

ANSWERING MACHINE MESSAGES AS TOOLS FOR AN RDD TELEPHONE SURVEY

Kymn M. Kochanek, Donald P. Camburn, Ann-Sofi Roden, Marilyn Sawyer, Abt Associates Inc.; Chuck D. Wolters, James T. Massey, National Center for Health Statistics; Elizabeth R. Zell, Pamela L.Y.H. Ching, Centers for Disease Control and Prevention

Kymn Kochanek, Abt Associates Inc., 101 N. Wacker, Suite 400, Chicago, IL 60606

Key Words: CATI, NIS

I. Introduction

Every telephone survey will face answering machines as an outcome of some significant portion of the calls made in attempting to reach respondents. For the NIS, in a single quarter at least one attempt for the telephone number resulted in an answering machine outcome for 19.35% of the sample, or 77,764 out of 405,562 telephone numbers released to the telephone center. Our efforts were driven to achieve two ends: derive sufficient information from the message provided on the machine to make a classification that the telephone number was associated with a business or a residence, and if a residence, or of unknown status, to gain cooperation from the respondent by having them answer the next or some subsequent call, or return our call on the 800 number provided.

II. Background and Methods

At the beginning of the second quarter of 1994, Abt Associates Inc. began the NIS data collection, which will end with the final quarter of 1997. The study is being conducted to establish baseline estimates of vaccination levels of children between the ages of 19 and 35 months of age and to monitor changes in these levels over the four years of data collection. The study is being conducted in 78 Immunization Action Plan (IAP) areas which are geographic subsets of the United States and include 27 major metropolitan areas, the District of Columbia, and the 50 states. Each quarter, telephone numbers are randomly generated in replicates of 500 for each IAP and a list-assisted process is then applied to pre-screen working versus non-working status, and household versus business assignment by the telephone companies.

The telephone numbers that are identified as both probable working and residential are then released to the telephone center for the conduct of a computer-assisted telephone screening. Where an eligible household is discovered an interview is conducted, all respondents are asked to use their child's shot records for reporting the types, numbers and dates of the five antigens (DTP-diphtheria, tetanus, pertussis, Polio, MMR - measles,

mumps, rubella, Hib- Haemophilus influenzae type b, and hepatitis B). Parents are able to locate and use the shot record to complete the NIS survey about 50% of the time. Beyond this, respondents are asked some important demographic information that relates to the probabilities of the child being up-to-date, and to also provide information and consent for contact of the provider(s) of the vaccinations.

Use of a telephone-based sample design and data collection mode necessarily limits the target population to which inferences can be made to residents of households with telephones. Non-coverage bias in design is therefore a major concern. Although only approximately 7% of households in the U.S. do not have a telephone, the percentage of households with young children without telephones is significantly higher.⁷ Other factors closely related to the vaccination status of children, such as family income, minority status and education of the mother, are also significantly correlated with telephone ownership. In addition, telephone coverage of the household population varies by geographic area.

Because telephone coverage is uneven and therefore complicates our ability to extrapolate for the whole population, high response rates, including number resolution, household screening, and interviewing, were set for NIS. Resolving individual numbers, identifying whether they are working or not and whether they are categorized as residential or not, is as critical to the success of the study as collecting immunization information. Abt is achieving a 97% resolution rate of the numbers released to the computer-assisted telephone interviewing system (CATI). The numbers released to CATI are only those that were not identified as non-working or businesses through the identification process described above.

III. Procedures

Answering machines are an important component of the strategies we use to resolve telephone numbers. We created three separate dispositions to track and summarize the encounters with answering machines: 101 - Known Households, 119 - Known Business, and 121 - Household Status Unknown.

To be declared a known household the answering

machine message for the telephone number had to include one of the following words: family, household, residence, or home. Such a number counts toward the first tier of finalization - resolution, for which a number need only be determined working and a probable household.

For a telephone number to receive a case status of 119 (Final Status - Business Answering Machine) the answering machine message had to include the name of a nationally known company. The company or agency need not be located in every state, so companies as John Deere, Dow Chemical, NYNEX, etc. would be included. The answering machine message only needs to be encountered once and does not require verification by another interviewer or supervisor to be finalized as a business. All other answering machine messages were coded as household status unknown.

The reason that a more broad definition of business was not used is the concern that with growing numbers of people working from home some answering machines with more vague messages might actually be used for dual purposes. We hypothesized that households with small children might very likely be the types of households that would have at home workers. So messages that included phrases like "You've reached Bob's Garage" were considered indistinguishable from "You've reached Bob's answering machine".

We initiated our use of answering machine messages as a tool in the second quarter of 1994 (Q2) with messages being left after the third encounter. Because of the volume of calls coming into the 800 number, we altered our strategy by quarter three (Q3) to start leaving messages on the first call and there after every third call. This resulted in a message being left every 2 to 5 days depending on the call pattern for the specific case. We have retained this procedure for quarter 4 (Q4), and the first two quarters of 1995 (Q1 1995 and Q2 1995). The content of the message has evolved from naming the U.S. Public Health Service to the Centers for Disease Control with added description of the intent of the study. The content is revised about every other month for two purposes: 1) to increase the response from repeated calls to numbers associated with answering machines, and 2) to keep the message fresh for interviewers. Debriefings are held with the interviewers to suggest new wording. Experimentation has occurred linking the message content with the language of the screener and advance letter. Analyses may be found in other publications.

A problem we encountered was with a machine that takes only a 15 to 30 second message. Interviewers have been instructed to call the telephone number again, identify the project and leave the 800 number indicating that we were unable to leave the entire message during

the last call,

IV. Frequency of Encountering Answering Machines

Of the 401,959 telephone numbers released for Q4 1994, 7,344 (1.83%) were identified as businesses as a result of assessing the answering machine message. Another 70,420 (17.52%) telephone numbers had at least one call outcome of an answering machine and were identified as likely or unknown households, but were unlikely to be businesses. Combined, fully 19.35% or 77,764 of telephone numbers for the quarter had at least one attempt at which we encountered an answering machine.

Our experiences in Q1 1995 held quite constant. Of the 407,954 telephone numbers worked, 8,694 were business answering machines, 70,629 were non-business answering machines, and the remaining 328,631 never had a single call outcome as any type of answering machine.

V. Reaching Resolution

The process of finalizing cases has become more efficient, while in Q4 it took interviewers an average 3.5 calls to resolve answering machines attached to business telephone numbers, in Q1 1995 that was reduced to 2.4 calls. Similar reductions occurred for numbers that had any attempts that contacted a non-business number or never reached an answering machine.

This efficiency was achieved in three ways: 1) retraining and clarification of the process of identifying households and businesses by phone, 2) leaving clearer messages more frequently, and 3) setting call limits on chronically unresolved telephone numbers.

VI. Location of the Answering Machines

In each quarter, the telephone center receives on average nearly 405,000 telephone numbers to dial to achieve the 8,580 needed immunization interviews. These 405,000 telephone numbers are distributed unevenly across the 78 IAPs because of the varying eligibility and working household number rates. This geographic influence finds its way into the answering machines as well as seen in Table 1.

Encountering answering machines for a percentage of the telephone numbers by DHHS region ranged from 15.62% (Mountain) to 21.39% (New York) within Q4, and from 15.57 (Mountain) to 21.22 (New England) for Q1 1995. While the variance in encountering answering machines per quarter barely registered, a gain of .09% from Q4 to Q1 1995, some regions varied much more

significantly, most notably the Panhandle area with an increase of nearly 2%.

Strategies for resolving answering machine encounters might be tailored to the geographic location by assessing gender affects, message content, or by using a combined English and bilingual message NIS will continue to assess and experiment with the geographic differences.

VII. Effects of Answering Machines on Response Rates

Although the overall response rate for answering machines varied little, 69.97% for Q4 to 69.09% for Q1 1995, there was great variability between the eligibility rate and screener response rate. A few things may have contributed to this, including: setting upper limits on calls and message content. Further analysis is needed.

The rates fluctuated significantly between telephone numbers with an answering machine and those without. Unfortunately, the fluctuation was not consistent in one direction. While the eligibility rate is higher for households with answering machines, the screener rate is lower, yet the cooperation rate is significantly higher. This suggests that hitting an answering machine is helpful in targeting resources and strategies were our target population is concerned. One might conclude that the messages left encourage eligible households to declare themselves and cooperate. Ineligible households, knowing the study has nothing to do with them, appear less likely to declare themselves by calling the 800 number or picking up the phone on subsequent attempts, thereby decreasing the screening rate. Table 7 summarizes the differences in final outcomes and overall rates for both quarter 4 and quarter 1.

VIII. Business Office Calls

An additional effort was made to resolve "chronic" answering machines, those telephone numbers with 24 or more attempts without contact with a person, by checking the telephone business offices. Using Q4 data as representative, we found that 56.75% were confirmed as residential, 25.32% were identified as businesses, and for 17.92% of the numbers the telephone business offices refused or were unable to provide information. Business office attempts for all Q1 1995 cases and data entry of the outcome had not finished for Q1 1995 at the time of this paper.

TABLE 1. Comparing Final Outcomes for Cases With and Without Answering Maching Events (Quarter 4, 1994 and Quarter 1, 1995)

	Q4 Answering Machine at Least Once (Residence or Business)	Q4 Never Answering Machine	Q1 Answering Machine at Least Once (Residence or Business)	Q1 Never Answering Machine
Non-working/ Out of Scope	2,224	92,642	977	91,634
Business	11,063	45,153	12,603	46,280
Noncontact/ Unknown Scope	149	3,663	58	6,024
Total Non-residential Outcomes	13,436	141,458	13,638	143,938
Answering Machine	295	335	1,878	45
Known households	2,164	4,254	3,148	6,459
Likely Households	2,621	3,307	3,727	5,361
Ineligible Households	63,641	158,576	61,576	156,674
Complete Interviews	2,758	6,716	2,987	6,081
Partial Interviews	168	169	373	370
Total Possible Households	71,647	173,357	73,689	174,990
Proportion of Eligible Households	4.15	4.06	4.63	3.74
Screener Response Rate	93.27	95.64	88.74	93.49
Cooperation Rate	83.83	54.83	83.67	54.65
Overall Response Rate	69.97	72.85	69.09	63.09

IX. 800 Line call-in

On average per month NIS receives 3400 calls on the 800 line. A respondent would call under one of three circumstances: 1) in response to the advance letter that is mailed, 2) as a result of a message that was left on their answering machine, or 3) in the course of the interaction with the interviewer they requested the 800 number to confirm the validity of the study. Fully 96.81% of the time a respondent calls in to the 800 line it is answered immediately by a staff member. The remainder (3.19%) are calls made prior or subsequent to our normal business hours, or calls during our business day when the 800 line is fully occupied. Two incoming calls can be accommodated by the 800 line through call forwarding to another station, or roll-over after three rings to the back-up station.

By completing an analysis of the calls received at the 800 line for Q1 1995 only (n= 4832), we found that 95.74% were in response to messages left on answering machines. These calls added 72 completed immunization interviews and 4,477 households screened out as ineligible. Contributing .08% to the goal of 8,580.

X. Conclusion

Answering machines are in use by a significant portion of households throughout the U.S. and can be the key to reaching our target population. The use of multiple dispositions to separate out known businesses and households aids our resolution process. Answering machines seem to signal more likely eligible households. Despite the fact that a higher dial rate is required to resolve the telephone number, when used properly answering machines can achieve a higher cooperation rate. The assessment is that answering machines are able to provide information and can be used to engender response from our respondents, either in their willingness in subsequent calls to cooperate, or to call us to complete the survey.

The future holds many challenges with the increasingly available technology including voicemail, answering machines, beepers with display capability, call forwarding and other communication tools. On NIS we see a continuing opportunity to experiment on and conduct analysis of the effects of answering machines, including: message content, frequency of the messages, interval between the messages, and the gender of the person leaving the message, to name of few areas.

1. Thornberry, O. and Massey, J. 188. "Trends in United States Telephone Coverage Across Time and Subgroups." Telephone Survey Methodology, New York Wiley