A smoking ban in public places may reduce the incidence of acute coronary syndrome among non-smoking men

Thorarinn Gudnason, MD, PhD, FESC

Thorsteinn Vidar Viktorsson MD, Karl Andersen MD, PhD, FESC

Dep. of Cardiology, Landspitali University Hospital
Reykjavik, Iceland

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Background

- There is increasing evidence that second hand smoking has negative health effects.
- Increasing demand for a smokeless environment in the society
- Legislation has been passed to reduce environmental tobacco smoke in many countries and regions i.e.:
  - In the USA in certain states (i.e. California 1998)
  - Local bans in towns and counties in USA
  - Ireland (2004) – the first whole country
  - Italy (2005),
  - Spain (2006)
  - The Nordic countries (2004-2007)

Background

- What are the effects of such legislations on cardiovascular health?
- Several studies show a decline in admissions for acute myocardial infarction (AMI) after smoking bans.
  - Sargent et al, BMJ 2004
  - Barone-Andesi et al, Eur Heart J 2006
  - Bartecchi et al, Circulation 2006
- Less is known about acute coronary syndrome (ACS) and the effect on non smokers in particular, but increasing data indicates a similar pattern as for AMI.
  - Pell et al NEJM 2008
  - Cesaroni Circulation 2008
  - Pell et al Heart 2009

Background

- There pathogenesis of unstable angina, NSTEMI and STEMI is similar, including plack-rupture and atherothrombosis.

- Reasonable to investigate the possible effect of a smoking ban on ACS including all these clinical situations, and not only focusing on AMI.

Background

- The reduction in AMI admissions seen in previous studies with smokers and non-smokers are considered to be due to a combination of:

    1. less second hand smoke in the environment (non smokers)
    2. decrease in the numbers of cigarettes smoked (smokers).

- We aimed to separate these effecs by excluding active smokers and concentrating on non-smokers and the second hand smoke.

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Reykjavik, Iceland

Thorarinn Gudnason,
ESC 09 Barcelona

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Background - Iceland

- The only cath lab for invasive cardiology is at Landspitali
- 2000 coronary angiographies and 750 PCI´s each year.
- Essentially all patients in Iceland are sent to Landspitali for angiography during a hospital stay for ACS.
- A smoking ban in public places became effective in Iceland on the 1st of June 2007.

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Aim

To investigate if there was a difference in the incidence of ACS in the non-smoking population in Iceland, before compared to after a smoking ban in public places.

Material and methods

- Study period: in all 10 months during 2007
  - 5 months before ban (1st of January to 31st of May)
  - 5 months after ban (1st of June to 31st of October)

- Study data:
  - Data was registered prospectively in the SCAAR database (Swedish Coronary Angiography and Angioplasty Registry)
  - Data was complete in more than 99% of cases.

- Statistics
  - SPSS 11.0
  - Students t-test and Chi square test as apropriate
  - Significance level of $p < 0.05$

Material and methods

All patients that underwent a coronary angiography in Iceland during the study period were considered for participation.

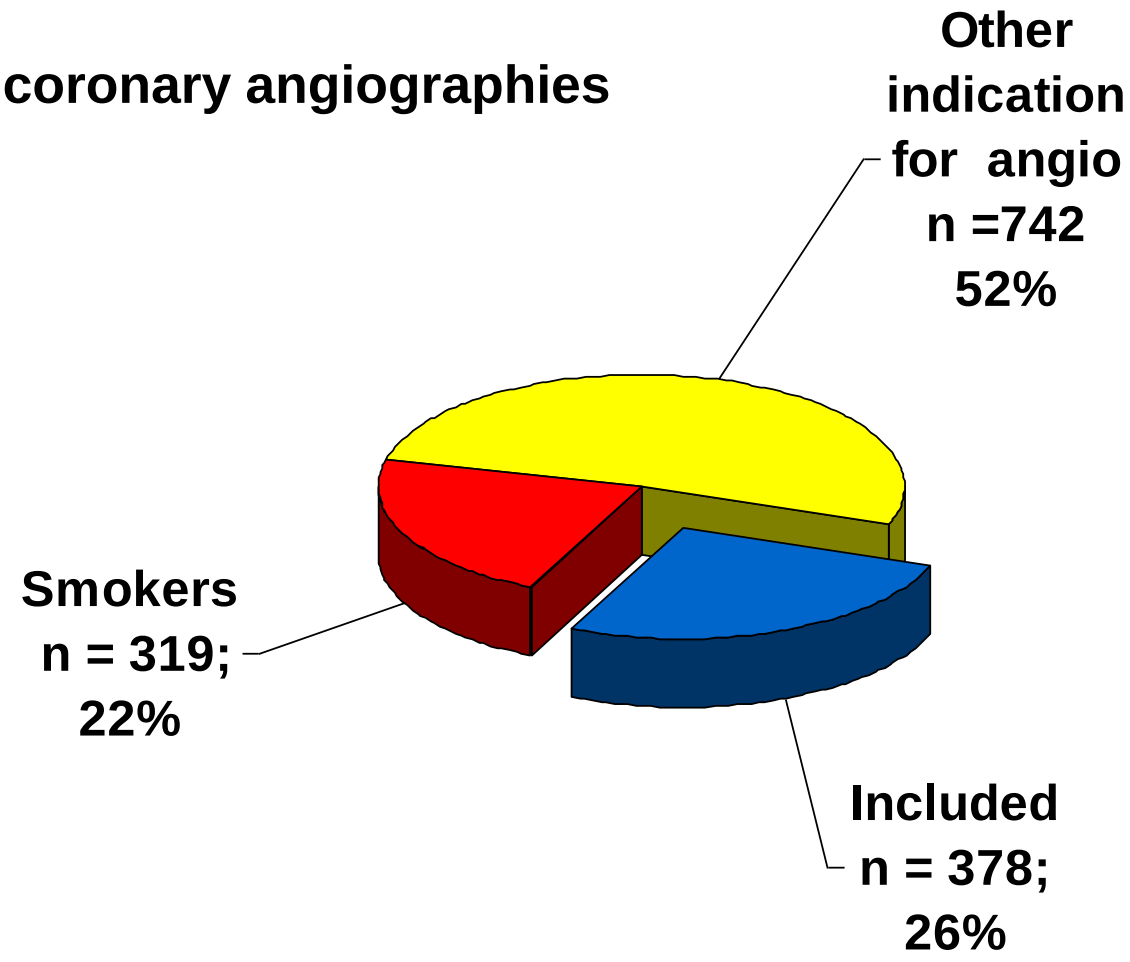
Patients had to fulfil the following criteria:

1. Non smokers (for at least 1 month prior to angio)

2. Clinical symptoms of unstable coronary artery disease (such as chest pain at rest), and at least one of the following:
   - elevated cardiac enzymes
   - ischemic changes on the EKG at rest
   - an abnormal exercise stress test during the unstable episode

Inclusion and exclusion:

In all 1439 coronary angiographies



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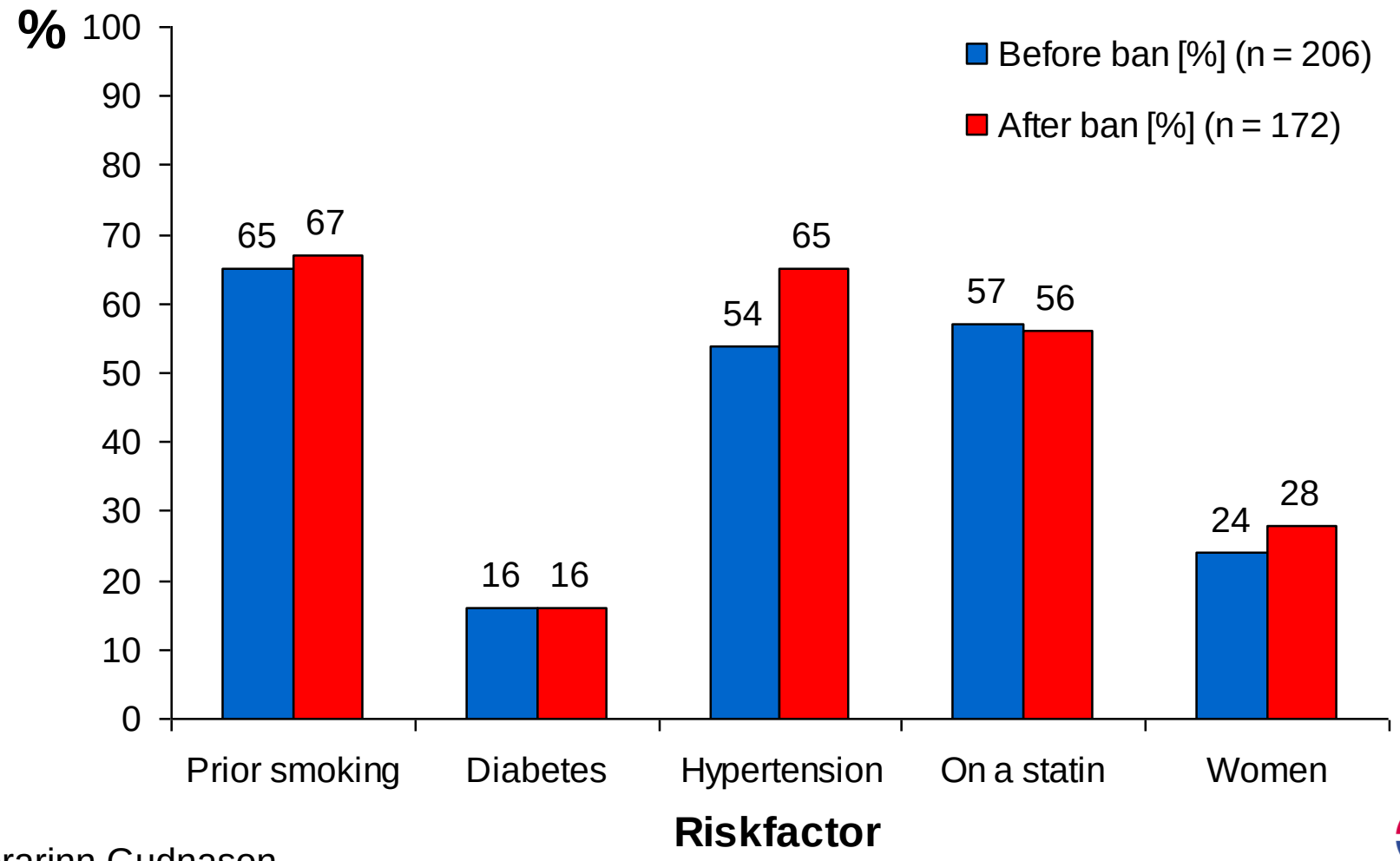
Results

Cardiovascular risk before and after smoking ban



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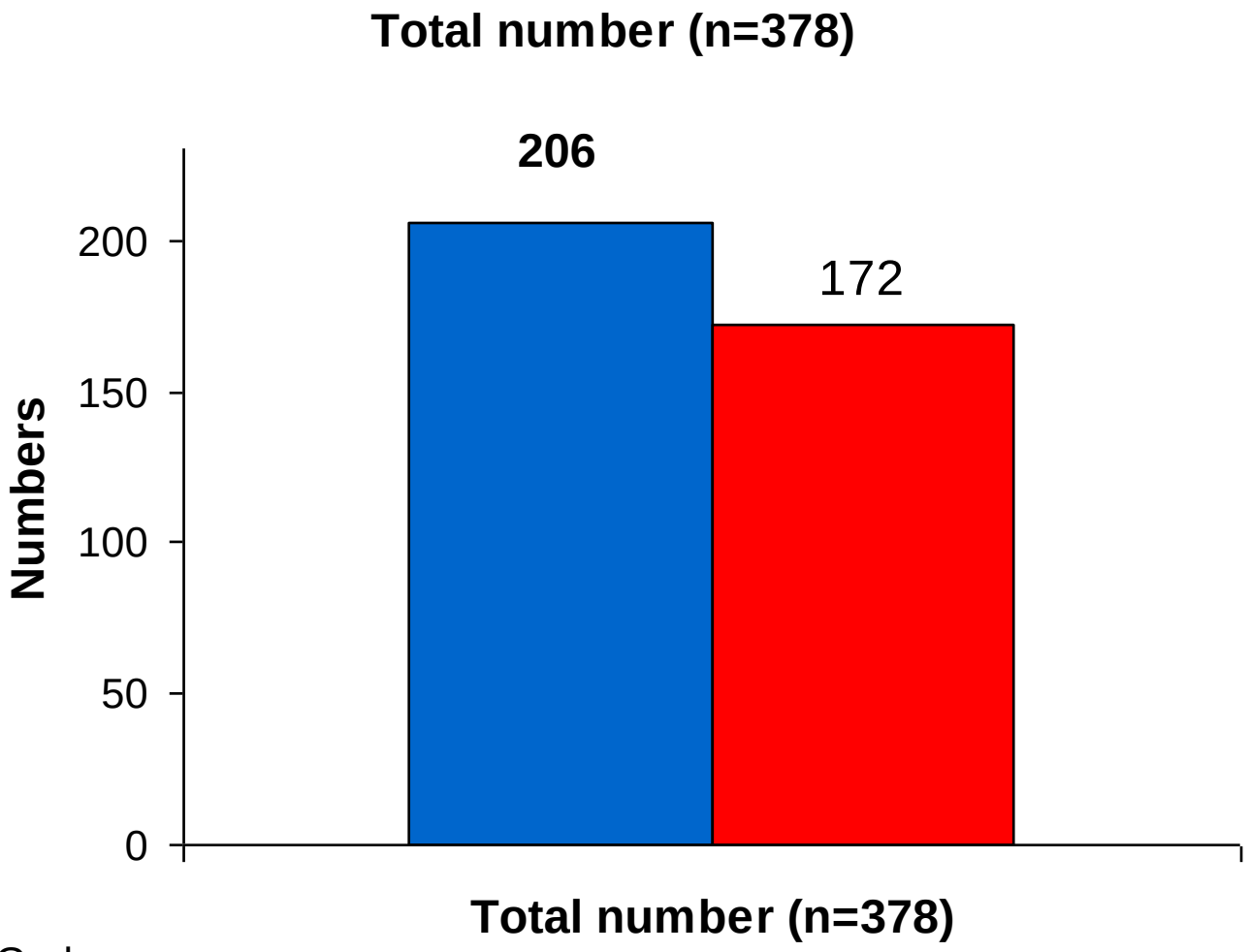
Results

Number of patients before and after ban



p = 0.08

-17%

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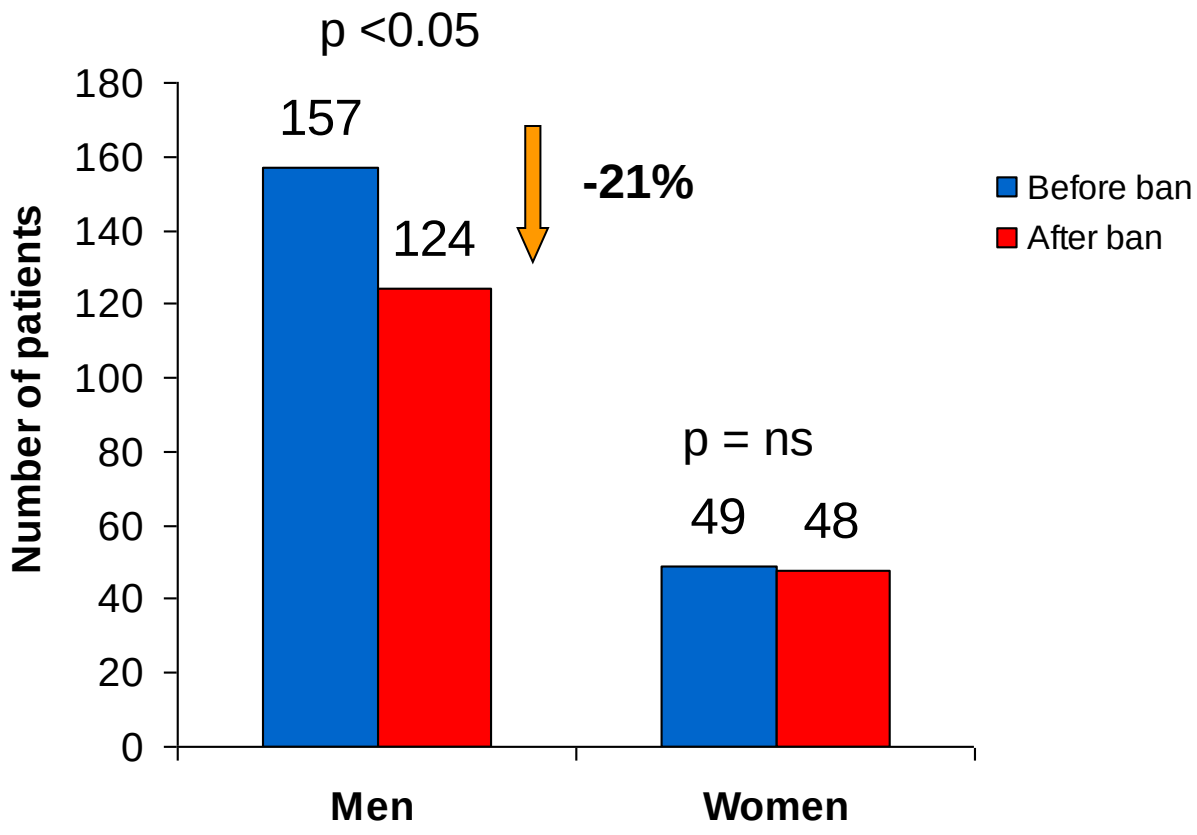
Results

Patients included before and after ban, men and women



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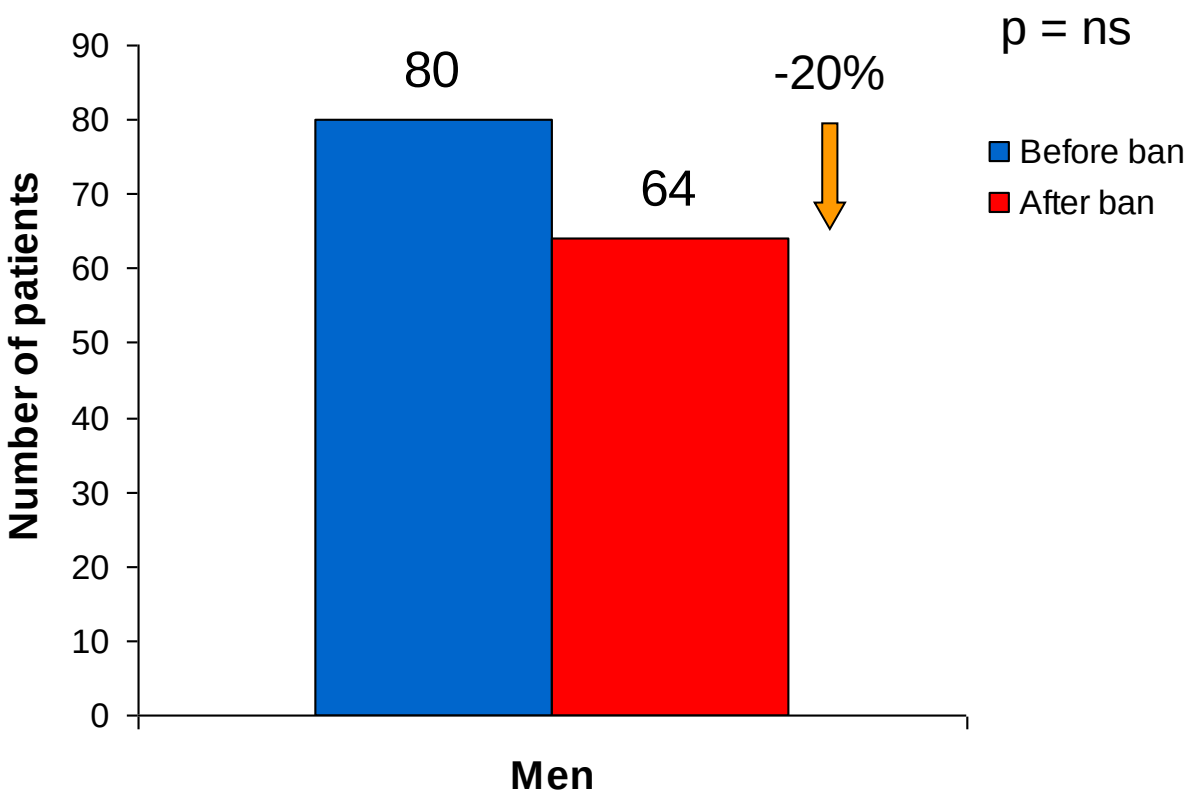
Results

Men with elevated cardiac ensymes before and after ban



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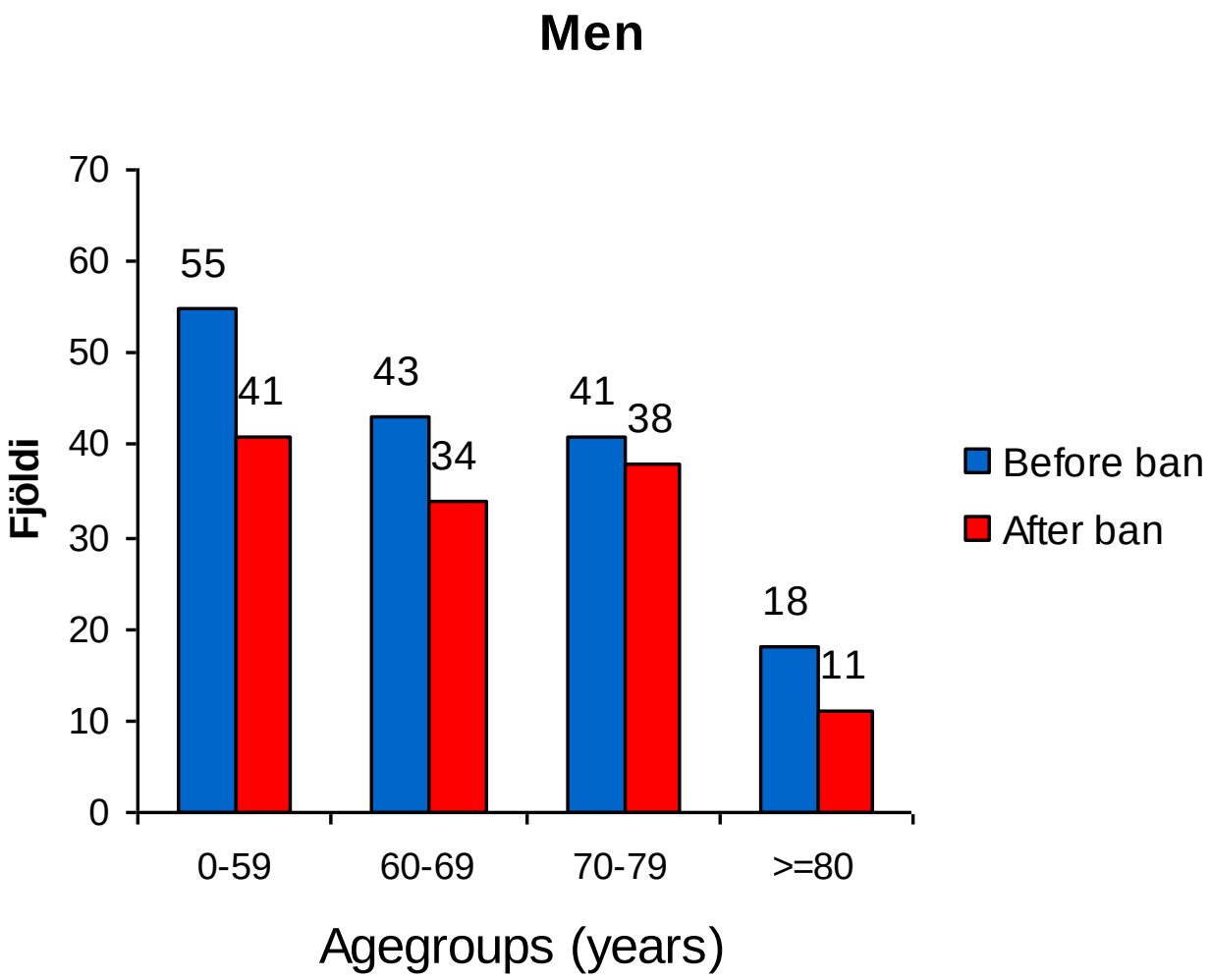
Results

Different age groups of men before and after ban



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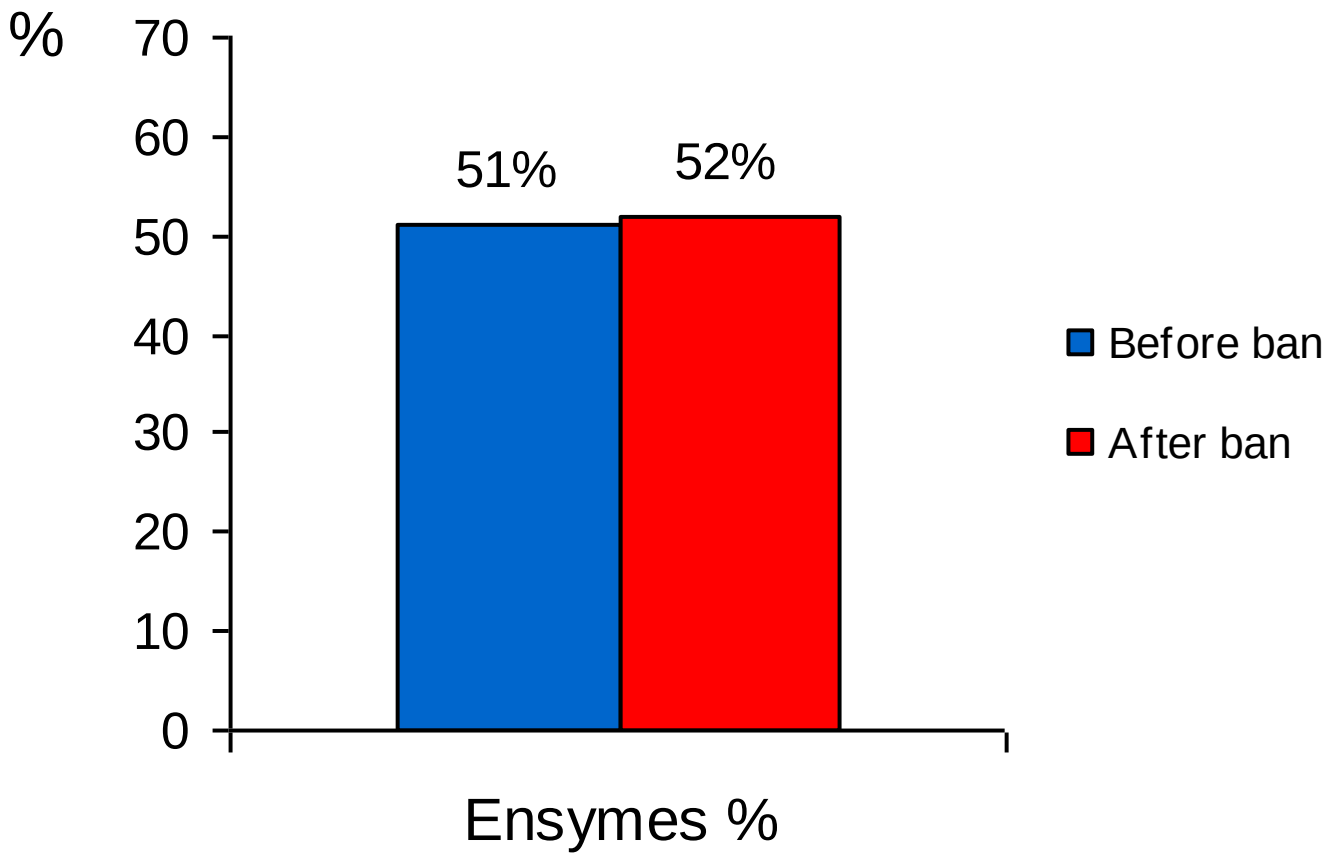
Results

Proportion of patients with elevated cardiac ensymes



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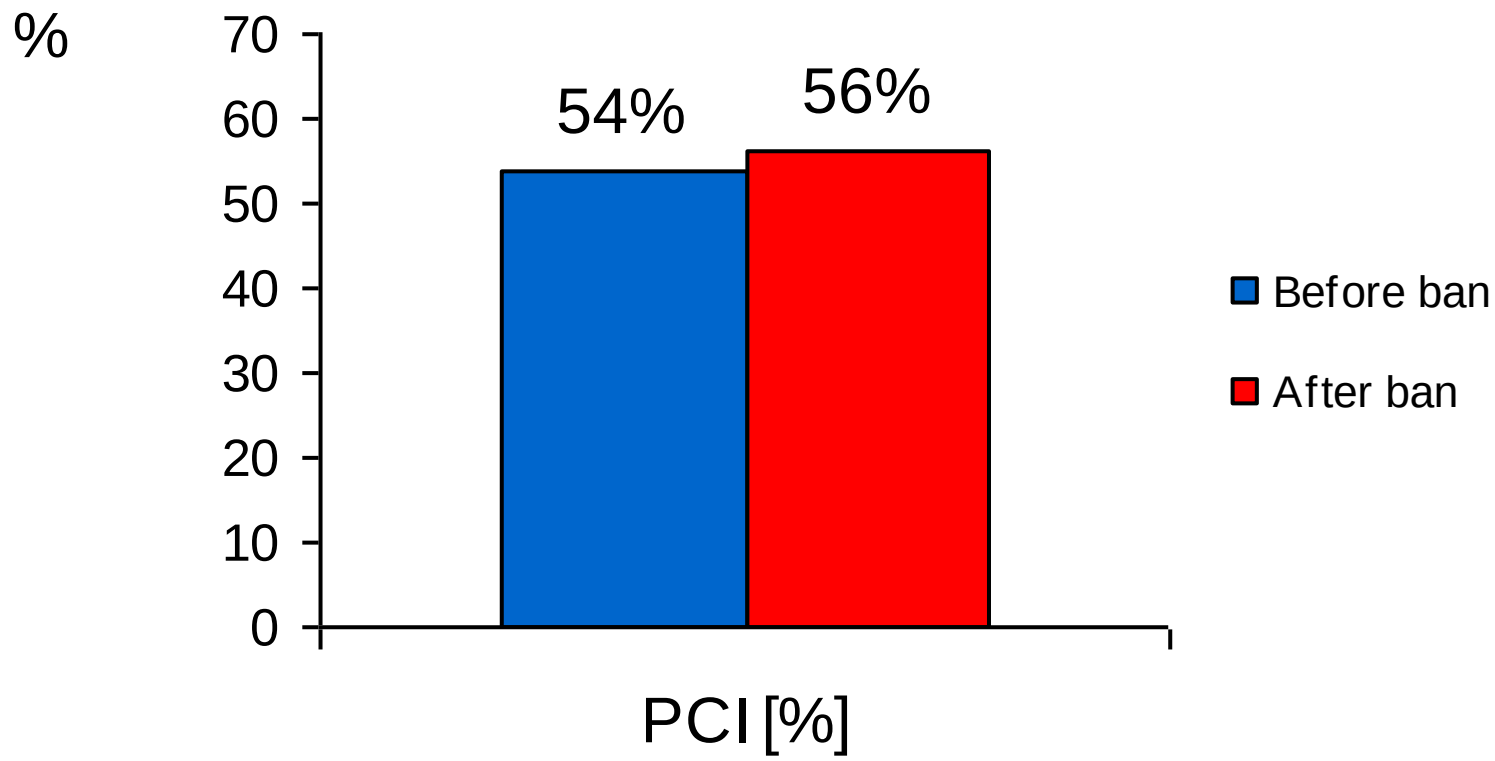
Results

Proportion of patients going to PCI ad hoc after angiography [%]



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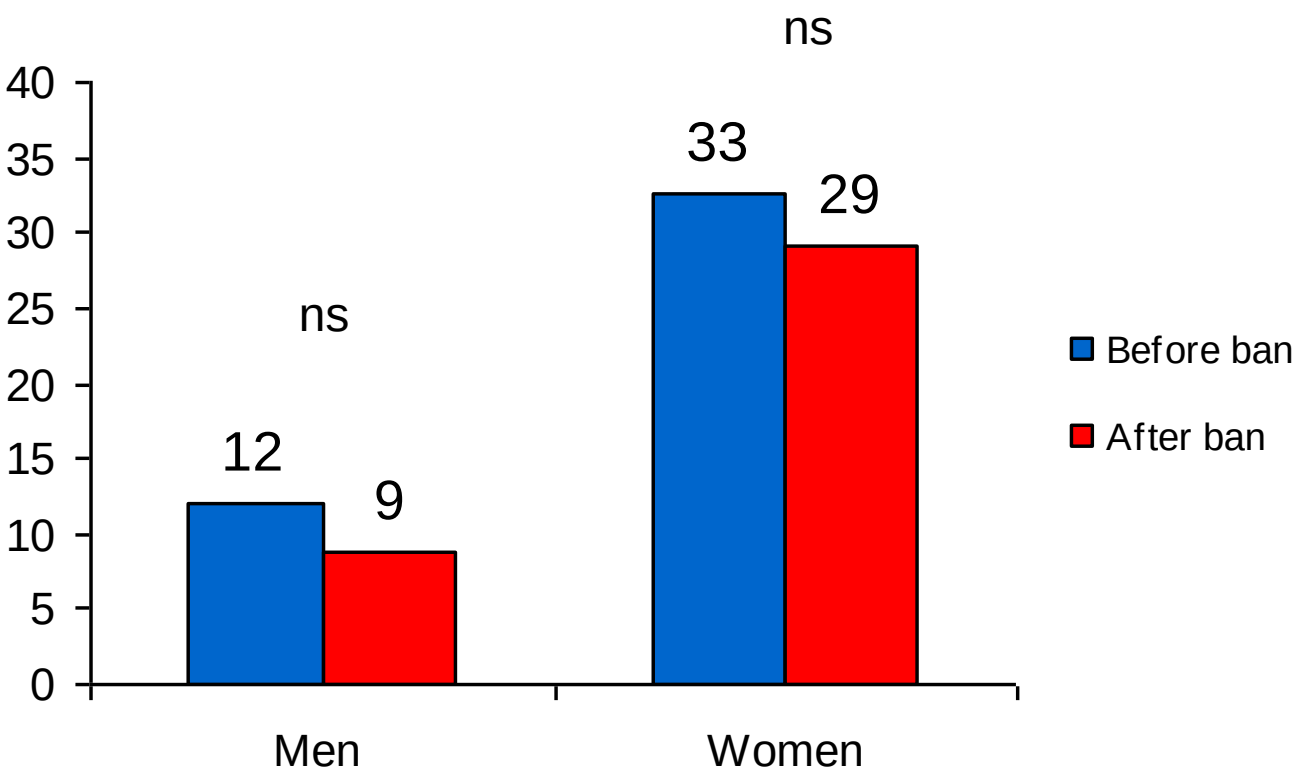
Results

Proportion of patients without significant stenosis in the coronary arteries on angiography [%]



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Conclusions

- The incidence of ACS including STEMI and NSTEMI, decreased more than 20% among non-smoking men after a smoking ban in public places became effective in Iceland
- A trend toward the same was seen in the total smoke-free population.
- No difference was seen among women
- The effect seems to come rapidly - within weeks or months
- The results are in line with prior studies on myocardial infarction and more recent studies on ACS

Conclusions

- Larger studies are needed to confirm these findings and investigate the possible sex difference observed.
- The inclusion period should be extended to exclude seasonal variation.
- The study it is observational and a causal relationship can only be suggested but not proven between the smoking ban and change in ACS incidence among men.
- The strengths of this study are that it is prospective, focuses on non smokers and thus second hand smoke, and covers a whole nation with minimal risk for selection bias.

Thank you for your attention

Thorarinn Gudnason,
ESC 09 Barcelona

LANDSPÍTALI
UNIVERSITY HOSPITAL

Landspitali University Hospital
Reykjavik, Iceland

Thorarinn Gudnason,
ESC 09 Barcelona

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