

Assignment 1: Visualization Design

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Visualization

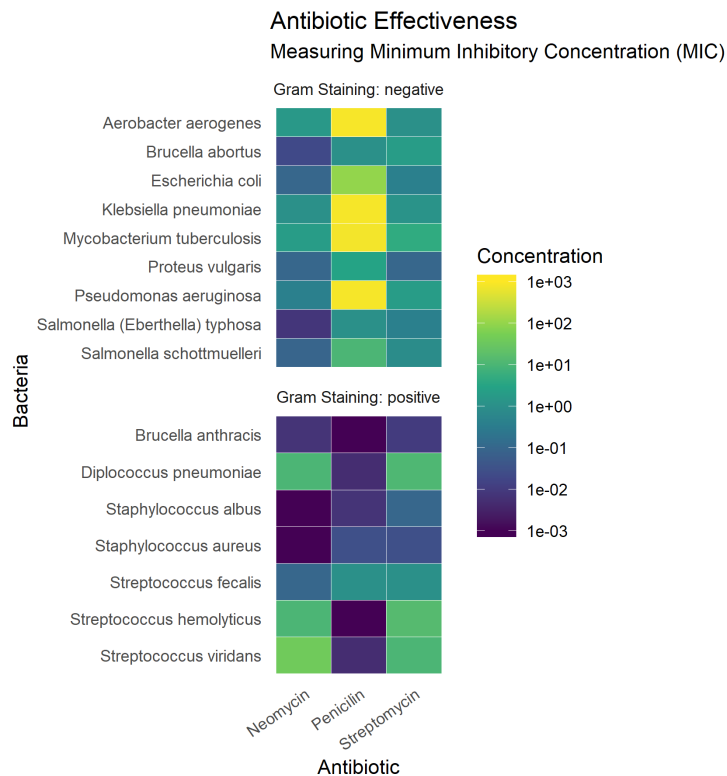


Figure 1: Plot comparing antibiotic effectiveness against different bacteria.

Design Rationale

The goal of this visualization is to compare the relationship each antibiotic has with each tested bacteria. A heatmap was chosen because is good at showing the relative differences between two interacting variables. Its purpose is not to present the exact data (looking at a table of number would be more effective for that), but to make it easy to see the realationships between different bacteria / antibiotic pairs. Arranging the data in a grid with colored cells

makes it easy to see these differences. In this case, antibiotics are shown on the x -axis, and bacteria are shown on the y -axis, where each rectangle represents one combination of the two. Since each axis represents nominal data with text labels, the axes are sorted alphabetically to aid in searching for a specific bacteria / antibiotic pair.

The primary relationship this visualization focuses on is the MIC values for every bacteria / antibiotic pair, which is encoded in the color values of the heatmap. Because the MIC values have a range extending across 6 orders of magnitude, with most values concentrated around the lower limits, the \log_{10} transform of the data was used to make the differences between values more apparent. Since this data is quantitative (ratio), we can color it based on a continuous color scale. The *viridis* color scale was chosen for its perceptual clarity.

The secondary relationship in this visualization is a bacteria's response to "Gram Staining". Because the response is binary (either positive or negative), bacteria can simply be separated in categories based on their response. This is encoded by faceting the heatmap by "Gram Staining" response, which presents itself as separation in the vertical (bacteria) axis. Each facet is labeled with its category for optimal clarity.

This visualization was created using *R* and the *ggplot2* package.