



# LA CIENCIA TRÁS EL DEPORTE

CONGRESO INTERNACIONAL DE

**MEDICINA Y CIENCIAS APLICADAS AL DEPORTE**

EN EL MARCO DE LA IX EDICIÓN DE LA COPA AMÉRICA FEMENINA 2022



Facultad de Medicina **15** años



# Prescripción del Ejercicio

*John Duperly MD, PhD*

*Instituto de Medicina del Ejercicio*

*Departamento de Medicina Interna - FSFB*

*Profesor Asociado Universidad de los Andes*

# **Conflictos de Interés**

(Speaker, Advisory Board, Research Grants, Consultorias, Patrocinios)

Asocaña, Abbott, Alpina, Allianz, Amgen, Astra-Zeneca,  
Bayer, Coca – Cola, MSD, FARMA, Gatorade, Johnson &  
Johnson, Merck, Nestlé, Novartis, Novo-Nordisk,  
Nutraceuticals, Polar, Red Bull, Sanofi-Aventis, Toma Café,  
Sanofi – Aventis, Technofarma, Van Camps

Physical Inactivity



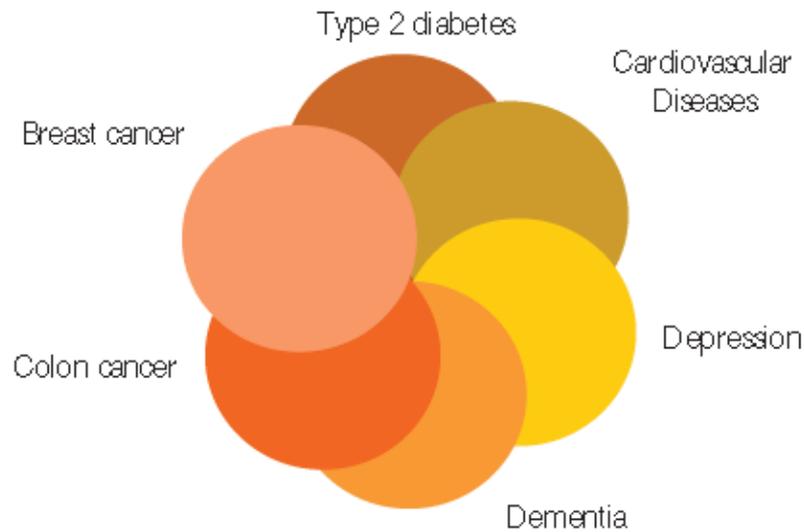
Visceral fat accumulation

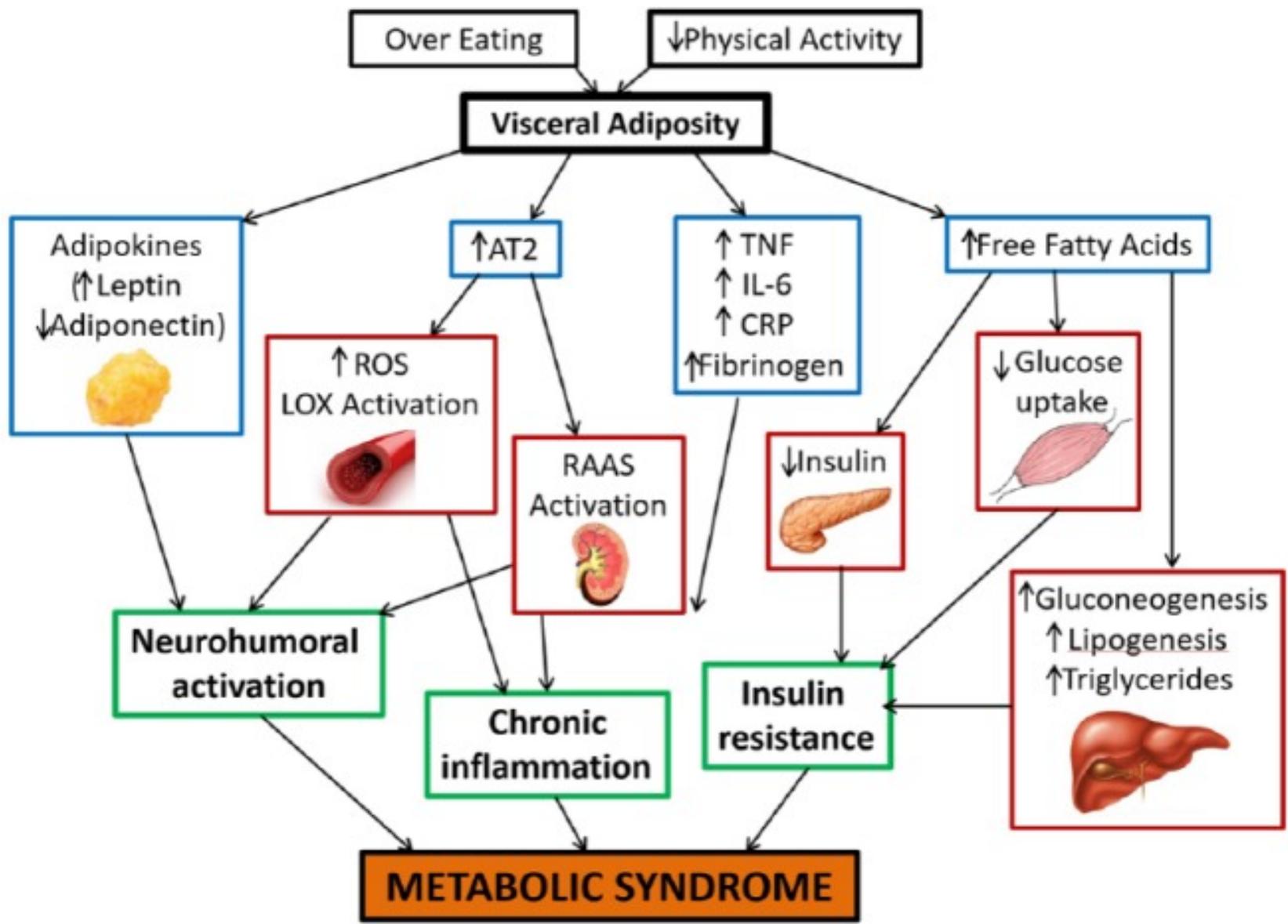


Chronic Systemic Inflammation



Insulin Resistance, Atherosclerosis, Neurodegeneration, Tumour growth

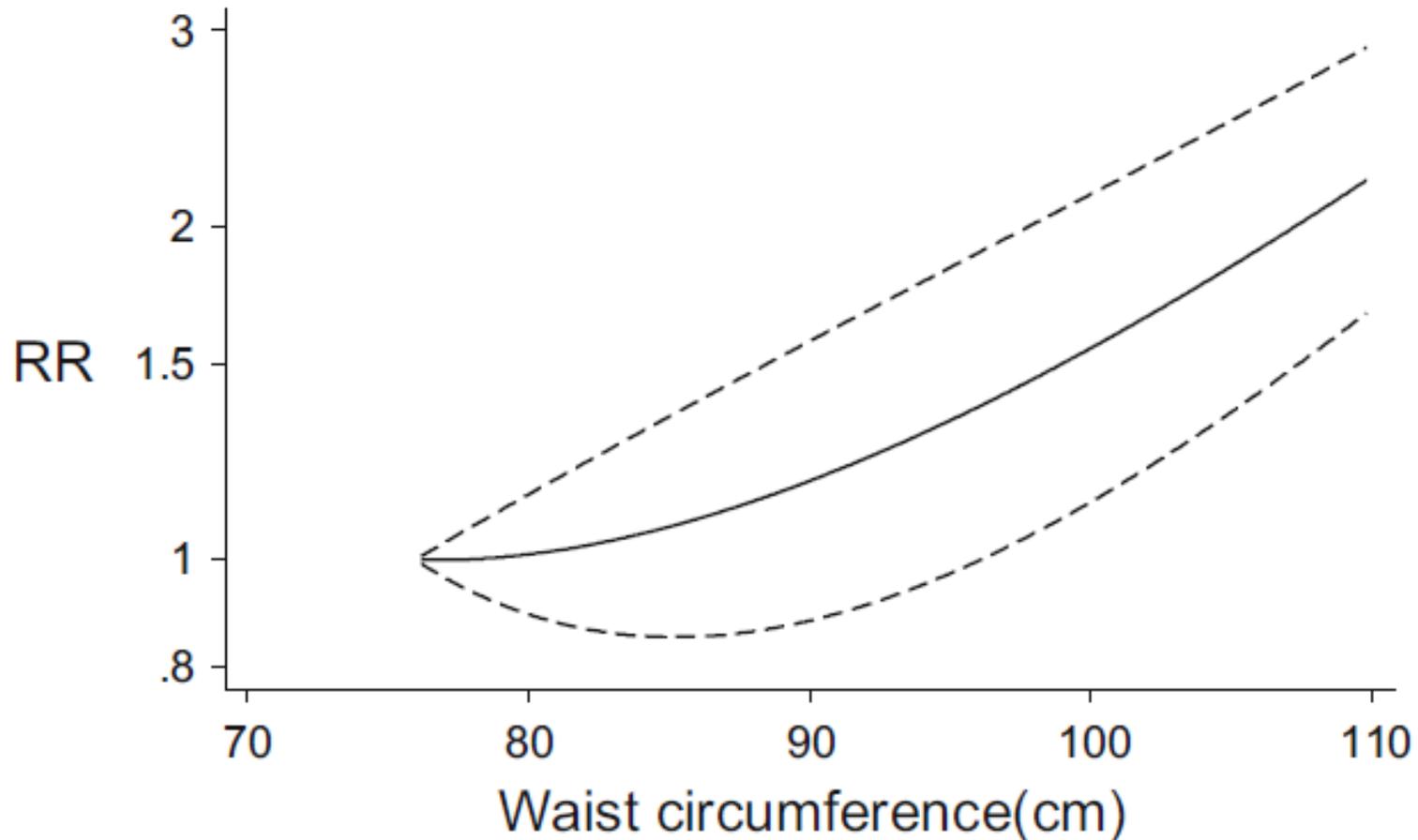




# OBESIDAD Abdominal & Fibrilación Auricular

**B**

Waist circumference and atrial fibrillation, nonlinear dose-response analysis



# The New England Journal of Medicine

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VOLUME 346

FEBRUARY 7, 2002

NUMBER 6

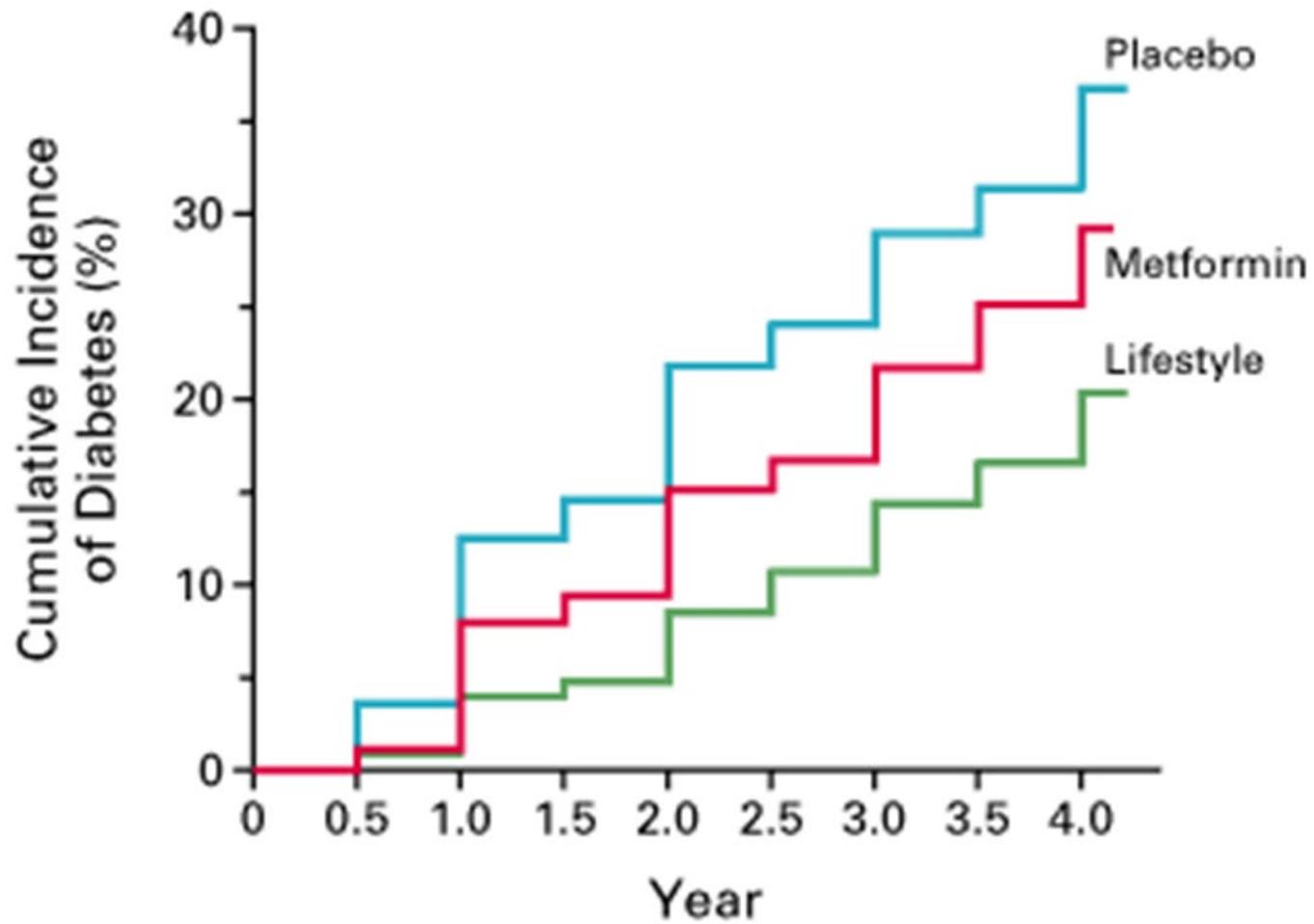


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## REDUCTION IN THE INCIDENCE OF TYPE 2 DIABETES WITH LIFESTYLE INTERVENTION OR METFORMIN

DIABETES PREVENTION PROGRAM RESEARCH GROUP\*

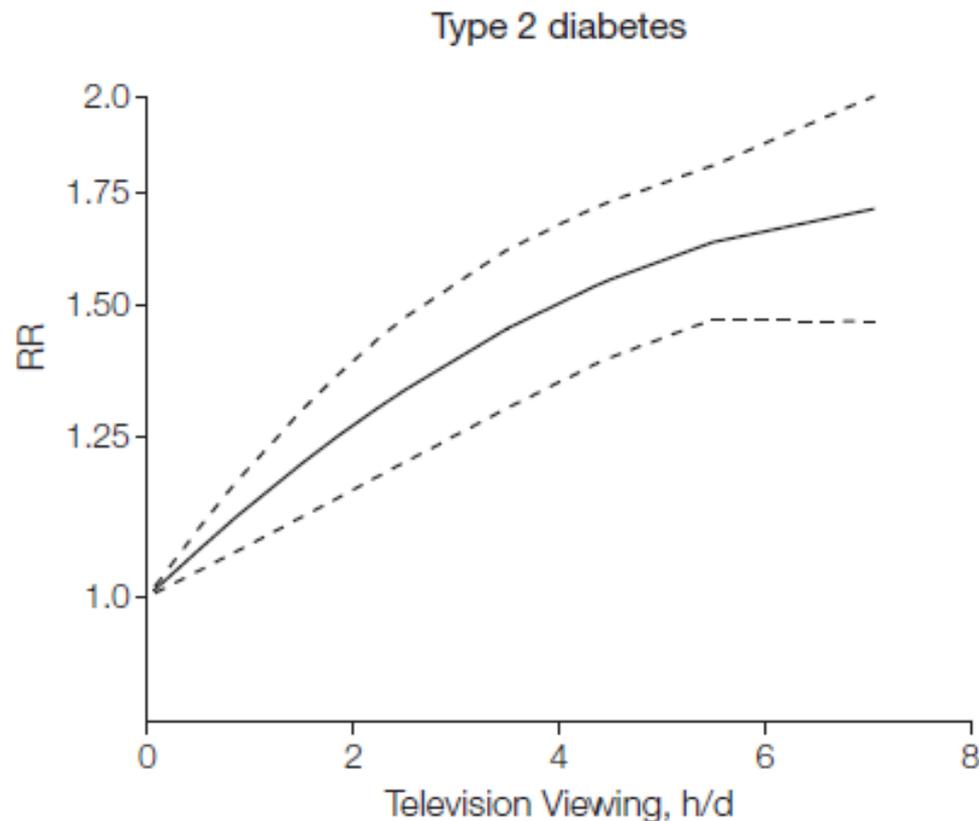
*Conclusions* Lifestyle changes and treatment with metformin both reduced the incidence of diabetes in persons at high risk. The lifestyle intervention was more effective than metformin. (N Engl J Med 2002;



# Television Viewing and Risk of Type 2 Diabetes, Cardiovascular Disease, and All-Cause Mortality

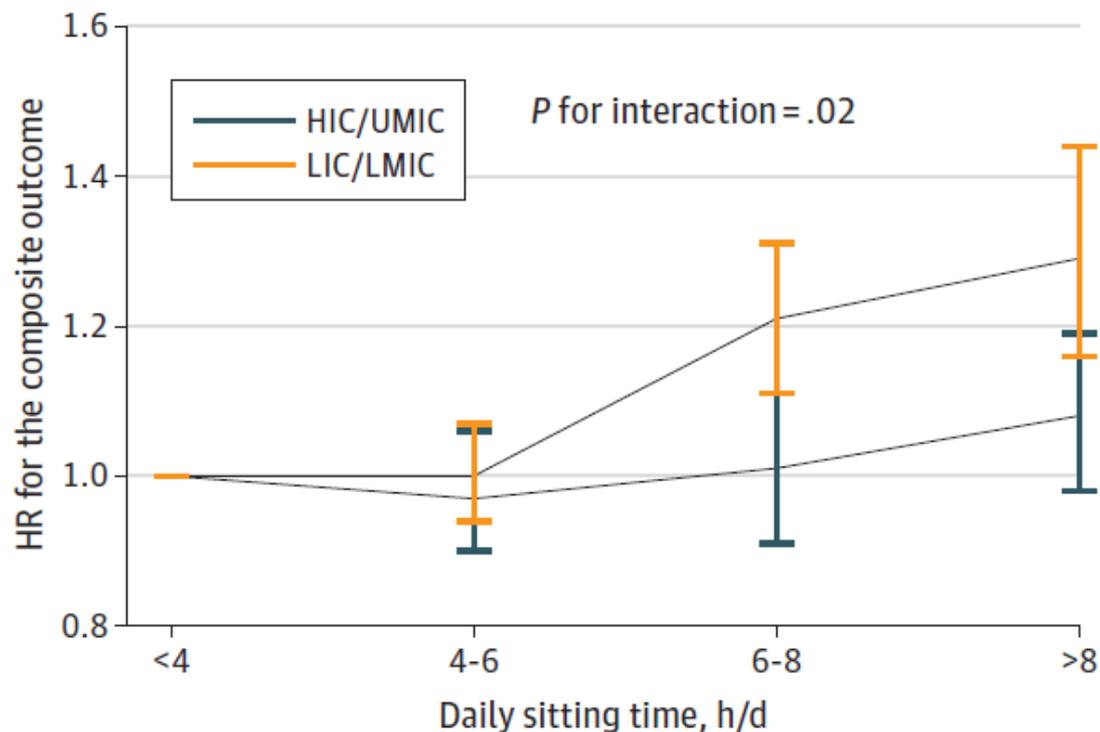
A Meta-analysis

**Figure 3.** Dose-Response Relationship Between Tele

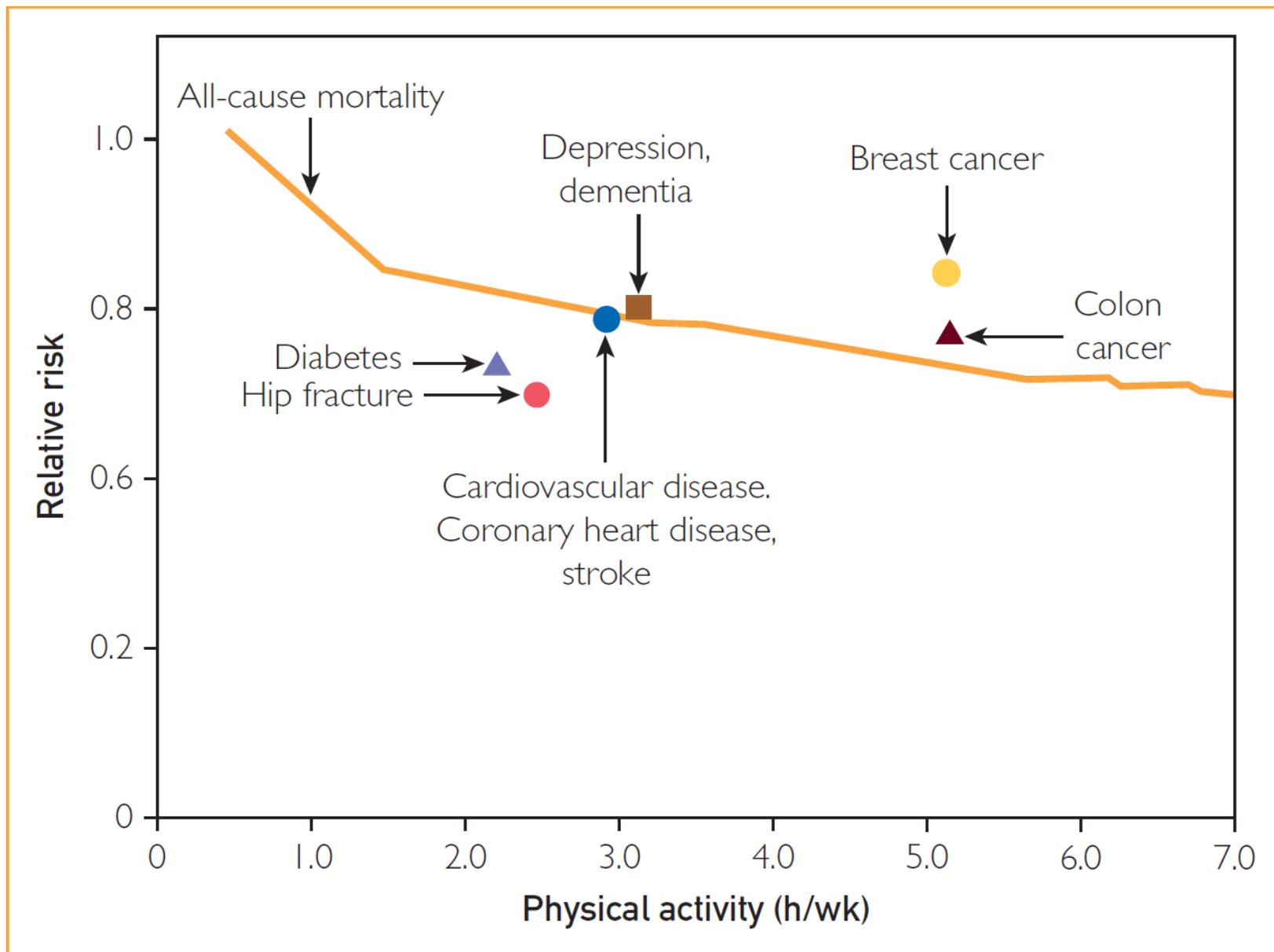


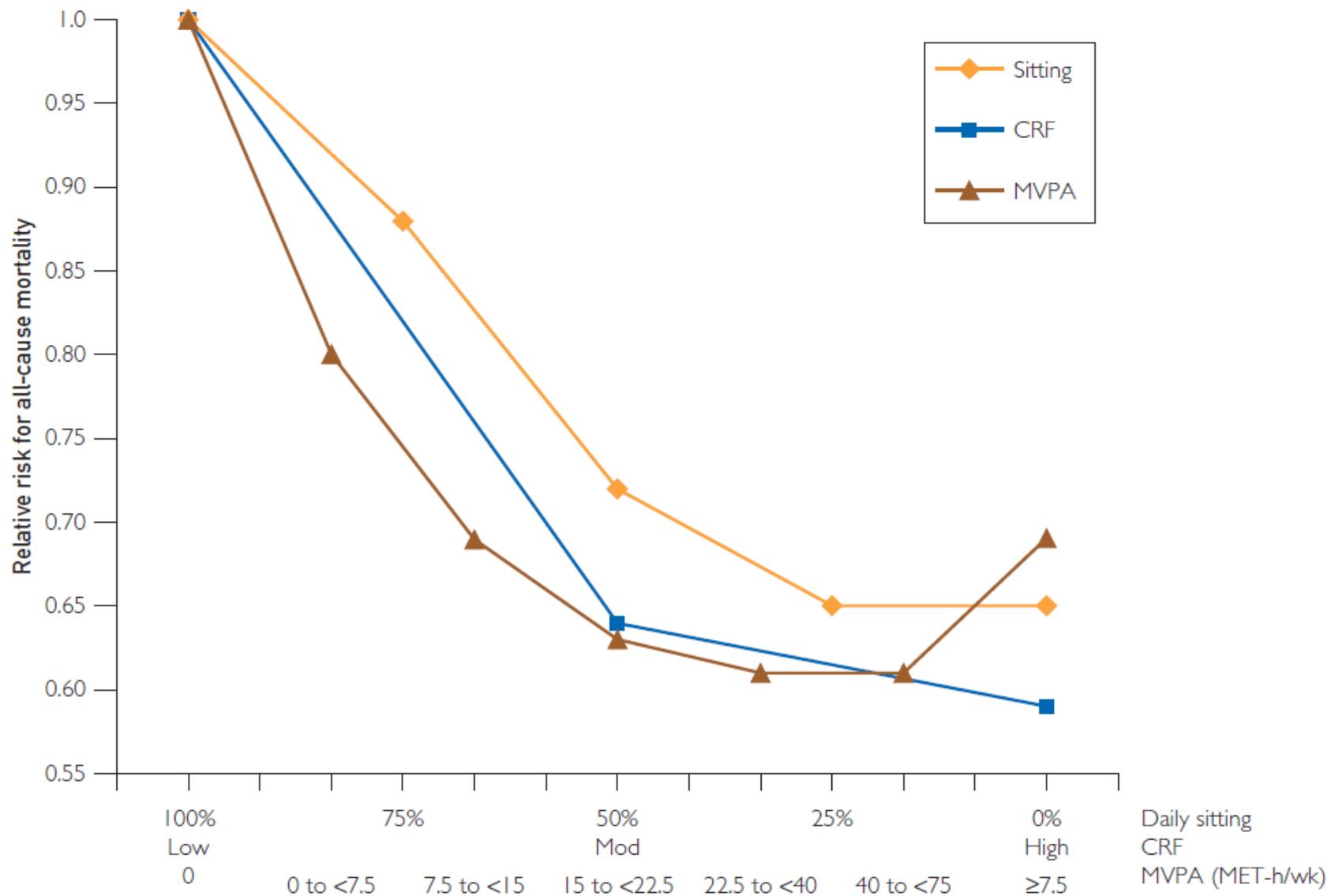
# Association of Sitting Time With Mortality and Cardiovascular Events in High-Income, Middle-Income, and Low-Income Countries

A Composite outcome



# Physical Activity Promotion in the Health Care System





**FIGURE 2.** Relative risks for all-cause mortality associated with daily sitting among 17,103 men and women followed up for a mean of 12.0 years,<sup>15</sup> cardiorespiratory fitness (CRF) from a meta-analysis of 102,980 participants from 33 published studies,<sup>25</sup> and moderate to vigorous physical activity (MVPA) among 661,137 men and women from 6 cohort studies followed up for a median of 14.2 years.<sup>21</sup> Relative risks are from models that include a variety of covariates as described in the original studies.

## Panel 1: Health benefits of physical activity in adults<sup>3-5</sup>

### Strong evidence of reduced rates of:

- All-cause mortality
- Coronary heart disease
- High blood pressure
- Stroke
- Metabolic syndrome
- Type 2 diabetes
- Breast cancer
- Colon cancer
- Depression
- Falling

### Strong evidence of:

- Increased cardiorespiratory and muscular fitness
- Healthier body mass and composition
- Improved bone health
- Increased functional health
- Improved cognitive function

## THE LANCET

The Lancet July 21, 2012 www.thelancet.com



"In view of the prevalence, global reach, and health effect of physical inactivity, the issue should be appropriately described as pandemic, with far-reaching health, economic, environmental, and social consequences."

Original Investigation | Nutrition, Obesity, and Exercise

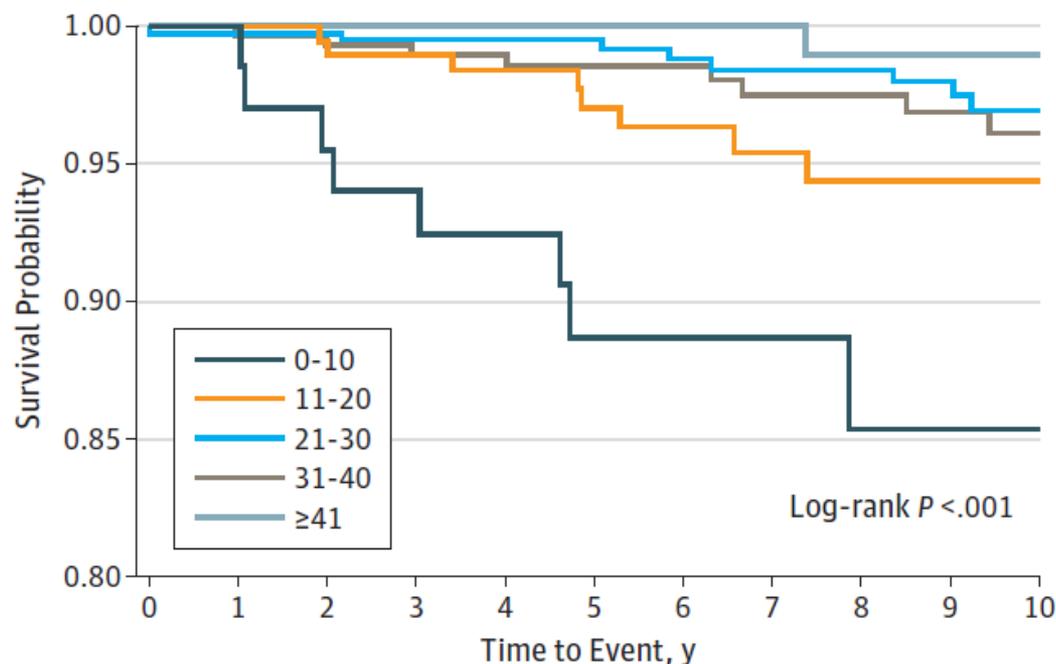
# Association Between Push-up Exercise Capacity and Future Cardiovascular Events Among Active Adult Men

Justin Yang, MD, MPH; Costas A. Christophi, PhD; Andrea Farioli, MD, PhD; Dorothee M. Baur, MD, MS; Steven Moffatt, MD; Terrell W. Zollinger, DrPH; Stefanos N. Kales, MD, MPH

**CONCLUSIONS AND RELEVANCE** The findings suggest that higher baseline push-up capacity is associated with a lower incidence of CVD events. Although larger studies in more diverse cohorts are needed, push-up capacity may be a simple, no-cost measure to estimate functional status.

# Association Between Push-up Exercise Capacity and Future Cardiovascular Events Among Active Adult Men

Figure. Kaplan-Meier Curves for the Cumulative Risk of Cardiovascular Disease Outcome in 5 Push-up Categories



No. at risk	0	1	2	3	4	5	6	7	8	9	10
0-10	75	68	63	60	53	39	32	28	26	23	17
11-20	200	200	186	184	172	139	118	96	89	78	63
21-30	389	386	382	375	368	310	275	238	227	202	155
31-40	285	283	276	271	267	232	208	179	169	148	120
≥41	155	153	151	149	147	129	112	99	92	86	63

# THE LANCET

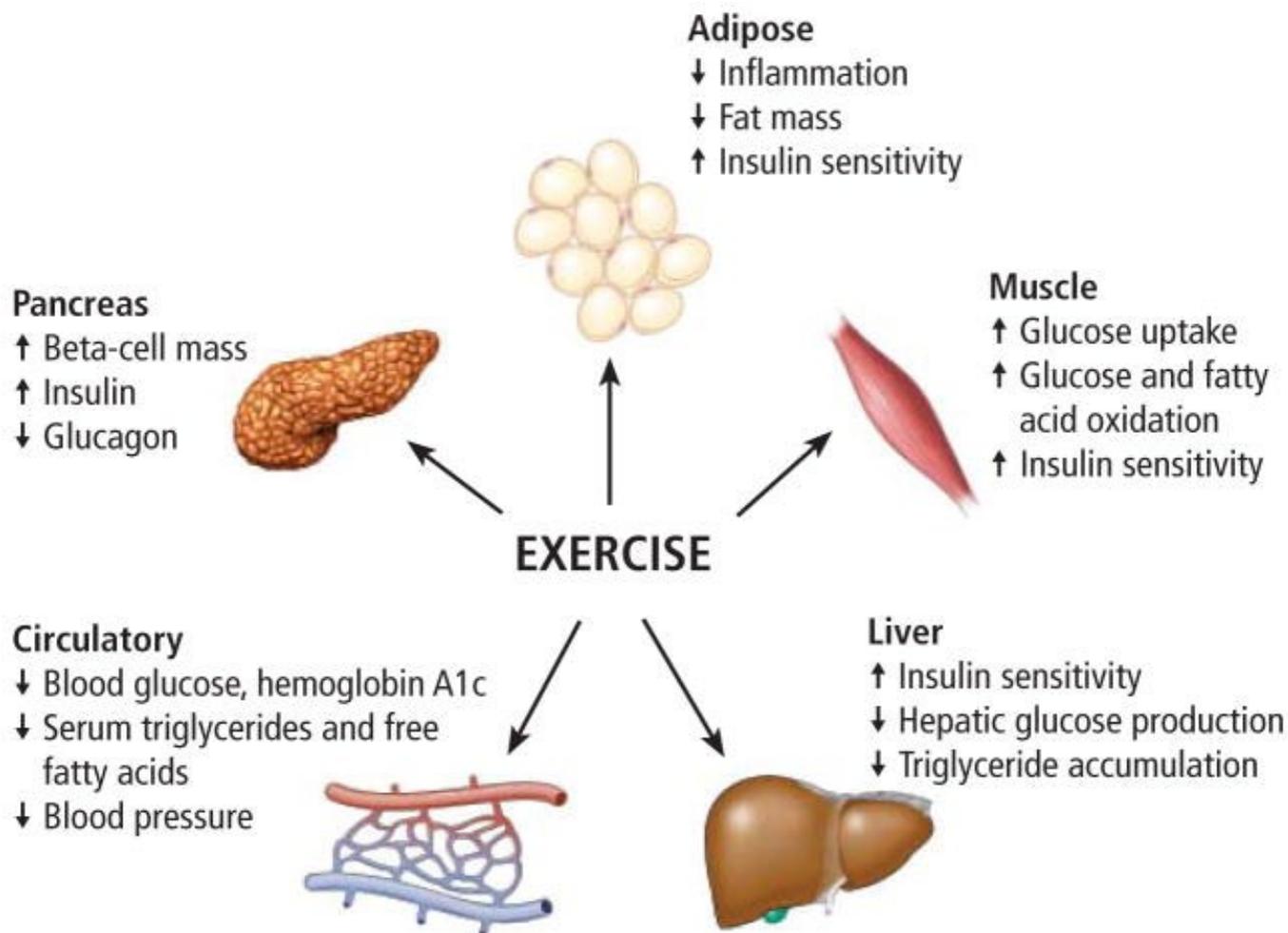
July, 2016

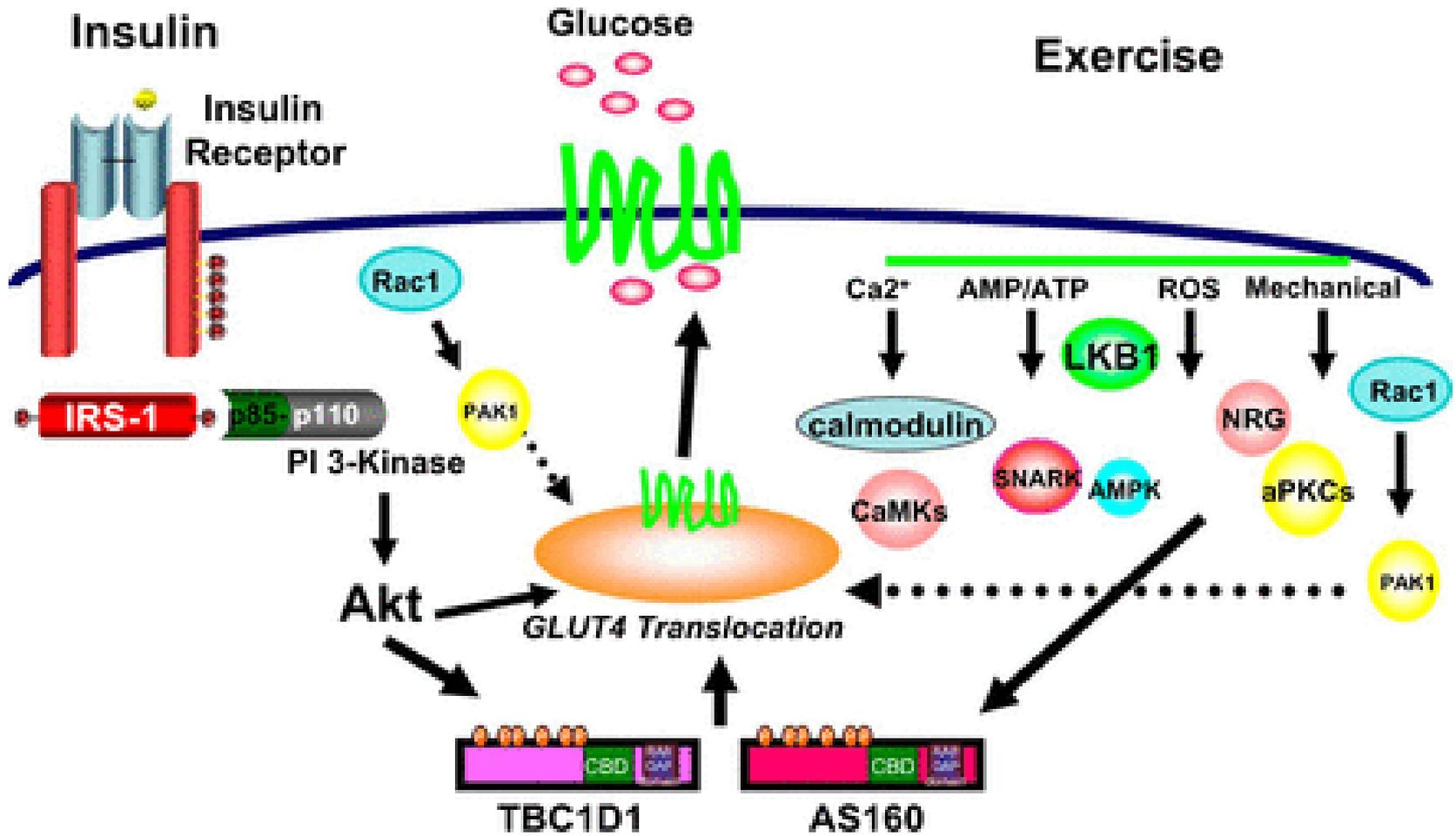
[www.thelancet.com](http://www.thelancet.com)

## Physical Activity 2016: Progress and Challenges

“We urge all sectors of government and society to take immediate, bold actions to help make active living a more desired, affordable, and accessible choice for all population groups.”

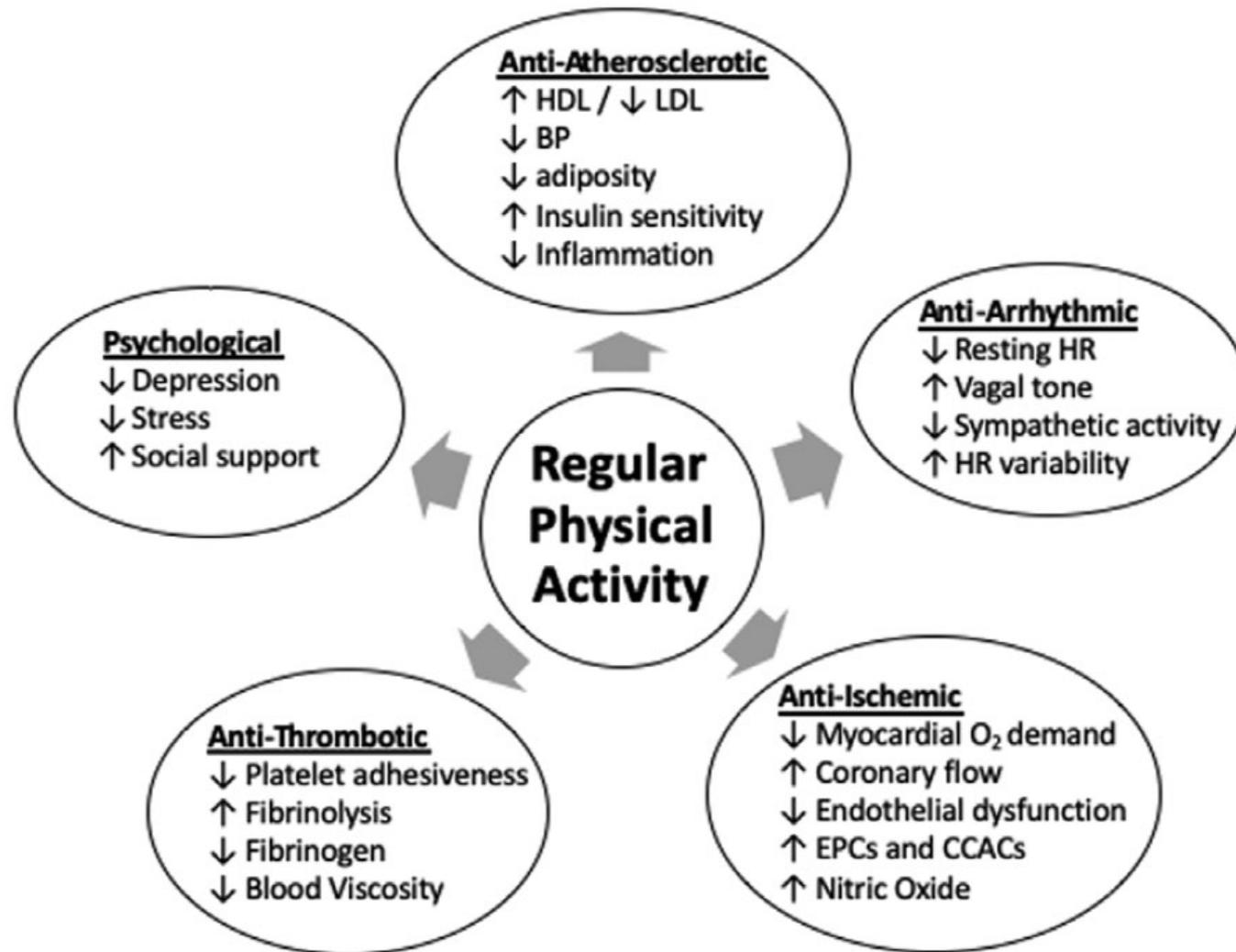
# The essential role of exercise in the management of type 2 diabetes

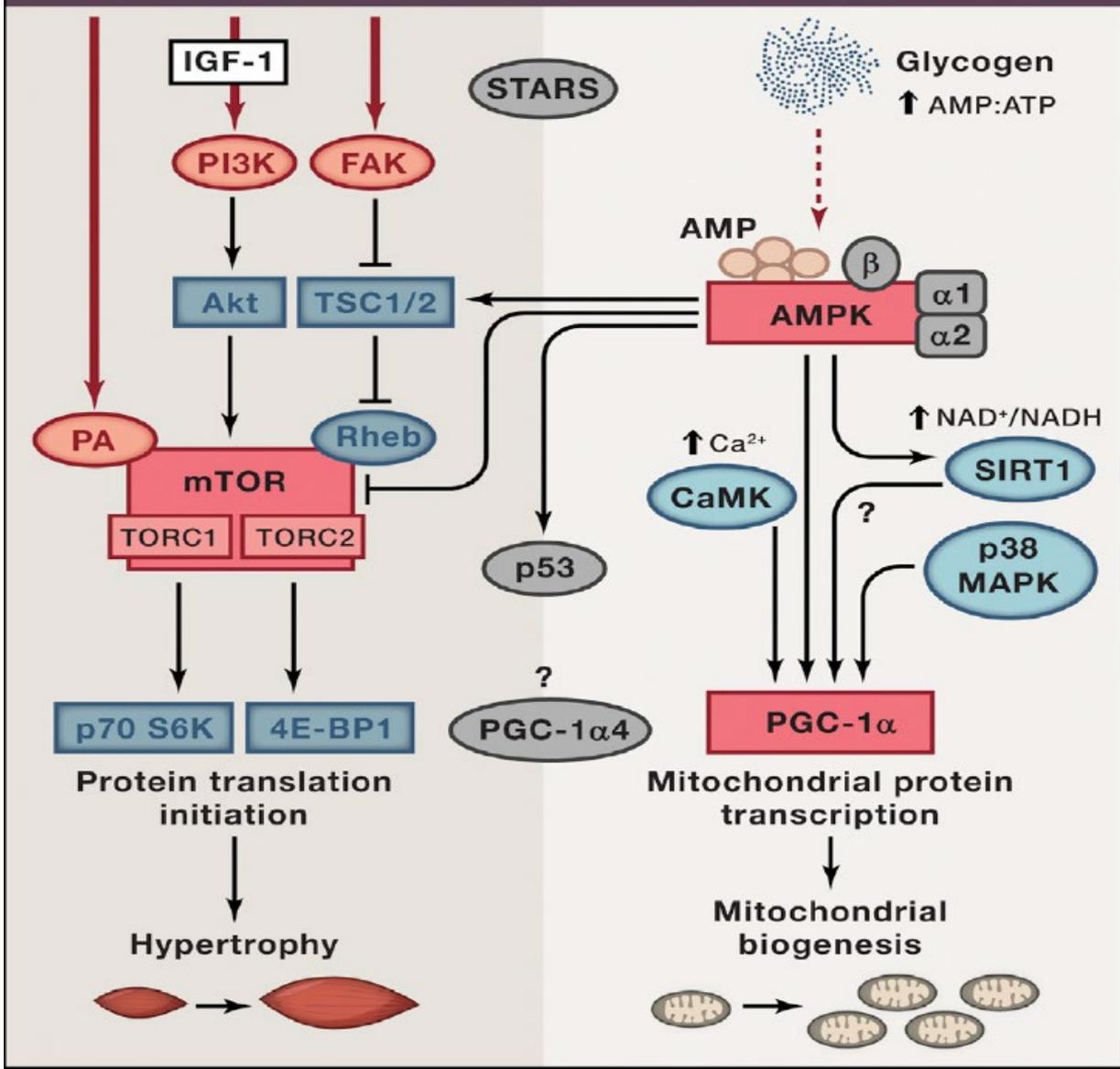




Exercise and type 2 diabetes: molecular mechanisms regulating glucose uptake in skeletal muscle

# Figure 1. Cardioprotective effects of regular physical activity.





**“An obligation for primary care physicians to prescribe physical activity to sedentary patients to reduce the risk of chronic health conditions.”**

*Mayo Clin Proc. 2002 Feb;77(2):165-73.*

# Prescripción del Ejercicio

*FITT - PR*

Frecuencia

Intensidad

Tiempo (duración)

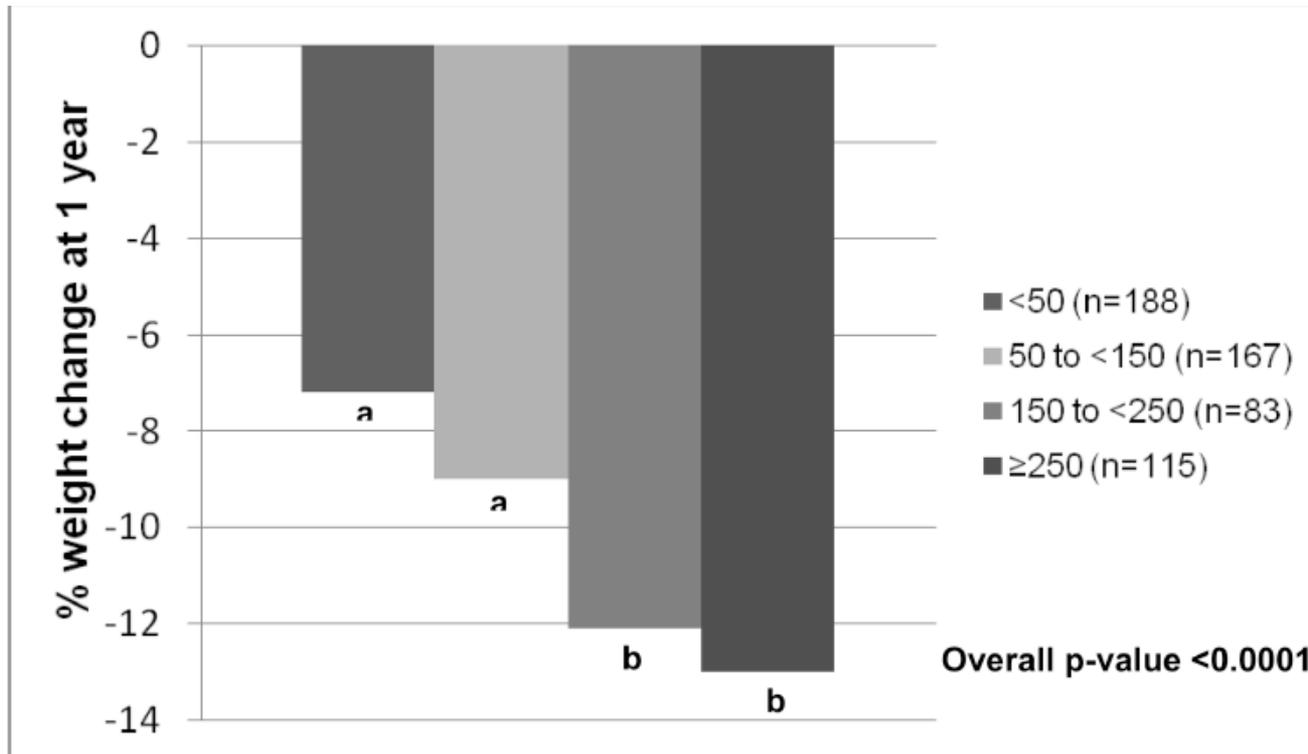
Tipo de ejercicio

Progresión

Recuperación

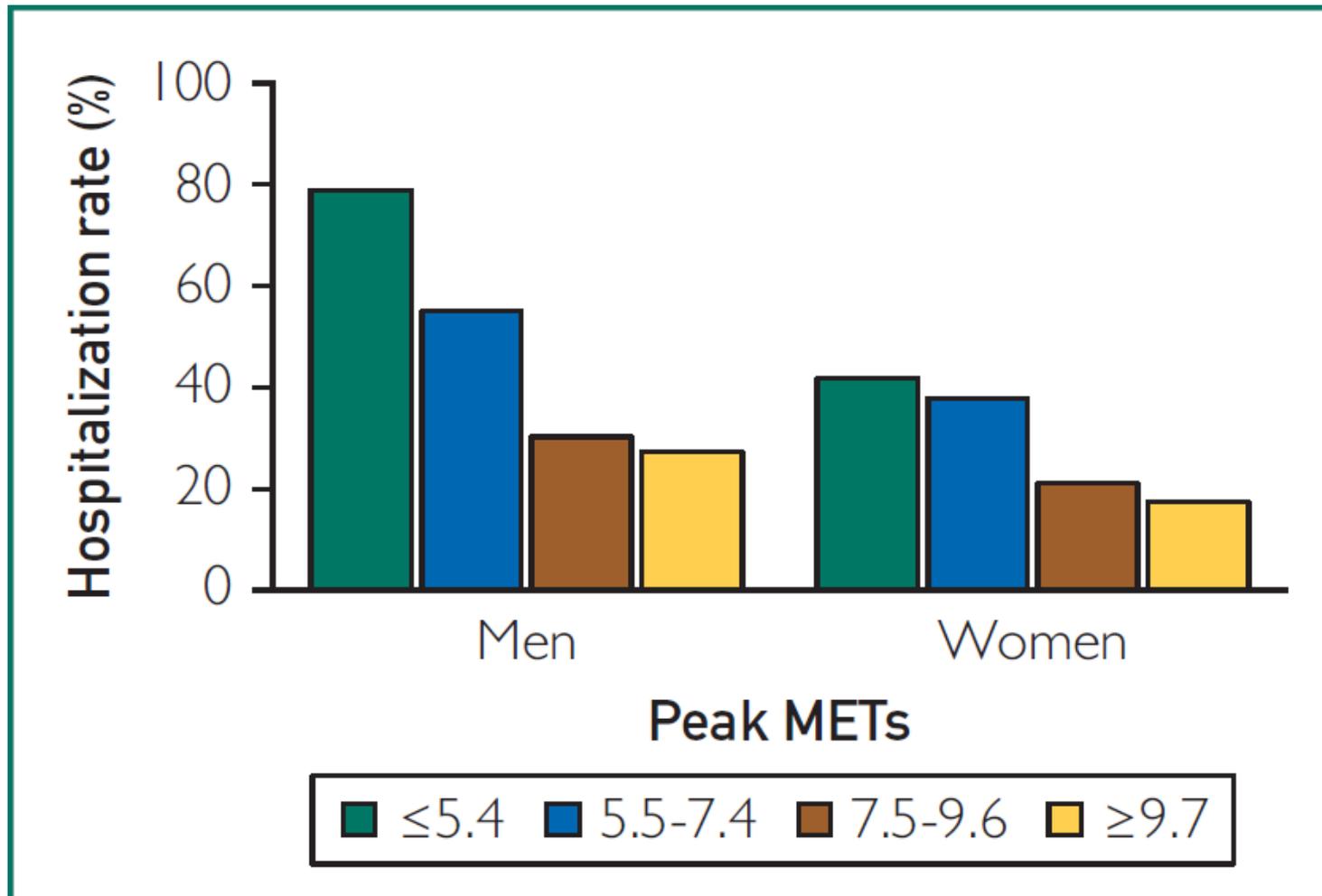
# Objectively-assessed physical activity and weight loss maintenance among individuals enrolled in a lifestyle intervention

## Perdida de Peso a 1 año



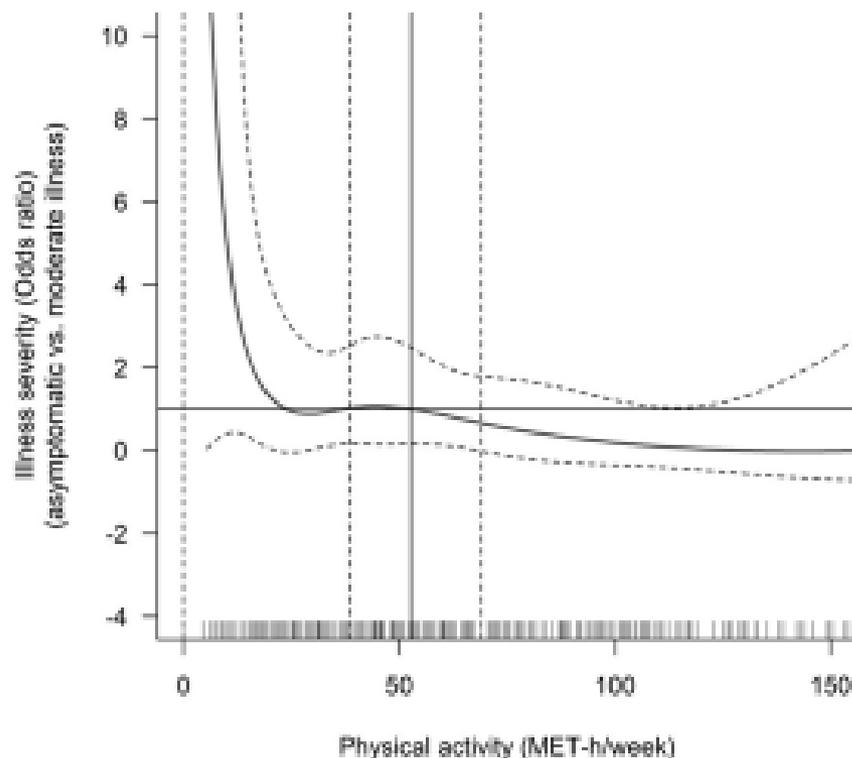
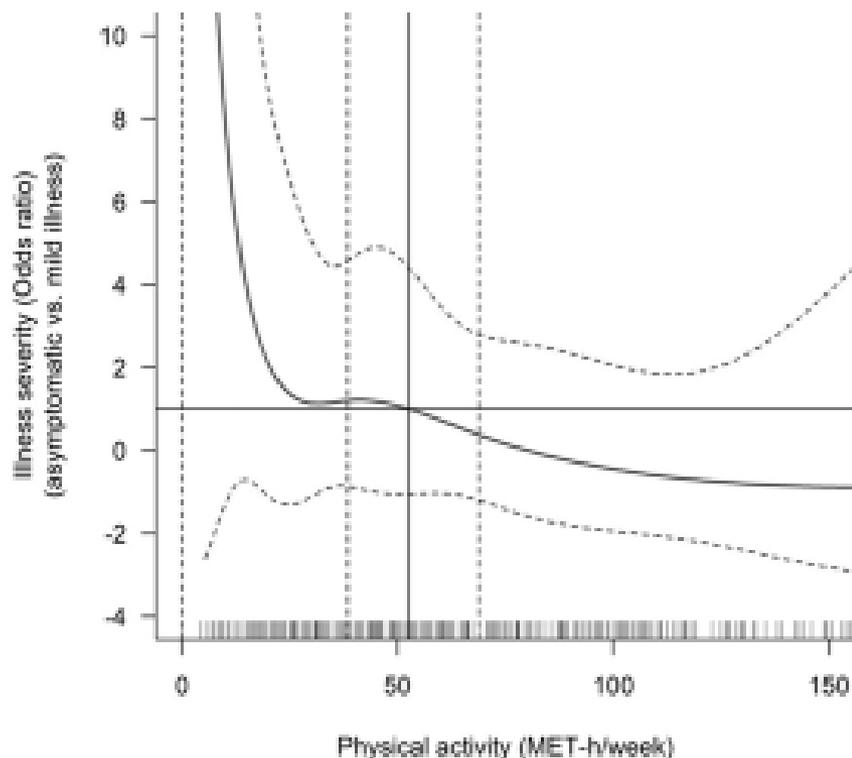
*Obesity (Silver Spring)*. 2017 November ; 25(11): 1903–1909.

# Capacidad de Ejercicio y Hospitalización por COVID 19



4. Brawner CA, Ehrman JK, Bole S, Kerrigan DJ, Parikh SS, Lewis BK, et al. Inverse Relationship of Maximal Exercise Capacity to Hospitalization Secondary to Coronavirus Disease 2019. Mayo Clin Proc. 2021 Jan 1;96(1):32-

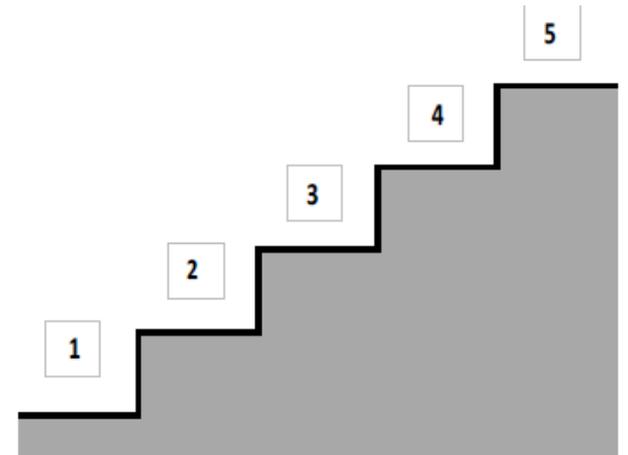
# Associations between physical activity prior to infection and COVID-19 disease severity and symptoms: results from the prospective Predi-COVID cohort study



# CAMBIO COMPORTAMENTAL

2. En cuál escalón usted cree que se encuentra para la práctica de actividad física (señale en el dibujo):

5. Realizo actividad física y estoy convencido de no abandonarla
4. Realizo actividad física de manera regular desde hace más de 6 meses
3. Realizo actividad física de manera regular desde hace menos de 1 mes
2. No realizo, pero tengo la intención de empezar en los próximos 6 meses
1. No realizo, no tengo la intención de empezar





# CAMBIO COMPORTAMENTAL

# BARRERAS COMUNES

3. Por favor marque su principal motivación y barrera para realizar actividad física:

## Motivaciones

- Quiero bajar de peso
- Quiero mejorar mi condición física
- Quiero tener reconocimiento social
- Quiero estar a la moda
- Por salud
- Manejo de stress
- Por placer
- Otra: \_\_\_\_\_

## Barreras

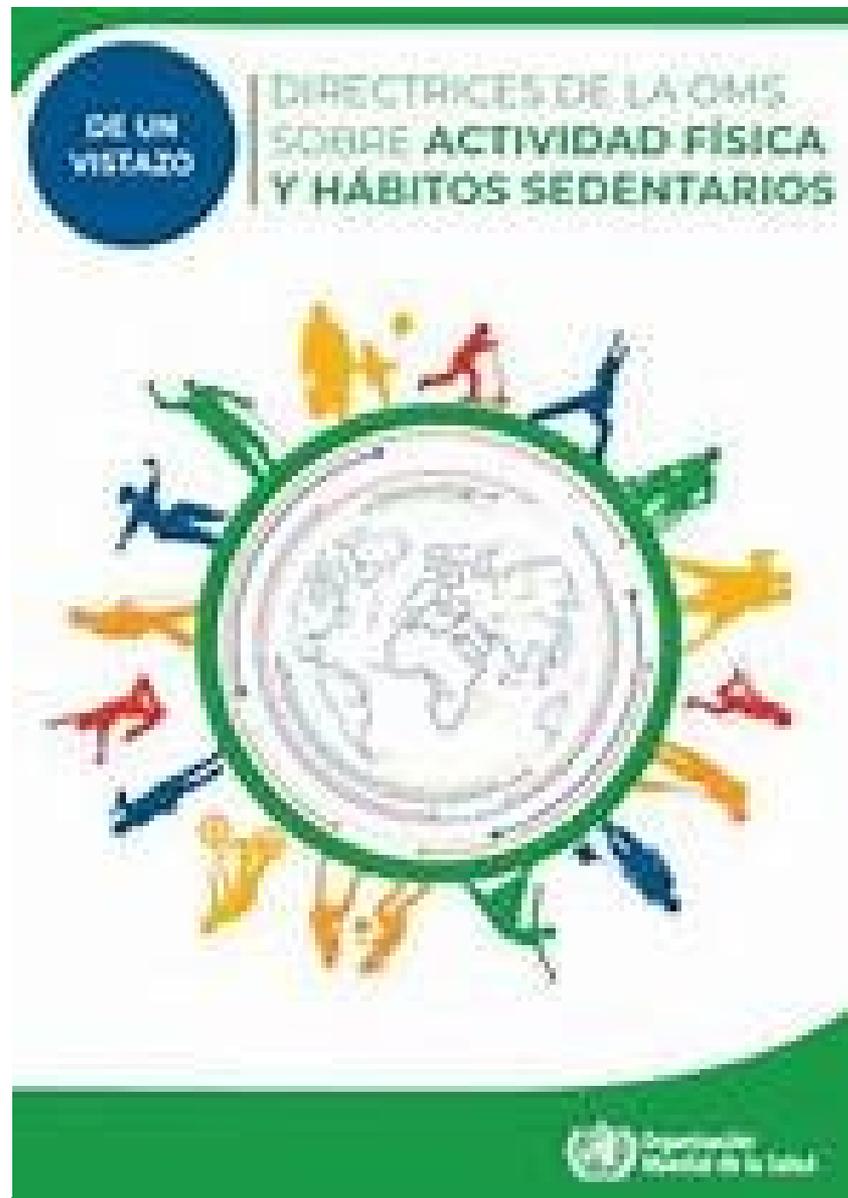
- Falta de tiempo
- Falta de interés
- Falta de dinero para ir al gimnasio
- Me parece aburrido
- No se que ejercicio practicar
- Estoy muy viejo para empezar
- Me siento inseguro y me da miedo
- Otra: \_\_\_\_\_

4. Señale con un círculo sus preferencias y gustos en actividad física:

Bailar      Gimnasio      Caminar      Nadar      Tenis      Bici      Fútbol      Otros \_\_\_\_\_

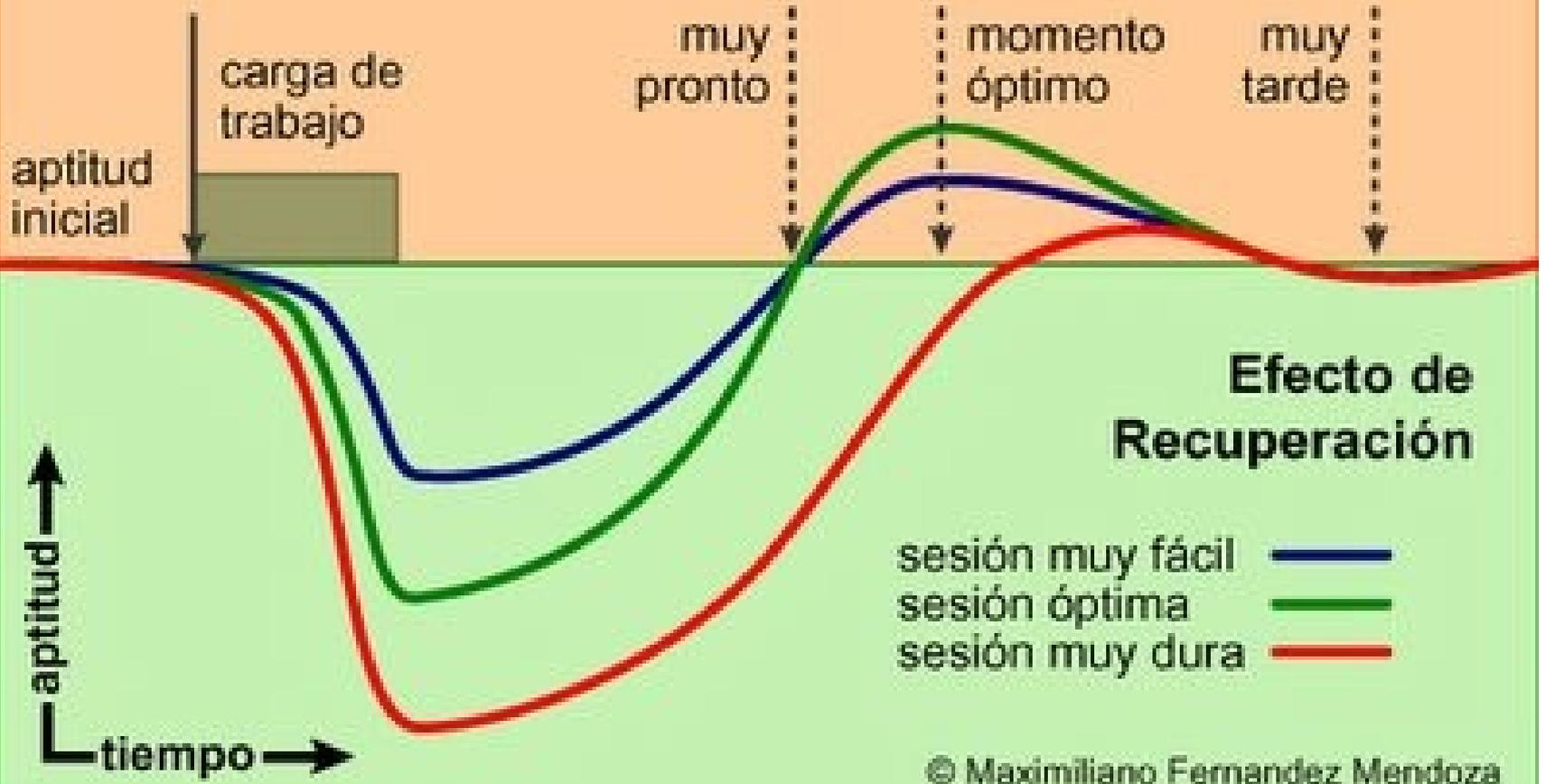


Oganización  
Mundial de la Salud



# Efecto de Entrenamiento

próxima carga de trabajo



# **Tipo**

¿Cuál es el mejor ejercicio?

**“El mejor tipo ejercicio es el que se ajuste al paciente, sus motivaciones y su vida cotidiana...”**

# Prescripción del ejercicio



**Una guía para recomendar  
actividad física a cada paciente**

John Duperly, MD, PhD  
Felipe Lobelo, MD, PhD



**John Duperly** es director del Centro Regional de Exercise is Medicine® (EIM®) América Latina. Es especialista en Medicina Interna y PhD en Medicina del Deporte, miembro institucional de la Fundación Santa Fe de Bogotá y profesor asociado de la Facultad de Medicina de la Universidad de Los Andes. Es representante del Presidente de la República de Colombia ante el Consejo Nacional del Deporte, la Recreación, la Actividad Física y el Aprovechamiento del Tiempo Libre.

**Felipe Lobelo** es profesor asociado del Departamento de Salud Global de la Escuela de Salud Pública de la Universidad de Emory y vicepresidente del Comité de Actividad Física de la Asociación Americana del Corazón (AHA). Es autor de más de 60 publicaciones científicas y miembro de la junta asesora de la iniciativa global EIM® del Colegio Americano de Medicina del Deporte (ACSM), del cual es director de su Centro Global de Investigación y Colaboración.

# **Routine Assessment and Promotion of Physical Activity in Healthcare Settings**

## **A Scientific Statement From the American Heart Association**

adult patients. It also adds concrete recommendations for healthcare systems, clinical and community care providers, fitness professionals, the technology industry, and other stakeholders in order to catalyze increased adoption of physical activity assessment and promotion in healthcare settings and to contribute to meeting the American Heart Association's 2020 Impact Goals.

**Felipe Lobelo, MD, PhD,  
FAHA, Chair**

**Deborah Rohm Young,  
PhD, FAHA, Vice Chair**

**Robert Sallis, MD**

**Michael D. Garber, MPH**

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**Michael V. McConnell,  
MD, MSEE, FAHA**

**Elizabeth A. Joy, MD, MPH**

# Mantente **Activo** Aun Cuando Te **Sientas Frágil**

Exe*R*cise  
is Medicine®

AMERICAN COLLEGE  
of SPORTS MEDICINE®

Estar **activo** cuando tienes  
**enfermedad  
renal crónica**

Estar **activo** con la  
**presión  
arterial alta**

Estar **activo** cuando  
tienes **depresión  
o ansiedad**

Estar **activo** cuando  
tiene **artritis  
reumatoide**

Estar **activo**  
cuando tienes  
**diabetes tipo 2**

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