Activity #2

Comparing Two Treatments

Question

Suppose that a new treatment for certain disease has been devised and you claim that the new treatment is better than the existing one. How would you go about supporting your claim?

Discussion

1. Suppose that you also find twenty people that have the disease. Discuss how you would go about designing an experiment that will allow you to answer the question as to which treatment is more effective. Which factors should be considered? What are the variables in question here?

2. Discuss why randomization is important in the experimental design that you set up in 1 above.

3. Suppose that you randomly divide the 20 people into two groups of equal size. Group T receives the new treatment and Group E receives the existing treatment. Of these 20 people, 7 from Group T recover and 5 from Group E recover. What do you conclude about the effectiveness of the two treatments? Do you feel that you have been given enough information to draw an accurate conclusion? Why or why not? (Answer these questions before continuing)

Simulations

You may have concluded that the new treatment is better since it yielded a higher recovery rate. However, this may have occurred simply by chance. In other words, maybe there is really no difference in the effectiveness of the two treatments, and that regardless of which treatment any person in the group got, 12 out of the 20 people would have recovered anyways. Given this, what is the probability that you would observe the results you got regarding the effectiveness of the new treatment? i.e., what is the probability that 7 (or

more) out of 10 in the new treatment group recover, given that 12 out of 20 will recover regardless of the treatment?

Your task for this activity is to simulate this experiment using playing cards in order to estimate the probability that, under the assumption that there is no difference between the treatments, 7 or more out of the treatment group will recover. To increase the accuracy of your results, be sure to run the simulation many times. Each team in the class will run simulations, and we will pool the results together.

Conclusions

Based on the results of the simulations, what can you conclude about the effectiveness of the two treatments? Is it possible that the initial findings could simply have resulted by chance? Would you have obtained these same results if there was no difference between the treatments?