Using the Calculator to Determine a Representative Sample from a Population

The purpose of this online calculator is to determine how many people you will need to include in a survey research project, in order to get a representative sample of a population.

Please note the following two points:

1. Calculating the right sample size for representativeness is not the same as calculating the right sample size for adequate statistical power. If you are testing a difference between groups and want to know if that difference is reliable, use the power analysis calculators on the website instead. If you are collecting data from survey respondents and want to make sure the results you get are representative of the population, use this calculator.

2. Just having enough people in your sample does not necessarily guarantee representativeness. If you get a biased sample (i.e., the only people who answer your survey are the ones who really like you, or the ones who really hate you), then your results aren’t representative. You still need to demonstrate that your results come from a group of people who aren’t too different from the entire population (for example, by comparing the demographics of your sample to the overall population demographics).

With those two caveats in mind, here’s how to use the calculator. If you are trying to determine adequate size for a representative sample, use the top calculator on the page:

![Determine Sample Size](image)

Step 1: select a confidence interval. Usually 95% is OK. If you’re less comfortable with a Type I error for some reason, then select a 99% confidence interval instead.

Step 2: enter a range within which you want to be sure of your results. This calculator is only for percentage data, so the number you enter here is “how many percentage points” you want your answer to be correct within.

Step 3: put in the total number of people in the population that you are interested in. If you are surveying a national organization of 8,000 nurses, this number would be 8,000.
Here’s an example:

![Image of a sample size determination tool]

In this example, I selected a confidence interval of 5, at the 95% confidence level. This means that if I get survey results from 367 nurses showing that 80% of the nurses surveyed were satisfied with the customer service provided by their organization, I can be 95% certain that the true population value (for all 8,000 nurses in the organization) is between 75% and 85%. That’s the 5-percentage-point confidence interval – the true population value could be as high or as low as 5 points above or below the obtained result. This will be true for 95% of the samples that I could get from that population of 8,000 nurses. 5% of the time, I will get a strange sample that is not representative, and my sample result would be farther off from the true population rate. We don’t know which of these is actually the case for our one and only sample, which is why we can say we’re “95% confident” (rather than 100% confident) in our results. Think of the 95% (confidence level) as how sure we are, and the ±5 percentage points (confidence interval) as the “margin of error” in our results.

To translate this result of 367 respondents into an actual surveying strategy, you also need to take into account the expected response rate to your survey. If you expect that only 20% (1 in 5) people surveyed will actually turn a completed survey back in, you need to multiply your target sample size by that factor of 5 – instead of sending out 367 surveys, you need to send out 367 x 5, or 1,835 surveys. 20% is probably a good average response rate for surveys, unless you think you have a very motivated or very unmotivated (or busy) group of potential respondents.

Sending out about 2,000 surveys is better than sending out 8,000, but of course it’s still a lot. If I raise my confidence interval to 10 instead of 5, and re-run the same calculation, I get a required sample size of only 95 respondents. Even assuming a 20% response rate, I would need only 95 x 5 = 475 surveys. Given this large difference in sample size requirements, I may decide that I can live with a margin of error of ±10 percentage points, rather than going for the greater degree of precision provided by a 5 percentage point margin of error.