

Precision of a Proportion

Objective: Determine Sample Size Necessary for Estimating a Proportion

An investigator is interested in determining the sample size needed in their study that is measuring the response rate of a patient showing up to their follow-up visit after a new protocol for reminders is put in place. The investigator is expecting 70% of patients to show up to the follow-up with the new protocol and would like a 95% confidence interval that ranges from 64% to 76%. That is, a 12-point total width of confidence interval ($76 - 64 = 12$).

Required Information	Inputs
What is the desired Confidence Interval?	95%
Response rate	70%
What is the total width of confidence interval?	0.12

P = 0.7 Expected proportion
 W = 0.12 Total width of confidence interval
 CL 95 % Confidence level

Calculate

If our expected response is 0.7 and want a 95% confidence interval that ranges from 0.64 to 0.76 then the total width of the confidence interval will be:
 $0.76 - 0.64 = 0.12$.

1. Binomial "exact" calculation

Sample size = N = 238
 Expected positive results in sample = x = 167

With a sample size of $n = 238$, if the estimated response rate is 70%, the 95% confidence interval will range from 64% to 76%.

Example using the UCSF Sample Size Calculators for Designing Clinical Research (<https://sample-size.net/sample-size-conf-interval-proportion/>)