

Homework #16
Stat 202

3.86 Gallup Canada polls. Gallup Canada bases its polls of Canadian public opinion on telephone samples of about 1000 adults, the same sample size as Gallup uses in the United States. Canada's population is about one-ninth as large as that of the United States, so the percent of adults that Gallup interviews in Canada is nine times as large as in the United States. Does this mean that the margin of error for a Gallup Canada poll is smaller? Explain your answer.

3.87 People want to move. The headline of a report on a Gallup Poll says "700 million worldwide desire to migrate permanently." They estimate that about 16% of the world's adults would like to move to another country.³³

(a) This poll took samples of adults aged 15 and over in 135 countries. What is this type of sampling procedure called?


(b) These countries represent 93% of the world's adult population. Do you think that this means that the survey is seriously biased? Give reasons for your answer.

(c) The report says that the margin of error for individual countries ranges from $\pm 3\%$ to $\pm 6\%$. Explain what this means in simple terms.

3.88 The health care system in Ontario. The Ministry of Health in the Canadian province of Ontario wants to know whether the national health care system is achieving its goals in the province. The ministry conducted the Ontario Health Survey, which interviewed a probability sample of 61,239 adults who live in Ontario.³⁴

(a) What is the population for this sample survey? What is the sample?

(b) The survey found that 76% of males and 86% of females in the sample had visited a general practitioner at least once in the past year. Do you think these estimates are close to the truth about the entire population? Why?

3.93 Analyze simple random samples. The CSDATA data set contains the college grade point averages (GPAs) of all 224 students in a university entering class who planned to major in computer science. This is our population. Statistical software can take repeated samples to illustrate sampling variability. 

(a) Using software, describe this population with a histogram and with numerical summaries. In particular, what is the mean GPA in the population? This is a parameter.

(b) Choose an SRS of 20 members from this population. Make a histogram of the GPAs in the sample and find their mean. The sample mean is a statistic. Briefly compare the distributions of GPA in the sample and in the population.

(c) Repeat the process of choosing an SRS of size 20 four more times (five in all). Record the five histograms of your sample GPAs. Does it seem reasonable to you from this small trial that an SRS will usually produce a sample that is generally representative of the population?

3.86. No: With sufficiently large populations (“at least 100 times larger than the sample”), the variability (and margin of error) depends on the sample size.

3.87. (a) This is a multistage sample. **(b)** Attitudes in smaller countries (many of which were not surveyed) might be different. **(c)** An individual country’s reported percent will typically differ from its true percent by no more than the stated margin of error. (The margins of error differ among the countries because the sample sizes were not all the same.)

Note: *The number of countries in the world is about 195 (the exact number depends on the criteria of what constitutes a separate country). That means that about 60 countries are not represented in this survey.*

3.88. (a) The population is Ontario residents; the sample is the 61,239 people interviewed.

(b) The sample size is very large, so if there were large numbers of both sexes in the sample—this is a safe assumption because we are told this is a “random sample”—these two numbers should be fairly accurate reflections of the values for the whole population.

3.93. (a) Below is the population stemplot (which gives the same information as a histogram).

The (population) mean GPA is $\mu \doteq 2.6352$, and the standard deviation is $\sigma \doteq 0.7794$.

[Technically, we should take $\sigma \doteq 0.7777$, which comes from dividing by n rather than $n - 1$, but few (if any) students would know this, and it has little effect on the results.]

(b) & (c) Results will vary; these histograms are not shown. Not every sample of size 20 could be viewed as “generally representative of the population,” but most should bear at least some resemblance to the population distribution.

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0 | 134
0 | 567889
1 | 0011233444
1 | 5566667888888888999999
2 | 0000000001111111122222222233333333344444444
2 | 5555555555556666666677777777778888888888999999
3 | 000000000000011111111222222223333333333344444444
3 | 55666666667777788889
4 | 0000
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