Scientific Bases of Health Subclinical Systemic Disease

Imaging Omics Behavior

ACC New York, Dec 8, 2017

No Disclosures

From Aging / Disease to Youth / Health

NHLBI $-1

Surgery
Intervention
Pharmacology.
Imaging
Genetics/Tr

Secondary
50-100 yrs

Primary
25-50 yrs

Primordial
00-25 yrs

1)

2) TANSNIP

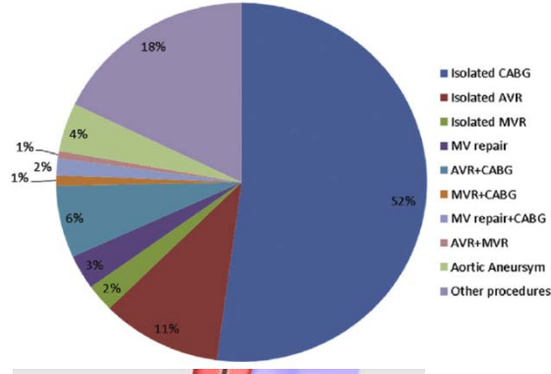
3) AGING)

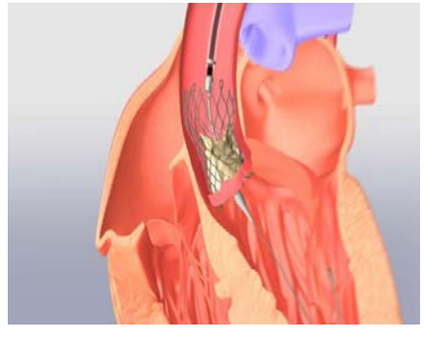
4) HRP
PESA
AWHS

5) IIIP
50/50

6) SHE

7) HARLEM
VILLAGE
MEXICO





From Aging / Disease to Youth / Health

NHLBI $-1

Surgery
Intervention
Pharmacology.
Imaging
Genetics/Tr

Secondary
50-100 yrs

Primary
25-50 yrs

Primordial
00-25 yrs

1)

2) TANSNIP

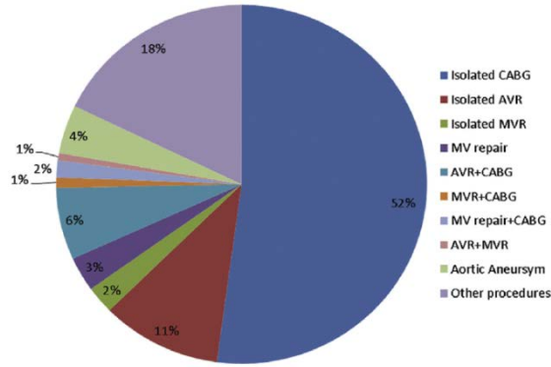
3) AGING)

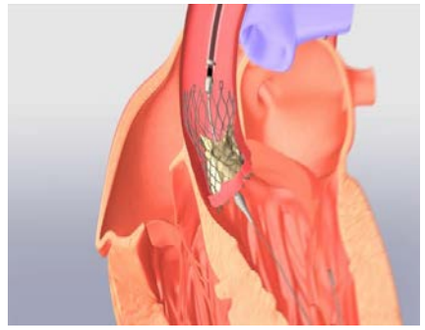
4) HRP
PESA
AWHS

5) IIIP
50/50

6) SHE

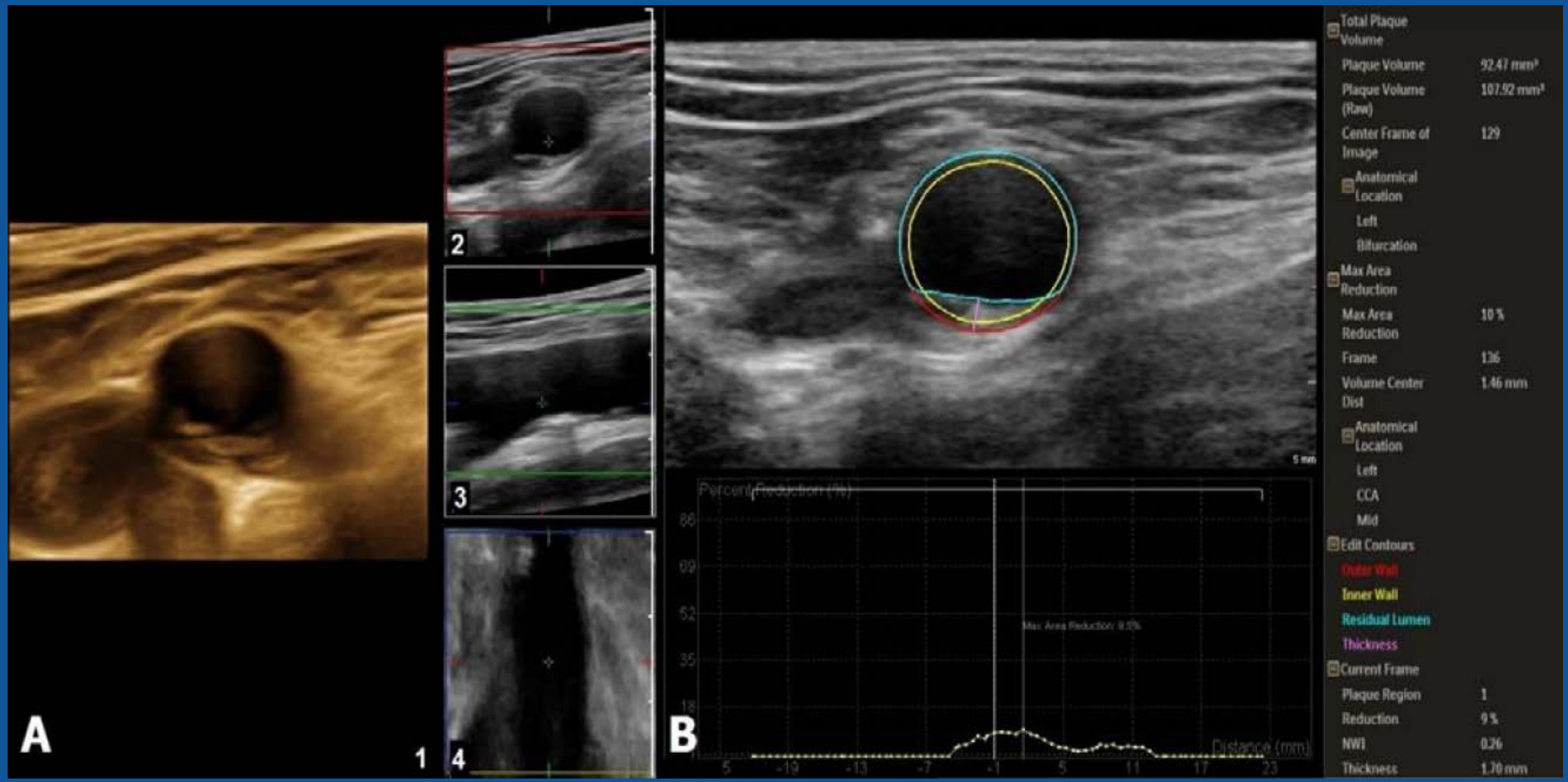
7) HARLEM
VILLAGE
MEXICO





Subclinical Atherosclerotic Burden–N= 12,000

Carotid 2D/3D-VUS Coronary Calcification



B López-Melgar, V Fuster et. al. Atheroscl. 2016;248:230 –Validated 3D vs 2D/3D

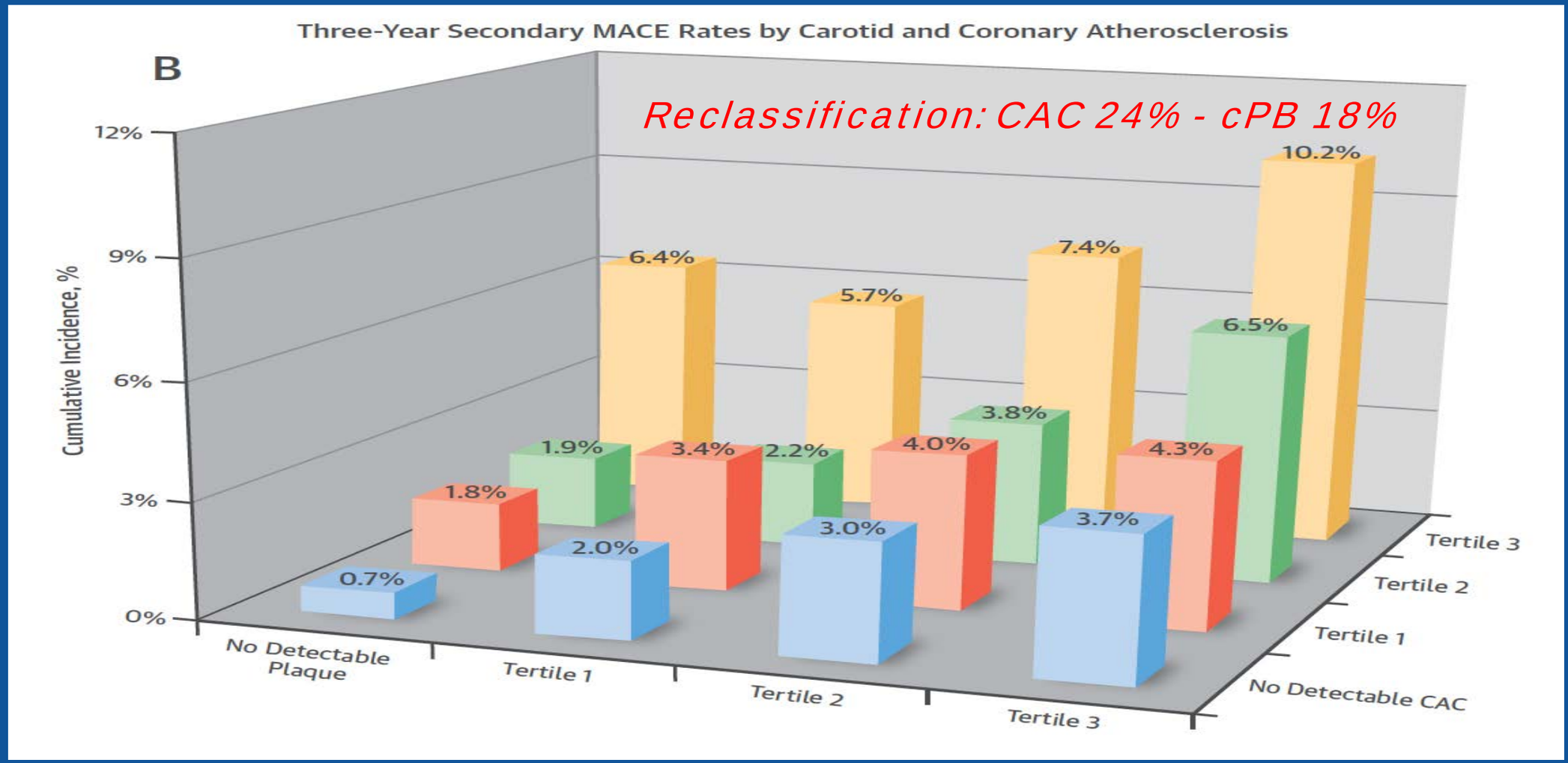
B López-Melgar, V Fuster et. al. J Am Coll Cardiol 2017 (In Press)

4a). Subclinical Atherosclerotic Burden
Bioimage HRP - N = 5,808

The High Risk Plaque (HRP) or BioImage Studym- Events

H Sillesen, P Muntendam, E Falk, V Fuster et.al JACC Imag. 2012;7:681.

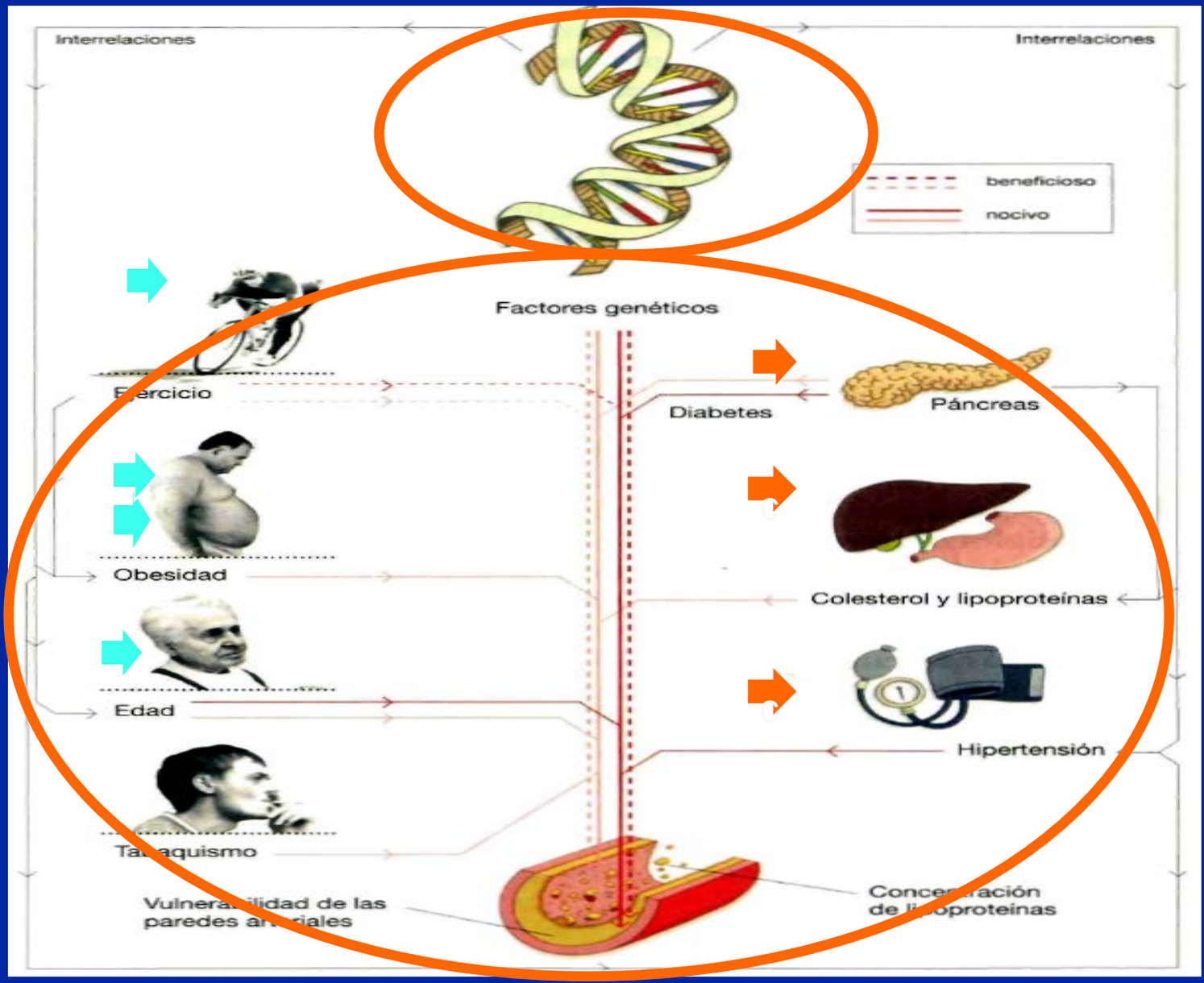
4a1). The Bioimage Study (N=5808)
Cumulative 3-Year MACE Endpoints (N=216)



U Baber, R Mehran, V Fuster, et al. J. Am. Coll. Card. 2015; 65: 1065

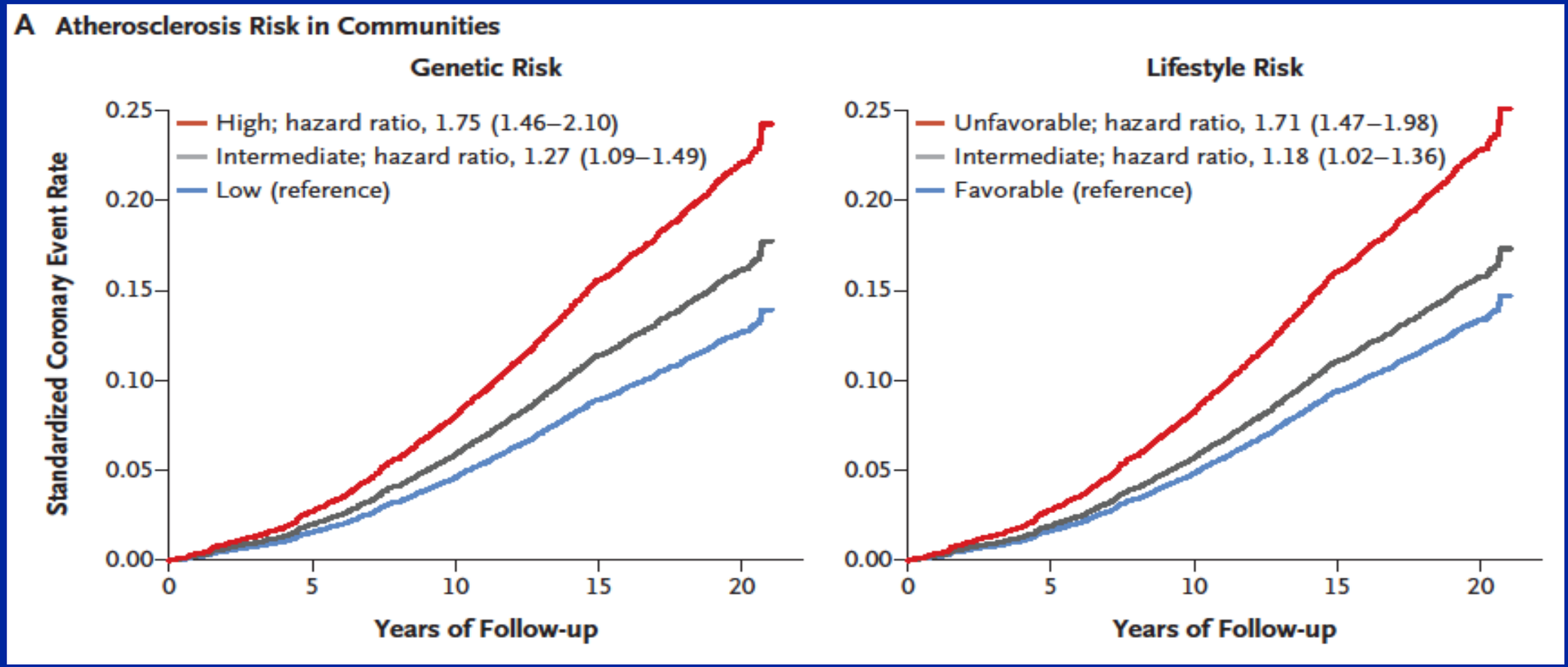
Sept 1, 2017 – 10 Year Follow-up

4a2). Modifiable CV RFrs (7) & Life Style



AV Khera, V Fuster, PM Ridker et al., NEJM 2016; 375:2349

Genetic (50) vs Lifestyle Risk (7) - 55,685
ARIC, MDCS, BioImage, WGHS,

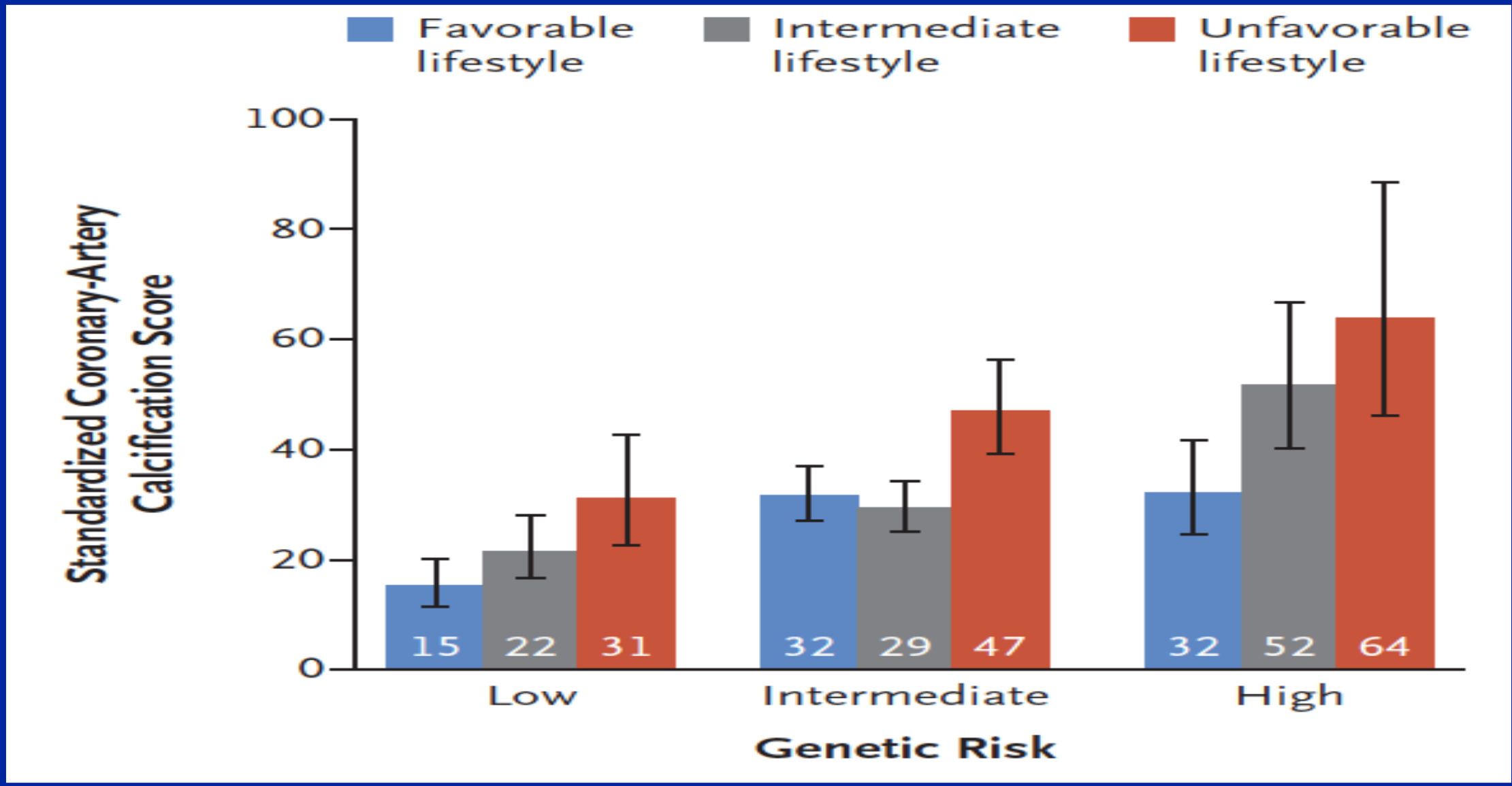


AV Khera, V Fuster et.al.NEJM 2016;375:2349 >Gen<RF=50% MACE

DJ Liu, V Fuster , et al. Nat Genetics 2017 (Press) Lipids

S Siddhartha, V Fuster, et.al.NEJM 2017;377:111 TET2 / M1

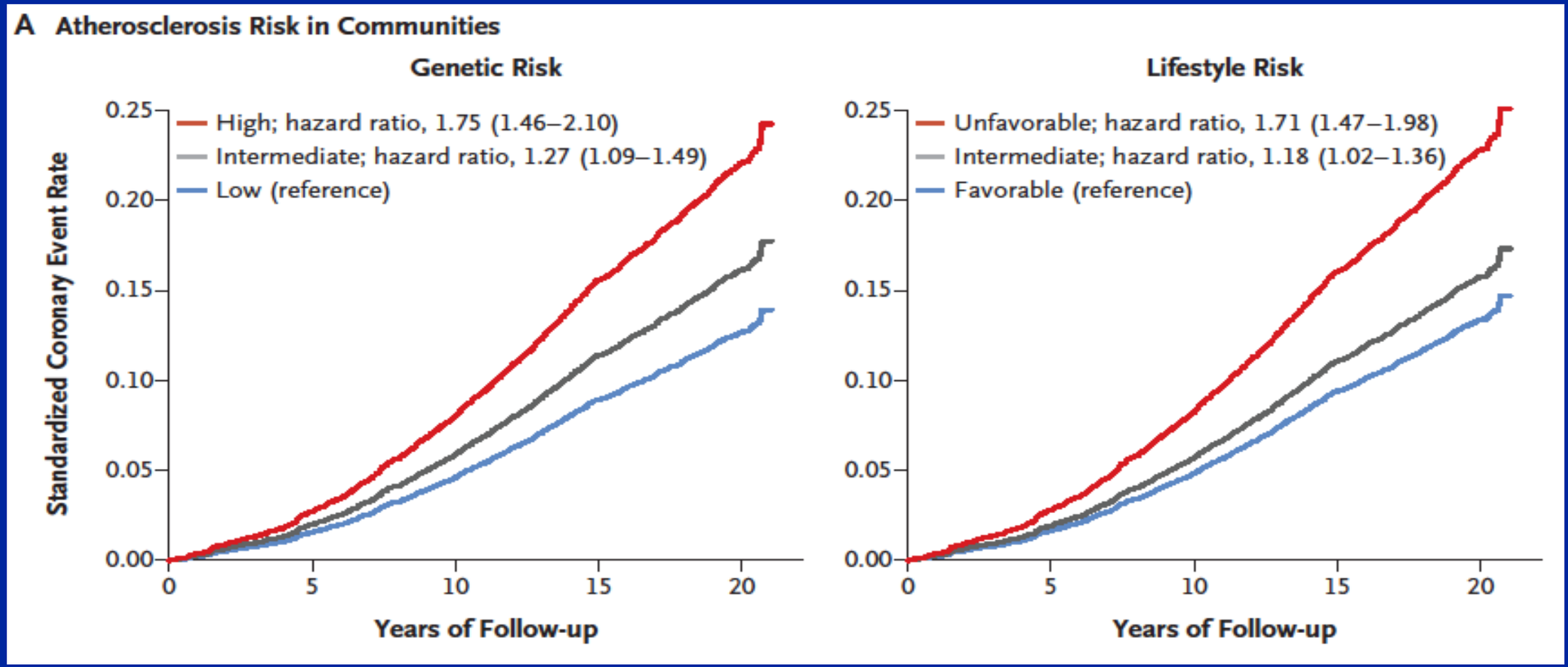
CAC Score in the BioImage Study, According to Lifestyle and Genetic Risk



AV Khera, V Fuster et. al. N Engl J Med 2016;375:2349

Genetic (50) vs Lifestyle Risk (7) - 55,685

ARIC, MDCS, BioImage, WGHS,

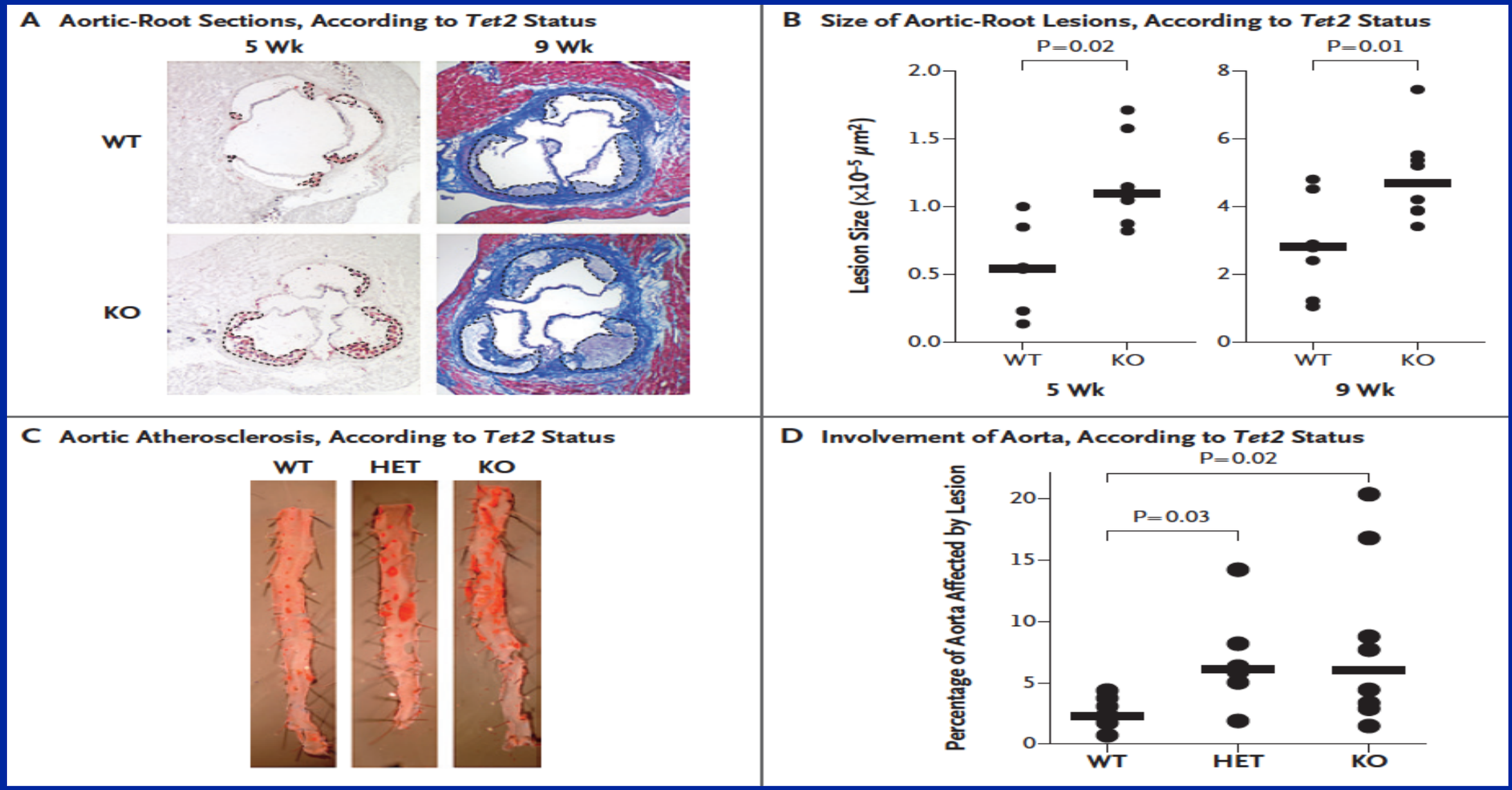


AV Khera, V Fuster et.al.NEJM 2016;375:2349 >Gen<RF=50% MACE

DJ Liu, V Fuster , et al. Nat Genetics 2017 (Press) Lipids

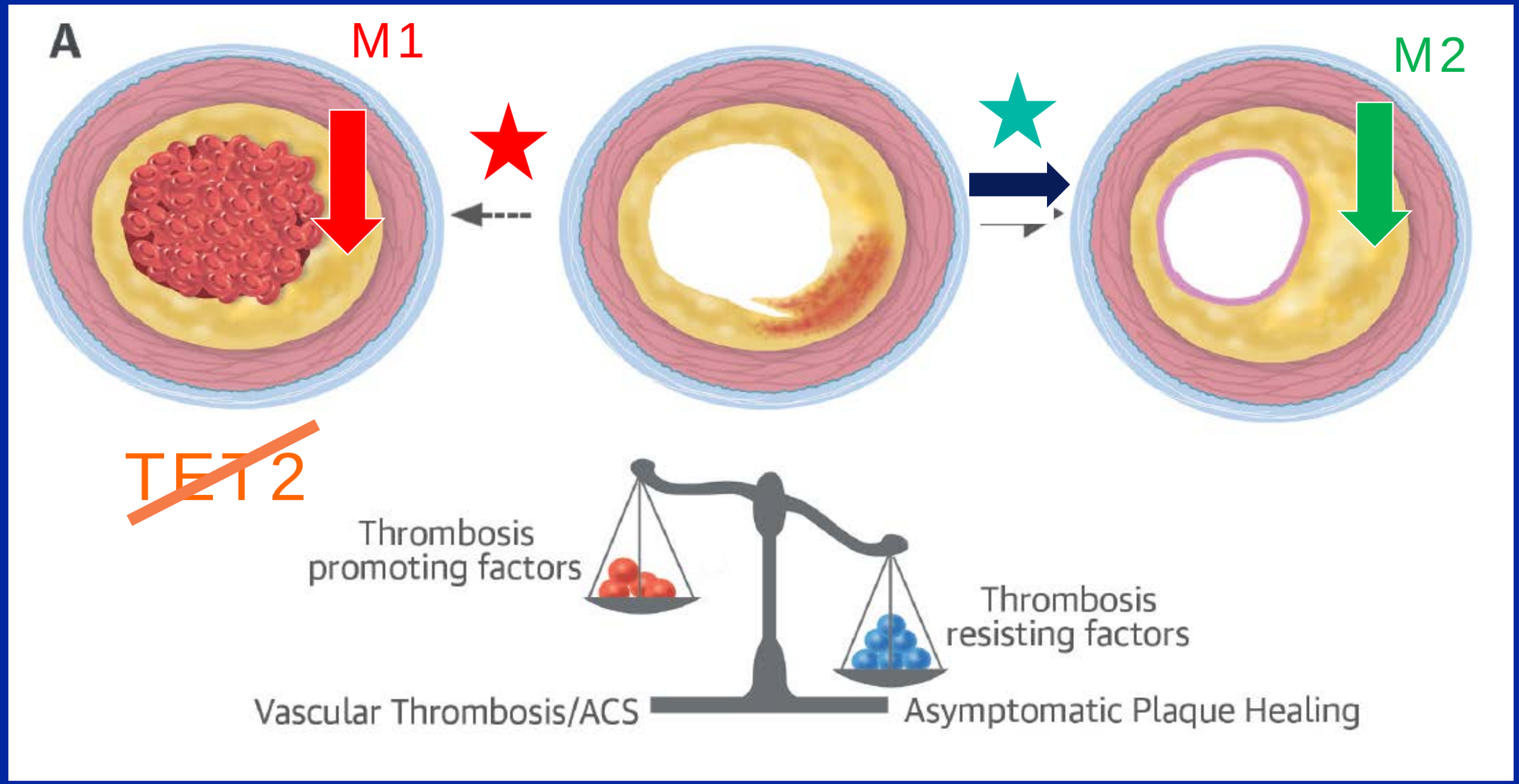
S Siddhartha, V Fuster, et.al.NEJM 2017;377:111 TET2 / M1

Loss of Tet2 in Hematopoietic Cells and Atherosclerosis in a Murine Model

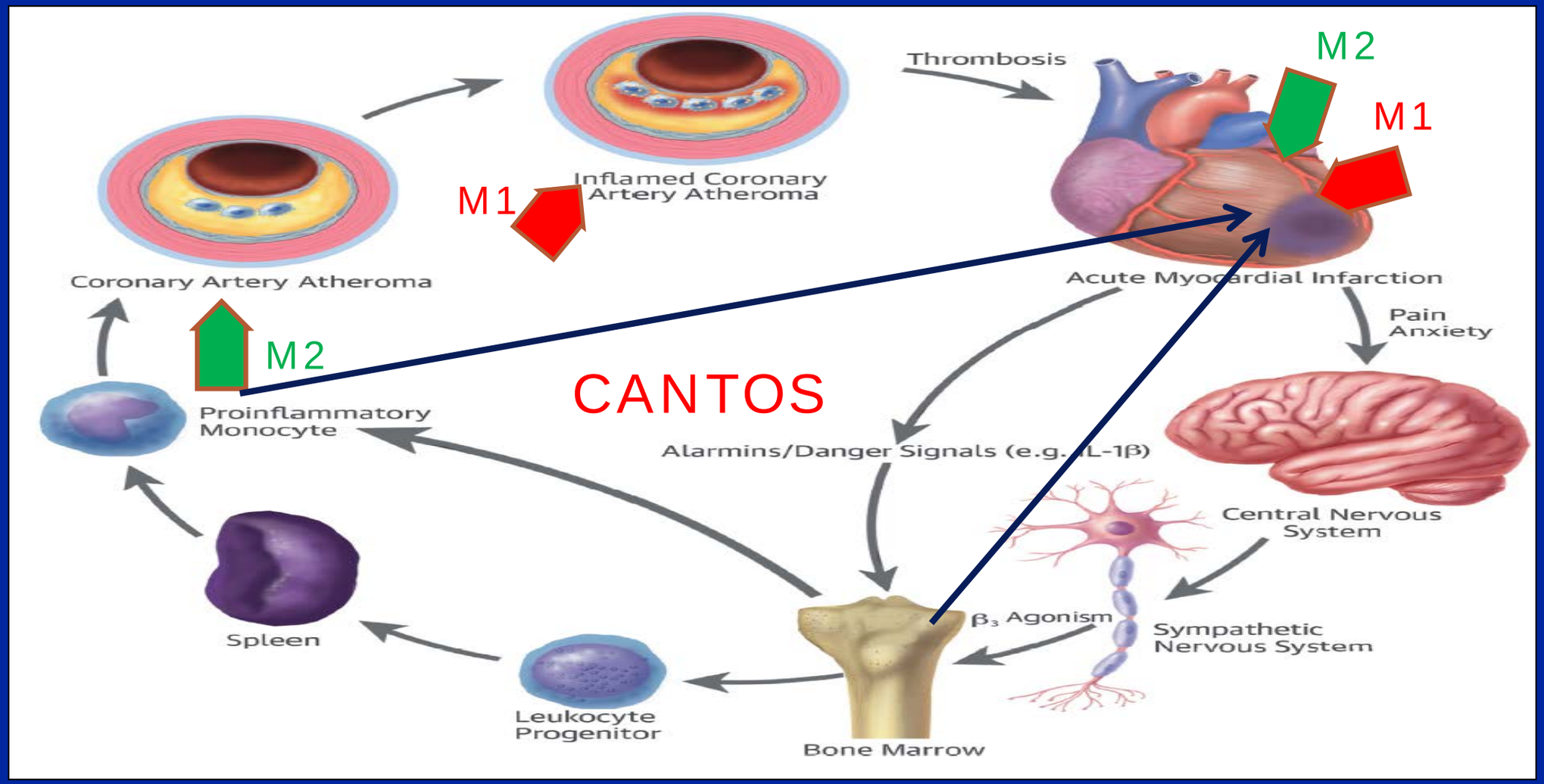


S. Jaiswal, R Mehran, V Fuster et. al. N Engl J Med 2017;377:111

Temporal Sequence & Functions of Leukocytes in the CAs



Local and Systemic Inflammation
Interleukin-1 in Ischemic CVD



Arbab-Zadeh, V Fuster. J Am Coll Cardiol 2015;65:846

P Libby et. al. J Am Coll Cardiol 2016;67:1091 (VF Modified)

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 SEPTEMBER 21, 2017 VOL. 377 NO. 12

Antiinflammatory Therapy with Canakinumab for Atherosclerotic Disease

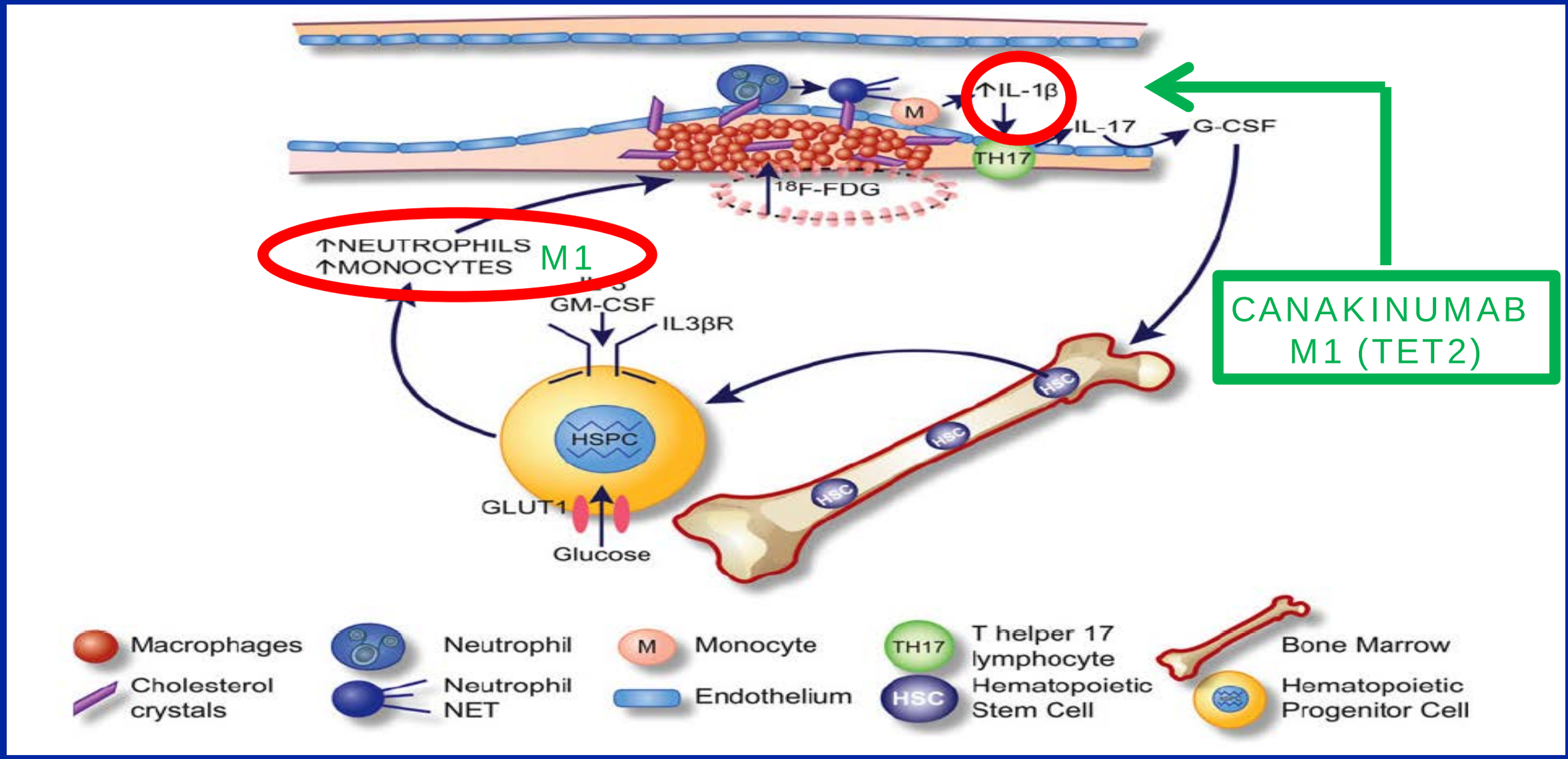
P.M. Ridker, B.M. Everett, T. Thuren, J.G. MacFadyen, W.H. Chang, C. Ballantyne, F. Fonseca, J. Nicolau, W. Koenig, S.D. Anker, J.J.P. Kastelein, J.H. Cornel, P. Pais, D. Pella, J. Genest, R. Cifkova, A. Lorenzatti, T. Forster, Z. Kobalava, L. Vida-Simiti, M. Flather, H. Shimokawa, H. Ogawa, M. Dellborg, P.R.F. Rossi, R.P.T. Troquay, P. Libby, and R.J. Glynn, for the CANTOS Trial Group*

CANTOS: A Gigantic Proof-of-Concept Trial

Borja Ibañez, Valentin Fuster

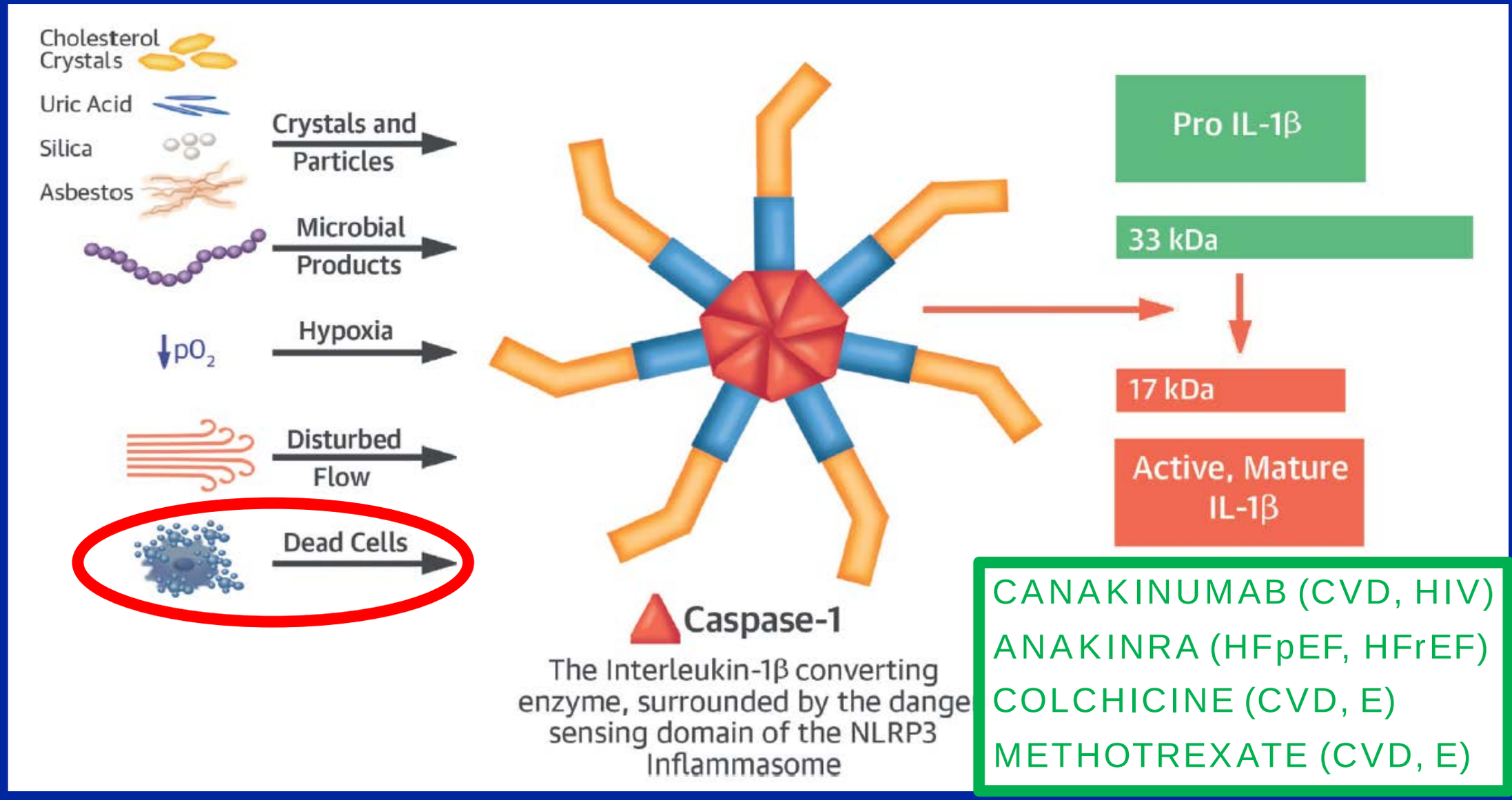
Circ Res 2017 (In Press)

Persistent Stem Cell Driven Inflammation In Atherosclerosis



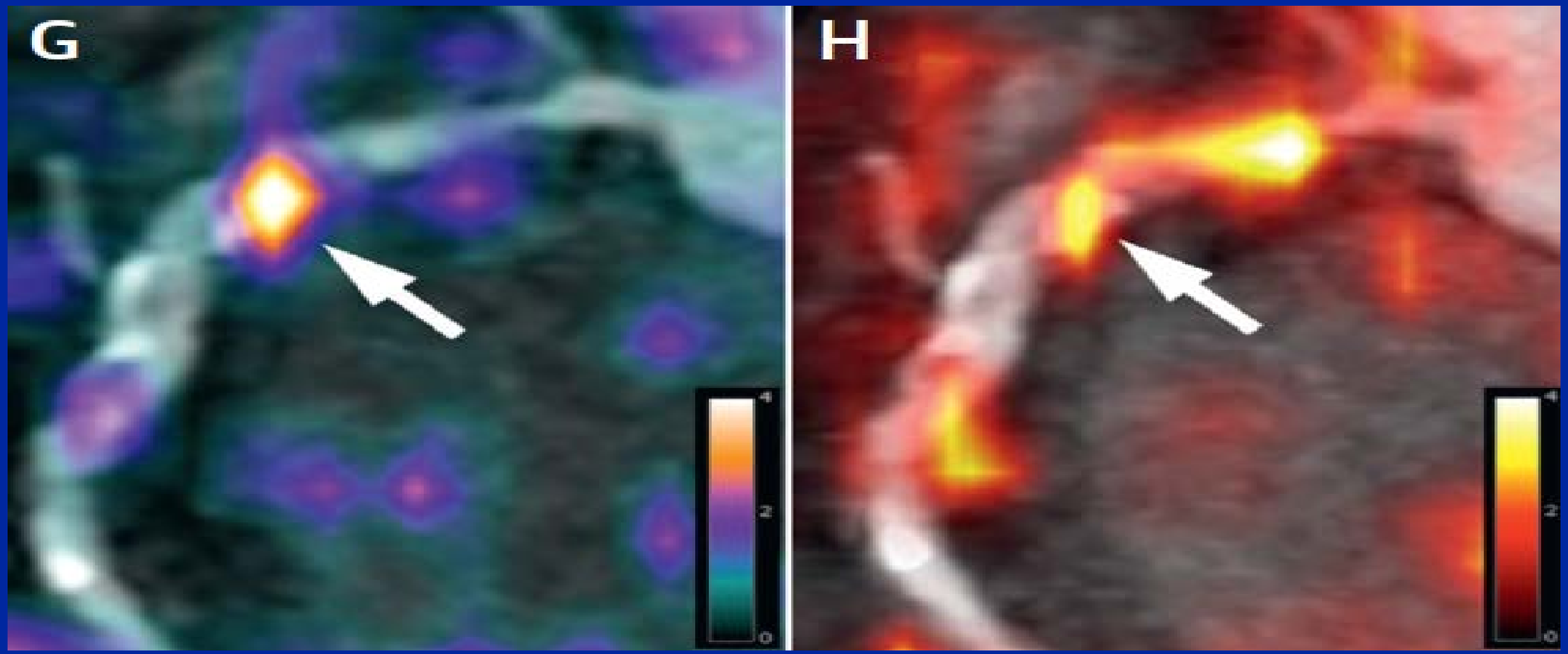
TR Cimato. Eur Heart J. 2017;38:433

Inflammasome Activates IL-1β by Proteolysis to the Mature Form by Caspase-1



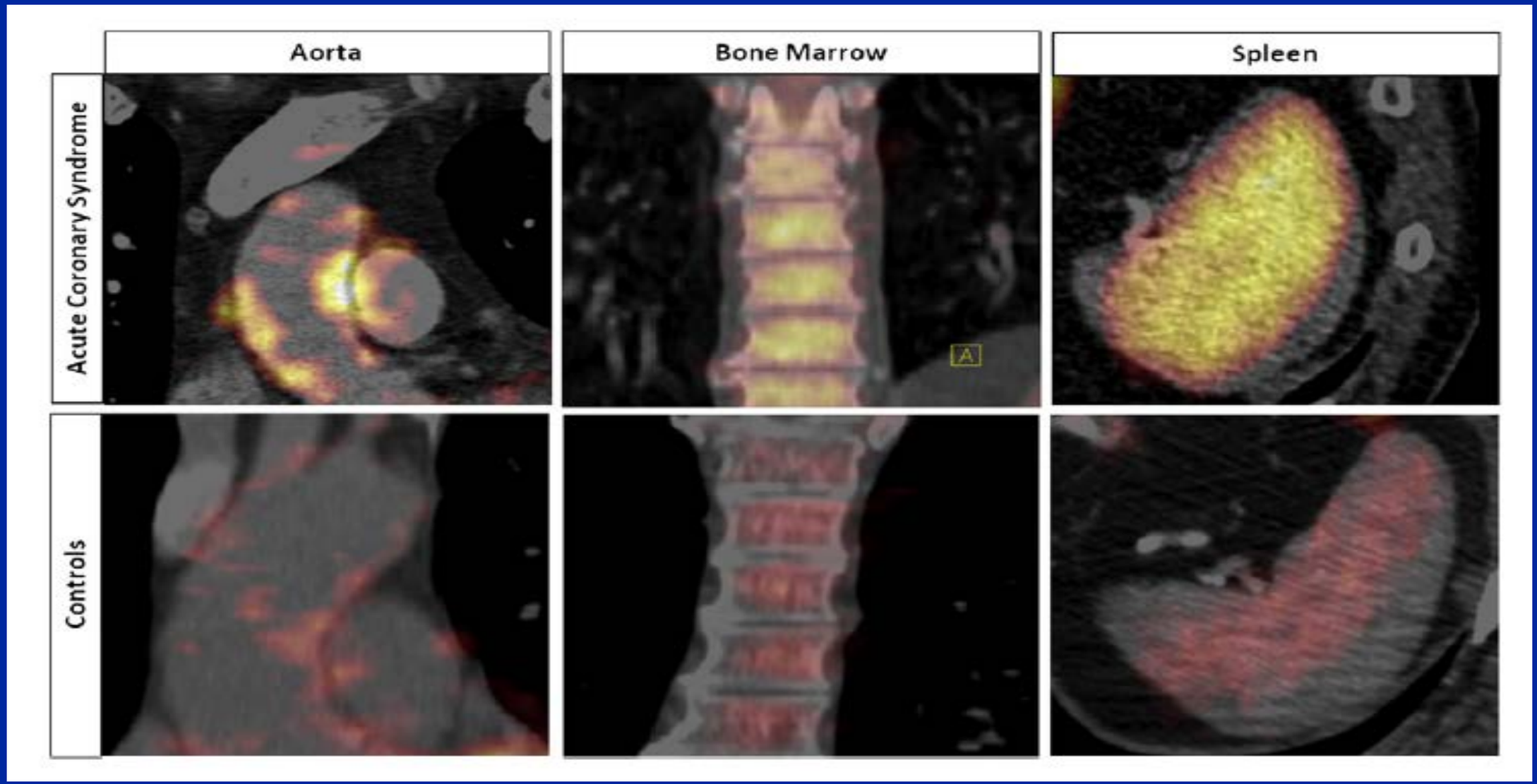
P Libby. J Am Coll Cardiol 2017;70:2278 (Modified by VF)

Coronary PET Inflammation Imaging: ACS Culprit vs Bystander Lesions



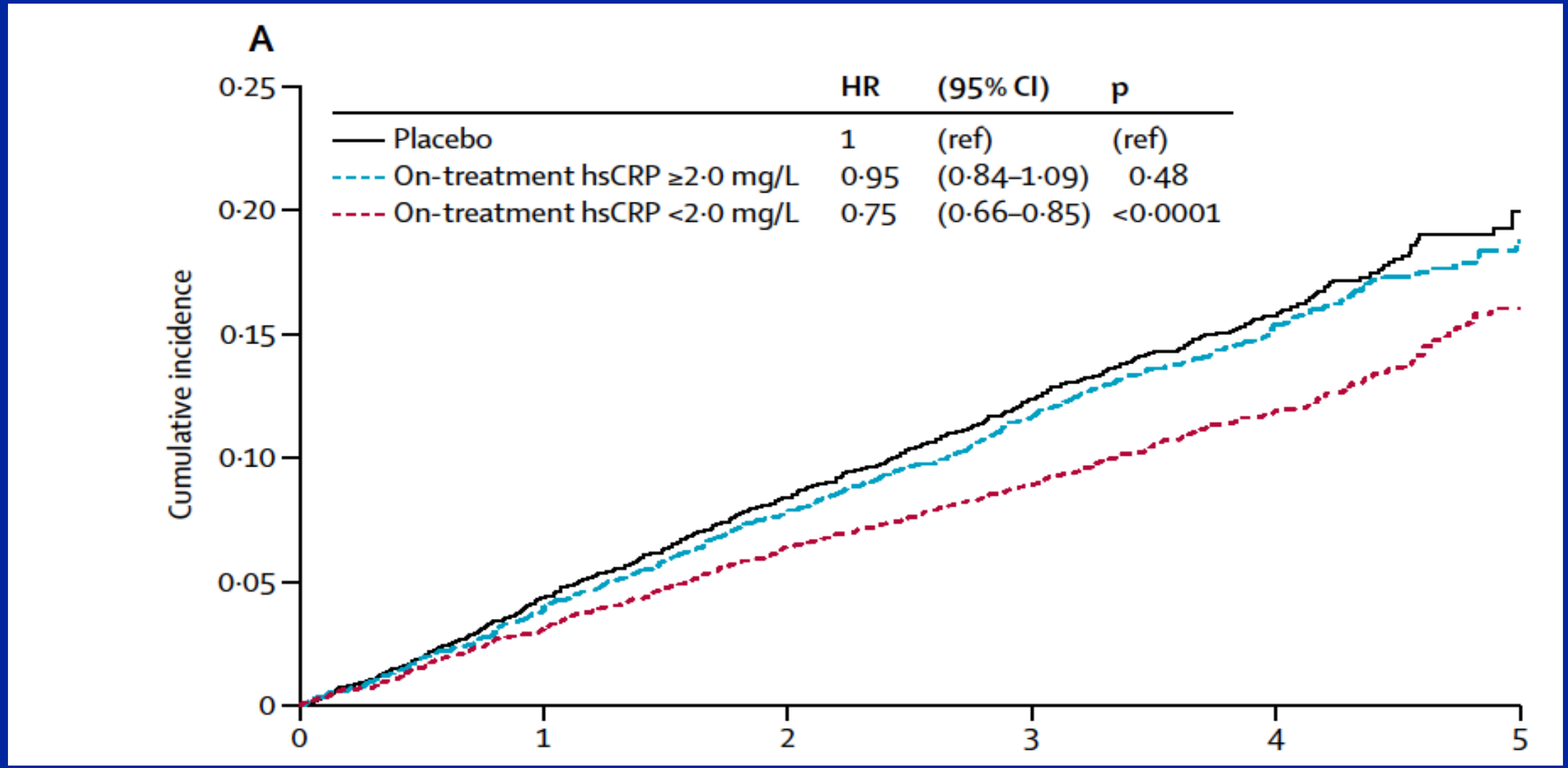
PM Robson, V Fuster, ZA Fayad et al. J. Am. Coll. Card. 2017;10:1103
JM Tarkin, JHR Rudd et. al. J. Am. Coll/ Card. 2017;69:1774
JMTarkin, Dweck M, Fayad ZA et al. Circ Research 2017 (in Press)

Increased Bone Marrow, Spleen, and Arterial FDG Uptake After ACS



H Emami, ZA Fayad et. al. J Am Coll Cardiol Img 2015;8:121

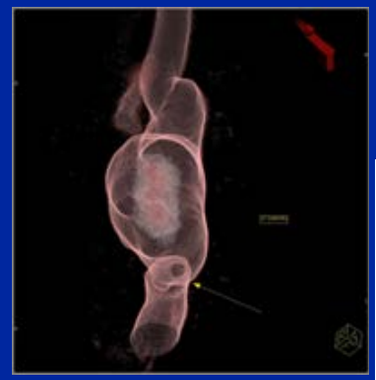
CV Events According To Whether At 3 Month on-treatment hsCRP was > or < 2 mg/L



CANTOS *(P Ridker et. al.) Lancet* ***2017*** *(In Press)*

High Risk Plaque Study Participants Who Underwent Carotid Ultrasound (Chicago, Florida)

Addition Data:
Coronary Calcium
Biomarkers
Genomic markers
MRI
PET-CT



8 yrs

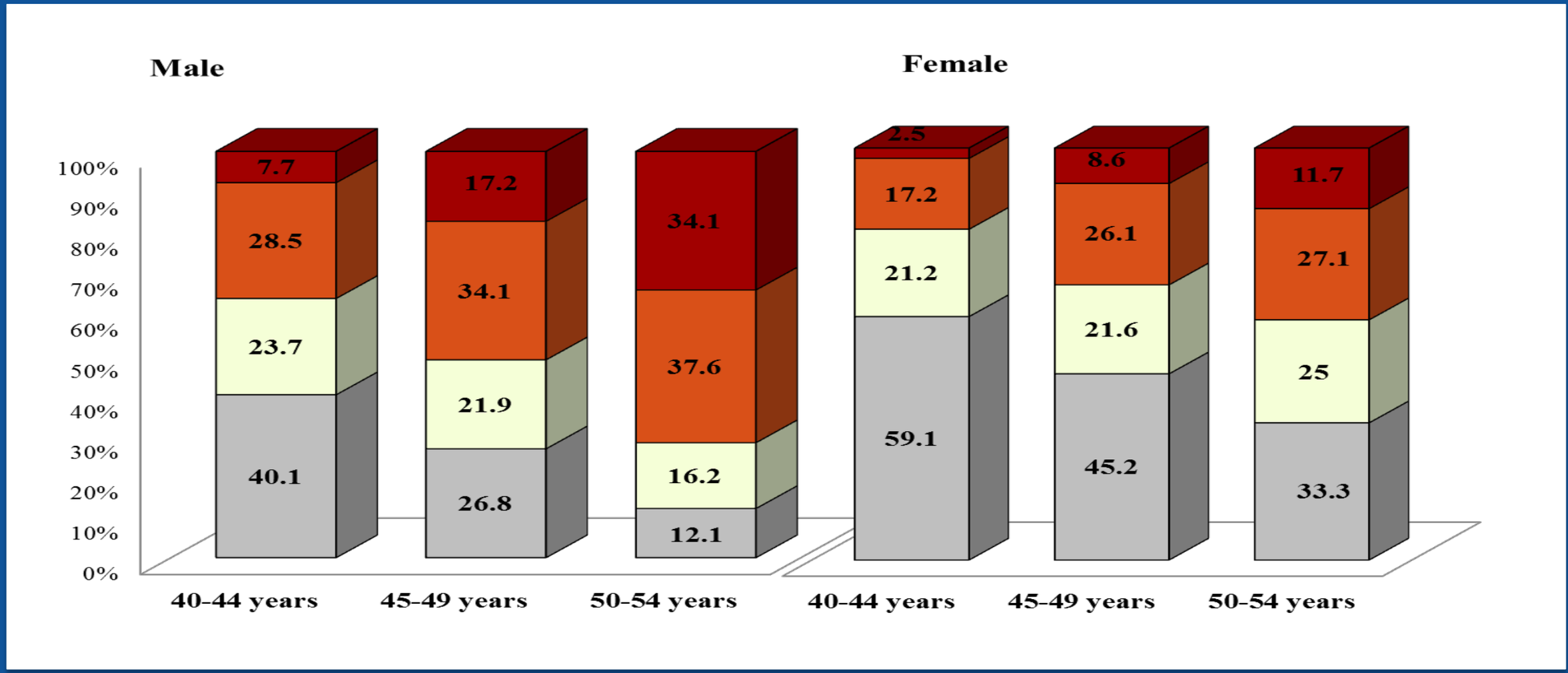
3-D Carotid Plaque Volume Ultrasound

CV Risk Assessment

Sept 1, 2017 Long Term Follow-up

4b). Study PESA - CNIC Santander - 2010

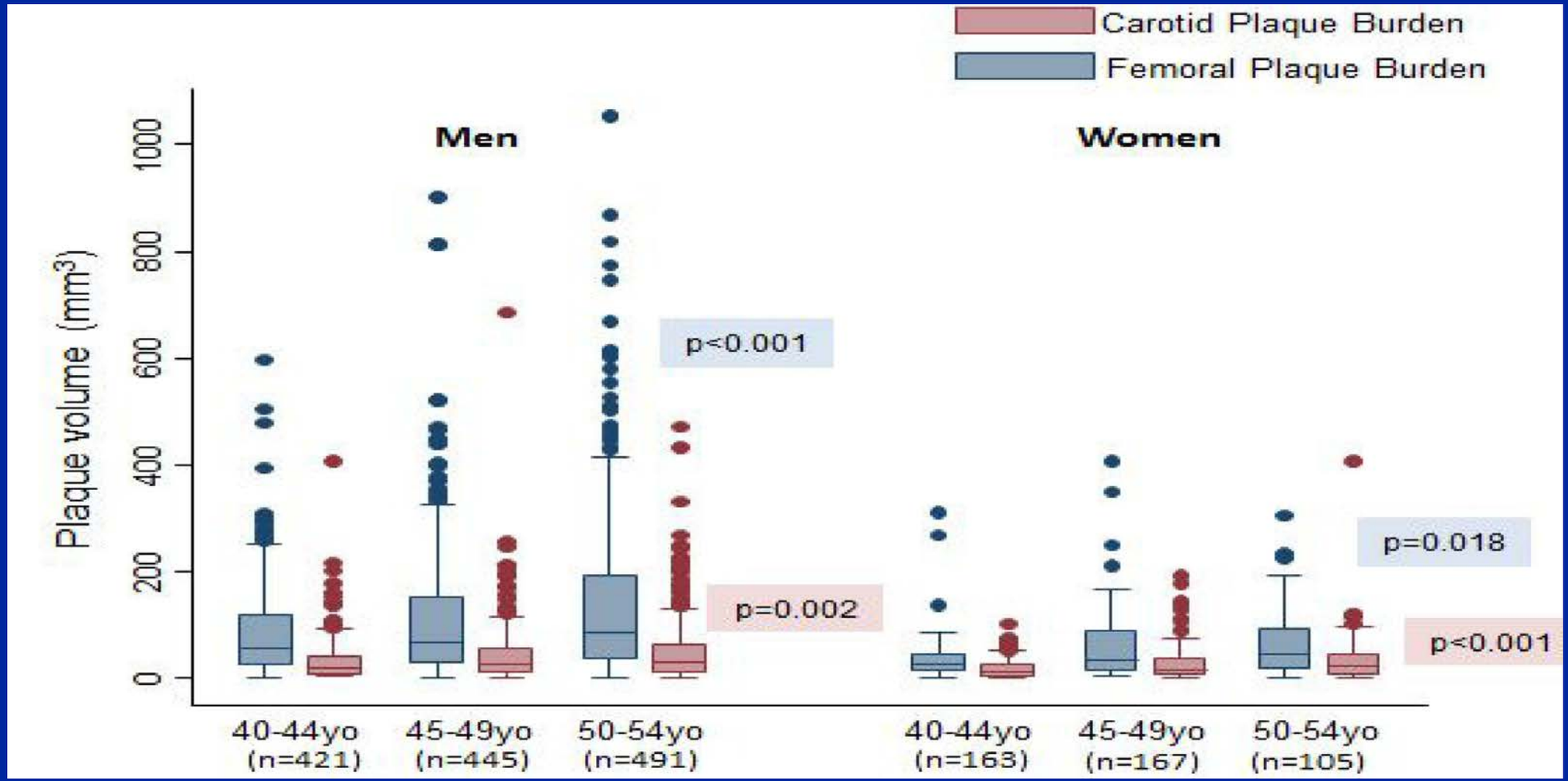
4b1). The PESA Study (N=4184) – 2D/3D VUS Atherosclerosis Assessment (mm^3)



PESA (L Fernandez-Friera, A Fernandez-Ortiz, V Fuster et.al)
Circulation **2015**;131:2104

4b2). The PESA Study (N=3860)

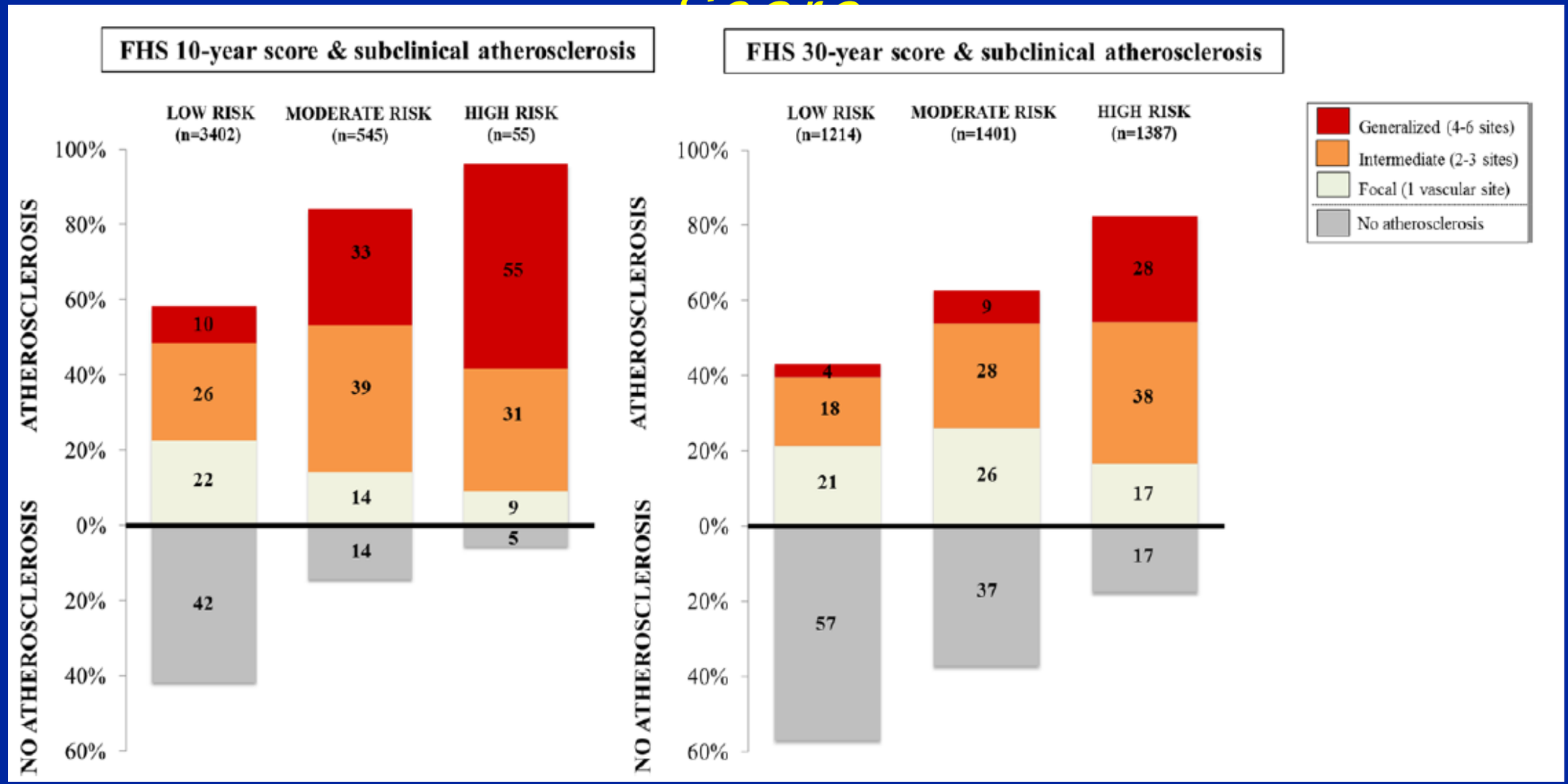
Femoral And Carotid 3D-VUS Plaque Volume



B López-Melgar, V Fuster et. al. J Am Coll Cardiol ***2017. (In Press)***

4b2). The PESA Study (N=4184)

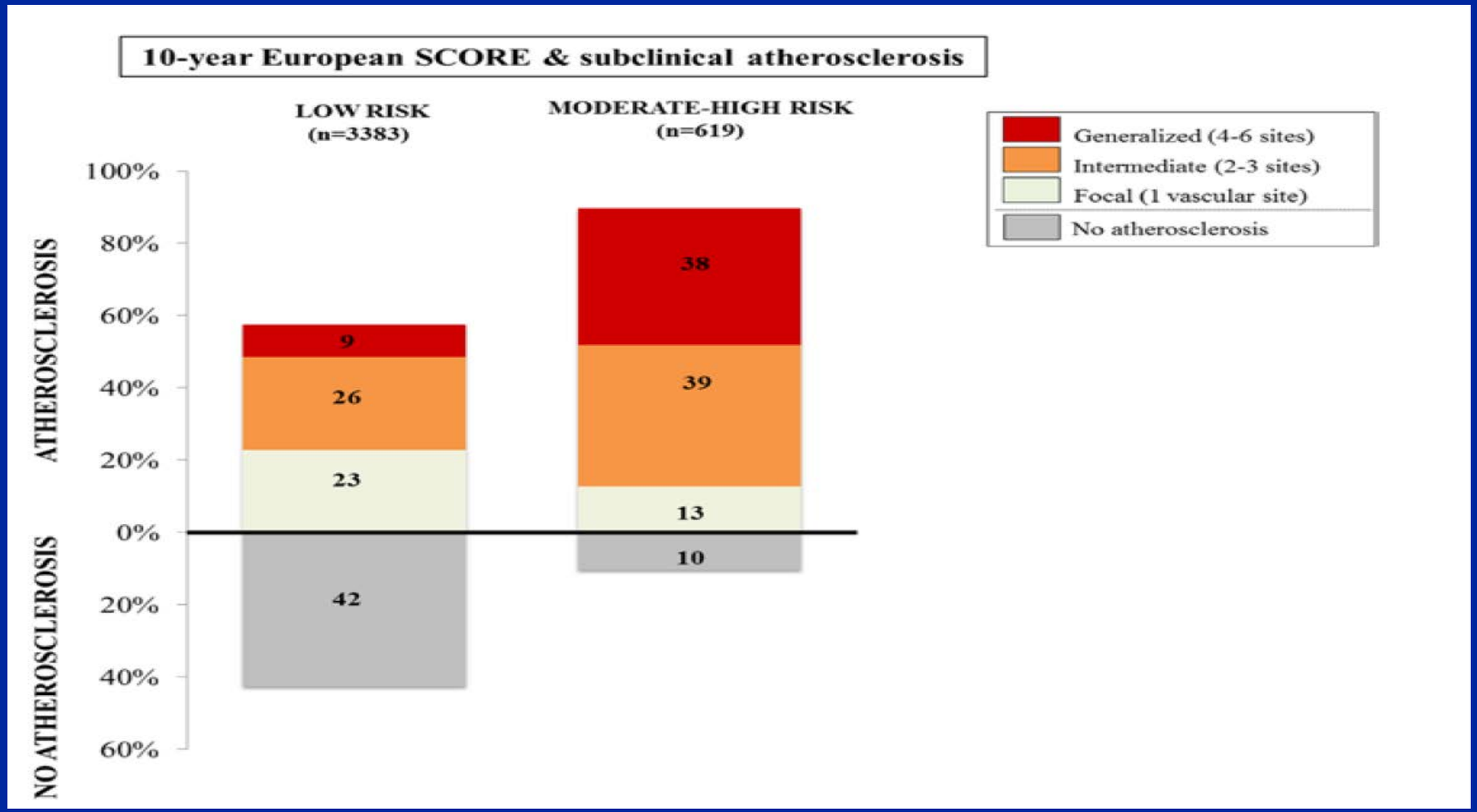
Subclinical Atherosclerosis & Framingham Risk Score



L Fernández-Friera, V Fuster et al., Circulation 2015; 131:2104

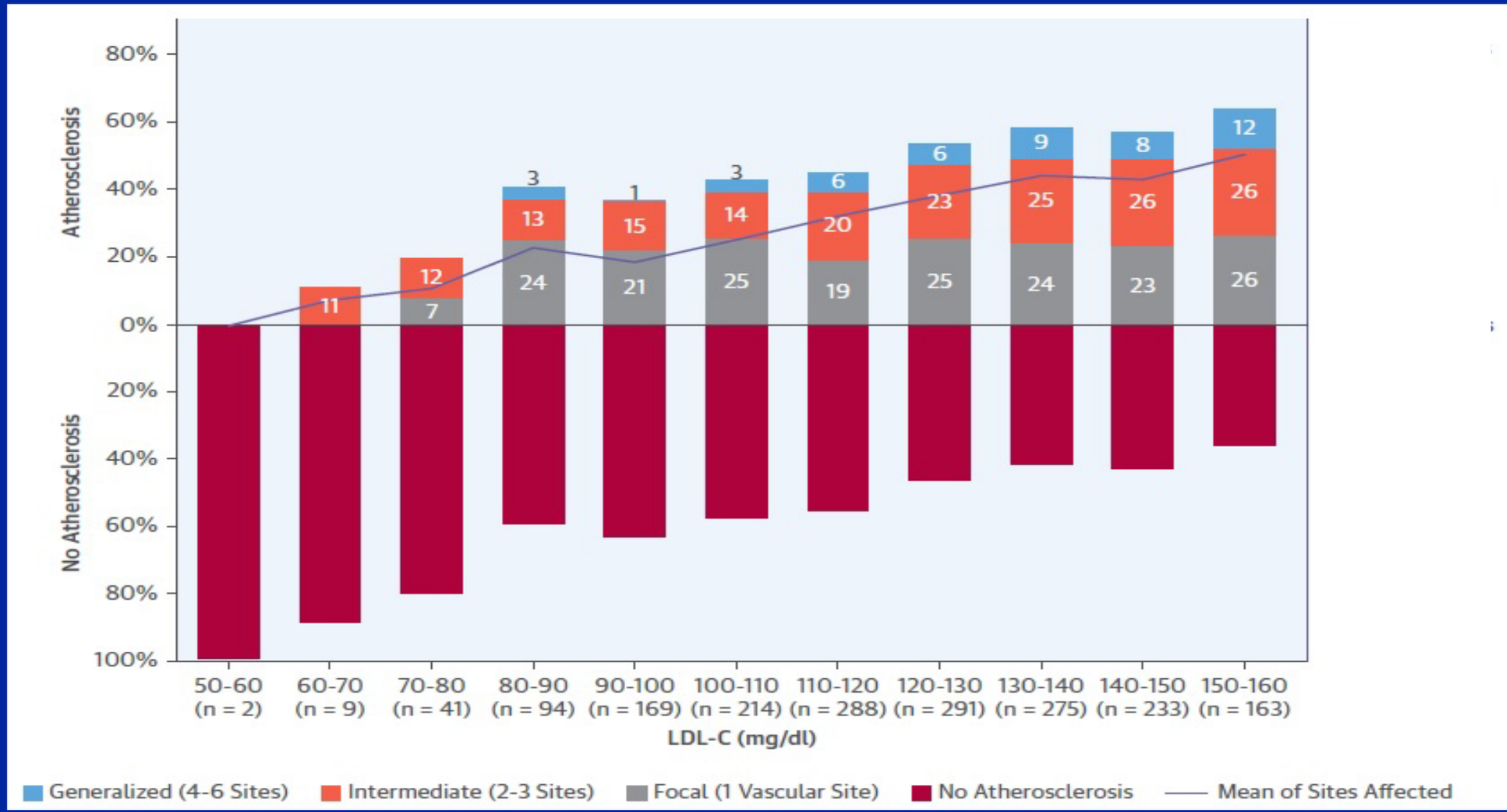
The PESA Study (N=4184)

Subclinical Atherosclerosis & 10 yr European Risk Score



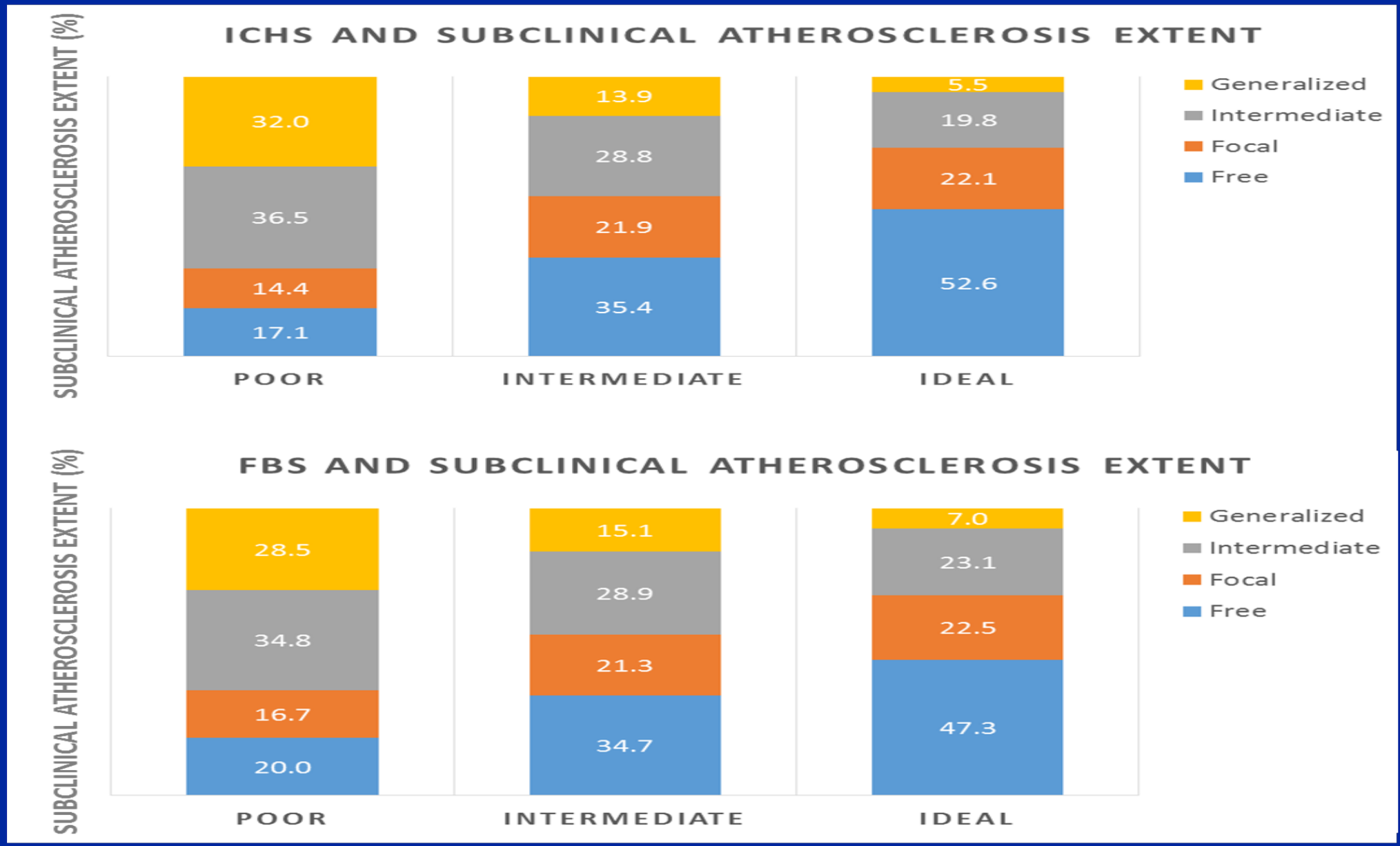
L Fernández-Friera, V Fuster et al., Circulation 2015; 131:2104

4b3). Absence of Risk Factors
Relation Between LDL-C and Atherosclerosis



L Fernández-Friera et. al. J Am Coll Cardiol 2017;70:2979

4b4). Ideal CV Health Fuster-BEWAT Scores (FBS)



JM Fernandez-Alvira, V Fuster, S Pocock et al 2017 *(In Press)*

4c). Framingham, When Positive Coronary Artery Calcification Score and Ultrasound are Added

AWHS - M Lacaustra, V Fuster et al. JACC 2016; 67: 1263

From Aging / Disease to Youth / Health

NHLBI $-1

Surgery
Intervention
Pharmacology.
Imaging
Genetics/Tr

Secondary
50-100 yrs

Primary
25-50 yrs

Primordial
00-25 yrs

1)

2) TANSNIP

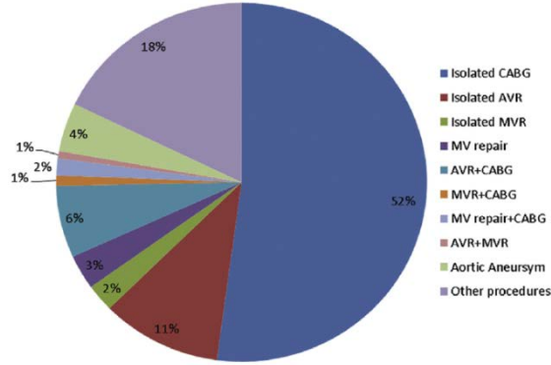
3) AGING)

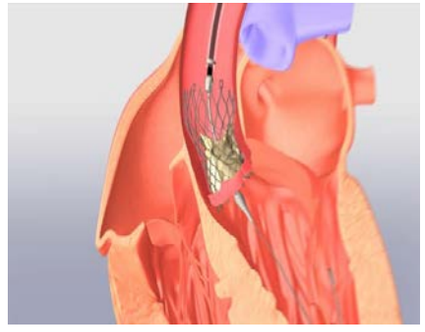
4) HRP
PESA
AWHS

5) IIIP
50/50

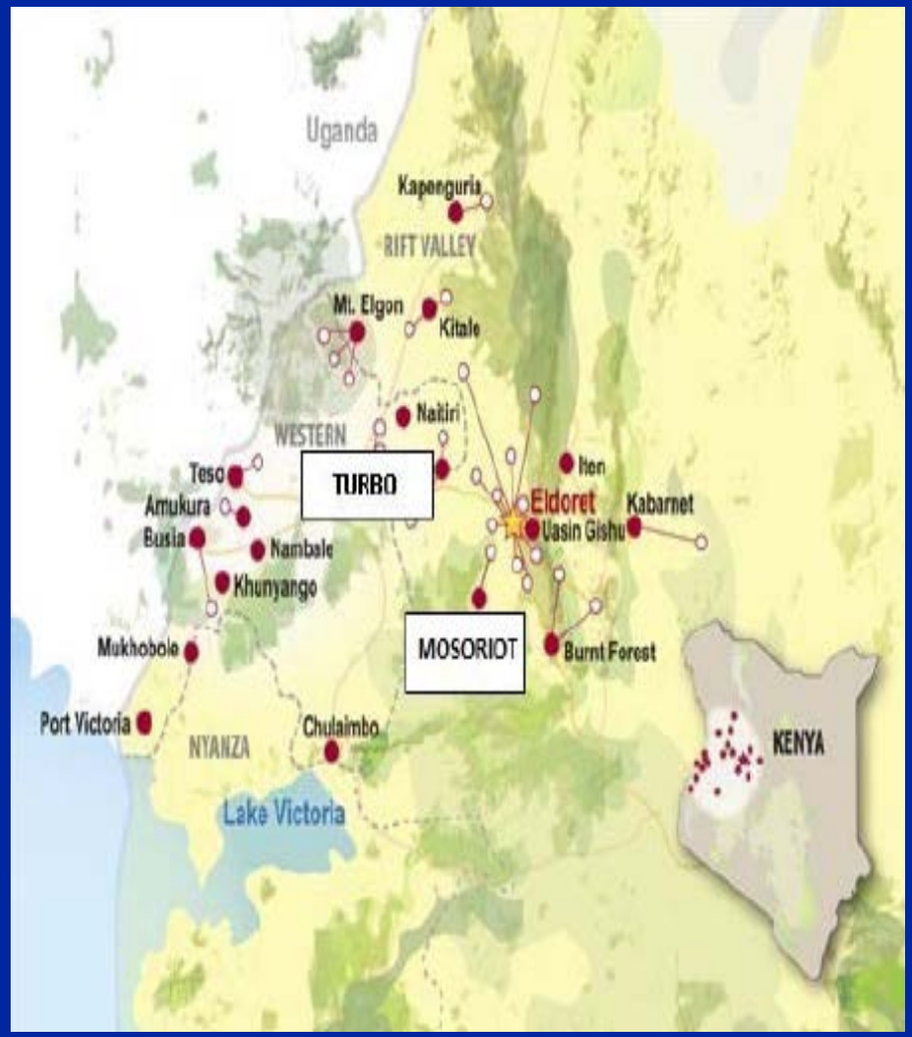
6) SHE

7) HARLEM
VILLAGE
MEXICO





5a). AMPATH Centers In Kenya
BP Control / Non MD / High Technology



R Vedanthan, V Fuster, NHLBI / Kenya Model (2012-2016)

5b). The Seven Community Study

N=552

86

69

96

104

127

70

Spain - E. Gomez, V Fuster et al JACC 2016; 67:476
Cardona Integral – "Fifty-fifty" - 2014
Global Demonstration Project – GHP – 2013

From Aging / Disease to Youth / Health

NHLBI $-1

Surgery
Intervention
Pharmacology.
Imaging
Genetics/Tr

Secondary
50-100 yrs

Primary
25-50 yrs

Primordial
00-25 yrs

1)

2) TANSNIP

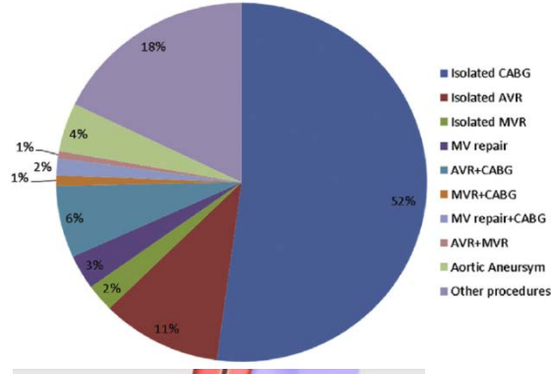
3) AGING)

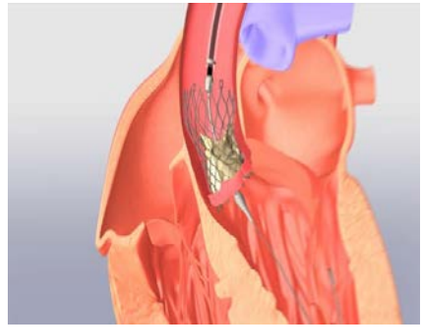
4) HRP
PESA
AWHS

5) IIIP
50/50

6) SHE

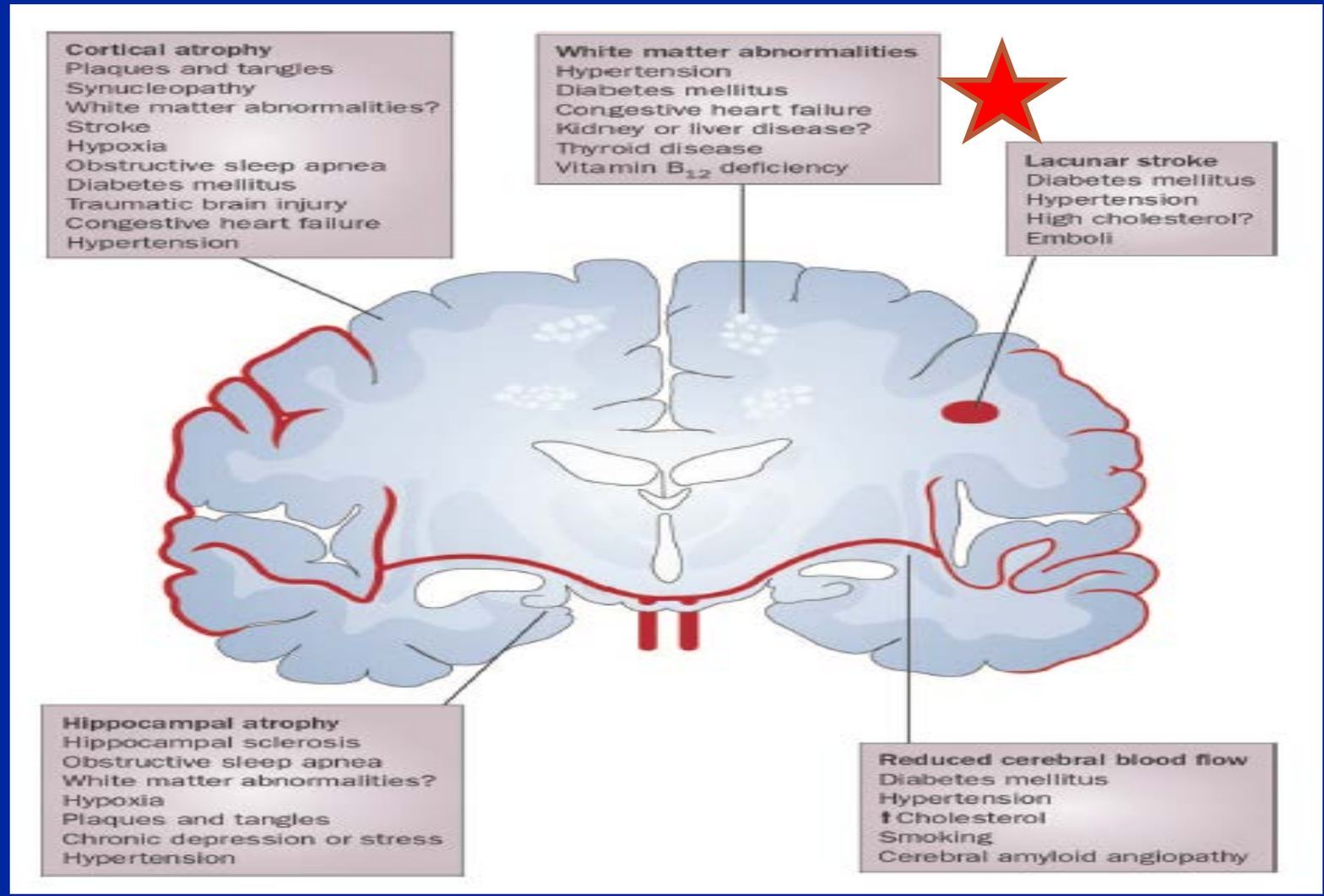
7) HARLEM
VILLAGE
MEXICO





2). Risk Factors of CV Disease

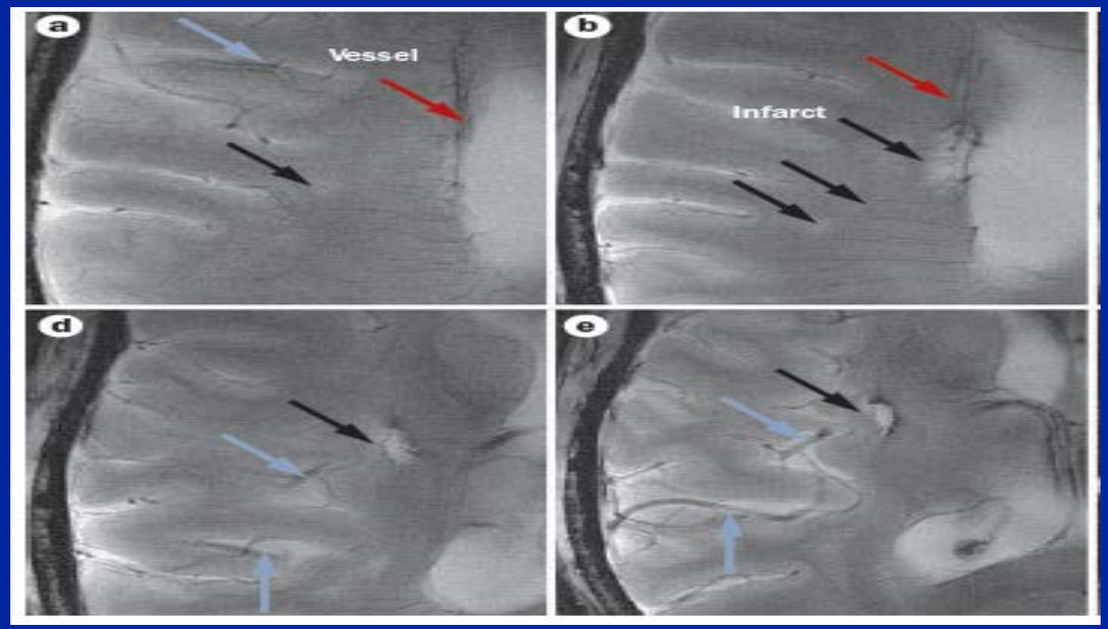
White Matter & Lacunar Lesions (DBD)

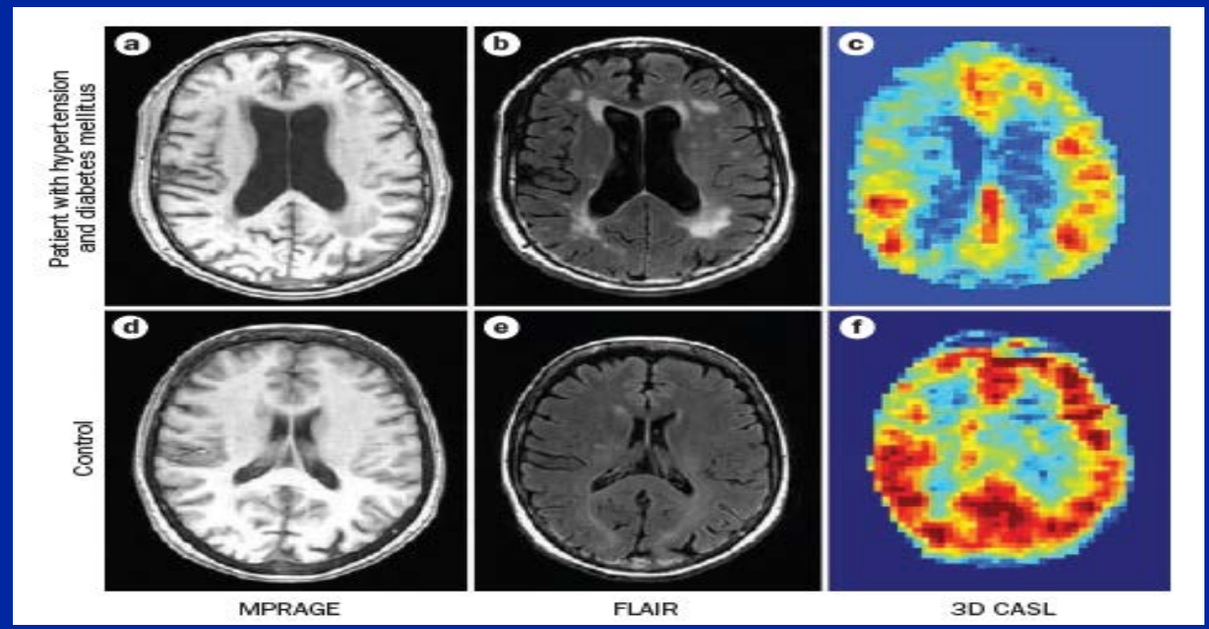


MA Lim et. al. Clin Geriatr Med. 2009;25:191.

JC Kovacic, V Fuster et. al. Circulation. 2011;123:1900

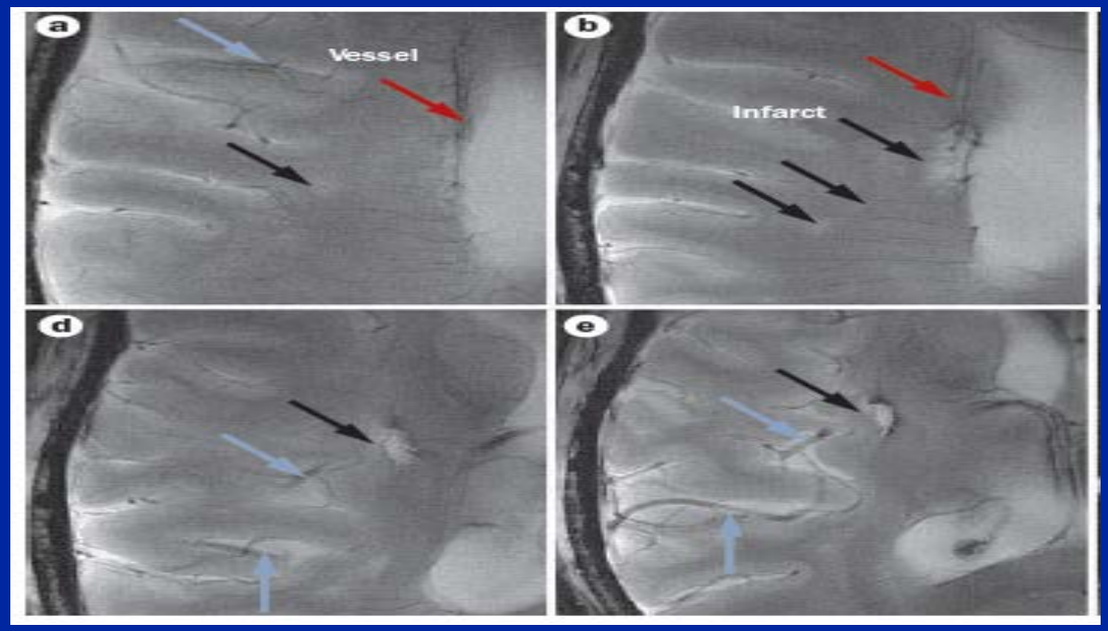
Microcirculation, Cognitive – 12 Studies

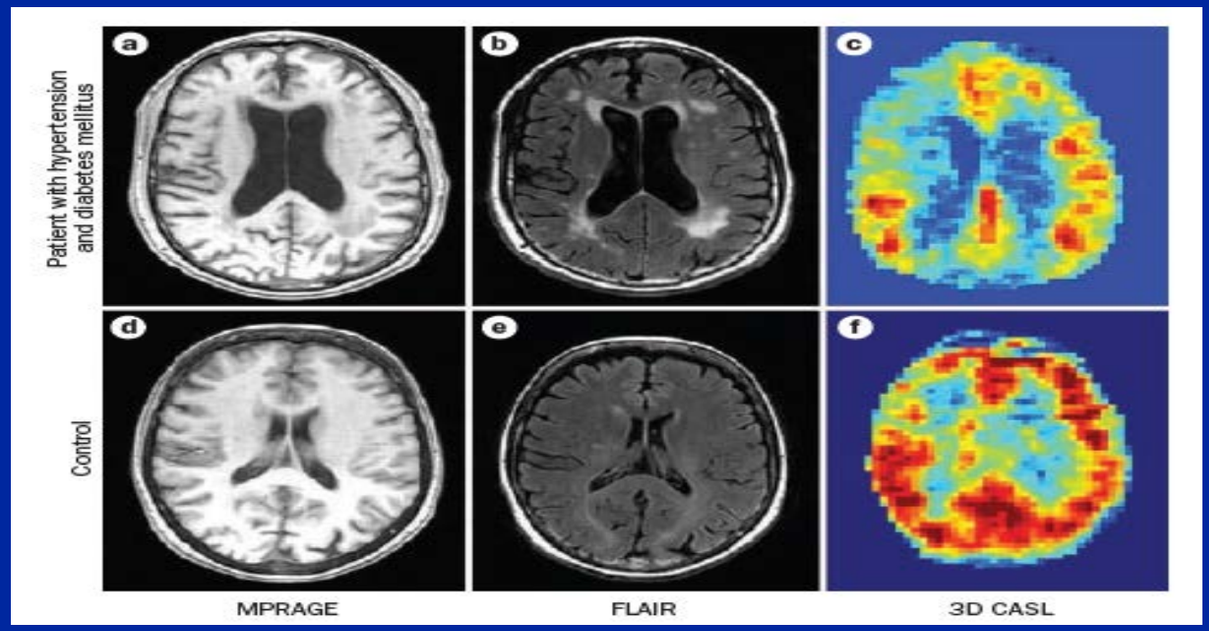




1. V Novak, I Hajjar. Nat. Rev. Cardiol. 2010; 7:686 – A'sD
2. HW Querfurth et al NEJM 2010;362:329 – Isch. 60-90% A'sD
3. JC Kovacic, V Fuster et. al. Circ. 2011;123:1900-MacVD/LL
4. CARDIA (K Yaffe et al) Circ 2014;129:1560 - CV RFrs, Cognitive
5. JI Friedman et al. JACC CV Imag. 2014;7:1039 - Imaging
6. JT O'Brien et. al. Lancet. 2015;386:1698 - Autopsy
7. FINGER (T Ngandu et al)., Lancet 2015; 385:2255 - Intervention

Microcirculation, Cognitive – 12 Studies





8.P Scheltens et al Lancet 2016;388:507– RF<Dementia 30%

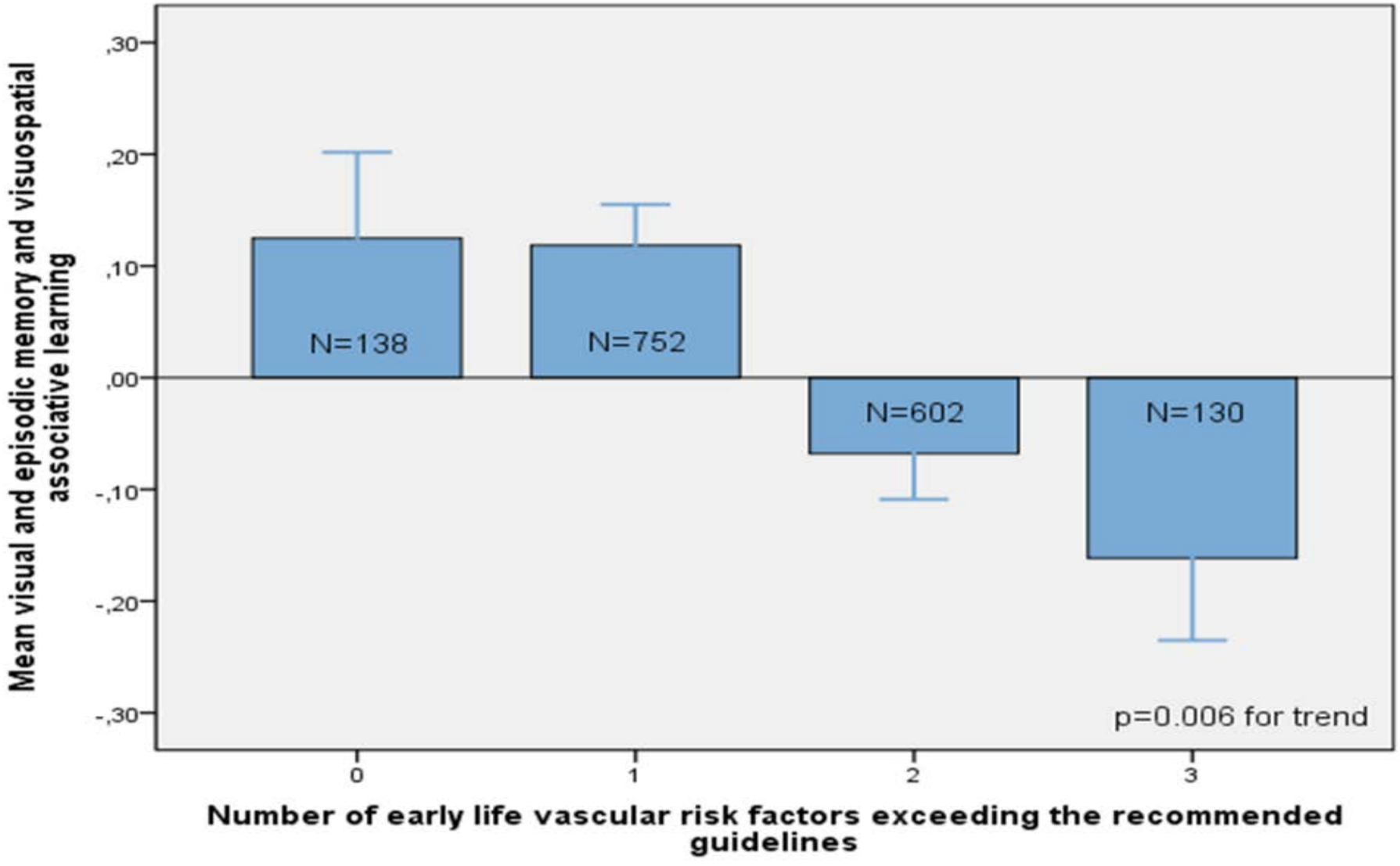
9.C Iadecola et al., Hypert. 2016;68:e67- Hypert. Alzheimer's

10. A de Roos et. al. Circ. 2017; 135: 2178- Aging<Pulse/Perf

11.YFS (SP Rovio et al), JACC 2017(In Press)-RF Child. Cogn.

12.TANSNIP Paths 1 & 2 (V Fuster et al)- 2017-A Prospective

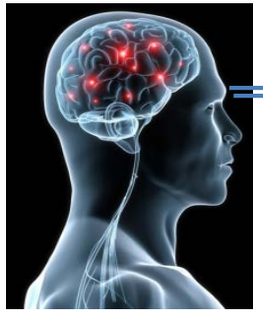
11. Cardiovascular Risk Factors From Childhood & Midlife Cognitive Performance



YFS (SP Rovio et al), J Am Coll Card 2017 (In Press)

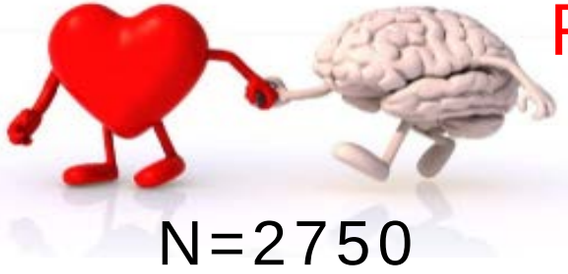
12a. TANSNIP Pathway 1

STEP 1:
Neurocognitive battery



Cognitive impaired N=50

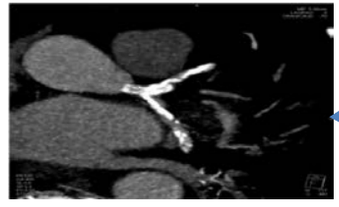
Cognitive Normal N=50



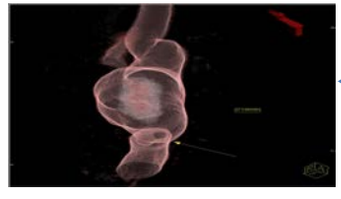
FAD

N=2750

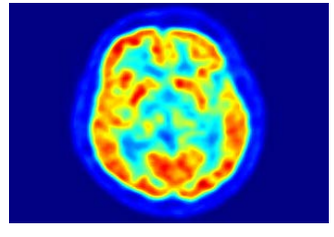
CV Risk Assessment



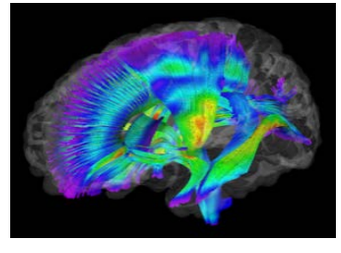
CACS



3DVUS-Carotid Plaque Volume and ileo-femoral



PET for Amyloid



MRI- functional + Micro/ Macrovasculature

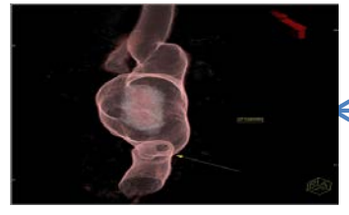
12b. TANSNIP Pathway 2

STEP 1:
CACS
Carotid Plaque w Volume

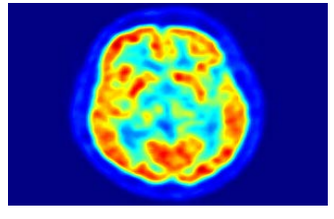
Continuous Scale N=100

Source- MSH
Coronary CT Suites

CV Risk Assessment

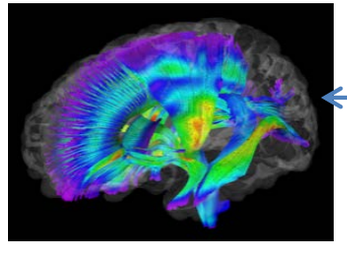


3-D carotid and ileo-femoral ultrasound



PET for Amyloid

Neurocognitive Testing



MRI- functional + Micro /Macrovasculature

From Aging / Disease to Youth / Health

NHLBI $-1

Surgery
Intervention
Pharmacology.
Imagin
Genetics/Tr

Secondary
50-100 yrs

Primary
25-50 yrs

Primordial
00-25 yrs

1)

2) TANSNIP

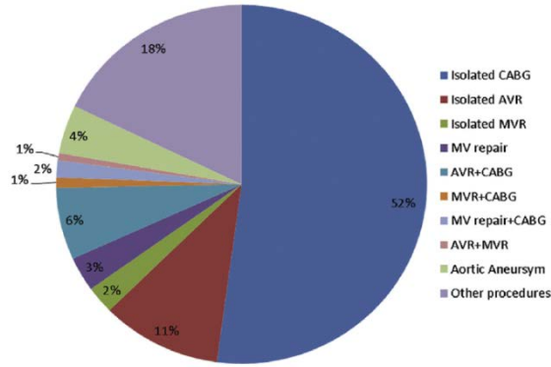
3) AGING)

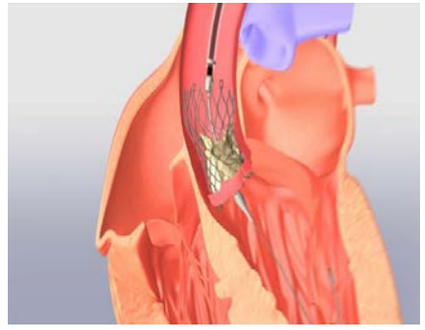
4) HRP
PESA
AWHS

5) IIIP
50/50

6) SHE

7) HARLEM
VILLAGE
MEXICO





Scientific Bases of Health Subclinical Systemic Disease

Imaging Omics Behavior

ACC New York, Dec 8, 2017

No Disclosures