CS306 Group Project – Step 4

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Can be accessed at https://github.com/Salihmaya/CS306_Group16

Tobacco Consumption: Causes and Effects

Introduction

In the previous phases of our project, we have focused on data collection, cleaning, transformation, and analysis with a keen interest on the relation between various factors like smoking, public health expenditure, and lung cancer deaths. We created views that compared filtered datasets, exploring connections between variables such as:

- High Smoking Quit Help & Low Smoking Death Rate
- High Advertisement Bans & Low Smoking Death Rate
- High Public Health Expenditure & High Lung Cancer Deaths
- Low Smoking Death Rate & High Lung Cancer Deaths
- High Advertisement Bans & High Lung Cancer Deaths

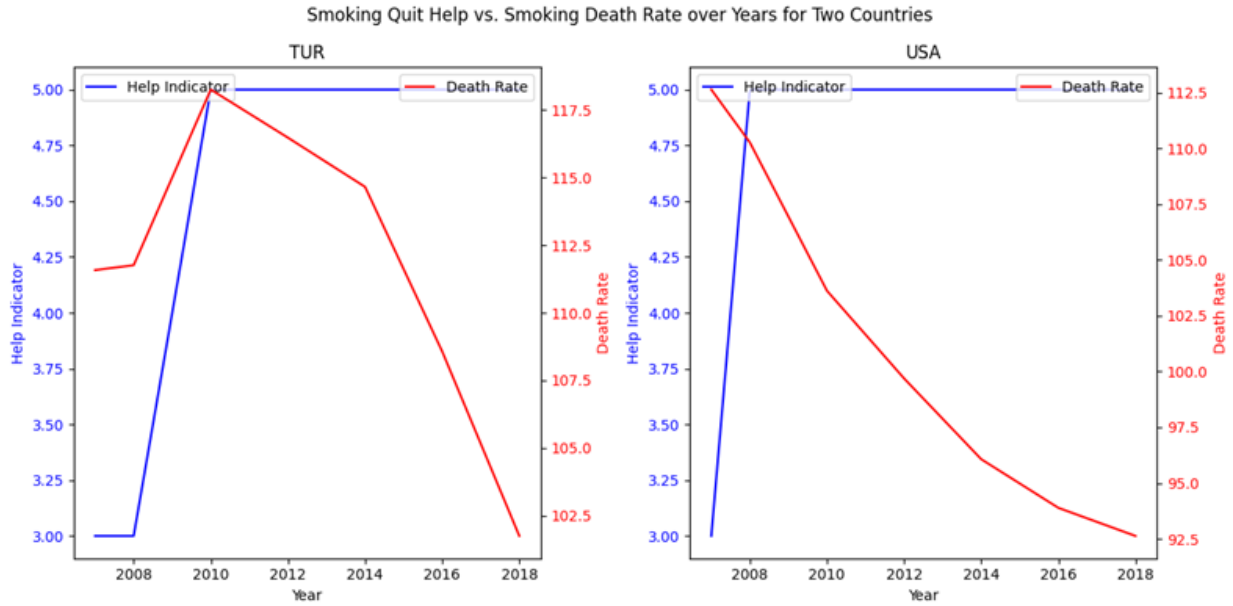
The aim of this phase of our project is to visualize the data, and interpret the results obtained from our analysis. The purpose is to tell a compelling data story that uncovers the patterns, trends, and correlations in our dataset. We will leverage Python and its powerful libraries such as Pandas, Matplotlib, and Seaborn to connect to our database, extract our views, and present our data in a visually appealing and easily understandable format.

Methodology

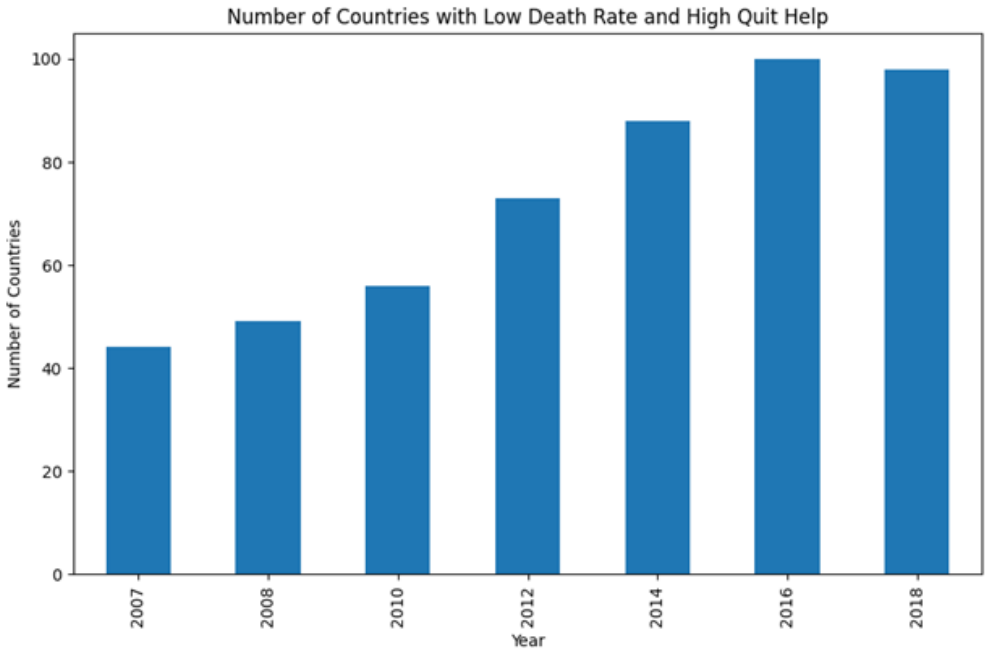
Our data visualization process utilizes Python, in conjunction with its powerful libraries, to connect to our MySQL database, manipulate and prepare the data, and then generate meaningful visualizations. We first establish a connection with our MySQL database using the mysql.connector module, which allows us to execute SQL queries to fetch our previously formed views. The retrieved data is then transformed into a more manageable format for analysis. Following this, we leverage the capabilities of Seaborn and Matplotlib libraries to create a range of visualizations, each designed to reveal unique insights and patterns within our data. The final step is to refine the aesthetics of our graphs, enhancing their interpretability and appeal, before displaying them to uncover our data stories.

Visualisations & Interpretations of the Views

Smoking Quit Help & Smoking Death Rate



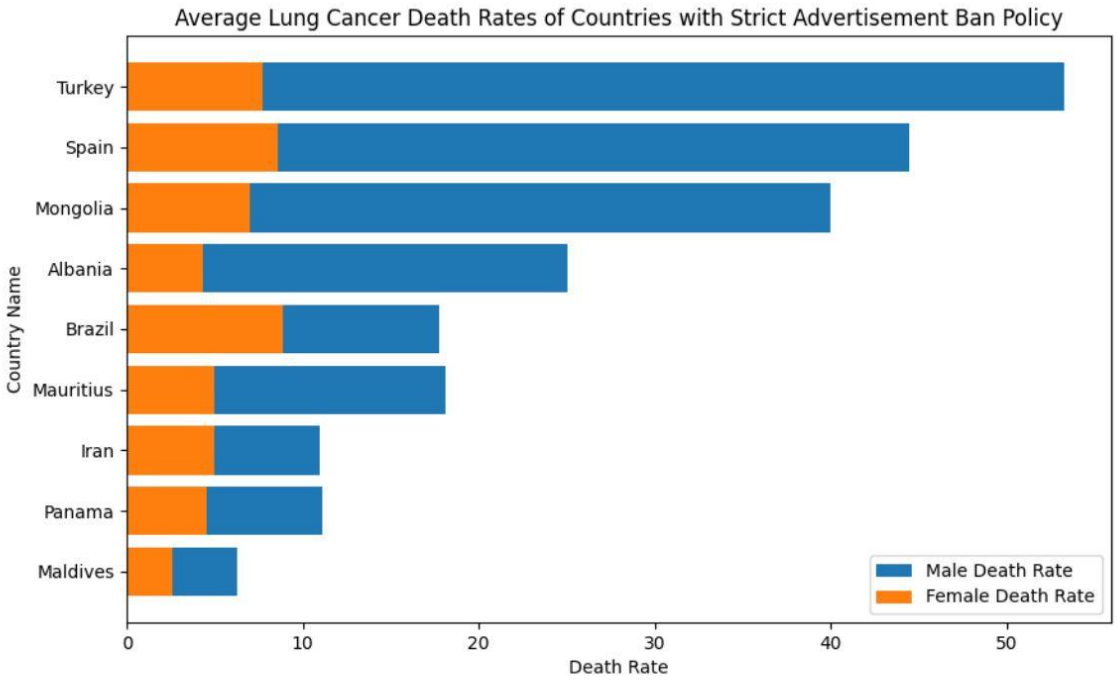
The graph comparing Turkey and the USA shows some significant distinctions. In the case of the USA, government assistance for quitting smoking shows a steadily rising pattern, which aligns with the notable decrease in the rate of smoking-related deaths. In Turkey, on the other hand, the increase in support for smoking quit help is slower, yet the rate of smoking-related deaths is declining steadily. It appears that Turkey has managed to achieve a considerable reduction in smoking-related deaths with relatively less support compared to the USA.



The graph exhibits a worldwide trend of high smoking quit support correlating with a low death rate from smoking. It shows the steady increase in the number of countries subscribing to this trend until 2018, underscoring the growing belief in the impact of smoking quit support on reducing tobacco-related fatalities. This data substantiates the positive influence of a unified public health approach on improving population life expectancy.

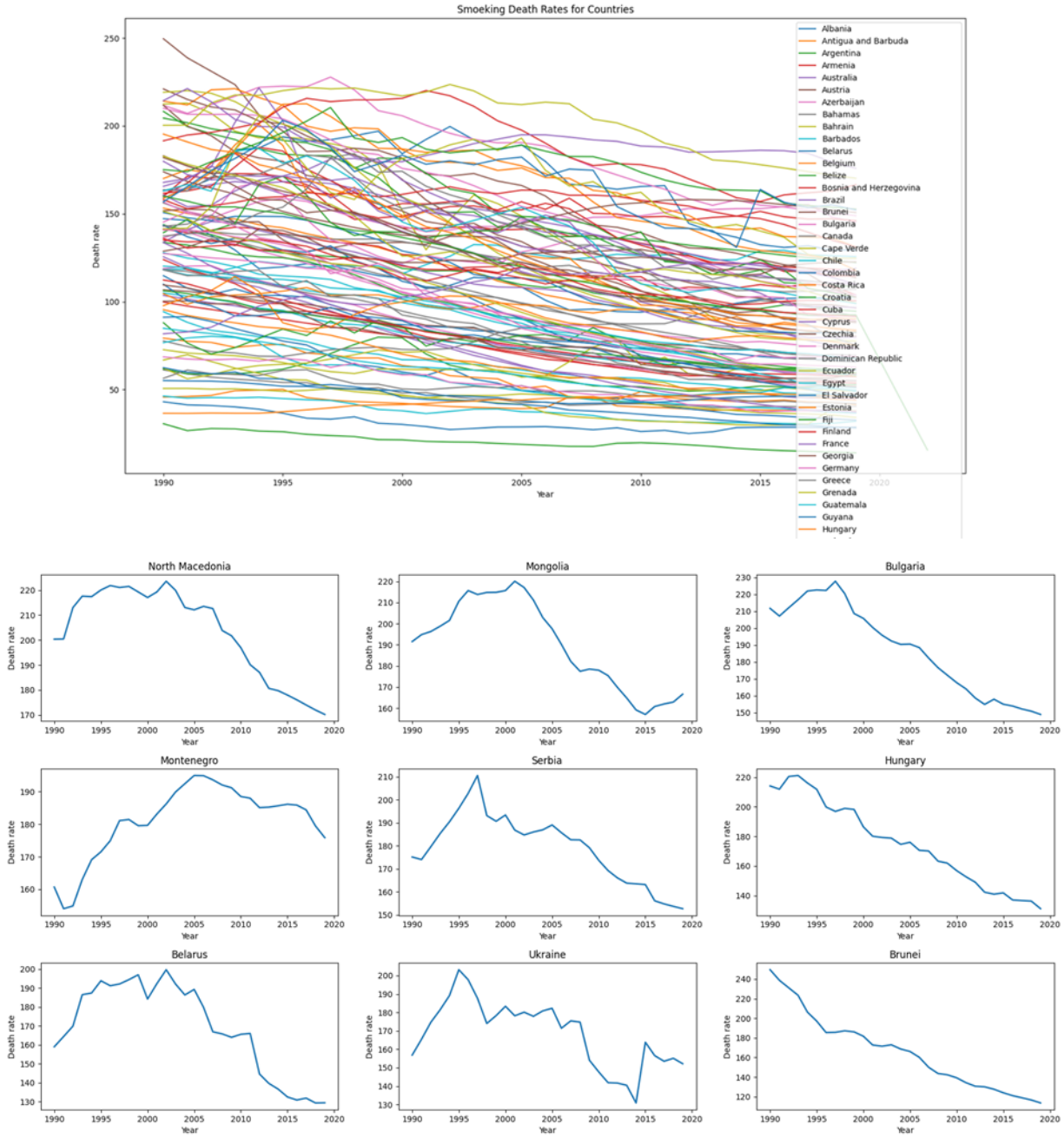
Lung Cancer Deaths & Smoking Advertisement Bans

The pie charts comparing male and female lung cancer death rates in the United Kingdom, Croatia, Czechia, Hungary, and Serbia reveal a striking gender discrepancy. In each of these countries, the male death rate is notably higher than the female death rate. This disparity indicates a significant gender-based difference in lung cancer mortality rates.



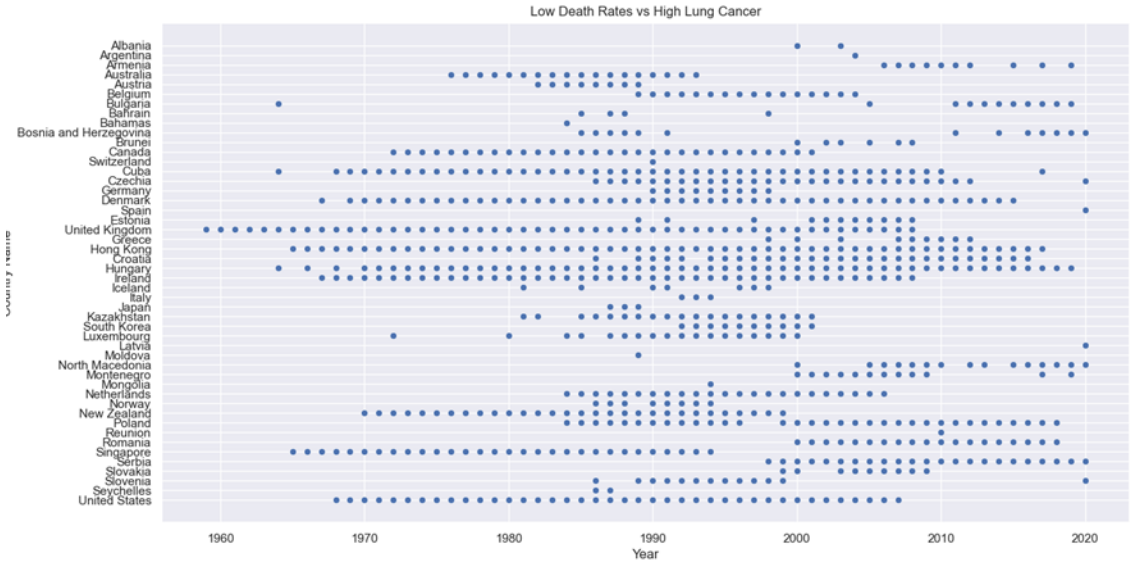
All of the countries present in the graph have strict advertisement ban policies, however the death rates range between roughly 5% and 55%, which suggests that the correlation between the advertisement ban policies and prevention of lung cancer deaths may be insignificant.

Smoking Death Rate & Lung Cancer Deaths



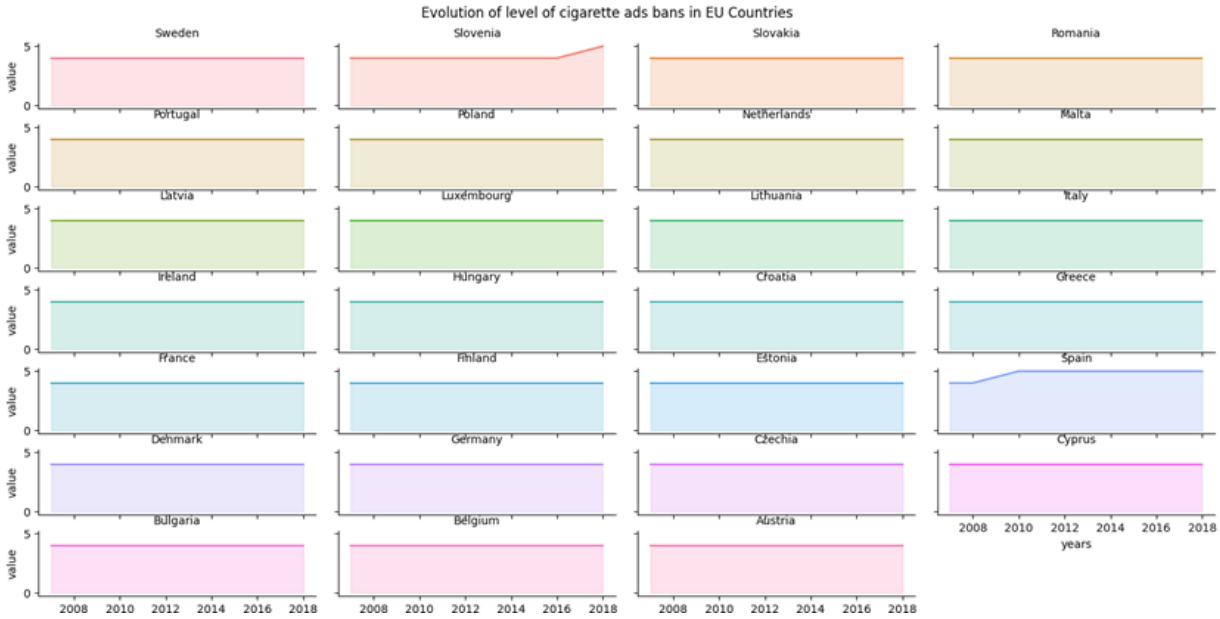
Graph 1 showcases the mortality rates linked to tobacco use. As can be seen, the smoking-induced fatality rates have largely either declined or remained steady over time in most countries. However, due to the enormous volume of data and the multitude of countries represented, fully understanding and interpreting this graph can be quite complex.

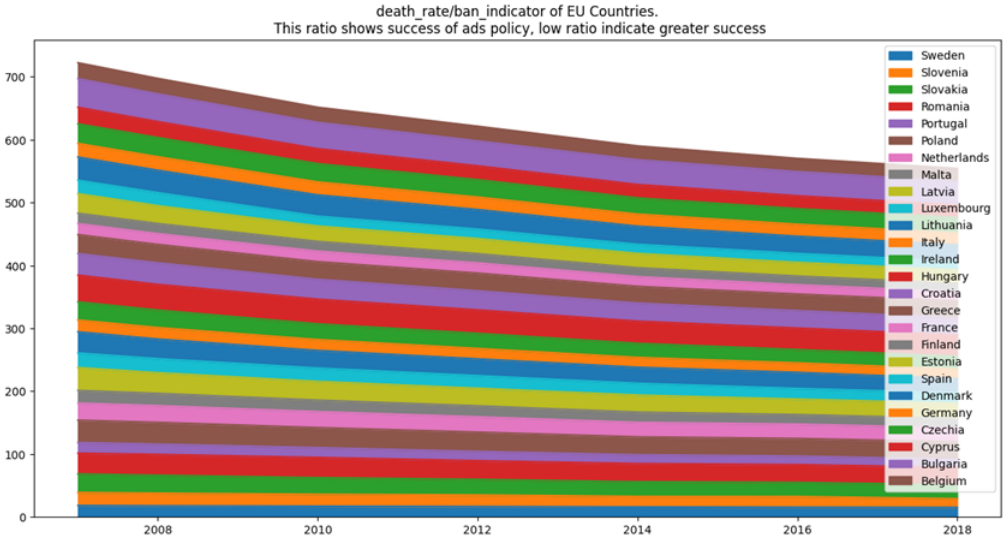
As a result, to offer a more straightforward and easily digestible visual representation, we have selected the top 10 countries with the most severe smoking-related death rates, as shown in Graph 2. This graph reveals a notable decline in smoking-related death rates in countries with historically high rates over the years. This trend suggests that strategies such as governmental regulations and anti-tobacco campaigns may have had some level of success.



The chart shows a lower occurrence of lung cancer in nations with fewer smoking-related fatalities. From 1960 to the 1990s, instances of low smoking death rates coinciding with lung cancer were scarce. However, the period post-2000 saw a rise in the data points per country, indicating that high rates of lung cancer were not necessarily tightly associated with deaths due to smoking. The growing quantity of data points in the graph over the years implies a decline in death rates related to smoking and consequent lung cancer post-2000. This result implies that government policies and anti-smoking ad campaigns directed at cigarette prohibition have proven effective.

Smoking Advertisement Bans & Smoking Death Rate



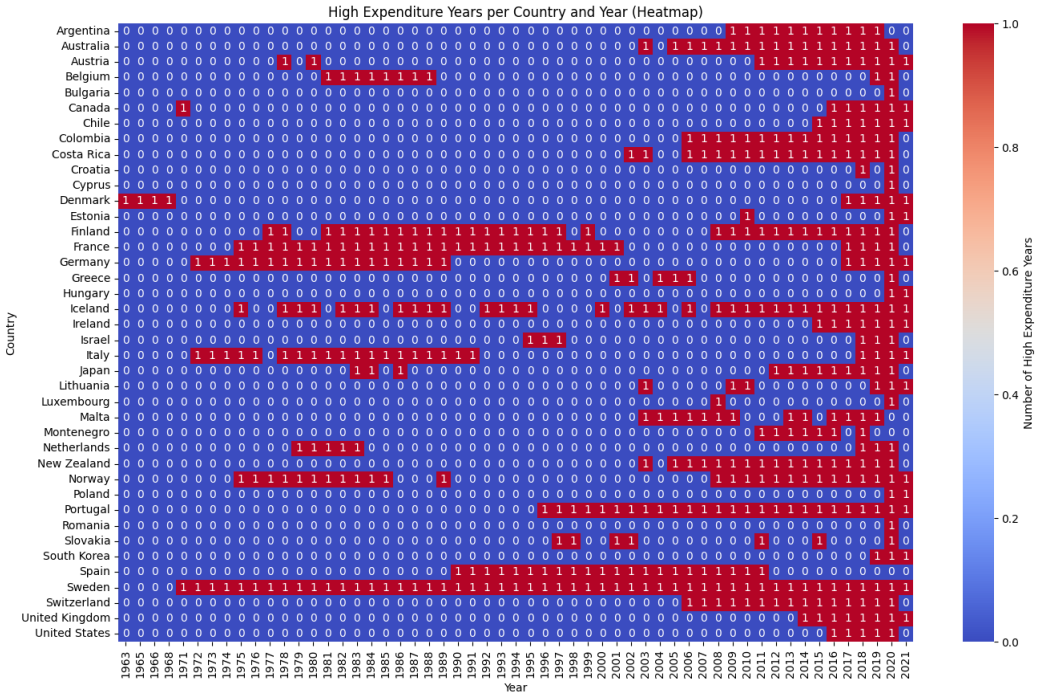


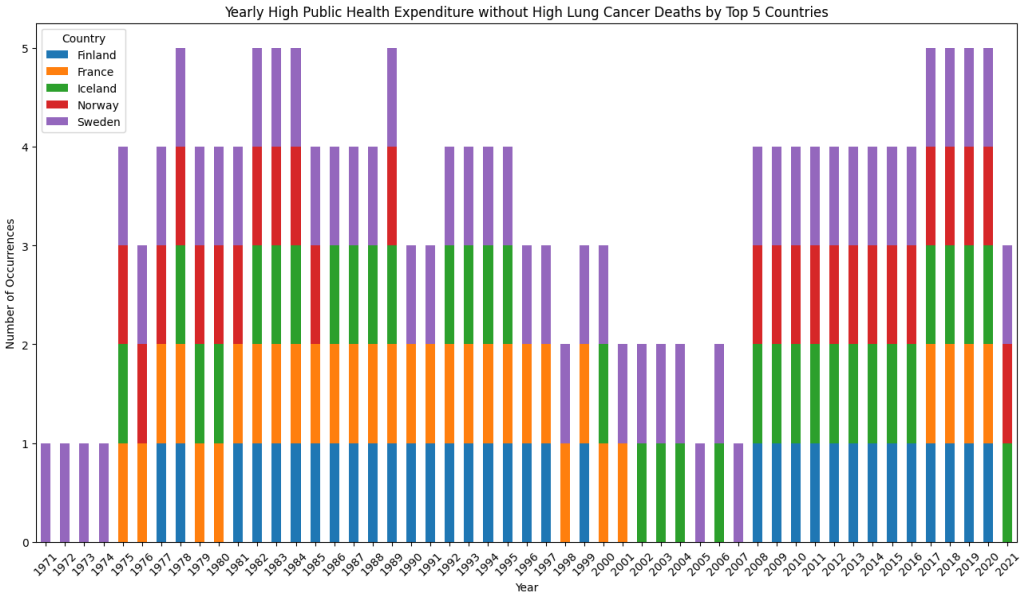
Interpreting the information from the dataset we analyzed, spanning the years 2007 to 2018:

The first graph clearly shows that the restrictions on cigarette advertising in European Union Countries have remained consistent (approximately at level 4). Despite the lack of any further strictness in advertising rules, the second graph indicates a consistent drop in death rates per advertising level.

Taking into account that the countries in the European Union boast some of the most educated populations, it is plausible that this reduction in mortality rates over the 11-year period can be attributed to increased public awareness.

Public Health Expenditure & Lung Cancer Deaths





The graphs show the successful track record of the High Public Health Expenditure countries such as Finland, France, Iceland, Norway and Sweden resulted in a low number of High Lung Cancer death years. The successive years of achieving this is evident in the heatmap where their undisrupted streak of above average public health expenditure resulted in consecutive years of high lung cancer death prevention, usually keeping the momentum.

It is also evident by the stacked bar chart that the top 5 countries managed to achieve this usually in the same years, which could be attributed to either outside factors in the global context, or the benefit and momentum of having high healthcare expenditure in the past years as well.

Therefore, assuming the causation is also present, the correlation shows that the top 5 countries successfully lowered their lung cancer deaths by having high public health expenditure and they kept a continuously positive track record in the years of doing so.

Data Story & Conclusion

Our data tells us an interesting story about smoking, health, and the steps governments take to help people stay healthy. When a government helps people quit smoking, fewer people die from smoking-related diseases. However, just stopping ads about smoking doesn't necessarily mean fewer people will die from lung cancer - there's more to it than that.

Over time, countries where a lot of people used to die because of smoking have seen these numbers go down. This suggests that things like government rules and campaigns against smoking are working. Also, after the year 2000, having a lot of lung cancer in a country didn't always mean more people died because of smoking. This could be because of better healthcare, finding the disease earlier, and how much a country spends on health.

In places where people are well-educated, like in the European Union, fewer people died from smoking over time, even though the rules about advertising cigarettes stayed the same. This shows that educating people about the dangers of smoking really helps.

Finally, countries that spend more money on health - on things like doctors, hospitals, and health education - have fewer people dying from lung cancer. This tells us that investing in health is a good strategy.

In short, the story we see is that the fight against smoking and lung cancer needs to be fought on many fronts. It's not just about banning ads or helping people quit smoking. It's also about education and investing in health.

Key Takeaways

- When governments help people quit smoking, fewer people die from smoking.
- Just banning smoking ads doesn't always lead to fewer people dying from lung cancer. Other things matter too.
- In countries where lots of people used to die from smoking, these numbers have gone down. This suggests that rules and campaigns against smoking work.
- After the year 2000, having lots of lung cancer in a country didn't always mean more people died because of smoking. Better healthcare, finding the disease earlier, and spending more on health could be reasons for this.
- In places where people are well-educated, like the European Union, fewer people die from smoking over time. This shows the importance of educating people about the dangers of smoking.
- Countries that spend more money on health have fewer people dying from lung cancer. This shows that investing in health pays off.
- The fight against smoking and lung cancer needs many different approaches. This includes banning ads, helping people quit, education, and spending money on health.