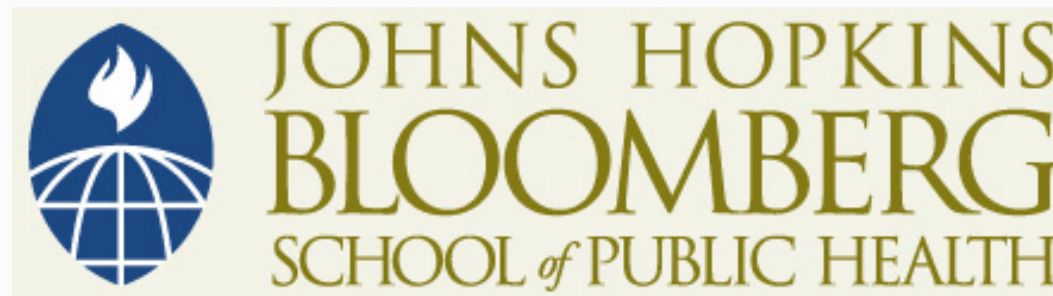


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Lecture 5a: Practice Problem Solutions

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Practice Problems

1. In a high school in the United States, a dietary counseling is being tested to measure the program's long-term impact on student's fat intake. Of the three hundred students at the school, 150 are randomized to receive five one-hour sessions of dietary counseling; the other 150 students receive no counseling.
 - Six months after the last counseling sessions, all students are asked to keep a food diary for one week. Each student's average fat intake in grams, is calculated at the end of this week. The results of this exercise are as follows:

Practice Problems

- Intervention group
 - $\bar{x}_1 = 54.8$ grams , $s_1 = 28.1$ grams, $n_1 = 146$
- Control group
 - $\bar{x}_2 = 62.8$ grams, $s_2 = 34.7$ grams, $n_2 = 142$
 - (Please note—follow up sample sizes differ slightly from initial sample size because of loss to follow up)
- The public-health question of interest is whether there is a difference in mean fat intake between the two groups, six months after the intervention ended. You are going to help answer this question:
 - Construct a 95% CI for the population mean difference in daily fat intake for the intervention group as compared to the control group.

Practice Problem Solutions

- To create a 95% CI for $\mu_2 - \mu_1$:

$$\begin{aligned} & (\bar{x}_2 - \bar{x}_1) \pm 2 \times \hat{SE}(\bar{x}_2 - \bar{x}_1) \\ & (62.8 - 54.8) \pm 2 \times \hat{SE}(\bar{x}_2 - \bar{x}_1) \\ & 8.0 \pm 2 \times \hat{SE}(\bar{x}_2 - \bar{x}_1) \end{aligned}$$

$$\begin{aligned} \hat{SE}(\bar{x}_2 - \bar{x}_1) &= \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} \\ &= \sqrt{\frac{(28.1)^2}{146} + \frac{(34.7)^2}{142}} \approx 3.7 \end{aligned}$$

- Business as usual!!

Practice Problem Solutions

- 95% CI for $\mu_2 - \mu_1$:
 - $8 \pm 2 \times (3.7)$
 - 8 ± 7.4
 - (0.6gm, 15.4 gm)
 - Notice that 0 is not included in the 95% CI