Use of Smartphones to Collect Information about Health Behaviors: Feasibility Study

New

Supporting Statement: Part B

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May 17, 2012

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COLLECTIONS OF INFORMATION EMPLOYING STATISTICAL METHODS

B.1 RESPONDENT UNIVERSE AND SAMPLING METHODS

The universe for the study is English-speaking U.S. residents aged 18-65. Major goals of the study are to evaluate the extent to which this universe can be covered by cell phone users in general and smartphone users in particular. The cell phone sample will be a national RDD sample of telephone numbers from a frame of known cell phone exchanges. We will purchase the cell phone RDD sample from MSG.

The primary goal of the sampling plan is to recruit ~700 smartphone respondents to the smartphone/text message surveys. Based on recent experience on other studies, we expect 63% of cell phone RDD respondents to be smartphone users, 80% to be between 18 and 65 years old, and 85% to be eligible based on being between ages 18 and 65 and being able to complete the survey in English. Of those we identify, we expect 70% to agree to participate in the follow-up surveys. Thus, we will need ~1990 initial interview respondents to identify 995 smartphone users, of whom approximately 500 will complete the follow-up surveys via Web (survey invitations will be sent by text message to respondents' smartphones) and 200 will complete by text message.

The follow-up survey cooperation rates are unknown (they are an important study outcome), but, given that respondents will be given incentives, and the surveys are very short, we hope that 85% of the recruited sample will participate in at least one survey, and 70% will participate in both. Table 1 shows the estimated sample sizes for important study comparisons based on these assumptions.

Table 1: Levels of Analysis and Estimated Sample Sizes

Evaluating	Comparing		То	
		Approx. N		Approx. N
Cell phone coverage	18-65 year old RDD cell respondents	1580	RDD non-respondents (from Census and NHIS)	N/A
Smartphone coverage	Smartphone users	995	Non-smartphone cell users	585
Smartphone non-response	Smartphone users who agree to follow-up	697	Smartphone users who do not agree	298
All cell type (smartphone/ text message) non-response	Smartphone and text message recipients who agree to follow-up	897	Invited participants who refuse	384
Smartphone and telephone interview responses	Smartphone users who answer at least one weekly survey	592	Smartphone users who answered the initial survey	697
	Smartphone + text respondents who answer at least one weekly survey	762	Smartphone + text respondents who answered the initial survey	897
Smartphone vs. text message survey data quality (responses and item non- response	Smartphone users who answer at least one weekly survey	592	Text message respondents who answer at least one weekly survey	170

B.2 PROCEDURES FOR THE COLLECTION OF INFORMATION

The pilot survey will consist of an initial telephone interview followed by a series of two smartphone/text message interviews.

The Smartphone Study sample will consist of a national RDD sample of phone numbers from cell phone and cell/landline exchanges. The exchanges originate from the Telecordia[®] TPM[™] Data Source. The cell phone exchanges and mixed-use exchanges are identified from exchange type.

Initial interview. Respondents will be contacted by trained interviewers. Respondents who are aged 18-65 will be asked simple demographic questions and questions about smoking and alcohol consumption (Appendix D). The questions will be drawn or adapted from the National Adult Tobacco Survey (OMB No.

0920-0828, exp. 10/31/2010), the National Health Interview Survey (OMB No. 0920-0214, exp. 8/31/2014), the Youth Risk Behavior Survey (OMB No. 0920-0493, exp. 11/30/2011), and other existing health surveillance instruments. Those who have smartphones will be asked to participate in the smartphone pilot. A sample of those who do not have smartphones will be asked to participate in the text message pilot. This phase will allow us to measure the coverage error associated with restricting the sample to smartphone holders and will set the stage for comparing data quality of RDD and smartphone question responses.

Smartphone interview. One goal of the study is to compare responses to the smartphone interview to responses to the initial interview. The topics of the smartphone interview, therefore, will be similar to those of the initial interview: alcohol and tobacco consumption. Another goal is to test the utility and quality of data collected via several short smartphone interviews. That is, part of the utility of the smartphone interview is in researchers' ability to use it like a diary, sending invitations to complete frequent, short interviews.

Text message interviews. Another goal of the study is to compare data collected directly through text messages to data collected via smartphones. Since text messages are limited in length, and an opt-out message must be included, the text message questions will be shorter (Appendix D) than the smartphone interview questions, but their content will be similar.

Telephone interviewing procedures

Managing Call Attempts: Each call attempt will be given a minimum of five rings. Careful management of the sample allocation and scheduling of interview sessions will assure adequate penetration coverage of residential households with a maximum of 6 attempts for unresolved telephone numbers. Persistent "ring - no answers" will be attempted a minimum of four times at different times and days of the week.

Conducting the Interview: A screener will be conducted at the beginning of each call (Appendix C). The screener consists of: (1) verification of phone number; (2) verification of private residence; and (3) verification that respondent is between 18 and 65 years of age; and (4) not driving or engaging in another activity that could jeopardize safety.

Attempting Call-backs: The calling system optimizes queuing for definite call-backs by continuously comparing station sample activity and the index of definite call-back records. When a definite appointment time arrives, the system finds the next available station and delivers the record as the next call. The call history screen that accompanies each record informs the interviewer that the next call is a definite appointment and describes the circumstances of the original contact. Callbacks to cell phone users will be limited to one additional refusal attempt after an initial refusal because refusal conversion attempts are less successful on cell phones than landlines. Nonetheless, scheduling and honoring callbacks is critical to achieving high response rates.

Managing Interrupted Interviews: Interrupted interviews with receptive respondents will be restarted using a definite call-back strategy. A definite call-back for an exact time can be set and the interview can begin where it left off. If the interviewer who began the survey is available at the prescribed time, the system will send the call back to that station.

Recording Call Dispositions: Dispositions of each call attempt on all records in the sample will be automatically stored in the CATI system. This provides a complete call history for each record in the sample. The call history is displayed on the interviewer's screen during each new attempt.

At the start of the initial CATI interview, the interviewer will read the informed consent (included in Appendix C as part of the Screener) to each participant. The consent form describes the interview, provides information on whom to contact with questions about any aspect of the study, and indicates that participation is completely voluntary and that participants can refuse to answer any question or discontinue the interview at any time without penalty or loss of benefits. The interviewer will enter a code via the keyboard to signify that the participant was read the informed consent script and agreed to participate.

Smartphone interviewing procedures

Invitation to participate: We will send invitations to participate by text message to respondents who agreed during the initial CATI interview to participate in the Smartphone study. Each text message will contain introductory text, a link to the survey, and a message regarding how to opt out of the survey:

CDC/ICF Macro Smartphone Study: _http://mysurvey.icfsurveys.com?id=abc123. To unsubscribe, text "STOP" to //destination//.

Survey administration. The link embedded in the text message invitation will direct respondents to the survey (Appendix E and Appendix F) and also provide the website with their randomly-generated, unique Master ID. Smartphone screens are small, and they may be portrait- or landscape-oriented. The surveys will be formatted to fit on these screens. Specifically:

- Survey questions and response categories will be short so that the necessity for scrolling is eliminated.
- Only one question will appear on each screen.
- There will be no grids or questions that require zooming.
- Focus group results may also be used to refine question presentation.

Text message interviewing procedures

Text message opt in. We will send invitations to participate by text message to respondents who agreed during the initial CATI interview to participate in the text message study. Before we send multiple messages (one message per survey item) to a cell phone number, it is appropriate to gain a second optin from the phone owner. Respondents will be asked to reply "yes" to a phone text message to enroll in the study.

Survey questions. Survey questions (Appendix G and Appendix H) will be sent one at a time. An automatic program will be used to check survey responses and send follow-up questions to compliant responses (e.g., "YES", "yes", etc.). Responses will also be visually reviewed at the end of each day to determine whether respondents sent a compliant response that was not recognized by the automatic system (e.g., "yes").

Opt out. The automatic system and visual review will also identify responses of STOP, the code that respondents will be instructed to use to opt out of the survey.

Incentives. Incentives for the text message surveys will be based on the same point system used in the smartphone surveys, but respondents will only have the option of receiving Amazon.com gift codes.

Quality Control

Maintaining the integrity of the data at each phase is a priority for the smartphone pilot. Table 2 shows the specific steps we will take to ensure that the data and the final analysis are accurate.

Survey Step	Quality Control Procedures
Testing of CATI and internet programs	 Visually review each question and response options (100%) Use "skip check" program and randomly generated data to check every possible path through the survey (100%) Use skip check program to test all data collected during data collection (every 24 hours)
CATI quality assurance	 Monitor at least 10% of all interviews (10% sample) Monitor each interviewer at least once per week (100%) Assign supervisors to manage a team of no more than 10 interviewers (100%) Participate in daily briefing call with Command Center (100%) Review call center shift reports and internal project tracking reports daily (100%)
Internet data collection quality assurance	 Project management staff phone numbers "seeded" in text message invitations (100%) Visual review of % in-survey break-offs (daily)
Text message data collection quality assurance	 Project management staff conduct a complete pilot survey to test all automatic systems before the survey is conducted with respondents (100%) Project management staff phone numbers "seeded" in text message invitations and questions (100%) Daily visual review of responses from participants to ensure that all messages are correctly recognized by automatic systems
Preparation of data files	 Assign a final disposition to each record (100%) Produce frequency tabulations of every question and variable to detect missing data or errors in skip patterns (100%)

B.3 METHODS TO MAXIMIZE RESPONSE RATES AND DEAL WITH NO RESPONSE

Two different kinds of response rates are used in CATI studies. The Cooperation Rate (CR) is the proportion of all respondents interviewed of all eligible units in which a respondent was selected and actually contacted. Non-contacts are excluded from the denominator. This rate is based on contacts with households containing an eligible respondent. For the cell phone RDD sample, we expect to attain a CR of 65% to 85%, with a mean of 70% to 75%. A Response Rate (RR) is an outcome rate with the number of completed interviews in the numerator and an estimate of the number of eligible units in the sample in the denominator. For the cell phone RDD sample, we expect to 40%, with a mean of 30%-35%.

To maximize cell phone survey response rates, we have kept the initial interview as short as is feasible. Dialing attempts will be spaced across daytime, weeknight, and weekend calling periods. Cell phone numbers will be dialed up to a maximum of six times, and we will expand calling hours both earlier and later to facilitate the completion of surveys with respondents who request a callback outside of normal calling hours.

To provide respondents with easily accessible information about the study, we will provide a project menu of Interactive Voice Recognition (IVR) options, so that respondents who wish to learn more about the study or verify its legitimacy may access a study-specific IVR system via a study-dedicated toll free number.

The smartphone and text message survey response rates are an important outcome of this feasibility study. To ensure that respondents do not incur uncompensated costs for data or text messages, they will be given a payment of up to \$10 for their participation.

Evaluating non-response is an important part of the present study. We will evaluate coverage and nonresponse error on alcohol consumption, tobacco use, sex, race, and ethnicity. See Table 1 for the specific planned comparisons.

B.4 TESTS OF PROCEDURES OR METHODS TO BE UNDERTAKEN

The purpose of this study is to evaluate procedures for collecting data using smartphones or text message surveys. On April 5, 2012, two focus groups of 4 participants each were conducted to evaluate the feasibility of using Smartphones for health and behavior data collection. During these groups, participants were asked questions to discern what kinds of and how many questions could be asked on a survey to be completed by smartphone or text message, what type of incentive would be needed, and what other barriers to participation were identified. Information gained from these focus groups included:

- The incentive amount and how interesting a project is are strong motivators to participate;
- Perceived burden of survey completion (including the inclusion of multiple choice vs. openended questions) is a barrier to participation;
- The use of contingent incentives is an effective way to increase compliance over time; and
- Most respondents are willing to answer sensitive questions on a Smartphone.

In addition, the focus groups revealed important, new information regarding barriers to Smartphone survey participation, including:

- Individuals with Androids and Blackberries face usability challenges that may impact their willingness to complete a survey on a Smartphone;
- Many individuals have Smartphones provided through their work, and would not be willing to answer survey questions on a work phone;
- Although all participants were active Smartphone users, many perceived their Smartphone as less secure than their laptop or desktop computer;
- Many participants do not shop online, and would not be motivated by online incentives such as ZashPay or Pay Pal; and
- Some participants would be very reluctant to participate in surveys which would require scanning products with their Smartphones.

Feedback from the focus groups will be used to help develop the surveys. Prior to collecting CATI data for the initial interview, a pretest of 20 interviews will be conducted to sharpen the articulation of certain survey questions and confirm the empirical estimate of the survey burden. The smartphone and text message surveys will be beta tested by ICF Macro using staff's smartphones and feature phones. The test will provide information on elements such as survey login procedures and displays of survey questions on screens, as this may differ by carrier and by phone type

<u>B.5</u> Individuals Consulted on Statistical Aspects and Individuals Collecting and/or Analyzing Data

Statistical aspects of the study have been reviewed by the individuals listed below.

Statistical Review

Shanta Dube, MPH, PhD Office on Smoking and Health National Center for Chronic Disease Prevention (NCCDPHP) Centers for Disease Control and Prevention (CDC) 4770 Buford Highway, MS K-50 Atlanta, GA 30341 770-488-6287 skd7@cdc.gov

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Data Collection

The representative of the contractor responsible for conducting the planned data collection is:

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Data Analysis

Analysis of data will be conducted by the individuals listed below.

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