

An Evaluation Of Respondent Selection Methods For Household Mail Surveys

Michael P. Battaglia¹, Michael W. Link², Martin R. Frankel³, and Ali H. Mokdad²
Abt Associates Inc.¹, Centers for Disease Control and Prevention², Abt Associates Inc. and Baruch College,
CUNY³

KEYWORDS: Birthday selection methods, Enumerate all adults in household, Behavioral Risk Factor Surveillance System

Introduction

Many surveys conducted in the U.S. have as their primary objective the production of estimates for adults (i.e., the household population age 18 years and over). The three most common approaches to achieving this objective are: 1) interview one adult in the sample household who reports for each adult in the household, 2) collect person-level data from each adult in the household, and 3) select one adult at random from the household and interview the selected adult. Techniques for random respondent selection are well established for in-person surveys (Kish 1965). Gaziano (2005) enumerated the respondent selection techniques used in random-digit-dialing (RDD) telephone surveys, noting that a range of techniques are used from Kish-style enumerations to nonprobability methods. She found “birthday selection” methods, which she describes as quasi-probability methods, were the most commonly used selection method in telephone surveys. For example, with the next birthday selection method (Salmon and Nichols 1983) after contact is made with the household, the interviewer determines if the household contains two or more adults and then asks to speak with the adult household member with the next birthday. An alternative method is to ask for the adult with the most recent birthday (i.e., last birthday method) (Lind, Link, and Oldendick 2000).

Turning to mail surveys, there is virtually no literature on random respondent selection other than an occasional mention of using a birthday selection method. This is probably the case because most mail surveys use a list-sampling frame that contains the names of individuals who are eligible for the survey. Mail surveys based on residential address sampling frames are not widely used. One could consider generating a sample of households using random-digit dialing, contacting the household initially by telephone to randomly select one adult from

within the sampled household, and then sending that sample member a mail survey questionnaire. With this two-phase data collection approach, however, nonresponse can occur both at the telephone contact and the mail survey phases, resulting in a lower overall response rate. In this study, our primary interest was in testing techniques for obtaining a sample of adults from a mail survey frame consisting of residential addresses.

Design Of The BRFSS Mail Pilot Survey

Link et al. (2005a, 2005b) detail the construction of a sampling frame of residential addresses in six states (California, Illinois, New Jersey, North Carolina, Texas and Washington), five of which have low response rates on the Behavioral Risk Factor Surveillance System (BRFSS) survey (North Carolina being the exception). The frame was used to sample residential addresses for conduct of a mail pilot survey consisting of an initial sample size of 10,080 residential addresses.

During the design phase focus groups were conducted with adults to assess their understanding of some alternative respondent selection techniques and their likelihood of compliance with the instructions. The qualitative research indicated that most people were unwilling to follow a traditional Kish-style enumeration process, creating a roster of adults in the household and then referring to a respondent selection table to determine the selected adult. The next birthday method seemed to offer some chance of compliance but the qualitative research indicated that many people did not understand the concept of random respondent selection while others thought that it would be sufficient to have an interested or available adult in the household fill out the mail questionnaire. The focus groups also made clear that the person in the household who opens the mail in the household potentially plays a key role in the respondent selection process.

Based on the results of the qualitative research, three methods were tested: 1) any adult in the household was allowed to fill out the

questionnaire, 2) the birthday selection method, and 3) all adults in the household were asked to fill out a questionnaire. The any adult method was tested mostly for comparative purposes. We expected this technique to have the lowest respondent burden and hence to yield the highest completion rate. The drawback of this approach is that it is a nonprobability method and it is likely that the person who opens the mail will be the one to fill out the questionnaire. The birthday selection method also relied on the person who opened the mail to read the instructions and give the questionnaire to the adult in the household selected using the birthday method. As noted above the next birthday and last birthday selection methods are classified as quasi-probability selection methods. In the mail pilot survey we developed a method to move the birthday selection method closer to a true probability of selection method. This can be accomplished by randomizing the sample of residential addresses to either the next birthday or the last birthday selection method. This makes the birthday selection method an equal probability of selection method for households with two adults. For households with three or more adults it moves it closer to an equal probability of selection method. Due to cost considerations we actually only tested the next birthday method. For the all adults method three questionnaires were sent to the sample household and a toll-free number was provided in case additional questionnaires were needed. The sample size for each of the three methods was 3,360 residential addresses.

Completion Rates

The completion rate is defined as the number of sample residential addresses from which a completed questionnaire was received. For the any adult method the unweighted completion rate for the six states combined was 26.6%. The next birthday method yielded a slightly lower completion rate of 24.7%. For the all adults method the completion rate has two components. First, for 24.6% of the residential addresses at least one completed questionnaire was received. It was encouraging to see that this rate and the rate for the next birthday method were close to the any adult completion rate. Second, among residential addresses for which at least one questionnaire was received, 85.1% of adults in those households returned the questionnaire. The product of these two rates yields an estimate

of the overall completion rate of 20.9% for the all adults method.

Demographic Comparisons

Age group by gender BRFSS population control totals from 2004 for the six states combined were assembled. Each sample of residential address was assigned a base sampling weight equal to the reciprocal of the probability of selection of the residential address. For the next birthday sample of residential addresses, the base sampling weight was multiplied times the number of adults in the household. We did not want California and Texas to dominate the weighted estimates for the combined sample. Therefore, for each respondent selection method the weights were ratio-adjusted so that the sum of the weights for each of the six states was the same. These "equalized" base sampling weights give each state an equal contribution to the combined estimates. Table 1 compares specific age group by gender-weighted distribution of each of the three samples with the BRFSS control totals. The youngest age groups are typically under-represented in RDD surveys. All three methods yielded an under-representation of males and females age 18-24 years and 25-34 years, except for the over-representation of females 25-34 years by the any adult method and the slight under-representation of females 18-24 years by the all adults method. Looking across all age groups, the BRFSS control total indicates that 51.4% of adults are females. For the any adult method and the next birthday methods, 61.5% of the respondents were females. The all adults method performed much better: 50.8% of the respondents were females.

In Table 2 we compare the weighted distribution of each of the three samples with the March 2004 CPS distribution of adults by number of adults in the household. All three methods resulted in an over-representation of adults from one-adult and two-adult households. The next birthday method had the smallest over-representation of adults in one-adult households, while the all adults method resulted in the smallest over-representation of adults in two-adult households. The next birthday and all adults methods came close to the population percentage for adults residing in households with three adults. Although 10.4% of adults live in households 4 or more adults, all three methods under-represented this category.

Telephone Follow-Up Survey

After the completion of the mail survey a random subsample of households from each of the three methods was selected for telephone follow-up. A sample of 96 residential addresses was selected from any adult households with a completed questionnaire. The primary objective of including this subsample was to determine why the respondent decided to fill out the questionnaire. A random sample of 399 next birthday residential addresses was selected among households with two or more adults. The primary objective was to assess the accuracy of the next birthday respondent selection. Lavrakas et al. (2000) found a 29.5% error rate for households with two or more adults for the last birthday selection method in an RDD survey. For the all adults method the sample (n=136) was also limited to households with two or more adults with the additional condition that one or more adults did not return a questionnaire. All three samples were restricted to households for whom a telephone number was available through a matching process with a commercial database of residential addresses with telephone numbers.

Fifty-six follow-up interviews were completed with any adult respondents, and 80.4% indicated that they were the first person to open the mail. Virtually all of the respondents (98.2%) indicated that the reason they completed the interview was that they “just decided to fill out the questionnaire”.

For the next birthday follow-up 224 interviews were completed. For 36.2% of the households the respondent was a person who did not have the next birthday at the time of the mail survey. This error rate is somewhat higher than what Lavrakas et al. (2000) observed for an RDD survey. We asked the main reason why the adult with the next birthday did not fill out the questionnaire and found that 29.1% reported that the person with the next birthday did not want to fill out the questionnaire, 8.9% of the adults with the next birthday did not have the time to fill out the questionnaire, and 7.6% were away from home or on a trip. Only 5.1% of the respondents indicated that they did not think it was important who filled out the questionnaire and only 3.8% indicated that they could not follow the next birthday respondent selection instructions. We also asked a question to find out how it was decided who should complete the questionnaire and found that 13.0% reported that

there was no particular reason, 12.5% reported whoever had the time, 12.5% reported that it was the adult who always fills out forms/paperwork, and 11.6% indicated that the next birthday adult does not fill out surveys and forms. Lavrakas et al. found a higher birthday selection error rate in larger households. Among 180 telephone follow-up households with 2 adults, for 31.1% an adult who did not have the next birthday filled out the questionnaire. On the other hand, among the 40 households with 3 adults, adults who did not have the next birthday completed 60.0% of the questionnaires.

For the all adults method 79 follow-up interviews were completed. We asked the main reason why each adult in the household did not complete a questionnaire. Focusing on the first adult in the household who did not fill out a questionnaire, we found that 28.2% were reported as not having time and 26.8% were said to not respond to surveys.

Conclusions

We found that the next birthday and all adults methods yielded household-level completion rates that were comparable to the any adult method, the method assumed to have the least respondent burden. Overall completion rate for the all adults method was lower when we accounted for within-household nonresponse. However, the all adults method produced the largest number of responses from both males and females age 18-24 years and for males overall. The error rate for the next birthday method was somewhat higher than what has been reported for RDD surveys. In RDD surveys the interviewer guides the person through a series of questions to identify the adult with the next birthday. Errors that occur are thought to be primarily due to the person making a mistake in identifying which adult in the household has the closest upcoming birthday. In a mail survey the person who opens the envelope must follow the instructions to identify the person with the next birthday. The person has more time to make that determination compared to a telephone survey, and we found in the follow-up interviews that very few of the errors were due to the identification of the wrong person with the next birthday. Rather, the person with the next birthday generally did not want to fill out the questionnaire, and therefore another adult in the household decided to fill it out. In a telephone survey the interviewer has the opportunity to schedule callbacks and try and

persuade the selected adult to complete the interview. In a mail survey the person who opened the envelope and followed the selection instructions is likely to fill out the questionnaire, if the adult with the next birthday does not want to complete the questionnaire. If we consider next birthday sample households where the wrong person filled out the questionnaire as nonrespondents, then the completion rate for the next birthday method would be closer to the overall completion rate for the all adults method. In sum, for mail surveys based on residential address sampling frames, the birthday selection and all adult methods both hold promise as techniques for the random selection of respondents within households in mail surveys, however, both techniques also warrant further refinement and testing.

Link, M., M. Battaglia, P. Giambo, M. Frankel, A. Mokdad, and S. Rao. 2005b. Assessment of Address Frame Replacements for RDD Sampling Frames. *2005 Proceedings of the American Statistical Association, Survey Research Methods Section* [CD-ROM], Alexandria, VA: American Statistical Association.

References

Gaziano, C. 2005. Comparative analysis of within-household respondent selection techniques. *Public Opinion Quarterly*, Vol 69, No 1, Spring 2005, pp. 125-157.

Kish, L. 1965. *Survey Sampling*. John Wiley & Sons: New York.

Lavrakas, P.J., Stasny, E.A., and Harpuder, B. 2000. A further investigation of the last-birthday respondent selection method and within-unit coverage error. *2000 Proceedings of the American Statistical Association, Survey Research Methods Section* [CD-ROM], Alexandria, VA: American Statistical Association.

Lind, K., M. Link, and R. Oldendick 2000. A Comparison of the Accuracy of the Last Birthday Method Versus Next Birthday Methods for Random Selection of Household Respondents. *2000 Proceedings of the American Statistical Association, Survey Research Methods Section* [CD-ROM], Alexandria, VA: American Statistical Association.

Link, M., M. Battaglia, M. Frankel, L. Osborn, and A. Mokdad. 2005a. Effectiveness of Address-based Sampling Frame Alternative to RDD: BRFSS Mail Survey Experiment Results. *2005 Proceedings of the American Statistical Association, Survey Research Methods Section* [CD-ROM], Alexandria, VA: American Statistical Association.

Table 1: Selected Age Group by Gender Comparison of Three Samples With BRFSS Control Totals

Group	BRFSS Percent	Any Adult Percent	Next Birthday Percent	All Adults Percent
Males 18-24 years	6.8	1.0	0.7	20.
Females 18-24	6.3	1.0	1.5	4.4
Males 25-34	9.7	3.4	3.9	3.3
Females 25-34	9.3	12.5	5.8	5.7
Males 55-64	6.1	8.3	12.4	7.8
Females 55-64	6.5	9.6	10.3	11.2

Table 2: Comparison of Number of Adults in the Household

Number of Adults in Household	CPS Percent	Any Adult Percent	Next Birthday Percent	All Adults Percent
1	15.7	28.3	17.8	23.8
2	55.8	59.3	59.4	57.1
3	18.1	9.3	17.5	16.2
4+	10.4	3.0	5.4	2.9