Paper 24: "A comparison of gender-linked population cancer risks between alcohol and tobacco: how many cigarettes are there in a bottle of wine?"

Matriculation Number: 2553483

Purpose: The purpose of this research was to determine the increase in risk of developing cancer resulting from moderate alcohol-consumption in both men and women and then compare this to the risk of developing cancer from smoking. Smoking causes many deaths, including a large quantity of cancer related fatalities. Public perception of the health risks related to smoking has grown substantially over recent decades, with the prevalence of smoking significantly decreasing. Alcohol similarly causes lots of deaths and cancer diagnoses, but the public is less aware. It has been shown that even moderate levels of alcohol consumption increase the risk of cancer developing. By comparing the cancer risks of tobacco and alcohol consumption, the paper aims to answer: *"how many cigarettes are there in a bottle of wine?"*

Methodology: The study makes use of data from different sources to perform calculations and predictions, including data for the lifetime cancer risk in the population from Cancer Research UK, relative risks for alcohol and tobacco consumption and the Attributable Fractions (estimated proportion of instances which would not have occurred without the influence of the factor in question) for both alcohol and tobacco.

Firstly, the Attributable Fraction was summed for all known cancers related to alcohol and tobacco respectively. After subtracting these from the lifetime cancer risk amongst the general population, the lifetime risk of cancer in people who consume neither alcohol nor tobacco was calculated from this. Due to the link between the consumption of alcohol and tobacco for certain cancers, the Attributable Fractions were scaled by the proportion of non-smoking alcohol consumers and vice-versa for these cancers. The relative risks of consuming 10 units of alcohol and smoking 10 cigarettes per week were multiplied by the lifetime risk of cancer in people who consume neither alcohol nor tobacco. There is some uncertainty in the relative risk data due to coming from different sources. A sensitivity analysis was performed to account for some of this uncertainty in cancers with both alcohol and tobacco as factors.

Findings/Results/Conclusions: Drinking a bottle of wine per week is equivalent to smoking five cigarettes per week for men and ten cigarettes for women. The gap between men and women grows as alcohol consumption increases, with three bottles of wine per week being the same as smoking eight cigarettes per week for men and twenty-three for women. This gap can be explained by the risk of breast cancer for women. The conclusion is that moderate levels of drinking is an important health matter, especially for women. The report highlights the perhaps poorly understood risks of non-excessive alcohol consumption and education on this issue could help address it.

Critique: The study uses data from up-to-date primary sources for its calculations. A potential issue could arise from the overlap between cancers related to both smoking and alcohol, however this is addressed in the calculations. In the authors' discussion, the caveats of the study are outlined and sufficiently justified. There are areas of the study where data is not available, which could open some level of error in the results. For example, due to data on the risks of smoking 10 cigarettes per week being unavailable, a log-transformation was used to estimate the risk. It took time to understand all the different results which are presented, as there are many different factors such as gender and alcohol/tobacco. The use of more figures or graphs may have made this simpler. Overall, the report provides an interesting perspective on the issue it discusses.