Assignment 5

Reading:

By Thursday, October 18, read Chapters 1 through 5 of *Sampling: Design and Analysis, second edition*; by Sharon L. Lohr.

For Thursday, October 25, read Chapter 6 (pages 219–266) of Lohr.

Homework 6:

The following problems are due in class on Thursday, November 1. Homework can also be submitted to the course mailbox in Room 904 SSW by 5:00pm on Wednesday, November 7.

1. An accounting firm is interested in estimating the error rate in a compliance audit it is conducting. The population contains 828 claims, and the firm audits a simple random sample of 85 of those claims. In each of the 85 sampled claims, 215 fields are checked for errors. One claim has errors in 4 of the 215 fields, 1 claim has 3 errors, 4 claims have 2 errors, 22 claims have 1 error, and the remaining 57 claims have no errors.

    (a) Treating the claims as psus and the observations for each field as ssus, estimate the error rate, defined to be the average number of errors per field, along with the standard error for your estimate. Give a 95% confidence interval.

    (b) Estimate (with standard error) the total number of errors in the 828 claims. Give a 95% confidence interval.

2. An inspector samples cans from a truckload of canned creamed corn to estimate the prevalence of worm fragments in the product. The truck has 580 cases; each case contains 24 cans. The inspector samples 12 cases at random, and subsamples 3 cans randomly from each selected case.

	Case											
	1	2	3	4	5	6	7	8	9	10	11	12
Can 1	1	4	0	3	4	0	5	3	7	3	4	0
Can 2	5	2	1	6	9	7	5	0	3	1	7	0
Can 3	7	4	2	6	8	3	1	2	5	4	9	0

    (a) Estimate the mean number of worm fragments per can, along with the standard error for your estimate.

    (b) Estimate the total number of worm fragments in the truckload, along with the standard error for your estimate.

3. A researcher took a simple random sample of 4 high schools from a region with 29 high schools for a study on the prevalence of smoking among female high school students in the region. The results were as follows.

School	Number of students	Number of female students in school	Number of female students interviewed	Number of smokers
1	1471	792	25	10
2	890	447	15	3
3	1021	511	20	6
4	1587	800	40	27

(a) Estimate the percentage of female high school students in the region who smoke, along with a 95% confidence interval.

(b) Estimate the total number of female high school students in the region who smoke, along with a 95% confidence interval.