II Curso Nacional de Tabaquismo en Pediatría
4 de Octubre de 2019
Hospital General Universitario de Alicante, Alicante

Tabaquismo pasivo infantil y evidencias en patología cardio-vascular y obesidad.

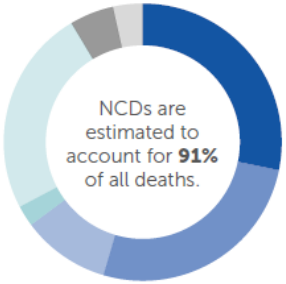
Julio Alvarez Pitti, MD, PhD
Servicio de Pediatría,
Unidad contra la Obesidad y el Riesgo Cardiovascular
Hospital General Universitario de Valencia
CIBERObn, Instituto de Salud Carlos III

paido
PROGRAMA ATENCIÓN INTEGRAL OBESIDAD INFANTIL

ciberobn

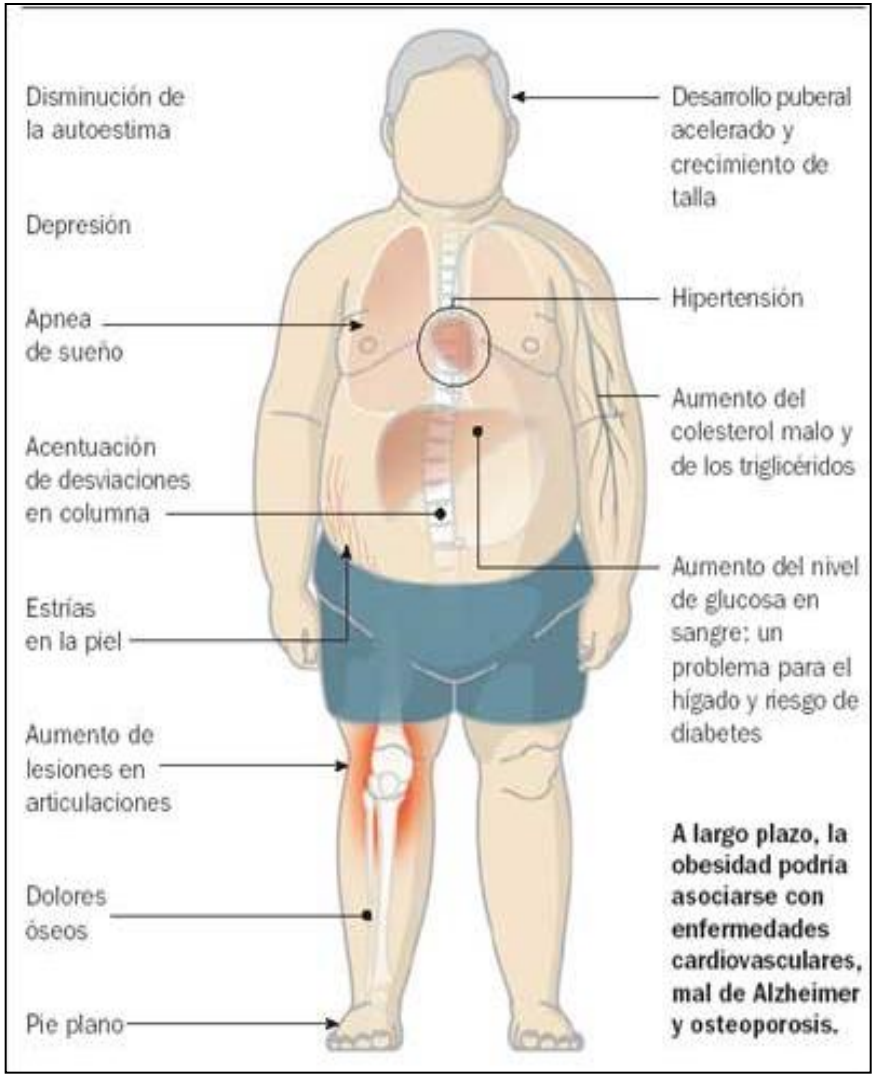
Las Enfermedades No Trasmisibles

4 x 4



World Health Organization - Noncommunicable Diseases (NCD) Country Profiles, 2018.

_Obesidad infantil: enfermedad crónica



OMS 1999 → AMA 2013 → EASO 2015

Obesity Facts
The European Journal of Obesity

Obes Facts 2015;8:342–349
DOI: 10.1159/000441483
Received: May 11, 2015
Accepted: September 4, 2015
Published online: October 16, 2015

© 2015 S. Karger GmbH, Freiburg

1662–4033/15/0085–0342$39.50/0
www.karger.com/ofa

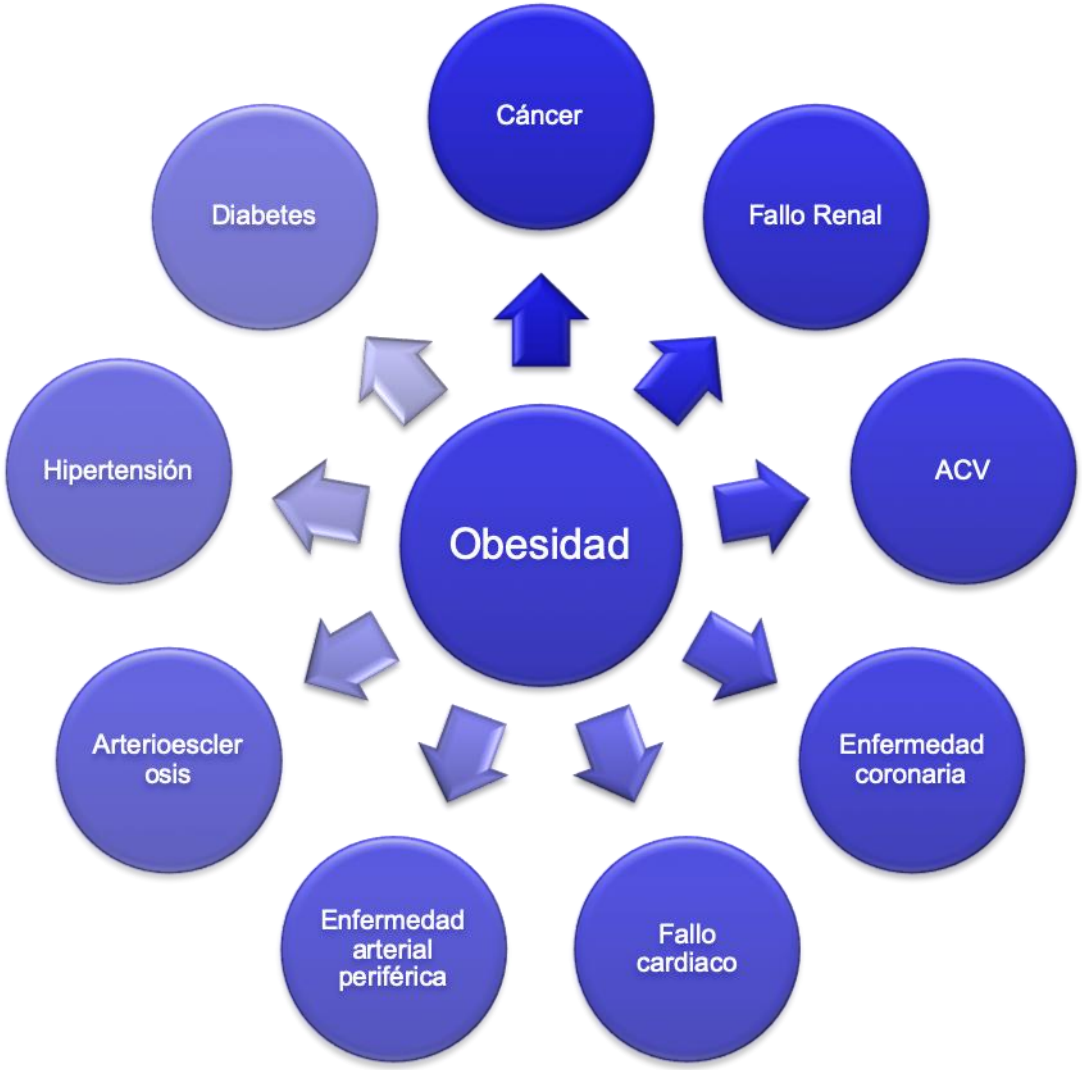
This is an Open Access article licensed under the terms of the Creative Commons Attribution-NonCommercial 3.0 Unported license (CC BY-NC) (www.karger.com/OA-license), applicable to the online version of the article only. Distribution permitted for non-commercial purposes only.

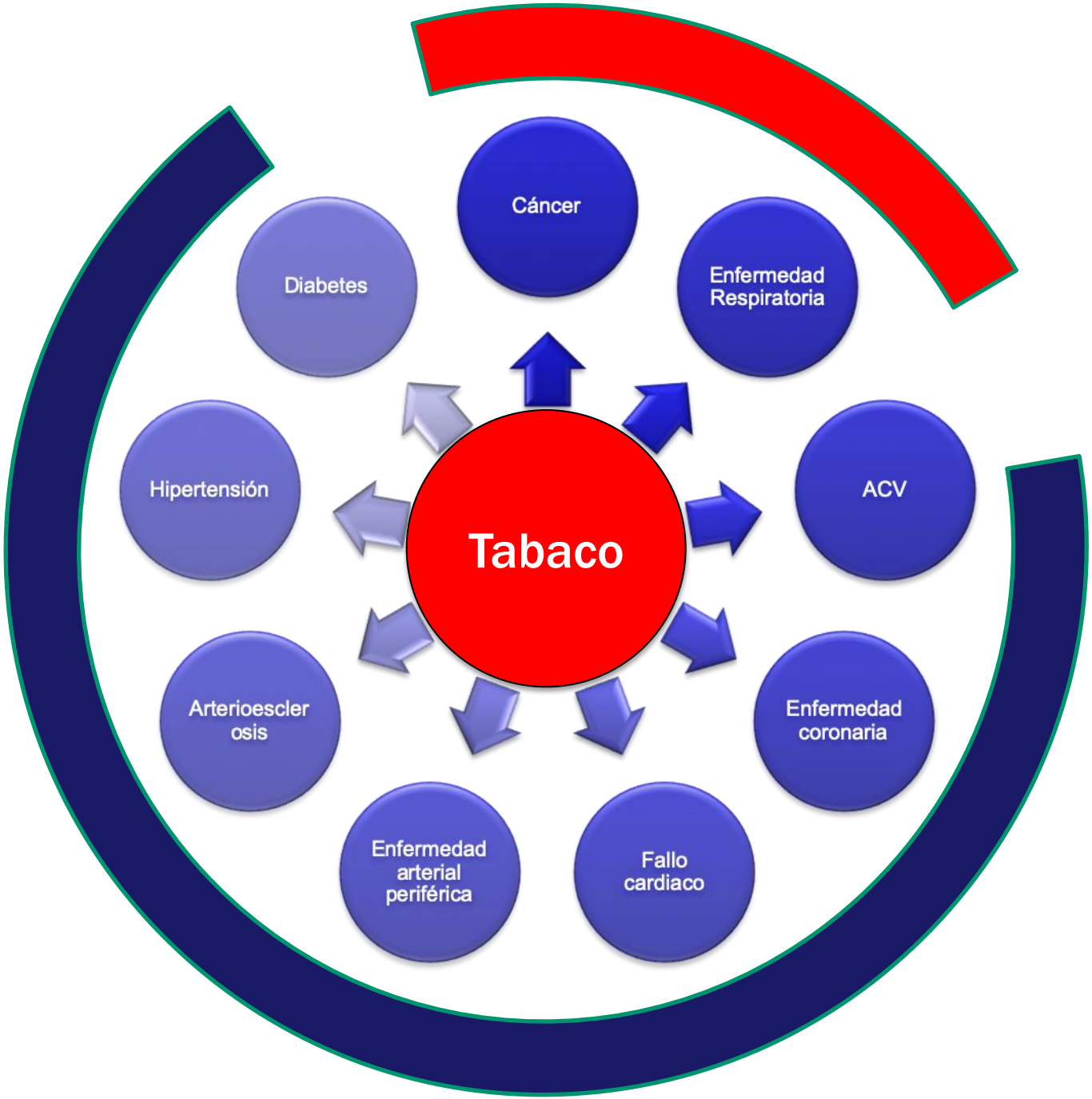
Clinical Information

Childhood Obesity Is a Chronic Disease Demanding Specific Health Care – a Position Statement from the Childhood Obesity Task Force (COTF) of the European Association for the Study of Obesity (EASO)

Nathalie J. Farpour-Lambert[a] Jennifer L. Baker[b, c] Maria Hassapidou[d]
Jens Christian Holm[e] Paulina Nowicka[f] Grace O'Malley[g] Ram Weiss[h]

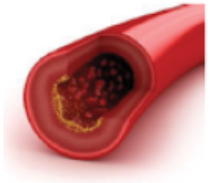
MINISTERIO DE SANIDAD, SERVICIOS SOCIALES E IGUALDAD
aecosan agencia española de consumo, seguridad alimentaria y nutrición


Cáncer
Fallo Renal
ACV
Enfermedad coronaria
Fallo cardiaco
Enfermedad arterial periférica
Arterioesclerosis
Hipertensión
Diabetes
Obesidad


Cáncer
Enfermedad Respiratoria
ACV
Enfermedad coronaria
Fallo cardiaco
Enfermedad arterial periférica
Arterioesclerosis
Hipertensión
Diabetes
Tabaco

Mecanismos fisiopatológicos del tabaco sobre el Sistema CV

Alquitrán y sustancias químicas

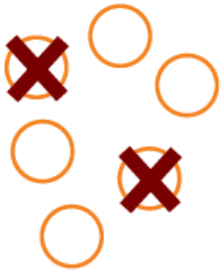


Dañan los vasos sanguíneos; alteran el perfil lipídico y aumentan la densidad de la sangre

Nicotina

Aumenta el ritmo cardiaco y la tensión arterial

Monóxido de carbono

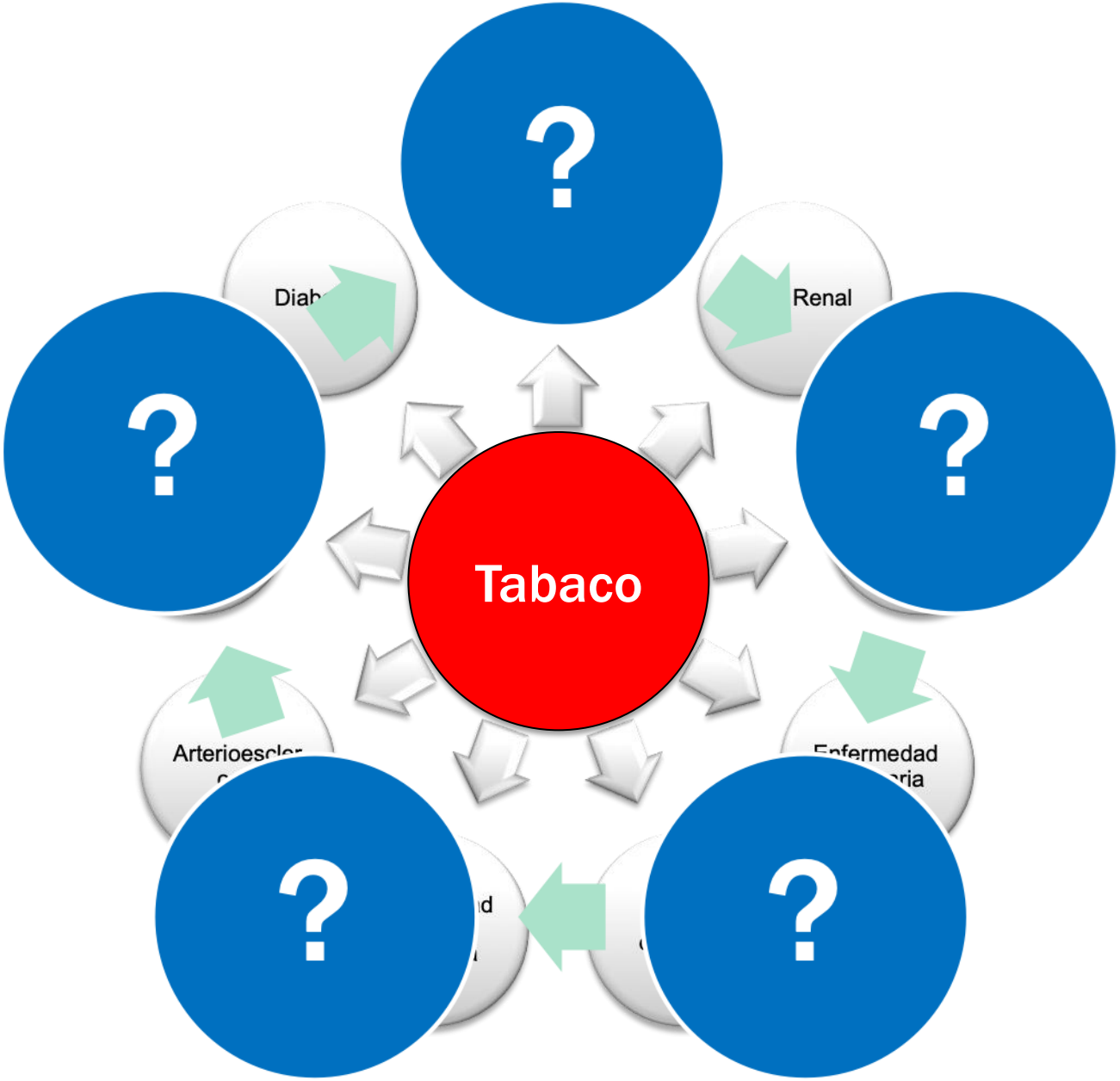


Sustituye al oxígeno

ENFERMEDADES CARDIOVASCULARES

Fuentes: (*9, 10, 12*); ilustración proporcionada por Dutch Heart Foundation.

Hipertensión
Dislipemia
Enfermedad
Disfunción endotelial
Alteración de la condición física
Arterioescler
Alteración metabólica
Obesidad

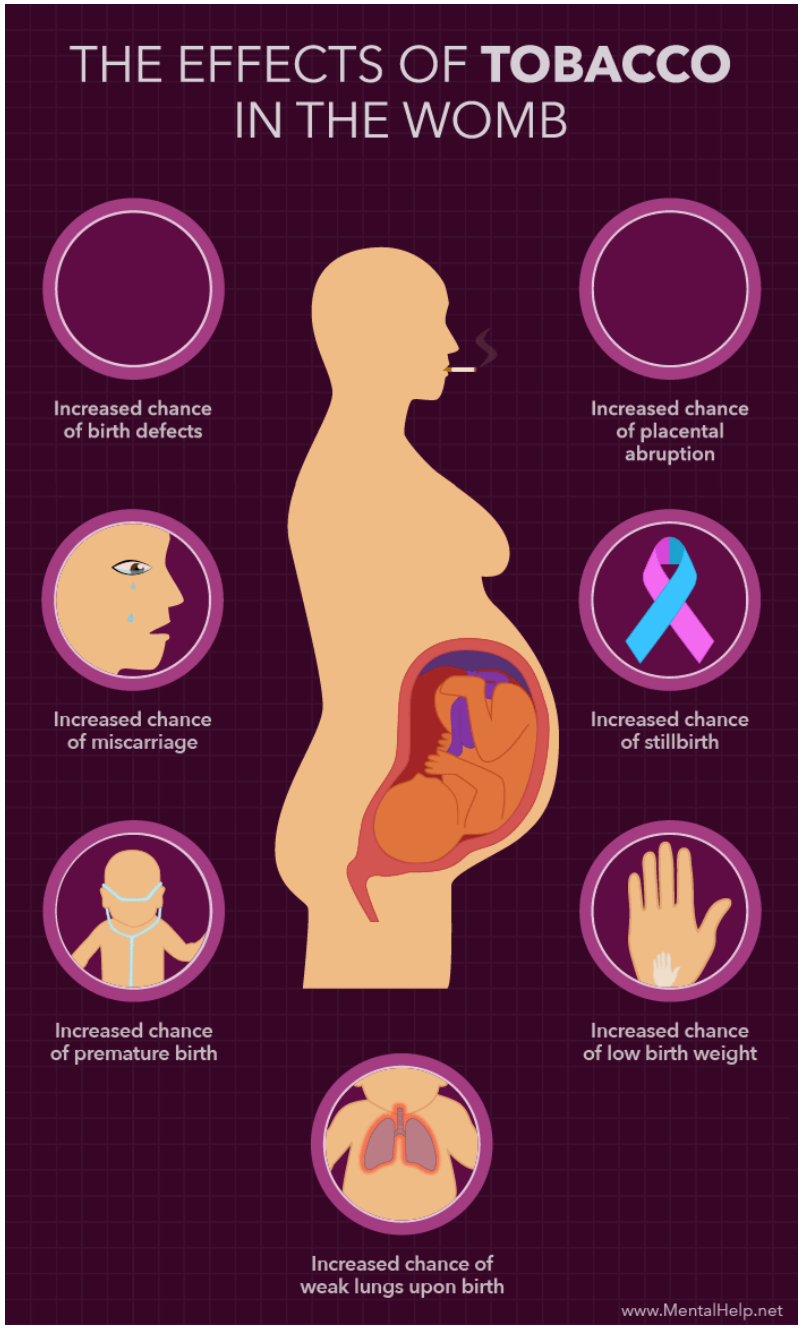

?
Renal
?
?
Tabaco
?
?

El continuum del tabaquismo en la infancia

A/P* RR1.23

A/P RR1.23

A/P RR 1,3-2,5



A/P RR 3,5

A/P* RR1.46

A/P* RR 1,3-10

Dosis dependiente

Contents lists available at ScienceDirect

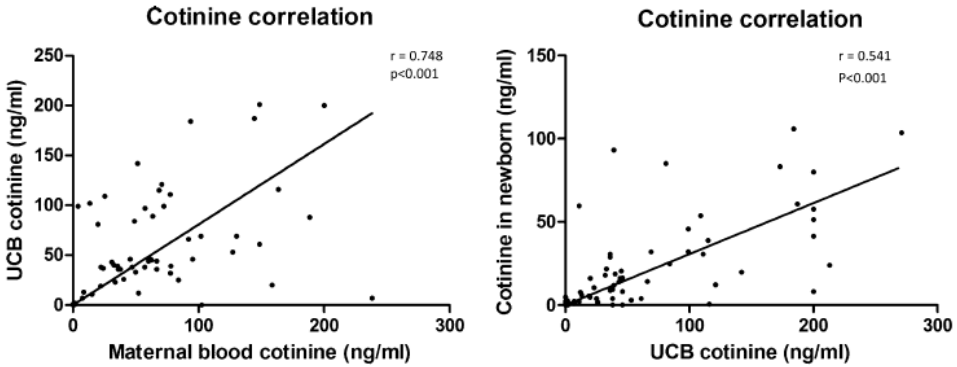
Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdep

High cotinine levels are persistent during the first days of life in newborn second hand smokers

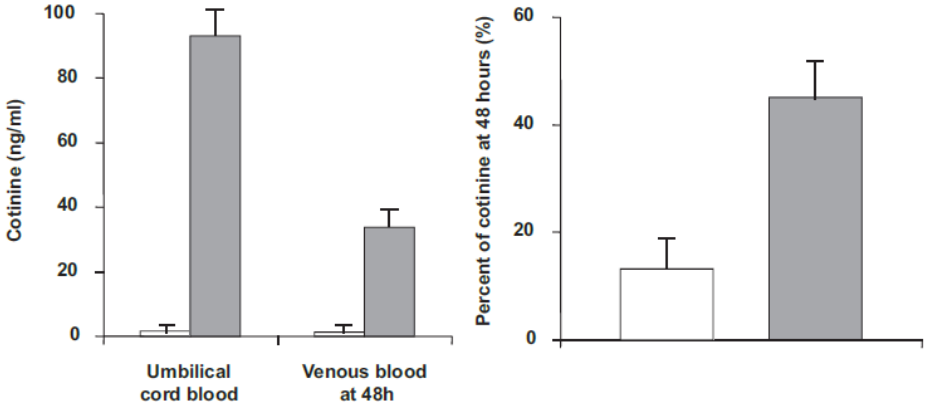
Carmen Ivorra[a,b,*], Consuelo García-Vicent[a,c], Francisco Ponce[a,b], Graciela Ortega-Evangelio[a], José Antonio Fernández-Formoso[b], Empar Lurbe[a,b]

- 90 parejas
- NO complicado, a término
- Cotinina: madre/cordón/ 48h
- NO fumadoras/moderadas/severa



Panel A

Panel B



Level of exposure to tobacco

☐ Slightly ■ Moderate and highly

Severa:cotinina RN>materna

Contents lists available at ScienceDirect

Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdep

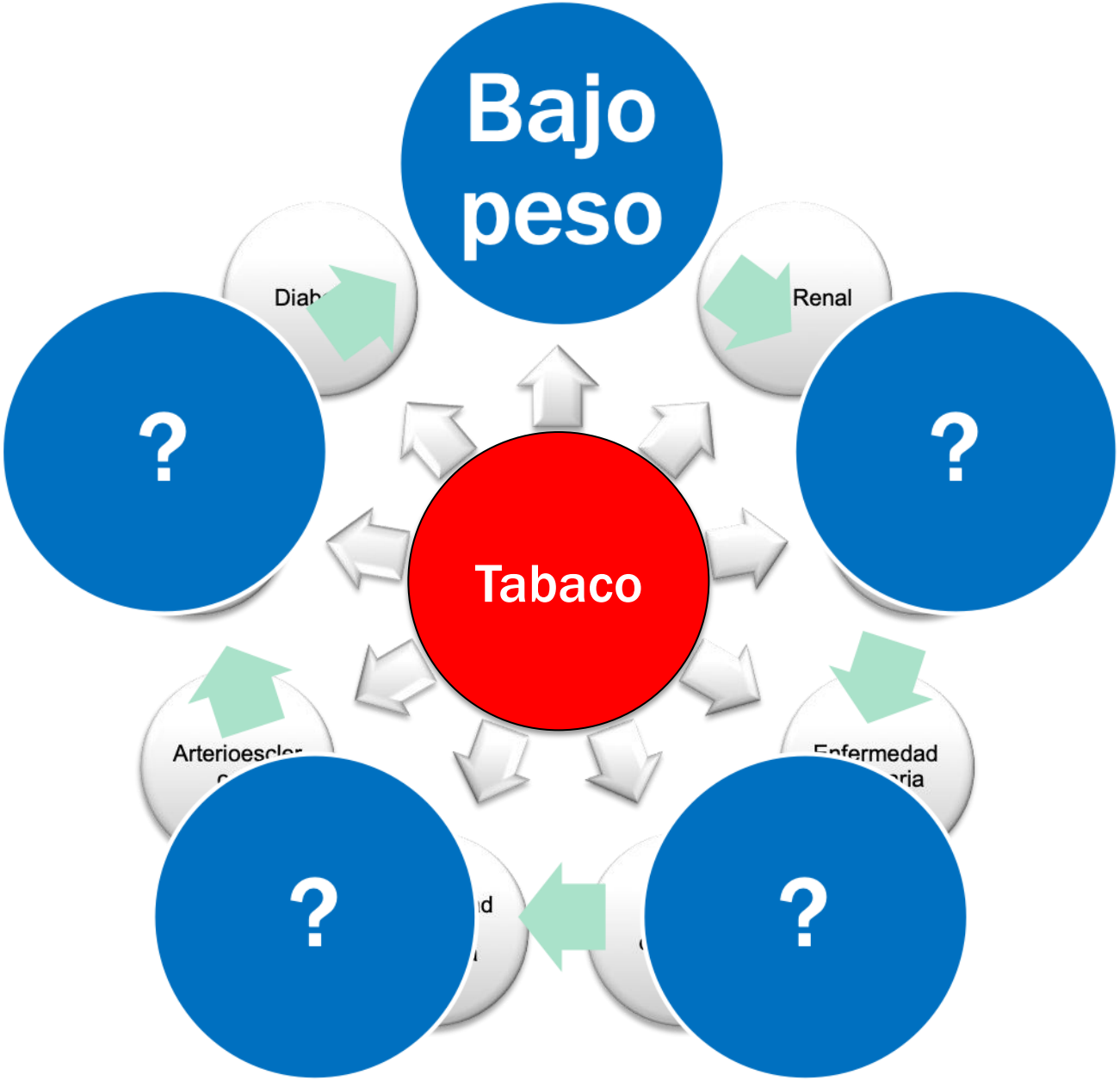
High cotinine levels are persistent during the first days of life in newborn second hand smokers

Carmen Ivorra[a,b,*], Consuelo García-Vicent[a,c], Francisco Ponce[a,b], Graciela Ortega-Evangelio[a], José Antonio Fernández-Formoso[b], Empar Lurbe[a,b]

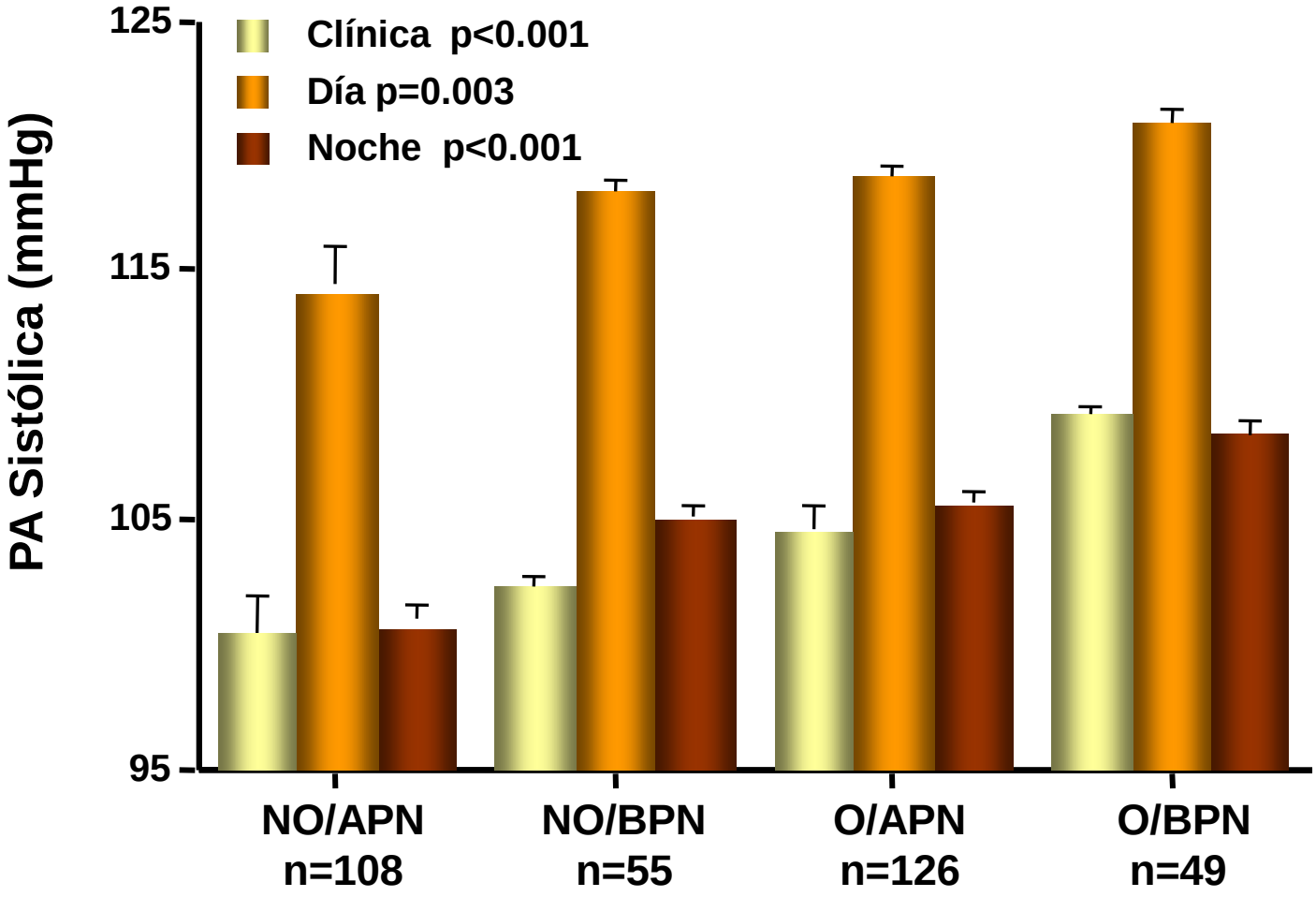
General characteristics of mother and newborns grouped according to cotinine umbilical cord blood levels.

	Slightly exposed ($n=36$) Cotinine < 14 ng/ml	Moderately exposed ($n=37$) Cotinine 14–100 ng/ml	Highly exposed ($n=17$) Cotinine > 100 ng/ml	p-value
Maternal characteristics				
Maternal age (years)	28.7 ± 0.9	30.2 ± 1.0	31.9 ± 119.0	0.139
Cotinine levels (peripheral blood) (ng/ml)	9.9 ± 5.9	67.3 ± 7.4	137.7 ± 19.5	$p < 0.0001$
Newborns characteristics				
Cotinine levels (UCB) (ng/ml)	1.4 ± 0.5	49.9 ± 3.9	173.1 ± 11.2	$p < 0.0001$
Gestational age at delivery (wk)	38.9 ± 0.2	39.1 ± 0.2	39.4 ± 0.3	0.409
Sex (male/female)	22/14	16/21	10/7	0.324
Breastfeeding (%)	58.3	62.2	76.5	0.536
Birth weight (g)	3415.1 ± 100	3100.1 ± 75	3027.1 ± 80	$p < 0.05$
Height (cm)	49.4 ± 0.4	48.7 ± 0.3	47.6 ± 0.5	$p < 0.05$
Systolic blood pressure (mm Hg)	74.7 ± 1.8	73.2 ± 1.8	75.2 ± 2.8	0.791
Diastolic blood pressure (mmHg)	46.3 ± 1.6	44.8 ± 1.6	46.8 ± 2.4	0.761
Heart rate (bpm)	124.94 ± 2.2	119.8 ± 2.3	127.0 ± 3.2	0.150

The values are mean ± SE; p-value = statistical significance of the differences among groups.


Bajo peso
Renal
?
?
Tabaco
?
?

Valores de PA Clínica y Ambulatoria en adolescentes, agrupados por peso al nacer



Valores ajustados por sexo, edad y talla

Bajo Peso
Renal
?
Enfermedad
?
?
Arterioesclor
SMSL
Prenatal

Jerusalem Perinatal Study (JPS)

17003 RN 1974/76

17 (70%) y 32 (10%) años

Associations[a] of maternal and paternal smoking with offspring cardio-metabolic outcomes at age 17.

	Maternal smoking[b]				Paternal smoking[b]				Any parent smoking[c]			
	Model 1[d]		Model 2[d]		Model 1[d]		Model 2[d]		Model 1[d]		Model 2[d]	
	B (SE)	*P*-value	*B* (SE)	*P*-value	*B* (SE)	*P*-value	*B* (SE)	*P*-value	*B* (SE)	*P*-value	*B* (SE)	*P*-value
Systolic BP, mmHg	−0.37 (0.28)	0.18	−0.27 (0.28)	0.33	−0.47 (0.23)	0.04	−0.31 (0.23)	0.18	−0.50 (0.22)	0.02	−0.31 (0.22)	0.17
Diastolic BP, mmHg	−0.15 (0.19)	0.43	−0.09 (0.19)	0.63	0.03 (0.16)	0.83	−0.05 (0.16)	0.77	0.01 (0.15)	0.94	0.05 (0.16)	0.75
Pulse rate, BPM	−0.80 (0.23)	0.001	−0.73 (0.23)	0.002	−0.49 (0.19)	0.01	−0.53 (0.20)	0.007	−0.78 (0.19)	<0.001	−0.78 (0.19)	<0.001
Height, cm	0.48 (0.16)	0.002	0.71 (0.15)	<0.001	0.23 (0.13)	0.08	0.37 (0.13)	0.004	0.39 (0.13)	0.002	0.59 (0.13)	<0.001
Weight, kg	1.36 (0.25)	<0.001	1.71 (0.24)	<0.001	0.73 (0.21)	<0.001	0.80 (0.20)	<0.001	1.23 (0.20)	<0.001	1.39 (0.20)	<0.001
BMI, kg/m^2	0.36 (0.08)	<0.001	0.43 (0.08)	<0.001	0.18 (0.07)	0.005	0.17 (0.06)	0.009	0.31 (0.06)	<0.001	0.32 (0.06)	<0.001

Associations[a] of maternal and paternal smoking with offspring cardio-metabolic outcomes at age 32.

	Maternal smoking[b]				Paternal smoking[b]				Any parent smoking[c]			
	Model 1[d]		Model 2[d]		Model 1[d]		Model 2[d]		Model 1[d]		Model 2[d]	
	B (SE)	*P*-value	*B* (SE)	*P*-value	*B* (SE)	*P*-value	*B* (SE)	*P*-value	*B* (SE)	*P*-value	*B* (SE)	*P*-value
Systolic BP, mmHg	−1.55 (1.05)	0.14	−0.94 (0.72)	0.24	0.24 (0.87)	0.78	0.56 (0.68)	0.41	−0.29 (0.79)	0.72	0.04 (0.65)	0.96
Diastolic BP, mmHg	−0.82 (0.85)	0.33	−0.56 (0.62)	0.37	−0.15 (0.72)	0.83	0.46 (0.52)	0.38	−0.28 (0.65)	0.67	0.27 (0.49)	0.59
Weight, kg	−0.64 (1.39)	0.65	0.84 (0.96)	0.38	2.29 (1.12)	0.04	2.12 (0.80)	0.008	2.34 (1.06)	0.03	2.22 (0.78)	0.004
Height, cm	−0.25 (0.67)	0.70	0.27 (0.51)	0.60	0.57 (0.51)	0.27	0.81 (0.39)	0.04	0.60 (0.50)	0.23	0.95 (0.39)	0.01
BMI, kg/m^2	−0.16 (0.45)	0.71	0.30 (0.29)	0.30	0.76 (0.37)	0.04	0.56 (0.25)	0.03	0.75 (0.34)	0.03	0.57 (0.24)	0.02
Waist circumference, cm	0.07 (1.12)	0.95	0.78 (0.80)	0.33	1.60 (0.91)	0.08	1.34 (0.65)	0.04	1.94 (0.86)	0.02	1.46 (0.62)	0.02
Pulse rate, BPM	0.23 (0.99)	0.82	0.17 (0.67)	0.80	−1.64 (0.76)	0.03	−0.98 (0.52)	0.06	−1.44 (0.77)	0.06	−0.74 (0.51)	0.15
Glucose, mg/dL	1.54 (1.16)	0.18	1.70 (0.77)	0.03	0.74 (1.00)	0.46	0.16 (0.70)	0.82	1.89 (0.92)	0.04	0.71 (0.65)	0.27
Insulin, μU/mL[e]	0.00 (0.03)	0.91	0.01 (0.02)	0.55	0.01 (0.02)	0.63	0.01 (0.01)	0.62	0.03 (0.02)	0.10	0.02 (0.01)	0.13
LDL-C, mg/dL	−1.89 (2.84)	0.50	0.29 (2.06)	0.89	3.37 (2.37)	0.16	2.02 (1.68)	0.23	2.86 (2.26)	0.21	1.99 (1.61)	0.22
Cholesterol, mg/dL	1.48 (3.17)	0.64	1.80 (2.40)	0.45	2.42 (2.68)	0.37	1.12 (1.98)	0.57	2.73 (2.60)	0.29	1.46 (1.90)	0.44
HDL-C, mg/dL	1.33 (1.44)	0.36	0.27 (0.97)	0.78	−1.20 (1.03)	0.24	−1.09 (0.83)	0.19	−1.10 (1.04)	0.29	−1.12 (0.80)	0.16
Triglycerides, mg/dL[e]	0.03 (0.02)	0.29	0.01 (0.02)	0.41	0.01 (0.02)	0.57	0.01 (0.01)	0.53	0.02 (0.02)	0.20	0.01 (0.01)	0.34

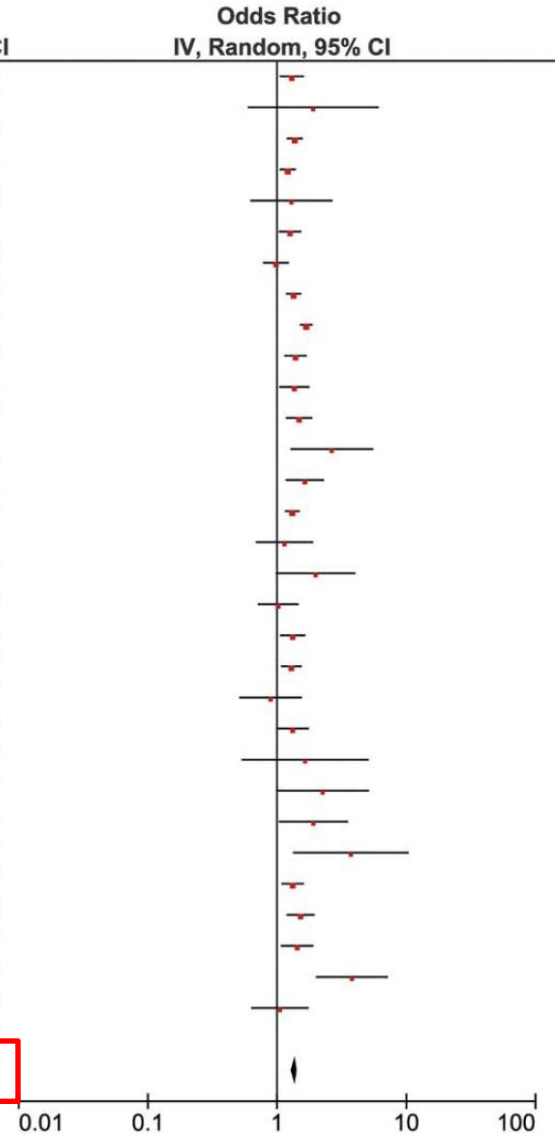
[a] Linear regression models; coefficient indicates the mean difference in cardio-metabolic outcome between offspring of smoking and non-smoking parents.
[b] Maternal and paternal smoking are included together in each model.
[c] Al least one parent smokes.
[d] Model 1: Adjusted for gender and ethnicity. Model 2: Model 1 plus socioeconomic status, age of parents, parent's years of education, birth weight, maternal pre-pregnancy BMI, maternal health conditions, offspring smoking status, physical activity at age 32, education at age 32 and genetic propensity score.

Metaanálisis obesidad

39

Study or Subgroup	log[Odds Ratio]	SE	Weight	Odds Ratio IV, Random, 95% CI
Al Mamum 2006 (Australia)	0.2624	0.109	4.6%	1.30 [1.05, 1.61]
Braun 2010 (USA)	0.6419	0.5951	0.3%	1.90 [0.59, 6.10]
Chen 2006 (USA) Female	0.3148	0.0719	6.4%	1.37 [1.19, 1.58]
Chen 2006 (USA) Male	0.1906	0.0724	6.4%	1.21 [1.05, 1.39]
Fasting 2009 (Norway)	0.2546	0.3738	0.7%	1.29 [0.62, 2.68]
Gorog 2011 (Europe)	0.2311	0.1028	4.9%	1.26 [1.03, 1.54]
Harris 2013 (USA)	-0.0202	0.1165	4.3%	0.98 [0.78, 1.23]
Hawkins 2009 (UK)	0.2927	0.0692	6.6%	1.34 [1.17, 1.53]
Kleiser 2009 (Germany)	0.5188	0.0578	7.2%	1.68 [1.50, 1.88]
Kuhle 2010 (Canada)	0.3293	0.1012	5.0%	1.39 [1.14, 1.69]
Laitinen 2012 (Finland)	0.3075	0.1369	3.6%	1.36 [1.04, 1.78]
Mangrio 2010 (Sweden)	0.392	0.1199	4.2%	1.48 [1.17, 1.87]
Mendez 2008 (Spain)	0.9746	0.3762	0.7%	2.65 [1.27, 5.54]
Messiah 2012 (USA)	0.4947	0.1726	2.7%	1.64 [1.17, 2.30]
Moller 2014 (Denmark)	0.27	0.0665	6.7%	1.31 [1.15, 1.49]
Moschonis 2008 (Greece)	0.131	0.2606	1.4%	1.14 [0.68, 1.90]
Olson 2009 (USA)	0.6861	0.3619	0.8%	1.99 [0.98, 4.04]
Pinot de Moira 2010 (UK) Offspring	0.0198	0.1848	2.4%	1.02 [0.71, 1.47]
Power 2002 (UK) Female	0.2776	0.1139	4.4%	1.32 [1.06, 1.65]
Power 2002 (UK) Male	0.2546	0.0937	5.3%	1.29 [1.07, 1.55]
Raum 2011 (Germany)	-0.1165	0.2841	1.2%	0.89 [0.51, 1.55]
Risvas 2011 (Finland)	0.2776	0.1468	3.3%	1.32 [0.99, 1.76]
Seach 2010 (Australia)	0.499	0.5775	0.3%	1.65 [0.53, 5.11]
Shi 2013 (Canada)	0.8109	0.4225	0.6%	2.25 [0.98, 5.15]
Suzuki 2009 (Japan)	0.6471	0.3151	1.0%	1.91 [1.03, 3.54]
Timmermans 2014 (Netherlands)	1.3137	0.5248	0.4%	3.72 [1.33, 10.41]
Toschke 2007 (Germany)	0.2776	0.1013	5.0%	1.32 [1.08, 1.61]
Von Kries 1999 (Germany)	0.4187	0.1271	3.9%	1.52 [1.18, 1.95]
Von Kries 2002 (Germany)	0.3577	0.148	3.3%	1.43 [1.07, 1.91]
Wideroe 2003 (Norway and Sweden)	1.335	0.3275	0.9%	3.80 [2.00, 7.22]
Yang 2013 (Belarus)	0.0488	0.2606	1.4%	1.05 [0.63, 1.75]
Total (95% CI)			**100.0%**	**1.37 [1.28, 1.46]**

Heterogeneity: Tau² = 0.01; Chi² = 54.88, df = 30 (P = 0.004); I² = 45%
Test for overall effect: Z = 9.34 (P < 0.00001)



Pooled adjusted OR for maternal prenatal smoking and childhood overweight.

Bajo Peso
Renal
Obesidad
Prenatal
SMSL
HTA?
Metabólica?

Cardiovascular Consequences of Childhood Secondhand Tobacco Smoke Exposure: Prevailing Evidence, Burden, and Racial and Socioeconomic Disparities

A Scientific Statement From the American Heart Association

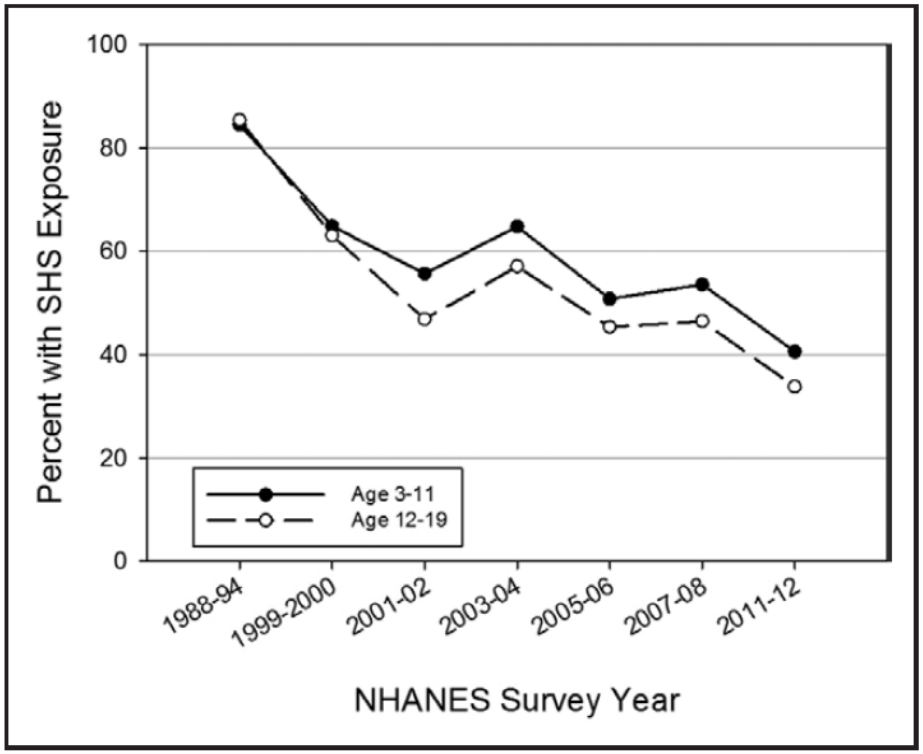


Figure 1. Trends in secondhand smoke (SHS) exposure among US nonsmoking children and adolescents. Data were compiled from NHANES (National Health and Nutrition Examination Survey) periodic survey data.[3,35,36] Solid line indicates children 3 to 11 years of age; and dashed line, adolescents 12 to 19 years of age.

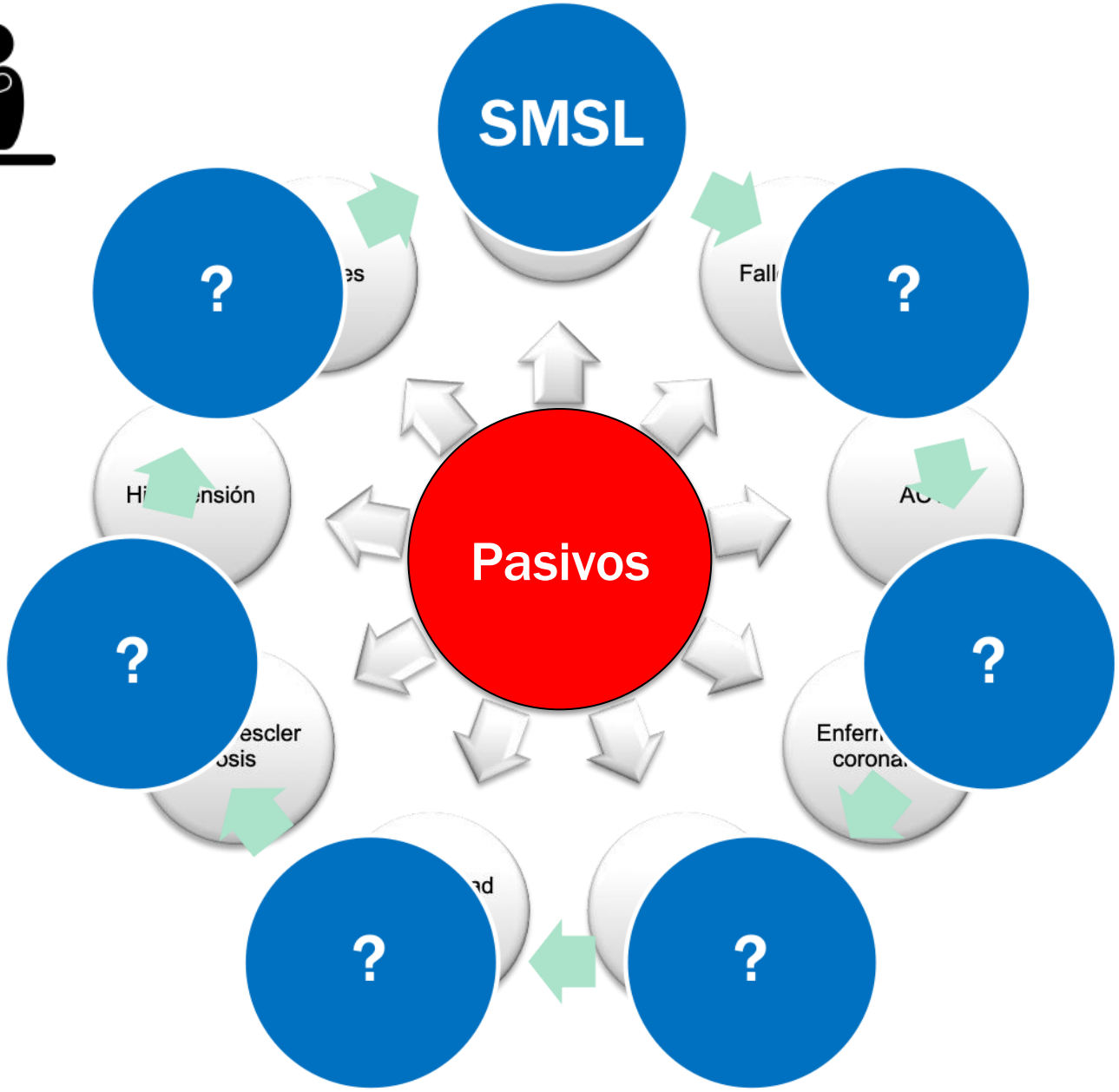
The effects of SHS exposure are dependent on

- Length of time exposed
- Intensity of exposure
- Aging of the SHS constituents in the environment
- Race and age

Cardiovascular effects of key components of cigarettes include

- Nicotine: hemodynamic alterations
- Acrolein: oxidation, inflammation, atherogenesis, hypertension, and arrhythmia
- Crotonaldehyde: plaque instability and thrombosis
- Cadmium: inflammation
- Lead: hypertension
- Particulate matter: arrhythmias and inflammation

Circulation. 2016;134:e336–e359.


SMSL
Pasivos
?
?
?
?
?
?
?
?

SMSL
Disfunción endotelial
?
?
?
?
?
?
Pasivos

545, 11 años

Cotinina

Finn+Australia

19-27 años

Padres fumadores Vs NO

Disfx persistente

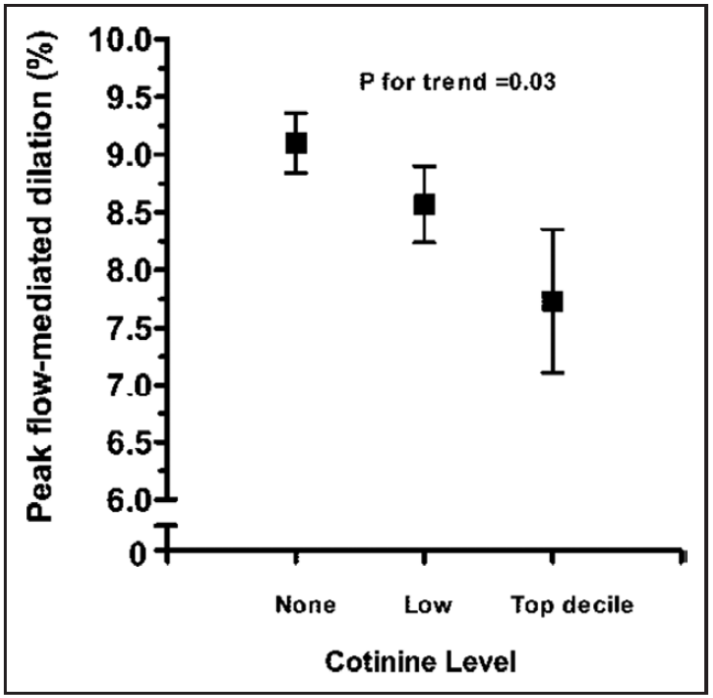
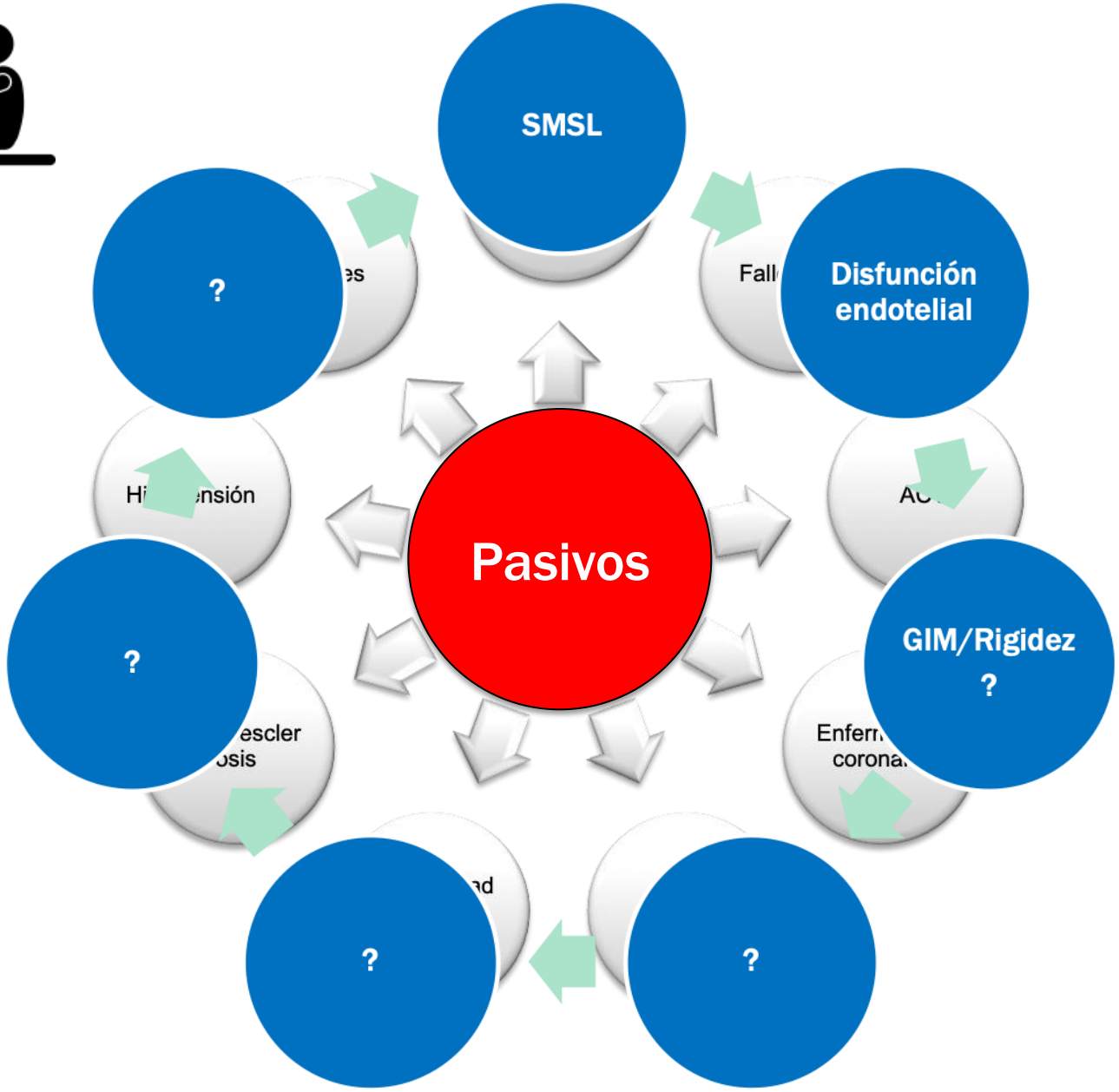


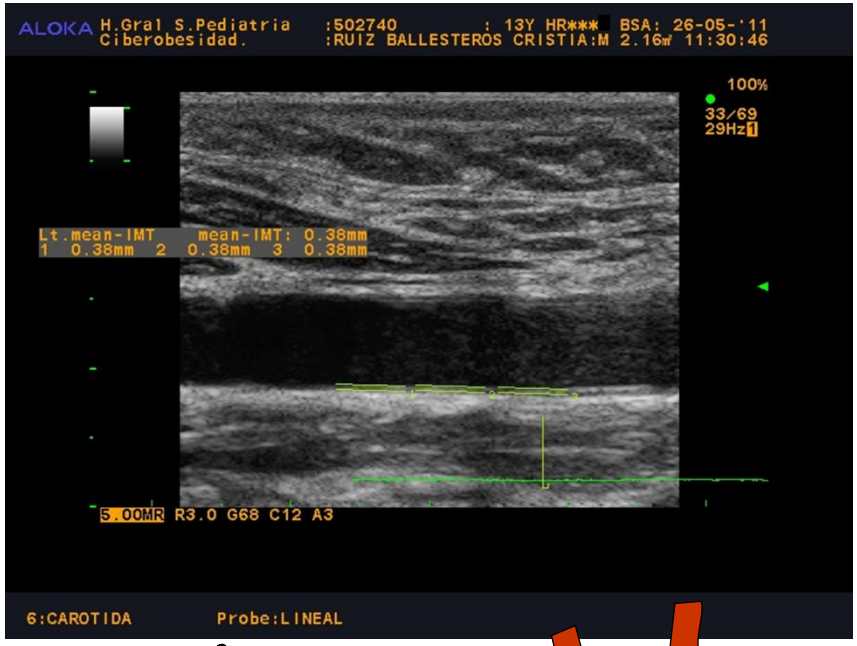
Figure 6. Peak flow-mediated dilatation of the brachial artery in 11-year-old secondhand smoke–exposed children according to cotinine group.
Values are mean±SEM. Reprinted from Kallio et al.[9] Copyright © 2007, American Heart Association, Inc.

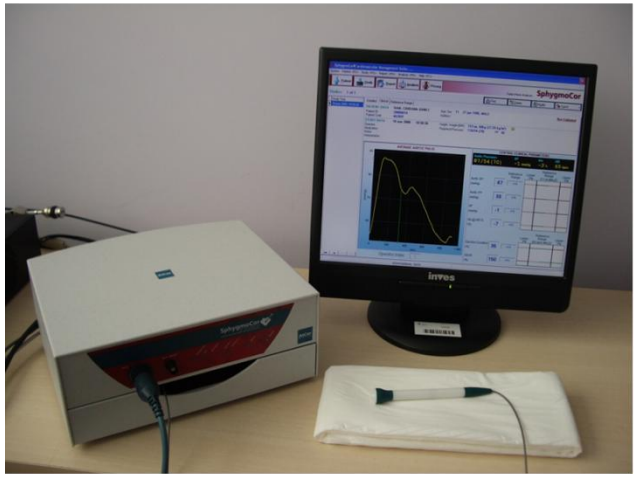
Dosis depend.

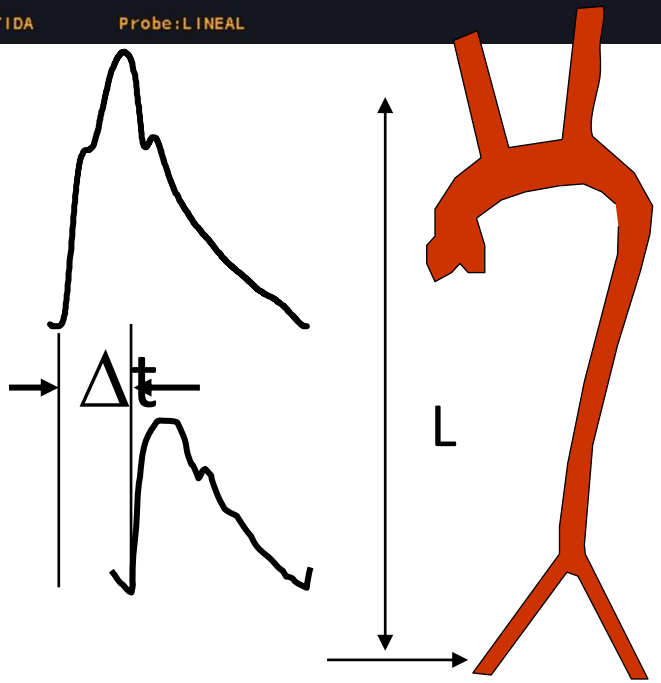
LDL, PA, BMI


SMSL
Disfunción endotelial
GIM/Rigidez
?
?
?
?
?
Pasivos

Estudios vasculares





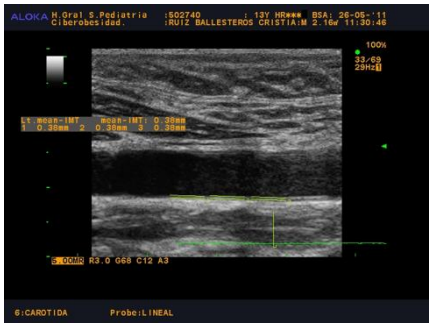


Estudios vasculares

3416 FINNs Study+CDAHS, 25 años

2448FINNs Study
1578 cotinina (26 años), placa

494 Kalio, 13 años, dosis dep



415 Bogalusa (36 años)

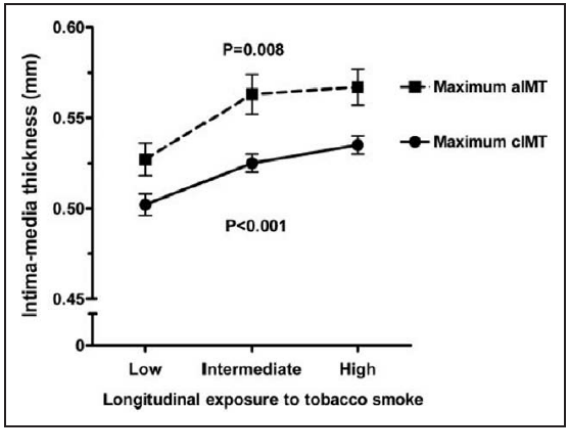


Figure 7. Maximum carotid artery intima-media thickness (cIMT) and maximum aortic intima-media thickness (aIMT) in healthy 13-year-old secondhand smoke–exposed adolescents according to tobacco smoke exposure levels.
Number of adolescents in exposure groups is as follows: cIMT: low, n=160; intermediate, n=171; and high, n=163; and aIMT, low, n=159; intermediate, n=167; and high, n=161. Values are mean±SEM. Reprinted from Kallio et al.[155]
Copyright © 2010, American Heart Association, Inc.

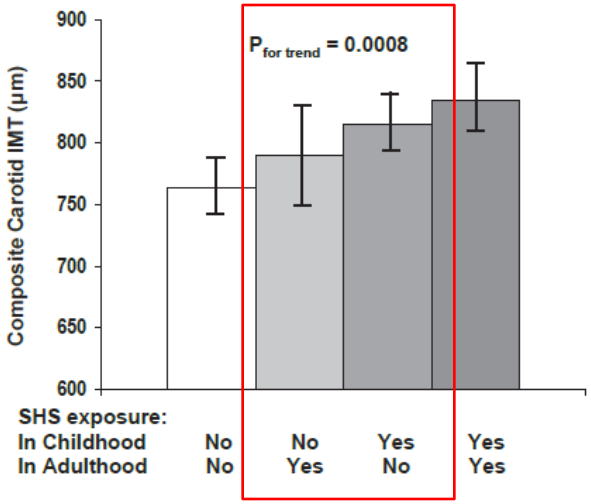
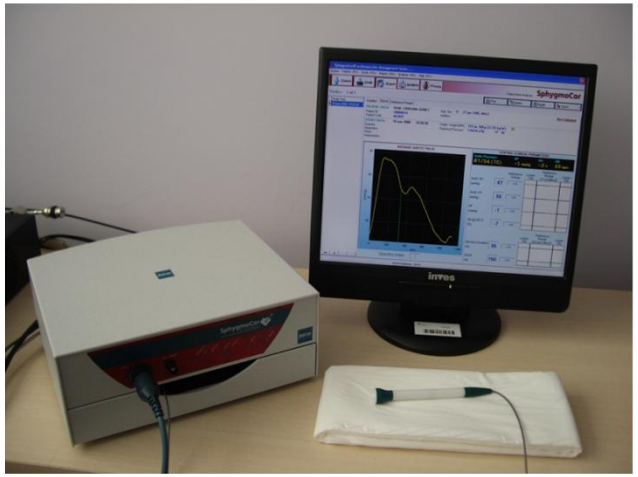
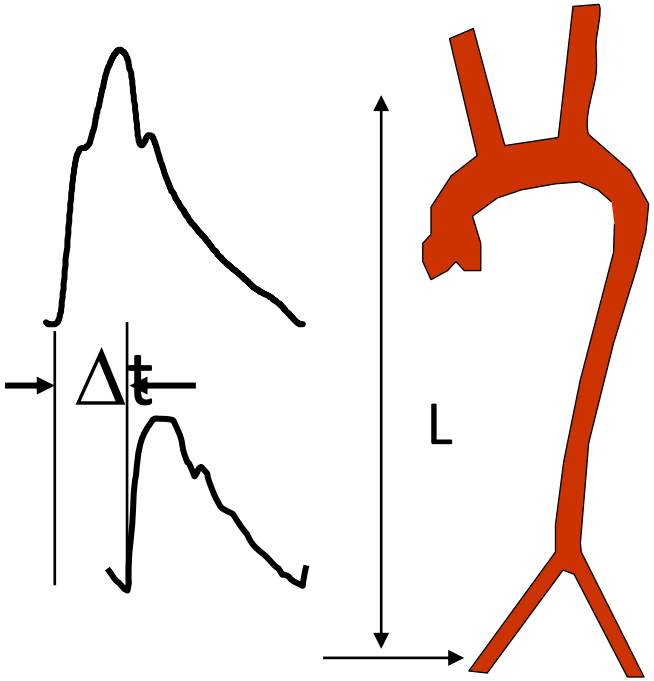


Fig. 1. Race-, age-, gender-, education-, income-, body mass index-, systolic blood pressure-, LDL cholesterol- and HDL cholesterol/triglycerides ratio-adjusted means (95% confidence intervals) of composite carotid IMT in non-smoking adults by SHS exposure status in childhood and adulthood. L(H)DL-C = low(high)-density lipoprotein cholesterol; IMT = intima-media thickness; SHS = secondhand smoke.

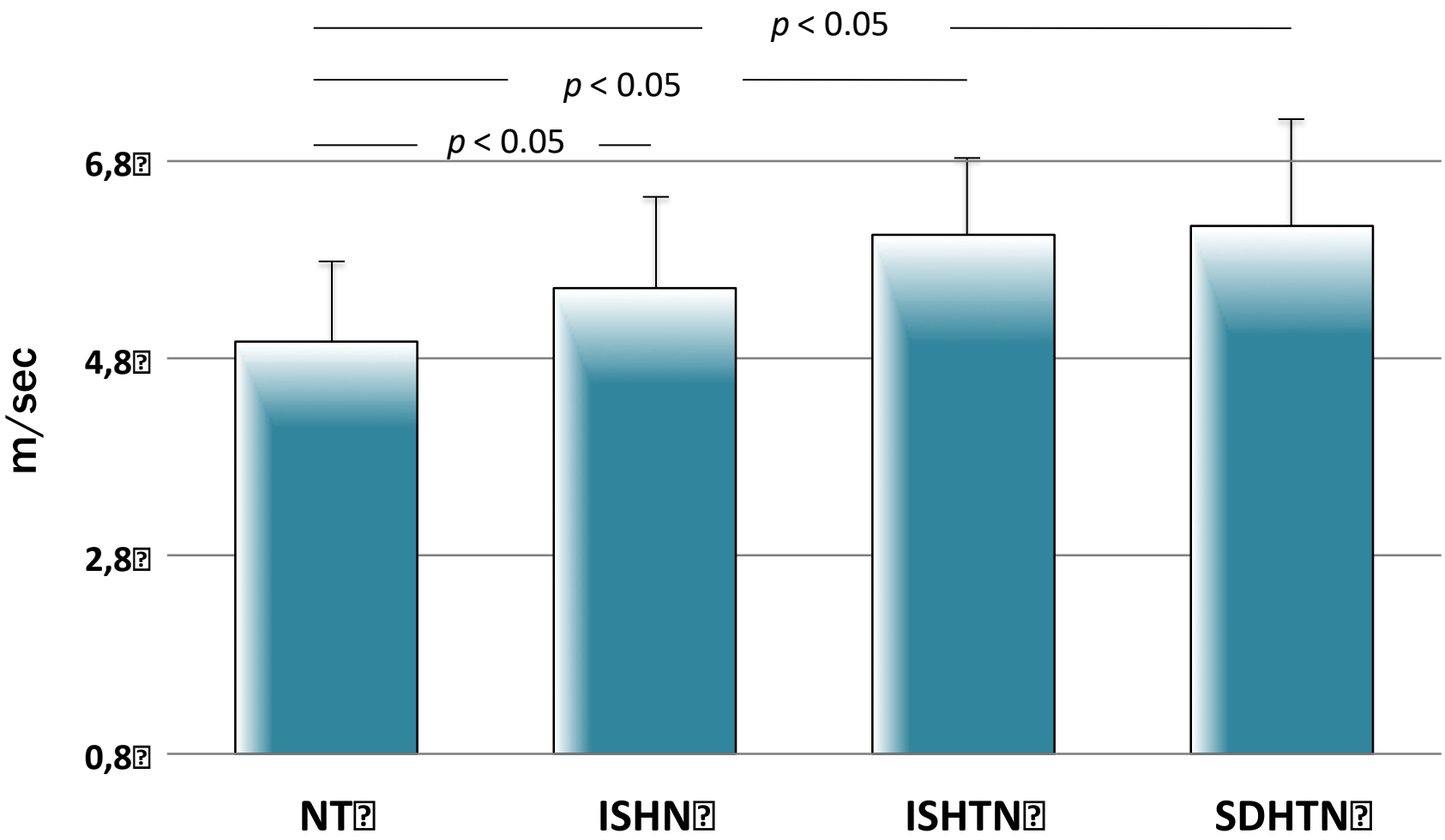
Estudios vasculares

386, 11 años, Cotinina, rigidez vascular

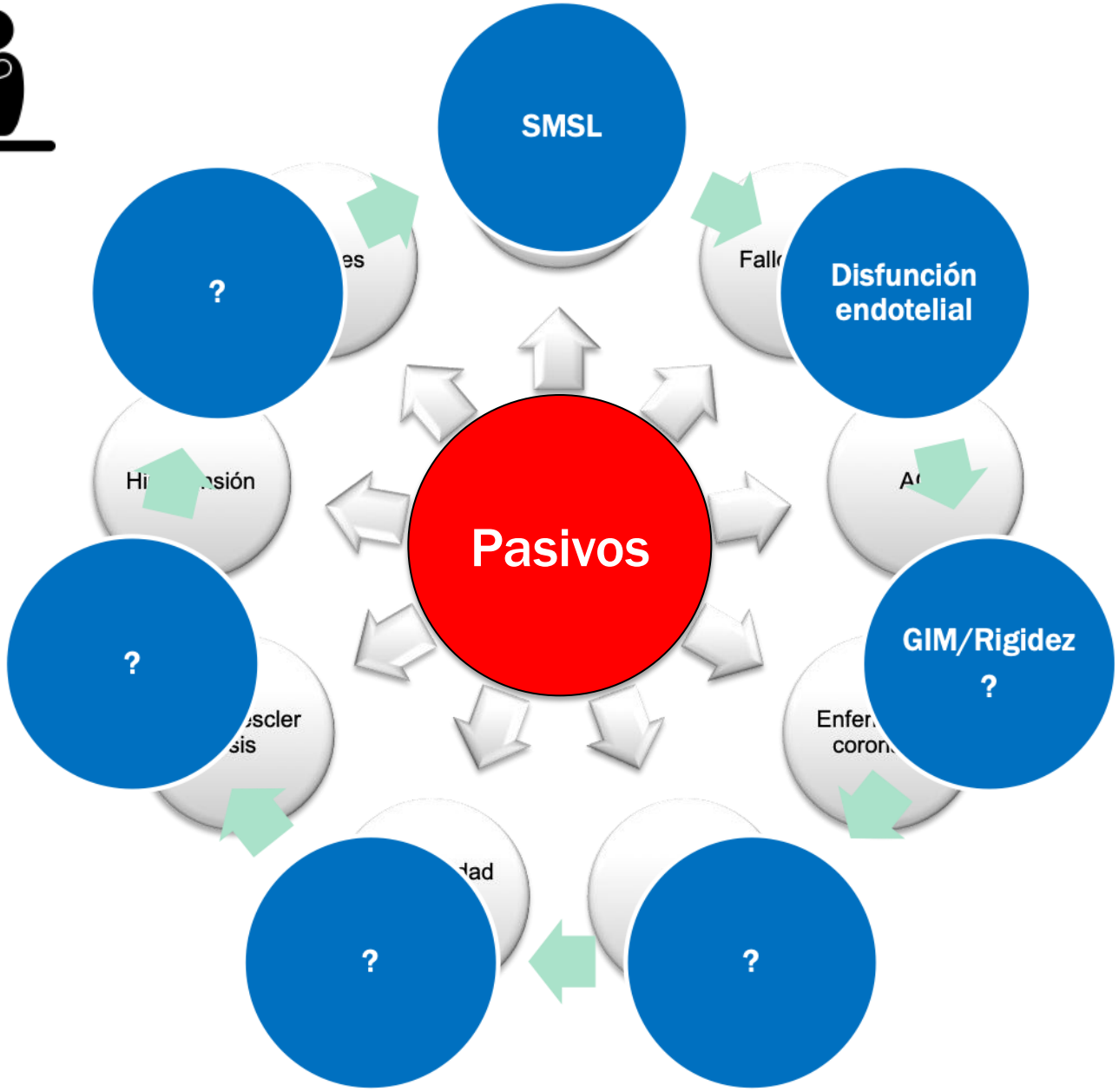




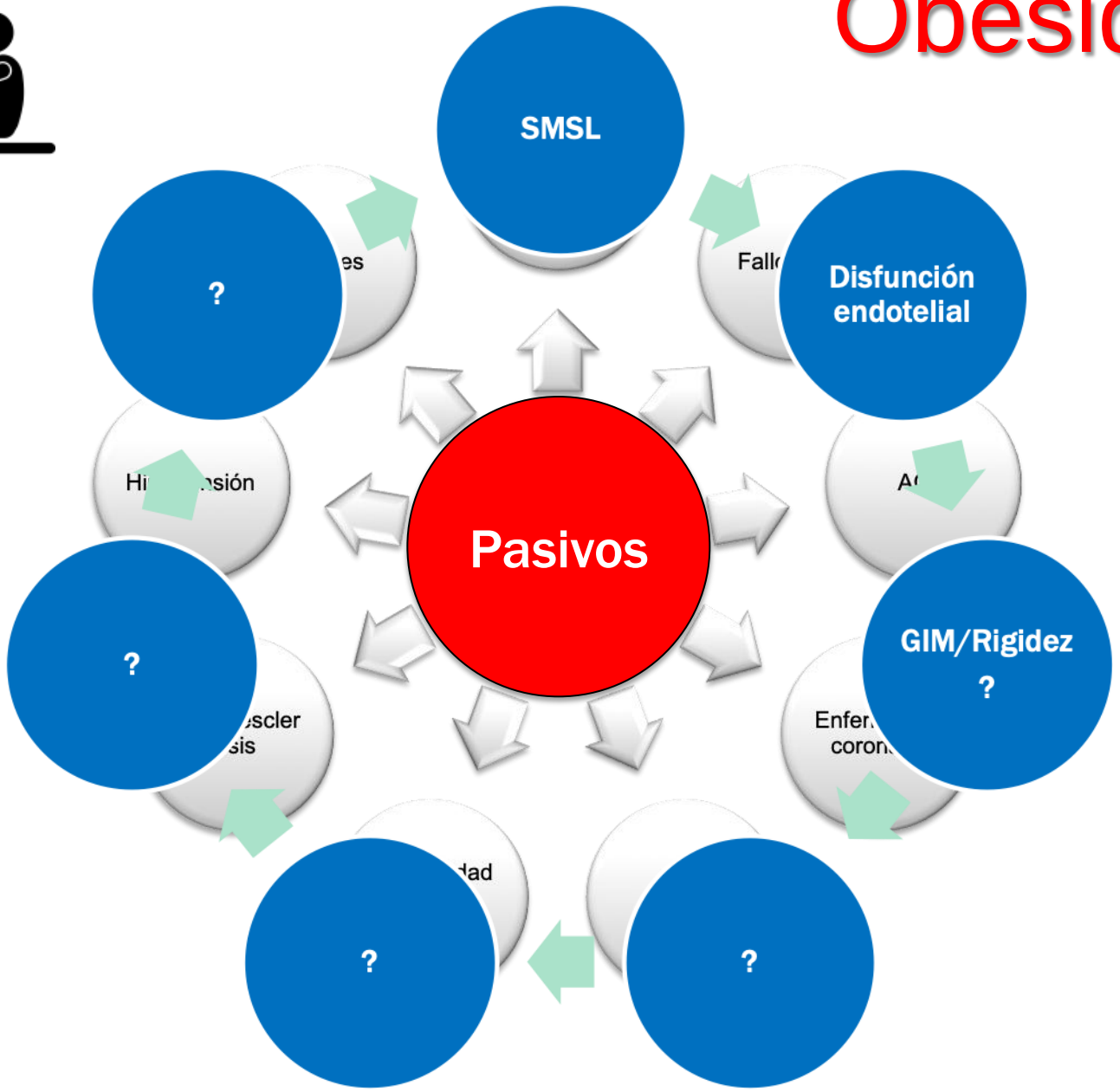
PWV across the spectrum of BP conditions



Lurbe et al. J Hypertens 2016;34:1389-1395


SMSL
Disfunción endotelial
GIM/Rigidez
?
?
?
?
?
Pasivos

Obesidad



Y otros FRC?

SMSL
Disfunción endotelial
GIM/Rigidez ?
Obesidad
Dislipemia
Hipertensión
Metabólico
Pasivos

Tobacco Smoke Exposure Is Associated With the Metabolic Syndrome in Adolescents

2273, 12- 19 años

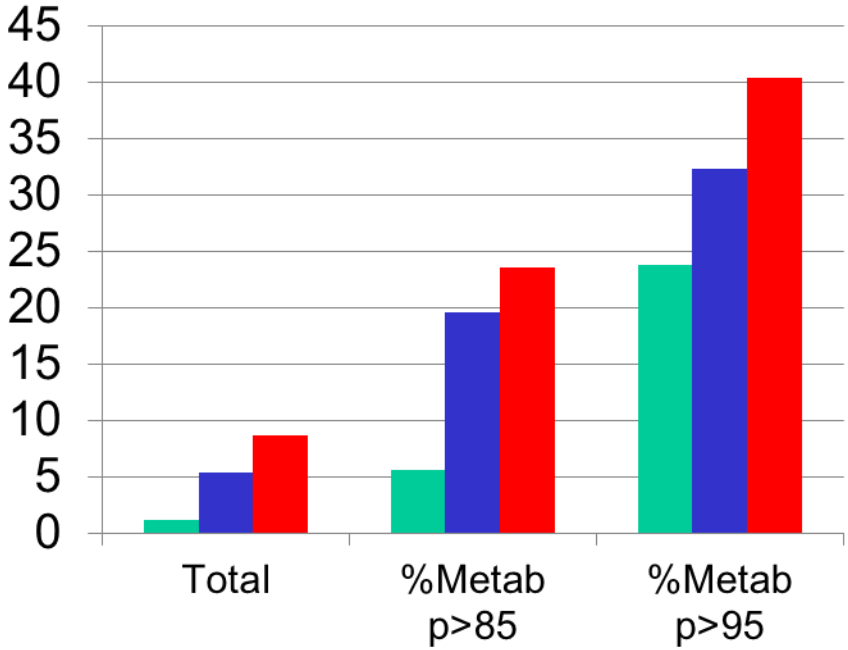
15% sobre/14% obe

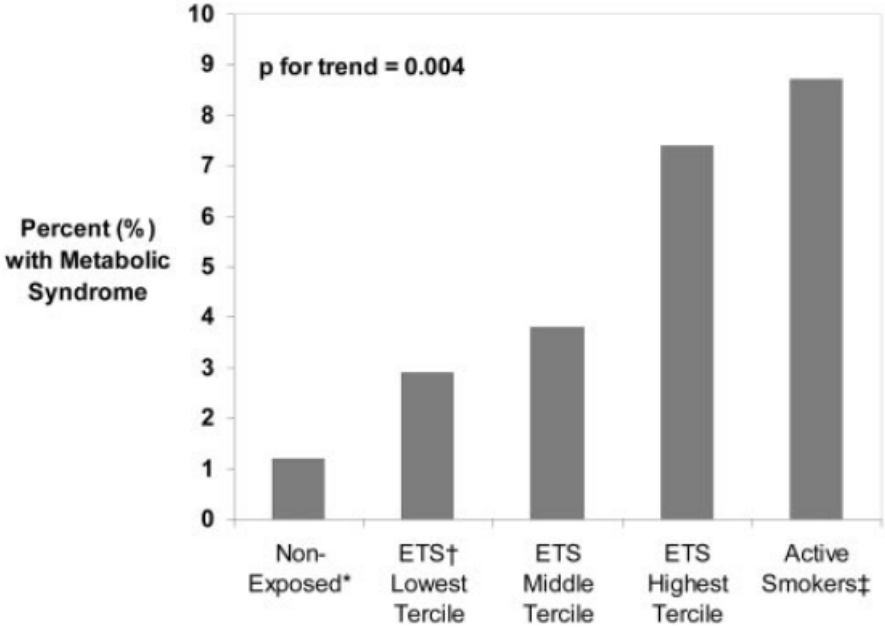
Registro+Cotinina

12% No/67% FSM/21%FA

TABLE 4. Independent Associations With the Metabolic Syndrome, NHANES III, 1988–1994, for Adolescents 12 to 19 Years of Age*

	All Adolescents 12–19 y of Age (n=2006)			At Risk or Overweight Adolescents 12–19 y of Age (n=584)		
	OR	95% CI	*P*	OR	95% CI	*P*
Tobacco						
Nonexposed† (referent)	1.0			1.0		
Exposed to ETS‡	4.7	1.7–12.9	0.003	4.1	1.4–12.6	0.01
Active smokers§	6.1	2.8–13.4	<0.001	4.4	1.4–14.0	0.01
Gender						
Male	3.3	1.6–6.6	0.001	4.2	1.9–9.2	0.001
Female (referent)						





Circulation. 2005;112:862-869

Secondhand Smoke Exposure and Preclinical Markers of Cardiovascular Risk in Toddlers

139 ,2–5 años

Nicotina pelo

- F. RCV
- F. RCV sub:
  - Inflamación
  - Oxidación
  - Estrés endotelial (EPC)

Table III. Multivariate linear regression analysis of associations with logarithmically transformed hair nicotine levels

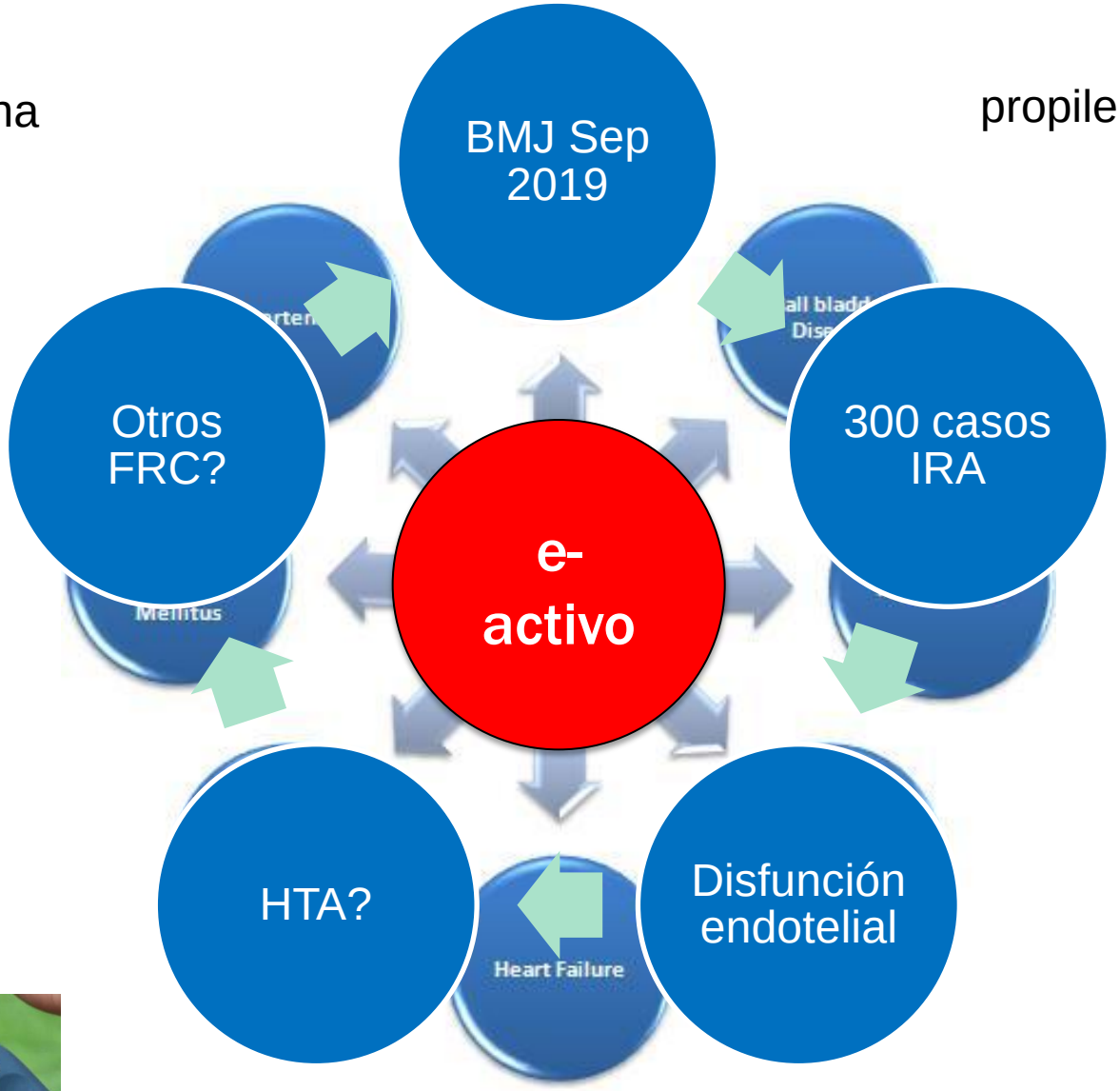
		Log Hair Nicotine		
Outcomes	Model n	b	SE b	*P* value
Systolic blood pressure	139	4.68	1.84	.013
Systolic blood pressure, %	139	15.32	5.21	.004
CRP	138	0.92	0.35	.012
HDL	139	–4.42	1.82	.017
Total antioxidant capacity	138	–6.72	3.08	.032
EPC prevalence	122	–0.39	0.17	.028

20-30 años

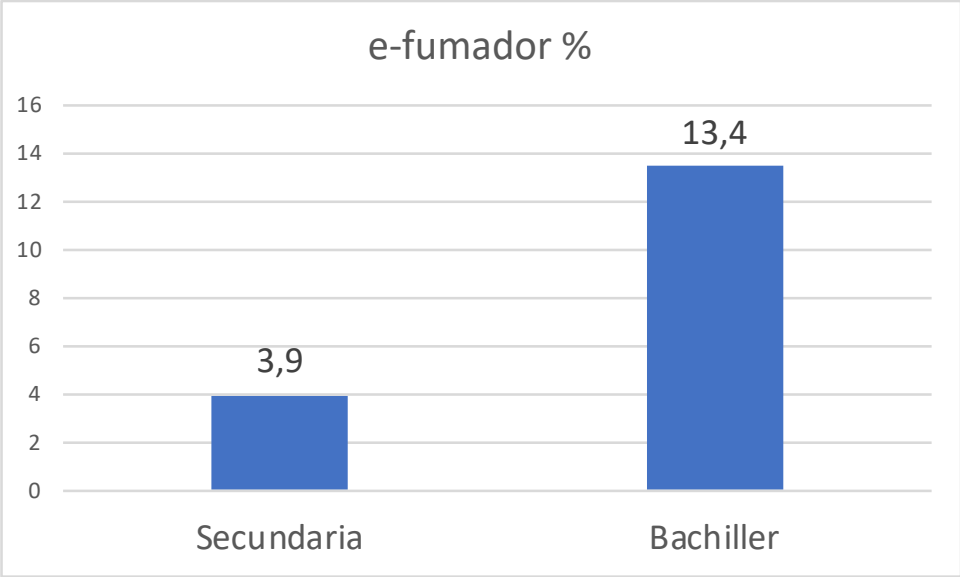
Arterioesclerosis coronaria/Ao cadáver
GIM/Rigidez Vascular
Disfx endotelial
Dislipemia
Alteración metabólica
Activos

nicotina

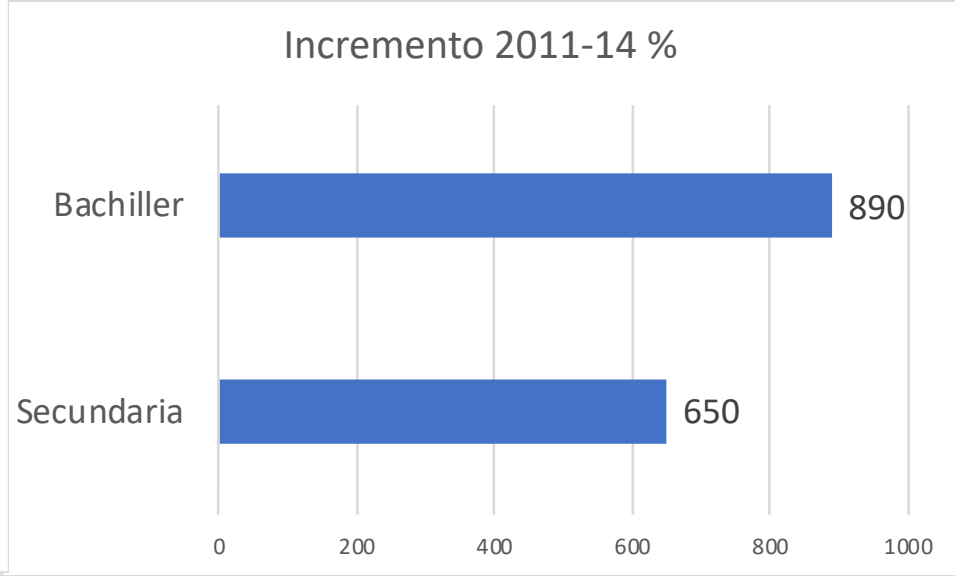
propilenglicol



EEUU 2014



EEUU 2011- 14



e-fumador incrementa riesgo de FUMADOR

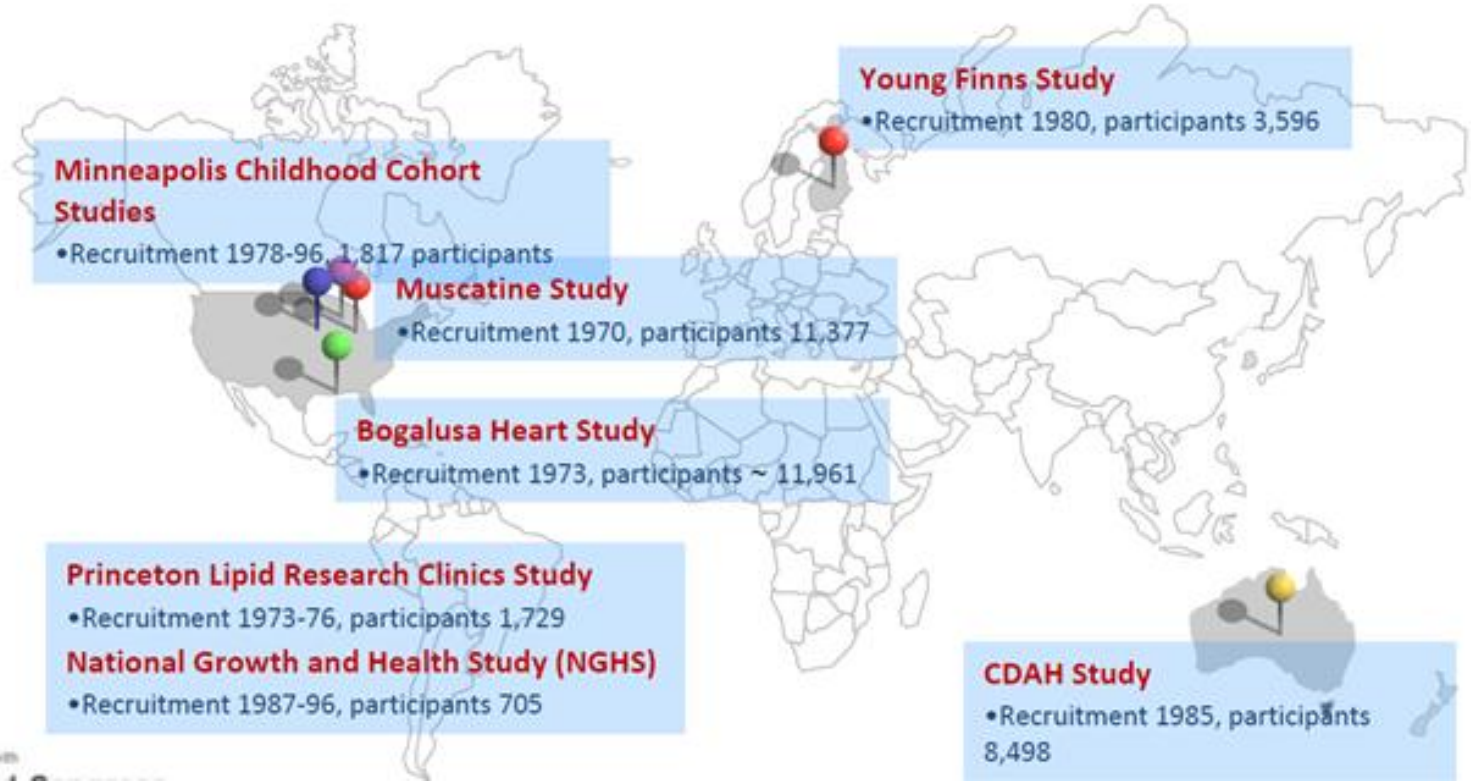
Childhood risk factors and cardiovascular disease outcomes in adulthood.

Preliminary findings from the International Childhood Cardiovascular Cohort (i3C) Consortium

ESC European Society of Cardiology
ESC CONGRESS 2019
31 August - 4 September 2019
Paris, France

Background

Child cohort studies with measurement of CVD risk factors were initiated in the 1970's



Childhood risk factors and cardiovascular disease outcomes in adulthood.

Preliminary findings from the International Childhood Cardiovascula Cohort (i3C) Consortium

ESC European Society of Cardiology

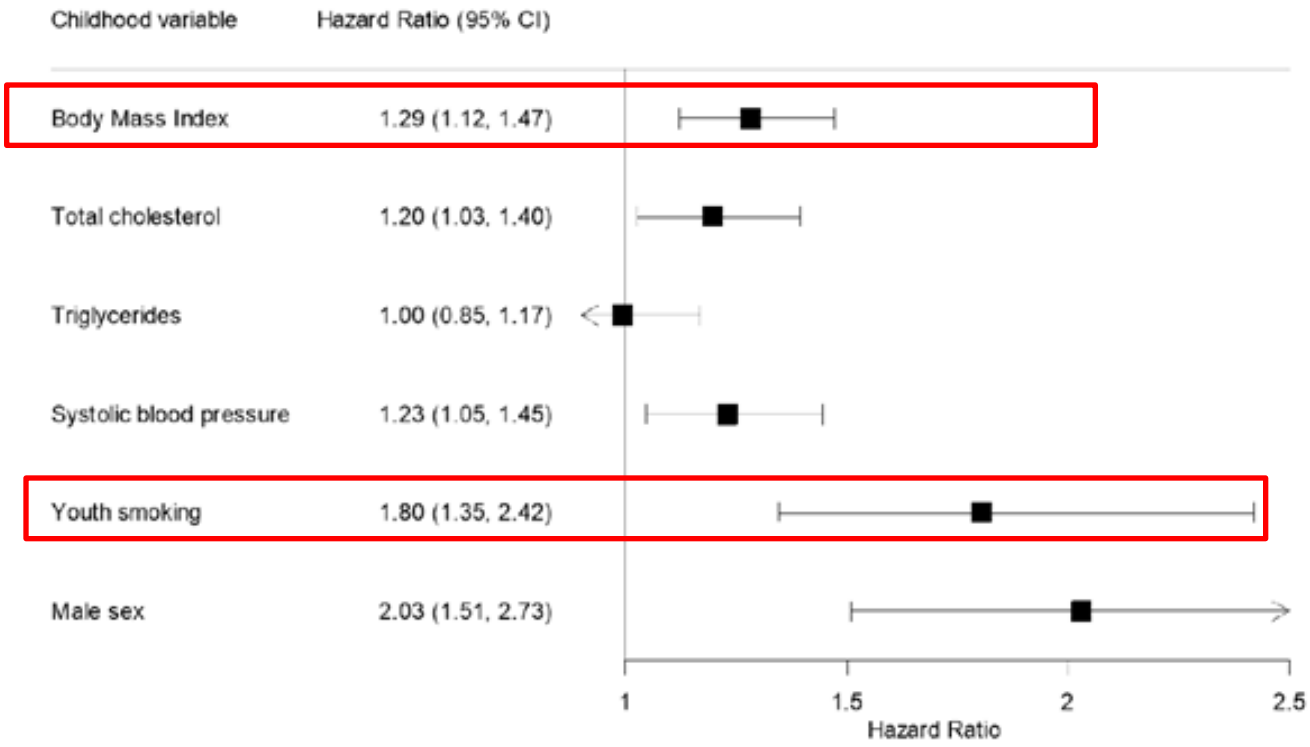
ESC CONGRESS 2019

31 August - 4 September 2019
Paris, France

42300 part. 68-25 años, X=50 1889 †

Multivariable regression model with the key explanatory variables.

The model includes data from 194 cases and 9050 non-cases



Childhood risk factors and cardiovascular disease outcomes in adulthood.

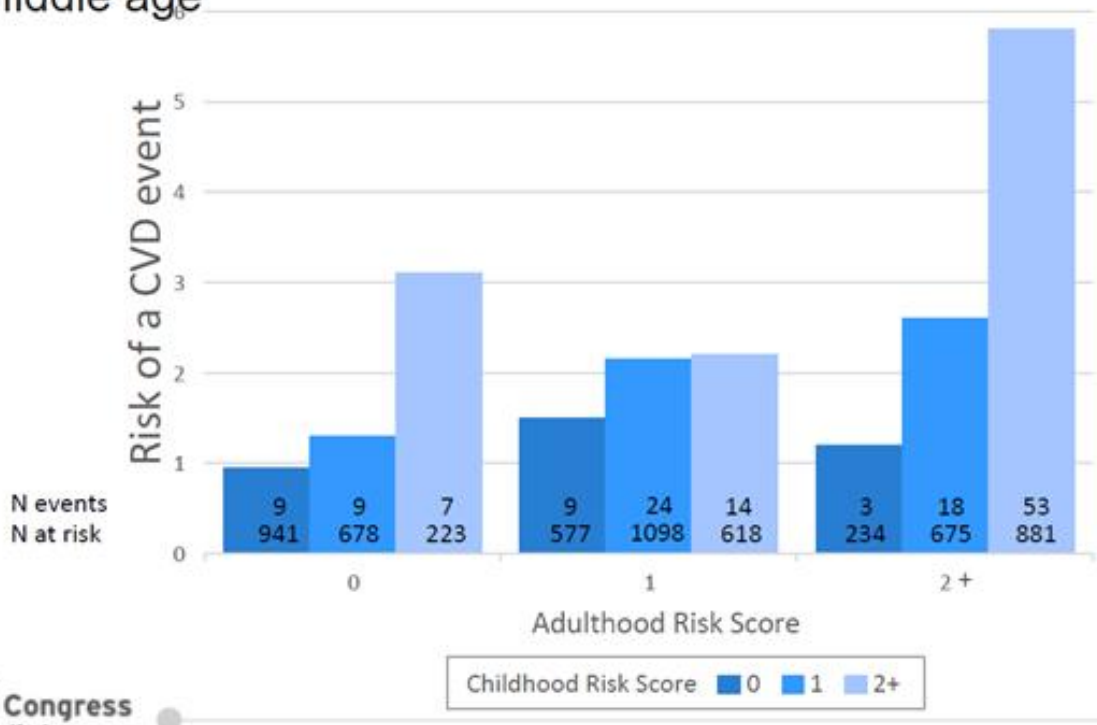
Preliminary findings from the International Childhood Cardiovascula Cohort (i3C) Consortium

ESC European Society of Cardiology
ESC CONGRESS 2019
31 August - 4 September 2019
Paris, France

Risk Score: Obeso / Hipertenso / LDL / Fumador.

Key Message

High levels of risk factors in childhood predict likelihood of major cardiovascular events in middle age



Conclusiones

- La exposición pasiva al tabaco es un continuum en la infancia y es mayor cuanto menor es el niño
- El tabaquismo en la madre gestante, incluso de segunda mano, tiene efectos deletéreos a nivel cardiovacular en la descendencia tanto a corto como a largo plazo y favorece el desarrollo de obesidad en la infancia y adolescencia
- Existe evidencia de que la exposición al TSM incrementa en los niños el riesgo de arterioesclerosis y parece que puede incrementar el riesgo de obesidad, dislipemia, HTA y SM en la época adulta.
- A nivel respiratorio el e-cigarrillo n parece más seguro que el tabaco, y a nivel cardiovascular incluso sin nicotina, parece lesivo

Conclusiones

- El tabaquismo pasivo en la infancia y el activo en adolescencia, puede incrementar el RCV, incluso si se abandona el hábito en la época adulta.
- Dentro de la prevención de la enfermedad cardiovascular ha de incluirse un cribado del tabaquismo parental, un consejo claro y favorecer procesos de deshabituación tabáquica

- Muchas gracias
- Unidad contra la Obesidad y el Riesgo Cardiovascular . Hospital General de Valencia
- alvarez_jul@gva.es

www.programapaido.com