The Global War Against Cancer

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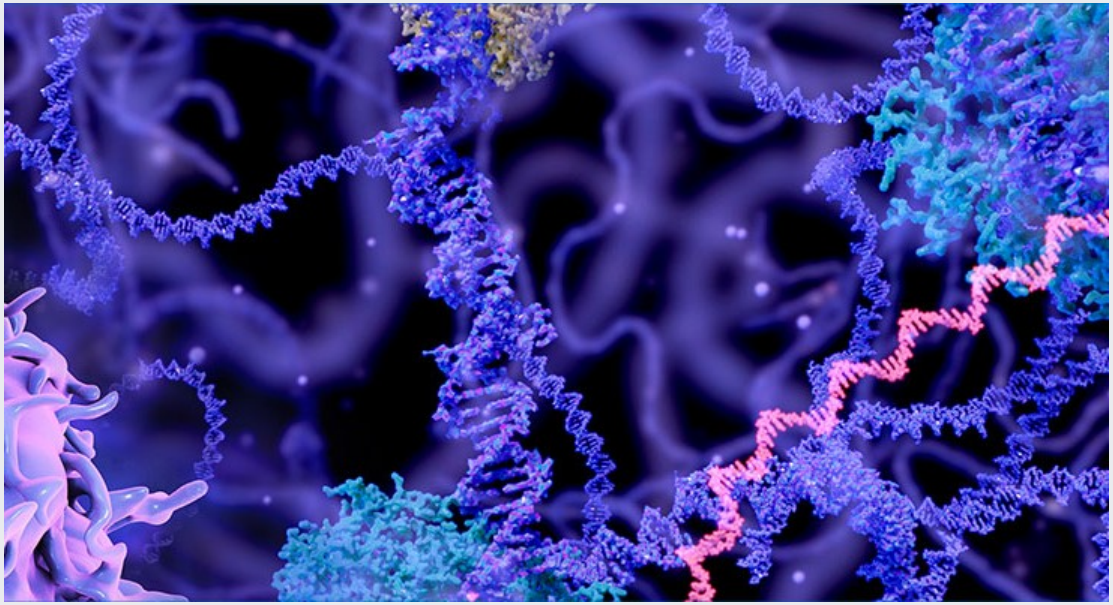
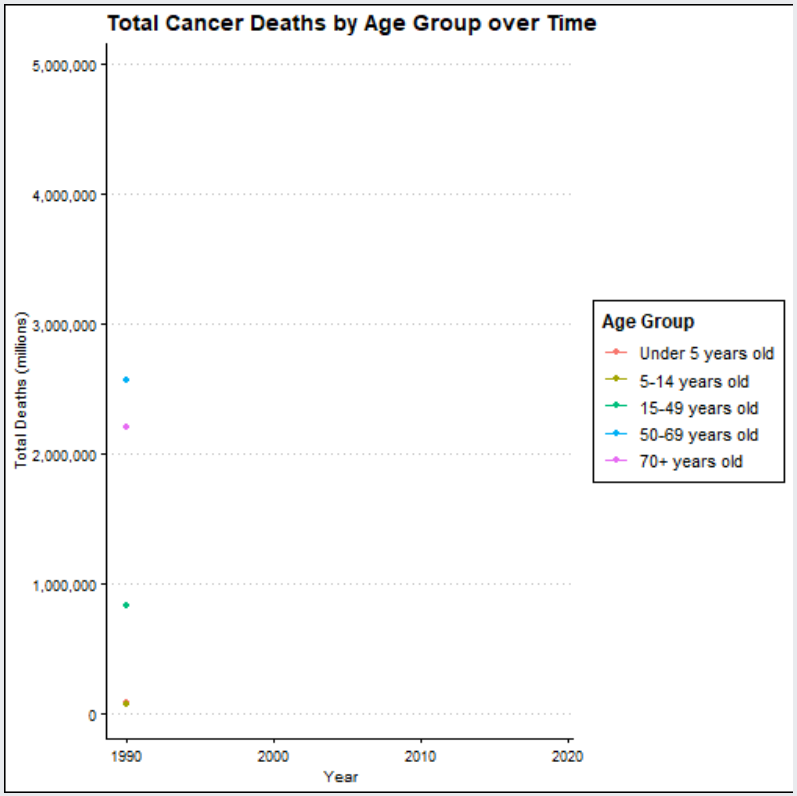
Introduction

- Cancer is a complex and diverse group of diseases that can affect anyone, regardless of age, gender, lifestyle, or background.
- Cancer occurs when normal cells in the body start to grow and divide uncontrollably, forming a mass or tumor.
- The treatment of cancer has garnered the attention and investments of numerous nations to come together and pool in resources along with their medical expertise to combat this deadly disease.
- Cancer is a significant public health challenge affecting millions of people worldwide and is a leading cause of death globally. In this presentation, we will discuss the different types of cancer, their causes, symptoms, and treatment options, and the current state of cancer research and treatment.



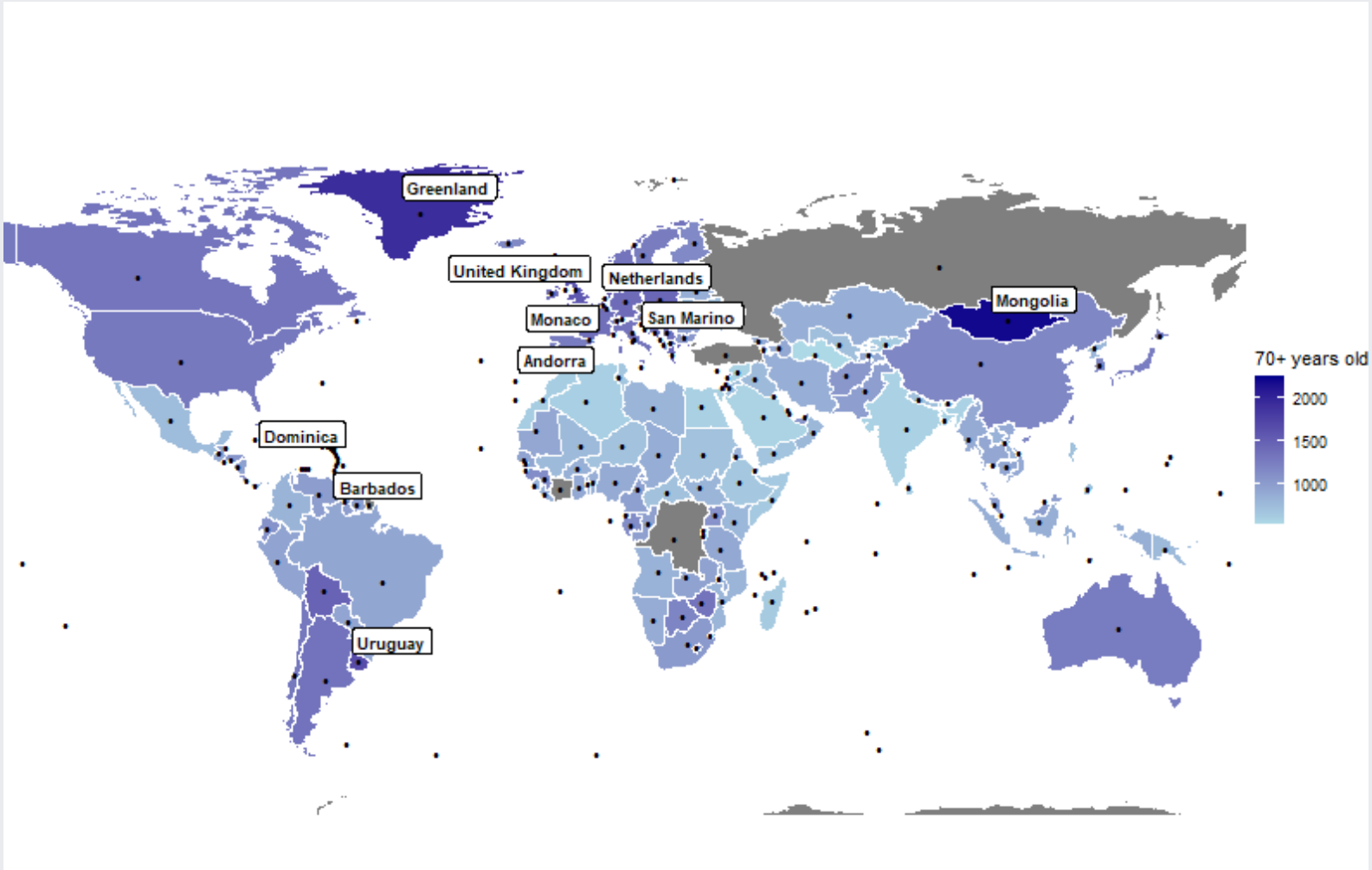
Cancer by Age



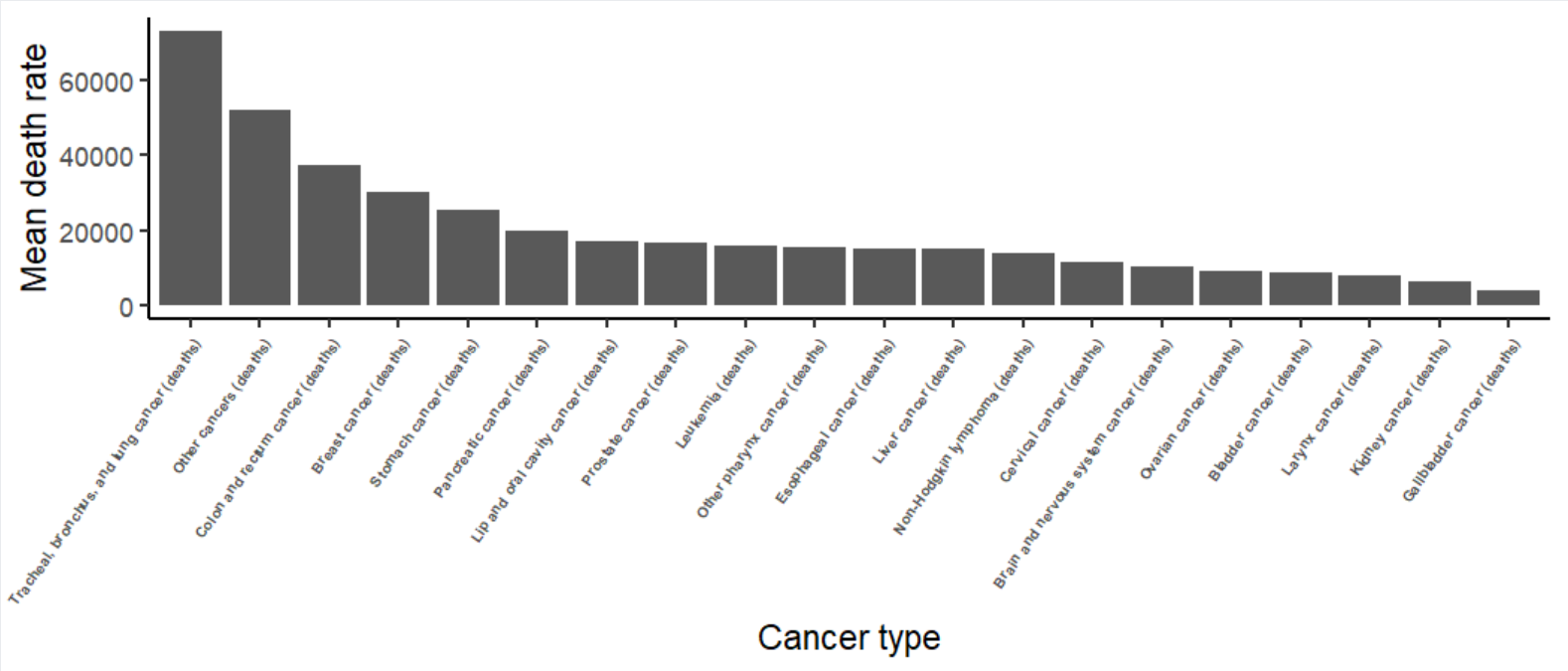
Cancer deaths increase with age:

- **"50-69"** and **"70+" age groups** had upward trends in cancer deaths
- Younger age groups had relatively stable trends with fewer cancer deaths
- **From 1990-1998:** "50-69" age group had highest number of cancer deaths
- **1998-Present**: "70+" age group surpassed "50-69" in cancer deaths
- **From 1995 onwards:** "70+" had a steeper upward trend in cancer deaths compared to "50-69" age group

Countries with Highest Cancer Death Rates for People Aged 70+ Years and Over (2019)



Cancer by type



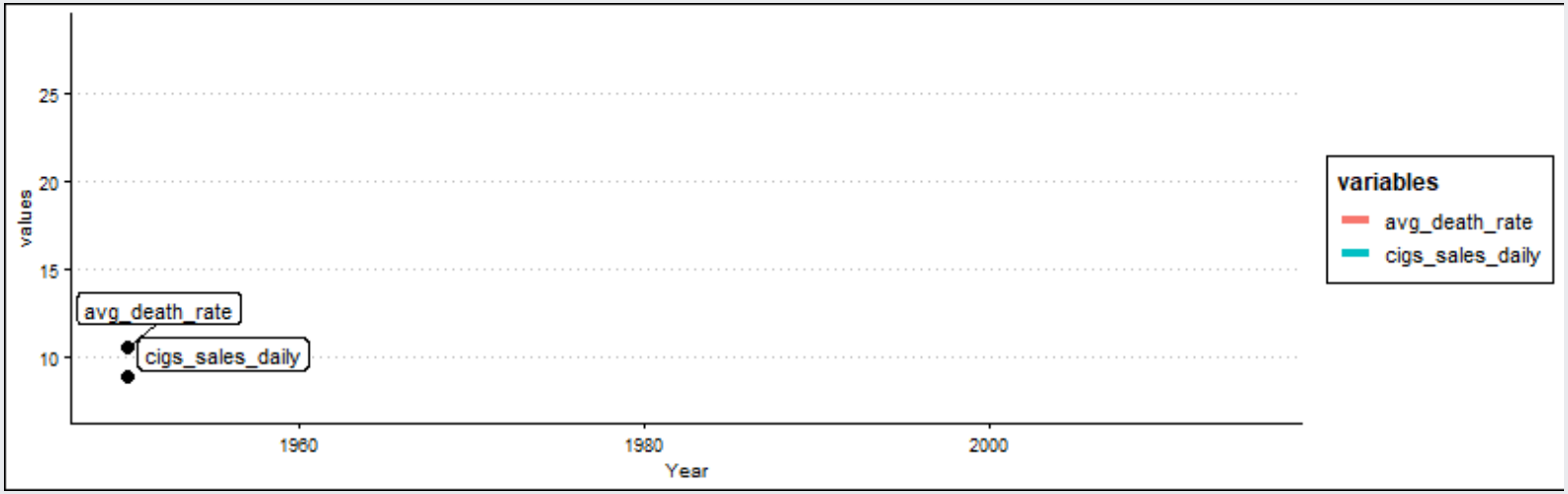
- The most common types include breast cancer, lung cancer, prostate cancer, and colon cancer.
- In 2016, lung cancer was the leading cause of cancer death globally, accounting for approximately 18% of all cancer deaths.
- India has the highest number of breast cancer deaths among the selected countries.

Sales of cigarettes and Lung Cancer

The Trend

- Why Cigarettes?
- Any relationship between Sales of Cigarettes and Lung Cancer Mortality Rates?
- **It is estimated that cigarette smoking explains almost 90% of lung cancer risk in men and 70% - 80% in women**. [Walser et al. (2008)]

Let's see the trend:

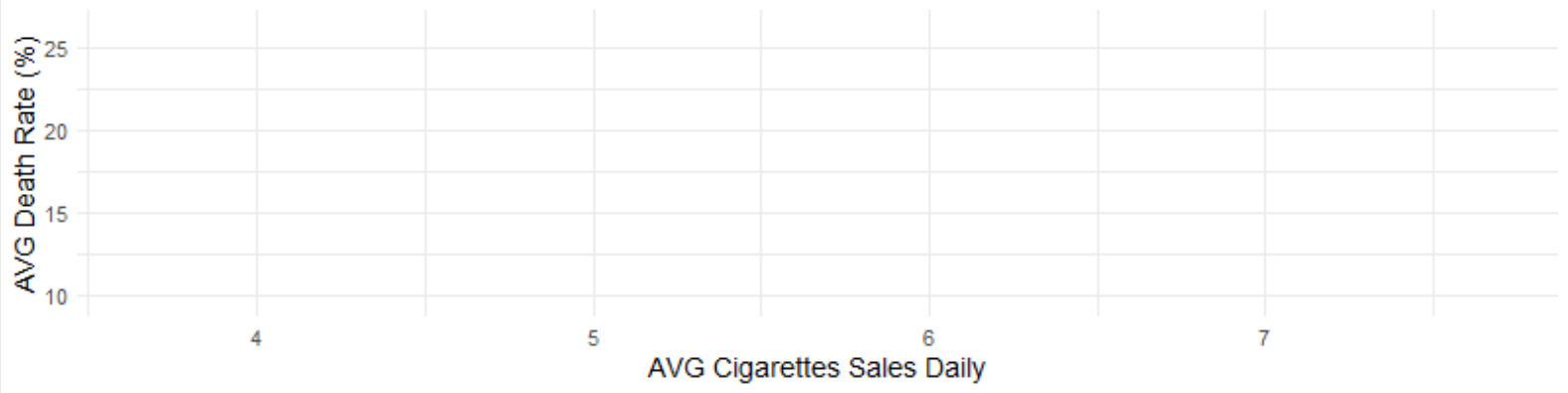


- When **the sales of cigarettes increases**, **the lung cancer mortality rates tend to increase** as well!
- **However**, there is a divergent movement starting from 1980, because the smoking downside does not affect directly.

Sales of cigarettes and Lung Cancer

The Smoothing Technique

By utilising **smoothing technique**, we can validate previous finding:



- The smoothed line is upward-sloping, meaning **a positive relationship between them!**

Finally, through the trend line and smoothing technique, we can conclude that **sales of cigarettes does affect lung cancer mortality**.

Photo by elnaz asadi on Unsplash

Is the world making progress against cancer ?

Methodology

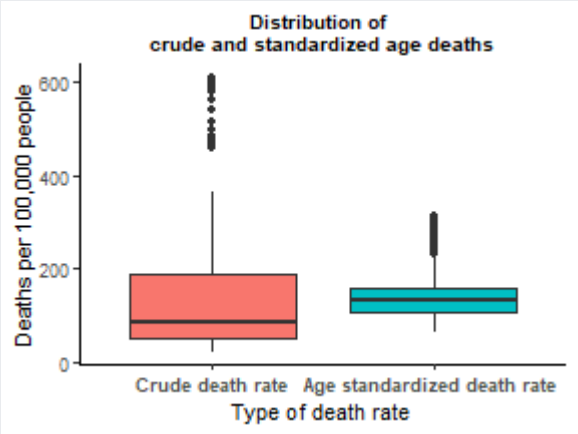
- Absolute number of deaths and rate of deaths are **heavily affected by the number of people constituted in each age group**.
- As **age distributions can drastically differ, a statistical treatment is required**.
- As a result, in Epidemiology, **age standardized death rates** are calculated to study the overall progress of treatments against diseases.

$$Standardization\ rate = \frac{\sum(r_i P_i)}{\sum P_i}$$

Where,

$r_i =$ is the age-group specific rate for age group i in the population being studied.

$P_i =$ is the population of age group i in the standard population.

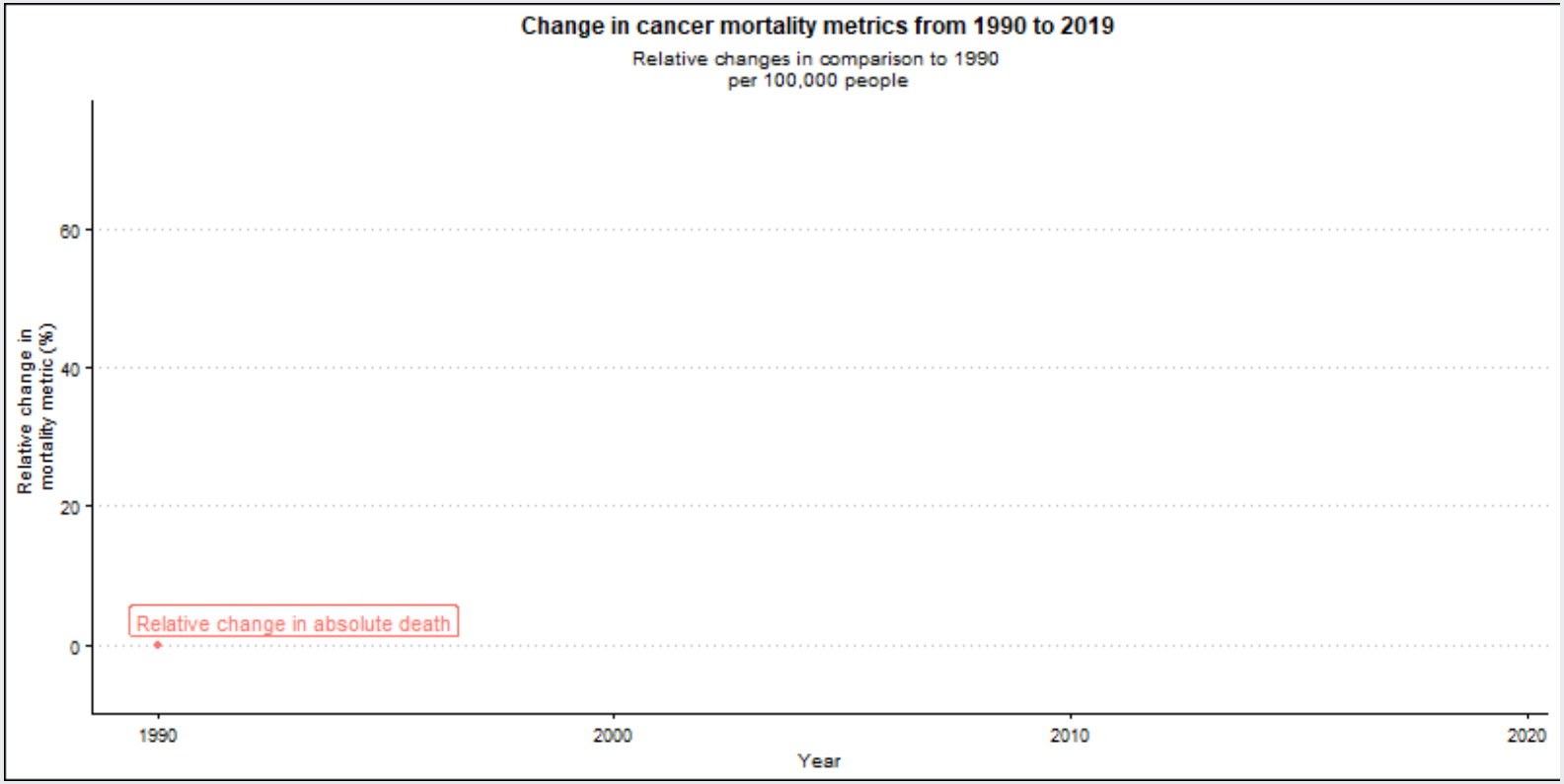


Is the world making progress against cancer ?

Key results

- Based on the current study, **cancer deaths** were observed to rise by approximately **73% globally since 1990**.
- **Non-age standardized death rate** due to cancer was observed to **rise by approximately 30%**.
- **Age standardized death rate** due to cancer was observed to **drop by 6% since 1990**.

Death rate temporal trend | Summarized trend



Conclusions

Key highlights

In conclusion, the analysis of deaths by different cancer types provide valuable insights into the global burden of cancer:

1. Lung cancer emerges as the **leading cause of cancer-related deaths, highlighting the urgent need for effective prevention and targeted interventions**. Colorectal cancer, stomach cancer, and liver cancer also contribute significantly to the cancer mortality burden.

2. Cancer deaths are found to be **more prevalent in older age groups**, as shown by rising trends in the **"50-69"** and **"70+"** age groups over time.

3. Countries with relatively **smaller populations**, such as **Greenland** and **Mongolia**, are also revealed to have higher cancer death rates among the elderly population.

4. There is a **positive relationship** between Sales of Cigarettes and Lung Cancer Mortality Rates, which mean as the **average daily number of cigarettes sold increases, the death rates of lung cancer tend to increase as well**.

5. While the death rates increased by **73% since 1990**, age standardized death rates have been observed to **drop by approximately 6%** since 1990. This metric indicates that **if the world population would have remained constant and the age profiles would have been consistent across all age groups**, the number of deaths have in fact dropped by 6%.

6. The above metrics indicate that while the total number of global deaths have increased, the world is in fact making a **slow but critical progress against cancer**.