# New Developments In AAA Screening: Should We Change Who Is Being Screened

*The Viborg trial 1995*
*Solitary AAA screening*

*The VIVA trial 2008*
*Triple vascular screening*

*The DANCAVAS trial 2015*
*Comprehensive CVD screening*

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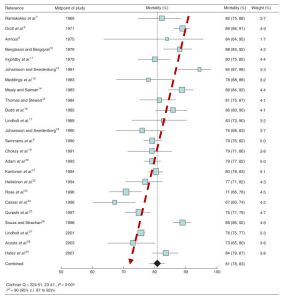
## Financial disclosures

- None

## Decreasing incidences of ruptures (mortality) worldwide



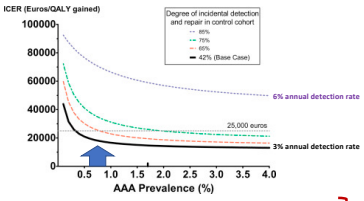
This is most likely due to

- Less misclassification due to better emergency diagnostics
- Increased incidental detection of large AAA: 3-fold increase to 15%/year in 2015 in DK
- Increased use of statins (associated with 25% less risk)
- Better hypertension treatment
- Decreasing prevalence of AAA ?

**Is it still cost-effective ?**

Reimerink JJ, et al. Systematic review and meta-analysis of population-based mortality from ruptured abdominal aortic aneurysm. Br J Surg. 2013 Oct;100(11):1405-13.

## Cost-effective as it is down to 0.35 (UK) - 0.5% (S) AAA prevalence




**Or is it ?**

Depends also on the incidentally detected AAA:

S: 42% over 13 years (3% annually)
UK: 7.7% annually

DK: 3% in the mid 90´ties
15% in 2010-11.

Sagaard R, Laustsen J, Lindholt JS. Cost effectiveness of abdominal aortic aneurysm screening and rescreening in men in a modern context: evaluation of a hypothetical cohort using a decision analytical model. BMJ. 2012 Jul 5;345:e4276.

Svensjö S, et al. Screening for AAA in 65-year-old men remains cost-effective with contemporary epidemiology and management. Eur J Vasc Endovasc Surg. 2014; :357–365.

Glover MJ, et al. Cost-effectiveness of the National Health Service AAA Screening Programme in England. Br J Surg. 2014 Jul;101(8):976-82.

**Matematical models based on AAA-specific mortality**

## High risk screening selected by smoking and CAD

All 16 232 men attending AAA screening in four neighbouring counties in Sweden 2006-2010: 236 (1.5%) AAA were detected.

The optimal threshold by ROC curve analysis:

*Men having smoked for >thirty years and/or history of CAD:*

- 74.0% of all AAAs by screening 33.0% of the population

*Targeting men having smoked for >ten years:*

- 84.0% of all AAAs by screening 55.0% of the population.

*Just ever smokers:*

- 85.0% of all AAAs by screening 61.0% of the population.

**Will it be feasible & cost-effective?**
A scan takes 5 minute to scan

How long time and at what will it cost to select the right ones?

Those with AAA not invited probably live longer and are less incidently detected

*Lindholt JS, Henneberg EW, Fasting H, Juul S. Mass or high-risk screening for abdominal aortic aneurysm. Br J Surg. 1997 Jan;84(1):40-2.*

*Söderberg P, Wanhainen A, Svensjö S. Optimising Abdominal Aortic Aneurysm Screening of 65 Year Old Men by Exploring Risk Factor Based Targeted Screening Strategies in Light of Declining Prevalence of the Disease. Eur J Vasc Endovasc Surg. 2024 Oct 9:S1078-5884(24)00876-1. Epub ahead of print.*

**Risk factor-targeted abdominal aortic aneurysm screening: systematic review of risk prediction for abdominal aortic aneurysm.**
**Musto L, et al. Br J Surg. 2024 Aug 30;111(9):znae239.**

The search identified 4813 articles. 37 reports were included

Age, sex, biometrics (such as height, weight, or BMI), etnicity, smoking, hypertension, hypercholesterolaemia, and history of heart disease.

**Applicability was poor when considering targeted screening strategies using electronic health record-based populations.**

Perhaps for future text mining of medical records ?

## The Four Randomised Screening Trials

**(N=124,929)**

*Table 1.* Methodological and Intervention Characteristics of the 4 Included Population-Based AAA Screening Randomized, Controlled Trials

| Variable | MASS (29–32) | Viborg Trial (37–41) | Western Australian Trial (42) | Chichester Trial (33–36) |
|---|---|---|---|---|
| Study quality | Good | Good | Fair | Fair |
| Participants randomly assigned, *n* | 67 800 men | 12 639 men | 41 000 men | 6433 men, 9342 women |
| Mortality follow-up, *n* (%) | 65 834 (97.1) | 12 639 (100.0) | 38 704 (94.4) | 6040 (93.9)* |
| Country | United Kingdom | Denmark | Australia | United Kingdom |
| Mean length of | 13.1 | 13 | 3.6† | 15.0 |

**Five-fold higher benefit, if judged by overall mortality**
**- without any other systematic preventive actions taken at all**

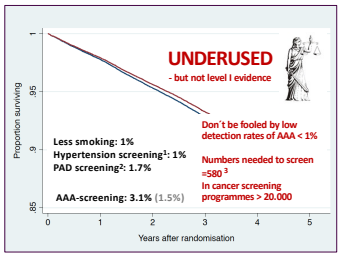
AAA specific mortality declined by 35%
- P<0.01, NNS= 796

Overall mortality declined by 1.5%
P = 0.03, NNS= 164

Meta-analysis after 15 years

*Ali MU, et al. A systematic review of short-term vs long-term effectiveness of one-time abdominal aortic aneurysm screening in men with ultrasound. J Vasc Surg. 2018 Aug;68(2):612-623*

## VIVA Screening Trial: Population based triple vascular screening of 65-74 yr old men




Systematic CVD prevention of AAA detected cases could **double** the benefit of screening

But why not add PAD screening on and almost double benefits?

1: Lindholt JS et al. Population screening and intervention for vascular disease in Danish men (VIVA): a randomised controlled trial. Lancet. 2017 Nov 18;390(10109):2256-2265.
2: Lindholt JS et al. Clinical Benefit, Harm, and Cost Effectiveness of Screening Men for Peripheral Artery Disease: A Markov Model Based on the VIVA Trial. EJVES. 2021 Jun;61(6):971-979.
3. Svensjö S, et al. Screening for AAA in 65-year-old men remains cost-effective with contemporary epidemiology and management. EJVES. 2014; :357–365.

## Conclusions: Should we change who we are screening?

- **Current screening practice:** Cost effectiveness is questioned, but proper evaluation must be based on overall mortality, and **double the benefits** by implementing systematic cardiovascular prevention.
- Consider to **add PAD screening** to double the benefits once more
- **Forget about the low prevalences** detected now a days – a numbers needed to screen of 500 to save one life is nothing compared to cancer screening programs (NNS>20 000).
- **Reseach to identify risk groups** outside the current target group is warranted – benefits and cost effectiveness must be evaluated based upon overall mortality