

Two-Proportion z-Test With Pooling (Ch.20.7)

- Conditions: Same as for two-proportion z-interval
- pooled proportion must be used for more accurate SE.
- $H_0 : p_1 = p_2$ allows to conceptually pool (combine) samples:
- Size = $n_1 + n_2$, # success = # success₁ + # success₂

- **pooled proportion** $\hat{p}_{pooled} = \frac{\text{\# success}_1 + \text{\# success}_2}{n_1 + n_2}$

- $SE(\hat{p}_1 - \hat{p}_2) = \sqrt{\frac{\hat{p}_{pooled} \cdot \hat{q}_{pooled}}{n_1} + \frac{\hat{p}_{pooled} \cdot \hat{q}_{pooled}}{n_2}}$

- Test statistic $z = \frac{\hat{p}_1 - \hat{p}_2}{SE(\hat{p}_1 - \hat{p}_2)}$

- Compute P-value to make decision on H_0