



Rigshospitalet
Hjertecentret



DANSK CARDIOLOGISK SELSKAB

KØBENHAVNS
UNIVERSITET



Tidlig opsporing af hjertesygdom *- til gavn eller skade*

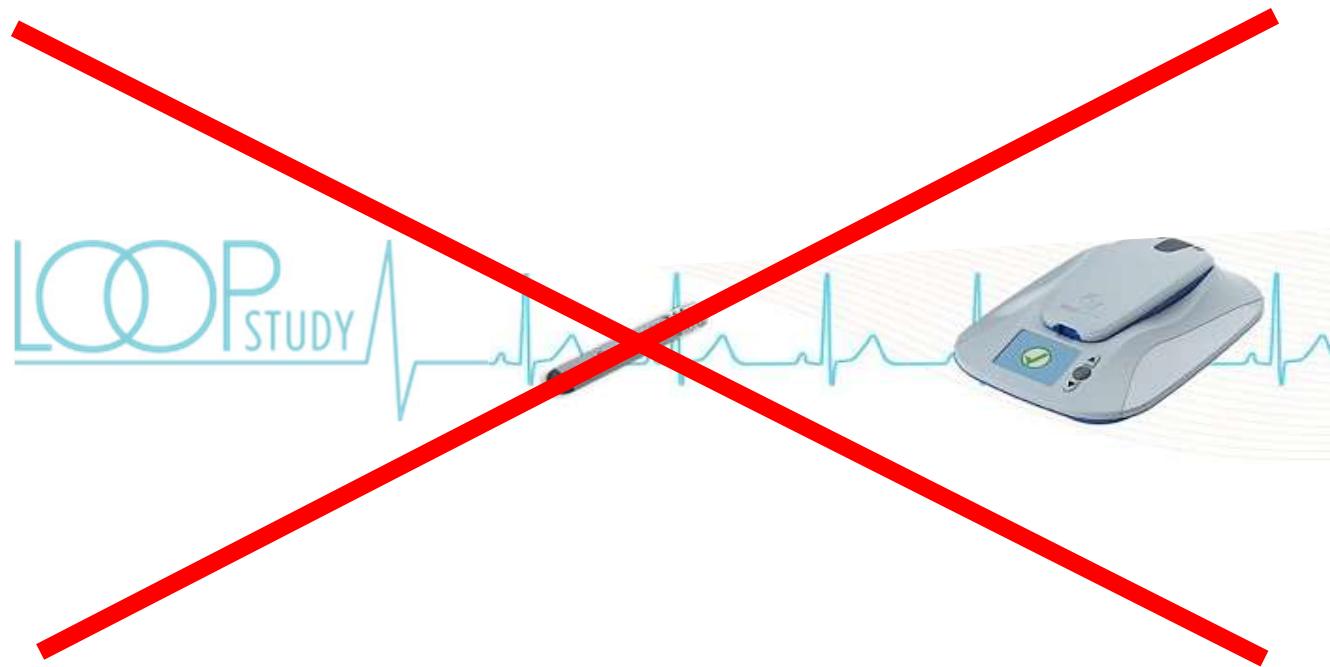
Ved DSIM årsmøde d. 3. marts 2023

Søren Zöga Diederichsen, læge ph.d

Interessekonflikter

Konsulent: BMS / Pfizer, Acesion, Vital Beats

Speaker: BMS / Pfizer

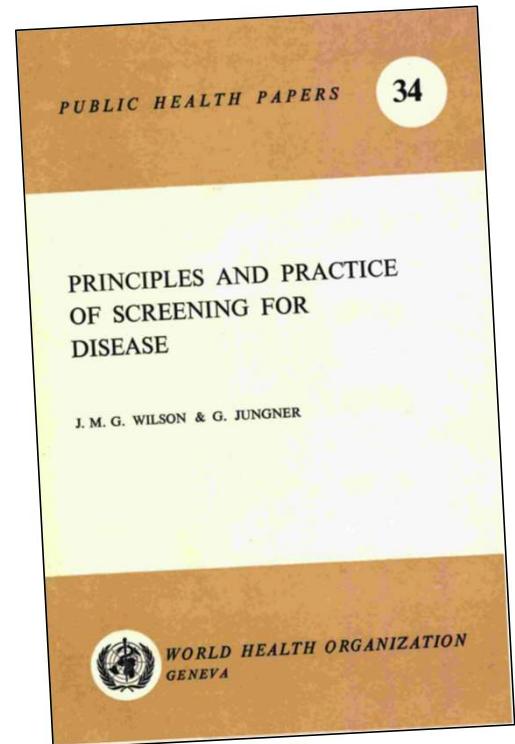


”Kardiologien har sejret sig selv ihjel”

”Man er syg til det modsatte er bevist”

Wilson and Jungner's principles of screening¹

- The condition sought should be an important health problem.
- The natural history of the condition, including development from latent to declared disease, should be adequately understood.
- There should be a recognizable latent or early symptomatic stage.
- There should be a suitable test or examination.
- The test should be acceptable to the population.
- There should be an agreed policy on whom to treat as patients.
- There should be an accepted treatment for patients with recognized disease.
- Facilities for diagnosis and treatment should be available.
- The cost of case-finding (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as a whole.
- Case-finding should be a continuing process and not a “once and for all” project.



Wilson and Jungner. WHO 1968

“General health checks did not reduce morbidity or mortality, neither overall nor for cardiovascular or cancer causes, although they increased the number of new diagnoses. Important harmful outcomes were often not studied or reported.”

BMJ
Page 1 of 13

RESEARCH

General health checks in adults for reducing morbidity and mortality from disease: Cochrane systematic review and meta-analysis

 OPEN ACCESS

Lasse T Krogsgaard doctor, Karsten Juul Jørgensen doctor, Christian Grønbaek Larsen doctor, Peter Gøtzsche professor, director

Nordic Cochrane Centre, Rigshospitalet, Blegdamsvej 9, 2100 Copenhagen, Denmark

Abstract To quantify the benefits and harms of general health checks in adults with an emphasis on relevant outcomes such as morbidity and mortality rather than surrogate outcomes.

Design Cochrane systematic review and meta-analysis of randomised trials. Mortality was the primary outcome with random effects meta-analysis, and for other outcomes we did a qualitative synthesis as meta-analyses were not feasible.

Data sources Medline, EMBASE, Healthstar, Cochrane Library, Cochrane Central Register of Controlled Trials, CINAHL, EPIC register, ClinicalTrials.gov, and WHO ICTRP, supplemented by manual searches of relevant journals, included studies, citation tracking (Web of Knowledge), and contacts with trialists.

Selection criteria Randomised trials comparing health checks with no health checks in adult populations irrespective of disease or risk factors. Health checks defined as screening general populations for more than one disease or risk factor in more than one organ system. We did not include trials of screening for specific diseases.

Data extraction Two observers independently assessed eligibility, selected data, and assessed the risk of bias. We contacted authors for additional outcomes or trial details where necessary.

Results We identified 18 trials, 14 of which provided relevant data (1 152 209 participants). Nine trials reported data on total mortality (11 949 deaths), and they yielded a risk ratio of 0.98 (95% confidence interval 0.85 to 1.03). One trial provided data on cardiovascular mortality (4557 deaths), risk ratio 1.03 (0.91 to 1.12), and eight on cancer mortality (3666 deaths), risk ratio 1.03 (0.92 to 1.12). Subgroup analysis showed that trials with higher quality had a greater risk reduction. We did not find any evidence of effects of general health checks on morbidity, including pain, disability, worry, withdrawal, or fatigue. One trial found that health checks led to a 25% increase in physician visits, or absence from work, but all trials reported on these outcomes. One trial found that health checks led to a 25% increase in the total number of new diagnoses per participant over six years.

Conclusions General health checks did not reduce morbidity or mortality, neither overall nor for cardiovascular or cancer causes, although they increased the number of new diagnoses. Important harmful outcomes were often not studied or reported.

Systematic review registration Cochrane Library, doi:10.1002/1469-1822.CD000809

Introduction

General health checks have long been common elements of healthcare in some countries such as the United States.¹ In the UK, the publicly funded NHS Health Check programme was introduced in 2009, and in Denmark an organised health check programme for the general public has been organised, but now seems abandoned. Health checks are also performed by some primary care physicians outside organised programmes and by commercial clinics.² However, evidence for their effectiveness has been lacking.

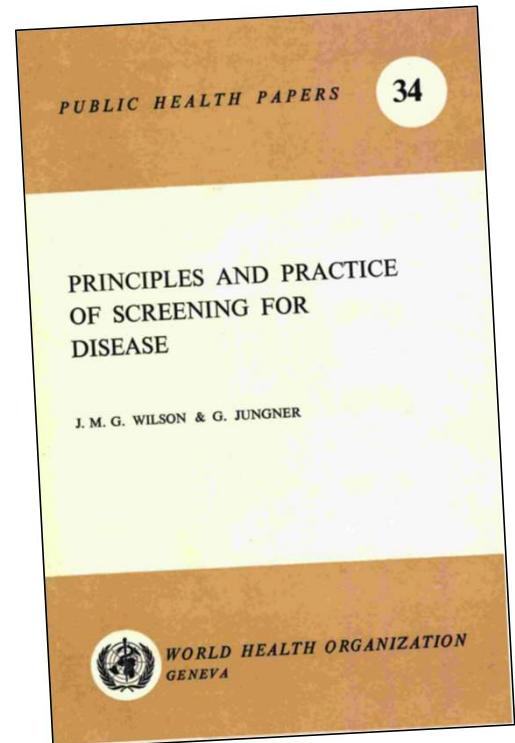
General health checks involve a contact between a patient and a healthcare professional to identify signs, symptoms, or risk factors for disease that were previously undiagnosed. They are combinations of screening tests, few of which have been adequately evaluated in randomised trials. For example, although the benefits and harms of treatments for conditions such as hypertension and diabetes have been extensively studied in randomised trials, screening asymptomatic people for these conditions has not.^{3,4}

Correspondence to: L T Krogsgaard krogsgaard@cochrane.dk
Extra material supplied by the author: see <http://www.bmjjournals.com/content/345/bmjj7191/relation/rebeatra>
Appendix 1: Example of a database search strategy
Appendix 2: Detailed results for secondary outcomes of study
1b: General health. See rights and reuse: <http://www.bmjjournals.org/rightsPermissions>

Downloaded from <http://www.bmjjournals.org/> on 24 March 2023 by guest. Protected by copyright.

Wilson and Jungner's principles of screening¹

- The condition sought should be an important health problem.
- The natural history of the condition, including development from latent to declared disease, should be adequately understood.
- There should be a recognizable latent or early symptomatic stage.
- There should be a suitable test or examination.
- The test should be acceptable to the population.
- There should be an agreed policy on whom to treat as patients.
- There should be an accepted treatment for patients with recognized disease.
- Facilities for diagnosis and treatment should be available.
- The cost of case-finding (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as a whole.
- Case-finding should be a continuing process and not a “once and for all” project.



Wilson and Jungner. WHO 1968

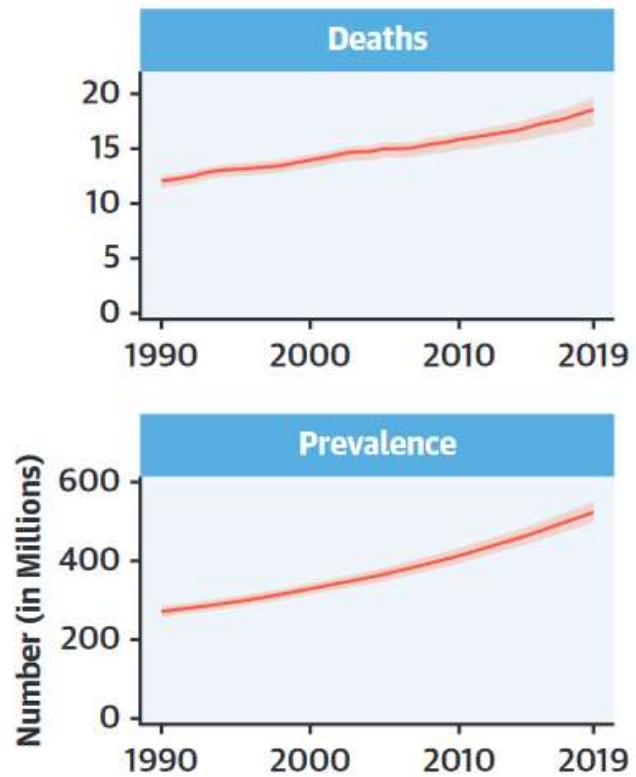
JACC STATE-OF-THE-ART REVIEW

Global Burden of Cardiovascular Diseases and Risk Factors, 1990–2019



Update From the GBD 2019 Study

Gregory A. Roth, MD, MPH,^a George A. Mensah, MD,^b Catherine O. Johnson, PhD, MPH,^c Giovanni Addolorato, MD,^d Enrico Ammirati, MD, PhD,^e Larry M. Baddour, MD,^f Noël C. Barengo, MD, PhD, MPH,^g Andrea Z. Beaton, MD,^h Emelia J. Benjamin, MD, ScM,ⁱ Catherine P. Benziger, MD,^j Aimé Bonny, MD, MSc,^k Michael Brauer, ScD,^l Marianne Brodmann, MD,^m Thomas J. Cahill, MBBS, DPhil,ⁿ Jonathan Carapetis, MBBS, PhD,^o Alberico L. Catapano, PhD,^p Sumeet S. Chugh, MD,^q Leslie T. Cooper, MD,^r Josef Coresh, MD, PhD,^s



Abdominal aortaaneurisme

Aterosklerose

Atrieflimren

Carotis-stenose

Diabetes

Hyperkolesterolæmi

Hypertension

Iskæmisk hjertesygdom

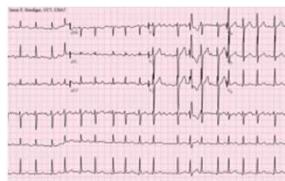
Perifer arteriesygdom

United States Preventive Services Task Force anbefalinger

Abdominal aortaaneurisme	FOR screening af 65-75-årige mænd m tobaksanamnese
Aterosklerose	USIKKER
Atrieflimren	USIKKER
Carotis-stenose	IMOD screening
Diabetes	FOR screening af 40-70-årige m hypertension
Hyperkolesterolæmi	FOR screening af >20-35-årige mænd og >20-45-årige kvinder afh. af risiko
Hypertension	FOR årlig screening af >40-årige eller personer med øget risiko
Iskæmisk hjertesygdom	IMOD screening/funktionsundersøgelse i lavrisikogrupper
Perifer arteriesygdom	IMOD screening
Medfødt hjertesygdom	...
Hjertesygdom v graviditet	...
Genetik/familieudredning	...
...	...

Adapteret fra Lindholt JS, Søgaard R. Heart 2021

Screening blandt personer med risikofaktorer finder ny AF hos 1-5%



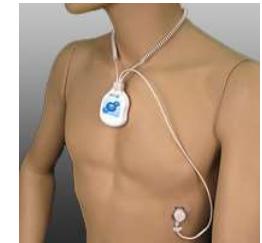
EKG (10 sec)



"tommel-EKG" (30 sec)



Holter (24-72 timer)



R-test (1-30 dage)



apple
WATCH
SERIES 8

**Et stort skridt for
din sundhed.**

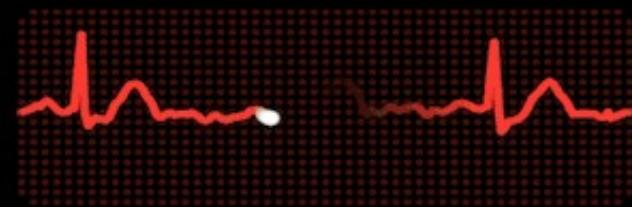
Fra 3.899 kr.

Køb

[Læs mere >](#)



Nu er Apple Watch blevet endnu sværere at leve uden. Nu med temperaturmålinger, der giver dybere indsigt i kvinders sundhed.¹ Registrering af ulykke, der sørger for hjælp i nødstilfælde.² Søvnstadier, der giver bedre forståelse af din søvn. Og



26sek

Atrial Fibrillation — ❤️ 120 BPM Average

This ECG shows signs of AFib.

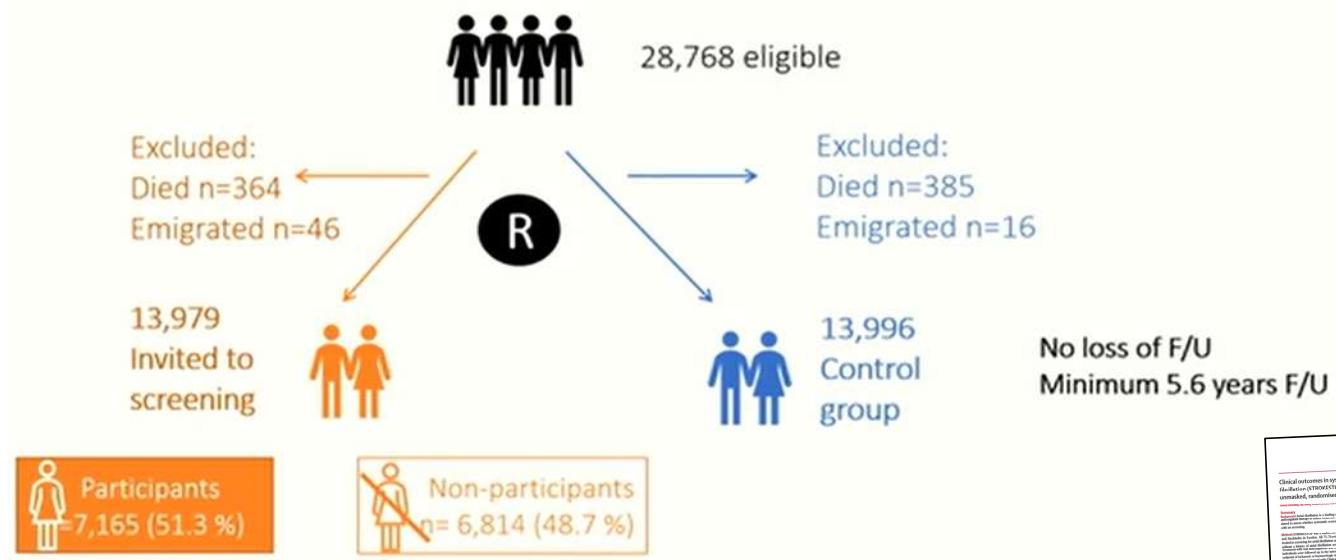
If this is an unexpected result, you should talk to your doctor.



STROKESTOP inkluderede alle 75-årige borgere i 2 kommuner i Sverige



"tommel-EKG" (30 sec)
x2 dagligt i 2 uger

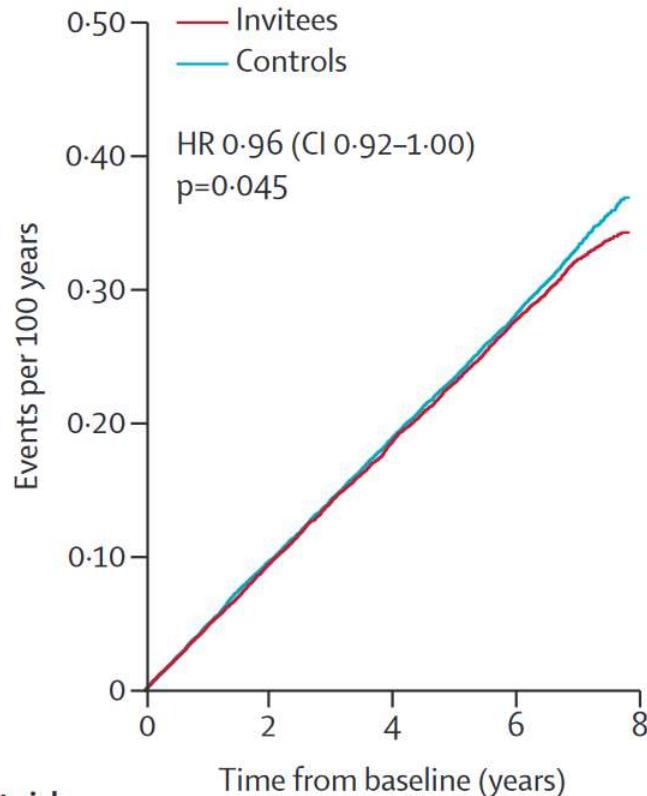


Svennberg E et al. Lancet 2021

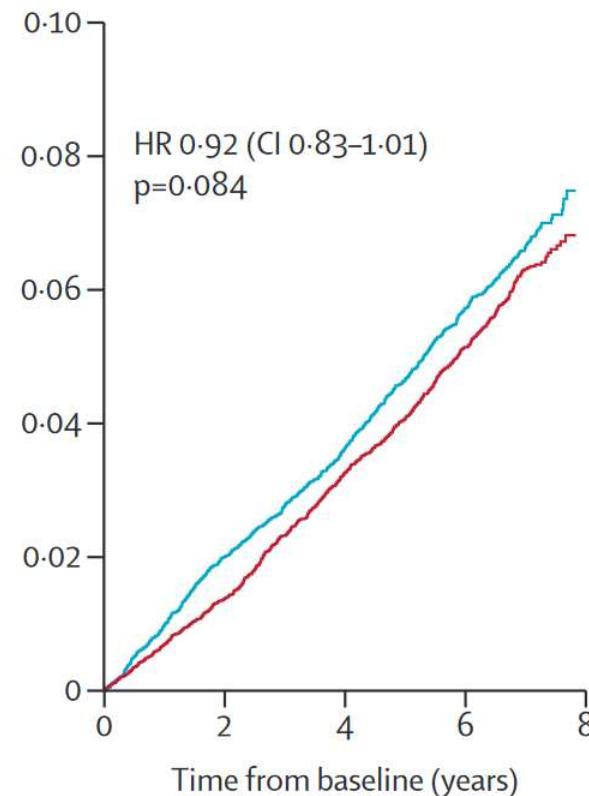
	Individuals with AF			Individuals using OAC		
	Invited to screening % (n/at risk)	Control % (n/at risk)	p	Invited to screening % (n/at risk)	Control % (n/at risk)	p
Before screening	12.1% (1691/13,979)	12.8% (1794/13,996)	0.068	9.2% (1282/13,979)	9.4% (1313/13,996)	0.544
After screening	14.0% (1953/13,979)	12.8% (1794/13,996)	0.005	-	--	-
After 6 months	14.4% (1991/13,779)	13.4% (1850/13,798)	0.012	10.6% (1455/13,779)	10.2% (1403/13,798)	0.286
After 1 year	15.1% (2047/13,552)	14.1% (1919/13,591)	0.022	11.3% (1526/13,552)	10.8% (1463/13,591)	0.192
After 1.5 years	15.6%	14.8%	0.075	11.6%	11.3%	0.424

Svennberg E et al. Lancet 2021

Apopleksi, arteriel emboli, blødning, død



Iskæmisk apopleksi



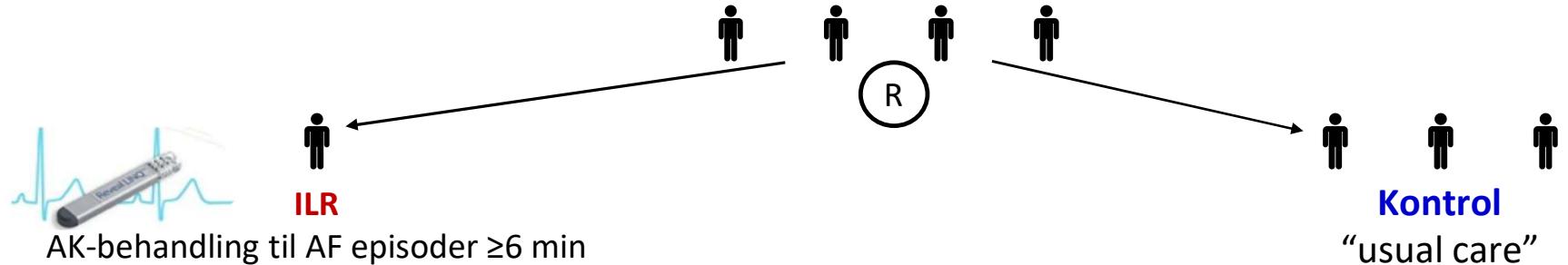
Number at risk

Invitees	13 979	12 639	11 342	9 747	..	13 979	12 960	11 929	10 470	..
Controls	13 996	12 614	11 300	9 727	..	13 996	12 929	11 880	10 437	..

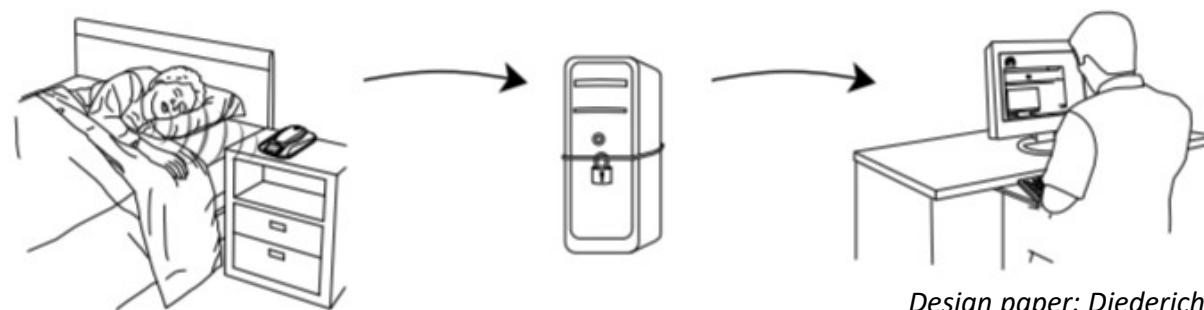
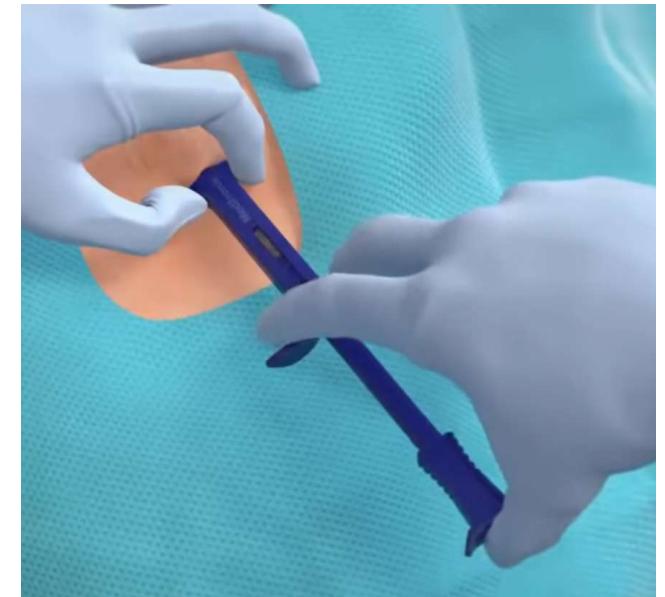
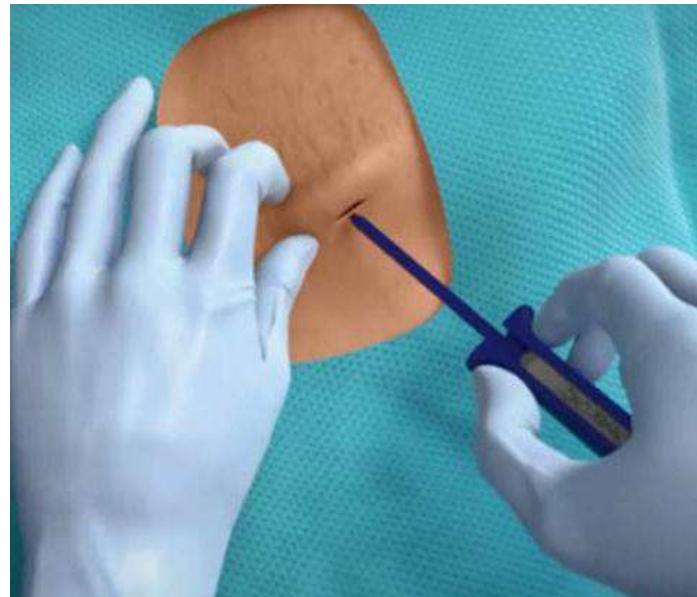
Svennberg E et al. Lancet 2021

LOOP inkluderede ≥ 70 -årige
med hypertension, diabetes, hjertesvigt eller tidligere stroke
uden atrieflimren eller AK-behandling

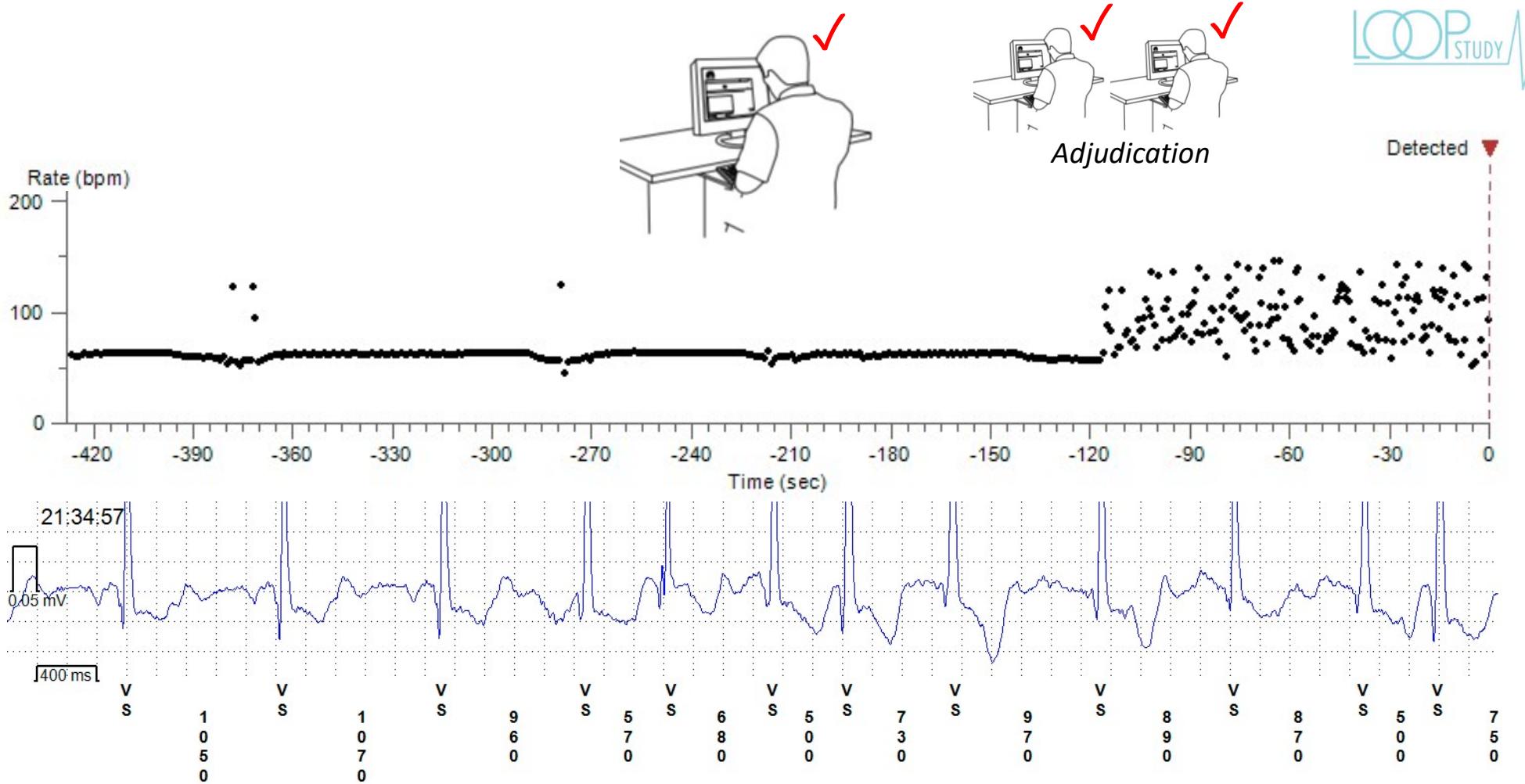
Randomiseret 1:3 til **Implantable Loop Recorder (ILR)** vs **Kontrol**



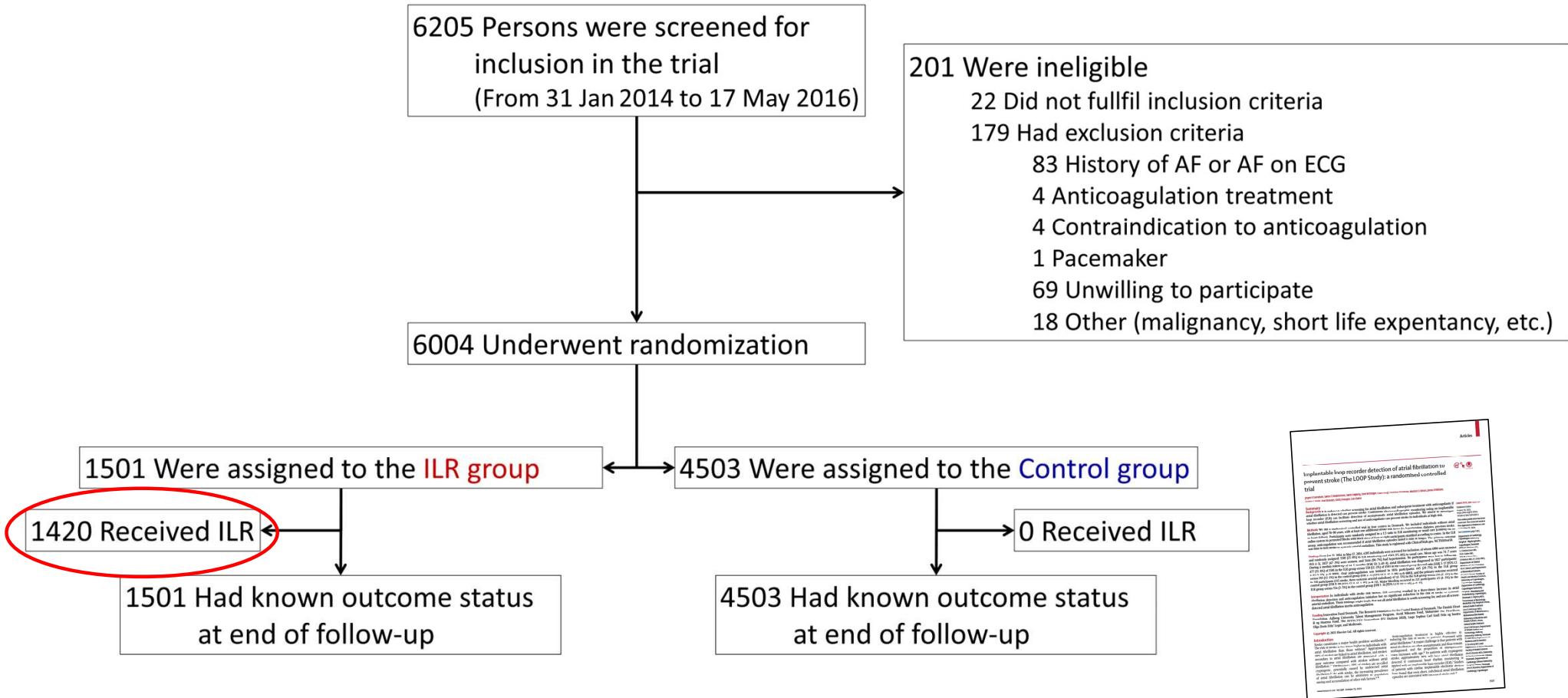
Design paper: Diederichsen SZ et al. Am Heart J 2017



Design paper: Diederichsen SZ et al. Am Heart J 2017



Design paper: Diederichsen SZ et al. Am Heart J 2017



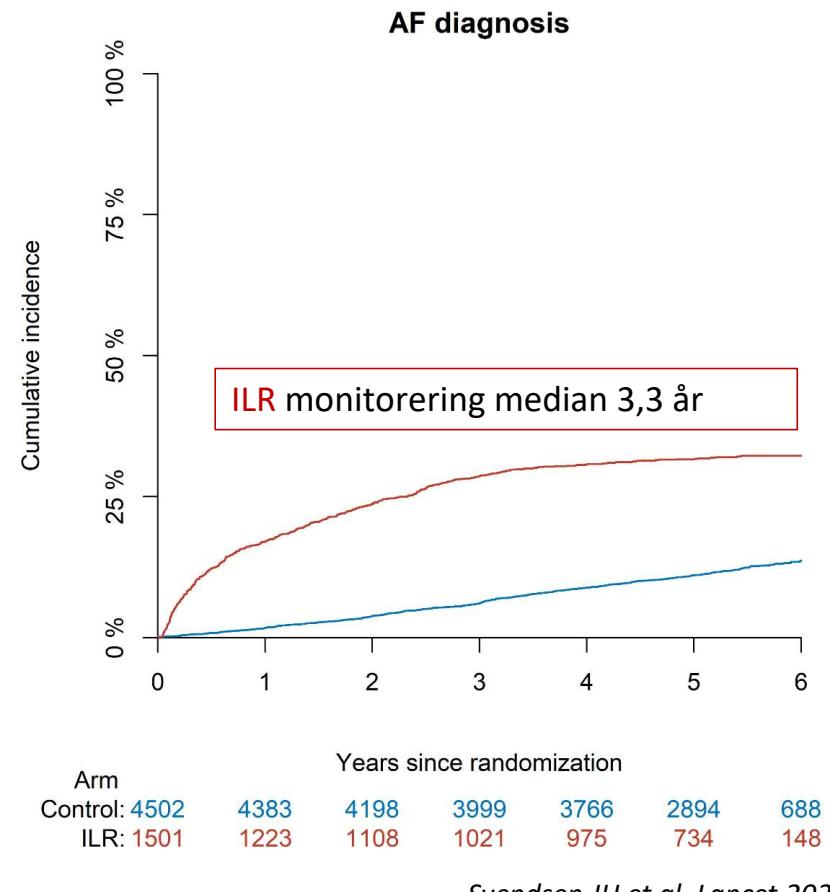
Svendsen JH et al. Lancet 2021

AF diagnosticeret i 1.027 deltagere;

ILR 477 (32%)

Kontrol 550 (12%)

HR 3,17; 95% CI 2,81-3,59; P<0.001

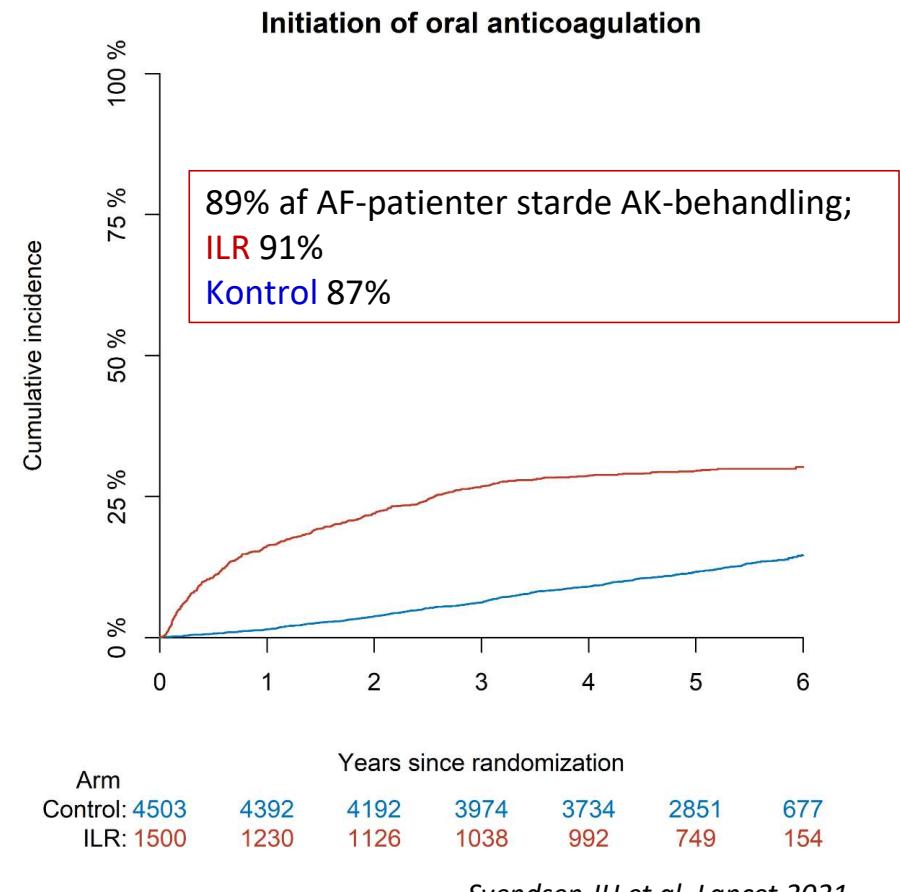


AK-opstart i 1.036 deltagere;

ILR 445 (30%)

Kontrol 591 (13%)

HR 2,72; 95% CI 2,41-3,08; P<0,001



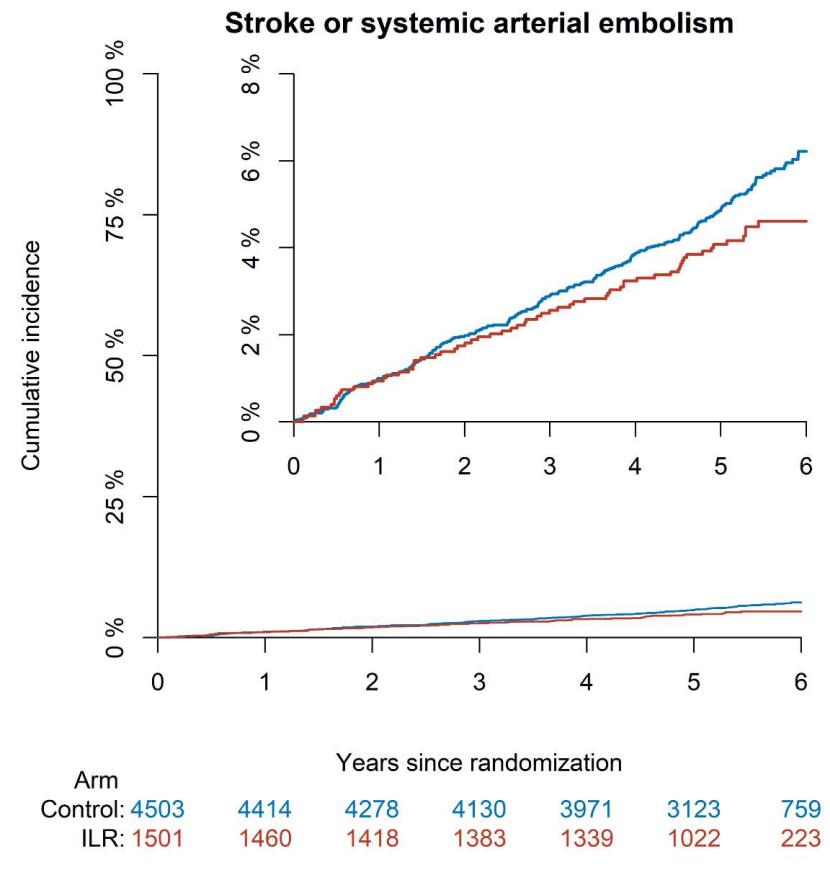
Svendsen JH et al. Lancet 2021

Primære outcome i 318 deltagere
(315 apoplexi, 3 arteriel emboli);

ILR 67 (4,5%)

Kontrol 251 (5,6%)

HR 0,80; 95% CI 0,61-1,05; P=0,11



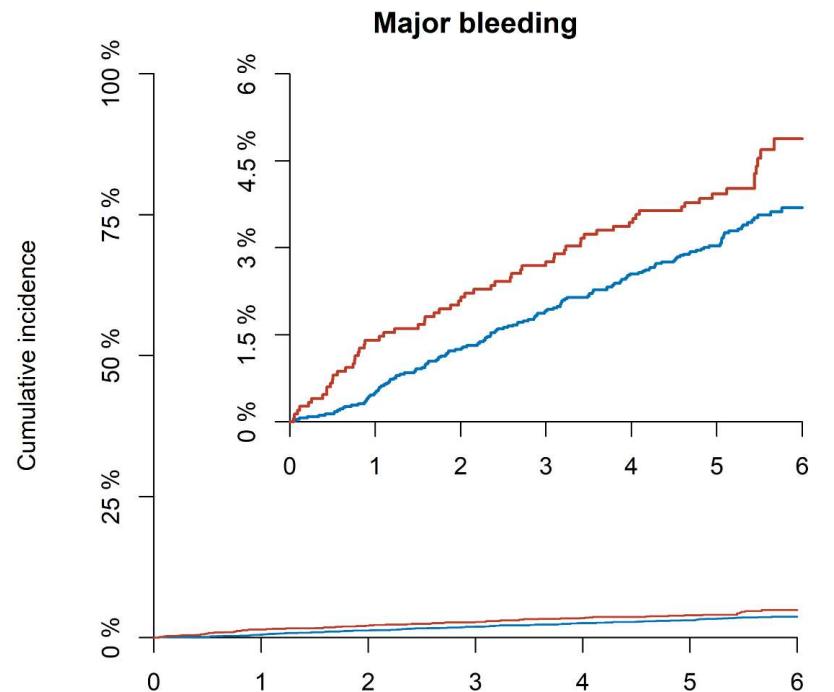
Svendsen JH et al. Lancet 2021

Major bleeding i 221 deltagere;

ILR 65 (4,3%)

Kontrol 156 (3,5%)

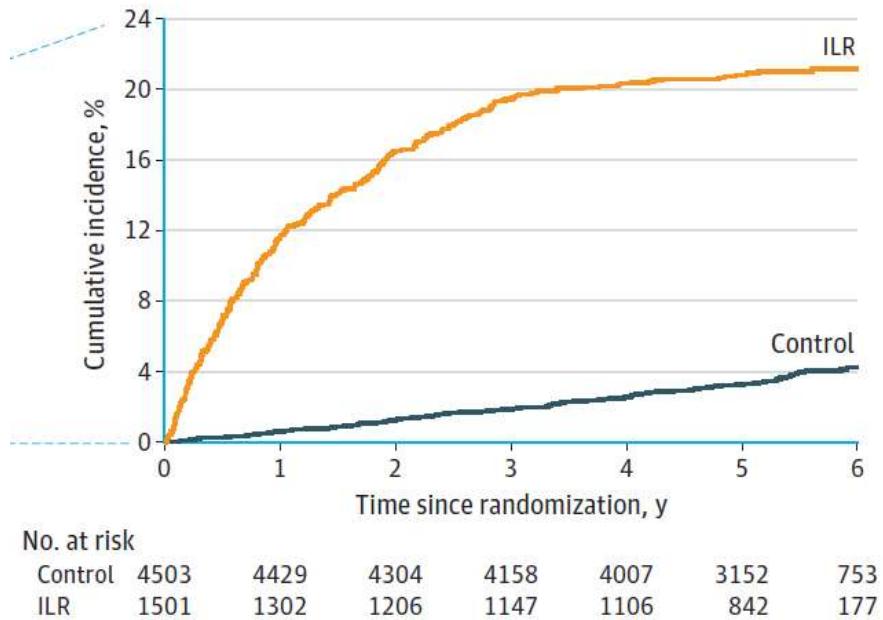
HR 1,26; 95% CI 0,95-1,69; P=0,11



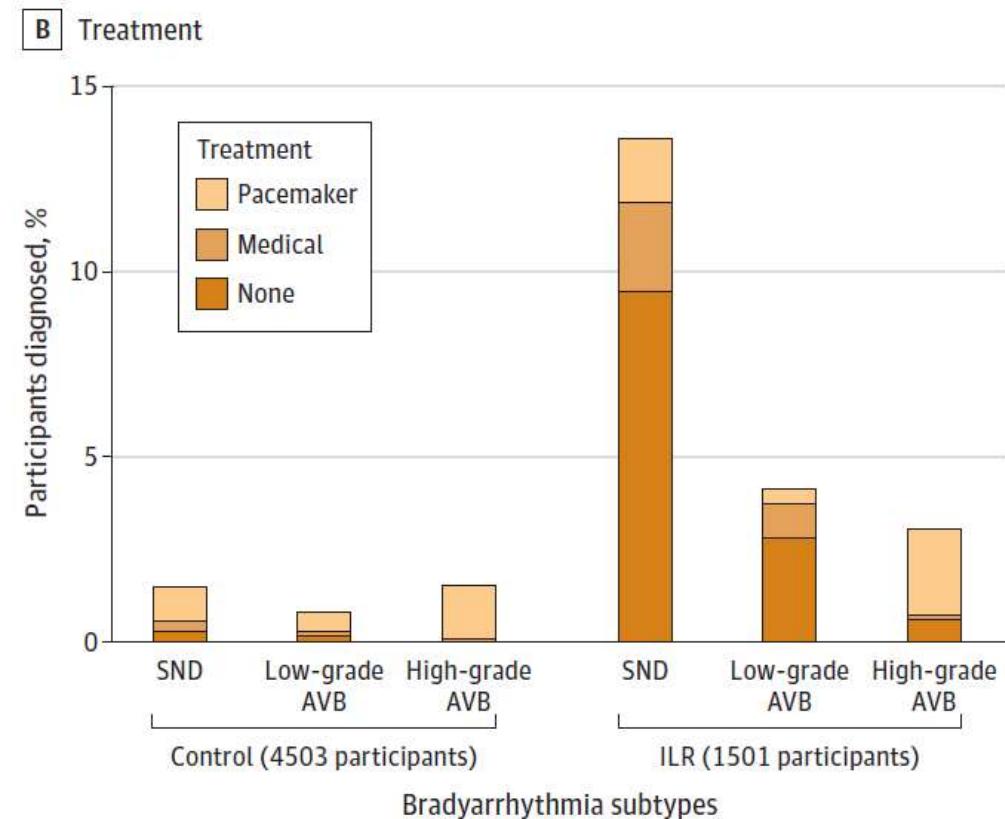
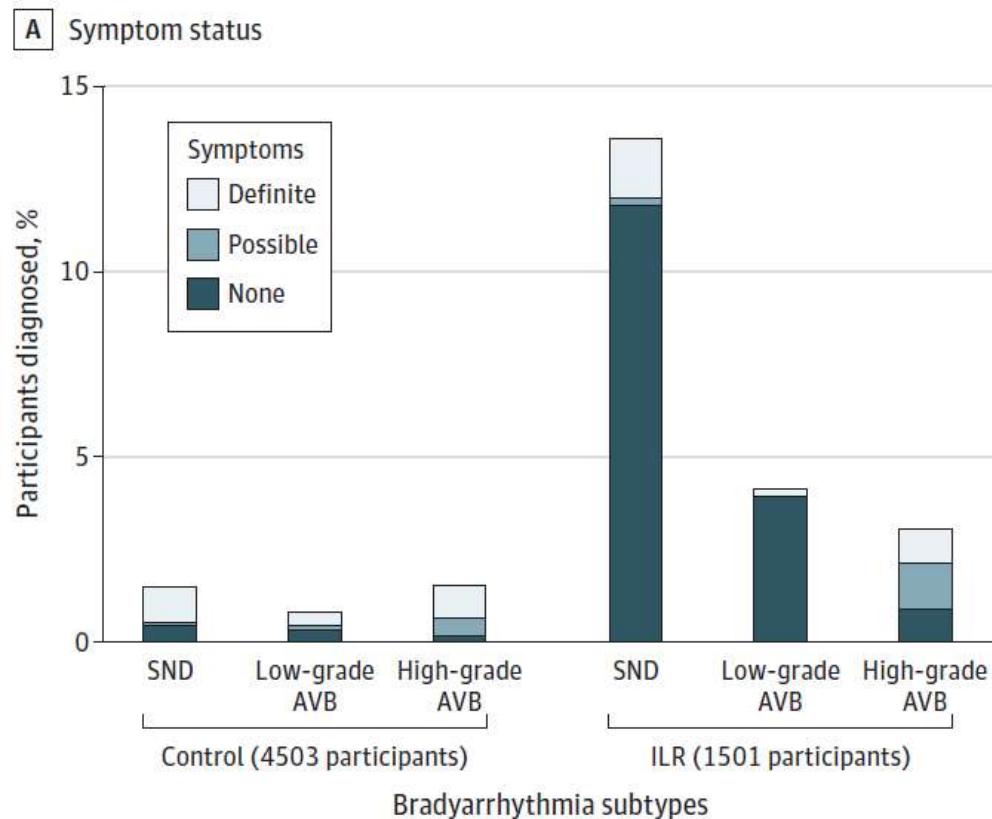
Arm	Years since randomization						
	0	1	2	3	4	5	6
Control: 4503	4437	4309	4169	4030	3184	774	
ILR: 1501	1454	1416	1386	1347	1028	224	

Svendsen JH et al. Lancet 2021

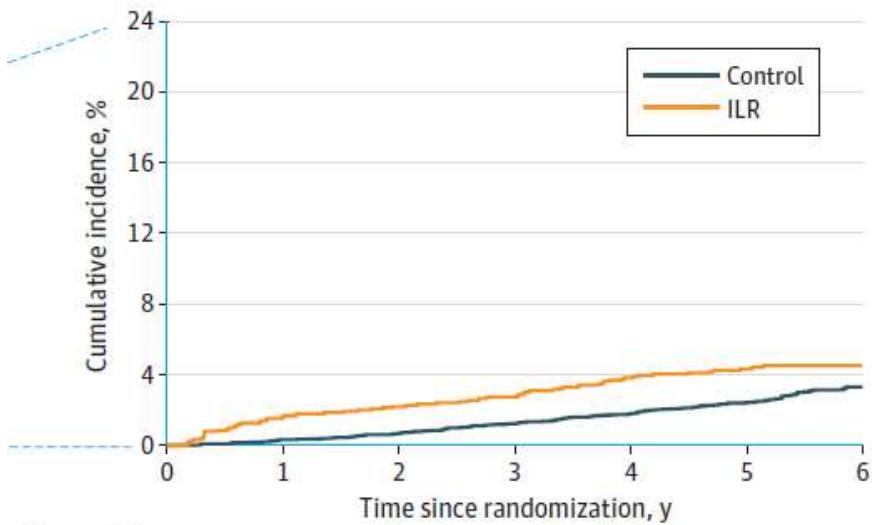
Bifund: Bradyarytmier



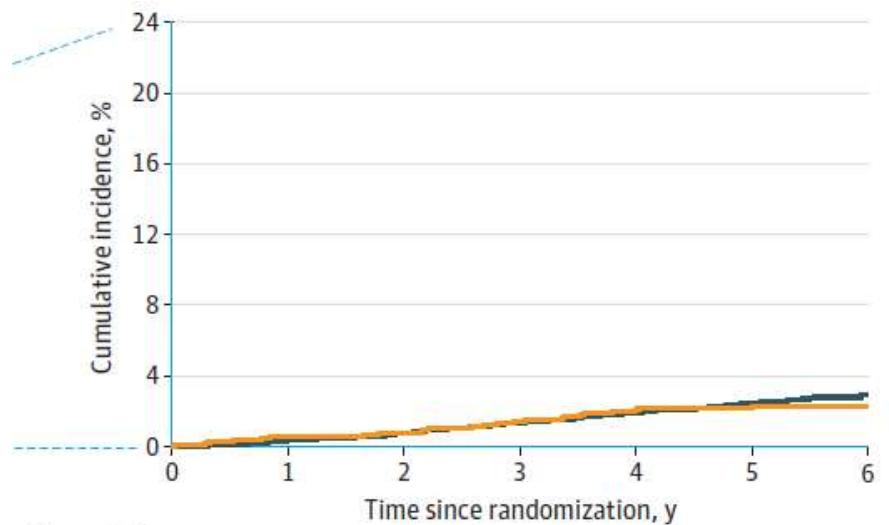
Diederichsen SZ et al. JAMA Cardiol 2023



Pacemakerimplantation



Synkope



No. at risk							
Control	4503	4442	4327	4183	4035	3177	767
ILR	1501	1449	1410	1378	1329	1017	219

No. at risk							
Control	4503	4441	4327	4181	4032	3184	771
ILR	1501	1464	1432	1397	1354	1040	231

United States Preventive Services Task Force anbefalinger

Abdominal aortaaneurisme	FOR screening af 65-75-årige mænd m tobaksanamnese
Aterosklerose	USIKKER
Atrieflimren	USIKKER
Carotis-stenose	IMOD screening
Diabetes	FOR screening af 40-70-årige m hypertension
Hyperkolesterolæmi	FOR screening af >20-35-årige mænd og >20-45-årige kvinder afh. af risiko
Hypertension	FOR årlig screening af >40-årige eller personer med øget risiko
Iskæmisk hjertesygdom	IMOD screening/funktionsundersøgelse i lavrisikogrupper
Perifer arteriesygdom	IMOD screening
Medfødt hjertesygdom	...
Hjertesygdom v graviditet	...
Genetik/familieudredning	...
...	...

Adapteret fra Lindholt JS, Søgaard R. Heart 2021

Cardiac CT for Coronary Artery Calcium Scoring at No Cost

Noninvasive atherosclerosis imaging provides more accurate and earlier detection of coronary heart disease than traditional risk scoring algorithms or empiric clinical judgment.



Make a Referral

To order a CACS test, call **833-535-0534**.

To refer a patient for UH Preventive Cardiology, call **440-745-7613** or email CVPrevention@UHhospitals.org.

Who should get a calcium-score screening?

You should consider a calcium scan if you are between ages 40-70 and at increased risk for heart disease but do not have symptoms. People at increased risk include those with the following traits:

- Family history of heart disease
- Past or present smoker
- History of high cholesterol, diabetes or high blood pressure
- Overweight
- Inactive lifestyle
- Other non-traditional risk factors



Non-Contrast Coronary Calcium CT Scans

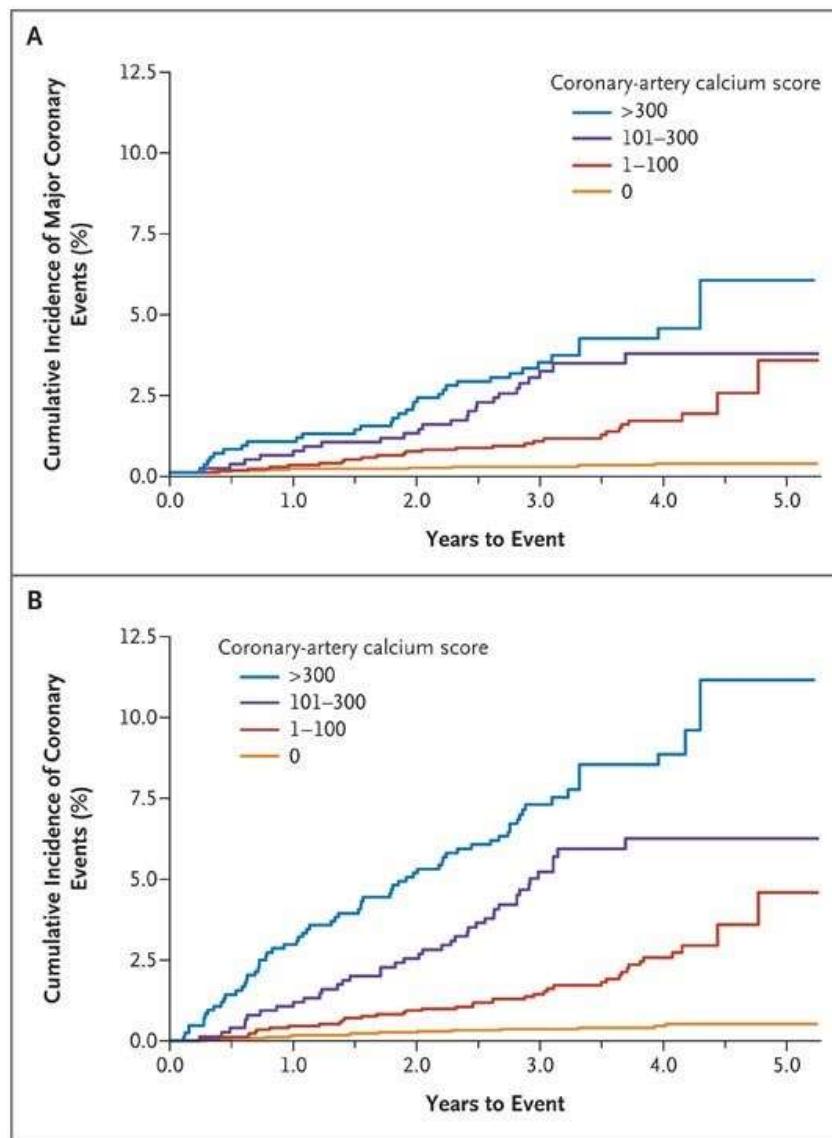
If you are less than 40 years old and high cholesterol runs in your family (familial hypercholesterolemia), you might consider a calcium scan.

Cleveland Clinic is a registered trademark of the Cleveland Clinic Foundation. All rights reserved.
Cleveland Clinic is a not-for-profit medical center. Advertising and promotional activities are not part of our mission. We do not accept advertising money or other compensation from pharmaceutical companies or service providers.

Related Ins Services

[Heart, Vascular \(Miller Family\)](#)

The latest information on heart and vascular disorders, treatment options and prevention. No. 1-ranked heart program.



N=30.154 tilfældigt udvalgte 50-64 årige svenske

(Eksklusion af personer uden scanning eller med kendt coronarsygdom, n=4.972)

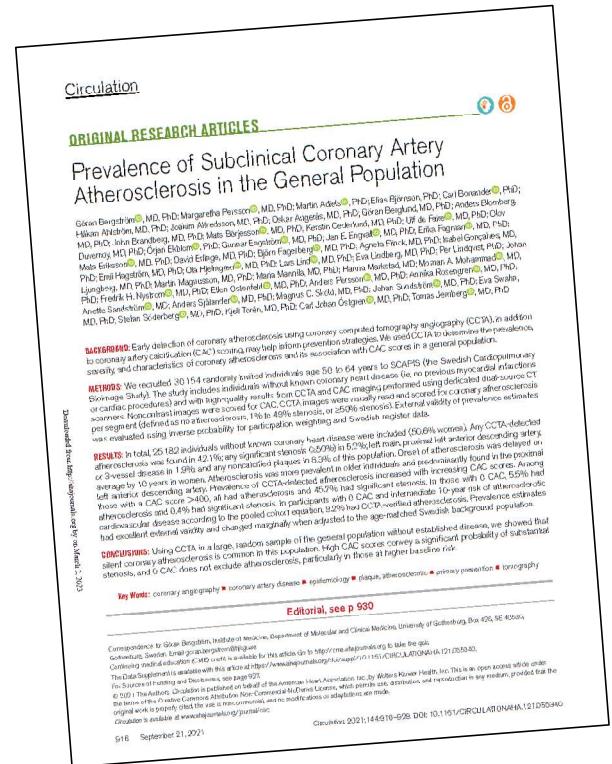
n=25.182 (50,6% kvinder, alder 57,4±4,3)

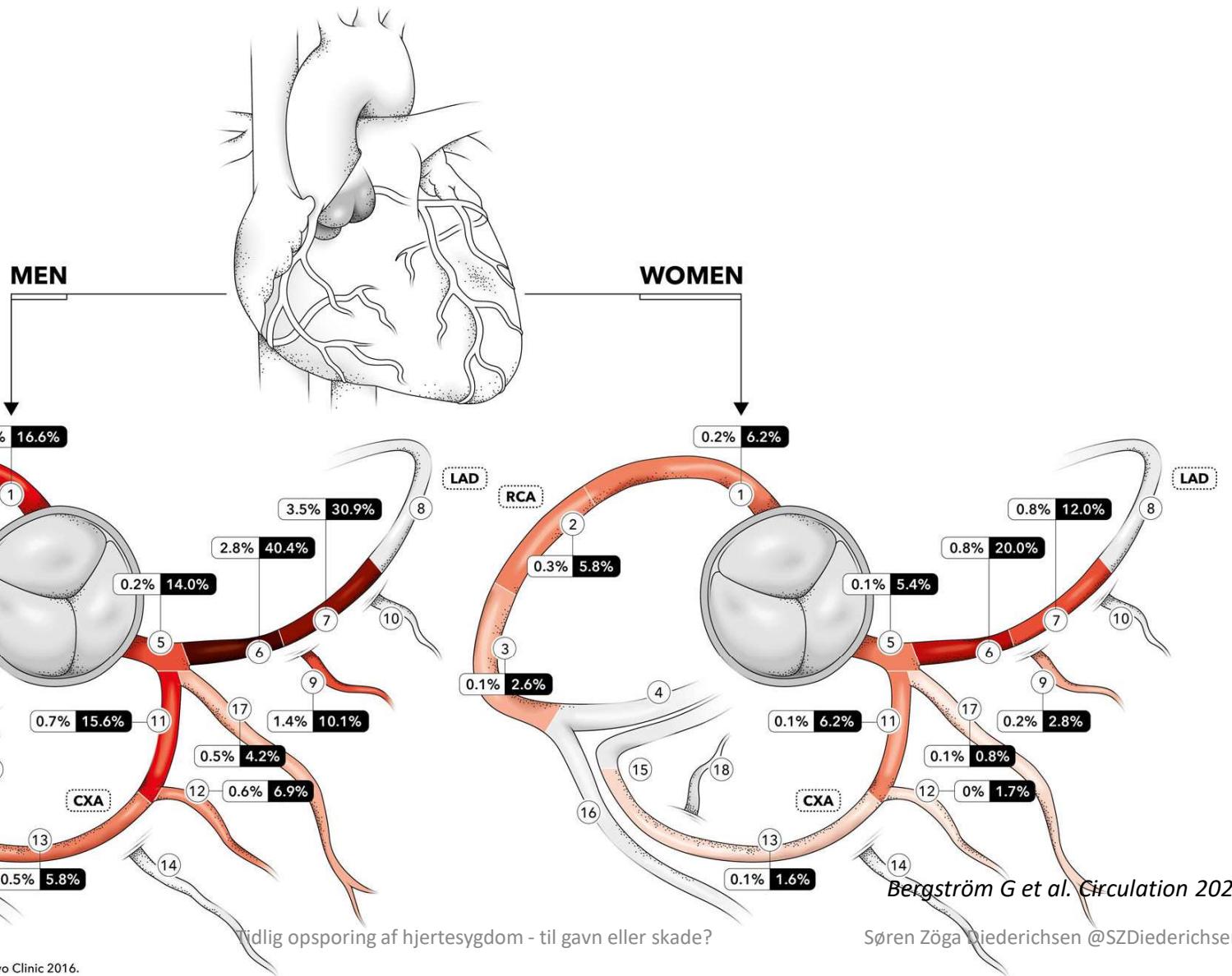
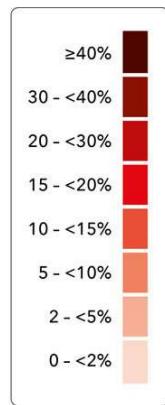
Prevalens:

CAC score >0 = 42,1%

Signifikant stenose = 5,2%

Hovedstamme/prox.LAD/3-karssyg = 1,9%





DSIM årsmøde 2023

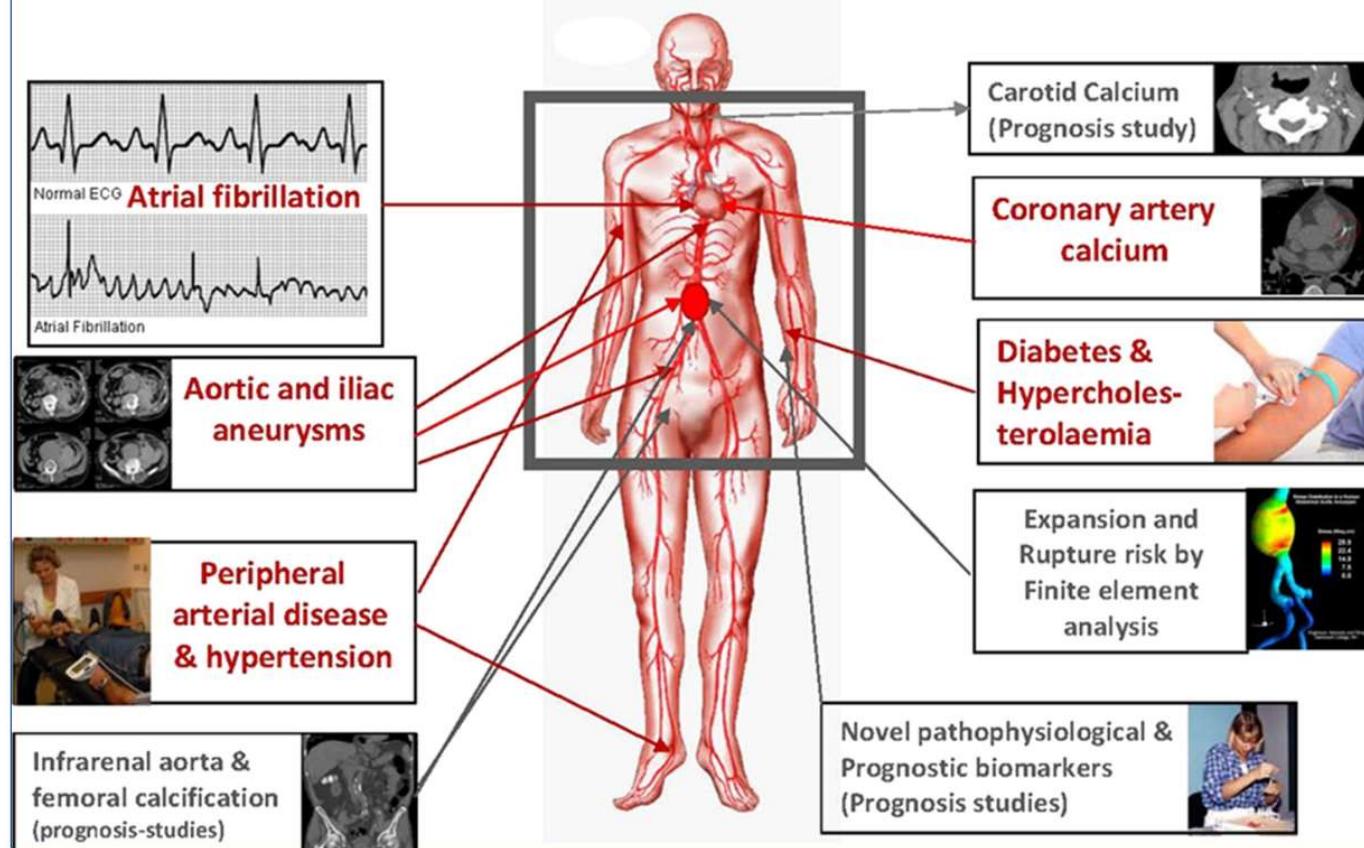
Tidlig opsporing af hjertesygdom - til gavn eller skade?

Graphic: Elin Brander modified from Mayo Clinic 2016.

Søren Zöga Diederichsen @SZDiederichsen

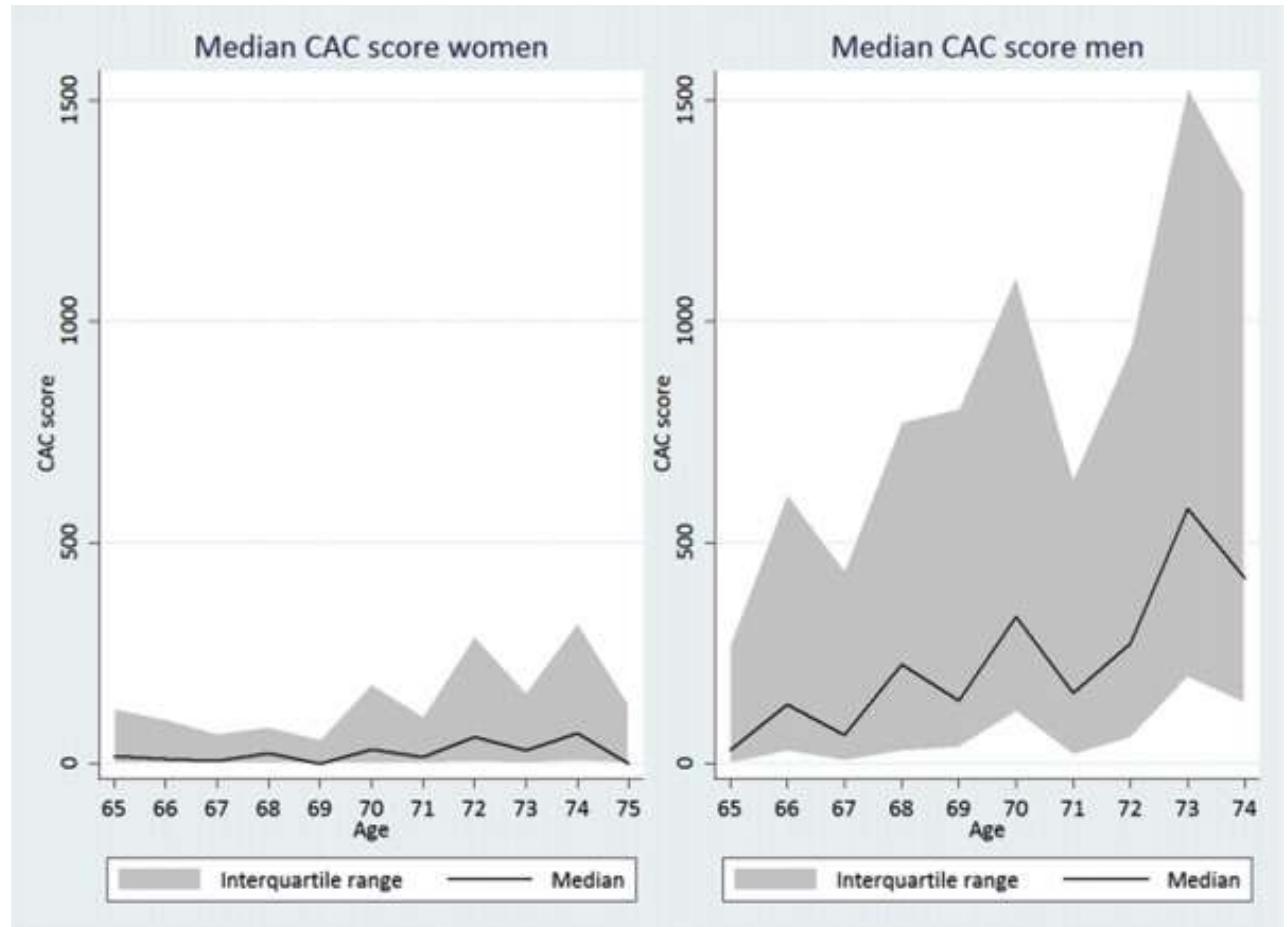
DANCAVAS

The Danish Cardiovascular Screening—a large population-based randomized clinical multicenter trial testing multifaceted cardiovascular screening



Diederichsen A et al. Trials 2015

DANCAVAS Pilot: Mindre CAC hos kvinder



Lindholt et al. NEJM 2022

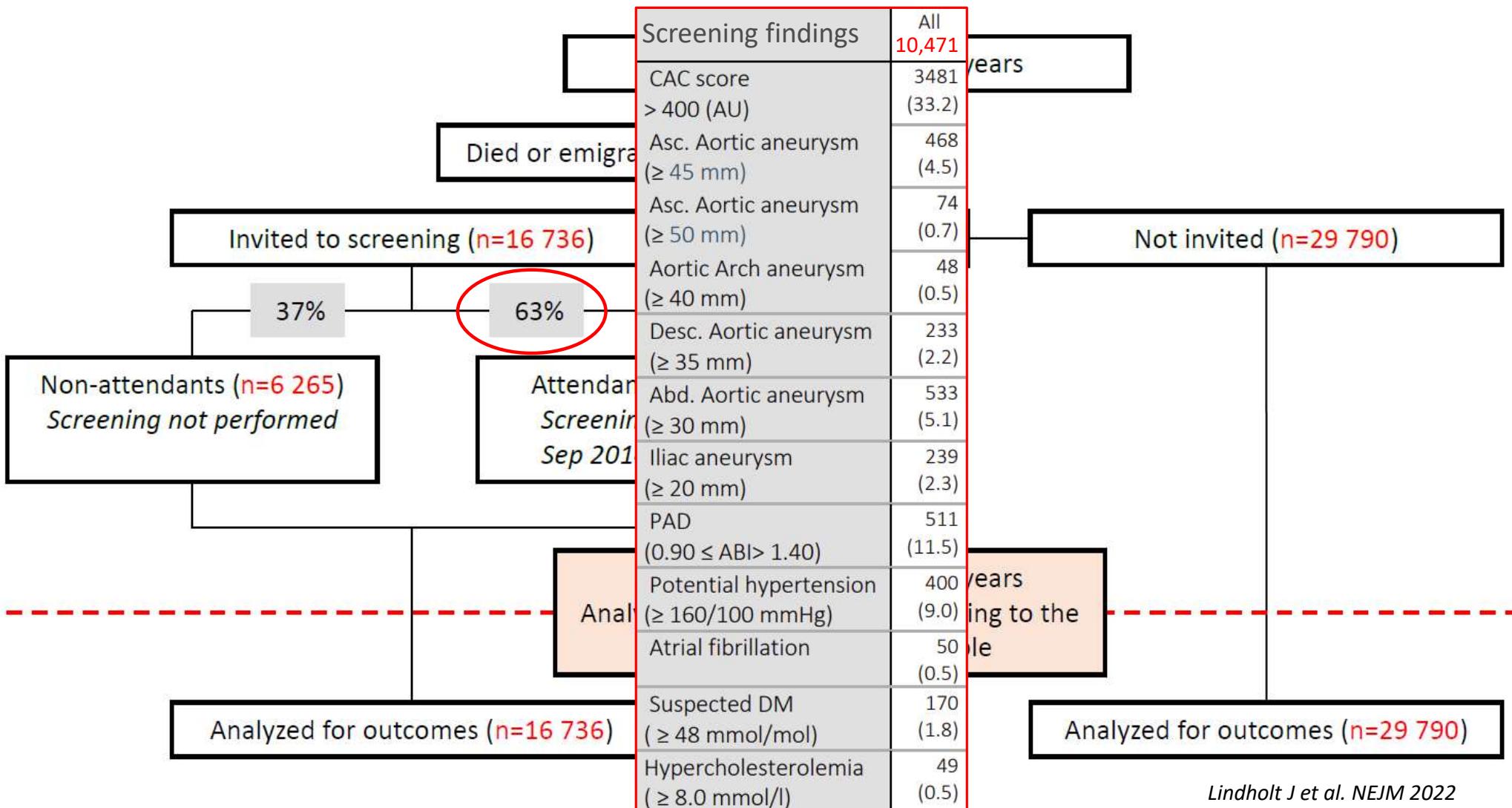
DANCAVAS inkluderede alle 65-74-årige mænd bosat i 15 kommuner

N=46.526 randomiseret 3:1 til kontrol vs screening

Screening: CT, "EKG", BT, blodprøver

- CAC score>aldersmedian → magnyl + statin
- Atrieflimren → henv. kardiolog
- Aortaaneurisme → henv. karkir
- Ankel-arm index <0.9>1.4 → magnyl + statin
- HT, HC, DM → henv. egen læge





Behandlinger

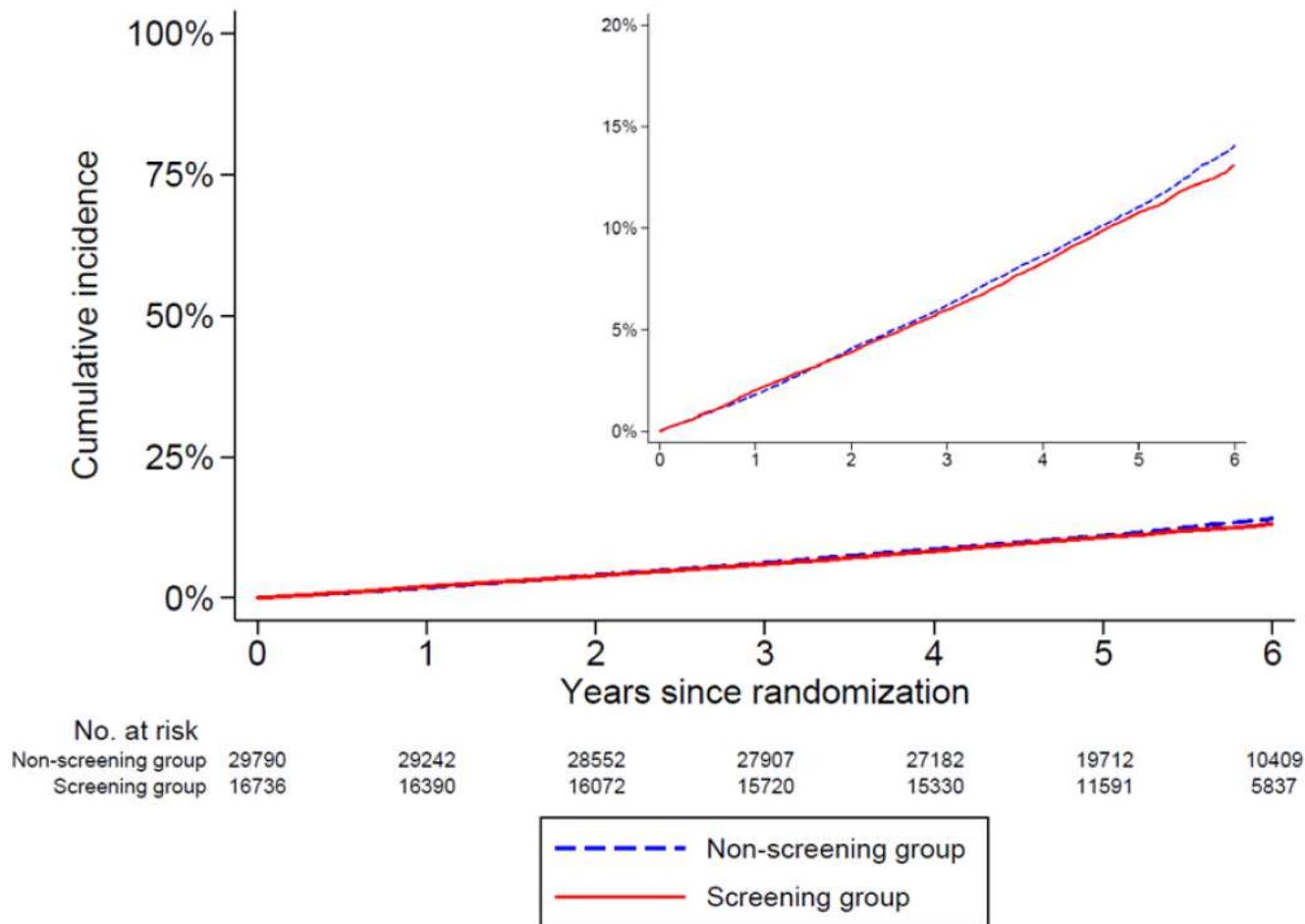
outcome	Invited			Controls			Difference in restricted mean survival time** (95% CI)
	Events No (%)	Years at risk Median (IQR)***	no. of events per 1000 person-years,	Events No (%)	Years at risk Median (IQR)***	no. of events per 1000 person-years	
Initiation of antiplatelet agents	3831 (22.9)	5.2 (2.3;6.1)	53.8	2482 (8.3)	5.4 (4.7;6.1)	16.6	-0.85 (-0.89;-0.81)
Initiation of anticoagulants	1090 (6.5)	5.4 (4.7;6.2)	12.7	1940 (6.5)	5.40 (4.7;6.1)	12.8	1.00 (0.93;1.08)*
Initiation of lipid-lowering drugs	3463 (20.7)	5.2 (3.0;6.1)	47.3	2689 (9.0)	5.4 (4.7;6.1)	18.1	-0.68 (-0.72;-0.65)
Initiation of hypertensive agents	1825 (10.90)	5.4 (4.7;6.1)	22.1	3116 (10.5)	5.4 (4.7;6.1)	21.2	-0.03 (-0.05;-0.00)
Initiation of antidiabetic agents	562 (3.4)	5.6 (4.8;6.2)	6.4	972 (3.3)	5.5 (4.;6.2)	6.3	-0.01 (-0.02;0.01)
Elective aortic repair: all	255 (1.5)	5.6 (4.8;6.2)	2.9	350 (1.2)	5.6 (4.8;6.2)	2.2	-0.02 (-0.02;-0.01)
Elective thoracic aortic repair	142 (0.9)	5.6 (4.9;6.2)	1.6	218 (0.7)	5.6 (4.8;6.2)	1.4	-0.00 (-0.01;-0.00)
Elective abdominal aortic aneurysm repair	114 (0.7)	5.6 (4.9;6.2)	1.3	135 (0.5)	5.6 (4.8;6.2)	0.9	-0.01 (-0.02;-0.01)

Lindholt J et al. NEJM 2022

Primary outcome – all cause mortality

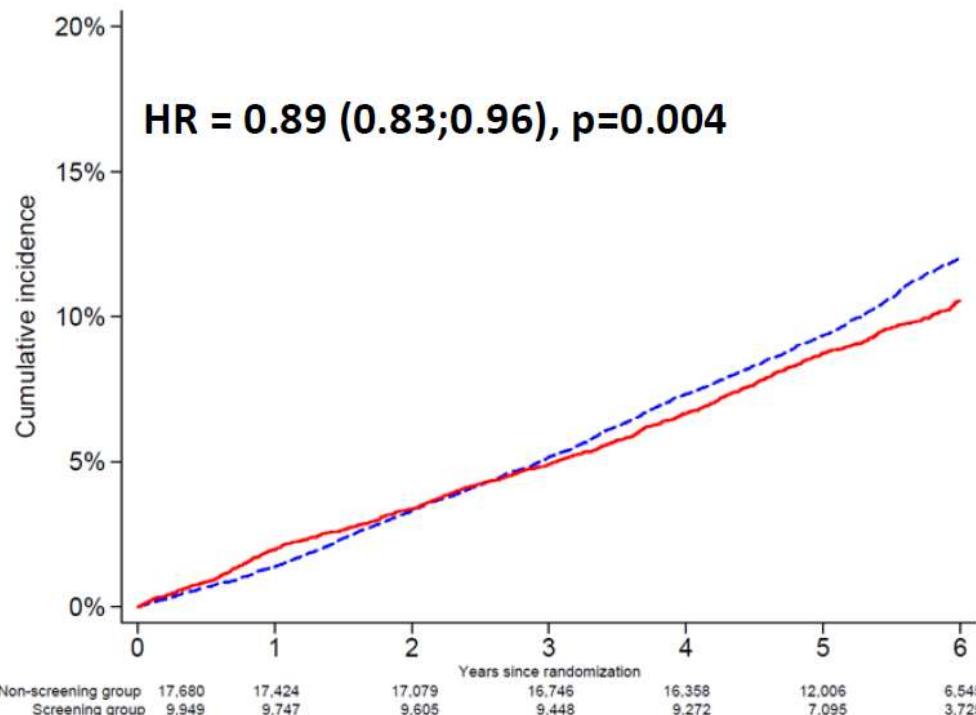
The primary outcome occurred in **2,106 (12.6%) in the invited group versus 3,915 (13.1%) in the non-invited group**

**HR = 0.95 (0.90;1.00),
p=0.062**

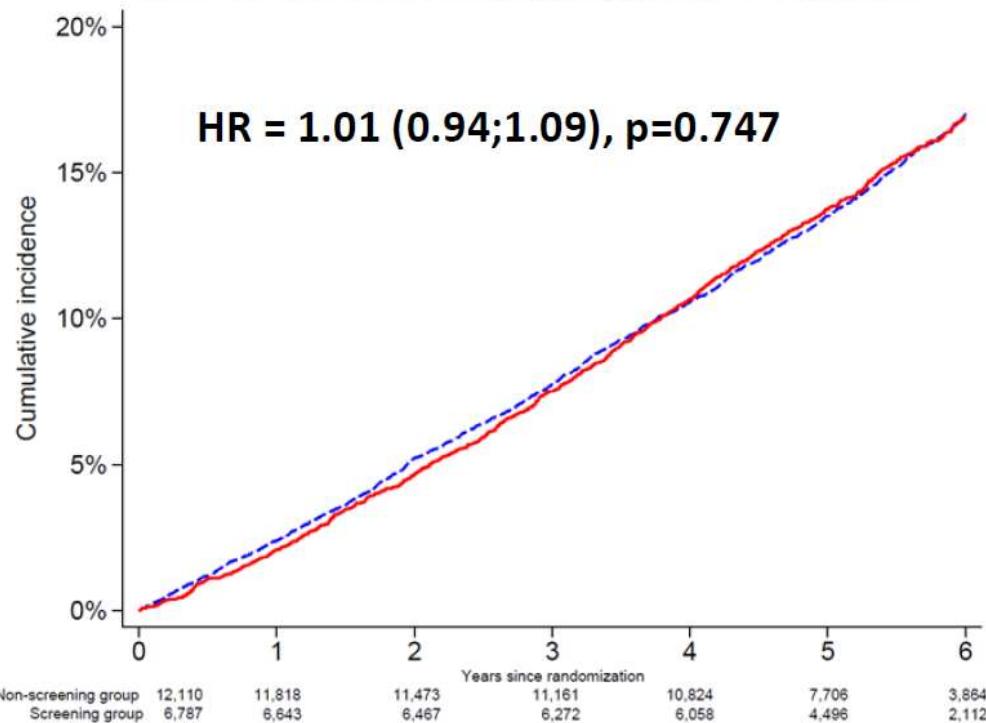


Primary outcome – stratified by age

All cause mortality, age 65-69 years



All cause mortality, age 70-74 years

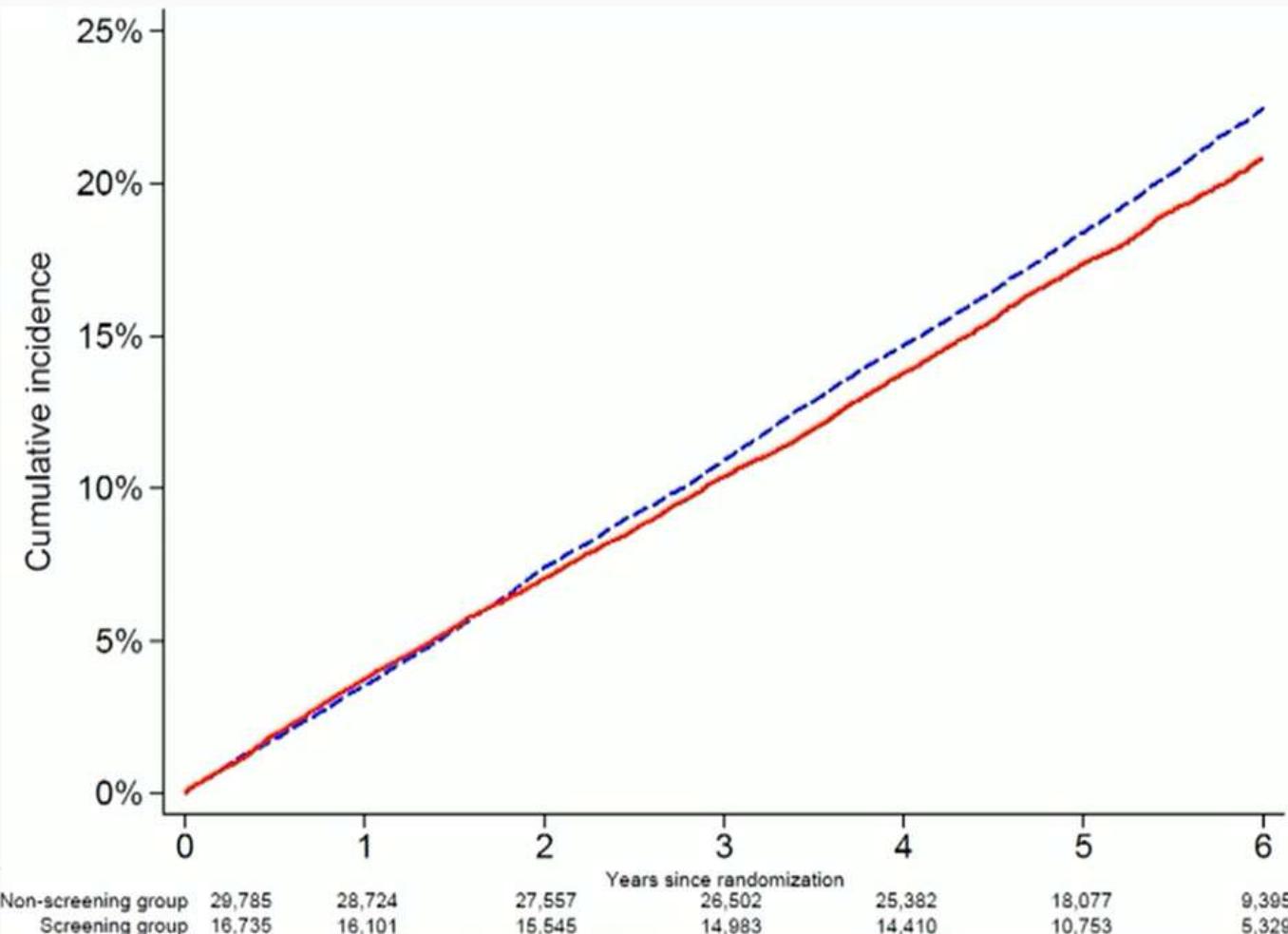


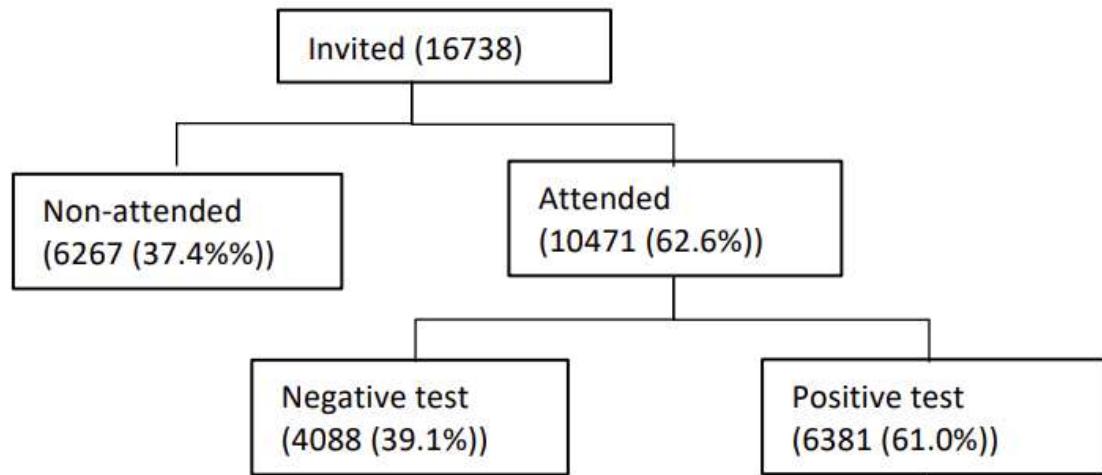
P for interaction = 0.002

Composite outcome – post hoc defined

Death, stroke or myocardial infarction occurred in 3335 (19.9%) in the invited group versus 6308 (21.2%) in the non-invited group

HR = 0.93 (0.89;0.97),
p<0.001

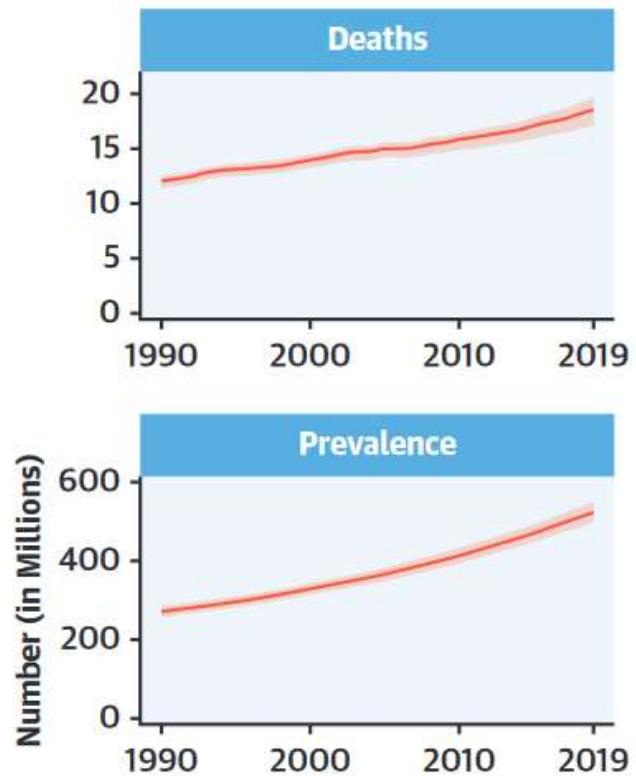




Bivirkninger

Safety outcome	Invited			Controls			Hazard Ratio (95% CI)
	Events No (%)	Years at risk Median (IQR) **	no. of events per 1000 person- years	Events No (%)	Years at risk Median (IQR) **	no. of events per 1000 person- years, Controls	
Severe bleeding	1141 (6.8)	5.4 (4.7;6.2)	13.1	1886 (6.3)	5.4 (4.7;6.2)	12.2	1.07 (1.00;1.15)
Intracerebral bleeding	274 (1.6)	5.6 (4.8;6.2)	3.1	421 (1.4)	5.6 (4.8;6.2)	2.7	1.15 (0.99;1.34)
Gastrointestinal bleeding	883 (5.3)	5.6 (4.9;6.2)	10.1	1492 (5.0)	5.6 (4.9;6.2)	9.6	1.05 (0.97;1.14)
Cancer	3316 (19.8)	5.6 (4.9;6.2)	40.8	6034 (20.3)	5.6 (4.9;6.2)	41.8	0.00 (-0.03;0.03)*
Cardiac revascularization	680 (4.1)	5.6 (4.9;6.2)	7.7	1295 (4.4)	5.6 (4.9;6.2)	8.3	0.93 (0.85;1.02)
Peripheral vascular revascularization	186 (1.1)	5.6 (4.9;6.2)	2.1	350 (1.2)	5.6 (4.9;6.2)	2.2	0.94 (0.79;1.12)
Aortic repair	262 (1.6)	5.6 (4.9;6.2)	2.9	365 (1.2)	5.6 (4.9;6.2)	2.3	0.00 (-0.03;0.03)*
Deaths < 30 days after cardiovascular surgery	34 (0.2)	5.6 (4.9;6.2)	0.4	53 (0.2)	5.6 (4.9;6.2)	0.3	1.13 (0.73;1.76)

Lindholt J et al. NEJM 2022



Perspektiver

Diagnoser → konsekvenser ?

Intervention → gavn / skade ?

Perspektiver

Behandlinger, sygdomme,
socioøkonomi, teknik ...

Alt ændrer sig

Perspektiver

Kan vi vælge den
**rigtige screening til den
rigtige patient ?**

