

Stat 205 Homework 2

Answer both questions **on one side of one sheet of paper**.

1. In a study of the effects of smoking, 9793 pregnant women were asked about their smoking habits. The following classifies each by whether their infant was low birthweight (less than 2500 grams) or normal birthweight, and whether they smoked:

Birthweight	Smoking status		Total
	Smoker	Nonsmoker	
Low	237	197	434
Normal	3489	5870	9359
Total	3726	6067	9793

- (a) What is the probability that a woman smokes?
- (b) What is the probability of low birthweight?
- (c) Given that a woman smokes, what is the probability of low birthweight?
- (d) Is *smoking* independent of *birthweight*? Why or why not?
2. At a sexually transmitted disease (STD) clinic in Miami, Florida, patients were screened for hepatitis C using Centers for Disease Control and Prevention (CDC) screening criteria in the form of a questionnaire (Weisbord et al., 2003). The study concluded that the probability of having Hepatitis C is $\Pr\{\text{disease}\} = 0.047$, the probability that the test comes up positive for those that have Hepatitis C (sensitivity) is 0.61 and the probability it comes up negative for those that do not have Hepatitis C (specificity) is 0.91.
- (a) Draw a probability tree for this situation.
- (b) Find the probability that the test comes up positive.
- (c) Given that the test comes up positive, find the probability of having Hepatitis C.