

0. Read Chapters 1 & 2 in SDA book by yourself.
1. (Exercise 1.5 on page 20 of SDA book) Many scholars and policy makers are interested in the proportion of homeless people who are mentally ill. Wright (1988) estimates that 33% of all homeless people are mentally ill, by sampling homeless persons who received medical attention from one of the clinics in the Health Care for the Homeless (HCH) project. He argues that selection bias is not a serious problem because the clinics were easily accessible to the homeless and because the demographic profiles of HCH clients were close to those of the general homeless population in each city in the sample.

Describe the target population, sampling frame, sampling unit, and observation unit. Discuss any possible sources of selection bias or inaccuracy of responses.

Do you agree with Wright (1988)'s conclusion?

2. (Exercise 2.3 on page 62 of SDA book) Each of the 10,000 shelves in a certain library is 300 cm long. To estimate how many books in the library need rebinding, a librarian takes a sample of 50 books using the following procedure: He first generates a random integer between 1 and 10,000 to select a shelf, and then generates a random number between 0 and 300 to select a location on that shelf. Thus, the pair of random numbers (2531, 25.4) would tell the librarian to include the book that is above the location 25.4 cm from the left end of shelf number 2531 in the sample. Does this procedure generate an SRS of the books in the library? Explain why, or why not.
3. (Exercise 2.10 on page 63 of SDA book) Which of the following SRS designs will give the most precision for estimating a population mean? Assume that each population has the same value of the population variance S^2 .
- 1) An SRS of size 400 from a population of size 4000
 - 2) An SRS of size 30 from a population of size 300
 - 3) An SRS of size 3000 from a population of size 300,000,000
4. (Exercise 2.12 on page 64 of SDA book) The percentage of patients overdue for a vaccination is often of interest for a medical clinic. Some clinics examine every record to determine that percentage; in a large practice, though, taking a census of the records can be time-consuming. Cullen (1994) took a sample of the 580 children served by an Auckland family practice to estimate the proportion of interest.
- a. What sample size in an SRS (without replacement) would be necessary to estimate the proportion with 95% confidence and margin of error 0.10?
 - b. Cullen actually took an SRS with replacement of size 120, of whom 27 were not overdue for vaccination. Give a 95% CI for the proportion of children not overdue for vaccination.