



ARTERIAL STIFFNESS DERIVED FROM FINGER PULSE PRESSURE IS ASSOCIATED WITH MORTALITY IN THE GENERAL POPULATION

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Introduction

Increased arterial stiffness may be linked to morbidity and mortality in CKD patients. Analysis of the contour of the peripheral arterial pulse pressure may offer a practical way to assess large artery stiffness.¹

To examine this potential technique, we investigated whether arterial stiffness, derived from finger pulse pressure, is associated with cardiovascular events (CVE) and mortality in the general population-based Prevention of Renal and Vascular End-stage Disease (PREVEND) cohort.

Methods

Between 2001 and 2003, arterial finger pulse pressure was recorded for 15 minutes in 5487 participants of the PREVEND study using a Portapres pressure monitor (Finapres Medical Systems, Amsterdam, The Netherlands). Pulse contour analysis was used to derive the pulse propagation time of the pressure wave reflected by the resistance arteries in the lower body. A stiffness index (SI), expressed in meter per second, was calculated by dividing the pulse propagation time by the subject's height.

Baseline characteristics

Tertiles of SI

	Population	I 4.4- 5.5	II 5.6 - 6.1	III 6.1- 12.1	p
N	5487	1829	1829	1829	
Age (yr)	52±11	47.6±10.4	51.3±11.4	57.9±11.6	<0.001
Male %	49.9%	24.9%	56.3%	67.9%	<0.001
SI (m/s)	5.9±0.6	5.3±0.2	5.8±1.2	6.6±0.6	<0.001
SBP (mmHg)	125±18	116.7±15	125±16	134±6	<0.001
Heart rate (beats/min)	68±10	65±9	68±10	72±10	<0.001
BMI (kg/m ²)	26.6±4.3	26.2±4.7	26.4±4.1	27.2±4.0	<0.001
Smoking (%)	27.6%	22.8%	28.5%	31.6%	<0.001
eGFR (ml/min/1.73m ²)	81±15	83±14	82±14	77±15	<0.001
24h UAE (mg)	30±140	20±99	24.5±111	45±190	<0.001
% Diabetic	2.4%	1.5%	1.9%	3.9%	<0.001
Cholesterol (mmol/l)	5.4±1	5.2±1	5.4±1	5.6±2	<0.001

Determinants of the SI

Stepwise multiple linear regression

	St. β	SE	p
Age (yr)	0.273	0.040	<0.001
Female gender	-0.318	0.007	<0.001
SBP (mmHg)	0.221	0.001	<0.001
Heart rate	0.271	0.001	<0.001
Smoking	0.136	0.009	<0.001

Association of SI with CVE and mortality

Figure 1: survival by tertile of the SI

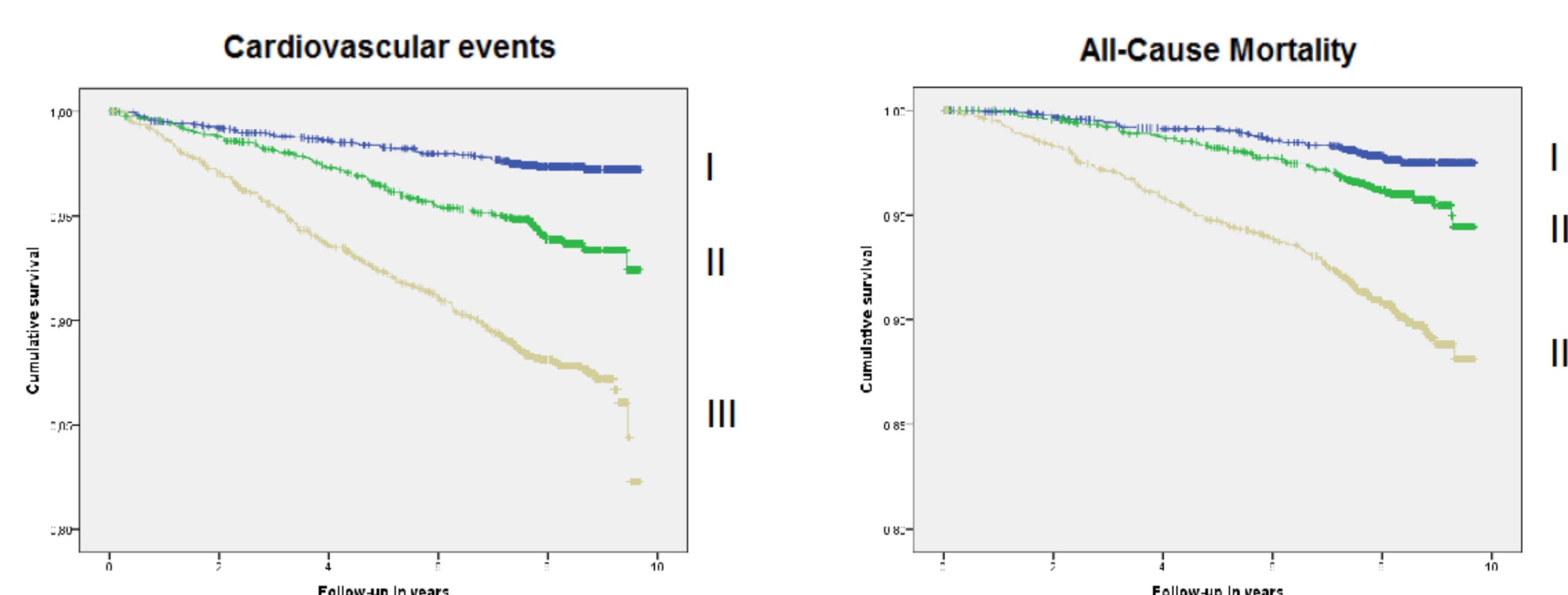


Figure 2: association of the SI with CVE and mortality

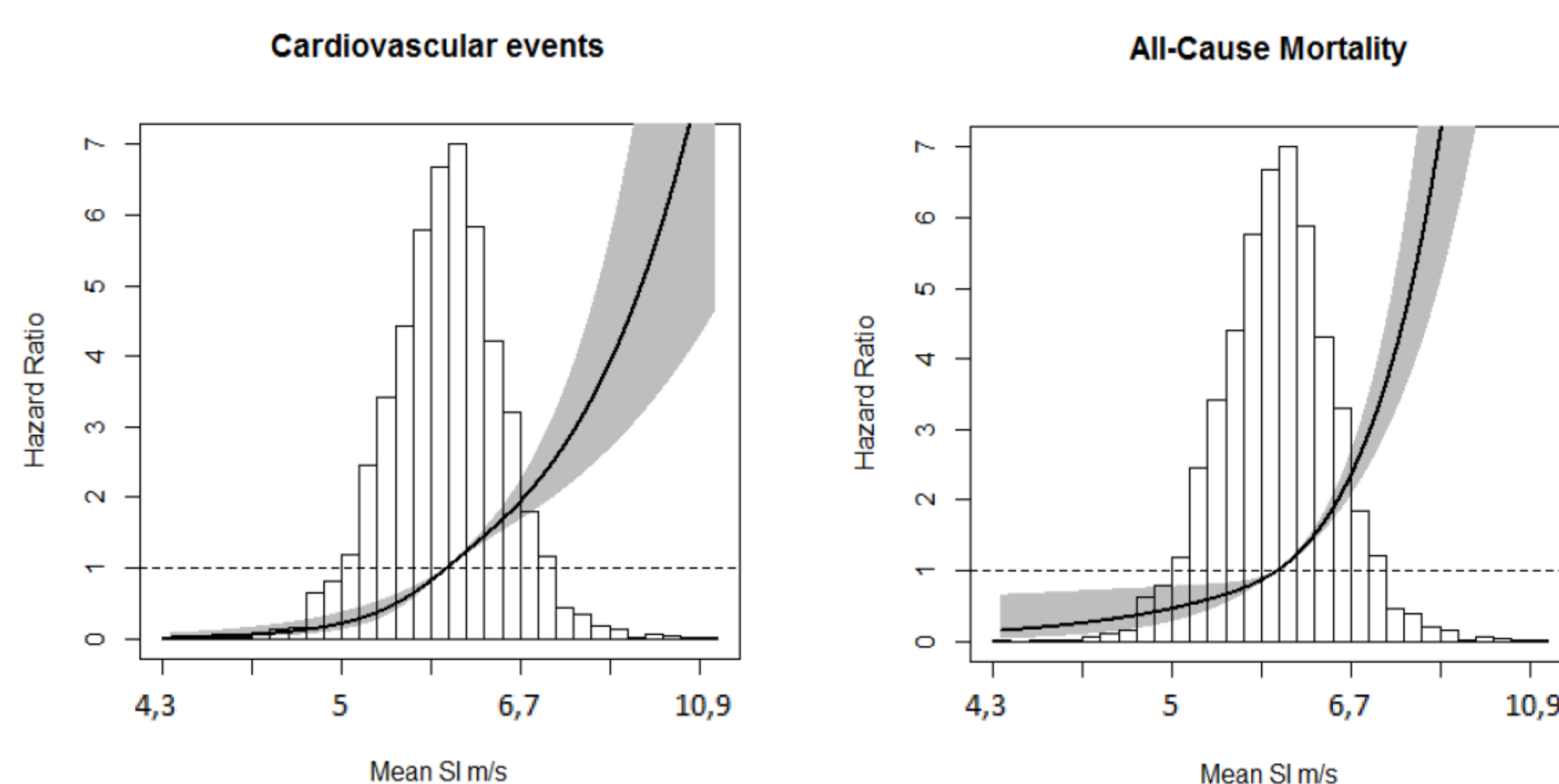


Figure 3: multivariable Cox regression analysis

	Mortality		CVE	
	HR (95% CI)	p	HR (95% CI)	p
Model 1	1.87 (1.70-2.05)	<0.001	1.73 (1.57-1.90)	<0.001
Model 2	1.27 (1.10-1.47)	0.001	1.22 (1.06-1.40)	0.004
Model 3	1.25 (1.07-1.45)	0.004	1.19 (1.03-1.37)	0.016
Model 4	1.19 (1.02-1.38)	0.04	1.08 (0.93-1.26)	0.29

Model 1: Crude
 Model 2: Adjustment for age + sex
 Model 3: Model 2 + BMI, diabetes, dyslipidemia, eGFR, and UAE
 Model 4: Model 3 + smoking and hypertension

Conclusion

Arterial stiffness, derived from the peripheral arterial pulse pressure contour, is associated with all-cause mortality in the population-based PREVEND cohort, independent of established cardiovascular risk factors.

Given the ease of use of the technique, finger pulse pressure measurement may be a practical way to identify patients at increased risk of mortality for research or clinical purposes.

Reference 1: Millasseau et al. J Hypertens 2006