

# Socioeconomic Differences in Mortality in the United States 1982-2019

PRINCIPAL RESEARCHER MAGALI BARBIERI  
UC BERKELEY/INED



---

PRESENTED BY JEAN-MARC FIX, FSA, MAAA  
VP, R&D-BIOMETRIC RISKS  
OPTIMUM RE

# Research goals

---

- Measure levels and trends in county-level socioeconomic disparities in mortality
- Identify causes of death contributing to the gap in life expectancy (1982-2019).

# Methodological approach

---

- Construction of lifetable series for years 1982-2019 for all US counties grouped into 10 categories based on their population-level socioeconomic characteristics
- Calculation of cause-specific mortality rates by year and sex in each decile

# Data and sources

---

- Socioeconomic variables (by county)
  - 2000 Census
- Mortality (1982-2019)
  - Individual death records (NCHS), with sex, age, cause of death and county/state of residence
  - July 1st population estimates(Census Bureau), by sex, age and county/state of residence

# Methods

---

- Construction of a county-level Socioeconomic Index Score (SIS) using Principal Component Analysis
- Distribution of all U.S. counties in 10 groups (deciles) based on their SIS
- Calculation of lifetables for each county grouping using the Human Mortality Database methods
- Calculation of cause-specific age-standardized mortality rates by year, sex and SIS decile

# Socioeconomic score – Education & Employment

---

1. % pop. 25+ with <9 years of education
2. % pop. 25+ with 4+ years of college
3. % pop. 16+ in white collar occupations
4. Unemployment rate

## Socioeconomic score – Income

---

5. Median household income adj. for state median housing costs
6. Ratio of median income in 1st and 5th quintiles
7. % pop. < Federal poverty threshold

## Socioeconomic score – Housing

---

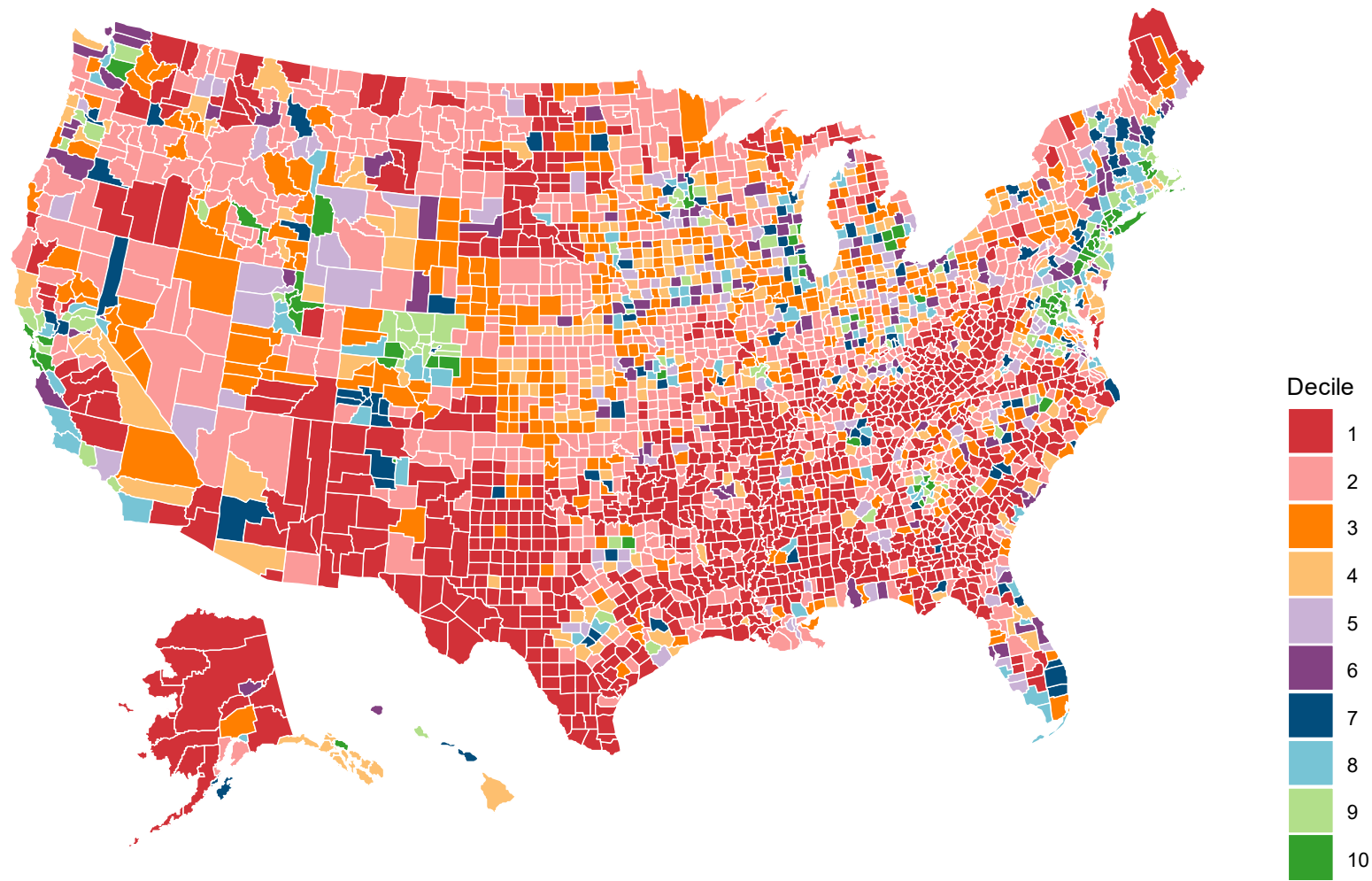
8. Median home value (owner occupied units)
9. Median gross rent
10. % housing with no telephone
11. % housing with no or incomplete plumbing



# Construction of socioeconomic deciles

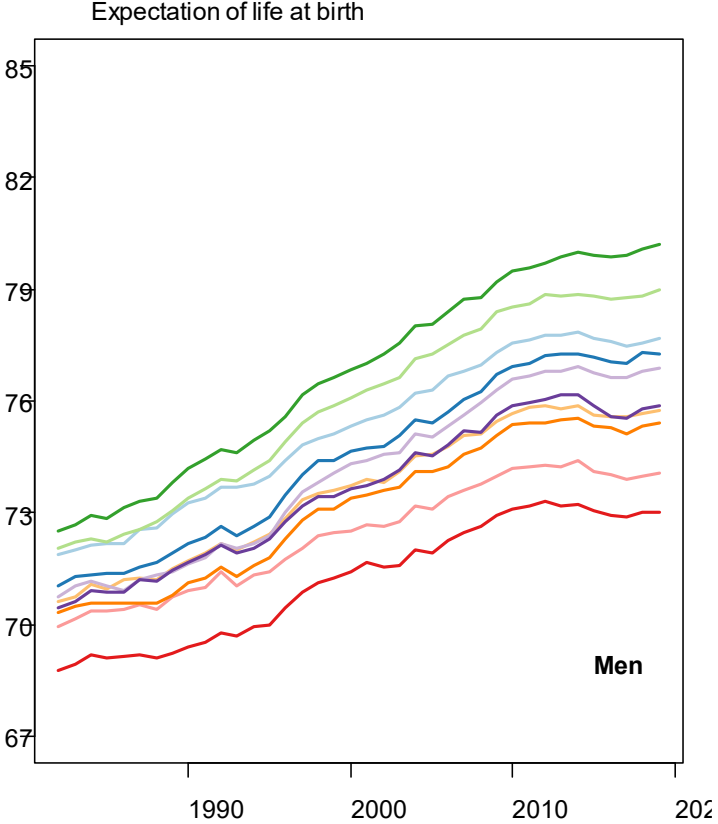
---

- Extraction/calculation of socioeconomic variables from 2000 census
- Principal Component Analysis
  - Normalization of variables
  - Construction of variance/covariance matrix
  - Extraction of principal components
- Correlations on 1st component applied to each variable to build the SIS
- Ranking of counties on the SIS
- Splitting into 10 groups (deciles) after weighing by population size

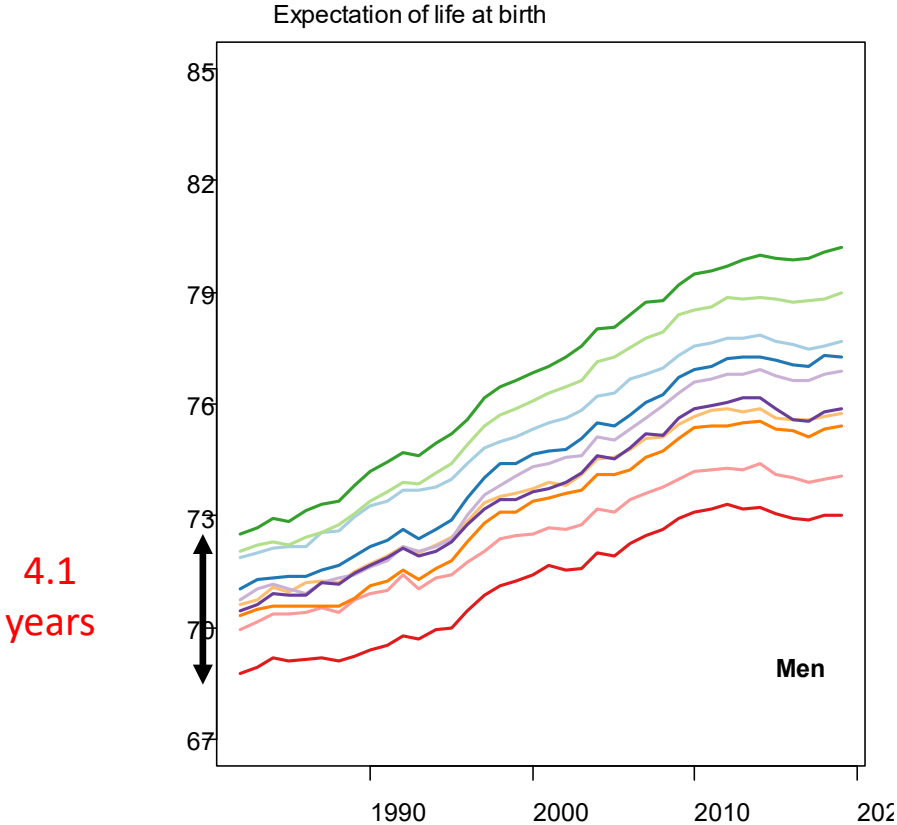


# Distribution of counties by socioeconomic deciles in 2000

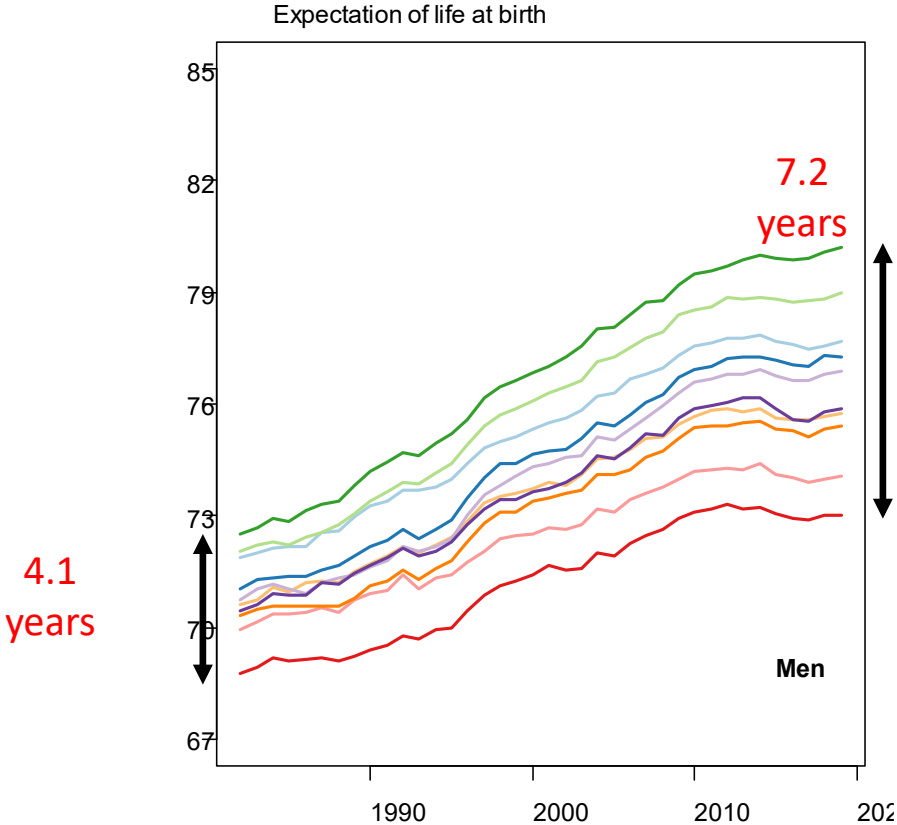
# County-level socioeconomic inequalities in mortality



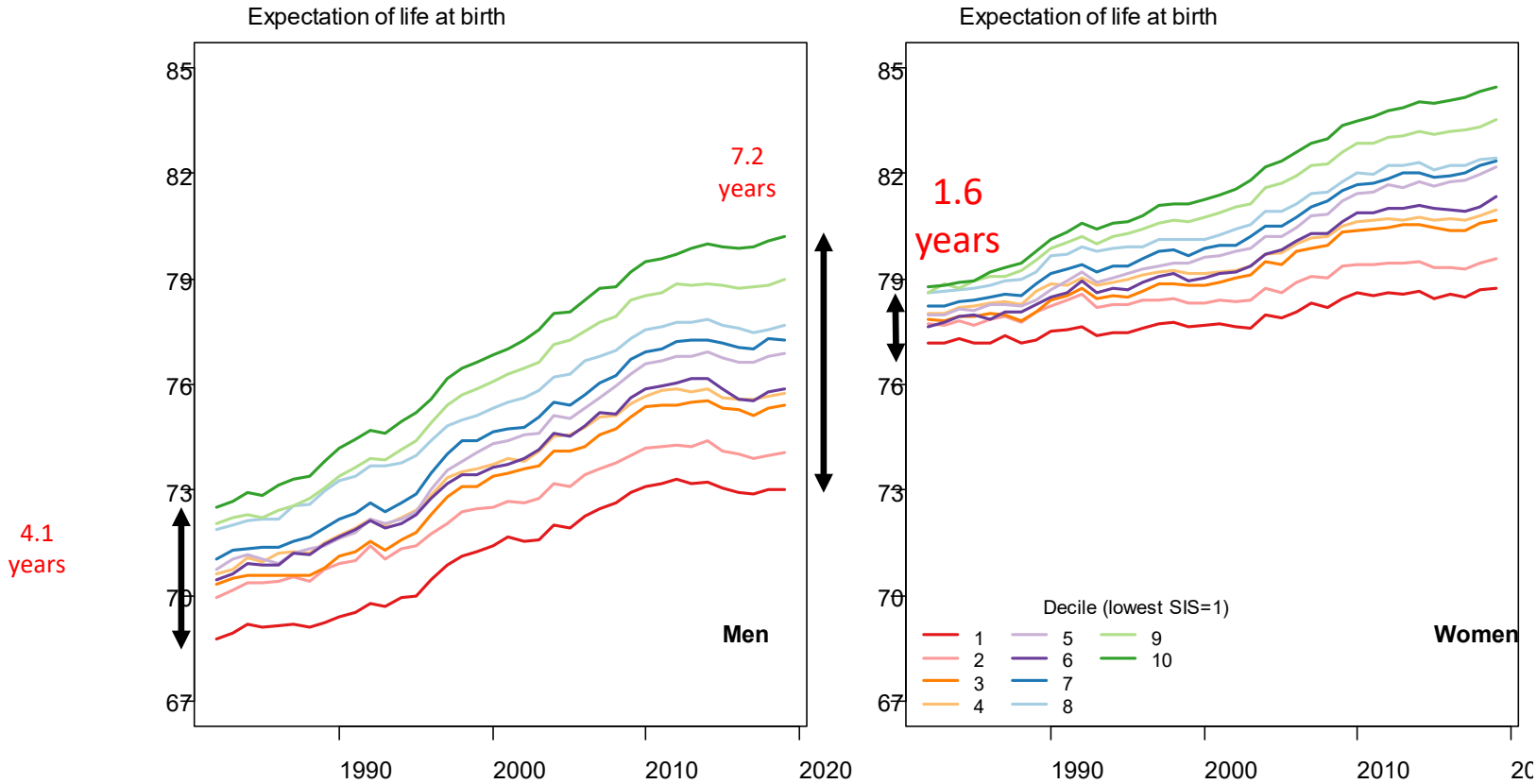
# County-level socioeconomic inequalities in mortality



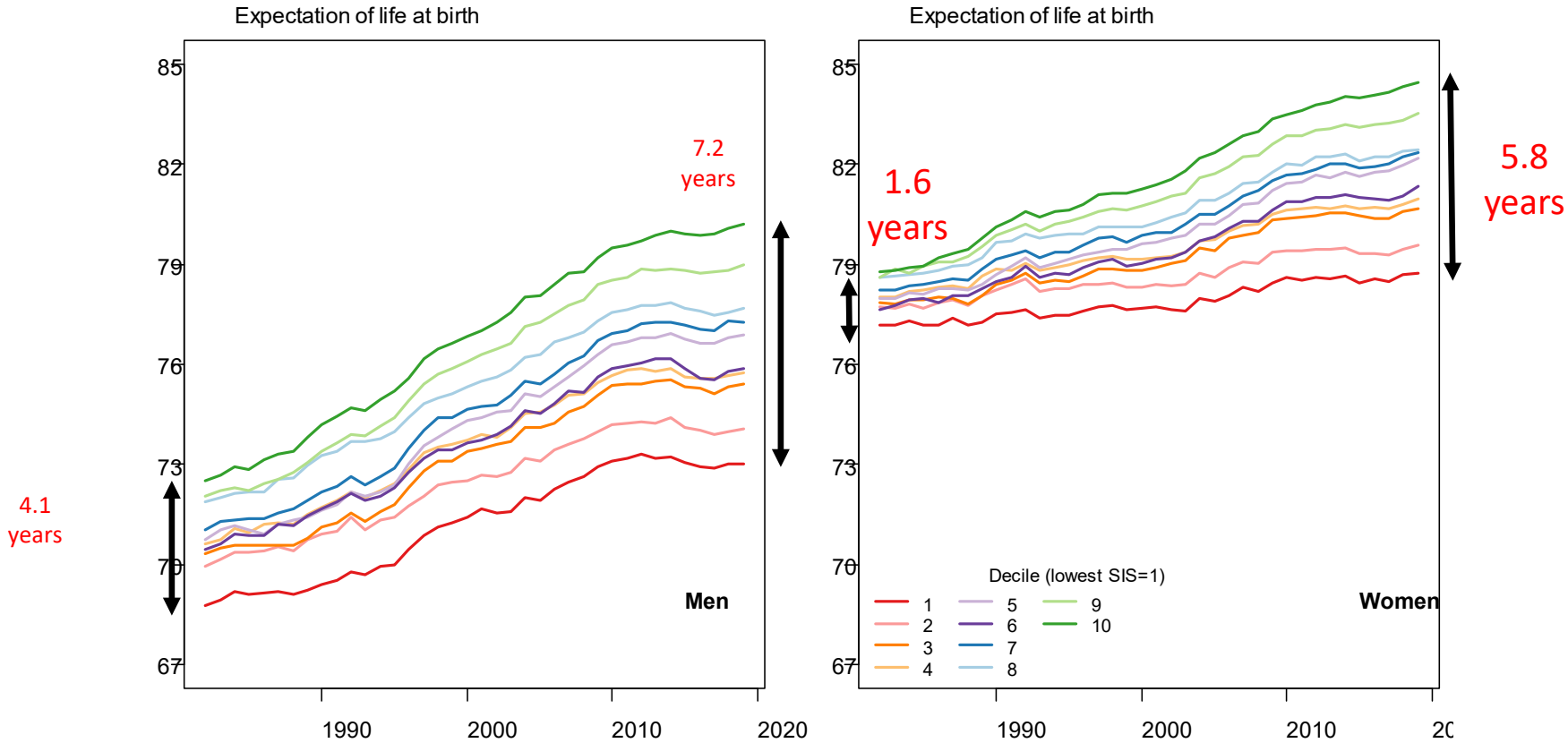
# County-level socioeconomic inequalities in mortality



# County-level socioeconomic inequalities in mortality



# County-level socioeconomic inequalities in mortality

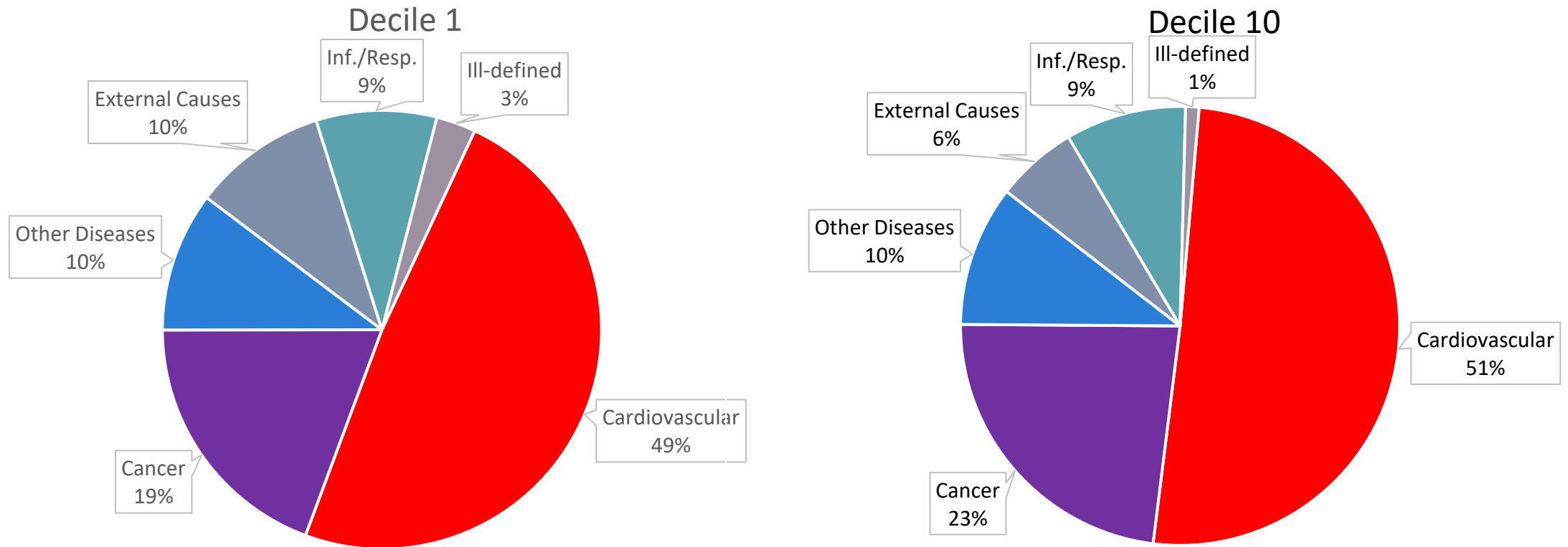


# Cause Specific ASDR 1982 vs. 2019

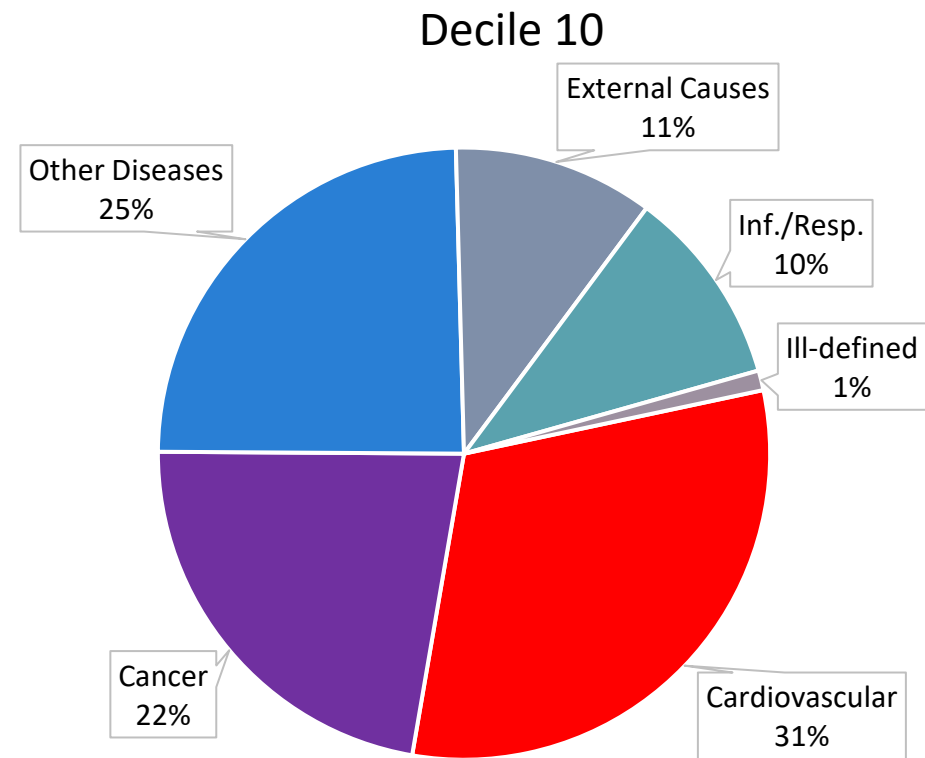
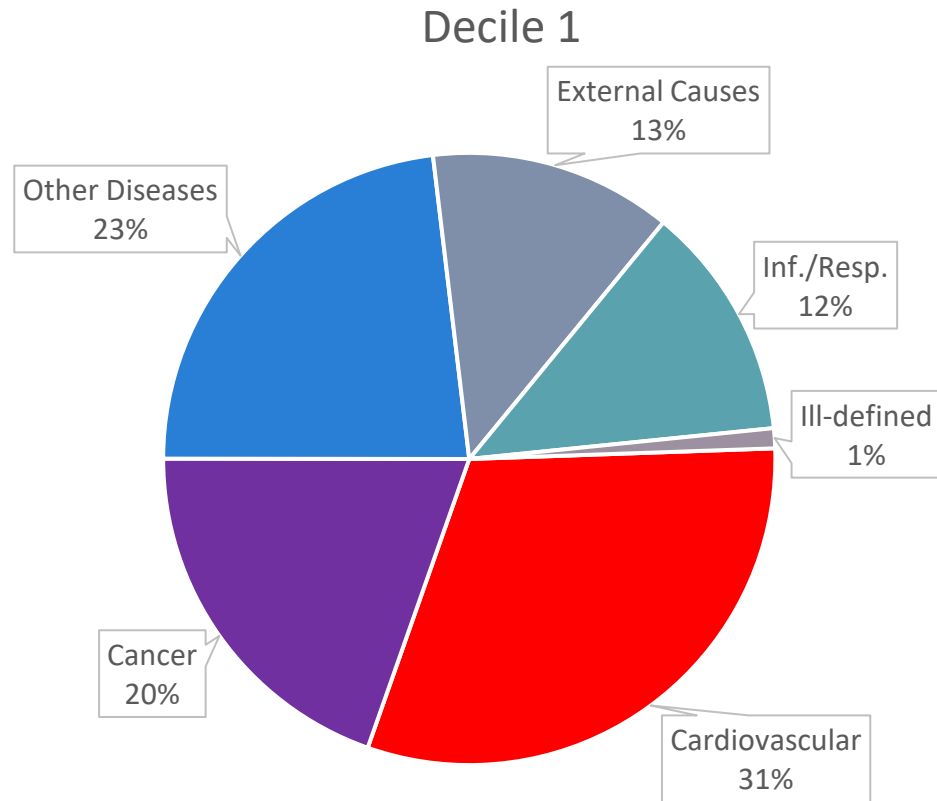
Cause of death category	Age-standardized death rate per 100,000							
	Men				Women			
	1982		2019		1982		2019	
	D1	D10	D1	D10	D1	D10	D1	D10
Cardiovascular	686	614	323	208	436	388	210	135
Cancer	272	281	205	150	157	181	141	113
Other diseases	145	126	241	164	109	92	204	134
External causes	139	73	134	71	54	53	53	28
Infectious/Respir.	125	108	130	70	41	29	98	52
Ill-defined	41	12	11	7	22	8	8	5
All	1408	1215	1043	670	818	751	715	467



# Cause Specific ASDR 1982 Men



# Cause Specific ASDR 2019 Men

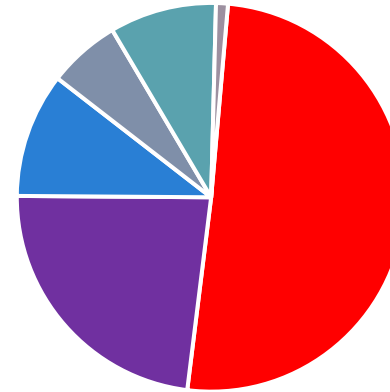
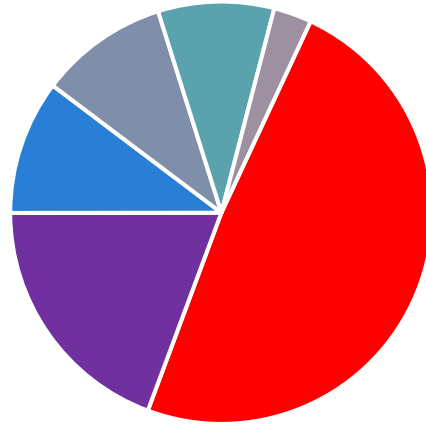


# ASDR Men

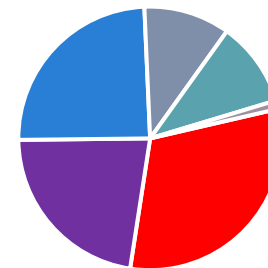
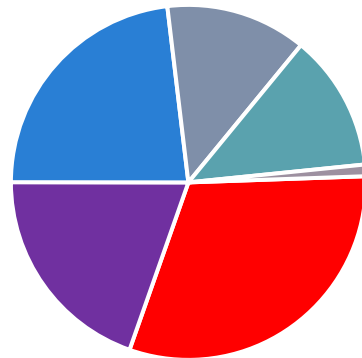
## Decile 1

## Decile 10

1982



2019

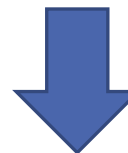
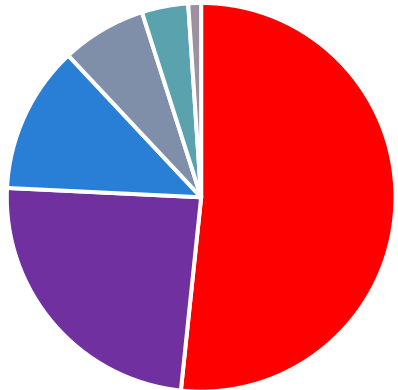


# ASDR Women

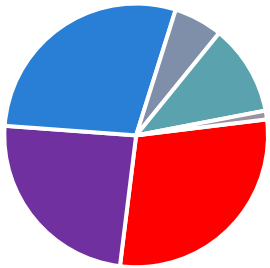
## Decile 1

## Decile 10

1982



2019



# Cause specific ASDR 1982 vs. 2019

Cause of death category	Age-standardized death rate per 100,000							
	Men				Women			
	1982		2019		1982		2019	
	D1	D10	D1	D10	D1	D10	D1	D10
Cardiovascular	686	614	323	208	436	388	210	135
Cancer	272	281	205	150	157	181	141	113
Other diseases	145	126	241	164	109	92	204	134
External causes	139	73	134	71	54	53	53	28
Infectious/Respir.	125	108	130	70	41	29	98	52
Ill-defined	41	12	11	7	22	8	8	5
All	1408	1215	1043	670	818	751	715	467

# COD contribution to increasing gradient

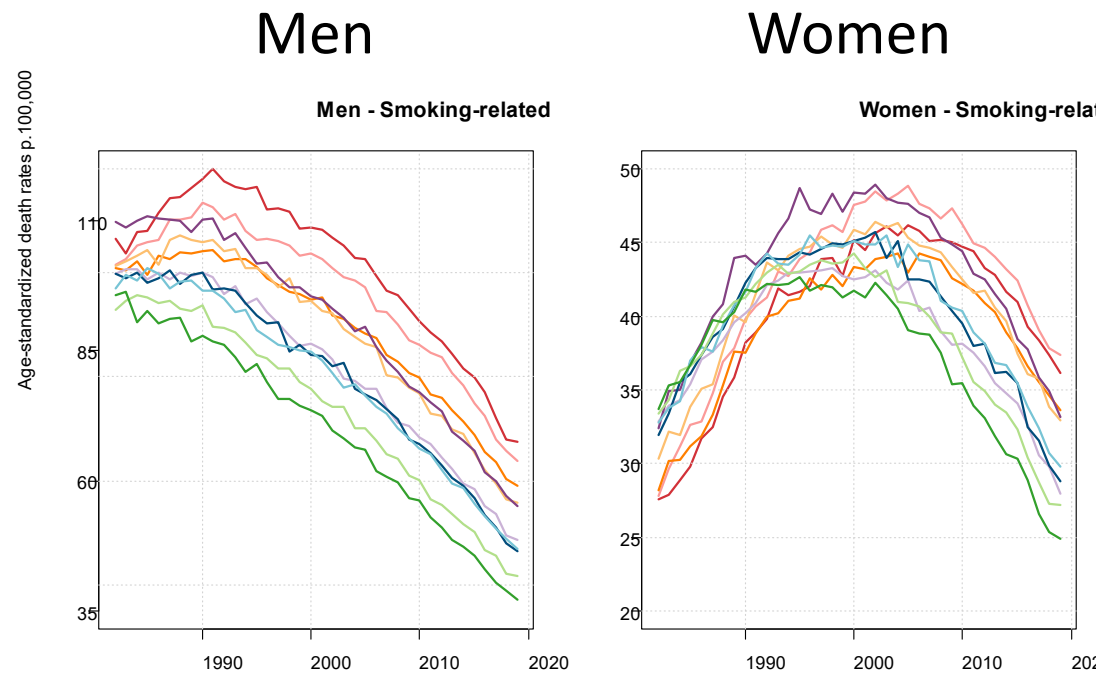
Cause of death category	Difference in the ASDR between decile 1 and decile 10							
	Men				Women			
	1982	2019	Diff.	% diff.	1982	2019	Diff.	% diff.
Cardiovascular	72	115	43	23.8	48	75	28	15.3
Cancer	-9	55	64	35.7	-24	28	52	28.8
Other diseases	19	77	57	31.8	17	71	54	29.9
External causes	66	63	-3	-1.7	1	25	24	13.2
Infectious/Respir.	16	60	43	24.0	12	46	34	19.0
Ill-defined	29	4	-25	-13.6	14	3	-11	-6.1
All	193	374	181	100.0	68	248	181	100.0

# COD contribution to increasing gradient

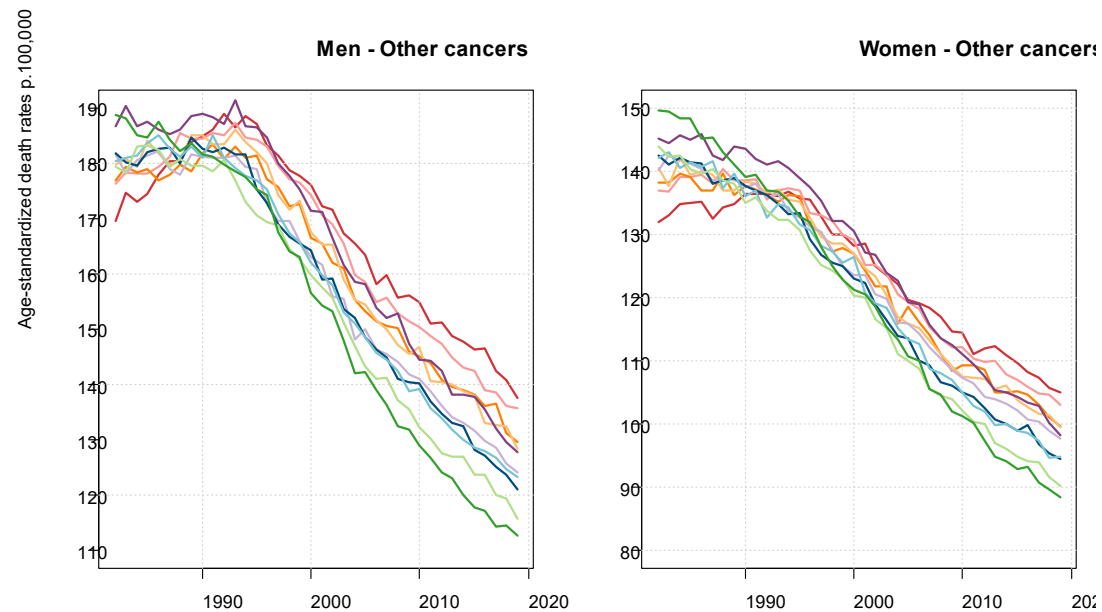
Cause of death category	Difference in the ASDR between decile 1 and decile 10							
	Men				Women			
	1982	2019	Diff.	% diff.	1982	2019	Diff.	% diff.
Cardiovascular	72	115	43	23.8	48	75	28	15.3
Cancer	-9	55	64	35.7	-24	28	52	28.8
Other diseases	19	77	57	31.8	17	71	54	29.9
External causes	66	63	-3	-1.7	1	25	24	13.2
Infectious/Respir.	16	60	43	24.0	12	46	34	19.0
Ill-defined	29	4	-25	-13.6	14	3	-11	-6.1
All	193	374	181	100.0	68	248	181	100.0

# Cancer Mortality (age adjusted)

Smoking  
related

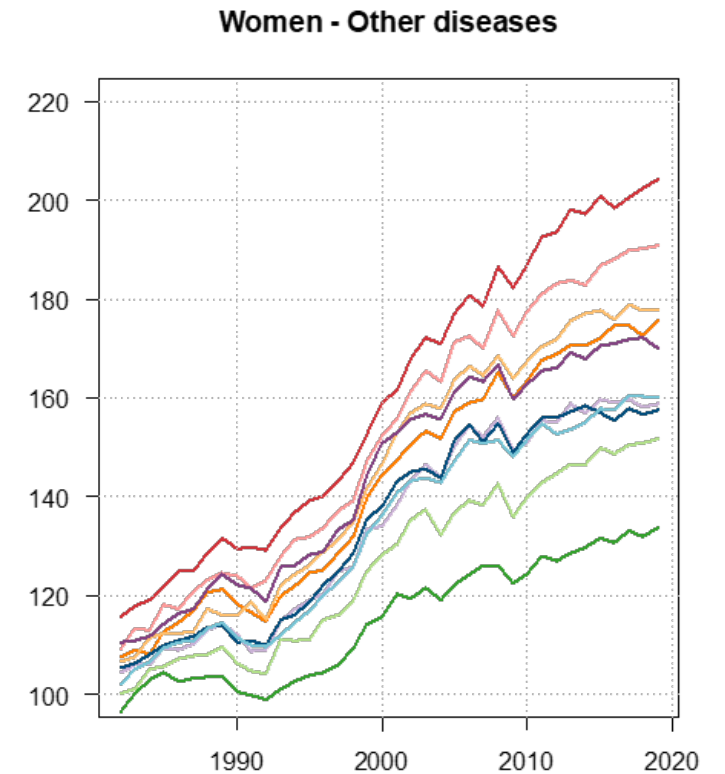
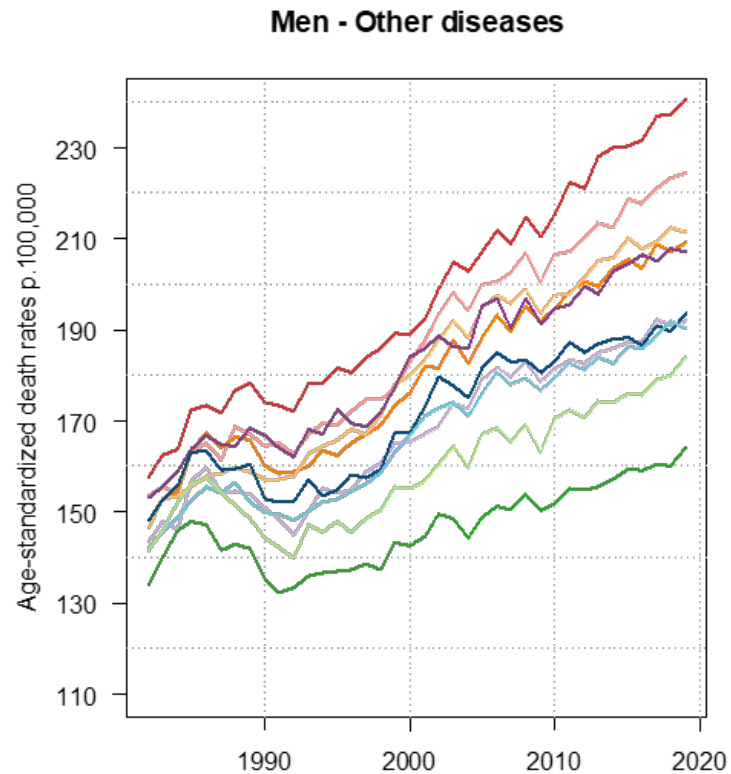


Other





# Other Diseases Mortality (age adjusted)



Most of the increase is due to :

- Diabetes mellitus (1/3 men, 1/6 women)
- Dis. nervous system (1/6 men, 1/3 women)
- Liver diseases (1/4 men, 1/6 women)

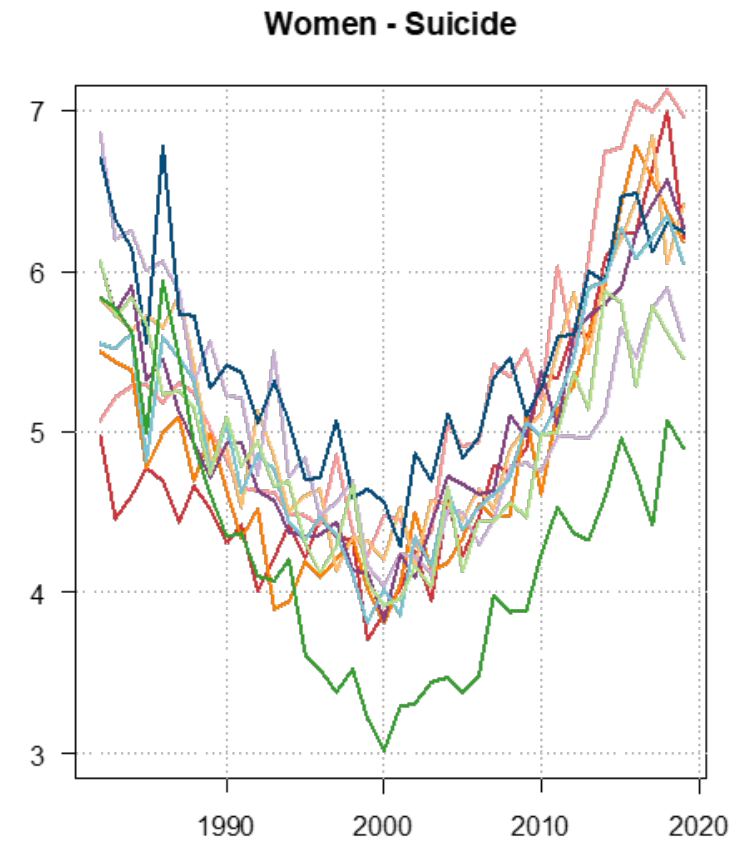
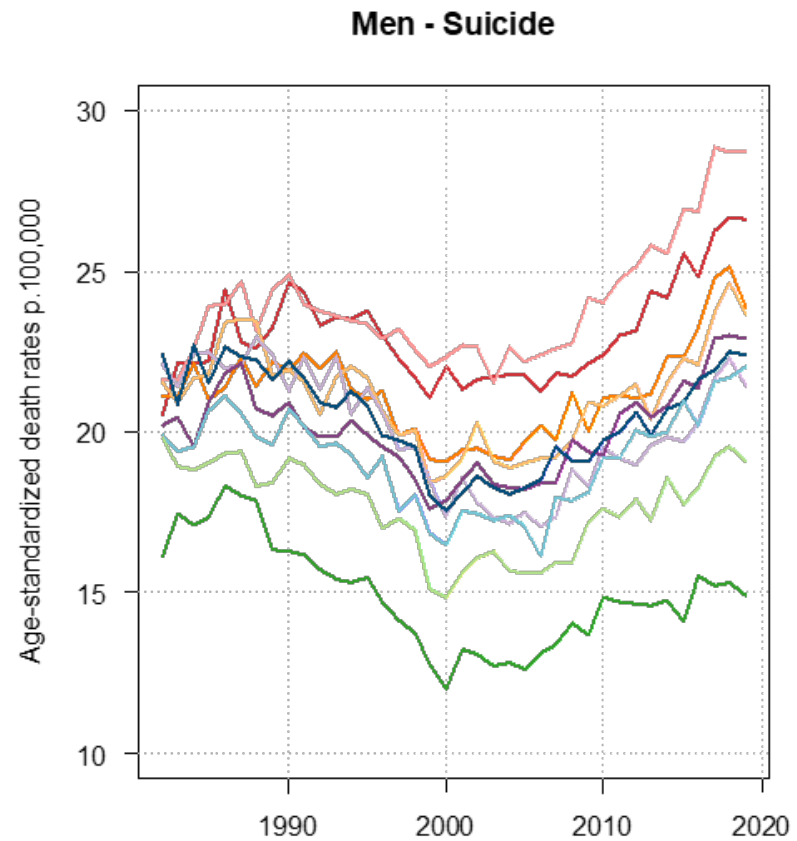
# External Causes

Cause of death category	Age-standardized death rate per 100,000							
	Men				Women			
	1982		2019		1982		2019	
	D1	D10	D1	D10	D1	D10	D1	D10
Cardiovascular	686	614	323	208	436	388	210	135
Cancer	272	281	205	150	157	181	141	113
Other diseases	145	126	241	164	109	92	204	134
External causes	139	73	134	71	54	53	53	28
Infectious/Respir.	125	108	130	70	41	29	98	52
Ill-defined	41	12	11	7	22	8	8	5
All	1408	1215	1043	670	818	751	715	467

# External Causes

Cause of death category	Age-standardized death rate per 100,000							
	Men				Women			
	1982		2019		1982		2019	
	D1	D10	D1	D10	D1	D10	D1	D10
Cardiovascular	686	614	323	208	436	388	210	135
Cancer	272	281	205	150	157	181	141	113
Other diseases	145	126	241	164	109	92	204	134
External causes	139	73	134	71	54	53	53	28
Infectious/Respir.	125	108	130	70	41	29	98	52
Ill-defined	41	12	11	7	22	8	8	5
All	1408	1215	1043	670	818	751	715	467

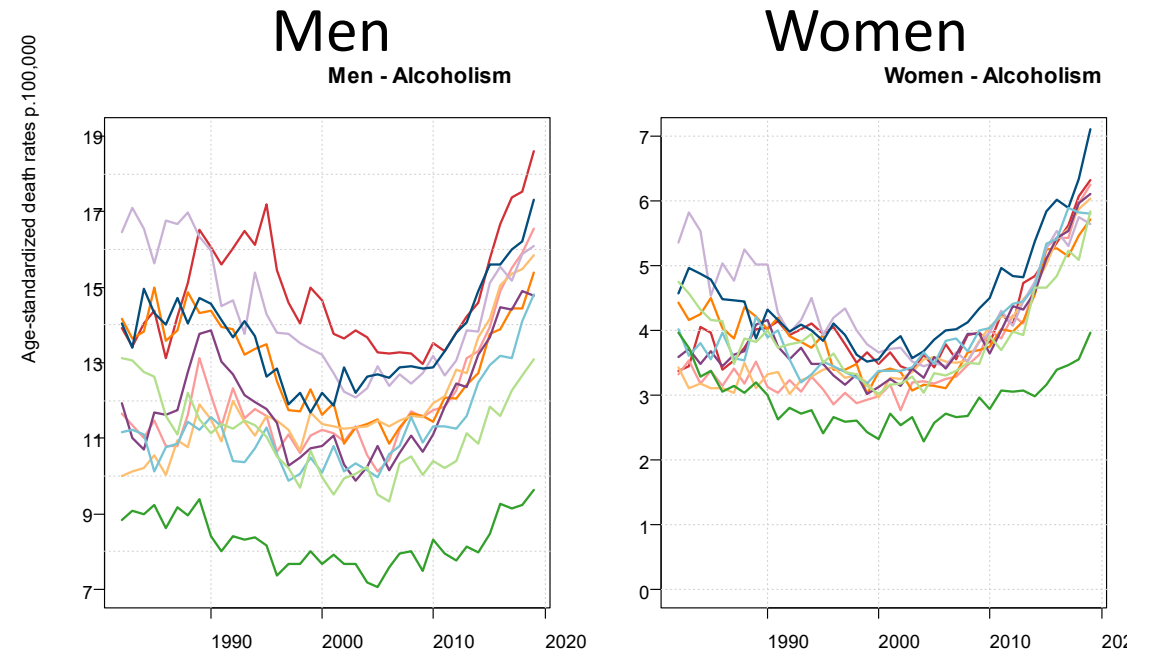
# Suicide Mortality (age adjusted)



Note the scale difference

# Deaths of “Despair” (age adjusted)

## Alcoholism



## Drugs

