

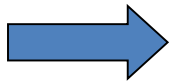
# Prevención cardiovascular. Estado actual del Estudio PREDIMED

*Miguel A. Martínez-González*  
Universidad de Málaga, abril 2018  
[mamartinez@unav.es](mailto:mamartinez@unav.es)

# Prevención CV

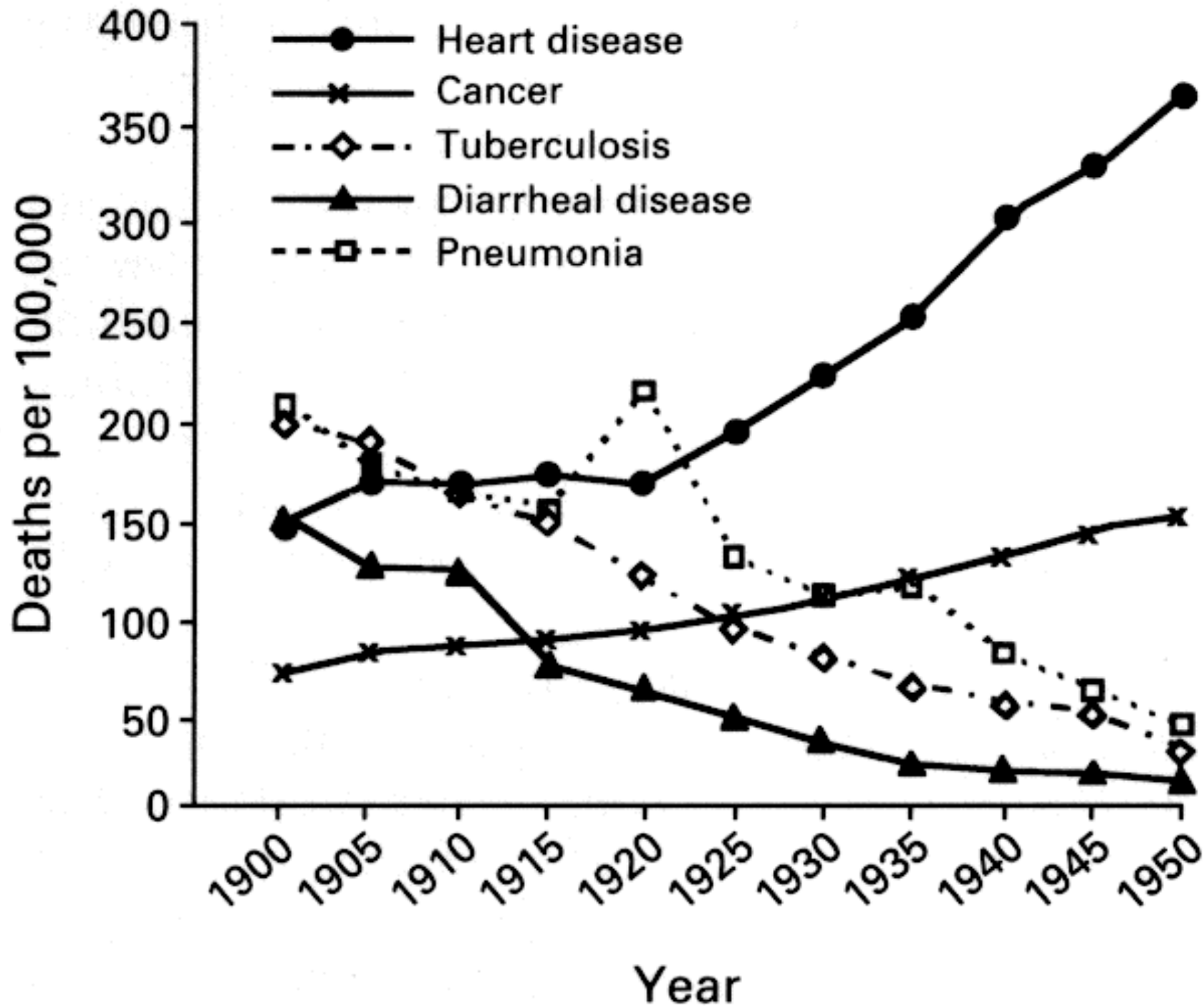
- Epi+M. Preventiva es espectacular
- FACTORES de RIESGO
- MÉTRICAS DE SALUD IDEAL: *Life's simple'7*
- Estrategias poblacional vs. alto riesgo
- Prevención PRIMORDIAL
- Acciones sobre
  - tabaco
  - TA
  - lípidos
- Genéticamente destinados?
- Evaluación global riesgo

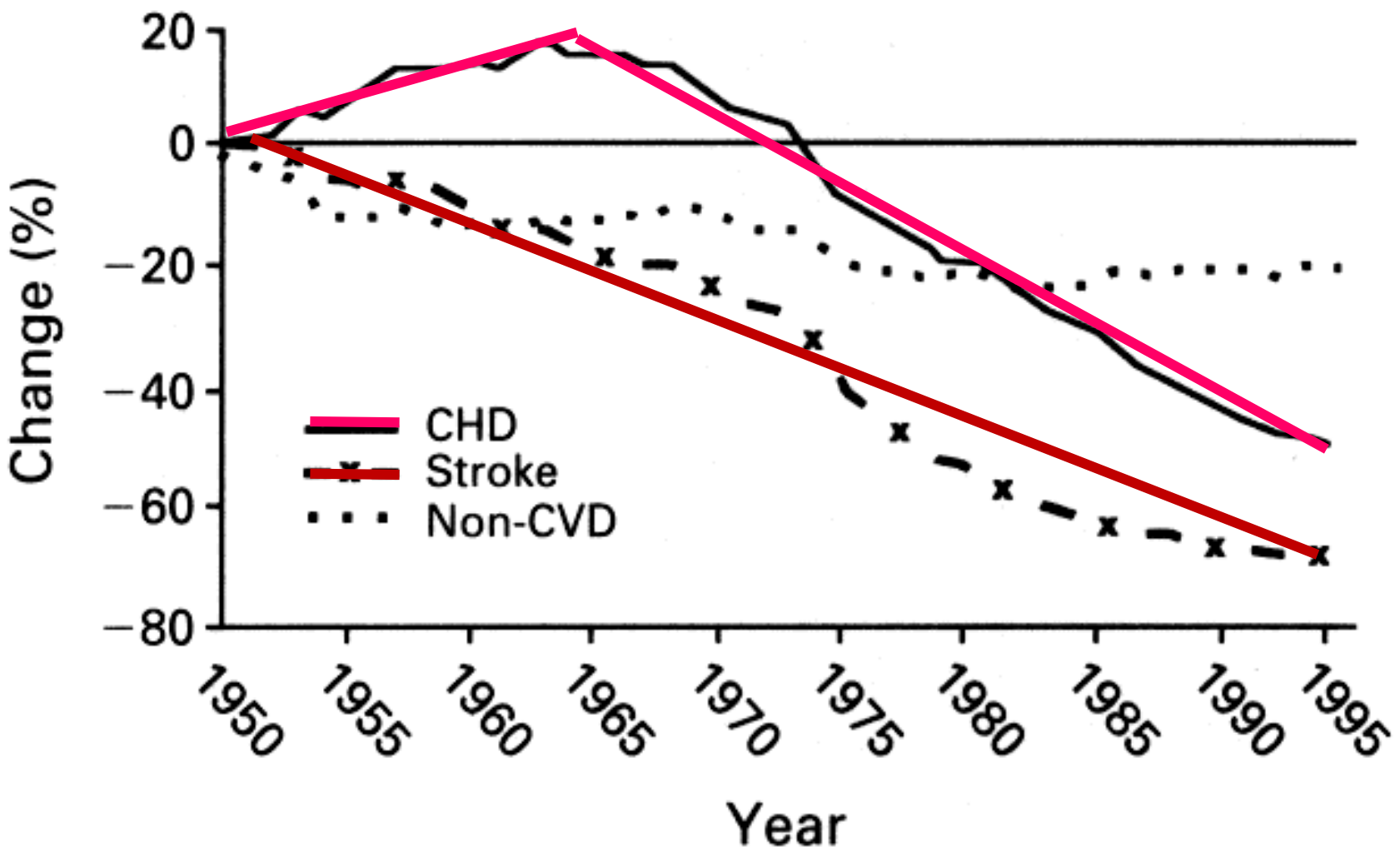
# Prevención CV



*Epi+M. Preventiva es espectacular*

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**Cambio en las tasas ajustadas por edad**

# Prevención CV

- *Epi+M. Preventiva* es espectacular

## FACTORES de RIESGO

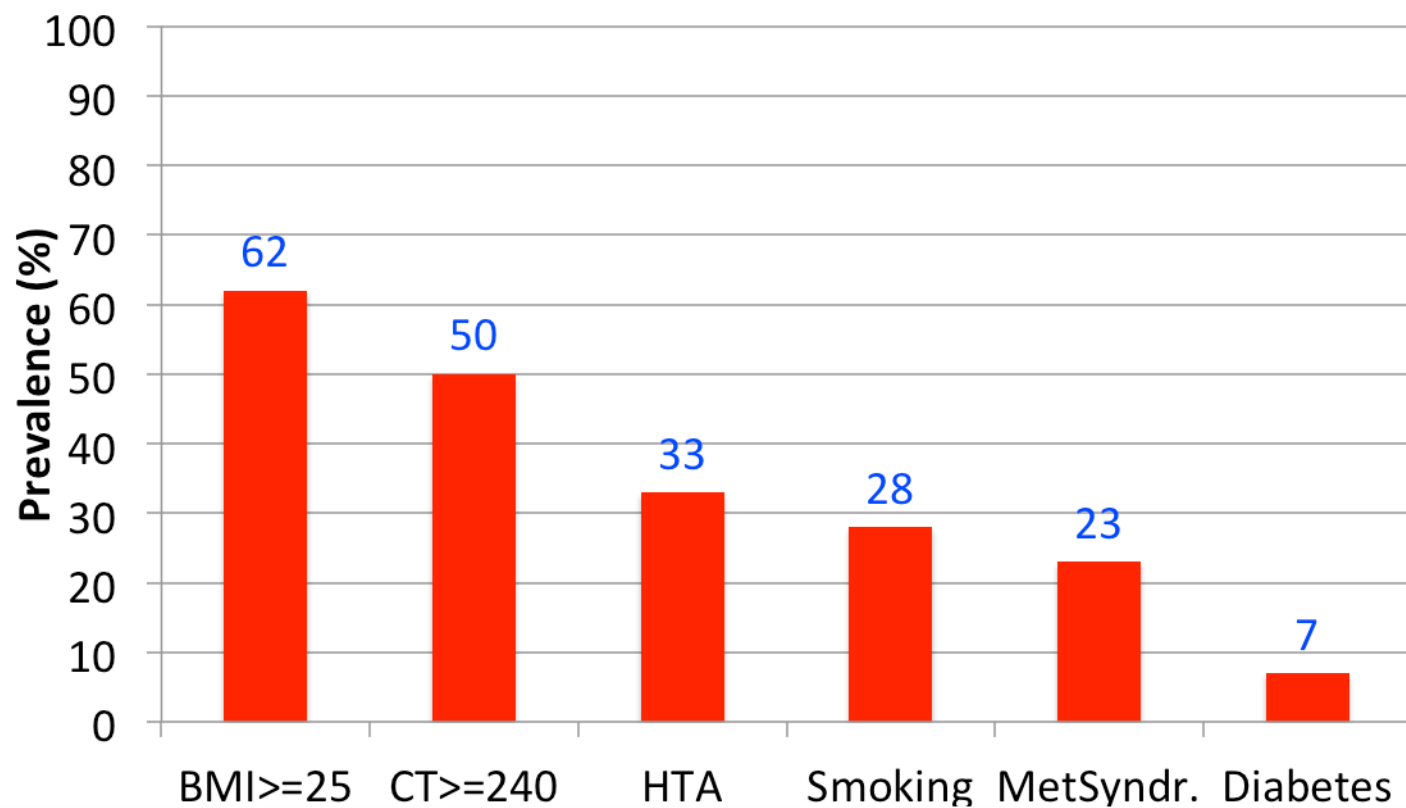
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TABLA 13-2

**Prevalencia de factores de riesgo cardiovascular en la población española mayor de 18 años  
Estudio ENRICA 2008-2010**

	Prevalencia (%)
Tabaquismo	28
Hipertensión	33
Hipercolesterolemia	50
Síndrome metabólico	23
Obesidad	23
Sobrepeso u obesidad	62
Diabetes	7

Tomado de Banegas JR, Graciani A, Guallar-Castillón P, León-Muñoz LM, Gutiérrez-Fisac JL, López-García E, et al. Estudio de Nutrición y Riesgo Cardiovascular en España (ENRICA). Madrid: Departamento de Medicina Preventiva y Salud Pública. Universidad Autónoma de Madrid; 2011.



# Prevención CV

- *Epi+M. Preventiva* es espectacular
- FACTORES de RIESGO

## MÉTRICAS DE SALUD IDEAL: Life's simple'7

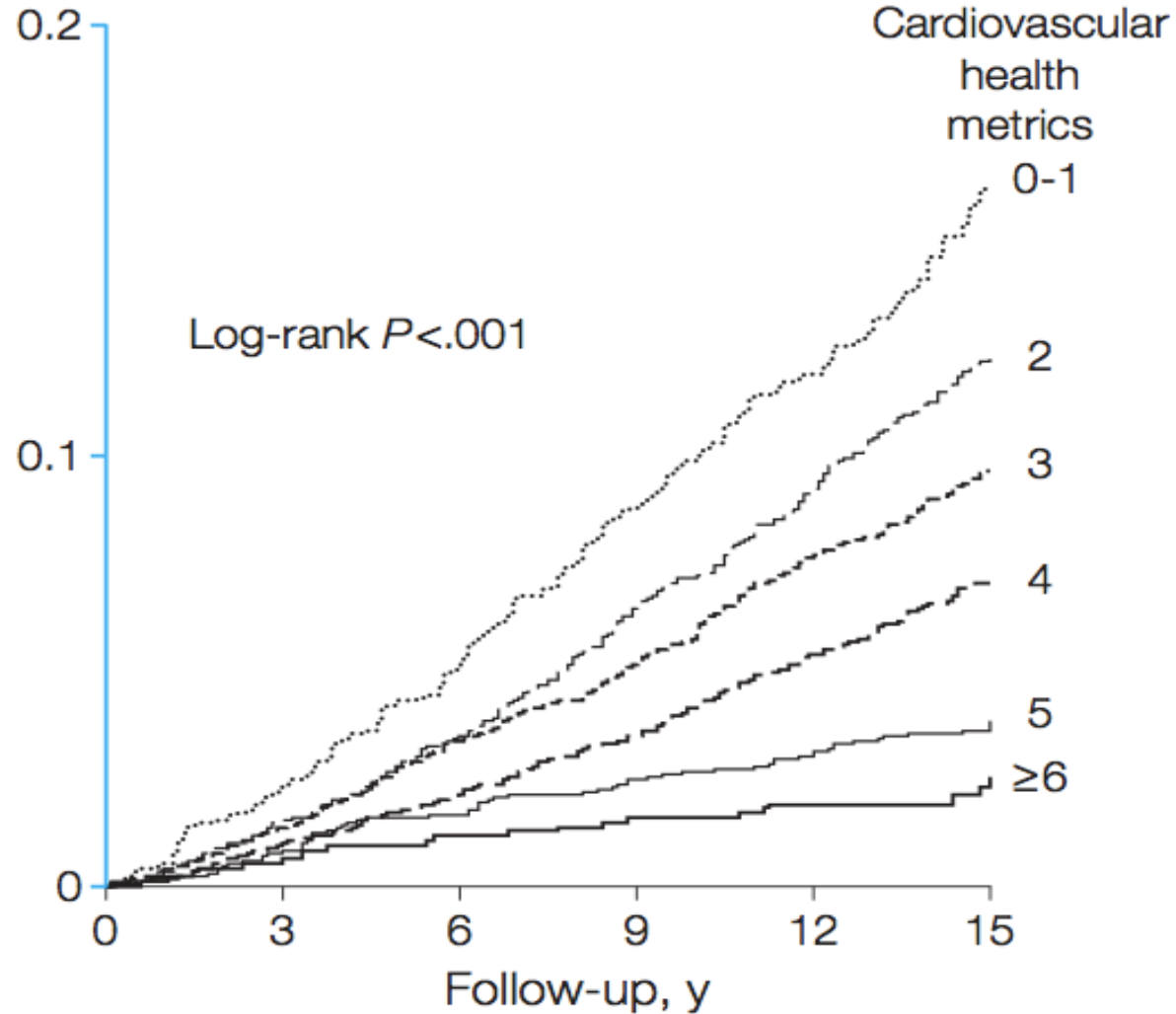
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**Defining and Setting National Goals for Cardiovascular Health Promotion and Disease Reduction**  
The American Heart Association's Strategic Impact Goal Through 2020 and Beyond

*Circulation. 2010;121:586-613*

## Cardiovascular disease mortality



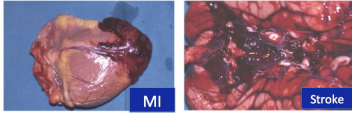
### Trends in Cardiovascular Health Metrics and Associations With All-Cause and CVD Mortality Among US Adults

- Quanhe Yang, PhD
- Mary E. Cogswell, DrPH
- W. Dana Flanders, MD, ScD
- Yuling Hong, MD, PhD
- Zefeng Zhang, MD, PhD
- Fleetwood Loustalot, FNP, PhD
- Cathleen Gillespie, MS
- Robert Merritt, BA, MA
- Frank B. Hu, MD, PhD

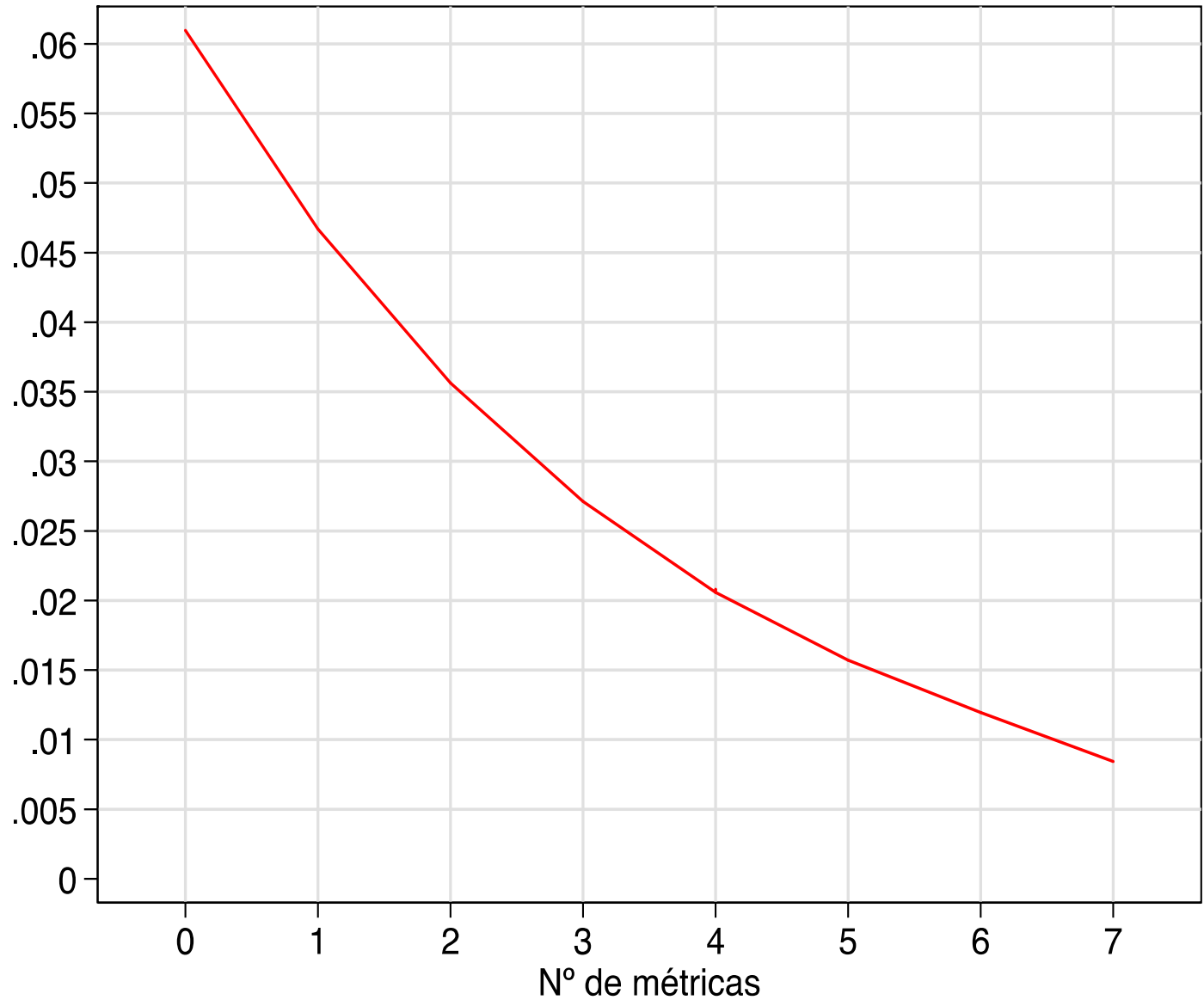
JAMA. 2012;307:1273-83

**PRIMARY  
END-POINT**

Myocardial Infarction– Heart Attack  
Cerebrovascular disease– Stroke  
Cardiovascular deaths

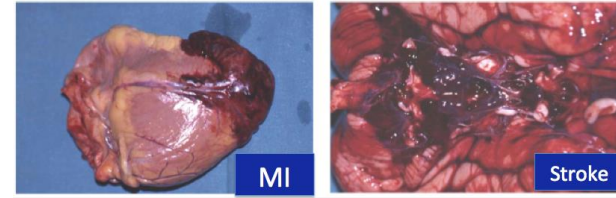


Probabilidad predicha de evento CV a 5 años



# PRIMARY END-POINT

Myocardial Infarction– Heart Attack  
Cerebrovascular disease– Stroke  
Cardiovascular deaths



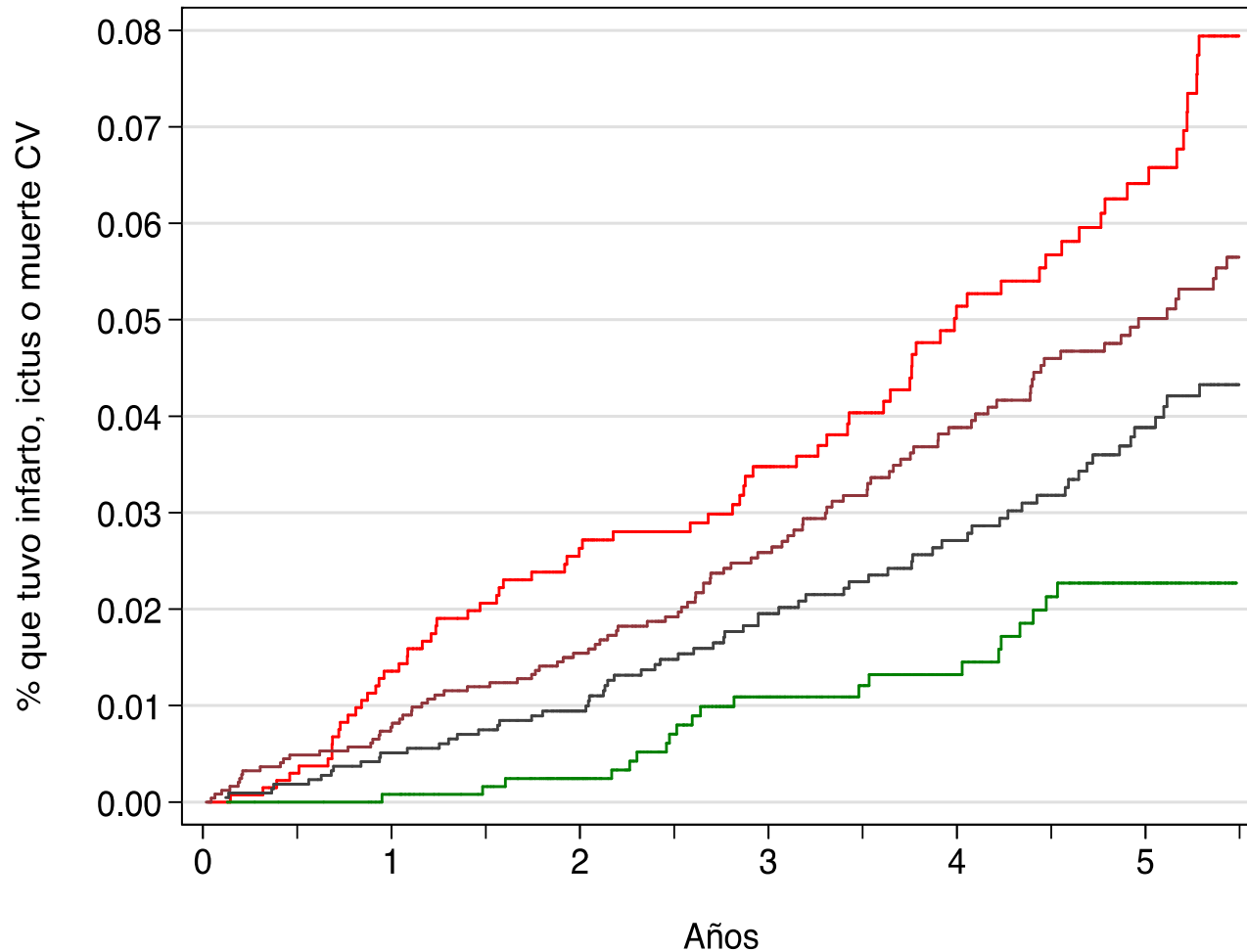
## Métricas de salud cardiovascular

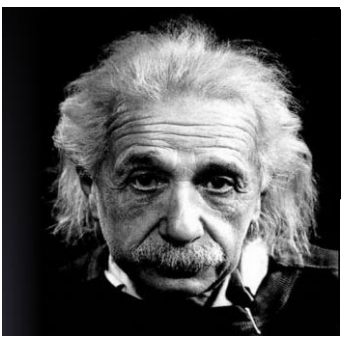
1 o ninguna (1406  
participantes)

2 (2541 participantes)

3 (2216 participantes)

4 o más (1284 participantes)





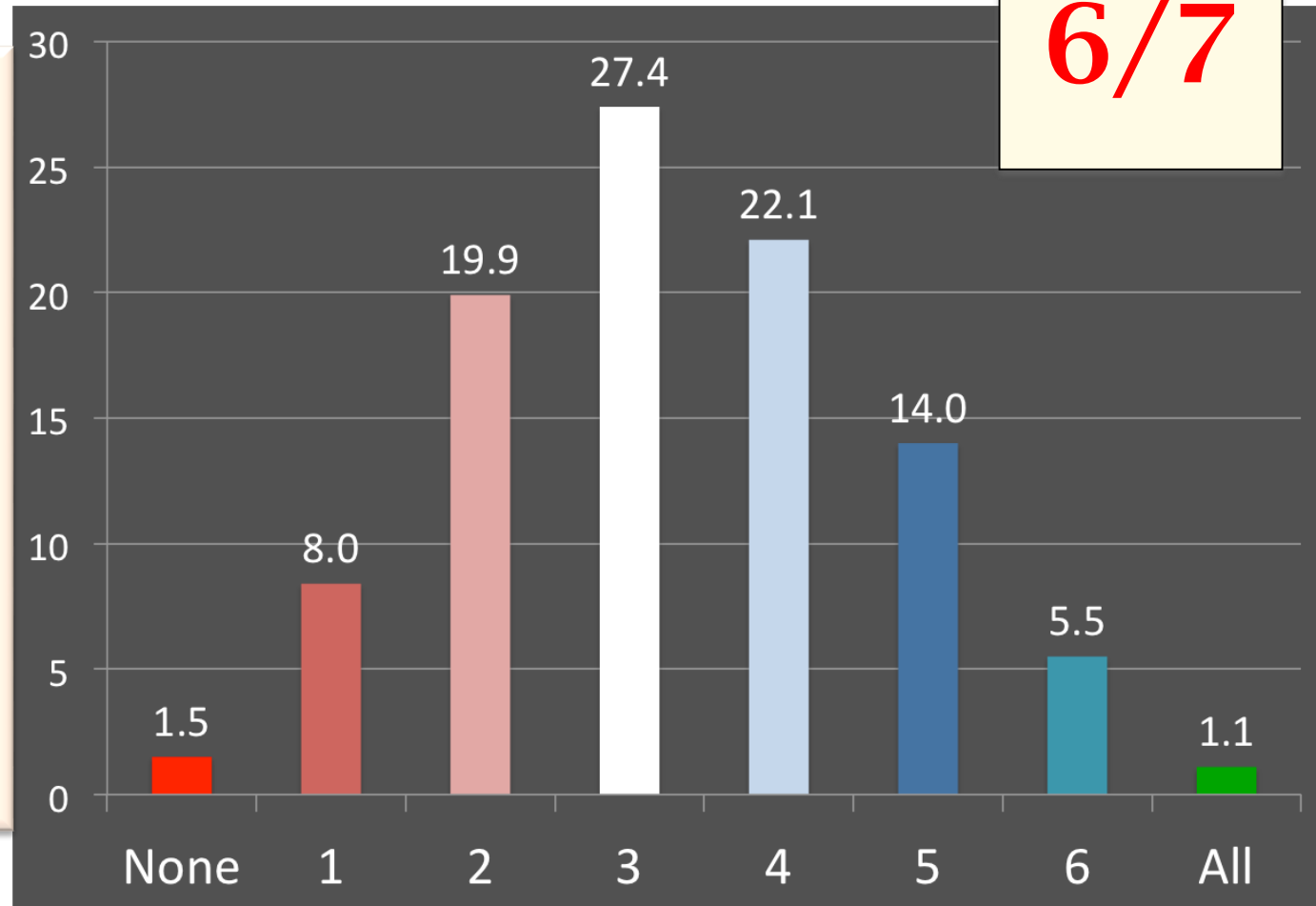
Albert Einstein:

- A clever person solves a problem
- A wise person avoids it

## 7 Ideal CV

### Health METRICS

1. Never smoking
2. BMI <25
3. Phys. Act >149 min/wk
4. Healthy Eating >3/5
5. Total chol. <200
6. BP <120/80
7. Fasting glucose <100



6/7

Ford et al, Circulation 2012;125:987

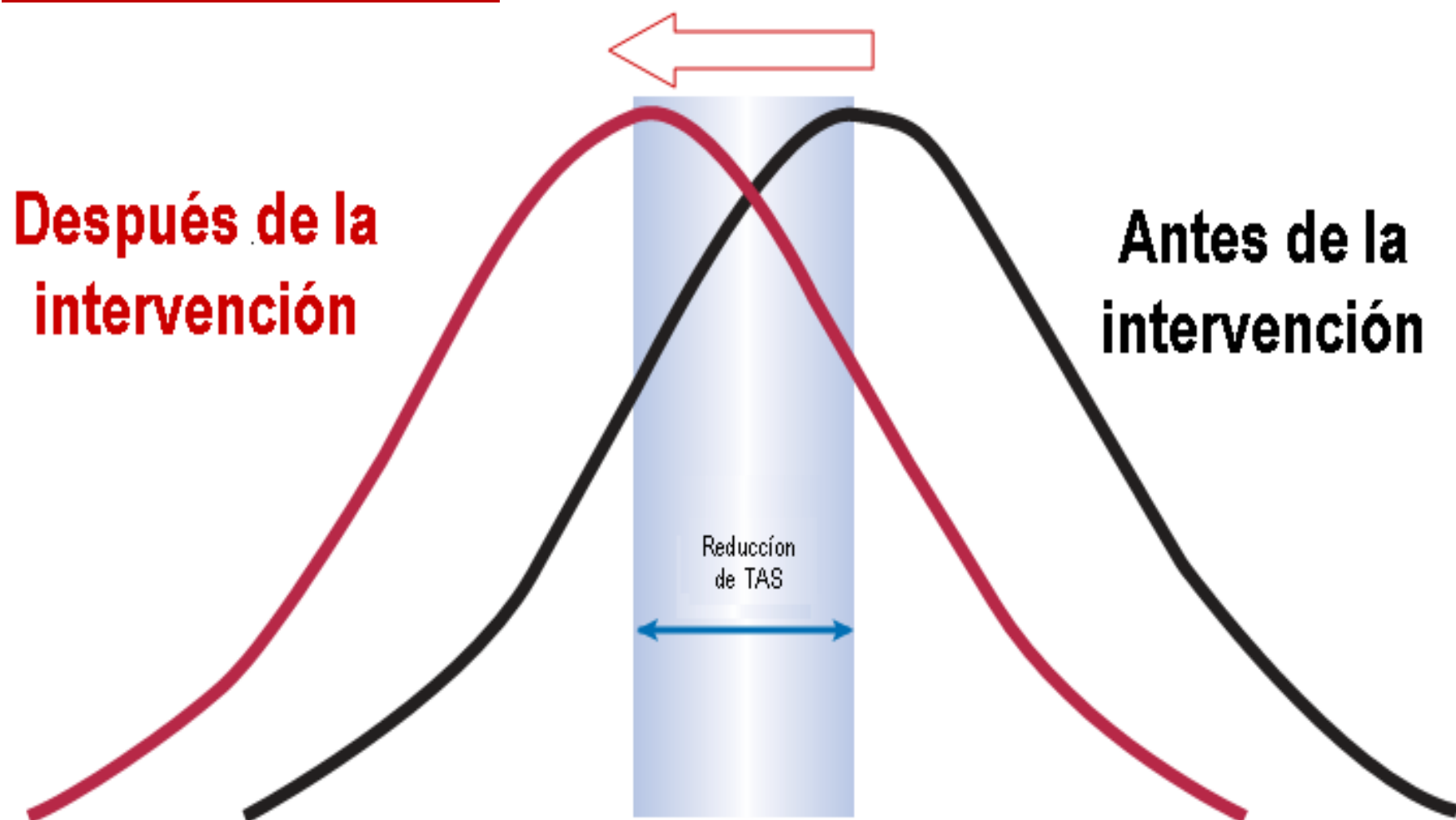
# Prevención CV

- *Epi+M. Preventiva* es espectacular
- FACTORES de RIESGO
- MÉTRICAS DE SALUD IDEAL: Life's simple'7

## Estrategias poblacional vs. alto riesgo

- Prevención PRIMORDIAL
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## Estrategia poblacional



Reducción de TAS

mmHg

2  
3  
5

%

ACV

CI

Total

-6      -4      -3  
-8      -5      -4  
-14     -9      -7

## Alto riesgo

- Requiere cribado
- Gran beneficio *individual*
- Alta eficiencia
- No resuelve el problema

## Poblacional

- No requiere cribado
- *Paradoja de la prevención*
- *Muchos* sujetos expuestos a un *moderado* exceso de riesgo generarán *más casos* que el pequeño grupo de alto riesgo
- Baja eficiencia
- Resuelve el problema

# Prevención CV

- *Epi+M. Preventiva* es espectacular
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## Prevención PRIMORDIAL

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# ¿Y si nos olvidamos de medir FR?

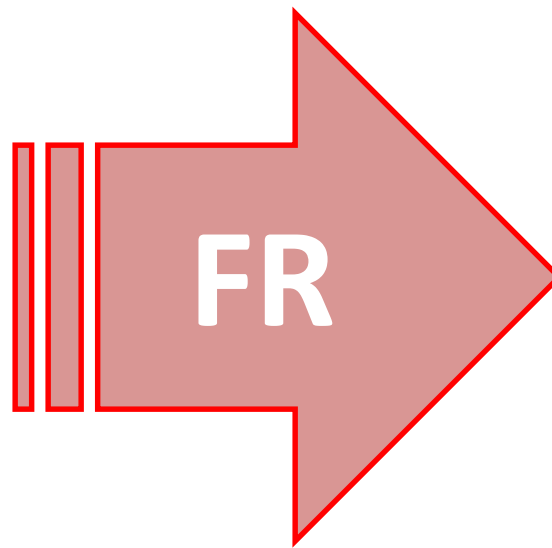
- TA



- lípidos

- glucosa





PRIMORDIAL!

Prevención  
anticipada

PRIMARIA  
POBLACIONAL

Primaria alto riesgo

lípidos

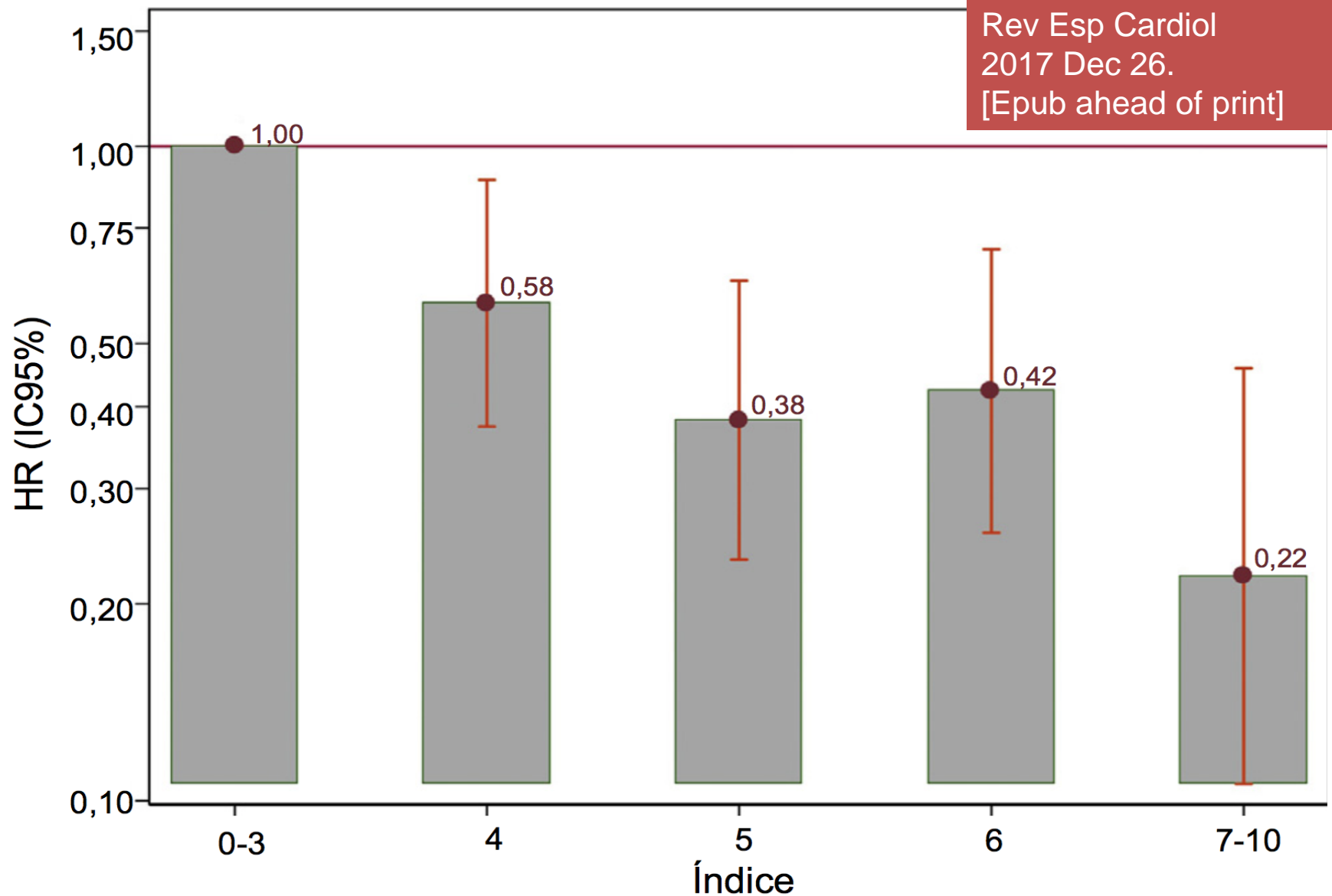
# Healthy Lifestyle in the **Primordial** Prevention of Cardiovascular Disease Among Young Women



Andrea K. Chomistek, ScD,\* Stephanie E. Chiuve, ScD,†‡ A. Heather Eliassen, ScD,§|| Kenneth J. Mukamal, MD, MPH,¶  
Walter C. Willett, MD, DrPH,†§|| Eric B. Rimm, ScD†§||

		CHD (n = 456)		
	Definition of Optimal	Person-Years at Optimal Level (%)	MV-Adjusted HR (95% CI)*	<b>FEP</b> PAR% (95% CI)
Smoking	Not currently smoking	91.0	0.29 (0.23–0.35)	19.2 (13.6–24.6)
Physical activity	≥2.5 h/week	43.7	0.72 (0.58–0.88)	20.0 (7.4–32.0)
AHEI-2010 score	AHEI-2010 score ≥47	41.8	0.69 (0.57–0.85)	19.5 (8.1–30.4)
BMI	18.5–24.9 kg/m <sup>2</sup>	49.2	0.68 (0.55–0.84)	22.9 (10.2–34.9)
Alcohol	0.1–14.9 g/day	53.4	0.77 (0.64–0.93)	12.6 (3.1–21.8)
TV watching	≤7 h/week	45.9	1.04 (0.86–1.26)	—
All 6 factors	—	4.6	0.08 (0.03–0.22)	72.7 (39.1–89.2)

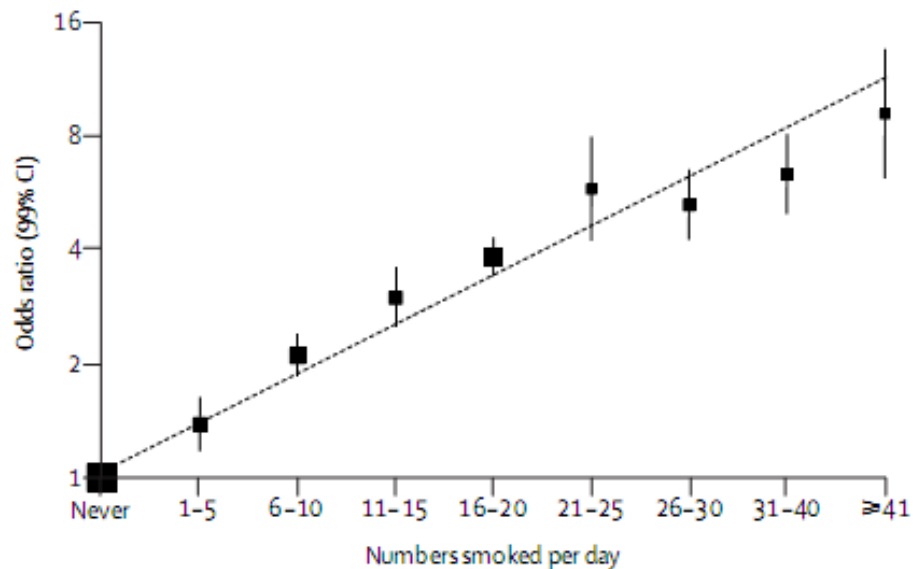
88,940 **women** ages **27 to 44 years** at baseline in the Nurses' Health Study II who were followed from 1991 to 2011.



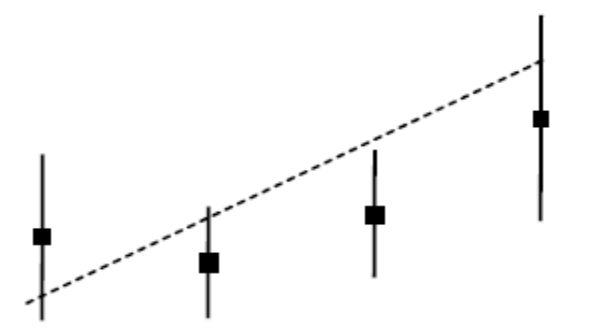
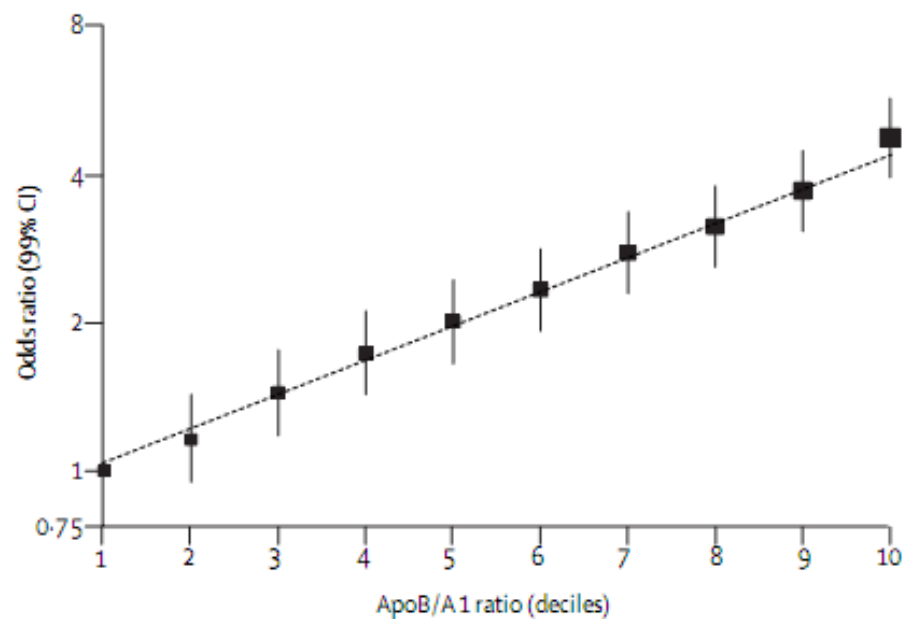
**Figura 2.** Disminución de eventos cardiovasculares incidentes según el número de hábitos saludables. HR: *hazard ratio*; IC95%: intervalo de confianza del 95%.

# Prevención CV

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  - ➔ **tabaco**
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Number of controls	7489	727	1031	446	1058	96	230	168	56
Number of cases	4223	469	1021	623	1832	254	538	459	218
Odds ratio	1	1.38	2.10	2.99	3.83	5.80	5.26	6.34	9.16



	26-30	31-40	≥41
Number of controls	230	168	56
Number of cases	538	459	218
Odds ratio	5.26	6.34	9.16

# Association of Long-term, Low-Intensity Smoking With All-Cause and Cause-Specific Mortality in the National Institutes of Health–AARP Diet and Health Study

Maki Inoue-Choi, PhD, MS; Linda M. Liao, PhD, MPH; Carolyn Reyes-Guzman, PhD, MPH; Patricia Hartge, ScD; Neil Caporaso, MD; Neal D. Freedman, PhD, MPH

JAMA Intern Med. 2017 Jan 1;177:87-95

Table 2. Smoking Status With All-Cause and Cause-Specific Mortality in the NIH-AARP Diet and Health Study Cohort<sup>a</sup>

Characteristic	All Cause (n = 37 331)			All Cancer (n = 13 762)		Lung Cancer (n = 3801)		Cardiovascular Disease (n = 9496)		Respiratory Disease (n = 3139)	
	No.	No. (%)	HR (95% CI)	No.	HR (95% CI)	No.	HR (95% CI)	No.	HR (95% CI)	No.	HR (95% CI)
Smoking status and CPD at baseline (2004-2005 questionnaire)											
Never	111 473	9821 (9)	1 [Reference]	3468	1 [Reference]	253	1 [Reference]	2631	1 [Reference]	824	1 [Reference]
<1	1754	266 (15)	1.99 (1.76-2.25)	92	1.91 (1.55-2.35)	37	10.73 (7.59-15.15)	63	1.71 (1.33-2.21)	26	6.38 (4.27-9.51)
1-10	6627	1360 (21)	2.60 (2.45-2.75)	522	2.83 (2.58-3.11)	253	18.38 (15.42-22.91)	299	2.13 (1.89-2.40)	197	11.04 (9.23-13.19)
11-20	7721	1722 (22)	2.96 (2.81-3.11)	713	3.44 (3.17-3.74)	374	24.05 (20.46-28.26)	402	2.61 (2.34-2.90)	261	12.76 (10.81-15.05)
21-30	3329	900 (27)	3.57 (3.33-3.82)	390	4.40 (3.96-4.89)	228	34.54 (28.83-41.39)	195	2.89 (2.50-3.35)	136	15.52 (12.67-19.01)
>30	2906	854 (29)	3.91 (3.65-4.21)	370	4.80 (4.30-5.35)	212	36.83 (30.61-44.33)	179	3.05 (2.62-3.55)	151	20.17 (16.57-24.56)



# Association of Long-term, Low-Intensity Smoking With All-Cause and Cause-Specific Mortality in the National Institutes of Health–AARP Diet and Health Study

Maki Inoue-Choi, PhD, MS; Linda M. Liao, PhD, MPH; Carolyn Reyes-Guzman, PhD, MPH; Patricia Hartge, ScD; Neil Caporaso, MD; Neal D. Freedman, PhD, MPH

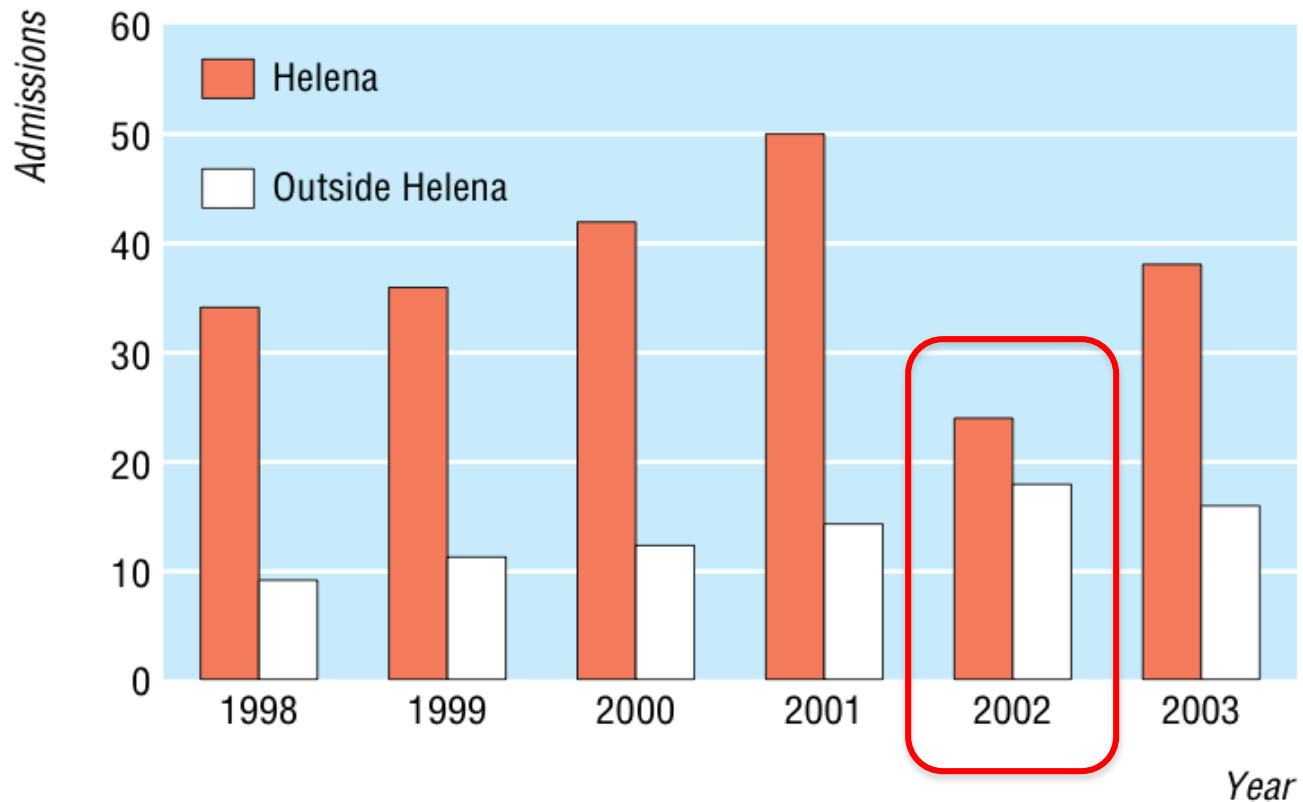
JAMA Intern Med. 2017 Jan 1;177:87-95

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Characteristic	No.	All Cause (n = 37 331)		All Cancer (n = 13 762)		Lung Cancer (n = 3801)		Cardiovascular Disease (n = 9496)		Other Disease (n = 13 762)
		No. (%)	HR (95% CI)	No.	HR (95% CI)	No.	HR (95% CI)	No.	HR (95% CI)	
Smoking status and CPD at baseline (2004-2005 questionnaire)										
Never	111 473	9821 (9)	1 [Reference]	3468	1 [Reference]	253	1 [Reference]			
<1	1754	266 (15)	1.99 (1.76-2.25)	92	1.91 (1.55-2.35)	37	10.73 (7.59-15.42)			6.38 (4.27-9.51)
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11-20	7721	1722 (22)	2.96 (2.81-3.11)	713	3.44 (3.17-3.74)	374	24.05 (20.46-28.33)			12.76 (10.81-15.05)
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>30	2906	854 (29)	3.91 (3.65-4.21)	370	4.80 (4.30-5.35)	212	36.83 (30.61-44.33)			20.17 (16.57-24.56)

# Helena, Montana 2002

geographically isolated...  
one hospital  
serving a  
population  
of 68,140.

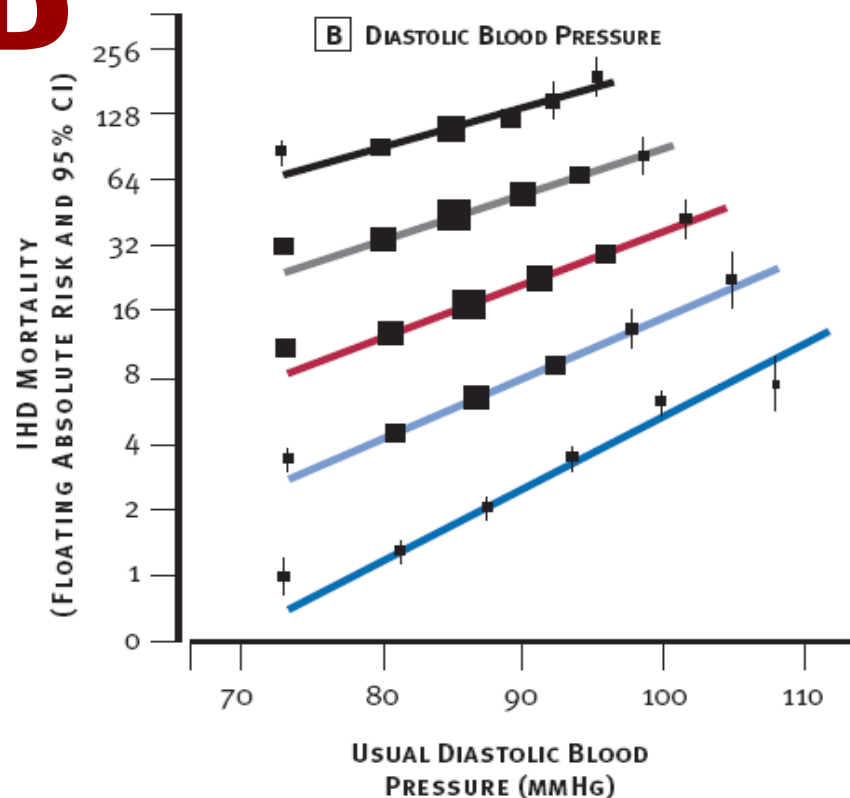
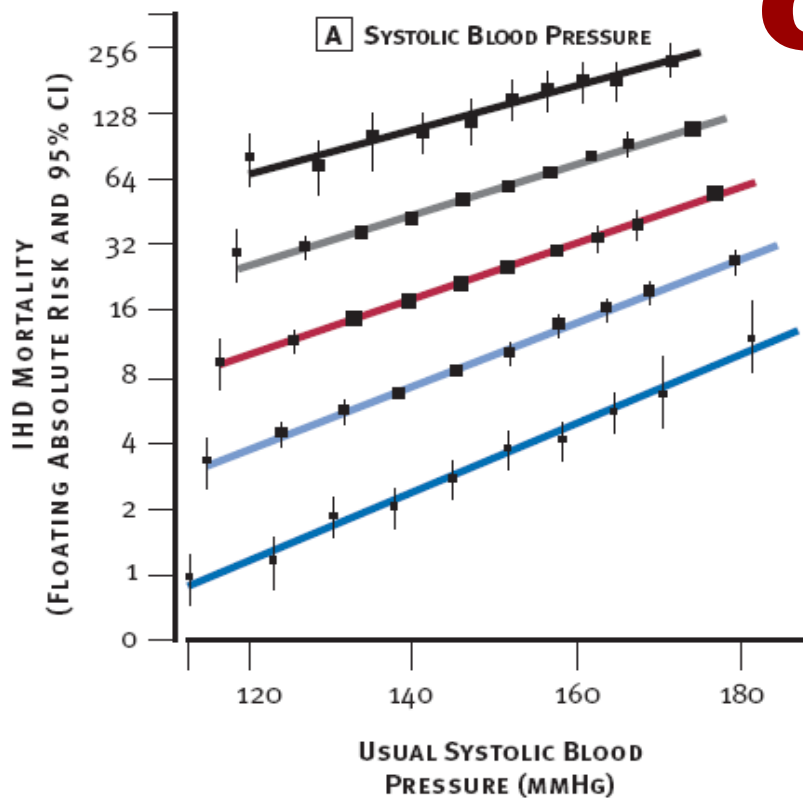


Admissions for acute myocardial infarction during six month periods June-November before, during (2002), and after the smoke-free ordinance (ordinance did not apply outside Helena). The law was implemented on 5 June 2002

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# CHD



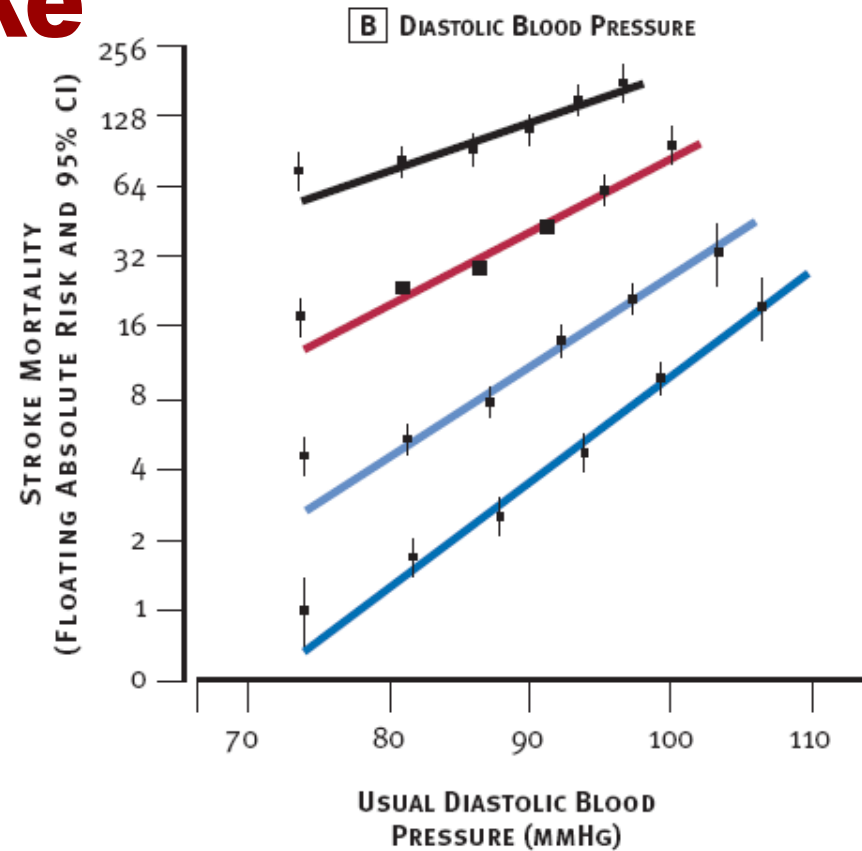
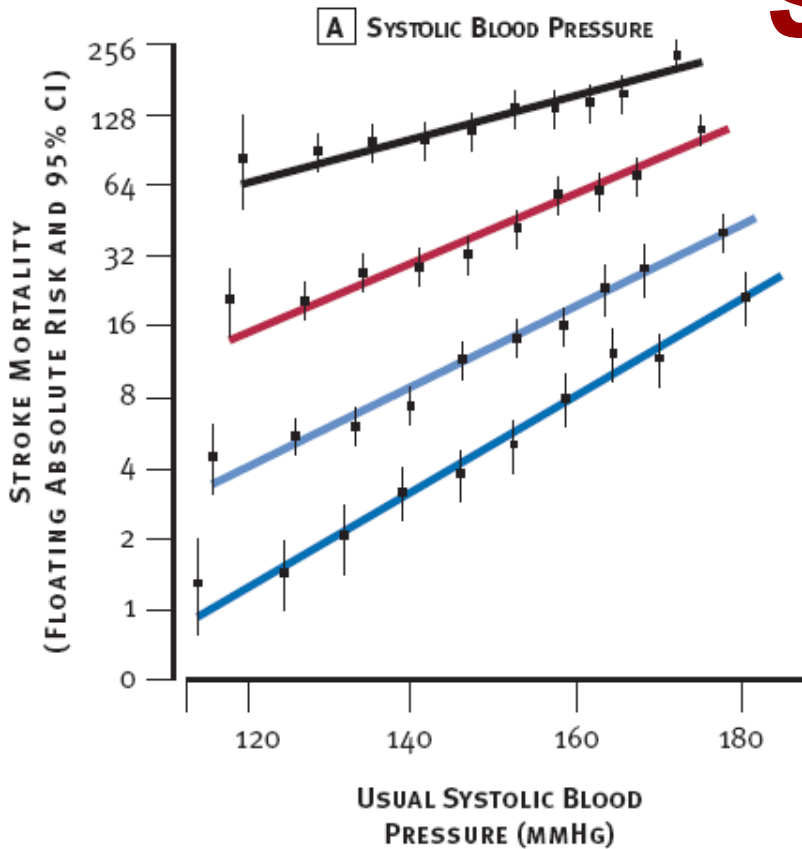
Age at risk:

■ 80-89 years   ■ 70-79 years   ■ 60-69 years   ■ 50-59 years   ■ 40-49 years

*IHD, ischemic heart disease*

*Source: Reprinted with permission from Elsevier. Lewington S, et al. Age-specific relevance of usual blood pressure to vascular mortality: A meta-analysis of individual data for one million adults in 61 prospective studies. (The Lancet 2002;360:1903-13).*

# Stroke



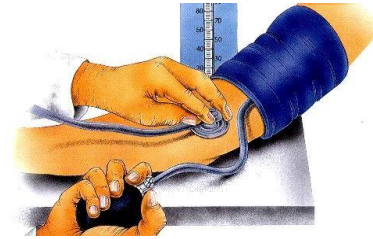
Age at risk:

■ 80-89 years ■ 70-79 years ■ 60-69 years ■ 50-59 years

Source: Reprinted with permission from Elsevier. Lewington S, et al. Age-specific relevance of usual blood pressure to vascular mortality: A meta-analysis of individual data for one million adults in 61 prospective studies. (The Lancet 2002; 360:1903-13).

# USPSTF

(actualizado 2015)



– Todos  $\geq 18$  años

- $\geq 40$  o  $\uparrow$  riesgo HTA: **anualmente**
- 18-39 y TA  $< 130/85$  y **sin FR**, *cada 3-5 años*

## High Blood Pressure in Adults: Screening

Release Date: October 2015

### Recommendation Summary

Population	Recommendation	Grade (What's This?)
Adults aged 18 years or older	The USPSTF recommends screening for high blood pressure in adults aged 18 years or older. The USPSTF recommends obtaining measurements outside of the clinical setting for diagnostic confirmation before starting treatment (see the <a href="#">Clinical Considerations section</a> ).	<b>A</b>

## ACC/AHA/AAPA/ABC/ACPM/AGS/APHA/ASH/ASPC/NMA/PCNA CLINICAL PRACTICE GUIDELINE

### 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: Executive Summary

A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

Paul K. Whelton, Robert M. Carey, Wilbert S. Aronow, Donald E. Casey, Karen J. Collins, Cheryl Dennison Himmelfarb, Sondra M. DePalma, Samuel Gidding, Kenneth A. Jamerson, Daniel W. Jones, Eric J. MacLaughlin, Paul Muntner, Bruce Ovbiagele, Sidney C. Smith, Crystal C. Spencer, Randall S. Stafford, Sandra J. Taler, Randal J. Thomas, Kim A. Williams, Jeff D. Williamson, Jackson T. Wright

**Table 6. Categories of BP in Adults\***

BP Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
<b>Hypertension</b>			
Stage 1	130–139 mm Hg	or	80–89 mm Hg
Stage 2	≥140 mm Hg	or	≥90 mm Hg

\*Individuals with SBP and DBP in 2 categories should be designated to the higher BP category.

BP indicates blood pressure (based on an average of ≥2 careful readings obtained on ≥2 occasions, as detailed in Section 4); DBP, diastolic blood pressure; and SBP systolic blood pressure.

# Higiénico dietéticas: prevención primaria

- reducir el sobrepeso y prevenir la obesidad
- reducir consumo alcohol
- reducir consumo sal
- incrementar consumo frutas y verduras
- incrementar consumo lácteos desnatados
- combatir sedentarismo
- integrar en la rutina diaria la actividad física.

**DASH**






# Medidas higiénico-dietéticas

**Table 15. Best Proven Nonpharmacological Interventions for Prevention and Treatment of Hypertension\***

Nonpharmacological Intervention	Dose	Approximate Impact on SBP		
		Hypertension	Normotension	Reference
Medida	Efecto en HIPERTENSOS	En normotensos		
Pérdida de peso	- 5 mm Hg	- 2 / - 3 mmHg		
DASH	- 11 mm Hg	- 3 mmHg		
Reducción sal	- 5 / - 6 mm Hg	- 2 / - 3 mmHg		
Incremento de potasio	- 4 / - 5 mm Hg	- 2 mmHg		
Ejercicio aeróbico	- 5 / - 8 mm Hg	- 2 / - 4 mmHg		
Alcohol <div style="display: flex; align-items: center;"> <span style="color: blue; margin-right: 5px;">≤2/d</span> </div> <div style="display: flex; align-items: center;"> <span style="color: red; margin-right: 5px;">≤1/d</span> </div>	- 5 / - 8 mm Hg	- 2 / - 4 mmHg		

# Prevención CV

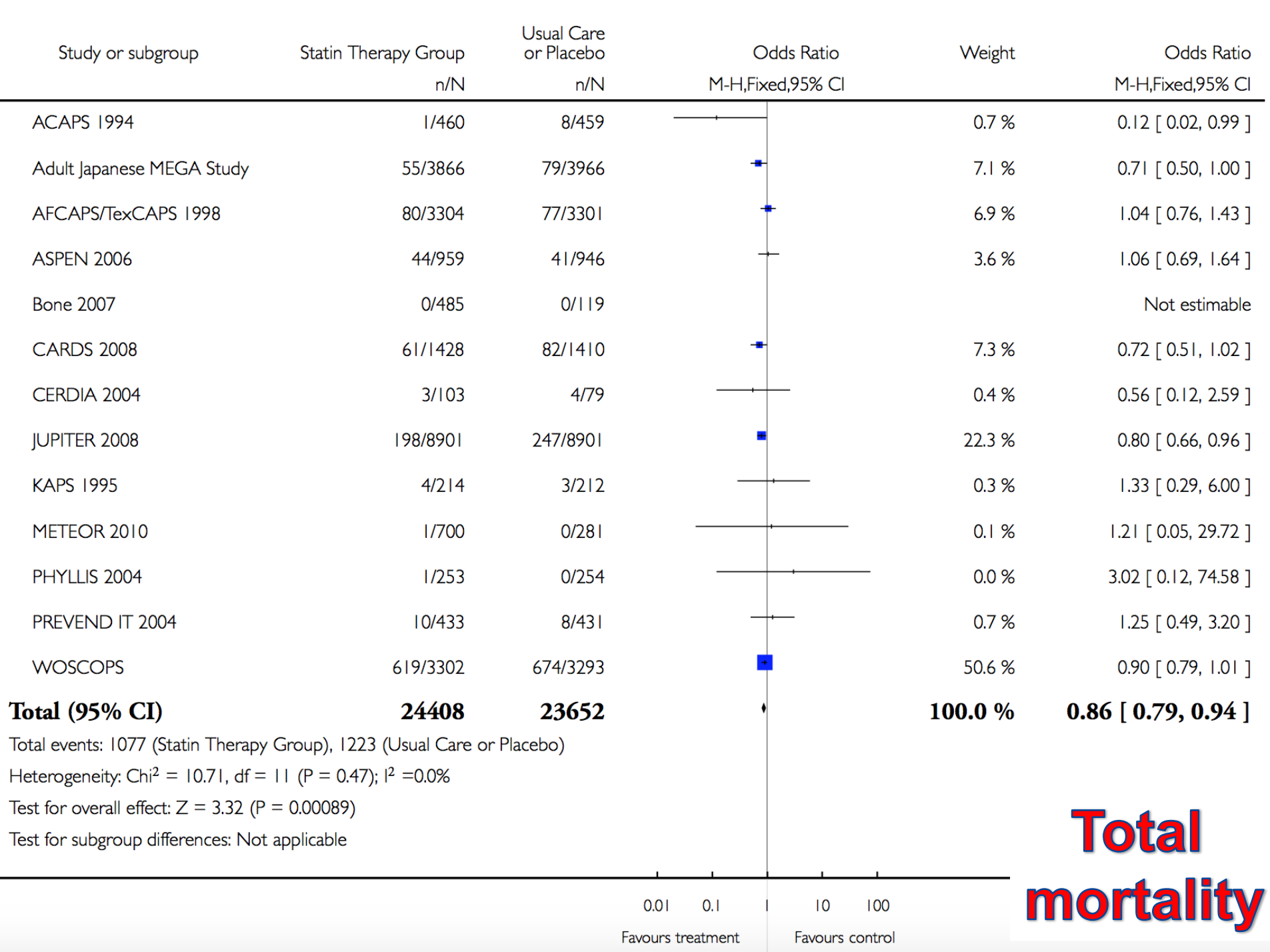
- *Epi+M. Preventiva* es espectacular
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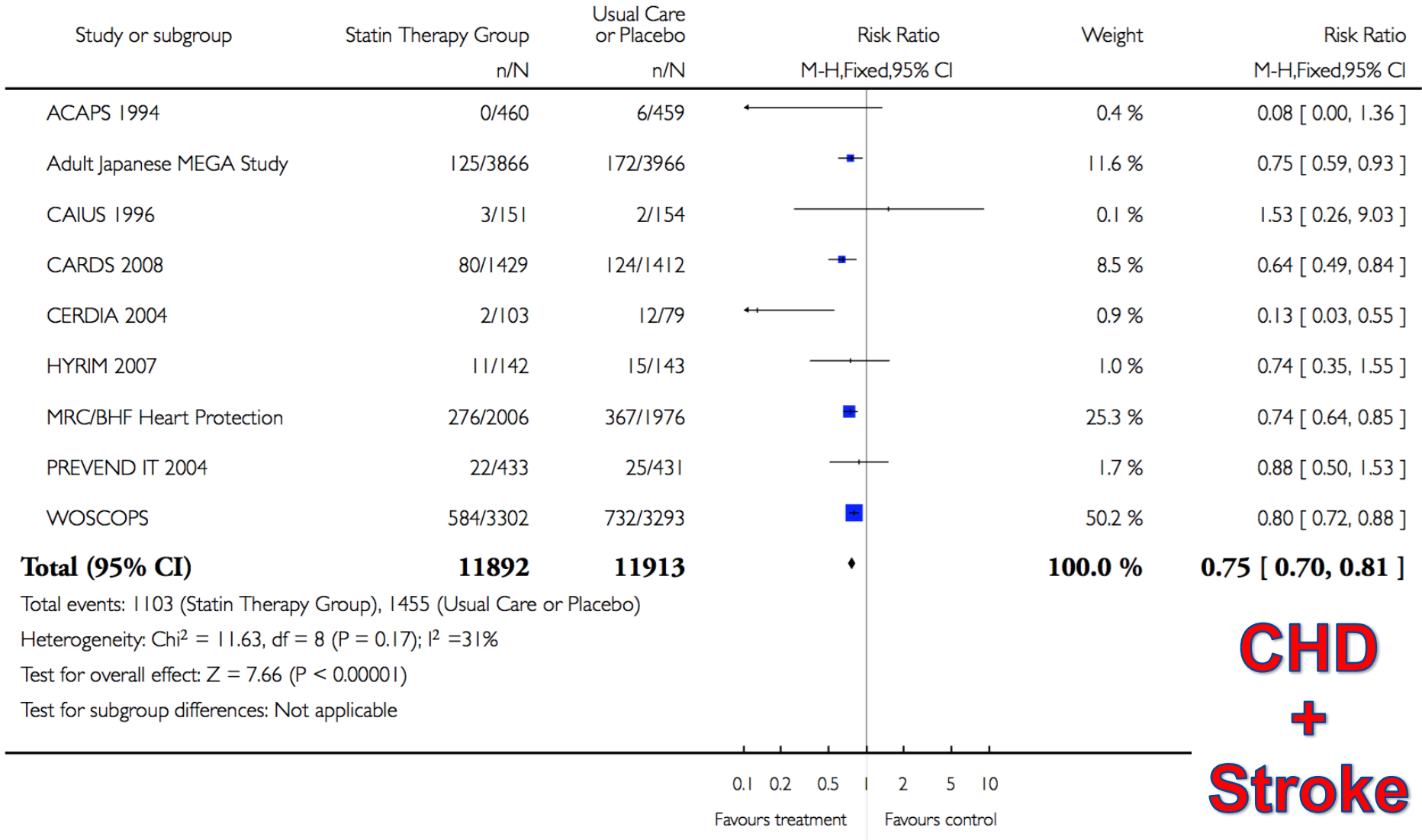
# Statins for the primary prevention of cardiovascular disease (Review)

Taylor F, Huffman MD, Macedo AF, Moore THM, Burke M, Davey Smith G, Ward K,  
Ebrahim S

Cochrane Database Syst Rev 2013;(1):CD004816.

- 18 RCT (19 trial arms; 56,934 participants).
- 14 RCT: patients with specific conditions (dyslipidemia, diabetes, HTA, microalbuminuria).
- **All-cause** mortality was reduced by statins  
OR **0.86** (95% CI 0.79 to 0.94)
- combined fatal & non-fatal **CVD**  
RR **0.75** (95% CI 0.70 to 0.81)
- combined fatal & non-fatal **CHD**  
RR **0.73** (95% CI 0.67 to 0.80)





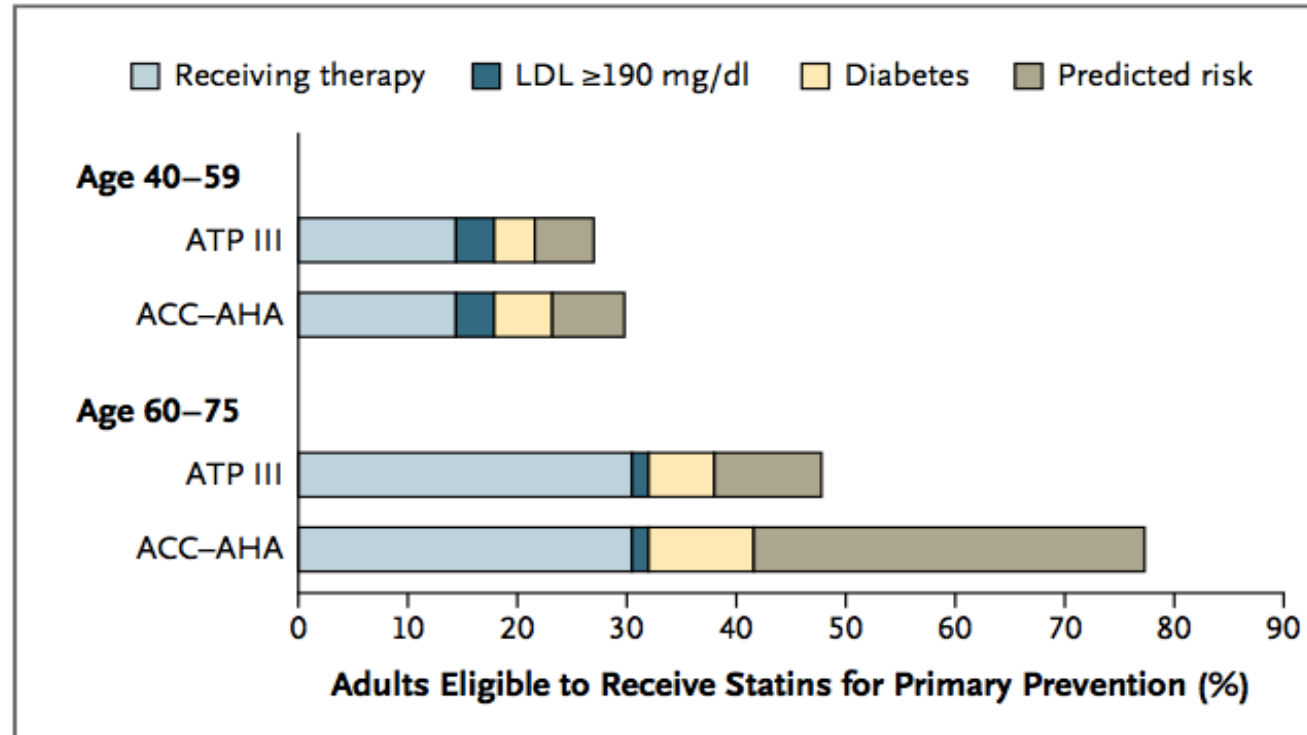
**CHD**  
**+**  
**Stroke**

# Application of New Cholesterol Guidelines to a Population-Based Sample

Michael J. Pencina, Ph.D., Ann Marie Navar-Boggan, M.D., Ph.D.,  
Ralph B. D'Agostino, Sr., Ph.D., Ken Williams, M.S., Benjamin Neely, M.S.,  
Allan D. Sniderman, M.D., and Eric D. Peterson, M.D., M.P.H.

U.S. adults (40-75 y) receiving or eligible for statin therapy ↑ from 43.2 million (37.5%) to 56.0 million (48.6%).

Most of this increase (10.4 million of **12.8 million**) would occur among adults without CVD.



**Figure 2.** Percent of U.S. Adults Who Would Be Eligible for Statin Therapy for Primary Prevention, According to Set of Guidelines and Age Group. Shown are the proportions of adults in two age groups (40 to 59 years and 60 to 75 years) without cardiovascular disease who would be eligible for statin therapy for primary prevention of cardiovascular disease under the ATP-III guidelines and the 2013 ACC-AHA guidelines, according to the indication for therapy (elevated LDL cholesterol level, the presence of diabetes, or the predicted risk of a cardiovascular event according to the set of guidelines).

USPSTF: estatinas **RECOMEND. B**

JAMA 2016;316:1997-2007  
**Nov 15, 2016**

JAMA | US Preventive Services Task Force | **RECOMMENDATION STATEMENT**

# Statin Use for the Primary Prevention of Cardiovascular Disease in Adults

## US Preventive Services Task Force Recommendation Statement

US Preventive Services Task Force

← Editorial pages 1977, 1979 and 1981

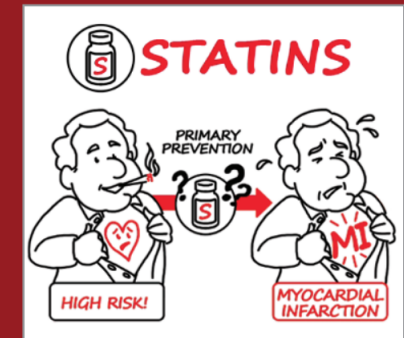
+ Author Audio Interview, Author Video Interview, Animated Summary Video, and JAMA Report Video

← Related article page 2008 and JAMA Patient Page page 2056

+ CME Quiz at [jamanetworkcme.com](http://jamanetworkcme.com)

+ Related articles at [jamacardiology.com](http://jamacardiology.com), [jamainternalmedicine.com](http://jamainternalmedicine.com)

JAMA.COM



**Animated Summary Video**  
Statins for Prevention of Cardiovascular Disease in Adults: USPSTF Recommendation Statement available at [jamastatins.com](http://jamastatins.com)

USPSTF: estatinas y *RECOM. B*  
*JAMA 2016;1997-2007.*

## Recomienda (tipo "B")

Estatina en dosis baja-moderada

Si 3 criterios a la vez:

1) Edad: **40 a 75** años

Y

2)  **$\geq 1$  FR** de ECV

(dislipidemia, diabetes, HTA, tabaquismo)

Y

3) Riesgo estimado (10 años)  **$\geq 10\%$**



## Recommendation Summary

Population	Recommendation	Grade (What's This?)
<p>Adults aged 40 to 75 years with no history of CVD, 1 or more CVD risk factors, and a calculated 10-year CVD event risk of 10% or greater</p>	<p>The USPSTF recommends that adults without a history of cardiovascular disease (CVD) (ie, symptomatic coronary artery disease or ischemic stroke) use a low- to moderate-dose statin for the prevention of CVD events and mortality when all of the following criteria are met: 1) they are aged 40 to 75 years; 2) they have 1 or more CVD risk factors (ie, dyslipidemia, diabetes, hypertension, or smoking); and 3) they have a calculated 10-year risk of a cardiovascular event of 10% or greater.</p> <p>Identification of dyslipidemia and calculation of 10-year CVD event risk requires universal lipids screening in adults aged 40 to 75 years. See the “Clinical Considerations” section for more information on lipids screening and the assessment of cardiovascular risk.</p>	<p><b>B</b></p>
<p>Adults aged 40 to 75 years with no history of CVD, 1 or more CVD risk factors, and a calculated 10-year CVD event risk of 7.5% to 10%</p>	<p>Although statin use may be beneficial for the primary prevention of CVD events in some adults with a 10-year CVD event risk of less than 10%, the likelihood of benefit is smaller, because of a lower probability of disease and uncertainty in individual risk prediction. Clinicians may choose to offer a low- to moderate-dose statin to certain adults without a history of CVD when all of the following criteria are met: 1) they are aged 40 to 75 years; 2) they have 1 or more CVD risk factors (ie, dyslipidemia, diabetes, hypertension, or smoking); and 3) they have a calculated 10-year risk of a cardiovascular event of 7.5% to 10%.</p>	<p><b>C</b></p>
<p>Adults 76 years and older with no history of CVD</p>	<p>The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of initiating statin use for the primary prevention of CVD events and mortality in adults 76 years and older without a history of heart attack or stroke.</p>	<p><b>I</b></p>

# Prevención CV

- *Epi+M. Preventiva* es espectacular
- FACTORES de RIESGO
- MÉTRICAS DE SALUD IDEAL: Life's simple'7
- Estrategias poblacional vs. alto riesgo
- Prevención PRIMORDIAL
- Acciones sobre
  - tabaco
  - TA
  - lípidos

 **Genéticamente destinados?**

- Evaluación global riesgo

# Genetic Risk, Adherence to a Healthy Lifestyle, and Coronary Disease

Amit V. Khera, M.D., Connor A. Emdin, D.Phil., Isabel Drake, Ph.D., Pradeep Natarajan, M.D., Alexander G. Bick, M.D., Ph.D., Nancy R. Cook, Ph.D., Daniel I. Chasman, Ph.D., Usman Baber, M.D., Roxana Mehran, M.D., Daniel J. Rader, M.D., Valentin Fuster, M.D., Ph.D., Eric Boerwinkle, Ph.D., Olle Melander, M.D., Ph.D., Marju Orho-Melander, Ph.D., Paul M Ridker, M.D., and Sekar Kathiresan, M.D.

N ENGL J MED 375;24, DECEMBER 15, 2016

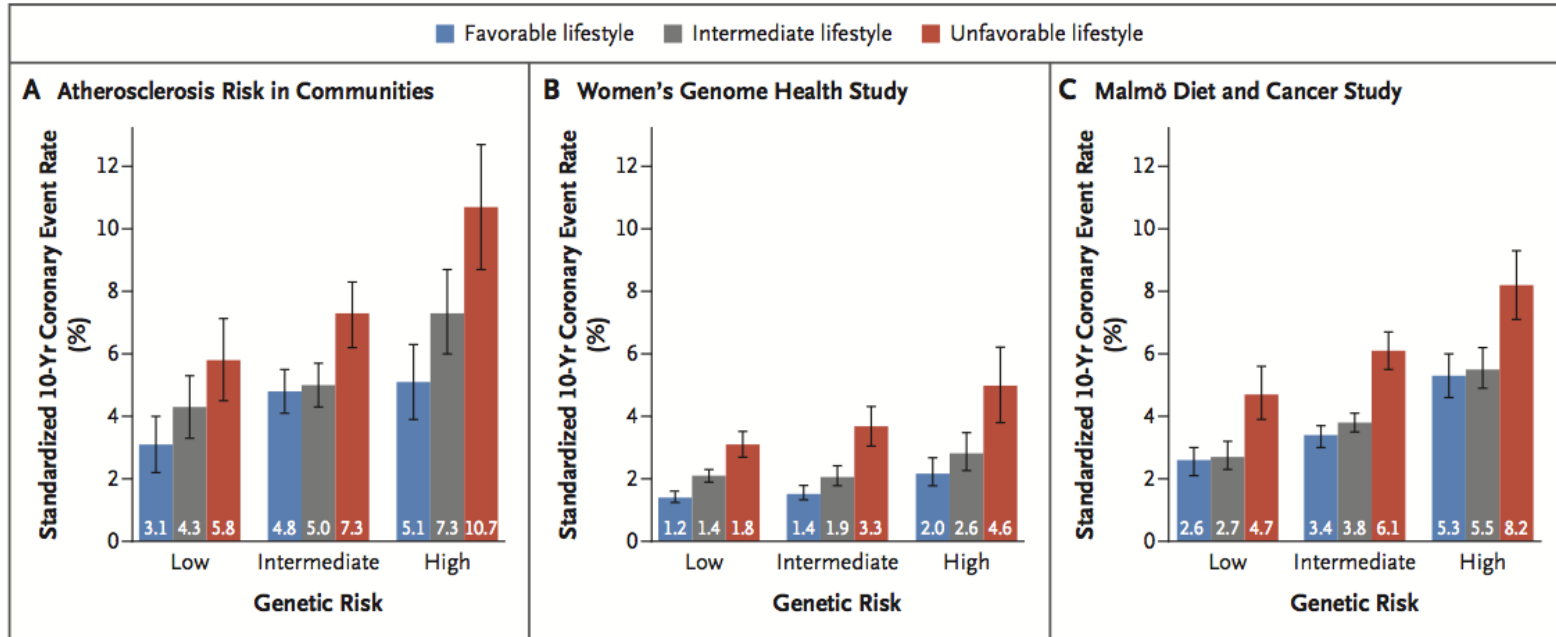
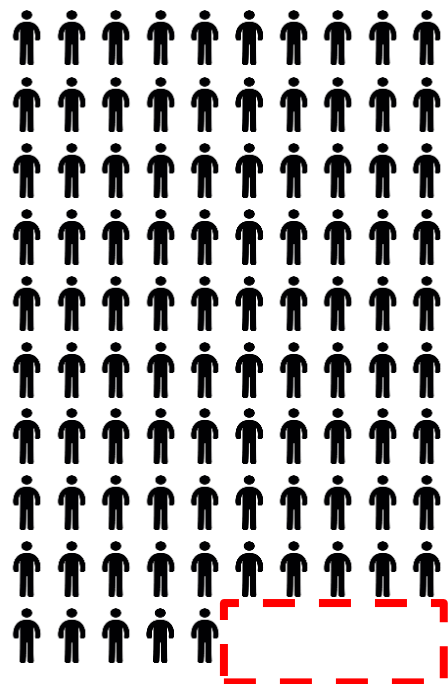


Figure 3. 10-Year Coronary Event Rates, According to Lifestyle and Genetic Risk in the Prospective Cohorts.

# A **monogenic** risk pathway mutation identified in **5%** of individuals presenting with myocardial infarction

100 patients with myocardial infarction



## Monogenic



↑ Risk



LDL cholesterol  
*LDLR, APOB*

**3.2-fold**



Triglyceride clearance  
*LPL, APOA5*

**2.3-fold**

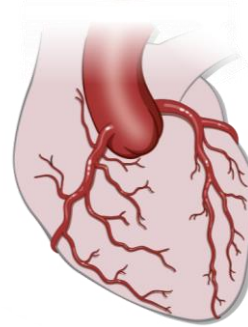
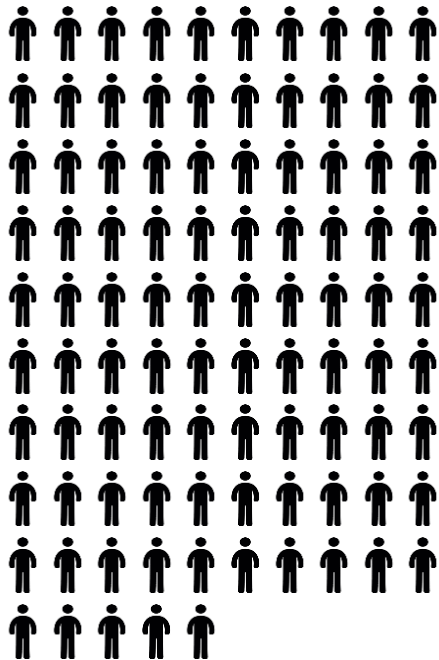


Lipoprotein(a)  
*LPA*

**2.8-fold**

# Clinical interpretation of genetic testing for heart attack risk

100 patients with myocardial infarction

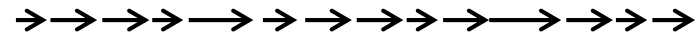


**Monogenic**



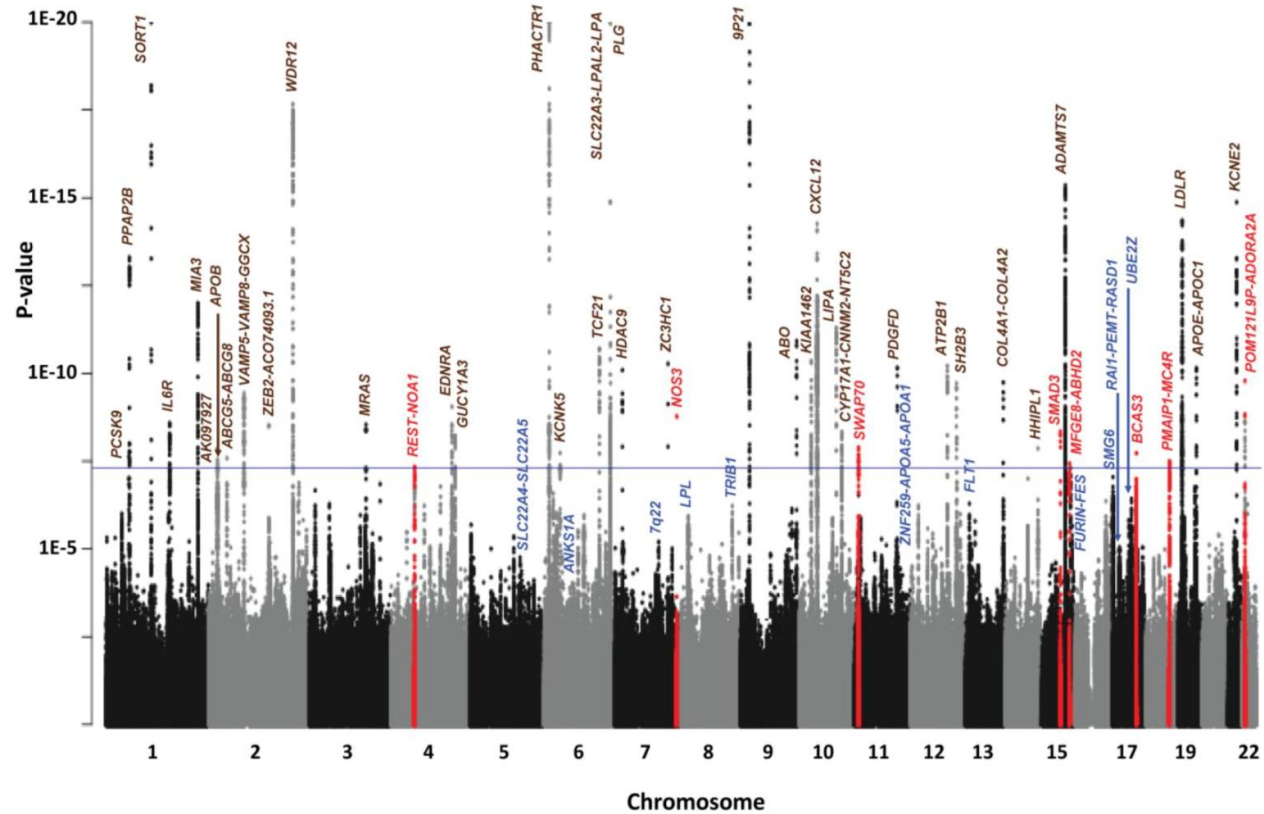
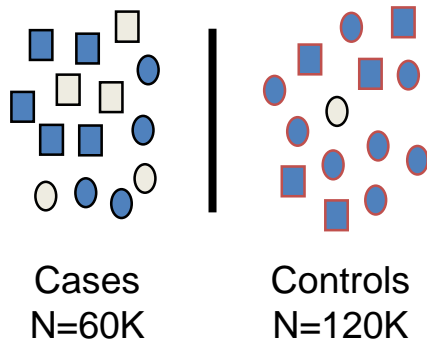
LDL Cholesterol  
Triglyceride Clearance  
Lipoprotein(a)

**Polygenic**



**Polygenic Risk Score**

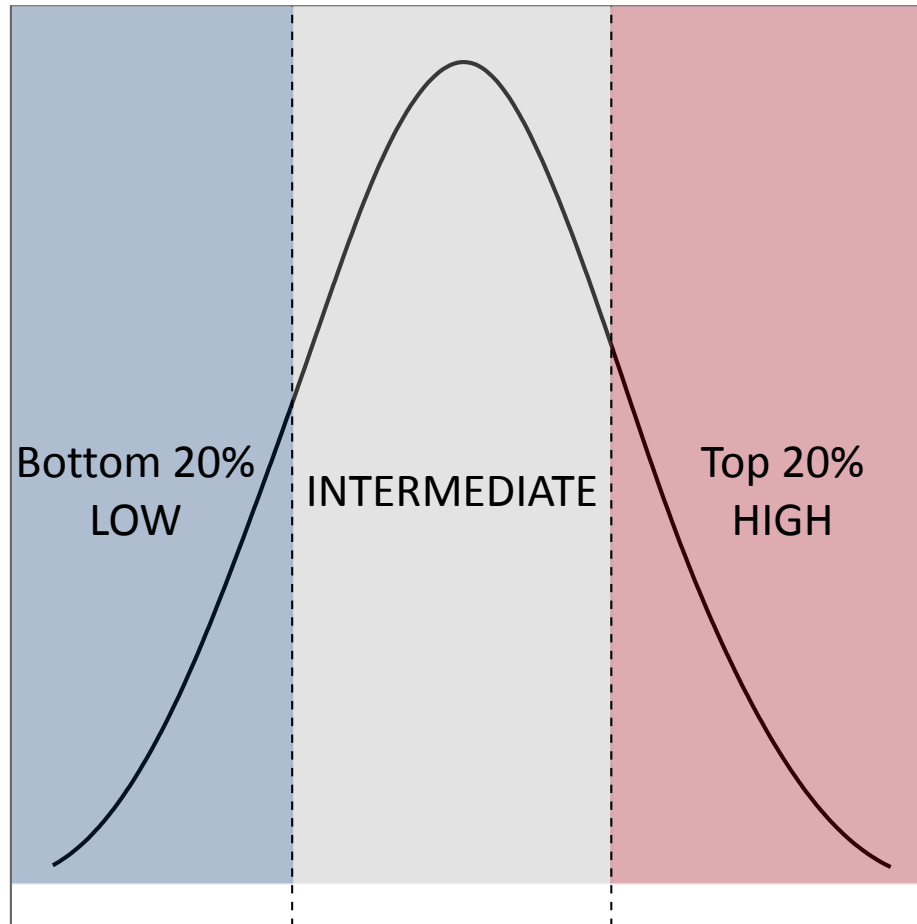
# >50 genetic variants associated with myocardial infarction



Kathiresan *Nature Genetics* (2009)  
Samani *Nature Genetics* (2011)  
Deloukas *Nature Genetics* (2013)  
Nikpay *Nature Genetics* (2015)

# Polygenic risk score: Divide population into genetic risk groups (low, intermediate, high)

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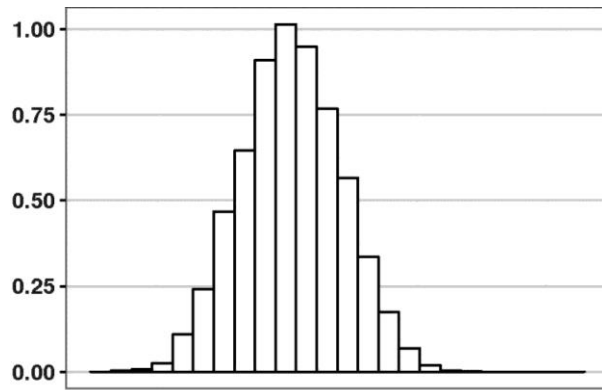
**Polygenic Risk Score**

# Building a polygenic risk score using 50 variants:

## Distribution in > 50,000 individuals

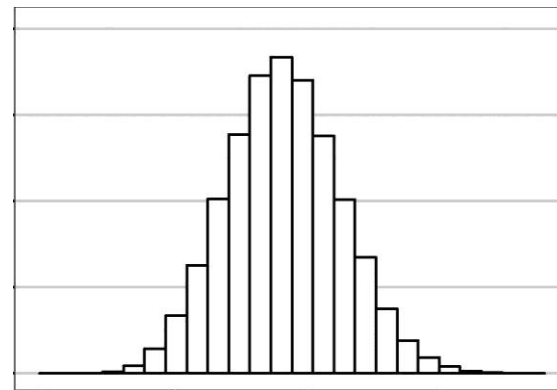
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**Atherosclerosis Risk  
in Communities  
(N = 7,814)**



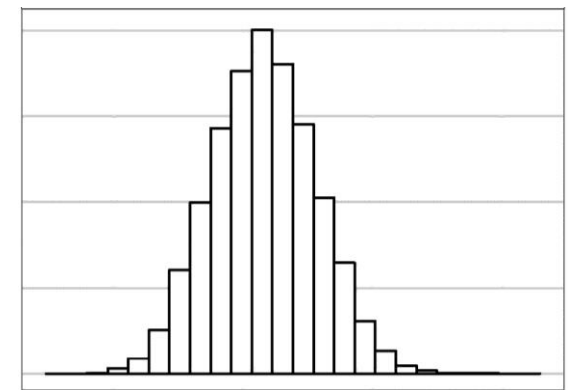
**Polygenic Risk Score**

**Women's Genome  
Health Study  
(N = 21,222)**



**Polygenic Risk Score**

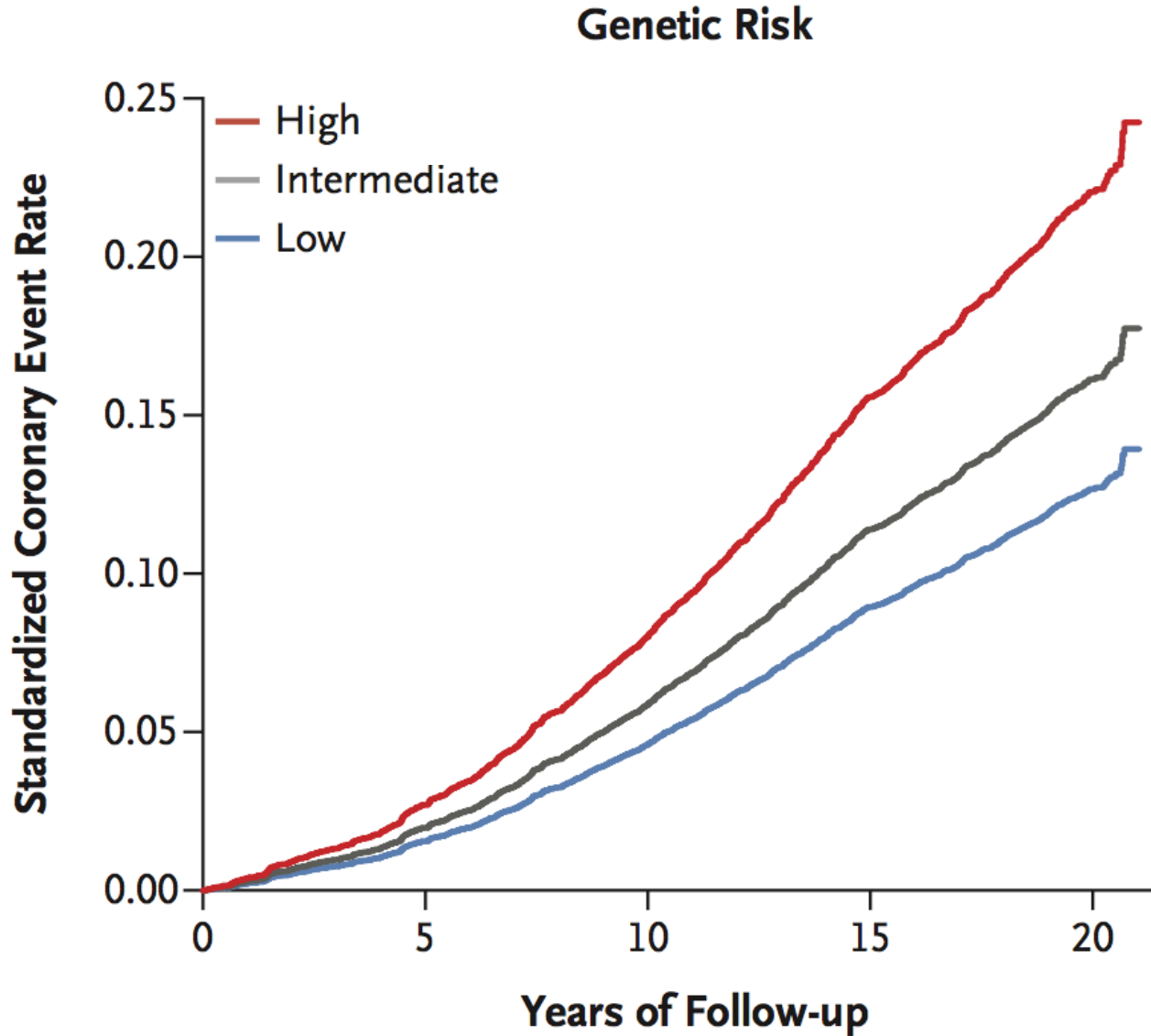
**Malmö Diet and  
Cancer Study  
(N = 22,389)**



**Polygenic Risk Score**



# High genetic risk → 91% higher event rate



# Interpretación clínica

100 pacientes con infarto de miocardio



Riesgo por un solo gen (monogénico)

↑ Riesgo

x3



Riesgo poligénico

x2

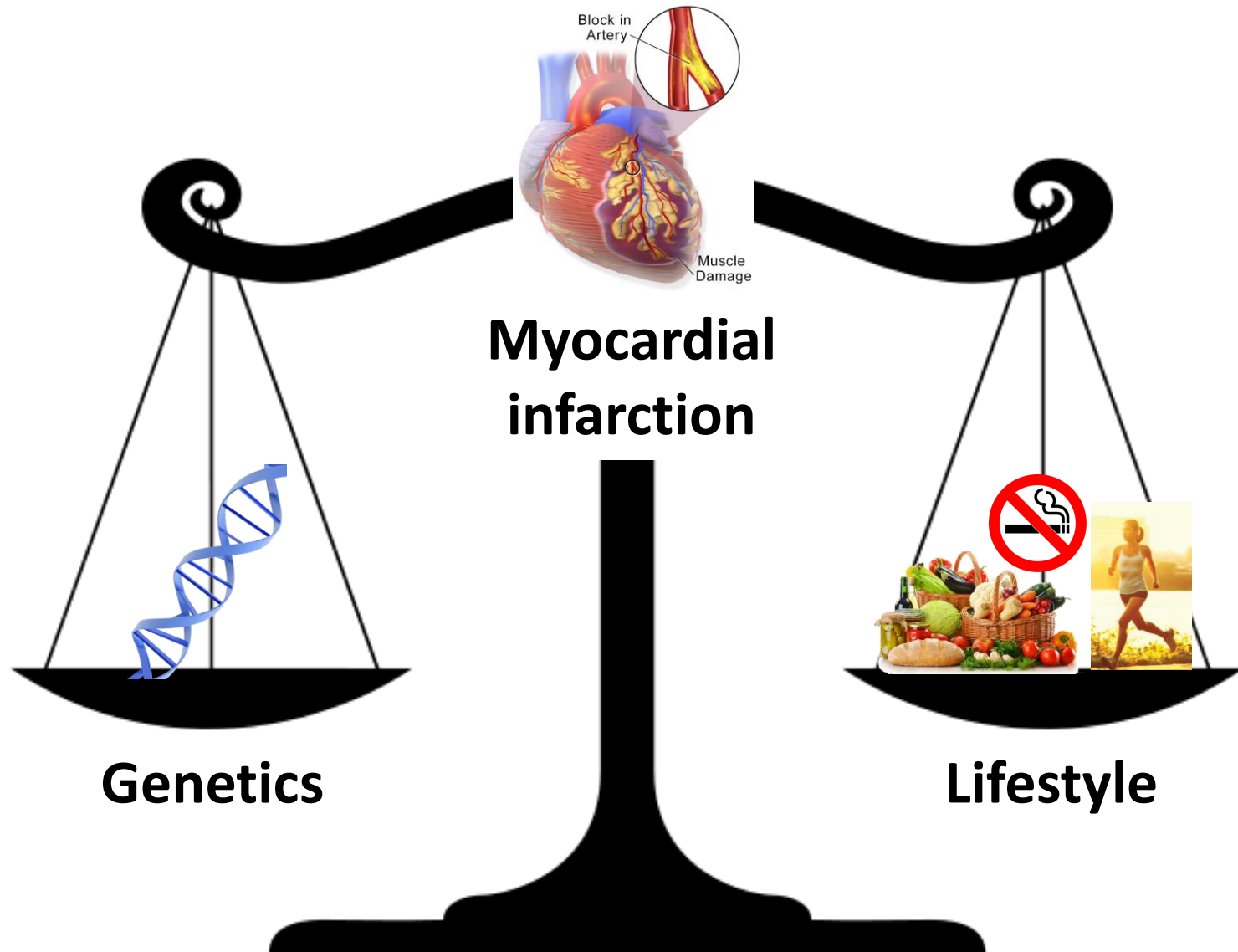


Mono + Poligénico

x6

# To what extent can a **healthy lifestyle** offset inherited risk of myocardial infarction?

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# Building a healthy lifestyle score:

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No current smoking



Avoiding obesity



Regular exercise



Healthy diet

**Favorable lifestyle**

3-4 healthy lifestyle factors

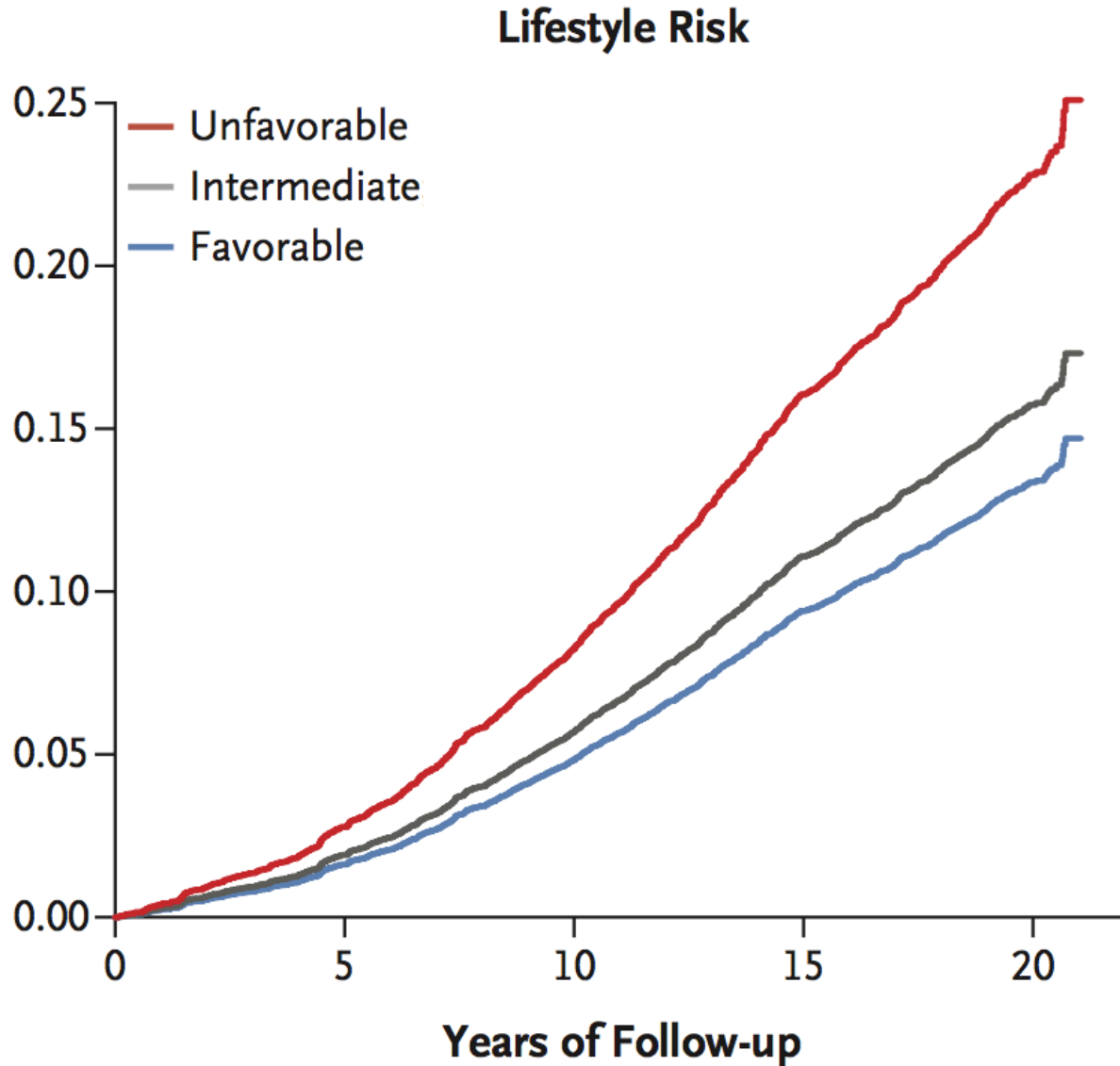
**Intermediate lifestyle**

2 healthy lifestyle factors

**Unfavorable lifestyle**

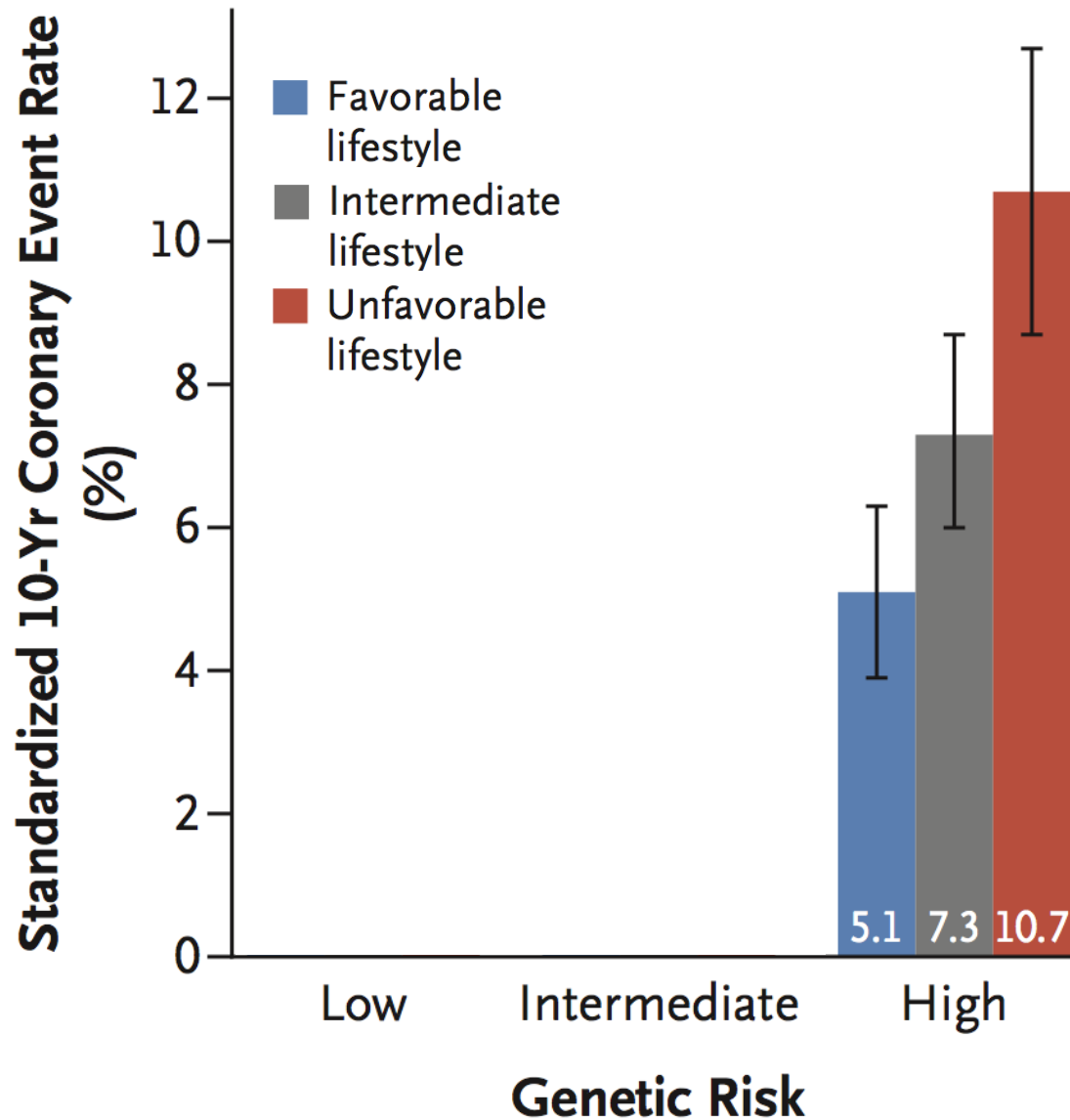
0-1 healthy lifestyle factors

# Favorable lifestyle → 50% lower event rate

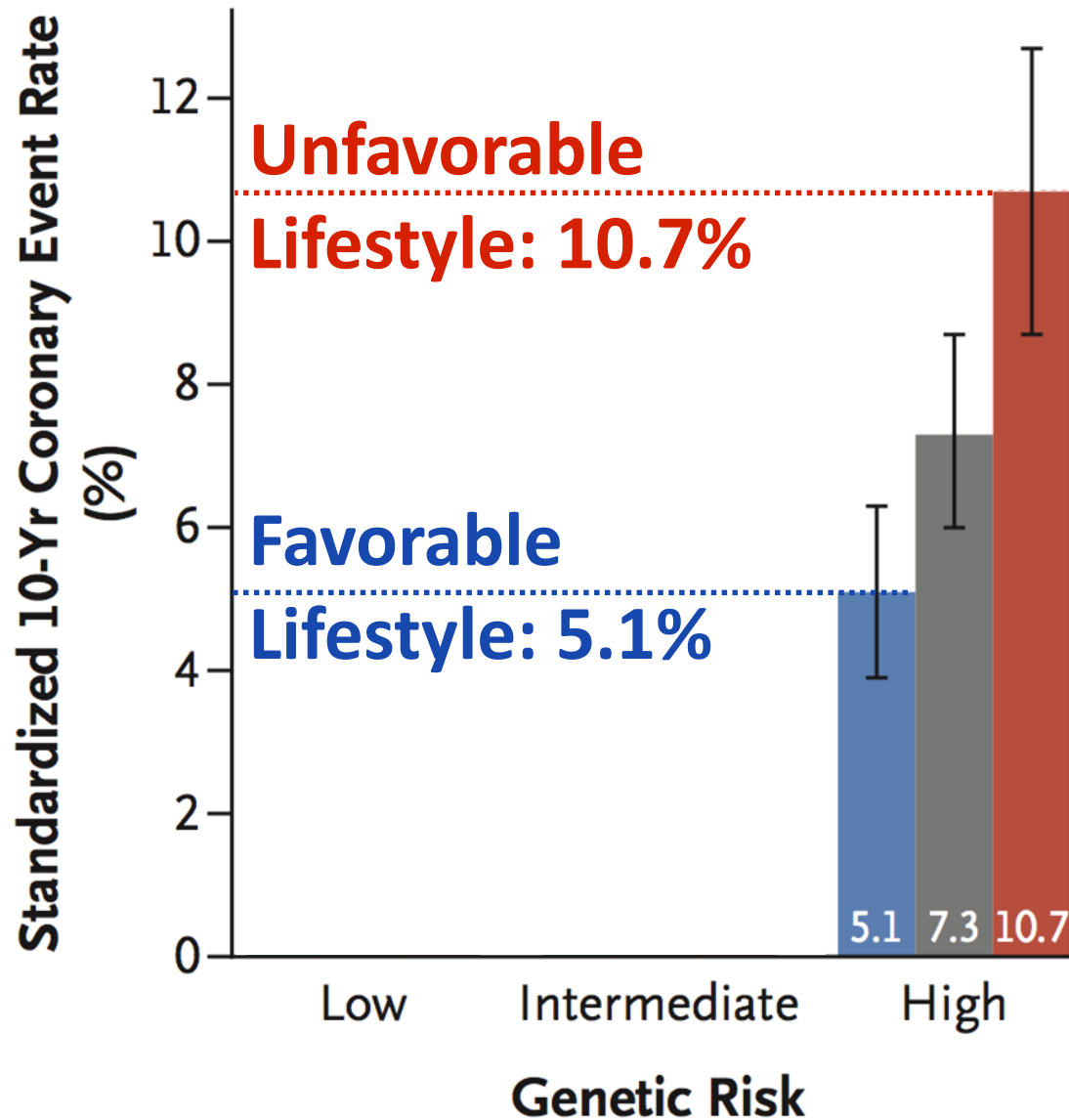


# Among high polygenic risk individuals, favorable lifestyle decreases risk by $\approx 50\%$

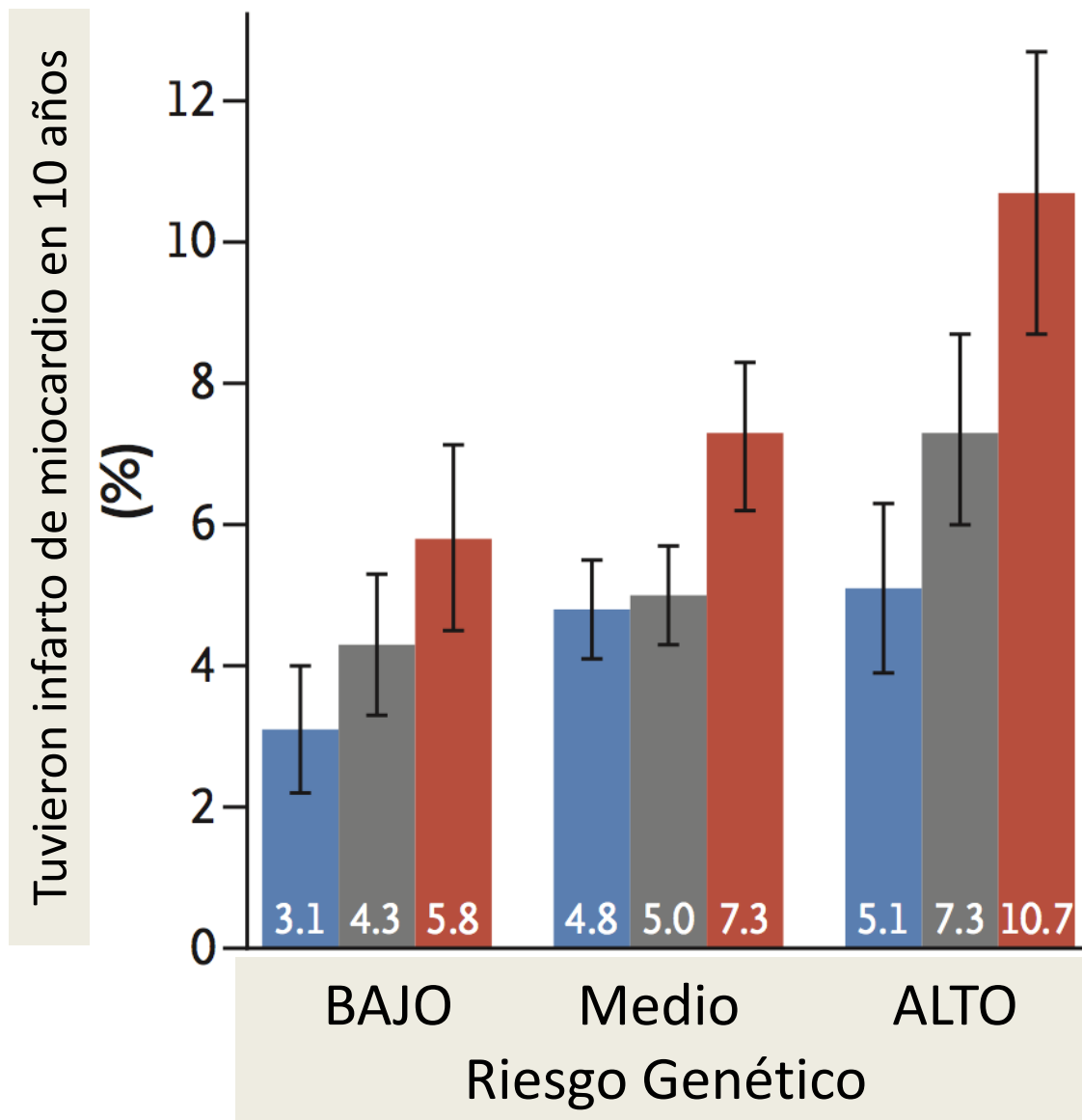
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# Among high polygenic risk individuals, favorable lifestyle decreases risk by $\approx 50\%$

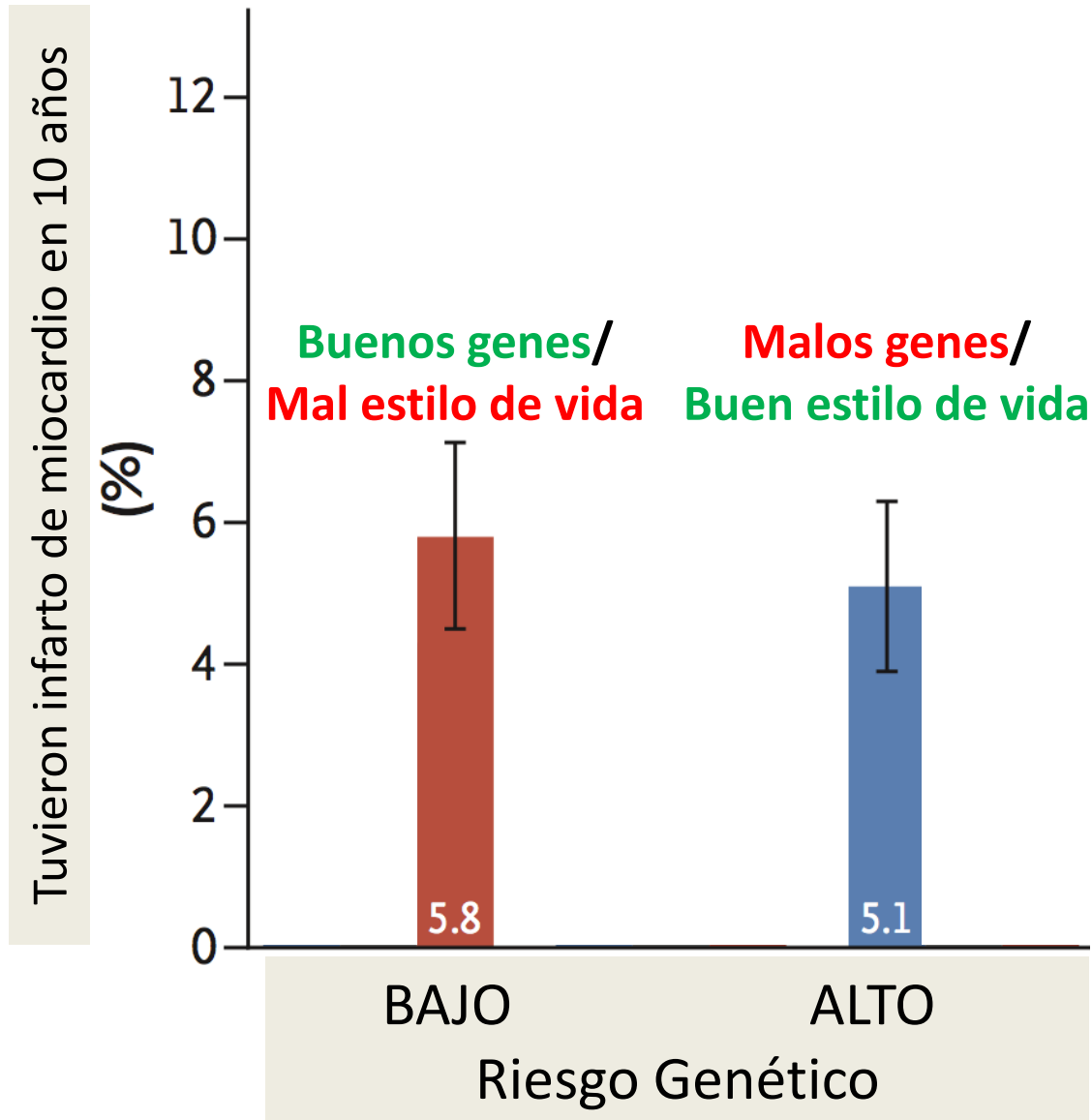


# Among high polygenic risk individuals, favorable lifestyle decreases risk by $\approx 50\%$





# Good genes / bad lifestyle $\approx$ bad genes / good lifestyle



To what extent can inherited risk of myocardial infarction be offset by lifestyle or statin therapy?

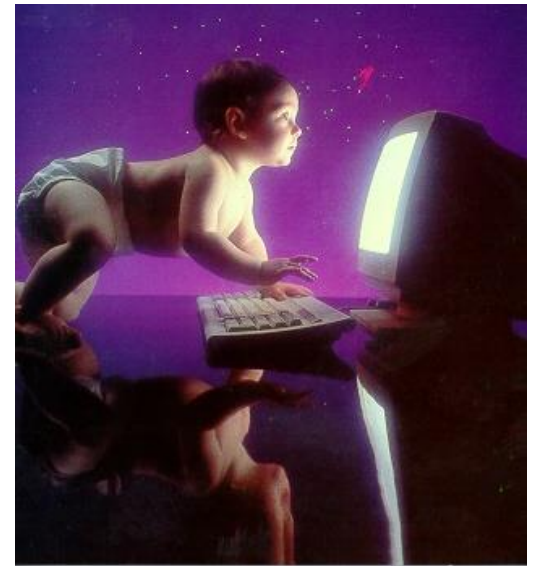
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**DNA is not destiny.**

Among those at high genetic risk,  
both healthy lifestyle and statin therapy  
→ **40-50% reduction** in myocardial infarction.

# Prevención CV

- *Epi+M. Preventiva* es espectacular
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- Genéticamente destinados?



➔ Evaluación global riesgo



# Framingham Heart Study

A Project of the National Heart, Lung, and Blood Institute and Boston University

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[Risk Functions](#)

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[Cardiovascular Disease](#)

[Congestive Heart Failure](#)

[Coronary Heart Disease](#)

[Diabetes](#)

[Hypertension](#)

[Intermittent](#)

[Stroke](#)

## Framingham Risk Functions

Risk prediction estimates for the risk of various cardiovascular disease outcomes in different time horizons are available as score sheets and direct risk functions. The choice of the appropriate risk prediction algorithm should take into account the following components: cardiovascular outcome, population of interest, time horizon, and risk factors. Outcome specific algorithms preceded by the descriptions of the above four components are available for the following:

### Atrial Fibrillation

- [Framingham Heart Study AF score \(10-year risk\) and Calculator](#)
- [Heart Failure in Atrial Fibrillation \(10-year risk\)](#)

### Cardiovascular Disease

- [Cardiovascular Disease \(10-year risk\) and Calculator](#)
- [Cardiovascular Disease \(30-year risk\) and Calculator – HCVD](#)

### Congestive Heart Failure

- [Congestive Heart Failure](#)

### Coronary Heart Disease

- [Hard Coronary Heart Disease \(10-year risk\) and Calculator](#)
- [Coronary Heart Disease \(10-year risk\)](#)
  - [en Español](#)



Contents lists available at ScienceDirect

## Preventive Medicine

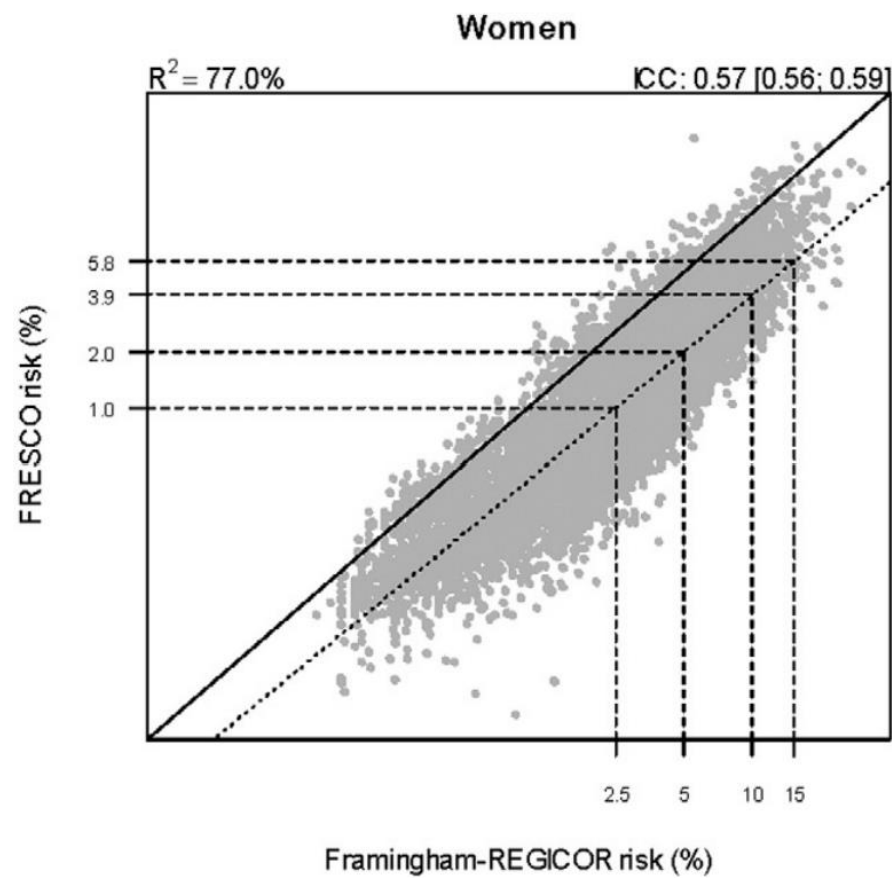
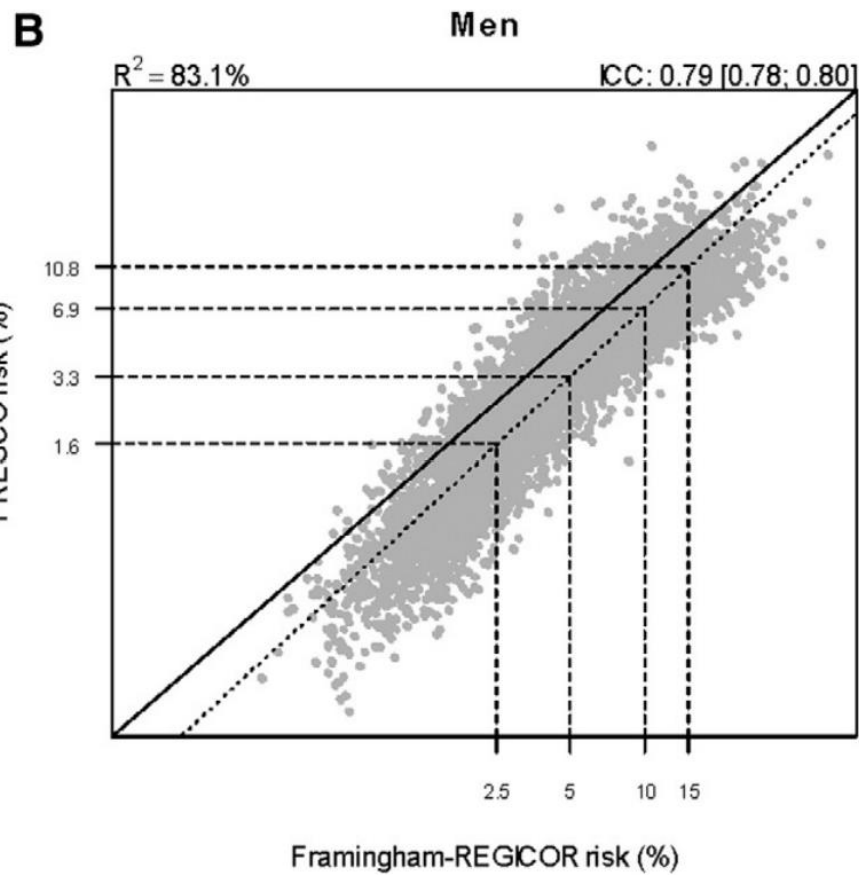
journal homepage: [www.elsevier.com/locate/ypmed](http://www.elsevier.com/locate/ypmed)



### Derivation and validation of a set of 10-year cardiovascular risk predictive functions in Spain: The FRESCO Study



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Antonio Segura <sup>k</sup>, José Miguel Baena-Díez <sup>l</sup>, Agustín Gómez de la Cámara <sup>b,m</sup>, José Lapetra <sup>n,o</sup>, María Grau <sup>a</sup>,  
Miquel Quesada <sup>c</sup>, María José Medrano <sup>p</sup>, Paulino González Diego <sup>e</sup>, Guiem Frontera <sup>g</sup>, Diana Gavrila <sup>b,h</sup>,  
Eva Ardanaz Aicua <sup>b,e,i</sup>, Josep Basora <sup>j,o</sup>, José María García <sup>k</sup>, Manuel García-Lareo <sup>l</sup>, José Antonio Gutierrez <sup>h</sup>,  
Eduardo Mayoral <sup>o,q</sup>, Joan Sala <sup>r</sup>, Ralph D'Agostino <sup>s</sup>, Roberto Elosua <sup>a,b</sup>, on behalf of the FRESCO Investigators <sup>1</sup>



# Tablas SCORE

Riesgo de muerte cardiovascular para países europeos de baja mortalidad cardiovascular (basada en colesterol total)

