Improving Response Rates for the BRFSS: Use of Lead Letters and Answering Machine Messages

by

Michael W. Link^a, Ali Mokdad^b, Machelle Town^b, Jodie Weiner^a, and David Roe^a ^aRTI International, ^b Centers for Disease Control and Prevention

Michael W. Link, RTI International, Research Triangle Park, North Carolina, 27709-2194

KEY WORDS: Advance letters, answering machines, response rates, BRFSS

As response rates in random digit dial (RDD) surveys continue to decline, researchers need to develop approaches and methods for countering this trend in an effort to curtail the decline of -- if not improve -- these rates. Low response rates threaten the validity of data collected in probability sample surveys by potentially decreasing the representativeness of resulting samples and increasing the bias associated with estimates made from these data. The research presented here provides preliminary data from two experiments conducted as part of the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is the world's largest ongoing telephone study with more than 200,000 surveys collected per year, tracking health risks in the United States. The experiments -- involving more than 7,200 sample members -- were designed to test the effects on survey participation of sending lead letters and leaving answering machine messages in studies with an RDD design. The experiments were embedded in routine, monthly data collections for eleven states conducting the BRFSS. The preliminary findings indicate that while lead letters may be an effective way of increasing survey participation, the same cannot be said of leaving scripted messages on telephone answering machines.

Background

There is growing evidence that the use of advance letters in telephone studies can improve cooperation rates and reduce initial refusals (for example, see Kennedy, et al. 1998; Camburn, et al. 1995; Smith et al. 1995; and, Haggard and Gray 1994). Camburn et al. point out that "contact before an actual interview attempt 'warms up' respondents, hopefully making them more positively disposed towards participation." Following this logic, "using advance response letters will increase response rates, thereby reducing the potential size of non-response related total survey error" (Camburn, et al. 1995).

Although lead letters are effective across survey research, they can be very effective when conducting telephone research. As Dillman and Salant (1994) point out, "First, they decrease the element of surprise that comes from unexpected phone calls, Second, they provide legitimacy by introducing the survey and distinguishing it as a genuine research effort. Third, they explain the within-household selection process, if one is used. Fourth, they let respondents know when to expect a call and that a more convenient time can be arranged if necessary. Finally, advanced letters thank respondents ahead of time for their participation".

Research by Camburn et al. (1995) concluded that in an RDD study, an advanced respondent letter "can reduce non response from refusals rates," thus concluding that "an advance letter can increase response rates and lower refusal rates." Similar research conducted by Kulka, McNeill and Guess (1983). found that the initial refusal rate for sample members receiving an advance letter was approximately half of the rate for those who did not receive a letter.

Telephone answering machines may be another way of providing sample members with advance notice of a call from a telephone survey researcher. It may be possible to use scripted messages left on such devices as "electronic lead letters," thereby, preparing the sample member for a subsequent call or even encouraging the sample member to call in to a toll-free number to complete the interview. Messages left on answering machines seem to "legitimate the subsequent call-back in about the same way that letters are sent to respondents so that they can expect an interview", giving potential respondents the same type of useful "preparedness" that lead letters appear to provide (Weisberg, Krosnick and Bowen, 1996).

The direction suggested by the research on this topic, however, is unclear. Many researchers have

^{*} We thank all of the BRFSS State Coordinators for their assistance in obtaining information about each states' operational protocols as well as the staff of the states and contracting organizations that assisted in implementing this experiment.

come to contrasting opinions on the effectiveness of leaving answering machine messages (for example, see Link, Kelly, and Malizio 2000, Baumgartner 1990, Daves 1990, and Tuckel et al. 2000)

The research presented here attempts to provide more definitive evidence for or against the use of lead letters and answering machine messages as tools for increasing participation, particularly in studies with an RDD design.

Study Design

The Behavioral Risk Factor Surveillance System (BRFSS) is a collaborative project of the U.S. states and territories and the Centers for Disease Control and Prevention's (CDC) Behavioral Surveillance Branch. The BRFSS is an on-going datacollection effort designed to measure behavioral risk factors in the adult population aged 18 years or older who live in households. The survey is conducted monthly in all 50 states, as well as the District of Columbia, Puerto Rico, Guam, and the Virgin Islands.¹ The objective of the BRFSS is to collect uniform, state-specific data on preventive health practices and risk behaviors that are linked to chronic diseases, injuries, and preventable infectious diseases in the adult population. Factors assessed by the BRFSS include tobacco and drug use, health care utilization, HIV/AIDS knowledge and prevention, physical activity, and fruit and vegetable consumption.

Development of Letters and Answering Machine Scripts

Although the findings of these experiments are presented together here, the advance letter experiment was run in five states and the telephone answering machine message experiment was run in six different states. The primary objective of the research was to assess the impact of sending letters and leaving messages on answering machines using the best letter and best script that could be developed. The purpose was not to experiment with different elements of letters or scripts - such experimentation was beyond the scope of this particular inquiry. Both the letter and the script were developed using a combination of research findings from the survey literature, established survey "best practices," and our own operational experience. These sources were used to develop three letters and three scripts of slightly different lengths and with slightly different content. Those three letters and scripts were then cognitively tested in a focus group of

12 individuals of varying backgrounds. Using feedback from the focus group sessions a single "best" letter and "best" script were developed. After a few minor revisions based on comments from CDC staff and state coordinators involved in the study, the letters and scripts were finalized (Available upon request).

<u>Selecting States for Inclusion in the Experiments</u> States were selected to participate in one or the other experiment, using the following protocol:

- Information was gathered from BRFSS State Coordinators² and/or published reports regarding:
 - current use of lead letters
 - current practice of leaving messages on answering machines
 - number of completed interviews collected monthly
 - 2001 CASRO response rate for each state
 - States that were already sending lead letters (N = 2) or leaving scripted messages on answering machines (N = 19) as part of their standard protocols were eliminated from consideration so as not to confound the experimental findings, leaving a potential sample of 32 states (the two states that use lead letters also leave answering machine messages).
- The remaining 32 states were then stratified by 2001 response rate into three groups:
 - "Low-level response rate" = below 40%
 - "Medium-level response rate" = between 40 54%
 - "High-level response rate" = 55% or higher
- Within response rate groups, states were further stratified by the average number of monthly completed surveys.
- Using this stratified listing and a random start, states were then assigned to either the lead letter or the answering machine message experiment, alternating systematically between the two experiments. This resulted in identification of 16 potential states for each experiment.
- Next, a potential yield variable was created for both samples to indicate the expected number of completes per state. For states in the lead letter experiment, this was assumed to be 50 percent of the monthly complete target, given that address matching of most RDD samples yields, on average, a 50 percent match rate. Similarly, the yield for the answering machine message experiment was expected to be approximately 50

¹ The term "state" is used here to refer to all areas participating in the surveillance system, including the District of Columbia, Guam, the Virgin Islands and the Commonwealth of Puerto Rico.

² Of the 54 localities conducting the BRFSS, responses were obtained from 51 coordinators. Those not responding were Guam, Virgin Islands, and Iowa.

percent, given that just over two-thirds of households have a telephone answering machine and that the machines in these households are generally reached three-fourths of the time on the first call attempt. These yield numbers were used to ensure that enough states would be selected to generate a minimum of 1,000 completed interviews within each experiment.

Final selection of states for the lead letter experiment : Using the stratification design specified above, the potential sample included three low, six medium, and seven high-level response rate states. From this list, one low, three medium, and one high-level response rate states were chosen for inclusion. After contacting State Coordinators about participation in the experiment, replacement of one state was required for this experiment.³ In total, five states were selected and agreed to participate in this experiment (see Table 1). *Final selection of states for the answering machine experiment* : Using the stratification design specified above, the potential sample included three low, seven medium, and seven high-level response rate states. From this list, two low, two medium, and two highlevel response rate states were chosen for inclusion (see Table 2).

Implementation of Lead Letter Experiment

The samples for each of the states were drawn by GENESYS according to standard, previously approved and CDC-monitored, BRFSS protocols. The telephone numbers were then reverse-matched against a database of address information and the address-matched cases identified. Each address-matched case was then randomly assigned to either the treatment group (targeted to receive an advance letter) or control group (no lead letter). Lead letters were generated on the respective state's letterhead and mailed in their envelopes. Letters were mailed approximately 3 days before the cases were released for telephone interviewers to contact.

<u>Implementation of Answering Machine Experiment</u> Like the lead letter experiment, samples for this experiment were drawn by GENESYS according to standard BRFSS protocol. All of the cases were then randomly assigned to either the treatment group (message left the first and fourth time a TAM was reached) or the control group (no message left). CATI was programmed to alert interviewers to leave messages for selected cases the first and fourth time an answering machine was encountered.

Findings

The findings presented here are preliminary findings, representing production statistics approximately 2-3 weeks into the four week data collection period, running from April 1 – 30, 2003. Additionally, while preliminary data were available from all six states in the answering machine experiment, data for the lead letter experiment were available from only three of the five states (North Carolina data were not available in time for inclusion in this paper and Idaho is conducting the experiment in May). Consequently, the final results may vary somewhat from the preliminary findings presented here.⁴

Results of Lead Letter Experiment

Lead letters do appear to increase significantly the percentage of individuals who complete the BRFSS survey – with an increase of nearly 10 percent among address-matched households (see Table 3).⁵ Among the 1,147 potential sample members who were mailed a lead letter, 37.4 percent completed the survey by the end of the third week of data collection, compared to 27.8 percent of those in the control group who did not receive a lead letter. This percentage difference varied somewhat across the three states, ranging from a 7.9 percent in South Carolina (28.9% with letters; 21.0% without letters) to 10.6 percent in Mississippi (49.5% with letters; 38.9% without letters).

Lead letters also had a significant effect in reducing initial refusal rates, with 26.9 percent of households that were sent a lead letter initially refusing, compared to 32.3 percent among those not sent a lead letter (see Table 4). There was greater variability among states on this measure. In Mississippi, the initial refusal rate was approximately 9 percent lower among households who were sent a

³ California was initially selected for inclusion in the experiment, with Texas as a replacement. Both states, however, have large Hispanic populations and required materials be developed in both English and Spanish. A previously conducted study in Texas using lead letters indicated that the Hispanic population may react differently than other populations to receiving lead letters from a government agency. Because of the need to maintain the same treatment across states – using the same lead letter – it was decided to hold-off on conducting lead letter experiments in these states. Virginia was substituted as a replacement state.

⁴ A final version of this paper with the complete data will be available from the authors in the near future. ⁵ For the purposes of reporting these preliminary

findings, the completion rates were calculated simply as the number of completed interviews divided by the number of completes and partials, final eligible noncompletes, and all pending cases where eligibility had not yet been determined; only cases determined to be ineligible were excluded from the calculation. The final reporting of these data will be conducted using the CASRO response rate calculation.

letter. In contrast, the difference in Virginia was less than 3 percent (not a statistically significant difference).

While letters were mailed prior to the start of data collection and not meant to necessarily be refusal conversion letters, we wanted to examine whether the letters had such an affect, perhaps being delivered or received late or being received by a different individual within the household (someone different than the individual who initially refused). As shown in Table 5, there was a significant difference in the percentage of initial refusals who were converted to completes during the first three weeks of data collection. Among households to which a lead letter was sent, 10.9 percent of households that initially refused to participate subsequently completed the interview, compared to 6.6 percent of households in the control group. This difference was most dramatic in Virginia, where the percentage of households converted in the letter group was more than 8 percent higher than those not receiving a letter. Letters did not appear to have a significant impact in converting initial refusals in the other two states.

It is also important to examine whether or not lead letters can reduce the overall level of effort in conducting the monthly survey. One way to examine this is to look at the average number of telephone calls required to complete an interview among each group. While marginally lower in the lead letter group (4.4 versus 4.6), the differences in call counts were not statistically significant overall.⁶

Another way to assess the impact of lead letters is to ask the respondents themselves about their effect. All sample members in the group designated to receive a lead letter were asked two follow-up questions at the beginning of the survey after respondent selection and informed consent, but before the actual questionnaire modules. The first asked if the sample member remembered receiving the letter and among those who did remember receiving it, did the letter influence their decision to participate in the survey (Letter available upon request).

Among the 470 completed cases targeted to receive a lead letter, 59.1 percent remembered seeing the letter and 40.9 percent did not remember seeing it. This percentage varied significantly among different demographic groups including age, income, race education and marital status.⁷

As a follow-up, those who remembered receiving the letter were asked if the letter made them more willing to participate, less willing, or if it had no effect. Because of the design of this study, it is quite likely that a percentage of individuals who did receive the letter and responded negatively to it did not complete the survey. The findings, therefore, need to be interpreted within this context. Overall, more than half (52%) who remembered receiving the letter said it made them more willing to participate in the survey; 48% said it made them more hesitant or had no impact on their decision. Differences were seen across a number of demographic groups, such as race, age, education, income and marital status.⁸

Results of Answering Machine Message Experiment

In contrast to the positive effects of lead letters, the impact of leaving messages on the answering machines of sample members is less clear cut. The findings for this experiment are based on analysis of 1,987 cases (975 treatment, 1012 control) where an answering machine was reached in the course of containing sample members. As shown in Table 6, the preliminary completion rate among household where an answering machine message was left was 19.2 percent, compared to 16.9 percent among households in the control group. This difference was not statistically significant.

Answering machine messages did not, however, appear to reduce initial refusal rates. Among households where messages were left the initial refusal rate after three weeks of production was 41.3 percent, compared to 41.0 percent for households in the control group. This difference was not statistically significant (See table 7).

The same is true when it comes to refusal conversion rates. Leaving messages on machines appeared to have little or no impact. In both groups the refusal conversion rates after three weeks were statistically the same (9.0% vs 8.6%).⁹

Likewise, leaving messages had no effect on the level of effort required. The average number of calls to complete a case in households where messages were left was 9.5, compared to 9.9 for the control group (P < .118).¹⁰

The lack of difference in the two groups across most of these measures is partially explained by the responses of sample members in the treatment group to the question of whether or not they remembered hearing the message on their answering machine. Only one-in-five (20.1%) sample members in households where a message was left indicated that they remembered hearing the messages.¹¹ Furthermore, even among those who heard the message, only one-in-four (24.9%) said the message made them more likely to participate in the survey.¹²

⁹⁻¹² Full table available upon request.

⁶⁻⁸ Full table available upon request.

Conclusions

In sum, sending advance letters does seem to have a significant positive impact in improving response rates. Among address-matched cases, the increase in response rate was nearly 10 percent. The letters also appear to have helped significantly reduce initial refusal rates and increase refusal conversion rates. Additionally, just under 60 percent of sample members remembered receiving a letter and of those more than half said it had a positive effect on their decision to participate in the survey. A respondent's race, age, education level, income, and marital status were all related to whether a person remembered receiving a letter and the letter making them more willing to participate in the survey. These results, however, only apply to the percentage of households that can be address-matched (which among the five states examined here ranged from 47.3% to 58.4%). The results do not apply to the portion of the sample for who no address was available. The overall effect of lead letters, therefore, is dependent upon the total percentage of address-matched cases in the final sample.

In contrast to lead letters, there is little evidence to indicate that leaving messages on answering machines is an effective means of increasing participation in RDD surveys. The lack of effectiveness may be due in large part to individuals simply not hearing the messages. However, even when they do hear them, the messages are reported to only have a positive effect one-fourth of the time.

References

Baumgartner, Robert M. (1990) "Telephone Answering Machine Messages and Completion Rates for Telephone Surveys". Paper presented at the annual meeting of the American Association for Public Opinion Research, Lancaster, Pennsylvania.

Camburn, D., Lavrakas, P.J., Battaglia, M.J., Massey, J.T., and Wright, R.A. (1995). "Using Advance Respondent Letters in Random-Digit-Dialing Telephone Surveys." *Proceedings of the Section on Survey Research Methods*, American Statistical Association, pp. 969-974.

Daves, R. (1990) "<u>You</u> Know what to Do at the Beep, but Do Survey Researchers." Paper presented to the Midwest Association for Public Opinion Research, Chicago, Illinois.

Dillman, D.; Salant, P. (1994). *How to Conduct Your Own Survey*. New York. John Wiley and Sons, Inc.

Haggard, L. M.; Gray, D. Z. (1994). "Improving Validity of Parental Reports of Child Immunization Status in a Telephone Survey." *Proceedings of the Section on Survey Research Methods*, American Statistical Association, pp. 1258-1262.

Kennedy, J.M., Parks, R.B., Bannister, N., Inghram, J., and Terhune, H. (1998). "An Analysis of the Effect of Varying Presurvey Letter Characteristics on Cooperation Rates." Paper presented at the Annual Conference of the American Association for Public Opinion Research, St. Louis, MO.

Kulka, R.A., McNeill, J.J., Guess, L. (1983). "An Evaluation of Alternative Procedures for Reducing Refusals In Telephone Surveys of the General Public." Paper presented at the 38th Annual Conference of the American Association for Public Opinion Research, Buck Hill Falls, PA.

Link, M., J. Kelly, and A. Malizio (2000). "Telephone Answering Machine Messages as a Tool for Reducing Survey Nonresponse." Paper presented at the Annual Meeting of the American Association for Public Opinion Research, Portland, OR.

Smith, W., Chey, T., and Jalaludin, B., Salkeld, G., and Capon, T. (1995). "Increasing Response Rates in Telephone Surveys: a Randomized Trial." *Journal of Public Health Medicine*, 17: 33-38.

Tuckel, P.; Schulman, M. (2000) "The Effect of Leaving Different Answering Machine Messages on Response Rates in a Nationwide RDD Survey" *Proceedings of the Section on Survey Research Methods*, American Statistical Association, pp. 901-906.

Weisberg, H.; Krosnick, J.; Bowen, B. (1996) *An Introduction to Survey Research, Polling, and Data Analysis.* Thousand Oaks. Sage Publications.

State	2001 RR	Sent Letter	No Letter
South Carolina	41.7	645	644
Mississippi	46.6	366	365
Virginia	51.8	599	558
Idaho*	54.3	329	329
North Carolina*	56.2	690	689
Total		2629	2585

		Table	1.	
States	Included	in Lead	Letter	Experiment

*Note: Data from ID and NC were not available for inclusion in this preliminary report of findings.

States Included	in Answerin	ng Machine Mess	sage Experiment
State	2001 RR	Left Message	No Message
New York	35.1	219	222
Connecticut	39.0	231	286

189

92

10

104

975

181

76

149

98

1012

NA

NA

45.7

46.4

50.4

59.4

Table 2.

	Sen	t Letter	No		
		%		%	
State	Ν	Complete ²	Ν	Complete ²	Sig. ³
Total	1147	37.4	1125	27.8	.001
Mississippi	295	49.5	296	38.9	.01
Virginia	322	40.4	300	29.0	.01
South Carolina	530	28.9	529	21.0	.01
North Carolina ⁴	NA	NA	NA	NA	NA

Table 3 Preliminary Completion Rates¹ by Lead Letter Experiment Status

Rates reflect preliminary results from production for approximately the first three weeks in April. ² Percent complete calculated as completes / completes + known eligibles + unknown eligibles. ³ Significance based on Chi-square test of significance. ⁴ Preliminary data not available for inclusion.

NA

NA

NA

Indiana

Oregon

Total

Idaho⁴

Arkansas

Wyoming

Table 4
Preliminary Initial Refusal Rates ¹ by Lead Letter Experiment Status

ļ	Sent Letter		No Letter		
		% Initial		% Initial	
State	Ν	Refusal ²	Ν	Refusal ²	Sig. ³
Total	1379	26.9	1373	32.3	.001
Mississippi	366	25.7	365	34.5	.01
Virginia	559	15.9	558	18.8	.115
South Carolina	645	29.1	644	32.9	.080
North Carolina ⁴	NA	NA	NA	NA	NA
Idaho ⁴	NA	NA	NA	NA	NA

¹ Rates reflect preliminary results from production for approximately the first three weeks in April.
² Percent initial refusal calculated as ever refusal / total released sample.
³ Significance based on Chi-square test of significance.
⁴ Preliminary data not available for inclusion.

	Sent Letter		No		
		% Refusal		% Refusal	
State	Ν	Conversion ²	Ν	Conversion ²	Sig. ³
Total	366	10.9	439	6.6	.02
Mississippi	92	19.6	124	12.9	.127
Virginia	89	11.2	105	2.9	.02
South Carolina	185	6.5	210	4.8	.299
North Carolina ⁴	NA	NA	NA	NA	NA
Idaho ⁴	NA	NA	NA	NA	NA

Table 5 Preliminary Refusal Conversion Rates¹ by Lead Letter Experiment Status

¹ Rates reflect preliminary results from production for approximately the first three weeks in April.

² Percent refusal conversion calculated as number of initial refusals converted to completes / number of cases ever at refusal status.
³ Significance based on Chi-square test of significance.

⁴ Preliminary data not available for inclusion.

Table 6 Preliminary Completion Rates¹ by Answering Machine Message Experiment Status

	Message Left		No Message		
		%		%	
State	Ν	Complete ²	Ν	Complete ²	Sig. ³
Total	953	19.2	976	16.9	.190
Arkansas	91	22.0	76	22.4	.952
Connecticut	222	13.5	267	12.0	.613
Indiana	184	20.1	177	18.6	.725
New York	216	9.3	216	10.2	.745
Oregon	137	23.4	145	28.3	.346
Wyoming	103	42.7	95	20.1	.001

¹ Rates reflect preliminary results from production for approximately the first three weeks in April.
² Percent complete calculated as completes / completes + known eligibles + unknown eligibles.
³ Significance based on Chi-square test of significance.
⁴ Preliminary data not available for inclusion.

	Mess	Message Left		No Message	
		% Initial		% Initial	
State	Ν	Refusal ²	Ν	Refusal ²	Sig. ³
Total	975	41.3	1012	41.0	.883
Arkansas	92	35.9	76	43.4	.319
Connecticut	231	45.0	286	39.9	.238
Indiana	189	46.6	181	40.3	.227
New York	219	33.3	222	34.7	.765
Oregon	140	49.3	149	49.0	.960
Wvoming	104	34.6	98	45.9	.101

Table 7 Preliminary Initial Refusal Rates¹ by Answering Machine Message Experiment Status

¹Rates reflect preliminary results from production for approximately the first three weeks in April. ² Percent initial refusal calculated as ever refusal / total released sample. ³ Significance based on Chi-square test of significance. ⁴ Preliminary data not available for inclusion.