12.3: Inferences between 2 proportions

Note Title 11/28/2016

Example 2: (Comparison of Cancer Drugs)

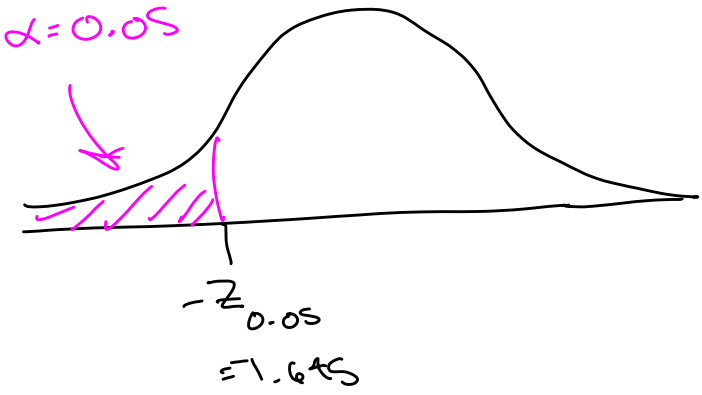
See pdf notes for formulas, etc.

Example 2: Suppose that a clinical trial for two different cancer drugs is conducted. For drug A, 637 of 2095 patients were cured. For drug B, 702 of 2119 patients were cured. Does this trial provide evidence that Drug B cures a higher percentage of patients than Drug A? Use a 5% level of significance.

$\alpha = 0.05$

$H_0: p_1 = p_2$

$H_a \quad p_1 < p_2$



From tables critical value for z is $z_{0.05} = 1.645$.

Sample info:

Drug A: $\hat{p}_1 = \frac{x_1}{n_1} = \frac{637}{2095} = 0.304$

$n_1 = 2095$

Drug B: $\hat{p}_2 = \frac{x_2}{n_2} = \frac{702}{2119} = 0.331$

$n_2 = 2119$

Calculate pooled sample proportion:

$\hat{p}_p = \frac{x_1 + x_2}{n_1 + n_2} = \frac{637 + 702}{2095 + 2119}$

$= \frac{1339}{4214}$

≈ 0.31775

$\hat{q}_p = 1 - \hat{p}_p = 1 - 0.31775$

$= 0.68225$

Standard error:

$$\sigma_{\hat{p}_1-\hat{p}_2} = \sqrt{\hat{p}_P(1-\hat{p}_P)}\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}$$

$$= \sqrt{0.31775(0.68225)}\sqrt{\frac{1}{2095}+\frac{1}{2119}}$$

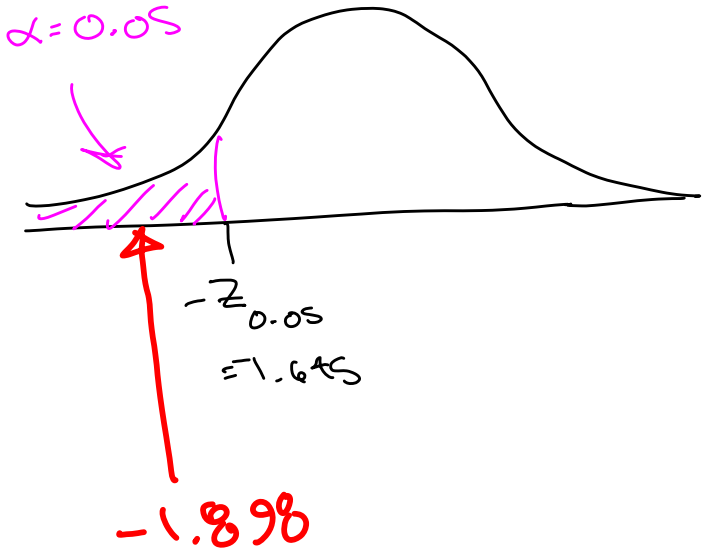
$$= \sqrt{0.31775 * 0.68225 * (1/2095 + 1/2119)}$$

$$\approx \sqrt{2.05789\times10^{-4}}$$

$$\approx 0.014345$$

Calculate test statistic:

$$Z = \frac{\hat{p}_1-\hat{p}_2}{\sigma_{\hat{p}_1-\hat{p}_2}} = \frac{0.304-0.331}{0.014345} \approx -1.898$$



This falls in rejection region, so we

Reject H_0.

The sample provides evidence Drug B cures a higher proportion of patients than Drug A.