



## **Beweging in diabetes**

Prof. dr. Dominique Hansen



**UHASSELT**

KNOWLEDGE IN ACTION

# Beweging in diabetes

Waarom, en wat is de evidentie?

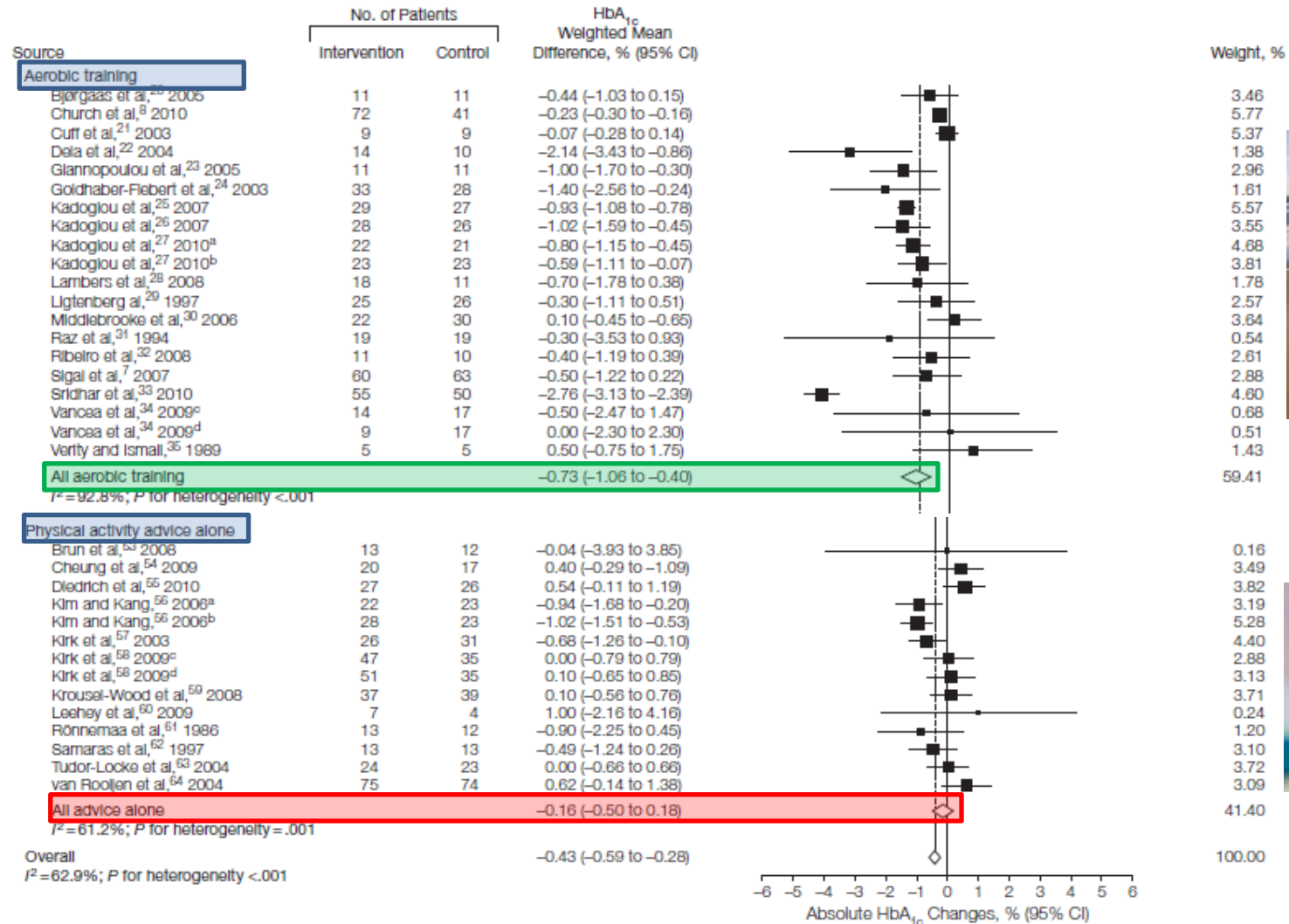


## Quizvraag

- Wat is de sterkste voorspeller voor onze levensduur?
  - A: de suikercontrole (HbA1c)
  - B: de buikomtrek
  - C: de fysieke fitheid (zoals VO2max)
  - D: of je rookt of niet

# Beweging(sadvies) in type 2 diabetes

**Figure 1.** Absolute Changes in HbA<sub>1c</sub> of Individual Studies of Structured Exercise Training vs No Intervention



# Beweging in type 1 diabetes

## A systematic review and meta-analysis of exercise interventions in adults with type 1 diabetes

Jane E. Yardley<sup>a,b</sup>, Jacqueline Hay<sup>a</sup>, Ahmed M. Abou-Setta<sup>c,d</sup>,  
Seth D. Marks<sup>e</sup>, Jonathan McGavock<sup>a,\*</sup>

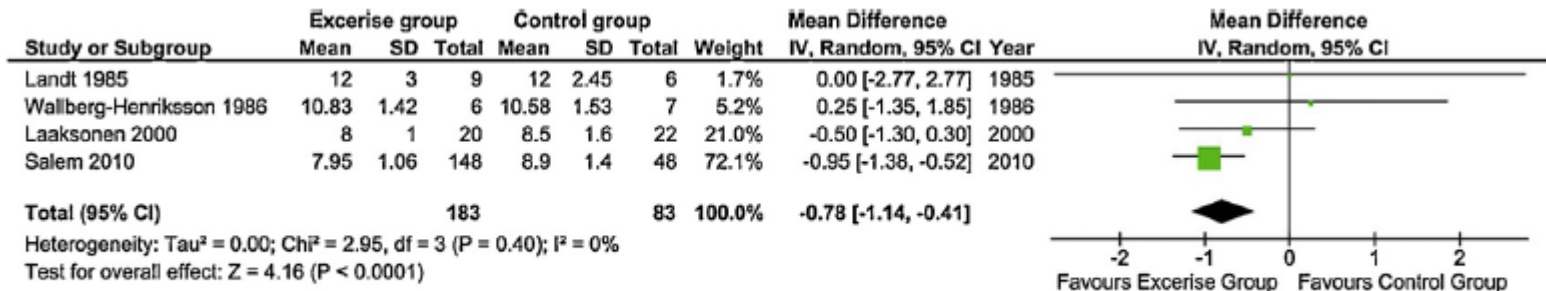


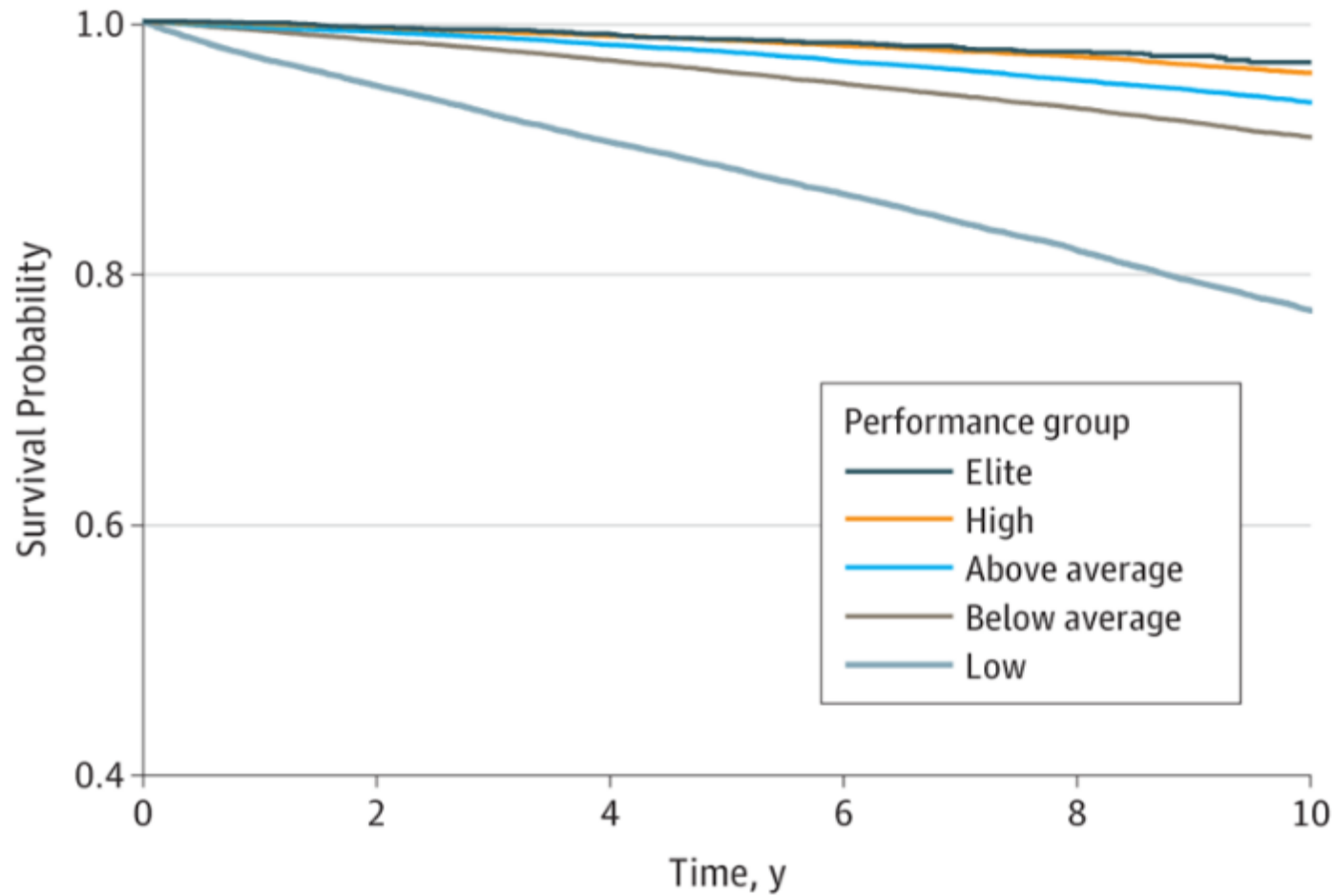
Fig. 2 – Post-treatment glycated hemoglobin (HbA<sub>1c</sub>).

# Fysieke fitheid...



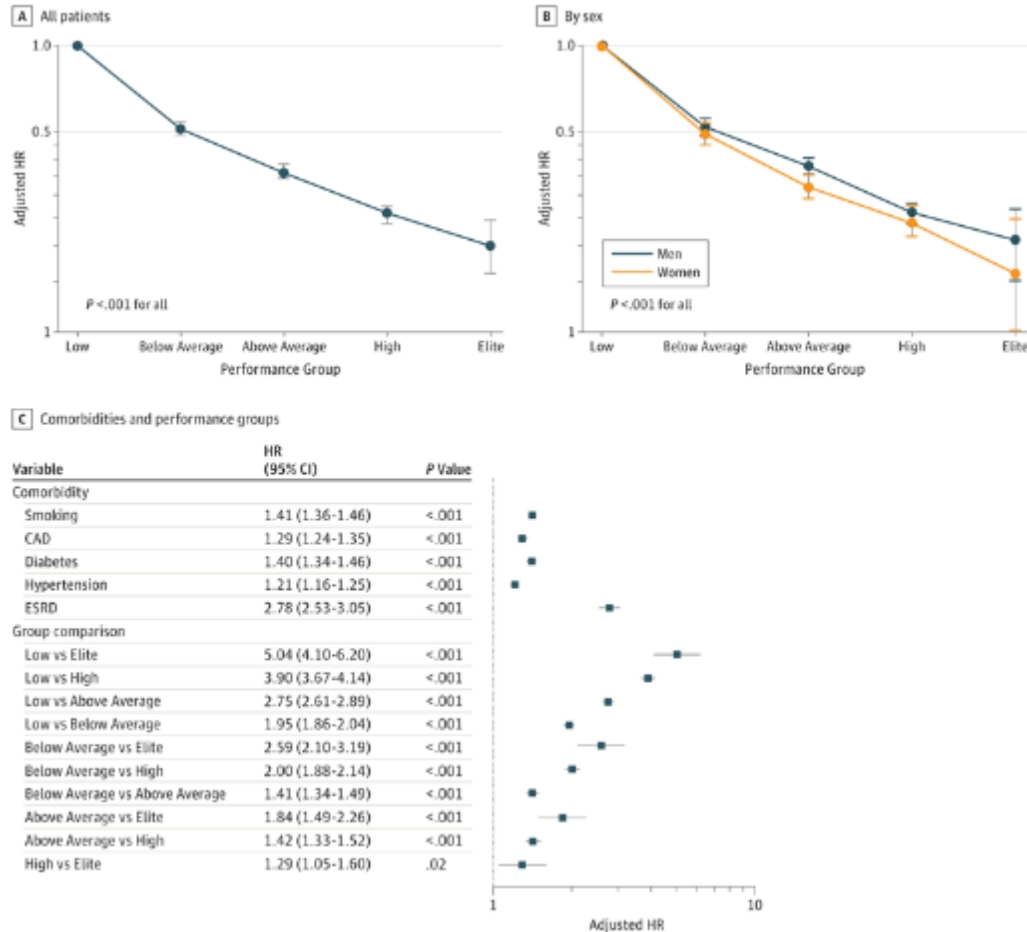
# Fysieke fitheid sterkste voorspeller voor levensduur...

122.007 patienten met 10 jaar opvolging



# Fysieke fitheid sterkste voorspeller voor levensduur...

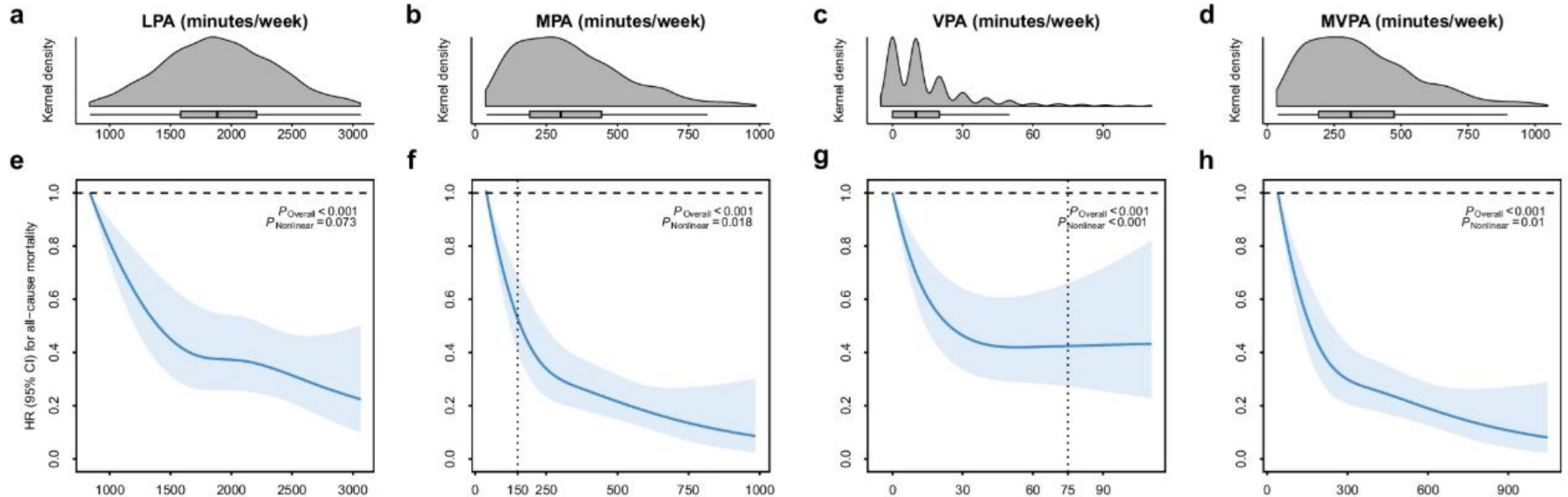
122.007 patienten met 10 jaar opvolging



Adjusted hazard ratios (HRs) for all-cause mortality compared with low performers in all patients (A) and by sex (B) (P values are for comparisons with low performers). C, Adjusted HRs for comorbidities and between performance groups. Error bars indicate 95% CIs. Performance group classifications by cardiorespiratory fitness are defined in Table 2. CAD indicates coronary artery disease; and ESRD, end-stage renal disease.

# Fysieke activiteit en kans op overlijden

4.003 patiënten met type 2 diabetes met opmeting van fysieke activiteit met accelerometer en opvolging van 6.9 jaar



Dose-response association of LPA, MPA, VPA, and MVPA with all-cause mortality.

## Quizvraag

- Hoeveel beweging heeft een persoon met diabetes nodig volgens de meest recente richtlijnen?
  - A: 10,000 stappen/dag
  - B: 15 min wandelen/dag én krachttraining (1 dag/week)
  - C: >30 min stevig doorwandelen/dag én krachttraining (minstens 3 dagen/week)
  - D: 60 min stevig doorwandelen of joggen/dag en krachttraining (tot 5 dagen/week)

# Aanbevelingen

Established/agreed issue	Class (level)
<ul style="list-style-type: none"> <li>In T2DM patients, it is recommended to exercise at least 3–5 days/week at least 30 min per session at a moderate-to-high intensity (at least 50–70% peak oxygen uptake)</li> </ul>	I (A)
<ul style="list-style-type: none"> <li>Two to three strength training sessions per week (add-on to aerobic training) involving large muscle groups at an intensity of 70–85% of 1-RM (8–10 repetitions) are recommended, ideally reaching at least 21 sets</li> </ul>	I (A)

Ambrosetti M, et al. Secondary prevention through comprehensive cardiovascular rehabilitation: From knowledge to implementation. 2020 update. A position paper from the Secondary Prevention and Rehabilitation Section of the European Association of Preventive Cardiology. Eur J Prev Cardiol. 2020 Apr 7:2047487320913379.

Recommendations	Class <sup>a</sup>	Level <sup>b</sup>
Among individuals with diabetes mellitus, resistance training $\geq 3$ times per week in addition to moderate or vigorous aerobic exercise (at least 30 min, 5–7 days per week) is recommended to improve insulin sensitivity and achieve a better CVD risk profile. <sup>176,178</sup>	I	A

Pelliccia A, et al. 2020 ESC Guidelines on sports cardiology and exercise in patients with cardiovascular disease. Eur Heart J. 2021;42:17-96.

# Aanbevelingen

TABLE 2. Recommended types of exercise training for all adults with T2D.

Type of Training	Type	Intensity	Frequency	Duration	Progression
Aerobic	Walking, jogging, cycling, swimming, aquatic activities, rowing, dancing, interval training	40%–59% of $\dot{V}O_2R$ or HRR (moderate), RPE 11–12; or 60%–89% of $\dot{V}O_2R$ or HRR (vigorous), RPE 14–17	3–7 d·wk <sup>-1</sup> , with no more than 2 consecutive days between bouts of activity	Minimum of 150–300 min·wk <sup>-1</sup> of moderate activity or 75–150 min of vigorous activity, or an equivalent combination thereof	Rate of progression depends on baseline fitness, age, weight, health status, and individual goals; gradual progression of both intensity and volume is recommended
Resistance	Free weights, machines, elastic bands, or body weight as resistance; undertake 8–10 exercises involving the major muscle groups	Moderate at 50%–69% of 1RM, or vigorous at 70%–85% of 1RM	2–3 d·wk <sup>-1</sup> , but never on consecutive days	10–15 repetitions per set, 1–3 sets per type of specific exercise	As tolerated; increase resistance first, followed by a greater number of sets, and then increased training frequency
Flexibility	Static, dynamic, or PNF stretching; balance exercises; yoga and tai chi increase range of motion	Stretch to the point of tightness or slight discomfort	≥2–3 d·wk <sup>-1</sup> or more; usually done with when muscles and joints are warmed up	10–30 s per stretch (static or dynamic)group; 2–4 repetitions of each	As tolerated; may increase range of stretch as long as not painful
Balance	Balance exercises: lower body and core resistance exercises, yoga, and tai chi also improve balance	No set intensity	≥2–3 d·wk <sup>-1</sup> or more	No set duration	As tolerated; balance training should be done carefully to minimize the risk of falls

1RM, 1-repetition maximum; HRR, heart rate reserve; PNF, proprioceptive neuromotor facilitation; RPE, rating of perceived exertion;  $\dot{V}O_2R$ ,  $\dot{V}O_2$  reserve.



*That's all Folks!*

**Nope... far from it!**



**UHASSELT**

KNOWLEDGE IN ACTION

# Beweging: wat moet er EXACT voorgeschreven worden?

TABLE 2. Recommended types of exercise training for all adults with T2D.

Type of Training	Type	Intensity	Frequency	Duration	Progression
Aerobic	Walking, jogging, cycling, swimming, aquatic activities, rowing, dancing, interval training	40%–59% of $\dot{V}O_2R$ or HRR (moderate), RPE 11–12; or 60%–89% of $\dot{V}O_2R$ or HRR (vigorous), RPE 14–17	3–7 d·wk <sup>-1</sup> , with no more than 2 consecutive days between bouts of activity	Minimum of 150–300 min·wk <sup>-1</sup> of moderate activity or 75–150 min of vigorous activity, or an equivalent combination thereof	Rate of progression depends on baseline fitness, age, weight, health status, and individual goals; gradual progression of both intensity and volume is recommended
Resistance	Free weights, machines, elastic bands, or body weight as resistance; undertake 8–10 exercises involving the major muscle groups	Moderate at 50%–69% of 1RM or vigorous at 70%–85% of 1RM	2–3 d·wk <sup>-1</sup> , but never on consecutive days	10–15 repetitions per set, 1–3 sets per type of specific exercise	As tolerated; increase resistance first, followed by a greater number of sets, and then increased training frequency
Flexibility	Static, dynamic, or PNF stretching; balance exercises; yoga and tai chi increase range of motion	Stretch to the point of tightness or slight discomfort	≥2–3 d·wk <sup>-1</sup> or more; usually done with when muscles and joints are warmed up	10–30 s per stretch (static or dynamic)group; 2–4 repetitions of each	As tolerated; may increase range of stretch as long as not painful
Balance	Balance exercises: lower body and core resistance exercises, yoga, and tai chi also improve balance	No set intensity	≥2–3 d·wk <sup>-1</sup> or more	No set duration	As tolerated; balance training should be done carefully to minimize the risk of falls

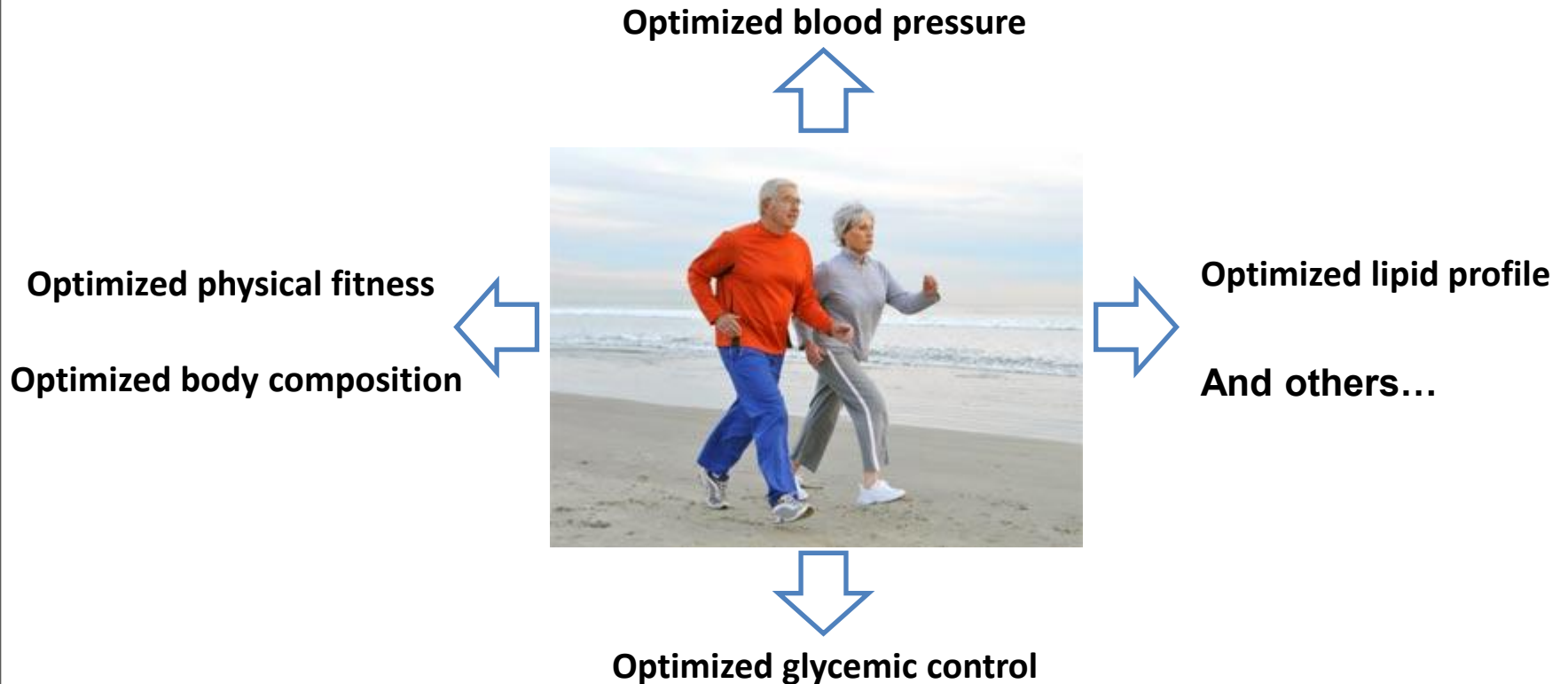
1RM, 1-repetition maximum; HRR, heart rate reserve; PNF, proprioceptive neuromotor facilitation; RPE, rating of perceived exertion;  $\dot{V}O_2R$ ,  $\dot{V}O_2$  reserve.

# Doel van beweging in diabetes?



**Optimized glycemic control**

# Doel van beweging in diabetes?



# Precisie beweging/inspanning in type 2 diabetes

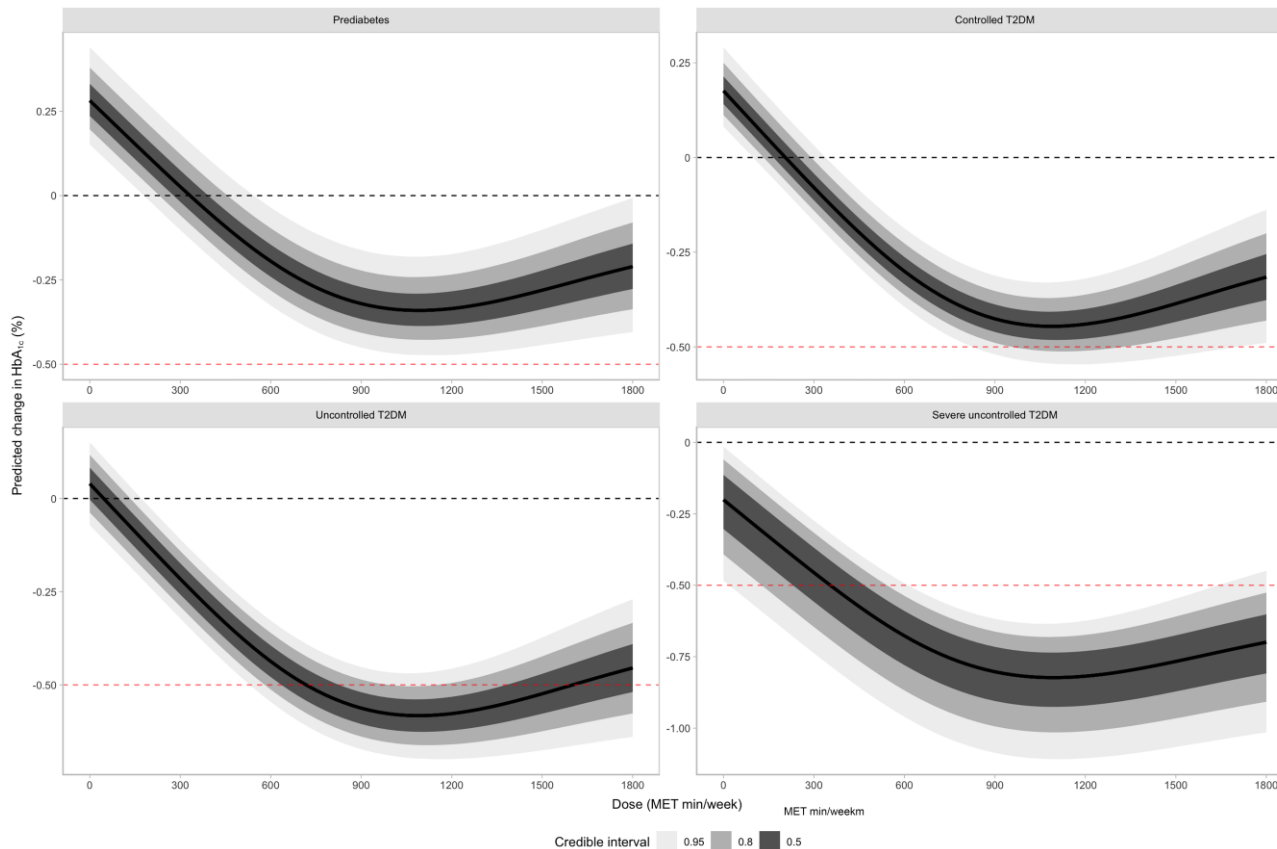
Huidige evidentie (2026)



**UHASSELT**

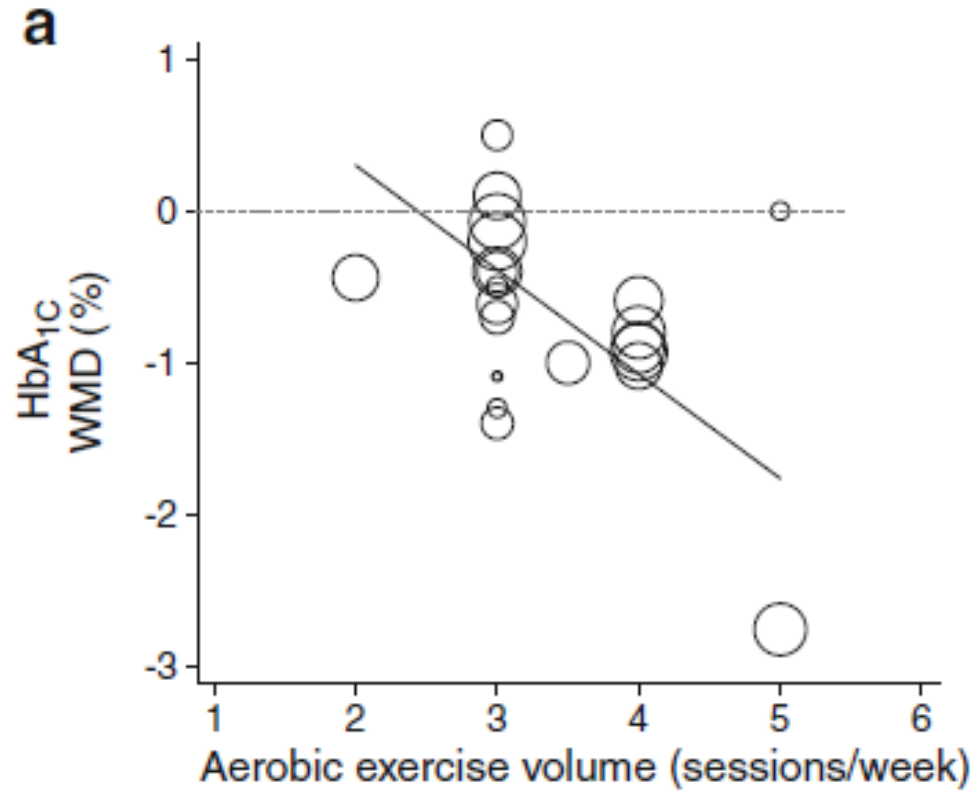
KNOWLEDGE IN ACTION

# Hoe suikercontrole verbeteren



1,100 MET min/week (i.e., the optimal dose) is equivalent on average to 244 min/week of moderate-intensity aerobic physical activity (ranging from 183 to 367 min/week, depending on the intensity of the activity, from 3 to 6 MET min)

# Hoe suikercontrole verbeteren



# Hoe suikercontrole verbeteren

## In Search of the Ideal Resistance Training Program to Improve Glycemic Control and its Indication for Patients with Type 2 Diabetes Mellitus: A Systematic Review and Meta-Analysis

Hajime Ishiguro<sup>1</sup> · Satoru Kodama<sup>2</sup> · Chika Horikawa<sup>3</sup> · Kazuya Fujihara<sup>4</sup> · Ayumi Sugawara Hirose<sup>5</sup> · Reiko Hirasawa<sup>1</sup> · Yoko Yachi<sup>6</sup> · Nobumasa Ohara<sup>1</sup> · Hitoshi Shimano<sup>4</sup> · Osamu Hanyu<sup>1</sup> · Hirohito Sone<sup>1</sup>

**Table 1** Analysis of the effect size (i.e., change in glycosylated hemoglobin in the resistance training group minus that in the control group) stratified by characteristics of the resistance training program

Characteristic	No. of data	Effect size (95 % CI) [%]	$I^2$	<i>P</i> value (heterogeneity)	<i>P</i> value (difference between strata)
<b>Intervention period</b>					
≥12 weeks	12	-0.33 (-0.60 to -0.06)	84.9	<0.001	
<12 weeks	11	-0.39 (-0.62 to -0.17)	46.5	0.04	0.72
<b>Frequency</b>					
≥3/week	17	-0.25 (-0.44 to -0.06)	77.8	<0.001	
<3/week	6	-0.66 (-0.88 to -0.44)	11.7	0.34	0.09
<b>No. of items</b>					
≥9 items	10	-0.54 (-0.90 to -0.19)	49.7	0.04	
<9 items	13	-0.25 (-0.47 to -0.04)	84.1	<0.001	0.24
<b>Intensity</b>					
≥75 % of 1 RM	10	-0.41 (-0.72 to -0.09)	86.8	<0.001	
<75 % of 1 RM	10	-0.30 (-0.51 to -0.09)	53.3	0.02	0.60
<b>Interval</b>					
≥1.5 min	8	-0.47 (-0.88 to -0.06)	91.3	<0.001	
<1.5 min	5	-0.38 (-0.97 to -0.21)	0.0	0.95	0.85
<b>Total sets per bout of exercise</b>					
≥21 sets	10	-0.65 (-0.97 to -0.32)	62.7	0.004	
<21 sets	13	-0.16 (-0.38 to 0.05)	79.8	<0.001	0.03
<b>Total sets per week</b>					
≥60 sets	14	-0.32 (-0.58 to -0.06)	80.9	<0.001	
<60 sets	9	-0.40 (-0.70 to -0.09)	72.6	<0.001	0.09

1 RM 1 repetition maximum, CI confidence interval



# Type 1 diabetes?

Zo anders...



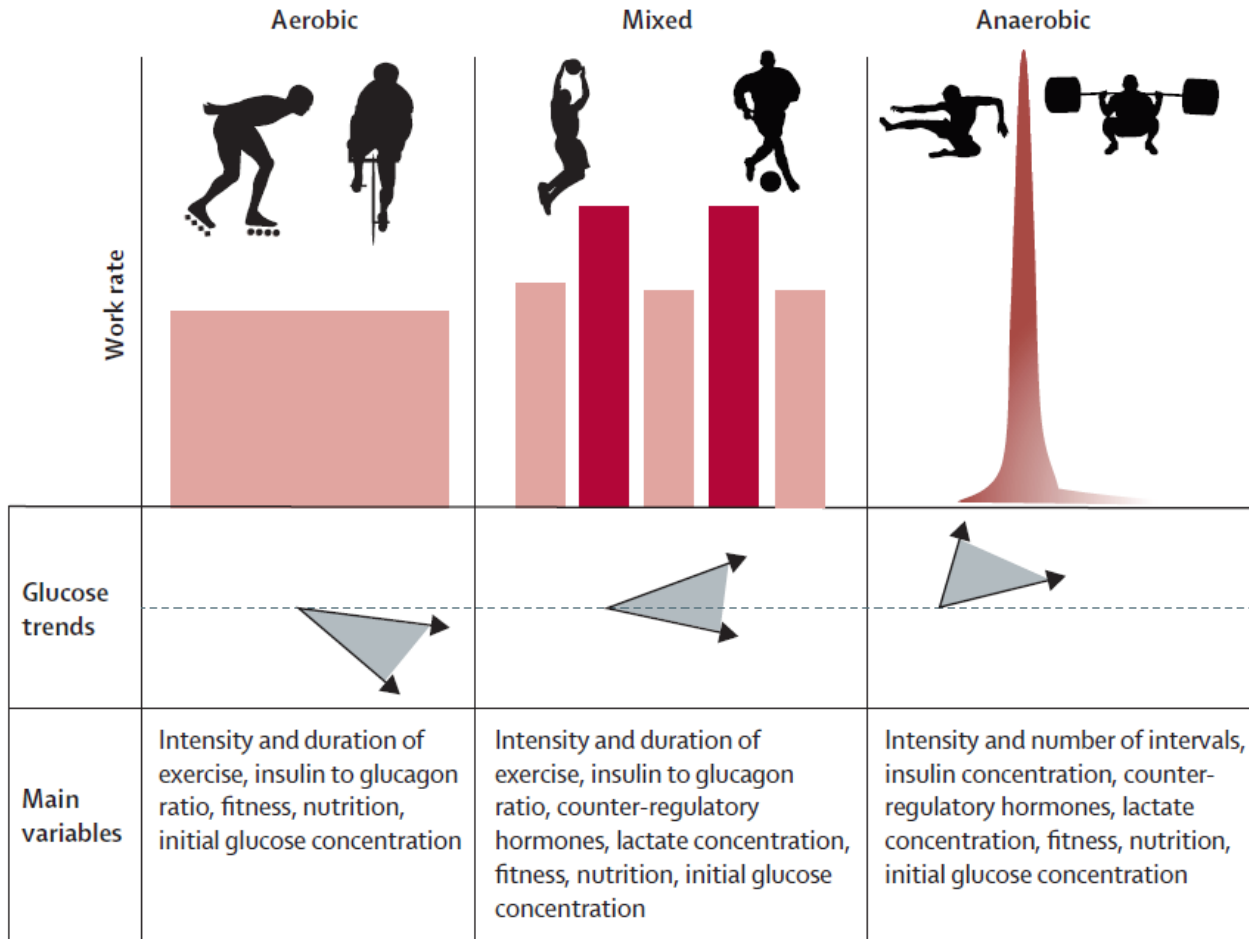
**UHASSELT**

KNOWLEDGE IN ACTION

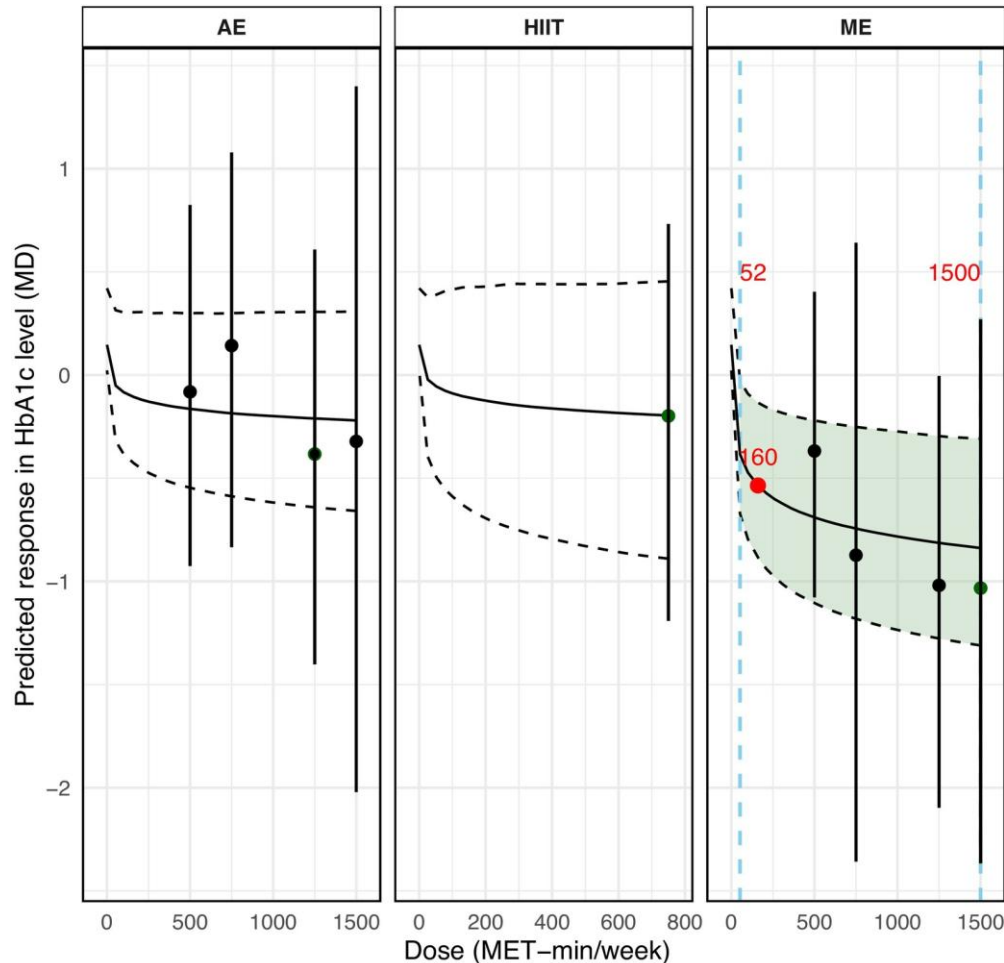
# Suikercontrole en sport in type 1 diabetes

## Exercise management in type 1 diabetes: a consensus statement

Michael C Riddell, Jan W Gallen, Carmel E Smart, Craig E Taplin, Peter Adolfsson, Alistair N Lumib, Aaron Kowalski, Remi Rabasa-Lhoret, Rory J McCrimmon, Carin Hume, Francesca Annon, Paul A Fournier, Claudia Graham, Bruce Bode, Pietro Galassetti, Timothy W Jones, Iñigo San Millán, Tim Heise, Anne L Peters, Andreas Petz, Lori M Laffel



# Beweging in type 1 diabetes: impact op HbA1c



For ME, a significant HbA1c reduction was observed starting at 52 MET-min/week, reaching the MCID ( $\geq 0.5\%$ ) at 160 MET-min/week, and peaking at 1500 MET-min/week.

-- 95% Credible Interval  
— Posterior Median



= minimally 40 min at 4 METs

Dose-response relationship between different exercise (MET-min/week) and HbA1c levels in patients with T1D. The blue vertical lines represent the minimum (52 MET-min/week) and maximum significant regions (1500 MET-min/week), with the middle green section indicating the significant area. The black vertical lines represent the predefined dose points (500, 750, 1250, 1500), and the red circles represent the dose points that reached the MCID (160 MET-min/week). AE: Aerobic exercise; HIIT: High-intensity interval training; ME: Multi-component exercise.

# Beweging in diabetes

Verder dan de suikercontrole...



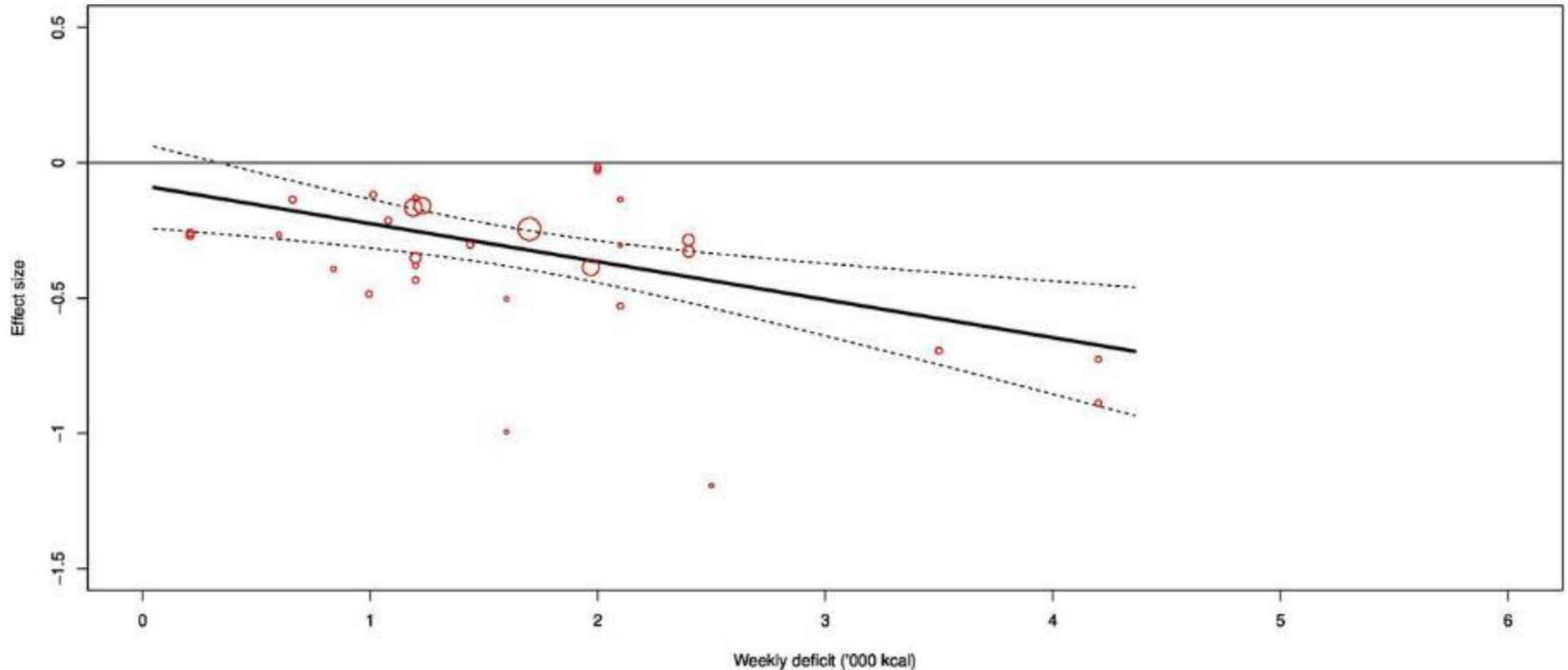
**UHASSELT**

KNOWLEDGE IN ACTION

## Quizvraag

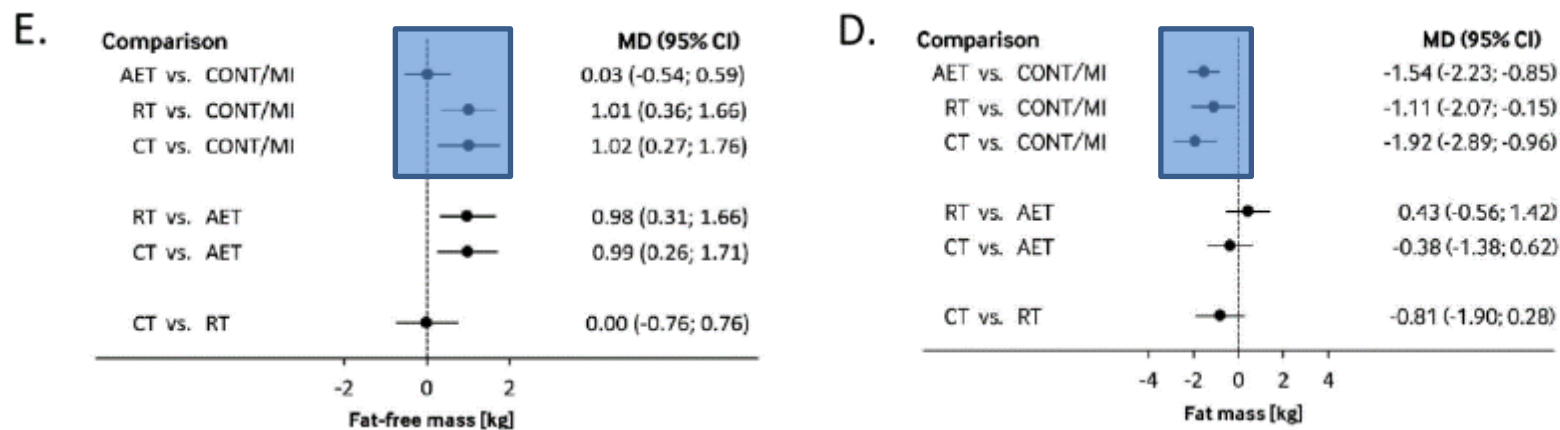
- Hoe zou jij sporten om af te vallen?
  - A: laag-intens sporten (zoals wandelen) (in de vetverbrandingszone)
  - B: nuchter sporten
  - C: zoveel mogelijk calorieën verbranden
  - D: vooral krachttraining doen

# Buikvetmassa: impact van beweegvolume



Exercise demonstrated a dose–response effect of  $-0.15$  ( $-0.23$  to  $-0.07$ );  $p < 0.001$ ) on visceral fat mass per 1000 calories deficit per week

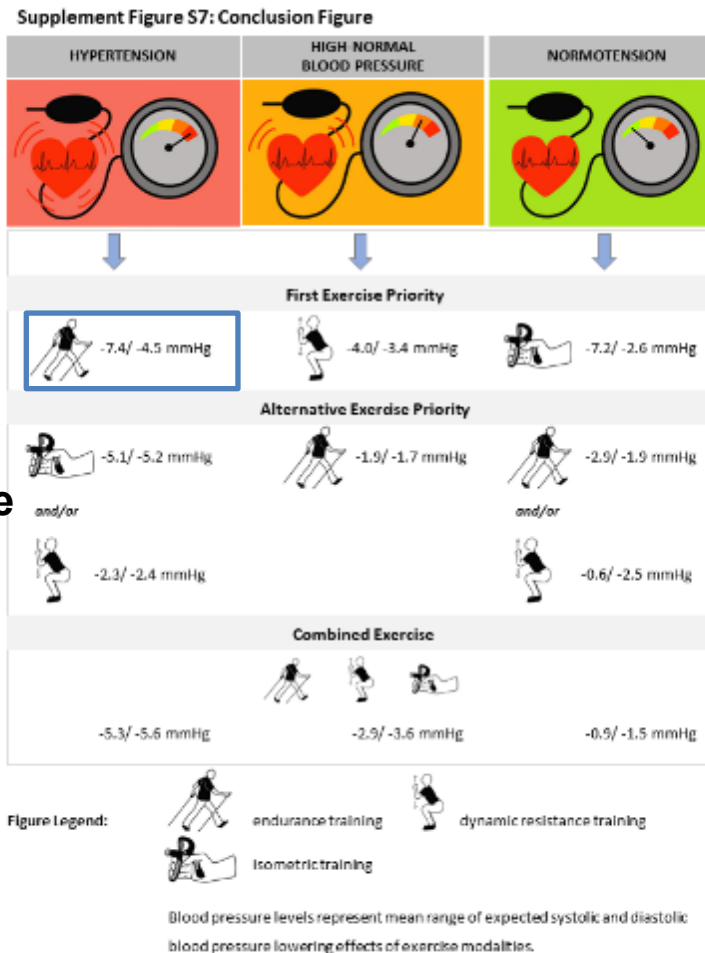
# Impact of different training modalities on anthropometric outcomes in patients with obesity: A systematic review and network meta-analysis



**FIGURE 3** Interval plot summarizing mean difference with 95% confidence interval for (A) body weight, (B) body mass index, (C) waist circumference, (D) fat mass, and (E) fat-free mass as estimated from the network meta-analysis for every possible pair of training modality. Negative values favor intervention on the left side. AET, aerobic exercise training; CONT, control; CT, combined training; MI, minimal intervention; RT, resistance training



# Beweging voor bloeddruk

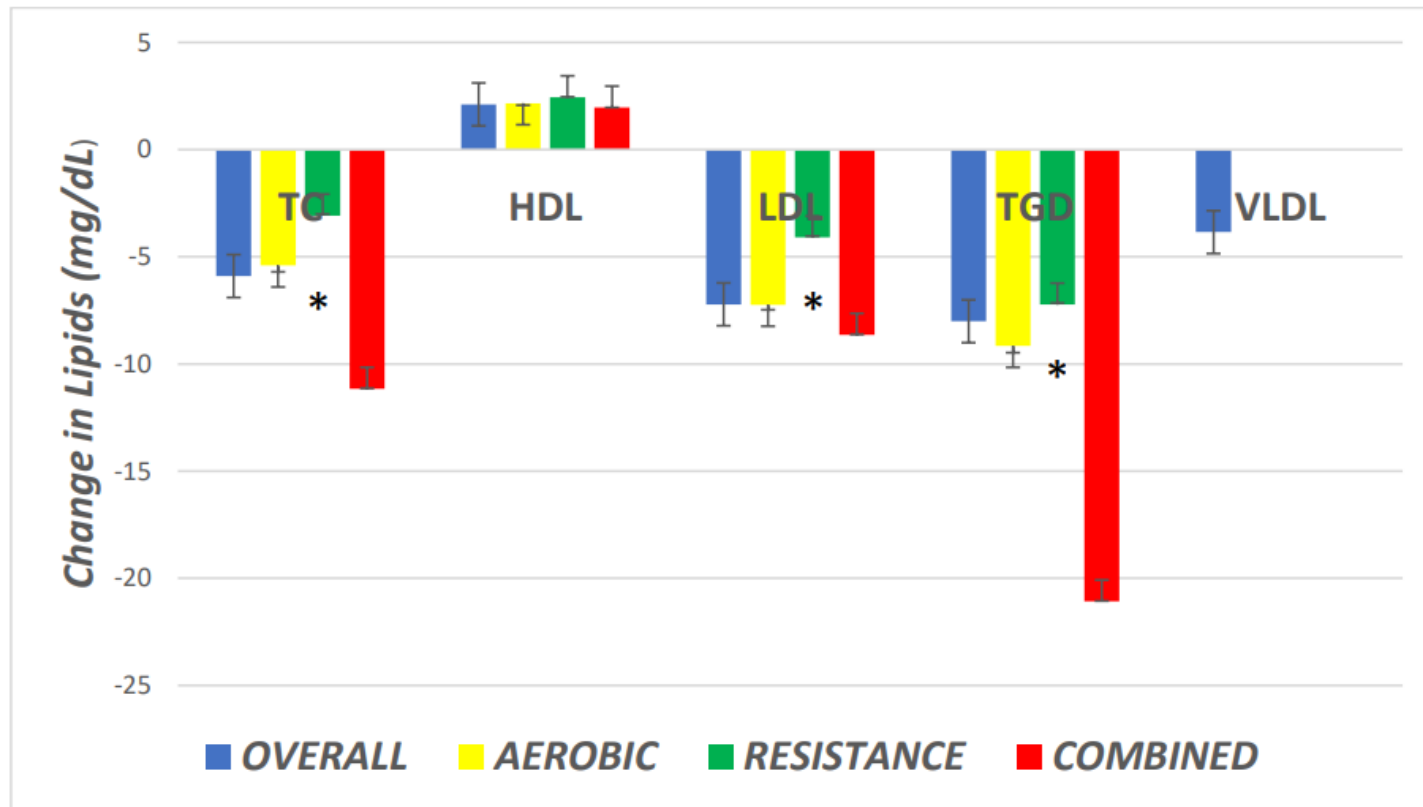


## Minimal standards

- moderate-intense
- >30 min/session

# Beweging voor cholesterol

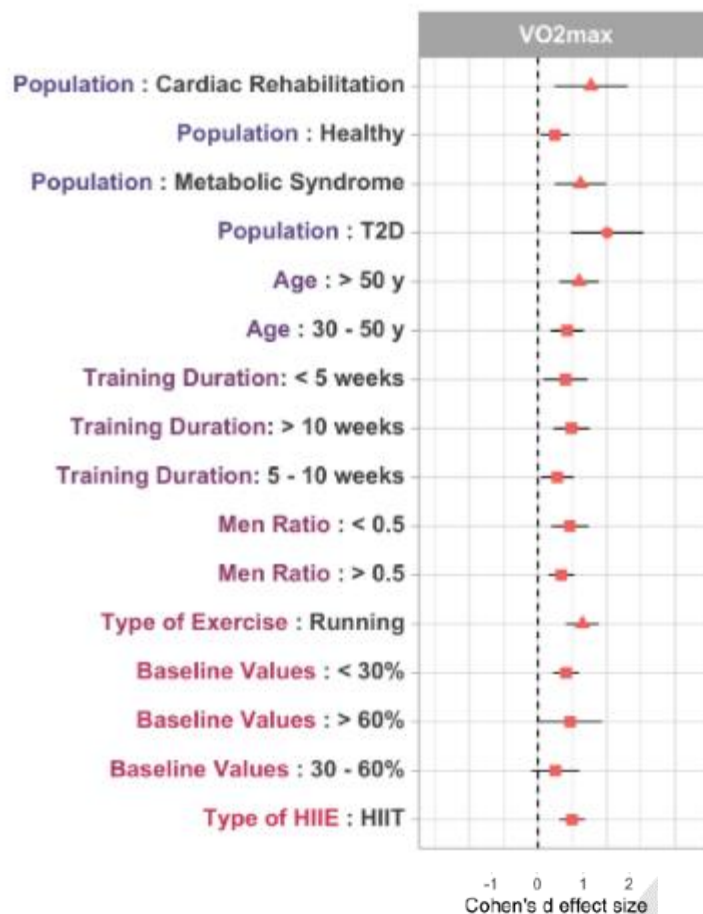
148 relevant RCTs, with 227 intervention groups, n=5,273 in exercise,  
n=3,400 sedentary controls



# Beweging voor uithoudingsvermogen (VO2max)

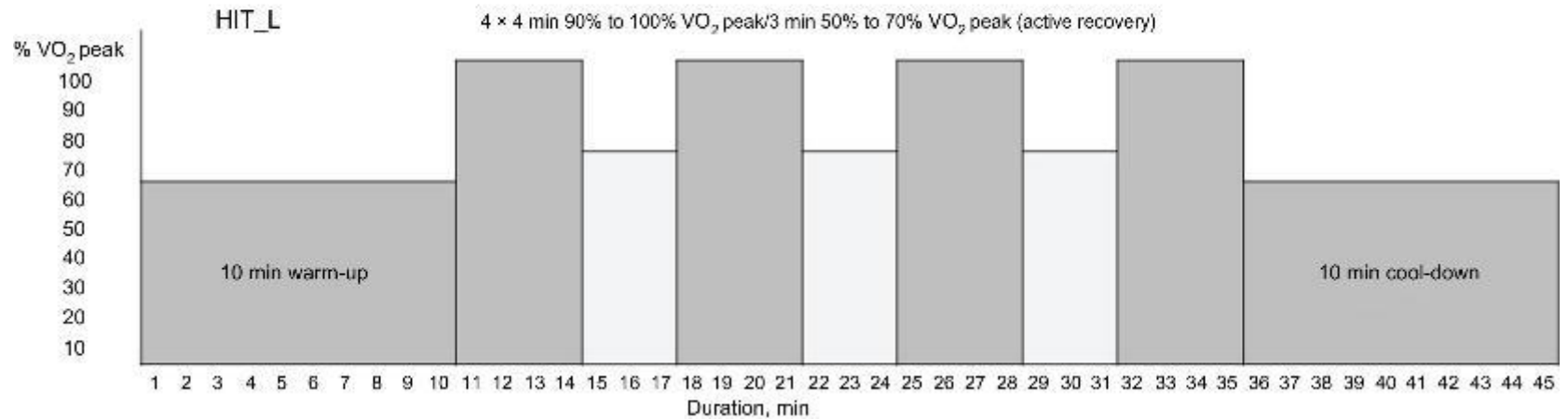
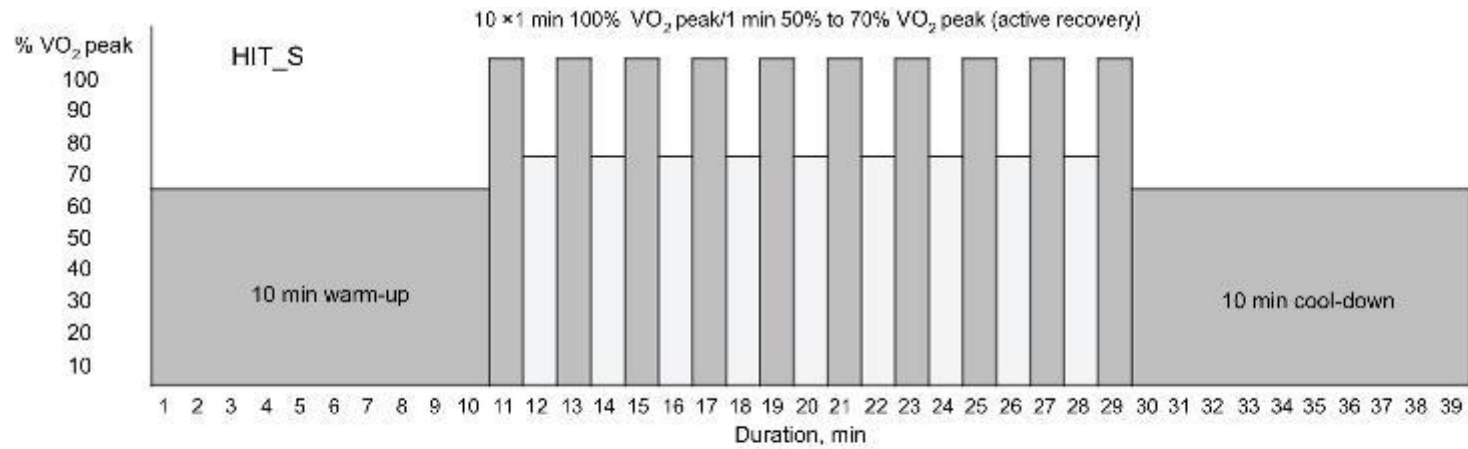
## Hoog-intensieve intervaltraining (HIIT)

Meta-Analysis	Number of Studies	Favours MICT	Favours HIIE	d	95% CI	p-value	Effect Size	Egger p-value
VO2max Heterogeneity: $I^2 = 47%$ , $\tau^2 = 0.1456$ , $p < 0.01$	48			0.40	[0.24; 0.57]	<0.001	small	> 0.05



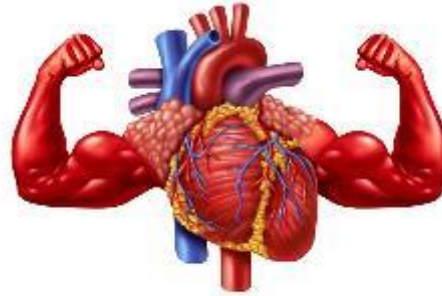
# Beweging voor uithoudingsvermogen (VO<sub>2</sub>max)

## Hoog-intensieve intervaltraining (HIIT)



# Beweging voor uithoudingsvermogen (VO<sub>2</sub>max)

Krachttraining erbij



In CAD

23 studies (N=916)

Combined training is more effective in increasing CRF (SMD 0.26, 95% CI 0.02 to 0.49,  $p=0.03$ ) compared with aerobic training alone.

Terada T, Pap R, Thomas A, Wei R, Noda T, Visintini S, Reed JL. Effects of muscle strength training combined with aerobic training versus aerobic training alone on cardiovascular disease risk indicators in patients with coronary artery disease: a systematic review and meta-analysis of randomised clinical trials. *Br J Sports Med.* 2024 Aug 30;bjssports-2024-108530. doi: 10.1136/bjssports-2024-108530. Epub ahead of print.

In CHF

82 studies (N=4574)

VO<sub>2</sub>peak increases by a greater magnitude when applying combined AET + HiRET (by +3.49 ml/kg/min) vs. AET only (by + 2.19 ml/kg/min) or combined AET + MiRET (by + 2.77 ml/kg/min)

Li Y, He W, Jiang J, Zhang J, Ding M, Li G, Luo X, Ma Z, Li J, Ma Y, Shen Y, Han X. Non-Pharmacological Interventions in Patients With Heart Failure With Reduced Ejection Fraction: A Systematic Review and Network Meta-analysis. *Arch Phys Med Rehabil.* 2024 May;105(5):963-974.

# Sport en beweging in diabetes

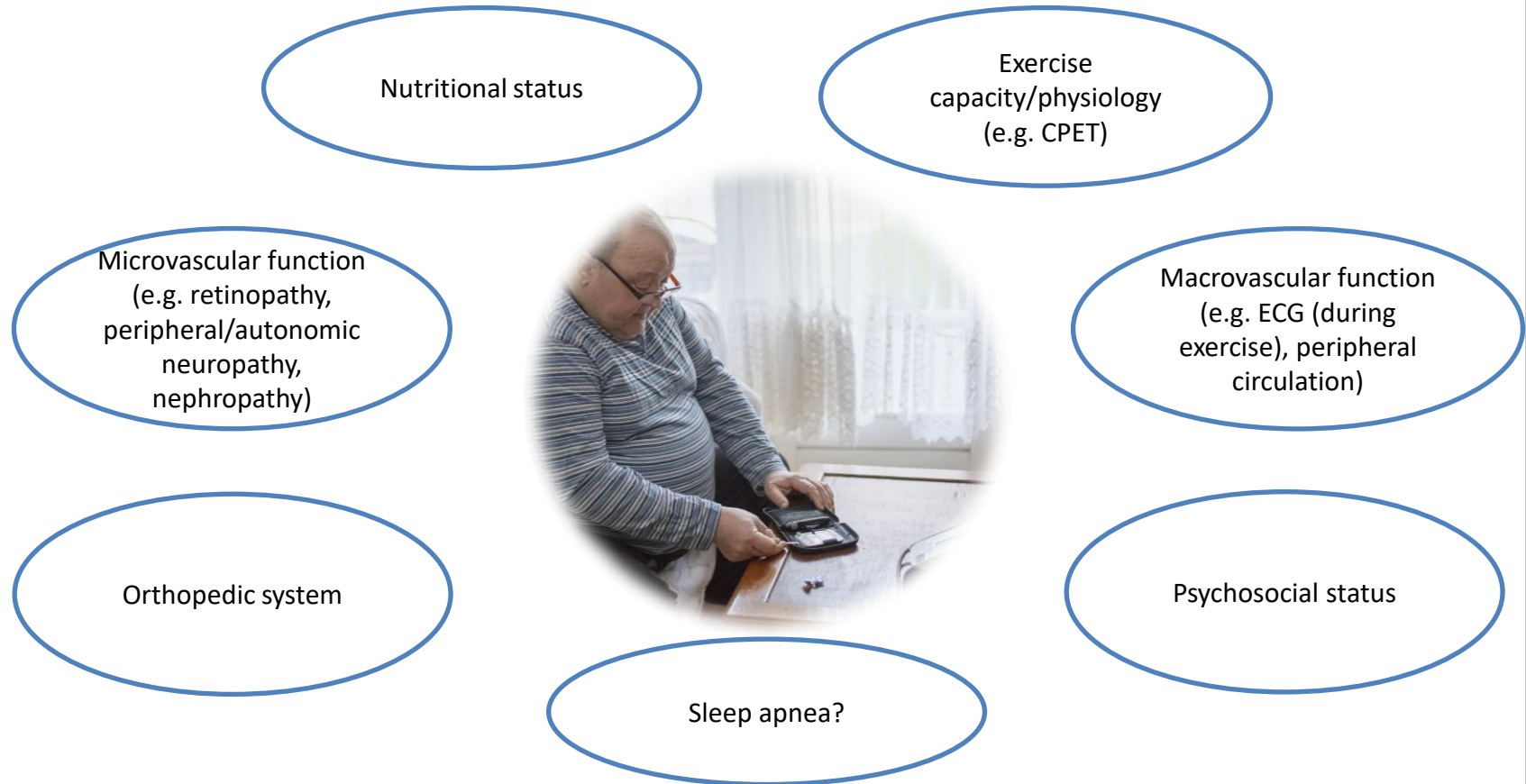
Hoe het veilig te houden



**UHASSELT**

KNOWLEDGE IN ACTION

# Een goede intake screening is belangrijk...



# Van screening tot veiligheidsmaatregelen

Health Complication	Precaution
Autonomic neuropathy	<ul style="list-style-type: none"><li>• Be aware of an increased likelihood of hypoglycemia, abnormal blood pressure responses, and impaired thermoregulation, as well as elevated resting and blunted maximal heart rate.</li><li>• Use of ratings of perceived exertion (RPE) is suggested to monitor exercise intensity.</li></ul>
Peripheral neuropathy	<ul style="list-style-type: none"><li>• Take steps to prevent dehydration and hyperthermia or hypothermia.</li><li>• Limit exercise participation that may cause foot trauma, such as prolonged hiking, jogging, or walking on uneven surfaces.</li><li>• Non-weight-bearing exercises (e.g., cycling, chair exercises, swimming) may be more appropriate, but avoid aquatic exercise with unhealed plantar surface ulcers.</li><li>• Check feet daily for signs of trauma and redness.</li><li>• Choose shoes and socks carefully for proper fit and wear socks that keep feet dry.</li><li>• Avoid activities requiring excessive balance ability.</li></ul>
Diabetic retinopathy	<ul style="list-style-type: none"><li>• With unstable proliferative and severe retinopathy, avoid vigorous, high-intensity activities that involve breath holding (e.g., weight lifting and isometrics) or overhead lifting.</li><li>• Avoid activities that lower the head (e.g., yoga, gymnastics) or that jar the head.</li><li>• In the absence of a stress test measured maximal heart rate, use RPE to monitor exercise intensity (10 to 12 on a 6–20 scale).</li><li>• Exercise is contraindicated for anyone with unstable or untreated proliferative retinopathy, recent panretinal photocoagulation, or other recent surgical eye treatment.</li></ul>
Diabetic kidney disease	<ul style="list-style-type: none"><li>• Consult an ophthalmologist for specific restrictions and limitations.</li><li>• Avoid exercise that causes excessive increases in blood pressure (e.g., weight lifting, high-intensity aerobic exercise) and refrain from breath holding during activities.</li><li>• High blood pressure is common, and lower-intensity exercise may be necessary to manage blood pressure responses and fatigue.</li><li>• Light to moderate exercise is possible during dialysis treatments if electrolytes are managed.</li></ul>
Hypertension	<ul style="list-style-type: none"><li>• Avoid heavy weight lifting or breath holding.</li><li>• Perform dynamic exercises using large muscle groups, such as walking and cycling at a low to moderate intensity.</li><li>• Follow blood pressure guidelines for activity levels.</li><li>• In the absence of a measured maximal heart rate, use of RPE is recommended (10 to 12 on a 6–20 scale).</li></ul>

# Veilig sporten in diabetes...algemene suggesties

- risicofactoren voor hypoglycemie bij inspanning:
  - Meglitinides, sulfonylureas, exogeen insuline
    - (verhoog) inname van koolhydraten en/of overweeg reductie medicatiedosis (vb. laatste pre-inspanning insuline bolus)
  - Beta-blockers: minder goed voelen aankomen van hypo
  - Groter volume van uithoudingsinspanning
- Meet de start glycemie
  - Start niet te laag als je T1DM hebt én een hoog volume van uithoudingsinspanning ambieert (<125 mg/dl)
  - bij bloed glucose >250 mg/dL (13.9 mmol/L) = voorzichtig zijn (voor ketose)



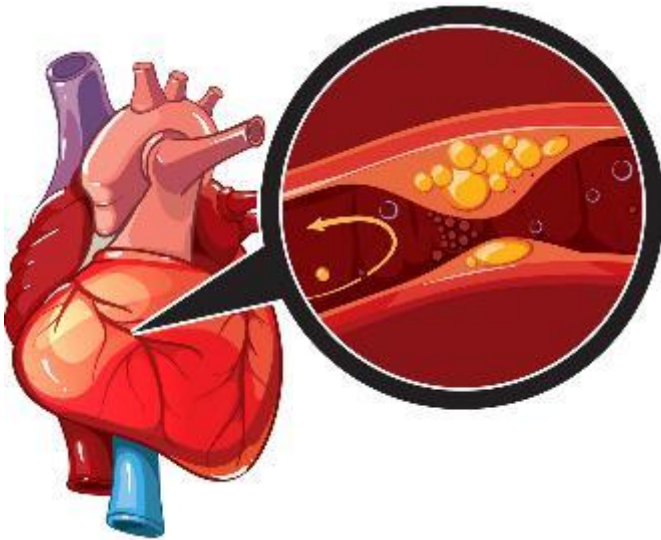
# Huidig onderzoek in diabetes aan REVAL



**UHASSELT**

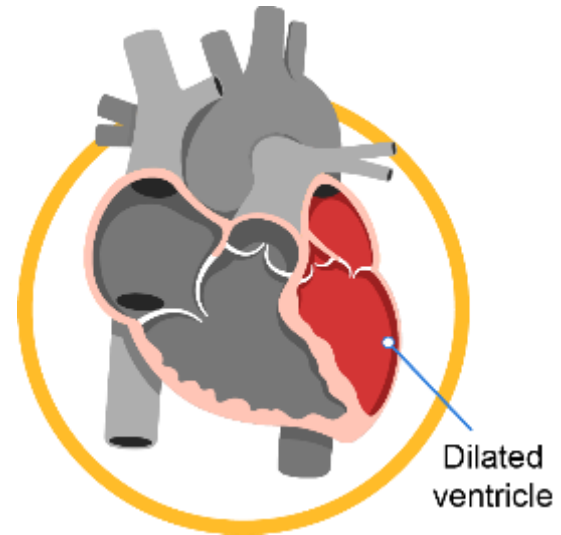
KNOWLEDGE IN ACTION

# Diabetes en risico op hartziekten



## Kransslagaderziekte

T2DM en T1DM verhogen de kans op deze ziekte minstens met 2-voud.  
Diabetes patiënten hebben een slechtere prognose bij hartinfarct.



## Chronisch hartfalen

DM verhoogt het risico op chronisch hartfalen met factor 2 in mannen en factor 5 in vrouwen.  
HFpEF is hoog prevalent.

# PROTECTION project

## SUBJECTS

## INTERVENTIONS

WP 1



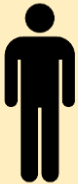
- No exercise intervention (controls), n=15
- Low-volume, moderate-intense, exercise intervention, n=15
- High-volume, moderate-intense, exercise intervention, n=15
- Low-volume, high-intense, exercise intervention, n=15

WP 2

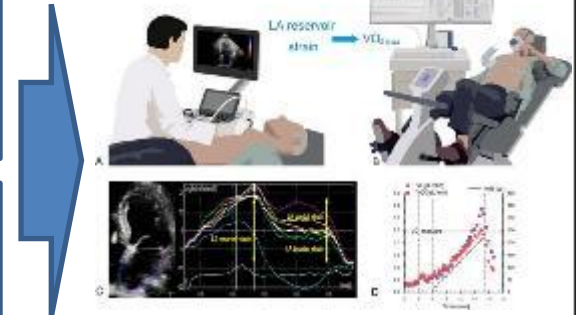


- No exercise intervention (controls), n=25
- Low-volume, moderate-intense exercise intervention, n=25
- High-volume, moderate-intense exercise intervention, n=25
- Low-volume, high-intense exercise intervention, n=25

WP 3



- High-volume, moderate-intense exercise intervention, n=107
- Relation of phenotype, habitual physical activity and diet towards magnitude of responsiveness



# PROTECTION project

## ■ WP 1

### ■ Fysieke training beschermt het hart effectief tegen diabetes-geïnduceerde veranderingen

#### ■ De INTENSITEIT van inspanning speelt weinig of geen rol

- D'Haese S, Verboven M, Evens L, Deluyker D, Lambrichts I, Eijnde BO, Hansen D, Bito V. Moderate- and High-Intensity Endurance Training Alleviate Diabetes-Induced Cardiac Dysfunction in Rats. *Nutrients*. 2023 Sep 12;15(18):3950.
- D'Haese S, Claes L, de Laat I, Van Campenhout S, Deluyker D, Heeren E, Haesen S, Lambrichts I, Wouters K, Schalkwijk CG, Hansen D, Eijnde BO, Bito V. Moderate-Intensity and High-Intensity Interval Exercise Training Offer Equal Cardioprotection, with Different Mechanisms, during the Development of Type 2 Diabetes in Rats. *Nutrients*. 2024 Jan 31;16(3):431.

#### ■ Het VOLUME van inspanning heeft een belangrijke rol

- Simons R, Bonilauri I, Vastmans L, Steegen L, Heeren E, Vandenboer V, Verghote E, D'Haese S, Claessen G, Lambrichts I, Martín-Fernández B, Volders PJ, Hansen D, Deluyker D, Bito V. Exercise Volume Modulates Cardiac Protection in a Type 2 Diabetic Rat Model: Differential Effects of High- and Low-Volume Moderate-Intensity Endurance Exercise Training on Diabetic Cardiomyopathy. *Cardiovasc Diabetol Endocrinol Rep* 2026; in press.

# PROTECTION project

- WP 2 & 3
  - Volledig afgerond
  - Data worden geanalyseerd (en bevindingen gepubliceerd)

# Diabetes en risico op dementie & cognitieve stoornissen



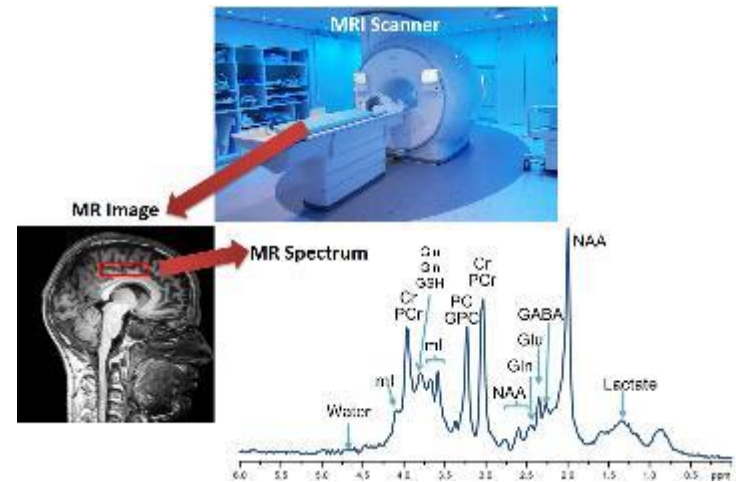
In 11.656 patients:

Earlier age of onset of diabetes had the strongest association with dementia:  
HR 2.92 for onset before 60 years;  
HR 1.73 for onset at 60-69 years;  
HR 1.23 for onset at 70-79 years.

# SAINT project



## Magnetic Resonance Spectroscopy



# SPORTEN TEGEN DEMENTIE BIJ DIABETES

Deelnemers gezocht!

**Wat?** Een studie over het effect van 6 maanden sporten op de hersenen bij type 2 diabetes

## Voor wie?

- ✓ Type 2 diabetes patiënten
- ✓ Geen insuliner therapie
- ✓ 30-75 jaar
- ✓ Inactief
- ✓ Geen claustrofobie

## Wat krijgt u?

- ✓ Gepersonaliseerde, begeleide trainingen
- ✓ Gedetailleerde Info over uw gezondheid

## Wat houdt het in?

- ✓ Hersenscan (MRI) + Cognitieve testen
- ✓ 6 maanden fietstraining (UHasselt)
- ✓ Maximale inspanningstest, bloedtest, meting lichaamssamenstelling

Bij interesse, of voor meer info, mail naar:

[diabetes.onderzoek@uhasselt.be](mailto:diabetes.onderzoek@uhasselt.be)



▶▶ UHASSELT

# SPORTEN VOOR HERSENGEZONDHEID?

**Deelnemers gezocht**

**Intake gesprek**  
(UHasselt, 1u)



**Hersenscan (MRI)**  
(UZ Leuven, 2u)



**Inspanningstest**  
(Virga Jessa, 1u)

## Voor wie?

- ✓ Inactief (geen sport, < 1u sport/week)
- ✓ Vrouwen 40-46 jaar
- ✓ Mannen 52-77 jaar
- ✓ Geen claustrofobie
- ✓ Gezond

## Wat krijgt u?

- ✓ Gedetailleerde info over uw gezondheid
- ✓ Gratis inspanningstest

**Bij interesse, of voor meer info, mail naar:**

**[neuro.onderzoek@uhasselt.be](mailto:neuro.onderzoek@uhasselt.be)**



**THANK  
YOU  
FOR  
YOUR  
ATTENTION**

Dominique.hansen@uhasselt.be