

Assignment 1: Visualization Design

In this assignment, you will design a visualization for a small data set and provide a rigorous rationale for your design choices. You should in theory be ready to explain the contribution of every pixel in the display. You are free to use any graphics or charting.

Data Set: Antibiotics

After the World War II, antibiotics were considered as "wonder drugs", since they were easy remedy for what had been intractable ailments. To learn which drug worked most effectively for which bacterial infection, performance of the three most popular antibiotics on 16 bacteria were gathered.

Table 1—Burtin's Data

Bacteria	Antibiotic			Gram Staining
	Penicillin	Streptomycin	Neomycin	
<i>Aerobacter aerogenes</i>	870	1	1.6	negative
<i>Brucella abortus</i>	1	2	0.02	negative
<i>Brucella anthracis</i>	0.001	0.01	0.007	positive
<i>Diplococcus pneumoniae</i>	0.005	11	10	positive
<i>Escherichia coli</i>	100	0.4	0.1	negative
<i>Klebsiella pneumoniae</i>	850	1.2	1	negative
<i>Mycobacterium tuberculosis</i>	800	5	2	negative
<i>Proteus vulgaris</i>	3	0.1	0.1	negative
<i>Pseudomonas aeruginosa</i>	850	2	0.4	negative
<i>Salmonella (Eberthella) typhosa</i>	1	0.4	0.008	negative
<i>Salmonella schottmuelleri</i>	10	0.8	0.09	negative
<i>Staphylococcus albus</i>	0.007	0.1	0.001	positive
<i>Staphylococcus aureus</i>	0.03	0.03	0.001	positive
<i>Streptococcus fecalis</i>	1	1	0.1	positive
<i>Streptococcus hemolyticus</i>	0.001	14	10	positive
<i>Streptococcus viridans</i>	0.005	10	40	positive

The values in the table represent the minimum inhibitory concentration (MIC), a measure of the effectiveness of the antibiotic, which represents the concentration of antibiotic required to prevent growth in vitro. The reaction of the bacteria to Gram staining is described by the

covariate “gram staining”. Bacteria that are stained dark blue or violet are Gram-positive. Otherwise, they are Gram-negative.

Dataset: [csv](#)

Assignment

Your task is to design a static (i.e., single image) visualization that you believe effectively communicates the data and provide a short write-up (no more than 4 paragraphs) describing your design. While you must use the data set given, note that you are free to transform the data as you see fit. You are also free to incorporate external data as you see fit. Your chart image should be interpretable without recourse to your short write-up. Do not forget to include title, axis labels or legends as needed!

As different visualizations can emphasize different aspects of a data set, you should document what aspects of the data you are attempting to most effectively communicate. In short, what story (or stories) are you trying to tell? Just as important, also note which aspects of the data might be obscured or down-played due to your visualization design.

In your write-up, you should provide a rigorous rationale for your design decisions. Document the visual encodings you used and why they are appropriate for the data. These decisions include the choice of visualization type, size, color, scale, and other visual elements, as well as the use of sorting or other data transformations. How do these decisions facilitate effective communication?