



## Methodology Statement

Firehouse/Optimus  
Likely Voter Survey  
December 3-5, 2019

The Firehouse/Optimus survey was conducted from December 3-5, 2019 and interviewed a total of 1,759 likely 2020 general election voters in the battleground states of Michigan, Pennsylvania, and Wisconsin. Interviews were conducted using a combination of live interviews via landline (39.4%) and cell phones (20.7%) and peer-to-peer text to web (39.9%). Telephone interviews were conducted by Dynata and text messages were sent by Opn Sesame.

The sample frame covers likely 2020 general election voters with reported landline or cellphone numbers from each state's voter file. Likely voters were identified as those who voted in either the 2016 or 2018 general elections plus additional voters who are expected to vote in the 2020 election as determined by Optimus turnout modeling. The probability sample was selected using registration-based sampling (RBS) stratified by age group, gender, and party for each battleground state.

The full sample included 551 likely voters in Michigan, 598 likely voters in Pennsylvania, and 610 likely voters in Wisconsin. While the margins of error vary slightly across questions due to item non-response and the base rate, the margins of errors based on Q1 are reported as  $\pm 4.3\%$  in Michigan,  $\pm 4.3\%$  in Pennsylvania, and  $\pm 4.1\%$  in Wisconsin. We calculate the margin of error as:

$$\sqrt{D_{eff}} * Z * \sqrt{\frac{\hat{p}(1 - \hat{p})}{n - 1}}$$

where  $n$  is sample size,  $Z$  is set to 1.96, and  $\hat{p}$  is the response proportion. The design effect ( $D_{eff}$ ) in Michigan is reported as 1.2, Pennsylvania as 1.2, and Wisconsin as 1.1.

The sample was weighted to account for non-response across age group, gender, party, and education using population data from state voter files and the U.S. Census, Current Population Survey (CPS). Further details are shown below.

Survey items can be found reported as topline and as cross-tabulations on our GitHub repository.



### Mode Breakdown by State

	MICHIGAN	PENNSYLVANIA	WISCONSIN	TOTAL
<b>LIVE</b>	228	227	238	693
<b>LANDLINE</b>	(41.4%)	(38.0%)	(39.0%)	(39.4%)
<b>LIVE CELL</b>	117	133	114	364
	(21.2%)	(22.2%)	(18.7%)	(20.7%)
<b>PEER-TO-PEER</b>	206	238	258	702
	(37.4%)	(39.8%)	(42.3%)	(39.9%)
<b>TOTAL N =</b>	551	598	610	1759

*Note: Column percentages may not add to 100% due to rounding.*

### Weighted Data (Broken out by Cohort Membership)

MICHIGAN	RAW N	UNBALANCED (%)	BALANCED (%)	POPULATION (%)
<b>AGE GROUP</b>				
<b>18-35</b>	108	19.6	19.3	19.4
<b>35-55</b>	188	34.1	30.8	30.8
<b>55+</b>	237	43.0	47.8	47.7
<b>OTHER/MISSING</b>	18	3.3	2.1	2.1
<b>GENDER</b>				
<b>MALE</b>	271	49.2	45.5	45.5
<b>FEMALE</b>	280	50.8	54.5	54.5
<b>OTHER</b>	0	0	0	0

PENNSYLVANIA	RAW N	UNBALANCED (%)	BALANCED (%)	POPULATION (%)
<b>AGE GROUP</b>				
<b>18-35</b>	143	23.9	20.9	20.8
<b>35-55</b>	194	32.4	30.0	30.0
<b>55+</b>	247	41.3	47.2	47.0
<b>OTHER/MISSING</b>	14	2.3	2.0	2.1
<b>GENDER</b>				
<b>MALE</b>	303	50.7	45.9	45.9
<b>FEMALE</b>	295	49.3	54.1	52.9
<b>OTHER</b>	0	0	0	1.2

WISCONSIN	RAW N	UNBALANCED (%)	BALANCED (%)	POPULATION (%)
<b>AGE GROUP</b>				
<b>18-35</b>	44	7.2	6.8	6.4
<b>35-55</b>	150	24.6	25.2	25.2
<b>55+</b>	245	40.2	46.1	45.4
<b>OTHER/MISSING</b>	171	28.0	21.9	22.9
<b>GENDER</b>				
<b>MALE</b>	308	50.5	46.8	46.8
<b>FEMALE</b>	294	48.2	52.2	51.8
<b>OTHER</b>	8	1.3	1.0	1.4

*Note: Column percentages may not add to 100% due to rounding.*