Comments for MEDB 5501, Week 9

Review confidence interval for a single mean, 1 of 3

If n < 30, we have 1-α level of confidence that the population mean lies between

- $\bar{X} - t(\alpha/2; n-1)se(\bar{X})$ and
- $\bar{X} + t(\alpha/2; n-1)se(\bar{X})$

Review confidence interval for a single mean, 2 of 3

If n > 30, we have 1-α level of confidence that the population mean lies between

- $\bar{X} - Z(\alpha/2)se(\bar{X})$ and
- $\bar{X} + Z(\alpha/2)se(\bar{X})$

Review confidence interval for a single mean, 3 of 3

Very rough rule of thumb (do not use in publications, grants. Do not use on your homework, unless specifically requested).

- $\bar{X} - 2 \times se(\bar{X})$ and
- $\bar{X} + 2 \times se(\bar{X})$

represent an approximate 95% confidence interval for the population mean.

Example, 1 of 3

- In a sample of 98 women who smoked during pregnancy, the average BMI of these women prior to pregnancy was 21.6 with a standard deviation of 2.3. You calculate a standard error of the mean equal to 0.23.
- Link information is on the Canvas site, or you can search for PMID 37822980 on PubMed

Example, 2 of 3

- Construct and interpret an approximate 95% confidence interval using the simple approximation.
  - $21.6 \pm 2 \times 0.23$
  - 21.6 ± 0.46
  - $(21.14, 22.06)$

Example, 3 of 3

- Interpretation
  - We are 95% confident that the average weight of all women in Great Britain who smoked during their pregnancy is somewhere between 21.14 and 22.06 kilograms per meter squared.

Confidence interval for a single proportion, 1 of 2

Let p represent a proportion computed from a sample. You wish to create a confidence interval for π, the proportion in the entire population.

- $se(p) = \sqrt{\frac{p(1-p)}{n}}$

Confidence interval for a single proportion, 2 of 2

- $p - Z(\alpha/2)se(p)$ and
- $p + Z(\alpha/2)se(p)$

is an approximate $1 - \alpha$ confidence interval for π.

- Note that this confidence interval uses z rather than t, regardless of the sample size.

Example, 1 of 3

In the same study, 27 of the 102 women (26.5%) were primiparous. Construct an approximate 95% confidence interval for the proportion of primiparous women in the population.

The standard error is

- $se(p) = \sqrt{\frac{0.265 \times 0.735}{102}} = 0.0436985 \approx 0.044$

Example, 2 of 3

The approximate confidence interval is

- $0.265 \pm 2 \times 0.044$
- 0.265 ± 0.088
- 0.177 to 0.353

Example, 3 of 3

Interpretation:

- We are 95% confident that the proportion of primiparous women among all women in Great Britain who smoked during pregnancy is somewhere betweeen 18% and 35%.