 **VA IACUC Training Exercise #4 - 2017**

The following exercise may be useful in stimulating discussion regarding how to calculate animal use data that are to be entered on VMU report. To facilitate discussion, the first three pages of the exercise may be distributed to the IACUC members prior to a meeting. After a few minutes of discussion about the exercise during the meeting, the remaining 4 pages of the exercise may be distributed to provide more fodder for the committee’s consideration.

The annual animal use data are due in VMU report on 1/15/18. The numbers that have been submitted in years past suggest that there is some confusion about what should be entered for the “average daily census”. The attached spreadsheets show the numbers that were recorded for Hometown VAMC for FY2017. Calculate the average daily census at Hometown for guinea pigs and for mice, and choose the correct options below:

Guinea Pigs

1. 0.08
2. 2.98
3. 4.49
4. 29
5. don’t have enough information to say

Mice

1. 2.42
2. 176
3. 426
4. 5350
5. don’t have enough information to say

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Receipt Date | Number of guinea pigs received |  |  |  |  |  |  |  |  |  |  |
| 10/1/2015 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1/1/2017 | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2/2/2017 | 6 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9/21/2017 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Guinea pig census each day |   | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |  |
|  | 1 | 10 | 2 | 0 | 3 | 0 | 6 | 5 | 3 | 2 | 0 | 0 | 0 |  |
|  | 2 | 10 | 2 | 0 | 3 | 6 | 6 | 5 | 3 | 2 | 0 | 0 | 0 |  |
|  | 3 | 10 | 2 | 0 | 3 | 6 | 6 | 5 | 3 | 2 | 0 | 0 | 0 |  |
|  | 4 | 10 | 2 | 0 | 3 | 6 | 6 | 5 | 3 | 2 | 0 | 0 | 0 |  |
|  | 5 | 10 | 2 | 0 | 3 | 6 | 6 | 3 | 3 | 2 | 0 | 0 | 0 |  |
|  | 6 | 10 | 2 | 0 | 3 | 6 | 6 | 3 | 3 | 2 | 0 | 0 | 0 |  |
|  | 7 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 2 | 0 | 0 | 0 |  |
|  | 8 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 2 | 0 | 0 | 0 |  |
|  | 9 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 2 | 0 | 0 | 0 |  |
|  | 10 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 0 |  |
|  | 11 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 0 |  |
|  | 12 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 0 |  |
|  | 13 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 0 |  |
|  | 14 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 15 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 16 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 17 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 18 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 19 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 20 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 21 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 22 | 10 | 2 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 23 | 10 | 2 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 24 | 10 | 2 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 25 | 2 | 2 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 26 | 2 | 2 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 27 | 2 | 0 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 28 | 2 | 0 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |  |
|  | 29 | 2 | 0 | 0 | 0 |   | 5 | 3 | 2 | 0 | 0 | 0 | 10 |  |
|  | 30 | 2 | 0 | 0 | 0 |   | 5 | 3 | 2 | 0 | 0 | 0 | 10 |  |
|  | 31 | 2 |   | 0 | 0 |   | 5 |   | 2 |   | 0 | 0 |   |  |
| Mouse cage census each day |   | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |  |
|  | 1 | 178 | 170 | 70 | 60 | 115 | 170 | 190 | 236 | 245 | 253 | 235 | 190 |  |
|  | 2 | 178 | 170 | 69 | 63 | 115 | 170 | 190 | 236 | 245 | 252 | 233 | 190 |  |
|  | 3 | 178 | 170 | 69 | 63 | 120 | 170 | 190 | 238 | 245 | 252 | 233 | 190 |  |
|  | 4 | 175 | 170 | 69 | 63 | 120 | 170 | 190 | 238 | 245 | 252 | 233 | 190 |  |
|  | 5 | 175 | 168 | 69 | 63 | 120 | 170 | 190 | 238 | 247 | 252 | 232 | 180 |  |
|  | 6 | 175 | 168 | 69 | 63 | 122 | 170 | 190 | 238 | 247 | 252 | 230 | 180 |  |
|  | 7 | 175 | 150 | 69 | 63 | 123 | 170 | 190 | 238 | 247 | 250 | 230 | 180 |  |
|  | 8 | 175 | 150 | 69 | 63 | 123 | 170 | 190 | 238 | 252 | 250 | 230 | 180 |  |
|  | 9 | 175 | 150 | 68 | 63 | 123 | 170 | 192 | 238 | 252 | 250 | 230 | 180 |  |
|  | 10 | 175 | 150 | 68 | 63 | 123 | 170 | 194 | 238 | 252 | 250 | 230 | 180 |  |
|  | 11 | 175 | 150 | 68 | 63 | 123 | 170 | 210 | 238 | 254 | 250 | 225 | 180 |  |
|  | 12 | 175 | 150 | 68 | 63 | 123 | 170 | 210 | 238 | 254 | 250 | 225 | 180 |  |
|  | 13 | 175 | 150 | 68 | 63 | 123 | 170 | 212 | 238 | 254 | 248 | 225 | 180 |  |
|  | 14 | 175 | 150 | 60 | 63 | 123 | 170 | 214 | 238 | 252 | 248 | 225 | 180 |  |
|  | 15 | 175 | 150 | 60 | 63 | 123 | 170 | 214 | 238 | 252 | 248 | 225 | 180 |  |
|  | 16 | 175 | 150 | 60 | 63 | 123 | 170 | 214 | 238 | 253 | 248 | 225 | 180 |  |
|  | 17 | 175 | 150 | 60 | 63 | 123 | 170 | 214 | 238 | 253 | 248 | 225 | 180 |  |
|  | 18 | 175 | 150 | 60 | 63 | 123 | 170 | 216 | 238 | 253 | 248 | 225 | 180 |  |
|  | 19 | 175 | 150 | 60 | 63 | 123 | 170 | 216 | 238 | 253 | 245 | 225 | 180 |  |
|  | 20 | 175 | 150 | 60 | 65 | 123 | 170 | 216 | 238 | 253 | 245 | 225 | 180 |  |
|  | 21 | 175 | 150 | 60 | 65 | 123 | 170 | 216 | 238 | 253 | 245 | 225 | 180 |  |
|  | 22 | 172 | 150 | 60 | 65 | 123 | 170 | 220 | 238 | 253 | 245 | 225 | 180 |  |
|  | 23 | 172 | 150 | 60 | 68 | 123 | 170 | 225 | 238 | 253 | 245 | 222 | 180 |  |
|  | 24 | 172 | 150 | 60 | 70 | 123 | 170 | 225 | 238 | 253 | 245 | 222 | 180 |  |
|  | 25 | 172 | 120 | 60 | 70 | 125 | 180 | 225 | 238 | 253 | 245 | 222 | 180 |  |
|  | 26 | 172 | 118 | 60 | 70 | 172 | 180 | 228 | 238 | 253 | 244 | 222 | 180 |  |
|  | 27 | 172 | 118 | 60 | 110 | 172 | 182 | 230 | 238 | 253 | 244 | 222 | 180 |  |
|  | 28 | 172 | 118 | 60 | 110 | 172 | 182 | 230 | 238 | 253 | 244 | 200 | 180 |  |
|  | 29 | 172 | 115 | 60 | 110 |   | 182 | 230 | 240 | 253 | 244 | 200 | 180 |  |
|  | 30 | 172 | 115 | 60 | 110 |   | 186 | 232 | 240 | 253 | 243 | 200 | 180 |  |
|  | 31 | 172 |   | 60 | 110 |   | 188 |   | 240 |   | 235 | 200 |   |  |
| Number of mice present on the first day of each month |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|  | 350 | 400 | 150 | 156 | 312 | 499 | 417 | 487 | 670 | 644 | 599 | 425 |

The average daily census is the average number of individuals of a species that were present in the animal facility each day. This number reflects the amount of husbandry that is required, is usually the basis for per diem charges to the investigators, is a measure of how busy the animal facility was, and depends not only on the total number of animals received, but also on how long each one was present. It can be calculated in different ways, depending on what you record. The examples in this exercise are intended to illustrate the concept of “average daily census”.

In this exercise, 29 guinea pigs in total were delivered to the Hometown VAMC, in four shipments, during FY 2017, as shown at the top of the spreadsheet on page 2. This means that the average daily census cannot be greater than 29, and would only be as high as 29 if all 29 guinea pigs had been in the facility every day of the fiscal year. The spreadsheet shows that the first 10 guinea pigs stayed at the Hometown VAMC from October 1 through October 24, so they were counted on each of those 24 days. This means that 10 guinea pigs required husbandry on each of those 24 days, even though it was the same 10 guinea pigs present on all of those days. As shown on the spreadsheet on the next page (page 5), adding up all of the guinea pig days for the year gives us 1087 (the total of the number of days that each guinea pig received care). Dividing 1087 by 365 days in the year, tells us that, averaged over all the days of the year, there were 2.98 guinea pigs present every day of the year. This is the average daily census (correct answer is option b).

Guinea Pigs

1. 0.08 (29/365)
2. **2.98 (1087/365)**
3. 4.49 (1087/(365-123) – average for non-zero days)
4. 29
5. don’t have enough information to say

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Guinea pig census each day |   | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|  | 1 | 10 | 2 | 0 | 3 | 0 | 6 | 5 | 3 | 2 | 0 | 0 | 0 |
|  | 2 | 10 | 2 | 0 | 3 | 6 | 6 | 5 | 3 | 2 | 0 | 0 | 0 |
|  | 3 | 10 | 2 | 0 | 3 | 6 | 6 | 5 | 3 | 2 | 0 | 0 | 0 |
|  | 4 | 10 | 2 | 0 | 3 | 6 | 6 | 5 | 3 | 2 | 0 | 0 | 0 |
|  | 5 | 10 | 2 | 0 | 3 | 6 | 6 | 3 | 3 | 2 | 0 | 0 | 0 |
|  | 6 | 10 | 2 | 0 | 3 | 6 | 6 | 3 | 3 | 2 | 0 | 0 | 0 |
|  | 7 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 2 | 0 | 0 | 0 |
|  | 8 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 2 | 0 | 0 | 0 |
|  | 9 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 2 | 0 | 0 | 0 |
|  | 10 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 0 |
|  | 11 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 0 |
|  | 12 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 0 |
|  | 13 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 0 |
|  | 14 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 15 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 16 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 17 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 18 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 19 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 20 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 21 | 10 | 2 | 0 | 3 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 22 | 10 | 2 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 23 | 10 | 2 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 24 | 10 | 2 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 25 | 2 | 2 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 26 | 2 | 2 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 27 | 2 | 0 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 28 | 2 | 0 | 0 | 0 | 6 | 5 | 3 | 3 | 1 | 0 | 0 | 10 |
|  | 29 | 2 | 0 | 0 | 0 |   | 5 | 3 | 2 | 0 | 0 | 0 | 10 |
|  | 30 | 2 | 0 | 0 | 0 |   | 5 | 3 | 2 | 0 | 0 | 0 | 10 |
|  | 31 | 2 |   | 0 | 0 |   | 5 |   | 2 |   | 0 | 0 |   |
| Monthly totals of daily census figures (total number of guinea pig days for each month): |  | 254 | 52 | 0 | 63 | 162 | 161 | 98 | 90 | 37 | 0 | 0 | 170 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Total number of guinea pig days over all months: | 1087 |  |  |  |  |  |  |  |  |
| Number of days: |  |  |  |  | 365 |  |  |  |  |  |  |  |  |
| Average daily census (1087/365): |  |  |  | 2.98 |  |  |  |  |  |  |  |  |

Rat and mouse numbers are often recorded in terms of the numbers of cages for which husbandry is provided, because it is just too burdensome to count each individual mouse every day, and per diem charges are calculated on the basis of cages anyway. The mouse CAGE census data are shown on the spreadsheet on page 3. Performing the calculation for mouse CAGES, just as for the guinea pigs (individuals) in this exercise, we get an average daily mouse CAGE census of 148.970 (calculation shown below).

To get to the average daily MOUSE census from the CAGE census, we have to have some idea of the average cage density. One way to estimate average cage density is to count individual mice as well as cages for a sampling of days. In the example shown on the spreadsheet on page 3, the census of individual mice was recorded on the first day of each month. Comparing those mouse numbers with the cage numbers for the same days, makes it possible to calculate the cage density for each of those days, as shown on page 7. The average of the twelve cage density numbers is an estimate of the average cage density in the VMU for the year. The same estimate can be calculated from the total number of individual mice counted, and the total number of cages counted for the corresponding days. The average daily MOUSE census is then the average daily CAGE census multiplied by the estimated average cage density.

Mice

1. 2.42 (estimated average cage density)
2. 176 (average daily cage census)
3. **426 (176 x 2.42)**
4. 5350 (average cage days per month, 64198/12)
5. don’t have enough information to say

Monthly totals of daily CAGE census figures (total number of mouse CAGE days for each month):

|  |  |
| --- | --- |
| Oct | 5,404 |
| Nov | 4,420 |
| Dec | 1,973 |
| Jan | 2,217 |
| Feb | 3,567 |
| Mar | 5,360 |
| Apr | 6,303 |
| May | 7,380 |
| Jun | 7,538 |
| Jul | 7,670 |
| Aug | 6,926 |
| Sep | 5,440 |
| Annual Total number of mouse CAGE days |  64,198  |

Number of days: 365

Average daily CAGE census (64198/365): 175.885

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | totals for first day of each month |
| Mouse daily census -- # of mice present on the first day of each month | 350 | 400 | 150 | 156 | 312 | 499 | 417 | 487 | 670 | 644 | 599 | 425 | 5109 |
| Mouse daily CAGE census -- # of cages of mice present on the first day of each month | 178 | 170 | 70 | 60 | 115 | 170 | 190 | 236 | 245 | 253 | 235 | 190 | 2112 |
| Mouse cage density on the first day of each month | 1.97 | 2.35 | 2.14 | 2.60 | 2.71 | 2.94 | 2.19 | 2.06 | 2.73 | 2.55 | 2.55 | 2.24 |   |

average cage density estimated as

the average of the densities calculated for the first day of each month = 2.42

average cage density estimated as 5109/2112 = 2.42

Estimated average daily mouse census = average daily CAGE census x estimated average cage density

= 175.885 x 2.42

= 426

(Correct response is option c.)