

Introductory Remarks

State of the Science on the Biological Importance of Diet and Physical Activity in Disease Risk Reduction and Health Maintenance

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Centro de Investigación Biomédica en Red
Fisiopatología de la Obesidad y Nutrición

Conflict of Interest Disclosure

I have no conflict of interest to report in relation to this presentation.

THE GLOBAL BURDEN OF MALNUTRITION 2016

OUT OF A WORLD POPULATION OF
7 BILLION



About **2 billion** people suffer from micronutrient malnutrition



Nearly **800 million** people suffer from calorie deficiency

OUT OF **5 BILLION**
ADULTS WORLDWIDE



Nearly **2 billion** are overweight or obese



One in 12 has type 2 diabetes

OUT OF **667 MILLION** CHILDREN UNDER AGE 5 WORLDWIDE



159 million under age 5 are too short for their age (stunted)



50 million do not weigh enough for their height (wasted)

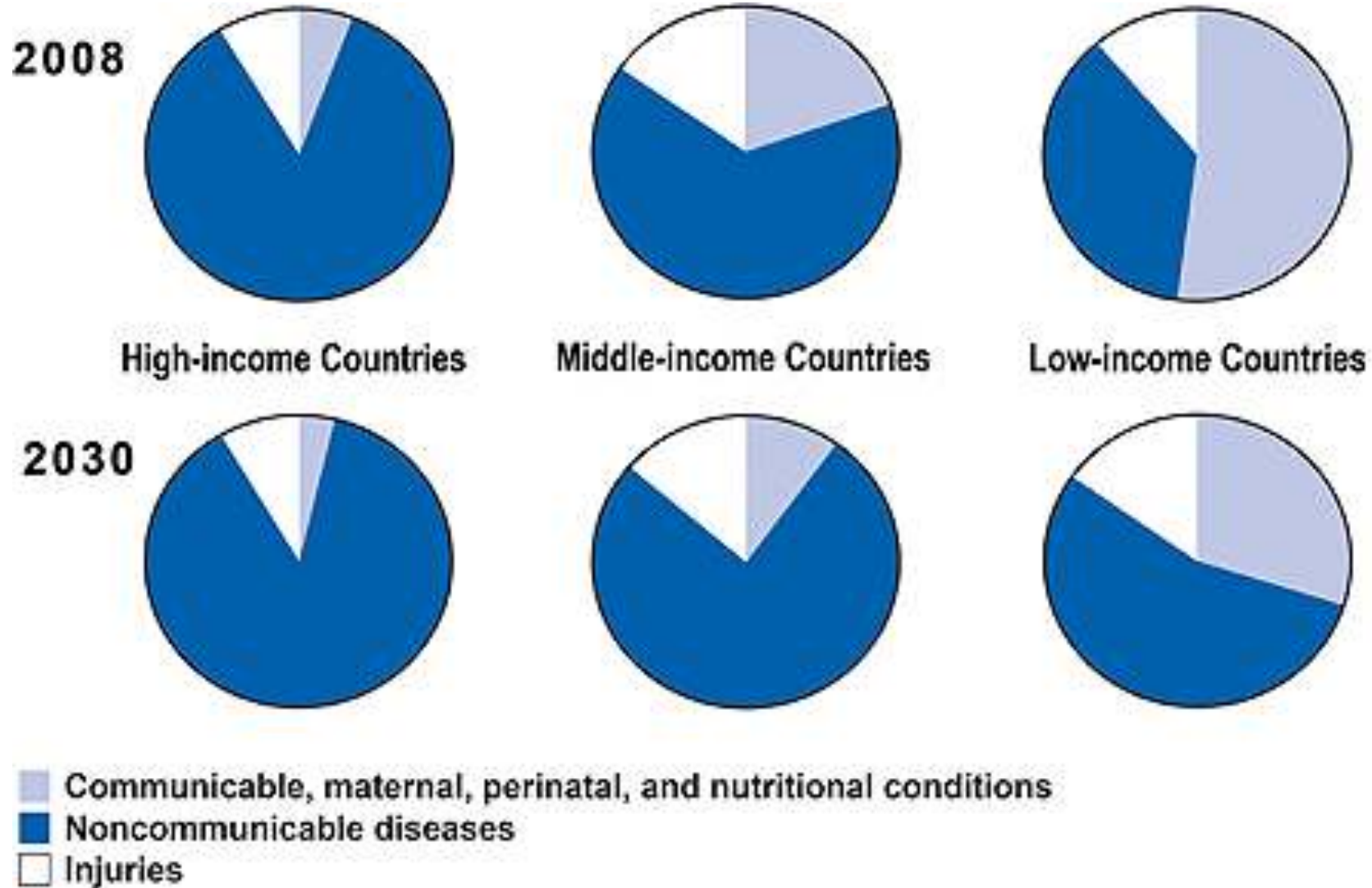


41 million are overweight

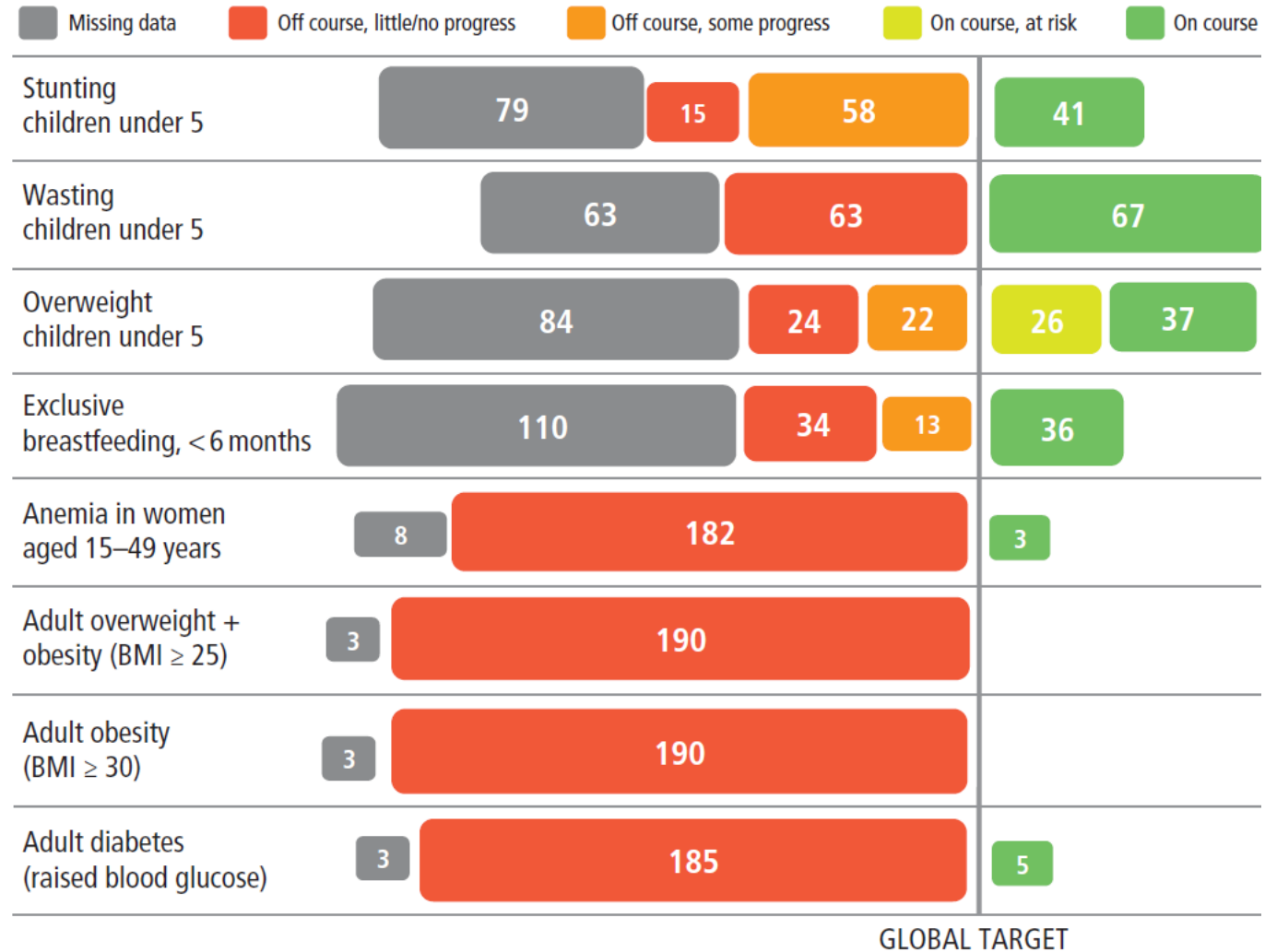
OUT OF 129 COUNTRIES WITH DATA, **57 COUNTRIES**

have serious levels of both undernutrition and adult overweight (including obesity)

PREVALENCE OF NON-COMMUNICABLE CHORNIC DISEASES



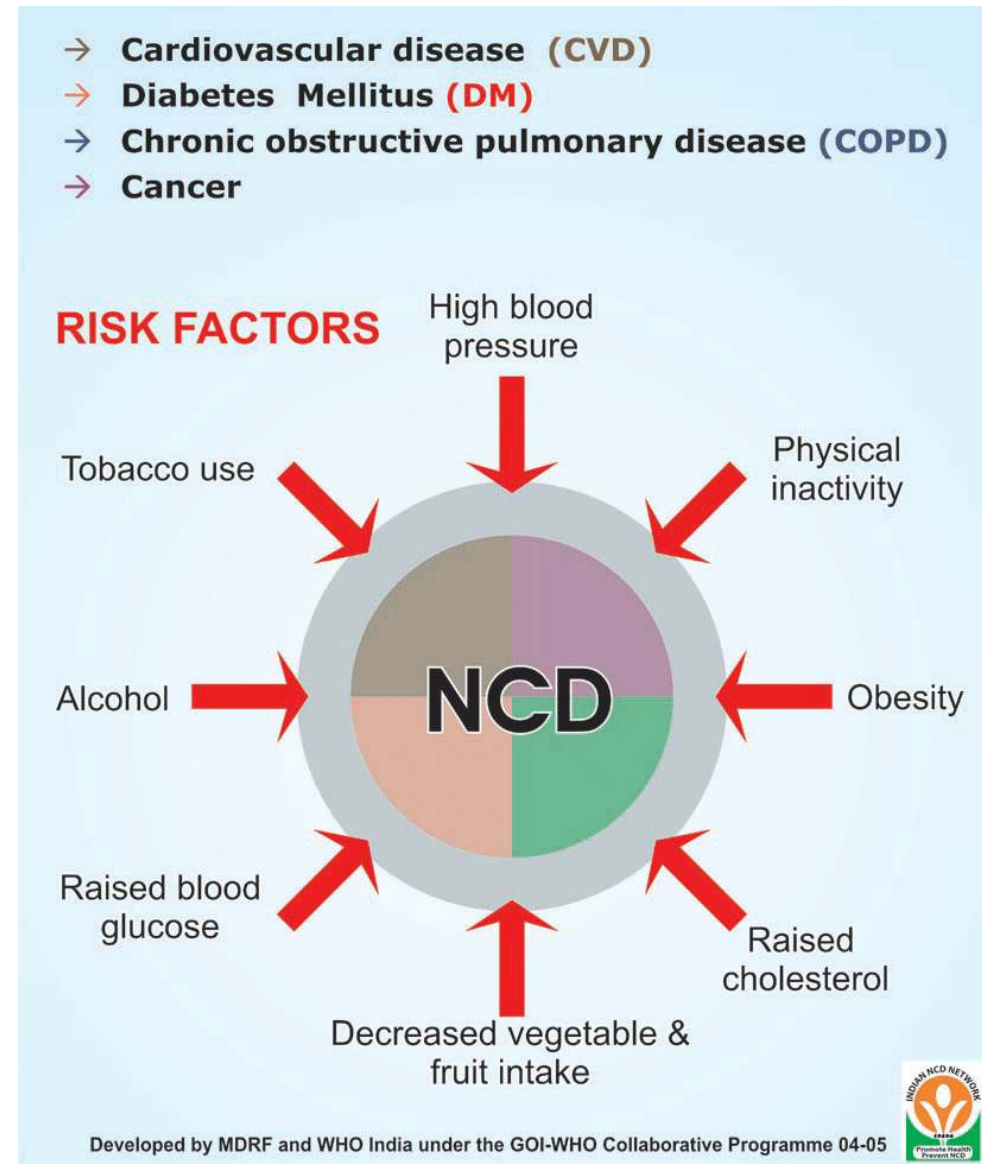
PROGRESS OF COUNTRIES RELATED TO GLOBAL SUSTAINABLE GOALS FOR 2030



Data based on Stevens et al. (2013), UNICEF (2016b), UNICEF, WHO, and World Bank (2015)

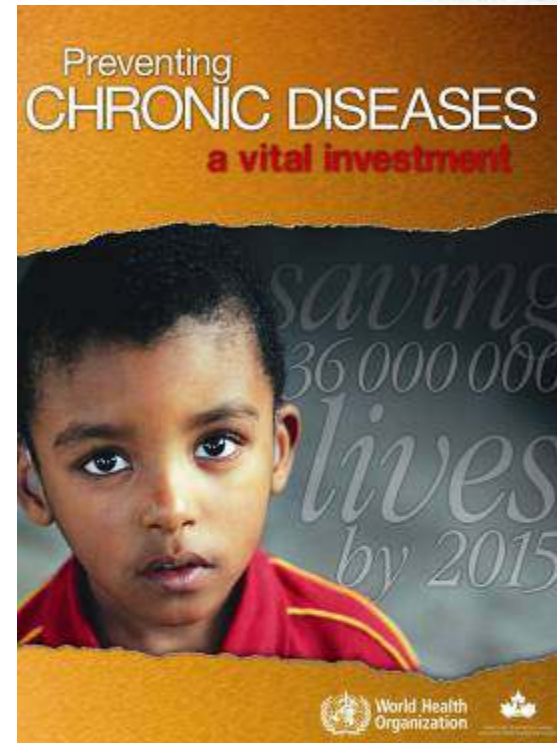
RISK FACTORS OF NCCD

- ▶ **Cardiovascular disease**
- ▶ **Diabetes**
- ▶ **Cancer**
- ▶ **Chronic respiratory disease**
- ▶ **Hypertension**
- ▶ **Dyslipidemia**
- ▶ **Obesity**
- ▶ **Metabolic syndrome**
- ▶ **Arthritis**
- ▶ **Osteopenia/osteoporosis**
- ▶ **Degenerative disc disease**
- ▶ **Depression**
- ▶ **Sarcopenia and frailty**
- ▶ **Cognitive impairment**
- ▶ **Cerebrovascular disease**
- ▶ **Neurodegenerative disease**
- ▶ **Rheumatoid arthritis**



Preventing CHRONIC DISEASES a vital investment

**ii Mortality due to NCCD
could be reduced by 50% by
application of recent
knowledge ii**



FRUITS AND VEGETABLES IN THE PREVENTION OF NCCD

Cancer

Gerber *et al*, 2002
Arts & Hollman, 2005



Obesity

Epstein *et al*, 2008
Epstein *et al*, 2001

Cardiovascular diseases

Hertog *et al*, 1993a
Hertog *et al*, 1995

Type 2 diabetes

Van dam & Hu, 2005
Rosengren *et al*, 2004

Preventive nutrition Bioactive compounds from plants

**Development of vegetal extracts
to balance lifestyle**

Campaign in different countries to
promote the consumption of Fruits
and Vegetables

Review

A Systematic Review of the Efficacy of Bioactive Compounds in Cardiovascular Disease: Phenolic Compounds

Oscar D. Rangel-Huerta, Belen Pastor-Villaescusa, Concepcion M. Aguilera and Angel Gil *

Evidence shows that some polyphenols used as BAC such as flavonols are helpful in decreasing risk factors of CVD. However, it is necessary to develop better quality RCTs (crossover design, double-blinded, long term, placebo/controlled) as well as elaborate rigorous meta-analysis of existing evidence to support the effect of BAC on the prevention and treatment of CVD.



Review

Nutrimetabolomics: An Update on Analytical Approaches to Investigate the Role of Plant-Based Foods and Their Bioactive Compounds in Non-Communicable Chronic Diseases

Oscar Daniel Rangel-Huerta ¹ and Angel Gil ^{1,2,*}

Metabolomics is a powerful tool to investigate the potential protective role of BACs in the prevention and treatment of non-communicable chronic diseases, namely cardiovascular disease, diabetes, and cancer.

Fats and fatty acids in human nutrition

Report of an expert consultation

ISSN 0254-4725

FAO
FOOD AND
NUTRITION
PAPER

91

Grasas y ácidos grasos en nutrición humana

Consulta de expertos

ISSN 0254-4725
FAO FOOD AND NUTRITION PAPER

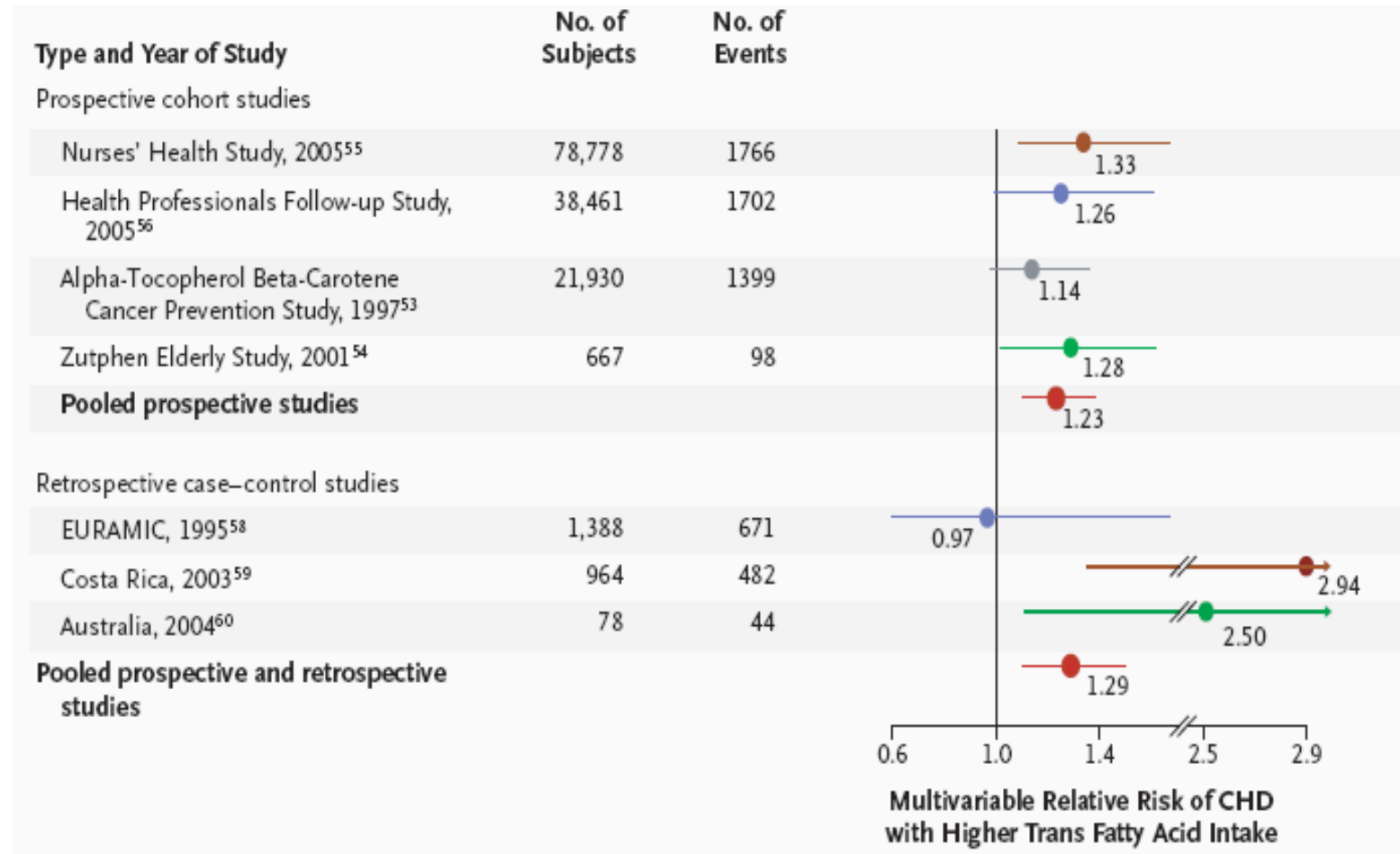
ESTUDIO FAO
ALIMENTACIÓN
Y NUTRICIÓN

91

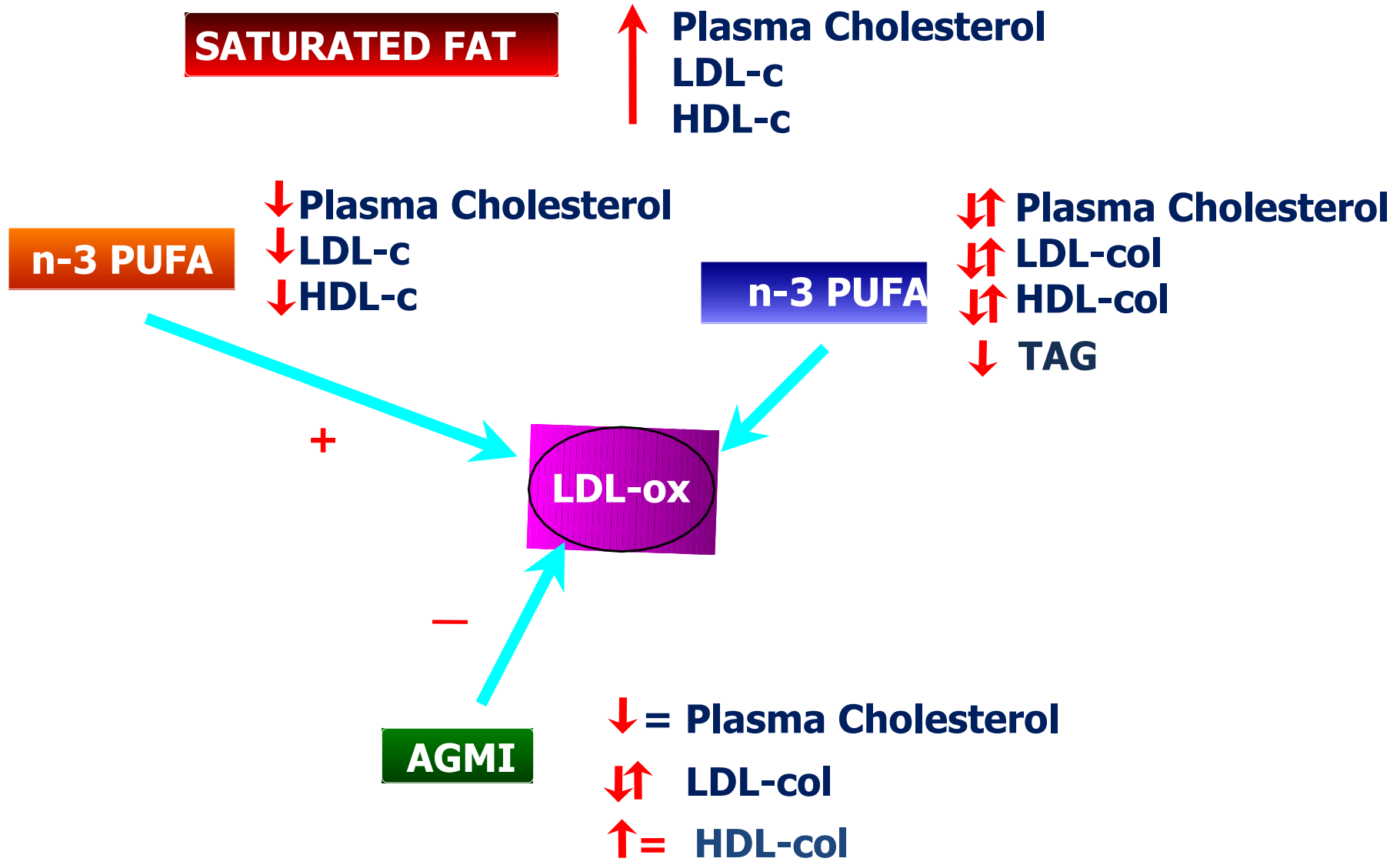


WWW.FINUT.ORG

RELATIVE RISKS OF CVD ASSOCIATED TO THE INTAKE OF *trans* FATTY ACID INTAKE



EFFECT OF FAT TYPE INTAKE ON LDL OXIDATION



BJN

BRITISH JOURNAL OF NUTRITION

Volume: 107

Supplement 2

June 2012

An International Journal
of Nutritional Science

Supplement

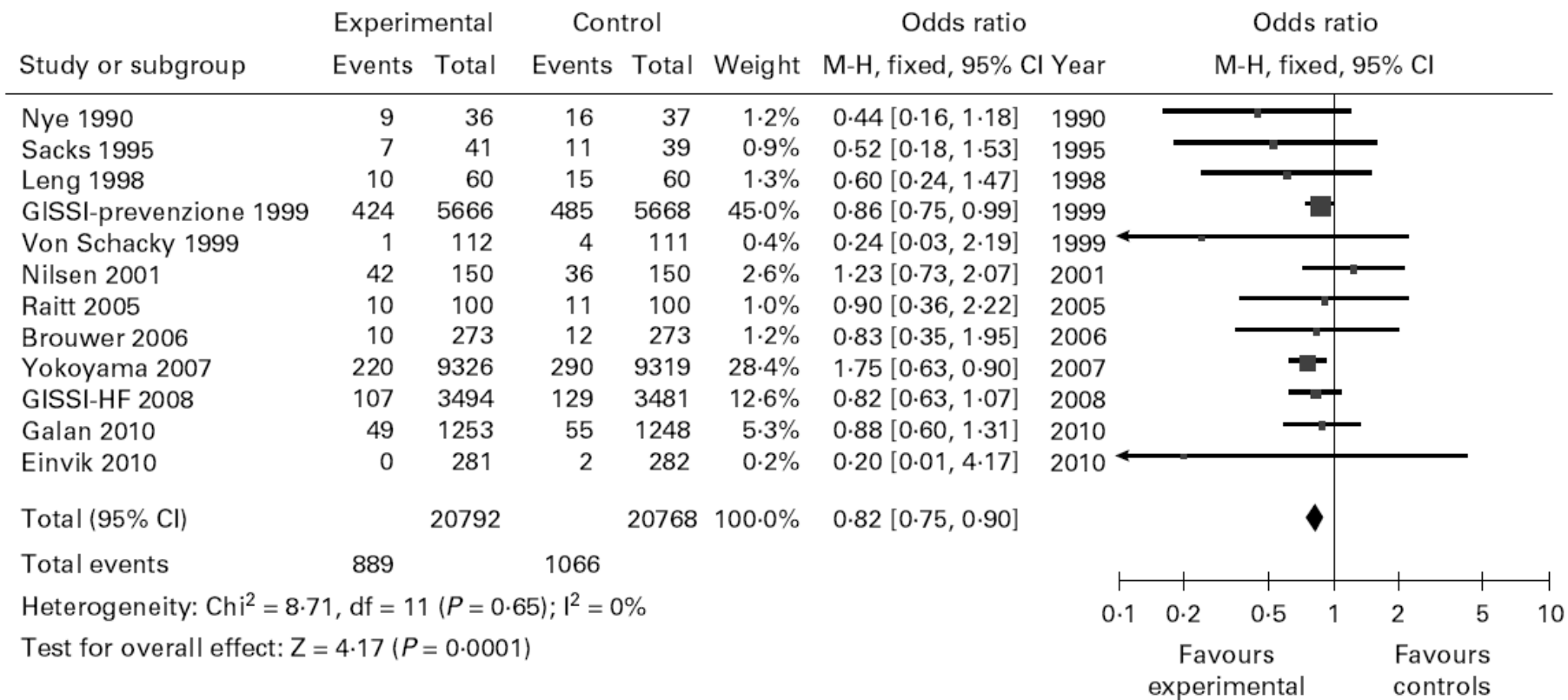
Systematic reviews of the role of omega-3 fatty acids in the prevention and treatment of disease

Guest Editor: Angel Gil

Associated Guest-Editors: Luis Serra, Philip Calder, Ricardo Uauy



n-3 PUFA AND CORONARY EVENTS





ELSEVIER

Contents lists available at ScienceDirect

Clinical Nutrition

journal homepage: <http://www.elsevier.com/locate/clnu>



Review

Omega 3 fatty acids in cardiovascular disease risk factors: An updated systematic review of randomised clinical trials

Oscar D. Rangel-Huerta ^a, Angel Gil ^{a, b, *}

The use of omega-3 LC-PUFAs for ameliorating CVD risk factors can be recommended. However, the administration of omega-3 does not seem to show any benefit for the management of CVD or associated complications

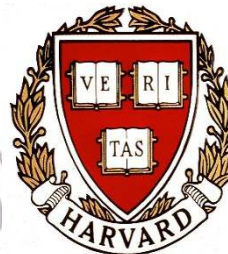
Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy

*I-Min Lee, Eric J Shiroma, Felipe Lobelo, Pekka Puska, Steven N Blair, Peter T Katzmarzyk, for the Lancet Physical Activity Series Working Group**

THE LANCET
2012



Dr. I-Min Lee
THOUGHT LEADERS SERIES
...insight from the world's leading experts



Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy

*I-Min Lee, Eric J Shiroma, Felipe Lobelo, Pekka Puska, Steven N Blair, Peter T Katzmarzyk, for the Lancet Physical Activity Series Working Group**

CONCLUSION

If inactivity were not eliminated, but decreased instead by 10% or 25%, more than 533 000 and more than 1·3 million deaths, respectively, could be SAVED every year.

The economic burden of physical inactivity: a global analysis of major non-communicable diseases

*Ding Ding, Kenny D Lawson, Tracy L Kolbe-Alexander, Eric A Finkelstein, Peter T Katzmarzyk, Willem van Mechelen, Michael Pratt, for the Lancet Physical Activity Series 2 Executive Committee**



THE LANCET
2016



Conservatively estimated...

physical inactivity cost health-care systems

53.8\$ billion worldwide in 2013

**What is more important for
health increasing physical activity
or decreasing sedentarism?**

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

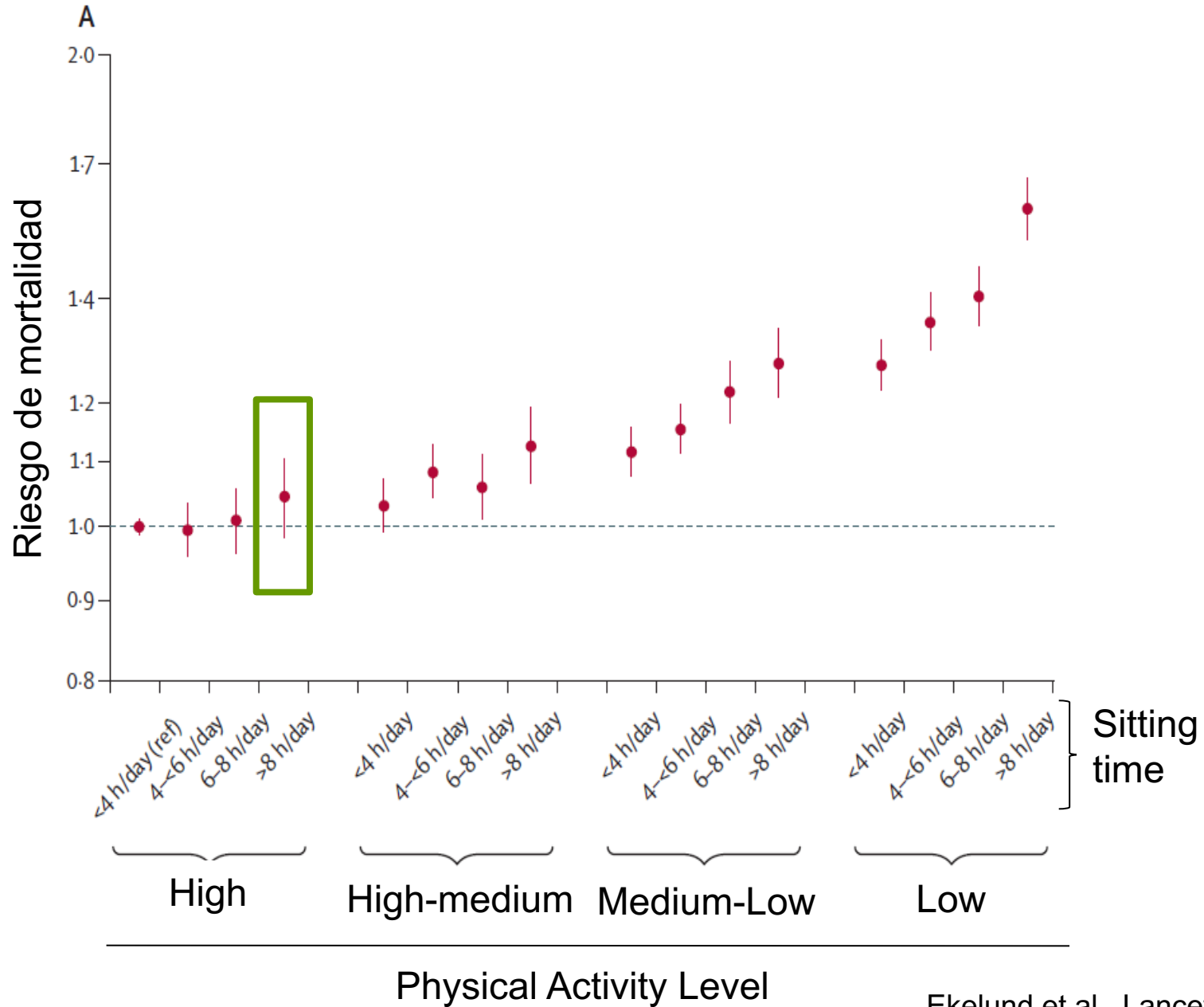
Ulf Ekelund, Jostein Steene-Johannessen, Wendy J Brown, Morten Wang Fagerland, Neville Owen, Kenneth E Powell, Adrian Bauman, I-Min Lee, for the Lancet Physical Activity Series 2 Executive Committee and the Lancet Sedentary Behaviour Working Group**



THE LANCET
2016



PHYSICAL ACTIVITY, SEDENTARISM AND HEALTH



HOW IMPORTANT IS FITNESS?

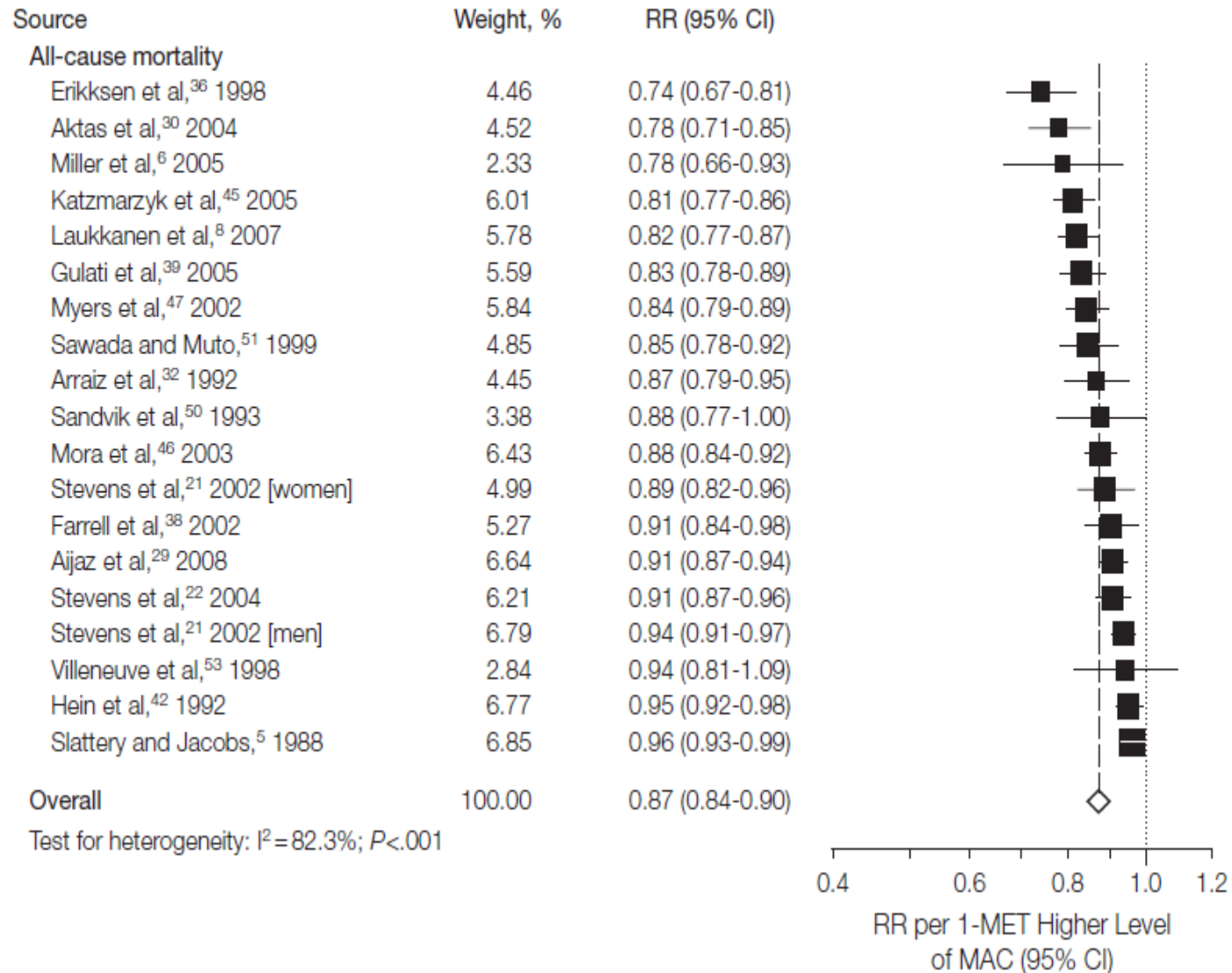
JAMA[®]

Cardiorespiratory Fitness as a Quantitative Predictor of All-Cause Mortality and Cardiovascular Events in Healthy Men and Women: A Meta-analysis

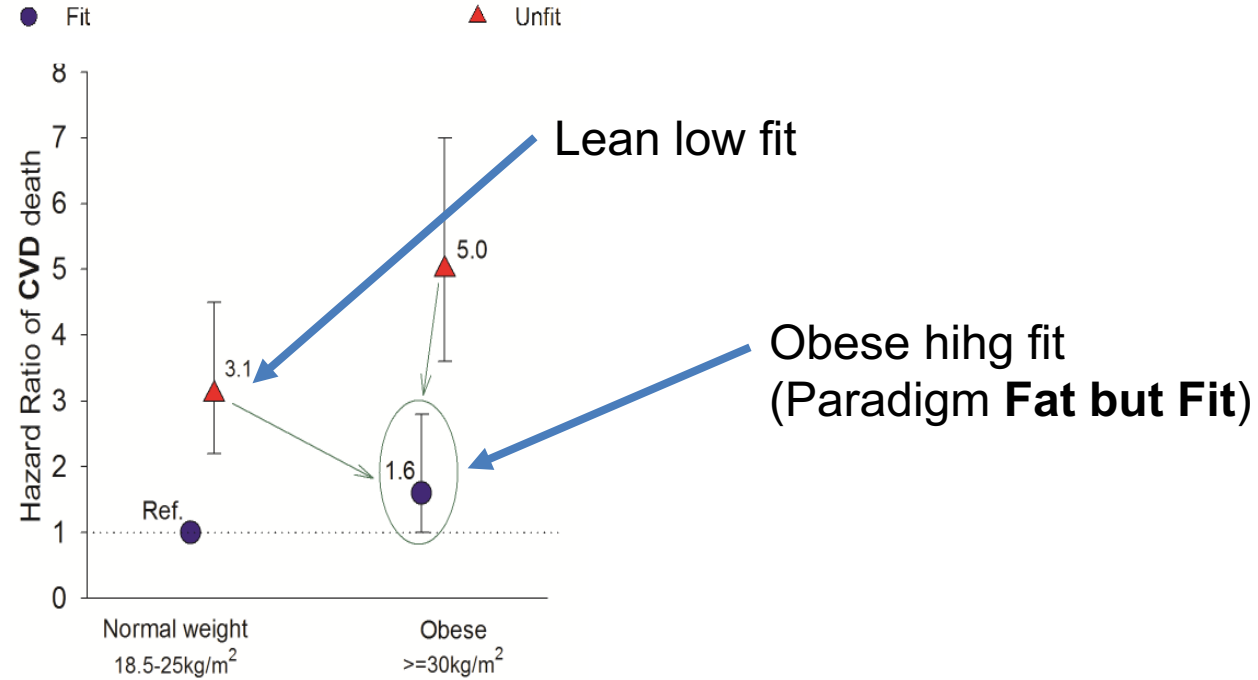
Satoru Kodama; Kazumi Saito; Shiro Tanaka; et al.

JAMA. 2009;301(19):2024-2035 (doi:10.1001/jama.2009.681)

Figure 2. Meta-analysis of All-Cause Mortality and CHD/CVD per 1-MET Higher Level of MAC




Lean low fit vs. Obese but fit



RESEARCH

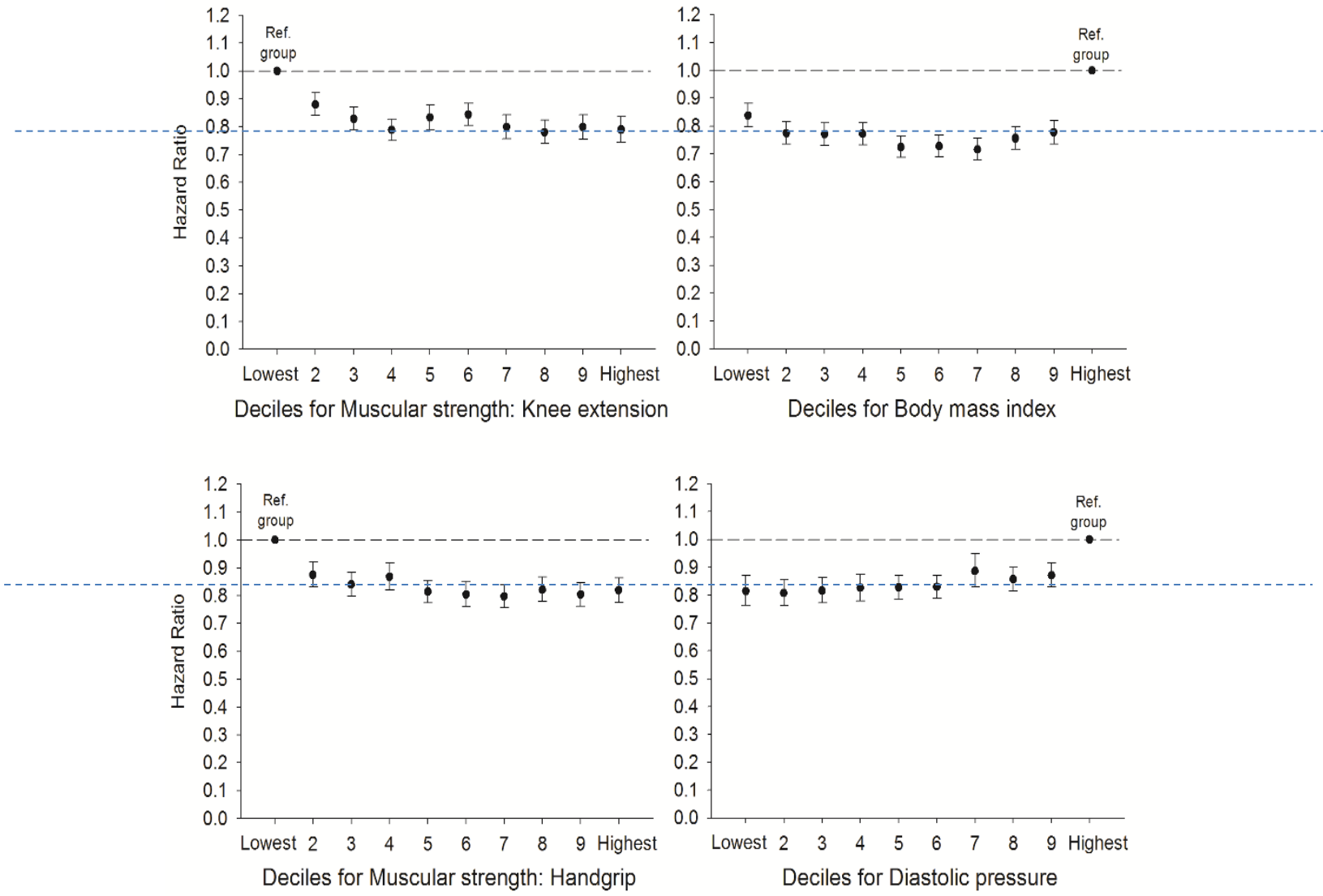
Muscular strength in male adolescents and premature death: cohort study of one million participants

 OPEN ACCESS

Francisco B Ortega *research associate*^{1,2,3}, Karri Silventoinen *research associate*⁴, Per Tynelius *statistician*⁵, Finn Rasmussen *professor*⁵

Follow-up: 25 years

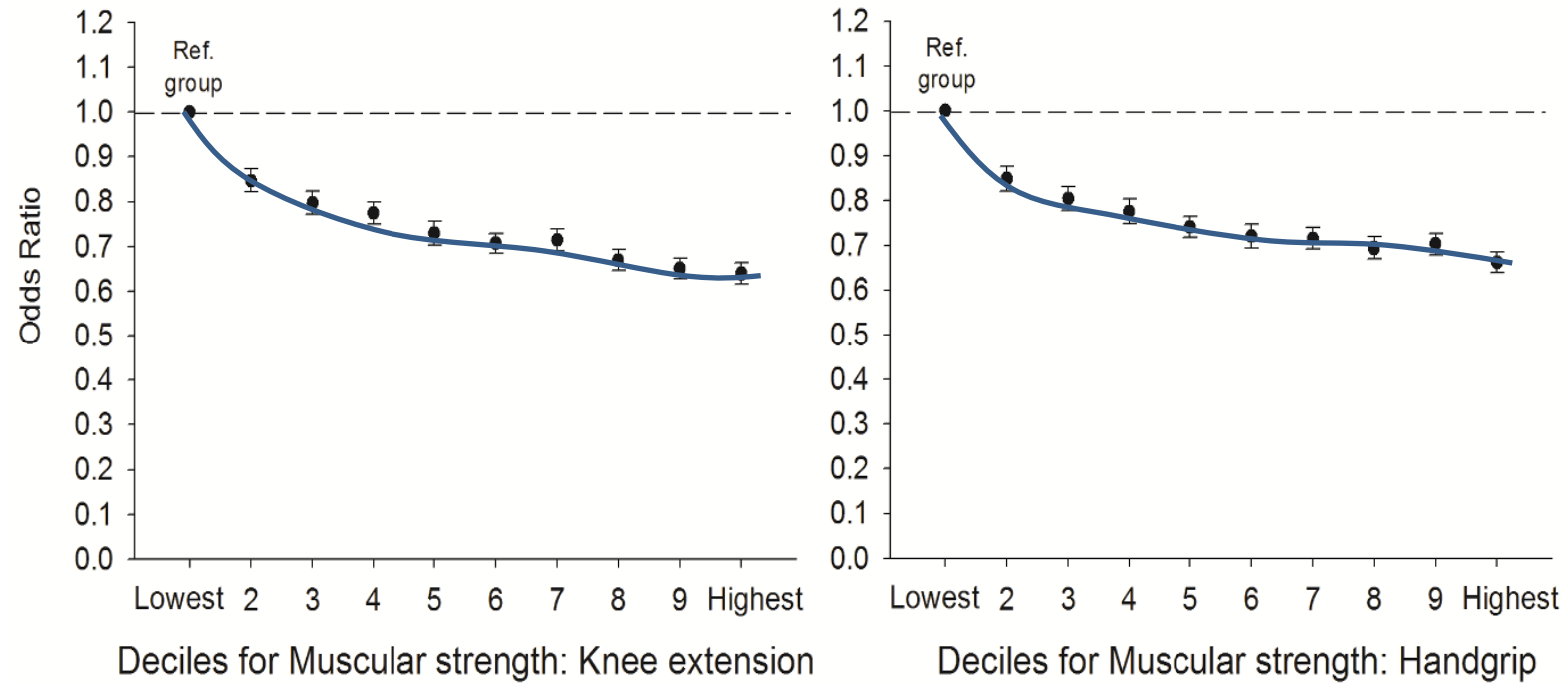
Association between strength, BMI, blood pressure and mortality by all causes





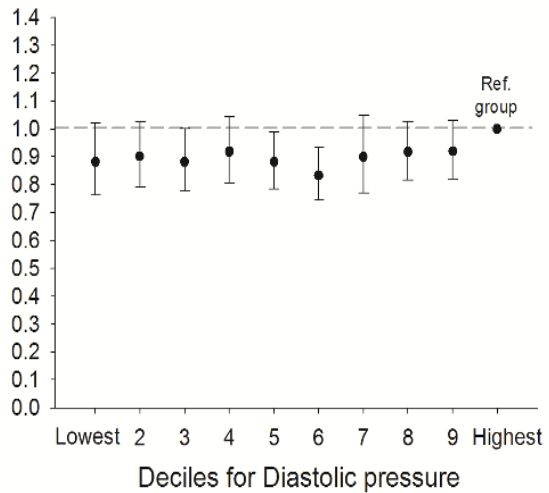
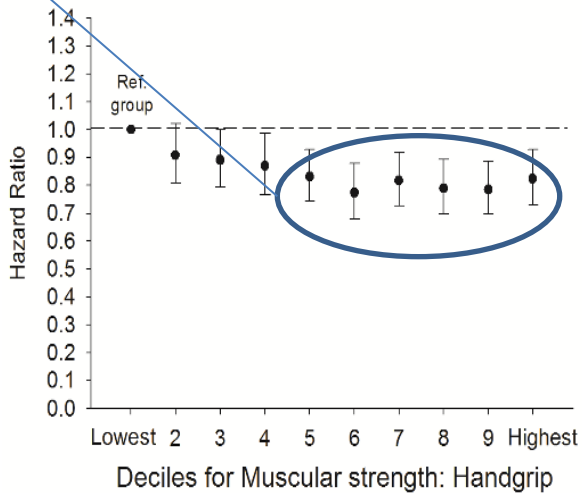
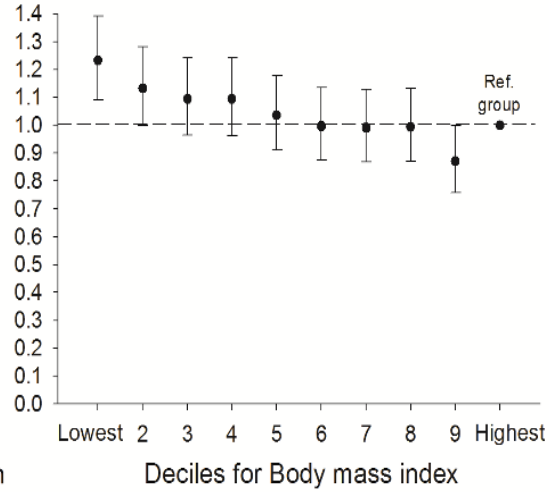
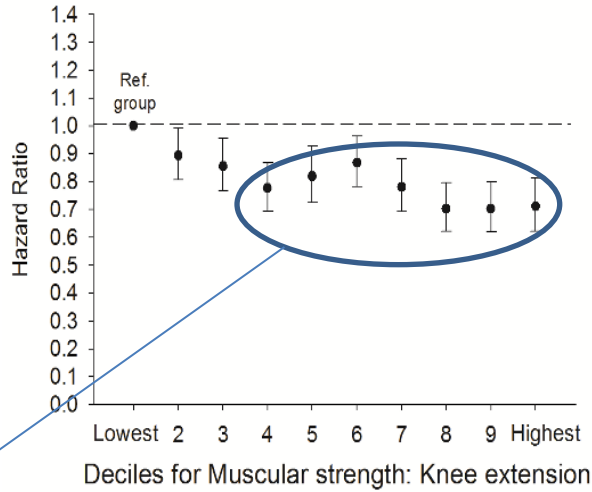
Association between strength and current and future risk of psychiatric disorder

Psychiatric diagnosis years later (longitudinal analysis)



Association between strength, BMI, blood pressure and mortality by suicide

Strength medium-high = Lower risk of death by suicide







2008

**>1000 citations
(July. 2017)**

SCIENCE AND SOCIETY

Be smart, exercise your heart:
exercise effects on brain and
cognition

Charles H. Hillman, Kirk I. Erickson and Arthur F. Kramer

ActiveBrains Project

“Effect of an exercise program on brain, cognition, physical and mental health in overweight and obese children”



<http://profith.ugr.es/activebrains>

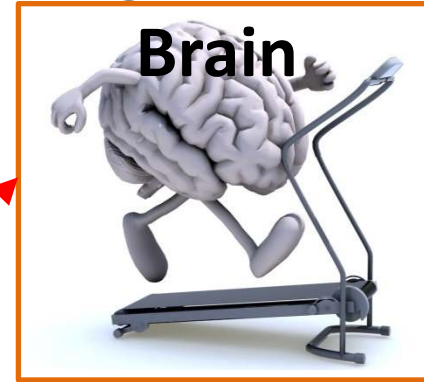
IP: Dr. F. Ortega

EXERCISE



4.5-months
5 sessions/week
Based on PA recommendations
High intensity
HR monitored in all sessions

Cognition & Brain



Physical Health



Mental Health

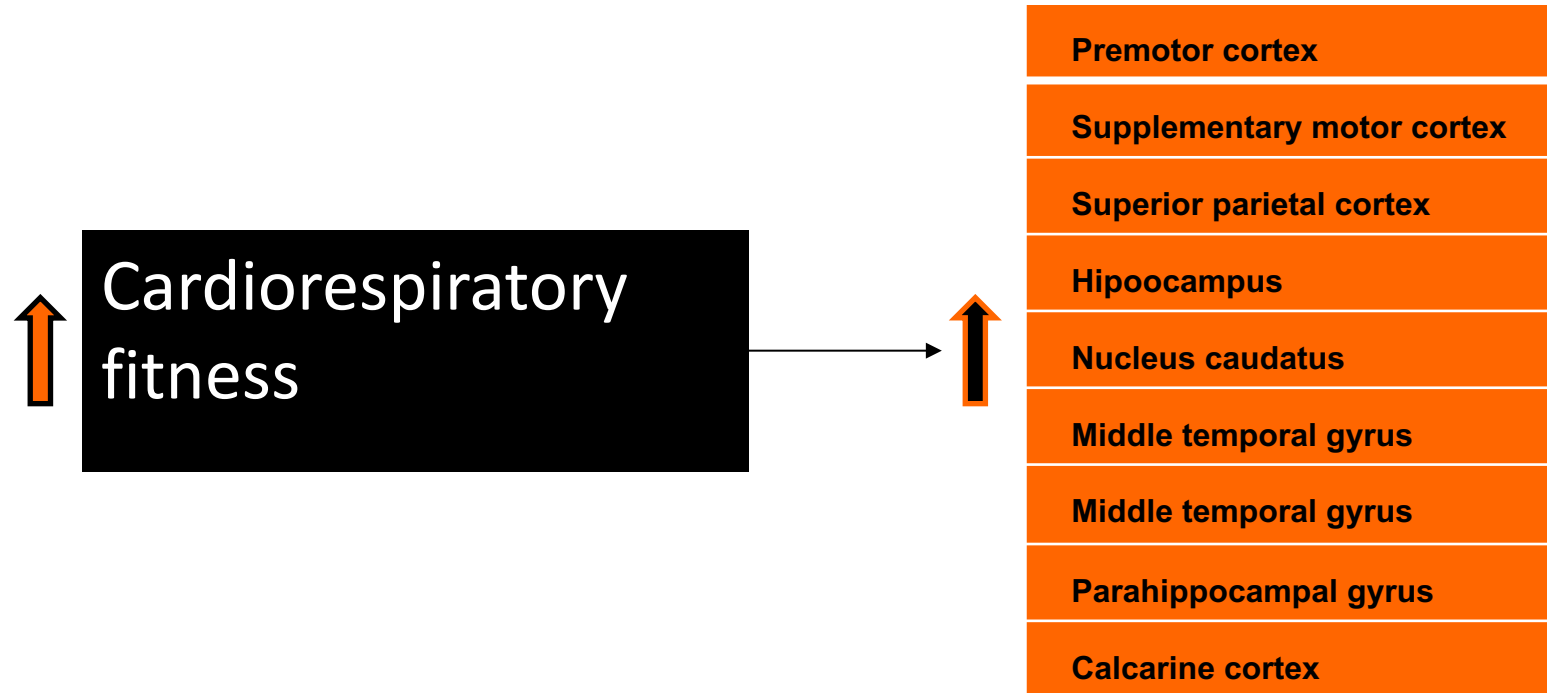


Cognition & Brain



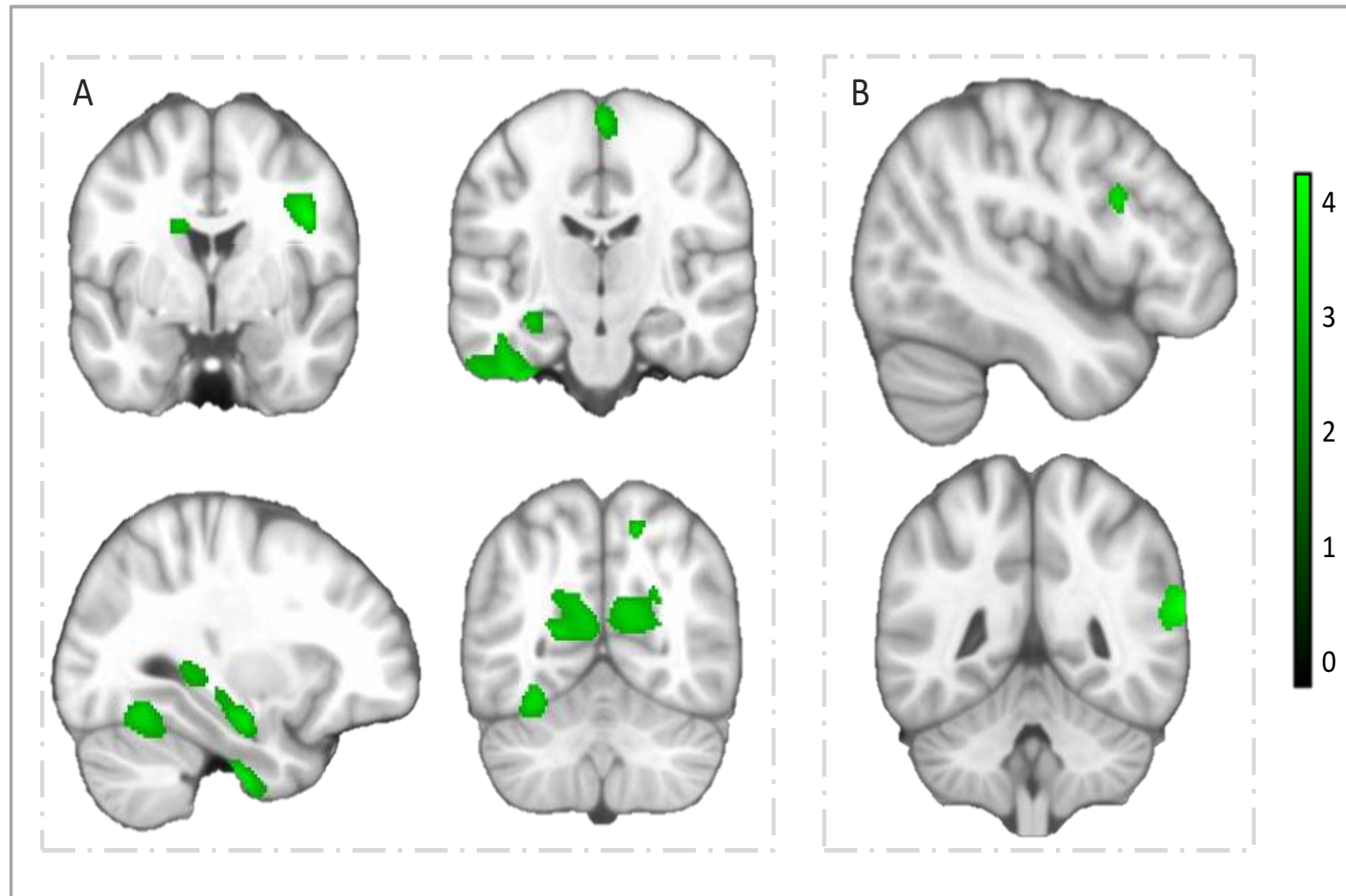
- **Changes (functional and structural) on brain-fMRI**
- **Neuroelectric measurements – ECG**
- **Cognitive performance**
- **Academic achievement**

Cardiorrespiratory fitness and brain area volumes

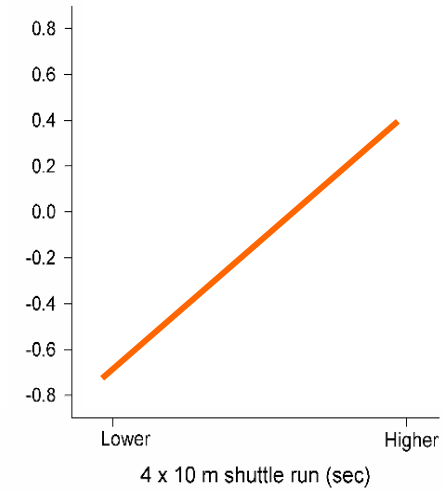
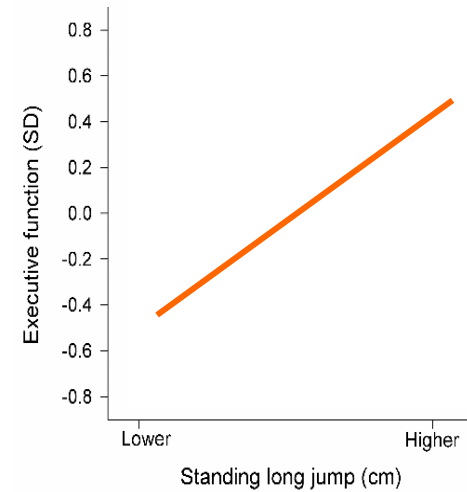
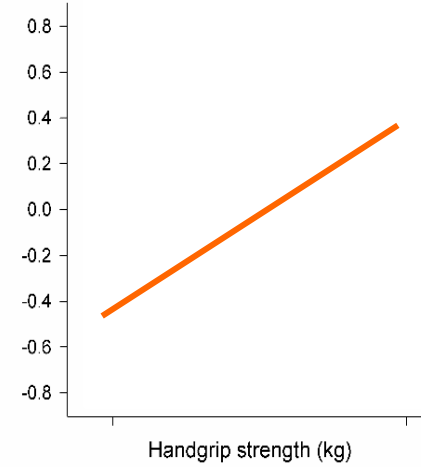
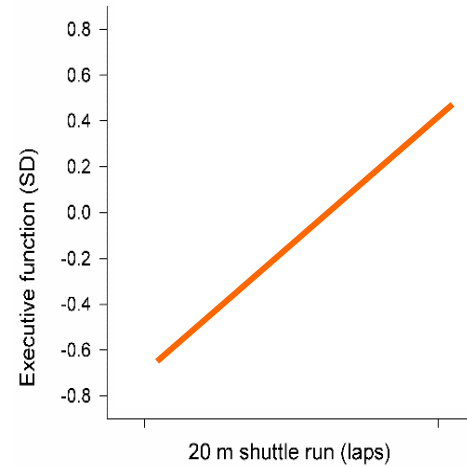


Cardiorespiratory fitness

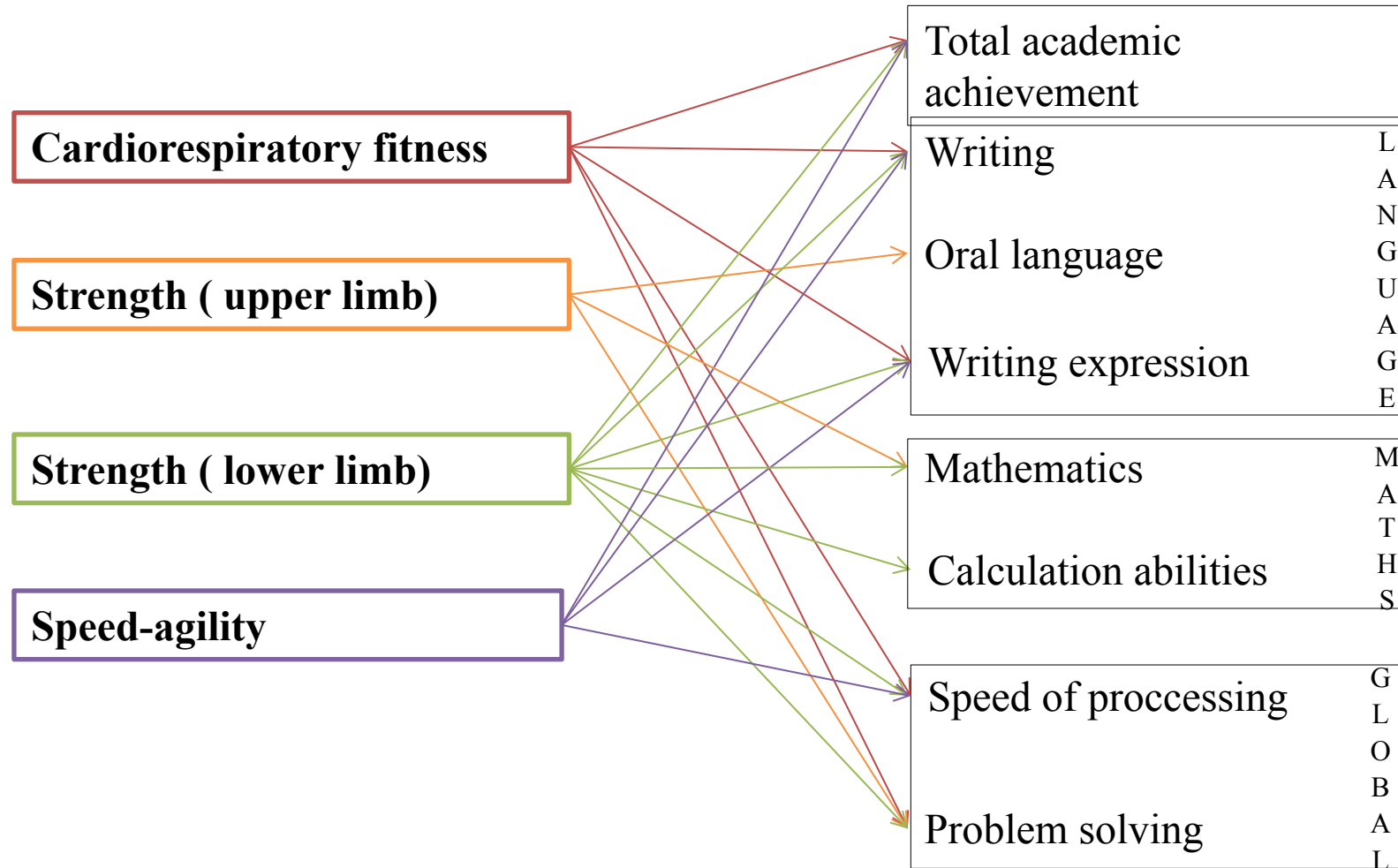
Speed-agility



Association of fitness with a higher cognition capacity



Association of fitness with higher academic achievement



¿...and what to do ?

The screenshot shows a web browser window with multiple tabs open. The active tab is 'Physical Activity Guide'. The address bar shows the URL 'https://health.gov/paguidelines/'. The browser's bookmark bar contains various items like 'Aplicaciones', 'Getting Started', 'Bookmarks', 'Journals and Datasets', 'UGR', 'cursos', 'KI', 'others', 'becas-proyectos', 'Save to Mendeley', and 'otros'. The website header includes the ODPHP logo (Office of Disease Prevention and Health Promotion) and navigation links for 'health.gov', 'healthfinder.gov', and 'HealthyPeople.gov'. A search bar is present with a 'Search' button. Below the header is a blue navigation bar with links for 'Dietary Guidelines', 'Physical Activity Guidelines' (highlighted), 'Health Literacy and Communication', 'Health Care Quality and Patient Safety', 'Healthy People', and 'healthfinder'. The main content area features a large image of a diverse group of people jumping rope outdoors. Below the image is a circular icon of a person jumping rope. The page title is 'Physical Activity Guidelines'. The introductory text states: 'The Physical Activity Guidelines for Americans (PAG or the Guidelines) are an essential resource for health professional and policymakers. Based on the latest science, they provide guidance on how children and adults can improve their health through physical activity. Learn ways to help consumers understand the benefits of physical activity and how to make it a part of their regular routine.' On the left side, there is a sidebar with the title 'Physical Activity Guidelines' and a list of links: 'Upcoming Guidelines', 'Overview', 'Q&A', and 'Public Comments'. The bottom of the browser window shows a taskbar with several PDF files open and a 'Mostrar todo' button.

¿Type of Exercise, Frequency, Duration?



Take home message



Go to training and exercise and become healthier!!!