Topic 6a Example

1. **Vitamin C and the Common Cold (Randomized Experiment)**

   Does vitamin C help prevent the occurrence of the common cold? A study was conducted on 818 volunteers. At the beginning of the winter, the subjects were randomly assigned to one of the two treatment groups, the vitamin C group and the placebo group. Both groups received an adequate supply of their respective drugs to last through the winter at 1,000 mg per day. At the end of the study, a physician who was unaware of the treatment to which the subject had been assigned interviewed each subject and determined whether the subject had suffered from a cold during the study period. The table below is a summary of the results:

		Outcome (Response)		
		Cold	No Cold	Total
Treatment (Explanatory)	Placebo	335	76	411
	Vitamin C	302	105	407
	Total	637	181	818

   a) Carry out a test to determine if the proportion of individuals who suffered from the cold is lower for the vitamin C group.
   b) Calculate the 95% confidence interval for the differences in the proportion of individuals who suffered from the cold for the two groups.
   c) Estimate the odds of suffering from a cold when taking vitamin C. Estimate the odds of suffering from a cold when not taking vitamin C.
   d) Estimate the odds of suffering from a cold for the placebo group vs. the vitamin C group. Calculate a 95% confidence interval for this result.

2. **Smoking and Lung Cancer (Retrospective Observational Study)**

   Are the odds of lung cancer greater for smokers or non-smokers? Random samples of 100 individuals with and without lung cancer were selected from hospitals in a particular region of the U.S. Below is the summary data for 100 lung cancer patients and 100 non-lung cancer patients.

		Outcome (Response)		
		Cancer	No Cancer	Total
Treatment (Explanatory)	Smoker	92	70	162
	Non-Smoker	8	30	38
	Total	100	100	200

   a) Estimate the odds of cancer for the smokers vs. non-smokers.
   b) Calculate a 95% confidence interval for the odds of cancer for smokers vs. non-smokers.
   c) Can this study be used to estimate the proportion of smokers (or non-smokers) who will suffer from lung cancer?