

Burden of infectious disease studies in Europe and the United Kingdom: a review of methodological design choices

Periklis Charalampous

Department of Public Health

Erasmus MC University, Rotterdam, The Netherlands

[e]: p.charalampous@erasmusmc.nl



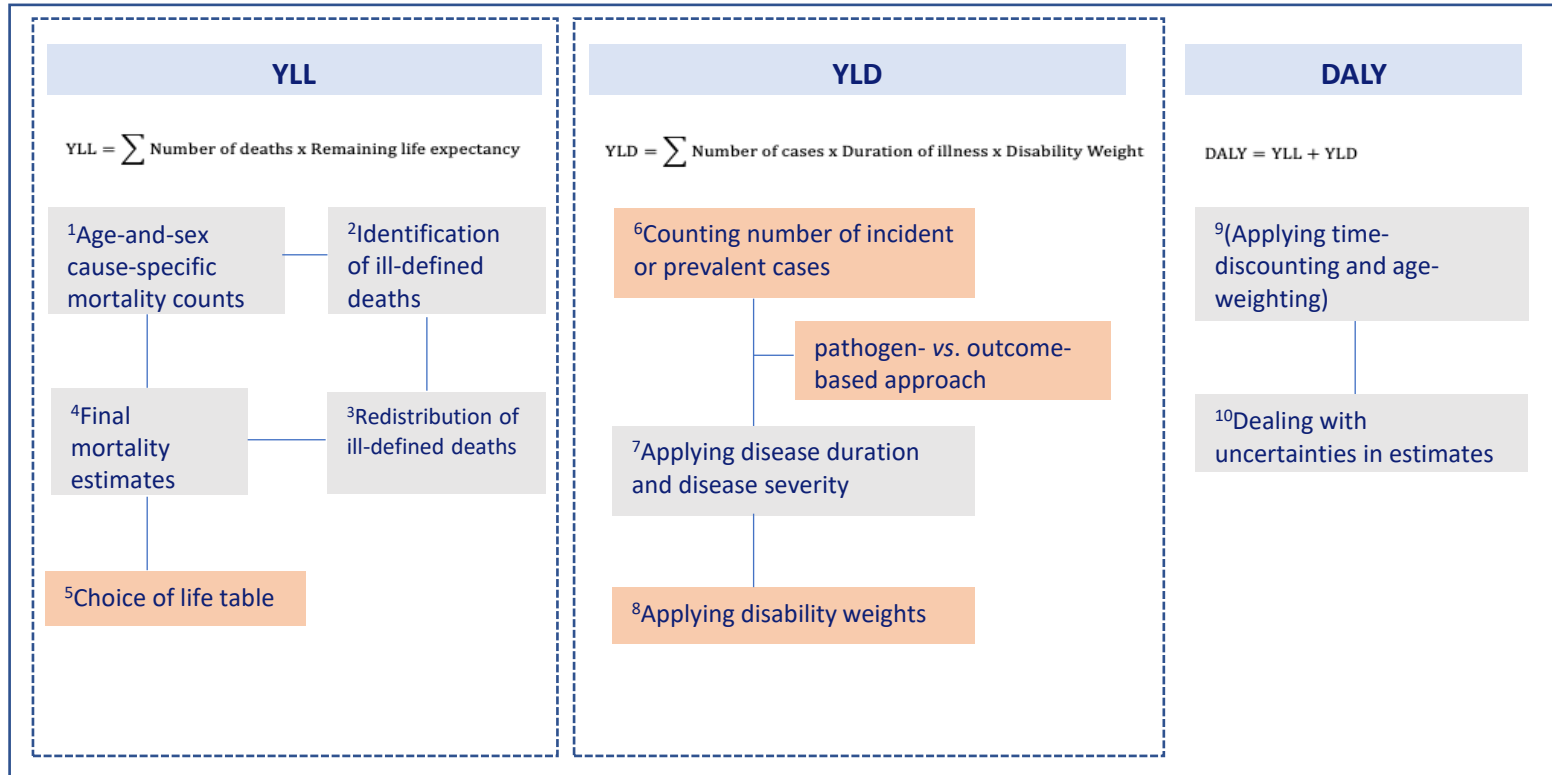
Erasmus MC
University Medical Center Rotterdam



Background

- **Disability-adjusted life years (DALYs)** are a summary measure of the impact of **mortality** and **morbidity**
 - **Years of Life Lost (YLL)** measures the frequency and age upon which death occurs
 - **Years Lived with Disability (YLD)** measures the frequency and severity of disease
- The DALY metric allows **comparisons** of (heterogeneous) causes of disease across subgroups of **population** and **over time**
- **Interpretation** of DALY estimates in burden of disease studies requires detailed **methodological knowledge**

Data input, processing, and burden of disease calculations



Statement of the problem

- To date, there have been three **large-scale multi-country studies** using DALYs to estimate the **burden of infectious diseases**
 - Burden of Communicable Diseases in Europe (BCoDE)
 - Global Burden of Disease (GBD)
 - Global Burden of Food-borne Diseases (FERG)
- These studies have used **different methodological approaches**
 - Differences in design choices may affect the **comparability** and **interpretation** of DALYs resulting from infectious diseases
- **Many countries** and public health agencies have adopted the DALY metric for monitoring population health and **identifying priorities** in preventive efforts

- In which countries have independent burden of infectious disease studies been performed?
- For which infectious diseases have independent burden of infectious disease studies been performed?
- Which methodological design choices have been used to estimate YLL and YLD in these independent burden of infectious studies?

Methods

- **Systematic (literature) review approach**
- Multiple international databases, search engines, platforms, and grey literature sources
- Studies estimating the burden of infectious diseases in terms of **YLL, YLD, and/or DALY** utilizing their **own** national or sub-national data
- Studies in which the **infection** was defined as an **illness** due to a pathogen arising through transmission from an **infected individual**, or from an **infected animal**, or from **other pathways**
- Studies estimating the disease burden attributable to environmental stressors and/or risk factors were excluded

Methods

- **Data synthesis**

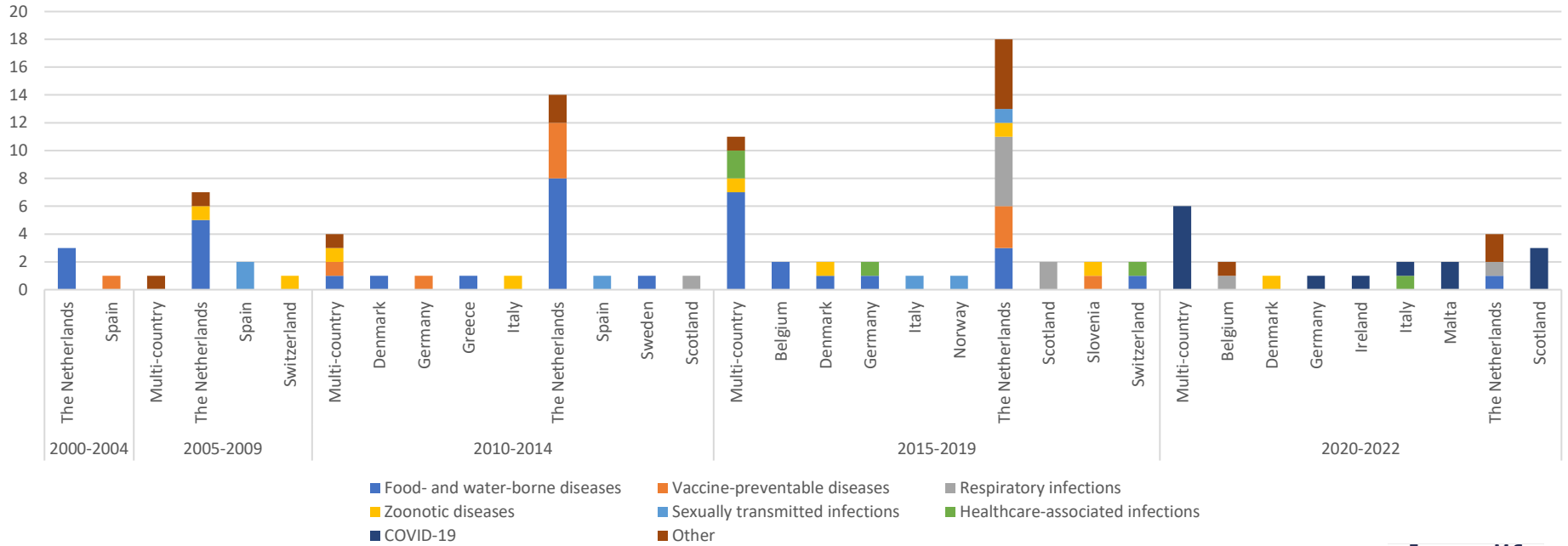
- Year of publication
- Single-country vs. multi-country
- COVID-19; Food- and water-borne disease; Respiratory infections; Sexually transmitted infections; Healthcare-associated infections; Zoonotic diseases; Vaccine-preventable diseases; and Other

- **Vaccine-preventable disease**

A vaccine-preventable disease refers to an infection/disease for which an **effective preventive vaccine** exists

Results

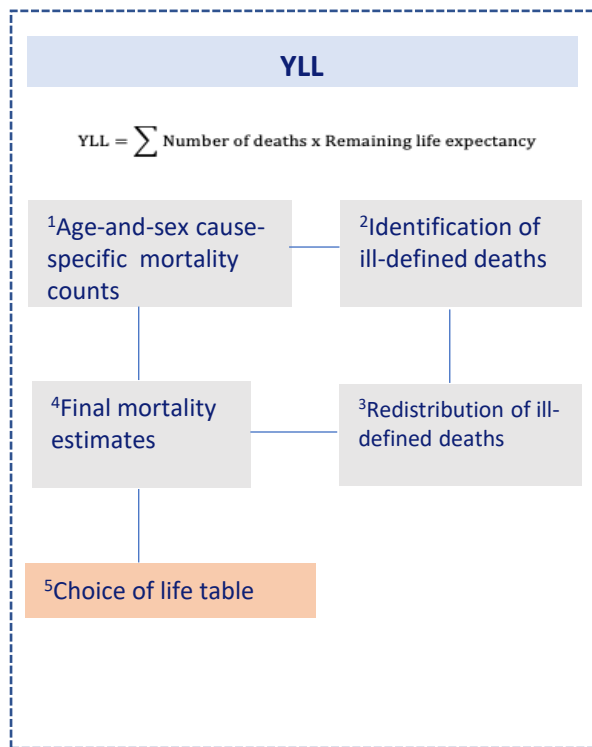
- 105 burden of infectious disease studies were included
 - 22 multi-country and 83 single-country studies



Results

- **11 studies** have estimated the **burden of vaccine-preventable diseases only**
 - The Netherlands (n=7)
 - Germany (n=1)
 - Slovenia (n=1)
 - Spain (n=1)
 - Multi-country level (n=1)
- Influenza, tick-borne encephalitis, measles, hepatitis B, pertussis, invasive pneumococcal diseases, herpes zoster
 - **most frequently studied** vaccine-preventable diseases

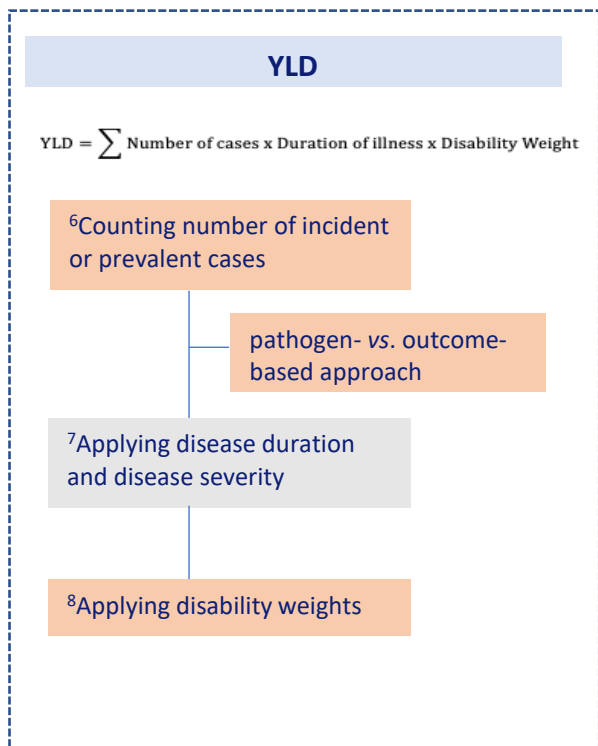
Results



- 63% of the included studies estimated **YLL** using **aspirational model life tables** (e.g., GBD 2019)

- Some studies **did not report** on the YLL methods used

Results



- **Incidence-based YLD** calculations: 97% applied a **pathogen-based approach**

- **48%** of the included studies used **GBD disability weights**
- **26%** of the included studies used **European disability weights**

- Some studies **did not report** on the YLD methods used

Discussion

- For some European countries, such as France, Greece, Belarus, Croatia, and Cyprus we identified a very **low number or no burden of infectious disease studies at all**
- **Food- and water-borne diseases** were the **most frequently studied infectious diseases**
- Few studies have estimated the burden of **vaccine-preventable disease** among (young) adults
 - Inequalities in vaccine coverage by geography and/or socio-economic status may contribute to the (high) burden of vaccine-preventable diseases
- Understanding the impact of vaccine-preventable diseases is important for developing **policies** to support a **life-course immunization programmes**

Discussion

- Development and use of **guidelines** will promote performing burden of infectious disease studies and facilitate **transparency** and **comparability of the results**
 - The European Burden of Disease Network (www.burden-eu.net/) aims to develop reporting guidelines for conducting burden of disease studies.
- Reporting guidelines for burden of (infectious) disease studies will serve as an **educational tool** for **better understanding** the complexity of DALY methods

Burden of infectious disease studies in Europe and the United Kingdom: a review of methodological design choices

Periklis Charalampous

Department of Public Health
Erasmus MC University, Rotterdam, The Netherlands

[e]: p.charalampous@erasmusmc.nl



Erasmus MC
University Medical Center Rotterdam

