Contact Histories in Personal Visit Surveys: The Survey of Income and Program Participation (SIPP) Methods Panel

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Introduction[1]

As survey organizations migrated from paper and pencil interviewing to computer-assisted interviewing, they reaped efficiencies in data editing, data processing, and data quality. However, as some survey organizations converted from paper to computers for their personal-visit surveys, the system of recording information about contact attempts leading up to final disposition were lost or severely minimized. As a result, some computer assisted personal interview (CAPI) surveys were designed without an automated feature designed to capture detailed contact histories. Consequently, the 'story' of interviewer efforts to complete in-person interviews was not retained in a fashion that would yield useful information.

In the following paper, we describe the U.S. Census Bureau experience with a research project aimed at reinstating contact histories as part of the personal-visit survey methodology. We present analyses from contact histories to address a variety of practical questions about the survey experience including how many visits are required for interviews versus non-interviews? What is the probability of making contact on the first attempt – second or third attempt? Is the probability of making contact better for a particular day of the week or time of day? Are interviewers making visits at optimal times? At what point does the likelihood of getting an interview decrease with each additional contact?

Background

As part of CAPI management, surveys use what is commonly referred to as case management systems. Like call scheduling in computer-assisted telephone interviewing (CATI), the purpose for laptop case management is to help interviewers efficiently handle their assignments and allow organizations to control work. For the most part, however, traditional case management systems are designed with a somewhat limited scope of

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[1]This paper reports the results of research undertaken by Census Bureau staff. It has undergone a Census Bureau review more limited in scope than that given to official Census Bureau publications. This report is released to inform interested parties of ongoing research and to encourage discussion of work in progress.

functions. For example, it can accept and store assignments, display cases, call up cases for interview, store interview data, and transmit data off the laptop. However, it is not equipped to collect and display the outcome of previous attempts in any chronological or systematic fashion.

Currently, the Census Bureau uses a case management system to perform the functions described above but is somewhat limited in the amount of detailed case history information it collects and stores. For example, if a new case is opened from case management but an interview is not conducted, the outcome code will change from 200 (new case - not started) to a code of 202 (started - no interview or insufficient partial). The 202 code covers almost every interim outcome prior to final disposition. When supervisors check the status of cases, a 202 code tells them the case was attempted at some point (or at least opened), but little else.

The current case management system does not record the number of attempts or contacts, the day or time a contact was attempted nor the outcome of attempts, e.g., no one home, appointment made for later, or soft refusal that requires supervisory follow-up. Interviewers can use the notes section in the survey instrument itself to record information to this effect, however they do not always take the time (or see the necessity) to record such information on every single attempt.

In February 2002, the Census Bureau and the Interagency Household Survey Nonresponse Group (IHSNG) sponsored a two-day Response Rate Summit comprised of an expert panel of survey methodologists, statisticians, and survey managers. The purpose was to provide a forum for discussion about how to address decreasing response rates in household surveys (for more information see Salvucci, Wenck, Hamsher and Bates, 2002). At the conclusion of the Summit, panel members prioritized the most important ideas generated over the two days. The top recommendation was for CAPI surveys to start collecting contact history information with two goals in mind: 1) as a feedback mechanism for regional office supervisors and interviewers and 2) for analytic purposes at the end of the survey cycle. Data could be used in real time by the field staff to quickly identify and aid interviewers having problems and to determine optimal callback patterns. At the end of the survey cycle, the data could be analyzed to more closely examine the reasons for refusals, successful call strategies, and differences between refusals and noncontacts.

Methods

With this recommendation in mind, the Census Bureau decided to sponsor a short-term research project to explore the use of contact histories in a personal visit survey. The Survey of Income and Program Participation Methods Panel

(SIPP—MP) was chosen as the vehicle. The SIPP - MP is an experimental survey sponsored by the Census Bureau and carried out in six regional offices. Its purpose is to test improvements and alternative measurement approaches for the core SIPP instrument. Each wave of interviewing yields approximately 2,000 randomly selected households of which half are administered the experimental MP instrument and the other half the production SIPP instrument (the control)[2]. The survey covers in-depth questions about all types of assets, income and earnings, labor force participation, health insurance, and recipiency and participation in Federal, state and local assistance programs. Interviews are conducted over a four week period. On average, interviews last about 30 minutes per person (all household members age 15 and older are interviewed by self-response if possible but proxy response is permitted). Initial contact is made by personal visit (PV) and most initial interviews are conducted in-person using CAPI. If a respondent requests a telephone interview, procedures allow for this by interviewers calling respondents from their own phones and using the CAPI laptop to conduct the interview. Prior to initial contact, households are sent an advance letter by regular mail explaining the purpose of the survey.

Because we had no automated system in place in 2002 and did not have sufficient time to build one, we elected to design a paper and pencil contact history log. The logs were implemented in July-August 2002 as part of the SIPP - MP Wave 1 core. The paper and pencil design allowed a quick means of collecting more detailed information on contacts and contact attempts without the lengthy schedule automation requires. The logs were printed front and back on heavy weight colored paper. One side contained a grid for interviewers to record the day, time, mode, interim contact code and comments after each contact or contact attempt. The flip side contained instructions and final outcome codes.

Among the set of interim codes, the logs contained a list of codes divided into Contact and Non-Contact categories. The contact codes were further divided into subcategories such as: eligible household member not home, language problem, respondent too busy (appointment set) and respondent refused. The non-contact codes consisted of subcategories such as: household did not answer door (but evidence of someone inside), unable to reach - gated community, no one home, telephoned - no answer, and telephoned - answering machine.

Interviewers were introduced to the contact logs

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during Wave 1 classroom training that took place in June. Interviewers were instructed to complete a record for each contact attempt --personal visit and telephone attempts. Trainers emphasized that information should be recorded even in 'drive by' cases where no one appeared home or when a telephone call resulted in a busy signal. Each log had space to record up to 10 attempted contacts. Cases requiring more than 10 attempted contacts completed a second log. Interviewers were instructed to select only one interim outcome code at each contact attempt. When the case was deemed 'complete', interviewers were instructed to record a final disposition code along with the final contact date, time, and mode. Complete cases reflect final disposition codes such as completed interview, completed partial interview, noninterview (no one home), noninterview (household refused) and noninterview (language barrier). At the completion of Wave 1, completed contact logs were gathered and mailed from the regional offices to headquarters and then keyed. In all, we keyed 2,965 useable logs. The entire Wave 1 sample consisted of 3,228 cases thus we received useable contact logs for approximately 92 percent of the total sample.

Results

In the discussion that follows, we use the contact logs to address several questions previously unanswered in the absence of interim contact histories. To begin, we examine number of contacts by final disposition – that is, what is the average number of attempts required for interviews? For noninterviews? For out-of-scope cases? The average number of attempts reflects both personal visits and telephone attempts (about 77 percent of all attempts were personal visit and 23 percent were telephone). It's important to keep in mind that an attempt does not always mean actual contact – the averages reported here are based upon the total number of tries and reflect both contacts and non-contacts.

The analysis of mean number of contact attempts indicates that the least amount of effort is spent on cases determined to be out-of-scope and ineligible for the survey. On average interviewers required just over two attempts to make these determinations and close out the case. The amount of effort increases with other outcomes – households that were eventually interviewed required an average of 3.6 different attempts before success. The last four outcomes (language barrier, refused, no one home, and 'other'), represent the noninterview outcomes that comprise nonresponse. Interviewers expended more effort on cases they ultimately failed to collect data from. On average, 6.6 attempts were required for refusal cases and over 10 before defining a case as 'no one home' (again, these means include attempts where personal contact was never made).

Chart 1 tracks the outcome of cases at each successive visit. At first contact, around 24 percent of the caseload are assigned a final disposition – most of these are completed interviews while a very small fraction are deemed non-interviews (about 1 percent). The rest of the cases remain

active but the caseload steadily declines with each additional attempt to contact. After the third visit, 60 percent of all eligible cases are assigned a final disposition and after the eighth visit, close to 90 percent of the eligible sample have been worked to conclusion.

Graph 1 plots the percentage of cases that become completed interviews over the eligible workload at each contact attempt. The average percent of completed interviews over all contact attempts is 22 percent (denoted by horizontal line). The graph illustrates that the percent of completed interviews is above average at contacts 1-5 but drops below average at contact 6. This type of chart is useful in determining optimal number of callbacks – the trick is finding the point at which additional calls result in diminishing returns. In a later section, we explore this concept by analyzing the probability of making contact at different contact attempts. From Graph 1 it appears that perhaps the maximum number of attempted contacts should be no more than 14 – up to that point, the line tends to hug the mean but falls rather dramatically thereafter.

The contact history interim outcome codes were designed to capture several pieces of basic information about the results of each call (e.g. contact or non-contact?) Several of the non-contact codes were included to measure relatively new situations occurring in the past decade. For example, cases where no one answers the door, yet there is evidence of someone inside (the 'hiding respondent'). The survey literature suggests this behavior may be particularly problematic in high crime urban areas where barred windows and doors are symbolic of residents apprehension to open doors to strangers (Groves and Couper, 1998). Such situations are a grey area – should we consider them no one home or soft refusals?

Another concern is the growing prevalence of physical impediments that deny interviewers access because of things like gated communities, buzzer entries and doormen. Anecdotal field evidence and interviewer debriefings suggest these are causing non-contacts to increase – but there is little quantitative data to substantiate these claims. We examined the situations leading up to final disposition by categorizing the 31 interim codes into six categories - one contact disposition and five non-contact dispositions:

(1) Contact (PV or phone) but no interview
(2) PV - No one Answers (but evidence of people inside)
(3) PV - No one Home
(4) PV - Physical/environmental impediment
(5) Phone - no contact
(6) Other noncontact

Category 1 (contact, no interview) includes cases where contact was made but eligible members were not at home, language barriers existed, health problems prevented data collection, the respondent was too busy, or the respondent refused the interview. Both personal visit and telephone contacts are included in this category. Category 2 (hiding respondent) reflects the 'hiding respondent' situation described above. Category 3 (PV - no one home) is the traditional 'no one home' and category 4 (PV - barrier) covers personal visit situations where interviewers could not access the sample household because of environmental barriers (drugs, crime, dogs) or physical barriers (buzzed entry, locked gate). Category 5 (phone - no contact) covers all situations of phone non-contact (e.g., busy signal, answering machine, call blocked, ring - no answer) and category 6 reflect the residual 'other' noncontact outcomes.

We examined the distribution of interim outcomes by final case disposition (interview, no one home, and refusal). One striking finding was the large percentage of cases with interim status of personal visit - no one home (around 50 percent). This was the most common occurrence leading up to a final disposition regardless of what the final disposition (interview, no one home, or refusal). Clearly, then, noncontacts are a problem across the board. Making contact without getting an interview was the second most frequently occurring precursor for cases that ultimately ended up as an interview or a refusal. Finally, the phone/no contact rate was also a fairly common interim outcome for all three dispositions.

Interviewers reported far fewer incidences of the noncontact due to the 'hiding respondent' or physical or environmental barriers. However, cases with physical barriers were more likely to end up classified as noncontact (no one home) compared to cases without these impediments – about 13 percent of these cases had a final disposition of no one home compared to around 4 percent of those without such barriers (data not shown). But, it is significant to note that few interviewers reported encountering these physical access impediments (gated community, locked gate, buzzer entry). Overall, this situation described only about 2 percent of all possible interim outcomes. Our findings suggest the actual frequency of these barriers is rare, but admittedly we lack any historical benchmark against which to compare and therefore cannot conclude they have increased, decreased, or stayed the same over time.

The interim outcome code analysis clearly illustrates the difficulties of making contact. This a trend echoed throughout the survey literature since the 90's (Groves and Couper, 1998; de Heer, 1999; Groves, Dillman, Eltinge and Little, 2002). Since repeat visits translate into more interviewer manhours and higher travel costs, it's useful to examine whether visits can be scheduled to increase the chance of contact. We used the contact logs to calculate the estimated probability of making contact at the first visit by day and time of the attempt. (See Table 1.)

Attempt Day/Time	Estimated Probability	Sample size
Saturday	0.53	323 (13%)
Sunday	0.53	110 (5%)
Weekday morning	0.36	288 (12%)
Weekday afternoon	0.43	1059 (44%)
Weekday evening	0.51	633 (26%)
Sample Size		2413 (100%)

$X^2 = 30.7$, d.f. $= 4$, p$<$.0001
[a] over 99% of 1st attempts were personal visit.

Table 1 divides up the 1st contact attempt by weekend day (all times), weekday mornings (up to 11:59 am), weekday afternoons (12:00-5:00pm) and weekday evenings (after 5:00pm). The probability of contact[3] at first attempt is greatest on weekends followed closely by weekday evenings. Probability of contact is lower on weekday afternoons and lowest of all weekday mornings. Having said that it's important to note that SIPP-MP interviewers made the largest proportion of 1st attempts on weekday afternoons – the day/time combination with the next lowest probability of making contact. Less than 20 percent of first attempts are on weekends, yet these are better days to make contact.

Table 2 illustrates the average probability of making contact at each successive attempt up to the 10th attempt. The probability of making contact at the 1st through 5th attempt are roughly similar ranging somewhere between .47 and .50. At the 6th and 7th attempt, the likelihood of contact falls a bit to .42-.44. After the 7th attempt, the likelihood falls still further.

As we begin to uncover the optimal days and times to make contact, the questions begs -- when are SIPP-MP interviewers making their visits? (See Table 3.) We examined the distribution of attempts by day and time at the first through fourth attempts and then for all attempts combined (excluding attempts made for out-of-scope cases). We also present how actual interviews were distributed by day and time. As noted previously, the majority of first attempts are made on weekday afternoons (44 percent). This shifts by the second attempt when more visits occur on weekday evenings. With each additional

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[3] Contact is defined as all situations where interviewers spoke with someone in the household (by telephone or in-person). This includes contact with ineligible children.

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attempt, the distribution shifts further away from weekday afternoons and more toward weekday evenings. However, even by the fourth attempt, the second most popular time for interviewers to attempt contact is during weekday afternoons. Perhaps not surprisingly then, the distribution for actual interviews falls closely along the distribution for all attempts combined with most interviews occurring on weekday evenings followed by weekday afternoons. It appears that current interviewer practices are over-emphasizing weekday afternoons and underutilizing weekends and weekday nights.

Given that the majority of interviews are not conducted during weekday afternoons, we wondered why interviewers tend to make their first visits during this timeframe? It is helpful to compare the SIPP-MP behavior to call behavior of other face-to-face surveys. In their study of call records from the National Survey of Health and Stress (NSHS) conducted in 1990-91, Groves and Couper (1998) also reported first visits being disproportionately made during the day. Likewise, in their study of a United Kingdom personal visit survey, Pardon, Campanelli, and Sturgis (1999) reported a preponderance of first attempts made during afternoon hours. Groves and Couper suggest that first contacts are concentrated during daylight hours because personal visit survey samples are often clustered such that multiple sample units are located in the same segment. Consequently, interviewers go out to a segment during daylight hours to 'precanvass' their assignments, locate the addresses, and gather initial information about the physical environment. After the first visit, interviewers begin to shift their visits to a timeframe more lucrative for making contact.

Overall, however, the combined frequency of attempts on weekday mornings and afternoons accounts for about half of all attempts. Is there much incentive for interviewers to calculate optimum times early on and then concentrate on these windows? Response rates are obviously an important performance measure for field staff and the Census Bureau does provide a night-time differential pay rate (10% increase from 6:00 pm - 6:00 am). However, there was no incentive program in place during the SIPP-MP that rewarded interviewers who worked weekends or evenings early on in order to close out assignments more quickly. Given the flexibility to choose and lack of clear incentive, interviewers may simply elect to make personal visit attempts during the times most convenient for them until the field period is nearing an end and they are forced to expend more effort during evenings and weekends to try and wrap up unresolved cases.

A final note of interest is the low frequency of attempted contact on Sundays. The rate of attempts on Sundays for SIPP-MP is very close to what Groves and Couper (1998) reported for the NSHS but somewhat higher than that reported in the UK study. It seems our interviewers are less inclined to contact households on Sundays one theory being sensitivity to religious observances or an unwillingness to work on Sundays for the same reason.

Table 3 is somewhat misleading because it's still conditional upon when interviewers are making calls. If all calls

are made on a weekday afternoon, then all of the interviews will occur during that timeframe. But, this doesn't mean that weekday afternoons are the most successful or efficient time to attempt an interview. To look at that we examine the effect of calling time on survey response. Once contact is made, is there variability by day and time regarding outcome? For example, if contact is made on a weekend, are the chances of completing an interview better or worse than if contact is made during a weekday afternoon? High response rates depend upon interviewers doing more than making contact – they must find a time when eligible respondents are at home and also willing to devote time to the interview. Does the call/visit time actually affect survey response and likelihood of cooperation? Table 4 explores this notion by limiting the base to first contacts and examining the outcome by call time.

Once contact is made, there are several outcomes of broad interest: interview conducted, appointment set, refusal, and 'other' noninterview. Using only log codes that reflect some type of contact, we constructed these four categories. We included in the refusal category those situations where the respondent was too busy to participate and would not agree to set an appointment. This is a common strategy among soft refusals – postponing the interview time and time again until the field period expires. The majority of the 'other' category reflects cases where an eligible respondent was not at home but this category also includes language barriers, health problems, instrument hardware problems, and the like.

More than half of the first contacts that occurred on weekday evenings ended up as interviews (55 percent). Around half of the first contacts that occurred on weekends or weekday afternoons ended as completed interviews at the time of contact (between 50-51 percent). Weekday mornings were the least successful of contact times (44 percent of these contacts resulted in a completed interview) – presumably because an eligible respondent is not at home (28 percent of contacts at this time were 'other' noninterviews). Refusals did not vary much by time of contact. They are slightly more evident on weekends but only by a slim margin. Weekday mornings and afternoons appear slightly less successful in getting future appointments set compared to other contact times, again, this may be a function of not finding an eligible respondent at home to try and set the appointment. Some fraction of children less than age 15 are presumably at home weekday afternoons while parents are still at work. So, in summary, the probability of making contact is best on weekday evenings and on weekends. Once contact is made, the relative success for an interview is best on weekday evenings followed by weekends and weekday afternoons.

Conclusion

This paper describes a short-term research project undertaken by the U.S. Census Bureau. The project devised a system whereby interviewers recorded pertinent information about all attempts leading up to final case dispositions in a personal visit survey. Using a pencil-and-paper log, interviewers collected basic statistics about the mode, number, and outcome of attempts prior to closing out cases. These type of survey process data are extremely useful in better understanding interviewer call patterns, optimal day and time for making contacts, situations leading up to interviews, refusals, and noncontacts, and the level of effort being put forth for what payoff.

We found interviewers reacted favorably to the logs and, in fact, used them to better manage their assignments. An analysis of the logs indicates that more effort is required of cases that don't yield data – interviews required an average of 3.6 attempted contacts while 'no one home' cases had an average of 10 contacts or attempted contacts. The first through the fifth attempts yield an above average percentage of interviews – contacts beyond that have a below average chance of becoming an interview.

Noncontact is the most frequently occurring event leading up to final disposition – this is true of cases that eventually end up as interviews, refusals, and noncontacts. Physical contact impediments are not as commonplace as might be suspected – these situations comprised less than 2 percent of the interim noninterview cases. However, such cases are much more likely to end up as noncontacts compared to those without such barriers (households with some type of physical or environmental barrier were three times more likely to be final status noncontacts compared to those without them – 13 percent versus 4 percent).

Weekends and weekday evenings are the best times to make contact. After the first visit, the SIPP-MP interviewers took advantage of weekday evenings but were also found to overly-favor weekday afternoons when the probability of contact isn't as good. Analyses such as these are typically conducted after the interview cycle and used to influence programmatic changes to things like call/visit rules and field work procedures in an effort to reduce noncontact rates.

Future of Contact Histories at Census

There is a second critical use for these type of data not discussed at length in this paper – the use of contact history data in real time for the purposes of efficient supervisory field management. A new automated system has recently been developed at the Census Bureau to provide both real time intervention and datasets for post-data collection analysis. This system is called the Contact History Instrument or CHI. The purpose is to routinely and systematically capture detailed quantitative and qualitative information on the nature of each contact attempt in personal visit surveys (see Oneto, 2003 for more information). It has been developed outside the CAPI instrument as a stand alone program that can be initiated from Case Management or the laptop desktop. The CHI contains functions that go above and beyond the simple PAPI contact histories devised for our SIPP-MP experiment.

In addition to recording number of attempts, mode, date and time of attempts, the CHI collects information about the outcome of attempt and also more detail behind noncontacts and refusals. For example, interviewers are instructed to select codes describing potential refusal situations (e.g., respondent too busy, has privacy concerns, asks questions about survey, says content does not apply, not interested, puts off FR indefinitely, says survey is voluntary, has anti-government concerns). In addition, the CHI records noncontact scenarios and attempted interview strategies after each non-interview attempt (e.g., no one home, on vacation, advance letter given to respondent, left promotional brochure, left message on answering machine, transferred case to senior FR, etc.).

The CHI will routinely produce reports for the regional office survey control system and be available daily for management supervisory review. The reports will yield information at the interviewer level about number of attempts, contact status, day/date/time of attempts, type of contact by time of attempt, and strategies attempted for potential refusals. Our plan is that regional office managers and supervisory field representatives will use these reports to quickly identify problems, correct interviewer behavior, and add resources where needed. The CHI will be first introduced into production during the 2004 National Health Interview Survey.

In the future, we recommend linking the CHI data with data from the Census 2000 Planning Database. This is a track-level database based on Census 2000 that consists of physical, social and demographic variables that can be used to pre-identify hard to enumerate areas (i.e., areas with low response rates). Since many demographic survey samples include cases from the Master Address File, these cases can be geocoded and linked to the Planning Database. We could then examine the correlates between number of visits, prevalence of refusals and noncontacts, etc. and variables in the database such as linguistic isolation, population density, percent minority, unemployment, and poverty levels. Used in tandem, we could model realistic tract-level response rates, predetermine levels of effort required, and better plan assignments for interviewers.

As noted previously, survey researchers around the world have documented that the noncontact rate increased in the 1990's. However, noncontact is attributed to call/visit rules and field work procedures, not a function of survey topic. Thus, having a tool like the CHI should help reduce number of contacts and perhaps the noncontact rates. These should help reduce survey costs and spill over to response rates if the 'no one home' rate can be reduced. Another benefit of a CHI-like system is the valuable information we collect regarding the nature of the non-contact or the reason for refusals. We know from the survey literature that refusals are not the same as non-contacts. As a survey organization we must do a better job discerning between the two to devise more creative contact strategies, designing targeted materials, and re-training our field staff to diffuse respondent concerns. Going 'back to the future' to collect contact histories is a positive step in the right direction.

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Chart 1. SIPP - MP, 2002 Wave 1: Case Status by Contact or Attempted Contact Number (n=2465 in-scope cases)
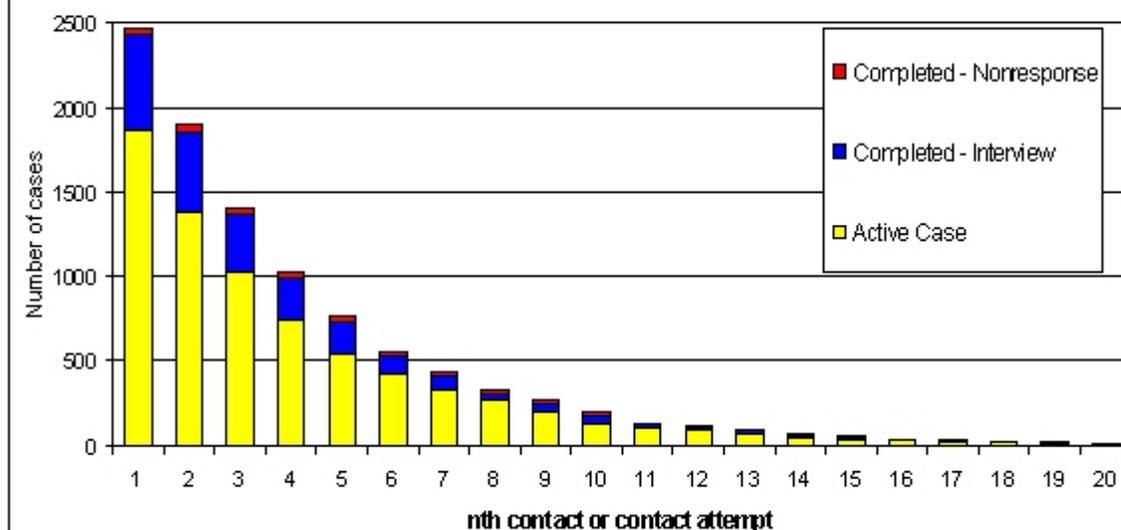
Graph 1. Percent Completed Interviews Based on Attempted Cases by Contact or Attempted Contact Number (n=2465 interviews)
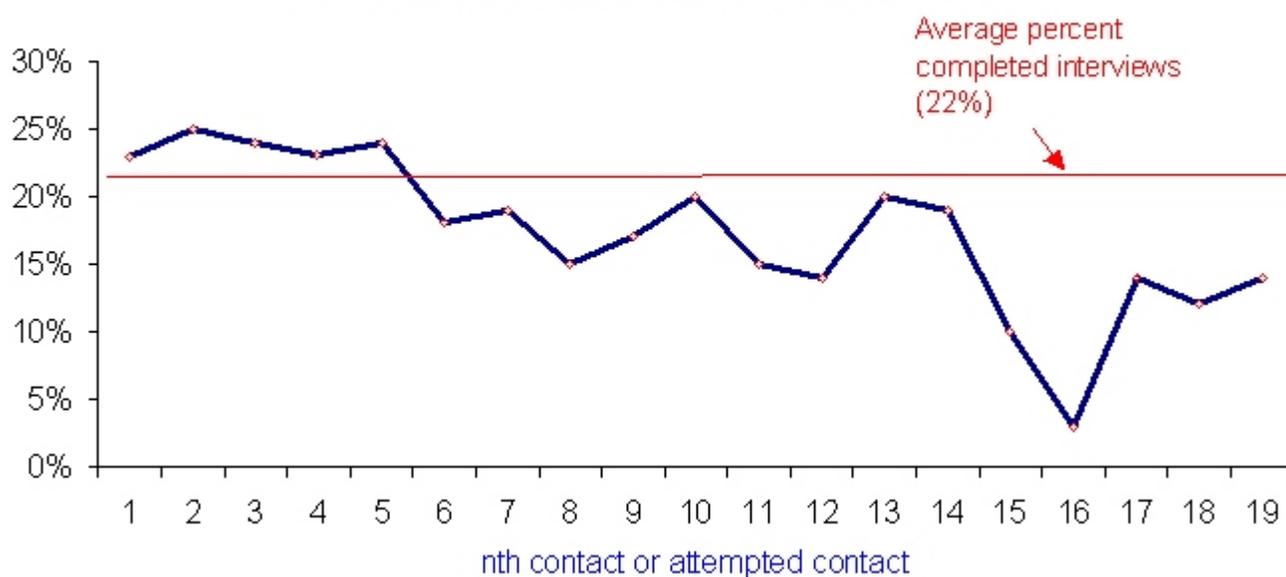
*Table 2. Contact rate at each **attempt***

Attempt No.	1	2	3	4	5	6	7	8	9	10
Proportion Contacted	.49	.50	.49	.49	.47	.42	.44	.38	.39	.41
Sample size	2468	1904	1413	1039	776	560	443	340	269	207

Table 3. Distribution of day/time interviewers make calls versus when they secure interviews

	When did FR's attempt contact?[1]					When did FR's get interviews?
	1st	2nd	3rd	4th	All	
Weekday evenings	26%	35%	37%	39%	35%	39%
Weekday afternoons	44	30	24	20	28	27
Saturdays	13	16	18	17	16	15
Weekday mornings	12	12	12	14	13	12
Sundays	5	7	9	9	8	7
N	2426	1866	1371	1011	9753	2052

[1] (excludes out-of-scope cases)

*Table 4. Outcome at 1st **contact** by time/day of contact*

Time of contact	Outcome				
	Interview	Appointment	Refusal[1]	Other Noninterview	Sample size
Saturday	50%	19%	13%	19%	400 (17%)
Sunday	51%	21%	14%	15%	179 (7%)
Weekday morning	44%	17%	11%	28%	244 (10%)
Weekday afternoon	51%	16%	11%	22%	757 (31%)
Weekday evening	55%	21%	12%	12%	841 (35%)

$X^2 = 52.82$, d.f.= 12, p<.0001   N = 2421

[1] includes 'contact – no appointment set' as soft refusals