



Prevención primordial para evitar la aparición de factores de riesgo: la infancia como ventana de oportunidad

1 de Diciembre de 2018

Rodrigo Fernandez-Jimenez, MD PhD

XII Curso de Fisiopatología Cardiovascular



Outline

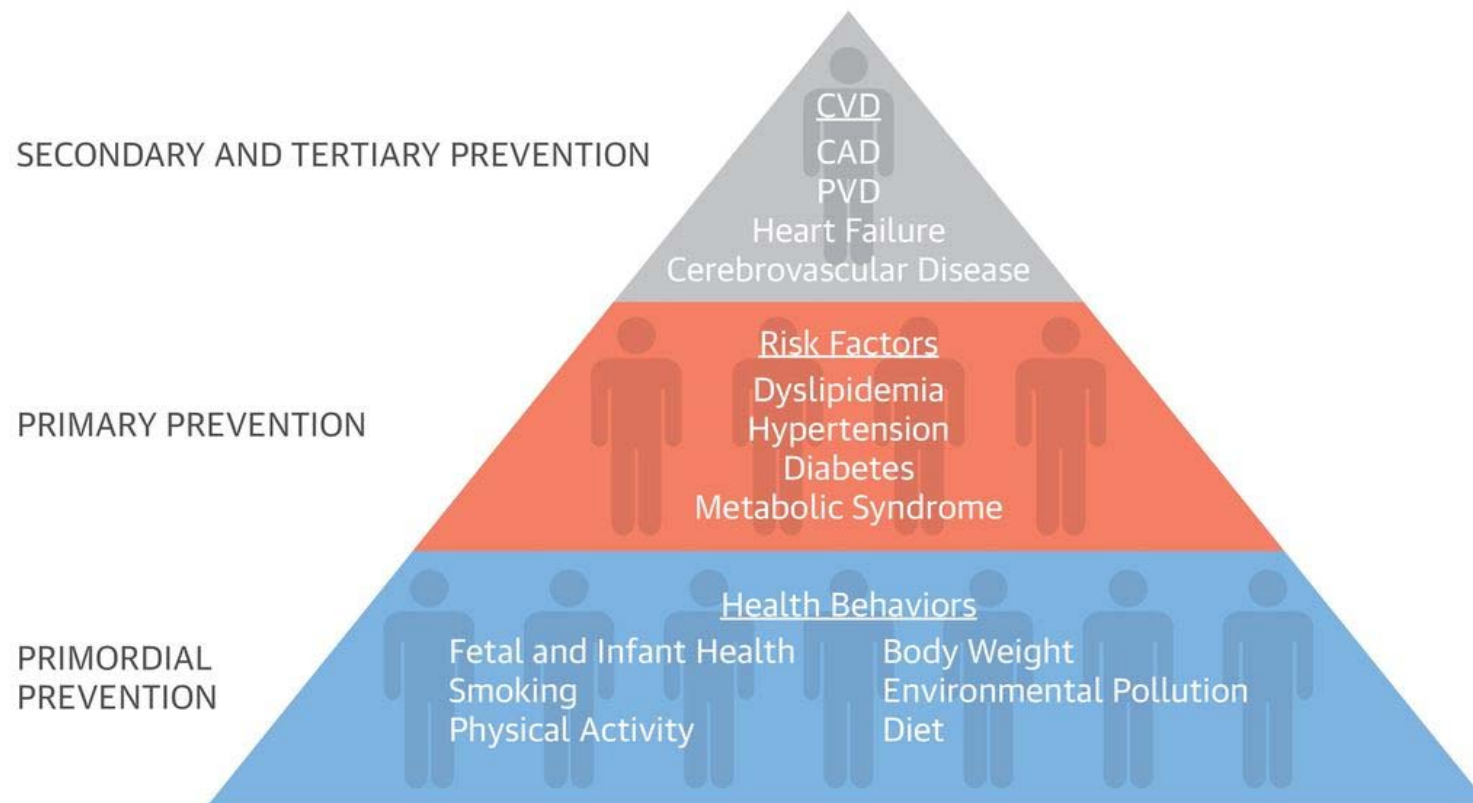
- o What?
- o Why?
- o How?
- o The SI! Program
 - SI! Colombia
 - SI! Spain
 - SI! USA
- o Conclusions

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- o What?
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What?

CENTRAL ILLUSTRATION: Cardiovascular Disease Prevention and Health Promotion



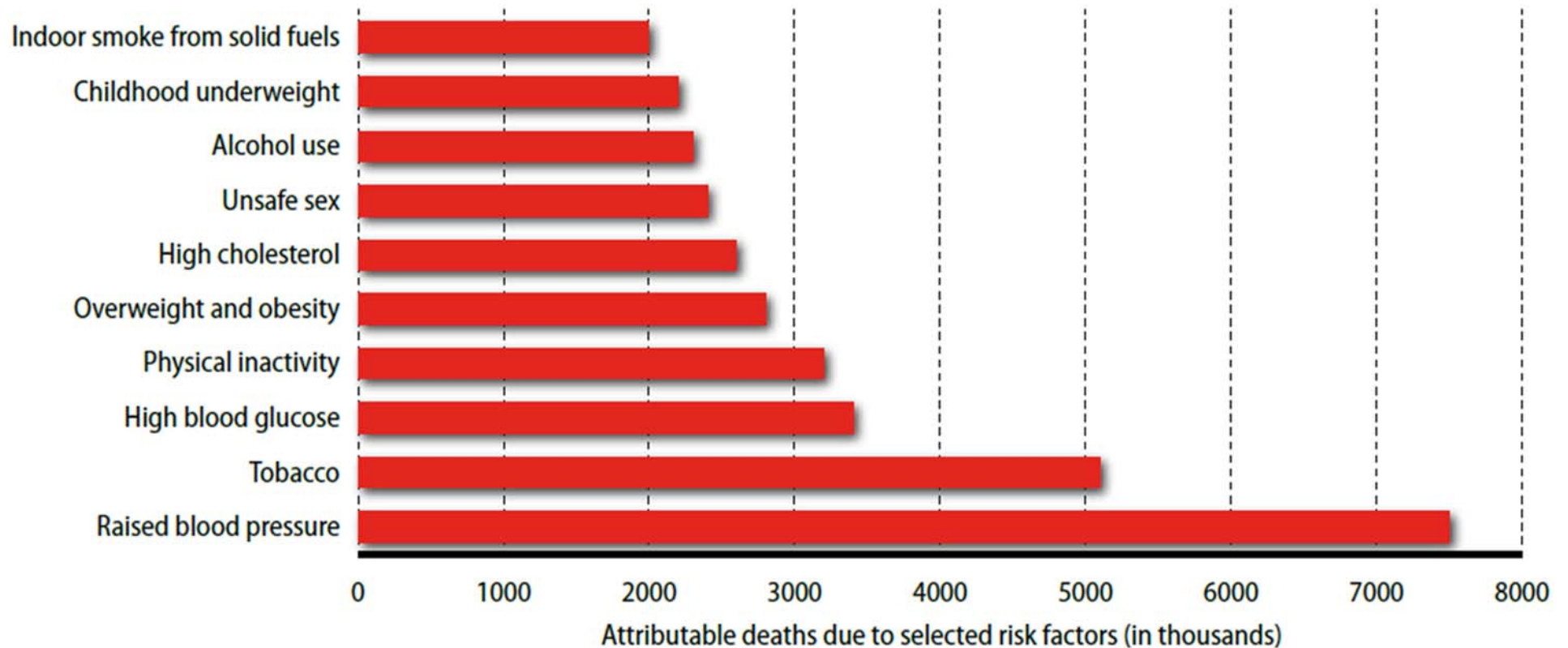
Hong, K.N. et al. J Am Coll Cardiol. 2017;70(17):2171-85.

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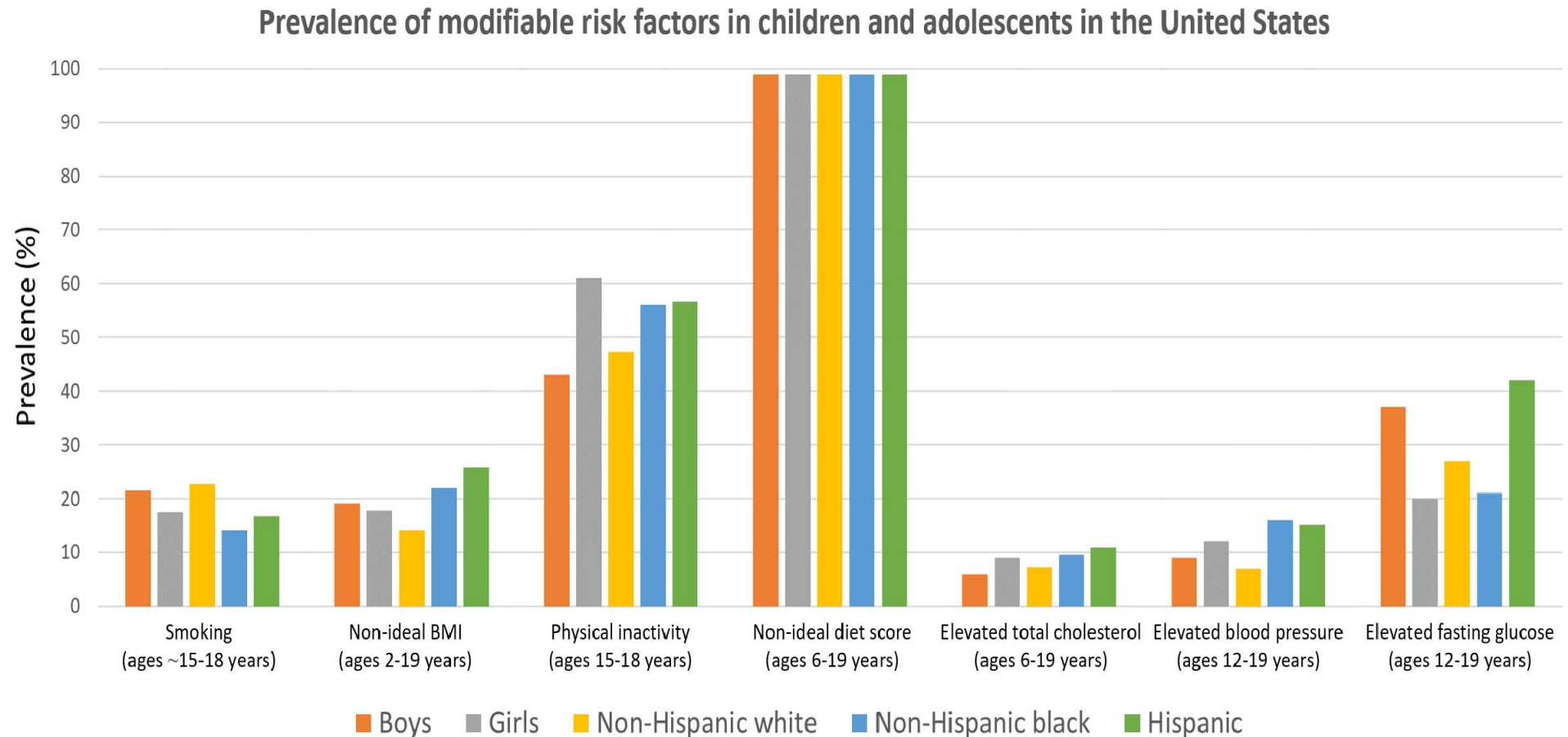
Why? (1) Most deaths are due to modifiable risk factors

Ranking of 10 selected risk factors of cause of death



WHO/WHF/WSO: **Global Atlas on Cardiovascular Diseases Prevention and Control. 2011**

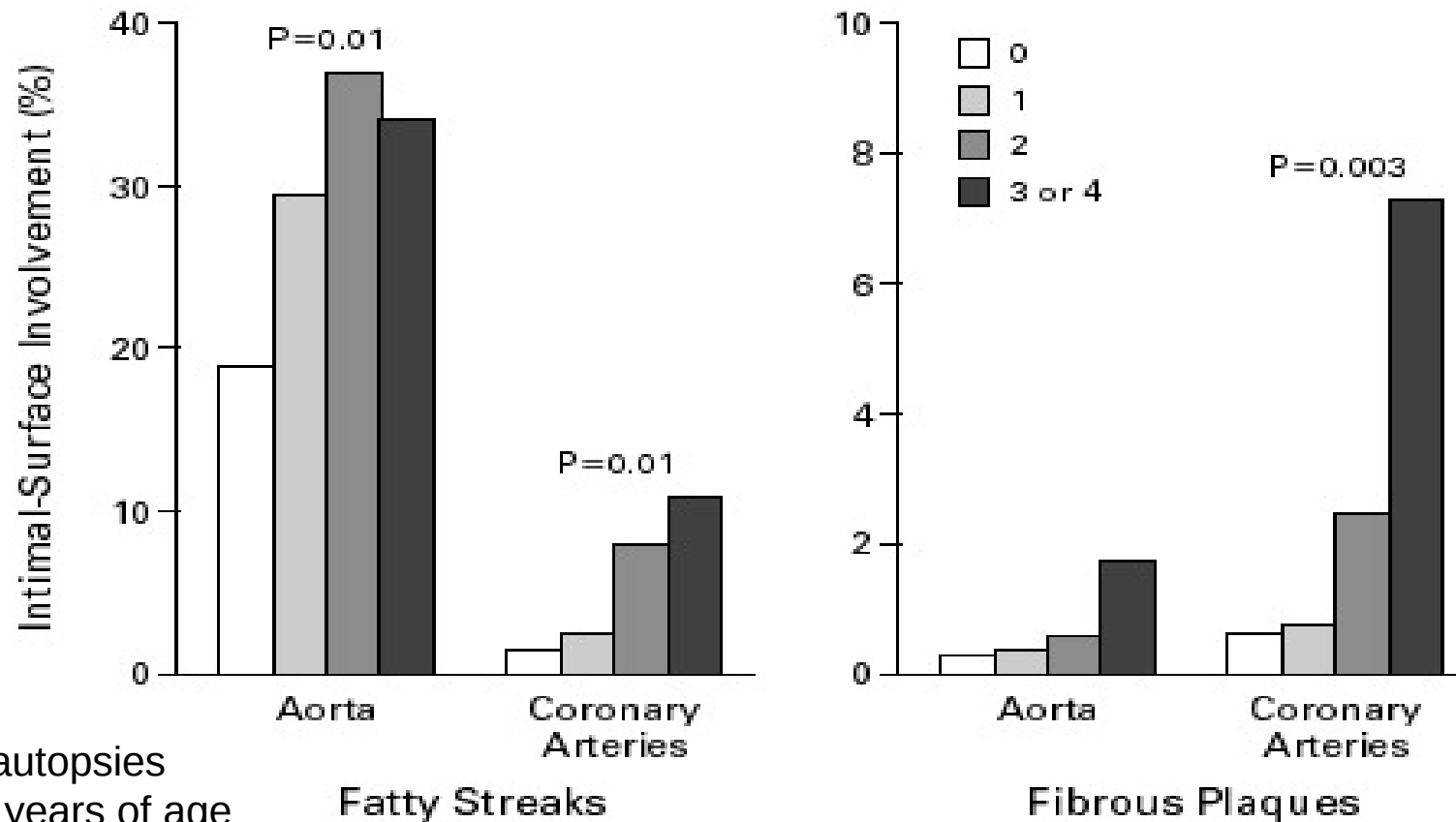
Why? (2) Alarming trends of unhealthy factors in children



Fernandez-Jimenez R,...,Fuster V. *J Am Coll Cardiol.* 2018; In press.

Why? (3) Link between unhealthy factors in children & CVD

The Effect of Multiple Risk Factors on the Extent of Atherosclerosis in the Aorta and Coronary Arteries in Children and Young Adults: The Bogalusa Heart Study

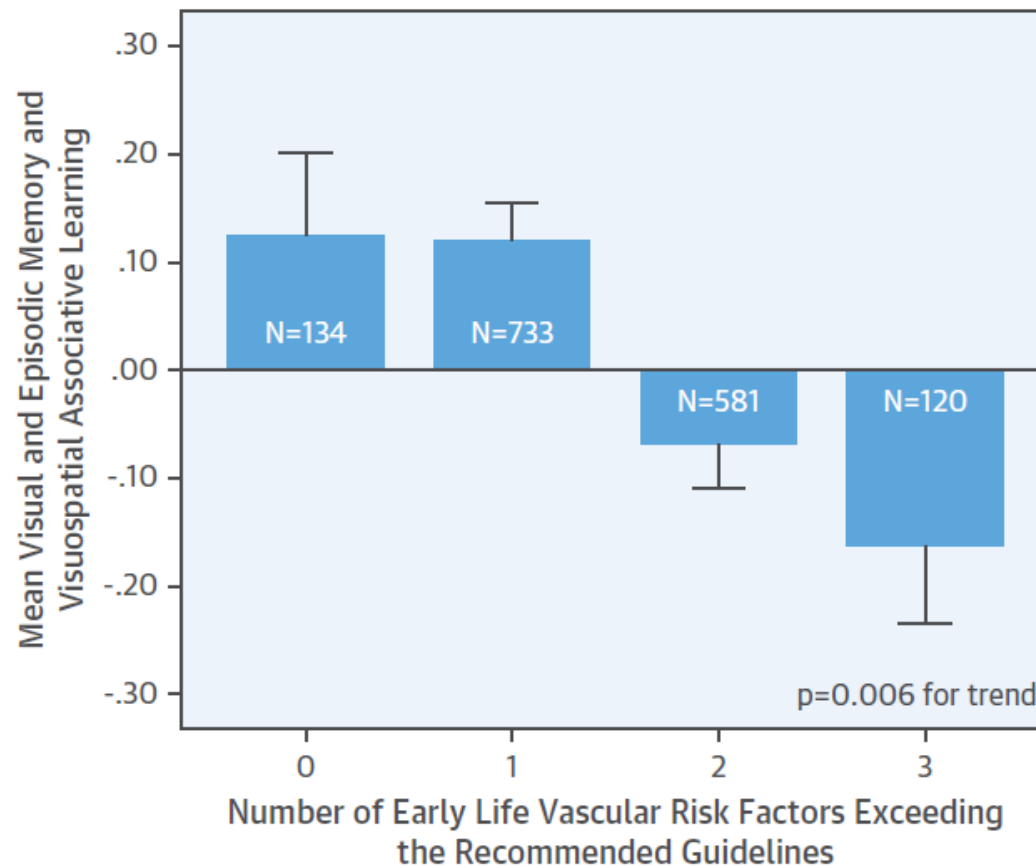


N= 93 autopsies
2 to 39 years of age
trauma

Berenson GS et al. *N Engl J Med.* 1998;338(23):1650-6.

Why? (3) Link between unhealthy factors in children & CVD

CENTRAL ILLUSTRATION Childhood Vascular Factors and Midlife Cognition: Midlife Performance on Episodic Memory and Visual Associative Learning

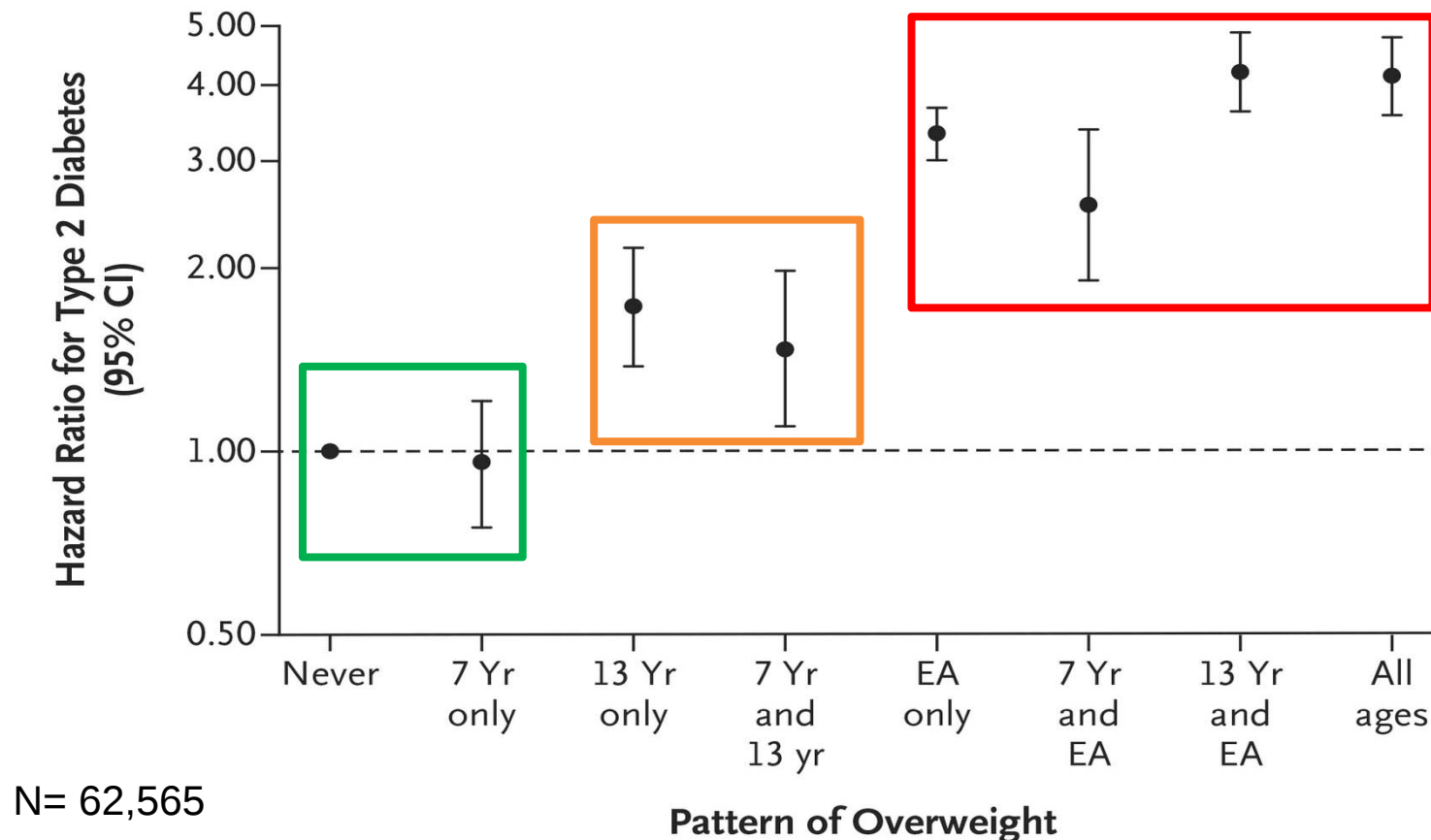


These data are based on the number of risk factors (high low-density lipoprotein [LDL]-cholesterol, elevated systolic blood pressure [BP], and cigarette smoking) with levels exceeding the recommended guidelines (16-18). The variables showing significant association for cognitive performance with guideline recommendations for children/adolescence (i.e., LDL-cholesterol, systolic BP, and smoking) were included in the variable for the cardiovascular risk factor clustering. The **bars** indicate the mean values of the principal component for visual and episodic memory and visuospatial associative learning and the **whiskers** are standard errors. The individuals were classified as: 0 = no risk factor levels exceeding guidelines or levels exceeding at most once per risk factor; 1 = risk factor levels exceeding guidelines twice or more on 1 risk factor; 2 = risk factor levels exceeding guidelines twice or more on 2 risk factors; or 3 = risk factor levels exceeding guidelines twice or more on all risk factors. The inverse dose-response relation with cognitive performance was significant ($\beta = -0.088$; $p = 0.007$), adjusted for age, sex, family income, anti-hypertension and dyslipidemia medications, and diagnoses of cardiovascular diseases and diabetes mellitus. The reference line is set on the population mean.

Rovio, S.P. et al. J Am Coll Cardiol. 2017;69(18):2279-89.

Why? (4) Transition to adolescence and adulthood: Potential to reverse adverse outcomes

Patterns of Overweight at 7 Years of Age, 13 Years of Age, and Early Adulthood (EA) and the Risk of Type 2 Diabetes at 30 to 60 Years of Age.



Bjerregaard LG et al. *N Engl J Med.* 2018;378(14):1302-1312.

Why? (4) Transition to adolescence and adulthood: Potential to reverse adverse outcomes

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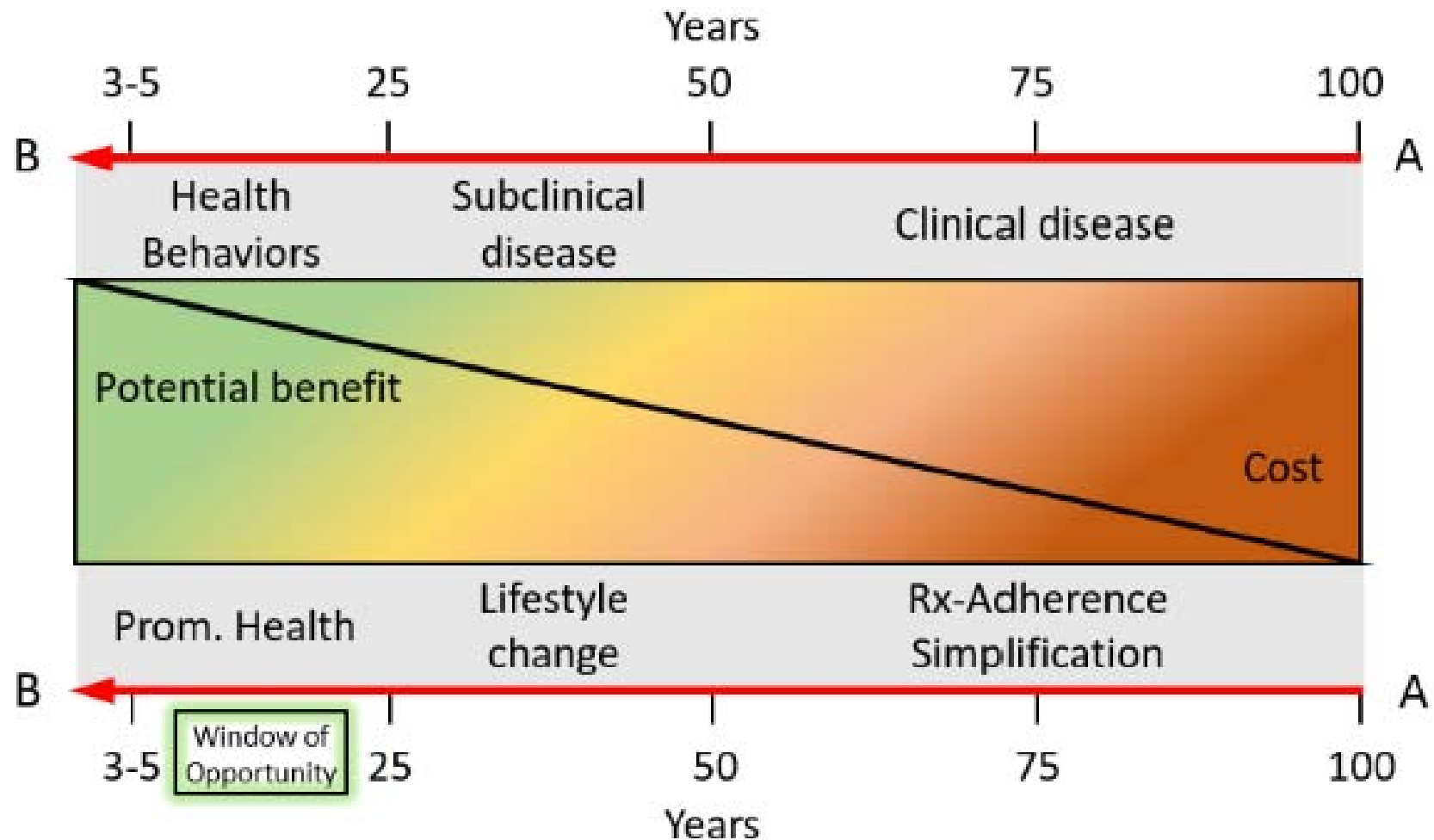
Acceleration of BMI in Early Childhood and Risk of Sustained Obesity

Mandy Geserick, M.Sc., Mandy Vogel, Ph.D., Ruth Gausche, M.B.A., Tobias Lipek, M.D., Ulrike Spielau, M.Sc., Eberhard Keller, M.D., Roland Pfäffle, M.D., Wieland Kiess, M.D., and Antje Körner, M.D.

CONCLUSIONS

Among obese adolescents, the most rapid weight gain had occurred between 2 and 6 years of age; most children who were obese at that age were obese in adolescence. (Funded by the German Research Council for the Clinical Research Center “Obesity Mechanisms” and others; ClinicalTrials.gov number, NCT03072537.)

Why? (5) Cost-effectiveness

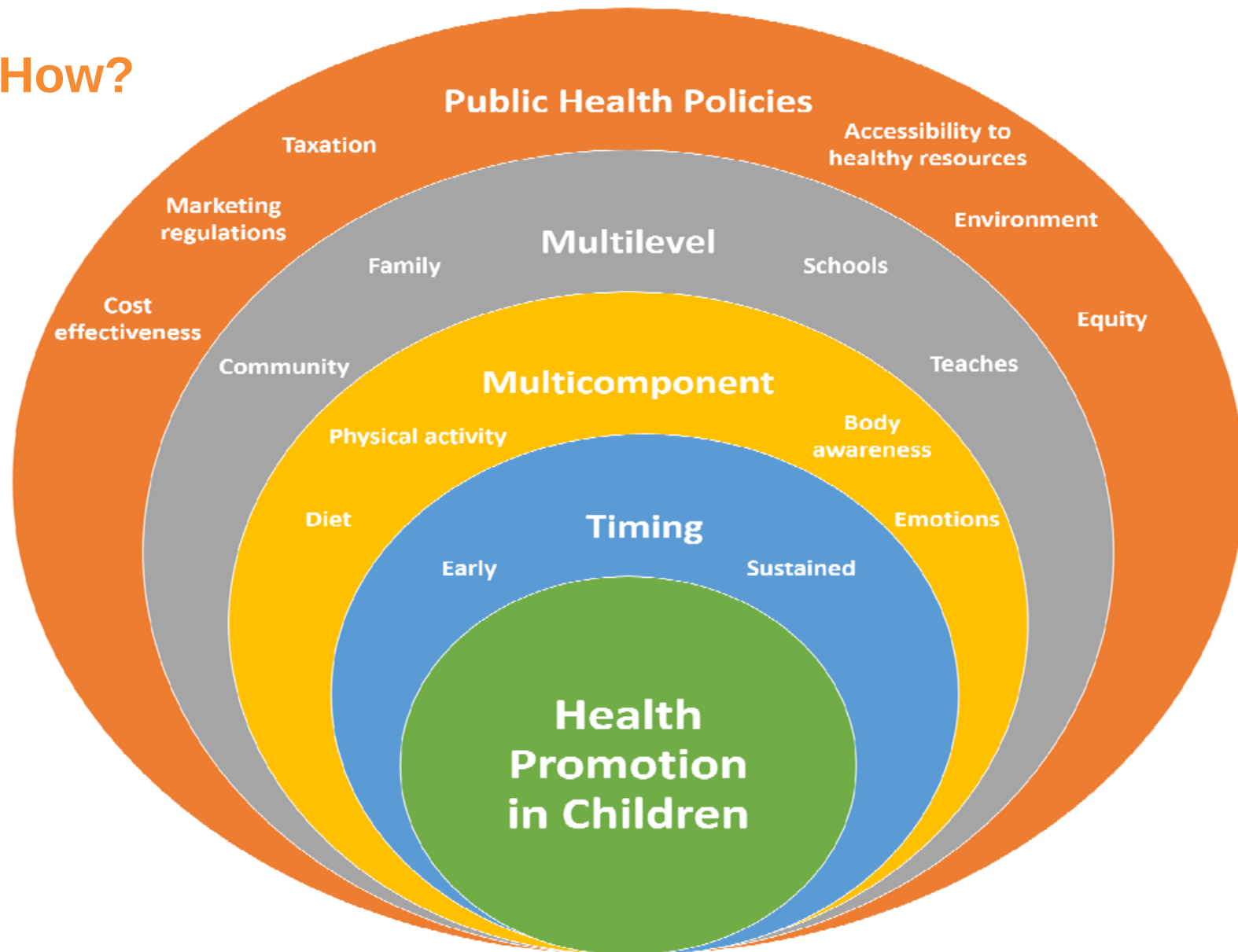


Fernandez-Jimenez R,...,Fuster V. *J Am Coll Cardiol.* 2018; In press.

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How?

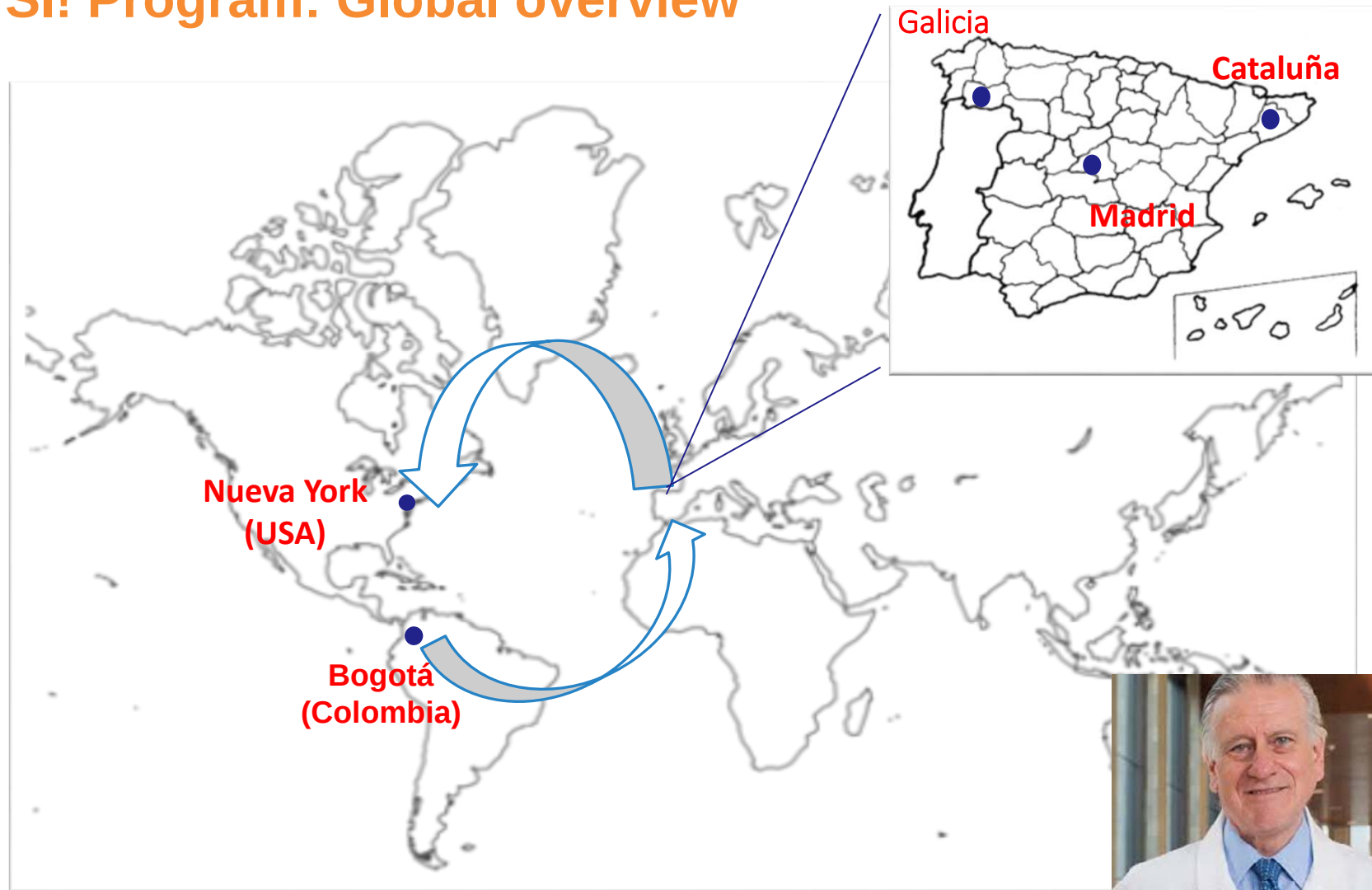


Fernandez-Jimenez R,...,Fuster V. *J Am Coll Cardiol.* 2018; In press.

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SI! Program: Global overview

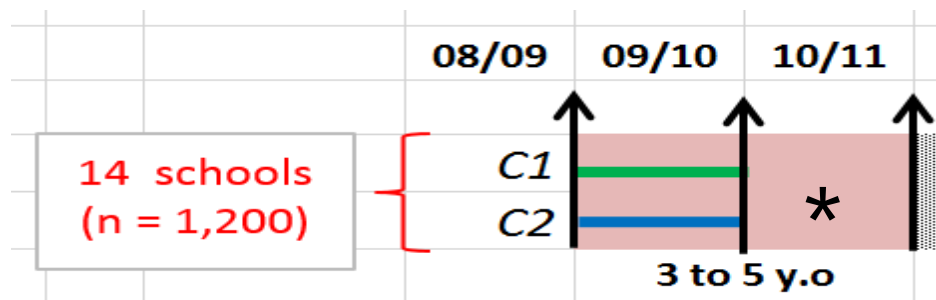


Dr Valentin Fuster

Outline

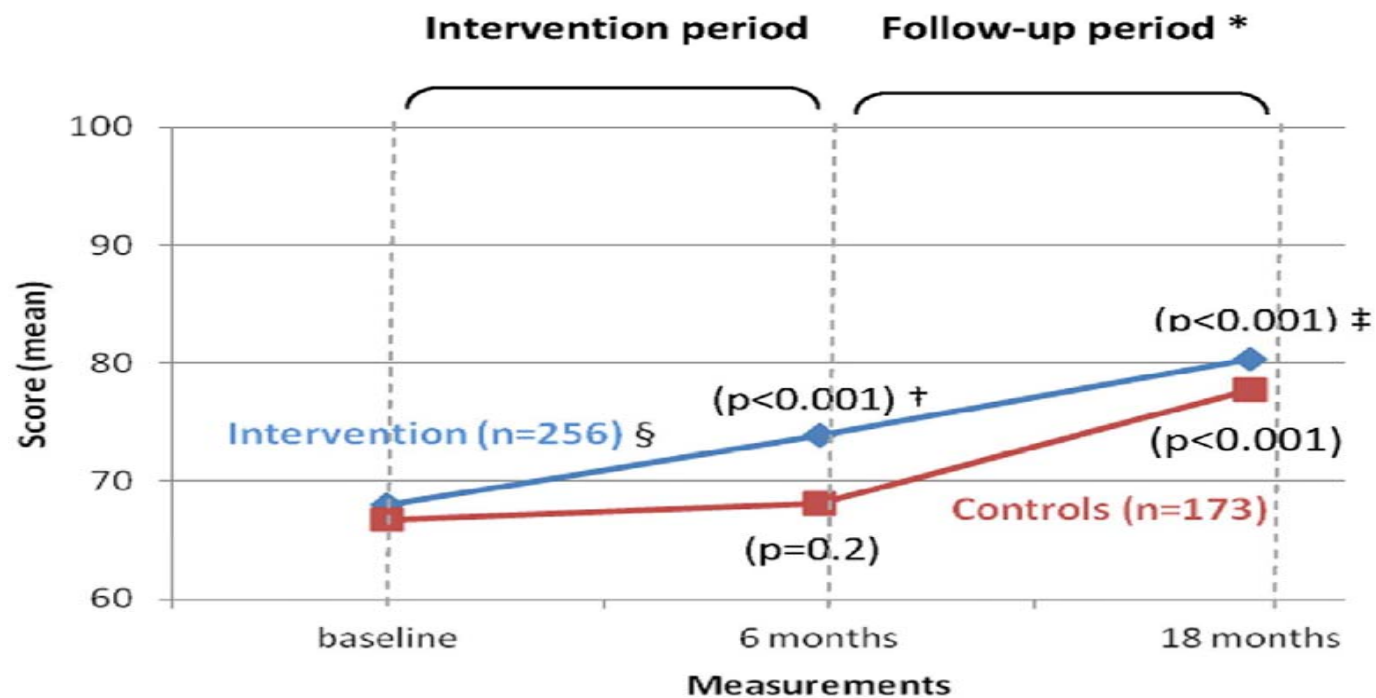
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SI! Colombia- Phase I: 2008-2012



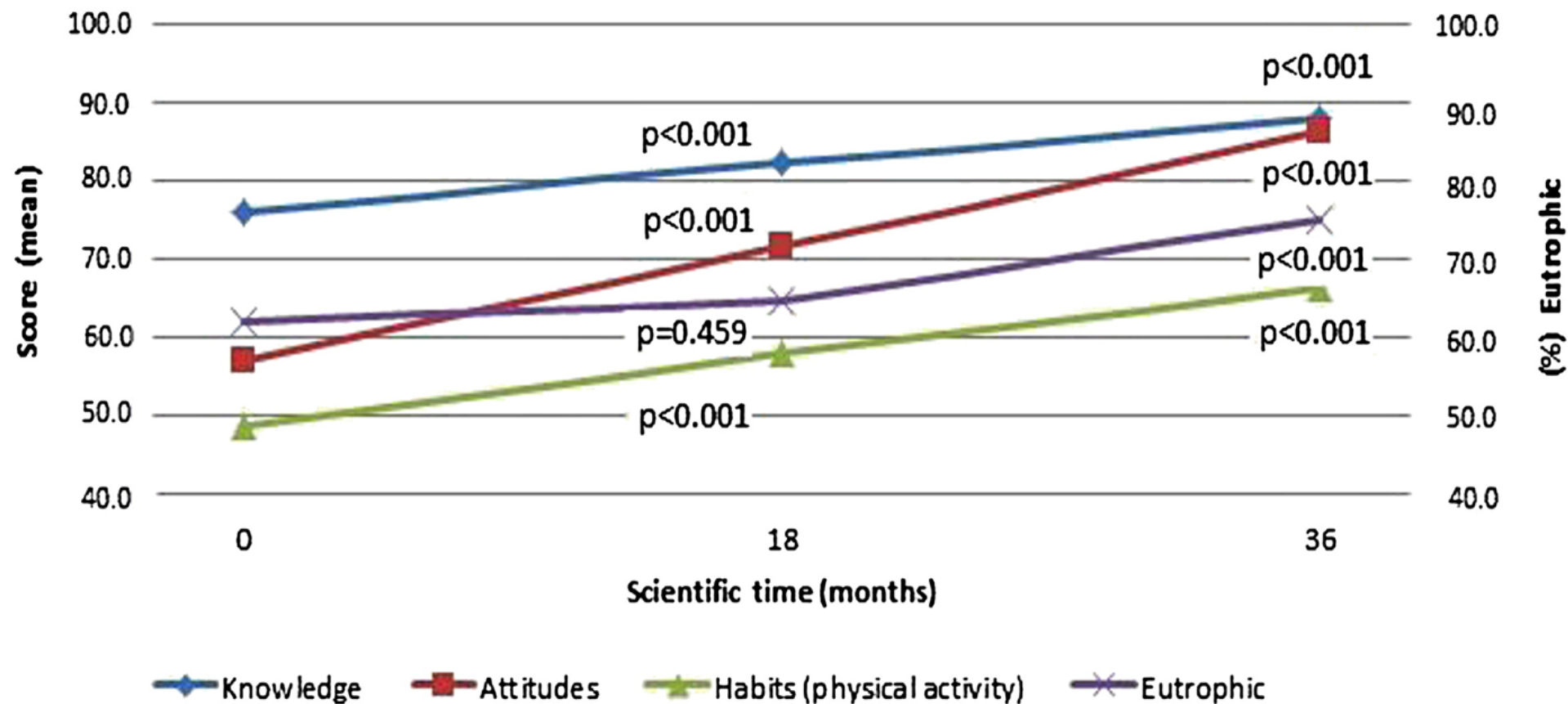
* Crossover

All kids received the educational intervention



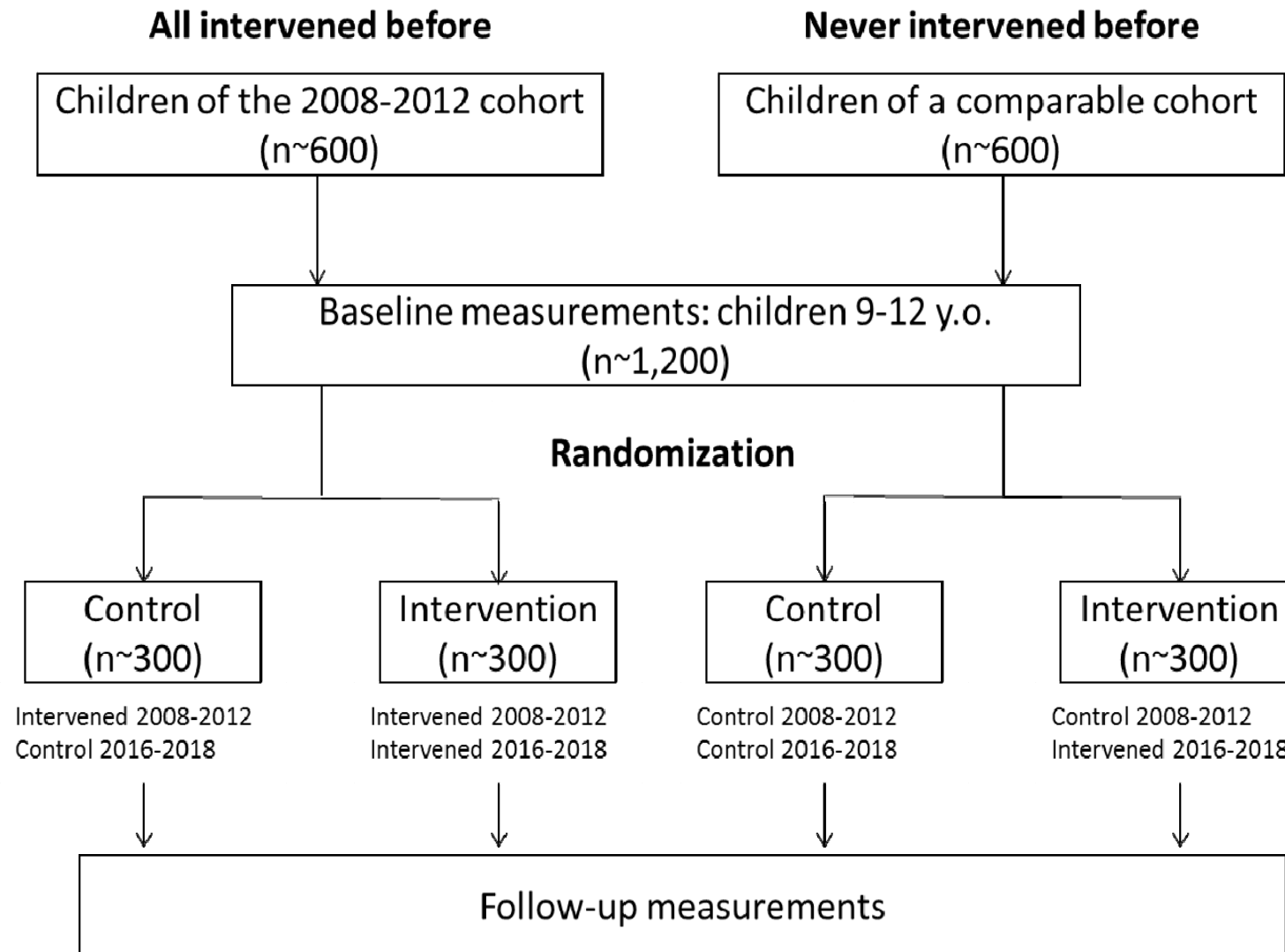
Cespedes J...Fuster V. *Am J Med.* 2013; 126(1): 27-35

SI! Colombia- Phase I: 2008-2012



Cespedes J...Fuster V. *Am J Med.* 2013; 126(12): 1122–26

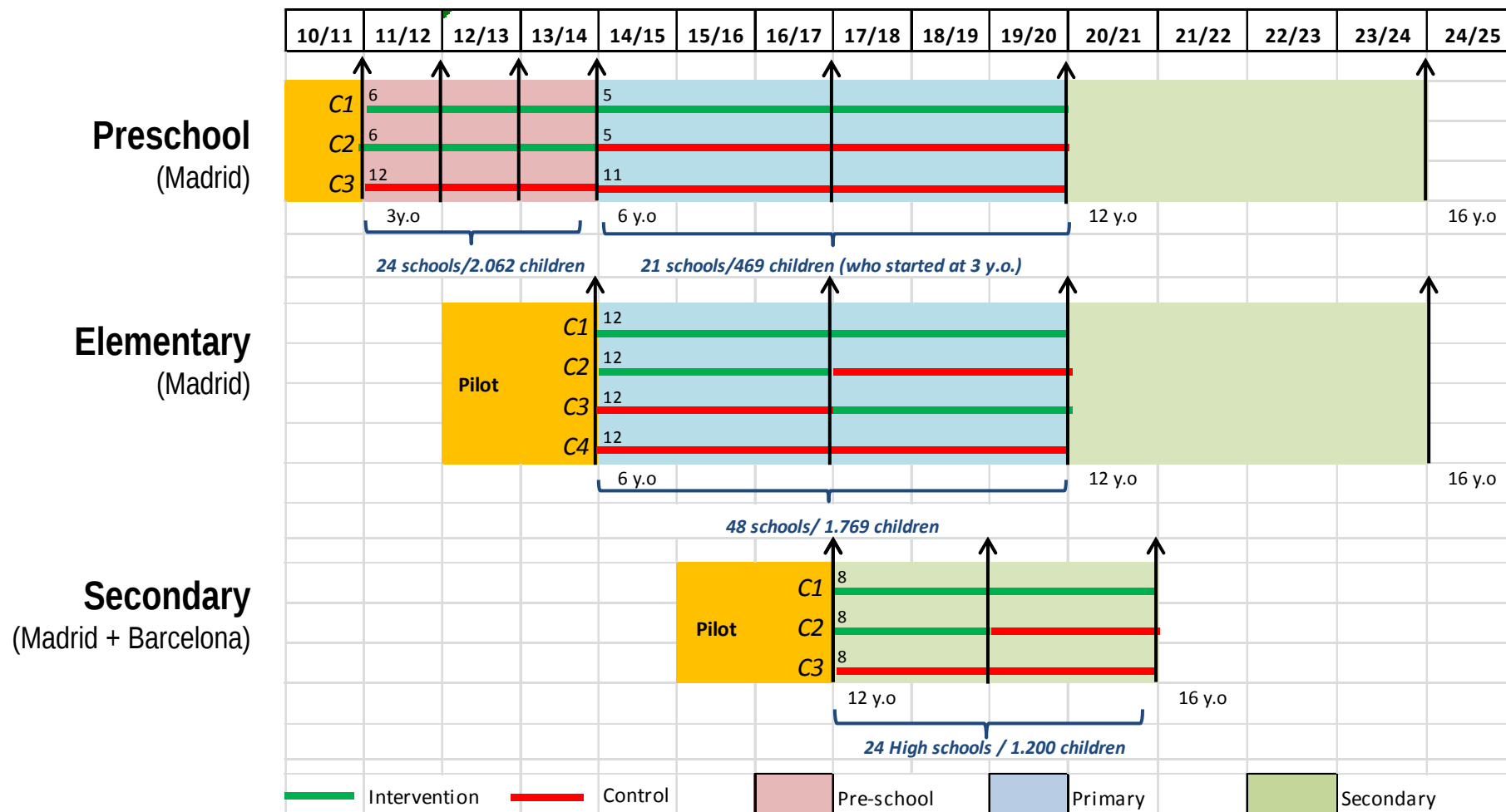
SI! Colombia- Phase II: 2016-2018



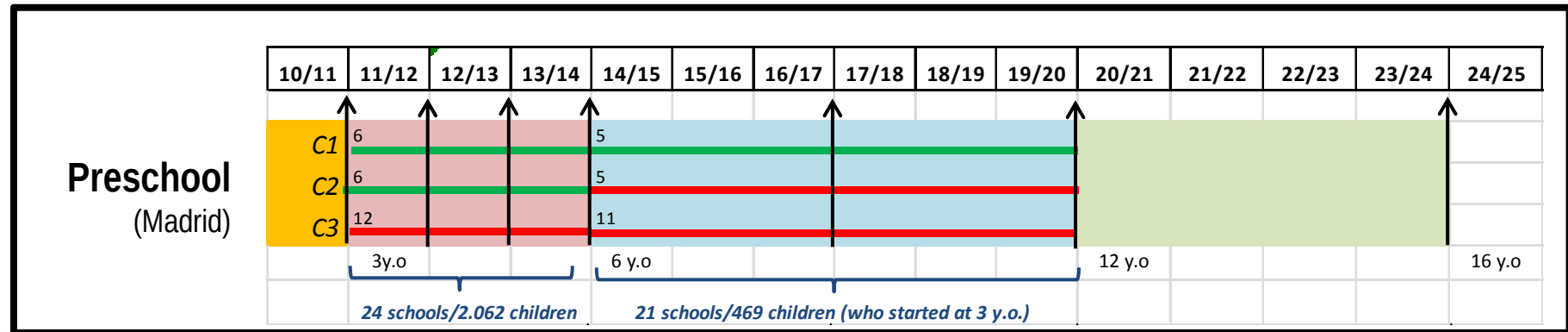
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SI! Program Spain



SI! Preschool (3-5 years old)



SI! Preschool (3-5 years old)

- INTERVENTION ✓ 3-5: 70 h per course
- QUESTIONNAIRES AND MEASUREMENTS

Randomized trial: 2011/2014
24 schools in Madrid (2062 children)

- Knowledge, attitudes and habits ¹
 - ✓ KAH- Diet
 - ✓ KAH- Physical activity
 - ✓ KAH- Body and Heart
- Test of Emotional Comprehension ²



Weight



Waist circumference



Height



Triceps and subscapular skinfolds



Blood pressure

¹Céspedes J, Fuster V et al. *Am J Med.* 2013; ²Pons F et al. *European Journal of Developmental Psychology.* 2014

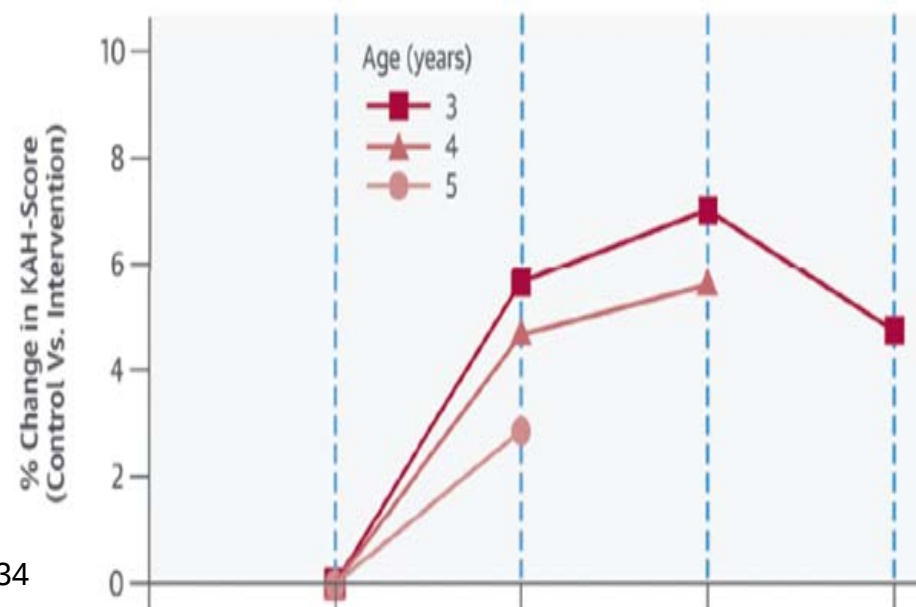
SI! Preschool (3-5 years old)

Changes From Baseline in KAH Scores by Intervention Component

		1-year follow-up		2-year follow-up		3-year follow-up	
	Score	% Diff	p	% Diff	p	% Diff	p
3 years old							
KAH Total	80	5.45	0.001	7.14	<0.001	4.90	<0.001
Diet	30	5.03	0.035	5.50	0.014	3.13	0.014
Physical activity	30	4.70	0.003	12.4	<0.001	8.63	<0.001
Body and heart	20	4.15	0.122	1.75	0.320	1.65	0.349
4 years old							
KAH Total	80	4.36	0.002	5.86	<0.001		
Diet	30	2.77	0.082	5.13	<0.001		
Physical activity	30	7.00	0.001	8.97	<0.001		
Body and heart	20	3.05	0.158	1.75	0.131		
5 years old							
KAH Total	80	2.93	0.002				
Diet	30	0.47	0.814				
Physical activity	30	8.40	<0.001				
Body and heart	20	2.30	0.134				

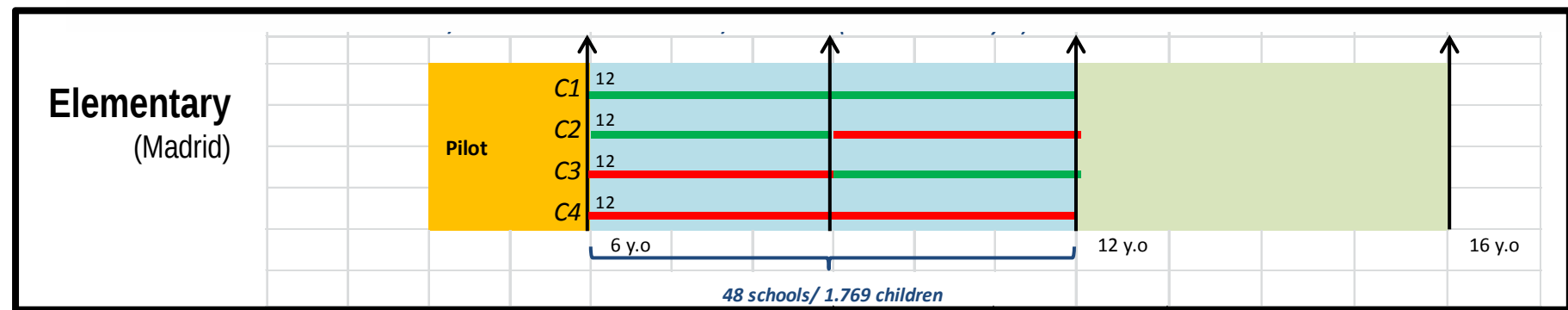
KAH: Knowledge, attitudes and habits.

Peñalvo JL...Fuster V. *J Am Coll Cardiol.* 2015;66(14):1525-1534



SI! Elementary School (6-11 years old)

10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25
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SI! Elementary School (6-11 years old)

- INTERVENTION ✓ 6-7: 32h per course
✓ 8-11: 24h per course
- QUESTIONNAIRES AND MEASUREMENTS

Randomized trial: 2014/2020
48 schools in Madrid (1770 children)

- Knowledge, attitudes and habits ¹

- ✓ KAH- Diet
- ✓ KAH- Physical activity
- ✓ KAH- Body and Heart
- ✓ KAH- Emotions



Weight



Waist circumference



Triceps and subscapular skinfolds



Blood pressure



Height

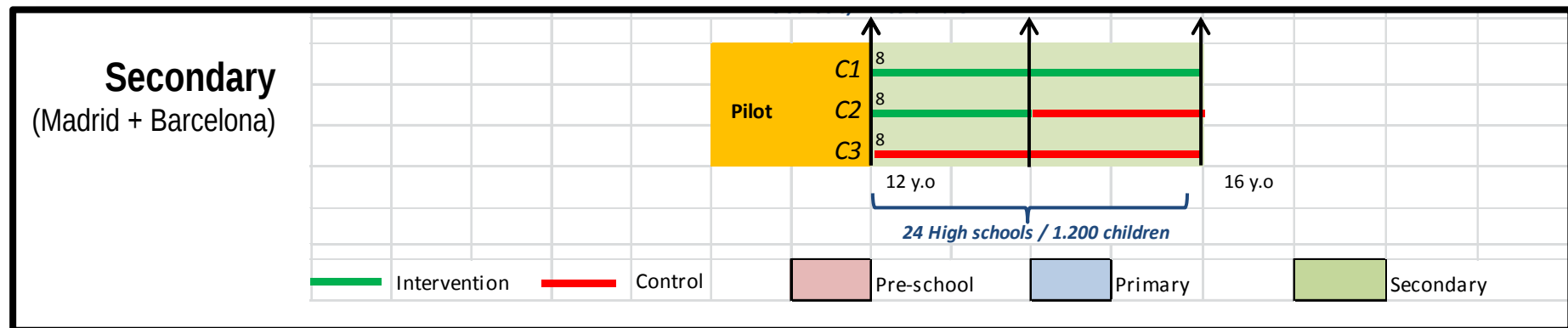
<https://clinicaltrials.gov/show/NCT02428634>

¹Santos-Beneit G, Fuster V et al. *BMC Public Health*. 2015

Santos-Beneit G...Fuster V. *Submitted, 2018*

SI! Secondary School (12-16 years old)

10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25
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SI! Secondary School (12-16 years old)

- **INTERVENTION** ✓ 12-16: 12h per course
✓ 12-14: 18h per course

• QUESTIONNAIRES AND MEASUREMENTS

Randomized trial: 2017/2021
24 schools in Madrid and Barcelona (1300 children)

- Diet ¹, Physical activity ², Emotions ³, Smoking and addictive substances ⁴
- Children's Eating Habits Questionnaire - Food Frequency Questionnaire (CEHQ-FFQ) ⁵



Accelerometers



Blood analysis



Blood pressure



DEXA

Lean/Fat mass (BIA)



Weight



Urine and saliva analysis



Waist circumference



Height



¹⁻⁵ All validated questionnaires and surveys

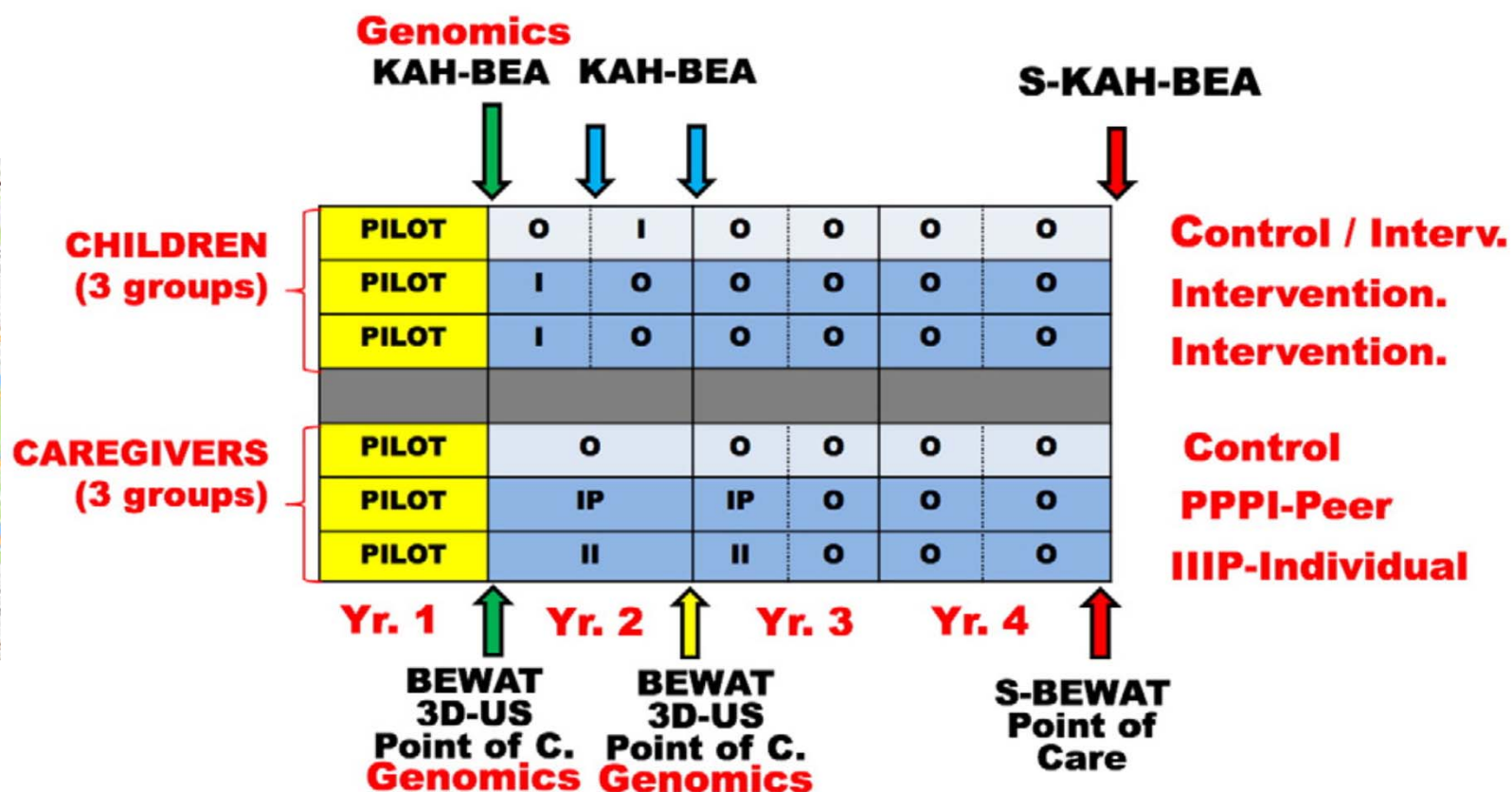
Fernandez-Jimenez R...Fuster V. **Submitted, 2018**

<https://clinicaltrials.gov/show/NCT03504059>

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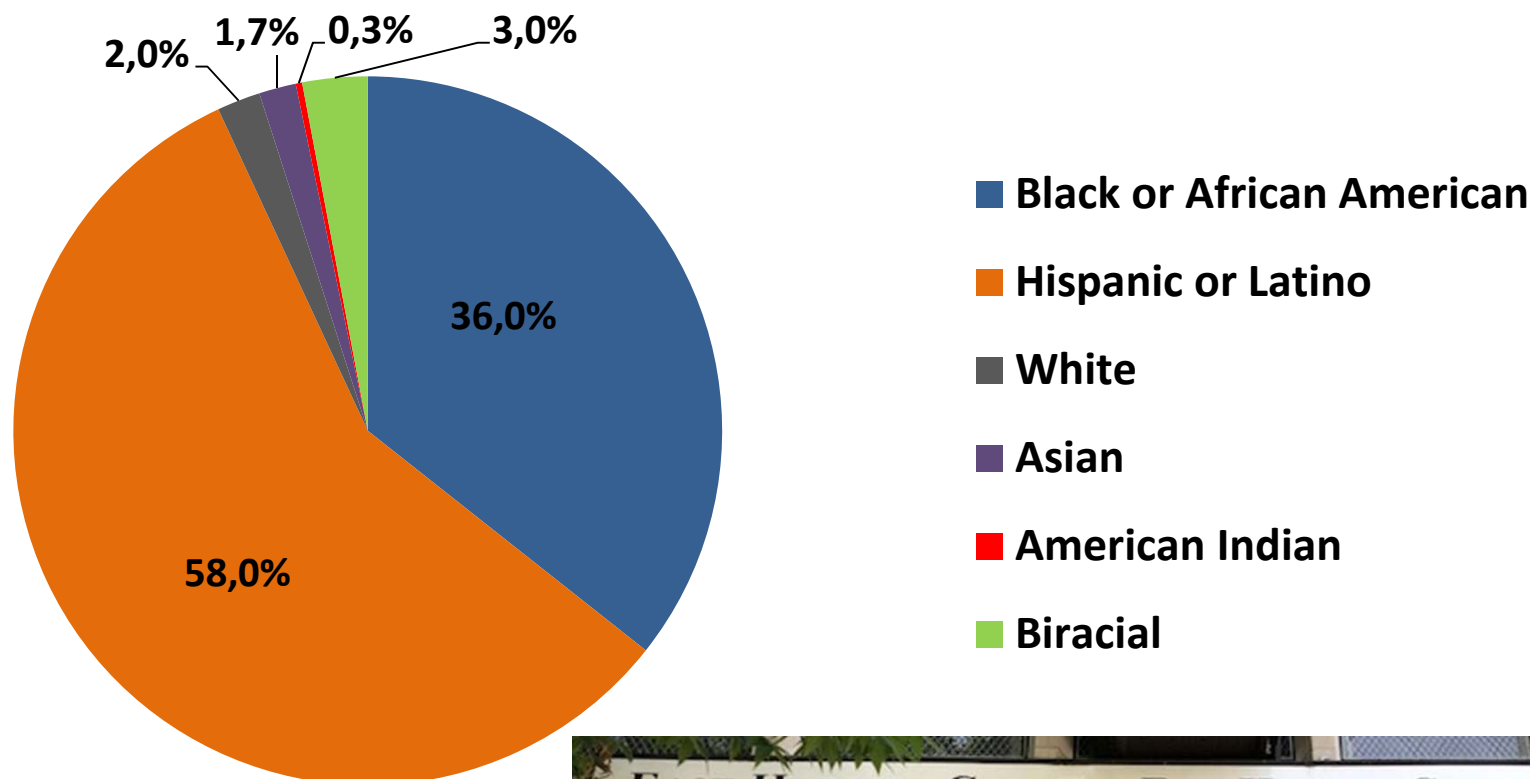
SI! USA: FAMILIA study design



KAH-BEA = Knowledge, Attitude, Habit, -BMI, Exercise, Alimentation ;
BEWAT = BP, Exercise, Weight, Alimentation, Tobacco; **S**=Sustained

Bansilal S...Fuster V. *Am Heart J.* 2017;187:170-181

FAMILIA study: Participant's race distribution



FAMILIA study: Educational intervention



¿PUEDO PROBAR?	Actividad clave 3 Primera comida del día: desayuno	Desarrollo Si! Programa de Salud Integral
Las comidas del día	DE PIES A CABEZA	Actividad clave 5 Alegria y tristeza
	Síntesis Si! Programa de Salud Integral	

¿PUEDO PROBAR?

Actividad clave 4
Comeremos juntos

Desarrollo Si! Programa de Salud Integral

Receta: Tostadas con queso fresco y mermelada

Objetivo: Fomentar el gusto por la cocina y probar alimentos nuevos.

Ingredientes: Pan tostado, aceite de oliva virgen, queso fresco, mermelada o compota de fruta (fruta chafada con un tenedor).

Elaboración

- Se disponen los ingredientes en diferentes mesas, de forma que el alumnado en fila tenga que ir pasando de una mesa a otra.
- Cada alumno o alumna coge dos rebanas de pan.
- Vierten un chorrito de aceite en la rebanada.
- Cortamos el queso en lonchas para que ellos mismos pongan un trozo encima de cada pan.
- Con una cuchara o tenedor vierten un poco de mermelada o compota de fruta y la untan en la rebanada.

Dado de emociones

Objetivo: Favorecer la identificación y expresión de las emociones a través de la expresión verbal y corporal empleando un juego colectivo.

Materiales: Caras del dado de emociones de Barrio Sésamo impresas, tijeras y pegamento.

Desarrollo:

- Imprimimos 6 emociones de las propuestas por el Programa SII con los materiales de Barrio Sésamo (para esta edad se recomienda imprimir las emociones primarias: alegría, tristeza, miedo, enfado y amor y sorpresa) o buscamos fotos de personas que expresen dichas emociones en revistas.
- Pegamos las 6 em
- Cada alumno y al
- teniendo que exp
- que les ha tocado.

Se les puede pedir qu

siendo modelo para e

qué emoción les ha s

sus gestos.

Sesame Super Stretch

Stretching keeps us flexible, which means we're able to move and bend our bodies easily – without tightness or pain. Most kids are pretty flexible, but they still can enjoy the best part of stretching: it feels great!

Try This!

After sitting still in circle time, this is a great way to get children up and moving.

Children will:

- Stretch their bodies in a variety of ways
- Learn that stretching helps "wake their bodies up"
- Mirror movements they see in pictures

Materials:

- Sesame Super Stretch Chart (copy page 32)
- Small block

Ask children:

Can you pretend you are waking up in the morning? How does your body feel? Now pretend you are sitting in the car for a long time. How do you feel? How does your body feel right now?

Activity:

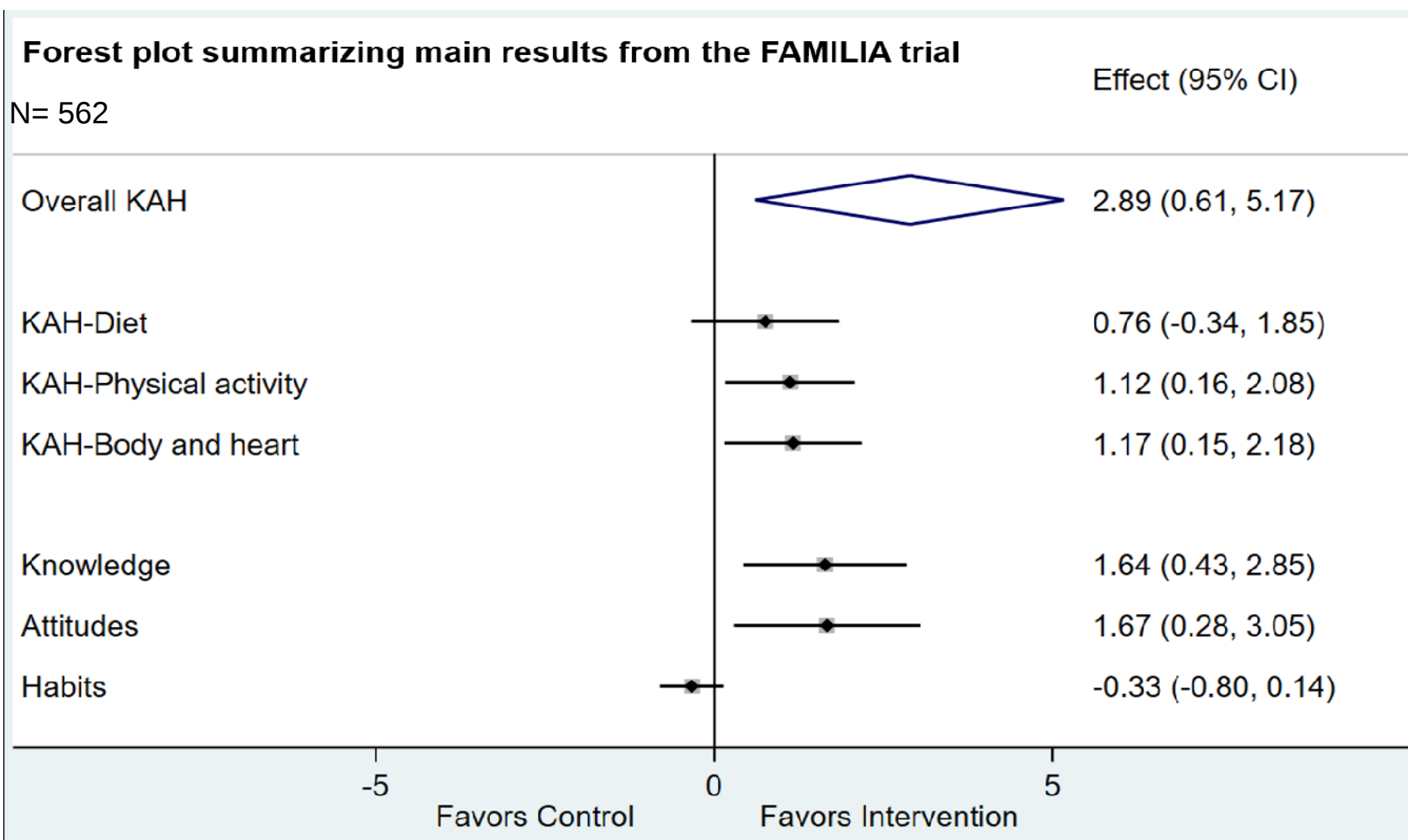
- Do some warm-up exercises (run or jump in place).
- Introduce different stretching moves:
 - Stretch UPI (reach up to the ceiling)
 - Stretch DOWN! (reach down to your toes)
 - Stretch all AROUND! (hold your arms out to the sides and move them around slowly in BIG circles)
- Have children take turns tossing the block onto the Stretch Chart to see which stretch it lands on. All children then stretch the way their Sesame Street friend is stretching on the chart.
- Ask, "What does it feel like after you stretch your muscles? Check your body – are there any spots you want to stretch more so you can move more easily?"

AC 03.01.05

Classroom worksheets: learning while playing

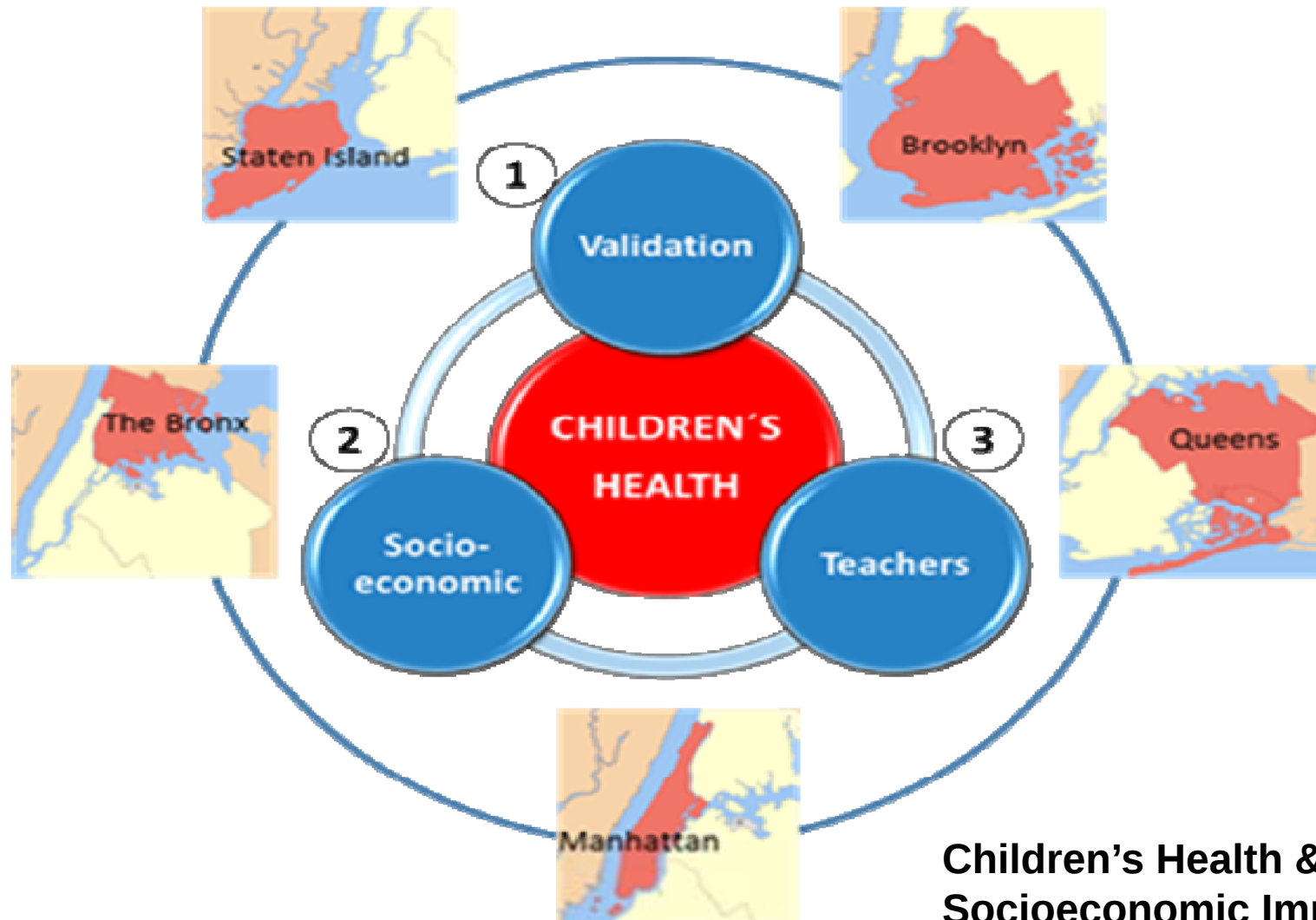


FAMILIA study: Primary results Children



Fernandez-Jimenez R...Fuster V. **AHA Scientific Sessions 2018 & Submitted, 2018**

5-Borough Project



**Children's Health & Biology:
Socioeconomic Implications**

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Conclusions

- CV disease is the leading cause of death/disability globally, largely because of **risk factors modifiable** by changes in behavior.
- Behavioral risk factors start in **early childhood**.
- Early and maintained multicomponent educational interventions focused on **health promotion in children** represent a promising approach to prevent disease in adulthood.
- The **integration** of school-, family- and community-based approaches, along with a wide support across multiple sectors through the implementation of public policies, are likely necessary for the success of child health promotion programs.
- **Long-term and large-scale** studies need to establish their effectiveness in reducing CV risk factors and disease later in life.

***“Las palabras
convencen, pero
el ejemplo
arrastra”***

More information

<http://programasi.org/en/>

<https://fundacionshe.org/es/inicio/>

<https://www.resilientheartmovie.com/>

https://www.youtube.com/watch?v=BP_GUFYYVrQ&feature=youtu.be



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