

SYSTEMATIC SAMPLING

The "technique" of systematic sampling proposed by Abramson in his "Survey Methods in Community Medicine" (page 59 of the second edition) is unsound. To see this, consider taking a sample of size 7 from a population of size 52. According to Abramson the sampling ratio is 1 in 7.43 and this value is rounded off to the nearest whole number 7 which is what he calls the sampling interval. He would then make a random selection from the first 7 items in the list, and select every 7th thereafter. Items 50 through 53 may, or may not be eligible for the sample. If the first selected item is any of 1 through 4, then one of items 50 through 54 will also be selected; if however the first selected item is one of 5, 6 or 7, the last four members of the population can not be included. Thus this breaks the basic rule that every member of the population shall have an equal chance of being included in the sample.

The correct procedure is not to round off to the nearest whole number until the last stage of the enumeration of the sampling, both in the sampling fraction and selection of the first item decimal places should be retained.

Thus, in the sample above, $\underline{n} = 7.43$. Adopt Abramson's sampling procedure from Table 1 (page 65) we require a three digit-number in the range 001 to 743 (to be divided by 100) starting in row 4. The second triplet is 162 and so the start point is 1.62. Then we add \underline{n} (not \underline{k}) to this start point to get seven numbers, as follows:

1.62, 9.05, 16.48, 23.91, 31.33, 38.76, and 46.19

Note that if we had continued the procedure we would have got the ineligible number 53.62 which is, of course, 1.62 units beyond the end of the listed population.

It is only now that we round to the nearest whole number to identify the items in the sample, as follows:

2, 9, 16, 24, 31, 39, and 46.

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