

Project 11 – 1 Proportion, 2 Proportion, 1 Mean, & Their Alternatives

For each hypothesis test use the standard 5-step procedure. Two of the tests will fail their conditions, forcing you to use the alternative test:

- one-proportion (binomial)
- two-proportion (randomization)
- one-mean (sign test)

Turn in your hypothesis tests on your own paper. You may work in groups of two or three.

1) Here are 10 randomly selected blood sugar levels from a laboratory. (Levels measured after a 12-hour fast in mg/DL.)

105 89 96 135 94 91 111 107 141 83

Use the data to test the claim that the mean blood sugar level is 100 mg/DL using the 0.05 level of significance.

2) A sample of 35 non-smokers revealed that 31 of them showed traces of a chemical that appears in the blood of people exposed to second-hand smoke. At the 0.05 level of significance test the claim that more than 80% of non-smokers are exposed to second-hand smoke.

3) In clinical trials of the allergy medicine Clarinex (5 mg), it was reported that 50 out of 1655 individuals in the Clarinex group and 31 out of 1652 individuals in the placebo group experienced dry mouth as a side effect of their respective treatments. Test the claim that the proportion of individuals experiencing dry mouth is greater for those taking Clarinex than for those taking a placebo at the 0.05 level of significance.

4) Eight artichoke plants at a farm were selected at random. Here are the number of artichokes produced by each plant last year.

38 32 17 51 40 36 34 39

At the 0.05 level of significance, test the claim that the mean number of artichokes is higher than 30 artichokes.

Alternative Tests

One Proportion Test

Conditions: $20n \leq N$, $np(1-p) \geq 10$

Alternative: Binomial Distribution

Stat > Calculators > Binomial

Use \leq for a left-tailed test, \geq for a right-tailed test, and double the appropriate tail for a two-tail test.

In the binomial calculator use the sample size for n , the claimed value of p in H_0 for p , and the number of successes in the sample for x .

Two Proportion Test

Conditions: For each sample check $20n \leq N$, $n\hat{p}(1-\hat{p}) \geq 10$

Alternative: Randomization

Applets > Resampling > Randomization test for two proportions

Use “below” for a left-tailed test, “above” for a right-tailed test, and “Total” for a two-tail test.

After building the applet use 10,000 runs to generate the P -value.

One Mean Test

Conditions: $20n \leq N$, no outliers (boxplot), data from a population that is normally distributed (QQ plot)

Alternative: Sign Test

Stat > Nonparametrics > Sign Test

Be sure to change the problem from μ (population mean) to M (population median).