Chapter 17

1. Better than aspirin? A very large study showed that aspirin reduced the rate of first heart attacks by 44%.
A pharmaceutical company thinks they have a drug that will be more effective than aspirin, and plans to do a randomized clinical trial to test the new drug.
a) What is the null hypothesis the company will use?
b) What is their alternative hypothesis?

3. Better than aspirin 2? A clinical trial compares the new drug described in Exercise 1 to aspirin. The group using the new drug had somewhat fewer heart attacks than those in the aspirin group.
a) The P-value from the hypothesis test was 0.28. What do you conclude?
b) What would you have concluded if the P-value had been 0.004?

11. Hypotheses Write the null and alternative hypotheses you would use to test each of the following situations:
a) A governor is concerned about their "negatives"—the percentage of state residents who express disapproval of their job performance. Their political committee pays for a series of TV ads, hoping that they can keep the negatives below 30%. They will use follow-up polling to assess the ads' effectiveness.
b) Is a coin fair?
c) Only about 20% of people who try to quit smoking succeed. Sellers of a motivational tape claim that listening to the recorded messages can help people quit.

13. Negatives After the political ad campaign described in Exercise 11, part a, pollsters check the governor's negatives. They test the hypothesis that the ads produced no change against the alternative that the negatives are now below 30% and find a P-value of 0.22. Which conclusion is appropriate? Explain.
a) There's a 22% chance that the ads worked.
b) There's a 78% chance that the ads worked.
c) There's a 22% chance that their poll is correct.
d) There's a 22% chance that natural sampling variation could produce poll results like these if there's really no change in public opinion.

25. Contributions, please, part II In Exercise 23 of Chapter 16, you learned that the Paralyzed Veterans of America is a philanthropic organization that relies on contributions. They send free mailing labels and greeting cards to potential donors on their list and ask for a voluntary contribution. To test a new campaign, the organization recently sent letters to a random sample of 100,000 potential donors and received 4781 donations. They've had a contribution rate of 5% in past campaigns, but a staff member worries that the rate will be lower if they run this campaign as currently designed.
a) What are the hypotheses?
b) Are the assumptions and conditions for inference met?
c) Do you think the rate would drop? Explain.

27. Law school 2007 According to the Law School Admission Council, in the fall of 2007, 66% of law school applicants were accepted to some law school. The training program *LSATisfaction* claims that 163 of the 240 students trained in 2007 were admitted to law school. You can safely consider these trainees to be representative of the population of law school applicants. Has *LSATisfaction* demonstrated a real improvement over the national average?
a) What are the hypotheses?
b) Check the conditions and find the P-value.
c) Would you recommend this program based on what you see here? Explain.

31. Twins In 2009, a national vital statistics report indicated that about 3% of all births produced twins. Is the rate of twin births the same among very young mothers? Data from a large city hospital found that only 7 sets of twins were born to 469 teenage girls. Test an appropriate hypothesis and state your conclusion. Be sure the appropriate assumptions and conditions are satisfied before you proceed.

33. WebZine A magazine is considering the launch of an online edition. The magazine plans to go ahead only if it's convinced that more than 25% of current readers would subscribe. The magazine contacted a simple random sample of 500 current subscribers, and 137 of those surveyed expressed interest. What should the company do? Test an appropriate hypothesis and state your conclusion. Be sure the appropriate assumptions and conditions are satisfied before you proceed.