## C A S E  C L O S E D !

### Do you have a fever?

At the beginning of the chapter, we presented some details of a study concerning normal human body temperature. Return to the Case Study (page 741) to refresh yourself on the details.

1. Use a significance test to determine whether we can conclude based on this study that "normal" body temperature in the population of healthy 18- to 40-year-olds differs from 98.6°F.

2. Construct and interpret a 95% confidence interval for the mean body temperature $\mu$ in the population of healthy 18- to 40-year-olds. What additional information does the confidence interval provide that the significance test in Question 1 did not?

3. If "normal" body temperature really is 98.6°F, we would expect that about half of all healthy 18- to 40-year-olds would have a body temperature less than 98.6°F. Carry out an appropriate test of this claim.

4. Use a 95% confidence interval to gain some additional information about the proportion described in Question 3.

5. Discuss any concerns you have about the design of this study that might affect your conclusions.

Answer these questions on *separate* page(s) clearly organizing your two significance tests and two confidence interviews.

Where the conditions for inference are identical, they can be incorporated by reference.

## Do you have a fever?

Sometimes when you're sick, your forehead feels really warm. You might have a fever. How can you find out whether you do? By taking your temperature, of course. But what temperature should the thermometer show if you're healthy? Is this temperature the same for everyone?

In the early 1990s, researchers conducted a study to determine whether the "accepted" value for normal body temperature, 98.6°F, is accurate. They used an oral thermometer to measure the temperatures of 140 healthy men and women aged 18 to 40 several times over a three-day period. The resulting data consisted of 700 temperature readings.

Exploratory data analysis revealed several interesting facts about this data set:[1]

- The distribution of all 700 temperature readings was approximately Normal.
- The mean temperature was $\bar{x} = 98.25°F$.
- The standard deviation of the temperature readings was $s = 0.73°F$.
- 62.3% of the temperature readings were less than 98.6°F.

Based on the results of this study, can we conclude that "normal" body temperature in the population of healthy 18- to 40-year-olds is *not* 98.6°F? By the end of this chapter, you will have developed the necessary tools to answer this question.