

WORKSHEET 2—PROBABILITY & NUMBERS OF DEATHS

In 1991, the death rate from motor vehicle accidents in the United States was 17.4 per 100,000 people per year. If the total U.S. population is 250,000,000 people, how many people would you expect to die in motor vehicle accidents each year? _____

How many people in a town of 50,000 people would you expect to die in motor vehicle accidents in one year? _____

Will that number of people actually die in each town of 50,000? _____

The Importance of Sample Size: Determining the danger of a particular risk to an entire population requires the use of statistics drawn from a sample. The accuracy of the statistics often depends on the size of the sample. Think about the role of sample size in these two studies.

Study 1: You work in a small laboratory. You have ten mice that are divided into two groups of five each. You give all the mice in Group A a drink from Bottle X, and you give all the mice in Group B a drink from Bottle Y. Two mice from Group A die within four hours. All of the mice from Group B stay healthy.

- What is the mortality rate for Group A? _____ Group B? _____
What, if any, conclusions can you draw about the liquid in Bottle X?
- How confident are you of these conclusions? Are there other possible explanations for what happened to the mice in Group A?
- Would you feel safe drinking from Bottle Y?

Study 2: You have 200 mice in your lab, and you divide them into two groups of 100 each. You repeat the experiment. After four hours, 21 mice in Group A die, and two in Group B die.

- What is the mortality rate for Group A? _____ What conclusions can you draw now about Bottle X? _____
- Are you more confident of your conclusion with the larger sample size? _____
Why? _____
- What about Group B? _____ What conclusions can you draw about Bottle Y? _____
Would you drink from Bottle Y? _____
- What additional information might be helpful to you? _____

In the problem at the beginning of this worksheet you learned that the death rate from motor vehicle accidents was 17.4 per 100,000 people. Which would you expect to be closer to that number, the actual number of people killed in the state of California or the state of Maine? (Hint: California has 25 times more people than Maine.)