Notes on the use of random sampling numbers

Source: Following Table A6 in Armitage & Berry

1 Random permutation

This is a rearrangement of the integers from 1 to n, each order being equally likely to be chosen.

   Start at an arbitrary point in the table. Use as many columns in the table as there are digits in n (e.g. if $n = 16$ use two columns). Go down the columns and continue to the next group of columns, writing down the numbers from 1 to n as they occur. Count 03 as 3, etc. Ignore 00, $n + 1$, $n + 2$, . . ., 99. Ignore repetitions.

   Direct tables are published, e.g. in Fisher and Yates (1963), Cochran and Cox (1957) and Cox (1958). For $n > 20$ see Moses and Oakford (1963).

2 Random selection of sample of size n from population of size N

Number the members of the population from 1 to N, start to make a random permutation of N and stop as soon as n numbers have been selected. These form the required sample.

3 Random allocation

To allocate n individuals randomly to k groups (e.g. in experimental design), form a random permutation of n and divide these from left to right into groups of the appropriate size. The permutation need not be continued beyond the stage at which k—1 groups have been formed, since the remaining individuals must fall into the kth group.

4 Random allocation with serial entry

Here n may be unknown. If allocation is to two treatments with equal probability, use odd and even numbers. For three treatments use 1-3, 4-6, 7-9, ignoring 0; and so on.

5 Restricted randomization (permuted blocks) with serial entry

It may be desirable to ensure that numbers allocated to different treatments are equal at various stages; e.g. two treatments may have to be balanced after each set of 10 individuals. In this case select five individuals out of each set of 10 to be allocated to one treatment (as in §2); the other five are allocated to the other treatment.

6 Extended use of tables

The tables can be used by reading entries in different directions, e.g. along the rows. If several random selections are needed in any investigation, different parts of the table should be used. More extensive tables are given in various books, e.g. Fisher and Yates (1963).

7 Use of computers

Most microcomputers, and many calculators, have random number generators which provide random numbers in various formats (e.g. single digits or pairs of digits). These can be used as a direct substitute for the table entries.