**Exercise 5.1**

*Refer to Tables 5.1 and 5.2. In Table 5.2, the first two columns show sample allocations based on proportional allocation and for payroll, as well as the resulting sampling variances for payroll and number of employees. How would these numbers change if the number of hospitals with less than 50 beds, shown in Table 5.1, was 2,614 instead of 1,614?*

**Table 5.1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Size*  *(in No. of Beds)* | *No. of Hospitals* |  | *Average Payroll* | *for Payroll* | *Average No. of Employees* | *for No. of Employees* |
| Under 50 | 1,614 | .246 | 266 | 183 | 54 | 25 |
| 50-99 | 1,566 | .238 | 384 | 316 | 123 | 51 |
| 100-199 | 1,419 | .216 | 1,484 | 641 | 262 | 95 |
| 200-299 | 683 | .104 | 3,110 | 1,347 | 538 | 152 |
| 300-499 | 679 | .103 | 5,758 | 2,463 | 912 | 384 |
| 500+ | 609 | .093 | 10,964 | 7,227 | 1,548 | 826 |
| Total | 6,570 | 1.000 |  |  |  |  |

**Table 5.2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Size*  *(in No. of Beds)* | *n Based on Proportional Allocation* | *Based on for Payroll* | *Based on for Employees* | *Based on Bed Size* |
| Under 50 | 246 | 34 | 36 | 28 |
| 50-99 | 238 | 57 | 71 | 83 |
| 100-199 | 216 | 104 | 120 | 150 |
| 200-299 | 104 | 106 | 93 | 120 |
| 300-499 | 103 | 192 | 231 | 191 |
| 500+ | 93 | 507 | 449 | 428 |
| Total | 1,000 | 1,000 | 1,000 | 1,000 |
| for payroll | 4,908 | 871 | 908 | 941 |
| for number of employees | 71.0 | 17.1 | 16.5 | 17.2 |

Using the following equations:

|  |  |  |
| --- | --- | --- |
| *Size*  *(in No. of Beds)* | *n Based on Proportional Allocation* | *Based on for Payroll* |
| Under 50 | 345 | 54 |
| 50-99 | 207 | 56 |
| 100-199 | 188 | 102 |
| 200-299 | 90 | 104 |
| 300-499 | 90 | 188 |
| 500+ | 80 | 496 |
| Total | 1000 | 1000 |

**Exercise 5.2**

*Following the example given in Section 5.1.3, assume that some Hispanics in a region line in areas that are 100% Hispanic, while others live in areas that are only 2% Hispanic. Assume that the cost of each interview is $25 and that screening households to determine if they are Hispanic costs $10 per screen. What should be the sampling rate in areas where Hispanics are rare compared with the areas that are entirely Hispanic?*

The sampling rate in areas where it’s 2% Hispanic should be approximately 26% of those areas where it’s 100% Hispanic.

**Appendix:**

HW05\_JackNelson.ipynb

