

# Stat 101 – Lecture 28

## Another Example

- According to the U.S. census, Story County has 9.7% of its population classified as non-white.
- Of 120 people called for jury duty in Story County only 3 are non-white. Is this convincing evidence of under-representation of non-whites?

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## Another Example

- Step 1: State your null and alternative hypotheses.
  - $H_0: p = 0.097$
  - $H_A: p < 0.097$
  - $p$  is the proportion of non-whites among all people in the jury pool for Story County.

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## Test of Hypothesis

- Step 2: Check conditions
  - Random sampling condition  
The 120 people selected should be a random sample from the jury pool.

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## Test of Hypothesis

- Step 2: Check conditions
  - 10% condition
  - There should be at least 1,200 people in the jury pool.

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## Test of Hypothesis

- Step 2: Check conditions
  - Success/Failure condition
  - $np = 120(0.097) = 11.64$
  - $n(1 - p) = 120(0.903) = 108.36$
  - Both of these are greater than 10.

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## Test of Hypothesis

- Step 3: Calculate the test statistic value and convert it into a P-value.

$$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1 - p_0)}{n}}} = \frac{0.025 - 0.097}{\sqrt{\frac{0.097(1 - 0.097)}{120}}}$$

$$z = \frac{-0.072}{0.027} = -2.67$$

$$P - \text{value} = 0.0038$$

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## Test of Hypothesis

- Step 4: Use the P-value to reach a decision.
  - Because the P-value is small, we should reject  $H_0$

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## Test of Hypothesis

- Step 5: State your conclusion in the context of the problem.
  - This is convincing evidence that non-whites are under-represented in the jury pool.

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## Discrimination?

- Even though there is convincing evidence that non-whites are under-represented in the jury pool this does not prove that non-whites are being discriminated against.

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