



# Sample Size

## Considerations

Sample size is one of the most important decisions a person can make while designing their patient perception study. And, it's often a challenge to find a perfect number when considering error rate and sticking to the budget. A sample that is too small will result in data that, when factoring in the error rate, is limited or even useless at a practical level. On the other hand, a sample that is larger than necessary wastes precious resources. PRC works with clients to find a statistically happy median.





## How PRC analyzes the data for you

The data PRC gathers from your patient research serves a number of purposes, some of which entail complex, statistical analyses.

- It provides you with a valid “snapshot” measure of patient perceptions at any given point in time.
- It allows for comparison of that snapshot score with other scores, such as previous time periods, other units or service areas, hospital wide scores, and PRC’s Norms.
- It allows for comparison of that snapshot score with other scores, such as previous time periods, other units or service areas, hospital wide scores, and PRC’s Norms. It allows PRC to determine your Key Drivers of Excellence, or the specific aspects of patient care that are more important in driving overall patient satisfaction for that particular group.
- It allows us to determine how and why patients answer certain items differently.

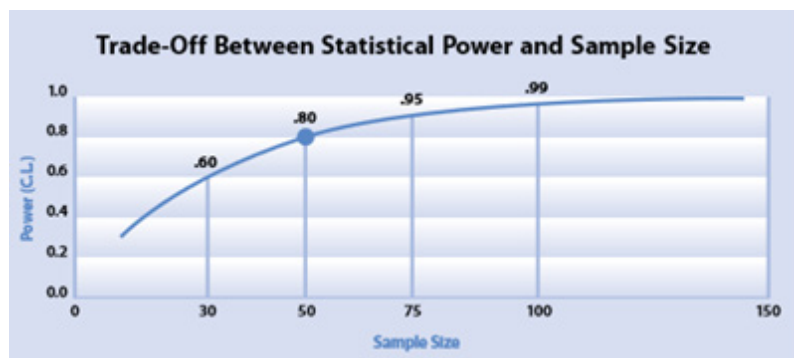
Not surprisingly, as the demands increase for the use of the data, the complexity of the statistics increases, as does the need for an appropriate sample size.

Several popular statistical tests—t-tests, stepwise multiple regression and discriminant analysis—are used in the analysis of your data of which all benefit from a robust sample size. **The T-Test**, a common test for significance in a patient satisfaction study, allows for a comparison of a unit mean (average) score to an overall hospital score, a normative score, or a score from a previous time period. This determines if the current score is truly different rather than just a random fluctuation within the range of sampling error. The second test—Stepwise Multiple Regression—determines those specific aspects of care that drive your patients’ satisfaction. Finally, **Discriminant Analysis** identifies variables (survey items) that best discriminate between groups. For example, by analyzing the differences between patients that responded with Always vs. Usually on Overall Quality of Care we can determine what we need to do to move the Usually group into the Always group.

## Statistical testing and power analysis

The key to statistical sampling is to find the most efficient, cost-effective sample size to reduce the error rate. The greater the sample size, the more likely you are to get a representative sample of the total population, and the smaller the margin of error. We use a statistical test to determine the compromise between too much error and costly overkill.

A statistical test called **Power Analysis** seeks to find the point where the sample size minimizes the chance for error in the significance testing while still accounting for the law of diminishing returns— where each additional patient interview does not markedly reduce the further chance of error. Put another way, the power analysis tells you how often the results of your significance testing will be accurate. The primary challenge in designing and carrying out patient research is to gain sufficient statistical power to minimize the rate of error.



For all but the smallest populations, this number hovers around fifty completed interviews per patient group per time period. The graph on the previous page is a useful visual aid in making decisions regarding the trade-off between statistical power and sample size. As you can see, a sample size of 50 is required for .80 power, which equates to an 80 percent confidence level for the significance testing. *This is true regardless of the size of your total population.* A sample size of 30 has far less statistical power – 60 percent power, which is in essence not much more predictive than the 50 percent power of a coin toss. Also notice that with a sample size greater than 75, the graph begins to flatten out –or the Rate of Increase in statistical power begins to reduce dramatically beyond the .95 power mark or 95 percent confidence level.

## The relationship between patient volume and sample size

When discussing matters of sampling, the relationship between patient volume and the size of a sample needed to achieve an acceptable error rate is often confusing. After a certain volume, the **number** in your sample becomes less important than the **quality** of your sampling techniques (making sure you are getting the best random representation of your total volume). Succinctly, the larger your volume, the smaller your sample size can be (relative to the total volume) to maintain your confidence level and precision when reporting scores. (Keep in mind that this is not the same thing as the confidence levels aforementioned; those are related to the power of the significance testing, and here we are discussing the confidence level of your actual scores.) This, unfortunately, means that as your patient volume shrinks, your sample size does not shrink at the same rate. The table below illustrates this point; notice how the **percentage of patients** that you need to interview increases as your patient volume decreases.

The benefit of doing more than 50 interviews in any given area is a decrease in the error rate, but again, the error rate will decrease the same amount for your 20,000-patient department as it will for your 5,000-patient department. (Remember that the graph on the opposite page illustrates the diminishing returns for the power analysis.)

Patient Volume and Sample Size Rates		
Patient Volume	Sample Size	Sample Size as % of Volume
20,000	97	0.49
10,000	96	0.96
5,000	95	1.90
1,000	89	8.90
500	81	16.20

Sample size calculated with +/-10% error rate at the 95% confidence level for all volumes.

## Options for creating your sample plan

How do we most effectively distribute interviews across a system of patients? Three variables are necessary for creating a sample plan: the number of patient groups you want to analyze individually, the frequency of receiving summary reports of the data for those individual patient groups, and the number of interviews that will be included in each of those summary reports.

In most cases, PRC recommends a minimum sample size of 50 patient interviews per patient group per quarter, or 200 per year. We strongly feel that reporting on fewer than 50 interviews is not effective to your organization, especially the managers and directors who will receive those reports. With fewer than 50 interviews, it takes a sizable change in the scores before a change will be recognized as statistically significant. Without seeing significant changes in their scores, especially if they are working hard to make improvements, managers and directors can become frustrated with the process.



## What are your goals?

To learn what PRC's custom data can do for you, contact us at 800-428-7455 or visit [PRCCustomResearch.com](http://PRCCustomResearch.com)

### PRC Product Lines



Regarding the number of patient groups, this is a decision that you will make. Some clients make this decision based on patient volumes, while some base their decision on accreditation requirements. Some organizations choose to divide groups along supervisory lines, making leaders responsible for results and giving them the freedom to make improvements based on survey results. The greatest flexibility in this equation, then, is found in changing the frequency of the summary reports. PRC produces summary reports that show significance testing results and changes over time. Keep in mind, however, that with our PRCEasyView®.com website, you may view the results from patient interviews at any time along the way, so the most current patient satisfaction data is always available to you.

As you make the final decisions regarding your sample plan, please keep in mind:

- A sample size of 50 is required for .80 power, which equates to an 80 percent confidence level for the significance testing. This is true regardless of the size of your total population.
- Sample size is not arithmetically related to patient volume; you can have the same confidence in the results of 50 interviews for a 200-patient area as you can in the results of 50 interviews for a 20,000 patient area.
- Moving some areas to a semi-annual reporting schedule will allow more interviews to be shifted to other quarterly reporting areas or allow the flexibility of segmenting larger areas into autonomous subgroups for sampling and reporting.

## Why choose PRC?

Professional Research Consultants, Inc., empowers healthcare organizations to become the best possible places for physicians to practice medicine, patients to be treated, and employees to work. Thousands of organizations turn to PRC for comprehensive custom research solutions that help them achieve excellence and drive growth.

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