Five-Year Outcomes of the Danish Cardiovascular Screening (DANCAVAS) Trial

Introduction:

- **Incidence and importance of cardiovascular diseases**
- **Up to 80% of cardiac events and strokes are preventable**
- **Importance of identifying patients at increased risk**
- **Previous similar studies and the aim of current study**

Methods:

- **Trial Design**
- **Participants**
- **Randomization**
- **Screening methods and preventive actions**
- **Outcomes**
  1. **Primary**
  2. **secondary**

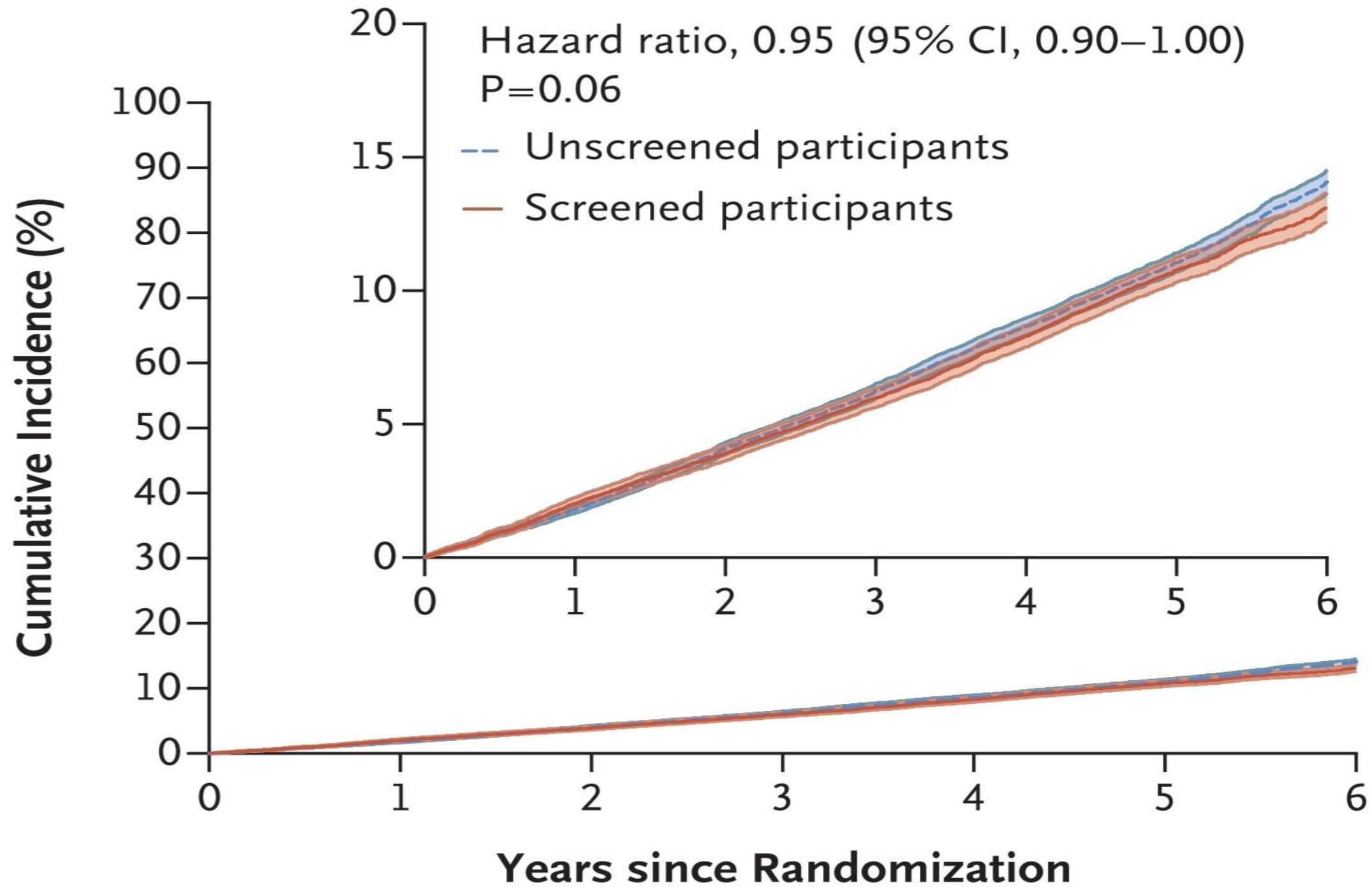| Characteristic	Control Group (N=29,843)	Invited Group (N=16,768)	Unscreened Invited Participants (N=6297)	Screened Invited Participants (N=10,471)
Mean age — yr	68.8±2.6	68.8±2.6	68.9±2.7	68.7±2.6
Education after primary school — no. (%)				
None	7849 (26.3)	4331 (25.8)	2057 (32.7)	2274 (21.7)
<3 yr	15,265 (51.2)	8577 (51.2)	3009 (47.8)	5568 (53.2)
≥3 yr	6676 (22.4)	3828 (22.8)	1201 (19.1)	2627 (25.1)
Missing data	53 (0.2)	32 (0.2)	30 (0.5)	2 (0.1)
Currently working — no. (%)	7577 (25.4)	4288 (25.6)	1327 (21.1)	2961 (28.3)
Non-Danish ethnic group — no. (%)	1235 (4.1)	641 (3.8)	341 (5.4)	300 (2.9)
Prescriptions within 1 yr before randomization — no. (%)				
Antiplatelet agents	7617 (25.5)	4191 (25.0)	1695 (26.9)	2496 (23.8)
Anticoagulant agents	2589 (8.7)	1444 (8.6)	600 (9.5)	844 (8.1)
Lipid-lowering agents	11,458 (38.4)	6261 (37.3)	2289 (36.4)	3972 (37.9)
Antihypertensive agents	15,787 (52.9)	8759 (52.2)	3418 (54.3)	5341 (51.0)
Antidiabetic agents	3777 (12.7)	2167 (12.9)	1039 (16.5)	1128 (10.8)
Reason for hospital admission within 5 yr before randomization — no. (%)				
Stroke	1531 (5.1)	751 (4.5)	346 (5.5)	405 (3.9)
Ischemic heart disease	1230 (4.1)	638 (3.8)	233 (3.7)	405 (3.9)
Peripheral artery disease	647 (2.2)	374 (2.2)	192 (3.0)	182 (1.7)
Aortic aneurysm	450 (1.5)	279 (1.7)	130 (2.1)	149 (1.4)

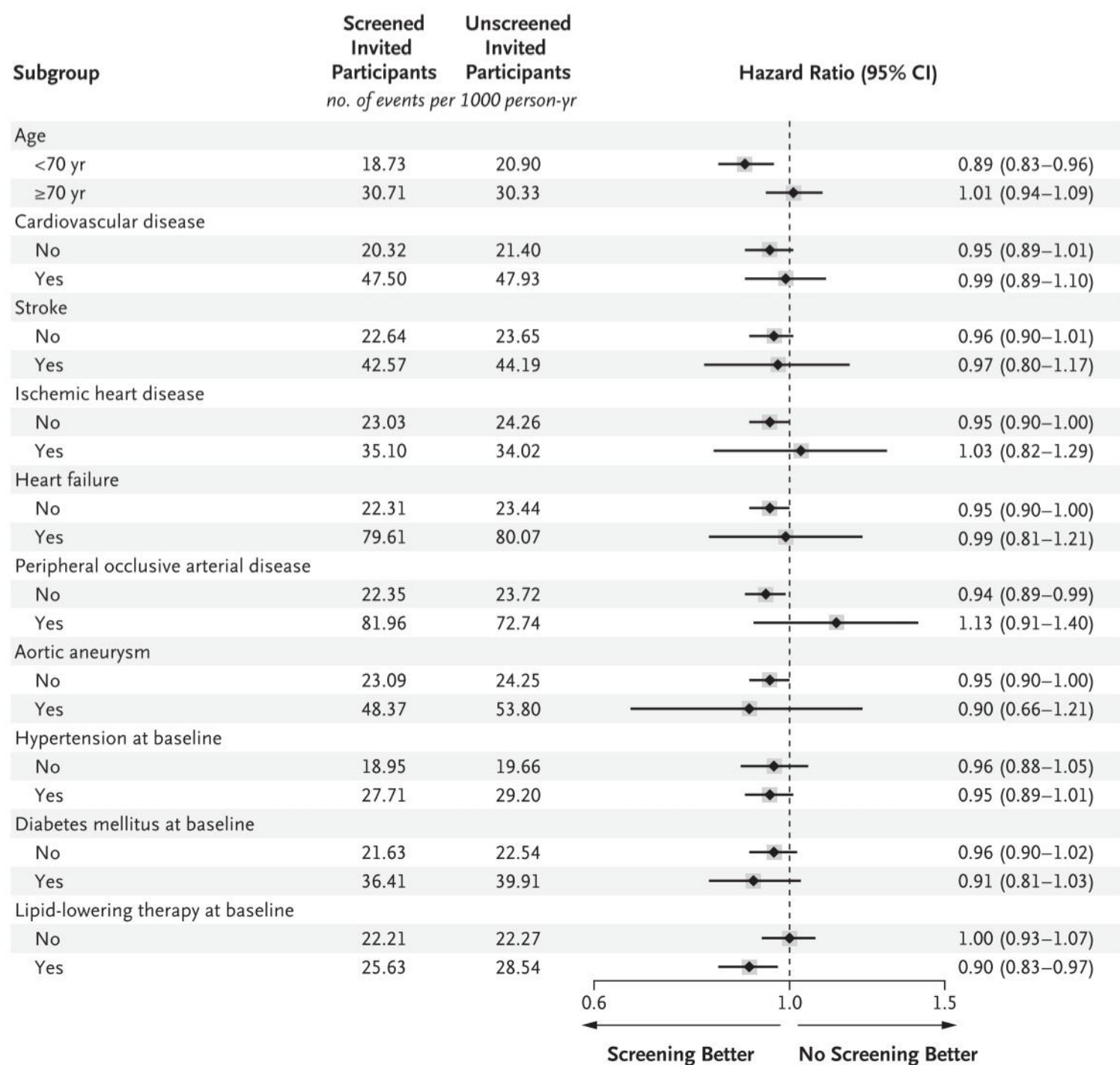**Table 1. Definitions of Positive Findings and Recommended Preventive Actions.***

Criteria for Positive Finding	Recommended Action
Increased coronary-artery calcification (coronary-artery calcium score greater than the median sex- and age-specific score)	Provide recommendations regarding general cardiovascular prevention† Provide referral to cardiology department if angina pectoris is suspected
Ascending aortic aneurysm ≥45 mm in maximal diameter at the site where the anterior–posterior and transverse diameters are equivalent on axial CT	Provide recommendations regarding general cardiovascular prevention† If ≥55 mm, provide referral for surgical evaluation If ≥50 mm, perform echocardiography to detect bicuspid aortic valve; if not detected, perform annual control CT, and if detected, provide referral for surgical evaluation If 45–49 mm, assess with CT after 5 yr
Aortic arch aneurysm ≥40 mm on axial CT	Provide recommendations regarding general cardiovascular prevention† If ≥55 mm, provide referral for surgical evaluation If <55 mm, perform annual control CT
Descending aortic aneurysm ≥35 mm on axial CT	Provide recommendations regarding general cardiovascular prevention† If ≥55 mm, provide referral for surgical evaluation If 45–54 mm, perform annual control CT If 35–44 mm, perform control CT every second yr
Abdominal aortic aneurysm ≥30 mm on axial CT	Provide recommendations regarding general cardiovascular prevention† If ≥55 mm, provide referral for surgical evaluation If 50–54 mm, perform control CT twice a year If 45–49 mm, perform annual control CT If 30–44 mm, perform control CT every second yr

Iliac aneurysm ≥20 mm on axial CT	Provide recommendations regarding general cardiovascular prevention†
	If ≥35 mm, provide referral for surgical evaluation
	If 30–34 mm, perform annual control CT
	If 20–29 mm, perform control CT every second yr
Peripheral artery disease (ankle–brachial blood-pressure index value ≤0.90 or >1.40)	Provide recommendations regarding general cardiovascular prevention†
	Provide instructions regarding walking exercise
	Provide referral to vascular surgical department if critical limb ischemia suspected because of pain at rest, ulcers, or gangrene
Atrial fibrillation (irregular rhythm on ECG-gated monitor)	Confirm by 12-lead ECG
	If not confirmed, no action
	If confirmed, provide referral for cardiac evaluation and initiate anticoagulant medication (unless contraindicated)
Potential hypertension (systolic blood pressure ≥160 mm Hg or diastolic blood pressure ≥100 mm Hg)	Provide referral to general practitioner for confirmation and treatment
Suspected diabetes mellitus (glycated hemoglobin level ≥48 mmol/mole)	Provide referral to general practitioner for confirmation and treatment
Hypercholesterolemia (total cholesterol level ≥8.0 mmol/liter)	Provide referral to general practitioner for confirmation and treatment

Results:

- **Overall risk of death**

- **Secondary outcomes**

- **Explanatory outcomes**

- **Safety outcomes**

Hazard ratio, 0.95 (95% CI, 0.90–1.00)
P=0.06
-- Unscreened participants
— Screened participants

Cumulative Incidence (%)

Years since Randomization

Subgroup	Screened Invited Participants	Unscreened Invited Participants	Hazard Ratio (95% CI)	
	no. of events per 1000 person-yr			
Age				
<70 yr	18.73	20.90		0.89 (0.83–0.96)
≥70 yr	30.71	30.33		1.01 (0.94–1.09)
Cardiovascular disease				
No	20.32	21.40		0.95 (0.89–1.01)
Yes	47.50	47.93		0.99 (0.89–1.10)
Stroke				
No	22.64	23.65		0.96 (0.90–1.01)
Yes	42.57	44.19		0.97 (0.80–1.17)
Ischemic heart disease				
No	23.03	24.26		0.95 (0.90–1.00)
Yes	35.10	34.02		1.03 (0.82–1.29)
Heart failure				
No	22.31	23.44		0.95 (0.90–1.00)
Yes	79.61	80.07		0.99 (0.81–1.21)
Peripheral occlusive arterial disease				
No	22.35	23.72		0.94 (0.89–0.99)
Yes	81.96	72.74		1.13 (0.91–1.40)
Aortic aneurysm				
No	23.09	24.25		0.95 (0.90–1.00)
Yes	48.37	53.80		0.90 (0.66–1.21)
Hypertension at baseline				
No	18.95	19.66		0.96 (0.88–1.05)
Yes	27.71	29.20		0.95 (0.89–1.01)
Diabetes mellitus at baseline				
No	21.63	22.54		0.96 (0.90–1.02)
Yes	36.41	39.91		0.91 (0.81–1.03)
Lipid-lowering therapy at baseline				
No	22.21	22.27		1.00 (0.93–1.07)
Yes	25.63	28.54		0.90 (0.83–0.97)

0.6   1.0   1.5

Screening Better   No Screening Better

Results:

- **No significant mortality reduction in older population after cardiovascular screening**

- **Possibility of a 10% reduction in mortality or morbidity especially in younger ages (65 – 69 years of age)**

- **Reasons for more efficacy of screening in younger ages**

- **Pilot study conducted on both males and females**

Results (limitations):

- **Potential harms of screening and therapeutic measures**
- **The effects of being invited to undergo screening vs. the effects of actual screening**
- **Do these results apply to other age groups, ethnicities or other countries?**
- **Longer term follow – up needed for making a more definite conclusion**

Thank You For Your Attention