Veel zitten

Wat zijn de effecten en wat kunnen we eraan doen?

Dominique Hansen, PhD, FESC

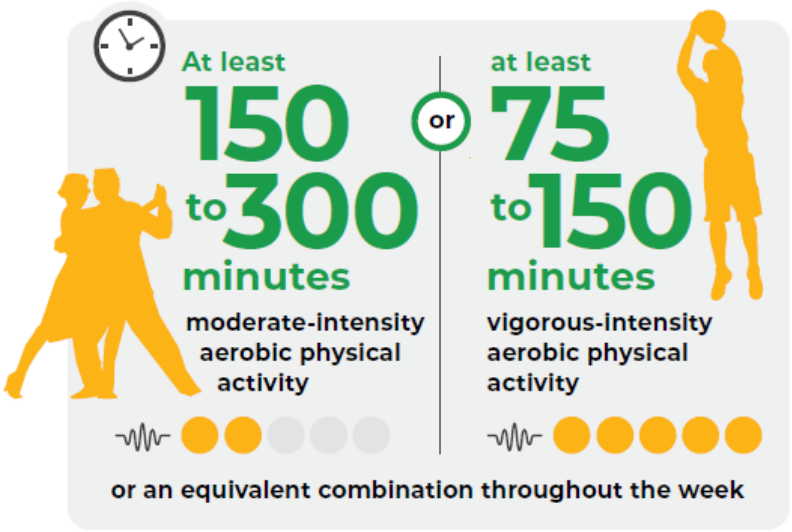
UHASSELT

KNOWLEDGE IN ACTION

Wat raadt de WHO aan?

› Adults should do at least 150–300 minutes of moderate-intensity aerobic physical activity; or at least 75–150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week, for substantial health benefits.

Strong recommendation, moderate certainty evidence



Fysieke activiteit is: recreatie en ontspanning (gestructureerd bewegen, sport en spel), actieve verplaatsing, huishoudelijke taken en werk

UHASSELT
KNOWLEDGE IN ACTION

Wat raadt de WHO aan?

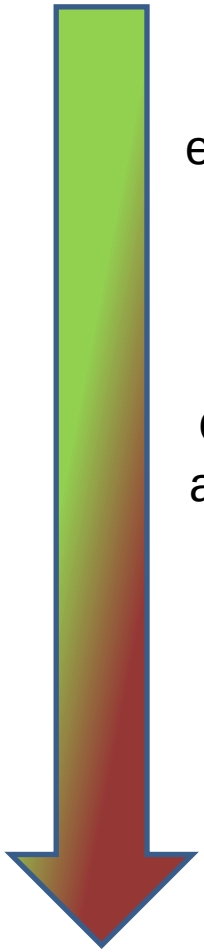
World Health Organization

› Adults should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these provide additional health benefits.

Strong recommendation, moderate certainty evidence

UHASSELT
KNOWLEDGE IN ACTION

Wat raadt de WHO aan?



Low-intensity physical activity is between 1.5 and 3 METs, i.e. activities with energy cost less than 3 times the energy expenditure at rest for that person. This can include slow walking, bathing, or other incidental activities that do not result in the person sweating or becoming short of breath.

On an absolute scale, **moderate-intensity** refers to the physical activity that is performed at 3.0–5.9 times the intensity of rest. On a scale relative to an individual's personal capacity, moderate-intensity physical activity is usually a 5 or 6 on a scale of 0–10.

On an absolute scale, **vigorous intensity** refers to physical activity that is performed at 6.0 or more METS. On a scale relative to an individual's personal capacity, vigorous-intensity physical activity is usually a 7 or 8 on a scale of 0–10.

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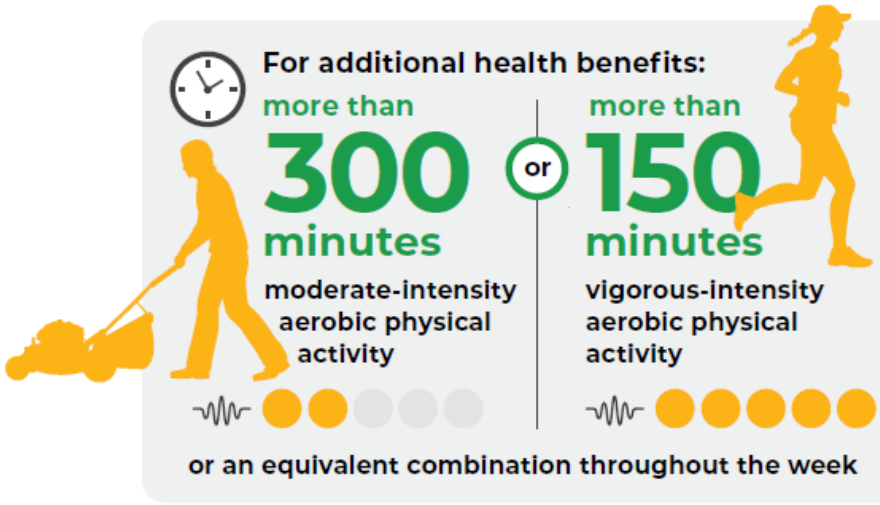
KNOWLEDGE IN ACTION

Wat raadt de WHO aan?

World Health Organization



› Adults may increase moderate-intensity aerobic physical activity to more than 300 minutes; or do more than 150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week for additional health benefits.

Conditional recommendation, moderate certainty evidence

UHASSELT
KNOWLEDGE IN ACTION

Wat raadt de WHO aan?

World Health Organization

It is recommended that:

- **Adults should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.**

  Strong recommendation, moderate certainty evidence

- **To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults should aim to do more than the recommended levels of moderate- to vigorous-intensity physical activity.**

  Strong recommendation, moderate certainty evidence

UHASSELT
KNOWLEDGE IN ACTION

Wat denken jullie?

- In een persoon vanaf 65 jaar…
  - Is wat minder fysieke activiteit al voldoende
  - Dient dezelfde bewegingsrichtlijnen gevolgd te worden
  - Is meer fysieke activiteit nodig

Wat raadt de WHO aan?

World Health Organization

› As part of their weekly physical activity, older adults should do varied multicomponent physical activity that emphasizes functional balance and strength training at moderate or greater intensity, on 3 or more days a week, to enhance functional capacity and to prevent falls.

Strong recommendation, moderate certainty evidence

UHASSELT
KNOWLEDGE IN ACTION

- In een persoon vanaf 65 jaar…
  - Is wat minder fysieke activiteit al voldoende
  - Dient dezelfde bewegingsrichtlijnen gevolgd te worden
  - **Is meer fysieke activiteit nodig**

UHASSELT
KNOWLEDGE IN ACTION

Hoe (in)actief zijn we?

UHASSELT

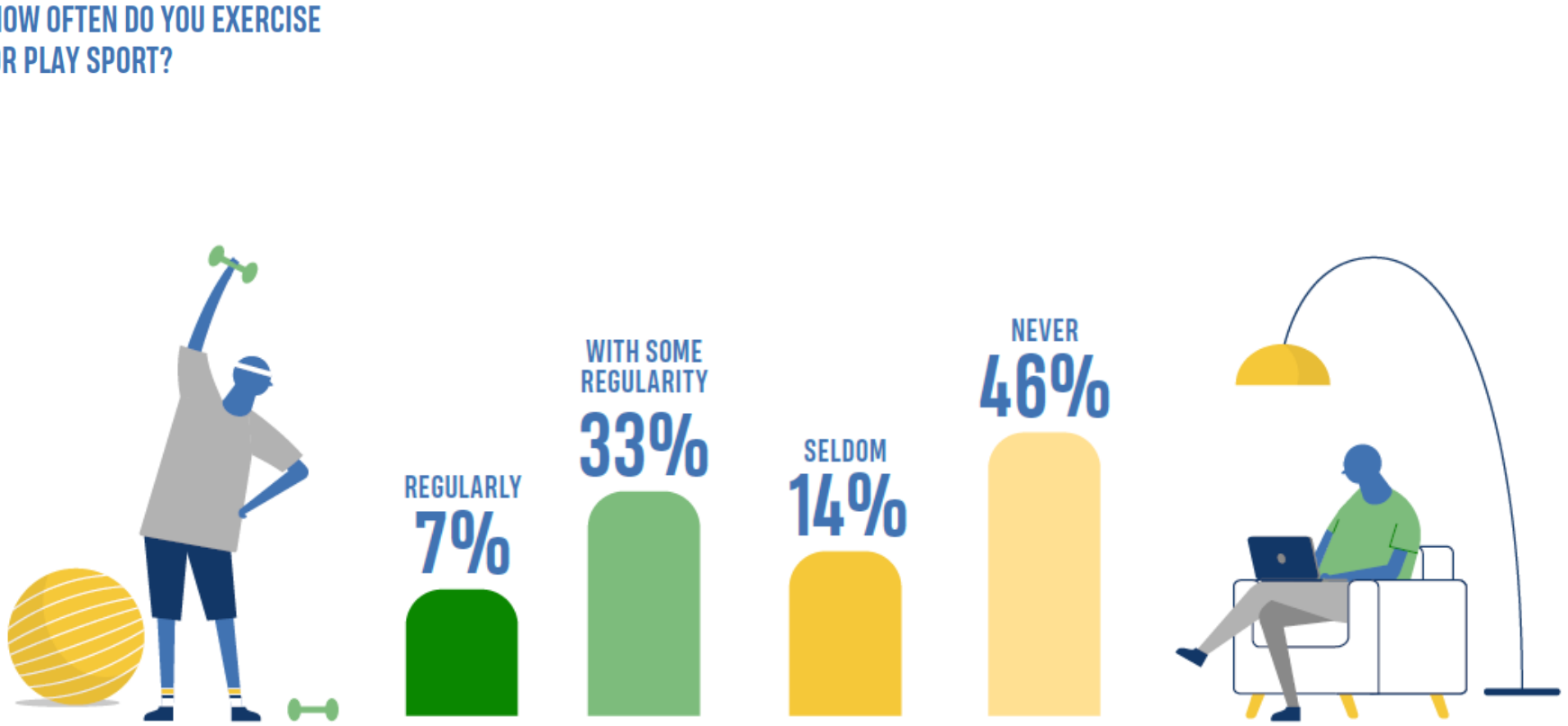
KNOWLEDGE IN ACTION

Wat denken jullie?

- Hoeveel % van de Europese bevolking beweegt voldoende?
  - 50%
  - 25%
  - <10%

UHASSELT
KNOWLEDGE IN ACTION

Hoe (in)actief zijn we?



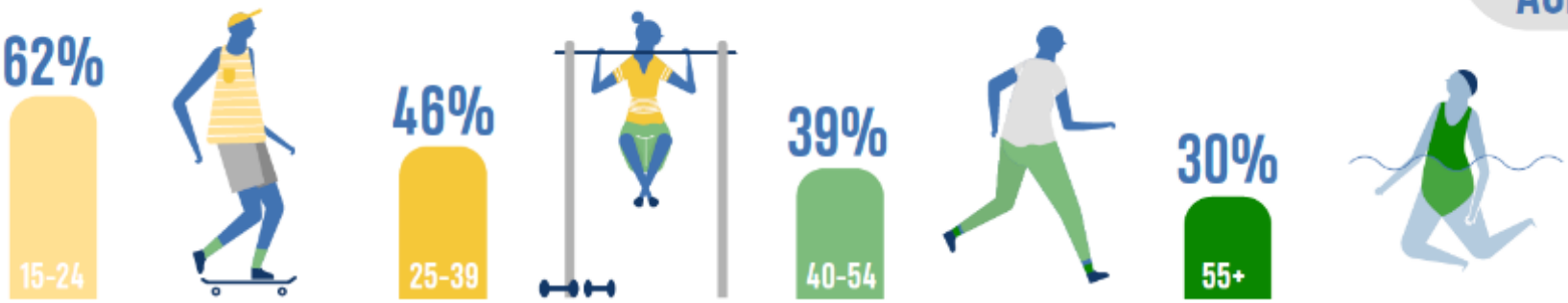
- Hoeveel % van de Europese bevolking beweegt voldoende?
  - 50%
  - 25%
  - **<10%**

UHASSELT
KNOWLEDGE IN ACTION

Hoe (in)actief zijn we?

RESULTS FOR
"AT LEAST ONCE A WEEK"

AGE



UHASSELT
KNOWLEDGE IN ACTION

Wat denken jullie?

- Wie zit er het meest?
  - Groep 15-24 jaar
  - Groep 25-39 jaar
  - Groep >55 jaar

UHASSELT
KNOWLEDGE IN ACTION

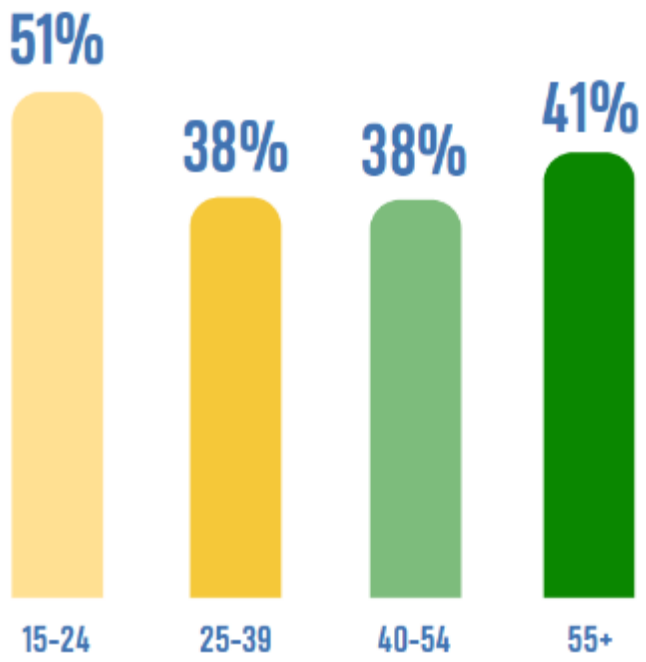
Hoe (in)actief zijn we?

41% OF EUROPEANS SAY THEY SPEND 5.5 HOURS OR MORE SITTING DOWN EACH DAY

HOW MANY HOURS DO YOU SPEND SITTING DOWN EACH DAY?

HALF OF YOUNG PEOPLE (15-24) SAY THEY SPEND 5.5 HOURS OR MORE SITTING DOWN EACH DAY

RESULTS FOR "5.5 HOURS OR MORE"



UHASSELT
KNOWLEDGE IN ACTION

- Wie zit er het meest?
  - **Groep 15-24 jaar**
  - Groep 25-39 jaar
  - Groep >55 jaar

Waarom is dit zo belangrijk?

UHASSELT

KNOWLEDGE IN ACTION

Hoe meer je beweegt…

Minimum amount of physical activity for reduced mortality and extended life expectancy: a prospective cohort study

Chi Pang Wen*, Jackson Pui Man Wai*, Min Kuang Tsai, Yi Chen Yang, Ting Yuan David Cheng, Meng-Chih Lee, Hui Ting Chan, Chwen Keng Tsao, Shan Pou Tsai, Xifeng Wu

416 175 individuals — average follow-up of 8·05 years

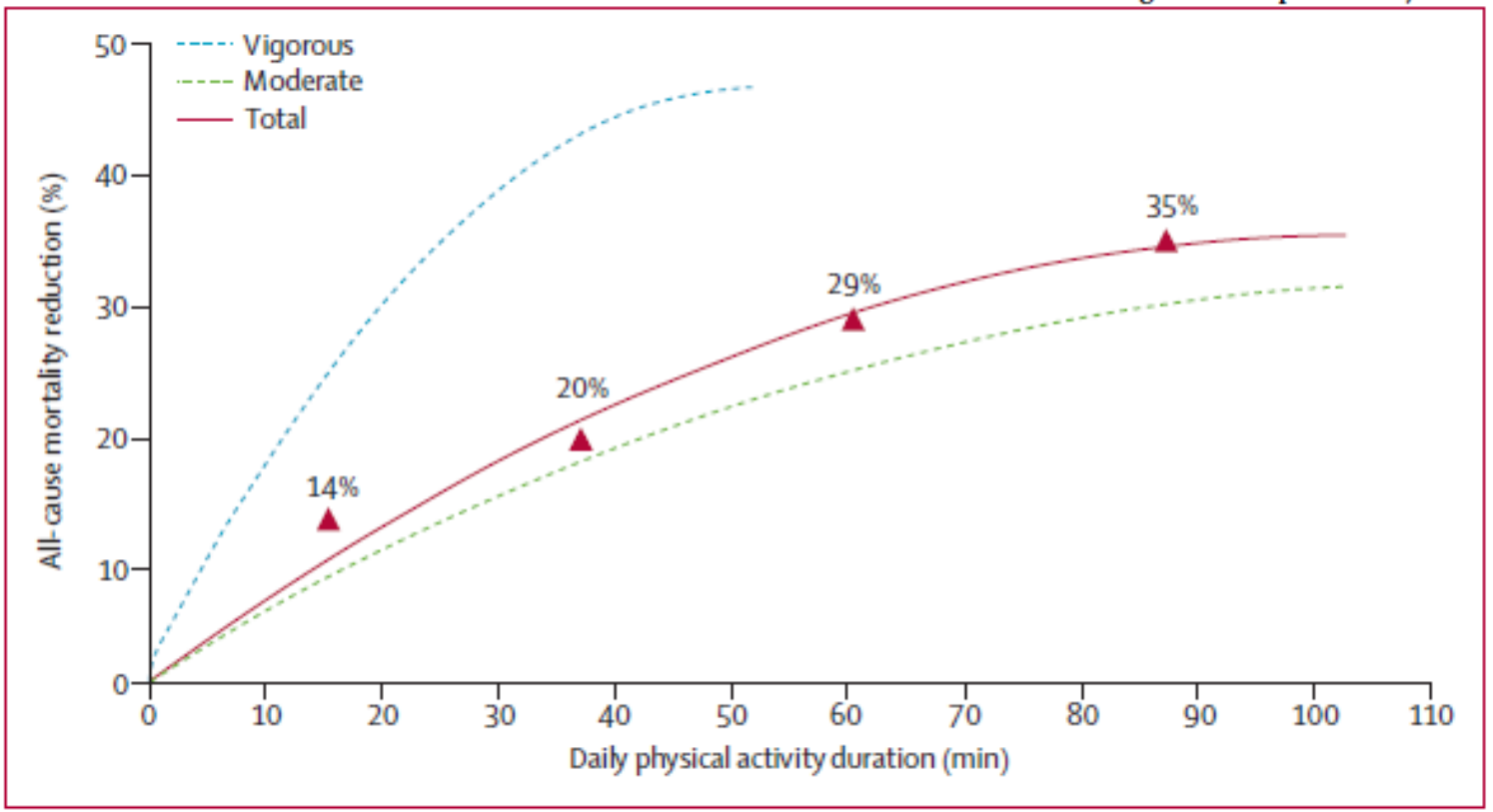


Figure 2: **Daily physical activity duration and all-cause mortality reduction**

Lancet 2011; 378: 1244-53

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KNOWLEDGE IN ACTION

Hoe meer je beweegt…

Voldoende bewegen =

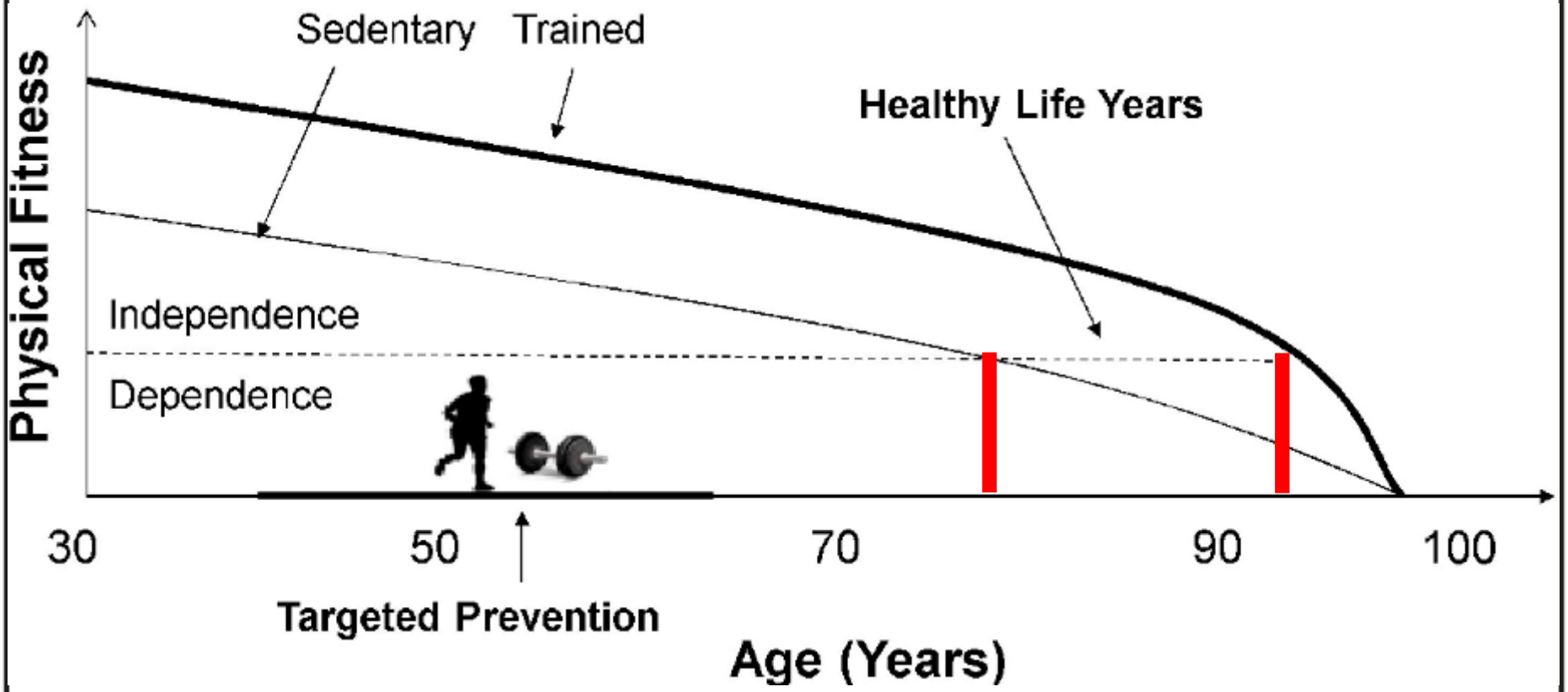
Dementie: -30%
Heupfracturen: -68%
Hart- en vaatziekten: -35%
Type 2 diabetes: -40%
Darmkanker: -30%
Borstkanker: -20%
Depressie: -30%

10 jaar langer leven in heren
5 jaar langer leven in dames

Zaccardi F, et al. Comparative Relevance of Physical Fitness and Adiposity on Life Expectancy: A UK Biobank Observational Study. Mayo Clin Proc. 2019;94:985-994

UHASSELT
KNOWLEDGE IN ACTION

Hoe meer je beweegt…



Strasser, B. et al. Frontiers in bioscience 2018: 23; 1505-16

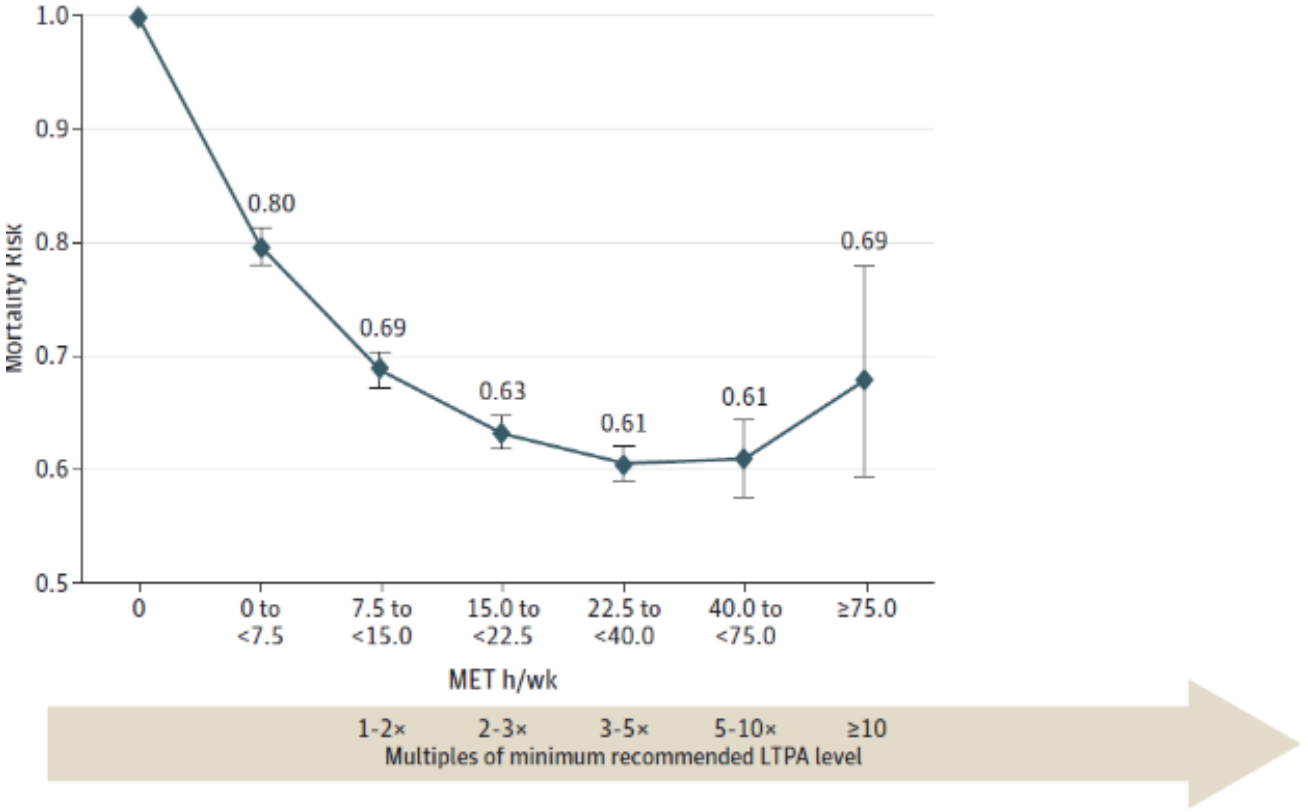
Wat denken jullie?

- Ten opzichte van niet sporten
  - Verhoogt topsport de levensverwachting
  - Verlaagt topsport de levensverwachting
  - Heeft topsport niet veel impact op de levensverwachting

Is topsport dan gevaarlijk?

Leisure Time Physical Activity and Mortality
A Detailed Pooled Analysis of the Dose-Response Relationship

Hannah Arem, MHS, PhD; Steven C. Moore, PhD; Alpa Patel, PhD; Patricia Hartge, ScD; Amy Berrington de Gonzalez, DPhil; Kala Visvanathan, MBBS, MPH; Peter T. Campbell, PhD; Michal Freedman, JD, PhD; Elisabete Weiderpass, MD, MSc, PhD; Hans Olov Adami, MD, PhD; Martha S. Linet, MD; I-Min Lee, MBBS, ScD; Charles E. Matthews, PhD



661.137 participants (291.485 men and 369.652 women), followed for 14.2 follow-up years, observing 116 686 deaths

JAMA Internal Medicine June 2015 Volume 175, Number 6

UHASSELT
KNOWLEDGE IN ACTION

Wat denken jullie?

- Ten opzichte van niet sporten
  - **Verhoogt topsport de levensverwachting**
  - Verlaagt topsport de levensverwachting
  - Heeft topsport niet veel impact op de levensverwachting

Economische consequenties

Globale jaarlijkse kost van fysieke inactiviteit

Minstens **67.000.000.000 euro**

…en stijgende ieder jaar

Ding D, et al. The economic burden of physical inactivity: a global analysis of major non-communicable diseases. Lancet. 2016 Sep 24;388(10051):1311-24.

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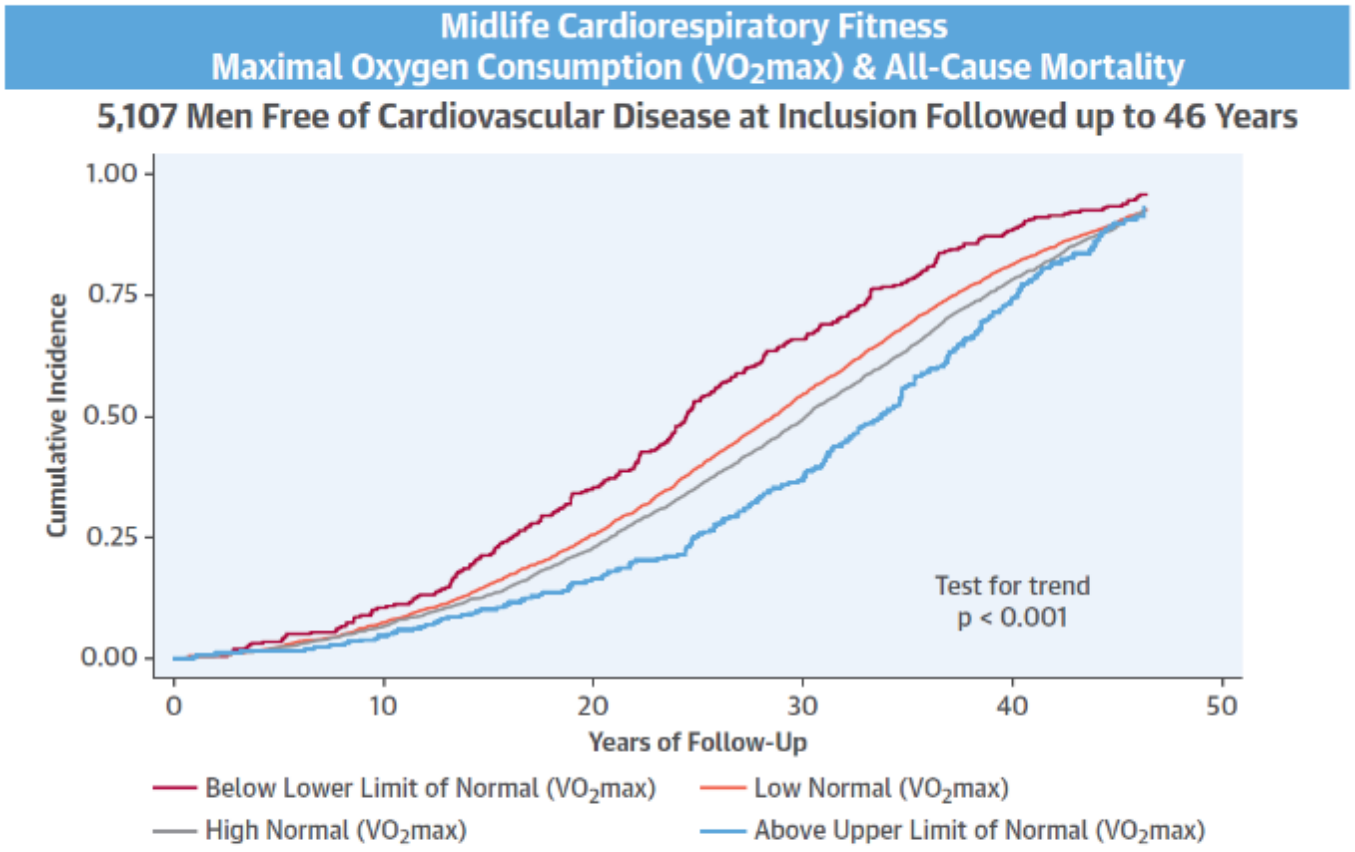
KNOWLEDGE IN ACTION

Waarom fitheid zo belangrijk is

CENTRAL ILLUSTRATION Physical Fitness and Longevity: All-cause Mortality



Clausen, J.S.R. et al. J Am Coll Cardiol. 2018;72(9):987-95.

Cumulative incidence of all-cause mortality according to categories of age-adjusted cardiorespiratory fitness level in 5,107 middle-aged, employed men without cardiovascular disease (CVD) followed up for up to 46 years. Cardiorespiratory fitness was related to longevity in a dose-response-dependent manner. Vo_2max = maximal oxygen consumption.

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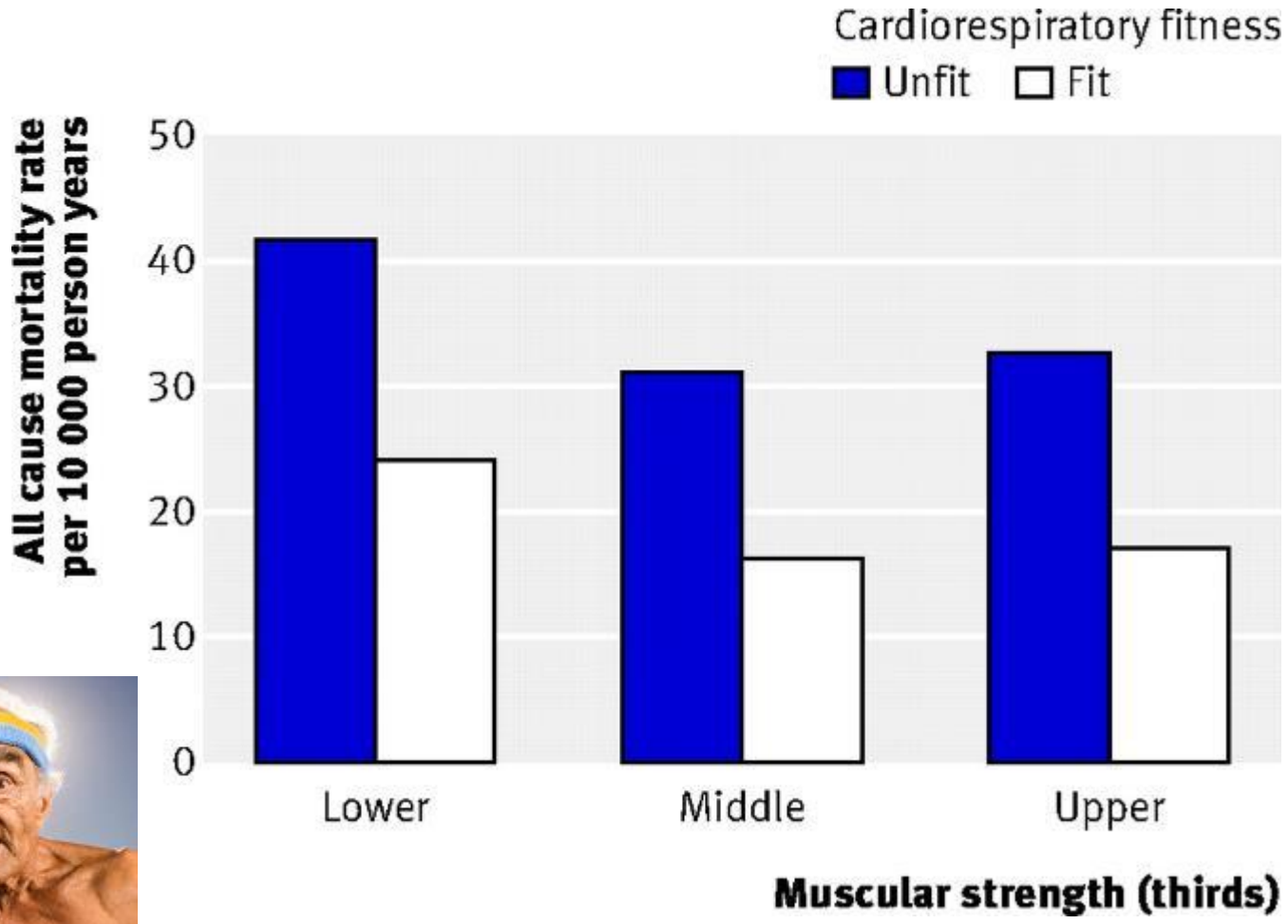
KNOWLEDGE IN ACTION

Waarom fitheid belangrijk is

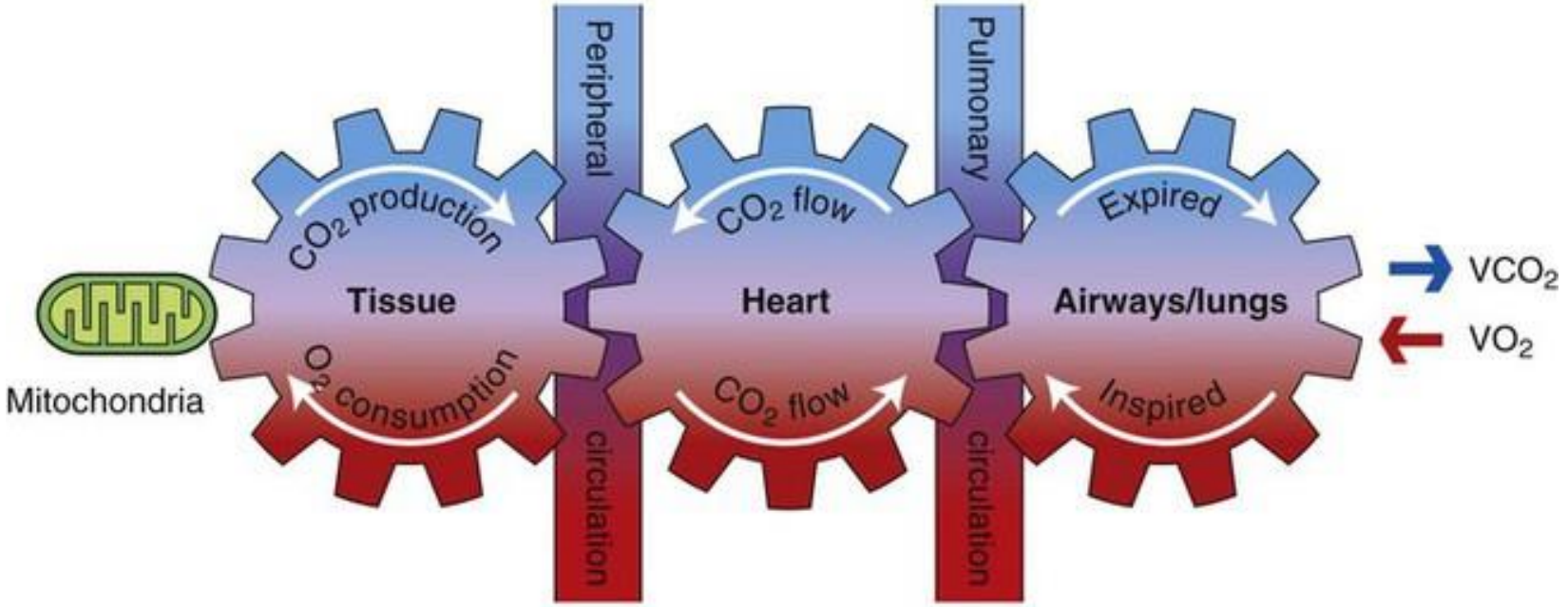


Number of men and age adjusted all cause death rates per 10 000 person years according to thirds of muscular strength and cardiorespiratory fitness categories (n=8762 men aged 20-80 years).

Ruiz JR, et al. BMJ 2008;337:a439

UHASSELT
KNOWLEDGE IN ACTION

Waarom is fitheid gerelateerd aan levensverwachting?



Beweging doet zoveel meer…

UHASSELT

KNOWLEDGE IN ACTION

Wat denken jullie?

- Ons genoom ligt vast…beweging zal dus niet veel invloed hebben
- Ons genoom is er wel, maar toch zal beweging ervoor zorgen dat genexpressie in onszelf kan veranderen
- Het gaat nog verder: beweging kan ervoor zorgen dat genexpressie in onze toekomstige kinderen kan veranderen

De Nederlandse hongersnood (1944-45)

Goboren in die periode?

Meer hart –en vaatziekten, zwaarlijvigheid en chronische longziekten als volwassene

Hoe kan dit?

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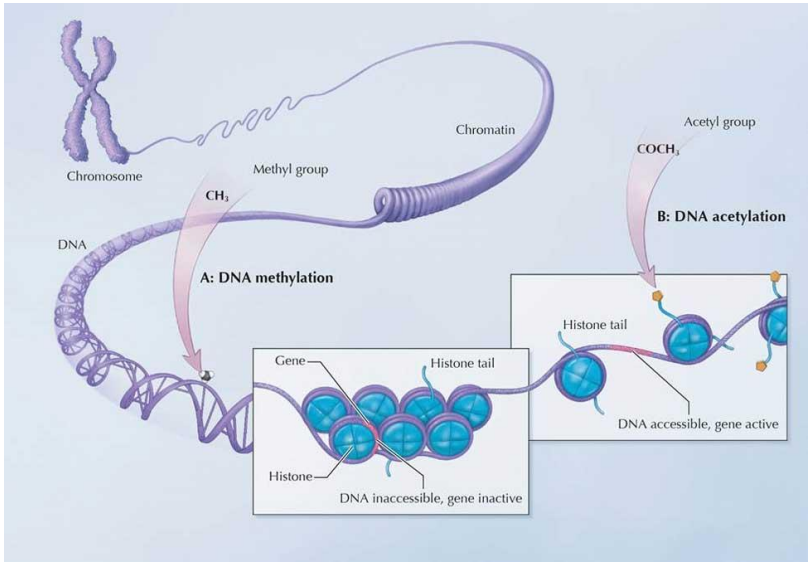
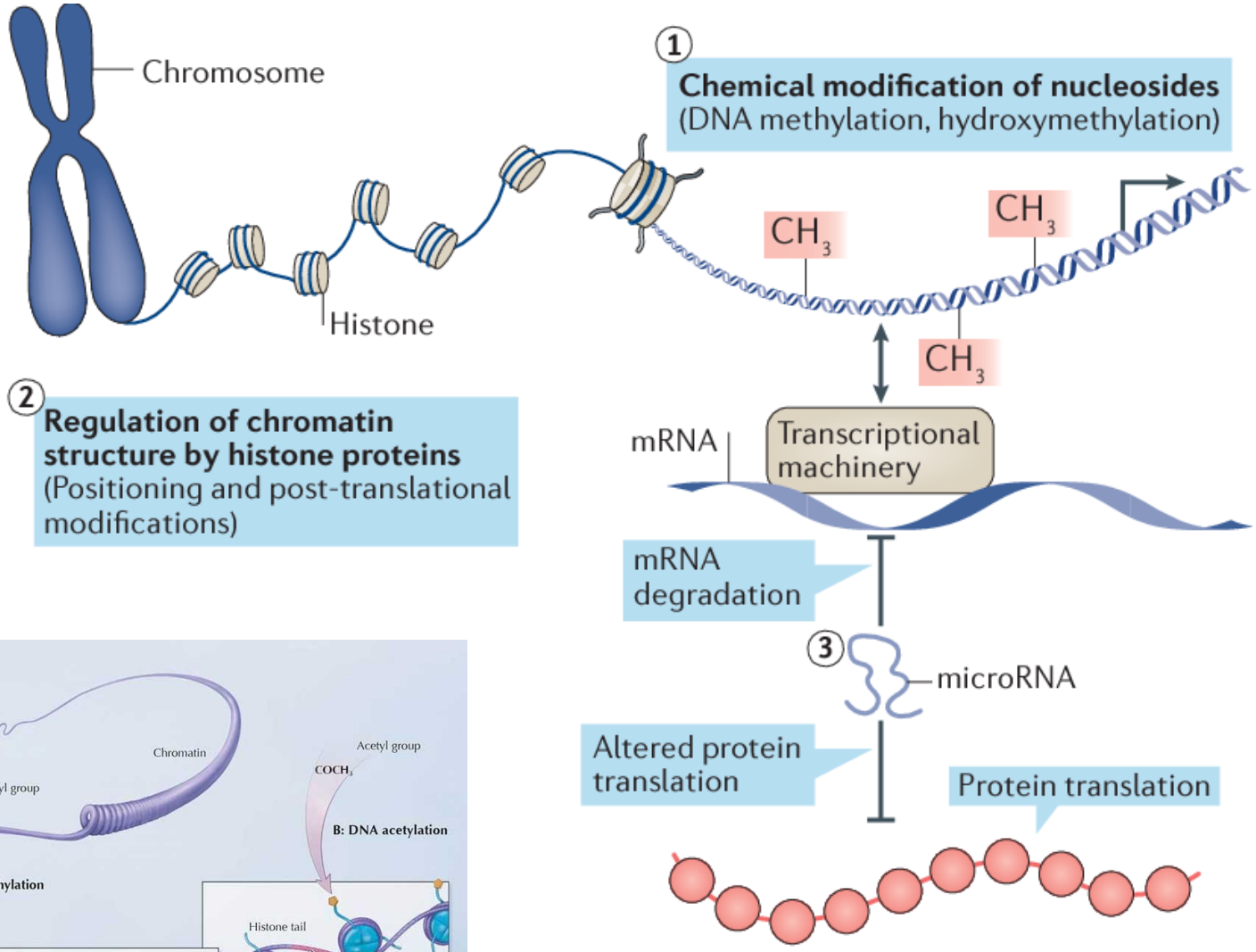
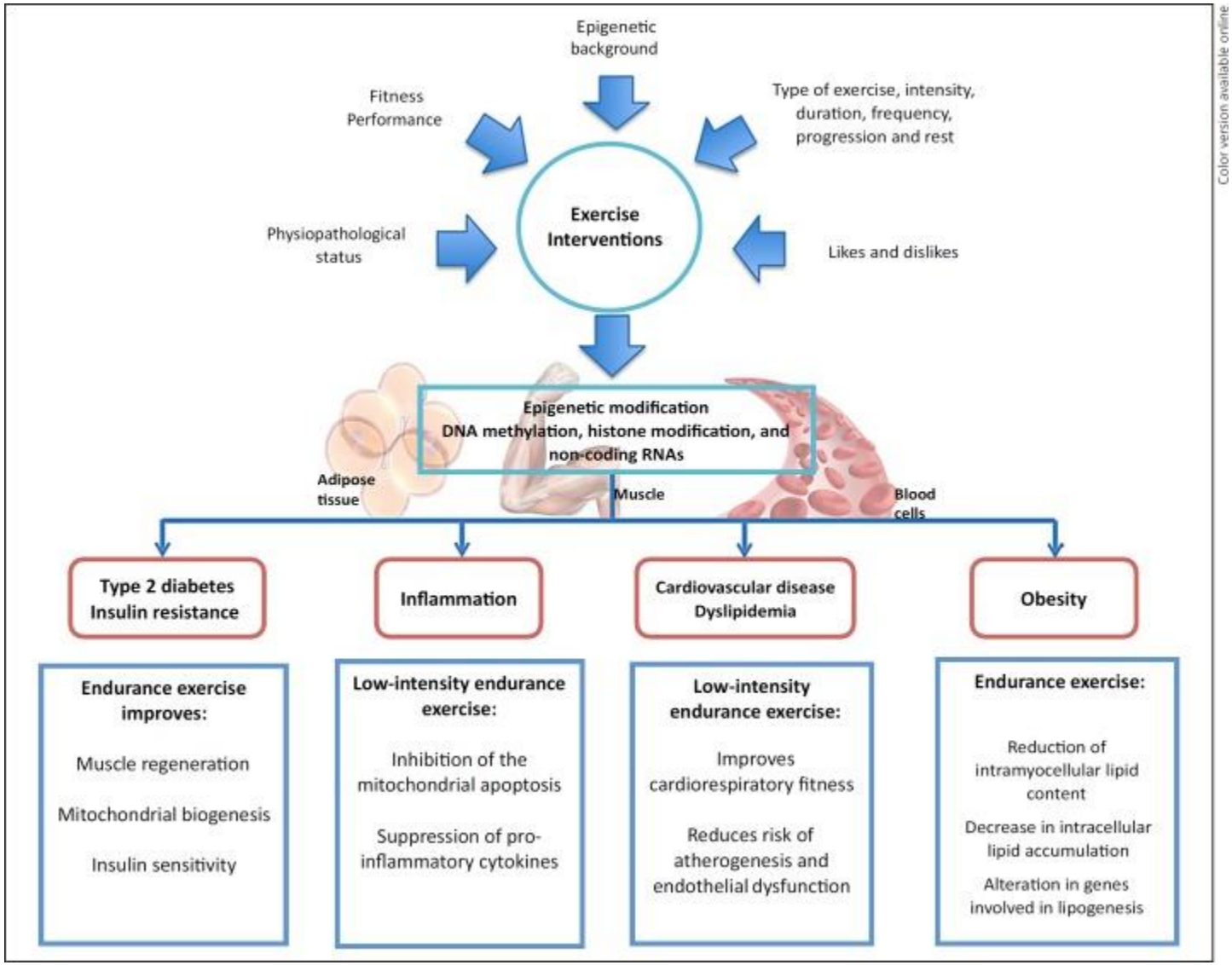
KNOWLEDGE IN ACTION



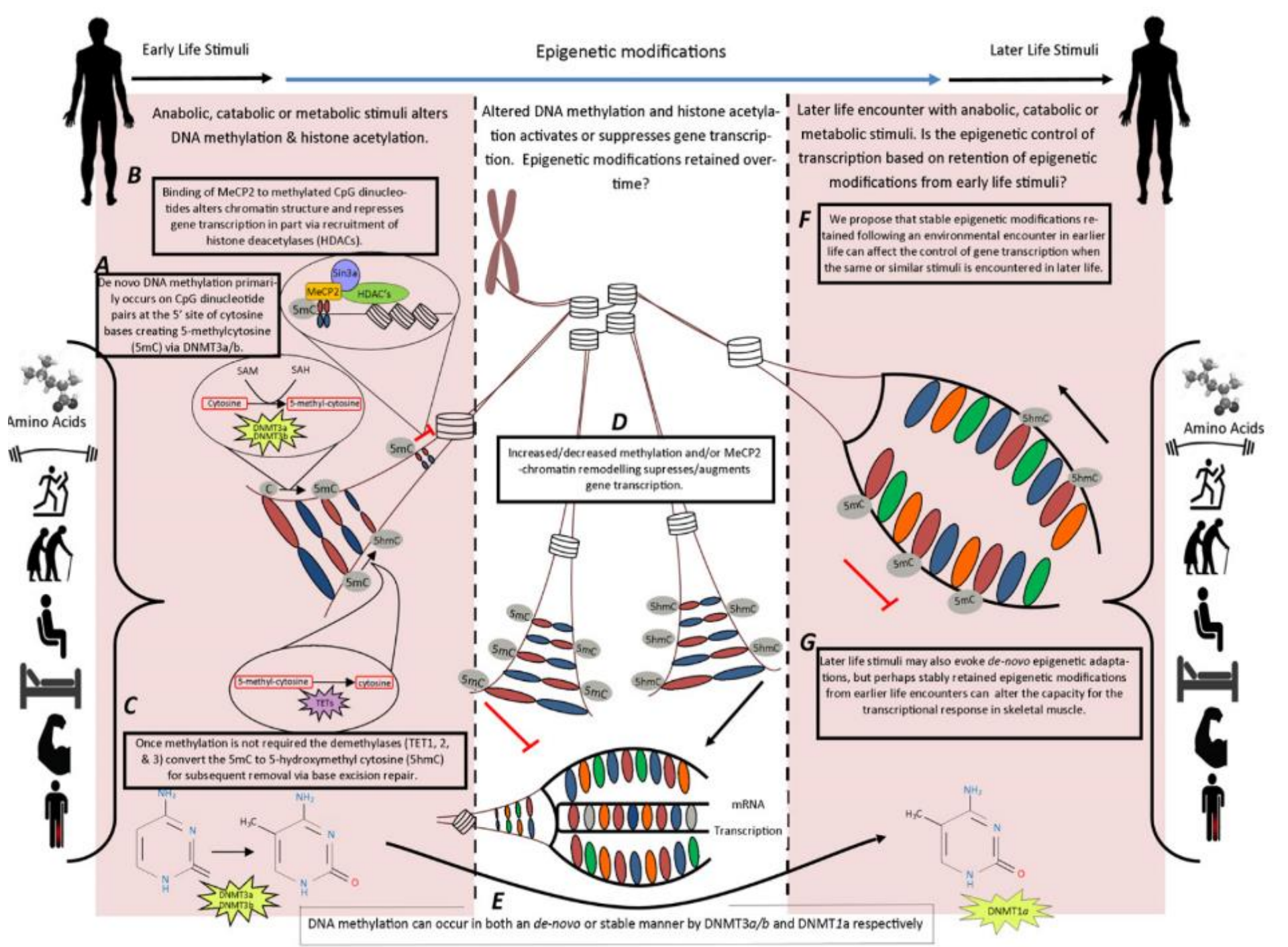


Barrès R et al. Nature Reviews Endocrinology 12 (2016): 441-451.

UHASSELT
KNOWLEDGE IN ACTION



Lifestyle Genom. 2019 Oct; 12(1-6): 25–44



Effects of maternal and paternal exercise on offspring metabolism

Joji Kusuyama[1,2], Ana Barbara Alves-Wagner[1,2], Nathan S. Makarewicz[1] and Laurie J. Goodyear[1]✉

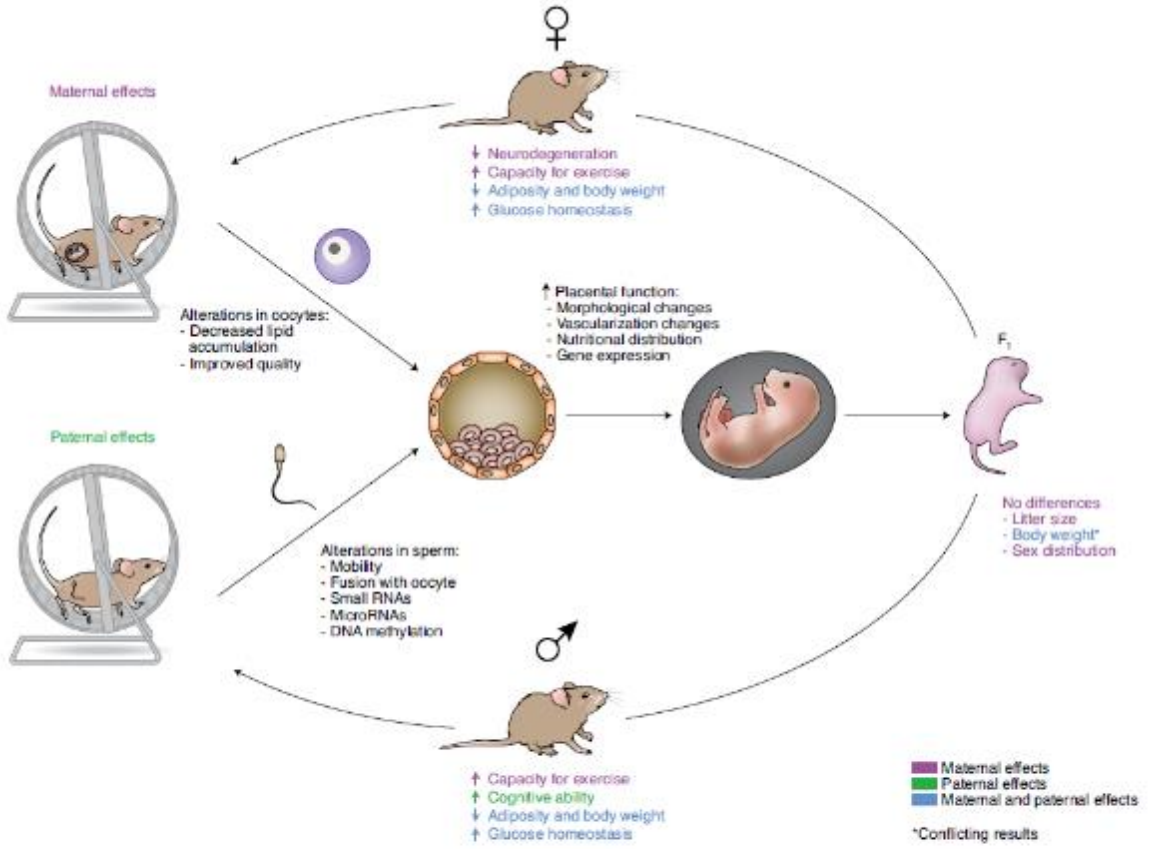


Fig. 5 | Effects of exercise training in rodents on F_0 gametes and placenta, and on F_1 newborns and adults. When dams are exposed to exercise before and during pregnancy, their oocytes and placentas are affected. Although litter size and pup weight are generally not affected by maternal exercise, numerous beneficial metabolic changes occur in offspring and are most prevalent in adulthood. Sires exposed to exercise have numerous alterations in sperm, and these changes probably mediate the beneficial metabolic changes in F_1 offspring. Some sex-specific adaptations are seen in the offspring in response to both maternal and paternal exercise. The beneficial effects of parental exercise offspring may be propagated across subsequent generations, thus ensuring healthier life cycles for further progeny.

Effects of maternal and paternal exercise on offspring metabolism

Joji Kusuyama[1,2], Ana Barbara Alves-Wagner[1,2], Nathan S. Makarewicz[1] and Laurie J. Goodyear[1]

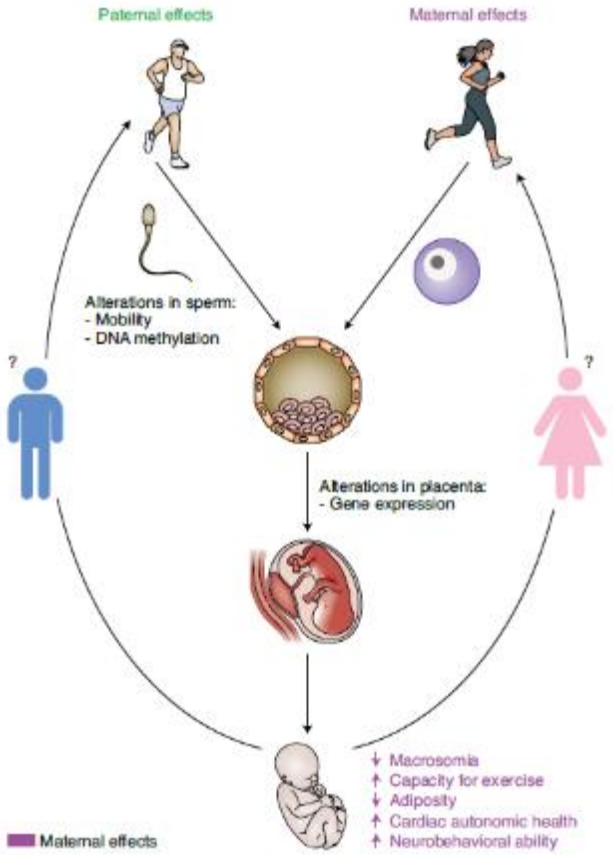
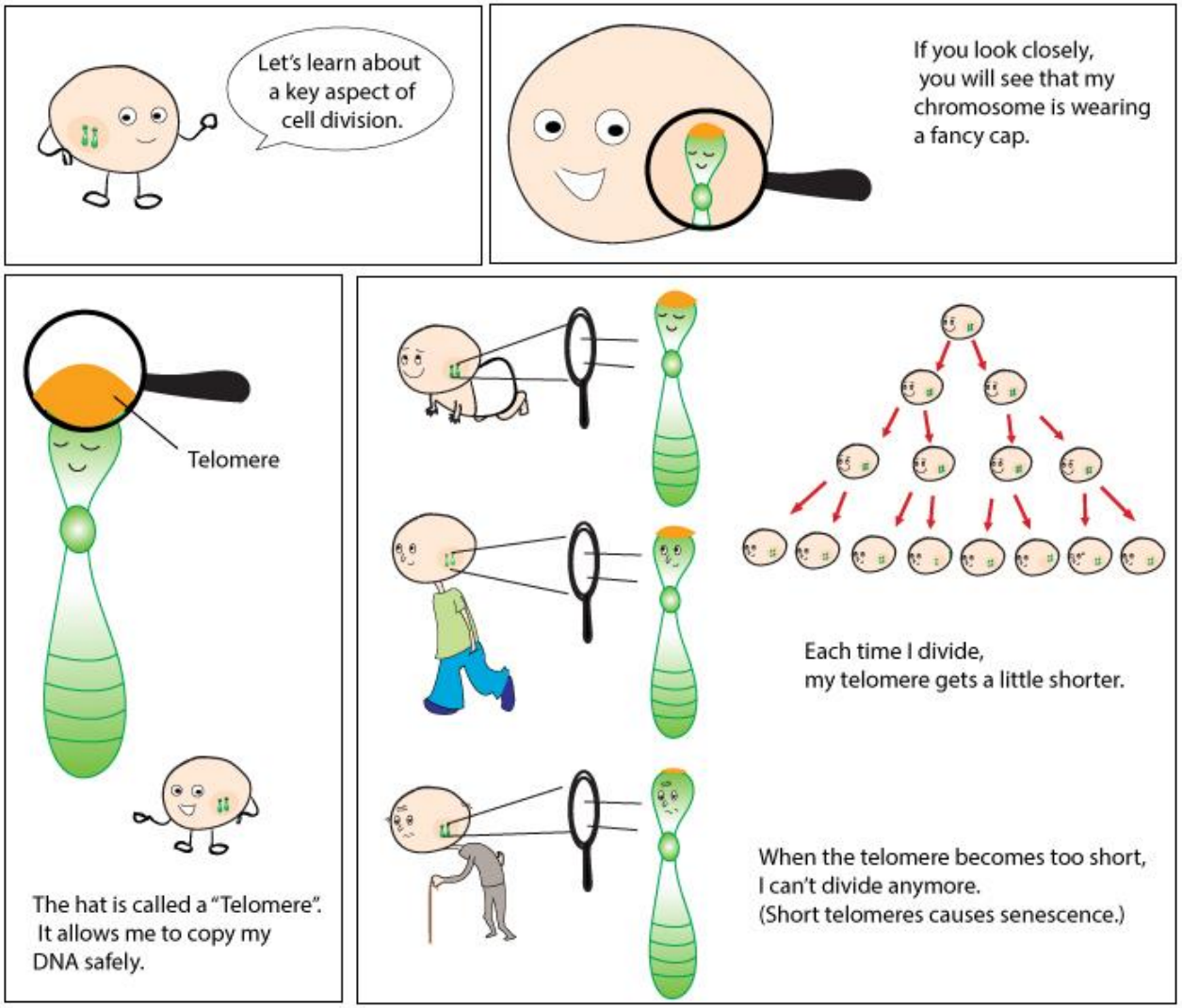


Fig. 2 | Parental exercise training affects parents and offspring. When women exercise before pregnancy, their oocytes may be affected, and exercise during pregnancy affects the placenta. These alterations result in numerous effects in F_1 newborns—adaptations that may continue into adulthood. When men are exposed to exercise before breeding, their sperm physiology is altered, thus potentially leading to changes in the F_1 newborns. Whether these changes affect the health of the offspring as they age to adulthood is unknown. More studies are needed to understand the effects of maternal and paternal exercise on offspring health in adulthood and to determine mechanisms underlying these effects.

- Ons genoom ligt vast…beweging zal dus niet veel invloed hebben
- Ons genoom is er wel, maar toch zal beweging ervoor zorgen dat genexpressie in onszelf kan veranderen
- **Het gaat nog verder: beweging kan ervoor zorgen dat genexpressie in onze toekomstige kinderen kan veranderen**

Welkom in de wereld van telomeren…



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KNOWLEDGE IN ACTION

The Association Between Physical Activity in Leisure Time and Leukocyte Telomere Length

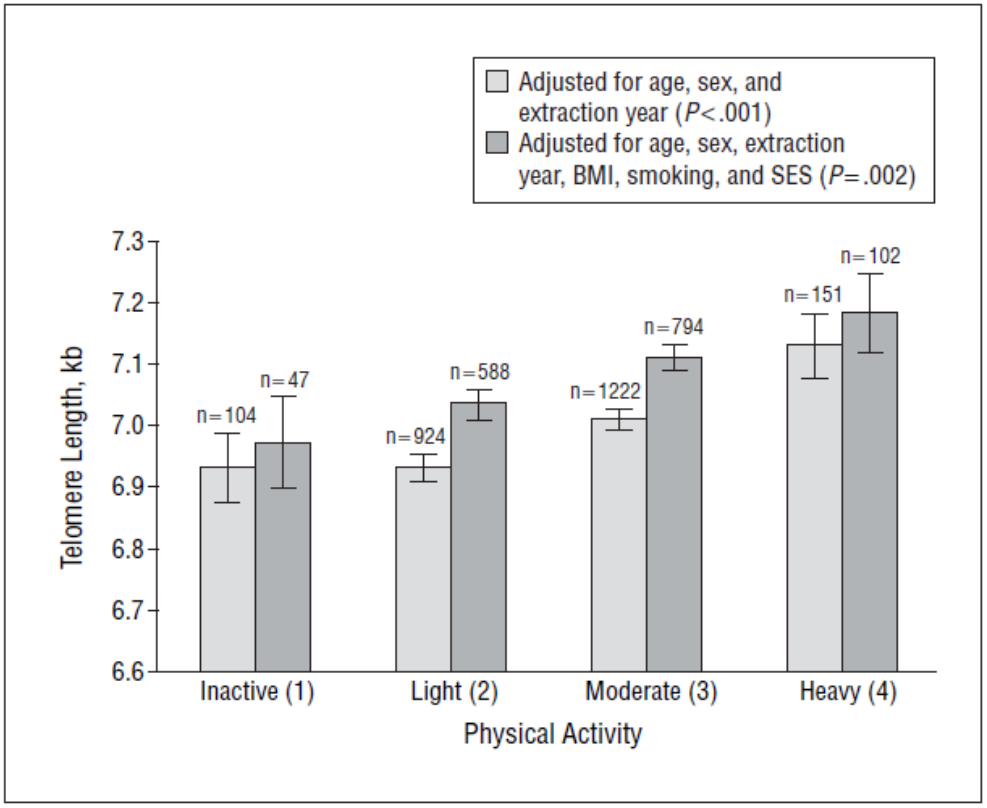


Figure 1. Mean telomere length and standard error bars by physical activity level in leisure time. See the "Methods" section for an explanation of the activity levels. BMI indicates body mass index; kb; kilobases; and SES, socioeconomic status.

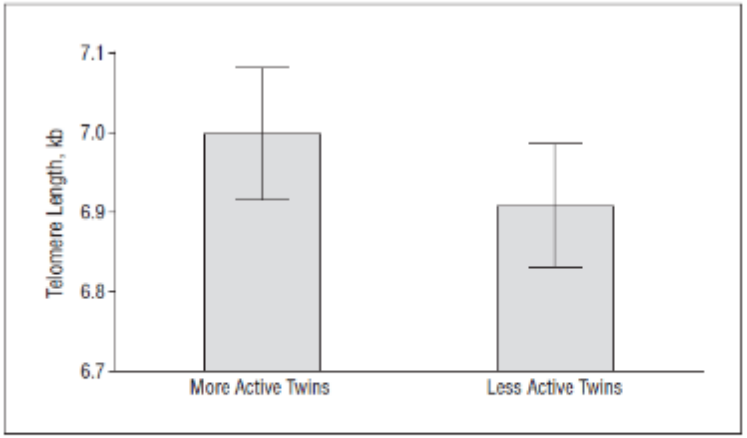
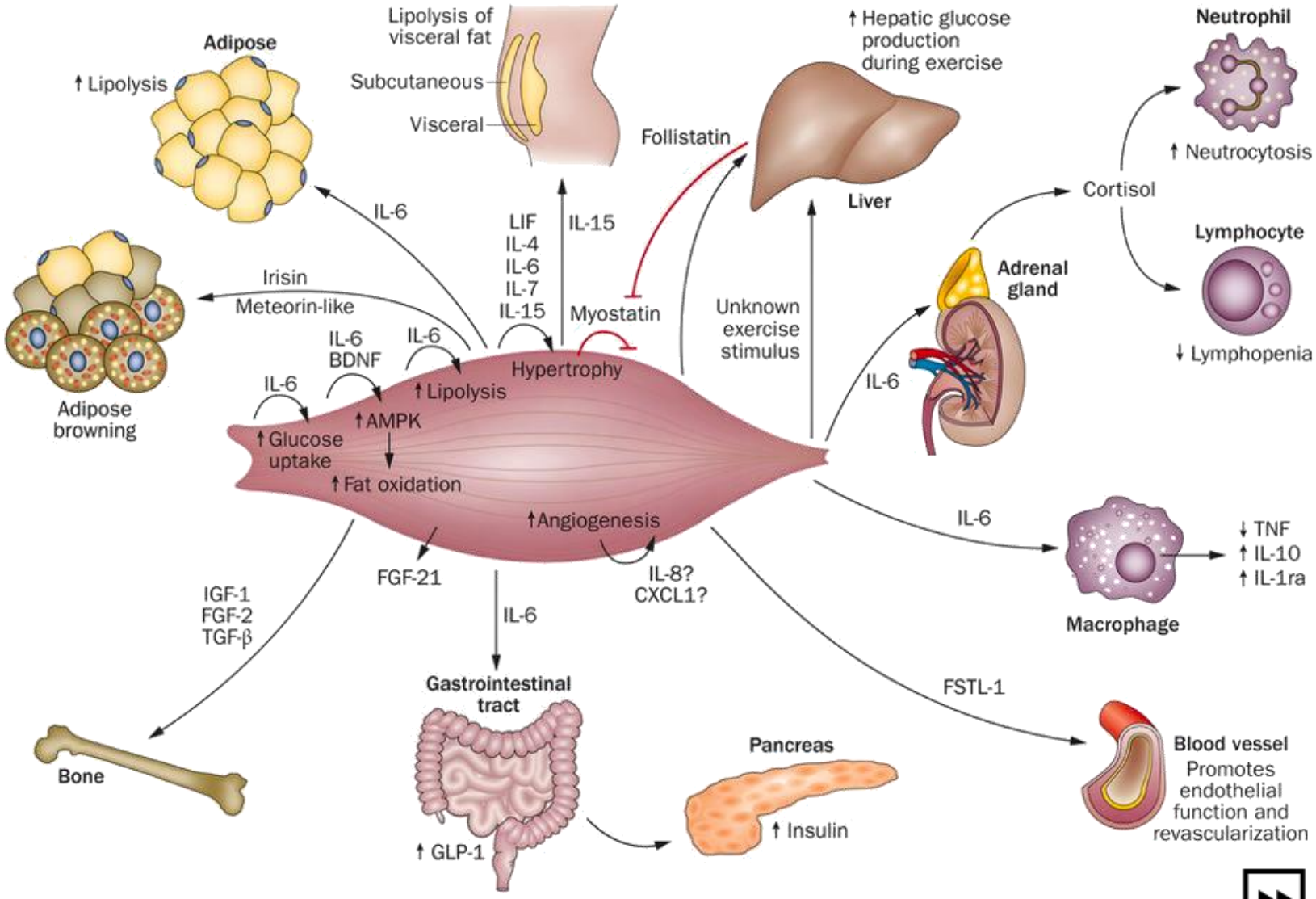


Figure 2. Mean telomere length and standard error bars for physical activity–discordant twin pairs (n=67 pairs). The mean for more active twins was 6.9968; for less active twins, 6.9091. Data were adjusted for age, sex, and extraction year. kb indicates kilobases.

Arch Intern Med. 2008;168(2):154-158

De spieren praten



Wat zijn de effecten van (veel) zitten?

UHASSELT

KNOWLEDGE IN ACTION

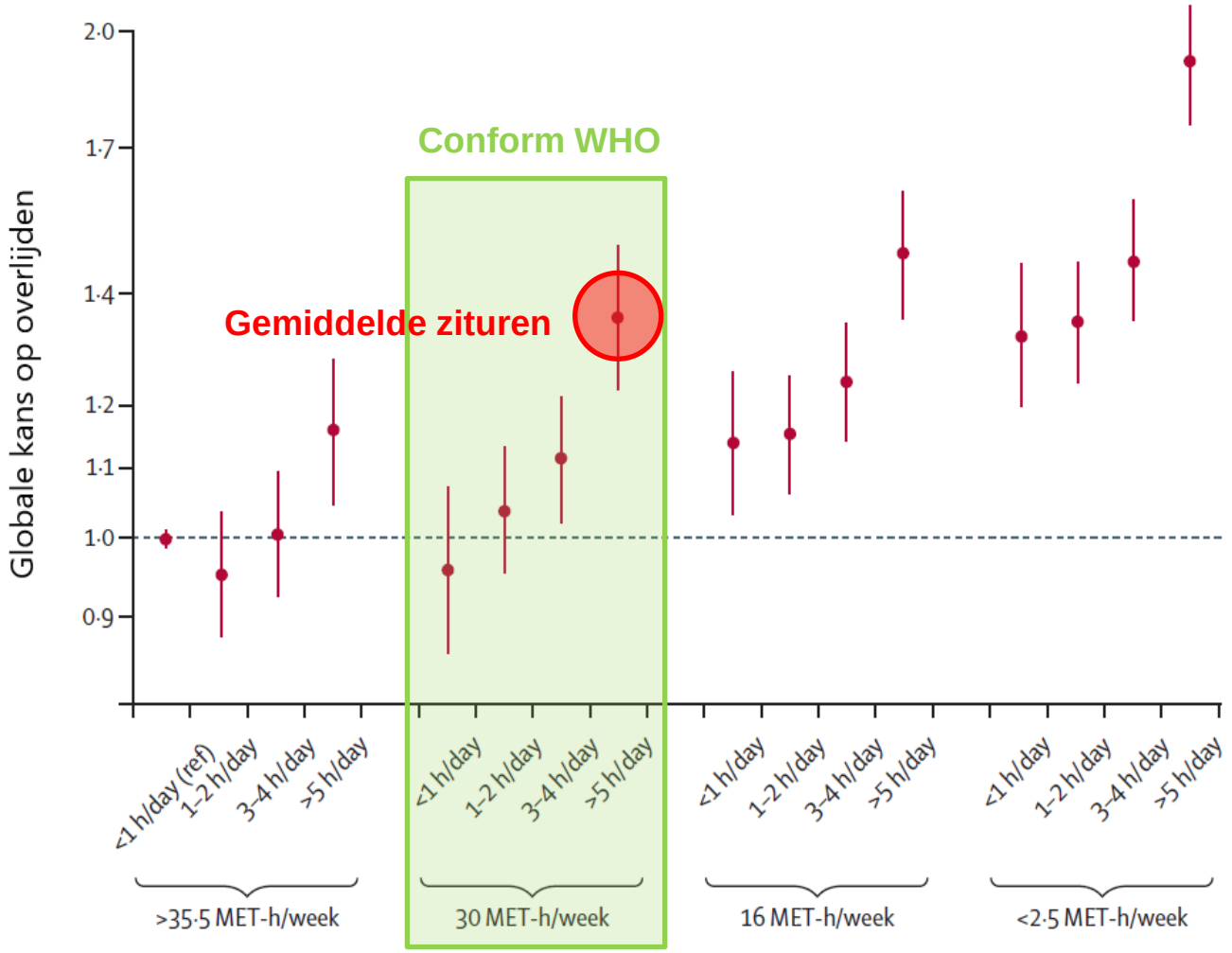
Morris JN, et al. Incidence and prediction of ischaemic heart-disease in London busmen. Lancet. 1966;2(7463):553-9.

Wat denken jullie?

- Stel dat je volgens WHO voldoende beweegt, en je daarnaast 5 uur of meer zit per dag. Met hoeveel % stijgt je kans op vroegtijdig overlijden?
  - 0%
  - 20%
  - 35%

UHASSELT
KNOWLEDGE IN ACTION

Wat doet zitten?



Ekelund U, et al. Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women. Lancet. 2016;388(10051):1302-10

UHASSELT
KNOWLEDGE IN ACTION

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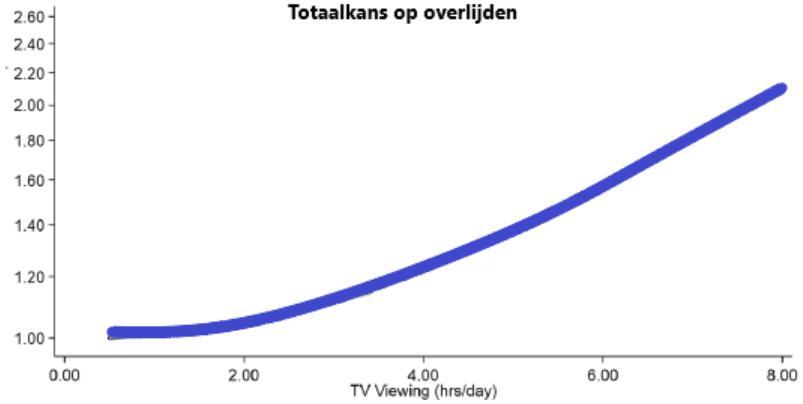
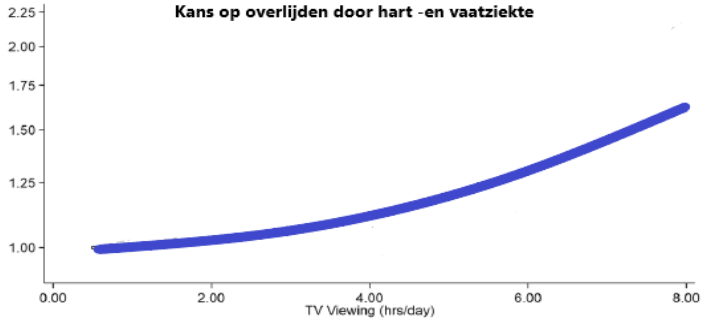
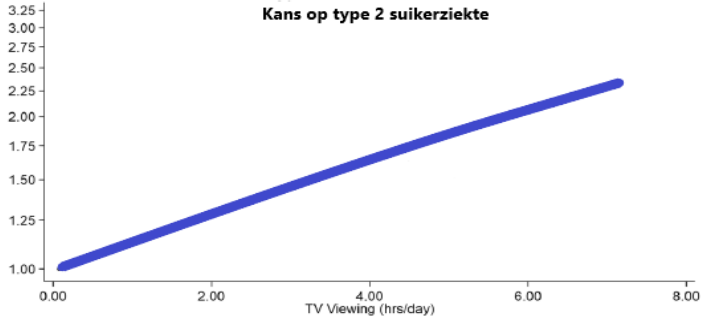
  - 0%
  - 20%
  - **35%**

Wat doet zitten?







Patterson R, et al. Sedentary behaviour and risk of all-cause, cardiovascular and cancer mortality, and incident type 2 diabetes: a systematic review and dose response meta-analysis. Eur J Epidemiol. 2018;33:811-829

UHASSELT
KNOWLEDGE IN ACTION

Hoe komt dit?

If you don’t use it, you will loose it

UHASSELT
KNOWLEDGE IN ACTION

De Dallas bed rust studie

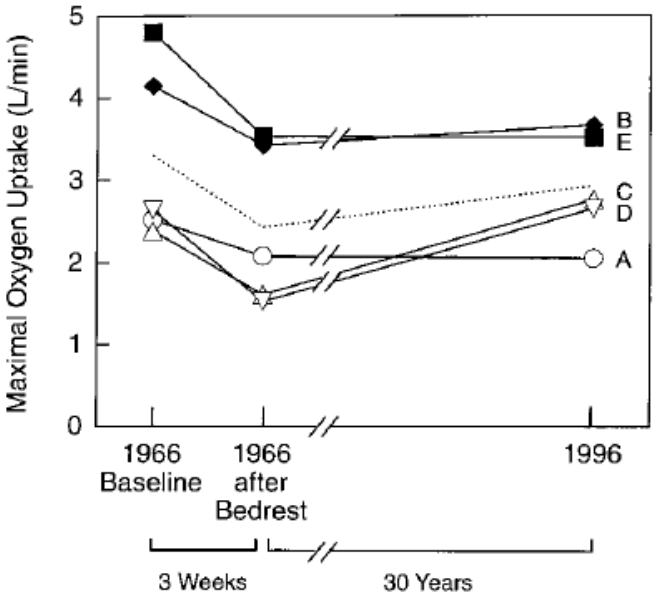


Figure 2. Absolute $\dot{V}O_2max$ before and after bedrest in 1966 and current values.

3 weken in het bedje liggen…

is gelijk aan 20 jaar verouderen!

Saltin B, et al. Circulation 1968; 38(suppl VII):VII-1–VII-78.

Zeven dagen in bedje liggen in gezonde personen

- 1.4 kg spiermassa verlies
- 7% daling in spierkracht
- 8% daling in spier uithoudingsvermogen
- 6% daling in VO2 piek
- 29% daling in insuline gevoeligheid

Dirks M, et al. Diabetes. 2016; 65: 2862-75

Wat doet zitten?

Zwakkere immuunfunctie

Spierafbraak

Slechtere suikercontrole

Brozere botten

Verminderde hartfunctie

Verminderde functie bloedvaten

Afname breinfunctie

Daling metabolisme

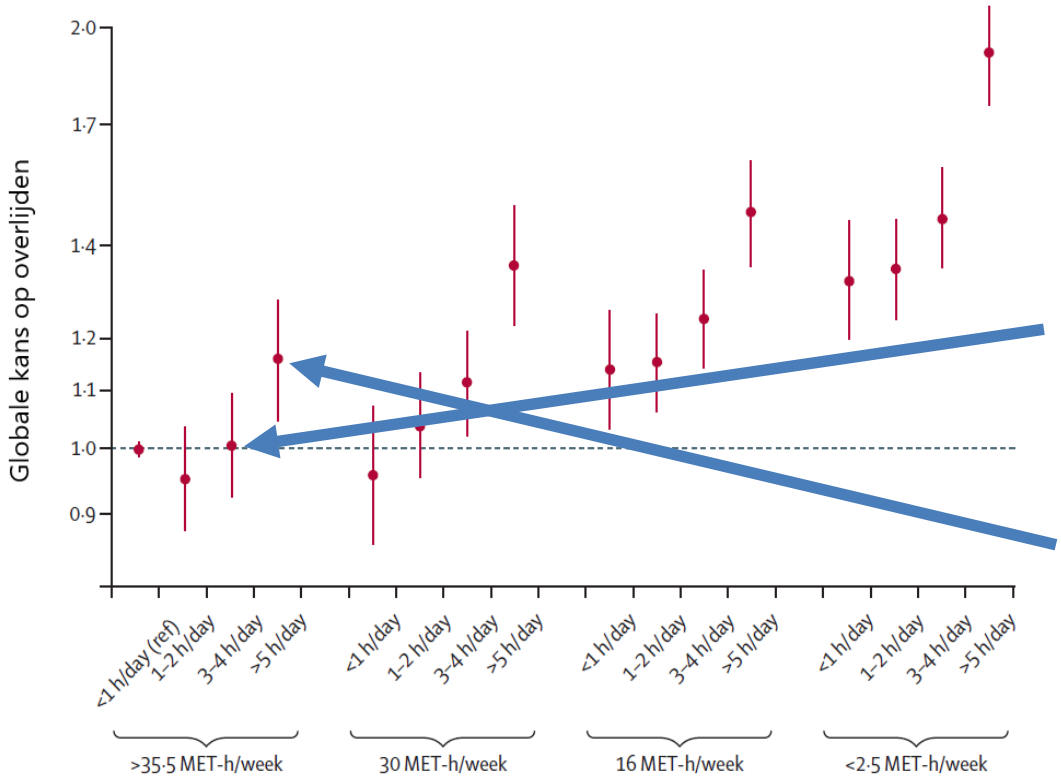
UHASSELT
KNOWLEDGE IN ACTION

Kunnen we dit verhelpen?

UHASSELT

KNOWLEDGE IN ACTION

Kunnen we dit verhelpen?



3-4 uur/dag TV kijken en normale prognose behouden:
>420 minuten matig-intens bewegen/week
>300 minuten hoger intens bewegen/week

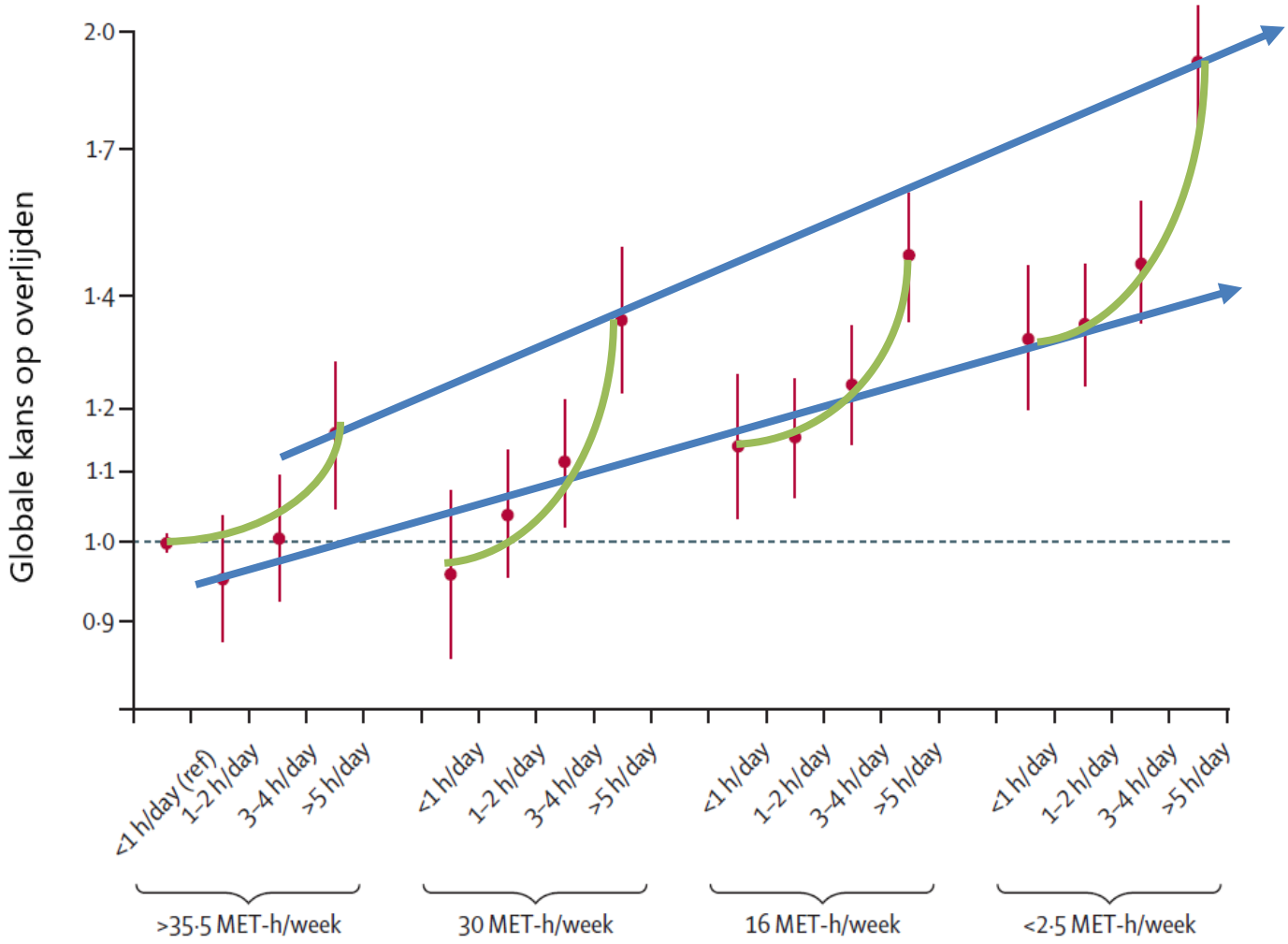
>5 uur/dag TV kijken, en je doet:
>420 minuten matig-intens bewegen/week of
>300 minuten hoger intens bewegen/week

Toch nog 18% meer kans op vroegtijdig overlijden

Ekelund U, et al. Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women. Lancet. 2016;388(10051):1302-10

UHASSELT
KNOWLEDGE IN ACTION

Kunnen we dit verhelpen?



Ekelund U, et al. Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women. Lancet. 2016;388(10051):1302-10

UHASSELT
KNOWLEDGE IN ACTION

Kunnen we dit verhelpen?

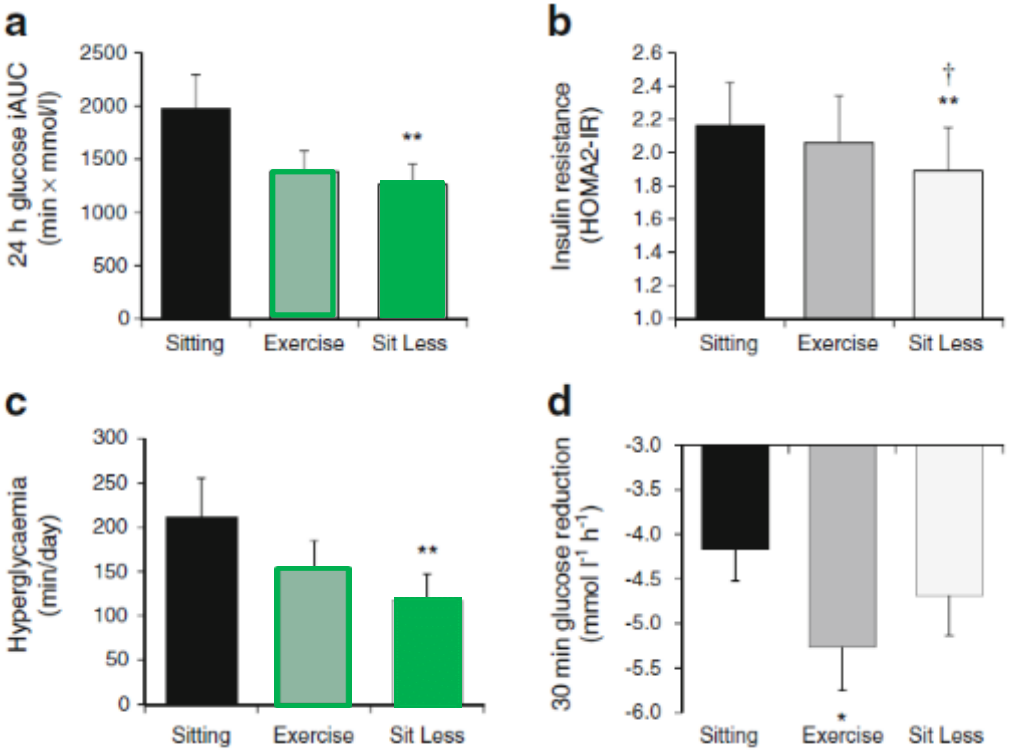


Fig. 3 (**a**) Twenty-four hour glucose iAUC during the last day of each activity regimen, (**b**) insulin resistance expressed as HOMA2-IR on the morning after each activity regimen, (**c**) duration of hyperglycaemia, and (**d**) maximal reduction in glucose level at 30 min during the last day of each activity regimen. Data are estimated means ± SEM ($n = 19$ individuals). *$p \leq 0.05$, **$p < 0.01$ vs Sitting regimen; †, $p \leq 0.05$ vs Exercise regimen

Diabetologia (2017) 60:490–498

Kunnen we dit verhelpen?

- Effecten van onderbreken of verminderen van zittijd:
  - Daling van buikomtrek en vetmassa
  - Betere suikercontrole
  - Daling in systolische bloeddruk
  - Stijging in HDL cholesterol

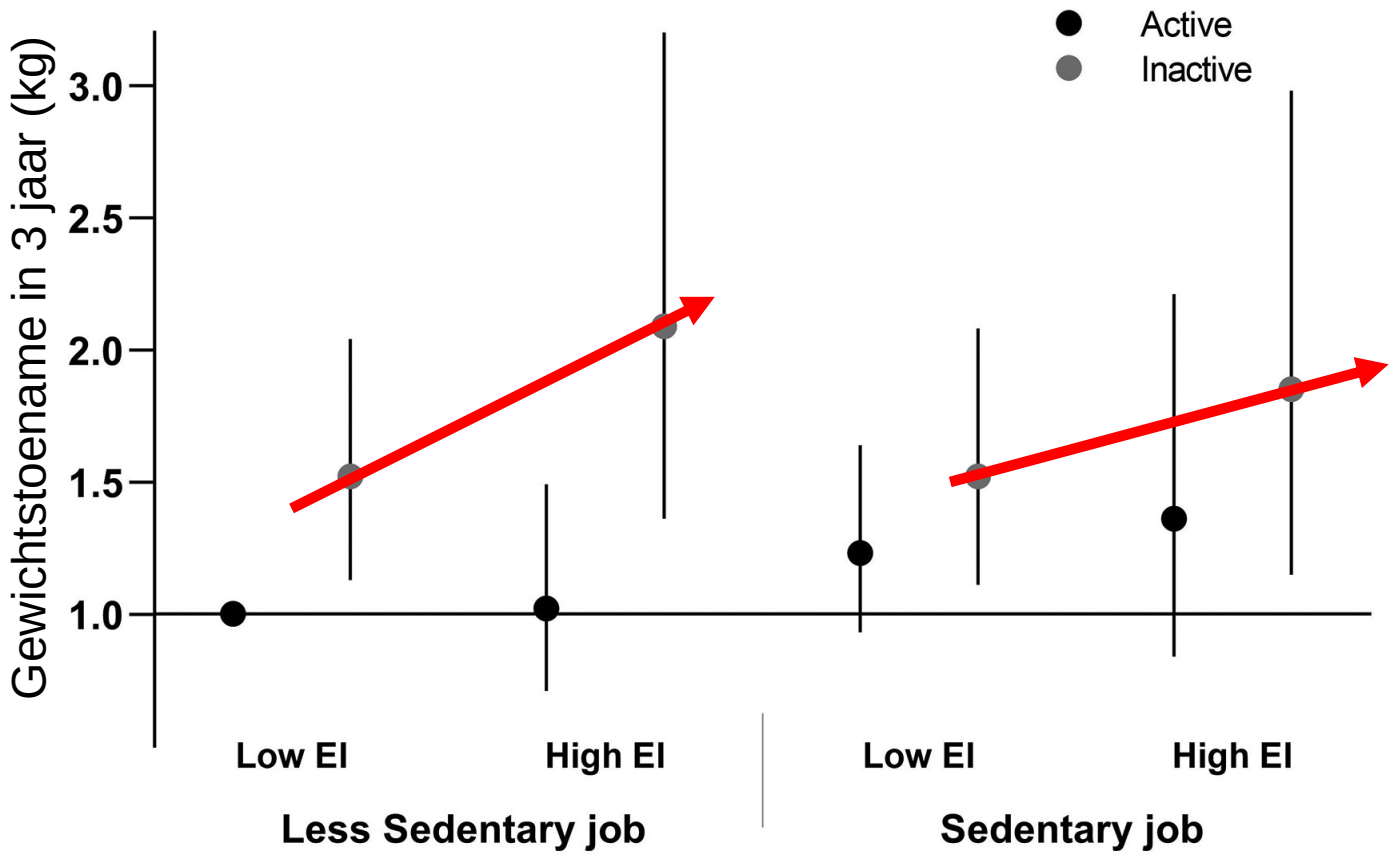
…en meer effecten zullen nog ontdekt worden

Nieste I, e al. Prev Med. 2021 Jul;148:106593.
Hadgraft NT, et al. Br J Sports Med. 2021 Feb;55(3):144-154.

Kunnen we dit verhelpen?

Maar verwacht geen effecten op fitheid

Kunnen we dit verhelpen?



Pas je calorie inname aan

Torquati L, et al. Associations between indicators of energy intake and expenditure with excess weight and obesity among women in sedentary and less-sedentary jobs. Prev Med. 2021 Jun;147:106507.

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Kunnen we dit verhelpen?

Fietsen of wandelen naar het werk

Daling in kans op vroegtijdig overlijden -9%
Daling in kans op overlijden door hart –en vaatziekten -15%

Grotere effecten bij langere afstanden

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Dutheil F, et al. Sports Med. 2020 Dec;50(12):2237-2250.

Kunnen we dit verhelpen?

Helaas toch nog complexer dan dat…

Iedereen is fysiologisch/anatomisch anders

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Helaas toch nog complexer dan dat…

Iedere gezondheidsindicator vereist andere vorm van beweging

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