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SECTION B

B) Collections of Information Employing Statistical Methods

NHTSA is seeking approval for two survey instruments to measure public awareness, attitudes, and behaviors regarding distracted driving and interventions to reduce distracted driving.

The first survey is the National Survey of Distracted Driving Attitudes and Behavior (NSDDAB), which will be conducted annually with a national sample of 6,000 drivers ages 16 years and older (pending IRB approval). The sample will include residents from all 50 States and the District of Columbia and will begin no earlier than September 2010. This survey will provide a measure of national public awareness of distracted driving behaviors. A 'driver' is defined as a person who has driven within the past year. An over-sample of drivers aged 16-34 years old will be incorporated in the national sample.

The second survey, the Distracted Driving Intercept Survey (DDIS), will measure attitudes and awareness of distracted driving messaging and enforcement. This survey will be conducted in program and control sites with samples of 400 drivers per site ages 16 years and older who are recruited at driving license offices in program and control cities. It is a paper and pencil survey administered in driver licensing offices while drivers are waiting to have the photograph developed at the last stage of a license renewal procedure.

Although the NSDDAB and the DDIS have similar core questions that will be used to help NHTSA understand distracted driving, these surveys are different in important ways. The NSDDAB is designed to get a national representative sample to understand the prevalence of attitudes and behaviors related to distracted-driving. The DDIS will measure changes in awareness of distracted driving enforcement, messaging, and distracted driving-related behaviors before and after specific local enforcement mobilizations.

B.1) Describe the potential respondent universe and any sampling or other respondent selection method to be used.

B.1.a) National Survey of Distracted Driving Attitudes and Behavior (NSDDAB)

The general procedure in developing a population-based sample for the National Survey of Distracted Driving Attitudes and Behaviors (NSDDAB) involves four steps. The first step involves a population-based sample allocation in proportion to the 10 NHTSA regions according to the most recent Census Bureau estimates. NHTSA regions are divided as follows:

TABLE 3. NHTSA Regions

Region	States
Region 1-New England Region	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
Region 2- Eastern Region	New York, New Jersey, Pennsylvania
Region 3- Mid Atlantic Region	Delaware, District of Columbia, Maryland, Virginia, West Virginia, North Carolina, Kentucky
Region 4- Southeast Region	Alabama, Florida, Georgia, South Carolina, Tennessee
Region 5- Great Lakes Region	Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin
Region 6- South Central Region	Louisiana, New Mexico, Oklahoma, Texas, Mississippi
Region 7- Central Region	Iowa, Kansas, Missouri, Nebraska. Arkansas
Region 8- Rocky Mountain Region	Colorado, North Dakota, South Dakota, Utah, Wyoming, Nevada
Region 9- Western Region	Arizona, California, Hawaii
Region 10- Northwest Region	Alaska, Idaho, Oregon, Washington, Montana

The second step of the sampling process involves assigning telephone hundred banks with one or more residential directory-listed telephone numbers to the NHTSA regions. The third step in the sampling procedure is drawing a random sample of telephone hundred banks and append a two-digit random number to each of the sampled hundred banks. This step produces a list-assisted random digit dialing (RDD) sample of telephone numbers. The fourth step requires the screening of these numbers to identify households with eligible drivers and the selection of one eligible driver within each eligible household so that the household sample will yield a probability sample of the eligible driver population in the U.S. This allows valid generalizations to be made to the entire eligible population, within specified limits of expected sampling variability.

Based on the Census Bureau estimates of the non-institutionalized civilian population, we estimate that about 33 percent of drivers are between 16-34 years old. However, estimates from strictly RDD landline surveys for this age group are well below 33 percent. In the most recent findings from the Motor Vehicle Occupant Safety Survey (MVOSS) study, 16-34 year olds made up only 18 percent of the entire sample. The reasons for this discrepancy include: a lower response rate among younger adults, a higher proportion of 16-34 year olds living in group quarters (e.g. dormitories), and a higher proportion of this age group living in cell phone-only households. Hence, a simple proportionate sample of the adult driver population based on RDD landline methodology will not meet the needs of this study design. Consequently, persons 16 to 34 years old will be over-sampled using the following probability sampling procedure. The entire landline RDD sample will be divided into random subsamples called replicates. For one set of replicates, one eligible individual will be randomly selected from the sample household. For a second set of replicates, we will screen the sample household for the presence of eligible individuals aged 16-34 years, and randomly select one per sample household. The achievement of the target number of interviews is

managed through the careful release of sample replicates within each of the two sets. This approach yields a probability sample because no quotas are used.

Table 4 presents the national population figures and projected sample distribution by age for the total sample of 6,000 respondents. In this figure, we show the distribution of age given the population proportions, as well as our experience with the cross-sectional sample of drivers in MVOSS 2007 (i.e., without an oversample or a cell phone component). We outline our plan to correct for this discrepancy in the following sections.

TABLE 4. Expected Population and Sample Distribution By Age

	Population		Sample		
	Target Population (in thousands)	Percentage of Target Population	Population-Based Distribution of Sample	Expected Distribution of Sample** (n)	Expected Distribution of Sample (in percent)
Total (16+)	233,627		6,000	6,000	
16-24	37,476	16.04%	962	366	6.1%
25-34	39,960	17.10%	1,026	732	12.2%
35-44	41,735	17.86%	1,072	1,086	18.1%
45-64	77,397	33.13%	1,988	2,406	40.1%
65+	37,060	15.86%	952	1,410	23.5%

U.S. Bureau of the Census, Population Estimates, Age Category Estimates, 6/01/08
Source: http://www.census.gov/popest/national/asrh/files/NC-EST2007-ALLDATA-N-File19.csv
** Sample distribution from MVOSS 2007

B.1.a.1) NSDDAB Sample Construction

The target population specified for this study is the driver (aged 16 and older) population, residing in the 50 States and the District of Columbia. Consequently, the initial stage in the construction of this sample requires the development of a national probability sample of the non-institutionalized adult population of the United States.

The estimated distribution of the population by stratum is calculated on the basis of the U.S. Census Bureau, *Population Estimates by State by Single Year of Age, Sex, Race, and Hispanic Origin: 2008*[1]. The population estimates are taken for the population age 16 and older. Based on these Census estimates of the geographic distribution of the target population, the total sample is proportionately allocated by NHTSA region.

[1] http://www.census.gov/popest/datasets.html

B.1.a.2) NSDDAB Cell Phone-Only Households

For the past several decades, random-digit-dial (RDD) landline telephone sampling has provided a cost-efficient strategy for conducting surveys of the U.S. household population. However, as the percentage of cell phone-only households (households with no landline but accessible by cell phone) continues to grow, the validity of the basic RDD landline sampling model has come into question. The increasing percentage of households that are abandoning their landline telephones for cell phones has significantly reduced the population coverage provided by landline-based surveys. For the second half of 2008, the percentage of cell phone-only households was 20.2 percent according to the National Health Interview Survey (NHIS) (Blumberg & Luke 2009[2]). Moreover, three out of five (60.6 percent) of all adults living with unrelated roommates and two out of five (41.5 percent) adults aged 25 to 29 years live in cell phone-only households. These adults are not covered by current RDD landline sampling procedures, which exclude telephone exchanges and 1,000 banks used exclusively for cell phones. Based on NHIS estimates from January-June 2004 to July-December 2008, the percentage of cell phone-only households is increasing. Furthermore, these are some of the same groups that are increasingly under-represented in current RDD landline telephone surveys due to differential non-response.

The NSDDAB will include a sample of cellular telephone numbers by drawing a NHTSA-region stratified sample of cellular telephone numbers. Regional stratification based on cellular area codes is feasible to implement because the regions are defined in terms of states. However, due to number portability, some cell phone respondents may be living outside of their area code. We will ask all cell phone respondents what their State and zip code is in order to account for this.

For the cell phone-only sample, we will interview drivers that only have cellular telephone service and do not have a landline phone in their household. Our experience with other surveys is that about 40 percent of the contacted adults in a cell phone sample only have cellular telephone service, while 60 percent have a cell phone and a landline in their household. We will conduct 780 interviews with cell phone-only households.

B.1.a.3) NSDDAB Landline and Cell Phone Mostly Households

Dual frame sampling indicates that one can use a landline RDD sample to sample landline-only households and households that have landline and cellular telephone service (dual service). If one screens for cell phone-only adults in the cell phone sample, then the design is referred to as a non-overlapping dual frame design (i.e., a two-stratum design: landline households and cell-only individuals). Estimation procedures are much simpler for non-overlapping dual frame designs compared to

[2] Blumberg S J, Luke JV. Wireless substitution: Early release of estimates from the National Health Interview Survey, July-December 2008. National Center for Health Statistics. May 2009. Available from: http://www.cdc.gov/nchs/nhis.htm.

overlapping dual frame designs (e.g., if we also included adults in the cell phone sample with dual telephone service). Therefore, most cell phone samples have only included cell phone-only adults.

Landline households include both households which exclusively use a landline (i.e., do not own or use a cellular phone) as well as those with dual telephone service who primarily use their landline phone. We will conduct 4,440 interviews with respondents in landline mostly households.

NHTSA is oversampling 16-34 year olds in the landline sample because they are overrepresented in motor vehicle crashes. Blumberg and Luke (2009) demonstrate that at least 50 percent of those living in cell phone only households are between the ages of 16-34. There is a slightly smaller proportion of 16-34 year olds living in households which are cell phone mostly. Thus, we anticipate completing about 702 interviews in this age group from the 1,560 interviews in the cell phone sample. This is in addition to 721 16-34 year olds we expect to contact in the landline sample and 500 16-34 year olds we will oversample via landline, bringing the total number of 16-34 year-olds in the final sample to 1,923 (32 percent of total sample).

Cell phone mostly households are those households which have both a landline and a cell phone. Past studies have shown that cell-phone mostly households are similar, in many ways, to cell phone-only households (e.g. Blumberg & Luke, 2009). We will conduct 780 interviews with respondents in cell phone mostly households.

Non-Overlapping Dual Frame Design

Landline RDD Sample		
Landline Only/Mostly	Cell Phone Mostly	Cell Phone Only

In Table 5 we show the expected number of interviews which will be conducted using each sample stratified by age. These numbers are based on estimates from past studies and are not meant to reflect an exact representation of the final sample.

TABLE 5. Sample Size by Type and Age

	RDD Sample (87%)			**Cell Phone Sample (13%)**	
Age	**Landline**	**Landline Oversample**	**Cell Phone-Mostly**	**Cell Phone-only**	**TOTAL**
16-34	721	500	312	390	1,923
35+	3,219	0	468	390	4,077
TOTAL	**3,940**	**500**	**780**	**780**	**6,000**

B.1.b) Distracted Driving Intercept Survey (DDIS)

NHTSA plans to use the DDIS to examine the public awareness of enforcement and messaging of a distracted driving enforcement mobilization demonstration. The potential response universe for the DDIS is a quota sample of licensed drivers drawn from people visiting the department of motor vehicle offices in the demonstration project cities and in appropriate control cities for the periods two weeks before and two weeks after the planned distracted driving mobilizations. See Appendix G for a detailed demographic description of the control and experimental sites in Connecticut and New York.

In quota sampling, the population is segmented into mutually exclusive demographic sub-groups. Subsets of the population are created by examining the census data on the demographics of the particular city so that each subset has a common characteristic, such as age, sex, and race. Subjects are recruited as they arrive at Driver Licensing offices and the researcher will assign them to demographic groups based on variables like age and sex. When the quota for a given demographic group is filled, the researcher will stop recruiting subjects from that particular group. This approach is useful in obtaining a representative sample within the limited time before and after the multiple media waves and enforcement mobilizations. It is an economical way to obtain responses from licensed drivers within a limited geographic area who cannot be reached via land line telephones and participate in phone surveys. Since targeting people with cell phones-only in a limited geographical area is difficult, intercept surveys using quota sample is an efficient way to reach these people.

External validation of the measures produced in the Survey will be obtained by administering the survey at different sites within the demonstration cities and control cities so that observed differences can be reported across sites. NHTSA proposes to administer surveys at Department of Motor Vehicle offices in both the control and program sites. In Syracuse, NHTSA plans to administer surveys at both the Syracuse DMV and the North Syracuse DMV in order to ensure that our sample is not a skewed portion of the city population. Albany, New York has only one DMV that services the city.

Connecticut's program sites, Hartford, East Hartford, and West Hartford share a DMV office in Hartford. There is no DMV office in Stamford, Connecticut,, so the closest DMV office in Norwalk will be used. To the extent that similar results are obtained in different locations using different on-site interview operations, it is less likely that idiosyncrasies of sample selection or administration can account for obtained results.

TABLE 7. DDIS Sample Size

	SPRING 2010		**SUMMER 2010**		**FALL 2010**		**WINTER 2011**		
	1st Quarter Mobilization		**2ndQuarter Mobilization**		**3rd Quarter Mobilization**		**4th Quarter Mobilization**		
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	**Total**
Demonstration City	400	400	400	400	400	400	400	400	3,200
Control City	400	400	400	400	400	400	400	400	3,200
Total	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**6,400**

B.1.c) Total Sampling Needs

Overall, the total sample needs for the NSDDAB and the DDIS are 12,400 respondents annually, which would be 37,200 respondents over a three-year period. Since the national survey is estimated to be 20 minutes and length, and the community-level survey is estimated to be 10 minutes in length, the estimated annual time is 1,022.2 hours interviewing, which would be or 9,200 hours over a three-year period.

	Annual Sample	3-year Total	Minutes	Hours
NSDDAB	6,000	18,000	x20	6,000
DDIS	6,400	19,200	x10	3,200
Total	**12,400**	**37,200**		**9,200**

B.2.) Describe the procedures for the collection of information.

The data collection procedures for National Survey of Distracted Driving Attitudes and Behavior (NSDDAB and the Distracted Driving Intercept Survey (DDIS) are described separately.

B.2.a) National Survey of Distracted Driving Attitudes and Behavior (NSDDAB)

The most important elements of the study design of the National Survey of Distracted Driving Attitudes and Behavior are:

- Survey population is defined as total non-institutionalized population, age 16 and older, who drove at least once in the past year, of the United States residing in households having telephones.
- Survey will be conducted by telephone, using computer-assisted telephone interviewing.
- There will be one questionnaire delivered to every respondent. This questionnaire will take approximately 20 minutes to complete.
- One eligible adult (16 years or older) will be selected in each household sampled from the landline frame, using the "most recent/next birthday" for random selection within household. There will not be a respondent selection procedure for those drivers reached on their cell phone, since cell phones are being treated as a personal device.
- A total sample size of 6,000 persons ages 16 and older will be interviewed using the questionnaire. The questionnaire focuses on the respondent's attitudes and behavior regarding speeding and countermeasure strategies to reduce speeding.

- The survey will include a Spanish language version of the questionnaire used by bilingual interviewers to minimize language barriers.
- Professional interviewers who are experienced in conducting interviews will carry out the interviews, using computer assisted telephone interviewing.
- The completed data sets will be weighted to correct for disproportionate sampling and non-response bias.

B.2.a.1) NSDDAB Sampling Frame

The purpose of this study is to generate accurate population estimates of the non-institutionalized population, age 16 and older, currently living in the United States and the District of Columbia, on the basis of a survey sample. An efficient method of constructing national area probability surveys involves multi-stage stratified sampling. The sample is first stratified by NHTSA region, with sample allocation proportionate to target population distribution. The second stage involves random selection of hundred banks with one or more directory-listed telephone numbers within the NHTSA regions. The third stage involves appending a two-digit random number to each selected hundred bank to form complete ten-digit telephone numbers for household contact. The fourth stage requires the random selection of one age-eligible respondent within each household as the designated respondent.

The specific steps that will be used to construct this type of sample are outlined in detail below.

B.2.a.2) NSDDAB National Population Sample Design

A national sample of assigned telephone banks will be randomly selected from the active telephone exchanges within the United States. Phone numbers in the United States are 10 digits long - where the first three numbers are the area code, the next three are the exchange, and the last four numbers are the number within the exchange. The first two digits of the four digit number define a cluster, with each cluster containing 100 numbers or a “100-bank” (the last two digits). Selection will be made from those 100-banks containing one or more residential listings.

In the second sampling stage, a two-digit number is randomly generated for each 100-bank selected in the first stage. This second stage sampling technique is known as random digit dialing (RDD). Every telephone number within a given 100-bank has an equal probability of selection, regardless of whether it is listed or unlisted. The use of RDD sampling eliminates the otherwise serious problem of not covering unlisted telephone numbers.

B.2.a.3) NSDDAB Selection of Respondent within Households Reached on Landline Phone

The sample construction described above yields a population-based, random digit dialing sample of telephone numbers. The systematic dialing of those numbers to obtain a residential contact should yield a random sample of telephone households. Next, a random selection procedure will be used to select one designated respondent for each household sampled. The "most recent/next birthday method" will be used for within household selection among multiple eligible respondents. Salmon and Nichols (1983[3]) proposed the birthday selection method as a less obtrusive method of selection than the traditional grid selections of Kish, et al. In theory, birthday selection methods represent true random selection (Lavrakas, 1987[4]). Empirical studies indicate that the birthday method produces shorter interviews with higher response rates than grid selection (Tarnai, Rosa & Scott, 1987[5]).

Upon contacting the household, interviewers will briefly state the purpose of their call (including noting the anonymity of the interview), and then request to speak to the person in the household within the eligible age range who has had the most recent birthday, or will have the next birthday. The CATI system will randomly rotate whether the interviewer asks for the most recent or next birthday. If the person who answered the phone is the selected respondent, then the interviewer will proceed with the interview. If the selected respondent is someone else who then comes to the phone, then the interviewer will again introduce the survey and proceed with the interview. If the selected respondent is not available, then the interviewer will arrange a callback.

B.2.a.4) NSDDAB Precision of Sample Estimates

The objective of the sampling procedures described above is to produce a random sample of the target population. This means that with a randomly drawn sample, one can make inferences about population characteristics within certain specified limits of certainty and sampling variability.

The confidence interval for sample estimates of population proportions, using simple random sampling without replacement, is calculated by the following formulas:

$$x = (1.96)SE$$

[3] Salmon, C. and Nichols, J. *The Next-Birthday Method of Respondent Selection*. Public Opinion Quarterly, 1983, Vol. 47, pp. 270-276.
[4] Lavrakas, P. *Telephone Survey Methods: Sampling, Selection and Supervision*. Beverly Hills: Sage Publications, 1987.
[5] Tarnai, J., Rosa, E. and Scott, L. *An Empirical Comparison of the Kish and the Most Recent Birthday Method for Selecting a Random Household Respondent in Telephone Surveys*. Presented at the Annual Meeting of the American Association for Public Opinion Research. Hershey, PA, 1987.

$$SE = \sqrt{Deff}\sqrt{\frac{p(1-p)}{n}}$$

Where:

x = confidence interval half-width
SE = the standard error of the sample estimate for a proportion (p)
p = some proportion of the sample displaying a certain characteristic or attribute
Deff = design effect arising from the combined impact of the random selection of one eligible individual from a sample household, and unequal weighting from other aspects of the sample design and weighting methodology
n = the size of the sample

Using this formula, the maximum expected sampling error at the 95% confidence level (i.e., in 95 out of 100 repeated samples) for a total sample of 6,000 is ± 1.55 percentage points, using a Deff of 1.5. It should be noted that the maximum sampling error is based upon the conservative estimate that p = 0.5.

The total sample size for the survey is large enough to permit robust estimates for subgroup analysis including driver type, age, sex, income, and other demographics. Respondents will be grouped into categories based on these characteristics and cell sample size. The analysis will ensure that cell size is large enough for these subsamples to produce reliable estimates.

Below is an illustration of this approach for categorization of the sample into age groups. This table shows the approximate sample size (N) and error estimates for each age category based on the expected population and sample distribution by age. This assumes that there will be a 50% split by sex (male, female).

95% Confidence Intervals by Sample Size and Answer Probability

		Answer p = 0.5				Answer p = 0.8			
Group	Group N	Std. Error	1.96*SE	Lower Lim	Upper Lim	Std. Error	1.96*SE	Lower Lim	Upper Lim
16-24	366	3.20%	6.27%	43.73%	56.27%	2.56%	5.02%	74.98%	85.02%
25-34	732	2.26%	4.44%	45.56%	54.44%	1.81%	3.55%	76.45%	83.55%
35-44	1,086	1.86%	3.64%	46.36%	53.64%	1.49%	2.91%	77.09%	82.91%
45-64	2,406	1.25%	2.45%	47.55%	52.45%	1.00%	1.96%	78.04%	81.96%
65+	1,410	1.63%	3.20%	46.80%	53.20%	1.30%	2.56%	77.44%	82.56%
Sex (50%)	3,000	1.12%	2.19%	47.81%	52.19%	0.89%	1.75%	78.25%	81.75%
All	6,000	0.79%	1.55%	48.45%	51.55%	0.63%	1.24%	78.76%	81.24%

B.2.a.5) NSDDAB Data Collection

Data collection for the National Survey of Distracted Driving Attitudes and Behavior (NSDDAB) will be conducted from a telephone call center. The contractor will administer the survey using computer-assisted telephone interviewing (CATI), and will have sufficient numbers of CATI stations to conduct large numbers of interviews in short periods of time.

All interviewers on the project will have been previously trained in effective interviewing techniques as a condition of their employment. The contractor will develop an interview manual for this survey, and conduct a training session specific to this study with all interviewers prior to their conducting any interviews.

Interviewing will be conducted on a schedule designed to facilitate successful contact with targeted households (concentrating on weekends and weekday evenings). Interviewers will make up to 25 call attempts before the number is classified as a permanent no answer. This extended callback protocol will increase the proportion of younger male respondents, and minorities in the final sample. Call attempts will be made at different times, on different days over a number of weeks, according to a standard call attempt strategy. However, the 25 call attempt protocol shall only apply to telephone numbers where nobody picks up the telephone. If someone picks up the phone but terminates the contact before in-house selection of a subject can be made, then the alternative protocol of five additional contact attempts, designed not to repeatedly call and annoy the prospective household participant, will be implemented for the specific household.

When an answering machine is reached the interviewer will leave a message on the machine encouraging survey participation and providing information that the household member can use to verify the legitimacy of the survey and contact the research organization or NHTSA. A toll free number will be setup that the prospective survey participants can call. In addition, NHTSA will place a statement on its Web site that the prospective survey participant can visit to verify the legitimacy of the survey. The interviewer may also note these sources of verification to persons directly contacted on the phone if that would be deemed helpful in getting their participation.

When the household is reached, the interviewer will use a systematic procedure to randomly select one respondent from the household. If the respondent is reached but an interview at that time is inconvenient or inappropriate, the interviewer will set up an appointment with the respondent. If contact is made with the household, but not the designated respondent, the interviewer will probe for an appropriate callback time to set up an appointment. Once a household is reached, a minimum of five additional contact attempts will be made to identify and interview the designated respondents. If contact is made with the eligible respondent, but the respondent refuses to participate, then the interviewer will record information for use in refusal conversion to be conducted at a later time (see Section B.3).

If the interviewer encounters a language barrier, either with the person answering the phone or with the designated respondent, the interviewer will thank the person and terminate the call. If the case is designated as Spanish language, it will be turned over to a Spanish-speaking interviewer.

All interviewers on the study will be supervised in a manner designed to maintain high quality control. One component of this supervision will entail periodic monitoring of interviewers while they are working. Through computer and phone technology, supervisors can silently monitor an interviewer's work without the awareness of either the interviewer or respondent. Second, supervisors will check interviewers' completed work for accuracy and completeness.

B.2.a.6) NSDDAB Sample Weighting

A sequential process of weighting will be applied to the final data. In general, the base sampling weight equals the reciprocal of the initial probability of selection. For most households (and their respondents) the base sampling weight will be equal to the reciprocal of the probability of selecting the household's telephone number in its geographic sampling stratum. Thus, the base sampling weight will be equal to the ratio of the number of telephone numbers in the 1+ working banks for that geographic stratum to the number of telephone numbers drawn from those banks and actually released for use. Then a sub sampling weight to compensate for any oversampling of households containing drivers aged 16-34 years will be calculated.

The reciprocal of the number of voice-use landline telephone numbers in the household (up to a maximum of three such numbers) will be calculated. It will compensate for a household's higher probability of selection when it has multiple voice-use residential telephone lines.

Next, a within-household weighting factor to account for the random selection of one driver from the household will be created. The design weight then equals the product of each of the weight components described above.

The adjustment for unit non-response will be based on at least two cells in each of the regions. The non-response adjustment cells will be defined by whether the respondent (or person who was selected for an interview but did not complete it) resides in a directory-listed number household. We will consider other telephone exchange variables in the development of the unit non-response adjustments. The non-response adjusted weight equals the design weight times the non-response adjustment factor.

The population control totals for the raking will be based primarily on the latest Census Bureau population estimates (age by sex by race/ethnicity). We will also consider using the American Community Survey or the Current Population Survey to develop some of the population control totals for socioeconomic

variables such as education. Battaglia et al. (2008) have shown the potential for strong bias reduction from the inclusion of a socioeconomic variable in the raking. Finally, we will develop a non-telephone adjustment margin to compensate for the exclusion of non-telephone households (Frankel et al. 2003). This margin will use information from the ACS or the CPS on the number of non-telephone adults in the U.S., and information from the survey question on whether the household experienced an interruption in landline telephone service of one week or longer in the past 12 months.

For all of the raking margins discussed above, we will need to examine how to use DOT information on the population of vehicle drivers to adjust the Census Bureau population estimates and the estimates from the ACS or CPS. These data sources do not directly identify vehicle drivers.

To develop the final weights, we will rake the non-response adjusted weight, iterating to get close agreement on the margins for sex by age by race/ethnicity, non-telephone adjustment, and education. We will use the latest version of the Izrael, Battaglia and Frankel (IBF) SAS raking macro (Izrael et al. 2009[6]) to implement the raking. The IBF SAS raking macro also allows for weight trimming during the iterations to avoid ending up with extreme weights. We will also examine whether any additional margins should be included in the raking. Marital status, education, presence of children in the household, home ownership, and household size will be examined.

B.2.a.7) NSDDAB Cell Phone Weighting Methodology

A second final weight will be created for the combined landline sample of adults and the cell phone-only adults. This type of sample design is referred to as a non-overlapping dual frame design, because the landline RDD sample will also contain some cell-mostly adults.

For the landline sample of adults the calculation of the design weight and the non-response adjusted weight would proceed as described above. For the cell phone sample the first step is to assign a base sampling weight that equals the reciprocal of the probability of selection of the cellular telephone number. The cellular phone will be treated as a personal device so there will be no random selection of a driver. The design weights will then be adjusted for unit non-response separately for cell phone-only drivers and for cell-mostly drivers. At this point we have non-response adjusted weights for the two samples.

Some have attempted to use internal weighted sample estimates on size of the telephone usage groups but research has shown that this will lead to an overestimation of the number of cell phone-only adults, because in the cell phone

[6] David Izrael, Michael P. Battaglia, Martin R. Frankel. Extreme Survey Weight Adjustment as a Component of Sample Balancing (a.k.a. Raking). *Presented at SAS Global Forum 2009*, March 2009, Washington, D.C.

sample it is easier to make contact with cell phone-only adults than with adults that also have a voice-use landline telephone in their household.[7] It is therefore important to have control totals related to telephone usage: number of adults that only have landline telephone service, number of adults that only have cellular telephone service, and number of adults that have dual (landline and cellular) telephone service, with this last group split in cell-mostly and not cell-mostly subgroups. Such estimates can be obtained for the U.S. and for the four Census regions from the National Health Interview Survey (NHIS). We therefore plan to use the latest available NHIS estimates to create telephone usage control totals that will allow the two samples to be combined. It is, however, important to examine the characteristics of the cell-mostly adults in the landline RDD sample and cell-mostly adults in the cell phone sample. The usual dual frame estimator is unbiased only if these two groups are equivalent (i.e., they are random samples from the same population). Because the NHIS does not directly identify vehicle drivers we will need to use data from the current survey to adjust the NHIS estimates. The final step in the process is to rake the combined sample to the control totals discussed above.

B.2.b) Distracted Driving Intercept Survey (DDIS)

The DDIS will be used in a Non-Equivalent Groups Design (NEGD), which is frequently used by NHTSA evaluators to evaluate the special media and enforcement mobilizations, such as Click It or Ticket and Over the Limit Under Arrest. The design is structured like a pretest-posttest randomized experiment, but lacks random assignment. The DDIS will examine the changes that occur as a result of specific distracted driving interventions. The DDIS will be conducted on a schedule corresponding with the fixed dates for the distracted driving mobilizations that will depend on the timing and sequencing of the components of each demonstration project. The DDIS will be administered simultaneously in the experimental and control sites.

The research questions for the evaluation of the Distracted Driving Demonstration program which the DDIS data collection seeks to answer include:

A) Did drivers see and hear the NHTSA's High Visibility Enforcement messages?

16) Have you recently read, seen or heard anything about distracted driving in [STATE]? If yes, where did you see or hear about it? If yes, what did it say?

[7] . Michael Brick, Sarah Dipko, Stanley Presser, Clyde Tucker, and Yangyang Yuan **Nonresponse Bias in a Dual Frame Sample of Cell and Landline Numbers** Public Opin Q, 2006; 70: 780 - 793.

17) Do you know the name of any distracted driving program(s) in [STATE]?

B) Did the program change drivers' perception of the enforcement of cell phone laws?

11) What do you think the chances are of getting a ticket if you use a hand-held cellular phone while driving?

12) Do you think the hand-held cellular phone law in [STATE] is enforced:

13) Have you ever received a ticket for using a hand-held cellular phone while driving?

14) In the past month, have you seen or heard about police enforcement focused on hand-held cellular phone use?

C) Did the program change the public perception of the risks of distracted driving?

10) Do you think that it is important for police to enforce hand-held cellular phone laws?

D) Did self-reported cell phone use change while driving?

8) How often do you talk on a hand-held cellular phone when you drive?

9) How often do you send text messages or emails on a hand-held cellular phone when you drive?

Pre and post intervention responses from the program and control sites will be compared using Chi Square to determine if there are any significant differences that can be attributed to the distracted driving demonstration program activities.

B.2.b.1) DDIS Project Samples

A sample N= 800 drivers will be recruited from Department of Motor Vehicle Offices for each survey wave, half from the program areas and have from the control areas. A power analysis confirms that the sample size will be sufficient to detect a change of at least 7 percentage points. Previous NHTSA research indicates that this sensitivity is sufficient.

Drawing a sample at driver licensing offices is a form of purposive sampling, to reach a targeted sample quickly, in this case drivers. DMV offices serve the general public and a broad range of drivers visit these offices daily to conduct

business. We will select people non-randomly according to a fixed quota represent the major characteristics of the sample population, as described by census data and sample a proportional amount of each group by sex, age and race. Quota sampling for the DDIS is more desirable than random sampling given the relatively smaller sample sizes (compared to those used in the national survey). The quotas will enable NHTSA to measure changes in attitudes and awareness across sex, age, and race/ethnicity without the potential complication of a randomly skewed sample.

The DDIS data collectors will employ a multi- step process to survey drivers: (1) interception, (2) determining eligibility, (3) recruitment, (4) completion questionnaire, and (5) on-site data quality procedures.

Data collectors stationed at each driver licensing office will be responsible for approaching and holding the initial contact with potential participants. Initially, interviewers will intercept every 5th person, with the goal of obtaining 10 completed questionnaires per hour. However, this protocol may be revised based upon the actual sampling conditions at each location.

Upon approaching a potential participant, the screening interviewer will introduce him or herself and give a brief explanation of the study following a pre-determined script for this initial contact. Following the initial interception the interviewer will administer a brief screener questionnaire (see Appendix E). The objectives of this questionnaire are to determine eligibility and to collect information that can be used to characterize the driving population. Each question will be read to the participant and the screening interviewer will record the participant's responses on the questionnaire form. A driver will be eligible to complete the questionnaire if they are (1) regularly drive a vehicle, (2) live within the demonstration project area or control area (3) there are no language barriers.

Regardless of the eligibility determination, a "disposition" code will be entered onto each form to indicate the results of the screening. Examples of disposition codes are:

- Ineligible Due to Questionnaire Responses
- Eligible Due to Questionnaire Responses
- Refused Screener
- Eligible Due to Questionnaire Responses but Refused Main Questionnaire
- Ineligible Due to Language Barrier
- Ineligible Due to Other (specify other)

A tracking number will be assigned to each driver intercepted. This number will serve as the unique identifier that links the responses on the screener questionnaire to responses on the main questionnaire.

Once the eligibility of the driver has been determined, the interviewer will endeavor to recruit eligible participants to complete the main questionnaire. In general, this will not be a scripted dialog, but the team member will cover key elements, which include: additional details on the study, and an estimated time for completion (it is anticipated that the main questionnaire will take less than 10 minutes to complete). If the screening interviewer is successful in recruiting the driver, they will direct the participant to a questionnaire administrator waiting at a nearby table.

The questionnaire administrator is responsible for all aspects related to the completion of the main questionnaire. This consists of: (1) receiving the eligible drivers identified by the Screening interviewer at a pre-determined location, (2) transferring the unique identifier from the screener form to a main questionnaire form, (3) directing the drivers on how to complete the form and what to do with it once they are finished, and (4) answering questions from participants in the process of completing a questionnaire.

After drivers complete the questionnaire, the interviewer will review all screening and questionnaire forms for completeness and accuracy. This review will be conducted to ensure that the respondent did not inadvertently miss survey questions. If missing questions are identified, the interviewer will attempt to question the respondent to obtain the response.

Several statistical techniques will be used to compare the responses of pre and post including t-tests, P2 tests, log-linear models, and general linear models will be employed. NHTSA will use the States' Driver Records Databases to obtain the demographic features of the licensed driver population. If there is any measurable discrepancy between the population of vehicle drivers and the Census Bureau's population estimates with regards to age and sex[8], we will use the demographic State's Driver Records Databases to weigh the samples.

B.3) Describe methods to maximize response rates and to deal with issues of non-response.

B.3.a) National Survey of Distracted Driving Awareness and Behavior (NSDDAB)

In order to attain the highest possible response rate, an interviewing strategy with the following major components will be followed. The initial contact script has been carefully developed and refined to be persuasive and appealing to the sample. Only thoroughly trained and experienced interviewers, highly motivated and carefully monitored, will conduct the interviewing. Interviewers will be trained on how to overcome initial reluctance, lack of interest or hostility during the contact phase of the interview. The interviewing corps will include Spanish-speaking interviewers to ensure

[8] Data available from the Federal Highways Administration: http://www.fhwa.dot.gov/policyinformation/statistics/2007/dl22.cfm

that Spanish language is not a barrier to survey participation. Twenty-five call attempts will be made to ring-no-answer numbers, and interviewers will leave an approved message on answering machines according to study protocol (see Section B.2.e).

The CATI program will record all refusals and interview terminations in a permanent file, including the nature, reason, time, and the interviewer. This information will be reviewed on an ongoing basis to identify any problems with the contact script, interviewing procedures, questionnaire items, etc. Also, the refusal rate by interviewer will be closely monitored. Using these analyses, a "Conversion Script" will be developed. This script will provide interviewers with responses to the more common reasons given by persons for not wanting to participate in the survey. The responses are designed to allay concerns or problems expressed by the telephone contacts.

A refusal conversion plan will be implemented in which each person selected for the sample that refuses to participate will be re-contacted approximately one-to-two weeks following the refusal. A conversion script will be utilized in an attempt to convince the individual to reconsider and participate in the survey. Only the most experienced and skilled interviewers will conduct the refusal conversions. Exceptions to refusal conversion will be allowed on an individual basis if for some reason the refusal conversion effort is deemed inappropriate.

There will be maintenance and regular review of field outcome data in the sample reporting file, derived from both the sample control and CATI files, so that patterns and problems in both response rate and production rates can be detected and analyzed. Meetings will be held with the interviewing and field supervisory staff and the study management staff to discuss problems with contact and interviewing procedures and to share methods of successful persuasion and conversion.

The procedures described above resulted in a response rate for the cross-sectional sample of between 45% and 50% percent[9] for past NHTSA surveys. Sample will be released gradually and conservatively for the current survey and the 25 call protocol will be utilized to improve response rates for this survey. The sampling methods described above will yield reliable data that can be generalized to the universe studied (the general population age 16 and older).

B.3.a.1) NSDDAB Non-Response Analysis

A comparison of the characteristics of the completed and non-completed cases from the random digit dialing sample will be conducted to determine whether there is any evidence of significant non-response bias in the completed sample. There are three points at which sample characteristics are collected in the course of the telephone survey: prior to household contact; at respondent selection for the survey; and after beginning the interview. Analysis will be conducted with the data available for respondents and non-respondents at each of these points.

[9] Boyle, John & Lampkin,Cheryl. 2007 Motor Vehicle Occupant Safety Survey. August, 2008.

The drawn sample of random digit dialing numbers that are released to telephone interviewers for contact attempts can be coded for certain contextual characteristics. The "hundreds bank" from which the RDD number is drawn (e.g., 301-608-38xx) is classified geographically according to the unit from which the majority of listed numbers in that bank are located. This permits us to classify all of the numbers drawn by NHTSA region, State, and urbanicity (central city, metro remainder, and non-metropolitan area). It also permits us to classify those numbers by demographic characteristics, such as percentage of African-American and Hispanic, based on Census data linked to telephone exchanges. A comparison of the characteristics of all dialed residential numbers in which an interview had not been completed with those that had been completed can be done with these variables.

Once contact is achieved with a household, one adult is selected in each household as the designated respondent. If there is more than one eligible respondent per household, then a random selection is done for the individual with the most recent/next birthday. The age and sex of this individual is obtained so that they can be identified if callbacks are necessary. This information permits additional comparisons of any differences in the age and sex of respondents in the completed sample and those in the non-completed sample after household contact and respondent selection had been made.

Finally, we expect there will be a small percentage (<2.5%) of terminated interviews based on a past survey we conducted for NHTSA (MVOSS 2007[10]) throughout the course of data collection. A terminated interview is one in which the designated respondent begins the interview (answers the first question) but refuses to complete the interview at some point after the first question. Some key motor vehicle and driving characteristics are collected at the very beginning of the interview, including frequency of driving, type of vehicle and seat belt use. Differences in driver characteristics can be analyzed at this third stage between those who terminate the interview and those who complete the interview.

This three-step process of analyzing the characteristics of respondents and non-respondents to the survey should identify whether there is any evidence of significant non-response bias in the most likely areas: region, size of place, minority communities, age, sex, and driving characteristics. This analysis will suggest whether any weighting or other statistical adjustment needs to be made to correct for non-response bias in the completed sample.

B.3.b) Distracted Driving Intercept Survey (DDIS)

The choice of driver licensing offices as the venue for the DDIS was to maximize response rates, because the licensing offices are typically places where people have to wait and potential participants are likely to be free to take a survey, and perhaps would welcome the distraction. Furthermore, given that criteria for selection includes driving, we expect a higher percentage of individuals approached will be drivers compared to

[10] Boyle, John & Lampkin,Cheryl. 2007 Motor Vehicle Occupant Safety Survey. August, 2008.

other public venues such as shopping malls or movie theaters.

NHTSA does not intend to assess non-response bias in the community level DMV survey (DDIS). Generally, only a small proportion of non-respondents are willing to participate in a non-response follow up interview. NHTSA has examined responses of past DMV surveys and found that the respondents represented the age and sex distribution of licensed drivers in the state. For example, an intercept survey conducted by the Washington Traffic Safety Commission found that 50.9% of the survey respondents were female and 49.1% male compared to 48.2% of the licensed drivers who are female and 51.8% male.

Age distribution of Department of Licensing (DOL)
Public Awareness Surveys vs. Licensed Drivers in Washington State

	Nighttime Seat Belt Enforcement Driver Licensing Office Surveys 2007-2008*			Washington State Licensed Drivers 2007**		
Age	Number	Percent	Cum Percent	Number	Percent	Cum Percent
-21	639	6.91%	6.91%	293,798	6.02%	6.02%
21-25	1,318	14.25%	21.16%	443,463	9.08%	15.10%
26-34	1,663	17.98%	39.14%	812,800	16.65%	31.75%
35-49	2,557	27.65%	66.79%	1,447,666	29.66%	61.41%
50-59	1,385	14.98%	81.77%	901,914	18.48%	79.89%
60+	1,686	18.23%	100.00%	981,702	20.11%	100.00%
Total	9,248	100.00%		4,881,343	100.00%	

*Those who reported age on the survey
** Drivers with valid Washington licenses and residences, DOL, 2007

B.4) Describe any tests of procedures or methods to be undertaken.

NHTSA will conduct a pretest of the National Survey of Distracted Driving Attitudes and Behaviors among 30 people to ensure the CATI script is functioning properly and the data is being collected accurately. These pretests will consist of the entire survey process, from sample management to tabulation of results. Any problems encountered during the pretests of the questionnaire will be resolved before the surveys are put into the field.

B.5) Provide the name and telephone number of individuals consulted on statistical aspects of the design.

The following individuals have reviewed technical and statistical aspects of procedures that will be used to conduct the National Survey of Distracted Driving Attitudes and Behaviors (NSDDAB), the Distracted Driving Enforcement Awareness Survey (DDSEA), and the Distracted Driving Intercept Survey (DDIS):

Richard Compton, Ph.D.
(202) 366-2699
Office of Behavioral Safety Research (NTI-130)
National Highway Traffic Safety Administration
1200 New Jersey Ave SE, W46-304
Washington D.C., 29590

Linda Cosgrove, Ph.D.
(202) 366-5592
Office of Behavioral Safety Research (NTI-132)
National Highway Traffic Safety Administration
1200 New Jersey Ave SE, W46-307
Washington D.C., 29590

John Siegler, Ph.D.
(202) 366-3976
Office of Behavioral Safety Research (NTI-132)
National Highway Traffic Safety Administration
1200 New Jersey Ave SE, W46-474
Washington D.C., 29590

Scott Roberts, Ph.D.
(202) 366-5594
Office of Behavioral Safety Research (NTI-132)
National Highway Traffic Safety Administration
1200 New Jersey Ave SE, W46-495
Washington D.C., 29590