

Clinical Reading Questions #3

HST 190: Introduction to Biostatistics

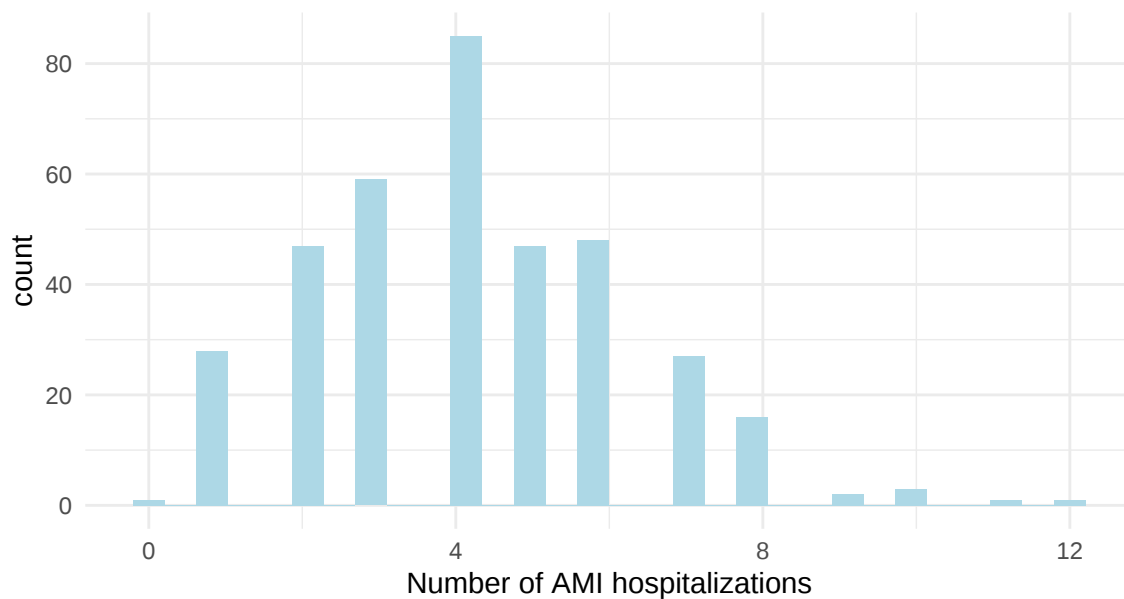
- The project is out-of-sync -- use ``renv::status()`` for details.

These discussion questions are based on Milne and Whitty (1995).

1. This paper focuses on modeling a discrete numerical outcome that represents count data. What is being “counted”?
2. On page 506, these counts are summarized in a table as column 2. Roughly speaking, if we plotted this data as a histogram, what would the shape be? How would the shape compare to the Poisson histogram in Figure 3.20 (reproduced below) of Vu and Harrington (2020) ?

Histogram of AMI hospitalization for 365 days in NYC

(from a Poisson distribution with $\lambda = 4.4$)



3. Figure 1 illustrates an alternative to the histogram for summarizing the distribution of data. How do we interpret the solid lines in Figure 1? For example, what does it mean when the solid “Northern Region” line is at 11 on the x-axis and about 200 on the y-axis? (Hint: is it related to the ‘cumulative’ column of the table on page 506?)

4. Figure 1 also compares the observed count data to an approximation using the Poisson distribution. How did the authors choose the value of the parameter λ for the Poisson distributions plotted in Figure 1?
5. Based on Figure 1, does it look like the counts can be well-approximated by a Poisson distribution? What other visual tools have we seen in Vu and Harrington (2020) to compare observed data and theoretical distributions?
6. Why might it be useful to approximate (or “model”) these counts using a known probability distribution like the Poisson? What do the authors use this approximation for?
7. What assumptions do the authors make by approximating these counts with a Poisson distribution? How do the authors address violations of those assumptions?

References

- Milne, Eugene, and Paula Whitty. 1995. “Calculation of the Need for Paediatric Intensive Care Beds.” *Archives of Disease in Childhood* 73 (6): 505–7. <https://doi.org/10.1136/adc.73.6.505>.
- Vu, Julie, and David Harrington. 2020. *Introductory Statistics for the Life and Biomedical Sciences*. OpenIntro. <https://openintro.org/book/biostat>.