Alcohol-attributable mortality in Europe: Past and future trends, and their effects on overall mortality variations

PhD Research

PhD candidate: Sergi Trias-Llimós - Population Research Centre (PRC)

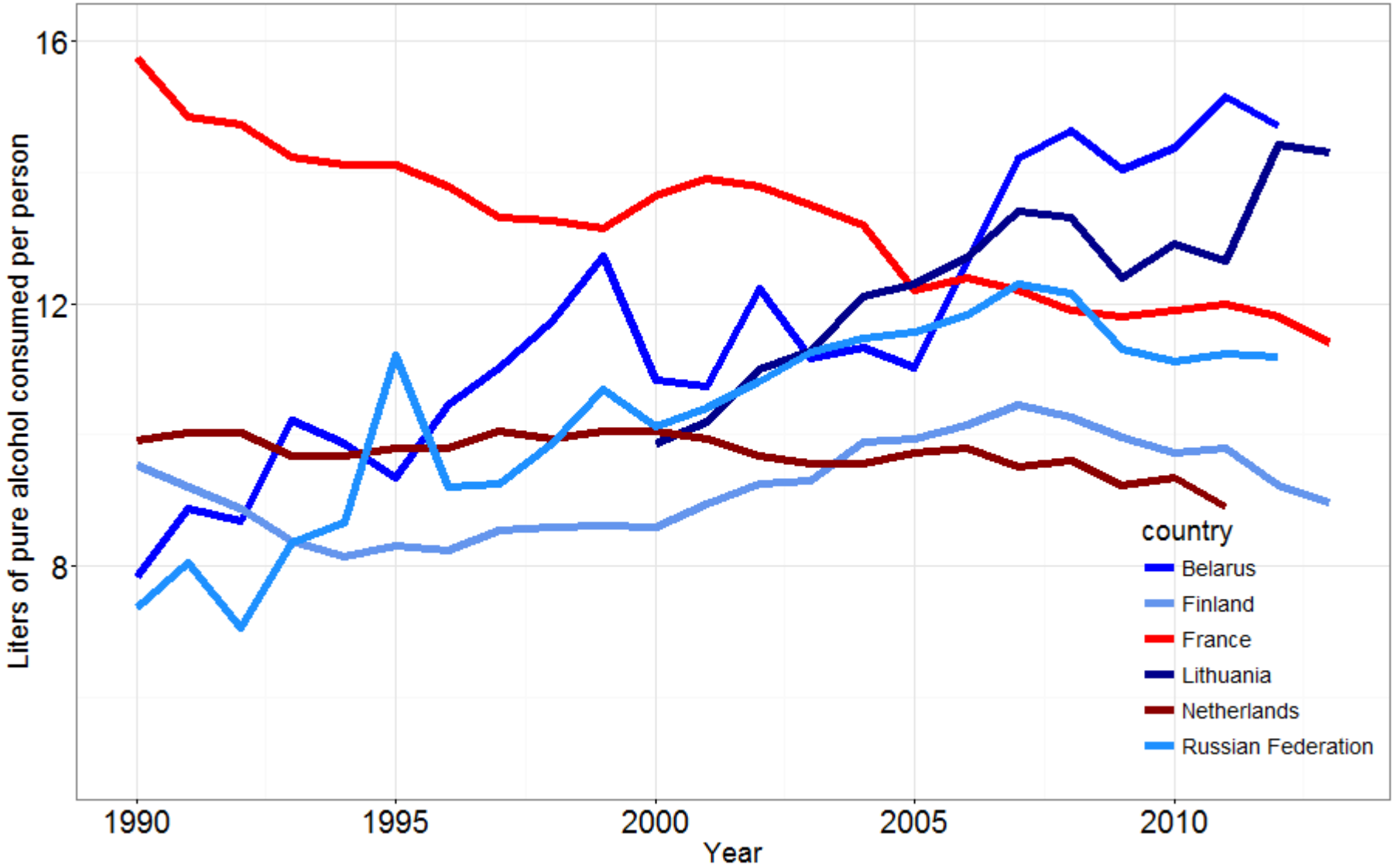
VIDI project "Smoking, alcohol and obesity – ingredients for improved and robust mortality projections" by Dr. Fanny Janssen (PRC, NIDI), funded by the Netherlands Organisation for Scientific Research

MPIDR, Rostock (Germany)

Outline of the presentation

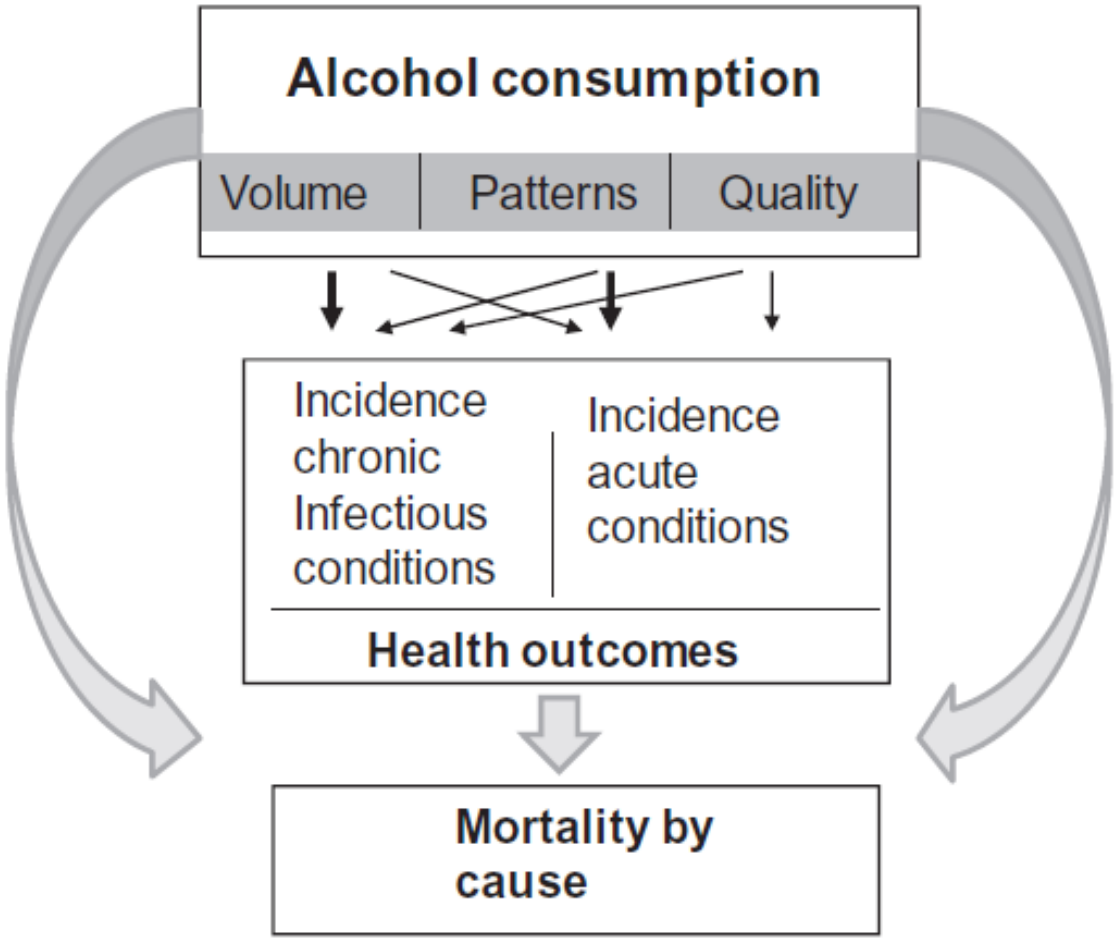
- Background and objectives of the PhD
  - Estimating alcohol-attributable mortality
  - The contribution of alcohol to e_0 gap between Eastern European countries and Western Europe
- Discussion

Average alcohol consumption



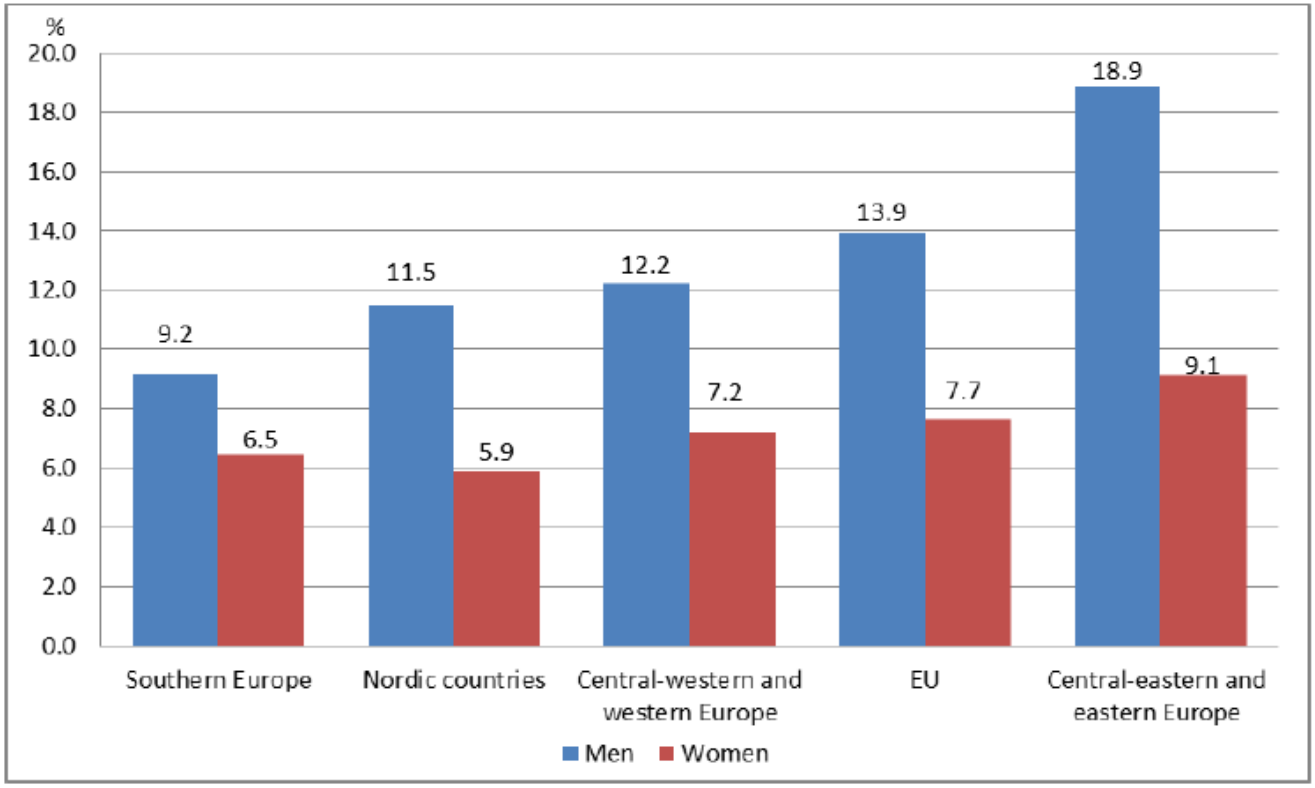
Source: WHO Global Health Observatory Data Repository

Alcohol consumption long-term consequences



Source: Rehm et al. 2010

Alcohol-attributable mortality



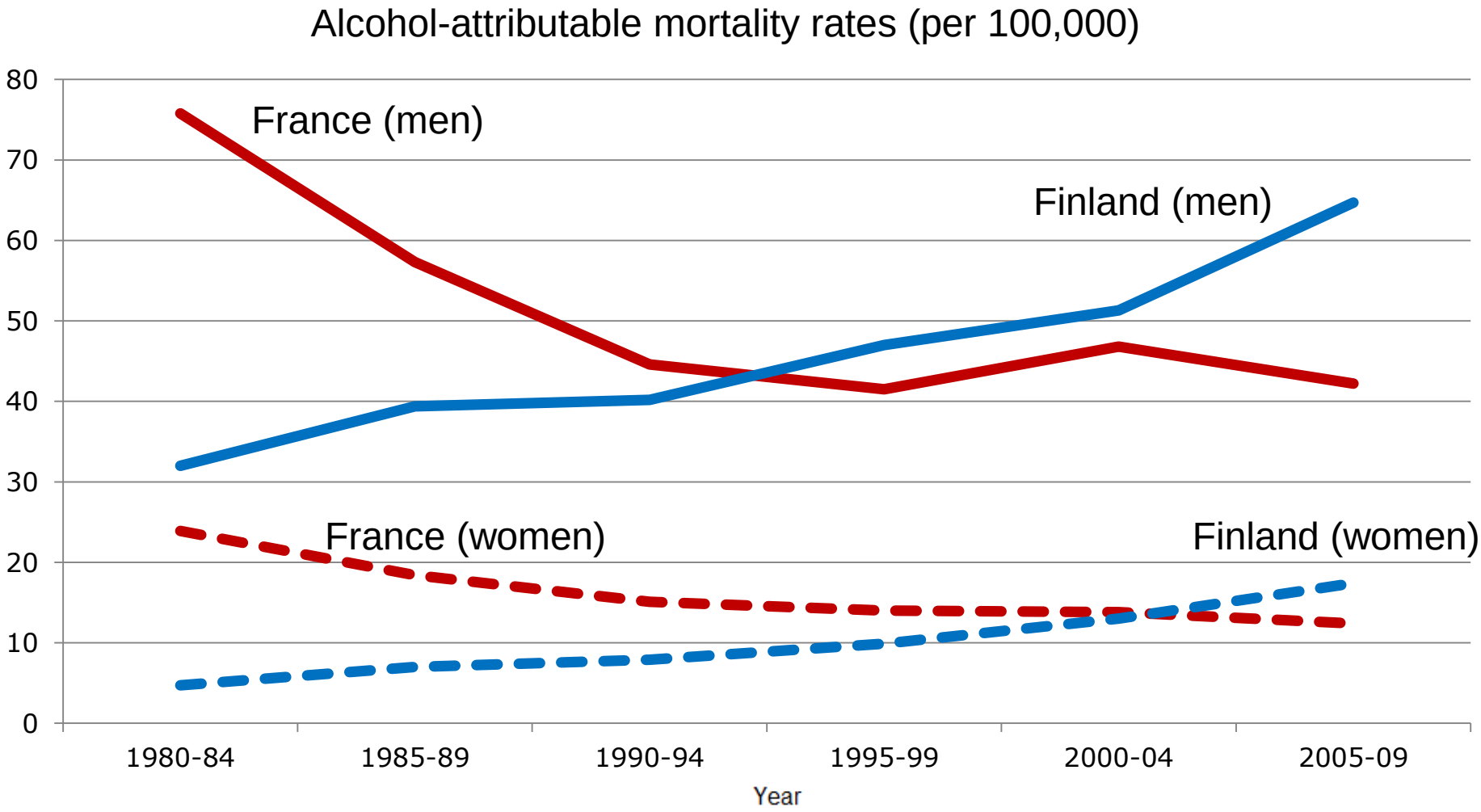
Source: WHO 2012

Premature deaths (men) attributed to alcohol:

Poland	13.6%
Czech Rep.	16.3%
Lithuania	22.8%
Hungary	25.2%

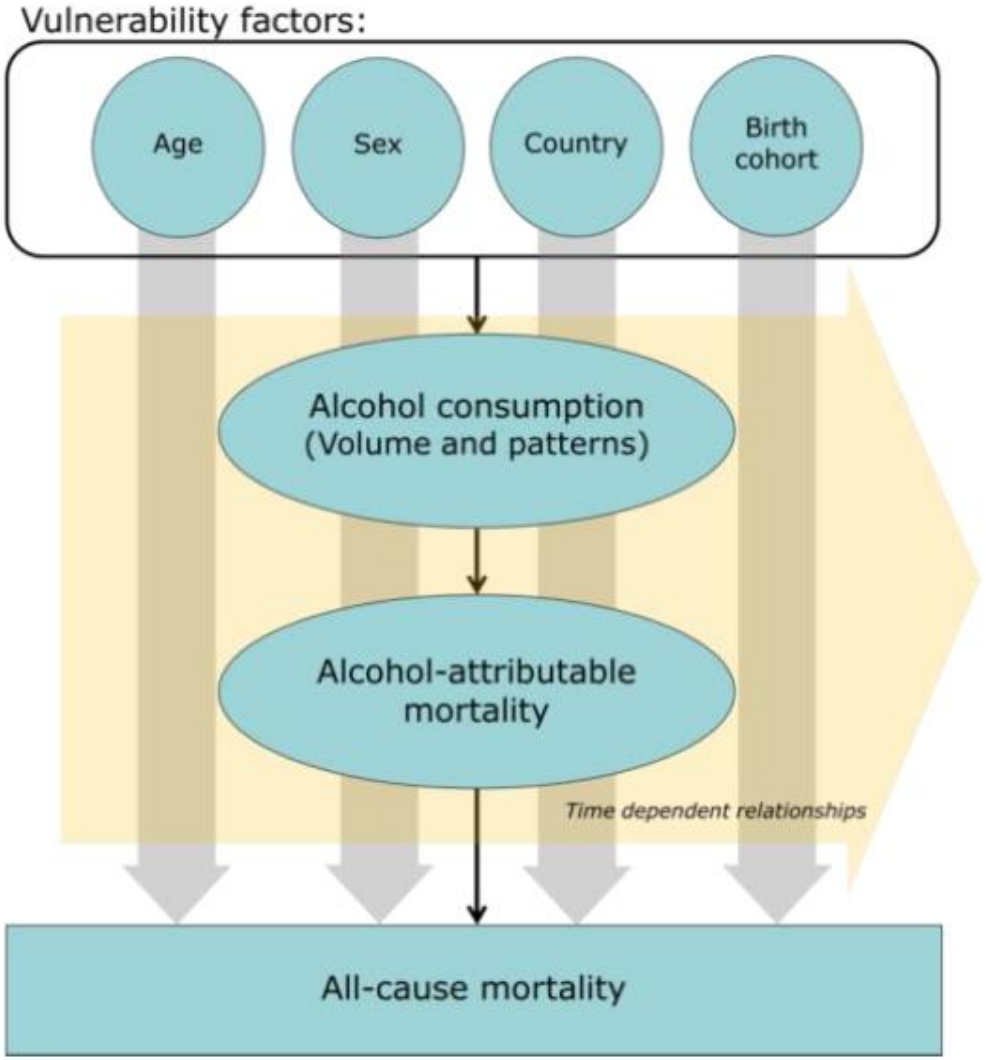
Source: Rehm et al. 2007

Time-trends of alcohol-related mortality



Source: Own elaboration; Data: Kraus et al. 2015

Alcohol-attributable mortality at the population level



Source: Own elaboration

Objectives

- To study past and future trends of alcohol-attributable mortality across European countries
  - Cohort effects
- To assess the effects of alcohol on overall mortality variations
  - Across countries
  - Over time
  - In changes in the survival curve

Objectives

- To study past and future trends of alcohol-attributable mortality across European countries
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Outline of the PhD

- Work done
  - **The role of birth cohorts** in long-term trends in liver cirrhosis mortality in different European regions (with Bijlsma and Janssen) *Under review*

- Current work
  - Comparison of different approaches to **estimate** age-specific **alcohol-attributable mortality**: The cases of France and Finland (with Martikainen, Mäkelä and Janssen)
  - The contribution of alcohol to **life expectancy differentials across countries** and over time in Europe (with Kunst and Janssen)

- Future work
  - The role of alcohol in changes in the survival curve
  - Future alcohol-attributable mortality in Europe

Estimating alcohol-attributable mortality

Causes of death attributable to alcohol

Alcohol has been identified as a contributor to more than 200 different diseases (Rehm et al. 2010)

Wholly-attributable
Mental and behavioural disorders due to use of alcohol (F10)
Alcoholic liver disease (K70)
Accidental poisoning by and exposure to alcohol (X45)
…

Causes of death attributable to alcohol

Alcohol has been identified as a contributor to more than 200 different diseases (Rehm et al. 2010)

Wholly-attributable	Partly-attributable
Mental and behavioural disorders due to use of alcohol (F10)	Cancers (oral cavity, pharynx, stomach, liver, larynx…)
Alcoholic liver disease (K70)	Circulatory system diseases (hyperthension, ischemic stroke, cardiac arrythima…)
Accidental poisoning by and exposure to alcohol (X45)	Digestive system diseases (unespecified liver disease, cholelithiasis and pancreatitis)
…	Other diseases (epilepsy, psoriasis, type 2 diabetes)

Approaches to estimate alcohol-attributable mortality

- Using few diseases as a proxy
  - Liver cirrhosis (e.g. Zatoński et al. 2010)
  - HFA-DB (e.g. McCartney et al. 2011)
  - List of diseases considered wholly-attributed to alcohol (e.g. Kraus et al. 2015)

- Contributory causes of death data
  - Adding deaths with an alcohol-related cause as a contributory cause (Mäkelä 1998; Martikainen et al. 2014)

Approaches to estimate alcohol-attributable mortality

- Using alcohol prevalence data and RR to estimate alcohol-attributable fractions (AAF) (Rehm et al. 2007; Rey et al. 2010; Guerin et al. 2013) (CRA WHO)
  - All-cause
  - Cause-specific
- GBD estimates (Forouzanfar et al. 2015)
  - Mean levels of alcohol consumption to generate a gamma distribution of alcohol consumption

Objective

To compare performance of different approaches to estimate age-specific alcohol-attributable mortality in France and Finland

Data and methods

- WHO Mortality Database: Underlying cause of death
- INSERM: Underlying + Contributory (F10) causes of death
- GBD: Alcohol-attributable mortality estimates
- ESPS: Alcohol prevalence data

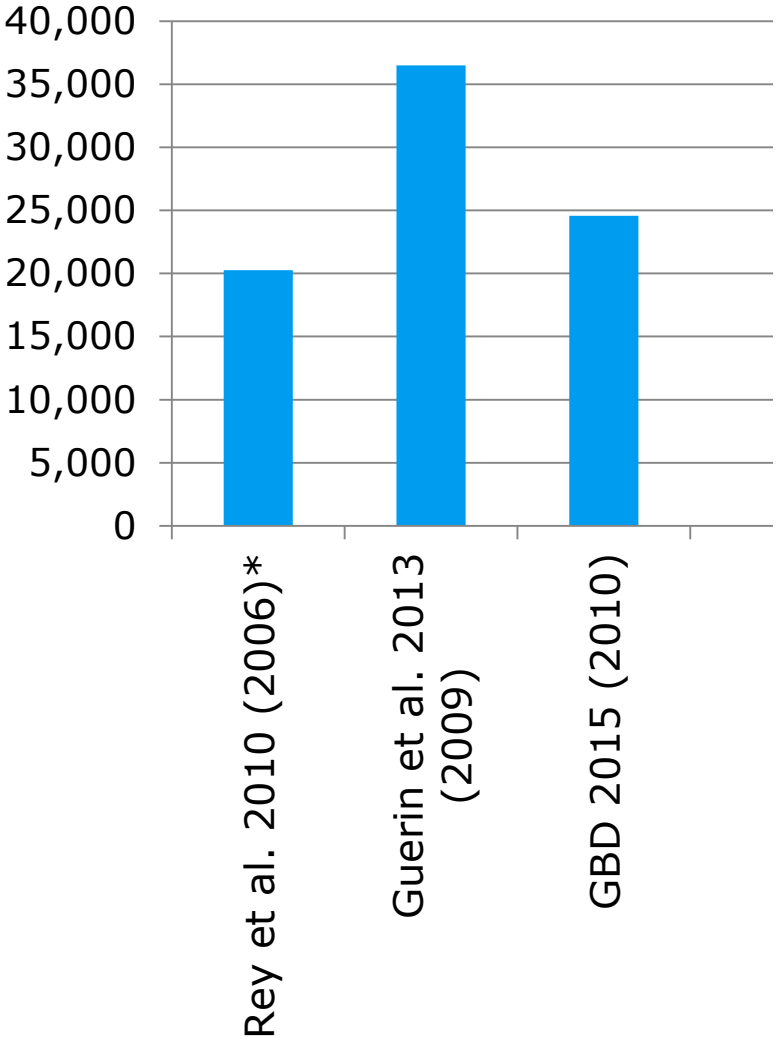
- Wholly: F10, G312, G621, I426, K70, K860, X45, X65
- HFA-DB: C15, C32, K70, K73, K74, K76, V00-Y99
- Liver cirrhosis: K70, K73, K74
- Cause-specific (CRA WHO)

$$AAF = \frac{\sum_{i=1}^{n} p_i(RR_i - 1)}{1 + \sum_{i=1}^{n} p_i(RR_i - 1)}$$

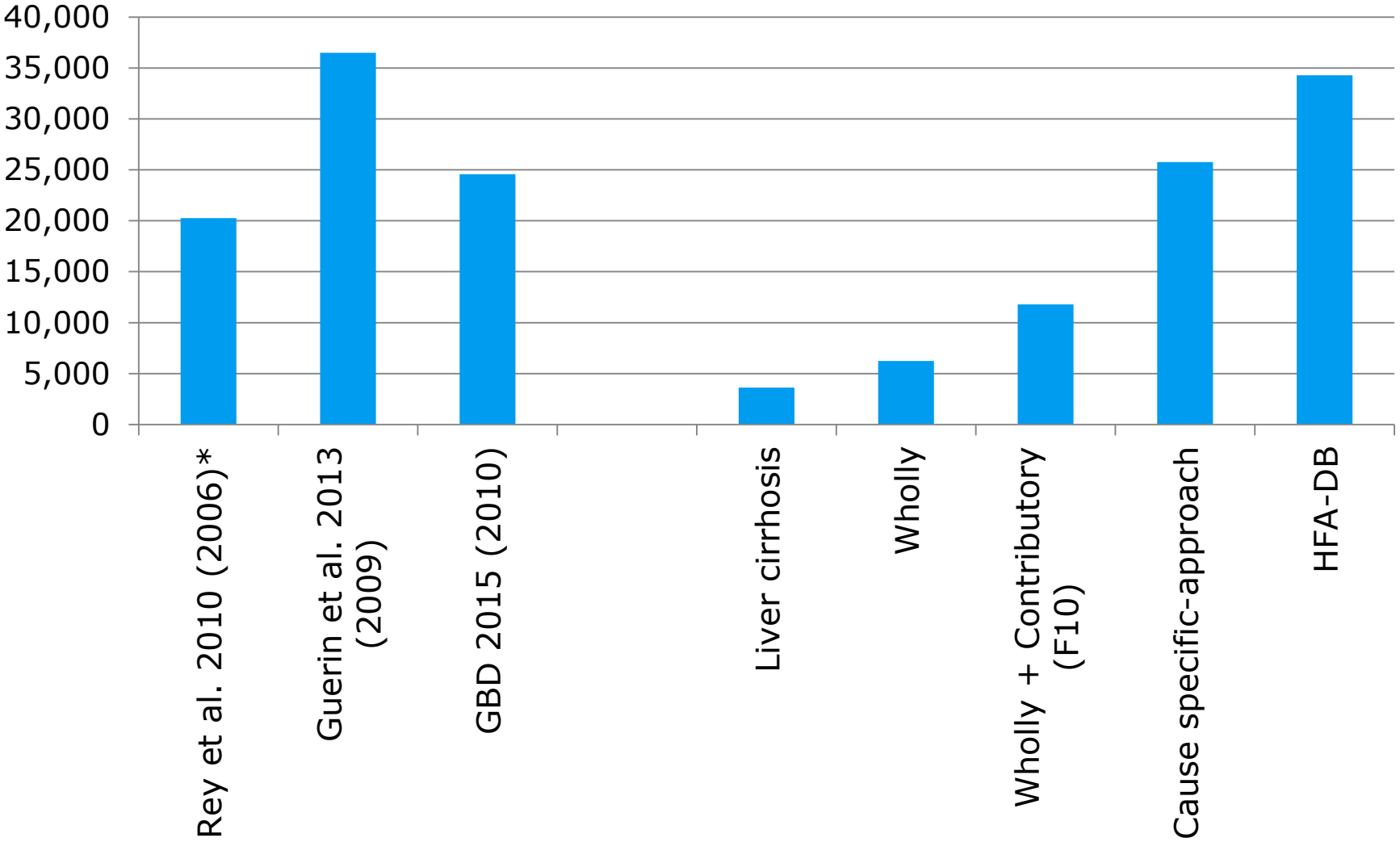
i: exposure (0-20, 20-40, 40-60, 60+)
p: alcohol prevalence
RR: Relative risks

- GBD estimates for total alcohol-att mortality
- Wholly + contributory (F10)

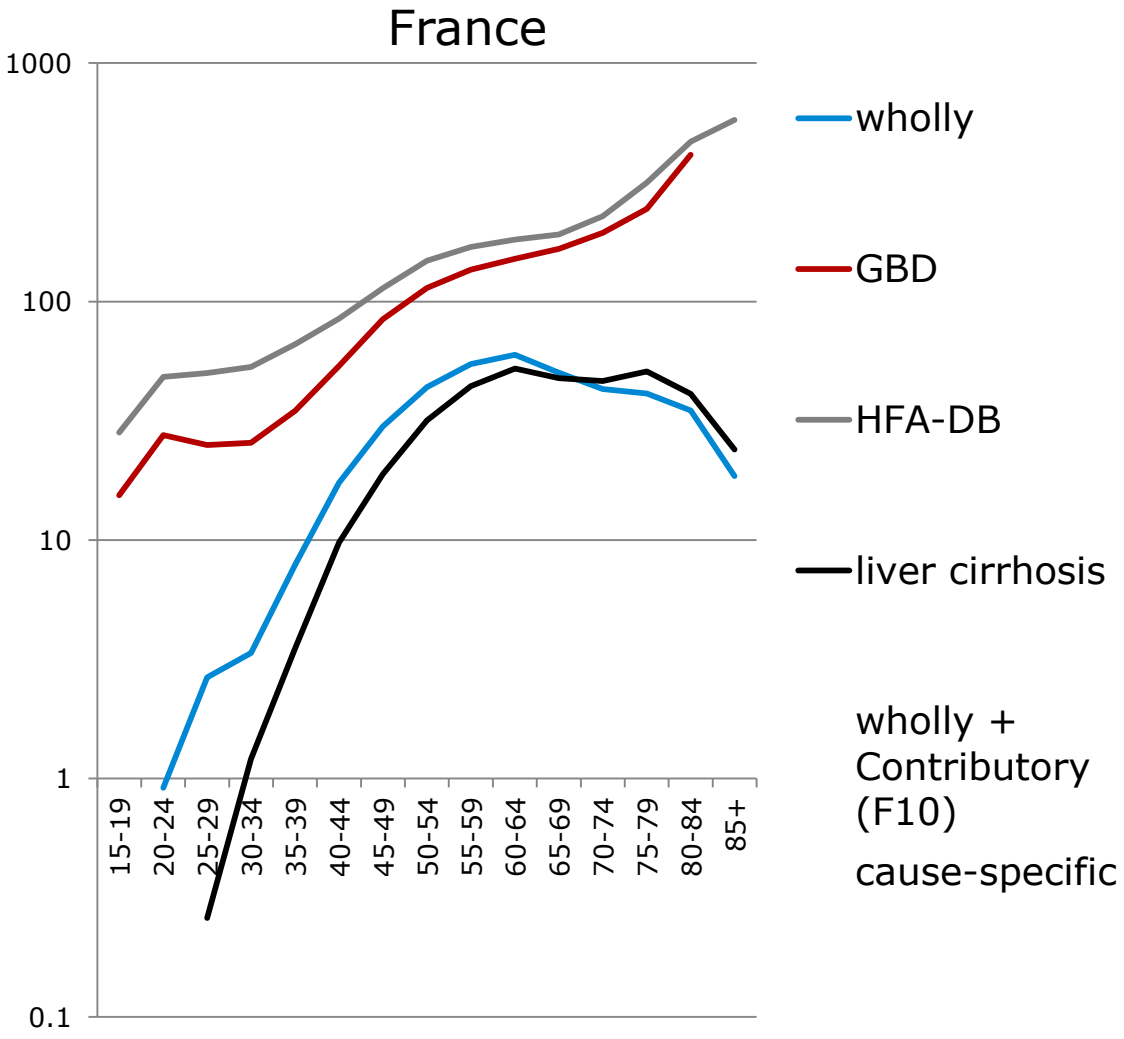
Total alcohol-attributable mortality in France 2010 (men)



Total alcohol-attributable mortality in France 2010 (men)



Alcohol-attributable mortality rates in 2010



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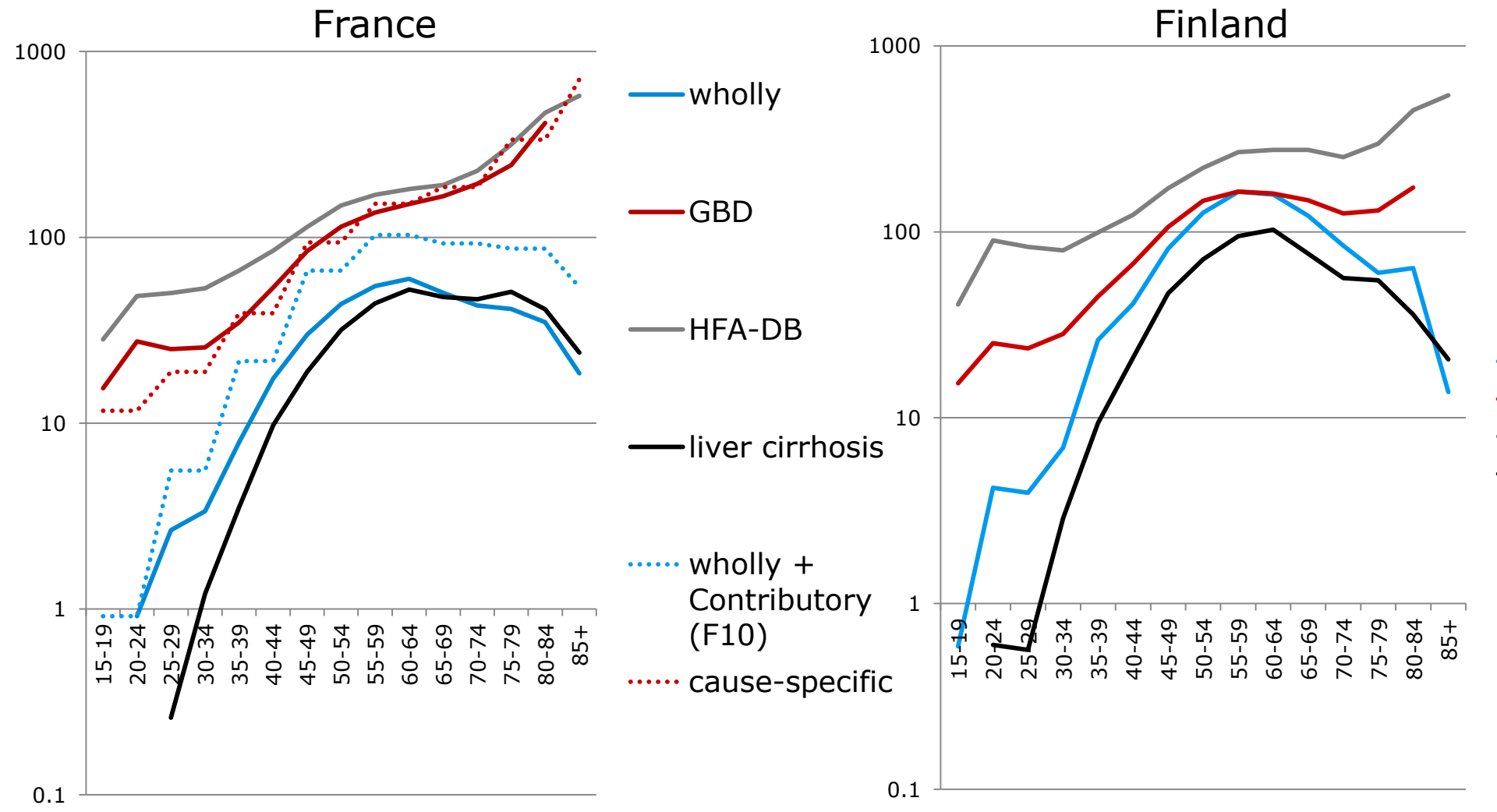


Conclusions so far

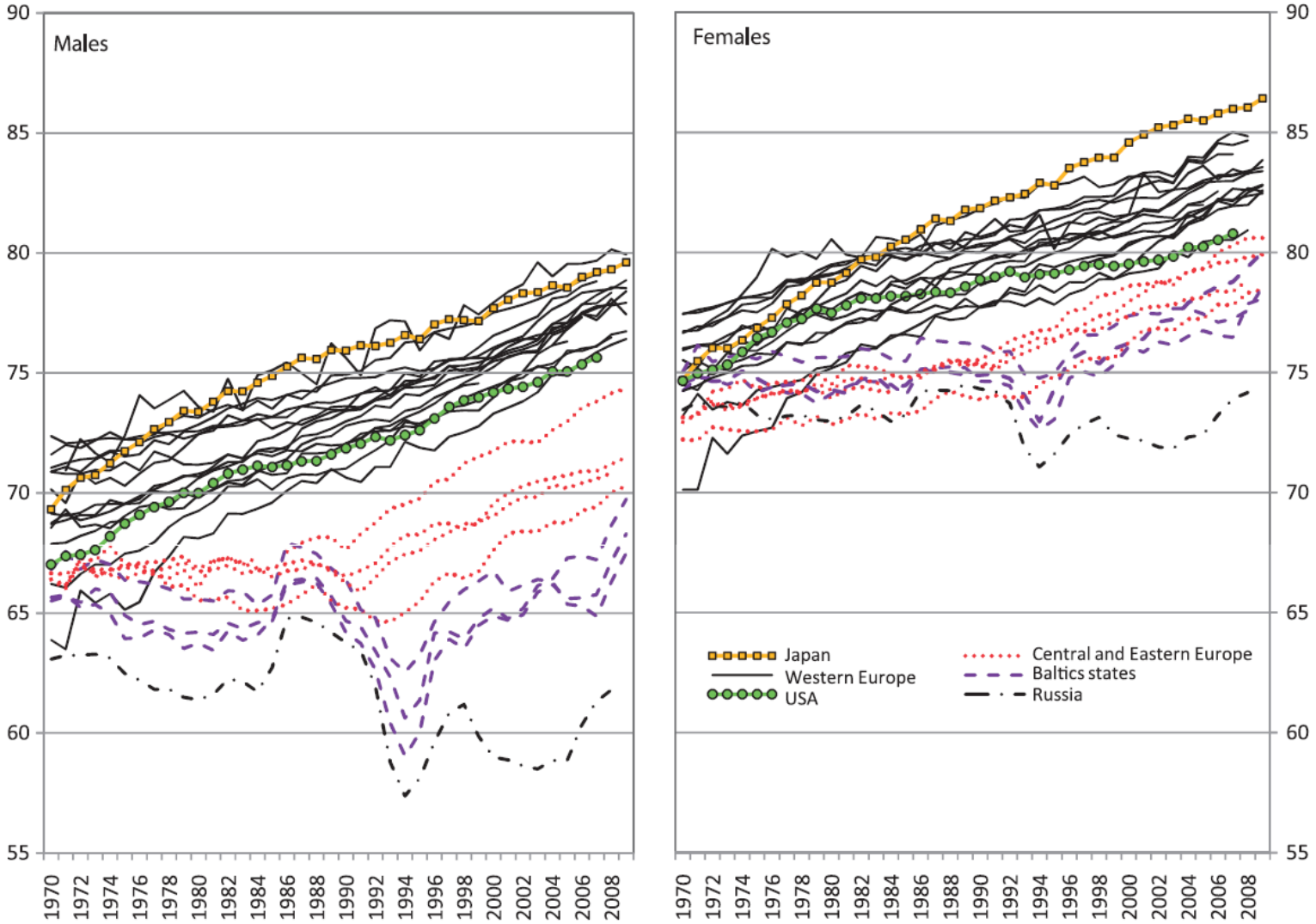
- The age-specific patterns differ between approaches
- Similar results between the cause-specific approach and the GBD estimates in France

Next steps:

- Finland
- To assess the performance of the different approaches over time

The contribution of alcohol to LE gap between Eastern European countries and Western Europe

Life expectancy in Europe



Source: Leon 2011

The contribution of alcohol to e0

- Alcohol is contributing to the East-West differences in life expectancy, but not likely to equally across Eastern European countries

- Country differences
  - Finland-Baltic states (Karanikolos et al. 2012)
  - Belarus-Lithuania-Russia (Grigoriev et al. 2010)

- Over time (Shkolnikov et al. 1998; Meslé et al. 2002; Jasilionis et al. 2011)

Objectives

To assess the contribution of alcohol to East-West differences in e_0 since 1990

Questions:

1. To what extent did alcohol consumption influence e_0 in European countries?

2. How much did alcohol consumption contribute to variations in e_0 between Eastern European countries and Western Europe?

3. How and how much had this contribution changed between 1990 and 2013?

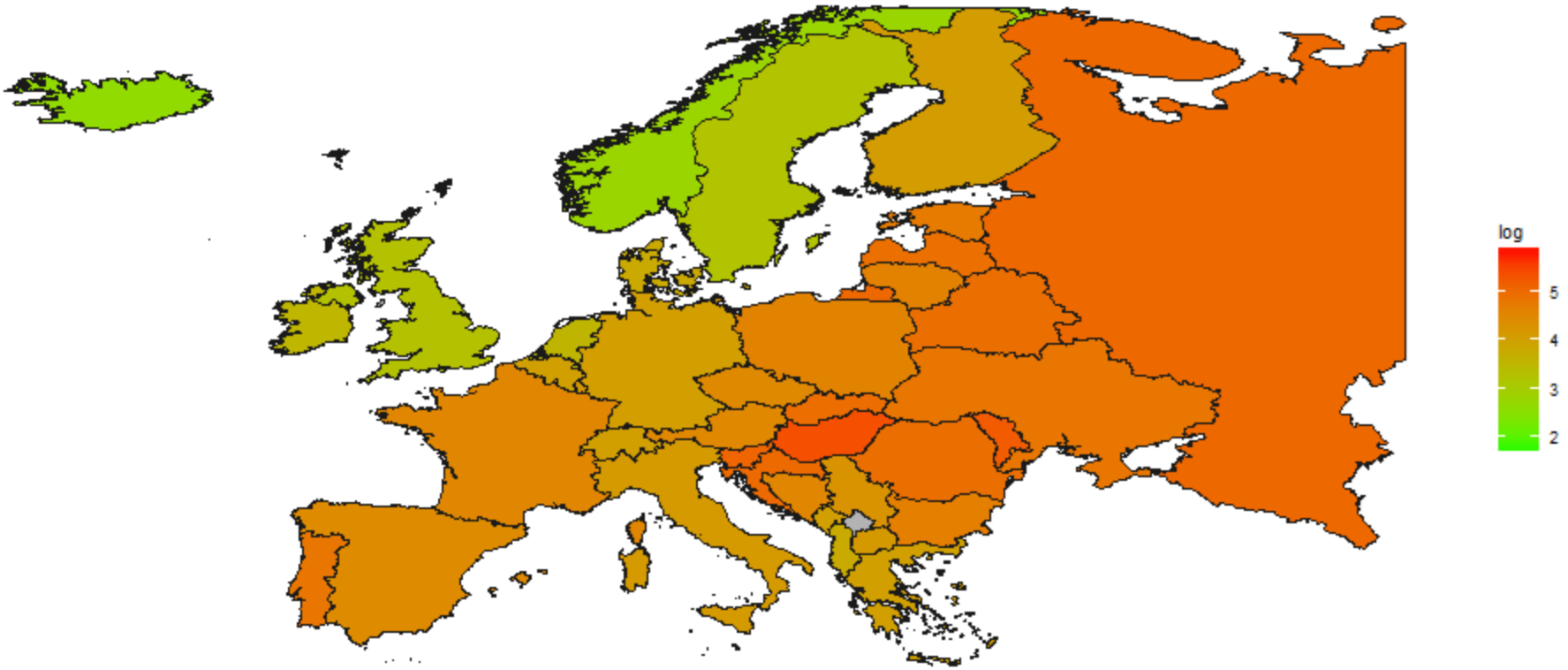
Data and Methods

- GBD estimates of alcohol-attributable mortality by age, sex, year for 42 European countries (GBD 2015)
  - Western: EU-15, CH, NO, AD
  - Eastern: Former communist countries

- Associated single decrement life tables
- Life expectancy decomposition techniques:
  - Eastern European countries – Western Europe

GBD data: Age-standardized alcohol-attributable mortality (men)

1990



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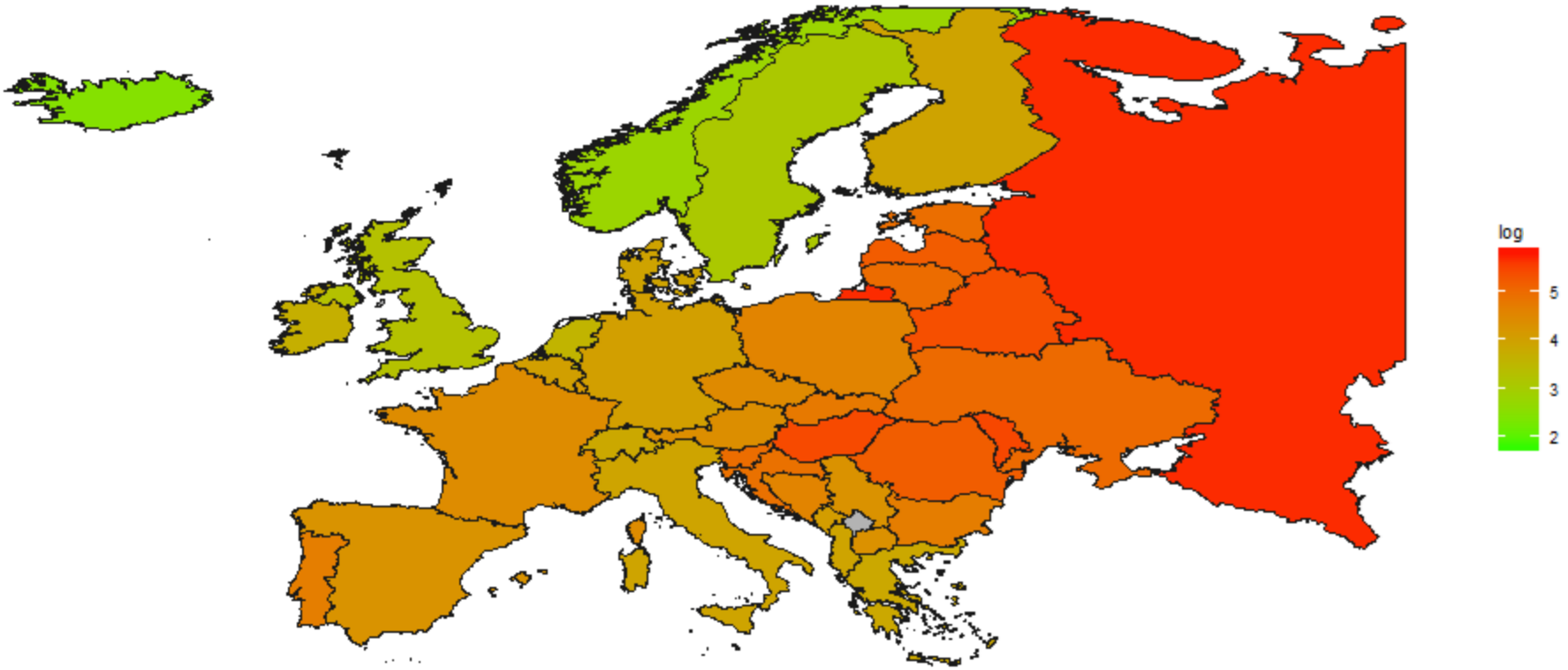

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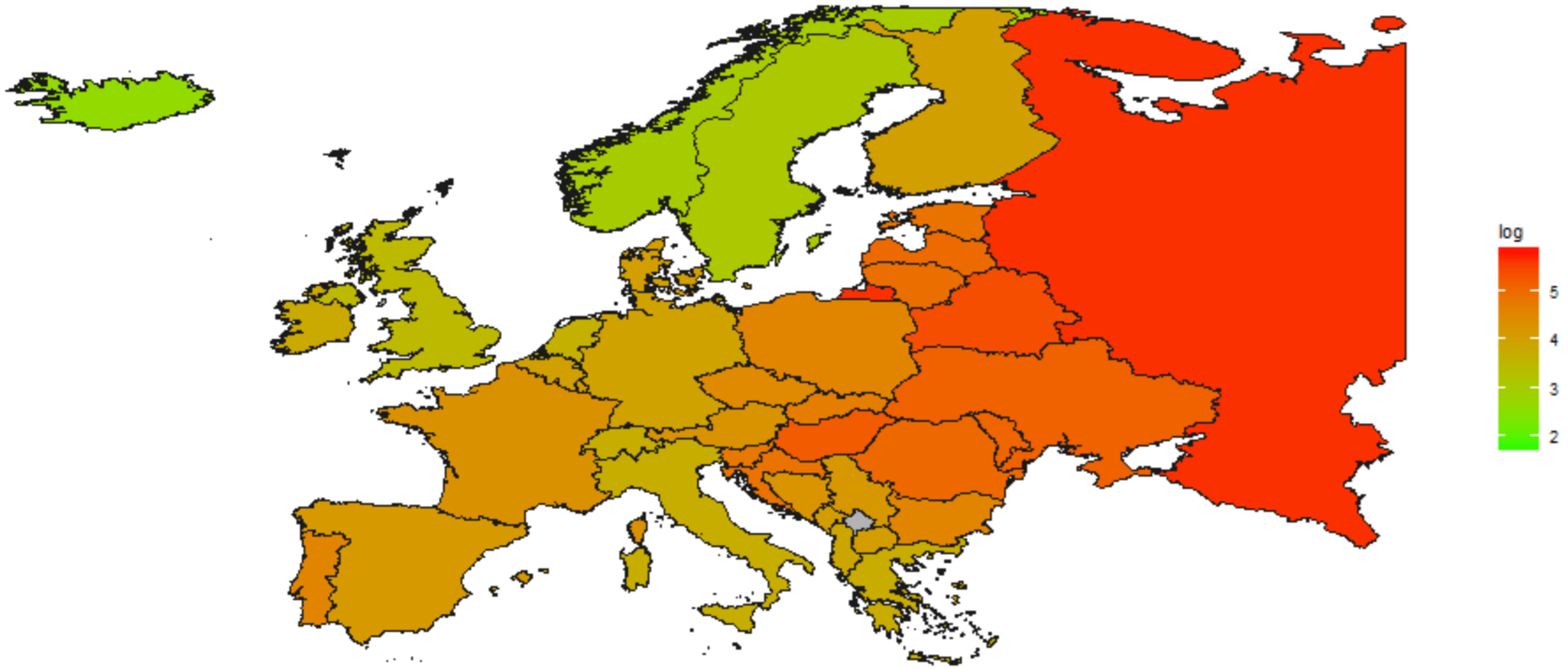

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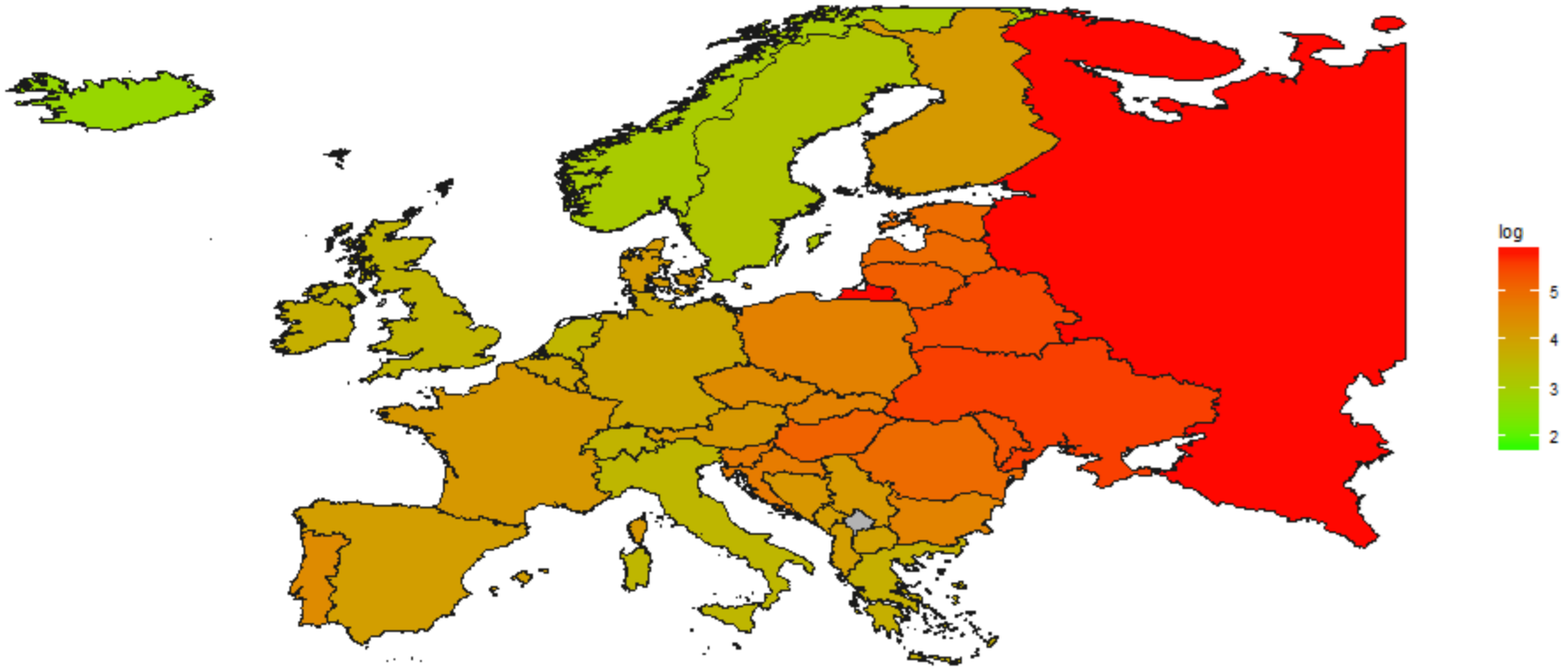
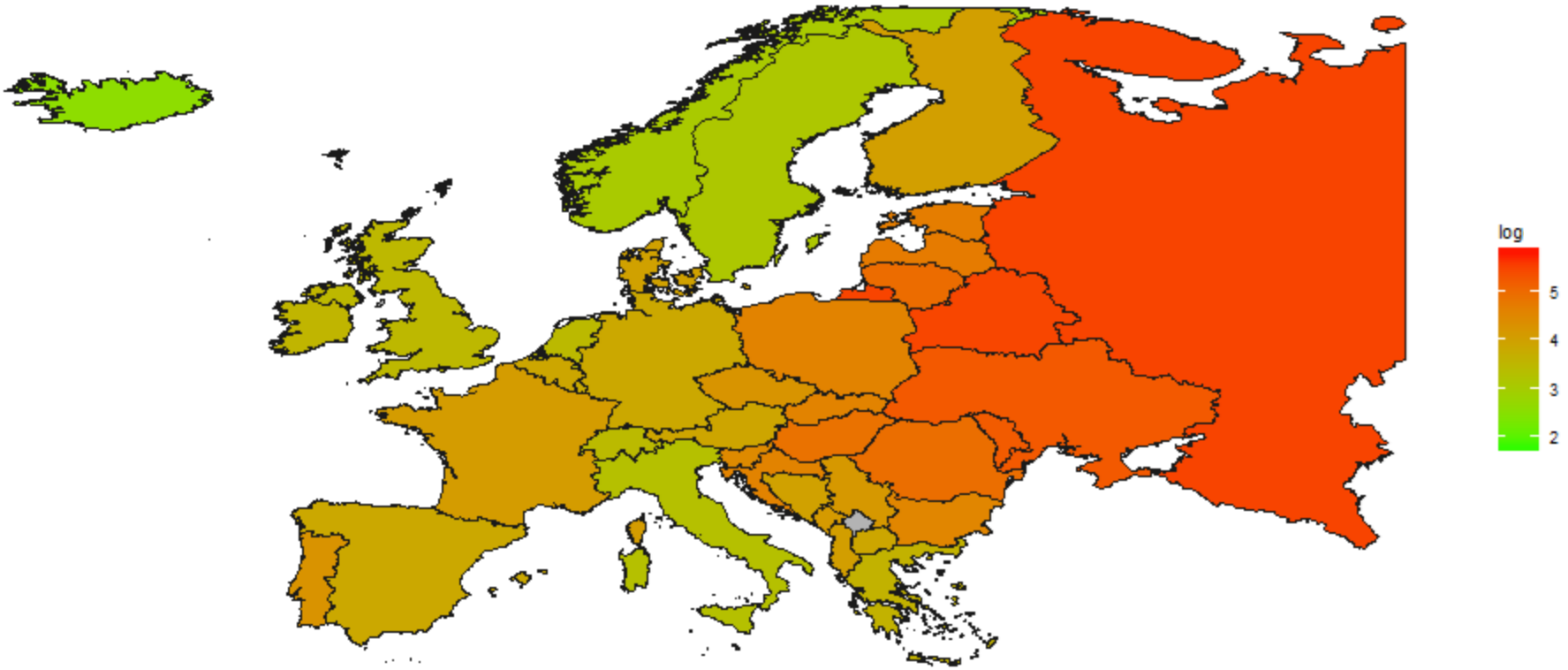
2005



GBD data: Age-standardized alcohol-attributable mortality (men)

2010



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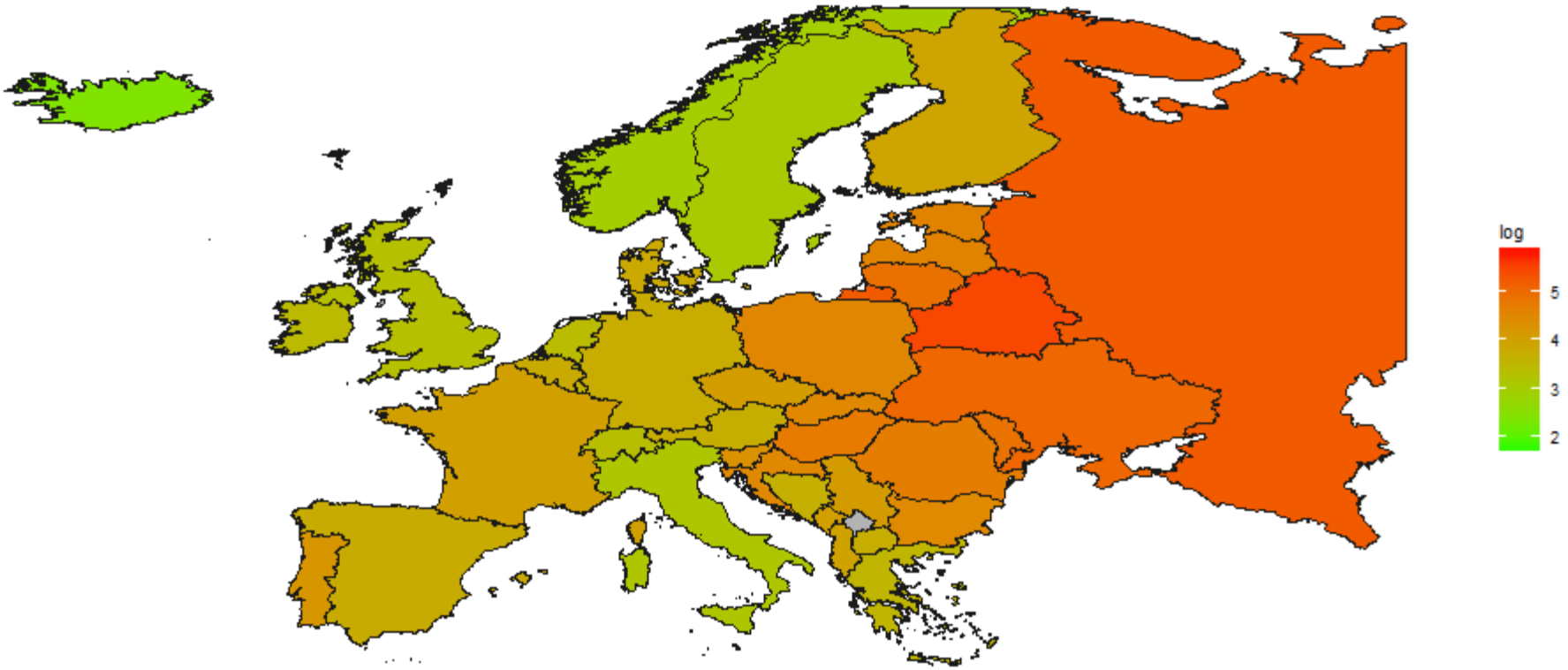
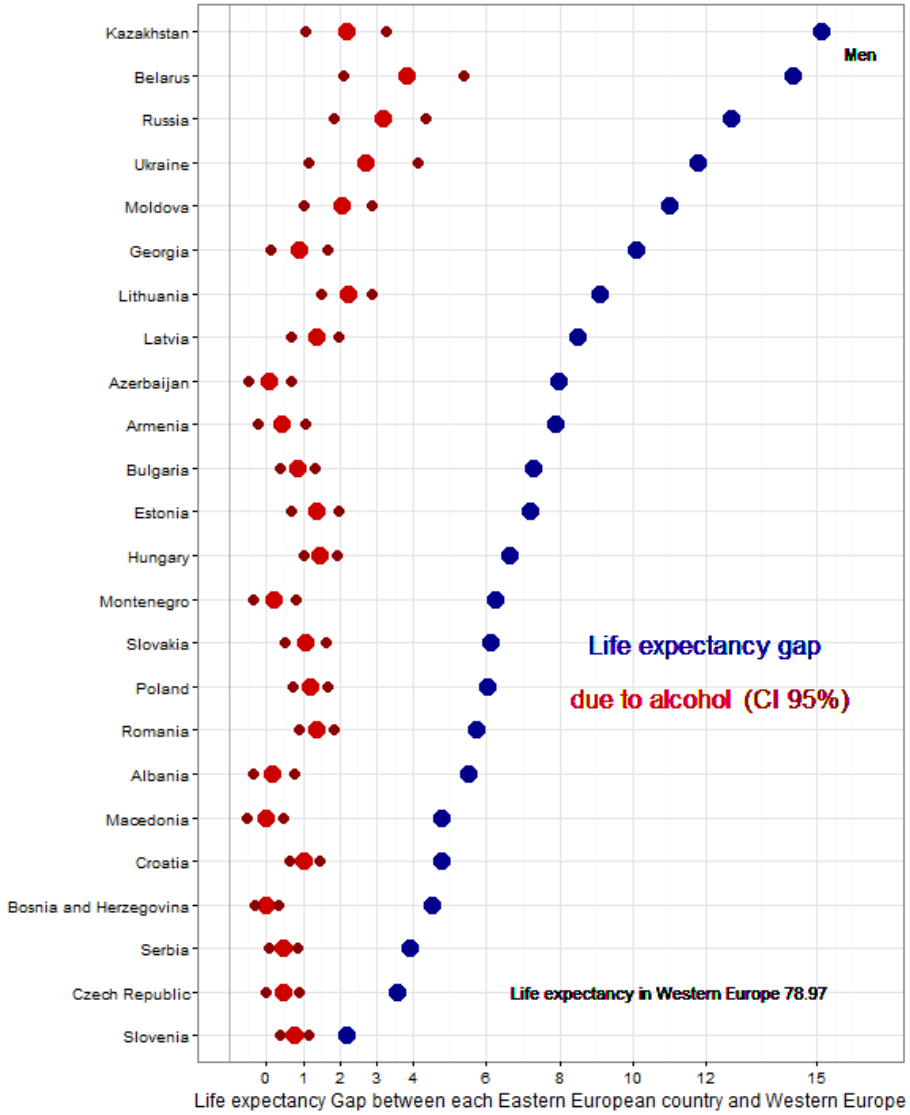
2013



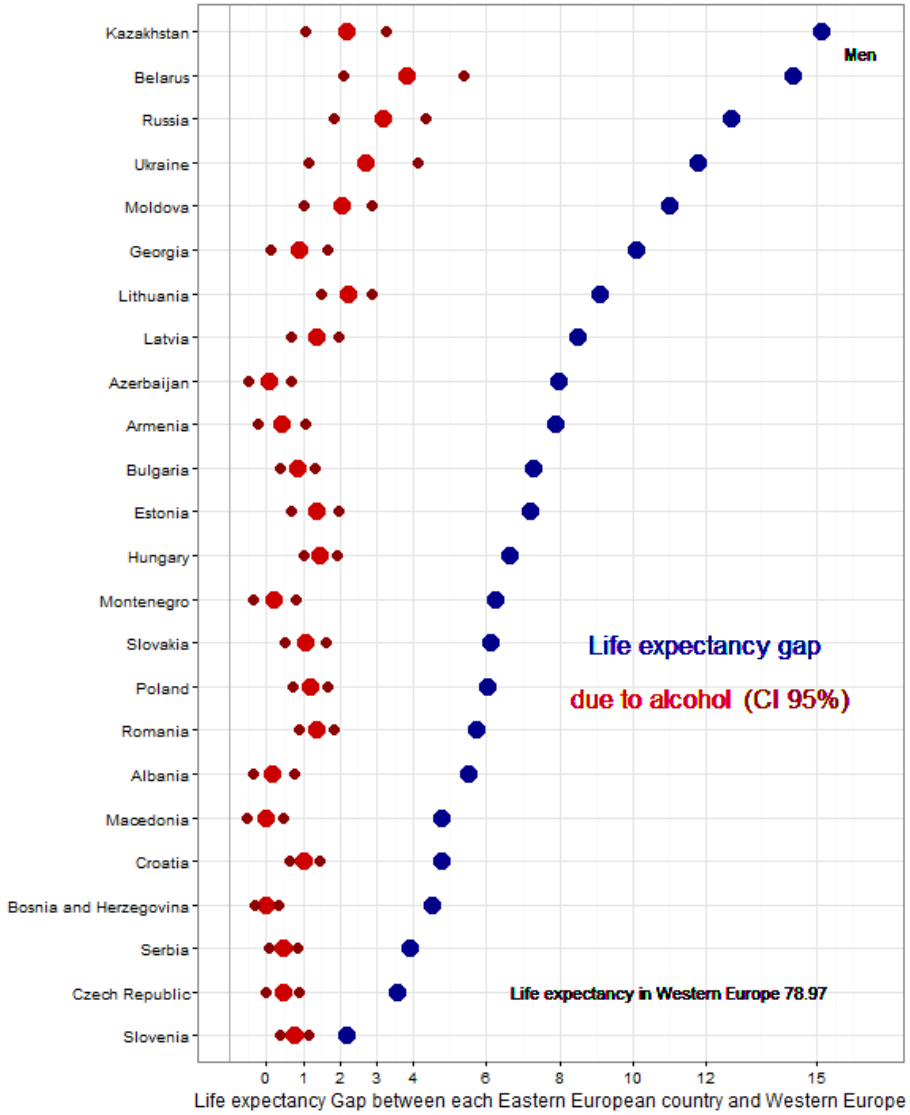
Years of life expectancy loss due to alcohol

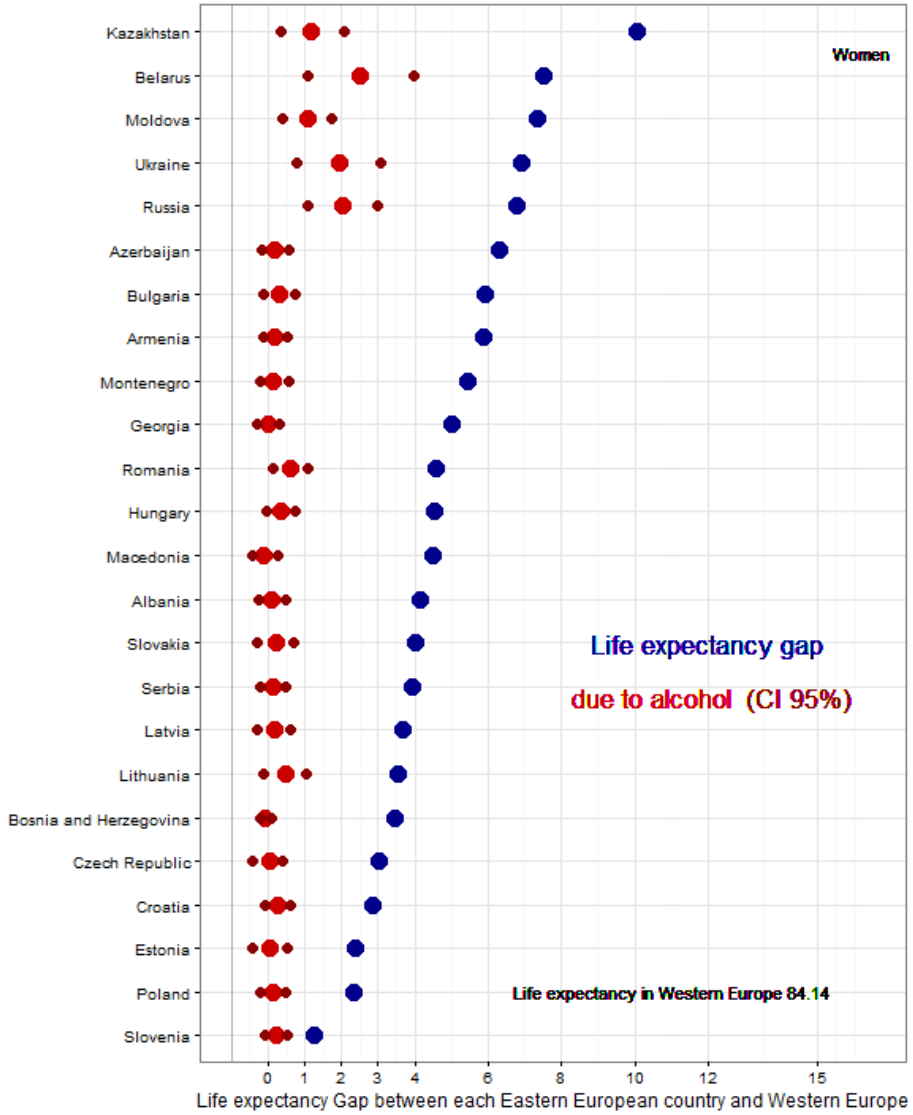
Years of life expectancy loss due to alcohol

The contribution of alcohol to the e0 gap between Eastern European countries and Western Europe

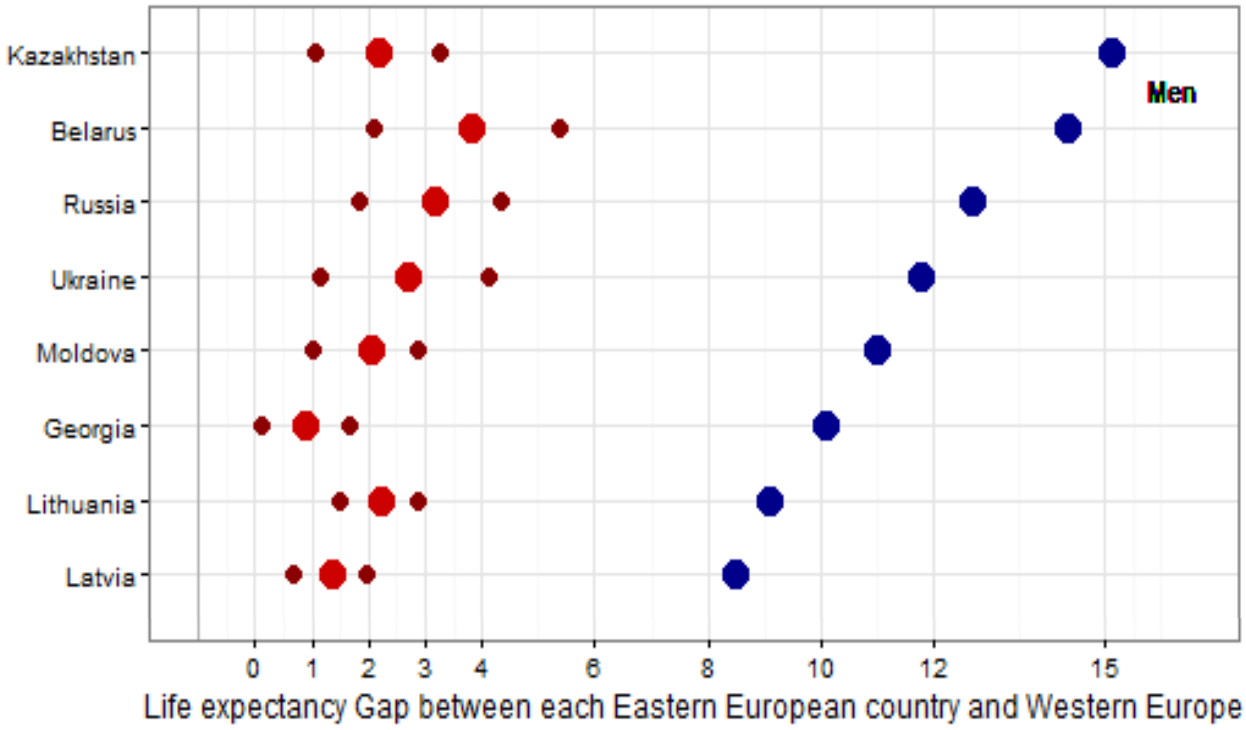


The contribution of alcohol to the e0 gap between Eastern European countries and Western Europe





The contribution of alcohol to the e0 gap between Eastern European countries and Western Europe



Conclusions so far

- Quantified the contribution of alcohol to life expectancy differentials across European countries
- The contribution of alcohol to life expectancy has declined in Eastern European countries
- The contribution of alcohol to life expectancy differentials between Eastern countries and Western Europe is large (~4 years Belarus)

Thank you!

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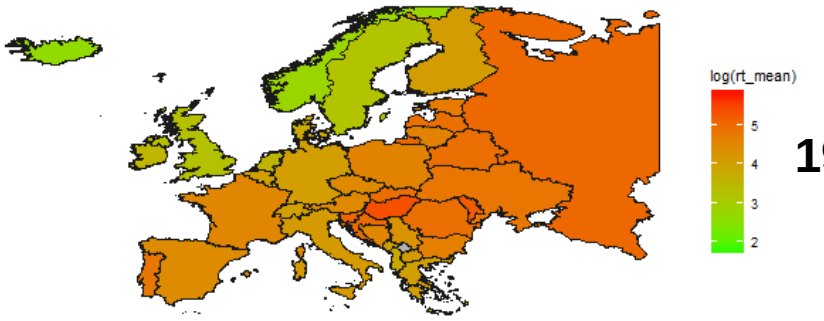
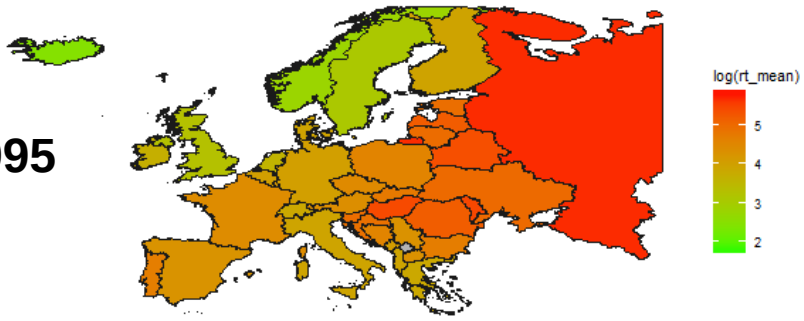
Additional material

GBD data: Age-standardized alcohol-attributable mortality (men)

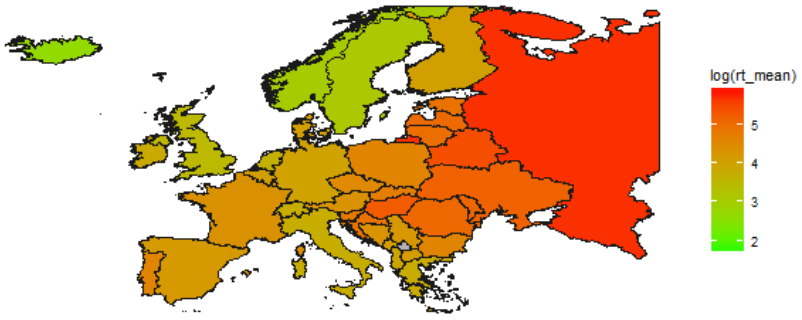
1990



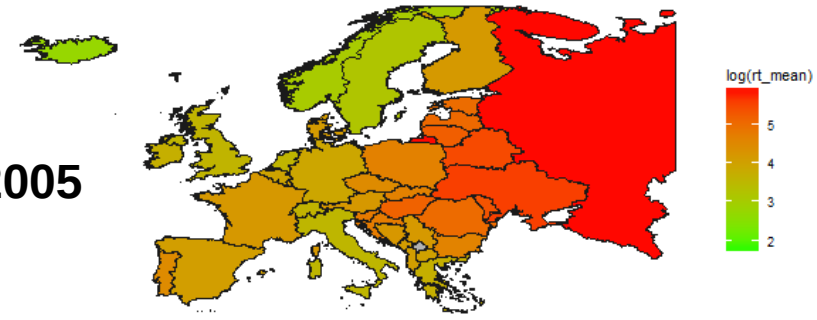
1995



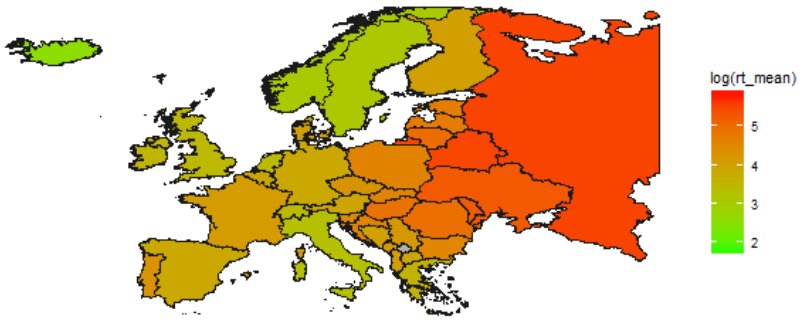
2000



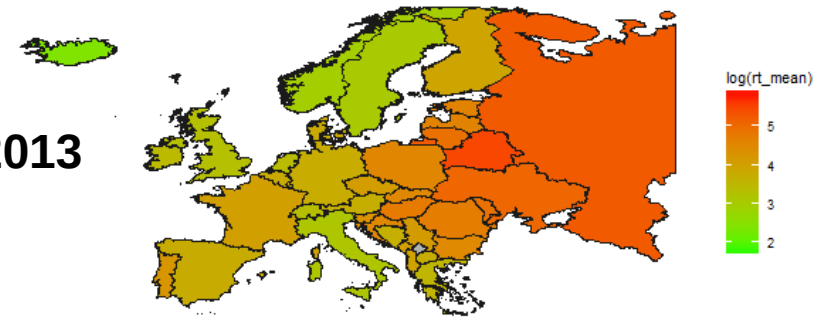
2005



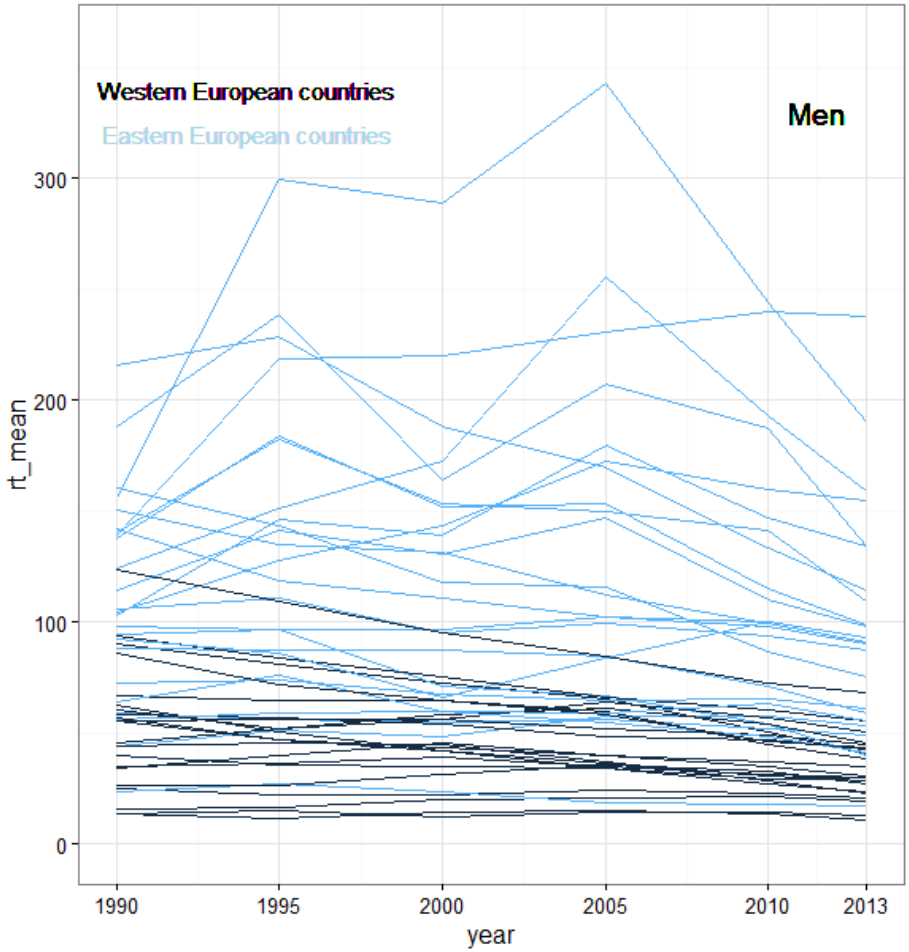
2010

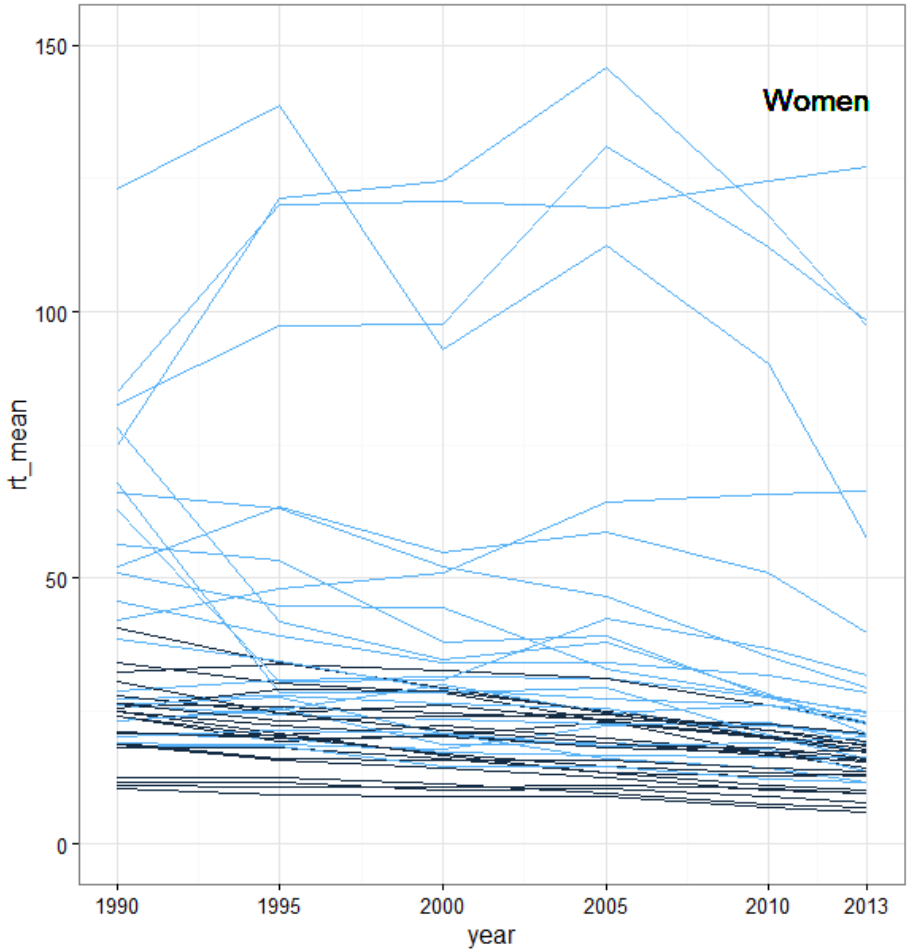


2013

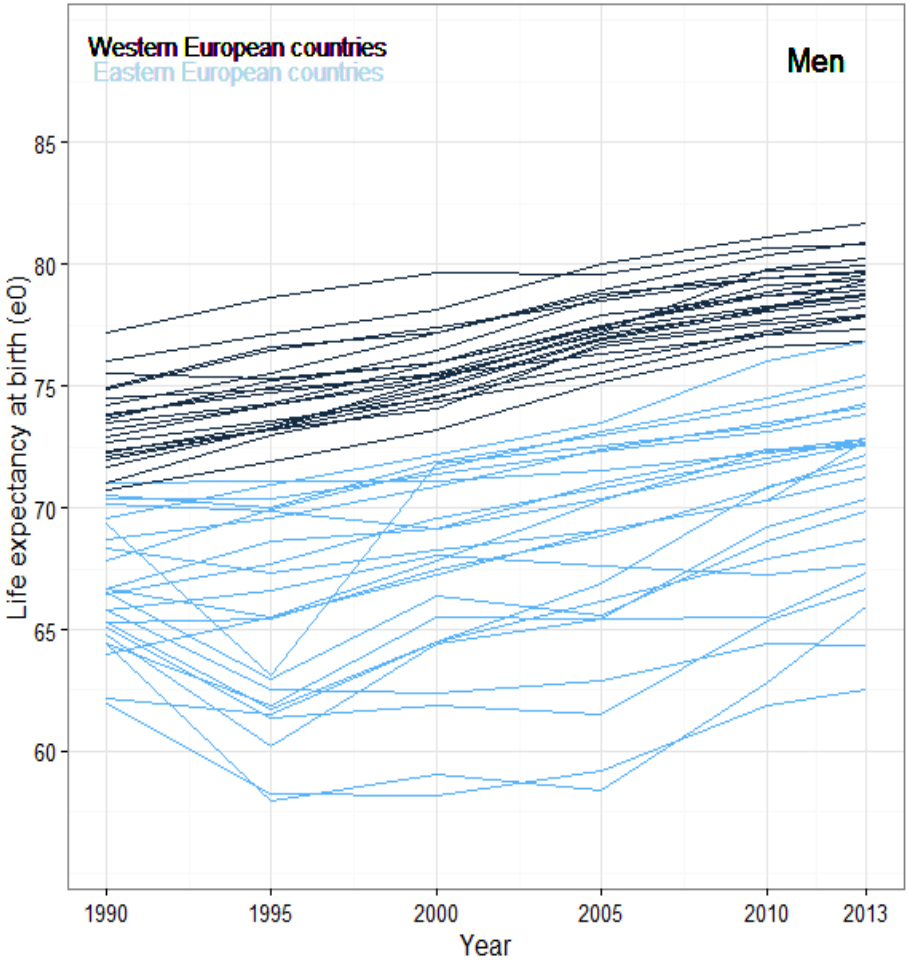


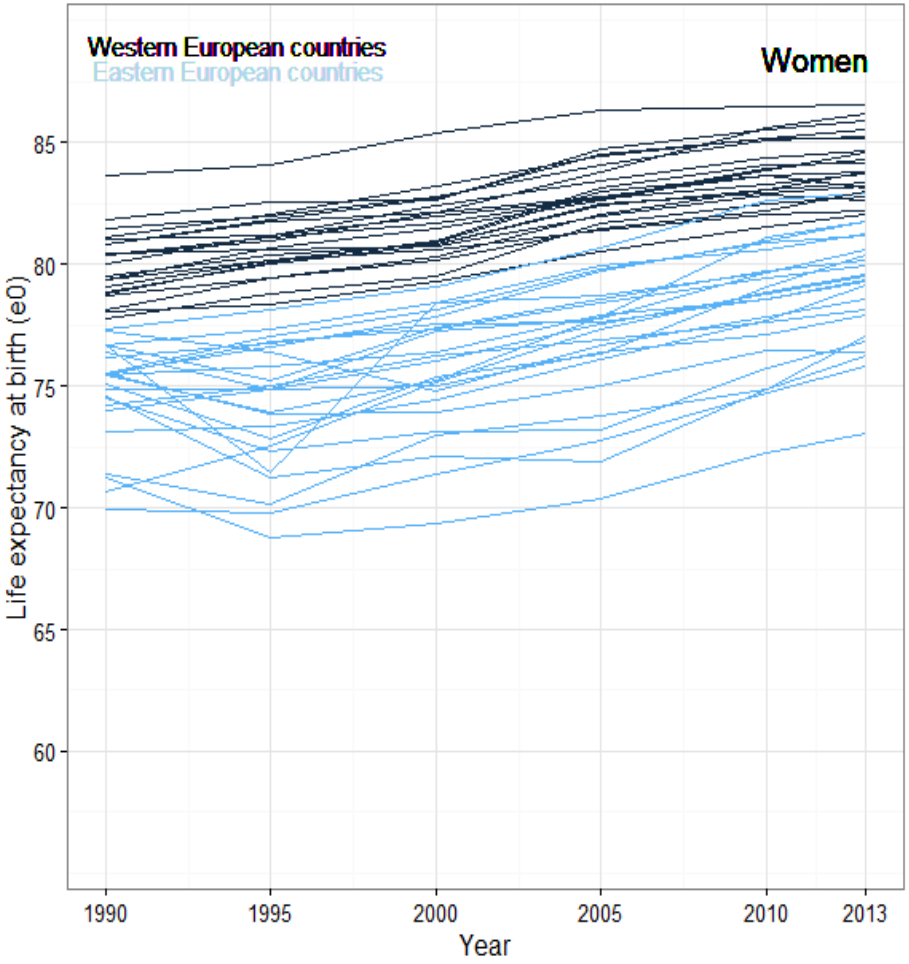
Age-standardized alcohol-attributable mortality rates (GBD data)





Life expectancy trends in European countries (GBD data)





Comparison life expectancy HMB vs. GBD (own estimation) for selected countries