

Ch11.04.A. Epidural analgesia and C-section rates (adapted from a problem by Susan Lee).

In problem 9.6 we showed a figure from a natural experiment that occurred when the US Department of Defense began to offer epidural anesthesia during labor.

The observed proportions of Cesarean deliveries were 14.4% of 507 deliveries before and 12.1% of 581 deliveries after the policy change. Although not provided by the authors, this is an absolute risk reduction (ARR) of 2.35%, with a 95% CI (for the risk *reduction*) of (-1.7% to 6.4%). For each of the following statements about this risk reduction and 95% CI, **read the statement carefully**, indicate whether it is true or false **and explain**.

- a. The ARR does not appear to be statistically significant at the $\alpha = 0.05$ level.

Answer: True. The 95% CI does not come close to excluding zero.

- b. The 95% CI means that if we could repeat this study many times, we would expect the observed risk difference to fall in this interval about 95% of the time.

Answer: False. While 95% of the CIs would include the true risk difference, we can't say there's a 95% chance that THIS interval will include subsequent point estimates.

- c. The range of changes in C-section rates consistent with this study is between a 1.7% decrease and a 6.4% increase after the policy was implemented.

Answer: False; it's just the opposite. The point estimate was a 2.35% absolute risk reduction, a decrease in C-sections that would not even be included in the 95% confidence interval above. The 95% CI ranges from a 6.4% decrease to a 1.7% increase.

- d. The observed effect of **labor epidural analgesia** on the proportion of women receiving C-sections in this study was a 2.35% decrease (95% CI from a 6.4% decrease to a 1.7% increase).

Answer: False. The statement is false because the confidence interval is for the difference by time period, which does not correlate perfectly with difference by the treatment of interest (epidural analgesia). Many of the women in the second time period did not receive epidurals.

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