



Regional differences in the attributable burden for Germany: exploring YLL for selected risk factors

Background

The BURDEN 2020 project will provide **burden of disease estimates** on sub-national level for Germany to give a comprehensive overview about diseases and to evaluate their impact on population health. **Years of Life Lost due to death** (YLL) and **Years Lost due to Disability** (YLD) are summed up to **Disability-Adjusted Live Years** (DALY). Burden of disease indicators capture the life lost due to mortality as well as morbidity and can be **attributed to** a set of **risk factors**.

Methods

Years of Life Lost (YLL)

The aim is to estimate **YLL for chronic obstructive pulmonary disease (COPD) across spatial planning regions (SPR) in Germany that are attributed to a set of risk factors**.

YLL are calculated by multiplying the number of deaths with the remaining life expectancy at the age of death.

✓ Data: German cause of death statistics

Comparative Risk Assessment (CRA)

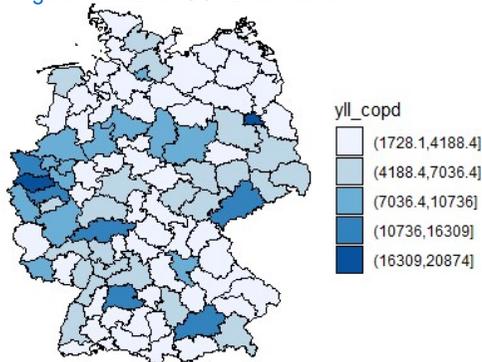
YLL for COPD are then exemplarily linked to the risk factors smoking and ambient particulate matter pollution ($PM_{2.5}$). The **analysis quantifies the reduction in years of life lost** if a given risk factor exposure is reduced to a theoretical minimum. The CRA estimates the population attributable fraction (PAF) and, therefore, refers to the distribution of risk factors and the association between them and a given health outcome. For example, the formula to calculate the PAF for smoking is:

$$PAF = \frac{p(c) * \int \exp(y) * rr(y) - 1}{p(c) * \int \exp(y) * rr(y)}$$

$p(c)$ = prevalence of current smoker, $rr(y)$ relative risk by amount of cigarettes smoked ($\int \exp(y)$)

- ✓ Data: German representative health surveys (GEDA study) provided by the RKI
- ✓ Data: High resolution $PM_{2.5}$ -exposure provided by the German Environment Agency

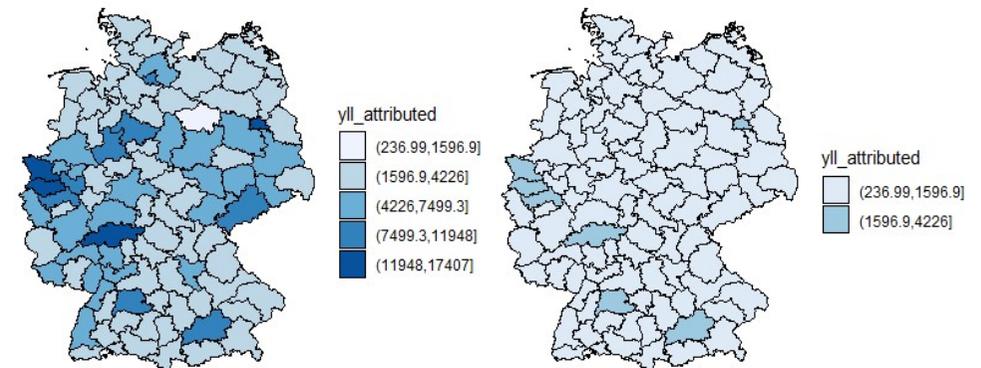
Figure 1: YLL for COPD across SPR



(Preliminary) Results

The figures show the attributable burden for COPD mapped to the risk factors smoking (figure 2) and ambient particulate matter pollution (figure 3) across the 96 SPR in Germany.

Figure 2: COPD-burden attributed to smoking Figure 3: COPD-burden attributed to $PM_{2.5}$



The (preliminary) results indicate:

1. Variation in the attributable burden for COPD across SPR, which can be explained by both the distribution of the risk population and the distribution of risk exposure
2. Higher variation in the burden attributed to smoking compared to $PM_{2.5}$
3. The total number of YLL attributed to smoking is higher compared to those mapped to $PM_{2.5}$
4. Some SPR have a high attributable COPD-burden for smoking and $PM_{2.5}$

Conclusion

Estimating the share of disease burden attributable to risk factors reveals necessary **fields of action**, especially across regions, when it comes to **health care interventions**. In order to allocate financial resources within the health care and to manage public health actions, the CRA can provide additional insights for **political decision making**.