



# GLOBAL MORTALITY CAUSE ANALYSIS INSIGHTS OF 30 YEARS OF INDONESIA'S DATA

By Harish Muhammad

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# Outlines

- Background/context
- problem Statement
- Data Understanding
- Data Cleaning
- Data Analysis
- Insights
- Recommendations
- References



# Background



Most countries allocate substantial portions (5-12%) of their GDP to healthcare (IPSOS, 2023 )



**Anggaran Kesehatan 2024  
Ditetapkan Sebesar 5.6% dari APBN,  
naik 8.1% dibanding 2023**



Indonesia's healthcare budget is projected to increase up to IDR 184.6 trillion in 2024 (Indonesia's Ministry of Health, 2023)



Does rising healthcare expenditure improve public health outcomes?

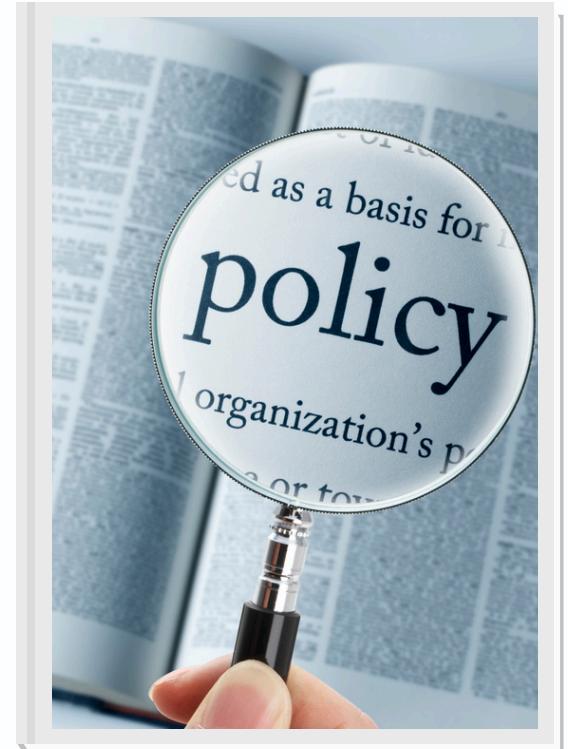
# Background



The Global Burden of Disease (GBD) study is a collaborative effort aimed at quantifying health loss due to diseases, injuries, and risk factors worldwide.



GBD study provides valuable insights into the leading causes of death and their implications for population health.

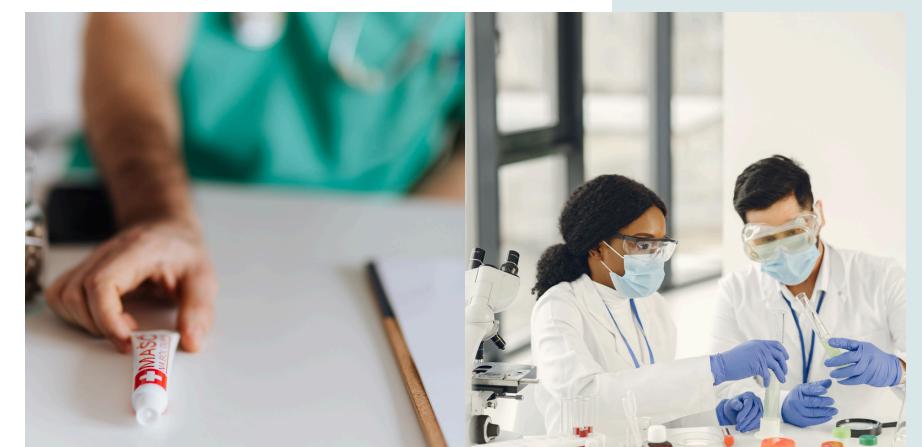
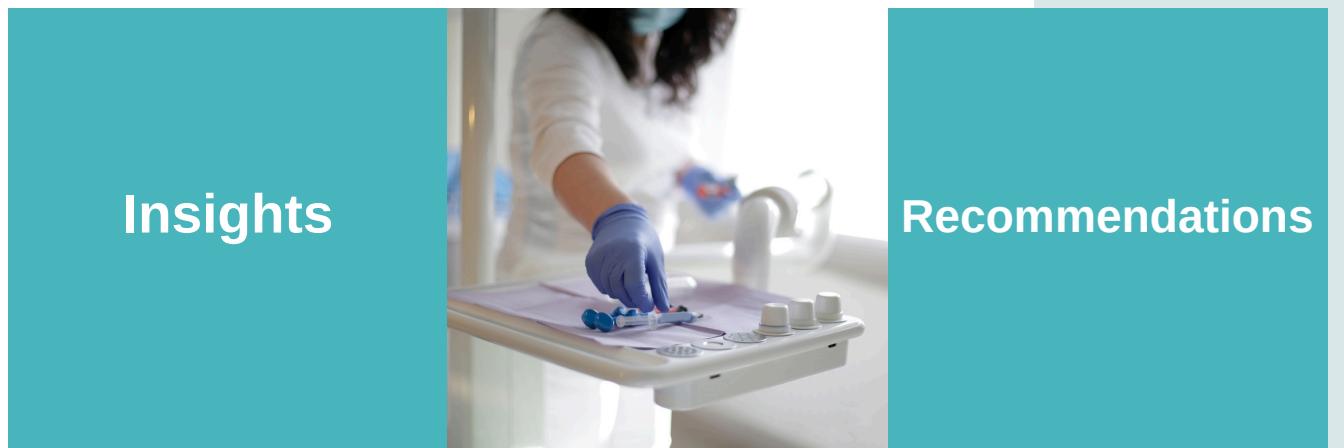


Understanding global mortality trends is crucial in guiding evidence-based decision-making and shaping healthcare policies.

# Problem statement

## Question:

**What are the key insights and recommendations that can be obtained from global mortality data to improve the population health of Indonesia?**



# Data Collection

## Dataset source:

The Global Burden of Disease:

- An international initiative
- collaboration between researchers and health institutions worldwide

The screenshot shows the IHME website with a green header bar containing the IHME logo, a search bar, and navigation links for "Research and analysis", "Data tools and practices", and "News and events". Below the header, a dark banner features a world map and the text "Global Burden of Disease (GBD)". A descriptive paragraph explains the GBD study's purpose: "The Global Burden of Disease (GBD) study provides a comprehensive picture of mortality and disability across countries, time, age, and sex. It quantifies health loss from hundreds of diseases, injuries, and risk factors, so that health systems can be improved and disparities eliminated." At the bottom of the page, there is a navigation bar with links for "Our World in Data", "Browse by topic", "Latest", "Resources", "About", and a search bar.



Institute for  
Health Metrics  
and Evaluation



World Health  
Organization

The screenshot shows the "Burden of Disease" page on the Our World in Data website. The page title is "Burden of Disease" and includes the subtitle "How is the burden of disease distributed and how did it change over time?". It is authored by Max Roser, Hannah Ritchie, and Fiona Spooner. A note at the bottom states, "This page was first published in 2016, and last revised in February 2024." The page has a light blue background with some data visualizations.

# Data Understanding

## Raw Dataset

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8254 entries, 0 to 8253
Data columns (total 36 columns):
 #   Column           Non-Null Count   Dtype  
 ---  -- 
 0   Entity            8254 non-null    object  
 1   Code              6206 non-null    object  
 2   Year              8254 non-null    int64  
 3   Number of executions (Amnesty International) 267 non-null   object  
 4   Deaths - Meningitis - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 5   Deaths - Neoplasms - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 6   Deaths - Fire, heat, and hot substances - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 7   Deaths - Malaria - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 8   Deaths - Drowning - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 9   Deaths - Interpersonal violence - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 10  Deaths - HIV/AIDS - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 11  Deaths - Drug use disorders - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 12  Deaths - Tuberculosis - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 13  Deaths - Road injuries - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 14  Deaths - Maternal disorders - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 15  Deaths - Lower respiratory infections - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 16  Deaths - Neonatal disorders - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 17  Deaths - Alcohol use disorders - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 18  Deaths - Exposure to forces of nature - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 19  Deaths - Diarrheal diseases - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 20  Deaths - Environmental heat and cold exposure - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 21  Deaths - Nutritional deficiencies - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 22  Deaths - Self-harm - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 23  Deaths - Conflict and terrorism - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 24  Deaths - Diabetes mellitus - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 25  Deaths - Poisonings - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 26  Deaths - Protein-energy malnutrition - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 27  Terrorism (deaths) 2891 non-null    float64 
 28  Deaths - Cardiovascular diseases - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 29  Deaths - Chronic kidney disease - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 30  Deaths - Chronic respiratory diseases - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 31  Deaths - Cirrhosis and other chronic liver diseases - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 32  Deaths - Digestive diseases - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 33  Deaths - Acute hepatitis - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 34  Deaths - Alzheimer's disease and other dementias - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
 35  Deaths - Parkinson's disease - Sex: Both - Age: All Ages (Number) 8010 non-null   float64 
dtypes: float64(32), int64(1), object(3)
```

32 numerical columns (data type: int64 & float64)  
4 categorical columns (data type: object)

# Data Cleaning

## Dataset after cleaning

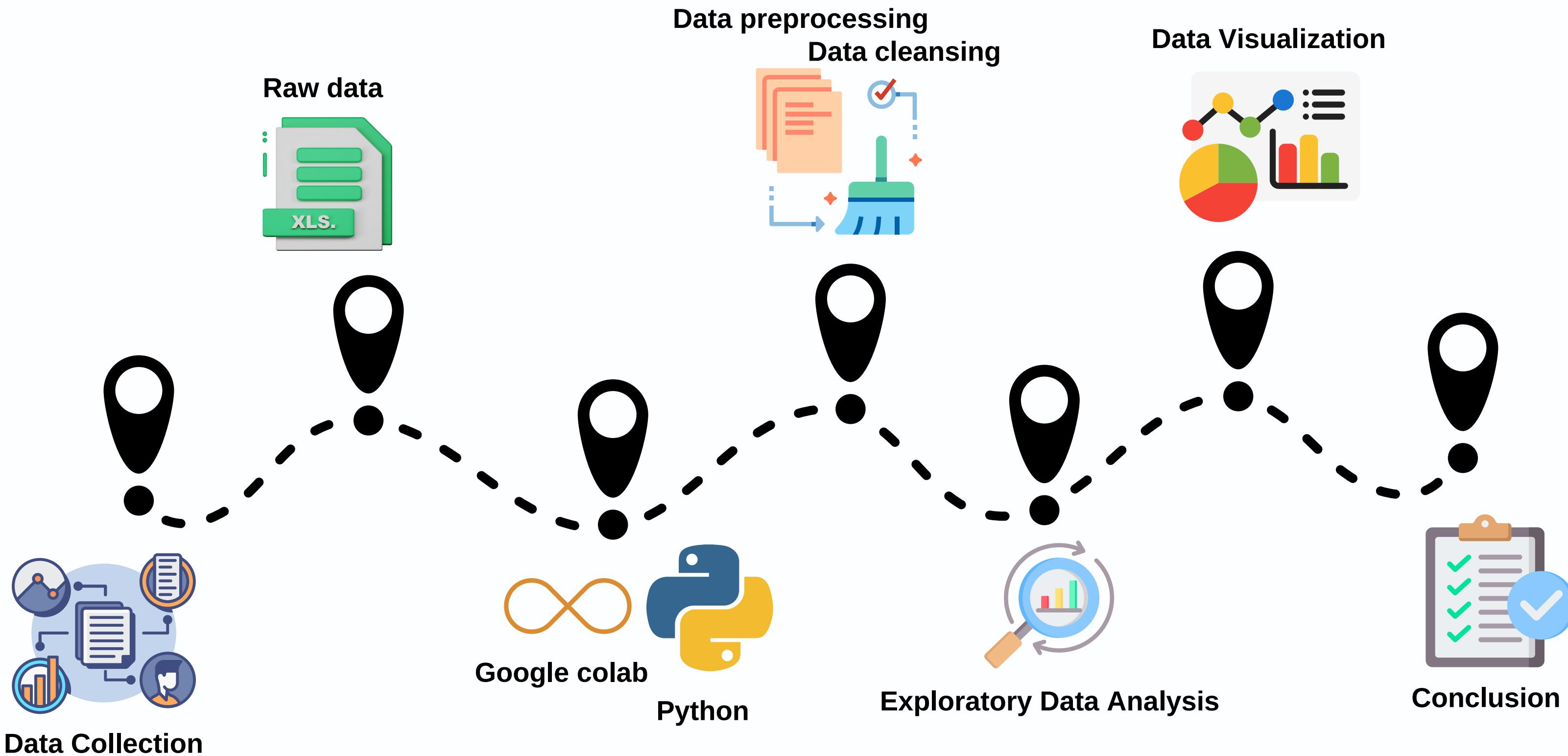
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 6120 entries, 0 to 6119
Data columns (total 34 columns):
 #   Column           Non-Null Count   Dtype  
 ---  -- 
 0   Country          6120 non-null    object  
 1   Year             6120 non-null    datetime64[ns] 
 2   Meningitis        6120 non-null    float64 
 3   Cancers           6120 non-null    float64 
 4   Burns and Scalds 6120 non-null    float64 
 5   Malaria            6120 non-null    float64 
 6   Drowning           6120 non-null    float64 
 7   Violence           6120 non-null    float64 
 8   HIV/AIDS           6120 non-null    float64 
 9   Drug abuse         6120 non-null    float64 
 10  Tuberculosis       6120 non-null    float64 
 11  Road Injuries      6120 non-null    float64 
 12  Maternal Disorders 6120 non-null    float64 
 13  Chest Infections   6120 non-null    float64 
 14  Newborn Health Issues 6120 non-null    float64 
 15  Alcohol            6120 non-null    float64 
 16  natural disasters   6120 non-null    float64 
 17  Diarrhea           6120 non-null    float64 
 18  Extreme Weather     6120 non-null    float64 
 19  Malnourishment      6120 non-null    float64 
 20  Self-harm           6120 non-null    float64 
 21  War and Terrorism    6120 non-null    float64 
 22  Diabetes            6120 non-null    float64 
 23  Poisonings          6120 non-null    float64 
 24  Malnutrition         6120 non-null    float64 
 25  Heart diseases       6120 non-null    float64 
 26  Kidney Failure       6120 non-null    float64 
 27  Chronic Lung Conditions 6120 non-null    float64 
 28  Liver Cirrhosis      6120 non-null    float64 
 29  Digestive Diseases    6120 non-null    float64 
 30  Acute Hepatitis       6120 non-null    float64 
 31  Alzheimer/Dementias 6120 non-null    float64 
 32  Parkinson's Disease   6120 non-null    float64 
 33  Total mortality       6120 non-null    float64 
dtypes: datetime64[ns](1), float64(32), object(1)
```

32 numerical columns (data type: int64 & float64)  
1 categorical column (data type: object)  
1 date time (data type: datetime64)  
New additional columns:  
'Total\_mortality'

## Data Cleaning:

- Handling duplicated data
- Handling missing values
- Selecting and filtering relevant rows
- Changing data type
- Renaming columns to be more meaningful
- Dropping unnecessary & redundant columns: 'code', 'number of executions (amnesty international)', 'Terrorism (deaths)'

# Steps of Analysis





# Analysis of global mortality within 30 years of data

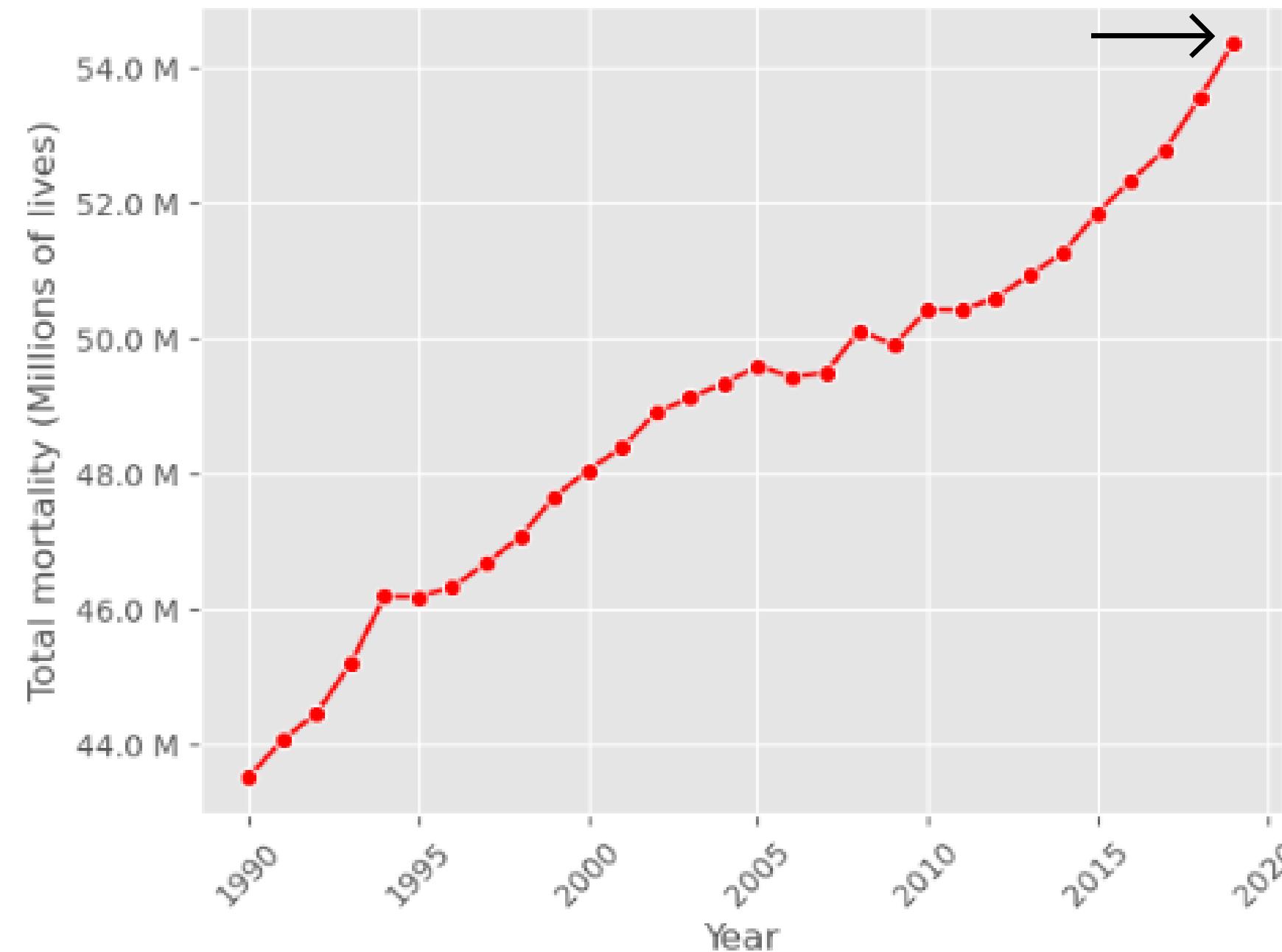
- **What is the current global mortality trend?**
- **Which countries have the highest number of mortality?**
- **Which causes that dominantly causing mortality?**

# Global Mortality Analysis

## Global Mortality trend from 1990 to 2019

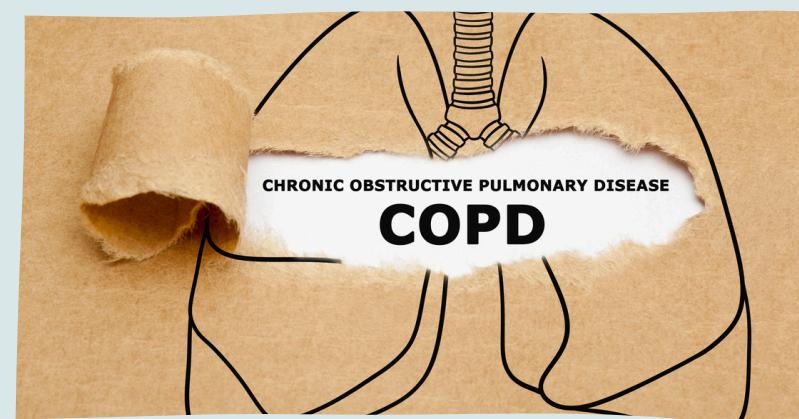
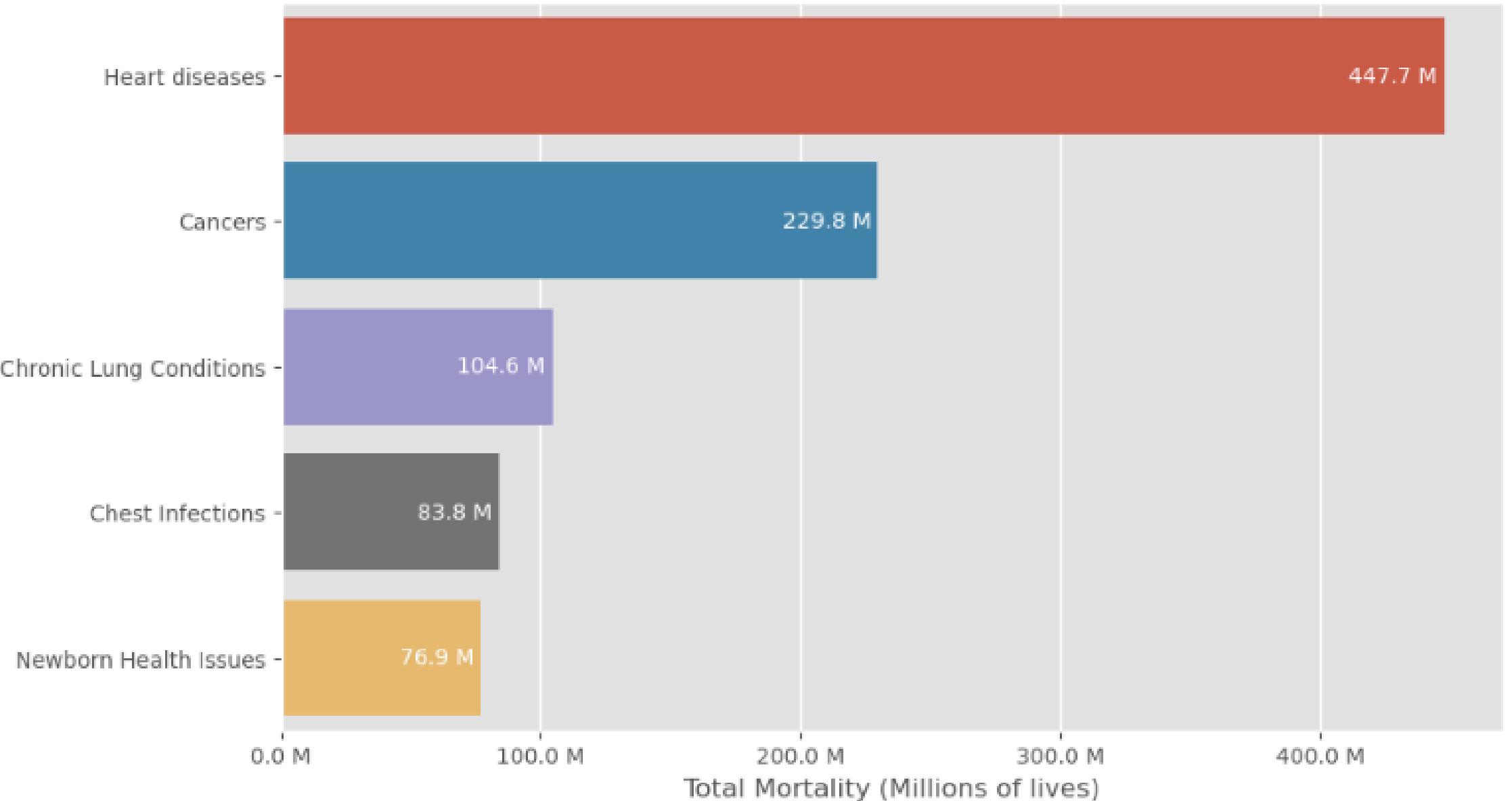
Global mortality rates have steadily risen, exceeding 54 million deaths in 2019

Global mortality trend from 1990 to 2019



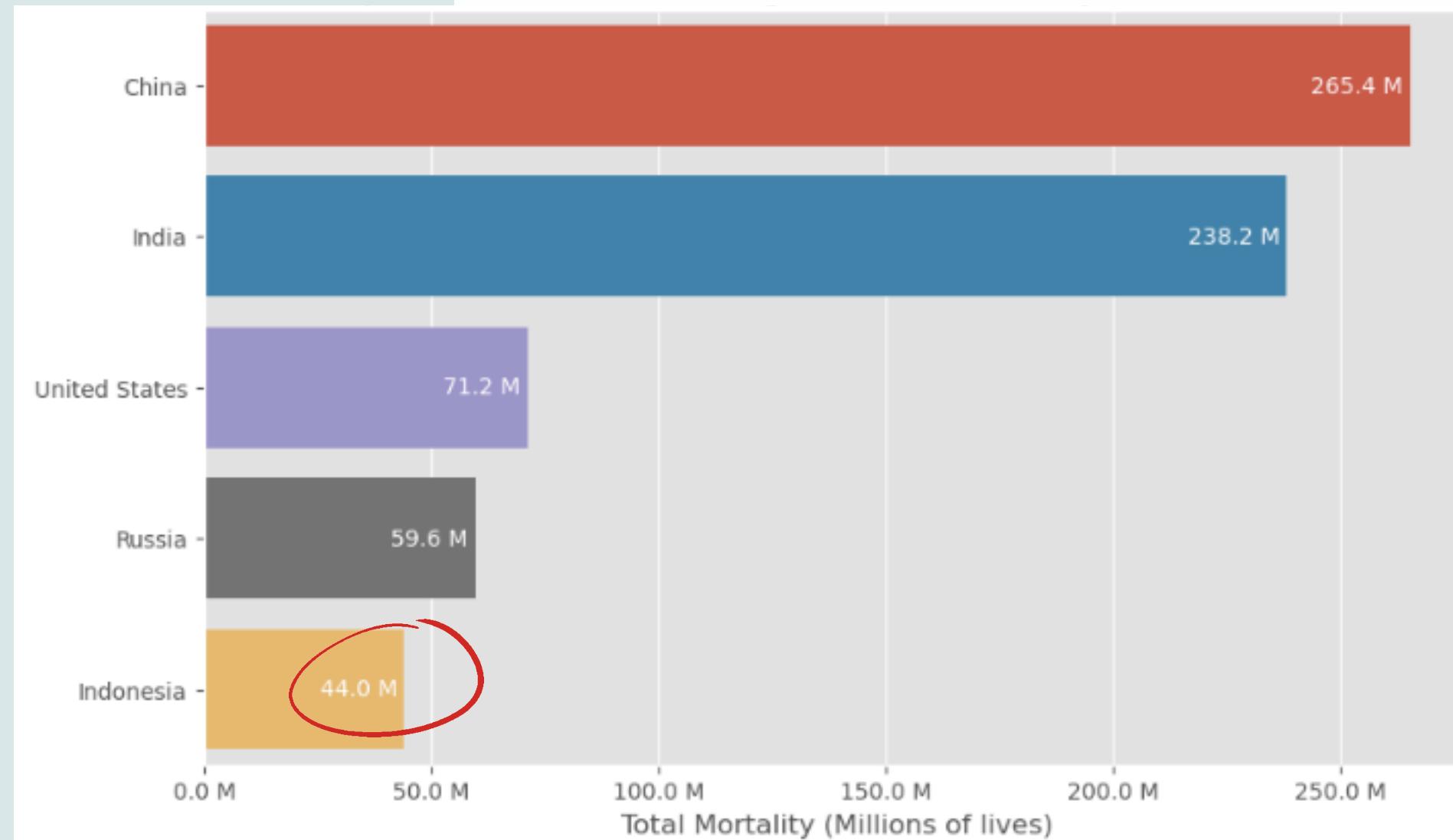
# Global Mortality Analysis

## The top 5 causes of global mortality



# Global Mortality Analysis

The top 5 countries with highest mortality from 1990 to 2019





# Analysis of Indonesia's mortality

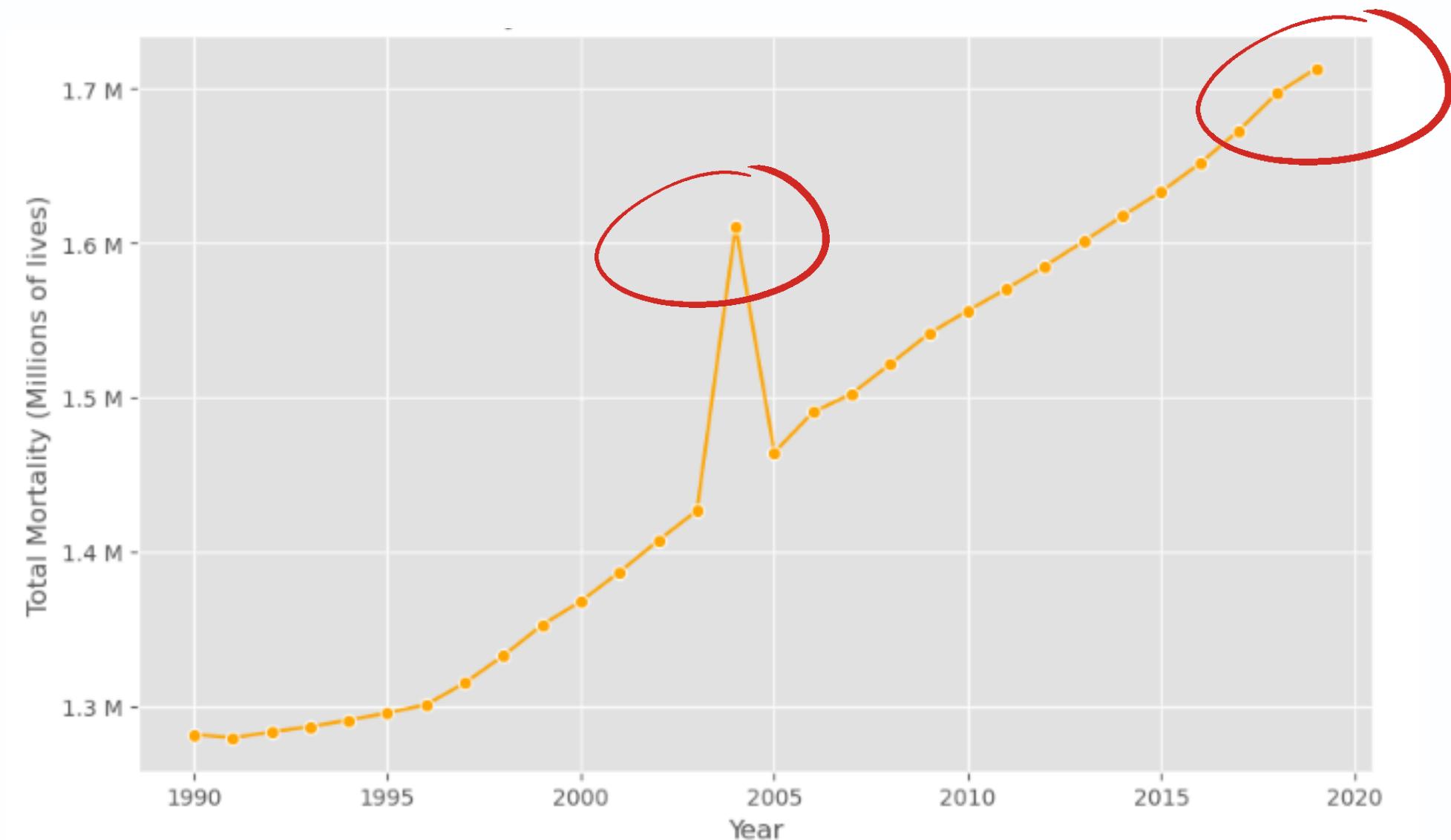
- What is the current Indonesia mortality trend?
- Which are the most important mortality causes in Indonesia?

# Indonesia's Mortality Analysis

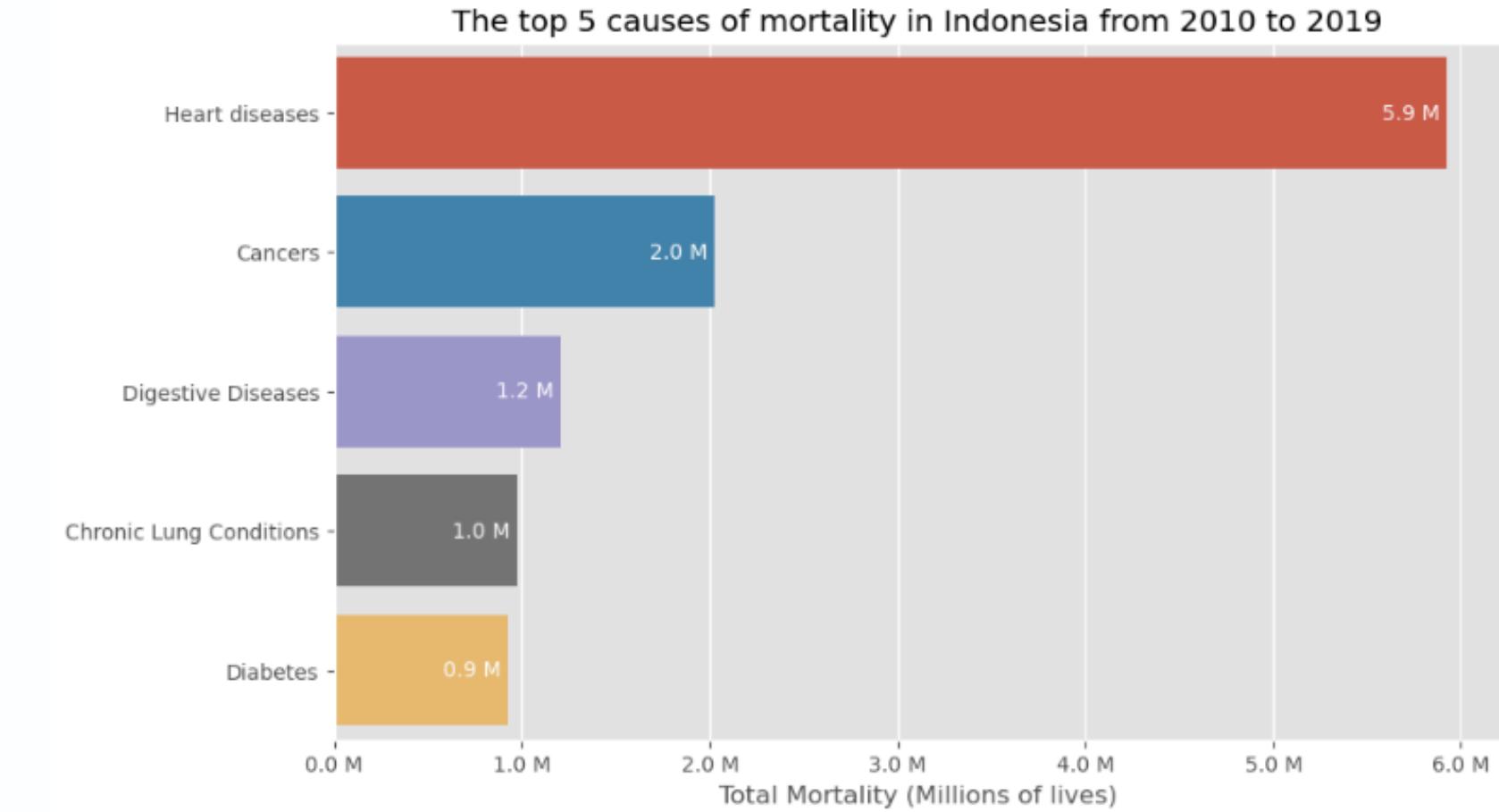
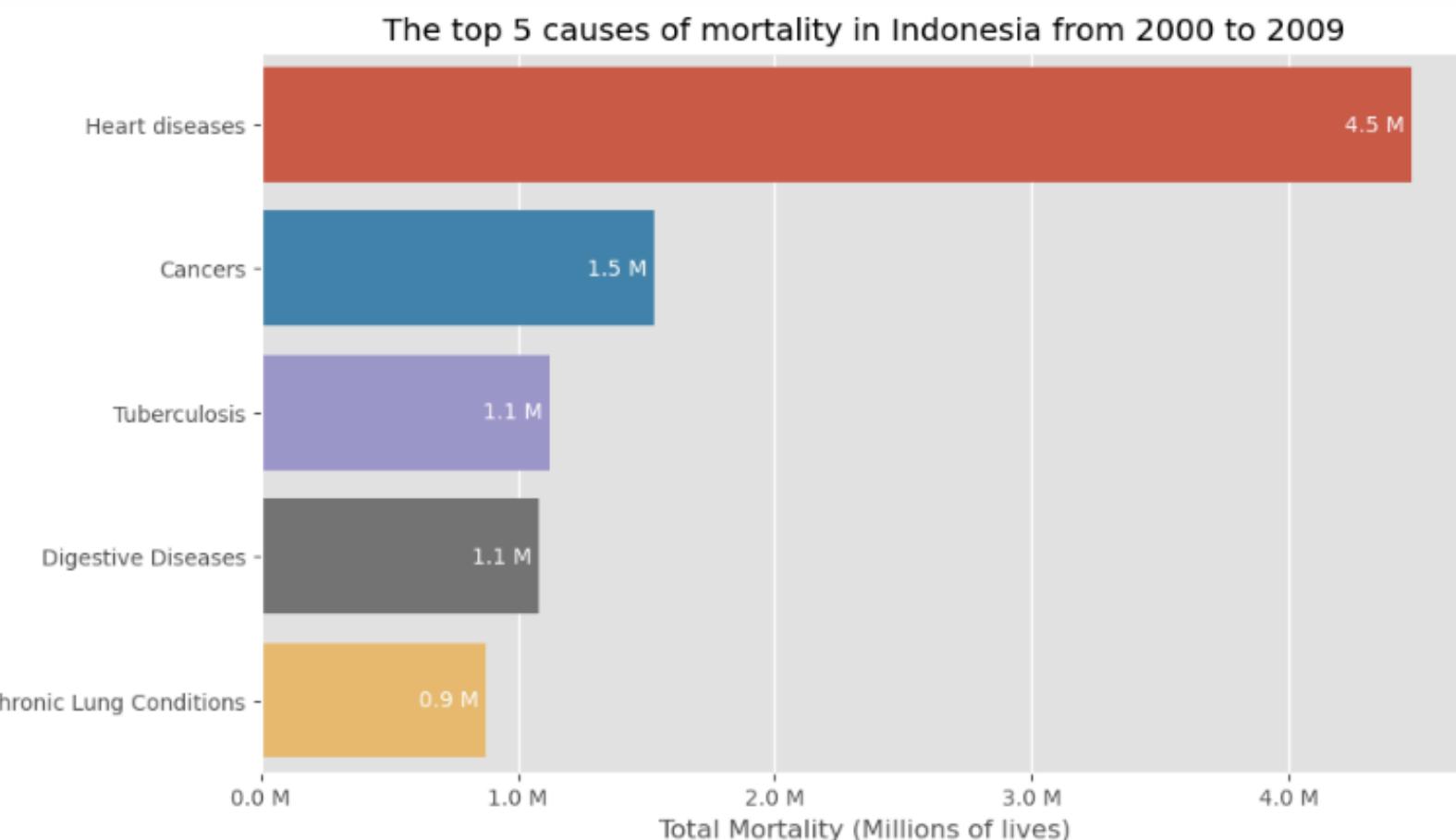
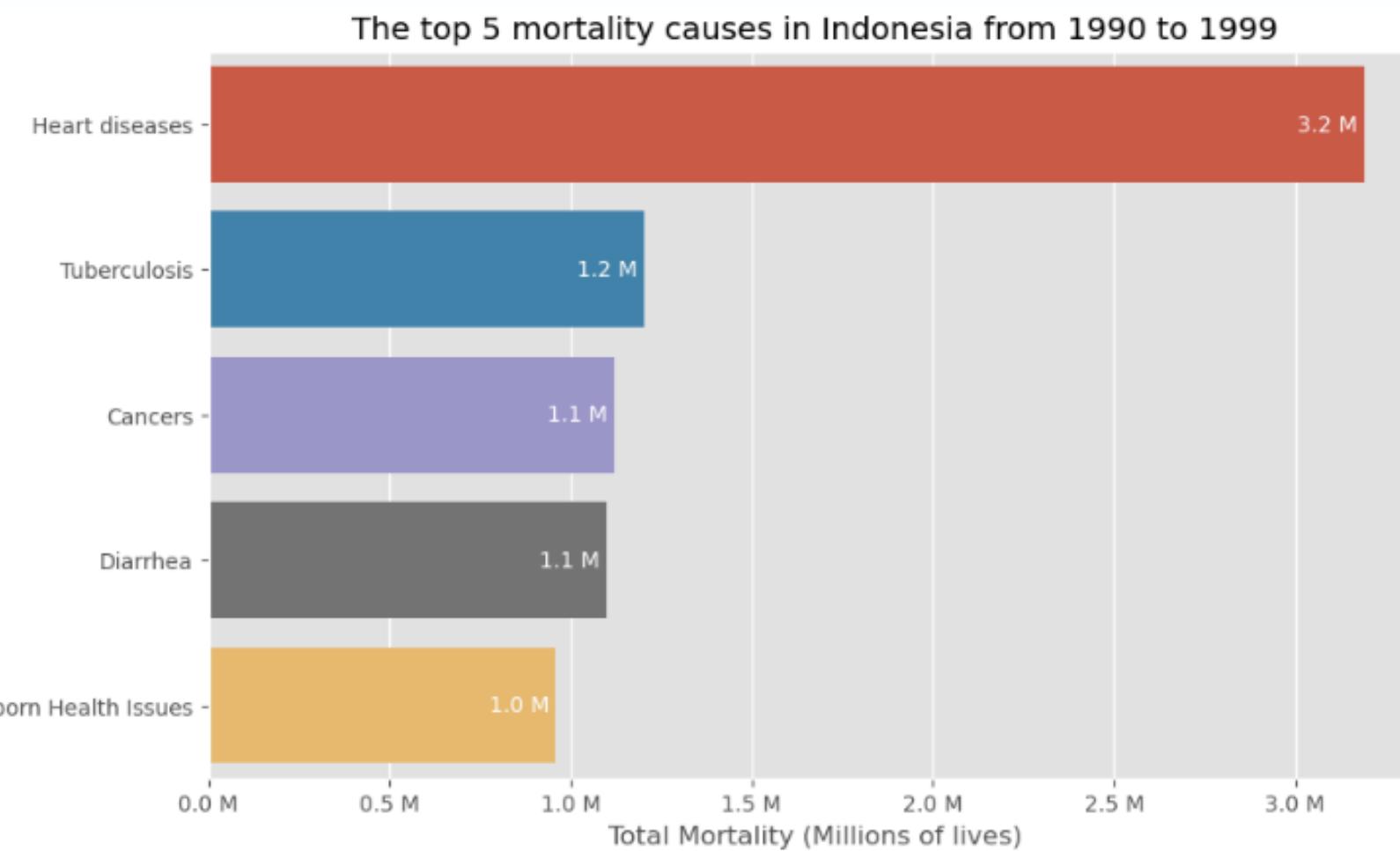
## Mortality trend in Indonesia

- 2019: Exceeding 1.7 M deaths
- 2004: Aceh Tsunami (-130 k lives)

## Mortality trend in Indonesia from 1990 to 2019

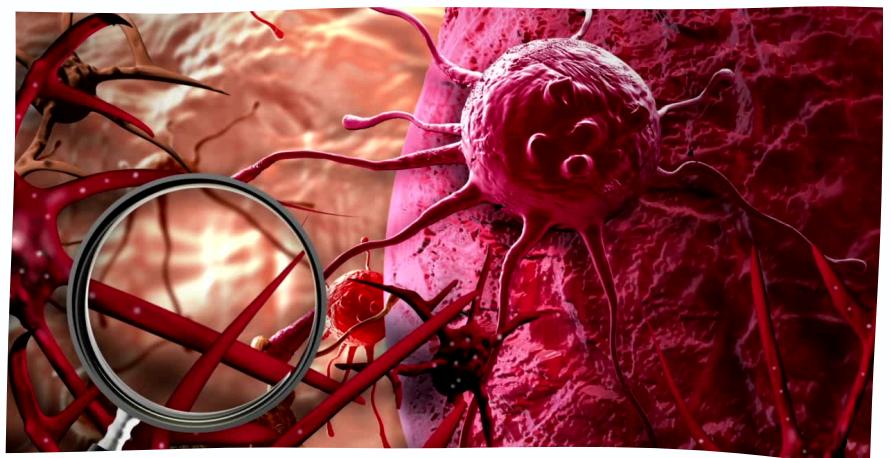
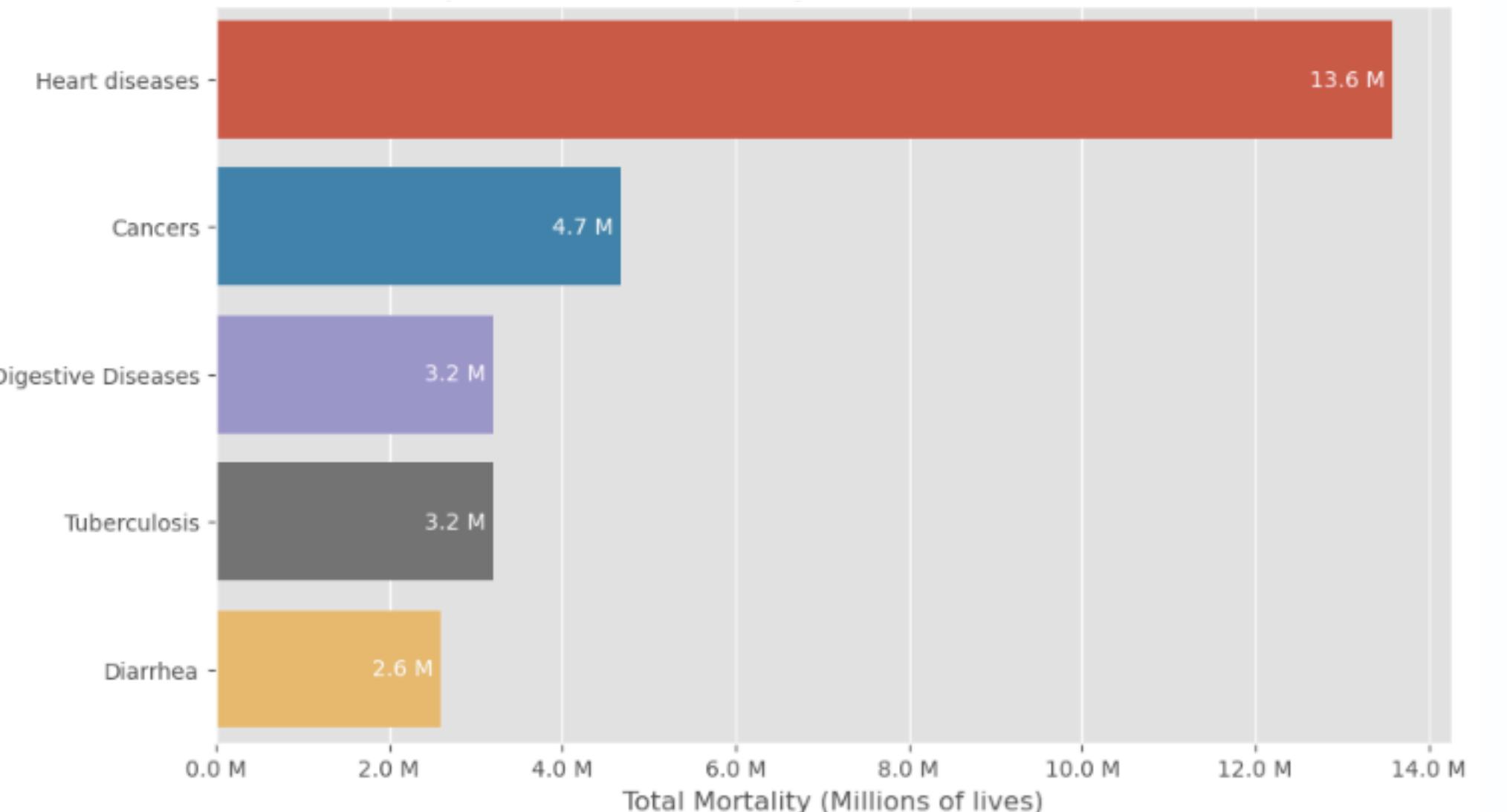


# Indonesia's Mortality Analysis



# Indonesia's Mortality Analysis

The top 5 mortality causes in Indonesia within 30 years



## INSIGHTS

**Indonesia's 30-year mortality profile differs from the global pattern:**

**Both non-communicable (heart diseases, cancers, etc) and communicable diseases (tuberculosis, diarrheal, etc) are present and play crucial roles in Indonesia.**

# RECOMMENDATIONS FOR PUBLIC HEALTH POLICY FORMULATORS



1

Leverage data for evidence-based policies and interventions. Prioritize resources toward addressing prevalent causes/diseases

2

Implement prevention, early detection, and treatment of prevalent diseases

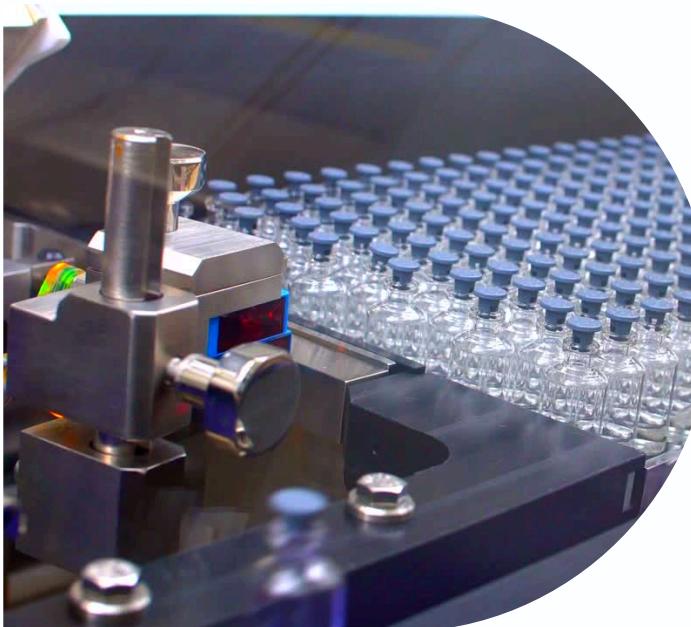
3

Implement preventive measures and awareness campaigns to reduce the burden of infectious diseases like Tuberculosis and diarrheal diseases.

4

Strengthen healthcare infrastructure to improve access to quality healthcare services.

# RECOMMENDATIONS FOR HEALTHCARE INDUSTRIES



1

Develop affordable medicines and effective treatments for prevalent diseases.

2

Research and innovate in diagnostics and therapies for prevalent communicable diseases, like Tuberculosis.

3

Collaborate with government initiatives to improve healthcare access and delivery across Indonesia.

# References

- Institute for Health Metrics and Evaluation (IHME) (2014). Financing Global Health. [www.healthdata.org/research-analysis/library/financing-global-health-2013-transition-age-austerity](http://www.healthdata.org/research-analysis/library/financing-global-health-2013-transition-age-austerity)
- IPSOS (2023). Global perceptions of healthcare 2023. [www.ipsos.com/sites/default/files/ct/news/documents/2023-07/ipsos-global-perceptions-of-healthcare-2023.pdf](http://www.ipsos.com/sites/default/files/ct/news/documents/2023-07/ipsos-global-perceptions-of-healthcare-2023.pdf)
- Max Roser, Hannah Ritchie, and Fiona Spooner (2021). Burden of disease. <https://ourworldindata.org/burden-of-disease>
- Ministry of health Indonesia (2023). Anggaran kesehatan 2024 ditetapkan sebesar 5-6 dari apbn naik 8,1 dibanding 2023.<https://sehatnegeriku.kemkes.go.id/baca/rilis-media/20230816/0643661/anggaran-kesehatan-2024-ditetapkan-sebesar-5-6-dari-apbn-naik-8-1-dibanding-2023> [Bahasa]

# Thank you!



## Understanding Global Mortality Trends: A Focus on Indonesia's Landscape

By Harish Muhammad



### My Contact

 <https://github.com/harishmuh>

 [www.linkedin.com/in/harish-muhammad-7b600b102/](https://www.linkedin.com/in/harish-muhammad-7b600b102/)

 [harishmuh@gmail.com](mailto:harishmuh@gmail.com)

### Visualization using Streamlit:

<https://global-mortality-cause-in-indonesia.streamlit.app/>