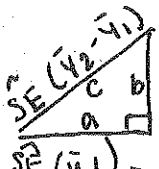
AMS7
Lecture 11

(P.56) $\hat{SE}(\bar{y}_2 - \bar{y}_1) = ?$ • Has to be bigger than 0.241

• Cannot be > sum 2 #s

math fact



L-198

$$\hat{SE}(\bar{y}_2 - \bar{y}_1) = \sqrt{(\hat{SE}(\bar{y}_2))^2 + (\hat{SE}(\bar{y}_1))^2}$$

$$= \hat{SE}(\bar{y}_1 - \bar{y}_2)$$

= .3614 days

inferential summary

unknown quantity of interest	$\mu_2 - \mu_1$ = pop mean diff time to reproduce bw gen or I + II
estimate	$\bar{y}_2 - \bar{y}_1 = 7.6571 - 7.6143 = +.0428$
give/take	$\hat{SE}(\bar{y}_2 - \bar{y}_1) = .3614$ days
95% CI	$\bar{y}_2 - \bar{y}_1 \pm 2.179\ SE(\bar{y}_2 - \bar{y}_1)$

Difference does not seem large practically (or statsig)

$n_1 + n_2 - 2$ is okay to use (JUMP=amplex)

2 versions 2-Independent-Samples Study

Use this one →
- (A) unpooled $\sigma_1 ?= ? \sigma_2$ unequal variances
- (B) pooled $\sigma_1 = \sigma_2$ equal variances

ex. Redwood Grove, (ca) chosen 265 trees 9 infected
(or) sample 281 trees 20 infected

Q. How strong is the evidence that parasite affecting redwoods [or] more than [ca]

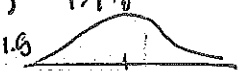
pop$_1$: [all trees CA grove] — sample$_1$: [redwood trees observed] — I.D. 1: [possible]

N_1=? $\begin{bmatrix}1\\0\\1\end{bmatrix}$ SRS IID → $\begin{bmatrix}1\\0\end{bmatrix}$ $n_1 = 265$ → $\begin{bmatrix}3.4\%\\3.7\%\\\vdots\end{bmatrix}$

p_1 = ? $\quad \hat{p}_1 = 3.4\%$ $\quad \hat{E}_{IID}(\hat{p}_1) = p_1$

$SD\sigma_1$ = $\quad \hat{SE}_{IID}(\hat{p}_1) = 1.1\%$

hist $\quad \hat{SE} = 1.1$ CLT



p_1

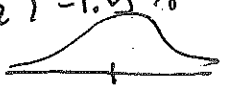
pop$_2$: [ditto OR] — sample$_2$: [ditto OR] — I.D. 2: [possible]

N_2=? $\begin{bmatrix}1\\\vdots\end{bmatrix}$ SRS IID → [infected?] $n_2 = 281$ → $\begin{bmatrix}\\\vdots\end{bmatrix}$

p_2 = $\quad \hat{p}_2 = 20/281 = 7.1\%$ $\quad \hat{E}_{IID}(\hat{p}_2) = p_2$

$SD\sigma_2$ = $\quad \hat{SE}_{IID}(\hat{p}_2) = 1.9\%$ CLT

hist $\quad \hat{SE} = 1.9$



p_2

CALC:

$$\sqrt{0.0111^2 + 0.0193^2} = 0.01866 = 1.9\%$$

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

The rate in OR is (7.1%) more than twice CA (3.4%)
↳ Practically Sig

	infer. summary
unknown QI	$p_1 - p_2$
estimate	$\hat{p}_1 - \hat{p}_2 = 3.4\% - 7.1\% = -3.7\%$
give|take	$\hat{SE}(\hat{p}_1 - \hat{p}_2) = 1.9\%$
95% CI	$\hat{p}_1 - \hat{p}_2 \pm 2\hat{SE}(\hat{p}_1 - \hat{p}_2)$

95% Int.