Hypothetical Studies with Different Sampling Schemes

1. Randomly assign a treatment (drug or placebo) to a sample of prostate cancer patients at UCSF Medical Center such that $n_1=100$ get placebo and $n_2=150$ get drug treatment. Observe how many go into remission within 1 year.

		Remission		
		Yes	No	Total
Treatment	Drug	40	110	150
	Placebo	12	88	100
	Total	52	198	250

This is **binomial** sampling. The sample size in each group is fixed (they need not be equal, just fixed). In tables with more cells, we call it **product multinomial** sampling. If the sample sizes in both the rows and the columns are fixed, or if we do inference conditional on the observed totals, we call it **hypergeometric** sampling.

2. Select a random sample of n=200 deaths in California and record smoking (ever or never) and heart disease (yes or no).

		Heart Disease		
		Yes	No	Total
Smoking	Ever	22	8	30
	Never	75	95	170
	Total	97	103	200

This is **multinomial** sampling. The total sample size is fixed, but the marginal totals are random.

3. Record eating (yes or no) and cell phone use (yes or no) for all drivers in injury accidents on I-80 in January 2005.

		Cell Phone		
		Yes	No	Total
Eating	Yes	22	50	72
	No	48	30	78
	Total	70	80	150

This is **Poisson** sampling. The place/time window for sampling is defined, but none of the totals (numbers of observations) is fixed.