

De gevolgen van excessief sporten voor hart en bloedvaten

Dr. Thijs Eijsvogels
Inspanningsfysioloog
Radboudumc, Nijmegen

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Dr. Thijs M. H. Eijsvogels
Department of Physiology



Thijs.Eijsvogels@Radboudumc.nl



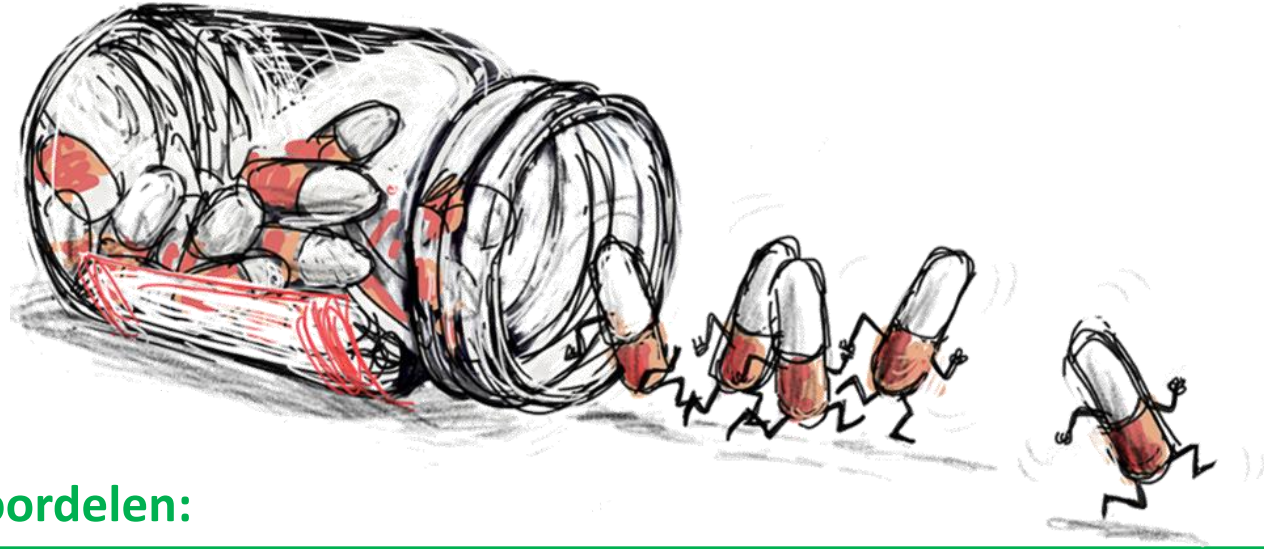
@ThijsEijsvogels

Radboudumc

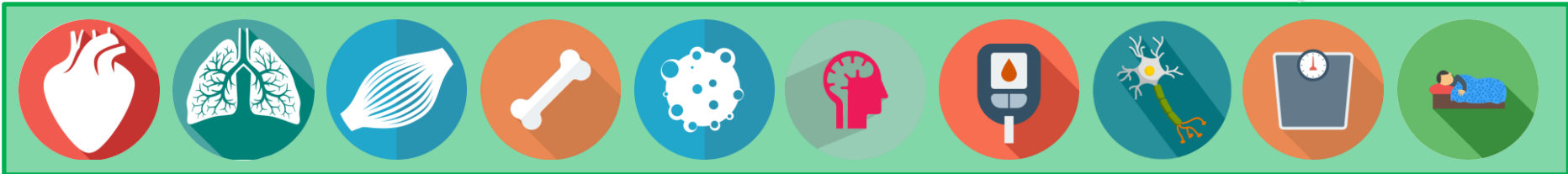
Disclosures

Voor presentatie mogelijk relevante relaties	
Sponsoring of onderzoeksgeld:	Geen
Honorarium of andere (financiële) vergoeding:	Geen
Aandeelhouder:	Geen
Andere relatie, namelijk ...	Geen

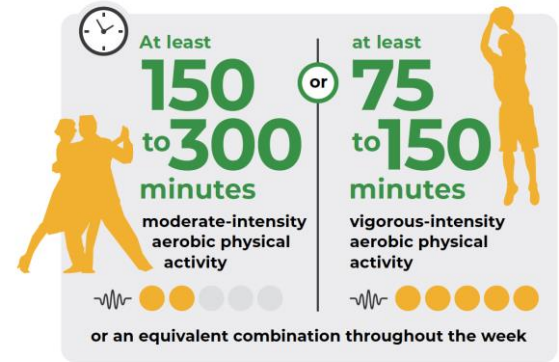
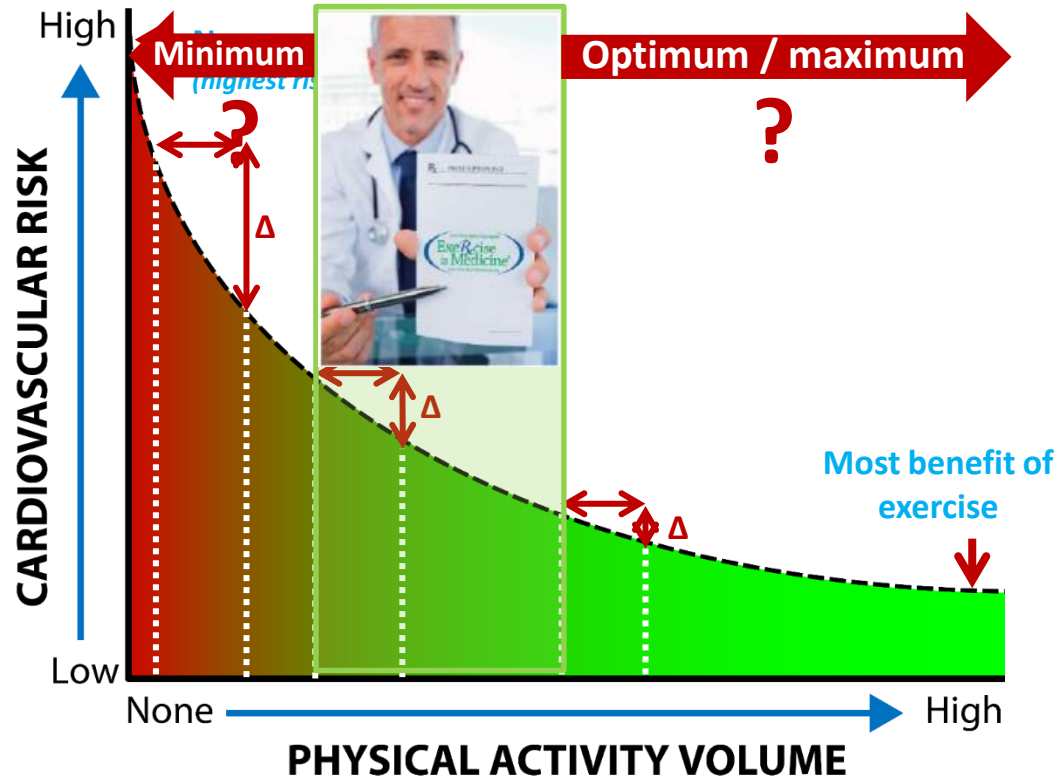
Beweging als medicijn



Gezondheidsvoordelen:



De dosis-respons curve



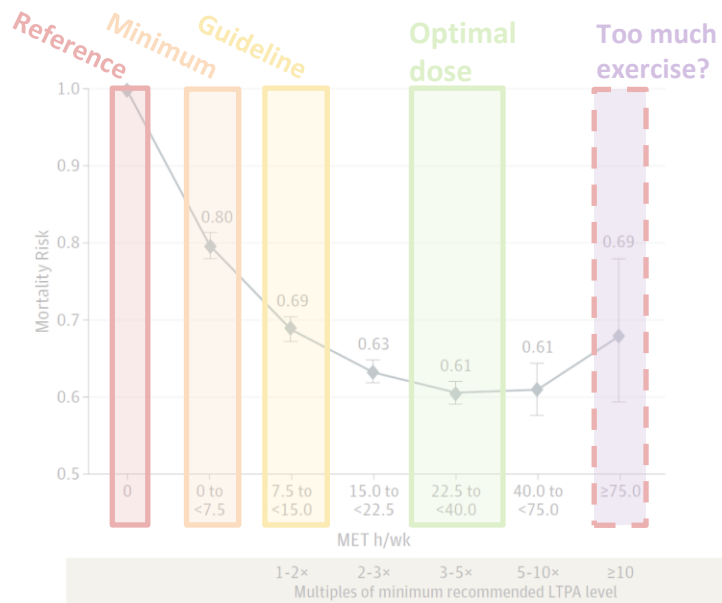
Epidemiologische inzichten



n=661,137



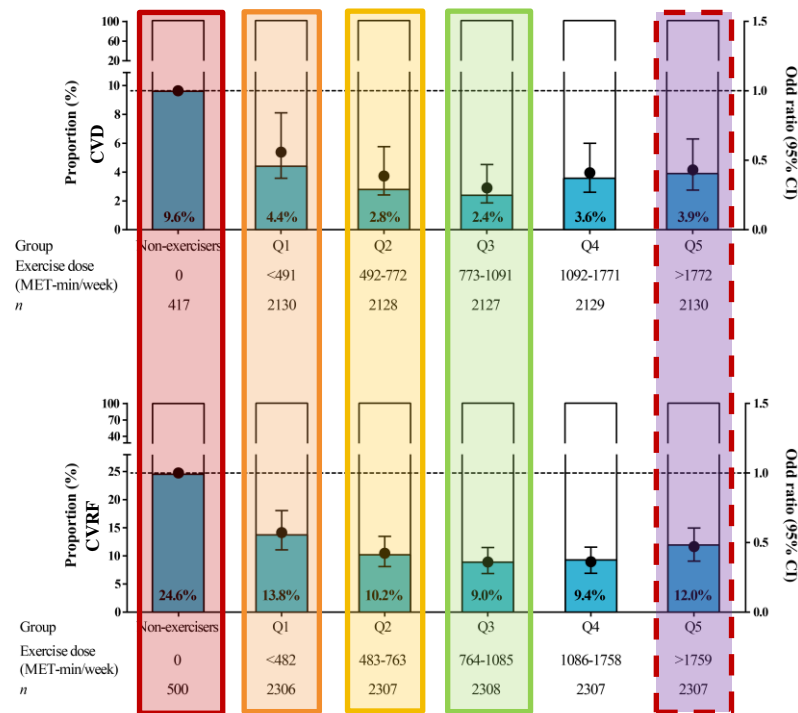
14 years follow-up



n=21,266

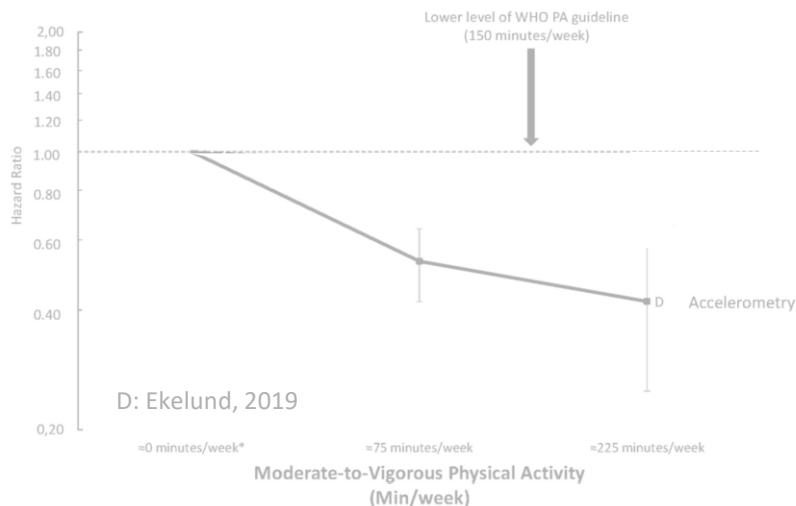


32 years follow-up



Van vragenlijsten naar wearables

- ↓ Meetfout (i.v.m. overrapportage)
- ↑ Informatie over intensiteit, frequency and duur
- + Meten van (on)gestructureerde fysieke (in)activiteit



Stap karakteristieken



Eenvoudig te begrijpen



Eenvoudig te meten



Eenvoudig voor te schrijven

Stappen en gezondheidsuitkomsten



12 cohorts

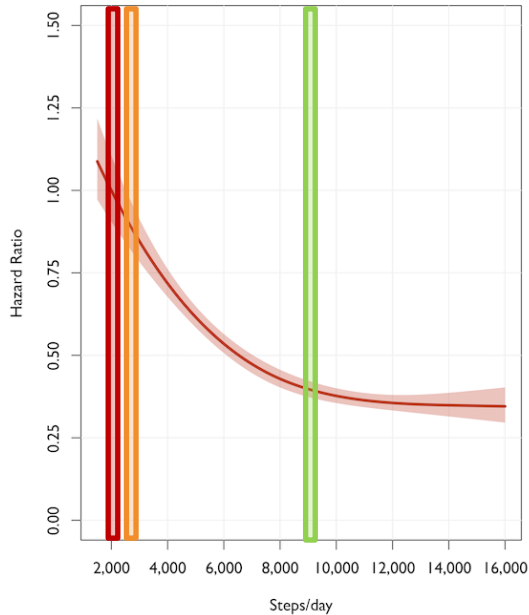


N = 111,309

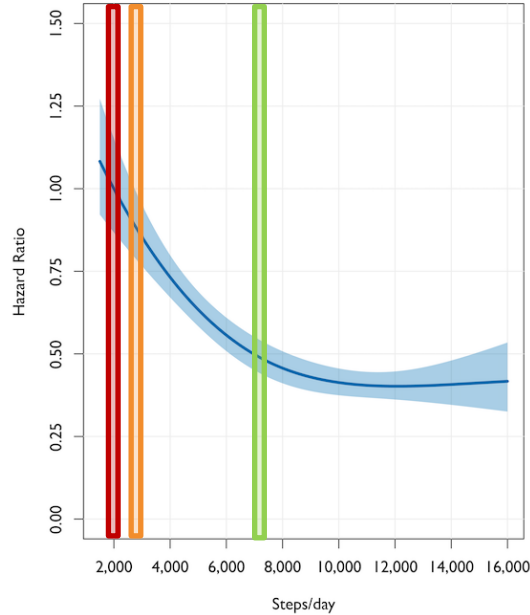


6.8 years follow-up

All-cause mortality



Incident CVD (fatal and non-fatal)



	Steps/day	Hazard ratio (95% CI)
Minimum dose	2,517	0.92 (0.84, 1.00)
Optimum dose	8,763	0.40 (0.38, 0.43)
Risk reduction at 16,000 steps	16,000	0.35 (0.30, 0.40)

	Steps/day	Hazard ratio (95% CI)
Minimum dose	2,735	0.89 (0.79, 1.00)
Optimum dose	7,126	0.49 (0.45, 0.55)
Risk reduction at 16,000 steps	16,000	0.42 (0.33, 0.53)

Stappen en gezondheidsuitkomsten

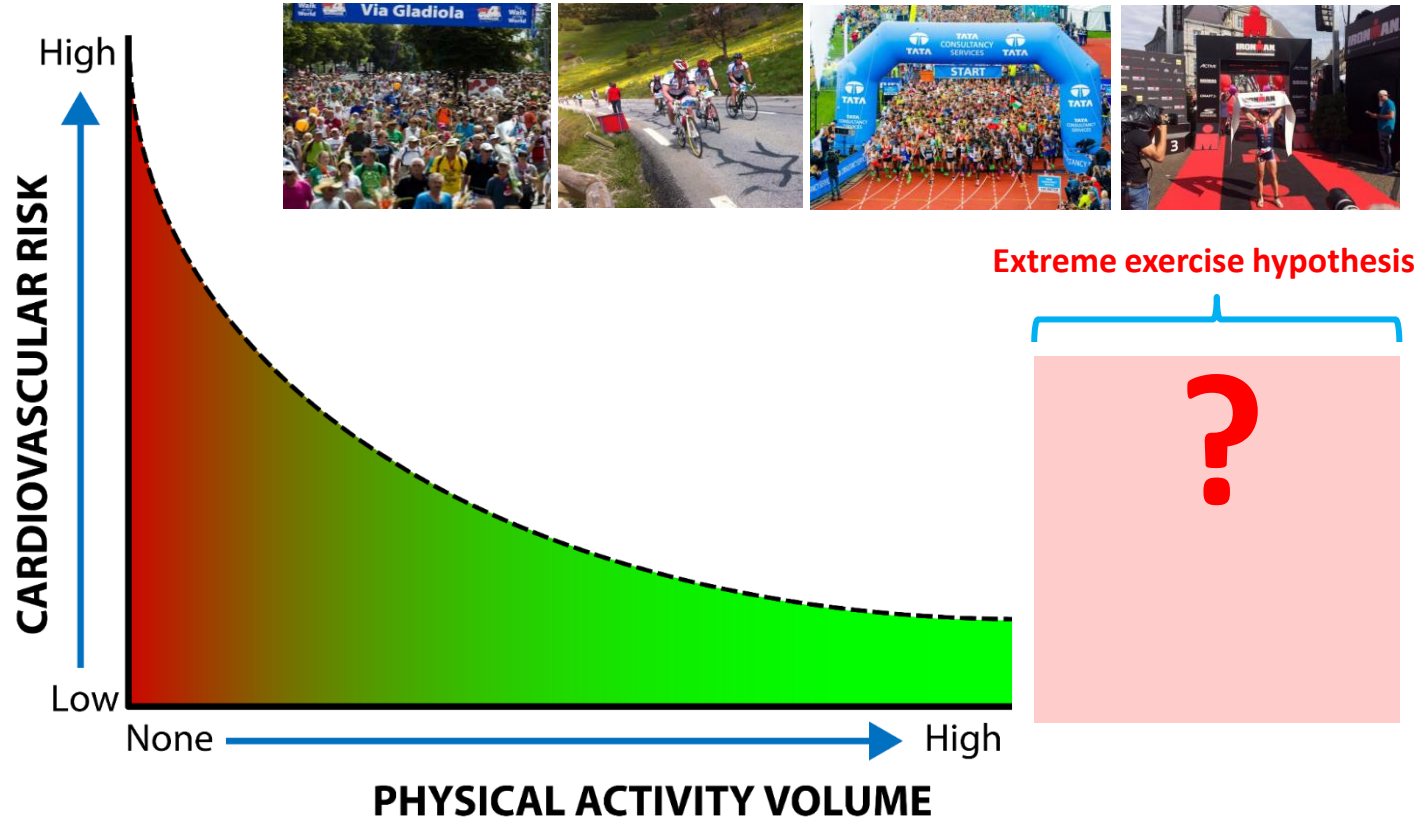
All-cause mortality

	2,000 steps/day	3,000 steps/day	4,000 steps/day	5,000 steps/day	6,000 steps/day	7,000 steps/day	8,000 steps/day	9,000 steps/day	10,000 steps/day	11,000 steps/day	12,000 steps/day	13,000 steps/day	14,000 steps/day	15,000 steps/day	16,000 steps/day
2,000 steps/day	REF	0.85	0.72	0.61	0.53	0.47	0.43	0.39	0.37	0.36	0.36	0.35	0.35	0.35	0.35
3,000 steps/day	1.18	REF	0.85	0.73	0.63	0.56	0.50	0.47	0.44	0.43	0.42	0.42	0.42	0.42	0.42
4,000 steps/day	1.39	1.18	REF	0.86	0.74	0.66	0.59	0.55	0.52	0.50	0.49	0.49	0.49	0.49	0.49
5,000 steps/day	1.63	1.38	1.17	REF	0.87	0.77	0.69	0.64	0.61	0.59	0.58	0.57	0.57	0.57	0.57
6,000 steps/day	1.88	1.59	1.35	1.15	REF	0.88	0.80	0.74	0.70	0.68	0.67	0.66	0.66	0.66	0.66
7,000 steps/day	2.13	1.80	1.53	1.31	1.13	REF	0.90	0.84	0.80	0.77	0.75	0.75	0.75	0.75	0.75
8,000 steps/day	2.35	1.99	1.69	1.45	1.25	1.11	REF	0.93	0.88	0.85	0.83	0.83	0.83	0.83	0.83
9,000 steps/day	2.54	2.15	1.82	1.56	1.35	1.20	1.08	REF	0.95	0.92	0.90	0.89	0.89	0.89	0.89
10,000 steps/day	2.67	2.26	1.92	1.64	1.43	1.26	1.14	1.05	REF	0.97	0.95	0.94	0.94	0.94	0.94
11,000 steps/day	2.77	2.34	1.98	1.70	1.47	1.30	1.18	1.09	1.03	REF	0.98	0.97	0.97	0.97	0.97
12,000 steps/day	2.82	2.38	2.02	1.73	1.50	1.33	1.20	1.11	1.05	1.02	REF	0.99	0.99	0.99	0.99
13,000 steps/day	2.84	2.40	2.04	1.75	1.52	1.34	1.21	1.12	1.06	1.03	1.01	REF	1.00	1.00	1.00
14,000 steps/day	2.85	2.41	2.04	1.75	1.52	1.34	1.21	1.12	1.07	1.03	1.01	1.00	REF	1.00	1.00
15,000 steps/day	2.85	2.41	2.04	1.75	1.52	1.34	1.21	1.12	1.07	1.03	1.01	1.00	1.00	REF	1.00
16,000 steps/day	2.85	2.41	2.04	1.75	1.52	1.34	1.21	1.12	1.07	1.03	1.01	1.00	1.00	1.00	REF

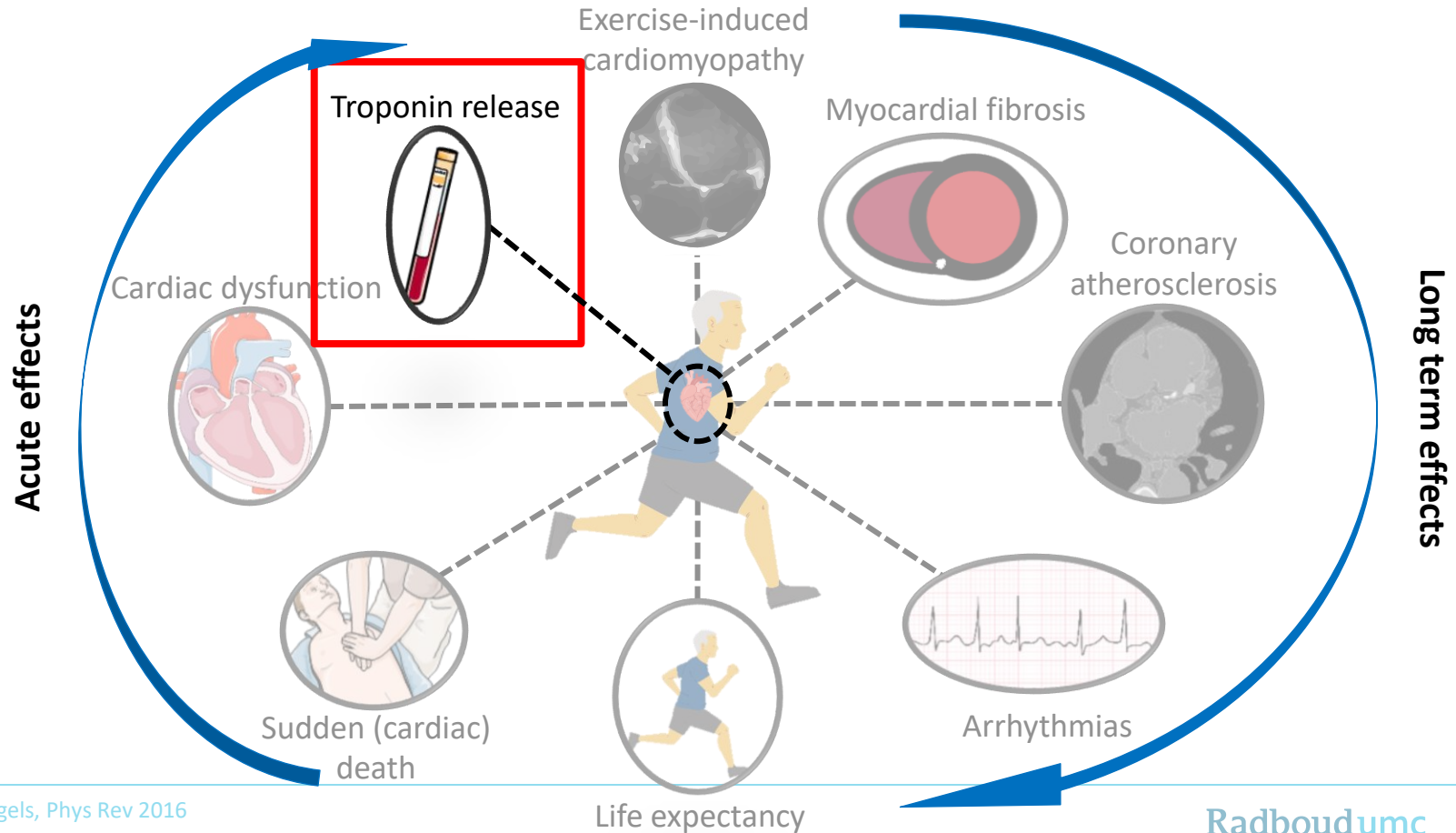
Incident CVD (fatal and non-fatal)

	2,000 steps/day	3,000 steps/day	4,000 steps/day	5,000 steps/day	6,000 steps/day	7,000 steps/day	8,000 steps/day	9,000 steps/day	10,000 steps/day	11,000 steps/day	12,000 steps/day	13,000 steps/day	14,000 steps/day	15,000 steps/day	16,000 steps/day
2,000 steps/day	REF	0.85	0.73	0.63	0.56	0.50	0.46	0.43	0.41	0.41	0.40	0.40	0.41	0.41	0.42
3,000 steps/day	1.17	REF	0.86	0.74	0.65	0.58	0.54	0.50	0.48	0.47	0.47	0.47	0.48	0.48	0.49
4,000 steps/day	1.37	1.17	REF	0.87	0.76	0.68	0.62	0.59	0.56	0.55	0.55	0.55	0.56	0.56	0.57
5,000 steps/day	1.58	1.35	1.16	REF	0.88	0.79	0.72	0.68	0.65	0.64	0.63	0.64	0.64	0.65	0.66
6,000 steps/day	1.80	1.53	1.32	1.14	REF	0.90	0.82	0.77	0.74	0.73	0.72	0.73	0.73	0.74	0.75
7,000 steps/day	2.01	1.71	1.47	1.27	1.12	REF	0.92	0.86	0.83	0.81	0.81	0.81	0.82	0.83	0.84
8,000 steps/day	2.19	1.87	1.60	1.39	1.22	1.09	REF	0.94	0.91	0.89	0.88	0.88	0.89	0.90	0.91
9,000 steps/day	2.33	1.99	1.70	1.48	1.30	1.16	1.06	REF	0.96	0.94	0.94	0.94	0.95	0.96	0.97
10,000 steps/day	2.42	2.07	1.77	1.53	1.35	1.21	1.11	1.04	REF	0.98	0.97	0.98	0.99	1.00	1.01
11,000 steps/day	2.47	2.11	1.81	1.57	1.38	1.23	1.13	1.06	1.02	REF	0.99	1.00	1.01	1.02	1.03
12,000 steps/day	2.49	2.12	1.82	1.58	1.39	1.24	1.14	1.07	1.03	1.01	REF	1.00	1.01	1.03	1.04
13,000 steps/day	2.48	2.12	1.82	1.57	1.38	1.24	1.13	1.07	1.02	1.00	1.00	REF	1.01	1.02	1.03
14,000 steps/day	2.46	2.10	1.80	1.56	1.37	1.22	1.12	1.06	1.01	0.99	0.99	0.99	REF	1.01	1.02
15,000 steps/day	2.43	2.07	1.78	1.54	1.35	1.21	1.10	1.04	1.00	0.98	0.98	0.98	0.99	REF	1.01
16,000 steps/day	2.40	2.05	1.76	1.52	1.34	1.20	1.10	1.03	0.99	0.97	0.96	0.97	0.98	0.99	REF

Te weinig of te veel beweging?



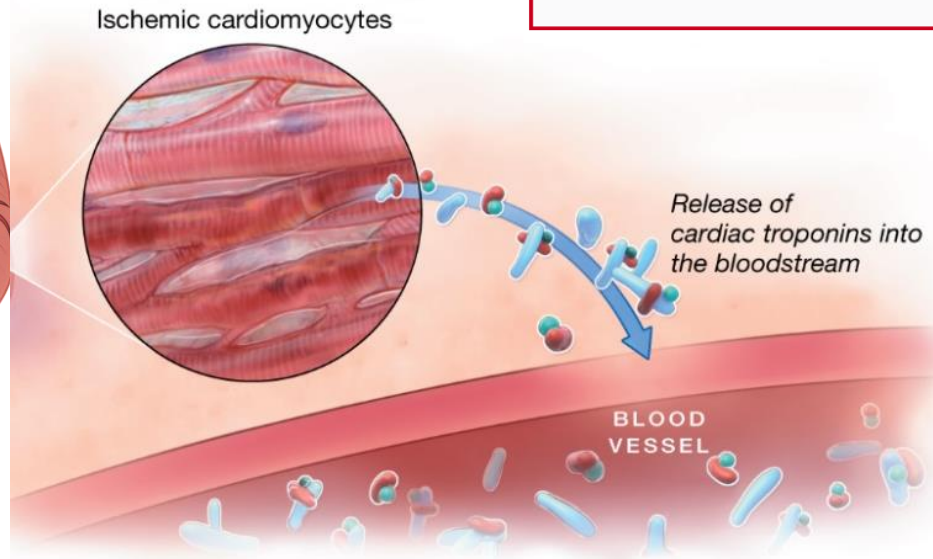
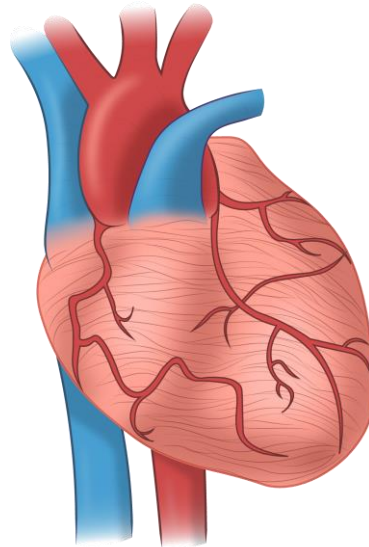
“Bijwerkingen” van excessief bewegen



Cardiac troponin

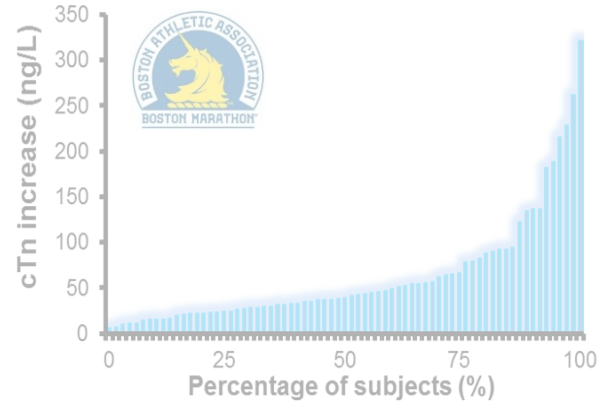
Criteria for Myocardial Injury

Detection of an elevated cTn value above the 99th percentile URL is defined as myocardial injury. The injury is considered acute if there is a rise and/or fall of cTn values.

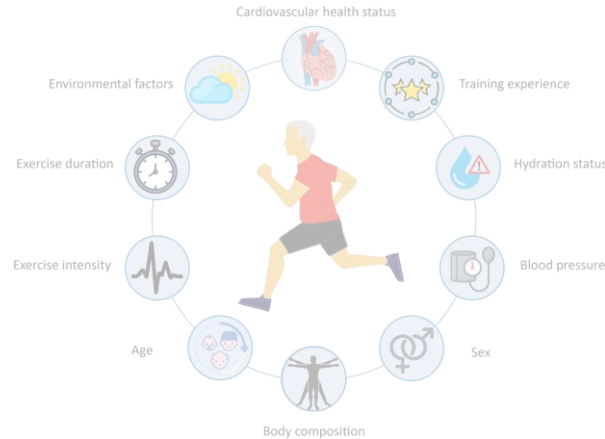


Inspanning en troponine

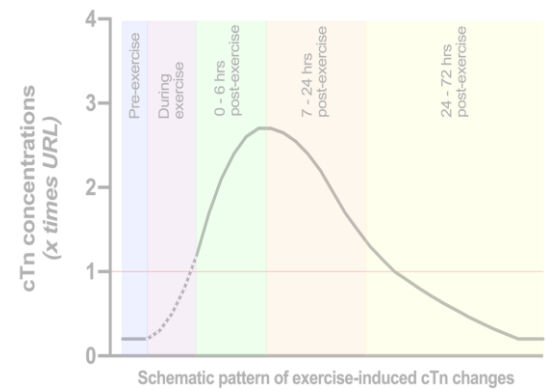
✓ Toename in iedereen



✓ Associatie met diverse factoren



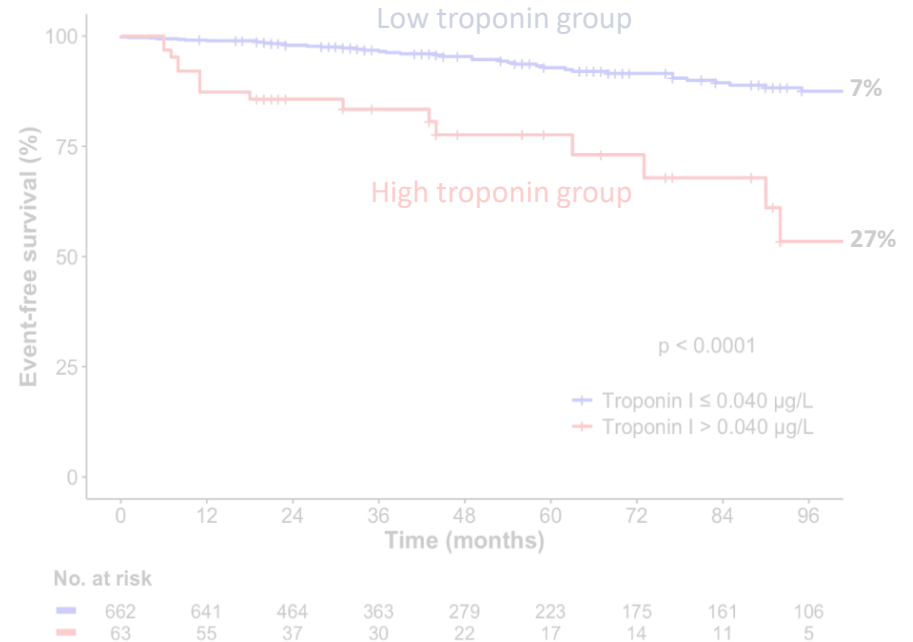
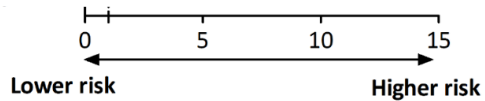
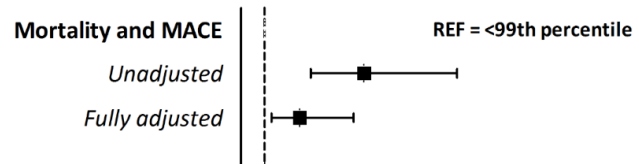
✓ Snelle normalisatie



✗ Geen fysieke of klinische klachten

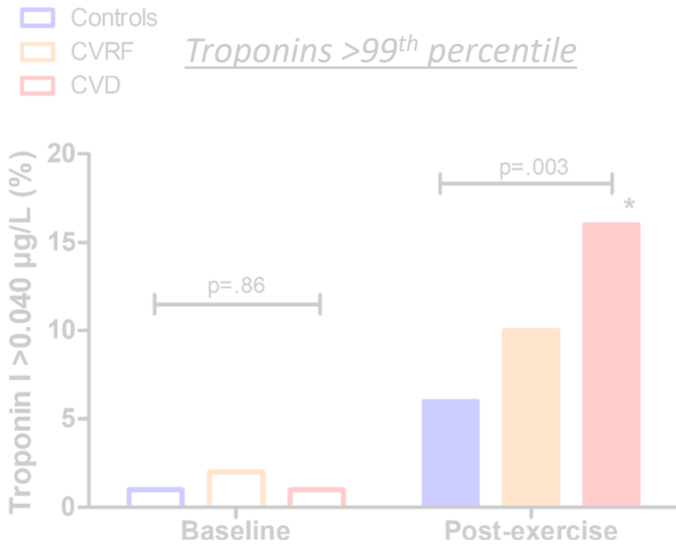
Inspanning en troponine

Post-exercise troponin >99th percentile

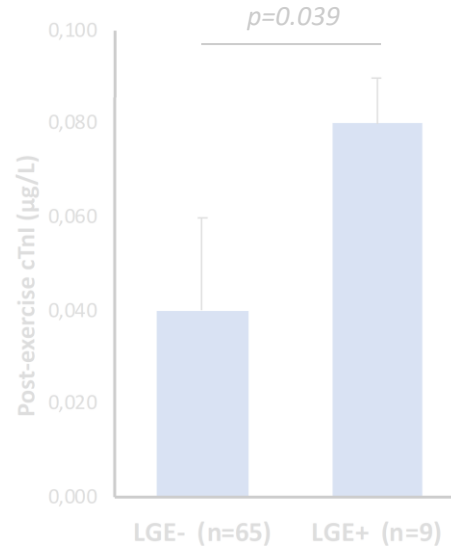


Een biomarker van sub-klinische ziekte?

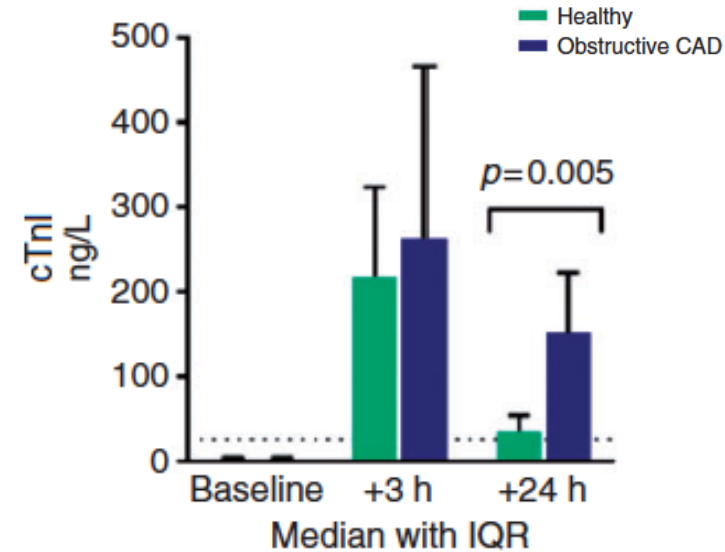
Hart- en vaatziekten



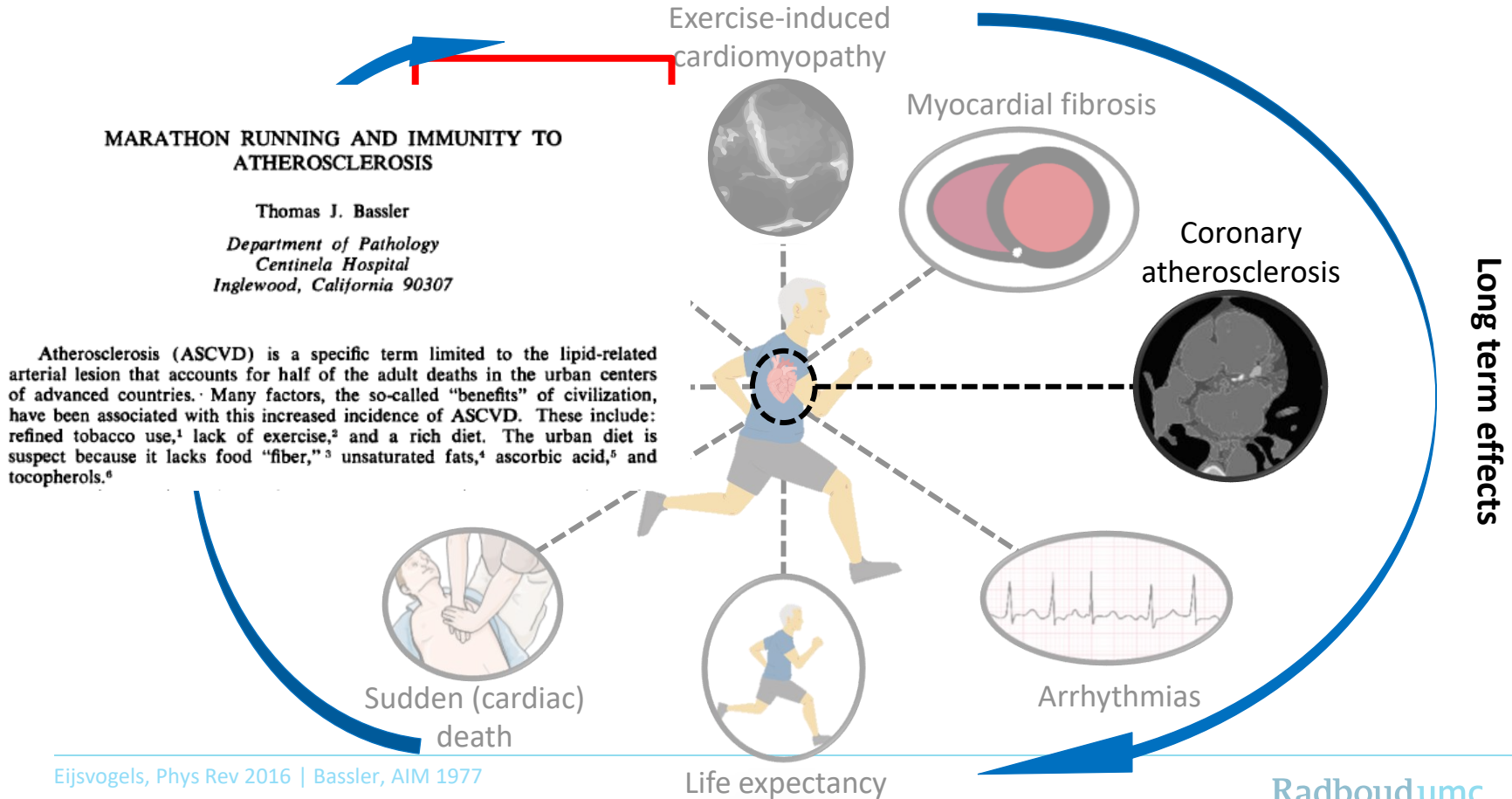
Myocardiale fibrose



Coronaire atherosclerose



“Bijwerkingen” van excessief bewegen



MARC: Inspanning & coronaire atherosclerose

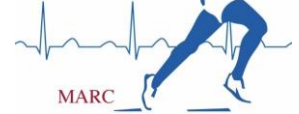


n=318 ♂ sporters (≥45 jaar oud)

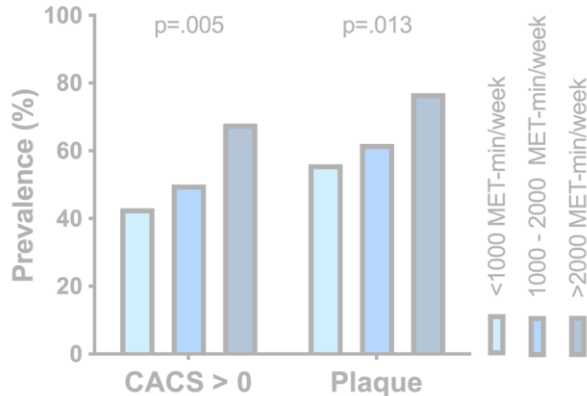


- Non-contrast CT (CAC scores)
- Coronary CT angiography (plaques)

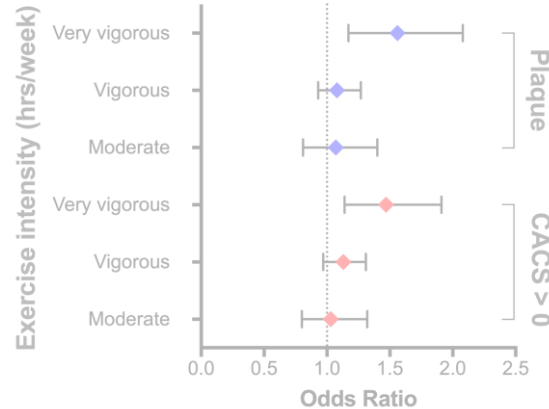
Measuring
Athlete's
Risk of
Cardiovascular events



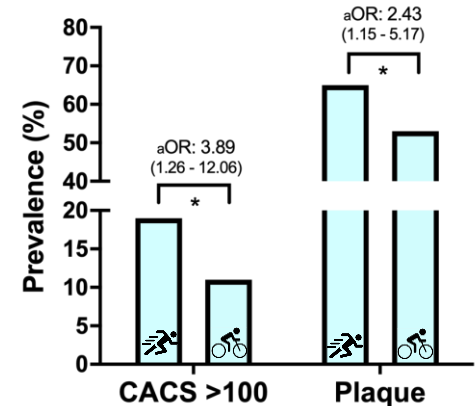
Vaker atherosclerose in meest actieve sporters



Associatie met sportintensiteit



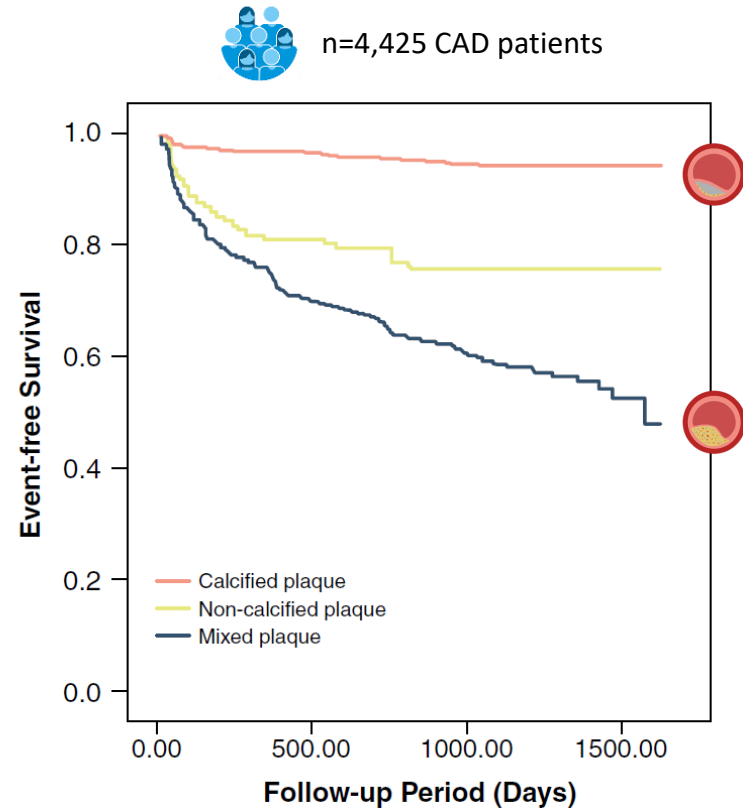
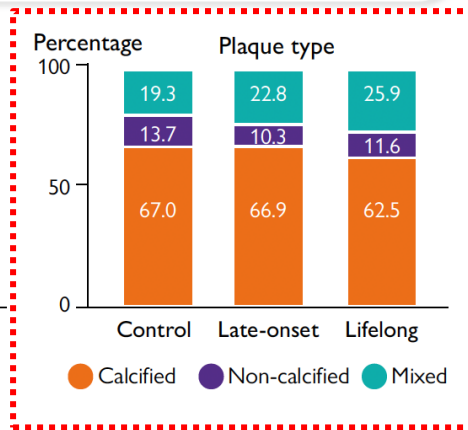
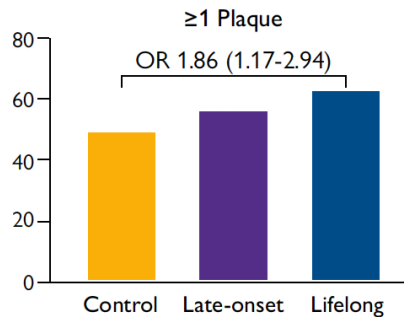
Sporttype afhankelijk



Plaque phenotype en klinische relevantie



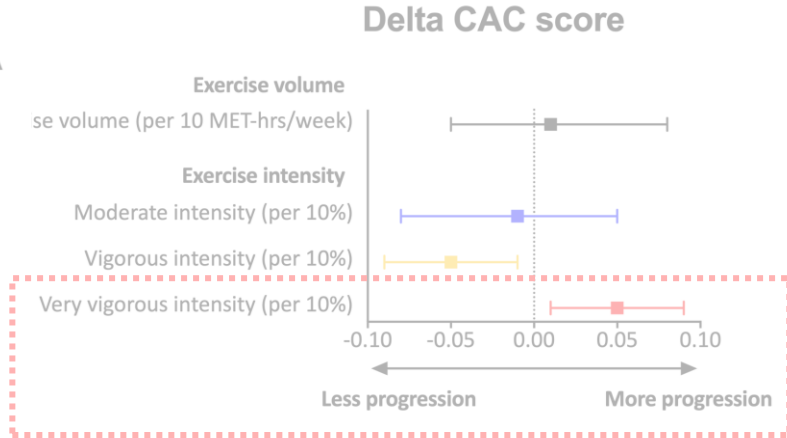
Plaque burden and plaque composition by endurance exercise group



MARC-2: Progressie van atherosclerosis



A



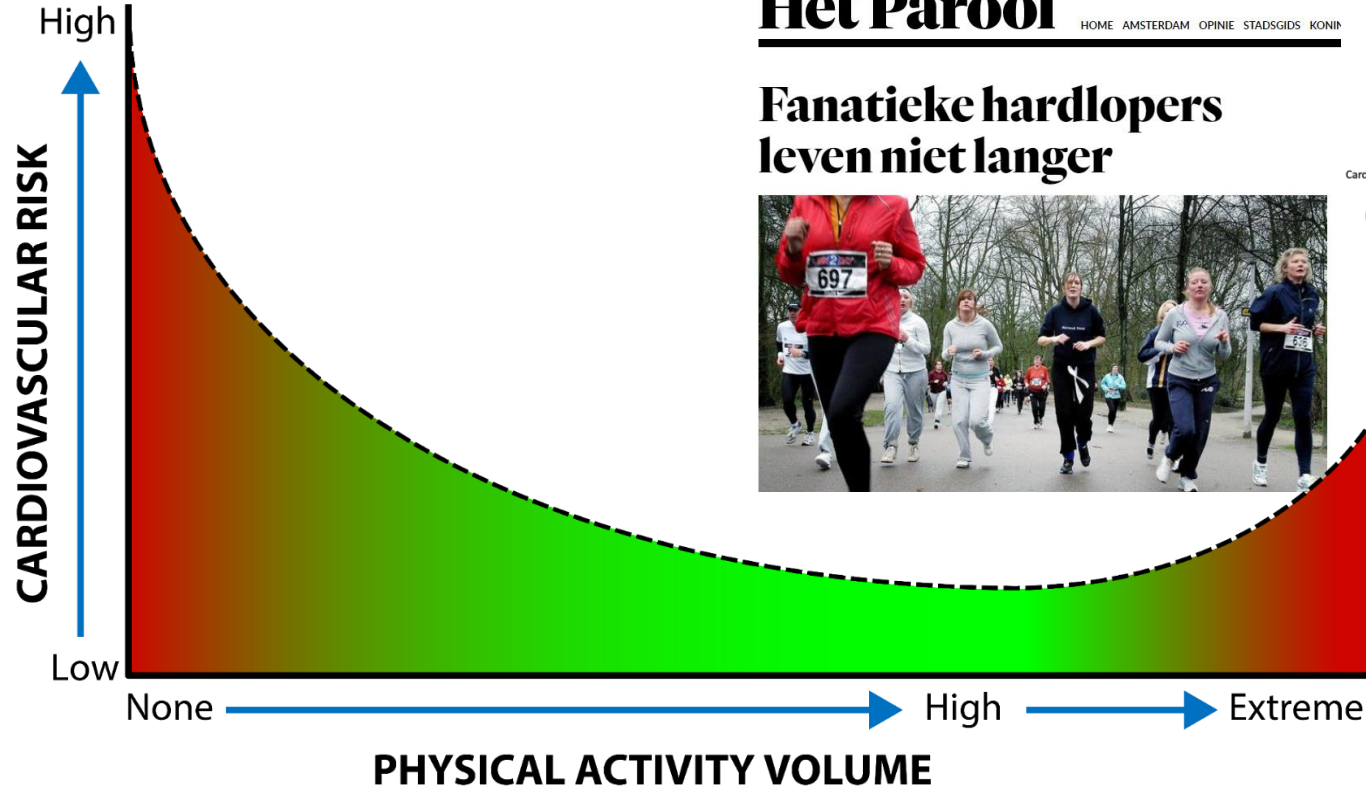
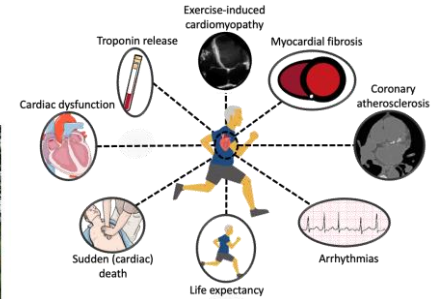
Moeten we ons zorgen maken?

TOPICS NIEUWSBRIEF DIGITALE

Vrij, Overveerd
Het Parool

HOME AMSTERDAM OPINIE STADSGIDS KONIN

Fanatieke hardlopers leven niet langer



Sporters leven langer!



N=394,981



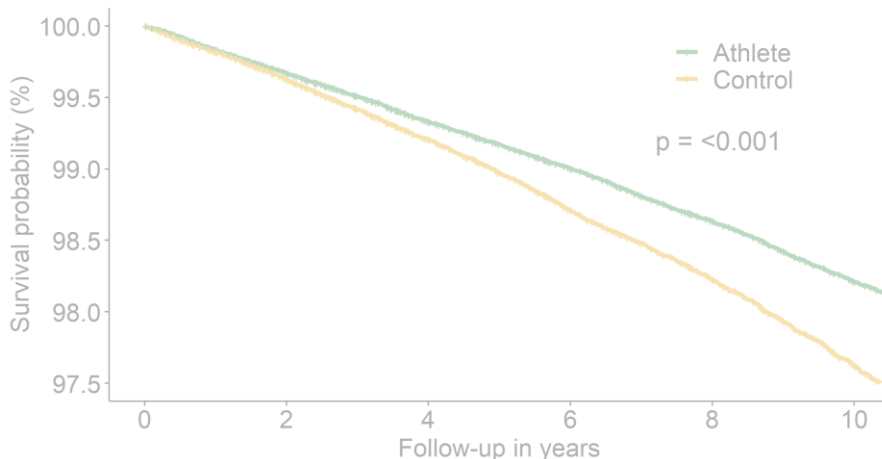
N=60,586



N=91,309



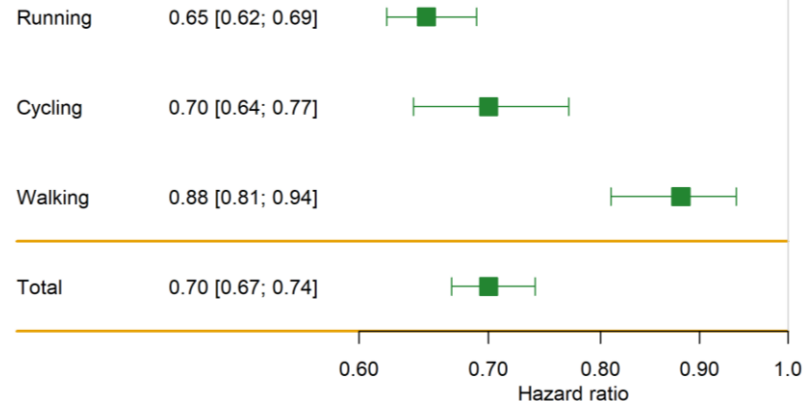
N=211,592 non-athletes



Number at risk

	0	2	4	6	8	10
Athlete	546876	342179	247448	179224	124825	80602
Control	211592	135303	98436	72070	50562	32839

Subgroup OR [95% CI]



Samenvattend:

1. Een beetje bewegen (~15 min/dag of ~3000 stappen/dag) verlaagt al het risico op hart- en vaatziekten en vroegtijdige sterfte.
2. Meer bewegen zorgt voor meer gezondheidswinst, met optimale risico reducties bij 7100 stappen/dag voor hart- en vaatziekten en 8800 stappen voor vroegtijdige sterfte.
3. Acute en langdurige inspanning met een hoog volume en hoge intensiteit is geassocieerd met cardiale gezondheidsproblemen, zoals troponine stijging en coronaire atheroslerose.
4. Sporters hebben een betere levensverwachting dan niet-sporters.



De gevolgen van excessief sporten voor hart en bloedvaten



Dr. Thijs M. H. Eijsvogels
Department of Physiology



Thijs.Eijsvogels@Radboudumc.nl



@ThijsEijsvogels

Radboudumc