

WINE CONSUMPTION AND HEART DISEASE

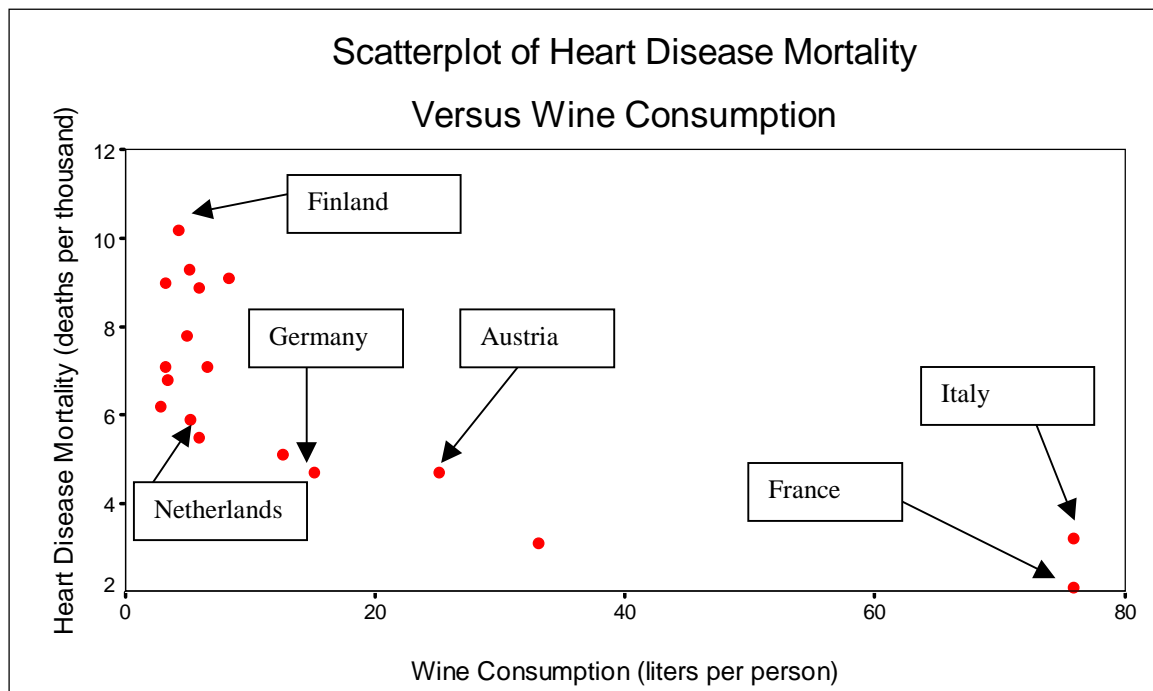
3. Displaying the Relationship between Heart Disease Mortality and Wine Consumption

Graphical displays of the data can be very helpful for understanding the information contained in the data. We will display the relationship between wine consumption and mortality of heart disease with a scatterplot.

3.1 Scatterplot of Heart Disease Mortality versus Wine Consumption

3.2 Scatterplot of Heart Disease Mortality (log scale) versus Wine Consumption (log scale)

3.1 SPSS produces the following scatterplot of heart disease mortality versus wine consumption on the original scales of measurement:



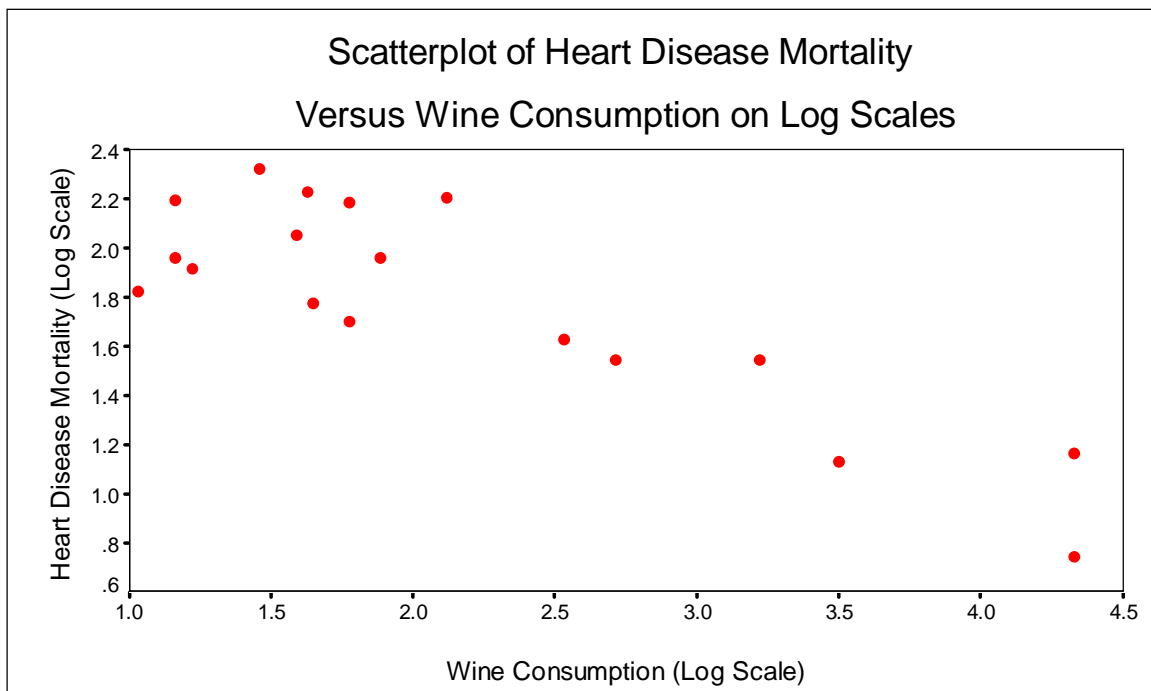
The pattern in the data shows that countries with high wine consumption have very low death rates and countries with low wine consumption have high death rates. It looks there is a strong negative association between heart disease mortality and wine consumption.

France (the lowest point in the lower right part of the plot) with the wine consumption of 75.9 litres per person has the lowest heart disease mortality (2.1 deaths per thousand). However, Italy has the same average wine consumption but much higher (3.2) mortality rate. On the other hand, Germany and Austria have identical heart disease mortality but the wine consumption in Austria (25.1) is

much higher than in Germany (15.1). Finland and Netherlands have very similar wine consumption (4.3 and 5.2, respectively) but very different heart disease mortality (10.2 and 5.9, respectively). Therefore, even if the wine consumption indeed has an effect on the mortality rate, there still exist other factors that make the rates different in countries with similar wine consumption.

A strong relationship exists between mortality and wine consumption, but a straight line does not provide an adequate description of the data. More precisely, mortality rate decreases exponentially as wine consumption increases. This pattern suggests the need for transformation. As France and Italy are clearly separated from the rest of the observations, they can be treated as outliers.

- 3.2** We will try to apply the natural logarithm transformation hoping to obtain a linear relationship between the transformed mortality rates and wine consumption readings. We believe that the transformation will be successful to linearize our data because the scatterplot of untransformed observations follows an exponential pattern.



As you can see, the logarithm transformation applied to both variables made the relationship between the two variables approximately linear. France and Italy are not separated from the main body of the data.