Survey Sampling
Statistics 4234/5234 — Fall 2018

Assignment 1

Reading:

By Tuesday, September 4, read Chapter 1 (pages 1–18) and Appendix A (pages 549–562) of *Sampling: Design and Analysis, second edition*; by Sharon L. Lohr.

For Tuesday, September 11, read Sections 2.1–2.7 (pages 25–51) of Lohr.

Homework 1:

The following problems are due in class on Tuesday, September 18. You can also submit your paper to the course mailbox in Room 904 SSW by 5:00pm on Friday, September 21.

1. For each of the following surveys: describe the target population, sampling frame, sampling unit, and observation unit; and discuss any possible sources of selection bias or inaccuracy of responses.

   (a) A student wants to estimate the percentage of mutual funds whose shares went up in price last week. She selects every tenth fund listed in the Mutual Fund pages, and calculates the percentage of those in which the share price increased.

   (b) A survey is conducted to find the average weight of cows in a region. A list of all farms is available for the region, and 50 farms are selected at random. Then the weight of each cow at the 50 selected farms is recorded.

   (c) To study nutrient content of menus in boarding homes for the elderly in Washington State, researchers mailed surveys to all 184 licensed homes in Washington State, directed to the administrator and food service namager. Of those, 43 were returned by the deadline and included menus.

2. Let the discrete random vector (X, Y) have a joint probability mass function $p(x, y)$ given by the following table:

		y			
		1	2	3	4
	1	0.12	0.21	0.24	0.03
x	2	0.06	0.06	0.12	0.06
	3	0.02	0.03	0.04	0.01

   (a) Find the marginal distributions of X and Y.

   (b) Are X and Y independent? Justify your answer.

   (c) Find $E(X)$, $E(Y)$, and $E(3X - 2Y)$.

   (d) Find $E(XY)$, $\text{Cov}(X, Y)$, and $V(3X - 2Y)$.