WS #2 - Confidence Intervals
Math 150, Jo Hardin

Monday, January 27, 2025

Your Name: _____

Names of people you worked with: _____

How are your classes are going? Is your schedule set or are you trying to move things around?

Task: Consider the data on mortality associated with elective surgery. Find a 98% confidence interval for the true difference in ages for patients who have surgery in July/August versus those who don't.

You might want to use:

$$
\begin{aligned}
\overline{y}_1 &= 57.62 \\
\overline{y}_2 &= 57.84 \\
s_p &= 15.04 \\
SE(\overline{y}_1 - \overline{y}_2) &= s_p \cdot \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \\
n_1 &= 26498 \\
n_2 &= 5501 \\
df &= n_1 + n_2 - 2
\end{aligned}
$$

Also, you'll need the t-multiplier to find the CI, how do you find it?

Solution:

$$98\% \text{ CI for } \mu_1 - \mu_2: \quad \bar{y}_1 - \bar{y}_2 \pm t^*_{31997} s_p \sqrt{1/n_1 + 1/n_2}$$

$$57.62 - 57.84 \pm 2.33 \times 15.04 \cdot \sqrt{\frac{1}{26498} + \frac{1}{5501}}$$

$$(-0.739, 0.299)$$

In R to find the t-multiplier:
```
qt(.99, df = (26498+5501-2))
[1] 2.326464
```

We are 98% confident that the true difference in ages for all people (in the population) who get elective surgery in July/August versus in other months is between -0.739 years and 0.299 years. Note that our CI overlaps zero and so the true difference in parameters might be zero. Therefore, we have no evidence to claim that the July/August group is significantly younger (or significantly older!) than the rest of the patients.