

## HOW THE POLL WAS CONDUCTED AND THE MARGIN OF ERROR CALCULATED

The CBS News 2016 Battleground Tracker is a panel study based on interviews conducted on the internet of registered voters in Florida, Ohio, Arizona, Colorado, North Carolina, Pennsylvania, Georgia, Iowa, Michigan, Missouri, Nevada, New Hampshire, Texas, Utah, Virginia, Wisconsin, California, Illinois, Indiana, New Jersey, New York, South Carolina, and Texas. The poll was conducted by YouGov, an online polling organization.

The most recent wave interviewed registered voters in Florida and Ohio between November 2-4, 2016.

The first wave was fielded between September 3-10, 2015, with 4860 respondents, and the second wave fieldwork was completed between October 15-22, 2015, with 3952 respondents and the third wave between November 15-19, 2015. The fourth wave was fielded between December 13-17, 2015. The majority of the 2nd-4th wave respondents are recontacted panelists. The first 4 waves consist of interviews in Iowa, New Hampshire, and South Carolina only. The fifth wave added new interviews in Florida, Georgia, and Texas, and was completed between January 17-21, 2016. The sixth wave was fielded only in South Carolina, with interviews completed February 10-12, 2016. The seventh wave was fielded also in February, among panelists in Georgia, Texas, and Virginia. The eighth wave fielded February 22-26, 2016, and recontacted panelists from the January wave in Georgia and Texas. Virginia respondents were all new to the panel. The ninth wave was fielded to new respondents in Michigan from March 2-4, 2016, and in addition, respondents in Florida, Illinois, and Ohio were contacted March 9-11, 2016. Respondents in New York, Pennsylvania, and Wisconsin were contacted March 29-April 1, 2016 for the tenth wave. In the eleventh wave of our primary surveys, respondents in California, New York, and Pennsylvania were contacted April 13-15, 2016. The twelfth was conducted April 20-22, 2016 and interviewed panelists in Indiana and Pennsylvania. The thirteenth wave was the first general election poll, and was conducted of registered voters in Florida and Ohio May 16-19, 2016. The fourteenth wave was fielded May 31-June 3, 2016, and consists of registered voters in California and New Jersey, interviewing both those likely to vote in the November general election and the upcoming Democratic primary election. The fifteenth wave of the Battleground Tracker interviewed registered voters in Colorado, Florida, North Carolina, and Wisconsin from June 21-24, 2016.

The July waves were conducted before and after the conventions. These waves interviewed registered voters on July 13-15, 2016 in eleven battleground states (Colorado, Florida, Iowa, Michigan, North Carolina, New Hampshire, Nevada, Ohio, Pennsylvania, Virginia, and Wisconsin) and combined single state polls in Iowa, Michigan, and Ohio. All YouGov respondents were recontacted July 15-16, 2016 for a follow-up survey on the Trump Vice Presidential announcement, were recontacted again July 22-23, 2016 for a follow-up survey at the conclusion of the Republican National Convention, and finally recontacted July 29-30, 2016 for a follow-up survey at the conclusion of the Democratic National Convention.

The seventeenth wave interviewed registered voters in Arizona, Nevada, and Virginia on August 2-5, 2016. The eighteenth wave interviewed registered voters in Florida, Georgia, and New Hampshire on August 10-12, 2016. The eighteenth interviewed registered voters in Iowa and Ohio on August 17-19, 2016. The nineteenth interviewed registered voters on August 30-September 2, 2016 in thirteen battleground states (Arizona, Colorado, Florida, Georgia, Iowa, Michigan, North Carolina, New Hampshire, Nevada, Ohio, Pennsylvania, Virginia, and Wisconsin) and combined single state polls in North Carolina and Pennsylvania. The twentieth wave interviewed registered voters on September 7-9, 2016 in thirteen battleground states (Arizona, Colorado, Florida, Georgia, Iowa, Michigan, North Carolina, New Hampshire, Nevada, Ohio, Pennsylvania, Virginia, and Wisconsin) and combined single state polls in Florida and Ohio. The twenty-first wave interviewed registered voters on September 14-16, 2016 in thirteen battleground states (Arizona, Colorado, Florida, Georgia, Iowa, Michigan, North Carolina, New Hampshire, Nevada, Ohio, Pennsylvania, Virginia, and Wisconsin). The twenty-second wave was fielded between September 21-23, 2016 interviewing registered voters in Colorado, Missouri, and Virginia. The twenty-third wave was fielded between October 5-7, 2016 interviewing registered voters in Ohio, Pennsylvania, and Wisconsin. All respondents in Ohio and Pennsylvania were recontacted October 7-8, 2016 for a follow-up survey on the breaking news about the "Trump tapes." The twentieth-fourth wave interviewed registered voters on October 12-14, 2016 in thirteen battleground states (Arizona, Colorado, Florida, Georgia, Iowa, Michigan, North Carolina, New Hampshire,

Nevada, Ohio, Pennsylvania, Virginia, and Wisconsin) and combined a single state poll in Nevada. In addition, registered voters in Utah were interviewed for a separate single state poll. Panelists in the thirteen battleground states were interviewed again on October 16-18, 2016 to indicate whether they planned to watch the 3rd Presidential debate, and if they were willing to be reinterviewed after the debate on October 18, 2016. The twenty-fifth wave interviewed registered voters in Florida and Texas on October 20-21, 2016. The twenty-sixth wave interviewed registered voters in Arizona, Colorado, North Carolina, and Pennsylvania on October 26-28, 2016. In addition, likely voters in thirteen battleground states (Arizona, Colorado, Florida, Georgia, Iowa, Michigan, North Carolina, New Hampshire, Nevada, Ohio, Pennsylvania, Virginia, and Wisconsin) were interviewed on October 28-29, 2016 for a brief recontact survey regarding the FBI announcement.

Respondents were selected from YouGovs and two other online panels. These are “opt-in” panels which are open for anyone to join. However, YouGov also randomly selected persons from voter registration lists who had previously voted in primary elections and contacted them by phone. A total of 24017 registered voters were contacted by phone and the YouGov sample includes 1821 phone recruits.

Recontact rates ranged from 34% to 75% for each state for the reinterview waves. In addition, new respondents were selected from the YouGov panel each wave.

For the October, November, and December waves, all respondents from previous waves were contacted to participate. In the January wave, all respondents from previous waves in Iowa, New Hampshire, and South Carolina were contacted to participate. Florida, Georgia, and Texas are completely new interviews. In the February wave, all respondents from previous South Carolina waves were contacted to participate. In the March wave, all respondents from the previous Florida wave were invited to participate. All respondents from the New York survey in late March were invited to participate in the April wave. In the June 21-24, 2016 survey, all respondents from the previous Florida general election poll (conducted May 16-19, 2016) were invited to participate.

Approximately 60% of the October wave consists of reinterviews, with the remainder coming from new additions. Approximately 70% of the November wave consists of reinterviews from the previous waves, approximately 90% of the December and January waves consist of reinterviews. Approximately 84% of the February South Carolina wave consists of reinterviews.

In the February SEC Primary wave, Republican respondents from the January wave in Georgia and Texas were invited to participate. We did not interview Democrats in these states in January. Similarly, Republican respondents from the January wave in Florida were invited to participate in the mid-March wave, and Republican respondents from the late-march wave in Pennsylvania were invited to take the April wave. Approximately 60% of the New York and Pennsylvania portions of the April wave consist of reinterviews; all California respondents were new interviews this month. In the final Pennsylvania poll, all previous Republican respondents were invited to participate. Approximately 80% of the Pennsylvania Republicans in the April 20-22 wave had taken at least one previous wave. Approximately 50% of the Florida registered voters in the June 21-24, 2016 wave had taken the previous survey. Approximately 20% of the Battleground sample in the July 13-15, 2016 wave had taken a previous survey. The Iowa, Michigan, and Ohio samples consist of 50-75% recontacts. The Florida sample in the August 10-12, 2016 wave consisted of 72% recontacts. The August 17-19, 2016 wave has 55% recontacts in Iowa, and 92% of the Ohio respondents have taken at least one previous wave. Approximately 54% of the Battleground sample in the August 30-September 2, 2016 wave had taken a previous survey. The North Carolina sample consists of 62% recontacts from the June wave. In the September 7-9, 2016 wave, approximately 84% of the Florida and 90% of the Ohio samples had taken at least one previous survey. Approximately 83% of the Battleground sample in the September 14-16, 2016 wave had taken at least one prior wave of Battleground interviewing. The September 21-23, 2016 wave consisted of approximately 50% recontacts in Colorado and Virginia, and included new respondents in Missouri. The October 5-7, 2016 wave consisted of approximately 72% recontacts in Pennsylvania, and 50% recontacts in Wisconsin. About 90% of the Ohio respondents had taken at least one of the previous four waves in that state. Approximately 37% of the October 12-14, 2016 wave in Nevada consisted of reinterviews, and 60% of the Battleground sample had taken at least one prior wave of Battleground polls. The October 20-21, 2016 wave consisted of new interviews in Texas, and 97% of the Florida respondents had taken at least one of the four prior waves. Approximately 30% of the Arizona and Colorado respondents were recontacts

Total Interviews														
	Sept.			Oct.			Nov.			Dec.				
	IA	NH	SC	IA	NH	SC	IA	NH	SC	IA	NH	SC		
YouGov	1263	1078	1170	1003	918	1083	1134	1002	1021	920	837	884		
Research Now	407	272	335	339	230	282	421	334	426	332	254	518		
Critical Mix	0	0	335	0	0	97	0	0	62	0	0	67		
Total	1670	1350	1840	1342	1148	1462	1555	1336	1509	1252	1091	1469		
	Jan.			Feb.			Mar. 2-4							
	FL	GA	IA	NH	SC	TX	SC	GA	TX	VA	MI			
YouGov	988	494	906	764	943	984	1011	1322	3146	1193	1415			
Research Now	0	0	341	276	359	0	233	98	0	54	0			
Critical Mix	0	0	0	0	68	0	71	0	0	0	0			
Total	988	494	1247	1040	1370	984	1315	1420	3146	1193	1415			
	Mar. 9-11			Mar. 29-Apr. 1			Apr. 13-15			Apr. 20-22				
	FL	IL	OH	NY	PA	WI	CA	NY	PA	IN	PA			
YouGov	1877	1681	1742	1654	729	1086	2403	2050	837	1084	1917			
Research Now	0	0	0	0	0	415	0	0	0	0	0			
Critical Mix	0	0	0	0	0	0	0	0	0	0	0			
Total	1877	1681	1742	1654	729	1501	2403	2050	837	1084	1917			
	May 16-19		May 31-June 3			June 21-24								
	FL	OH	CA	NJ	CO	FL	NC	WI						
YouGov	880	875	1200	910	707	1126	842	783						
SSI	98	89	0	210	161	72	115	169						
Toluna	22	36	0	80	132	3	43	47						
Total	1000	1000	1200	1200	1000	1200	1000	1000						
	July 13-15			July 15-16		July 22-23		July 29-30		Aug. 2-5				
	IA	MI	OH	Battle Ground	Battle Ground	Battle Ground	Battle Ground	AZ	NV	VA				
YouGov	751	1082	1047	3289	2458	2131	2211	782	500	839				
SSI	118	119	55	77	0	0	0	62	78	68				
Toluna	0	0	0	0	0	0	0	0	25	0				
Critical Mix	129	0	2	17	0	0	0	251	174	274				
GMI	0	0	0	0	0	0	0	0	54	0				
Research Now	0	0	0	0	0	0	0	0	162	0				
Total	998	1201	1104	3383	2458	2131	2211	1095	993	1181				
	Aug. 10-12			Aug. 17-19			Aug. 30-Sept. 2			Sept. 7-9				
	FL	GA	NH	IA	OH	NC	PA	Battle Ground	FL	OH	Battle Ground			
YouGov	1194	705	601	697	980	1088	1091	3675	1193	994	3870			
SSI	0	114	61	17	17	0	0	0	0	0	0			
Critical Mix	0	169	97	273	0	0	0	0	0	0	0			
GMI	0	0	50	0	0	0	0	0	0	0	0			
Research Now	0	0	181	0	0	0	0	0	0	0	0			
Total	1194	988	990	987	997	1088	1091	3675	1193	994	3870			
	Sept. 14-16			Sept. 21-23			Oct. 5-7			Oct. 12-14			Oct. 20-21	
	Battle Ground	CO	MO	VA	OH	PA	WI	Battle Ground	NV	UT	FL	TX		
YouGov	4202	646	693	641	997	997	640	3231	593	495	1042	1031		
SSI	0	0	0	86	0	0	0	7	91	66	0	0		
Critical Mix	0	345	394	510	0	0	353	22	311	390	0	0		
GMI	0	0	0	0	0	0	0	0	0	0	0	0		
Research Now	0	0	0	0	0	0	0	0	0	0	0	0		
Total	4202	991	1087	1237	997	997	993	3260	996	951	1042	1031		
	Oct. 26-28			Nov. 2-4										
	AZ	CO	NC	PA	FL	OH								
YouGov	619	656	992	1091	1188	1189								
SSI	118	100	0	0	0	0								
Critical Mix	257	241	0	0	0	0								
Total	994	997	992	1091	1188	1189								

from a prior wave, and 50% of the North Carolina and Pennsylvania respondents were recontacts in the October 26-28, 2016 poll. Approximately 90% of the Florida and Ohio respondents in the November 2-4, 2016 wave had taken a previous wave.

All respondents in Florida (January), Virginia (February), Michigan (early March), Illinois and Ohio (mid-March), Wisconsin (late March), California (April), and Indiana (late April) only participated in one wave. Reinterviews of the primary election panel surveys are summarized below.<sup>1</sup> The general election surveys started with the May 16-19, 2016 wave and are summarized in a separate table below.

Recontacts and New Interviews								
Primary Election Surveys								
	IA	NH	SC	GA	TX	FL	NY	PA
Six Waves	-	-	434	-	-	-	-	-
Five Waves	450	349	278	-	-	-	-	-
Four Waves	404	375	400	-	-	-	-	-
Three Waves	414	408	374	-	-	-	-	544
Two Waves	742	547	658	300	489	633	1256	429
One Wave	823	643	1303	195	496	356	1196	252
Total	2833	2322	3447	495	985	989	2452	1225

Recontacts and New Interviews																		
General Election Surveys																		
	FL	OH	CA	NJ	CO	NC	WI	IA	MI	AZ	NV	VA	GA	NH	PA	MO	UT	TX
Six Waves	194	199	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Five Waves	323	263	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Four Waves	348	302	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Three Waves	397	327	0	0	452	493	0	0	0	0	0	0	0	0	550	0	0	0
Two Waves	368	413	0	0	243	478	520	563	0	540	365	579	0	0	499	0	0	0
One Wave	705	750	1200	1200	1142	633	947	859	1201	1009	1624	1260	988	990	531	1087	951	1031
Total	2335	2254	1200	1200	1837	1640	1467	1422	1201	1549	993	1839	988	990	1580	1087	951	1031

Respondents were selected for participation from available panel members to be representative of registered voters from each state in terms of age, race, and gender. A propensity score (based upon a case-control logistic regression including age, race, gender, education, born-again status, party registration, and 2012 vote) was estimated for each respondent and responding panelists were post-stratified upon propensity score deciles, and adjusted for differential recontact from the prior wave. A score for likelihood of voting was computed for each respondent based upon past turnout and self-reported likelihood of voting in the presidential primary.

Finally, the product of the base weights and turnout probabilities were raked to match parameters from past primary and general elections in the state drawn from exit polls, and aggregate parameters from the current voter file. The weights were trimmed to have a maximum value of seven.

The “margin of error” is an approximate 95 percent confidence interval for the sampling proportion. It is calculated for a sample proportion using

$$\hat{p} \pm \sqrt{(1 + CV^2)/n}$$

where CV is the coefficient of variation of the sample weights and n is the sample size used to compute the proportion. This is a measure of sampling error (the average of all estimates obtained using the same sample selection and weighting procedures repeatedly should, in principle, be within the margin of error in 95 percent of such samples). It does not reflect non-sampling errors, including potential selection bias in panel participation or in response to a particular survey. The validity of the margin of error for total survey error (including non-sampling error) requires that, after controlling for the sample selection and weighting variables, survey measurements be independent of sample selection.

<sup>1</sup>Florida (January), Georgia, Pennsylvania, and Texas counts are Likely Republican Voters only. Democratic voters were not contacted in the first wave.