

Section 5.3 Confidence Intervals for Proportions

Suppose we conduct an experiment where X is the number of successes in n trials.

Take a simple random sample of 45 Oregonians. Ask if the person voted in the last election. Let the random variable, X , be the total number who voted. You find $X = 36$.

Calculate the proportion of people who voted.

What is the population parameter we are interested in?

What is our best guess for the value of this parameter?

So...Our goal is to estimate p , the population proportion.

We say \hat{p} is an unbiased estimator of p because...

Confidence Interval for the Population Proportion

A car manufacturer needs to estimate the proportion of cars that have defective brakes. In a sample of 430 cars, 39 were found to have defective brakes. Give a 95% Confidence Interval for the proportion of cars with defective brakes.

How many measurements must be taken to specify the proportion of defectives to within ± 0.01 with 95% certainty?

What if we have no prior knowledge of the sample proportion?
How will we decide what sample size to use?

A drug manufacturer must estimate the proportion of people who have a severe reaction to a new drug. In the absence of any preliminary data, how big a sample should be taken so that a 95% confidence interval specifies the proportion to within ± 0.05 ?

Example: The United States has not had a military draft since 1970. It is suspected that 15% of the population would favor reinstating the draft. We want to take a sample and get a 99% CI for the proportion of people in the U.S. who would favor reinstating the draft.

Calculate the needed sample size if you will accept a 5% margin of error.

Calculate the needed sample size if you will accept a 1% margin of error.