

# Life disparity before, during and after stagnation of Danish female life expectancy

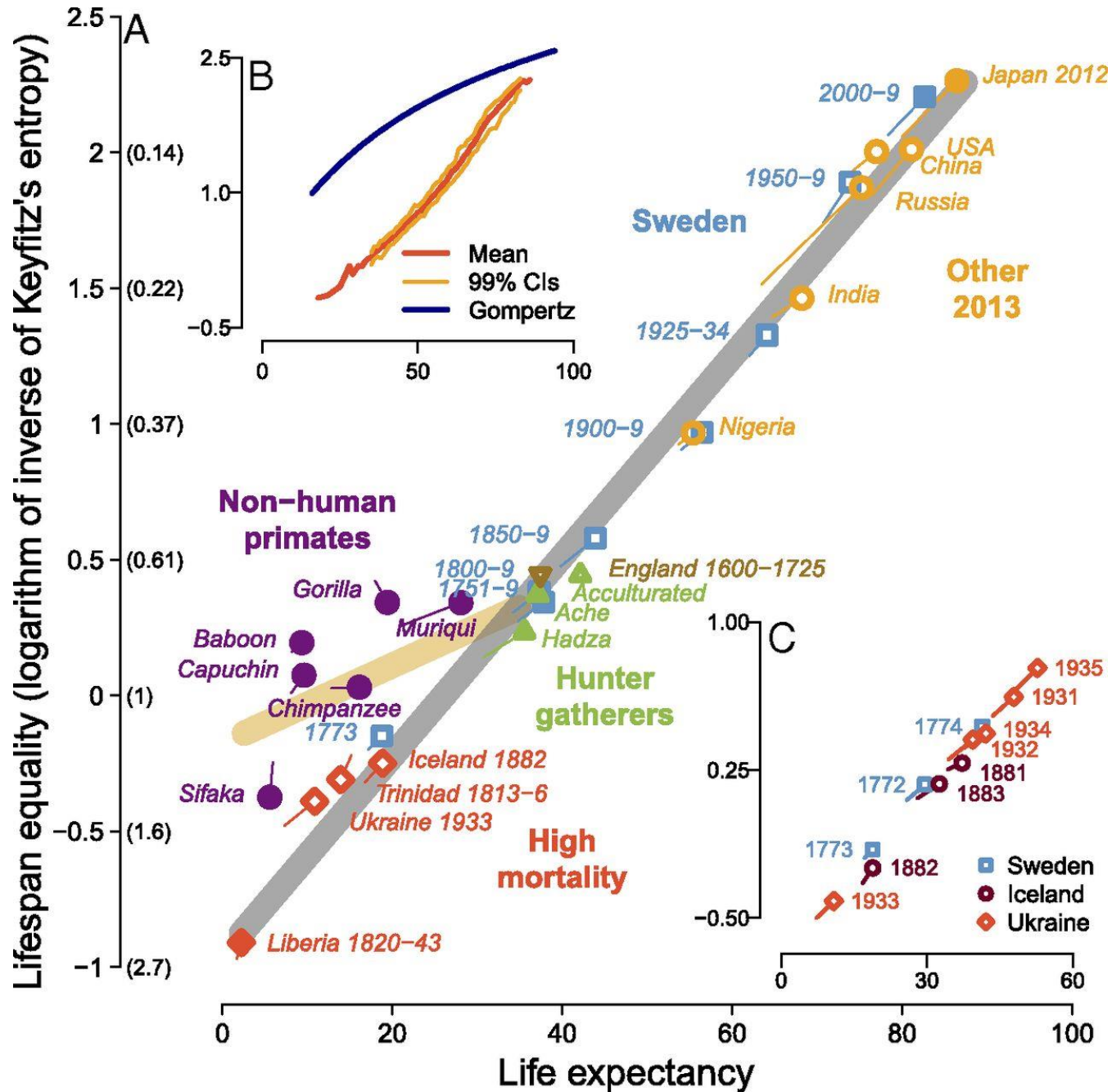
*Causal decomposition and comparison  
with Scandinavian counterparts*

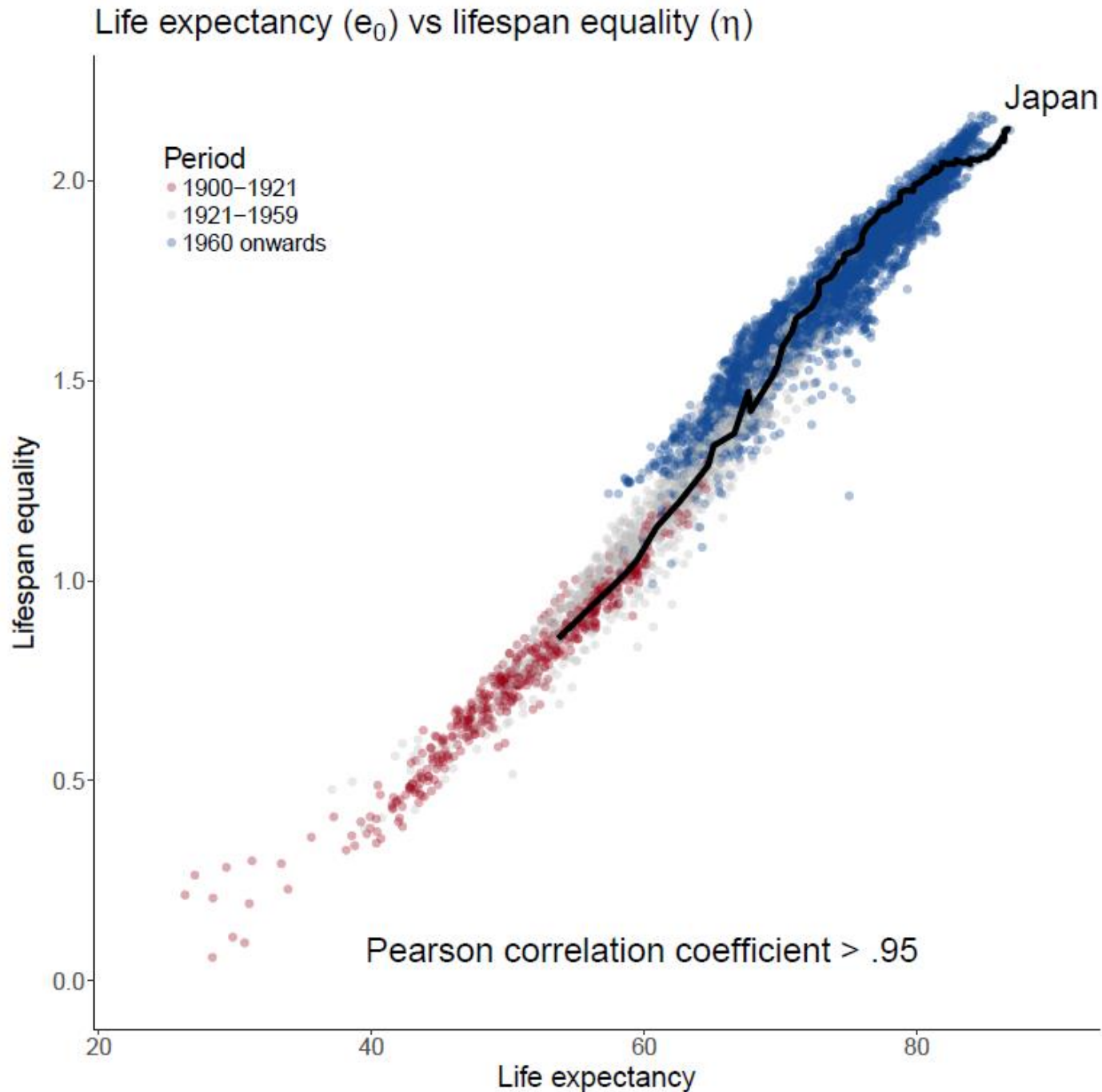
José Manuel Aburto, Maarten Wensink, Jim Vaupel, Rune Lindahl-Jacobsen

October 13, 2017



# The continuum of lifespan equality and life expectancy in primates.

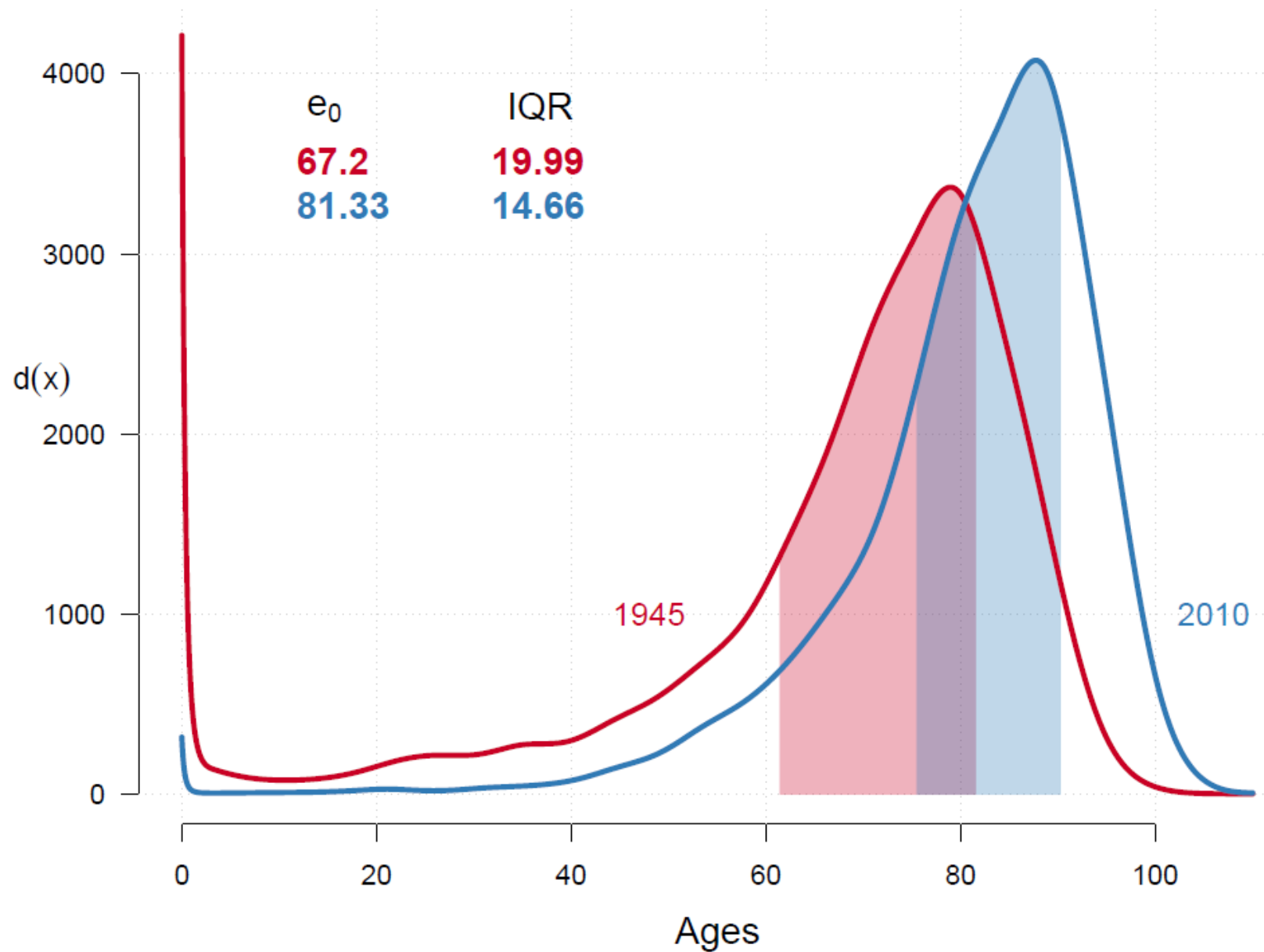




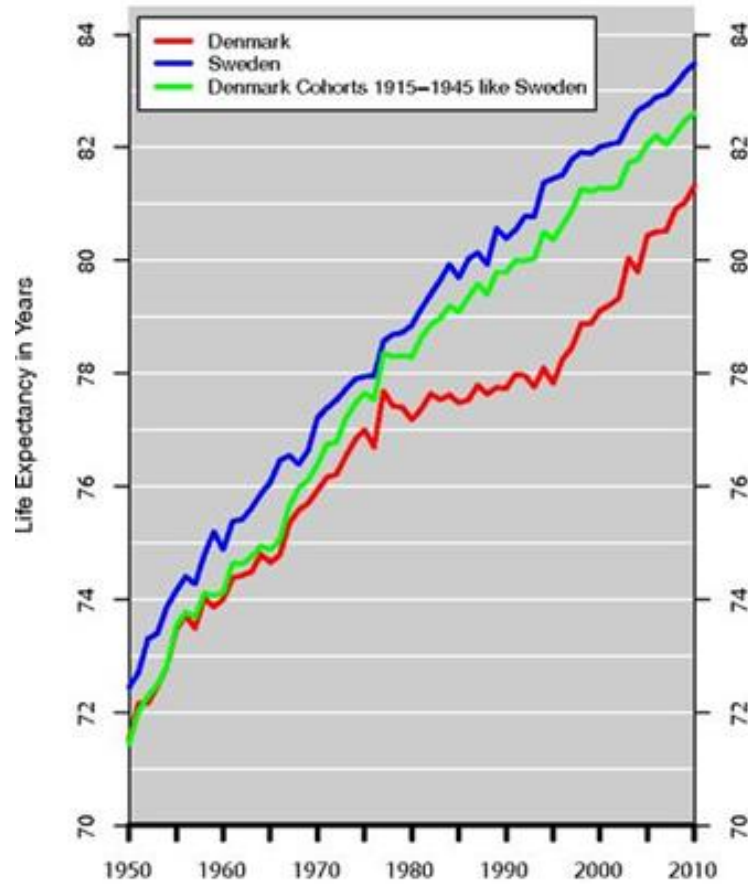
**Strong association  
life expectancy and  
equality**

$\eta = -\log(\text{Keyfitz' entropy})$

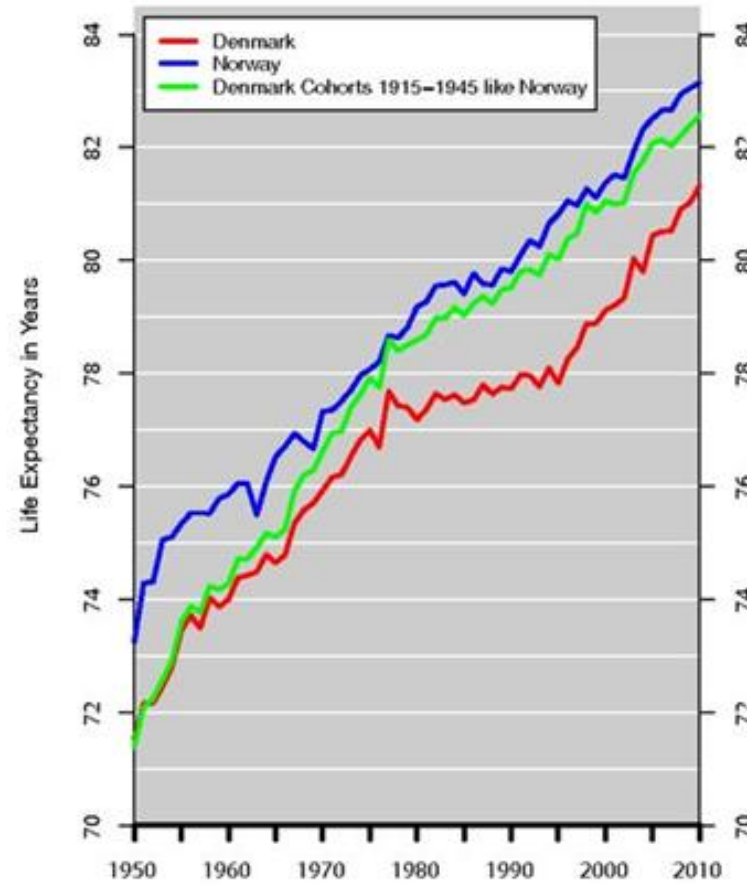
# Mortality distribution Danish females, 1945 vs 2010



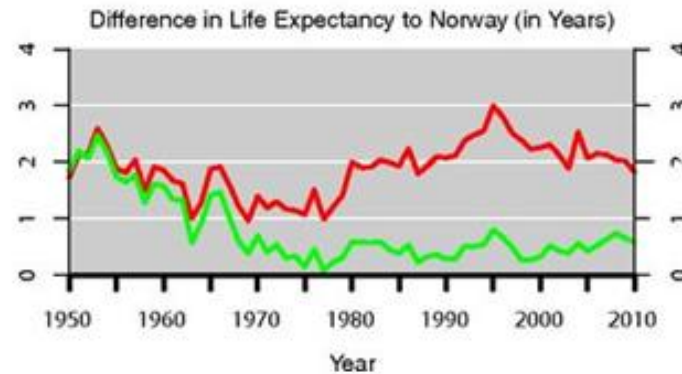
Denmark vs. Sweden Women



Denmark vs. Norway Women



**Danish female life expectancy and the role of the interwar cohort(s)**



So the questions came up..

1. ..what happened to life disparity during stagnation?
2. ..which causes contributed?
3. ..what should Denmark do now?

# Methods

- HMD 1960-2014 (one year)
- WHO cause of death data (five year, ungrouped)
- We decomposed lifespan (inequality) differences before, during, and after the stagnation of life expectancy by age and causes of death *within* Denmark (comparing periods).
- We quantify the cause-of-death contribution by age group to the difference between Denmark and Sweden (2014).

# Cause of death decomposition

- Stagnation known to be mostly due to smoking
- Smoking causes mainly:
  - (Specific types of) cancer
  - Cardiovascular diseases
  - Respiratory diseases
- Subject to the usual limitations
  - Causes are not partitionable (but are treated as such)
  - Gross overestimation of doctor's capabilities
  - Sizeable overestimation of coroner's capabilities



# Cause of death grouping

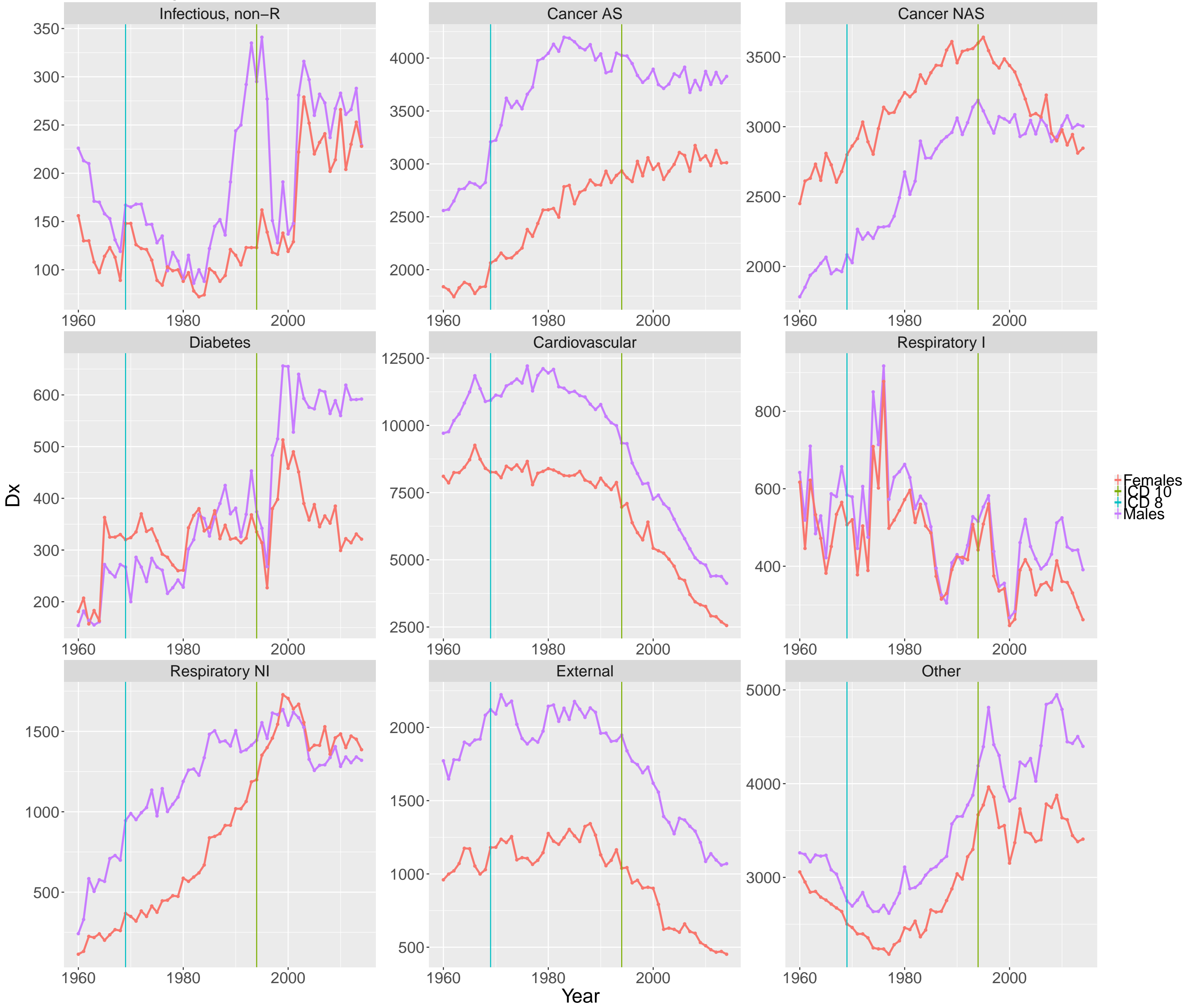
- Respiratory, infectious
- Respiratory, non-infectious
- Cancer, amenable to smoking
- Cancer, not amenable to smoking
- Cardiovascular
- External
- Other
- (Diabetes)
- (Infectious, non-respiratory)

# Across ICD classifications

- ICD-7, ICD-8 and ICD-10 for Denmark
- ICD-7, ICD-8, ICD-9 and ICD-10 for Sweden and Norway
- Cross-checked with other bridge codings
- Sensitivity analysis

# Denmark

Years of change in ICDs: 1969 and 1994

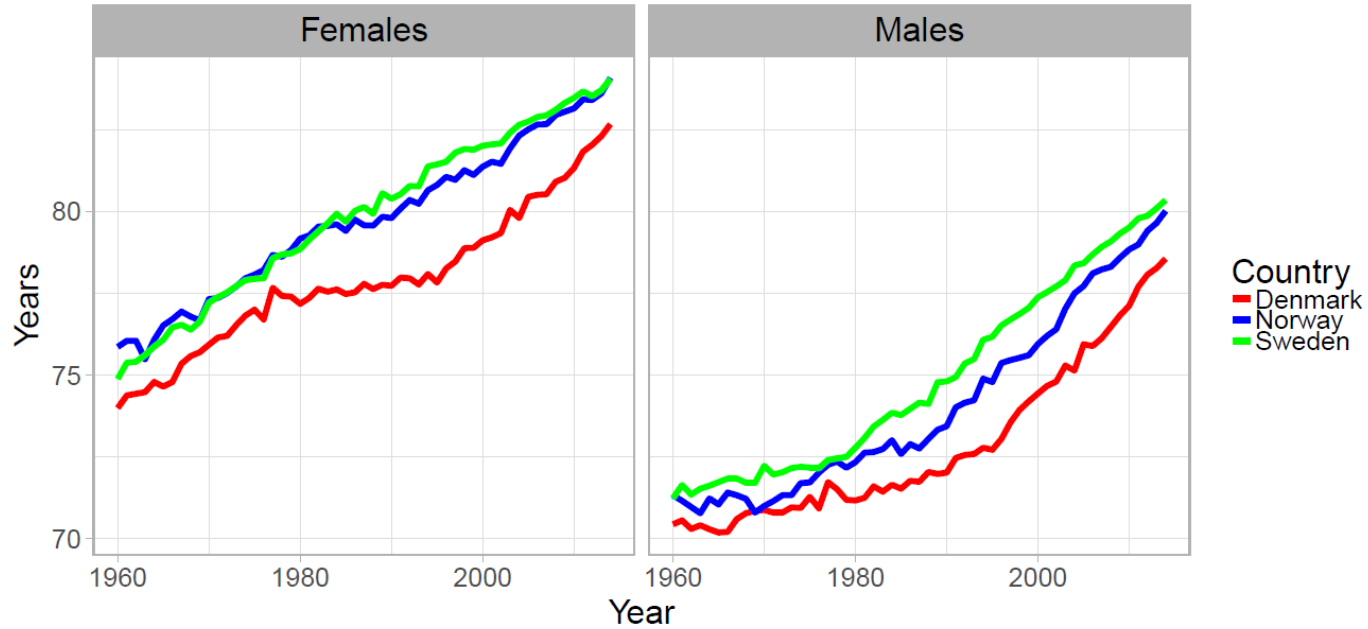


# Results

# Results

- Amazing

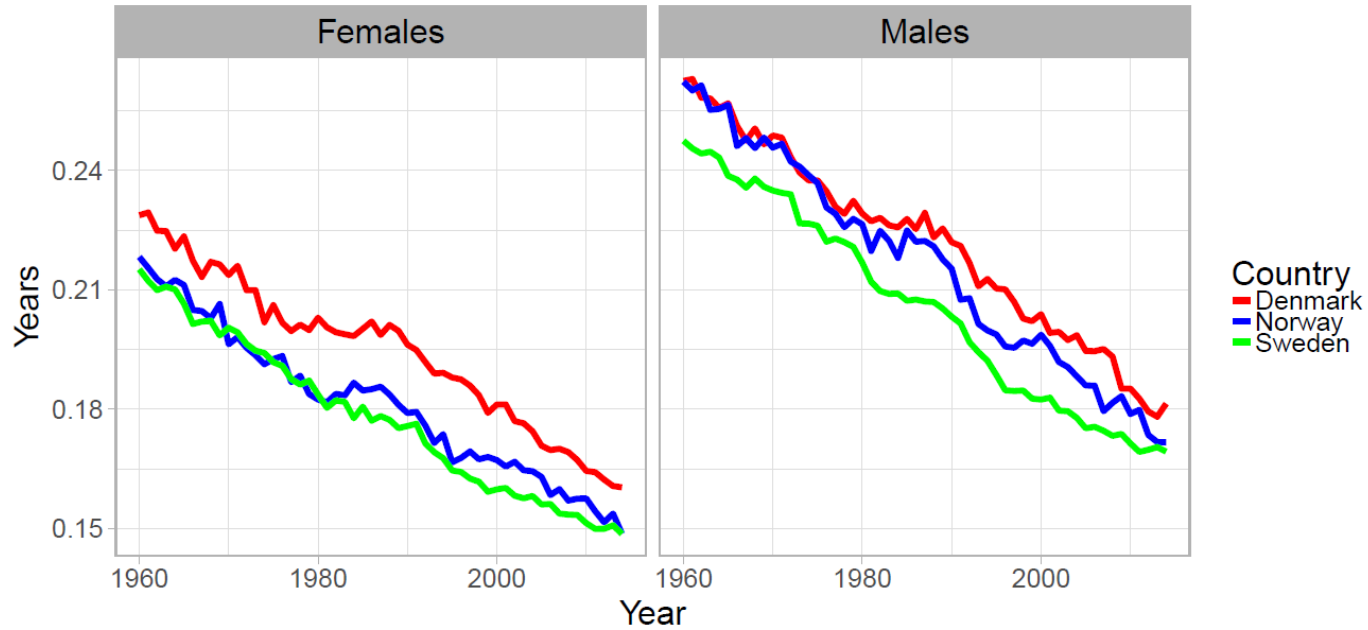
A Life expectancy at birth



# Life expectancy at birth and lifespan inequality in three Nordic countries

Lifespan inequality=CoV

B Lifespan inequality



# Keep in mind that:

- Sweden higher life expectancy than Denmark
  - Sweden minus Denmark is positive
  - This positive value is decomposed
- Sweden lower inequality than Denmark
  - Sweden minus Denmark is negative
  - This negative value is decomposed
- $2014-1939=75$ : some women of the interwar cohort are still dying
- $2014-1919=95$ : most women of the interwar cohort are dead

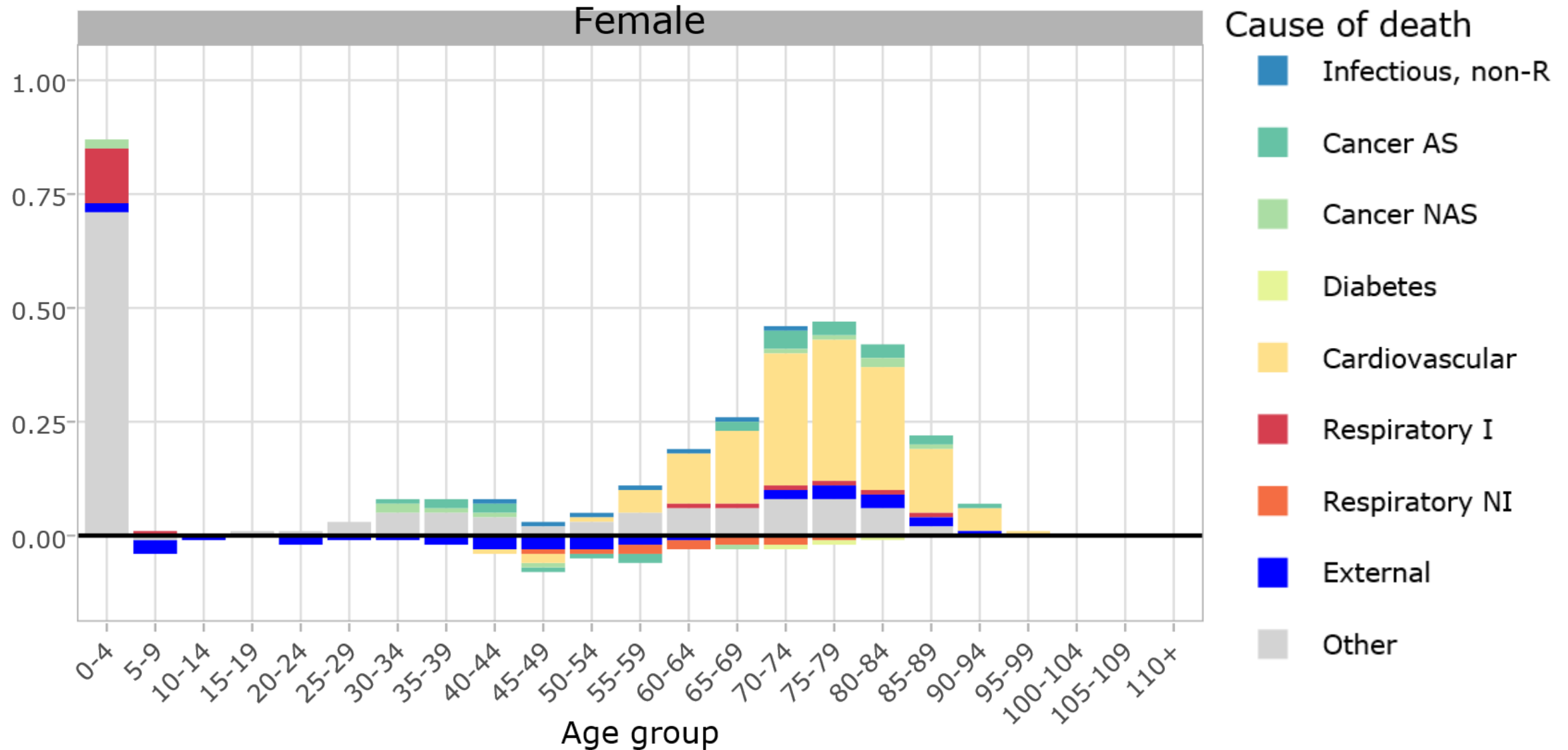
# Also keep in mind that:

- A reduction/increase in mortality may reduce/increase inequality depending on its timing.

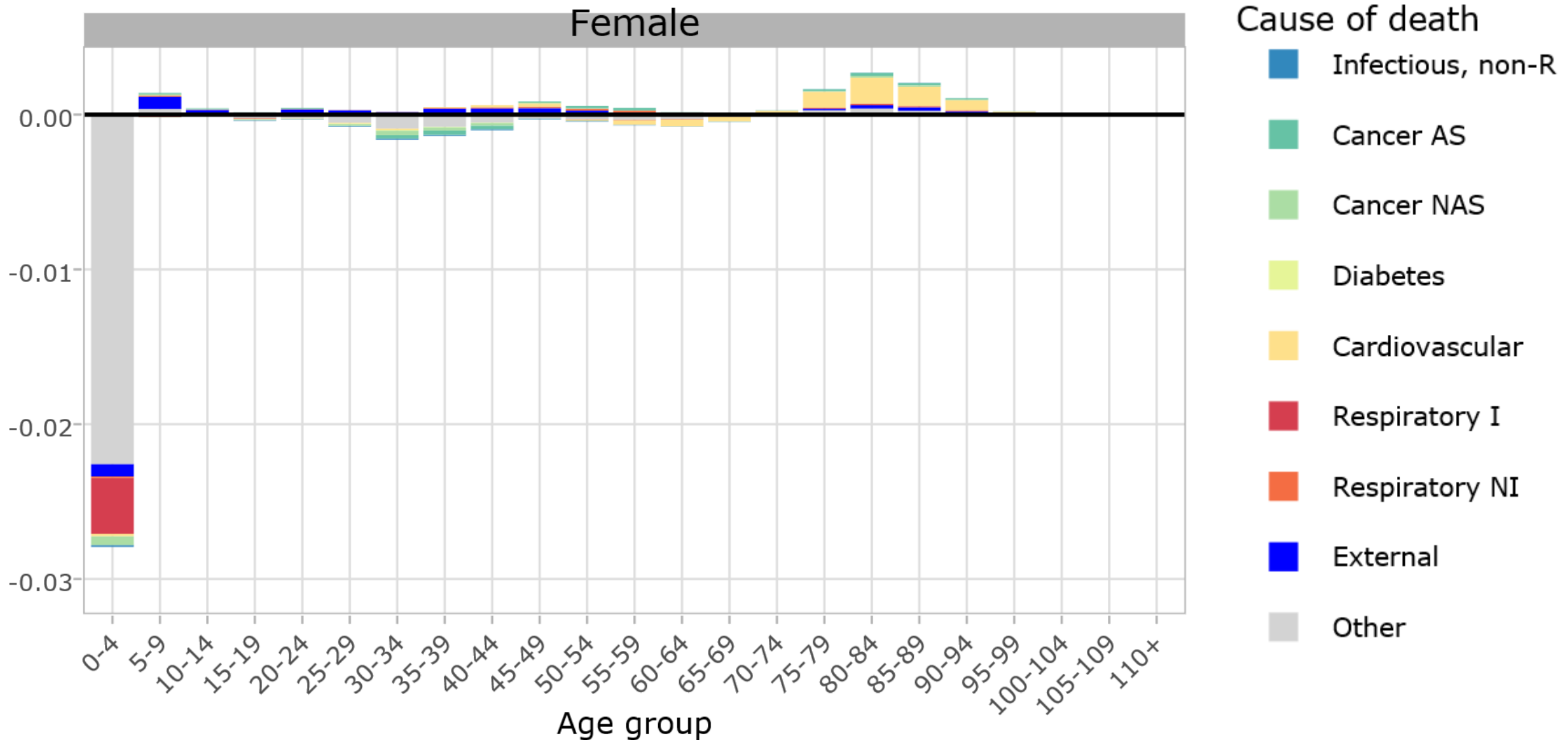
	Young Age	Old age
Mortality Increase	<b>Lifespan</b> ↓ <b>Inequality</b> ↑	<b>Lifespan</b> ↓ <b>Inequality</b> ↓
Mortality Decrease	<b>Inequality</b> ↓ <b>Lifespan</b> ↑	<b>Inequality</b> ↑ <b>Lifespan</b> ↑



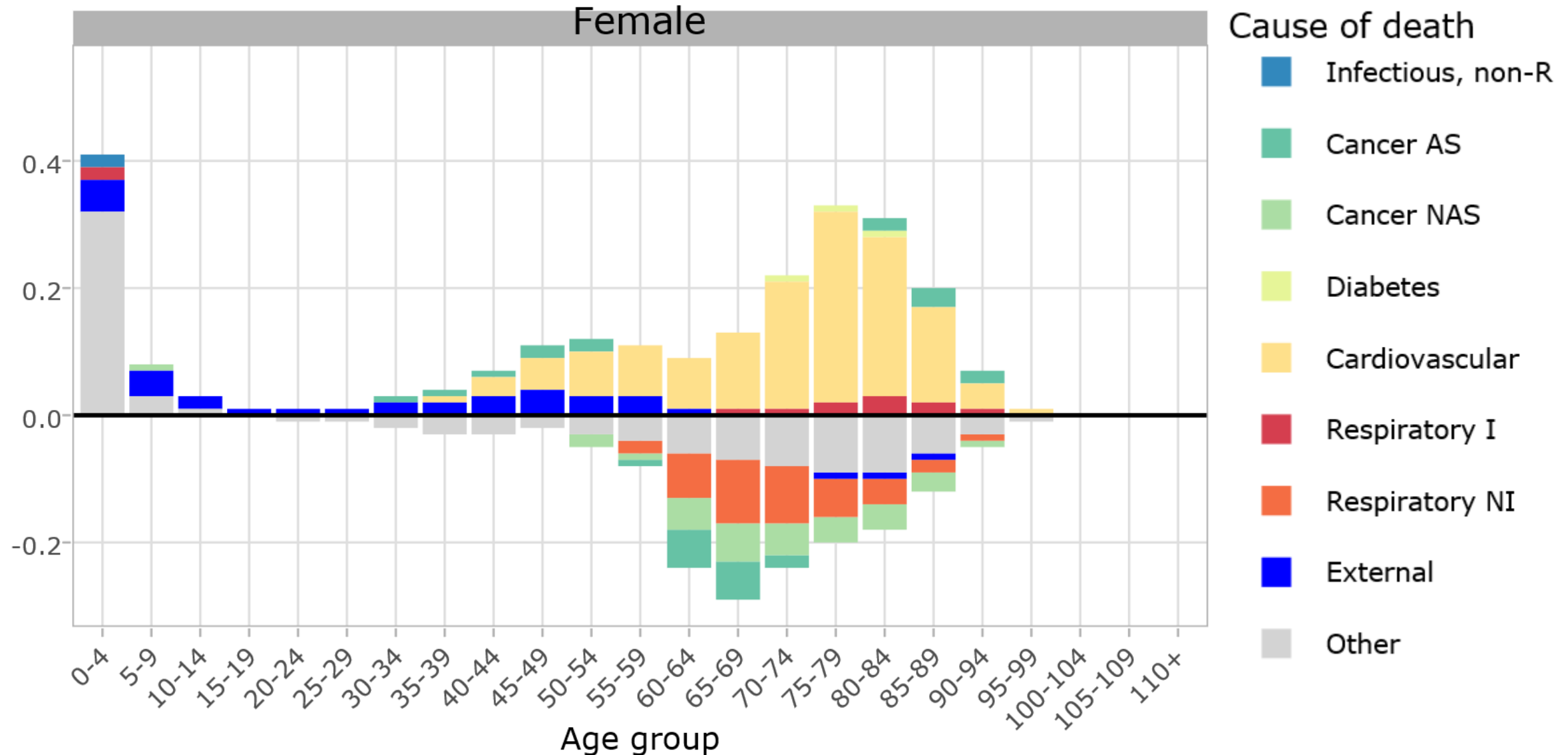
# Life expectancy 1975 vs 1960, Denmark



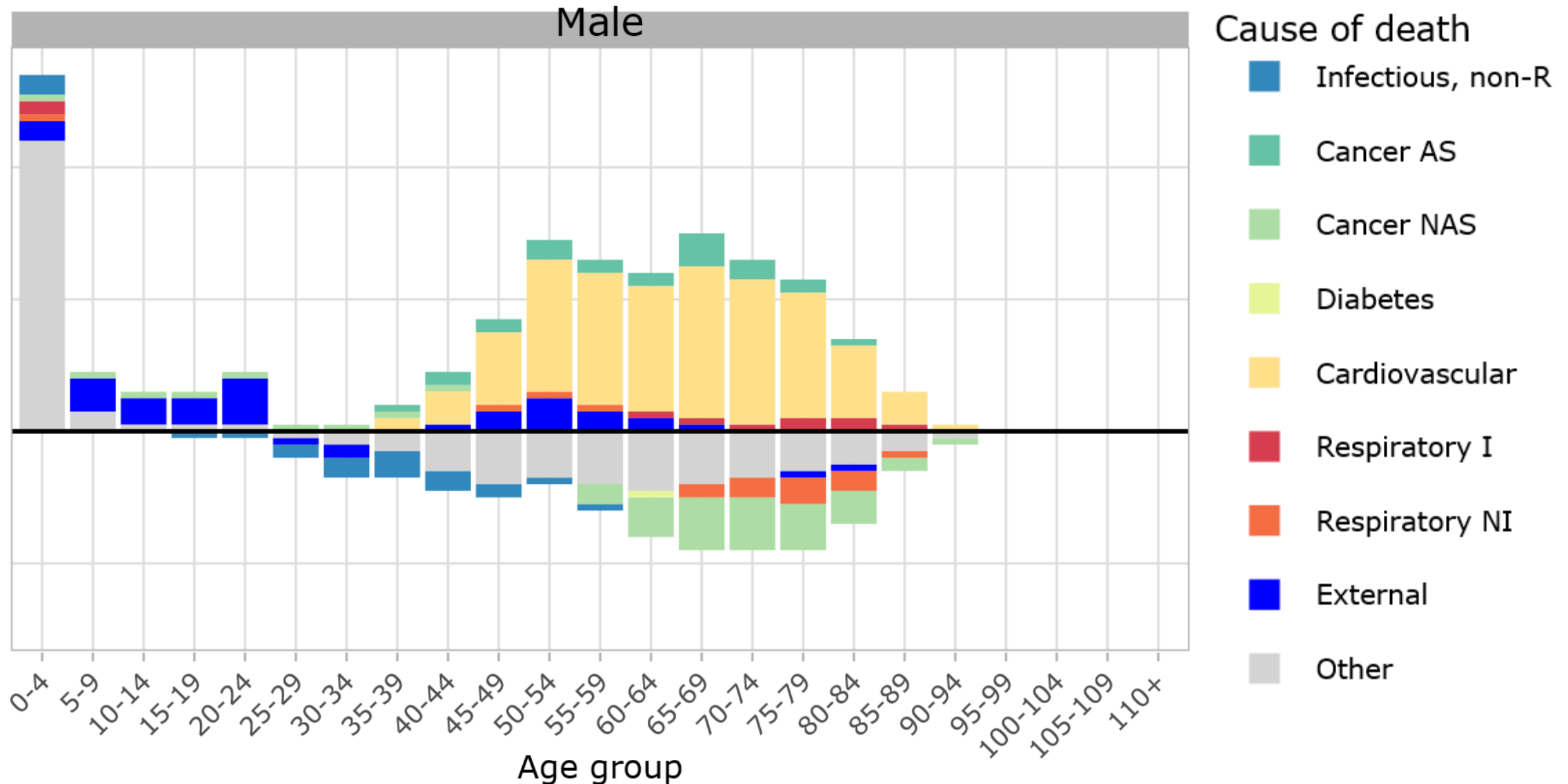
# Lifespan inequality 1975 vs 1960, Denmark



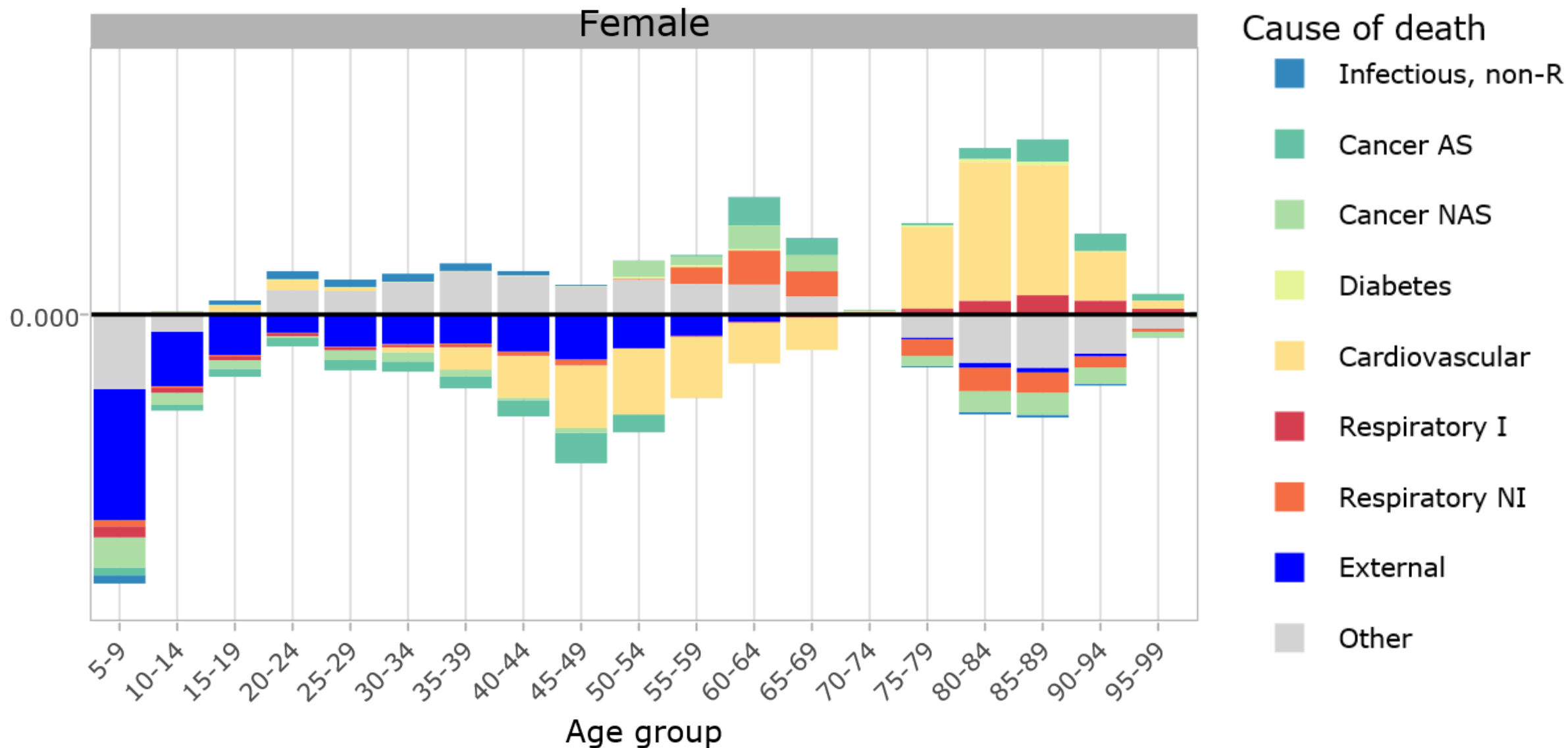
# Life expectancy 1995 vs 1975, Denmark



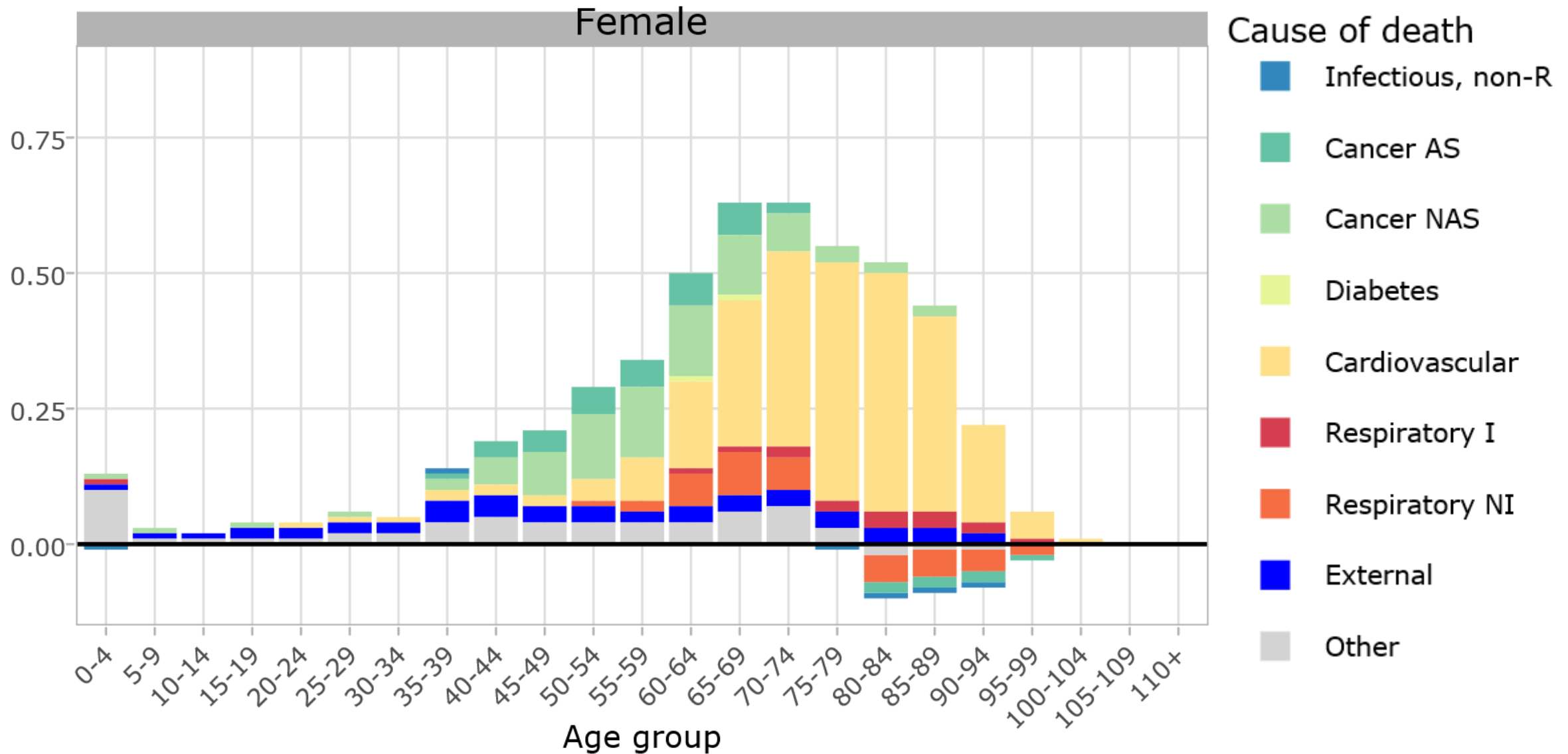
# Life expectancy 1995 vs 1975, Denmark



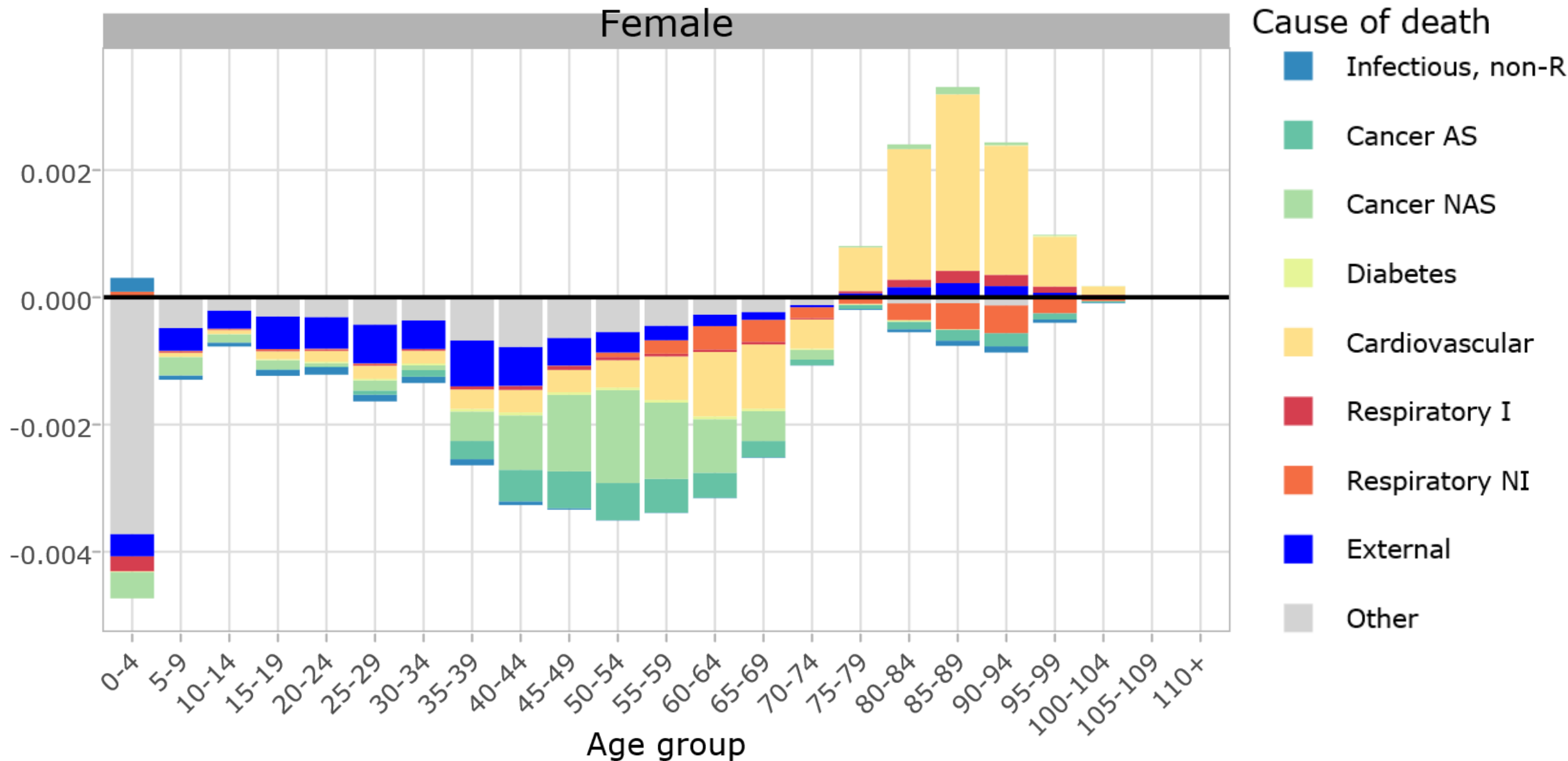
# Lifespan inequality 1995 vs 1975



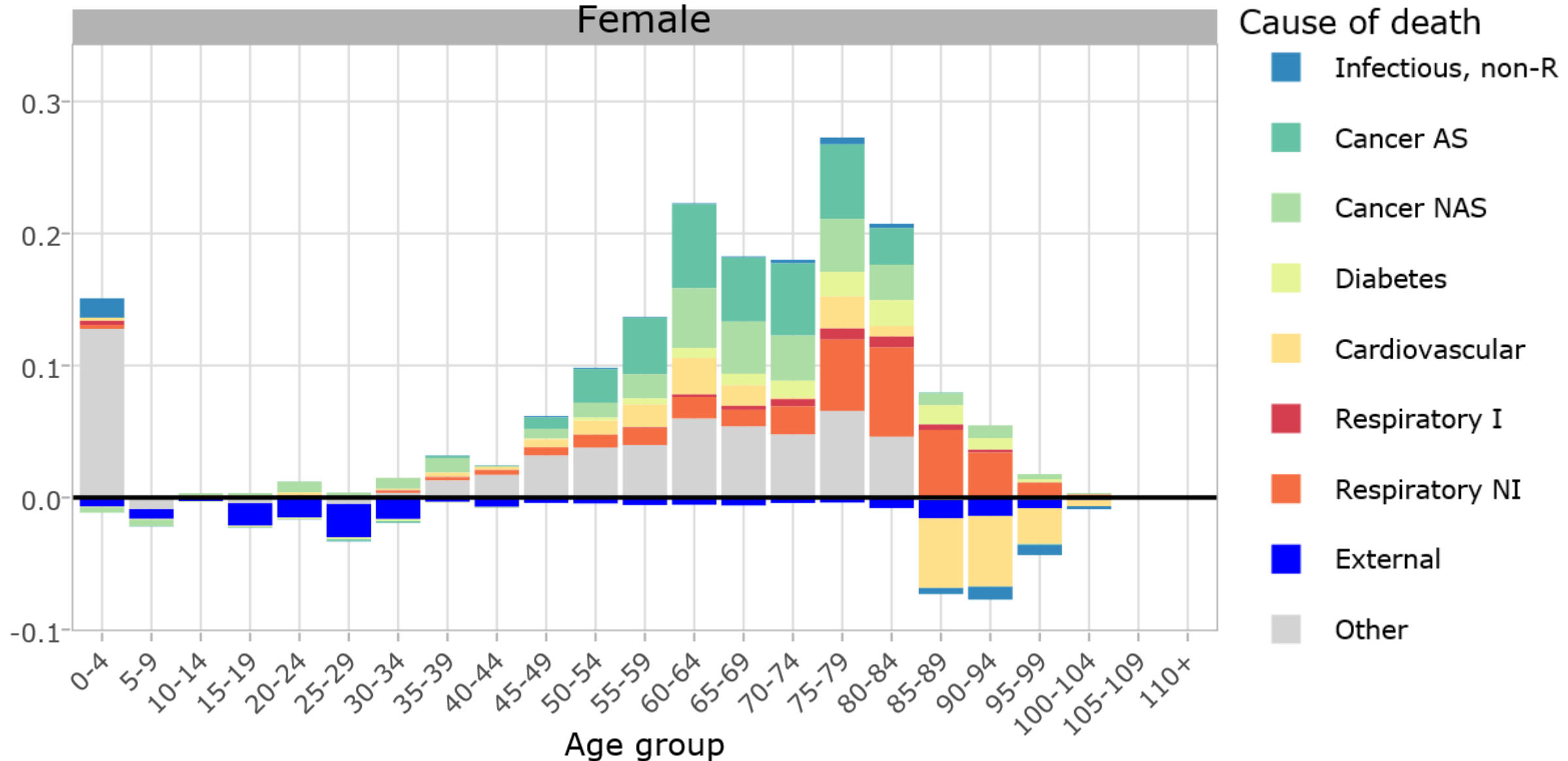
# Life expectancy 2014 vs 1995



# Lifespan inequality 2014 vs 1995

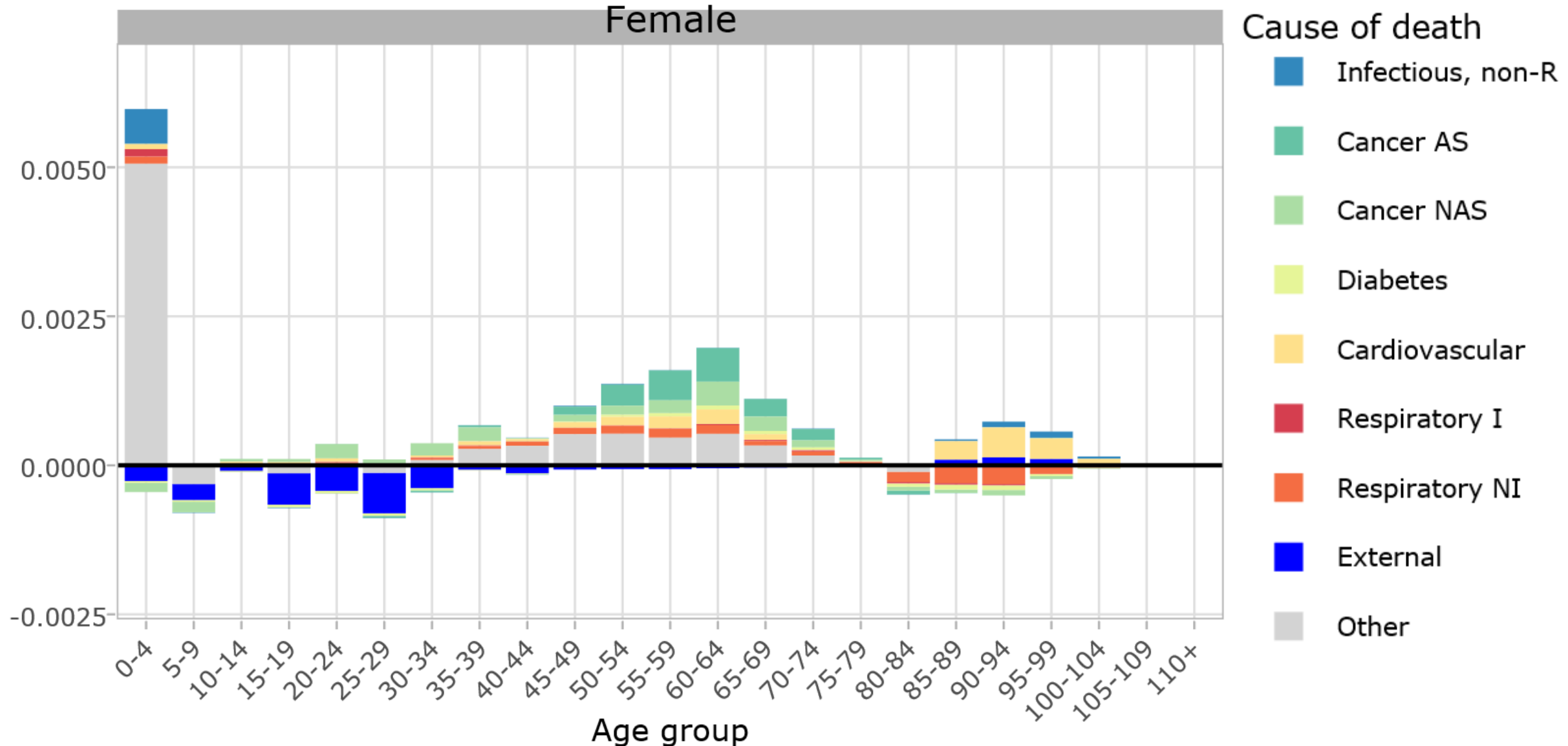


# Denmark vs Sweden, life expectancy, 2014





# Denmark vs Sweden, lifespan inequality, 2014



Thoughts?

# We had some ideas

- Cohort effects
- Partial life expectancy
  - Start smoking at age 15
  - Start dying from smoking at age 30
- Other interesting periods?
- Measure of inequality

# Lifespan inequality in Denmark, Sweden and Norway

Country

Denmark

Initial year

1975

Final year

1995

Comparison year

2014

Females

Year	L. Exp	L. Inequality
1975	77	0.20613
1995	77.83	0.18797
Difference	0.83	-0.01816

Males

Year	L. Exp	L. Inequality
1975	71.28	0.23749
1995	72.72	0.21034
Difference	1.44	-0.02715

Difference with Sweden

Indicator	Sex	
	Females	Males
Life expectancy	1.38	1.79
cv	-0.0117	-0.0121

Life expectancy and lifespan inequality trends

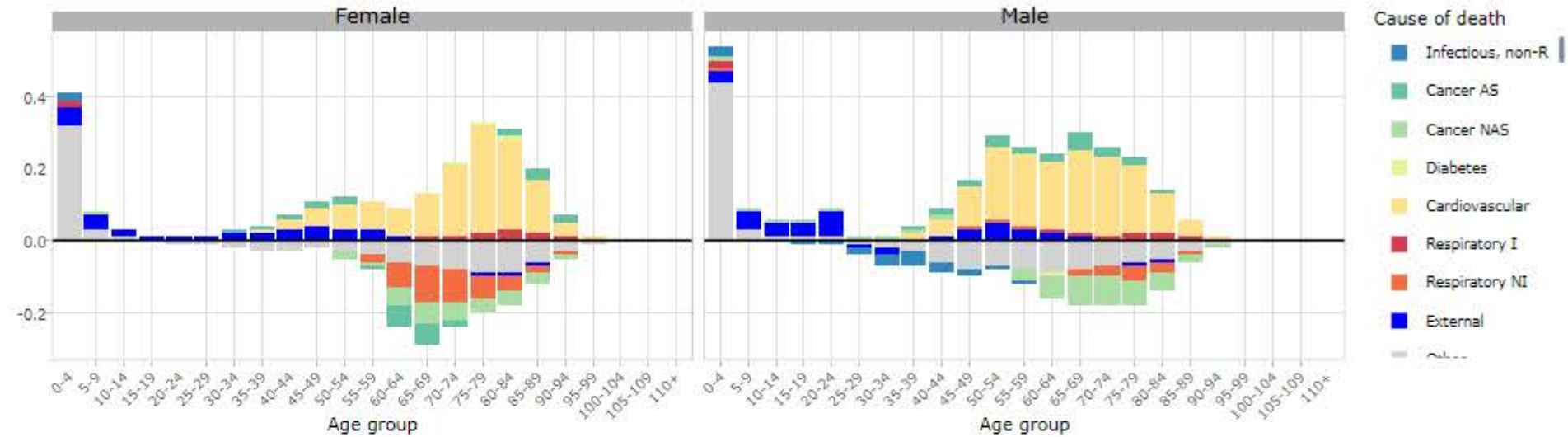
Decomposition results

Cause-specific summary

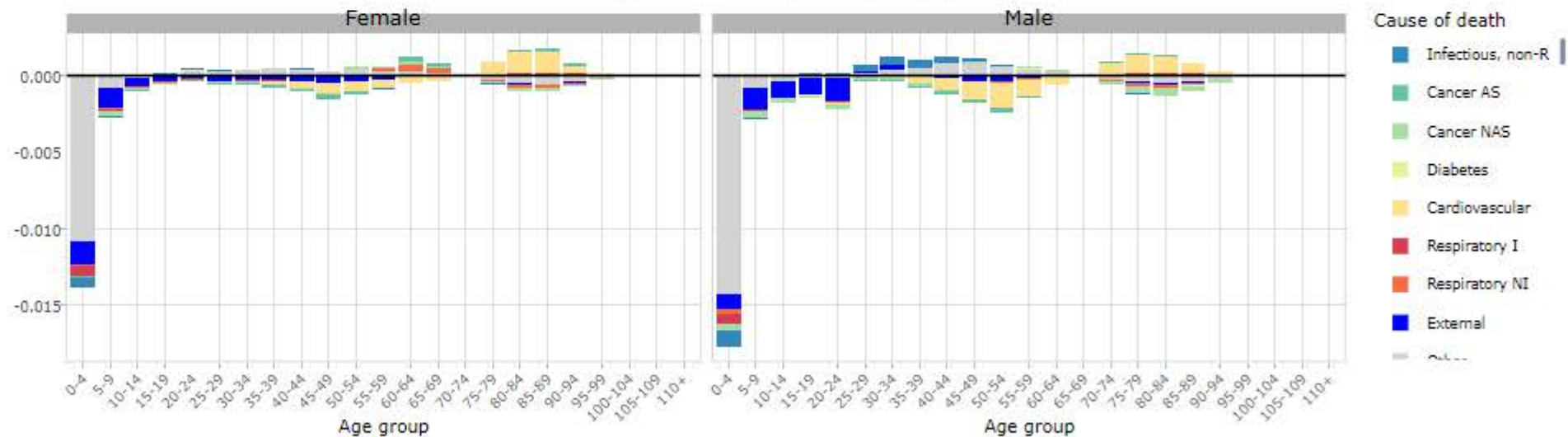
Comparison with Sweden

Early life ASMR

Decomposition of life expectancy (years)



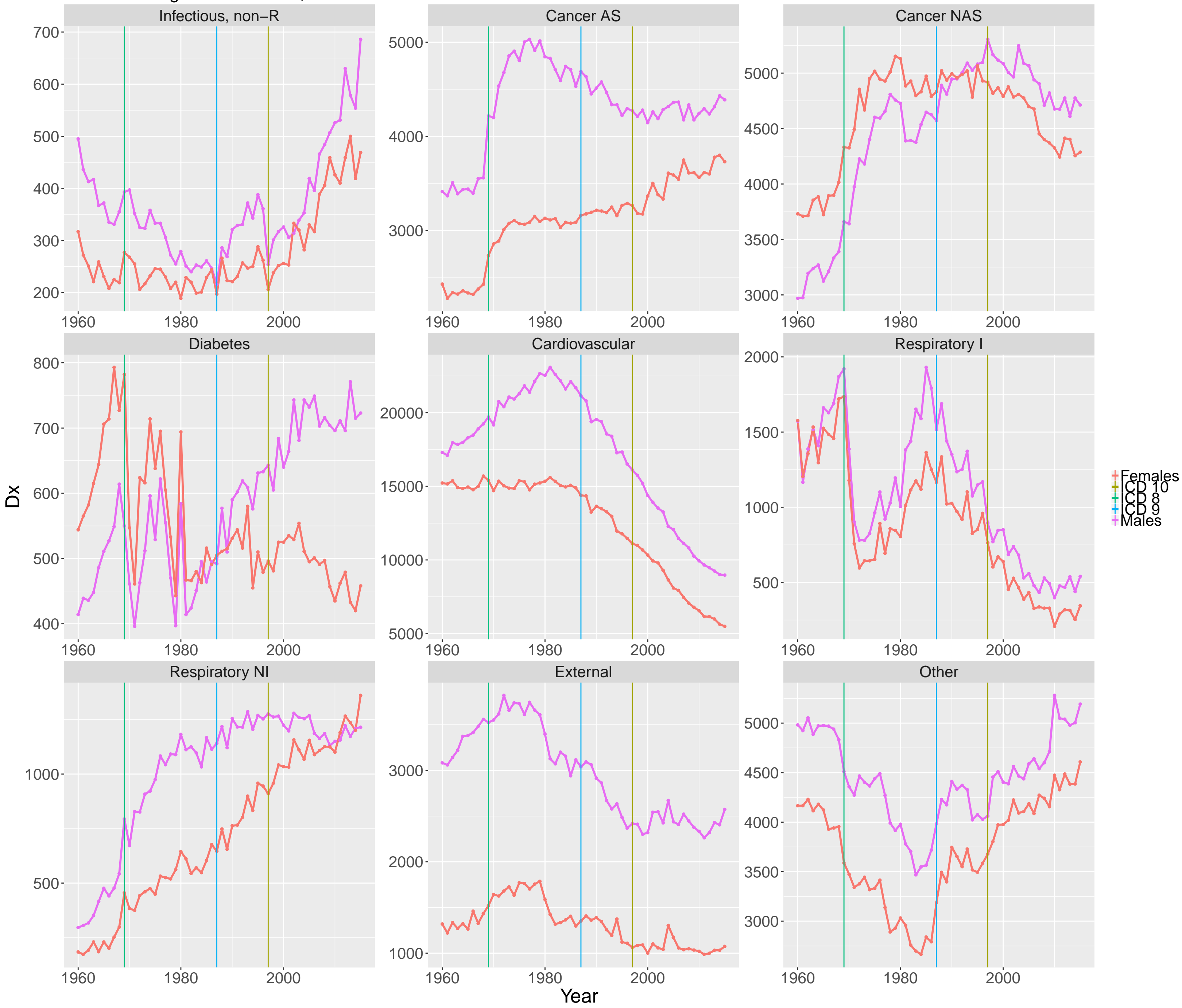
Decomposition of lifespan inequality (years)



[https://jmaburto.shinyapps.io/DK\\_App/](https://jmaburto.shinyapps.io/DK_App/)

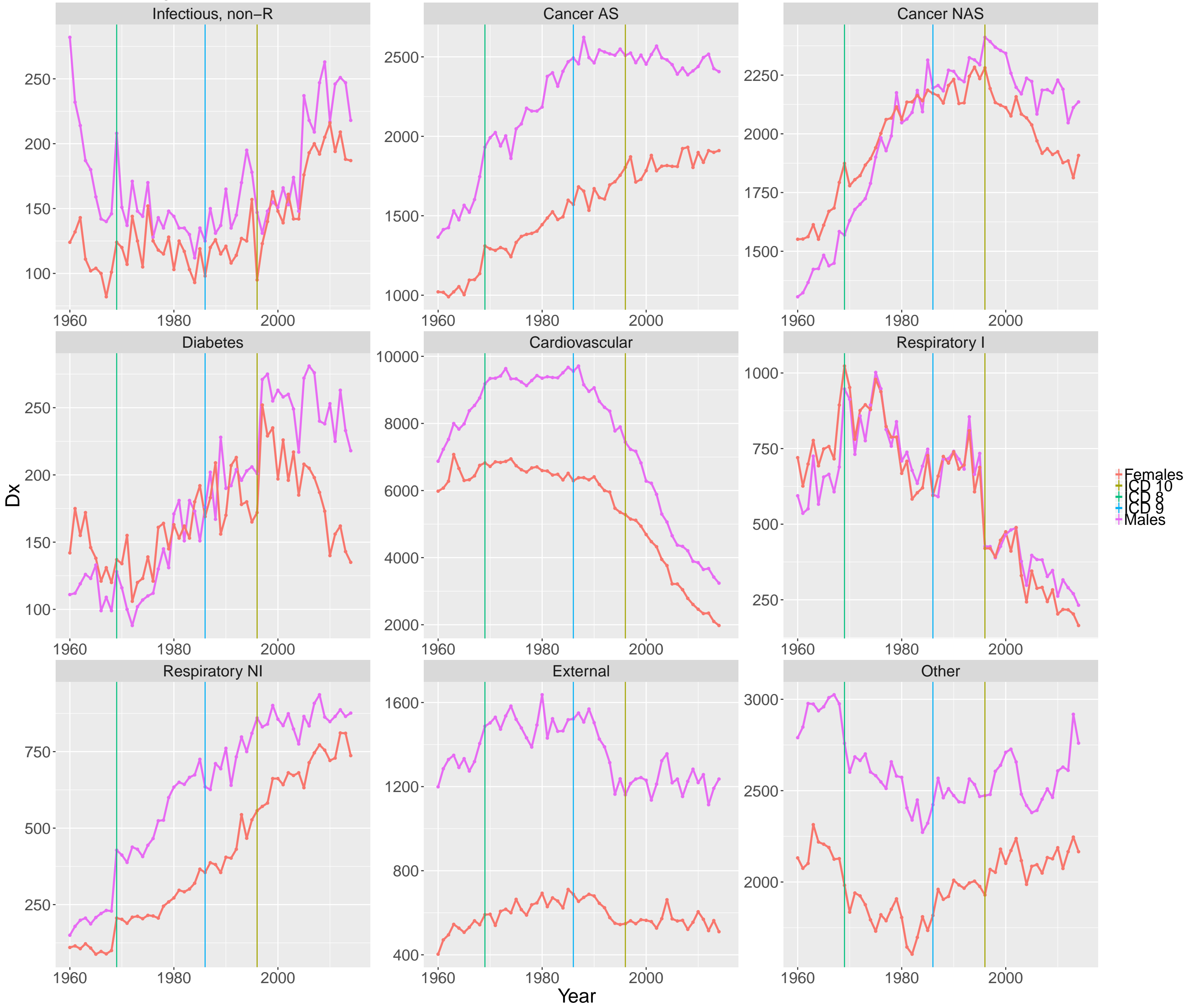
# Sweden

Years of change in ICDs: 1969, 1987 and 1997



# Norway

Years of change in ICDs: 1969, 1986 and 1996



# Finally, keep in mind that

- Cancer amenable to smoking  $\neq$  cancer attributable to smoking.
- Even lung cancer can be attracted without smoking.
- Discount results above age 85.
- What is being compared to what?