

Example 1

Researchers were interested in estimating mean cholesterol level in patients who had undergone gastric bypass surgery. The standard deviation of cholesterol level is known to be $\sigma = 40$ mg/dL. A random sample of 64 gastric bypass patients were enrolled in the study. Mean cholesterol for this sample was 195 mg/dL.

Use this information to answer the following questions and construct the confidence intervals.

- a. What is the point estimate of mean cholesterol for this population?
- b. What is the standard error of the mean?
- c. To construct a confidence interval around this point estimate would you use a z-coefficient or a t-coefficient?
- d. Construct a 95% confidence interval for this estimate and provide the interpretation
- e. Construct a 99% confidence interval for this estimate and provide the interpretation
- f. Construct a 90% confidence interval for this estimate and provide the interpretation
- g. What is the margin of error of the 95% confidence interval?
- h. If the sample size had been 100 instead of 64 would each confidence interval be wider or narrower? Why?

Example 2

Parents in the Dennison study completed a 7-day dietary record. The mean daily calorie intake (kcal/day) for the sample of 94 children age 2-2.9 years was 1242 kcal. The SE of the mean was 30 kcal (Table 5-2). Use this information along with the following t-distribution information to calculate a 95% and a 90% confidence interval of mean daily kcal intake for 2 year olds.

Reference: Dawson B, Trapp RG. (2004). Chapter 5. Research Questions About One Group. In, *Basic & Clinical Biostatistics*. 4th ed. New York: McGraw-Hill.

t-coefficient for $df=93$ and 0.025 probability in each tail= **1.99**

Rcmdr: Distributions > Continuous Distributions > t distribution > t quantiles
Probabilities = 0.975; $df=93$; select Lower Tail
R Script: qt(0.975, $df=93$)

t-coefficient for $df=93$ and 0.05 probability in each tail = **1.66**

Rcmdr: Distributions > Continuous Distributions > t distribution > t quantiles
Probabilities = 0.95; $df=93$; select Lower Tail
R Script: qt(0.95, $df=93$)

- a. Construct a 95% confidence interval of mean daily kcal intake for 2 year olds and provide an interpretation.
- b. Construct a 90% confidence interval of mean daily kcal intake for 2 year olds and provide an interpretation
- c. What is the margin of error of the 95% confidence interval?
- d. If the study had sampled 194 children instead of 94 children and the sample SD was the same for both studies, how would the 95% and 90% confidence intervals from these studies differ from the ones constructed above? Why?

Example 3

For each comparison, which coefficient will have larger absolute value?

- a. z-coefficient for 95% confidence interval or t-coefficient for 95% confidence interval from t-distribution with 16 df.
- b. t-coefficient from t_{15} for 95% confidence interval or t-coefficient from t_{35} for 95% confidence interval
- c. t-coefficient from t_{15} for 95% confidence interval or t-coefficient from t_{15} for 90% confidence interval
- d. t-coefficient from t_{15} for 95% confidence interval or t-coefficient from t_{15} for 99% confidence interval
- e. z-coefficient for 95% confidence interval or z-coefficient for 99% confidence interval