

# AIR POLLUTION-RELATED MORTALITY

A study into the global patterns of air-pollution related deaths based on sex and disease

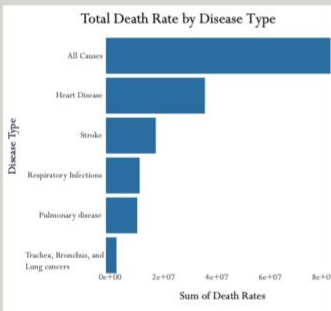
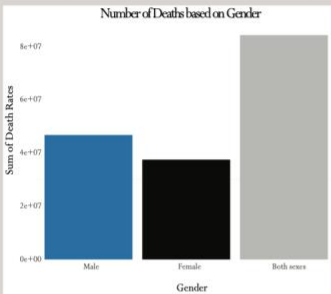
Samantha Zygmunt | IST 719: Information Visualizations | Syracuse University | June 2025

## STORY & MOTIVATION

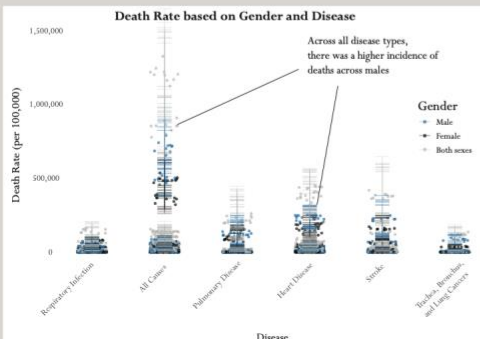
Air pollution can silently contribute to millions of deaths worldwide, and its impact is variable across different populations. By exploring some of the disparities in air-pollution related deaths, very critical insights can be targeted to address these public health needs.

This topic is very important to me, as someone who has worked in the healthcare and research fields and understands how population disparities can vastly impact health outcomes for vulnerable groups. This project aims to provide public health officials with a comprehensive overview of this global health issue.

## GENDER DIFFERENCES



As illustrated in the distribution plots above, there are some distinct differences in death rates based on gender and disease type. Based on the first distribution plot, there is a higher incidence in air-pollution related deaths amongst males than females. There were also some diseases that had increased death rates which included heart disease, stroke, and respiratory infections respectively. This data was further supported by the plot below which illustrated the death rate based on disease and gender. This plot illustrated that across all disease types, there seemed to be higher rates of males dying than females.



## DATA DESCRIPTION



This data set was cleaned prior to analysis to ensure that the data was ready for manipulation. The cleaning steps taken were to remove all the missing values and keeping only the necessary columns: location, time period, sex, disease, death rate, upper CI, and lower CI. After cleaning, there were 7 columns and 32,490 observations.

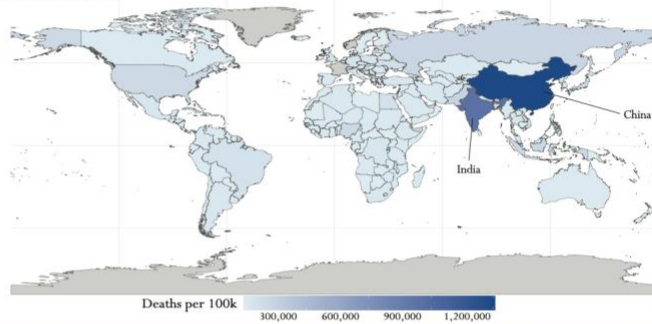
This dataset, sourced from the World Health Organization (WHO), details ambient air pollution-attributable deaths by country, sex, and cause of death from 2019 to 2024. The data includes estimates for mortality based on various causes such as lung cancer and various geographical locations.

## QUESTIONS

1. Is there a relationship between death rate ranges and disease burden by gender?
2. Are certain countries or regions disproportionately affected by specific pollution-related diseases?
3. Do air pollution-attributed death rates vary significantly based on disease type across countries?

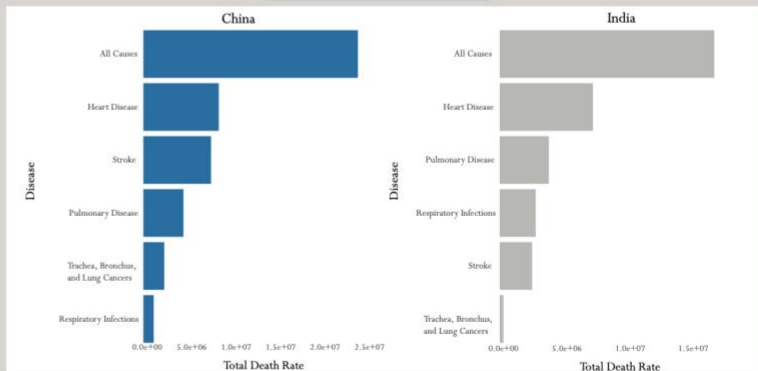
## GEOGRAPHIC BREAKDOWN

Air Pollution Death Rate by Country  
Both Sexes | All Causes



Based on the above geographic plot, it is clear that there are certain countries that are experiencing significantly higher incidence in air-pollution related deaths. The highest number of air-pollution related deaths were observed in China followed by India illustrated in a dark blue color on the map. The rest of the world had much lower death rates comparatively.

## DISEASE BURDEN



As highlighted in the above plots, the major disease contributing to air-pollution related mortality is heart disease across China and India, which were the two most prominent countries experiencing air-pollution related deaths. There was some variance between the other diseases causing deaths in these countries. For example stroke is the second leading disease causing mortality in China, while it is the fourth leading cause in India.

## SOURCES/R PACKAGES

**DATASET**  
<https://www.who.int/data/gho/data/indicators/indicator-details/GHO/ambient-air-pollution-attributable-deaths>

**IMAGES**

Smoke Stack  
<https://unsplash.com/photos/smoke-stack>

**WHO Logo**  
<https://thecolorfuldreams.com/world-health-organization-the-colorful-dreams/>

**FLAGS**  
<https://www.worldatlas.com/flags/china>  
<https://www.worldatlas.com/flags/india>

**R PACKAGES**

dplyr

ggplot2

sf

rnaturalearth

countrycode

patchwork