2019 NASHVILLE/ DAVIDSON COUNTY SURVEY

Submitted to: CSDI at Vanderbilt University

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ssrs research. refined.

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1. SUMMARY

Beginning in 2015, the Center for the Study of Democratic Institutions (CSDI) at Vanderbilt University has conducted public opinion polls of Nashville/Davidson County residents to help inform community stakeholders, government officials, academics, the general public, etc. about important issues facing the Nashville Metro area. The 2019 survey marks Vanderbilt University's fourth poll of the Nashville Metro area.

The 2019 Nashville/Davidson County Poll obtained interviews via telephone, web, and mail with a representative sample of 910 adults, age 18 or older, living in Nashville-Davidson County, Tennessee. Data collection was conducted in English and Spanish from March 5, 2019 to April 3, 2019.

Under the RDD telephone design, telephone interviews were conducted by landline (140) and cell phone (260, including 181 without a landline phone).

Under the ABS design, 510 respondents were reached via mail. ABS respondents were asked to complete the survey via web or through a paper version of the survey, which was included in one of the mailings sent to respondents.

Statistical results are weighted to correct known demographic discrepancies. The margin of sampling error for the complete set of weighted data is ± 4.6 percentage points.

Details on the design, execution and analysis of the survey are discussed below.

2. QUESTIONNAIRE AND LETTER DEVELOPMENT

2.1 Questionnaire Development

The questionnaire was developed by the Principal Investigators at the Center for the Study of Democratic Institutions (CSDI) at Vanderbilt in consultation with the SSRS project team. SSRS reviewed the questionnaire primarily to identify potential problems in the instrument that might increase respondent burden, cause respondents to refuse or terminate the interview, create problems with respondent comprehension, or pose practical challenges for a hard copy questionnaire such as complex skip patterns. SSRS also translated the instrument into Spanish.

2.2 Letter and Postcard Design

The text for the study invitation letter, reminder postcard, and non-responder follow-up cover letter were developed by SSRS in consultation with Vanderbilt University investigators. SSRS translated these materials into Spanish and formatted the letters and postcards to prepare them for mailing. SSRS sent Vanderbilt University the final mailing materials for approval before printing and mailing the materials to contacts.

2.3 Paper Survey Formatting

SSRS was responsible for formatting the questionnaire into a self-administered paper instrument. Focusing on clarity of formatting for skip logic and for overall comprehension of the questionnaire, SSRS made efforts to design a paper questionnaire that would (1) encourage cooperation by offering easy-to-read, easy-to-maneuver hard copy; and (2) reduce the potential for confusion and thereby produce the most accurate data. We formatted the survey in Word and then worked with our professional printing service for execution and printing. Paper surveys were printed in both English and Spanish and were sent to Vanderbilt University investigators for approval before printing and mailing the materials to contacts.

3. SAMPLE DESIGN

3.1 Overview

The target population for this poll was non-institutionalized adults age 18 or older living in Nashville/Davidson County, Tennessee. SSRS used a hybrid RDD/ABS sampling design. Our sampling approach ensured that we obtained a representative sample of the target population by utilizing a full probability design.

The sample size for this poll was n=910 interviews. Overall, approximately 44% of respondents were reached by phone and 56% reached by mail.

Table 1: Completed Interviews by Sample Frame

	Total n achieved	% of Total sample
NET RDD	**400**	**44%**
Landline	140	15%
Cell	260	29%
NET ABS	**510**	**56%**
Web	450	49%
Mail	60	7%
TOTAL	**910**	**100%**

3.2 Random Digit Dial (RDD) Telephone Design

Under this design, SSRS implemented an overlapping dual-frame Random Digit Dial (RDD) phone design with 65% of the surveys allocated to the RDD cellular frame and 35% of the surveys allocated to the RDD landline frame. In addition, SSRS leveraged cellular billing zip code in commercially-available databases and sample records with a Davidson County billing zip code at a higher rate.

In order to address the challenge of cell RDD sampling including a large number of inactive/non-working numbers in the frame, SSRS sample vendors utilized procedures for pre-identifying likely inactive cell phone numbers. These data indicate whether each number was likely "active" (working) or "inactive" (non-working) based on real-time database queries when the sample was drawn. In this manner, SSRS leveraged these activity codes. Consistent with prior waves, inactive cellular phone numbers in the RDD samples were purged prior to dialing.

A total of n=400 surveys were obtained via this methodology (n=140 landline and n=260 cell phone).

3.3 Address-Based Sampling (ABS) Design

The sampling frame under this design was the United States Postal Service (USPS) Computerized Delivery Sequence File (CDS or CDSF). The CDS File is a computerized file that contains information on all delivery addresses serviced by the USPS. For this poll, SSRS selected a simple random sample of addresses in Davidson County from the CDS File. We appended householder age, education of head of household, and Hispanic surname flags, where available, to ABS records to stratify the sample during the data collection period if needed. Hispanic surname flags were also used to customize mailings (discussed below in the Contact Procedures section).

A total of n=510 surveys were obtained via this methodology (n=450 web and n=60 mail).

4. CONTACT PROCEDURES

4.1 Telephone Procedures

For respondent selection for landline samples, interviews were conducted with the youngest adult 18+ male/female at home based on a random rotation. For the cellular sample, interviews were conducted with the person who answered the phone. Interviewers verified that the person was an adult and in a safe place before administering the survey. For both landline and cell samples, after an adult was on the phone, geographic eligibility was determined prior to accepting the respondent into the survey.

4.2 ABS Procedures

For this study, SSRS conducted a sequential Web-Mail mixed-mode methodology. Data collection was conducted in English or Spanish. Eighty-eight percent of the ABS surveys were completed via Web (n=450) and 12% were completed via Mail mode (n=60).

All selected sample records received a one-page study invitation letter, which was printed on Vanderbilt University CSDI stationery and was addressed to "Nashville Area Resident." For records flagged with a Hispanic surname, the letter was printed double-sided with one side in English and the other side in Spanish. The text of this letter was developed in collaboration with Vanderbilt University investigators, and it included a short web link for the survey and a personalized PIN for respondents to use to access the web survey. The

prenotification mailing also included a $1 pre-incentive bill and an offer of $10 payment via an electronic gift card code sent immediately upon completion of the survey.

Two days after mailing of the study invitation letter, reminder postcards were sent to contacts. The purpose of this mailing was simply to remind potential respondents to reply to the initial mailing. To ensure confidentiality, the postcard did not contain the survey web link or the target respondent's personal PIN.

Approximately two weeks after the study invitation letters were mailed, questionnaire packets were sent to non-responders via first-class USPS mail. This mailing contained: a personalized cover letter on Vanderbilt University CSDI stationery, explaining the nature of the survey; one 8-page questionnaire booklet in English, or two 8-page questionnaire booklets (one English and one Spanish) for ABS records flagged with Hispanic surname; and a postage-paid business reply envelope.

In order to detect any questionnaire, sampling, or response rate issues, SSRS planned to conduct the mailing in two phases, where the outcome of Phase 1 would be used to inform the needs for Phase 2. Phase I involved mailing 4,714 study invitation letters and reminder postcards, and up to 4,550 mail questionnaire packets to non-responders. Following the high response achieved from the Phase 1 mailing, it was determined that Phase 2 mailings would not be needed to obtain the ABS targets.

Table 2: Contact Schedule

Date	Mailing	Count
March 6, 2019	Invitation letters mailed	4,714
March 8, 2019	Reminder postcards mailed	4,714
March 19, 2019	Survey packets mailed to select non-responders	1,410

Sampling of non-responders was stratified in order to optimize the chances of obtaining completions with harder-to-reach contacts, specifically non-white and lower-educated residents. All non-responders with a Hispanic surname flag or a head of household flagged as having "less than a high school diploma" were sent a survey packet mailing containing a paper questionnaire. A random 25% sample of the remaining non-responders were also sent a survey packet mailing.

5. DATA COLLECTION, PROCESSING, AND INTEGRATION

5.1 Programming

Prior to the field period, SSRS programmed the study into CfMC 8.8 Survox software for Computer Assisted Telephone Interviewing (CATI) and Web administration in both English and Spanish. The CATI capabilities of the software ensured that questions followed logical skip patterns and that complete dispositions of all call attempts were recorded.

Extensive checking of the program was conducted to ensure that skip patterns followed the design of the questionnaire. The program was checked on multiple devices, including desktop computers and handheld mobile devices, and web browsers in order to ensure consistent and optimized visualization across devices and web browsers.

5.2 Telephone Data Collection

CATI interviewers received written materials about the survey instrument and received formal training for this particular project. The written materials were provided prior to commencement of data collection and included an annotated questionnaire that contained information about the goals of the study, detailed explanations about why questions were being asked, the meaning and pronunciation of key terms, potential obstacles to be overcome in getting good answers to questions, and respondent problems that could be anticipated ahead of time, as well as strategies for addressing the potential problems.

Interviewer training was conducted before the study was launched. Interviewers were given instructions to help them maximize response rates and ensure accurate data collection.

In order to maximize survey response, SSRS enacted the following procedures during the field period:

- As many as five (5) attempts were made to contact every sampled telephone number.
- Calls were staggered over times of day and days of the week to maximize the chance of making contact with potential respondents. At least one daytime call was conducted if necessary.
- Interviewers explained the purpose of the study and its importance.
- Respondents were offered the option of scheduling a call-back at their convenience.
- Additional calls were made to eligible households. Special high-producing interviewers were selected to call back eligible respondents who had suspended an interview in an attempt to complete it.
- A refusal conversion effort was made on each initial refusal by special interviewers versed in refusal conversion.

5.3 ABS Data Collection

As previously mentioned, SSRS conducted a sequential Web-Mail mixed-mode methodology for the ABS portion of this study. All contacts were first invited to take the survey online, accessing the survey using a unique PIN to avoid duplication of interviews by the same person.

Approximately two weeks after the study invitation letters were mailed, questionnaire packets were mailed to a select group of non-responders via first-class USPS mail. Non-responders receiving the survey packet were encouraged to take the survey either online or via the paper questionnaire enclosed in the packet. Those who completed the paper questionnaire were also supplied with a postage-paid business reply envelope (BRE) to return their completed booklet to SSRS for processing and data entry.

5.4 Data Processing and Integration

Prior to running cross-tabulations, data were cleaned and checked using standard procedures. This program establishes editing parameters in order to locate any errors. No coding was done for open-end responses.

Prior to running cross-tabulations, data from telephone, web, and paper modes were combined and thoroughly cleaned with a computer validation program written by one of SSRS's data processing programmers. This program established editing parameters in order to locate any errors, including data that did not follow skip patterns, out of range values, and errors in data field locations.

After quality control procedures were carried out, SSRS provided a clean, processed, fully-labeled and weighted final SPSS dataset to Vanderbilt University.

6. WEIGHTING AND ANALYSIS

The survey data were weighted to account for the sample design and to correct for systematic nonresponse along known population benchmarks. Two independent samples were used - an overlapping dual-frame telephone sample drawn from random digit dial landline and cellular frames, and an address-based sample drawn from the U.S. Postal Service's Computerized Delivery Sequence File. The telephone and ABS samples were weighted separately to be representative of the adult population of Davidson County, Tennessee. Weightings were done in two stages: an initial base weight followed by raking of sample demographics to known population benchmarks.

6.1 Base weight

The base weight for the telephone sample includes a ZIP code oversample adjustment (ZOA) to correct for the oversampling of cellular records with a ZIP code appended.[1] The adjustment is calculated so that the proportion of ZIP-appended cellular numbers in the total cell sample equals the proportion of ZIP-appended cell numbers in the cell sample frame.

The second adjustment in the telephone sample base weight is the probability of selection adjustment (PSA) that corrects for differing sampling probabilities based on the overlapping frames, the sizes of the frames and of the samples drawn, telephone usage, and number of adults in the household. The PSA is calculated as follows.

$$PSA_i = \left[\left(\frac{LL_i}{AD_i} \times \frac{SLL}{FLL}\right) + \left(CP_i \times \frac{SCP}{FCP}\right) - \left(\frac{LL_i}{AD_i} \times \frac{SLL}{FLL} \times CP_i \times \frac{SCP}{FCP}\right)\right]^{-1} \quad for\ LL\ and\ cell\ samples$$

[1] ZIP-appended cellular numbers are often oversampled because they are more likely to be working than numbers that do not have a billing ZIP appended. Therefore, oversampling these numbers increases the efficiency of the cell sample.

Where $LL_i = 1$ if respondent i has a landline telephone and $LL_i = 0$ if respondent i does not have a landline telephone. Similarly, $CP_i = 1$ if respondent i has a cellular telephone and $CP_i = 0$ if respondent i does not have a cellular telephone. AD_i is the number of adults in the household of respondent i. SLL is the size of the landline sample and FLL is the size of the landline frame. SCP is the size of the cellular sample and FCP is the size of the cellular frame.

The base weight for the telephone sample, BW_T, is the product of the ZIP code oversample adjustment and the probability of selection adjustment:

$$BW_T = ZOA \times PSA$$

The base weight for the ABS sample is simply the number of adults in the household.

$$BW_{ABS} = AD$$

6.2 Post-stratification

The second stage of weighting for each sample rakes sample demographics to population parameters. The samples are balanced to match Davidson County, Tennessee adult population benchmarks for sex, age, education, and race/ethnicity. For the telephone samples, phone use parameter was also included. The sex, age, education, and race/ethnicity parameters were derived from the U.S. Census Bureau's 2012-2016 5-year American Community Survey (ACS) data. The phone use estimate was derived from NHIS[2] estimates.

The following table lists the dimensions used in the raking.

[2] Early release of state-level estimates from the National Health Interview Survey, 2012-2016. National Center for Health Statistics. December 2017.

Table 3: Raking Dimensions

Dimension	Value Label	
Gender by Age	Male, 18-24	Female, 18-24
	Male, 25-34	Female, 25-34
	Male, 35-44	Female, 35-44
	Male, 45-54	Female, 45-54
	Male, 55-64	Female, 55-64
	Male, 65+	Female, 65+
Sex by Education	Male, High School Grad or less	
	Male, Some College / Associates Degree	
	Male, College Grad or higher	
	Female, High School Grad or less	
	Female, Some College / Associates Degree	
	Female, College Grad or higher	
Race/Ethnicity	White, not Hispanic	
	Black or African-American, not Hispanic	
	Hispanic	
	Other, not Hispanic	
Phone Use (telephone sample only)	Landline only	
	Dual Frame	
	Cell phone only	

Rakings were accomplished using SPSSINC RAKE, an SPSS extension module that simultaneously balances the distributions of all variables using the GENLOG procedure. Weights were trimmed to prevent individual interviews from having too much influence on the final results. The use of these weights in statistical analysis ensures that the demographic characteristics of the sample closely approximate the demographic characteristics of the target population. Tables 4 and 5 compare weighted and unweighted distributions to population parameters.

Table 4: Population Parameters and Weighted and Unweighted RDD Sample Distributions

Characteristic	Value Label	Parameter	Unweighted	Weighted
Gender by Age	Male, 18-24	5.4%	2.5%	5.6%
	Male, 25-34	12.1%	5.0%	11.4%
	Male, 35-44	9.0%	6.5%	9.3%
	Male, 45-54	7.9%	7.5%	8.1%
	Male, 55-64	7.0%	8.0%	7.2%
	Male, 65+	5.9%	16.0%	6.1%
	Female, 18-24	5.9%	1.8%	4.7%
	Female, 25-34	13.1%	4.5%	12.8%
	Female, 35-44	9.0%	7.8%	9.3%
	Female, 45-54	8.5%	8.0%	8.8%
	Female, 55-64	8.1%	9.3%	8.4%
	Female, 65+	8.3%	23.3%	8.6%
Gender by Education	Male, HS Grad or less	17.8%	12.8%	17.3%
	Male, Some College	12.5%	8.5%	12.9%
	Male, College+	16.9%	24.3%	17.4%
	Female, HS Grad or less	17.9%	11.3%	16.7%
	Female, Some College	14.8%	15.5%	15.0%
	Female, College+	20.1%	27.8%	20.8%
Race/Ethnicity	White, non-Hispanic	61.0%	65.8%	60.5%
	Black, non-Hispanic	25.7%	20.8%	25.9%
	Hispanic	8.0%	9.3%	8.3%
	Other, non-Hispanic	5.2%	4.3%	5.4%
Phone Use	LLO	5.4%	2.0%	5.6%
	Dual	33.9%	52.8%	34.9%
	CPO	60.7%	45.3%	59.5%

Table 5: Population Parameters and Weighted and Unweighted ABS Sample Distributions

Characteristic	Value Label	Parameter	Unweighted	Weighted
Gender by Age	Male, 18-24	5.4%	1.6%	4.9%
	Male, 25-34	12.1%	8.2%	10.3%
	Male, 35-44	9.0%	7.8%	9.5%
	Male, 45-54	7.9%	7.3%	8.3%
	Male, 55-64	7.0%	8.6%	7.3%
	Male, 65+	5.9%	9.8%	6.2%
	Female, 18-24	5.9%	3.9%	5.7%
	Female, 25-34	13.1%	13.9%	12.5%
	Female, 35-44	9.0%	11.0%	9.5%
	Female, 45-54	8.5%	6.7%	8.5%
	Female, 55-64	8.1%	8.8%	8.5%
	Female, 65+	8.3%	12.4%	8.8%
Gender by Education	Male, HS Grad or less	17.8%	5.7%	15.4%
	Male, Some College	12.5%	7.3%	13.2%
	Male, College+	16.9%	30.4%	17.9%
	Female, HS Grad or less	17.9%	6.1%	16.7%
	Female, Some College	14.8%	12.4%	15.6%
	Female, College+	20.1%	38.2%	21.2%
Race/Ethnicity	White, non-Hispanic	61.0%	77.3%	64.4%
	Black, non-Hispanic p	25.7%	11.8%	22.4%
	Hispanic	8.0%	4.9%	7.7%
	Other, non-Hispanic	5.2%	6.1%	5.5%

6.3 Effects of Sample Design on Statistical Analysis

Post-data collection statistical adjustments require analysis procedures that reflect departures from simple random sampling. SSRS calculates the effects of these design features so that an appropriate adjustment can be incorporated into tests of statistical significance when using these data. The so-called "design effect" or *deff* represents the loss in statistical efficiency that results from a disproportionate sample design and systematic non-response. The design effect for the RDD sample is 2.06 and the ABS sample is 2.03.

SSRS calculates the composite design effect for a sample of size n, with each case having a weight, w as:

$$deff = \frac{n \sum w^2}{(\sum w)^2}$$

In a wide range of situations, the adjusted standard error of a statistic should be calculated by multiplying the usual formula by the square root of the design effect ($\sqrt{deff}$). Thus, the formula for computing the 95% confidence interval around a percentage is:

$$\hat{p} \pm \sqrt{deff} \times 1.96 \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

where $\hat{p}$ is the sample estimate and n is the unweighted number of sample cases in the group being considered.

The survey's margin of error is the largest 95% confidence interval for any estimated proportion based on the total sample — the one around 50%. For example, the margin of error for the RDD sample is ± 7.0 percentage points. This means that in 95 out every 100 samples drawn using the same methodology, estimated proportions based on the RDD sample will be no more than seven percentage points away from their true values in the population. The margin of error for the ABS sample is ± 6.2 percentage points. The margin of error for the full sample is ± 4.6 percentage points. Margins of error for subgroups will be larger. It is important to remember that sampling fluctuations are only one possible source of error in a survey estimate. Other sources, such as respondent selection bias, questionnaire wording, and reporting inaccuracy, may contribute additional error of greater or lesser magnitude.

7. RESPONSE RATES

Table 6 reports the disposition of all sampled telephone numbers ever dialed from the original telephone number samples. Table 7 reports the disposition of all sampled ABS records that were contacted. The response rate estimates the fraction of all eligible sample that was ultimately interviewed. Response rates are computed according to American Association for Public Opinion Research standards.

- The response rate for the RDD landline sample was 7.5 percent.
- The response rate for the RDD cellular sample was 7.8 percent.
- The response rate for ABS sample was 10.8 percent.

Table 6: Telephone Sample Disposition

LL	CELL	TOTAL	
0	2	2	Duplicate number/already completed survey
1	1	2	Cell in landline frame/LL in cell frame
115	130	245	Non-residential/Business
116	**133**	**249**	OF = Out of Frame
260	550	810	Not working
145	4	149	Computer/fax/modem
405	**554**	**959**	NWC = Not working/computer
1,586	1,796	3,382	NA/Busy all attempts
236	1,191	1,427	VM, unknown if household
1,822	**2,987**	**4,809**	$UHUO_{NC}$ = Non-contact, unknown if household/unknown other
124	677	801	VM, household
0	3	3	Not available for duration of study
46	120	166	Privacy manager
3	9	12	Other non-contact (deaf/disabled/deceased)
173	**809**	**982**	UO_{NC} = Non-contact, unknown eligibility
198	1,160	1,358	Refusals, no screener completed
50	32	82	Refusal during screener
25	155	180	Refusal, DNC
136	790	926	Hung up during intro
3	115	118	Callbacks, Spanish
59	316	375	Callbacks, no screener completed
471	**2,568**	**3,039**	UO_R = Refusal, unknown if eligible
4	**25**	**29**	O = Other (language)
0	70	70	Child's cell phone
10	255	265	Out of area
10	**325**	**335**	SO = Screen out
40	**67**	**107**	R = Refusal, known eligible (breakoffs and qualified CBs)
140	**260**	**400**	I = Completed interviews
3,181	**7,728**	**10,909**	T = Total numbers sampled

Table 6: Telephone Sample Disposition (continued)

LL	CELL	TOTAL	
61.7%	85.5%	80.2%	e1 = $(I+R+SO+O+UO_R+UO_{NC})/(I+R+SO+O+UO_R+UO_{NC}+OF+NWC)$ - Est. frame eligibility of non-contacts
94.7%	50.2%	60.2%	e2 = (I+R)/(I+R+SO) - Est. screening eligibility of unscreened contacts
33.9%	49.1%	44.7%	CON2 = $[I + R + (e2*[O + UO_R])]/[I + R + (e2*[O + UO_R + UO_{NC}]) + (e1*e2*UHUO_{NC})]$
22.2%	16.0%	17.0%	COOP = $I/[I + R + (e2*[O + UO_R])]$
7.5%	**7.8%**	**7.6%**	**AAPOR RR3=$I/[I+R+[e2*(UO_R+UO_{NC}+O)]+[e1*e2*UHUO_{NC}]]$ = CON*COOP**

Table 7: ABS Sample Disposition

Disposition	N
1. Complete (I)	**510**
2. Eligible, non-interview (R)	**0**
Refusal & Break-off	0
3. Unknown eligibility, non-interview (UH)	**4,203**
Nothing ever returned	3,934
Refused, unknown if eligible	35
Overquota	25
Undeliverable	209
4. Not eligible, returned (IN)	**1**
Currently lives in Davidson County	0
Do not live in Davidson County	1
Total records contacted	**4,714**
e=(I+R)/(I+R+IN)	99.8%
RR3=I/[I+R+(e*UH)]	**10.8%**

8. DELIVERABLES

SSRS delivered to Vanderbilt University:

- Final questionnaire instrument;
- Weighted dataset in SPSS;
- Weighted banners in PDF;
- Topline; and
- A detailed methodology report.

ABOUT SSRS

SSRS is a full-service market and survey research firm managed by a core of dedicated professionals with advanced degrees in the social sciences. Service offerings include the Omnibus Survey, SSRS Opinion Panel and other Online Solutions, as well as custom research programs – all driven by a central commitment to methodological rigor. The SSRS team is renowned for its multimodal approach, as well as its sophisticated and proprietary sample designs. Typical projects for the company include complex strategic, tactical and public opinion initiatives in the U.S. and in more than 40 countries worldwide. SSRS is research, refined. Visit www.ssrs.com for more information.