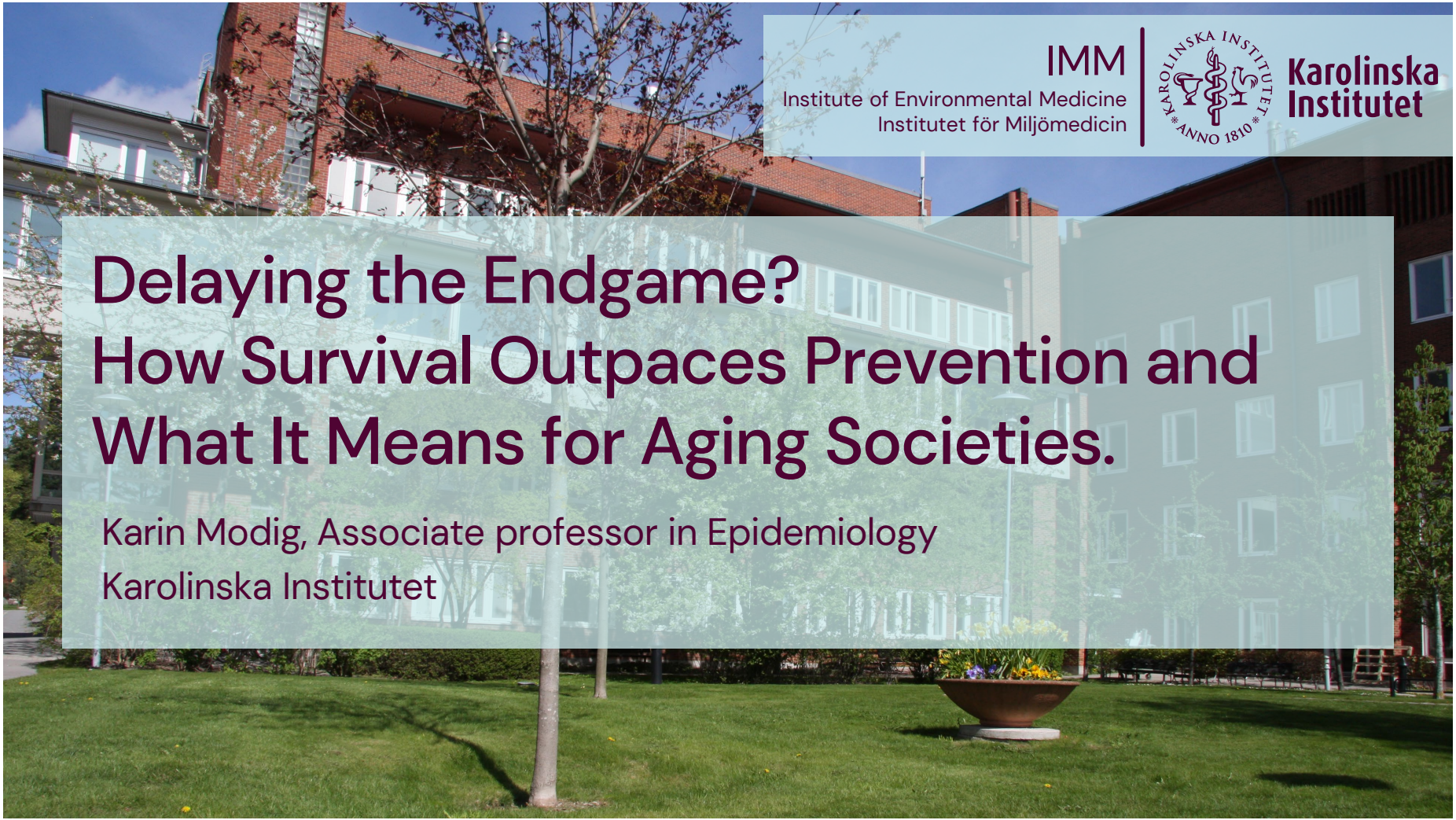

IMM
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Institutet för Miljömedicin

Karolinska Institutet

Delaying the Endgame? How Survival Outpaces Prevention and What It Means for Aging Societies.

Karin Modig, Associate professor in Epidemiology
Karolinska Institutet

Outline

- What is age in relation to health
- The changing composition of the older population
- Consequences of that

Is it unhealthy or healthy to age?

The view of aging has changed over the centuries.

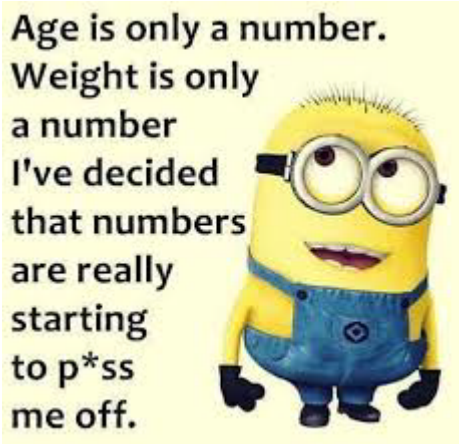
In the 18th century, advice similar to that given today on how to age healthily: fresh air, sleep, exercise, rest, food, drink and love.

During the 19th century, various medicines were developed that were supposed to “cure the sick”, aging a disease that could be cured.

Today, back to health promotion, (primary prevention) - help us age healthily, but also secondary (catch early) and tertiary prevention (limit the damage of disease).

But there is certainly a focus on curing aging, and aging is considered bad and ugly.

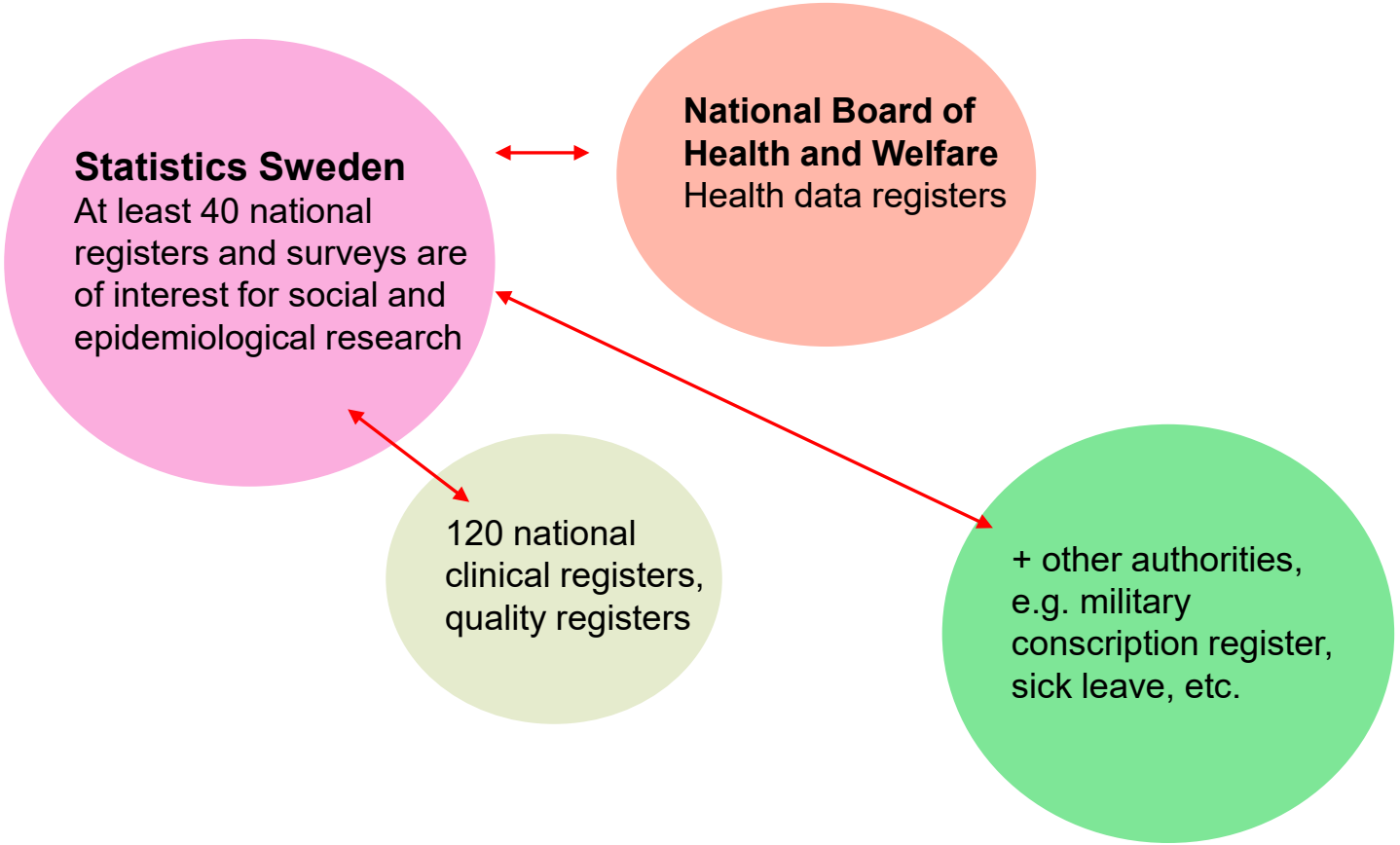
Aging: Chronological or Biological? Is Age Just a Number?



- No.
- Even though there is a certain discrepancy between chronological and biological age.
- Biological age refers to the body's functioning in relation to what can be expected at a certain chronological age
- Can be measured in different ways, cellularly and functionally

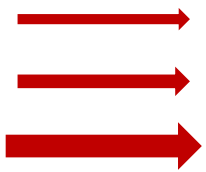
The goldmine of population registers

The landscape of administrative population based registers in Sweden



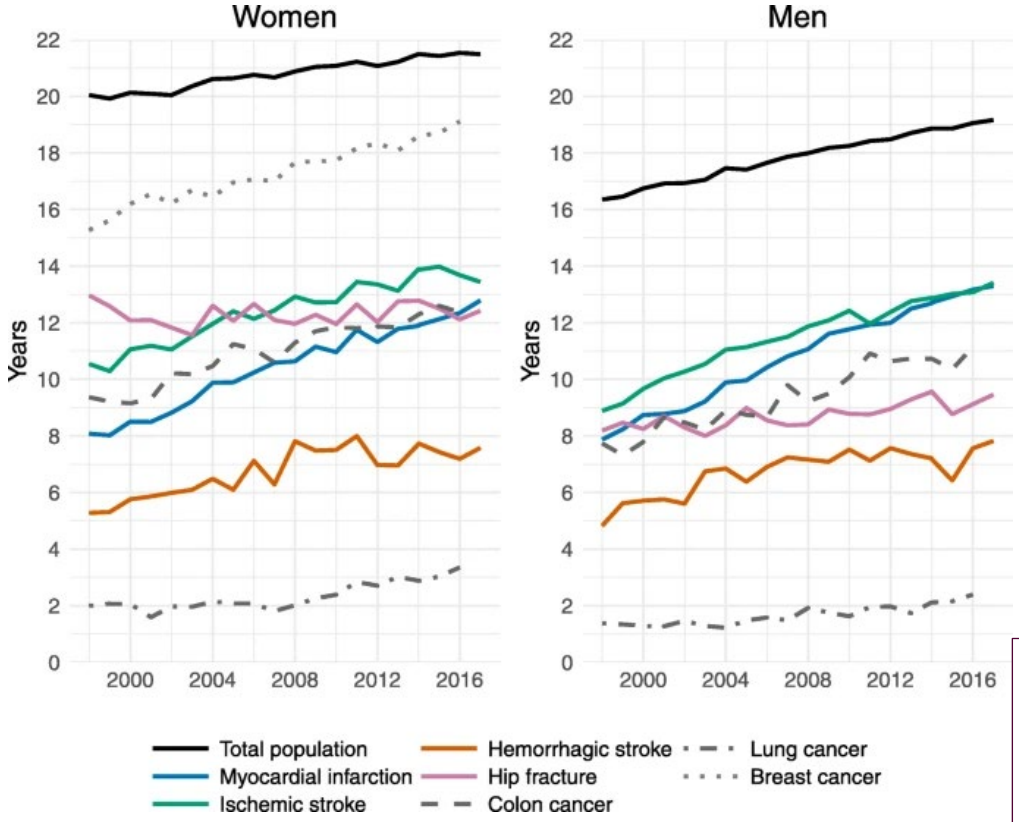
What is/has been driving the increase in life expectancy?

- Prevention of disease (avoiding disease)
- Delaying disease
- Improved survival



More older people with a history of disease

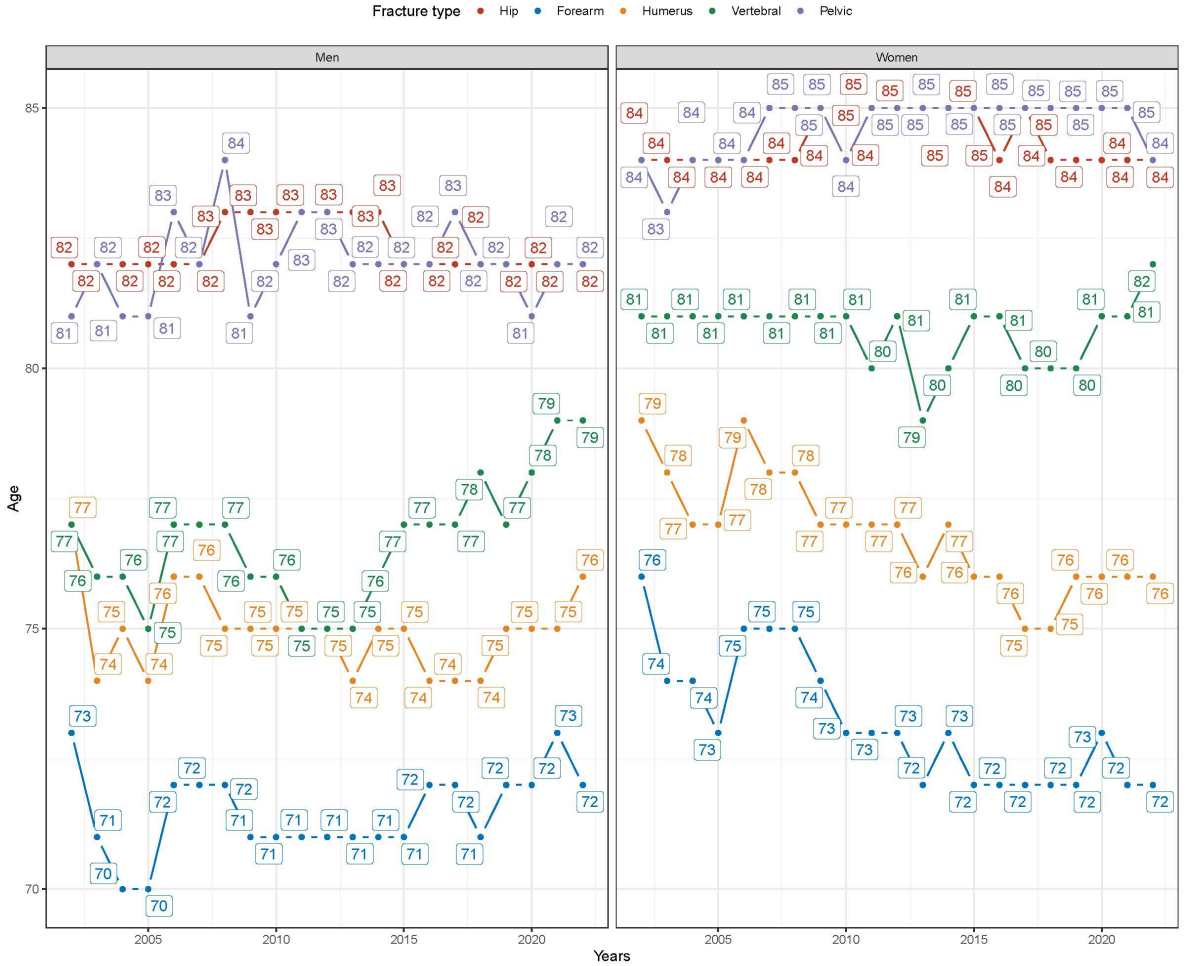
Life expectancy is increasing across all disease groups, although large differences remain



Meyer A, et al. Trends in life expectancy: Did the gap between the healthy and the ill widen or close? *BMC Med. 2020*

Mean age at onset of first and second stroke, Sweden

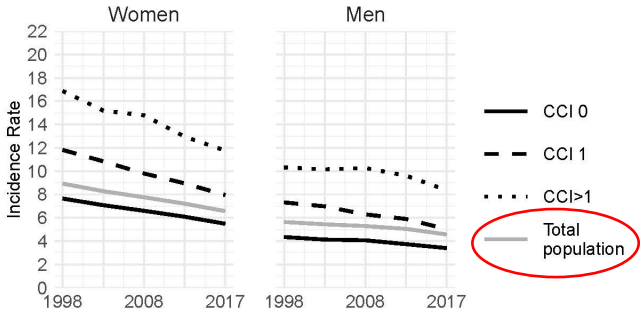
Fractures Mean age of onset

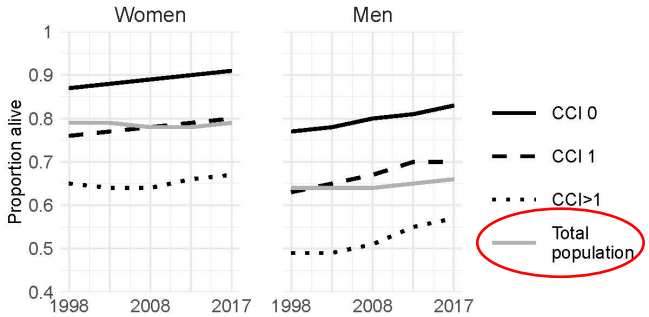


Characteristics of hip fracture patients 1998–2017

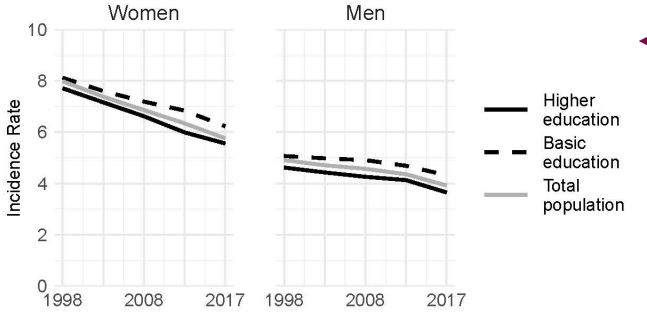
	Women (N=200,172)				
Calendar period	1998–2001	2002–2005	2006–2009	2010–2013	2014–2017
Number of patients	43,248	41,355	40,206	38,759	36,604
Age, %					
60–69	6.9	6.9	7.8	8.6	8.2
70–79	26.4	24.0	21.9	21.3	22.8
80–89	50.1	50.8	50.3	47.5	44.9
90+	16.7	18.4	20.0	22.6	24.1
Educational level %					
Basic	54.4	60.1	60.2	56.4	49.9
Higher education	21.8	28.9	35.5	41.4	48.7
Missing	23.7	10.9	4.4	2.2	1.5
CCI at fracture, %					
0	46.6	43.7	39.7	33.2	31.8
1	32.0	32.1	32.7	33.3	32.8
2+	21.4	24.2	27.6	33.5	35.4
Surviving 30 days %	95.5	94.7	94.1	93.6	93.9
Surviving 365 days %	79.5	78.9	78.2	77.5	78.1
1 year Recurrent fracture	7.1	5.5	5.4	4.6	4.1

	Men (N=89,431)				
Calendar period	1998–2001	2002–2005	2006–2009	2010–2013	2014–2017
Number of patients	17,155	17,438	18,130	18,569	18,139
Age, n (%)					
60–69	10.8	11.2	13.0	13.4	12.5
70–79	32.0	27.8	25.3	24.7	27.0
80–89	45.1	47.8	47.4	45.7	42.5
90+	12.0	13.1	14.4	16.2	17.9
Educational level, n (%)					
Basic	51.9	55.4	54.2	50.0	45.9
Higher education	29.9	37.0	42.8	48.4	52.8
Missing	18.2	7.6	3.0	1.6	1.3
CCI at fracture, n (%)					
0	36.3	33.1	30.3	23.5	22.3
1	33.1	32.1	30.2	28.6	27.8
2+	30.7	30.7	39.6	47.9	49.8
Surviving 30 days[a] (%)	90.5	88.9	88.5	88.2	88.8
Surviving 365 days[b] (%)	67.4	66.9	67.0	67.1	67.9
1 year Recurrent fracture	6.4	5.0	4.6	4.1	3.7



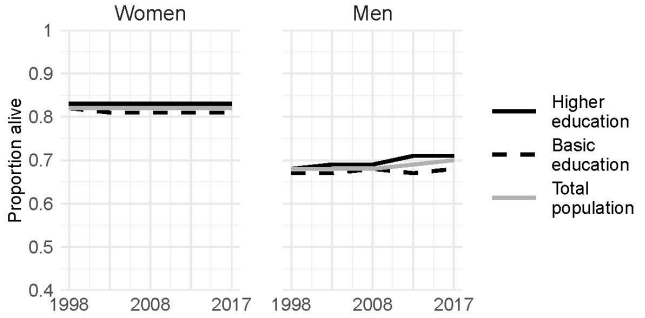


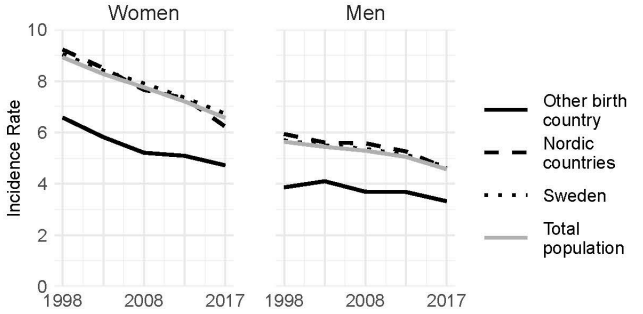
Hip fractures

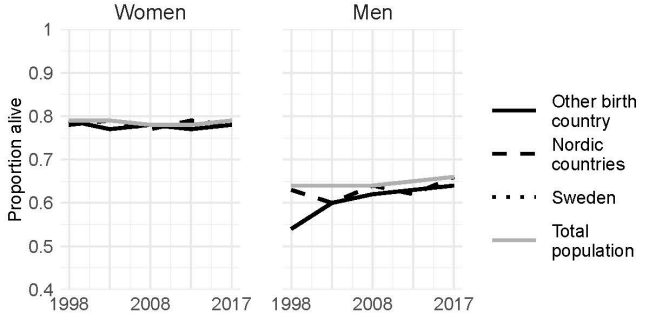


Risk

1-year survival

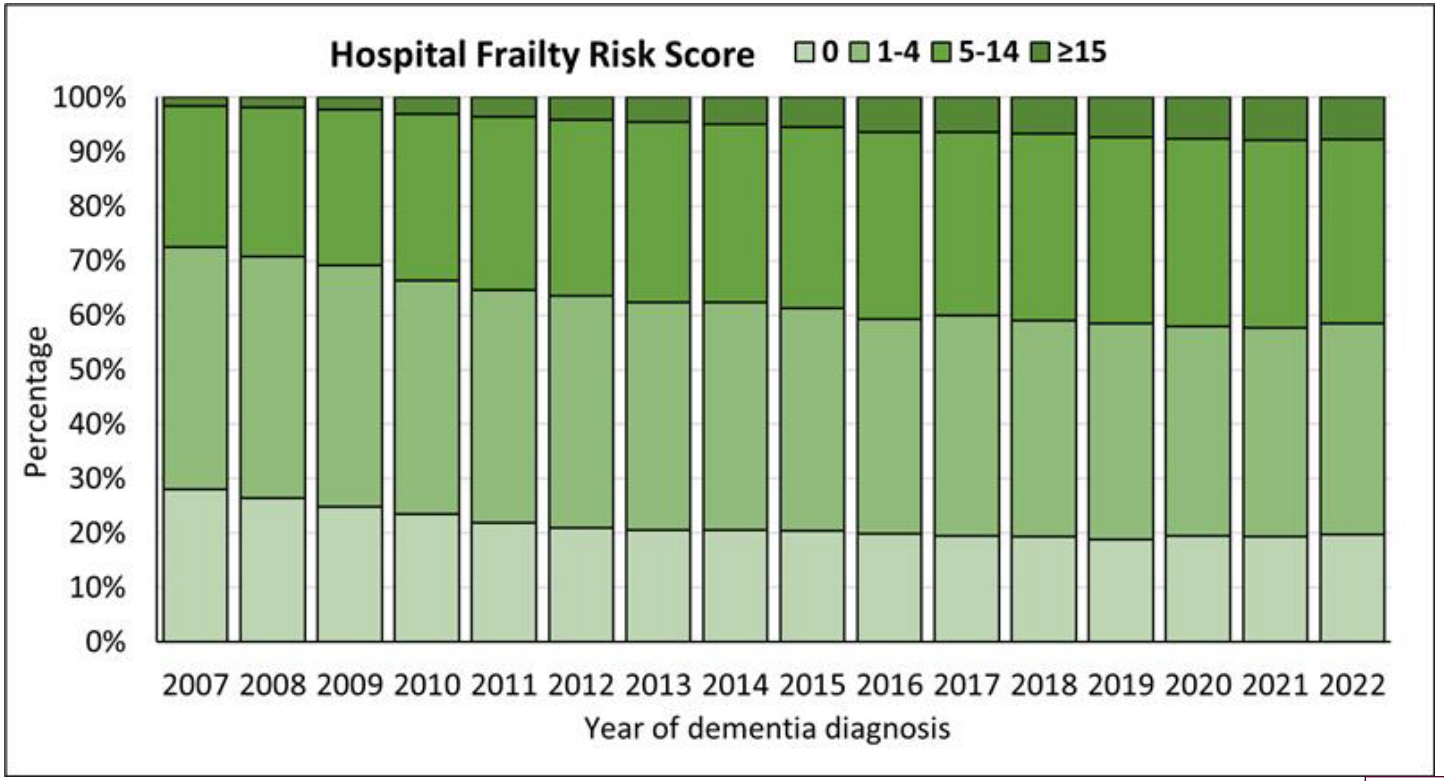






Meyer, Modig et al. Epidemiology. 2021

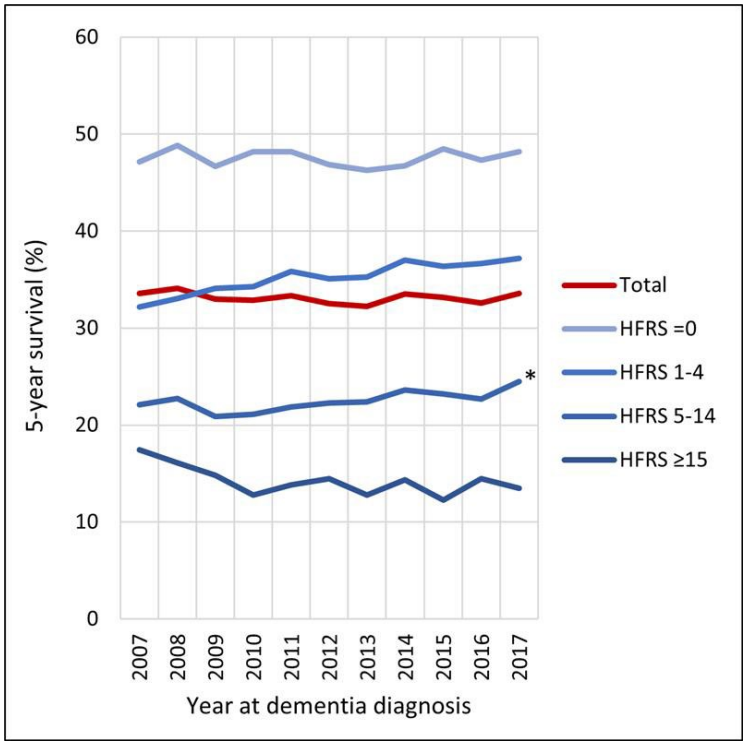
Also dementiapatients have become frailer



Time trends of Hospital Frailty Risk score at the time of dementia diagnosis, by year of diagnosis.

Ding, Modig et al. *Unpublished*

Similar pattern for dementia incidence has come down over time, with less improvements in overall survival

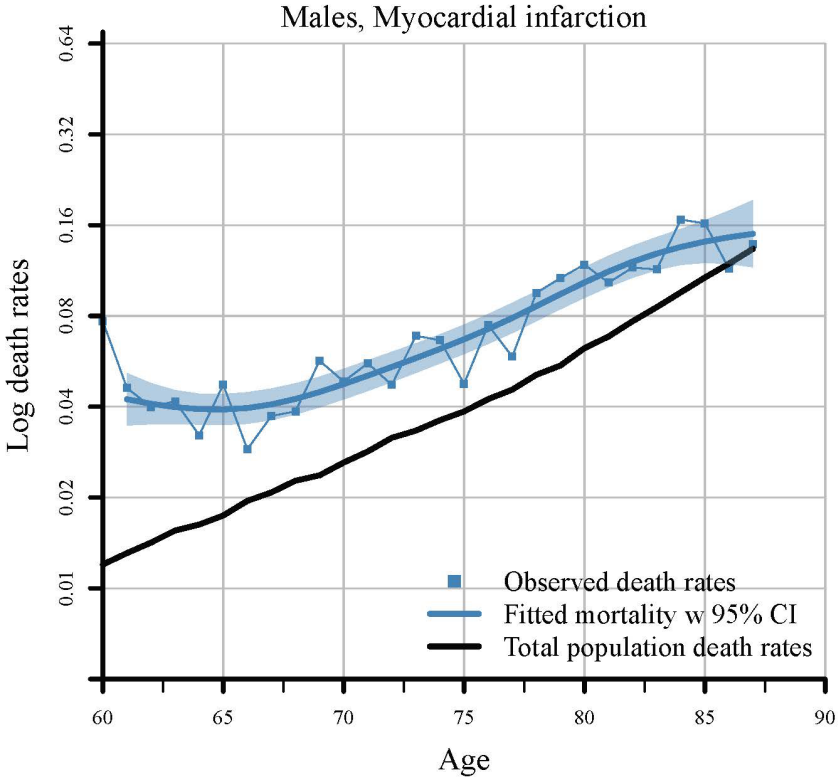


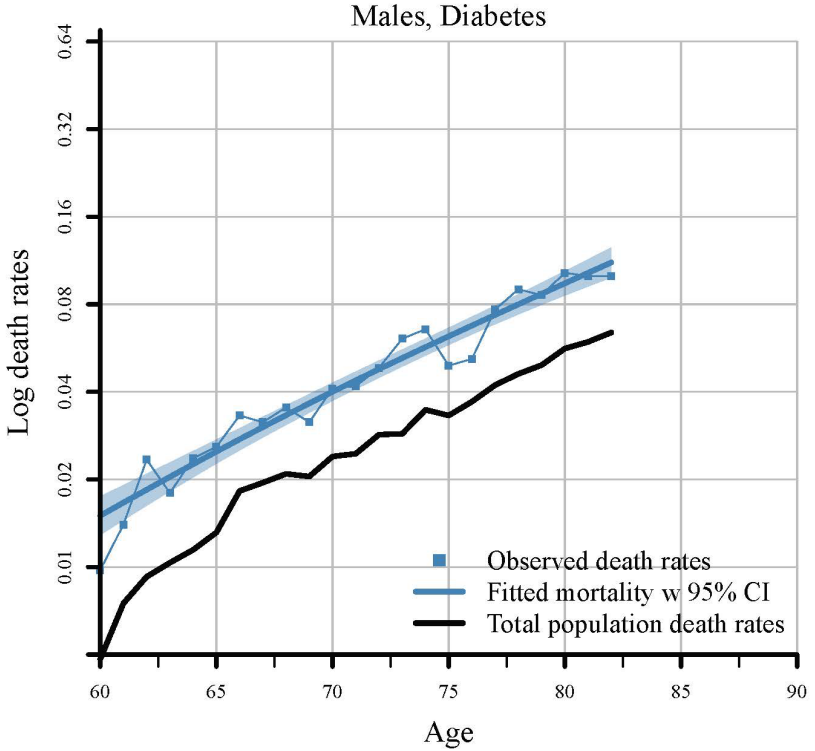
Ding, Modig et al.
Unpublished

Time trends in 5-year survival of dementia, 2007-2022 by level of frailty. Age- and sex-standardized.

What do we gain from saving lives vs preventing diseases?

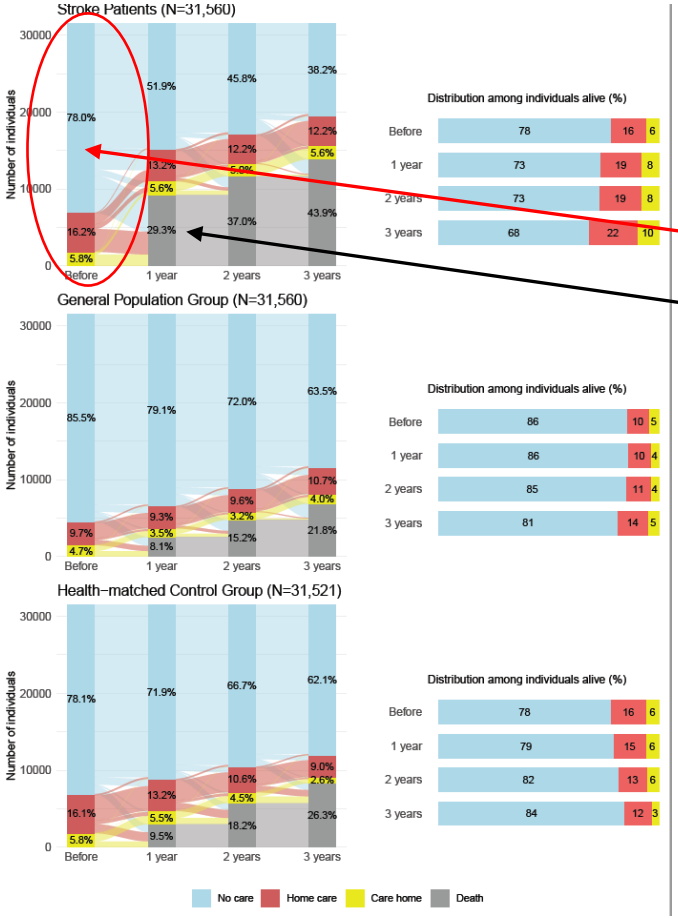
Slower (or faster) rate of aging?





Ebeling, Modig, et al. Age and Aging. *2021*

Healthy lives?

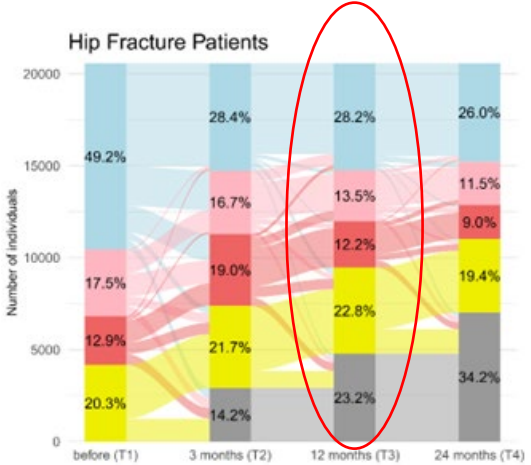


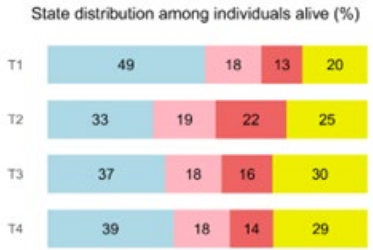
Preventing stroke

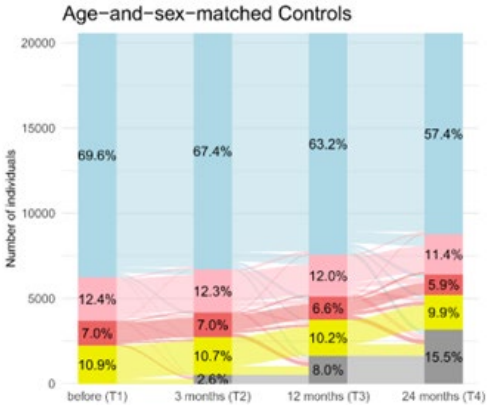
Improving survival

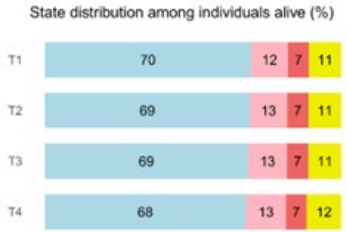
Meyer, Modig, et al. J Am Med Dir Assoc. 2024

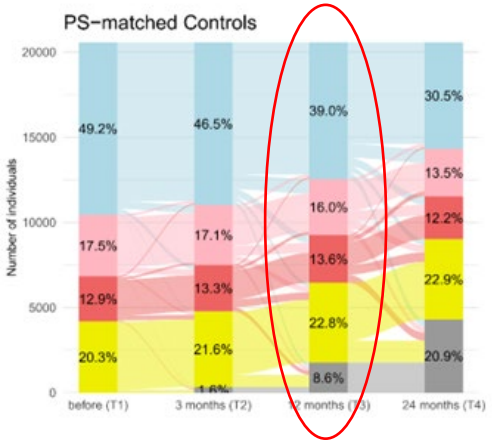
Hip fractures

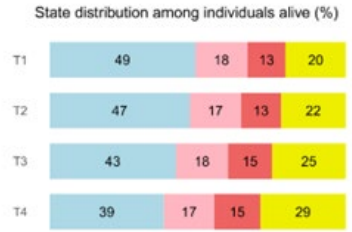










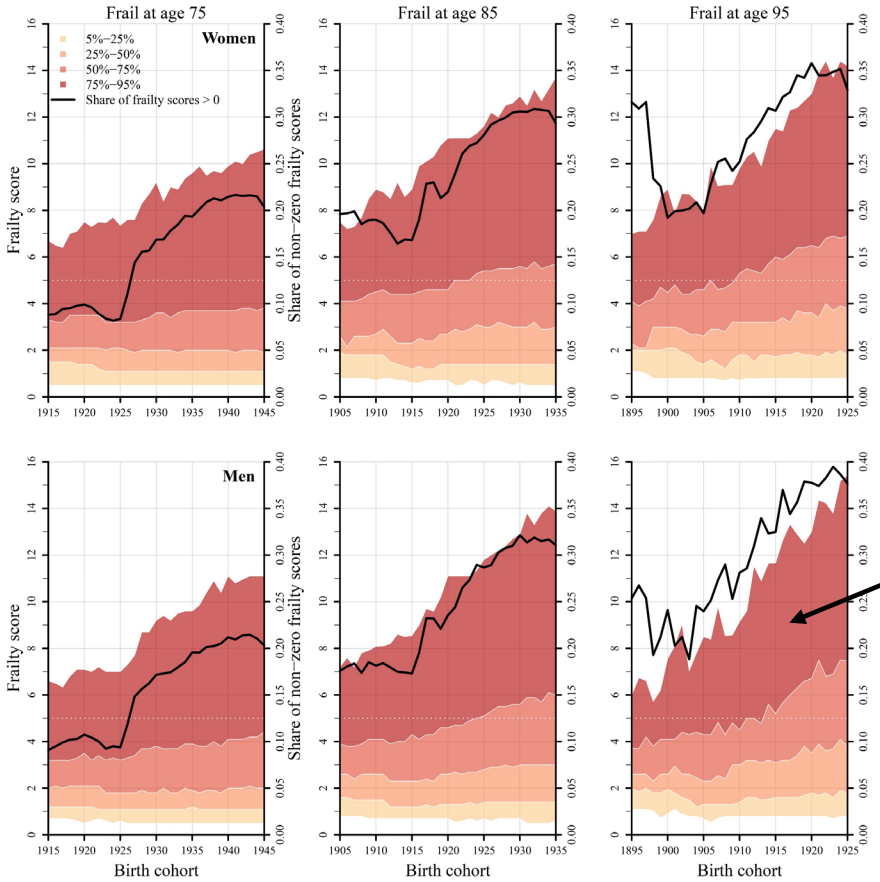


Meyer, Modig, et al. Am J Epidemiol 2023

Increasing levels of frailty over time in patient groups.

- But also in the general population

Time trend in population level frailty



Frailty has increased over time at ages 75, 85 and 95.

Primarily an increase from frail to frailer

Wennberg, Modig et al.
The journals of gerontology. Series A, 2023

We are living longer with a history of — or with — diseases

But! Many diseases pose less functional limitation today as compared to before

More effective

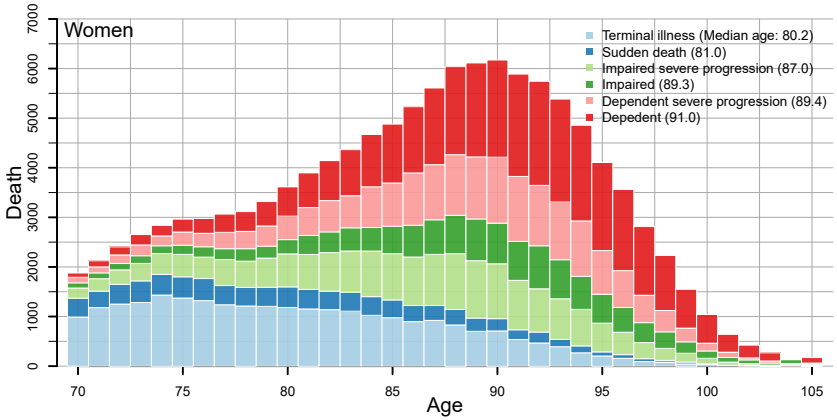
- Drugs
- Treatments
- Assistive tools
- Better knowledge

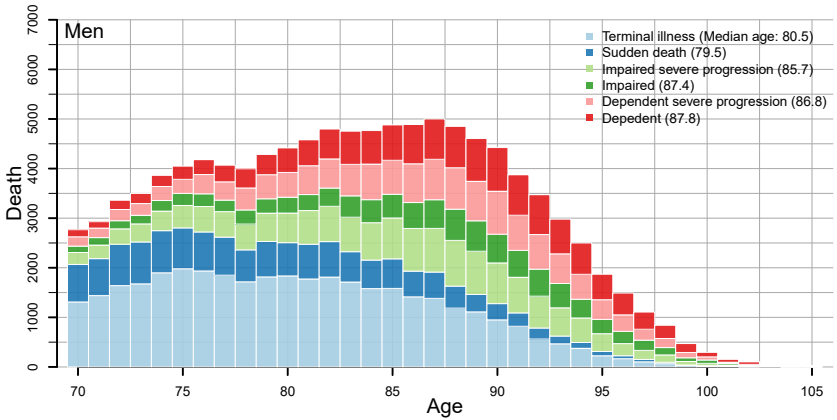
Therefore…

- Morbidity or multimorbidity is becoming less connected with functional limitation and poor self related health
- Frailty likely a better indicator than multimorbidity
- Increasing detatchment of chronological and biological age?
- Inconclusive results on time trends of biological age

Consequences

We survive diseases... and prolong death?





Most deaths occur after a final year of life with high use of healthcare and elderly care.

The older we become, the slower the dying process and the greater the need for care

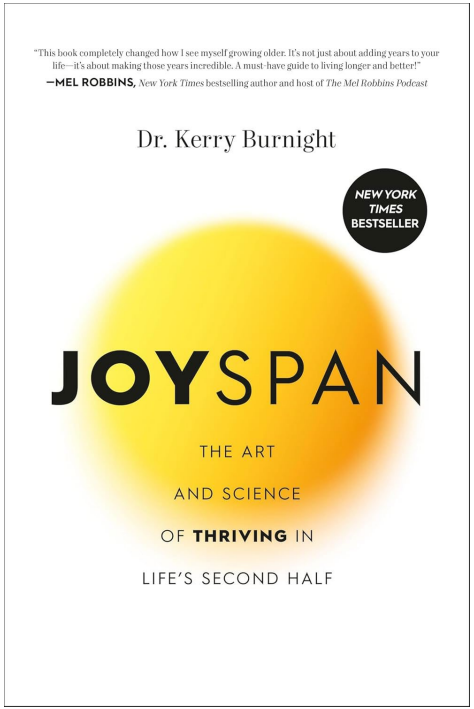
Consequences and challenges associated with a delayed endgame

- More complex disease profiles
- Prioritization of health conditions
- Specialized and individualized care versus primary care, home healthcare, and home care services
- Polypharmacy, discontinuation of medications
- Vulnerable groups – e.g., older people living alone, foreign-born
- (Aging)Relatives and their contributions
- Maintaining a sense of meaning and satisfaction

Lifespan – healthspan – joyspan

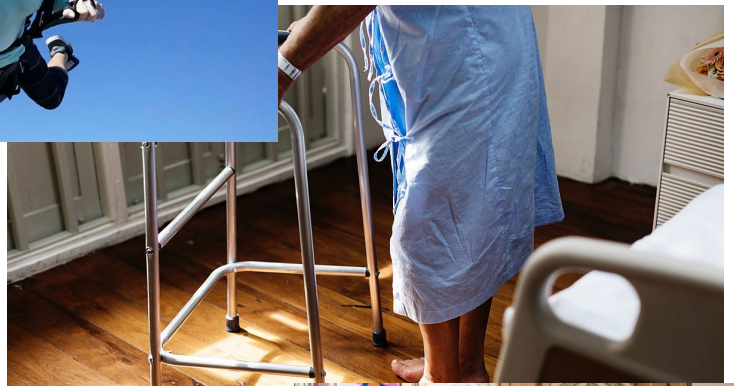
Joy - a feeling of wellbeing and life satisfaction, contentment

Not necessarily correlated with somatic health



Only 2% of Swedish centenarians are “healthy”

Meaning they have no chronic diseases, maximum 1 drug, no need of formal long-term care (in 2020)



Thank you for listening!

And acknowledgement to my team and collaborators

Karin Modig

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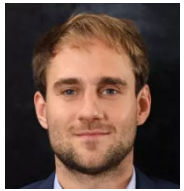

Marcus Ebeling

Katharina Schmidt-Mende

Hanna Bring

Anna Piereth


KAROLINSKA INSTITUTET
ANNO 1810
Karolinska
Institutet