

smoke. In Figure 7-6, we see that the confidence interval for smokers does not overlap the other confidence intervals, so it appears that the mean cotinine level of smokers is different from that of the other two groups. The two nonsmoking groups have confidence intervals that do overlap, so it is possible that they have the same mean cotinine level. It is helpful to compare confidence intervals or their graphs, but such comparisons should not be used for making formal and final conclusions about equality of means. Chapters 9 and 12 introduce better methods for formal comparisons of means.

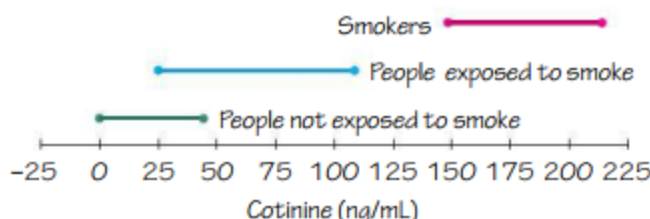


Figure 7-6 Comparing Confidence Intervals

CAUTION As in Sections 7-2 and 7-3, confidence intervals can be used informally to compare different data sets, but the overlapping of confidence intervals should not be used for making formal and final conclusions about equality of means.

Determining Sample Size If we want to collect a sample to be used for estimating a population mean μ , *how many* sample values do we need? When determining the sample size needed to estimate a population mean, we must have an estimated or known value of the population standard deviation σ , so that we can use Formula 7-4 shown in the accompanying box.

Finding the Sample Size Required to Estimate a Population Mean

Objective

Determine the sample size n required to estimate the value of a population mean μ .

Notation

μ = population mean

σ = population standard deviation

\bar{x} = sample mean

E = desired margin of error

$z_{\alpha/2}$ = z score separating an area of $\alpha/2$ in the right tail of the standard normal distribution

Requirement

The sample must be a simple random sample.

Sample Size

The required sample size is found by using Formula 7-4.

Formula 7-4

$$n = \left[\frac{z_{\alpha/2} \sigma}{E} \right]^2$$

Round-Off Rule

If the computed sample size n is not a whole number, round the value of n up to the next *larger* whole number.