



# STATS Project



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## Research Question

Is there a higher use of birth control among freshman compared to seniors?

# Data Collection

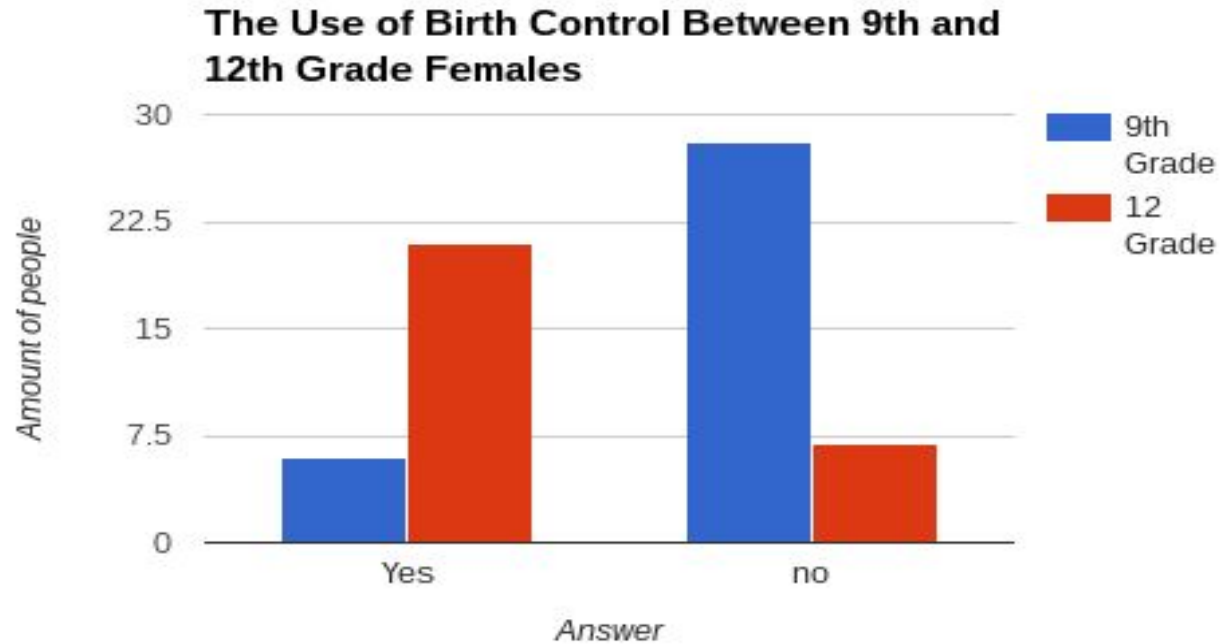
We went to four randomly chosen 9th and 12th grade classes and within those classes, we sampled all the people with a uterus.

Each of the people sampled filled out an anonymous survey where they checked a box. This will reduce bias and the answers will be more honest.

# Data Analysis

Answer	9th Grade	12 Grade
Yes	6	21
no	28	7
Total	34	28

# Data Analysis Continued



## Data Analysis Continued

Our findings showed us that more seniors use birth control than freshman. Our hypothesis was correct. We thought this because seniors are older and know more resources to access birth control. Seniors are also more willing to talk about birth control and be more open about these types of things.

# Data Collection/Equations

$\hat{p}_1$  = % of freshman who use birth control

$\hat{p}_2$  = % of seniors who use birth control

$\hat{p}_c$  = 0.771

$n_1$  = Random sample of freshman girls

$n_2$  = Random sample of seniors girls

$x_1$  = freshman who use birth control

$x_2$  = seniors who use birth control

$N_1$  = Total population of freshman/senior girls at Washburn High School

$$\frac{(\hat{p}_1 - \hat{p}_2) - 0}{\sqrt{\frac{\hat{p}_c(1 - \hat{p}_c)}{n_1} + \frac{\hat{p}_c(1 - \hat{p}_c)}{n_2}}}$$

# Inference Procedure

Two-proportion Z test



# Parameters and Hypotheses

**Parameter(s) - Identify the population(s) of interest and the parameter(s) you want to draw conclusions about.**

$P_1$  : The proportion of all Freshman at Washburn High School who use birth control

$P_2$  : The proportion of all Seniors at Washburn High School who use birth control

**Hypotheses - State null and alternative hypothesis in symbols and in words.**

$$H_o : P_1 = P_2$$

$$H_a : P_1 < P_2$$

# Assumptions

## Assumptions (Conditions) - Verify conditions.

✓ Random: Randomly selected freshman and senior classes

✗ Normal:  $(34)(0.1764) = 6$  \*Not  $\geq 10$

$(28)(0.75) = 7$  \*Not  $\geq 10$

✓ Independent:  $(0.1764) \leq 206$

$(0.75) \leq 154$

# Test Statistic

Test statistic - If the conditions are met, calculate the test statistic

$$Z = \frac{(.06 - .21) - 0}{\sqrt{\frac{.771(1 - .771)}{34} + \frac{.771(1 - .771)}{28}}}$$

**=-1.3988**

# Obtain the P-Value

Obtain the P-value - Use the test statistic to calculate the P-value

Look on table.

P-value = 0.0823

# Make Decision

## Make decision - Reject or fail to reject $H_0$

Because the P-value is not significant at the 5% level, we fail reject the null hypothesis.

# State Conclusion

State conclusion in context - State your conclusion in the context of the problem

There is **not** strong evidence that there is a higher use of birth control among freshman compared to seniors.

# Final Summary

This research provided us with data that showed a higher percentage of Seniors using birth control compared to Freshman. A limitation of this study is that because we were present while the subjects were filling out the survey, they could have felt uncomfortable and felt the need to lie even though it was completely anonymous. To fix this, we could have them fill out a survey online that they could complete at home or in a more private setting.

A large error that we encountered is that not all the conditions were met. It is not normal.