

ASNY

A practitioner's deep dive into mortality trends

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Munich Re Life US

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The scary headlines

The Actuary

The magazine of the Institute & Faculty of Actuaries

Slowdown in mortality improvements a 'trend' rather than a blip

Average mortality improvements between 2011 and 2017 were significantly lower than for any other recent six-year period, according to data from the Continuous Mortality Investigation (CMI).

01 MARCH 2018 | CHRIS SEEKINGS



U.S. Population Mortality Observations Updated with 2017 Experience

	Annual Improvement		
	1999-2017	2012-2017	2016-2017
All Ages			
Both	1.0%	0.0%	-0.4%
Female	0.9%	0.1%	-0.4%
Male	1.1%	0.0%	-0.4%

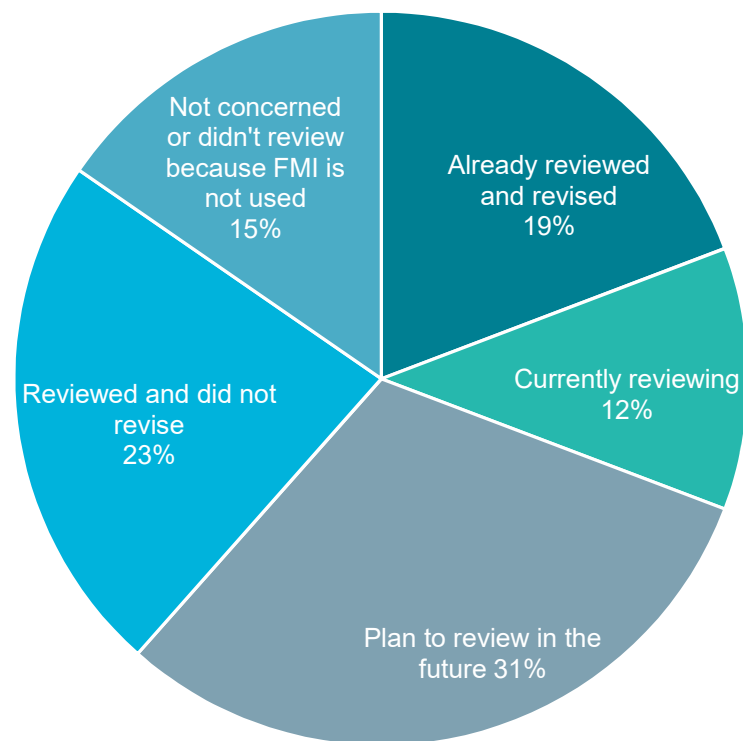
Improvements in mortality rates are slowed by rise in obesity in the United States

Date: January 15, 2018

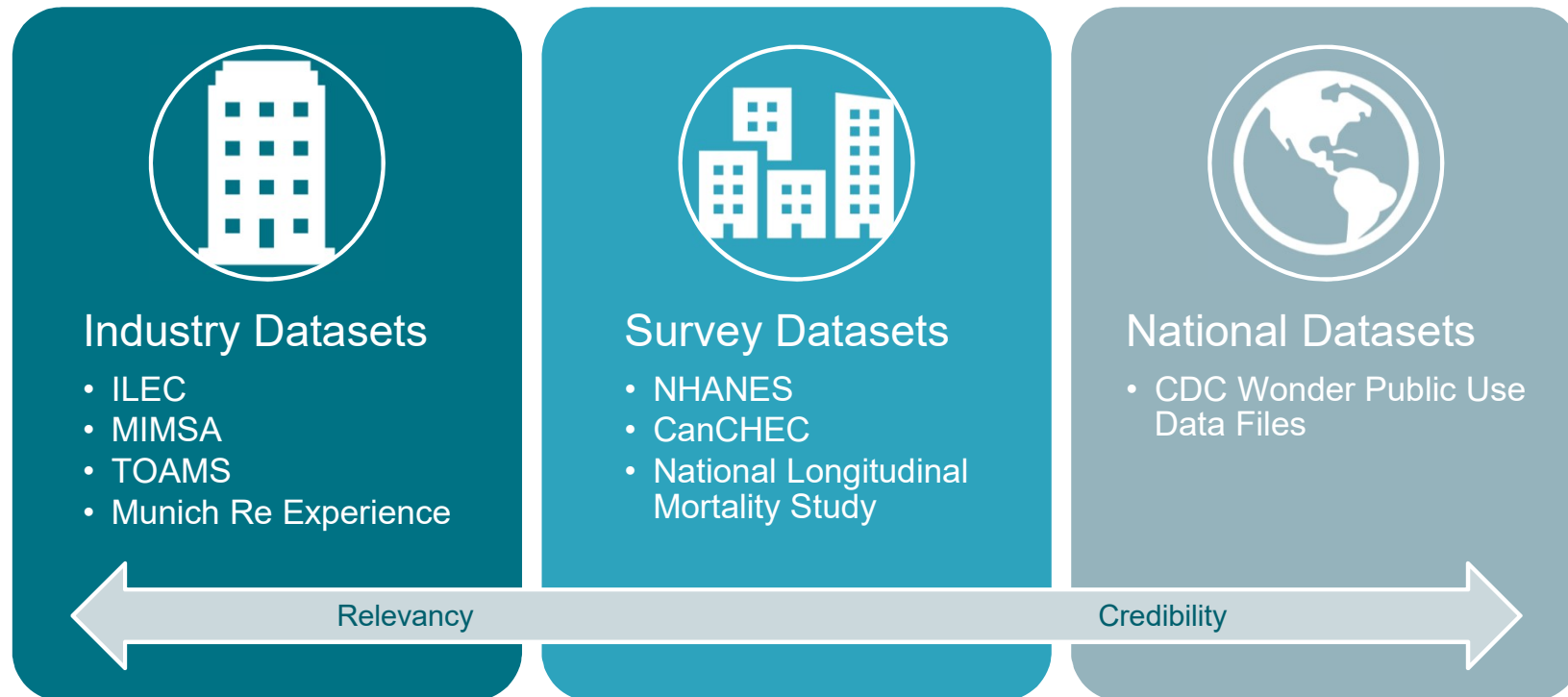
Source: University of Pennsylvania

2019 Munich Re Mortality Survey

We asked how 26 direct life insurers are reacting to the slowing MI in general population



What data can we look at?



Using general population data

General population vs. life insurance population

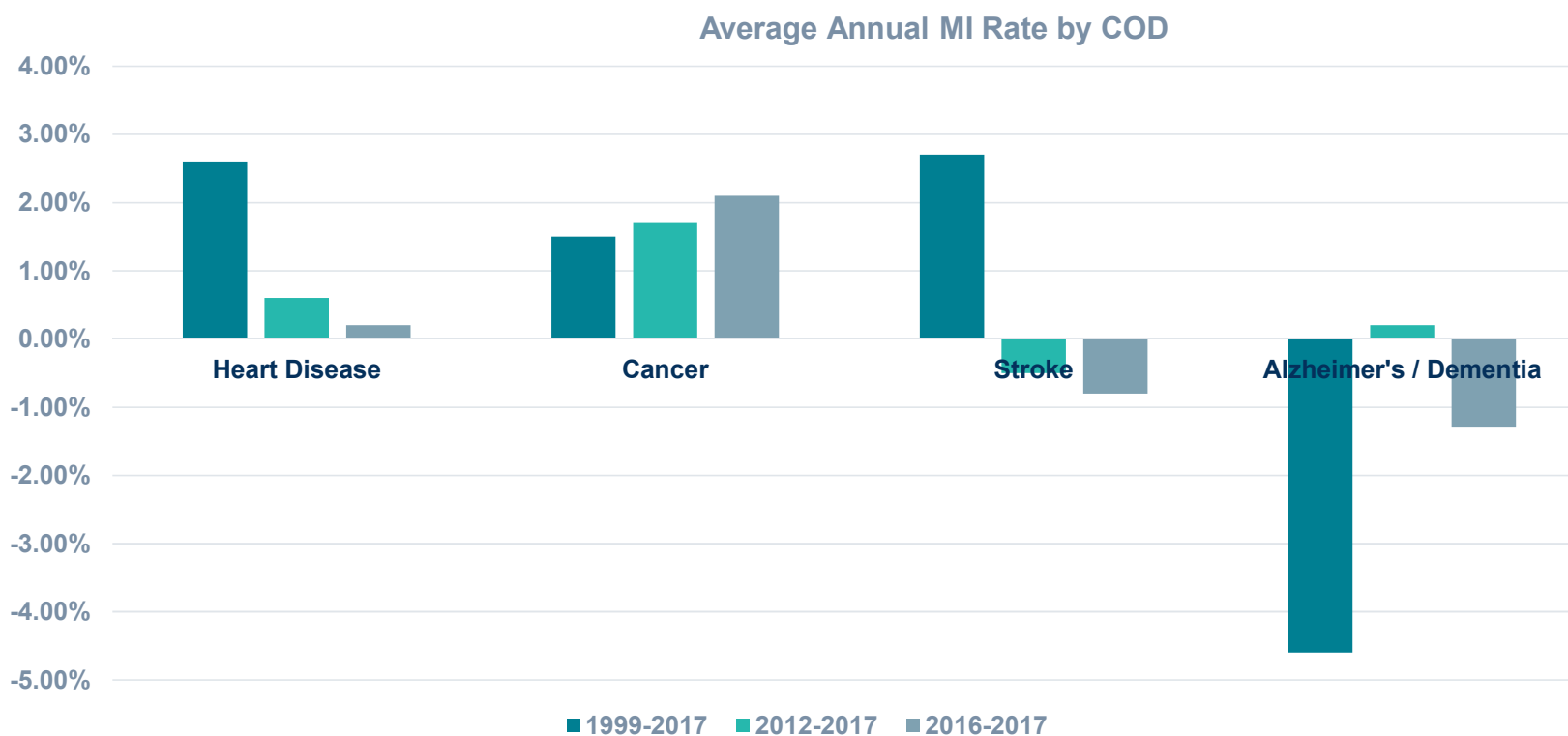
- Age prevalence
- Impact of underwriting
- Socio-economic status

⇒ Dimensions to analyze population MI data:

- Causes of Death (CoD)
- Socio-Economic Status (SES)

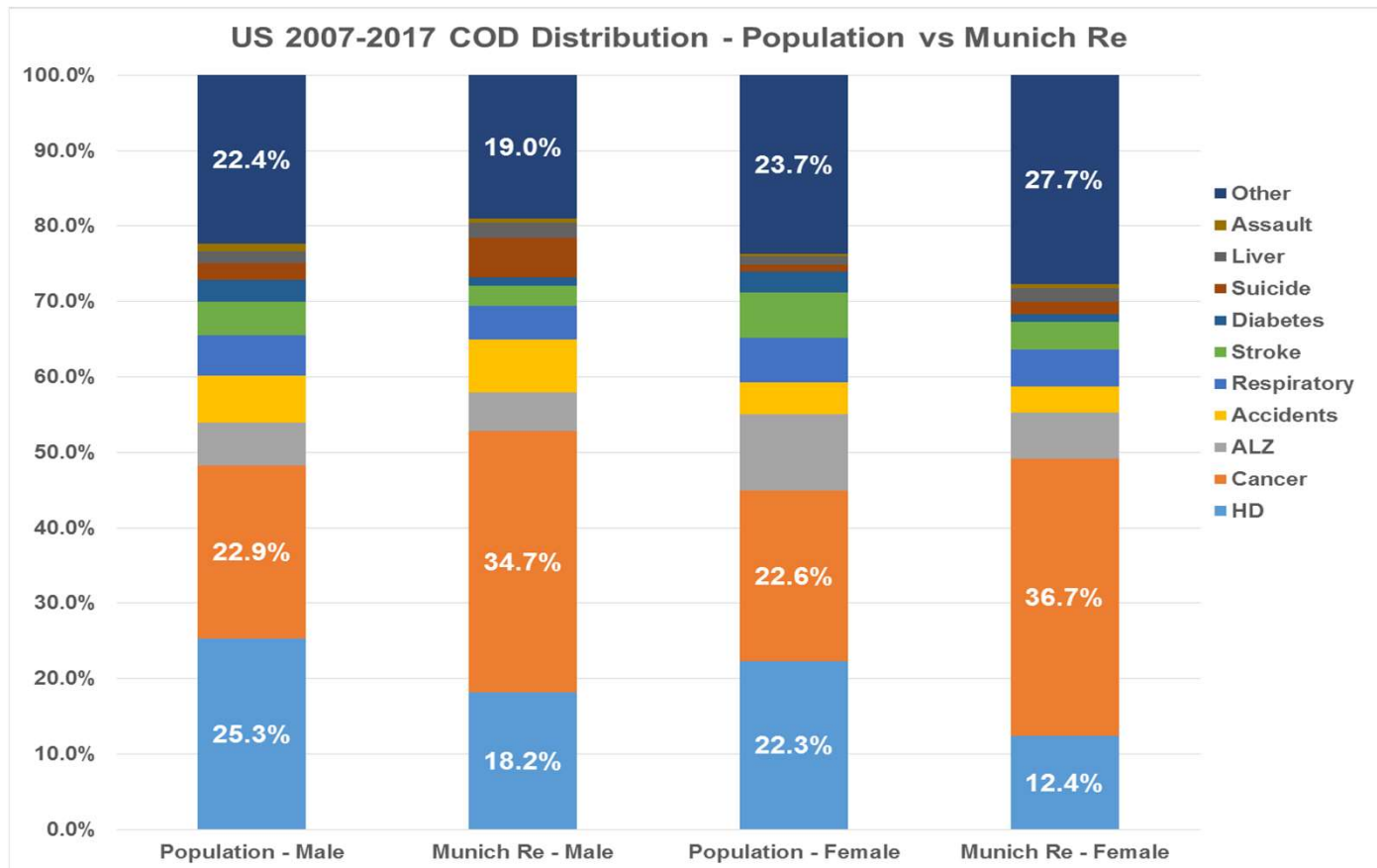
Causes of Death (CoD)

Mortality improvement by CoD

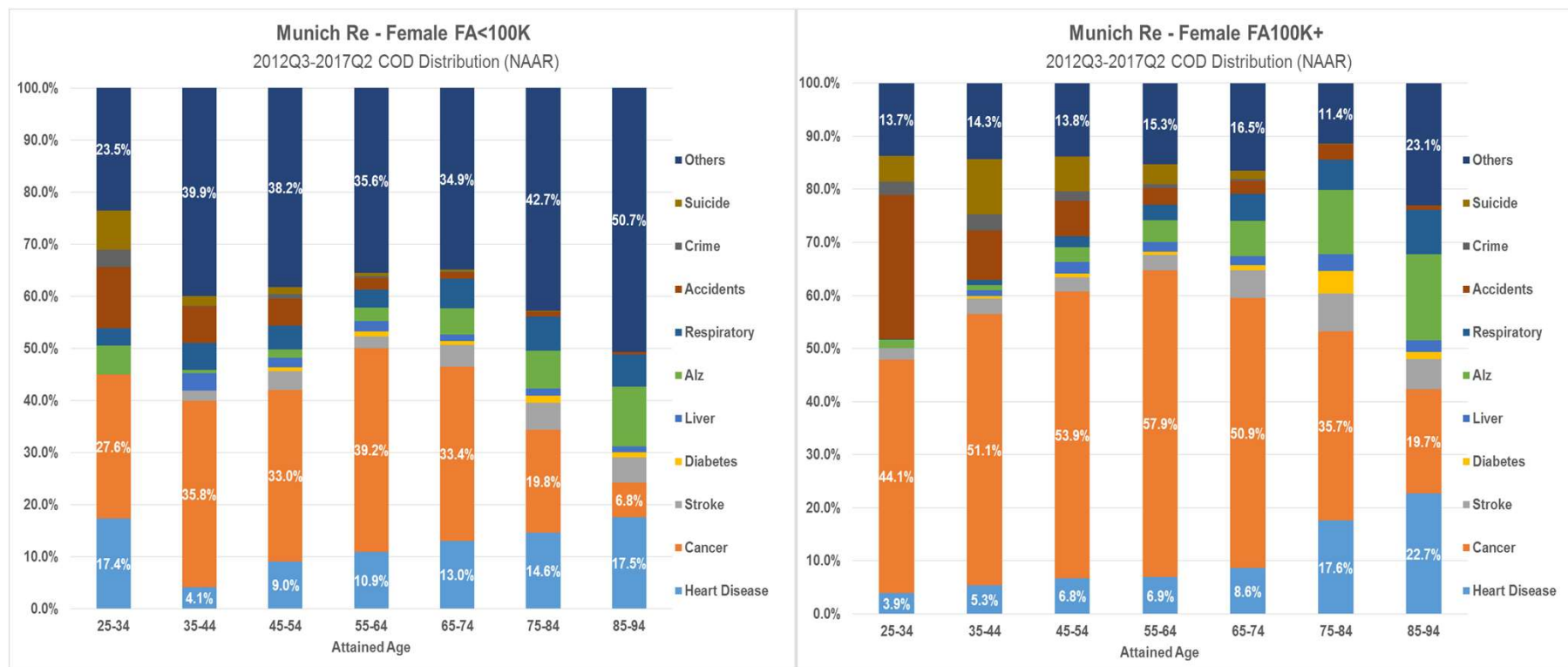


Source: <https://www.soa.org/globalassets/assets/files/resources/research-report/2019/us-population-mortality-observations.pdf>

Why is CoD important for MI analysis?



Underwriting impact



CoD key takeaways

- Consider target market for MI assumption
- Fluid underwriting impact
- Accelerated underwriting impact ?

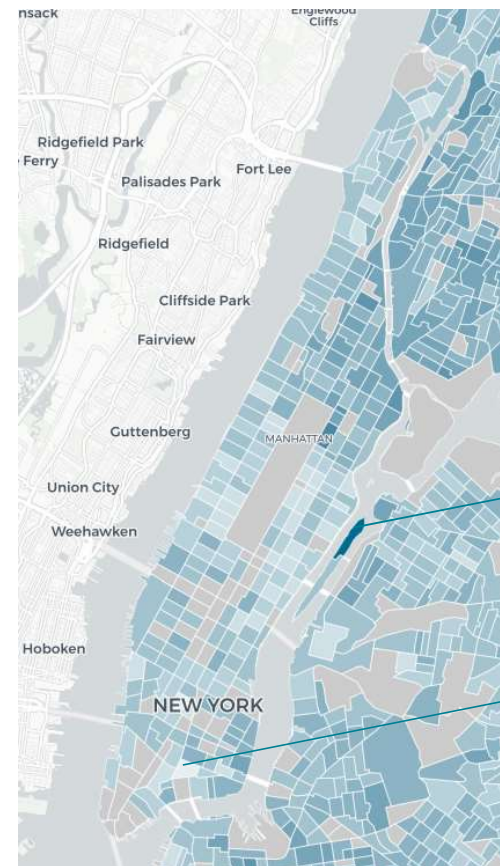
Socio-Economic Status (SES)

Why is SES important for MI analysis?

- The **cause for improvement** is different for the rich and the poor
- Higher SES: medical advancements, healthier lifestyle
- Lower SES: accessibility to healthcare, clean water supply and waste removal, growth in general standard of living

Two methods to segment population data by SES

- County income
 - Rank all US counties by historical per-capita income
 - Compare mortality rates from top and bottom X% percentile
- Education
 - Death certification education attainment
 - Exposure from US Census Bureau



City Value for Life Expectancy in New York, NY

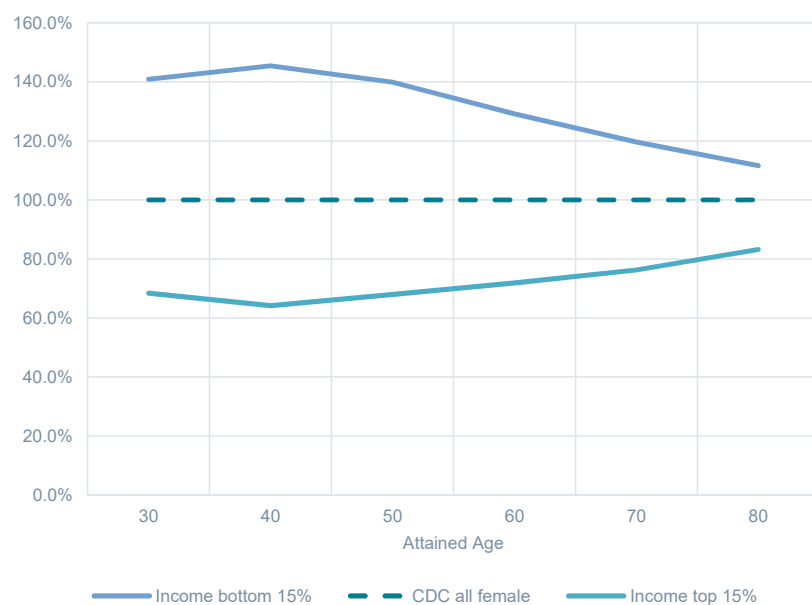
10044: 59 Years

10002: 93.6 Years

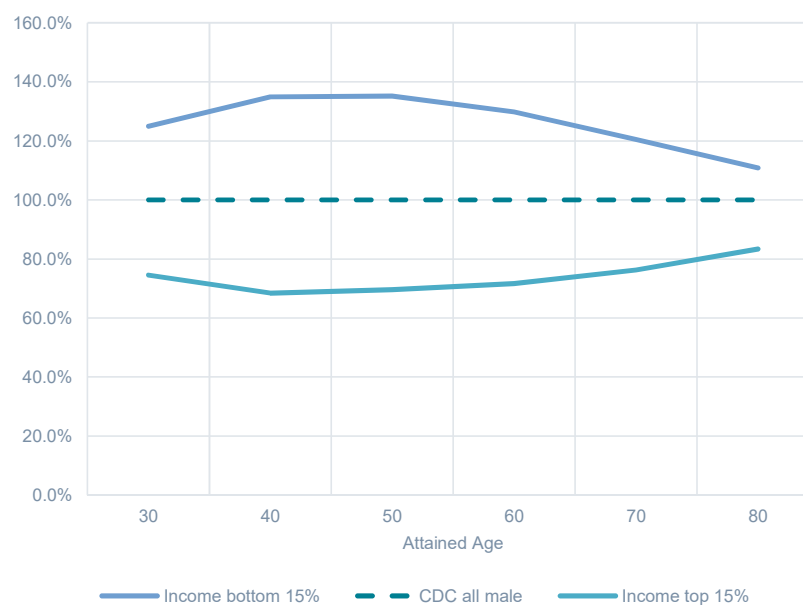
Source: City Health Dashboard by NYU Langone Health

Mortality rate by income

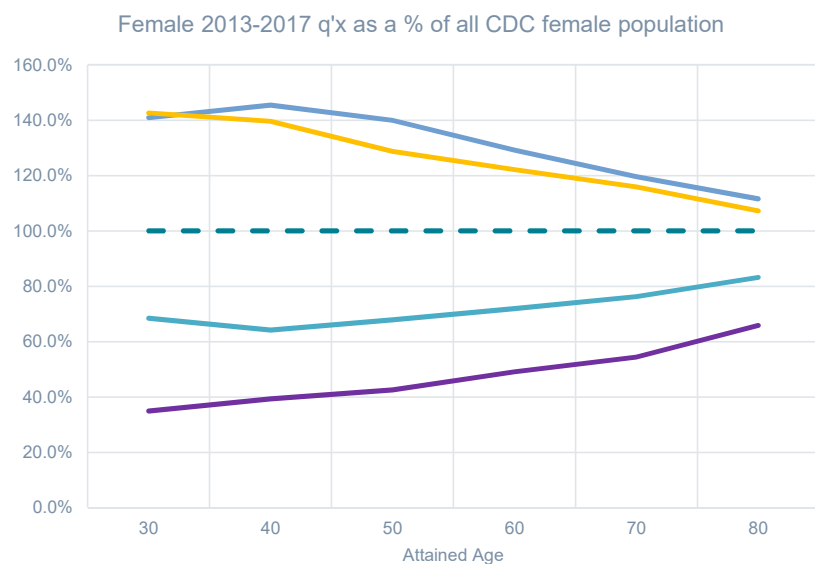
Female 2013-2017 q'x as a % of all CDC female population



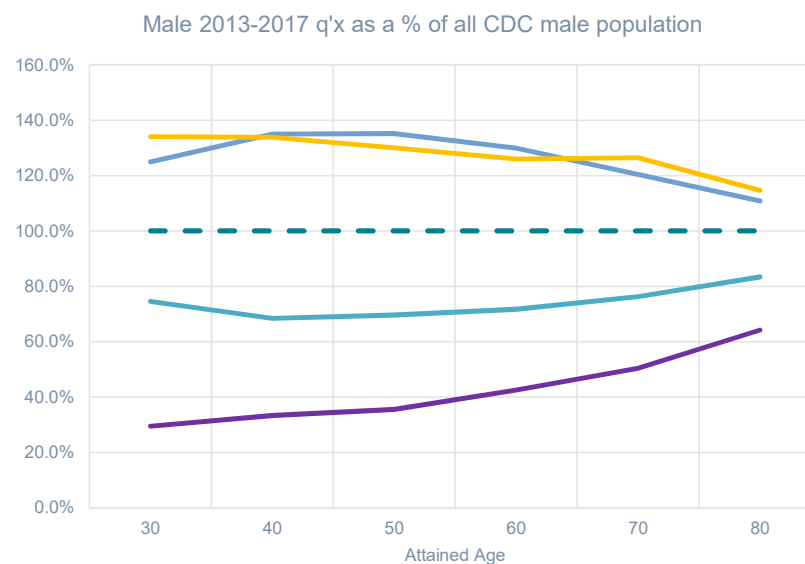
Male 2013-2017 q'x as a % of all CDC male population



Mortality rate by education



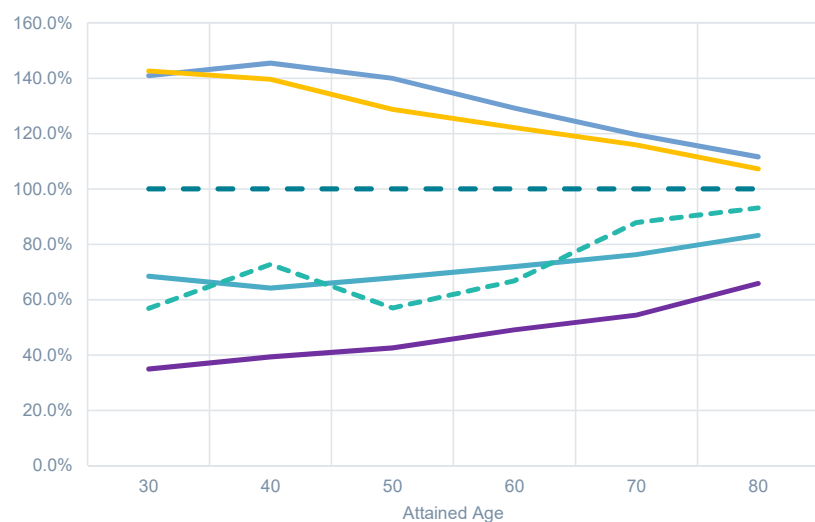
Income bottom 15% Education Bachelor- CDC all female
Income top 15% Education Bachelor+



Income bottom 15% Education Bachelor- CDC all male
Income top 15% Education Bachelor+

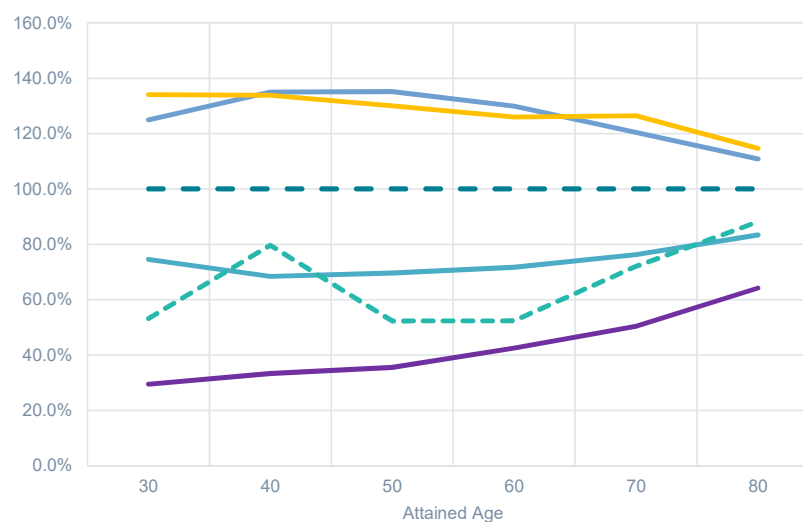
Mortality rate by SES

Female 2013-2017 q'x as a % of all CDC female population



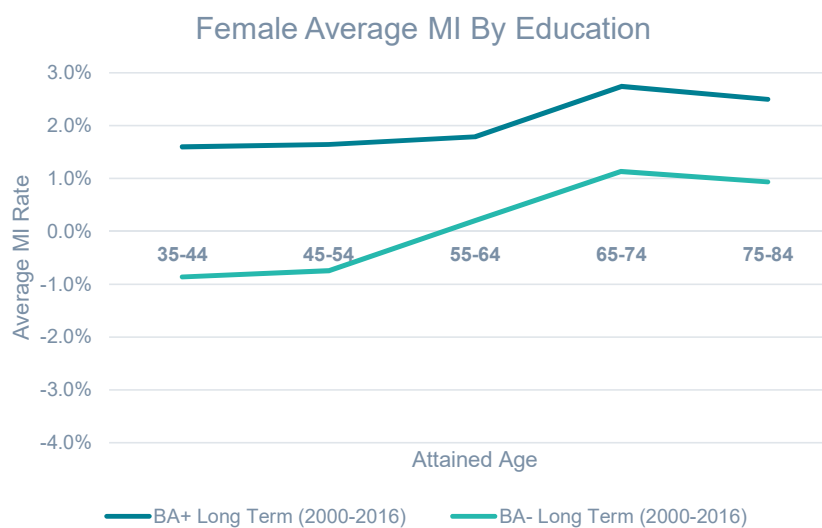
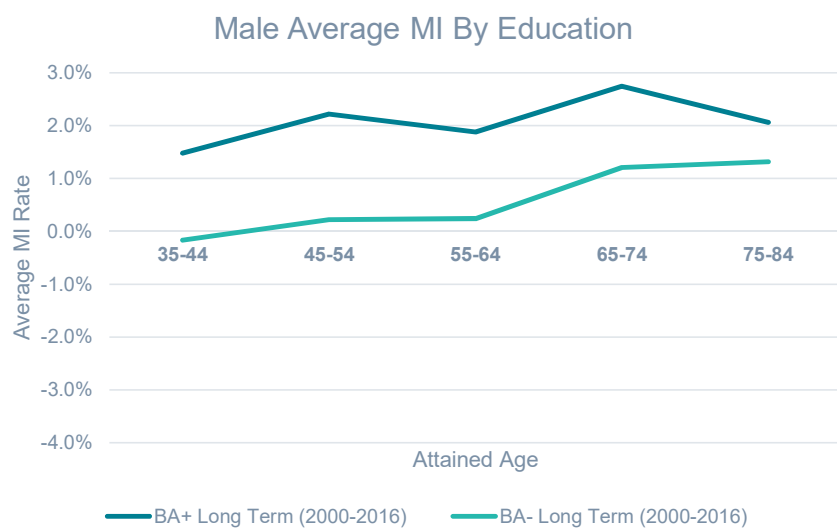
Income bottom 15% Education Bachelor- CDC all female
Income top 15% Education Bachelor+ VBT15 F AG ALB Ult

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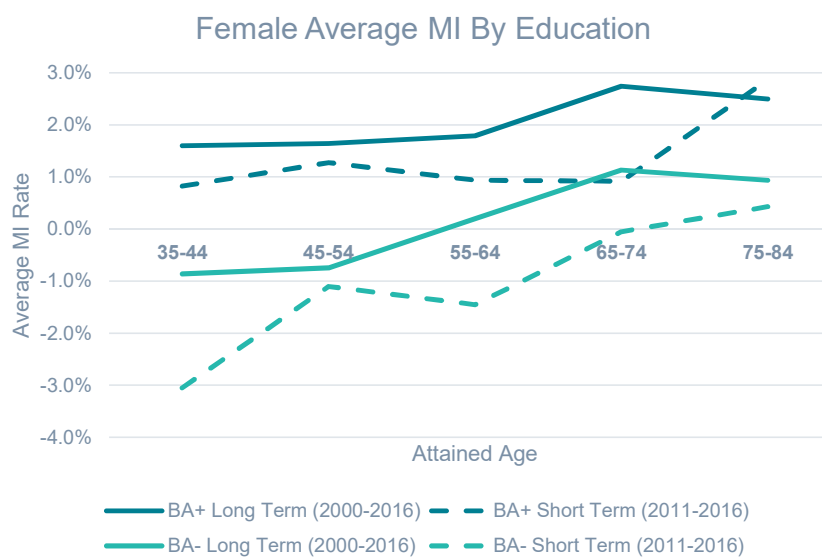
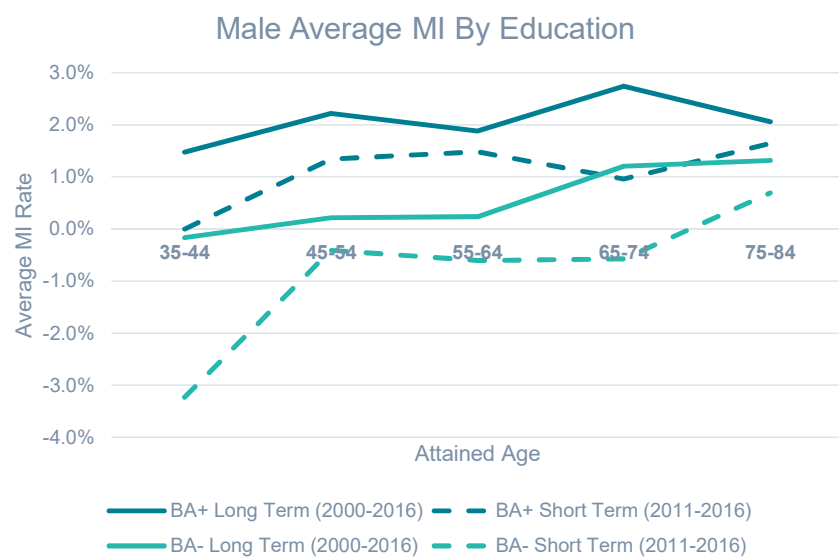


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Mortality Improvement rate by Education

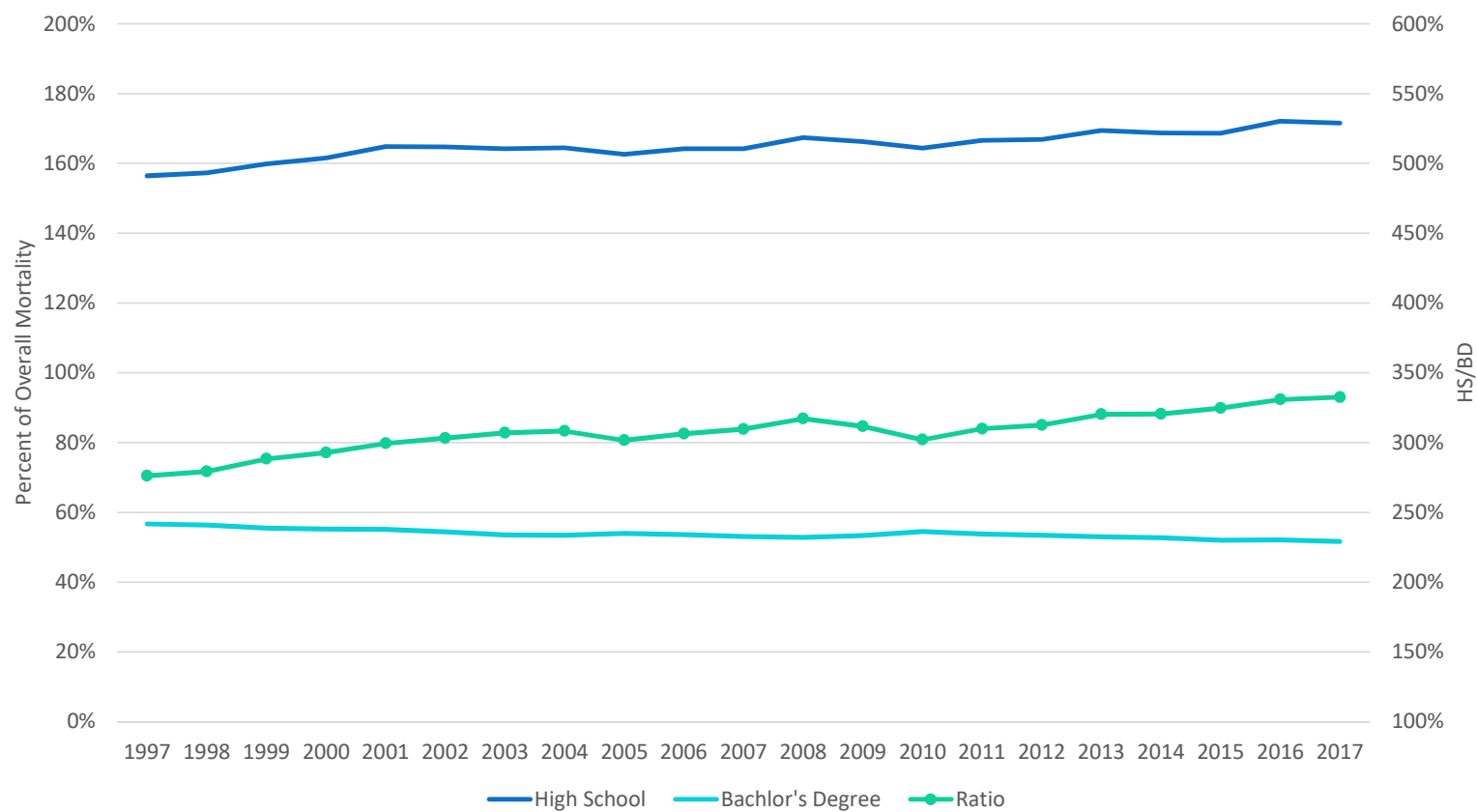


Mortality Improvement rate by Education

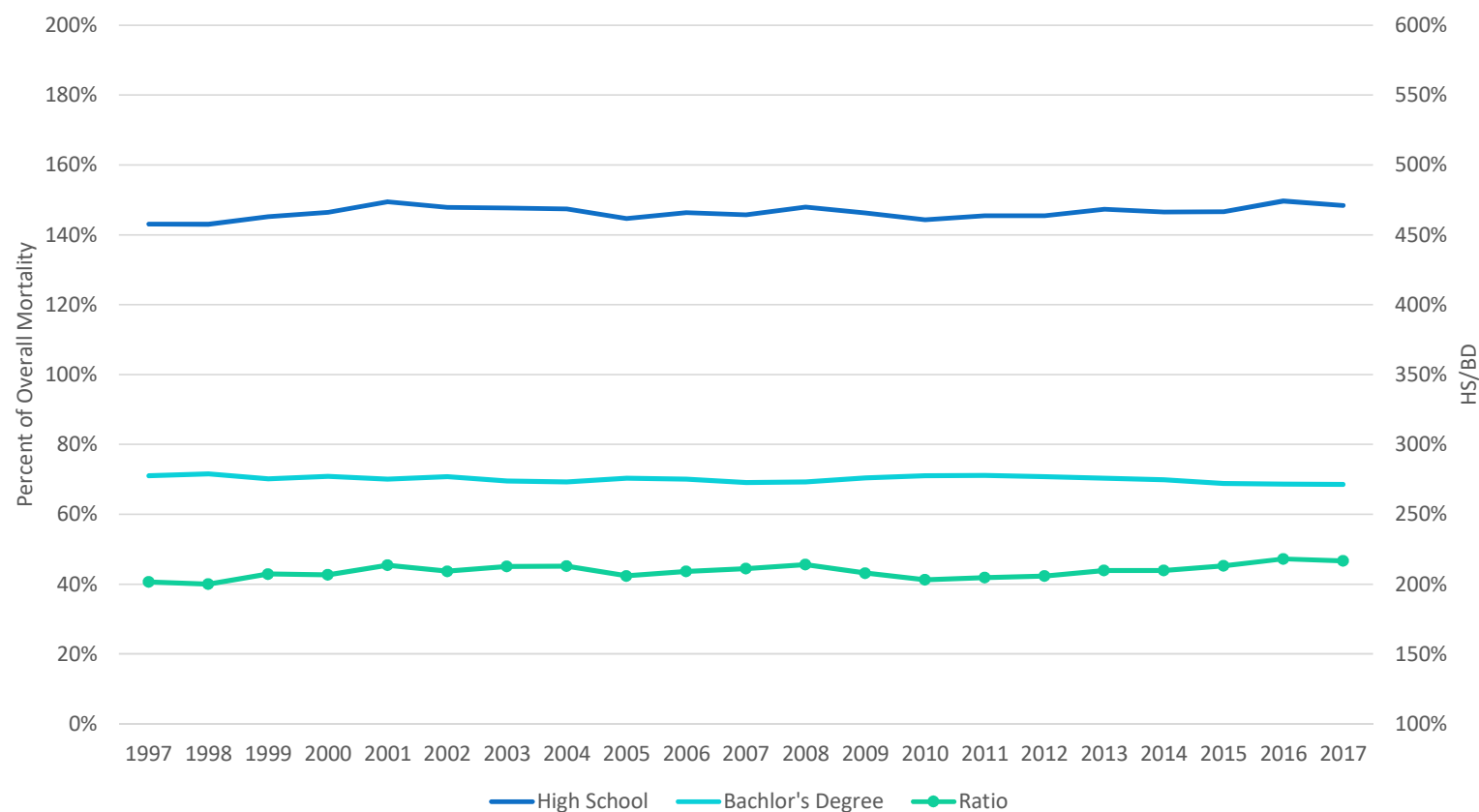


Drivers for SES mortality segmentation

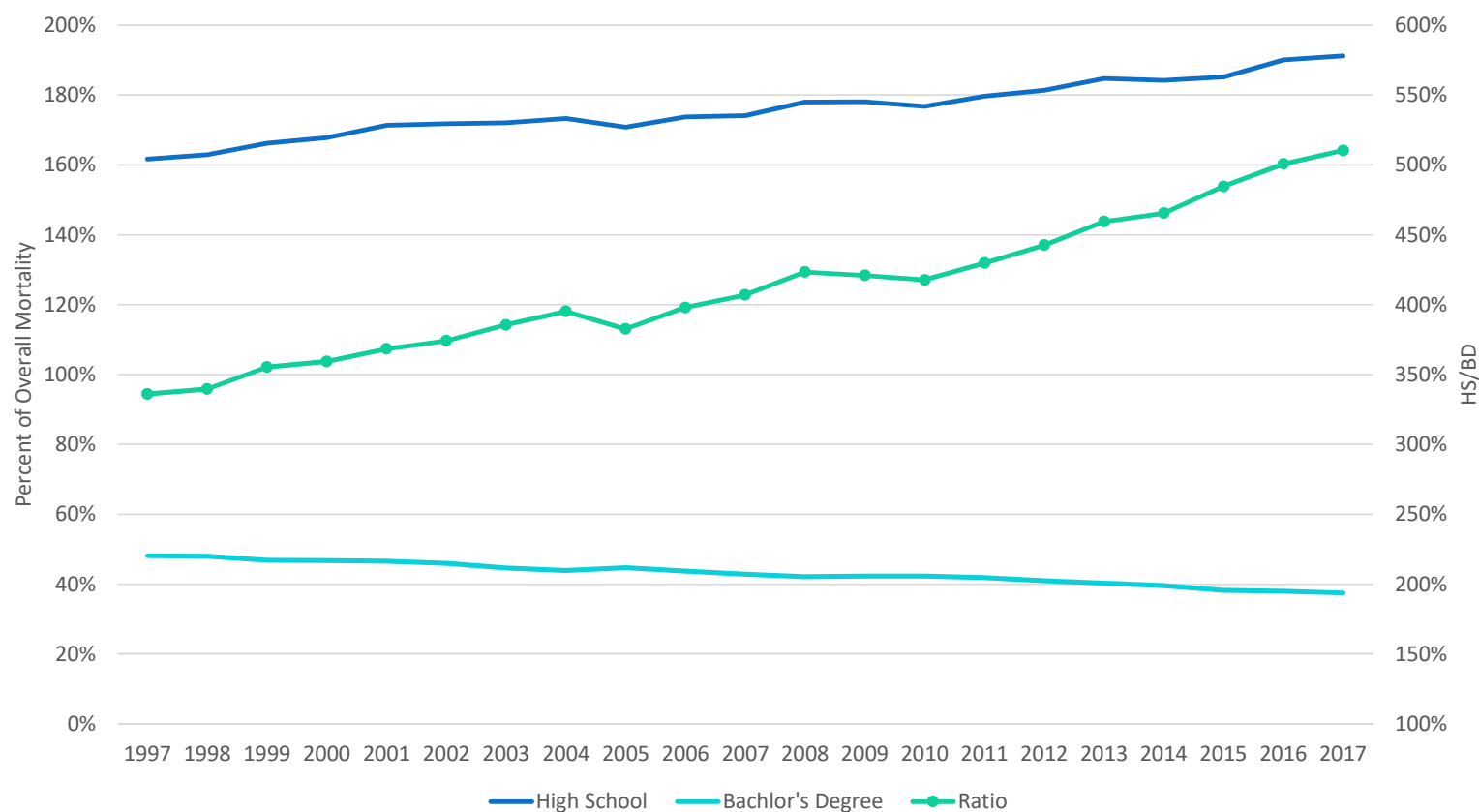
Heart Disease



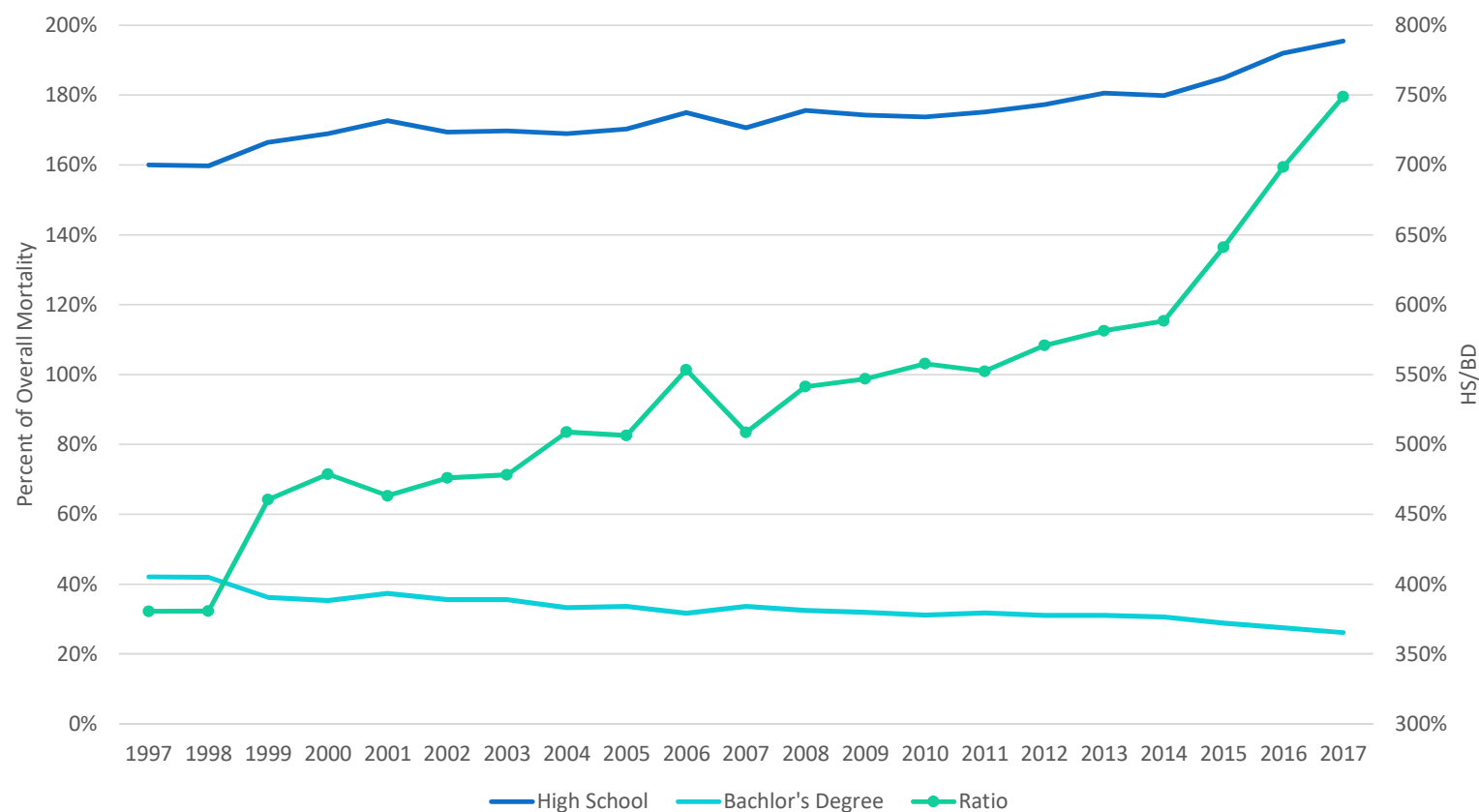
Cancer (Non-Lung)



Smoking Related Conditions



Alcohol and Drug Related Conditions



Key takeaways

Cause of death prevalence

Socio-Economic Status impact

Reference



U.S. Population Mortality Observations
Updated with 2017 Experience

<https://www.soa.org/globalassets/assets/Files/resources/research-report/2019/us-population-mortality-observations.pdf>



Article I: Analyzing Individual Life Insurance
Mortality Trends – Cause of Death Impact

<https://www.munichre.com/us-life/en/perspectives/mortality-studies/analyzing-ind-life-ins-mortality-trends-cause-of-death.html>

Article II: Socio-economic Status Impact

<https://www.munichre.com/us-life/en/perspectives.html>