



Improved Outcomes in Patients with Non-ST-Elevation Myocardial Infarction during 20 Years are Related to Implementation of Evidence-based Treatments – Results from the SWEDEHEART registry 1995 - 2014

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Background

- In patients with NSTEMI clinical characteristics and treatments have changed dramatically during the last two decades
- Several RCTs have, one-by-one, proven the efficacy of new medication/intervention alternatives
- Treatments were initially mainly focused on the relief of symptoms (e.g. nitroglycerin, beta-blocker) and later also on disease mechanisms (vulnerable stenotic plaques and thrombus formation (e.g. revascularization, platelet inhibitors, anticoagulants, statins)
- No study has previously described the overall effects of the new treatment alternatives on long-term fatal and non-fatal outcomes for an entire population over time

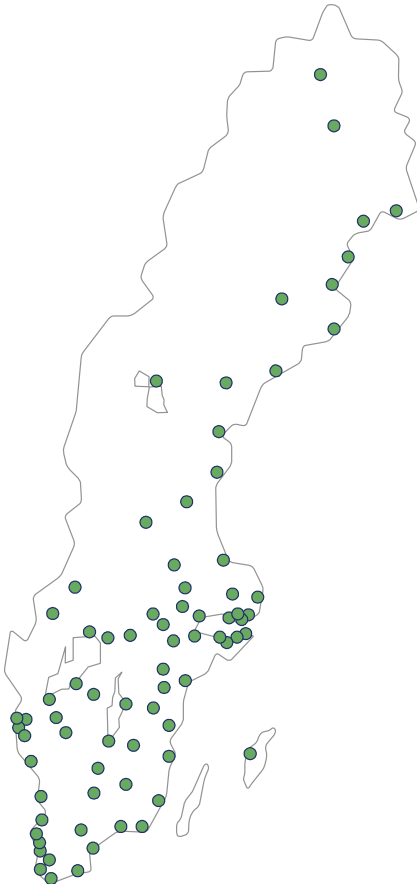


Aim

To describe the changes in treatments and outcomes and the effects of the implementation of new treatments on outcomes in patients with non-ST-elevation myocardial infarction during 20-years in an entire country



Methods



- Nearly all NSTEMI cases (n=205 693) in Sweden between 1995-2014 were registered in SWEDHEART and included
- Changes in patient characteristics, treatments and outcomes were continuously monitored
- 1-year mortality was compared with an age-gender- and calendar-year matched population
- Associations between time-period and in-hospital and 1-year outcomes were assessed by stepwise adjustment for baseline characteristics, coronary angiography, primary PCI and discharge medication
- Time period related long-term mortality and event rates were assessed during up to 20-years follow-up

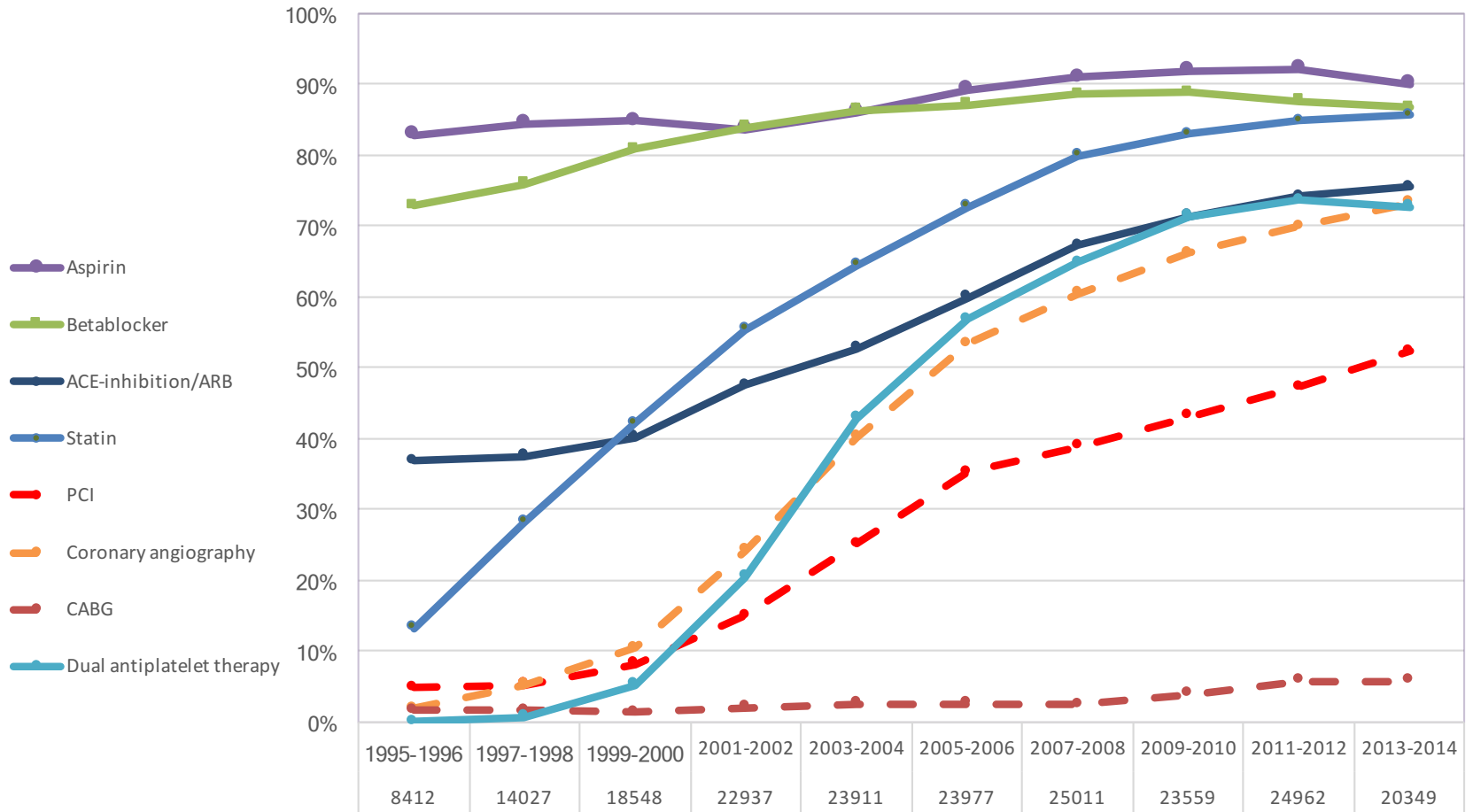


Baseline characteristics on admission 1995-2014

Variable	1995-96	1997-98	1999-00	2001-02	2003-04	2005-06	2007-08	2009-10	2011-12	2013-14
N	8412	14027	18548	22937	23911	23977	25011	23559	24962	20349
Age (years)	73 (64 - 80)	74 (65 - 80)	75 (65 - 81)	75 (65 - 81)	75 (65 - 82)	75 (65 - 82)	74 (64 - 82)	74 (64 - 82)	73 (64 - 82)	73 (64 - 82)
Male	65.3%	64.0%	63.6%	61.9%	61.6%	62.0%	61.6%	62.7%	62.6%	63.5%
Diabetes mellitus	23.4%	24.1%	25.0%	26.3%	26.2%	26.8%	27.1%	27.3%	27.6%	28.8%
Hypertension	37.1%	39.0%	40.6%	44.6%	49.2%	53.3%	60.0%	63.0%	66.1%	67.9%
Previous MI	35.6%	36.0%	34.9%	35.0%	34.2%	33.5%	32.9%	32.9%	32.6%	32.0%
Previous PCI	3.2%	4.1%	5.0%	6.5%	8.0%	10.6%	13.6%	16.8%	18.9%	20.8%
Rales on admission	37.3%	33.3%	30.5%	28.6%	25.5%	21.2%	17.5%	14.6%	12.9%	11.5%
Statin on admission	5.1%	9.2%	14.0%	20.3%	23.7%	28.2%	32.6%	35.6%	36.6%	35.8%



Treatments at NSTEMI diagnosis and at discharge

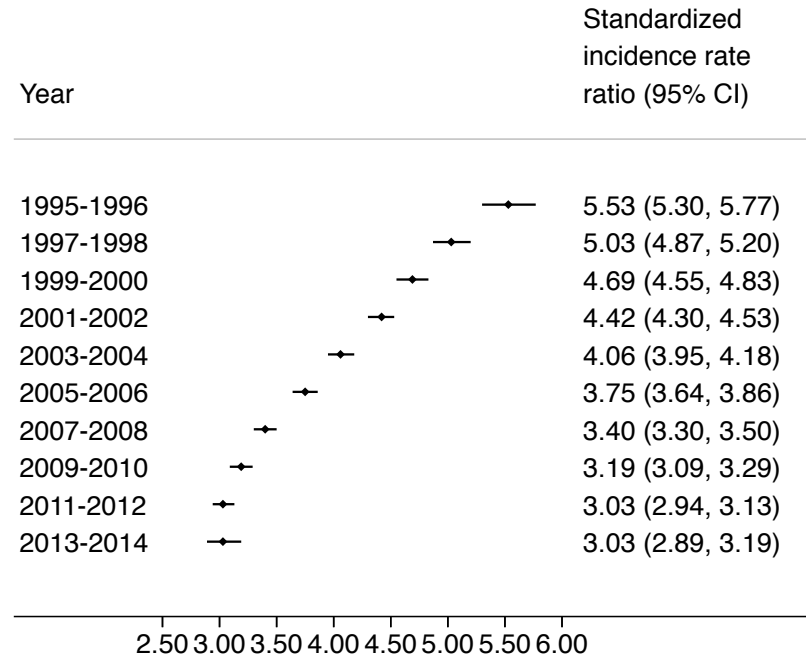
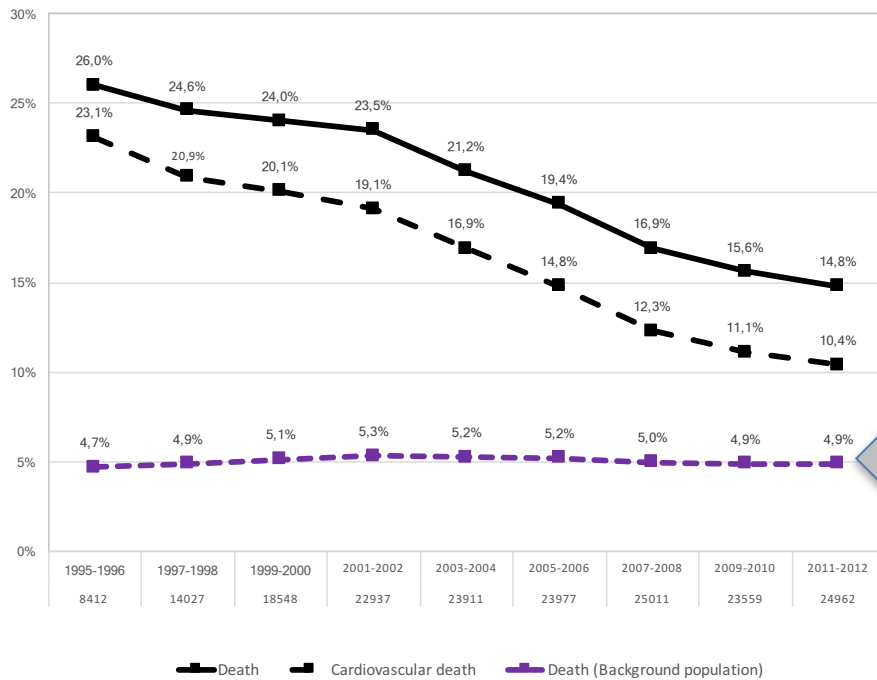




1-year outcomes

Mortality in NSTEMI in relation to mortality in the general population

Crude 1-year outcomes

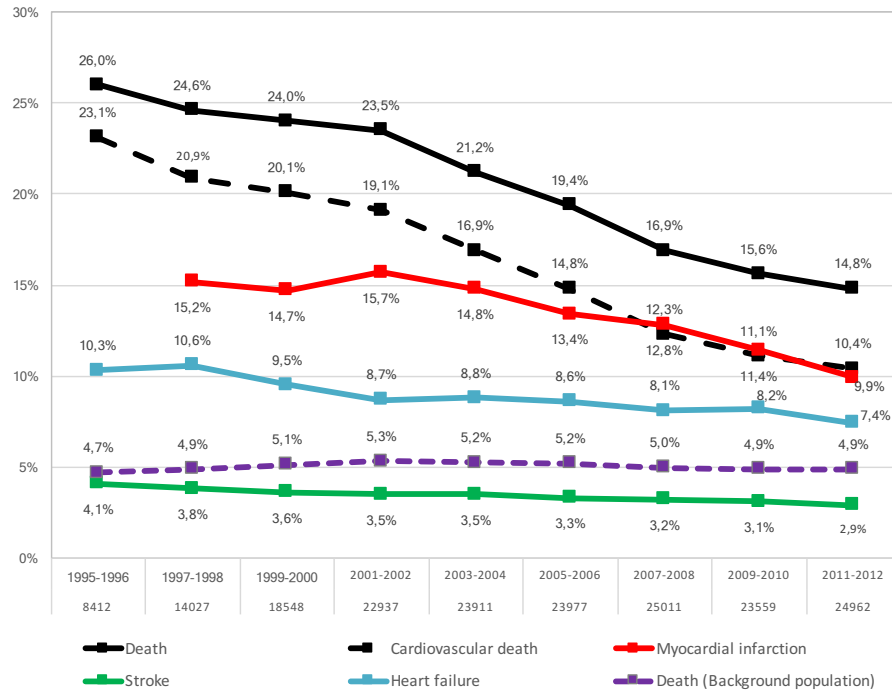




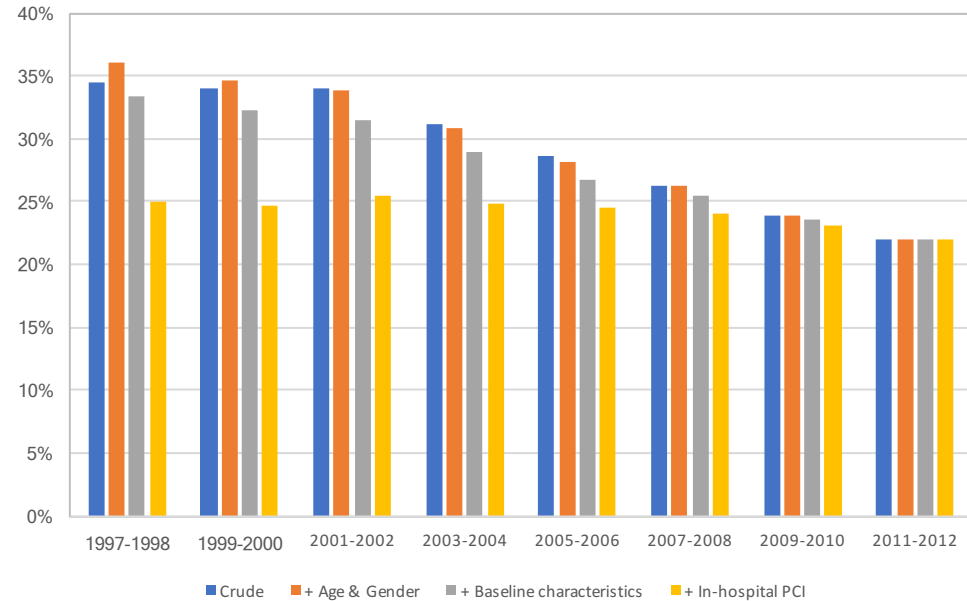
1-year outcomes

Crude and adjusted for changes in patient mix and treatments

Crude 1-year outcomes



Standardized death/myocardial infarction

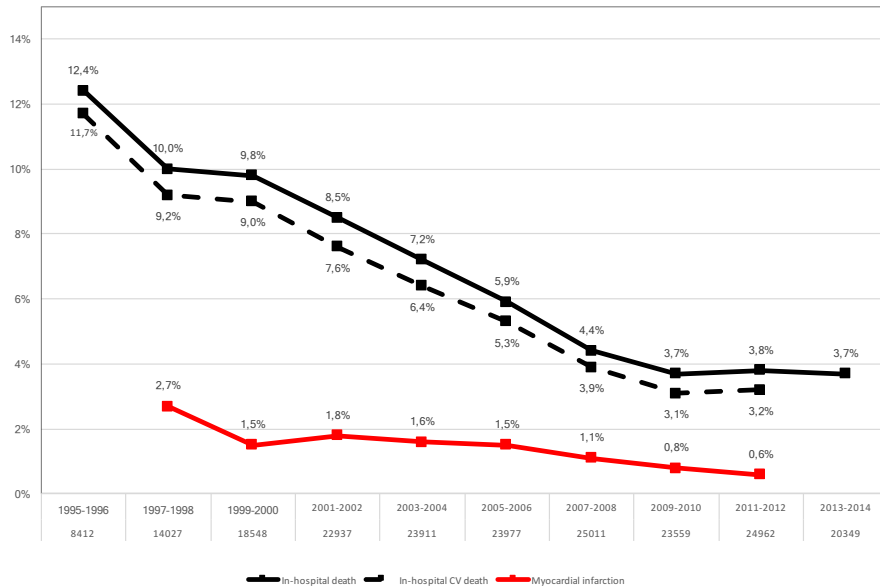




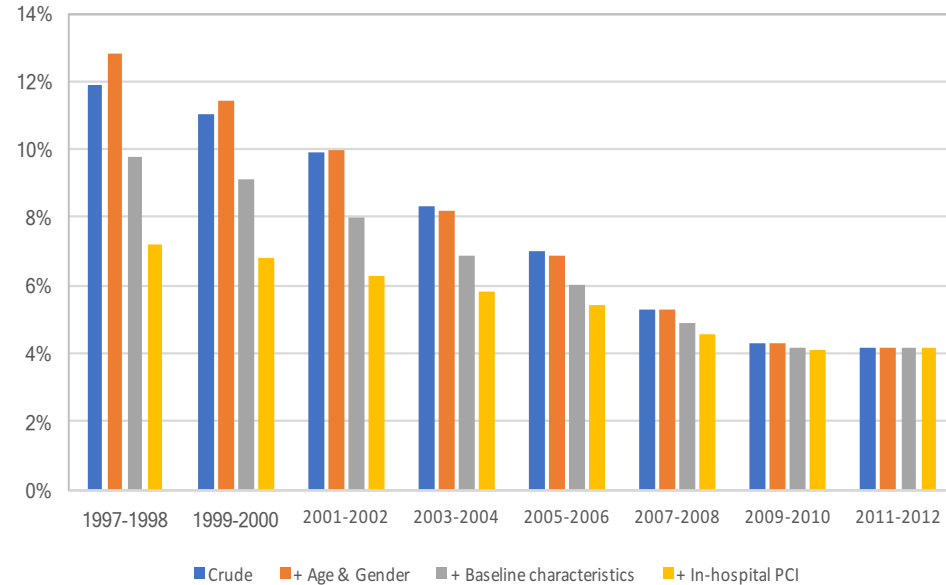
In-hospital outcomes

Crude and adjusted for changes in patient mix and treatments

Crude in-hospital outcomes

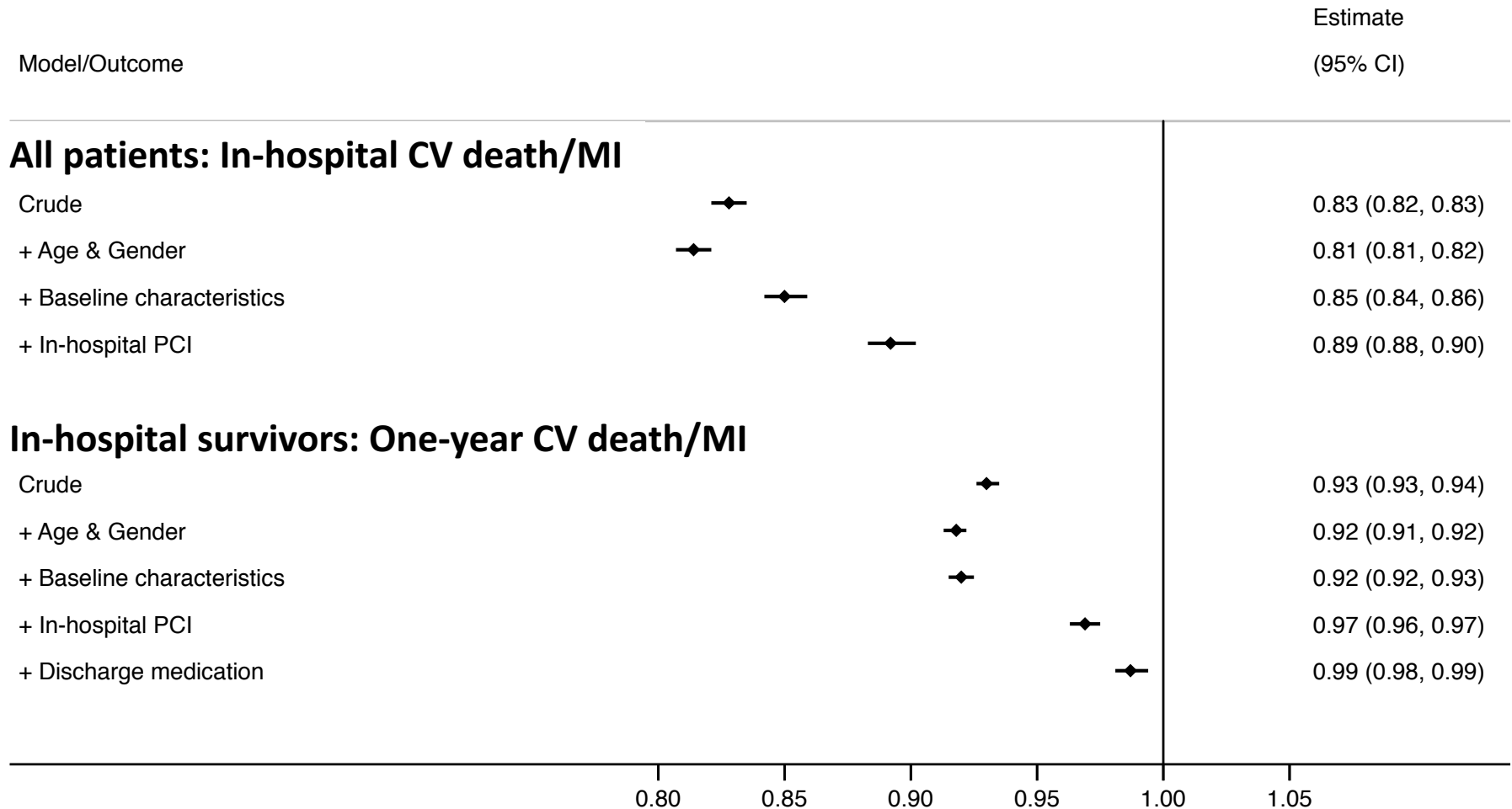


Standardized death/myocardial infarction





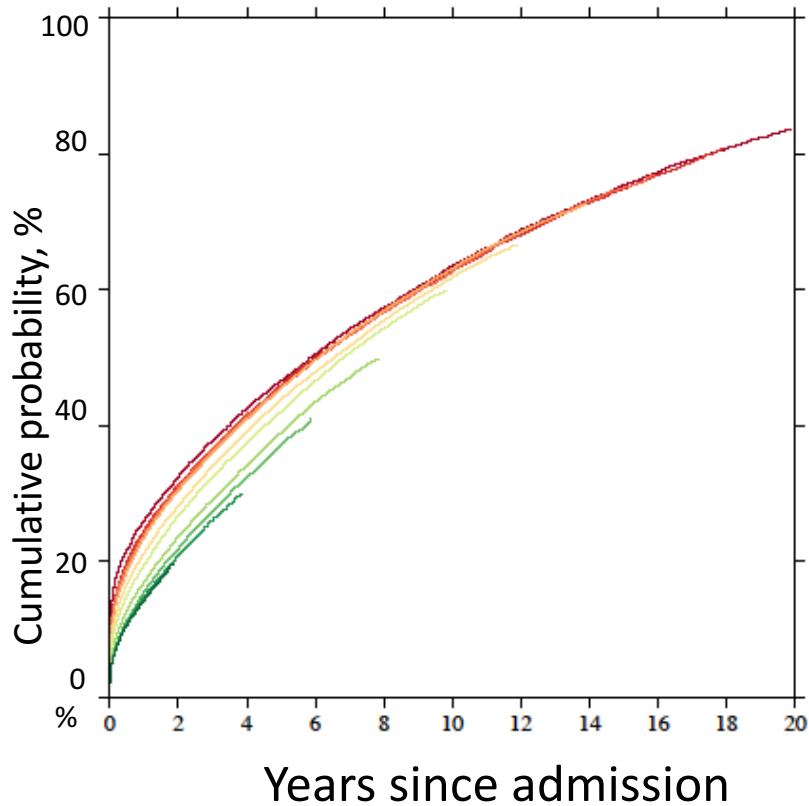
Relative change in risk of CV death/MI per 2-year period



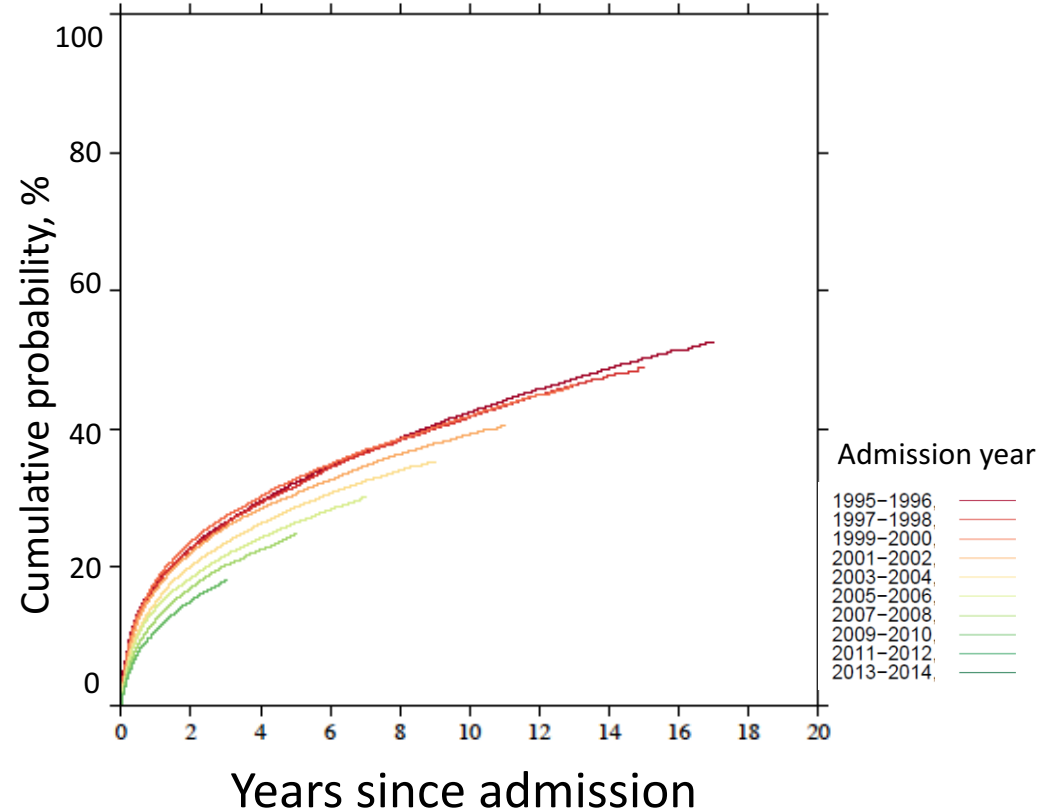


Long-term outcomes (1)

Death



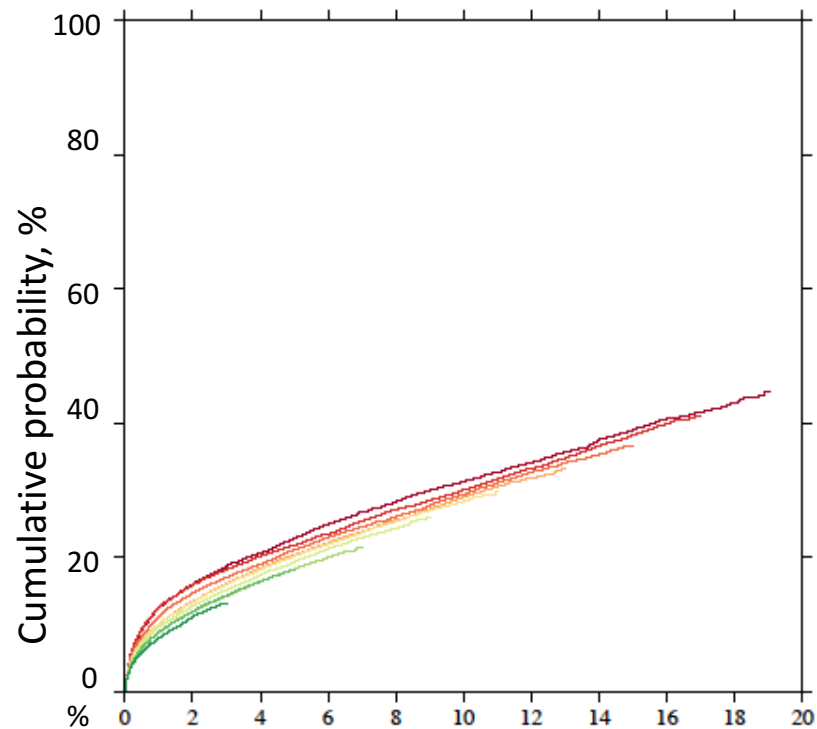
Myocardial infarction





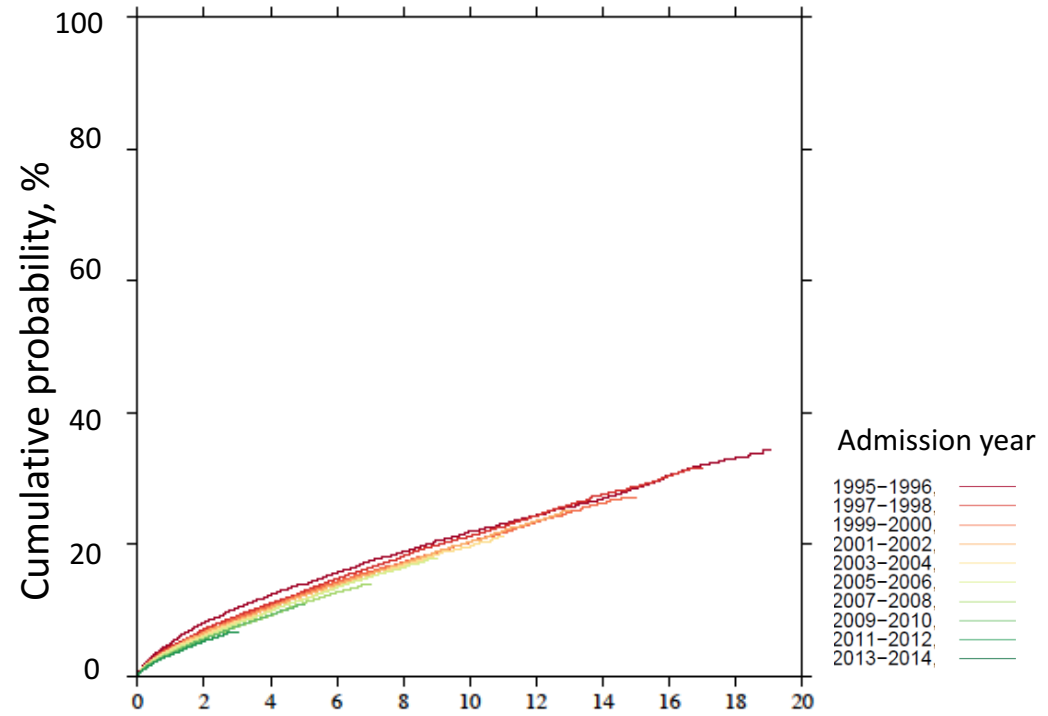
Long-term outcomes (2)

Heart failure



Years since admission

Stroke



Years since admission

- Admission year
- 1995-1996
 - 1997-1998
 - 1999-2000
 - 2001-2002
 - 2003-2004
 - 2005-2006
 - 2007-2008
 - 2009-2010
 - 2011-2012
 - 2013-2014



Limitations

- Definition of NSTEMI has changed over time
- Detection of myocardial injury has changed over time
- The effect of changes in PCI interventions and changes in antiplatelet therapy cannot be estimated separately



Conclusions

In patients with NSTEMI admitted to hospitals in Sweden over the last 20 years:

- Gradual uptake of new evidence-based treatments
- Improvement in long-term survival and reductions in the risk of new ischemic events and heart failure
- Improvements in outcomes are mainly explained by implementation of early coronary interventions and also of evidence-based medical treatments
- Continued and increased uptake of currently guideline recommended treatments can be expected to further improve outcomes



Thanks!

- Thanks to Professor Lars Wallentin and late Associate Professor Ulf Stenestrand who together initiated the national myocardial infarction registry RIKS-HIA, which later became the SWEDEHEART registry
- Thanks to all at Uppsala Clinical Research centre (UCR) for continuously maintaining and updating the registry
- Thanks to all participants and organizers of the SWEDEHEART registry