



UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau
Washington, DC 20233-0001

2014 AMERICAN COMMUNITY SURVEY RESEARCH AND EVALUATION REPORT
MEMORANDUM SERIES ACS14-RER-22

MEMORANDUM FOR ACS Research and Evaluation Advisory Group

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Subject: Reducing Respondent Burden in the American Community
Survey's Computer Assisted Personal Visit Interviewing Operation
– Phase 1 Results (Part 2)

Attached is the final American Community Survey Research and Evaluation report on reducing burden on respondents in the Computer Assisted Personal Visit Interviewing (CAPI) data collection mode. This project includes three phases. Phase 1 summarizes the current workloads, costs, burden, and quality associated with CAPI. Phase 2 identifies a set of stopping rules that we will simulate in Phase 3. This is the second report from Phase 1. It includes detailed information about contact attempts, contacts, and respondent reluctance as measures of respondent burden. It also summarizes costs and quality of the current CAPI operation in terms of hours spent, interviews completed, and CAPI response rates.

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Attachment

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Reducing Respondent Burden in the American Community Survey's Computer Assisted Personal Visit Interviewing Operation – Phase 1 Results (Part 2)

FINAL REPORT

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American Community Survey Office & Center for Survey Measurement



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1. INTRODUCTION

This research project is an extension of work recently completed for the Computer Assisted Telephone Interviewing (CATI) operation (Griffin and Hughes 2013). The motivation for this research is twofold. Of primary importance is addressing criticism from external stakeholders and survey respondents about the burden associated with repeated contact attempts in the American Community Survey (ACS). In addition, rising costs associated with field data collection suggest the need to understand the value of multiple Computer Assisted Personal Visit Interviewing (CAPI) contact attempts in reducing survey error. We designed this research to (1) quantify the costs, burden, and quality associated with CAPI contact attempts and (2) identify possible interventions that might reduce respondent burden without a significant loss in data quality.

This research also aligns with efforts to baseline current operational performance and quality for future adaptive design projects. Some of the proposed interventions in this research reflect the use of adaptive designs.

This CAPI project includes three phases. The initial phase summarizes the current state of CAPI in the ACS based on 2012 CAPI operational data and paradata. This includes documentation of average monthly CAPI workloads, outcomes and reluctance reasons, contact attempt distributions, respondent burden estimates, cost estimates, and quality metrics. In the second phase, we used the Phase 1 summaries to identify potential changes to CAPI data collection rules that we could implement in production. Griffin (2014) summarizes Phase 2 results. In the third phase, we will use 2012 production data to estimate the effects of the proposed alternative rules on respondent burden, costs, and quality. Based on our findings, we will recommend specific changes to existing CAPI methods and procedures.

This report and Zelenak (2014) summarize national-level Phase 1 results. We plan to analyze and summarize subnational findings in future reports.

2. BACKGROUND

Survey sponsors and stakeholders commonly judge a survey by its response rate. Consequently, surveys invest time, resources, and increasing levels of effort in order to convert noninterviews. Recently, researchers have studied the relationship between increased response rates and reductions in nonresponse bias to improve our understanding of the value of increased levels of effort. Heerwegh et al. (2007) investigated the link between effort and nonresponse error on a key survey estimate in the Flemish Housing Survey. They found that collecting more data did not necessarily imply higher data quality. Similar research on extended interviewing and nonresponse bias suggest that these additional efforts may not reap the expected benefits (Lynn et al. 2002, Keeter et al. 2000, Curtin et al. 2000, Willis et al. 2013, and Groves & Peytcheva 2008).

The 2013 ACS uses four sequential modes of data collection – Internet, mail, telephone, and personal visit¹. Since the survey's start in 2005, the weighted survey response rate has been high – over 97 percent (U.S. Census Bureau 2013a). Regional office managers try to obtain as-high-as-possible response rates in this final mode. While ACS managers closely monitor these levels of response, they have paid less attention to the costs associated with maintaining these rates, the burden placed on respondents, or the

¹ Prior to 2013, the ACS used three sequential modes – mail, telephone, and personal visit. This research uses 2012 ACS data based on those three modes. See [Section 4.2.1](#) for our assessment of any limitations.

quality gains. The ACS has not demonstrated a critical link between level of effort and reductions in nonresponse bias. This research is the first step in defining the optimal level of effort that considers cost, burden, and quality.

3. RESEARCH QUESTIONS

This paper addresses the following research questions:

1. After CAPI subsampling, how many sample cases do we assign to CAPI each month? How does that workload break out by CATI history?
2. What is our best estimate of the total number of CAPI contact attempts each month and the mean number of CAPI contact attempts per sample case? How many sample cases required a single CAPI contact attempt versus 2, 3, etc.?
3. What is our best estimate of the distribution of various combinations of CAPI contact attempts by mode? What are the distributions of productive (contact made) versus nonproductive (noncontact) attempts?
4. How many of the CAPI sample cases showed any sign of reluctance in CAPI? How many of these “reluctant” cases did we continue to contact? How many additional contact attempts, on average, did we make to reluctant respondents?
5. What are typical monthly CAPI outcomes?
6. What are the distributions of total CAPI contact attempts by outcome? How many contact attempts were required, on average, by outcome?
7. How do research questions 2-6 vary by the case histories defined in research question 1?
8. What are the average monthly CAPI response rate and the estimated total survey response rate?
9. How many interviews result from the current CAPI methods each year?
10. How complete are CAPI interviews? How does this completeness vary by outcome, case history, and required number of contact attempts?
11. How much time (in minutes) did we spend to obtain a completed interview? How does this vary by number of contact attempts?
12. What are the total monthly costs of CAPI? What are reasonable per case costs for completed interview and per contact attempt?

4. METHODOLOGY AND LIMITATIONS

4.1 Methodology

4.1.1 Data Sources

We created a dataset consisting of the workloads from the January through December 2012 CAPI operations to estimate the average monthly workloads and outcome distributions in this report. This 12-month file included 689,105 sample addresses. We excluded CAPI sample cases where we received a late mail return prior to the start of CAPI data collection but included all other late mail returns that we received during the course of CAPI interviewing. The universe includes housing unit sample addresses in the United States and Puerto Rico but excludes those in Remote Alaska. This January through December CAPI universe differs from the January through December 2012 sample panels, which represent CAPI data collection in March 2012 through February 2013. Selected tables in this report use the 2012 sample panels rather than the 2012 CAPI universe. We clarify in the results section when the data come from this slightly different source.

Zelenak (2014) used a different set of CAPI interviews than those used for most of the tables in this report; specifically a 9-month dataset reflecting CAPI data collection in June 2011 through February 2012. This 9-month universe includes all occupied and sufficient partial occupied interviews. It excludes interviews for vacant units and interviews received during CAPI in the form of a respondent-completed mail return form (late mail returns). Some of the estimates in her report differ slightly from those in this report and they are likely due to the late mail return restriction in her dataset and the different data collection months.

We base most of the summaries in this report on paradata from the Contact History Instrument (CHI); specifically, contact attempt information and associated outcomes. We also use paradata from the CATI operation when describing contact histories and Cost and Response Management Network (CARMN) data to estimate time spent and costs.

4.1.2 Coding

As its name implies, our Field Representatives (FRs) use the CHI to record information after every contact they attempt in person or over the telephone. The CHI application automatically records the date and time of the entry (if the FR enters the application at the time of the contact), the case identification number, and the duration that the CHI application was open². The CHI prompts the FR to identify the mode (telephone or personal visit), with whom, if anyone, they made contact (sample household member, non-sample household member, or no contact), the outcome of the attempt (completed interview, partial interview, unable to conduct interview), as well as a reason when they do not make contact with the sample household.

When FRs do make contact with the sample household but are not able to conduct a complete interview on that attempt, FRs are prompted for a reason. These reasons include: (1) eligible person not available, (2) inconvenient time, (3) respondent is reluctant; (4) language problem; (5) health problem; and (6) other. The “respondent is reluctant” category is included in the catchall reluctance category described below.

The CHI also prompts the FR to identify any “concerns, behaviors or reluctance” expressed by the respondent during a contact attempt with a sample household regardless of the outcome of that contact. This reluctance item includes 21 “mark all that apply” verbal and nonverbal concerns and behaviors that may be expressed or exhibited during interviewer-respondent interactions as well as an “other-specify” and a “no concerns” category.

Based on previous research³, we organized the data from this item into four major reasons for reluctance: (1) gatekeeping, (2) time constraints, (3) survey content, and (4) strong reluctance. We also created a fifth catchall (“all other reasons”) category that includes an assortment of reluctance behaviors and expressions, specifically: (1) interim refusal; (2) “Respondent is Reluctant” coded response (mentioned

² The FR records the contact date and time when they enter the CHI instrument at a time other than the time of contact. Our analysis uses both sets of paradata to assign the best estimate of the date and time of the contact.

³ Maitland, Cordero and Kreuter’s (2008, 2009) research found factors similar to what Dahlhamer and Simile (2009) reported: time constraints, survey content/privacy, hostility/hard refusal, and gatekeeping. Erdman (2012) performed a series of factor analyses using the 23 respondent concerns within the CHI instrument and identified four factors (gatekeeping, time constraints, survey content, and strong reluctance), and a fifth factor (related to previous interviews) for longitudinal surveys.

above); and (3) the remaining reasons from the reluctance item not included in any of the four major groupings. We explain the coding details in [Appendix A](#).

Prior to analyzing any CHI data, we removed all “ghost records” from the dataset. Ghost records are contact attempt records without any information about the attempt that the case management program automatically generates when an FR restarts or salvages a case. They also occur when an FR opens the instrument to geocode the case, to ready it for transmission, or to look at a case. In this situation, we train the FR to select “just looking” on the first CHI question. Selecting this option immediately exits from the CHI and creates a ghost record.

The 12-month 2012 CHI dataset initially contained about 2.6 million contact attempt records. After purging ghost records, our final full dataset contained about 2.0 million contact attempt records for 689,105 total cases. We include details on the monthly distribution of ghost records in [Appendix B](#).

We identify a contact attempt as any of the following efforts made by the FR: (1) personal visit or telephone contact with sample household member(s); (2) personal visit or telephone contact with non-sample household member(s); and (3) personal visit or telephone noncontact. Noncontacts include:

- unsuccessful attempts to locate the sample housing unit;
- unsuccessful attempts to gain access to the sample housing unit, such as locked gate or buzzer entry;
- one or more observations of the housing unit from the FR’s automobile; and
- no one answering the door or telephone when the FR visits or calls.

4.1.3 Measuring Workloads and Contact Attempts

We estimated average monthly CAPI workloads as a simple mean of the CAPI sample in our 12-month sample universe. CATI outcome codes allowed us to distinguish between CAPI cases with some CATI history and cases entering CAPI without prior CATI contact attempts. Specifically, we classified every CAPI case by its CATI history into one of the following five groups:

- Not in CATI – Cases with no CATI history; these include cases that were unmailable and those that were mailable nonrespondents to the mail request without available phone numbers
- CATI (Invalid Numbers) – Cases sent to CATI and determined to have either a nonfunctioning or incorrect phone number
- CATI (Refusal) – Cases sent to CATI that were noninterviews due to refusal or hang-ups
- CATI (Reached Call Max) – Cases sent to CATI that were noninterviews because they reached the call max limit without a contact being made
- CATI (Other noninterview) – Cases sent to CATI that were noninterviews for reasons other than invalid number, refusal, or call max

We define the specific CATI codes used to assign cases to these five groups in [Appendix C](#). We did not weight any of these estimates, as they represent workloads, not population estimates.

We consider total contact attempts as a workload metric and a burden metric. We calculate contact attempts in several ways, tallying CHI records overall and at the case level. From these data, we produced mean and median estimates of contact attempts per case. Several measures focus on total contact

attempts, regardless of the type of attempt and its outcome. We used information from CHI to distinguish between types of contact attempts. We coded each contact attempt as:

- Contact with a sample household respondent – contact established by telephone or in-person with an adult living at the sample address
- Contact with a non-sample household member – contact established by telephone or in-person with someone living outside of the sample address (e.g., neighbor, resident manager)
- Noncontact – no contact made during this attempt (by phone or in-person)

We also calculate case-level estimates of total contact attempts after signs of reluctance in CAPI. We do this by identifying when the reluctance was first expressed (which contact attempt) and then examine the number of additional contact attempts the FR made on that case. We summarize distributions of contact attempts and calculate mean and median contacts per case. We refer to the recorded reasons for reluctance in CHI to identify contact attempts expressing some form of reluctance, using the five groupings mentioned in Section 4.1.2 (gatekeeping, time constraints, survey content, strong reluctance, other). These categories are not mutually exclusive, in that a respondent could express multiple reasons for reluctance within a single contact attempt or across multiple contact attempts. The exception is the catchall category, which was only included when no other reluctance reason was identified.

4.1.4 Measuring Outcomes

An additional set of tables summarize final CAPI outcomes. We used the CAPI outcome codes to create aggregate classifications. The primary groupings that we use in this report include:

- Completed Interview (Occupied) – 201
- Sufficient Partial Interview (Occupied) – 203, 204
- Completed Interview (Vacant or Temporarily Occupied) – 301, 501⁴
- Completed Interview (Late Mail Return) – 309
- Noninterview (Refusal) – 218
- Noninterview (No One Home or Temporarily Absent) – 216, 217
- Noninterview (All Other) – 213, 214, 219, 233
- Ineligible – 229, 240, 241, 243, 244, 245, 248, 253, 254, 255

In several tables, we chose to collapse these groupings to distinguish between interviews and noninterviews. When looking at respondent burden, we restricted the universe to cases with outcome codes identifying the sample units as occupied units (Completed interview – occupied, sufficient partial interview, late mail return, all noninterviews). These occupied sample addresses require gaining cooperation from a member of the sample household. Interviewers normally obtain information about vacant housing units from another source such as a building manager or realtor.

We used these outcome codes to calculate several rates using AAPOR definitions (AAPOR 2011). Specifically, we calculated:

⁴ In the ACS, temporarily occupied units have no residents that meet the survey’s residence rules and we classify them as vacant units.

$$\text{Response Rate (occupied units)}^5 = \frac{\text{Complete + sufficient partial Interviews (occupied units)}}{\text{Complete + sufficient partial Interviews + noninterviews (occupied units)}}$$

$$\text{Contact Rate}^6 = \frac{\text{Complete + sufficient partial Interviews + refusals + contact noninterviews (occupied units)}}{\text{All eligible occupied cases}}$$

$$\text{Cooperation Rate (occupied units)}^7 = \frac{\text{Complete + sufficient partial Interviews (occupied units)}}{\text{Complete + sufficient partial Interviews + refusals + contact noninterviews (occupied units)}}$$

$$\text{Refusal Rate (occupied units)}^8 = \frac{\text{Refusals (occupied units)}}{\text{All eligible occupied cases}}$$

4.1.5 Measuring Costs

In the ACS, as in other surveys, FRs report their data collection costs in terms of hours spent and mileage for each day. They do not associate specific mileage or hours with each contact attempt. In order to assess the effects of a truncated interviewing cycle, we needed a measure of the effort expended for each interview attempt.

Staff in the Survey Analytics area of the Center for Survey Measurement within the Census Bureau developed a methodology that used an ordinary least squares regression model to produce estimates of hours spent for each CAPI contact attempt (Lawrence et al forthcoming). They used CHI paradata and CARMN data on interviewing hours and mileage from the 2012 ACS, including Remote Alaska. For each interviewer-day, they calculated the number of personal visit attempts that were successful, the number of personal visit attempts that were unsuccessful, the number of successful and unsuccessful telephone attempts, and the number of miles driven. They split the personal visit attempts into these two categories because of the differential amount of time required for successful versus unsuccessful efforts. Because most telephone attempts are unsuccessful in obtaining an interview, they chose to collapse the telephone attempts. The model used miles driven as a proxy for time spent traveling. Analysts used these coefficients to predict the hours worked that day at a regional office level. Using the data from the model, this methodology assigned a number of hours worked to each type of attempt and, therefore, to each attempt within a day. As a final step, the estimation process ratio-adjusted the resulting predicted hours to control totals for the total number of hours worked. These data include interviews and noninterviews, occupied and vacant units, and cases ultimately determined to be ineligible for the survey.

Survey Analytics staff summarized these per contact attempt estimates for the 2012 ACS CAPI workload to estimate the total hours required to complete each ACS case. We used these estimates to approximate the total hours worked in the 2012 CAPI operation. Unlike the other 2012 production data, the cost data

⁵ RR2 from AAPOR (2011)

⁶ CON1 from AAPOR (2011)

⁷ COOP2 from AAPOR (2011)

⁸ REF1 from AAPOR (2011)

included interviewing in Remote Alaska so the final numbers are slightly higher than those used in other parts of this report.

This methodology is one of several ways to approximate per case costs. Unlike other estimates in this report, we chose to derive these cost estimates indirectly based on several assumptions. We believe that the methodology is reasonable for this baseline summary but hope to explore improvements in our Phase 3 analysis. Staff has developed several enhancements to this cost model that we did not reflect in these estimates.

4.1.6 Measuring Quality

In this report, the basic quality metrics include measures of total completed interviews, CAPI and survey response rates, and completeness scores. The number of completed interviews in CAPI comes from two sources. The primary measure comes from the official documentation of the ACS 2012 unweighted sample disposition counts (Cyffka 2013b). We also calculated the estimated number of completed interviews each month from our dataset based on the outcome codes defined in [Section 5.5](#). Similarly, CAPI and survey weighted response rates originate from the official 2012 housing unit response rate report (Cyffka 2013a). We also used our unweighted outcomes to approximate the CAPI response rate as the ratio of interviews (vacant and occupied completed interviews, sufficient partial interviews and late mail returns) to eligible addresses. In the report, we call this metric the “Percent Interviewed.”

In the ACS, we calculate an aggregate completeness score for every completed or partial interview. It is a simple ratio of the items with nonblank responses to the items requiring a response. The algorithm used to create these scores classifies entries such as “R” and “DK” for “refused” and “don’t know” as nonresponses. We summarize these scores as percentages; therefore, a value of 100 means that the respondent answered every item that they should have answered. We used these scores to summarize the overall completeness of data collected in CAPI. See U.S. Census Bureau (2013b) for additional information about completeness scores.

4.2 Limitations

4.2.1 Use of 2012 Data

We chose data from 2012 in order to work with final edited data and have a rich enough sample to look at subnational results. To validate that the 2012 results serve as a reasonable approximation of the current ACS (with an Internet response option and changes to the CATI call parameters) we compared distributions from the May and June 2012 and 2013 CHI records. From this comparison, we concluded that it was appropriate to use the 2012 results as a proxy for the current ACS. [Appendix D](#) includes the detailed results of that comparison.

4.2.2 Misreporting in CHI

If FRs fail to record contact attempts properly in CHI, the summaries in this report will understate or overstate the true number of contact attempts. Safir and Tan (2009) voiced this concern when mentioning that there is no mechanism in place that ensures every contact attempt is recorded by the FRs. While the CHI automatically launches upon exiting the survey instrument, the first CHI question offers FRs a quick exit from the CHI application (“just looking” response on the first item immediately exits from the CHI and creates a ghost record, discussed earlier). If the FR is not in the survey instrument when attempting contact, then the FR must manually access CHI using a function key. This requires thoughtful effort from the FR.

Other CHI reporting errors on reasons for reluctance, for example, may also occur as mentioned by Bates et al (2008). The recording of concerns in the CHI is subjective because FRs are apt to vary in their perceptions and recording of concerns. For example, FRs may forget concerns voiced at the doorstep before the start of an interview because the CAPI instrument launches the CHI application at the end of an interview. For other contacts, the doorstep interaction may be very brief and result in an interim refusal or scheduled callback. The details of these interactions should be readily accessible from memory and accurately recorded in the CHI; however, should the FR opt to record the CHI entry later, there is a possibility of memory decay and potential confounding with other contact attempts.

Recording of CHI entries for vacant housing units may have additional limitations. The distinction between contacts with a sample household member and a non-sample household member could be problematic for units that are vacant or temporarily occupied. FRs are also allowed to complete “interviews” for vacant units by observation. They are not allowed this option for occupied units.

Additionally, the Census Bureau designed the CHI to collect information at the household level, and information recorded in it may reflect contact with multiple household members. This feature becomes problematic, report Nelson and Coombs (forthcoming), when multiple household members voice different concerns and data analysts are not able to link specific concerns to individuals. It is unclear how this inability to link concerns to specific individuals affects the usefulness of the CHI for understanding contact attempts or response propensity. Partly to correct for this uncertainty, the Census Bureau has designed and is currently testing a person-level CHI instrument, or “p-CHI,” on the National Crime Victimization Survey and the National Health Interview Survey.

5. RESULTS

5.1 CAPI Workload by Case History

After CAPI subsampling, how many sample cases do we assign to CAPI each month? How does that workload break out by CATI history?

Table 1 summarizes a typical month’s CAPI workload by case history. We estimate that in 2012 we sent an average of 57,425 cases each month to CAPI. The majority of the CAPI workload (over 60 percent) was r mailable addresses that did not respond by mail and for which we did not have an available phone number to send to CATI and unmailable addresses (addresses that are incomplete for mailing and ineligible for matching to obtain phone numbers). We grouped these cases together and labelled them, “Not in CATI” throughout this report. If you add the cases that we sent to CATI that we later determined to have invalid phone numbers, this rate rises to about 87 percent. This means that most cases enter CAPI without CATI contacts.

Table 1. CAPI Workload by CATI History – 2012 ACS

CATI History	Average Monthly CAPI Workload	Percent of Total CAPI Workload
Not in CATI	34,592	60.2
CATI-Invalid Numbers	15,313	26.7
CATI-Refusal	2,744	4.8
CATI-Reached Call Max	2,981	5.2
CATI-Other Noninterview	1,796	3.1
TOTAL CAPI Workload	57,425	100.0

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

If we look more closely at the 13 percent of the CAPI workload with some CATI history, about 5 percent were addresses that we were able to contact in CATI but refused to participate. CATI reached a maximum number of calls before the first contact for another 5 percent and 3 percent were other forms of CATI noninterviews, such as language barriers. These results suggest that stopping rules based on CATI history would target a relatively low proportion of the CAPI workload.

5.2 CAPI Contact Attempts

What is our best estimate of the total number of CAPI contact attempts each month and the mean number of CAPI contact attempts per sample case? How many sample cases required a single CAPI contact attempt versus 2, 3, etc.?

We estimate that we make close to 2 million CAPI contact attempts each year, averaging about 164,000 total contact attempts each month to complete the 57,000 cases in a typical month's CAPI workload. This implies that we make an average of about 2.85 contact attempts per sample case. Sample cases include both interviews and noninterviews. Contact attempts include all forms of attempts, those attempted by phone or in-person and those resulting in a contact as well as noncontacts. We summarize distributions of contact attempts by type in [Section 5.3](#). Table 2 includes estimates of the average number of CAPI sample cases each month by the required number of contact attempts. It also displays the distribution (and cumulative distribution) of cases across contact attempts.

FRs resolve about 37 percent of the CAPI workload in a single CAPI contact attempt and an additional 25 percent on the second contact attempt implying that about 62 percent of all CAPI cases required one or two contact attempts. Table 2 indicates that FRs completed over 88 percent of the CAPI workload after five contact attempts meaning that only about 12 percent of the total CAPI workload required six or more contact attempts. Similarly, only about 3 percent of the workload required 10 or more contact attempts.

Table 2 also provides this information for occupied units only, eliminating the cases that FRs determined to be either vacant housing units or addresses that were ineligible for the survey (e.g., nonexistent units, commercial units, demolished units). This is a better measure of the contact attempts required to obtain a full interview with a household respondent. While the ACS collects data for vacant units, the amount of information is trivial and the source is usually a non-household member.

The total and occupied distributions are similar with about 30 percent of all occupied housing units interviewed on the first contact attempt, about 54 percent interviewed after one or two attempts and only about 4 percent requiring 10 or more contact attempts. FRs are more likely to identify vacant and ineligible addresses in the first few contact attempts. Table 2 indicates that a stopping rule based on a maximum number of attempts, such as 10, would affect only about 4 percent of the CAPI occupied cases. Such rules might eliminate the highest burdened cases but would have a minimal effect on the mean burden. These distributions give us a sense of the potential change in the response rates if we used a stopping rule that we based on total contact attempts.

Table 2. Distribution of CAPI Contact Attempts – 2012 ACS

Total CAPI Contact Attempts	All CAPI Cases			Occupied CAPI Cases		
	Average Cases Each Month	Percent of Total CAPI Workload	Cumulative Percent	Average Cases Each Month	Percent of Total CAPI Workload	Cumulative Percent
1	21,086	36.7	36.7	11,562	30.3	30.3
2	14,528	25.3	62.0	9,096	23.8	54.1
3	7,680	13.4	75.4	5,671	14.9	69.0
4	4,583	8.0	83.4	3,649	9.6	78.6
5	2,929	5.1	88.5	2,403	6.3	84.9
6	1,924	3.4	91.8	1,627	4.3	89.1
7	1,318	2.3	94.1	1,142	3.0	92.1
8	936	1.6	95.7	822	2.2	94.3
9	657	1.1	96.9	580	1.5	95.8
10	472	0.8	97.7	420	1.1	96.9
11	336	0.6	98.3	306	0.8	97.7
12	250	0.4	98.7	224	0.6	98.3
13	183	0.3	99.1	164	0.4	98.7
14	136	0.2	99.3	125	0.3	99.0
15	93	0.2	99.4	83	0.2	99.2
16	77	0.1	99.6	69	0.2	99.4
17	57	0.1	99.7	52	0.1	99.6
18	35	0.1	99.7	32	0.1	99.6
19	34	0.1	99.8	31	0.1	99.7
20 or more	114	0.2	100.0	104	0.3	100.0
TOTAL	57,425	100.0	100.0	38,163	100.0	100.0

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

5.3 Combinations of Contact Attempts

What is our best estimate of the distribution of various combinations of CAPI contact attempts by mode? What are the distributions of productive (contact made) versus nonproductive (noncontact) attempts?

Tables 3 - 5 distribute every CAPI case by the outcome of its contact attempts. The data set that we used for these tables differs slightly from previous tables because it reflects the CAPI data collection associated with the 2012 sample panels (i.e., the March 2012 through February 2013 CAPI operations). Each month FRs identify some sample addresses as ineligible for the survey (Type C's). The remaining 54,000 CAPI cases are eligible for CAPI interviewing (our study universe). These three tables partition occupied housing units from vacant housing units. Table 3 summarizes the distribution of the CAPI workload by the number of contact attempts that resulted in a contact with a sample household member (an adult living at the sample address). Unlike Table 2 that counts every contact attempt, Table 3 only tallies the contact attempts that resulted in a contact with a member of the sample household. In contrast, Table 4 distributes all CAPI cases by the number of contact attempts that resulted in a contact with a non-sample household member (e.g., a neighbor, realtor, resident manager). Table 5 distributes the CAPI workload by the number of contact attempts that were noncontacts (i.e., no contact with either a sample household member or a non-sample household member).

From Table 3 we see that about 5.5 percent of the occupied CAPI eligible cases never had any contact attempt successfully reach a sample household member. The remaining 94.5 percent had at least one contact attempt result in a contact with a member of the sample household. The majority of those cases (about 72 percent) only involved a single contact with the household member – either completing an interview or classifying as a noninterview. In a typical month, fewer than 1000 cases involve four or

more contacts with a sample household. Of the cases with one or more contacts with a household member, only about 9 percent involved three or more contacts with that household. Stopping rules to eliminate these outliers would reduce burden by not pursuing reluctant households with multiple contacts. These data suggest that we would affect a small number of households.

Table 3 displays similar statistics for CAPI cases determined to be vacant or temporarily occupied housing units. As expected, the distributions are very different. About 73 percent of all vacant units had no contact with a household member. Of the cases with at least one contact with a household member, over 92 percent involved only a single contact. These may be cases that were temporarily occupied by individuals that did not meet the ACS requirements to be residents for purposes of this survey.

Table 3. Distribution of CAPI Workload by Number of Contacts with Sample Household - 2012 ACS

Number of CAPI Contacts with Sample Household	Occupied Housing Units			Vacant Housing Units		
	Average Number of CAPI Cases Each Month	Percent of Total Eligible CAPI Cases	Percent of CAPI Cases with 1 or more Contacts	Average Number of CAPI Cases Each Month	Percent of Total Eligible CAPI Cases	Percent of CAPI Cases with 1 or more Contacts
Total eligible CAPI workload	38,524	100.0	---	15,561	100.0	---
No CAPI contacts with sample household	2,136	5.5		11,344	72.9	
1 or more CAPI contacts with sample household	36,388	94.5	100.0	4,218	27.1	100.0
1 CAPI contact	26,104	67.8	71.7	3,901	25.1	92.5
2 CAPI contacts	7,170	18.6	19.7	264	1.7	6.3
3 CAPI contacts	2,144	5.6	5.9	40	0.3	1.0
4 CAPI contacts	642	1.7	1.7	8	0.1	0.2
5 CAPI contacts	216	0.6	0.6	2	*	0.1
6 CAPI contacts	69	0.2	0.2	1	*	*
7 or more CAPI contacts	44	0.1	0.2	0	*	*

* Less than 0.05 percent

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

Table 4 focuses on the contact attempts that involve a non-sample household member. This table, and Table 5, tell us little about respondent burden but are very useful in understanding the efficiency of data collection efforts. The potential gains in efficiency (reduction in costs) that certain stopping rules may realize are important to note.

About 17 percent of all occupied CAPI cases have at least one contact with someone who is not a member of the sample household. For vacant units this rate is about 63 percent. Most cases that involve non-sample household members, involve a single contact (72 percent of occupied cases, 85 percent of vacant cases). Of the occupied cases involving contacts with a non-sample household member, about 10 percent required three or more contacts with a non-sample household member.

Table 4. Distribution of CAPI Workload by the Number of Contacts with a Non-Sample Household Member – 2012 ACS

Number of CAPI Contacts with Non-Sample Household Member	Occupied Housing Units			Vacant Housing Units		
	Average Number of CAPI Cases Each Month	Percent of Total Eligible CAPI Cases	Percent of CAPI Cases with 1 or more Contacts	Average Number of CAPI Cases Each Month	Percent of Total Eligible CAPI Cases	Percent of CAPI Cases with 1 or more Contacts
Total eligible CAPI workload	38,524	100.0	---	15,561	100.0	---
No CAPI contact with a non-sample household member	32,099	83.3	---	5,763	37.0	---
1 or more CAPI contacts with a non-sample household member	6,426	16.7	100.0	9,798	63.0	100.0
1 CAPI contact	4,614	12.0	71.8	8,303	53.4	84.7
2 CAPI contacts	1,163	3.0	18.1	1,116	7.2	11.4
3 CAPI contacts	378	1.0	5.9	250	1.6	2.6
4 CAPI contacts	143	0.4	2.2	78	0.5	0.8
5 CAPI contacts	67	0.2	1.0	29	0.2	0.3
6 CAPI contacts	30	0.1	0.5	12	0.1	0.1
7 or more CAPI contacts	32	0.1	0.5	9	0.1	0.1

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

The last of these three tables summarizes contact attempts in terms of noncontacts; specifically, the number of attempts that resulted in a noncontact. In Table 5, noncontact means that the FR was unable to make contact with either a sample household member or a non-sample household member. These would include a drive-by to see if anyone was home or an unanswered phone call.

Table 5. Distribution of CAPI Workload by Number of Noncontacts - 2012 ACS

Number of CAPI Contact Attempts that were Noncontacts	Occupied Housing Units			Vacant Housing Units		
	Average Number of CAPI Cases Each Month	Percent of Total Eligible CAPI Cases	Percent of CAPI Cases with 1 or more Noncontacts	Average Number of CAPI Cases Each Month	Percent of Total Eligible CAPI Cases	Percent of CAPI Cases with 1 or more Noncontacts
Total eligible CAPI workload	38,524	100.0	---	15,561	100.0	---
No noncontacts	16,169	42.0	---	7,060	45.4	---
1 or more noncontacts	22,355	58.0	100.0	8,501	54.6	100.0
1 CAPI noncontact	9,198	23.9	41.1	5,035	32.4	59.2
2 CAPI noncontacts	4,845	12.6	21.7	1,784	11.5	21.0
3 CAPI noncontacts	2,815	7.3	12.6	738	4.7	8.7
4 CAPI noncontacts	1,753	4.6	7.8	378	2.4	4.4
5 CAPI noncontacts	1,127	2.9	5.0	211	1.3	2.5
6 CAPI noncontacts	750	1.9	3.3	121	0.8	1.4
7 CAPI noncontacts	522	1.4	2.3	79	0.5	0.9
8 CAPI noncontacts	379	1.0	1.7	47	0.3	0.6
9 CAPI noncontacts	262	0.7	1.2	34	0.2	0.4
10 or more CAPI noncontacts	704	1.8	3.1	74	0.5	0.9

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

We find that about 58 percent of all occupied CAPI eligible cases involve at least one contact attempt that was a noncontact (the rate for vacant units is similar – about 55 percent). Here we see a longer “tail” with over 9 percent of occupied eligible cases involving 5 or more unsuccessful contact attempts (noncontacts) and nearly 2 percent involving 10 or more.

Of the occupied cases that involved at least one noncontact, about 41 percent involved a single noncontact. FRs are able to complete a higher proportion of vacant units after a single noncontact (59 percent).

The next set of tables looks at mode of contact attempt. Unlike earlier tables, Tables 6 and 7 reflect tallies of contact attempts, not cases. Table 6 is restricted to eligible, occupied housing units, Table 7 to eligible, vacant and eligible, temporarily occupied housing units. We included these tables to assess if stopping rules, based on mode of attempt, were worth consideration.

We estimate that CAPI makes about 156,000 total contact attempts every month to interview eligible sample households⁹. FRs make, on average, about 121,000 total personal visit contact attempts and about 35,000 total telephone contact attempts each month. About 78 percent of all contact attempts are in-person for occupied and vacant housing units.

Of the 123,000 contact attempts related to occupied units, about 51,000 (41.5 percent) involve contact with a sample household member, 9,000 (7.6 percent) involve contact with a non-sample household member, and 63,000 (51 percent) are noncontacts. In the pursuit of interviewing occupied units, about 11 percent of all contact attempts are telephone noncontacts and about 39 percent are personal visit noncontacts. An additional 8 percent involve contact with a non-sample household member (6 percentage points in person, 2 percentage points by phone). If we look at the success in making contacts with occupied housing units across modes, they are similar. About half of all contact attempts result in a noncontact, regardless of mode. It is interesting that telephone contact attempts have a similar rate of contact with non-sample household members as personal visit contact attempts (about 8 percent).

Table 6. Distribution of CAPI Contact Attempts by Mode and Type of Contact (Occupied Units Only) – 2012 ACS

Mode of CAPI Contact Attempt and Type of Contact	Average Number of CAPI Contact Attempts Each Month	Percent of Total CAPI Contact Attempts	Percent within Mode
Personal Visit CAPI Contact Attempts	95,747	77.6	100.0
- Contact with sample HH member	39,893	32.3	41.7
- Contact with non-sample HH member	7,173	5.8	7.5
- Noncontact	48,680	39.4	50.8
Telephone CAPI Contact Attempts	27,689	22.4	100.0
- Contact with sample HH member	11,382	9.2	41.1
- Contact with non-sample HH member	2,254	1.8	8.1
- Noncontact	14,052	11.4	50.8
TOTAL CAPI Contact Attempts	123,435	100.0	---
- Contact with sample HH member	51,275	41.5	---
- Contact with non-sample HH member	9,428	7.6	---
- Noncontact	62,733	50.8	---

HH = household

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

⁹ Section 5.2 states that each month we make an average of 164,000 contact attempts. That estimate includes about 8,000 attempts that we make each month to determine that a sample address is ineligible for the survey.

Table 7 shows that we make about 33,000 contact attempts each month to collect data for vacant and temporarily occupied housing units. As was true with occupied units, about 78 percent of those contact attempts are in-person and about 50 percent are unsuccessful attempts (noncontacts). Over 40 percent of all contact attempts for vacant housing units are in-person noncontacts. Over 52 percent of all personal visit contact attempts for vacant housing units are noncontacts.

Table 7. Distribution of CAPI Contact Attempts by Mode and Type of Contact (Vacant Units Only) - 2012 ACS

Mode of CAPI Contact Attempt and Type of Contact	Average Number of CAPI Contact Attempts Each Month	Percent of Total CAPI Contact Attempts	Percent within Mode
Personal Visit Contact Attempts	25,362	77.3	100.0
- Contact with sample HH member	2,655	8.1	10.5
- Contact with non-sample HH member	9,432	28.8	37.2
- Noncontact	13,275	40.5	52.3
Telephone Contact Attempts	7,433	22.7	100.0
- Contact with sample HH member	1,951	5.9	26.2
- Contact with non-sample HH member	2,459	7.5	33.1
- Noncontact	3,023	9.2	40.7
TOTAL CAPI Contact Attempts	32,795	100.0	
- Contact with sample HH member	4,606	14.0	
- Contact with non-sample HH member	11,891	36.3	
- Noncontact	16,298	49.7	

HH = household

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

Table 8 summarizes mode and contact outcome information by the contact attempt number (e.g., the first attempt versus the fifth attempt). The universe is restricted to occupied units. All cases have a first attempt, and over 96 percent of these initial attempts are in-person. More specifically, about 51 percent are personal visit noncontacts (about 1 percentage point of this ends up as interviews, likely as late mail returns), about 30 percent are personal visit contacts resulting in an interview and about 15 percent are contacts that are noninterviews. Less than 4 percent of first contact attempts are telephone attempts (less than 1 percent of telephone contacts result in an interview, about 2.5 percent are telephone noncontacts).

After the second attempt, the distributions change and become more similar with about 60 – 70 percent of the first 10 attempts in person and 30 – 40 percent by phone. It is possible that the FR obtained a phone number in an initial contact attempt, leading to a callback. The percentage of third and fourth contact attempts resulting in a phone interview rises from less than 1 percent of the attempts to almost 10 percent. With the exception of the “last” contact attempts, the proportion of contact attempts that are personal visit contacts (both interviews and noninterviews) decreases slightly over contact attempt number. Contact noninterviews are flat across attempt number, regardless of mode.

We can use these data to assess the potential value of stopping rules that limit contact attempts. While interview rates decrease as attempt numbers increase, we still see noteworthy noninterview conversions.

Table 8. CAPI Mode and Contact Outcome by Attempt Number (Occupied only) – 2012 ACS

CAPI Attempt Number	Personal Visit					Telephone					Total CAPI Attempts
	Contact with Sample HH		No contact with Sample HH			Contact with Sample HH		No contact with Sample HH			
	Int	NI	Int	NI	PV Total	Int	NI	Int	NI	Phone Total	
1	29.6	14.8	1.1	51.0	96.5	0.8	0.3	0.1	2.4	3.5	462,288
2	24.0	11.1	0.9	41.2	77.2	7.7	3.4	0.2	11.4	22.8	314,804
3	19.8	9.4	0.9	39.6	69.8	9.7	4.4	0.3	15.9	30.2	208,557
4	17.2	8.5	0.8	40.0	66.6	9.9	4.7	0.3	18.5	33.4	141,322
5	14.9	7.7	0.8	41.0	64.5	9.8	4.6	0.3	20.8	35.5	97,715
6	13.3	7.3	0.7	42.0	63.3	9.5	4.6	0.4	22.3	36.7	68,951
7	12.0	6.8	0.7	43.1	62.6	8.9	4.5	0.3	23.7	37.4	49,301
8	11.0	6.4	0.7	43.8	61.8	8.6	4.3	0.3	25.0	38.2	35,585
9	10.2	5.9	0.7	45.0	61.8	8.1	4.1	0.3	25.8	38.2	25,824
10	9.0	5.7	0.6	45.3	60.6	7.9	4.2	0.3	27.0	39.4	18,947
11	8.8	5.1	0.4	45.5	59.8	7.9	4.0	0.4	27.9	40.2	14,044
12	8.0	5.2	0.5	45.9	59.7	7.7	4.1	0.4	28.1	40.3	10,404
13	7.8	5.1	0.4	46.0	59.4	7.2	3.6	0.4	29.4	40.6	7,767
14	6.5	4.9	0.4	46.6	58.5	7.2	3.5	0.3	30.5	41.5	5,808
15+	5.3	3.9	0.4	45.6	55.2	5.5	3.1	0.4	35.8	44.8	19,906
TOTAL	21.6	10.7	0.9	44.3	77.6	6.3	2.9	0.2	13.0	22.4	1,481,223

HH = household

Int = interview

NI = noninterview

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

Tables 9 and 10 categorize each eligible occupied CAPI case by the pattern of its contact attempts. Table 9 displays the distribution of all occupied CAPI cases by mode and sequence of mode. There are many possible ways to summarize patterns. We started by looking at the cases that we resolved using only a single mode of attempt. About 67 percent of the eligible CAPI workload involves cases with only personal visit contact attempts. These cases include all cases that required only a single attempt as well as cases that involved multiple personal visit attempts without any attempts by phone. Only about 1 percent includes only phone attempts. Similarly, these include cases resolved with a single phone attempt and cases requiring multiple phone attempts without any attempts in person.

To look at the cases that involved both modes we examined the cases that started with a sequence of attempts in a single mode (personal visit or telephone). These might have been cases with a single personal visit attempt followed by a phone attempt or by a string of two or more personal visit attempts before a phone attempt. Similarly, we identified cases with a single phone attempt or a sequence of phone attempts before switching to personal visit efforts. To simplify our summary, we did not continue the possible branching by mode. Therefore, you should interpret these mode and sequence combinations as accounting for the first two sequences only. This means that, “2PV, then phone” includes cases with 2 PV attempts followed by one or more phone attempts and possibly additional personal visit attempts.

Of the cases that involve an in-person contact attempt first, nearly 70 percent involve only personal visit attempts. The remaining 30 percent start with personal visit attempts and follow up by phone. These cases may obtain a phone number during the personal visit attempt or the respondent might request a callback. Over 66 percent of the cases that start with a telephone contact attempt also have at least one

personal visit attempt. Only about a third of the cases that start with a telephone contact attempt only use the telephone mode.

We were curious about the distribution of various patterns of attempts to see if certain patterns might be most (or least) effective. We found that the use of telephone interviewing was rare, likely due to the unavailability of phone numbers. Rules based on mode therefore seem impractical to consider.

Table 9. Distribution of CAPI Cases by Mode and Sequence of Mode (Occupied only) - 2012 ACS

Mode and Sequence	Average Number of Cases Each Month	Percent of Total Eligible Cases	Percent within Mode
Personal Visit CAPI Contact Attempt First	37,158	96.5	100.0
- PV only	25,785	66.9	69.4
- PV, then Phone	11,374	29.5	30.6
1 PV, then Phone	5,637	14.6	15.2
2 PV, then Phone	2,816	7.3	7.6
3+ PV, then Phone	2,921	7.6	7.9
Telephone CAPI Contact Attempt First	1,366	3.5	100.0
- Phone only	459	1.2	33.6
- Phone, then PV	907	2.4	66.4
1 Phone, then PV	689	1.8	50.5
2 Phone, then PV	133	0.3	9.7
3+ Phone, then PV	85	0.2	6.2

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

Table 10 considers mode and number of attempts in each mode (regardless of sequence) to categorize the eligible occupied CAPI cases that FRs were able to resolve in seven or fewer contact attempts. This is about 92 percent of all occupied CAPI cases. Only about 28 percent of eligible occupied CAPI cases completed in seven or fewer contact attempts used a combination of phone and personal visit modes and about 40 percent of those cases had a single phone attempt after either one or two personal visit attempts. The three most common scenarios involve one, two, or three personal visits and account for almost 61 percent of all occupied cases. The next two most common scenarios include the combination of a single phone attempt and one and two personal visit attempts, adding another 11 percent.

Table 10. Distribution of CAPI Cases by Mode of Contact Attempts (Occupied only) - 2012

Number and Mode of CAPI Contact Attempts	Average Cases Each Month	Percent of Total Workload	Percent of Mode Workload
All CAPI contact attempts by Phone	455	1.3	100.0
1	322	0.9	70.7
2	76	0.2	16.6
3	29	0.1	6.5
4	15	*	3.3
5	7	*	1.5
6	4	*	0.9
7	2	*	0.5
All CAPI contact attempts in Person	25,121	70.6	100.0
1	11,969	33.7	47.6
2	6,502	18.3	25.9
3	3,167	8.9	12.6
4	1,670	4.7	6.6
5	927	2.6	3.7
6	544	1.5	2.2
7	343	1.0	1.4
Phone & personal visit CAPI attempts	9,982	28.1	100.0
2 - 1 PV, 1 Phone	2,276	6.4	22.8
3 - 2 PV, 1 Phone	1,702	4.8	17.0
4 - 3 PV, 1 Phone	1,020	2.9	10.2
3 - 1 PV, 2 Phone	705	2.0	7.1
4 - 2 PV, 2 Phone	635	1.8	6.4
5 - 4 PV, 1 Phone	592	1.7	5.9
5 - 3 PV, 2 Phone	417	1.2	4.2
6 - 5 PV, 1 Phone	354	1.0	3.5
5 - 2 PV, 3 Phone	313	0.9	3.1
4 - 1 PV, 3 Phone	294	0.8	2.9
6 - 4 PV, 2 Phone	264	0.7	2.6
6 - 3 PV, 3 Phone	230	0.6	2.3
7 - 6 PV, 1 Phone	211	0.6	2.1
7 - 5 PV, 2 Phone	170	0.5	1.7
All others combined	799	2.2	8.0
TOTAL eligible CAPI workload resolved in 7 or fewer contact attempts	35,559	100.0	---

* Less than 0.05 percent

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

5.4 CAPI Reluctance

How many of the CAPI sample cases showed any sign of reluctance in CAPI? How many of these “reluctant” cases did we continue to contact? How many additional contact attempts, on average, did we make to reluctant respondents?

To answer these questions we classified every CAPI case based on whether any contact attempt for that case had an outcome coded with either:

- a specific reluctance reason,
- an outcome of 218 (indicating an interim refusal), or
- an indication that the respondent was reluctant as a response in CHI to why the respondent didn’t complete the interview on that contact attempt.

Of the 689,105 cases in our 12-month sample, we focused on the 457,958 cases that were eligible, occupied housing units (interviews and noninterviews). We found that about 34 percent of these occupied

housing units had at least one contact attempt where the respondent expressed some form of reluctance. Table 11 summarizes the average number of occupied cases each month that express some form of reluctance to participate broken out by the specific reasons cited by the respondent – gatekeeping, time constraints, survey content, strong reluctance and all other reasons. See [Appendix A](#) for detailed explanations for each of these groupings. Given that a case can have multiple reasons for reluctance, these percentages will not sum to 100 percent.

The major reasons identified by respondents include time constraints and survey content. About half of all expressions of reluctance involve the survey’s content. About 8 percent of all occupied cases have at least one contact attempt coded as an expression of strong reluctance.

Table 11. CAPI Reluctance - 2012 ACS

Reluctance Status	Average Occupied Cases Each Month	Percent of Total Occupied Cases	Percent of Reluctant Cases
TOTAL occupied CAPI cases	38,163	100.0	---
NO reluctance expressed on any CAPI contact attempts	25,089	65.7	---
Reluctance expressed on at least one CAPI contact attempt	13,074	34.3	100.0
Gatekeeping	1,186	3.1	9.1
Time constraints	5,873	15.4	44.9
Survey content	6,570	17.2	50.3
Strong reluctance	3,087	8.1	23.6
Other	5,354	14.0	40.9

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

An indication of respondent reluctance does not mean that the contact attempt was unsuccessful. A respondent may express reluctance on a given contact attempt but nonetheless, complete the interview on that specific attempt. Table 12 looks at the incidence of repeated contact attempts after a respondent has expressed some sign of reluctance. As shown in Table 11, each month about 13,000 occupied sample cases express some form of reluctance during one or more of the attempted contacts. About 5,000 or 41 percent of these reluctant respondents comply with the interview request during that contact. Table 12 focuses on the cases that cannot be resolved at that contact – we call them reluctant noninterviews.

Table 12. Additional Contact Attempts after CAPI Reluctance - 2012 ACS

Additional Contact Attempts After CAPI Reluctance	Reluctant Noninterviews	Percent of Reluctant Noninterviews
0 CAPI attempts	437	5.6
1 CAPI attempt	2,870	37.1
2 CAPI attempts	1,536	19.8
3 CAPI attempts	949	12.3
4 CAPI attempts	621	8.0
5 or more CAPI attempts	1,328	17.2
TOTAL	7,740	100.0

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

We estimate that about 8,000 cases each month express reluctance and we cannot obtain an interview on that contact attempt. We do not attempt to recontact about 6 percent of these sample addresses. We attempt to recontact about 37 percent of these reluctant noninterviews one additional time and 20 percent two additional times. We attempt five or more contacts for about 17 percent of these reluctant

noninterviews. Stopping rules that involve reluctance reasons seem worth pursuing. Reluctant households that we continue to attempt to interview may feel especially burdened. The 17 percent that we make five or more attempts in CAPI to convert may be a group of households to eliminate in a stopping rule.

5.5 CAPI Outcomes

What are typical monthly CAPI outcomes?

Table 13 displays the final distribution of outcome codes for the 2012 study universe. Each month about 58.5 percent of the CAPI workload result in a completed or sufficient partial interview for an occupied housing unit. We obtain another 26.9 percent as completed interviews for vacant and temporarily occupied housing units. We receive an interview by mail (a late mail return) for about 3.4 percent. In 2012 CAPI, we were able to obtain an interview for about 89.0 percent of the CAPI workload.

Noninterviews account for about 4.5 percent of the CAPI workload with the greatest proportion due to respondent refusals (about 49 percent of all noninterviews) and noncontacts - no one home (about 24 percent of all noninterviews). Each month about 6.6 percent of the CAPI workload is determined to be ineligible for the survey (Type Cs). Table 13 details the reasons for these ineligible sample addresses. We obtained an interview for about 95.2 percent of the 2012 CAPI workload that we determined were eligible for CAPI. This is essentially an unweighted CAPI response rate.

Table 13. Distribution of CAPI Final Outcomes - 2012 ACS

CAPI Final Outcome	Average Cases Each Month	Percent of Total Workload	Percent of Eligible Workload
Completed Interview (occupied)	33,037	57.5	61.6
Completed Interview (vacant)	15,065	26.2	28.1
Completed Interview (temporarily occupied)	419	0.7	0.8
Sufficient Partial Interview (occupied)	589	1.0	1.1
Late mail return	1,977	3.4	3.7
INTERVIEW SUBTOTAL	51,087	89.0	95.2
Type A noninterview – language problem	28	0.0	0.0
Type A noninterview – unable to locate	43	0.1	0.1
Type A noninterview – no one home	651	1.1	1.2
Type A noninterview – residents temporarily absent	100	0.2	0.2
Type A noninterview – respondent refusal	1,256	2.2	2.3
Type A noninterview – all other reasons	481	0.8	0.9
Type B noninterview – unable to access	3	0.0	0.0
NONINTERVIEW SUBTOTAL	2,560	4.5	4.8
ELIGIBLE SUBTOTAL	53,647	93.4	100.0
Type C noninterview – under construction	90	0.2	--
Type C noninterview – demolished	515	0.9	--
Type C noninterview – house or trailer moved, empty mobile home site	652	1.1	--
Type C noninterview – permanent business or storage	488	0.8	--
Type C noninterview – merged with another unit	75	0.1	--
Type C noninterview –condemned	80	0.1	--
Type C noninterview – unit nonexistent or address nonexistent	684	1.2	--
Type C noninterview – Group Quarters	156	0.3	--
Type C noninterview – address or unit nonexistent	1039	1.8	--
INELIGIBLE SUBTOTAL	3,778	6.6	--
TOTAL CAPI workload	57,425	100.0	--

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

From these detailed outcome codes, we can calculate several important measures. Using the definitions included in the methodology section, we estimated the following rates for the eligible, occupied CAPI cases:

CAPI Response Rate (occupied units) = 93.4 percent

CAPI Cooperation rate (occupied units) = 95.3 percent

CAPI Refusal Rate (occupied units) = 3.3 percent

CAPI Contact Rate (occupied units) = 97.9 percent

5.6 Contact Attempts by CAPI Outcomes

What are the distributions of total CAPI contact attempts by outcome? How many contact attempts were required, on average, by outcome?

As noted earlier, only about 3 percent of the CAPI workload required 10 or more contact attempts. However, the contact attempt distributions are quite different by survey outcome. Table 14 summarizes the contact attempt distributions for major groupings of outcomes. This section provides important information about the ultimate success of CAPI efforts for various subgroups. We can use this information to identify potentially useful stopping rules.

Table 14. Distribution of Number of Contact Attempts by Final CAPI Outcome - 2012 ACS

CAPI Contact Attempts	Final CAPI Outcome (Percent of Total Outcomes)								TOTAL	Obs
	Comp Intw (occ)	Suff Partial Intw (occ)	Comp Intw (vac*)	Late Mail Return	Refusal	No One Home	All other Non-intws	Ineligible		
1	32.7	14.5	47.9	26.4	4.3	4.2	9.4	55.7	36.7	253,029
2	25.1	16.9	28.2	25.1	9.0	6.8	9.0	28.4	25.3	174,339
3	15.0	15.4	10.8	17.8	10.9	9.1	10.4	8.9	13.4	92,159
4	9.3	12.7	5.2	11.5	11.7	10.2	10.6	3.4	8.0	54,993
5	5.9	9.5	3.0	7.0	10.7	11.2	9.9	1.6	5.1	35,144
6	3.8	7.7	1.7	4.4	10.0	9.3	9.2	0.8	3.4	23,088
7	2.5	6.1	1.0	2.4	8.7	9.5	8.1	0.4	2.3	15,812
8	1.7	4.4	0.7	1.8	7.5	8.1	6.9	0.3	1.6	11,231
9	1.2	3.3	0.5	1.2	5.9	6.9	5.2	0.2	1.1	7,878
10+	2.8	9.4	1.1	2.3	21.3	24.8	21.2	0.3	3.1	21,432
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	689,105

Obs = Observations

*Includes temporarily occupied units

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

About 21 percent of the CAPI cases with a final outcome of refusal required 10 or more contact attempts. The rate was 25 percent for noncontacts and 21 percent for all other noninterviews. It makes sense that ineligible outcomes (cases determined to be demolished, commercial units, etc.) required fewer contact attempts. In fact, FRs completed nearly 56 percent of all cases that were ultimately determined to be ineligible for the survey (Type Cs) in a single contact attempt. Similarly, units determined to be vacant require, on average, fewer contact attempts to resolve. Nearly 48 percent are resolved on the first contact attempt. The vacant units that require more than three contact attempts are probably identifying a knowledgeable source to provide information about the detailed characteristics of the vacant housing unit.

The procedures require two sources of verification that a housing unit is vacant which also lead to multiple contact attempts. The distribution of late mail returns follows a very similar pattern to other interviews. The CAPI contacts may prompt completed CAPI interviews and returned mail questionnaires at a similar pace.

Table 15 displays the distribution of CAPI outcomes by the number of required contact attempts. As expected, cases that an FR completed after one or two contact attempts were usually interviews (occupied or vacant) or ineligible cases. The proportions of sufficient partial interviews and noninterviews increase as the number of contact attempts increase. It is important to note that cases requiring 10 or more contact attempts still have a high proportion of positive outcomes (about 56 percent are complete or sufficient partial occupied interviews and about 9 percent are complete vacant interviews). We see a steady flow of late mail returns throughout the full CAPI interview period. We also see that about 10 percent of the outcomes for cases with eight or more contact attempts were for complete vacant interviews. It often takes multiple visits to determine that a housing unit is vacant (versus no one being at home at a certain time) and the ACS collects detailed information about the housing unit’s characteristics, which require finding a knowledgeable source to provide this information.

Table 15. Distribution of Final CAPI Outcomes by Number of Required Contact Attempts – 2012 ACS

Final CAPI Outcome (Percent of Total Contact Attempt)									
CAPI Contact Attempts	Complete Interview (occ)	Sufficient Partial Interview (occ)	Complete Interview (vacant*)	Late Mail Return	Refusal	No One Home	All other Non-interviews	Ineligible	TOTAL
1	51.3	0.4	35.2	2.5	0.3	0.1	0.3	10.0	100.0
2	57.0	0.7	30.0	3.4	0.8	0.3	0.4	7.4	100.0
3	64.6	1.2	21.8	4.6	1.8	0.8	0.9	4.4	100.0
4	66.9	1.6	17.5	5.0	3.2	1.4	1.5	2.8	100.0
5	66.1	1.9	15.9	4.7	4.6	2.5	2.2	2.1	100.0
6	64.9	2.4	13.9	4.5	6.5	3.1	3.1	1.5	100.0
7	63.4	2.7	12.1	3.7	8.2	4.7	4.0	1.3	100.0
8	60.6	2.8	11.1	3.8	10.1	5.7	4.8	1.2	100.0
9	58.5	2.9	10.8	3.6	11.3	6.8	5.2	0.9	100.0
10+	52.7	3.1	9.1	2.6	15.0	9.0	7.8	0.7	100.0
TOTAL	57.5	1.0	27.0	3.4	2.2	1.1	1.1	6.6	100.0

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

*Includes temporarily occupied units

Table 16 summarizes the contact attempt data in terms of means, medians, and totals for the 12 months of CAPI data collection in 2012. The 396,000 complete interviews with occupied housing units required an average of about three contact attempts; the 7,000 sufficient partial interviews required close to five. FRs identify ineligible and vacant units quickly (mean of 1.77 contact attempts for ineligibles, 2.13 for vacant units). Noninterviews, especially noncontacts (no one home) required the greatest investment, averaging between six and seven contact attempts. Late mail returns are similar to occupied interviews.

Table 16. Contact Attempt Statistics by Final CAPI Outcome – 2012 ACS

CAPI Contact Attempts	Final CAPI Outcome								TOTAL
	Complete Interview (occ)	Sufficient Partial Interview (occ)	Complete Interview (vacant*)	Late Mail Return	Refusal	No One Home	All other Non-interviews	Ineligible	
Mean	2.95	4.72	2.13	3.09	6.82	7.25	6.60	1.77	2.85
Median	2	4	2	2	6	6	6	1	2
TOTAL	396,445	7,067	185,806	23,721	15,074	7,811	7,840	45,341	689,105

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload
 *Includes temporarily occupied units

Tables 17, 18, and 19 summarize the survey outcomes in terms of interview rates. We calculate interview rates as the ratio of all cases resulting in an occupied interview (occupied complete, late mail returns, occupied sufficient partials) to all eligible occupied cases. Table 17 displays interview rates by the number of contacts with a sample household member, the number of contacts with a non-household member, and the number of noncontacts (see Tables 3, 4, and 5 for distributions of these types of contacts). With the exception of the cell for 0 contacts with a household member, we see a clear decline in interview rate when FRs require more contacts with household members and non-household members. We also see declines in interview rates as the number of noncontacts increase. Cases with 10 or more noncontacts result in an interview about half of the time.

Table 17. Interview Rates by Number and Type of Contact (Occupied only) - 2012 ACS

Number of CAPI Contact Attempts of the Specified Type and Outcome	Interview Rate		
	CAPI Contacts with Sample household (%)	CAPI Contacts with non-sample household member (%)	CAPI NonContacts (%)
0	48.0	94.5	98.7
1	97.2	88.2	96.5
2	93.6	81.2	93.4
3	89.2	75.7	88.9
4	85.1	70.4	83.4
5	80.0	71.3	77.1
6	78.4	66.4	73.1
7	73.8	60.0	67.4
8	71.7	58.2	62.1
9	76.1	54.1	58.0
10 or more	72.9	47.2	50.5

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

Each of these tables allow us to understand the success of gaining interviews under certain scenarios and the potential value of designing a stopping rule driven by specific paradata. For example, Table 17 indicates that we interview about 73 percent of the occupied sample addresses that we contact 10 or more times. While, from a burden perspective, we should try to eliminate these types of cases, the interview rate tells us that we will lose interviews.

Table 18 includes the interview rates by the mode and sequence of mode. (For details, see Table 9.) We find consistently high interview rates across these breakdowns of contact attempts. Cases completed by phone only or personal visit only have similar interview rates of about 95 percent. Cases initially contacted by phone have similar interview success as those initially contacted in-person (92-93 percent.)

As the numbers of attempts increase, the interview rates decrease, regardless of mode and sequence. We do not see that certain patterns and modes lead to low success in obtaining completed interviews.

Table 18. Interview Rates by Mode and Sequence of Mode (Occupied only) - 2012 ACS

Mode and Sequence	Average Number of Cases Each Month	Interview Rate
Personal Visit CAPI Contact Attempt First	37,158	93.1
- PV only	25,785	94.5
- PV, then Phone	11,374	89.8
1 PV, then Phone	5,637	92.7
2 PV, then Phone	2,816	90.4
3+ PV, then Phone	2,921	83.5
Telephone CAPI Contact Attempt First	1,366	91.8
- Phone only	459	95.6
- Phone, then PV	907	89.9
1 Phone, then PV	689	90.6
2 Phone, then PV	133	88.6
3+ Phone, then PV	85	86.2

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

Table 19 shows, with minor exceptions, that interview rates are high across number and mode of contact attempts. This table provides interview rates for the data summarized in Table 10. As we would expect, some of the highest interview rates are associated with cases resolved in a single personal visit attempt (about 99 percent), a single phone call (about 97 percent) and two contact attempts -one in-person and the other by phone (about 98 percent). Again, the cases with higher numbers of contact attempts have the lowest interview rates.

Table 19. Percent Interviewed by Mode and Number of Contact Attempts (Occupied only) – 2012 ACS

Number and Mode of CAPI Contact Attempts	Average Cases Each Month	Interview Rate
All CAPI contact attempts by Phone	455	
1	322	96.9
2	76	94.9
3	29	90.6
4	15	94.0
5	7	85.4
6	4	86.0
7	2	69.2
All CAPI contact attempts in Person	25,121	
1	11,969	98.9
2	6,502	97.3
3	3,167	93.6
4	1,670	88.5
5	927	82.0
6	544	75.3
7	343	69.0
Phone & personal visit CAPI contact attempts	9,982	
2 - 1 PV, 1 Phone	2,276	98.1
3 - 2 PV, 1 Phone	1,702	96.9
4 - 3 PV, 1 Phone	1,020	93.9
3 - 1 PV, 2 Phone	705	96.6
4 - 2 PV, 2 Phone	635	95.0
5 - 4 PV, 1 Phone	592	89.8
5 - 3 PV, 2 Phone	417	91.9
6 - 5 PV, 1 Phone	354	84.8
5 - 2 PV, 3 Phone	313	93.5
4 - 1 PV, 3 Phone	294	95.7
6 - 4 PV, 2 Phone	264	87.9
6 - 3 PV, 3 Phone	230	89.3
7 - 6 PV, 1 Phone	211	79.2
7 - 5 PV, 2 Phone	170	80.1
TOTAL eligible CAPI workload resolved in 7 or fewer contact attempts	35,559	93.0

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

Table 20 summarizes the survey outcomes in terms of the percent interviewed by reluctance status. While FRs successfully complete interviews with occupied units at a rate of about 91.7 percent, the rate is about 86.3 percent for cases that expressed some form of reluctance during CAPI. Cases expressing strong reluctance have interview rates of about 70 percent. A stopping rule involving reluctance status will certainly result in lost interviews.

Table 20. Percent Interviewed by Reluctance Status – 2012 ACS

Reluctance Status	Average CAPI Cases Each Month	Percent Interviewed
TOTAL occupied CAPI cases	38,163	91.7
NO reluctance expressed on any CAPI contact attempt	25,089	94.6
Reluctance expressed on at least one CAPI contact attempt	13,074	86.3
Gatekeeping	1,186	82.5
Time constraints	5,873	86.5
Survey content	6,570	87.1
Strong reluctance	3,087	69.3
Other	5,354	75.6

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

5.7 Variation in Outcomes and Contact Attempts by Case History

How do research questions 2-6 vary by the case histories defined in research question 1?

When we look at the total contact attempts each month by CATI history, we do not see a lot of variability. We find slightly lower mean contact attempts (2.7) for cases that did not go through CATI (specifically, unmailable addresses that never received a mail or CATI contact and mailable cases without phone numbers). The CATI noninterviews had higher means, each averaging over 3. When we look at how quickly cases were resolved, we see that the cases that were not in CATI were more likely to be resolved on the first attempt (about 39 percent) than those that were noninterviews in CATI (about 30 percent). We also see that a larger proportion of the cases that were noninterviews in CATI required 10 or more contact attempts.

Table 21. Contact Attempts by CATI History – 2012 ACS

CATI History	Mean CAPI Contact Attempts	Median CAPI Contact Attempts	Percent of Cases with 10 or more CAPI Contact Attempts	Percent of Cases with 1 CAPI Contact Attempt	Obs
Not in CATI	2.72	2	2.7	38.7	34,592
CATI-Invalid Numbers	2.93	2	3.2	35.3	15,313
CATI-Refusal	3.15	2	3.9	31.4	2,744
CATI-Reached Call Max	3.38	2	5.1	29.8	2,981
CATI-Other Noninterview	3.24	2	4.5	30.7	1,796
TOTAL CAPI Workload	2.85	2	3.1	36.7	57,425

Obs = Observations

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

Reluctance status and type of reluctance also vary by CATI history. Table 22 summarizes respondent reluctance by case history. Note that this table includes all CAPI cases – occupied and vacant housing units as well as cases later determined to be ineligible for the survey. The overall percent of cases expressing reluctance (24.3 percent) is lower than the rate of 34.6 percent in Table 11 because Table 11 focused on eligible, occupied units. We see that cases that were CATI refusals and CATI other noninterviews were more likely to express reluctance in CAPI.

Table 22. Reluctance by CATI History – 2012 ACS

CATI History	Obs	No reluctance on any CAPI contact attempts	Reluctance on at least 1 CAPI contact attempt	Gate- keeping	Time	Content	Strong	Other
		Not in CATI	34,592	78.4	21.6	1.8	9.3	10.7
CATI-Invalid Numbers	15,313	75.3	24.7	2.2	11.4	11.8	5.4	9.8
CATI-Refusal	2,744	55.2	44.8	5.2	16.8	25.9	15.5	22.3
CATI-Reached Call Max	2,981	70.0	30.0	2.6	13.4	14.9	7.0	12.7
CATI-Other Noninterview	1,796	66.6	33.4	3.6	15.3	16.6	7.7	14.3
TOTAL CAPI Workload	57,425	75.7	24.3	2.1	10.6	12.1	5.7	10.1

Obs = Observations

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

While Table 13 provided an overall summary of the distribution of CAPI outcomes, Table 23 summarizes final CAPI outcomes by CATI history. We see that addresses that did not go through CATI are much more likely to be ineligible (8.7 percent). Refusals are higher for the cases that were in CATI, especially CATI refusals but the rates are not dramatically higher – FRs are successful in obtaining interviews for cases that were CATI noninterviews. Given the high CAPI outcome of refusal for CATI refusals, a stopping rule that treats CATI refusals differently from other CATI histories may be useful to study.

Table 23. Final CAPI Outcomes by CATI History – 2012 ACS

CATI History	Final CAPI Outcome (Percent)							
	Complete and Sufficient Partial Interviews (occ)	Complete Interview (vacant*)	Late Mail Return	Refusal	No One Home	All other Non- interviews	Ineligible	TOTAL
	Not in CATI	54.4	29.9	3.1	1.8	1.1	1.1	8.7
CATI-Invalid Numbers	62.9	25.7	3.1	2.0	1.1	1.1	4.1	100.0
CATI-Refusal	73.9	9.6	5.3	6.8	1.2	1.7	1.4	100.0
CATI-Call Max	64.1	21.7	6.1	3.1	1.6	1.4	1.9	100.0
CATI-Other Nonintw	68.2	16.3	6.2	3.2	1.3	1.7	3.1	100.0
TOTAL CAPI	58.6	27.0	3.4	2.2	1.1	1.1	6.6	100.0

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

*Includes temporarily occupied units

Table 24 summarizes the mean and median contact attempts by final CAPI outcomes and CATI history. We do not see a lot of variability in these measures within CAPI outcome. For example, complete and sufficient partial interviews for occupied units required an average of 2.9 contact attempts if they were not eligible for CATI. The mean rises to 3.3 if the case went to CATI and reached a call max. FRs made fewer contact attempts for CAPI refusals that were also CATI refusals which makes sense as FRs may have been instructed to stop sooner for these non-cooperative households. We see the highest mean for those cases with a final CAPI outcome of “no one home” and within this final CAPI disposition for those cases that had reached a call max in CATI (8.33).

Table 24. Contact Attempts and Final CAPI Outcomes by CATI History – 2012 ACS

CATI History	Final CAPI Outcome						
	Complete and Sufficient Partial Interviews (occupied)	Complete Interview (vacant*)	Late Mail Return	Refusal	No One Home	All other Non-interviews	Ineligible
Not in CATI	225,909	124,222	12,727	7,303	4,504	4,448	35,991
Mean	2.93	2.07	3.05	6.90	7.12	6.35	1.74
Median	2	2	2	6	6	5	1
CATI-Invalid Numbers	115,637	47,139	5,712	3,747	2,063	1,944	7,513
Mean	3.01	2.19	3.17	7.13	7.23	6.80	1.84
Median	2	2	3	6	6	6	1
CATI-Refusal	24,338	3,153	1,759	2,228	399	574	476
Mean	2.93	2.40	2.86	5.55	6.86	6.56	2.01
Median	2	2	2	5	6	6	1
CATI-Call Max	22,931	7,777	2,186	1,109	567	503	694
Mean	3.30	2.49	3.36	7.60	8.33	7.73	2.00
Median	2	2	3	6	7	7	2
CATI-Other Nonintw	14,697	3,515	1,337	687	278	371	667
Mean	3.14	2.42	3.05	7.04	7.81	7.10	2.03
Median	2	2	2	6	7	6	2

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

*Includes temporarily occupied units

5.8 Response Rates

What are the average monthly CAPI response rate and the estimated total survey response rate?

The Census Bureau calculates official response rates for the ACS for each mode of data collection and for the survey overall. Cyffka, K. (2013a) documents the 2012 ACS response rates. Table 25 displays the CAPI and survey response rates for each of the 12 monthly panels. The CAPI and overall response rates are very consistent across panel. The 2012 CAPI response rate was 94.1 percent; the overall survey response rate was 97.4 percent. Based on the final CAPI outcomes reported in Table 13, we estimate an unweighted CAPI response rate for our 12-month dataset of 95.2 percent.

Table 25. CAPI and Survey Response Rates - 2012 ACS

	CAPI Response Rate	Survey Response Rate
2012-01	94.9	97.8
2012-02	94.7	97.9
2012-03	94.3	97.6
2012-04	94.5	97.6
2012-05	94.3	97.5
2012-06	94.1	97.4
2012-07	93.8	97.2
2012-08	94.6	97.6
2012-09	93.8	97.2
2012-10	93.0	96.9
2012-11	93.9	97.2
2012-12	93.1	97.0
2012	94.1	97.4

Source: Cyffka, K, 2013a

5.9 Completed Interviews

How many interviews result from the current CAPI methods each year?

We interviewed approximately 2.4 million addresses in 2012. Table 26 breaks these interviews out by mode. In the U.S., we obtained about 25 percent of all completed interviews in CAPI. The rate in Puerto Rico is much higher, about 66 percent. We estimate that in the U.S. and Puerto Rico combined, we obtain about 200,000 completed interviews each month with about 50,000 coming from CAPI. In Table 13, we estimated an average of 51,087 completed CAPI interviews each month.

Table 26. Completed Interviews by Mode of Data Collection - 2012 ACS

Mode	Number of Interviews in 2012	Average Number of Interviews Each Month	Percent of Total Interviews
United States			
Mail	1,571,632	130,969	66.1
CATI	217,576	18,131	9.2
CAPI	588,114	49,010	24.7
TOTAL	2,377,322	198,110	100.0
Puerto Rico			
Mail	7,033	586	30.9
CATI	688	57	3.0
CAPI	15,031	1,253	66.1
TOTAL	22,752	1,896	100.0
United States & Puerto Rico			
Mail	1,578,665	131,555	65.8
CATI	218,264	18,189	9.1
CAPI	603,145	50,262	25.1
TOTAL	2,400,074	200,006	100.0

Source: Cyffka, K, 2013b

5.10 Completeness of Responses

How complete are CAPI interviews? How does this completeness vary by outcome, case history, and required number of contact attempts?

In the ACS, we calculate an aggregate completeness score for every completed interview. It is a simple ratio of the number of items with nonblank responses to the total number of items requiring a response. We summarize these scores as percentages so a value of 100 means that the respondent answered every item that they should have answered. Tables 27 and 28 summarize completeness scores using the 2012 sample panels (the March 2012 through February 2013 ACS CAPI workloads). This universe includes all occupied and sufficient partial occupied interviews. It excludes interviews for vacant units.

We analyzed these results overall and by final CAPI outcome, splitting out the cases that were complete interviews (cases where interviewers were able to ask every question) versus sufficient partial interviews (cases that reached a certain point in the interview but broke off). In 2012, about 1.0 percent of all CAPI occupied interviews were sufficient partials (see Table 13). In this completeness score data set, about 1.7 percent of all occupied interviews were sufficient partials.

When we study the completeness of all CAPI interviews, we find that, on average, FRs were able to obtain about 88 percent of all required responses. Complete interviews had a mean completeness score of 89.3 (median of 91.5) while sufficient partials had a much lower mean score of 36.2 (median of 32.2). Late mail returns had a mean of 84.5 (median of 90.8). The low proportion of sufficient partials among all occupied interviews means that the scores for the total universe are very similar to the scores for completed interviews.

Tables 27 and 28 summarize information on completeness by case history (CATI history) and number of contact attempts. The completeness of CAPI interviews does not vary notably by case history. The completeness of responses suffers slightly when less cooperative respondents are pushed to respond, but the loss is not that great. CATI refusals that CAPI FRs eventually interview have a slightly lower score at about 85. Median scores are very similar. This is likely due to the insufficient partial interviews that may be associated with CATI refusals. Their significantly lower scores could lower the mean without having much of an effect on the median. The median completeness scores are very consistent across the required number of CAPI contact attempts; the mean scores drop slightly from a high of 89.0 for cases resolved in one contact attempt to a low of 85.5 for those cases needing 10 or more contact attempts. These data do not suggest that stopping rules based on contact attempts or CATI history would eliminate large numbers of incomplete cases.

Table 27. Completeness of Responses by CATI History – 2011/2012 ACS

CATI History	Mean Completeness Score	Median Completeness Score	Total CAPI Cases
Not in CATI	88.4	91.5	239,678
CATI- Refusal	85.2	90.7	26,589
CATI-Reached Call Max	87.3	91.4	25,468
CATI-Other Noninterview or Invalid Number	88.4	91.5	138,233
TOTAL CAPI Workload	88.2	91.5	429,968

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

Table 28. Completeness of Responses by Contact Attempts – 2011/2012 ACS

Total CAPI Contact Attempts	Mean Completeness Score	Median Completeness Score	Total CAPI Cases
1	89.0	91.5	145,884
2	88.5	91.5	103,612
3	88.0	91.5	63,815
4	87.6	91.5	39,965
5	87.2	91.4	25,258
6	86.7	91.4	16,440
7	86.5	91.3	10,795
8	86.1	91.4	7,323
9	85.6	91.3	4,975
10 or more	85.5	91.3	11,901
TOTAL	88.2	91.5	429,968

Source: March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

5.11 Costs - Time Required

How much time (in minutes) did we spend to obtain a completed interview? How does this vary by number of contact attempts?

We estimated the time associated with each contact attempt using the basic methodology described in [Section 4.1.5](#). To produce the estimates in Table 29 we aggregated all of the contact attempt-level estimates for a case to produce case-level estimates. The time included in these estimates accounts for travel time, contact attempt time, and interviewing time. We organized all cases by the total number of contact attempts that FRs made, summing case-level estimates within each “number of attempts” category. The average minutes per case is the ratio of the total estimated time for all cases within each category to the total number of cases in that category.

As expected, the average minutes per case for the full CAPI workload (134) is approximately 2.2 hours, the average amount that each regional office is authorized to spend. Cases requiring a single contact attempt require about an hour (59 minutes). Cases requiring a second contact attempt require, on average, a total of 103 minutes, or about 44 additional minutes. In general, each additional required contact attempt adds about 45 minutes.

Table 29 also displays the distribution of the workload by required contact attempt to show that only a small proportion of cases require the high minutes per case. Only about 17 percent of the 2012 CAPI workload required 5 or more contact attempts, the most expensive and time-consuming cases.

Table 29. Estimated Time Required by Contact Attempt – 2012 ACS

Number of CAPI Contact Attempts	Average Monthly Number of CAPI Cases	Percent of CAPI Workload	Estimated Minutes Per Case
1	21,034	36.7	59
2	14,518	25.3	103
3	7,685	13.4	147
4	4,586	8.0	191
5	2,934	5.1	233
6	1,931	3.4	277
7	1,328	2.3	321
8	943	1.6	359
9	661	1.1	400
10 or more	1,813	3.1	406
TOTAL	57,433	100.0	134

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

5.12 Per Case Costs

What are the total monthly costs of CAPI? What are reasonable per case costs for completed interview and per contact attempt?

For this research question we chose to discuss costs in terms of hours spent. We estimate that in 2012 we spent about 1.5 million total hours in CAPI conducting close to 2 million total contact attempts. This suggests that a monthly workload of about 57,000 cases included about 164,000 contact attempts and required about 129,000 hours. Table 30 summarizes the estimated monthly hours worked, the estimated monthly CAPI workloads, the associated monthly average number of contact attempts, and the average

number of CAPI interviews each month. From these results, we calculated several ratios and converted fractional hours to minutes. Specifically:

- Minutes per CAPI case – ratio of total CAPI hours to total CAPI workload
- Minutes per CAPI contact attempt – ratio of total CAPI hours to total CAPI contact attempts
- Minutes per CAPI Interview – ratio of total CAPI hours to total CAPI interviews

. We estimated an average of 134 minutes (or 2.2 hours) per CAPI case (the rate authorized for each regional office to spend). We also estimate that each contact attempt costs about 47 minutes.

Table 30. Per Case Costs – 2012 ACS¹⁰

Measure	Monthly Estimate
Estimated Total CAPI Hours	128,682
Total CAPI Contact Attempts	164,082
Total CAPI Workload	57,433
Total CAPI Interviews	50,262
Estimated Minutes Per CAPI Case	134.4
Estimated Minutes Per CAPI Contact Attempt	47.1
Estimated Minutes Per CAPI Interview	153.6

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

We also looked at costs per case based on the number of contact attempts. Table 31 displays the distribution of the CAPI workload by the number of contact attempts and the associated hours spent. We estimate that about 21,034 CAPI cases each month are resolved in a single contact attempt. These cases involve a total of 20,535 hours implying these cases require about an hour. In contrast, we spent about 12,264 hours for the 1,813 cases that needed 10 or more contact attempts. These cases required about 6.8 hours per case.

Table 31. Per Case Costs by Number of CAPI Contact Attempts – 2012 ACS

Total CAPI Contact Attempts	Average Monthly Number of CAPI Cases	Average Monthly Hours Spent	Estimated Hours Per Case
1	21,034	20,535	1.0
2	14,518	24,982	1.7
3	7,685	18,838	2.5
4	4,586	14,603	3.2
5	2,934	11,404	3.9
6	1,931	8,900	4.6
7	1,328	7,111	5.4
8	943	5,634	6.0
9	661	4,411	6.7
10 or more	1,813	12,264	6.8

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

¹⁰ Unlike previous tables, this table includes costs and attempts associated with Remote Alaska.

6. CONCLUSION

This report provides a baseline set of workload, burden, cost, and quality measures. Table 32 summarizes some of the key results. We will use these measures as benchmarks when we compare the expected workloads, burden, costs and quality associated with a CAPI operation with alternative stopping rules. The summaries included in many of these tables (frequencies, outcomes) are valuable tools in designing possible stopping rules. The frequencies provide a general sense of scale while the outcomes speak to the potential loss in interviews.

Table 32. Summary CAPI Metrics - 2012 ACS

Measure	Average Monthly Estimate	Percent
Total CAPI Workload¹¹	57,425	100.0
Total CAPI Interviews	51,087	89.0
- Occupied	35,603	62.0
- Vacant	15,484	27.0
Total Eligible CAPI Workload	53,647	93.4
CAPI Response Rate (unweighted)		95.2
Total CAPI Contact Attempts (CAPI-eligible cases)¹²	156,230	100.0
- By Phone	35,121	22.5
- In Person	121,109	77.5
- Total Contacts with HH Respondent	55,881	35.8
- Total Noncontacts	79,030	50.6
Total occupied sample addresses (interviews & noninterviews)¹³	38,163	100.0
Total Expressing Reluctance	13,074	34.3

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload; March 2012 through February 2013 American Community Survey Computer Assisted Personal Interviewing Workloads

7. ACKNOWLEDGEMENTS

In addition to CHI analysis by Dawn Nelson, this report includes a set of CHI summaries of contact attempts by mode and analysis of completeness scores produced by Eric Slud and Chandra Erdman. Tammy Adams provided summaries of cost and time data allowing us to estimate per contact attempt costs. The report benefitted greatly from the comments received from Todd Hughes, Mary Frances Zelenak, Barbara O’Hare, Eric Slud, Gina Walejko, Pad Murphy, Fern Bradshaw, Tony Tersine, and Beth Tyszka.

¹¹ From Tables 1 and 13

¹² From Tables 6 and 7

¹³ From Table 11

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CODING OF RESPONDENT RELUCTANCE

1. Reluctance Reasons on RSPNDENT CHI Screen

When the FR makes contact with sample unit member or nonsample unit member:

• CONCERN / BEHAVIOR / RELUCTANCE

• Select the categories that describe respondent concerns, behaviors, or reluctance during this contact attempt.
 • Enter all that apply, separate with commas.

1. Not interested / Does not want to be bothered
 2. Too busy
 3. Interview takes too much time
 4. Breaks appointments (puts off FR indefinitely)
 5. Scheduling difficulties
 6. Survey is voluntary
 7. Privacy concerns
 8. Anti-government concerns
 9. Does not understand survey / Asks questions about the survey
 10. Survey content does not apply (retired, healthy, no crimes to report)
 11. Hang-up / slams door on FR
 12. Hostile or threatens FR
 13. Other household members tell respondent not to participate
 14. Talk only to specific household member
 15. Family issues
 16. Respondent requests same FR as last time
 17. Gave that information last time
 18. Asked too many personal questions last time
 19. Too many interviews
 20. Last interview took too long
 21. Intends to quit survey
 22. No concerns
 23. Other - specify

Concern/Behavior/Reluctance

Reluctance Reason Group	Code	Description
Time Constraints	R02	Too busy
	R03	Interview takes too much time
	R04	Breaks appointments (puts off FR indefinitely)
	R05	Scheduling difficulties
Survey Content	R06	Survey is voluntary
	R07	Privacy concerns
	R08	Anti-government concerns
	R09	Does not understand survey / Asks questions about the survey
	R10	Survey content does not apply (retired, healthy, no crimes to report)
Gatekeeping	R13	Other household members tell respondent not to participate
	R14	Talk only to specific household member
	R15	Family issues
Strong Reluctance	R01	Not interested / Does not want to be bothered
	R11	Hang-up / slams door on FR
	R12	Hostile or threatens FR
	R21	Intends to quit survey
Other¹⁴	R17	Gave that information last time
	R18	Asked too many personal questions last time
	R19	Too many interviews
	R20	Last interview took too long
	R23	Other - specify

¹⁴ Cases coded with reason R16 (respondent requests same FR as last time) were not included in any reluctance tabulations. This reason code applies only to longitudinal surveys and we assume this is a CHI entry error.

2. "Respondent is Reluctant" on NONINTER CHI Screen

When the FR makes contact with a sample unit member but the FR was not able to complete the interview on that contact attempt:

The screenshot shows a software window titled "Contact History Instrument v6.3.1 - 04/29/2010". The menu bar includes "Forms", "Answer", "Navigate", "Options", and "Help". The main content area is titled "CHI" and contains the following text:

- ♦ **PARTIAL INTERVIEW OR UNABLE TO CONDUCT INTERVIEW**
- ♦ Select the categories that describe why you were not able to conduct or complete the interview during this contact attempt.
- ♦ Enter all that apply, separate with commas.

Below this text is a list of eight checkboxes:

- 1. Eligible person not available
- 2. Inconvenient time
- 3. Respondent is reluctant
- 4. Language problem - specify
- 5. Health problem
- 6. Specify who you talked with
- 7. Successful paper questionnaire placement/pick-up
- 8. Other - specify

At the bottom of the window, there is a label "Partial/Unable to Conduct" followed by a text input field.

When the FR is not able to make contact with a sample household member

The screenshot shows a software window titled "Contact History Instrument v5.9.1 Created 09/13/2005". The menu bar includes "Forms", "Answer", "Navigate", "Options", and "Help". The main content area is titled "CHI" and contains the following text:

- ♦ **NONCONTACT / PERSONAL VISIT**
- ♦ Select the categories that describe this personal visit noncontact.
- ♦ Enter all that apply, separate with commas.

Below this text is a list of fourteen checkboxes:

- 1. No one home
- 2. No one home -- appointment broken
- 3. No one home -- previous note / letter taken
- 4. Household does not answer door -- evidence someone is home
- 5. Drive-by
- 6. Multiple drive-bys - specify
- 7. Unable to reach / locked gate / buzzer entry
- 8. Address does not exist/unable to locate
- 9. On vacation, away from home / at second home
- 10. Spoke with neighbor
- 11. Building management / doorman contact
- 12. Completed case (Type B or C)
- 13. Sample respondent moved - specify
- 14. Other - specify

At the bottom of the window, there is a label "Noncontact Personal Visit" followed by a text input field.

GHOST RECORDS¹⁵

Monthly Distribution of Ghost Records

2012 CAPI	All Contact Attempts	Total Ghost Records	Percent Ghost Records	Total Number of Non-Ghost Contact Attempts	Total Number of Cases from Non-Ghost Contact Attempts
Jan	219,328	58,168	26.5%	161,160	57,633
Feb	219,079	57,013	26.0%	162,066	57,378
Mar	215,005	57,578	26.8%	157,427	55,773
Apr	210,710	54,348	25.8%	156,362	55,905
May	211,986	53,353	25.2%	158,633	56,443
June	215,475	52,698	24.5%	162,777	57,104
July	221,440	53,761	24.3%	167,679	57,883
Aug	220,427	52,850	24.0%	167,577	57,728
Sept	220,270	56,261	25.5%	164,009	57,770
Oct	222,510	53,427	24.0%	169,083	58,189
Nov	221,091	51,628	23.4%	169,463	58,541
Dec	220,645	52,934	24.0%	167,711	58,758
TOTAL	2,617,966	654,019	25.0%	1,963,947	689,105

Source: January – December 2012 American Community Survey Computer Assisted Personal Interviewing Workload

¹⁵ Ghost records are contact attempt records without any information about the attempt that the case management program automatically generates when an FR restarts or salvages a case. See [Section 4.1.2](#) for details.

CATI OUTCOME CODES USED TO DEFINE CATI HISTORY

CATI History	Code	Final CATI Outcome
Not in CATI	missing	No CATI outcomes
CATI-Invalid Numbers	195	Never contacted – unconfirmed number
CATI-Refusal	179	Hostile breakoff
	181	Refusal (includes 2 or more hang-ups)
	182	Hard Refusal
CATI-Reached Call Max	183	Exceeded unproductive call maximum
CATI-Other Noninterview	13	Respondent claims will file
	17	Data reported under another case
	20	Sample unit ineligible – out of scope
	21	Sample unit eligible but unavailable through closeout
	22	Sample unit not found/unreached – eligibility uncertain
	24	Unconverted language problem
	25	Unconverted hearing problem
	26	In scope but data unavailable
	174	Mail form received
	188	Insufficient partial interview
	193	Privacy detector
199	Never tried	

APPENDIX D

RESULTS OF COMPARING 2012 AND 2013 CHI RECORDS - MAY/JUNE

Table 1 summarizes key statistics and distributions about outcomes, contact attempts, and reluctance based on the May and June CAPI operations in 2012 and 2013. Despite the changes to the CATI call parameters in 2013, the 2012 and 2013 CAPI outcomes and contact attempt information are very similar.

Table 1. CHI outcomes and contact attempts – 2012 versus 2013

	2012	2013
CAPI Workload	113,547	116,519
INTERVIEW OUTCOMES		
Outcomes (%)		
201 – Complete (occupied)	57.6	57.0
216 – No One Home	1.2	1.2
218 – Refusal	2.1	2.5
301 – Complete (Vacant)	26.3	26.3
309 – Late mail return	3.6	3.0
CONTACT ATTEMPTS		
Mean Contact Attempts	2.83	2.83
Required Contact Attempts (%)		
1	37.1	36.6
2	25.4	25.3
3	13.2	13.4
4	7.8	8.0
5	5.0	5.2
In-Person Contact Attempts (%)	77.8	77.5
Contact Status (%)		
Contact with Sample Household	35.7	35.2
Contact with non-sample household member	14.9	15.8
Noncontact	49.7	49.1
Type of Contact (%)		
Complete Interview	24.4	24.0
Partial Interview	1.1	1.1
Noninterview	10.2	10.1
RELUCTANCE AND NONINTERVIEW REASONS		
Reason for Incomplete or Noninterview (%)		
Not available	14.0	14.5
Inconvenient time	54.1	54.5
Reluctance	17.2	17.0
Language Barrier	4.3	4.7
Health problem	1.9	1.9

Source: May & June 2012 American Community Survey Computer Assisted Personal Interviewing Workload; May & June 2013 American Community Survey Computer Assisted Personal Interviewing Workload