Communicating Vital Statistics Through Visualizations

Workshop on Vital Statistics for North and Central Asian Countries

Bishkek, Kyrgyzstan, 7-11 October 2019

Bloomberg Philanthropies

DATA FOR HEALTH INITIATIVE

Vital Strategies

Session objectives

By the end of the session, participants will be able to:

- **Describe** and **compare** the main types of data visualization
- Identify the factors involved in **choosing the type** of data visualization
- List **design principles** that contribute to effective data visualization
- Visualize vital statistics data using **maps**

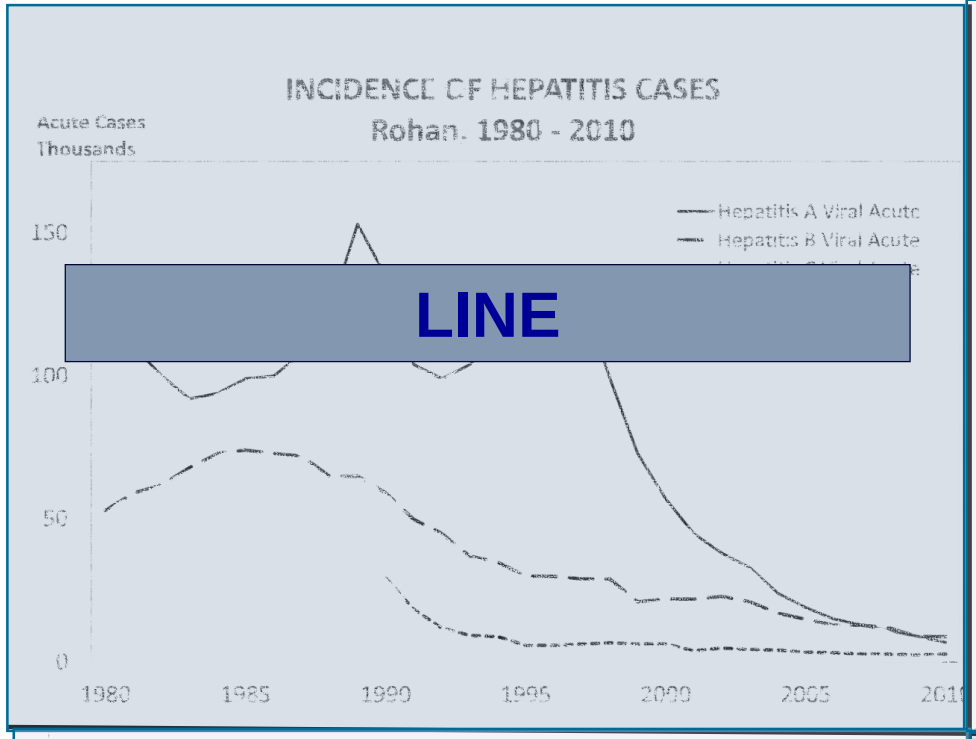
Vital Strategies

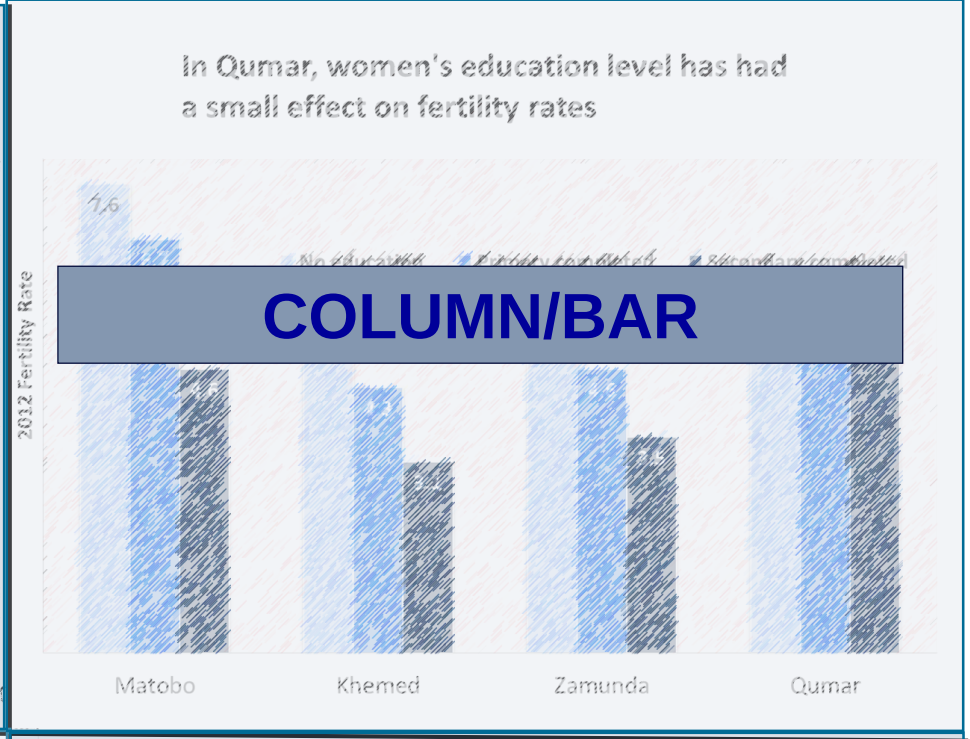
Factors in Choosing Visualization Type

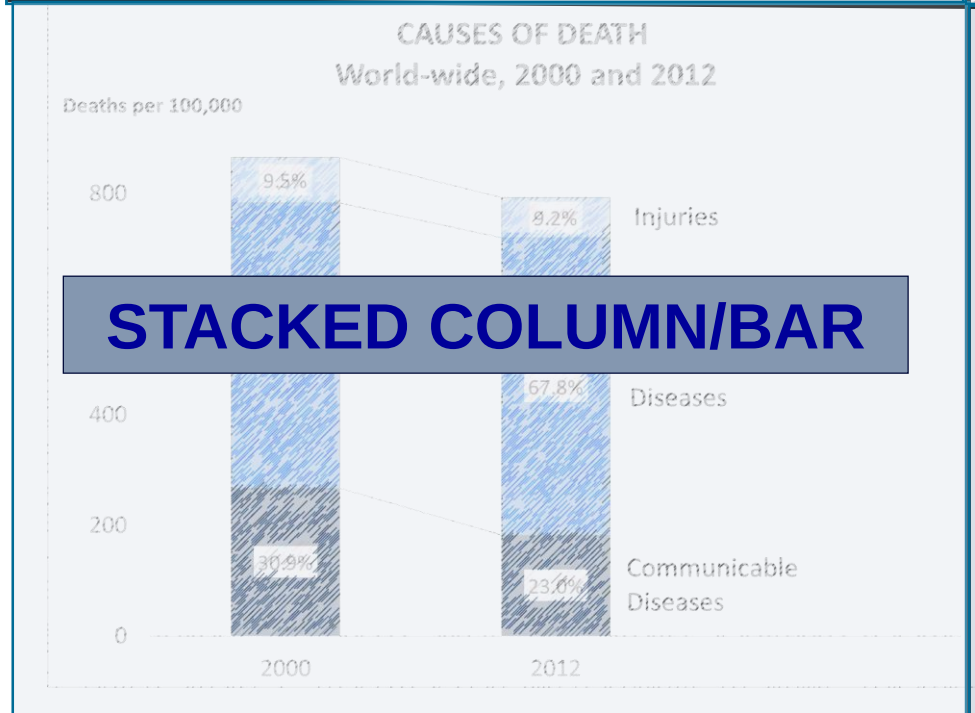
- **Communication Purpose**
  - Change
  - Comparison
  - Composition
  - Correlation

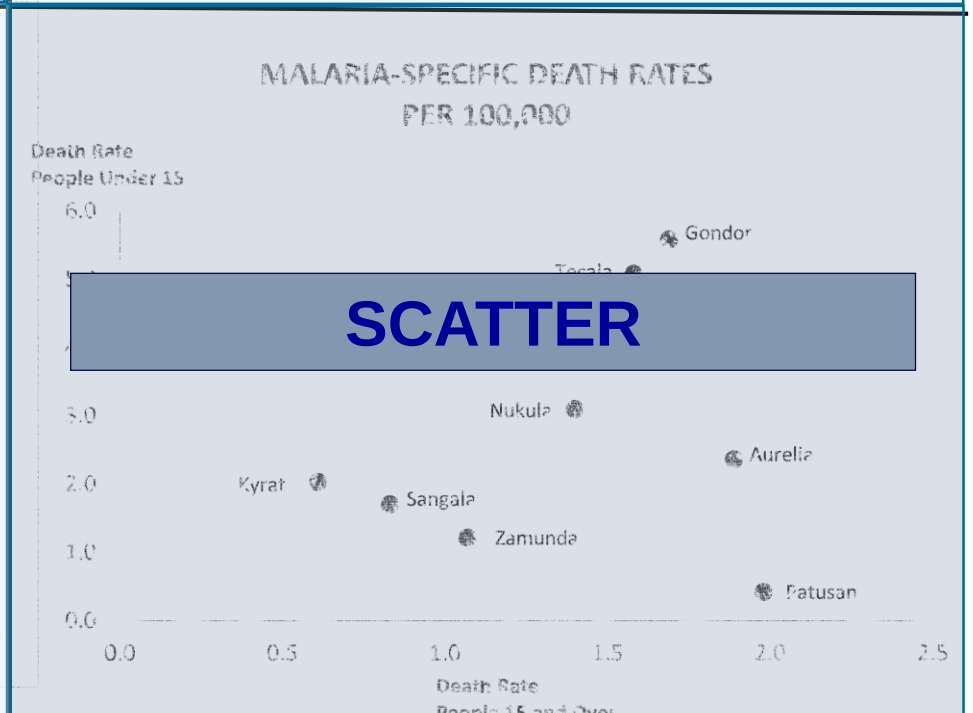
- **Characteristics of Data**
  - Number of series displayed
  - Number of points displayed within each series

Vital Strategies


INCIDENCE OF HEPATITIS CASES
Rohan, 1980 - 2010
Acute Cases
Thousands
Hepatitis A Viral Acute
Hepatitis B Viral Acute
150
100
50
0
1980
1985
1990
1995
2000
2005
LINE


In Qumar, women's education level has had a small effect on fertility rates
2012 Fertility Rate
Matobo
Khemed
Zamunda
Qumar
COLUMN/BAR


CAUSES OF DEATH
World-wide, 2000 and 2012
Deaths per 100,000
800
400
200
0
9.5%
8.2%
67.8%
30.9%
23.0%
Injuries
Diseases
Communicable Diseases
2000
2012
STACKED COLUMN/BAR


MALARIA-SPECIFIC DEATH RATES
PER 100,000
Death Rate
People Under 15
6.0
3.0
2.0
1.0
0.0
0.0
0.5
1.0
1.5
2.0
2.5
Death Rate
Gondor
Nukula
Aurelia
Kyrat
Sangala
Zamunda
Patusan
SCATTER

Line Graph

Vital Strategies

Matching Visualization to Purpose and Data

Communication Purpose:

I want to show the change over time *in life expectancy*

Characteristics of Data:

I want to show one series *with* many data points

Vital Strategies

Matching Visualization to Purpose and Data

Communication Purpose:

I want to show the change over time *in life expectancy*

I also want to compare values *across sex*

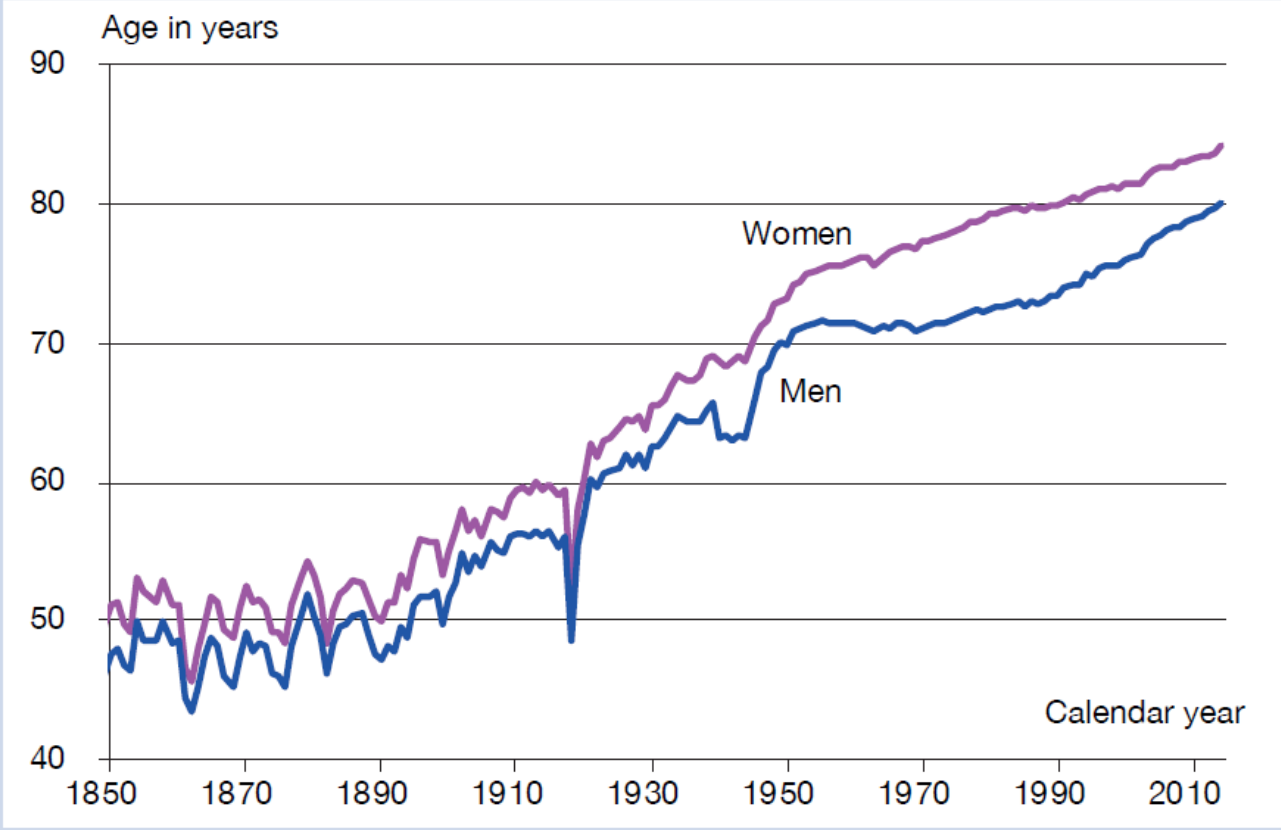
Characteristics of Data:

I want to show two series *with* many data points

Vital Strategies

Visualization Type: Line

Figure B18.4 Life expectancy at birth for males and females in Norway, 1850-2015



Source: Statistics Norway statistics bank.

Vital Strategies

Visualization Type: Line

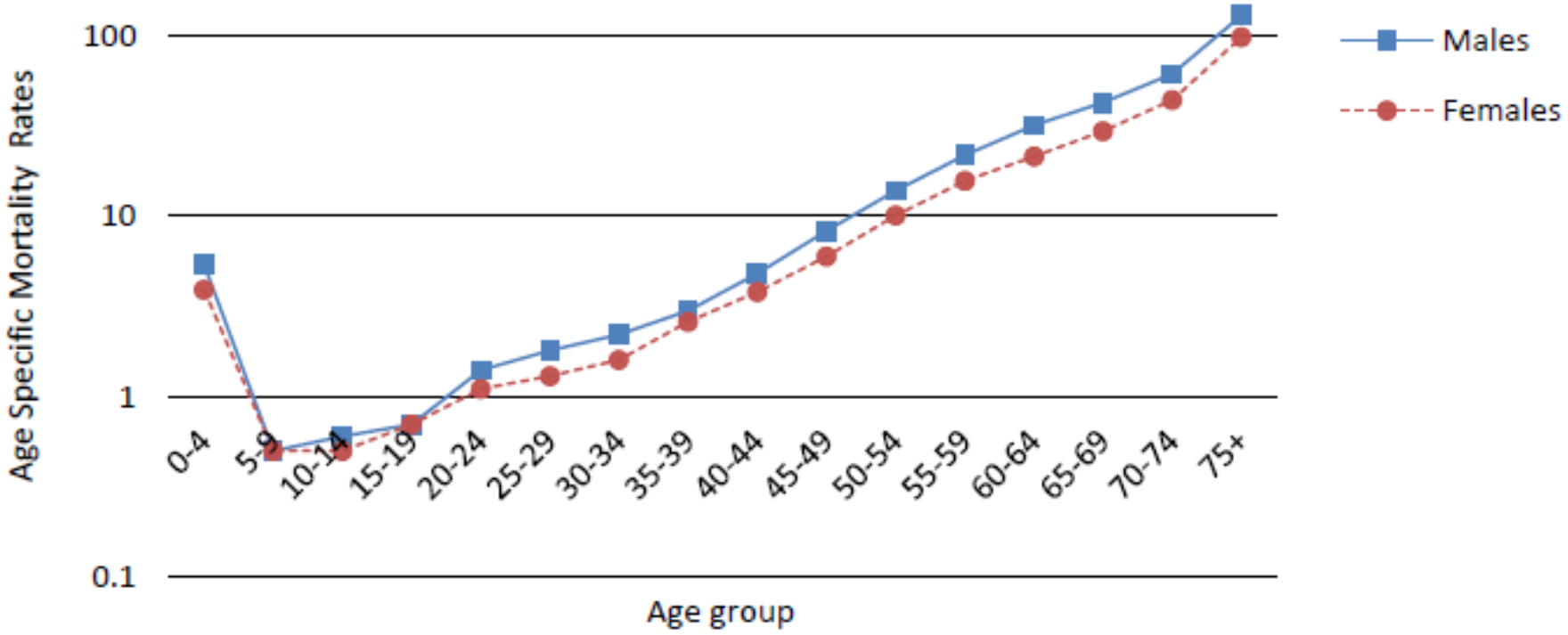


Figure 7: Age Specific Mortality Rates by period, (2015-2017)

Source: Republic of Fiji Vital Statistics Report 2017

Vital Strategies

Column/Bar

Vital Strategies

Matching Visualization to Purpose and Data

Communication Purpose:

I want to compare values *for mortality rates across categories*

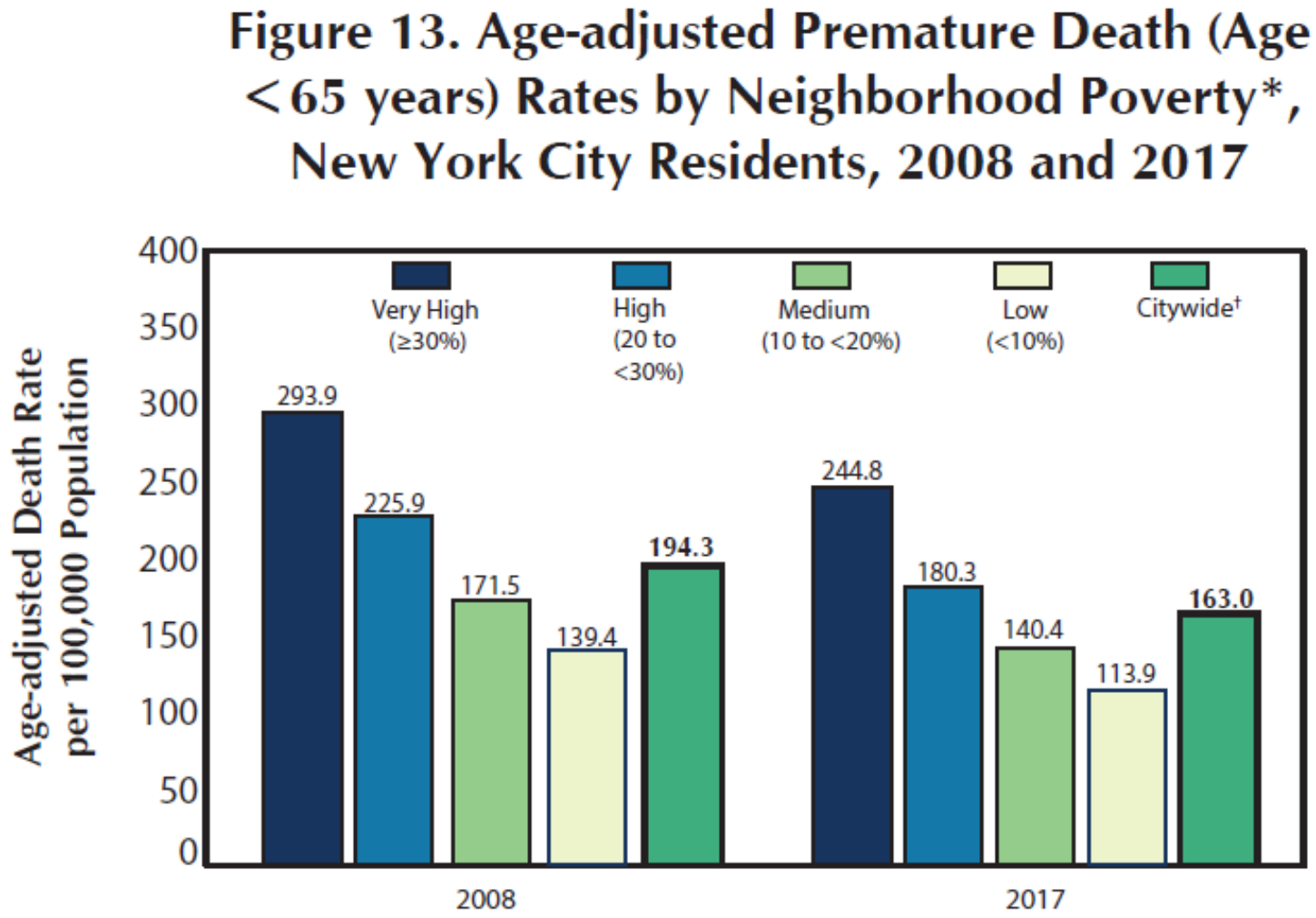
Characteristics of Data:

I want to show rates for five groups (five series)

I want to show information for two years (two data points *for each series)*

Vital Strategies

Visualization Type: Column



Source: New York City Department of Health and Mental Hygiene

Vital Strategies

Matching Visualization to Purpose and Data

Communication Purpose:

I want to compare values *for total fertility rates across regions*

Characteristics of Data:

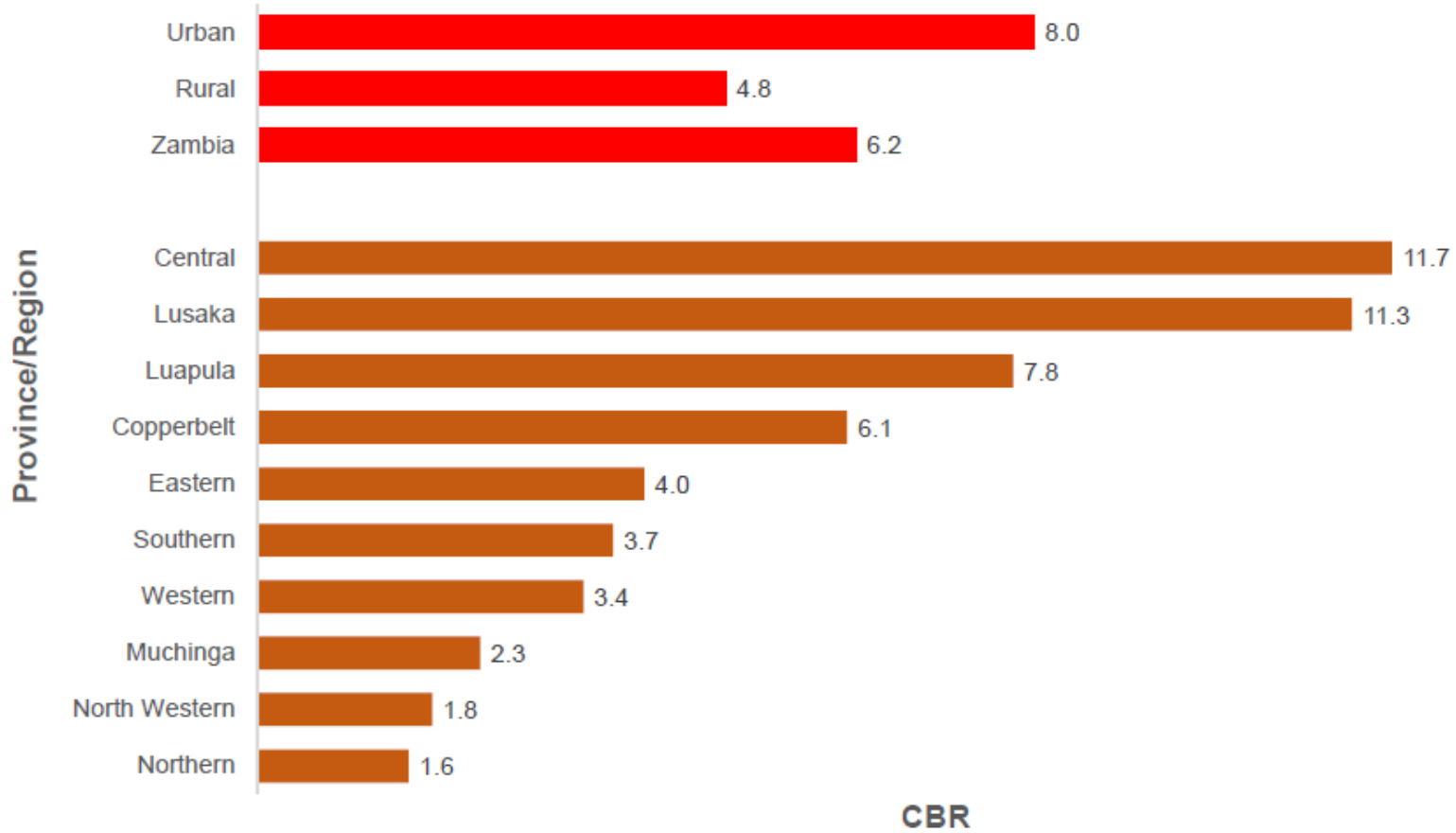
I want to show rates for only one group (one series)

I want to show information for 15 regions (15 data points)

Vital Strategies

Visualization Type: Bar

Figure 4.2: Crude Birth Rate by Province, Zambia 2016



Source: Department of National Registration Passport and Citizenship (DNRPC) 2013-16 Administrative Data

Zambia Vital Statistics Report, 2016

Vital Strategies

Stacked Column/Bar

Vital Strategies

Matching Visualization to Purpose and Data

Communication Purpose:

I want to break down causes of death (composition)

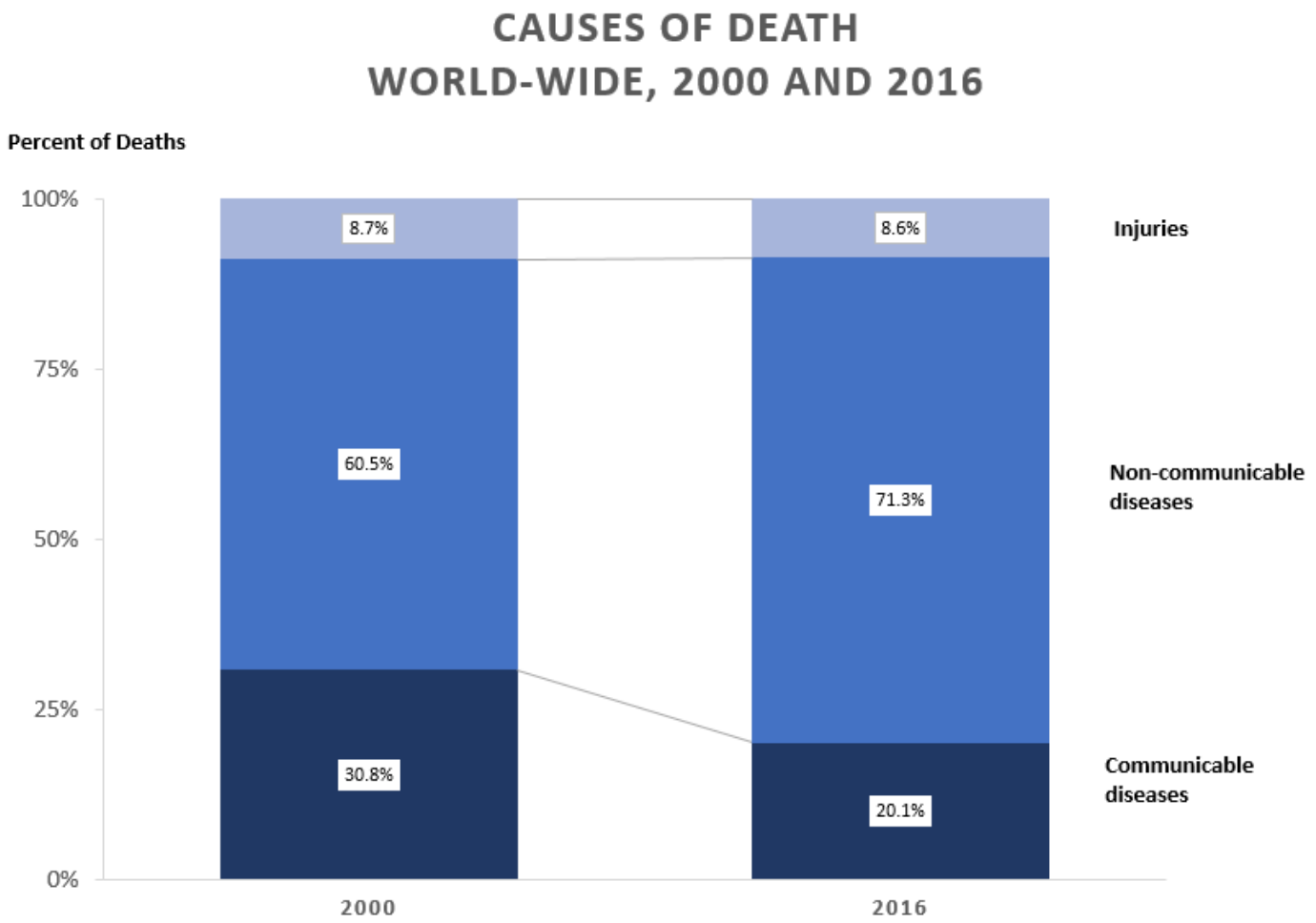
Characteristics of Data:

I want to show rates for two time period (two series)

I want to show three broad groups of causes (three data points for each series)

Vital Strategies

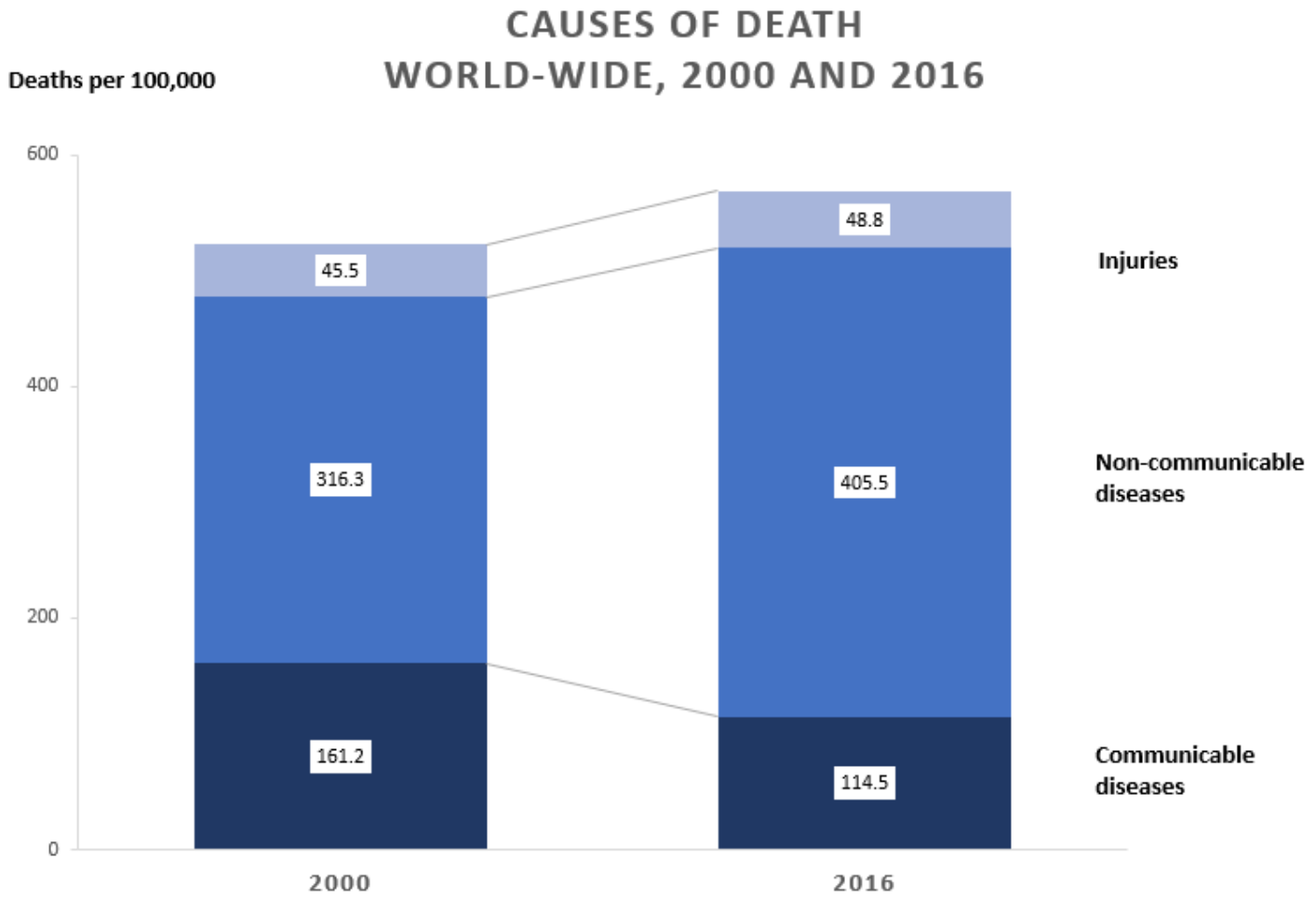
Visualization Type: Stacked Column



Source: World Health Organization

Vital Strategies

Visualization Type: Stacked Column



Source: World Health Organization

Vital Strategies

Scatter

Vital Strategies

Matching Visualization to Purpose and Data

Communication Purpose:

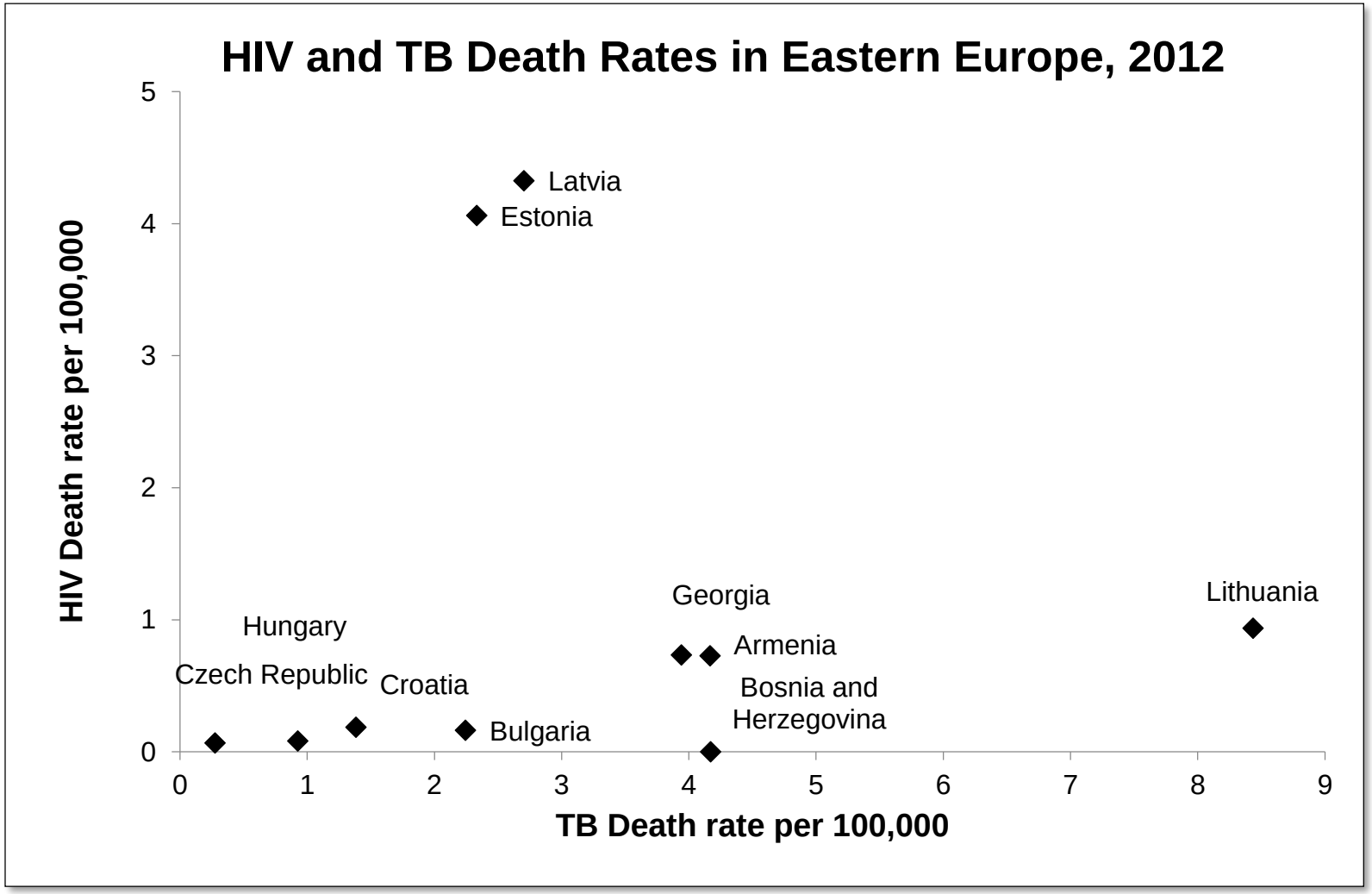
I want to show the correlation *between TB death rates and HIV death rates*

Characteristics of Data:

I want to show rates for ten different countries (ten data points)

Vital Strategies

Visualization Type: Scatter



Source: World Health Organization mortality database

Vital Strategies

Design Principles

Guide Viewer

- Label sufficiently
- Visually link related elements
- Create a visual hierarchy
- Simplify data comparisons

Eliminate Distractions

- Present text as it will be scanned
- Limit non-data elements
- Use formatting purposively
- Be cautious with images

Vital Strategies

Mapping Vital Statistics

Vital Strategies

Importance of geography — why map?

- Relating data to location as powerful analysis
  - Visualizing health outcomes by geography
  - Identifying geographic trends

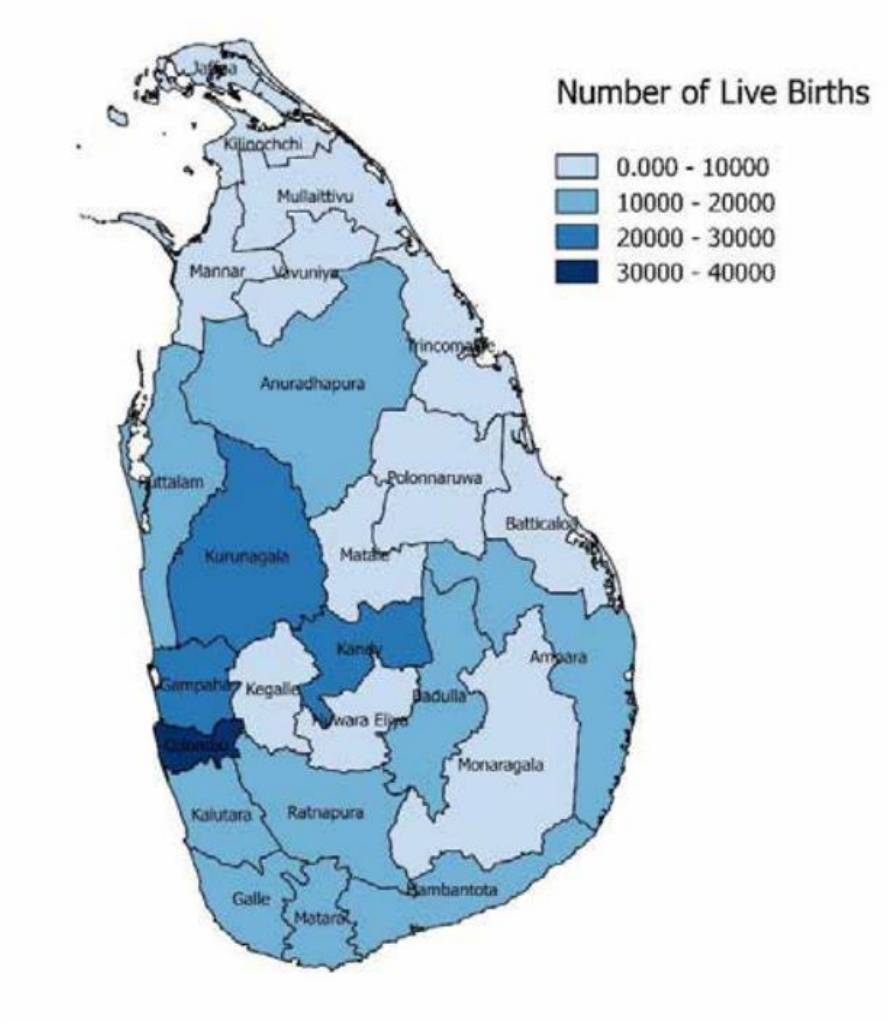


Figure 11.2: Distribution of Hospital Live Births by place of occurrence in Sri Lanka, 2016

Source: Medical Statistics unit

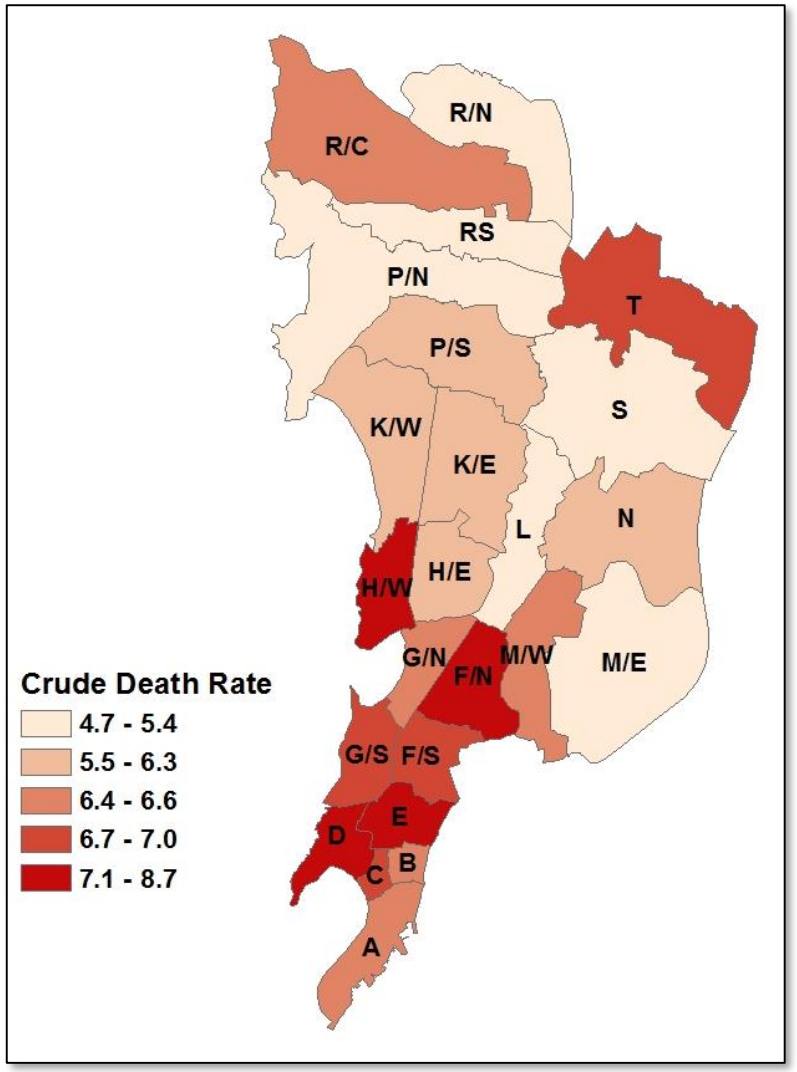
Source: Sri Lanka Annual Health Bulletin, 2016

Choropleth Maps

- Used for **prevalence**, **standardized rates** and **ratios** linked to administrative areas
- Division of data into **categories**
  - Rankings from *high to low* or *low to high*
  - Number of categories from 3–6

Vital Strategies

Crude Deaths Rates – Mumbai, 2015

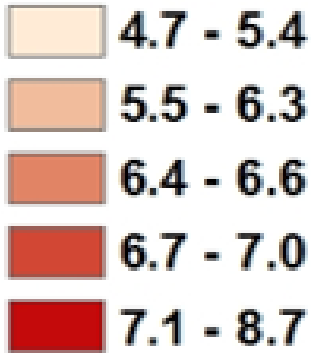


Source: Municipal Corporation of Greater Mumbai, 2015

Vital Strategies

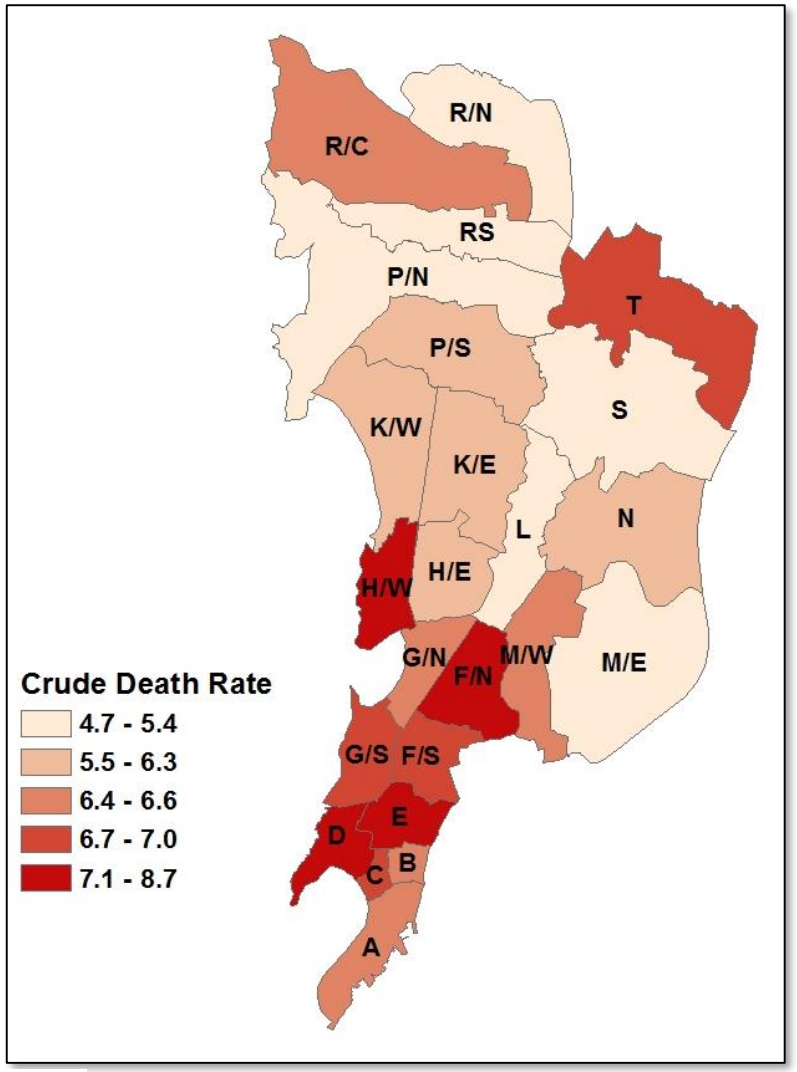
Legends

- A legend defines symbols and/or colors important to the map
  - Information necessary for reader
- Not all legend pieces are needed in map
  - Bar scales necessary if distance is important
  - If map does not point true north, a compass can be added for orientation if important



Vital Strategies

Crude Deaths Rates – Mumbai, 2015



Source: Municipal Corporation of Greater Mumbai, 2015

Vital Strategies

What is Needed for Mapping

- **Data for geographical area**
  - Shapefiles for areas to be mapped
    - Administrative areas for choropleth maps
- **Health data or events linked to location**
  - Latitude/longitude of events
  - General location
  - Addresses for geocoding
- **Software**

Vital Strategies

Limitations of Mapping

- Reliance on spatial data
- Cannot show all factors relevant to health issue
- Cannot convey all information necessary for understanding health issue

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Summary

- When choosing and creating visualizations, consider:
  - The story you want to tell
  - Communication purpose
  - Characteristics of data
  - Design principles
- Mapping health information can be a compelling visual method

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Acknowledgements

- Bloomberg Philanthropies Data for Health Initiative
- Vital Strategies
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- University of Melbourne
- Statistics Norway
- ESCAP
- EFTA

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