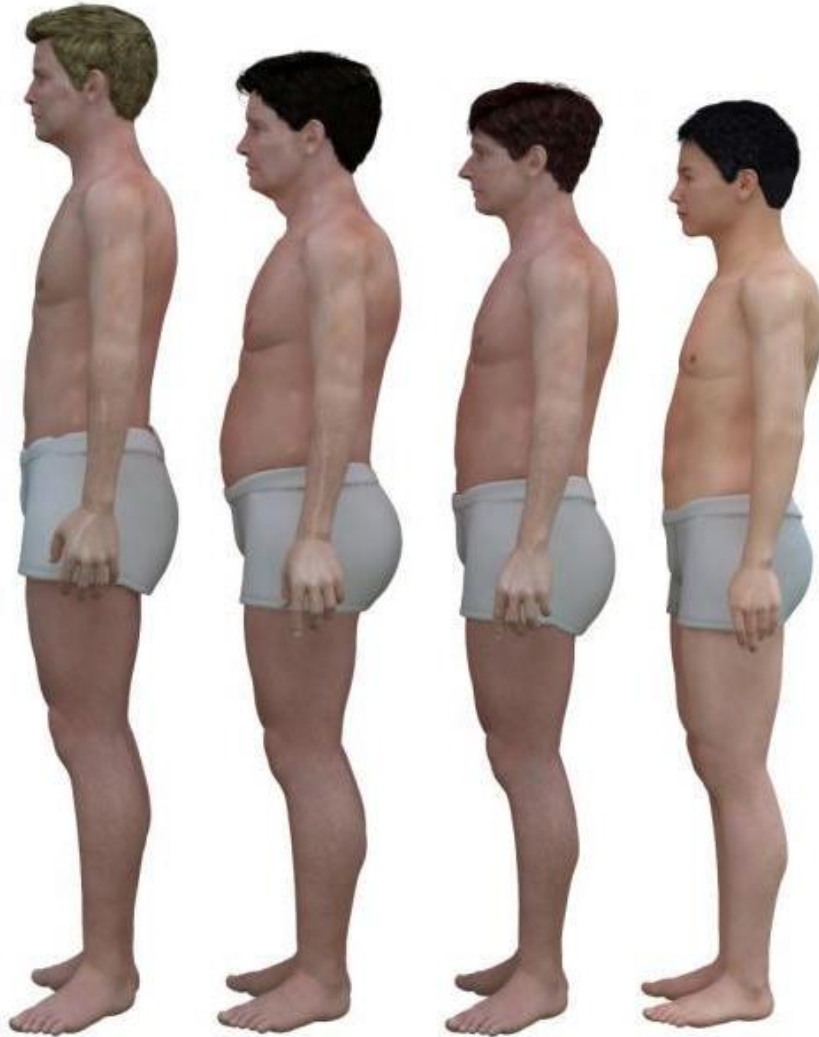


Thrombogenicity in East Asian vs. Western Population



Netherlands

25.2 BMI
183.3 cm height
91 cm waist

USA

29 BMI
176.4 cm height
99.4 cm waist

France

25.55 BMI
174.4 cm height
92.3 cm waist

Japan

23.7 BMI
171.4 cm height
82.9 cm waist

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National University Hospital, Jinju, Korea.

Disclosures

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GNUH

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Astrazeneca

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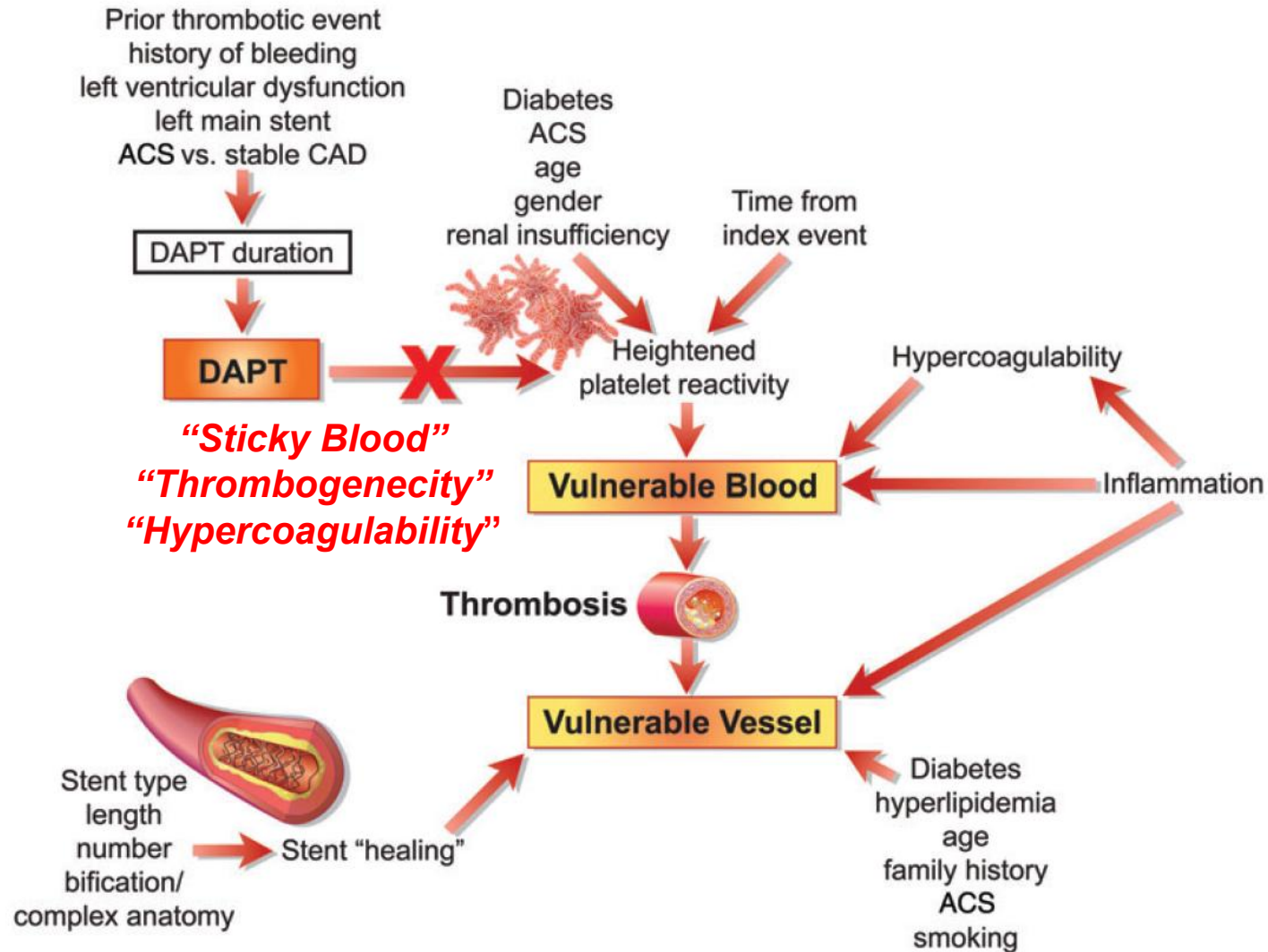
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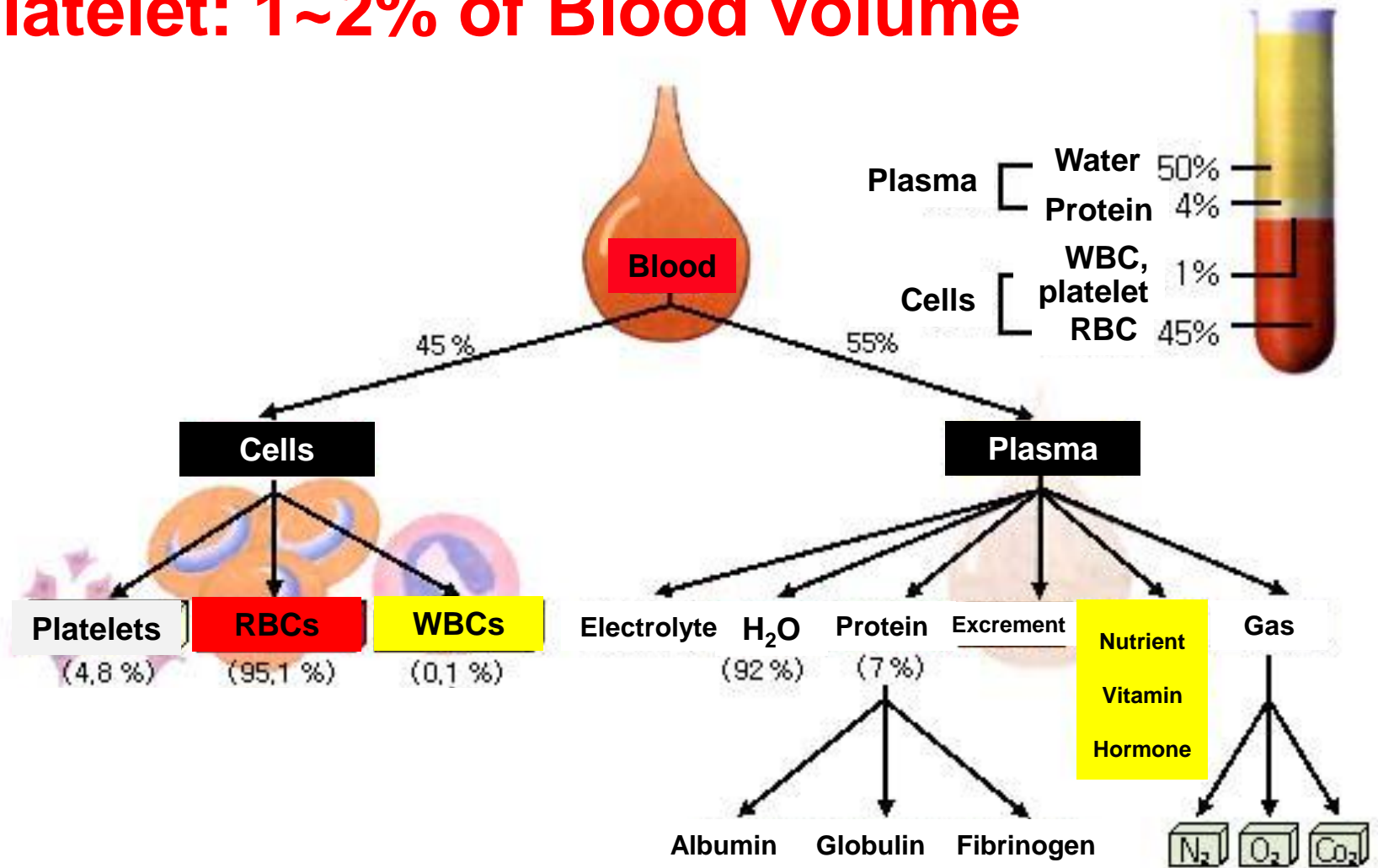
Mechanism of Atherothrombosis:

“Vulnerable Vessel” ↔ “Sticky Blood”

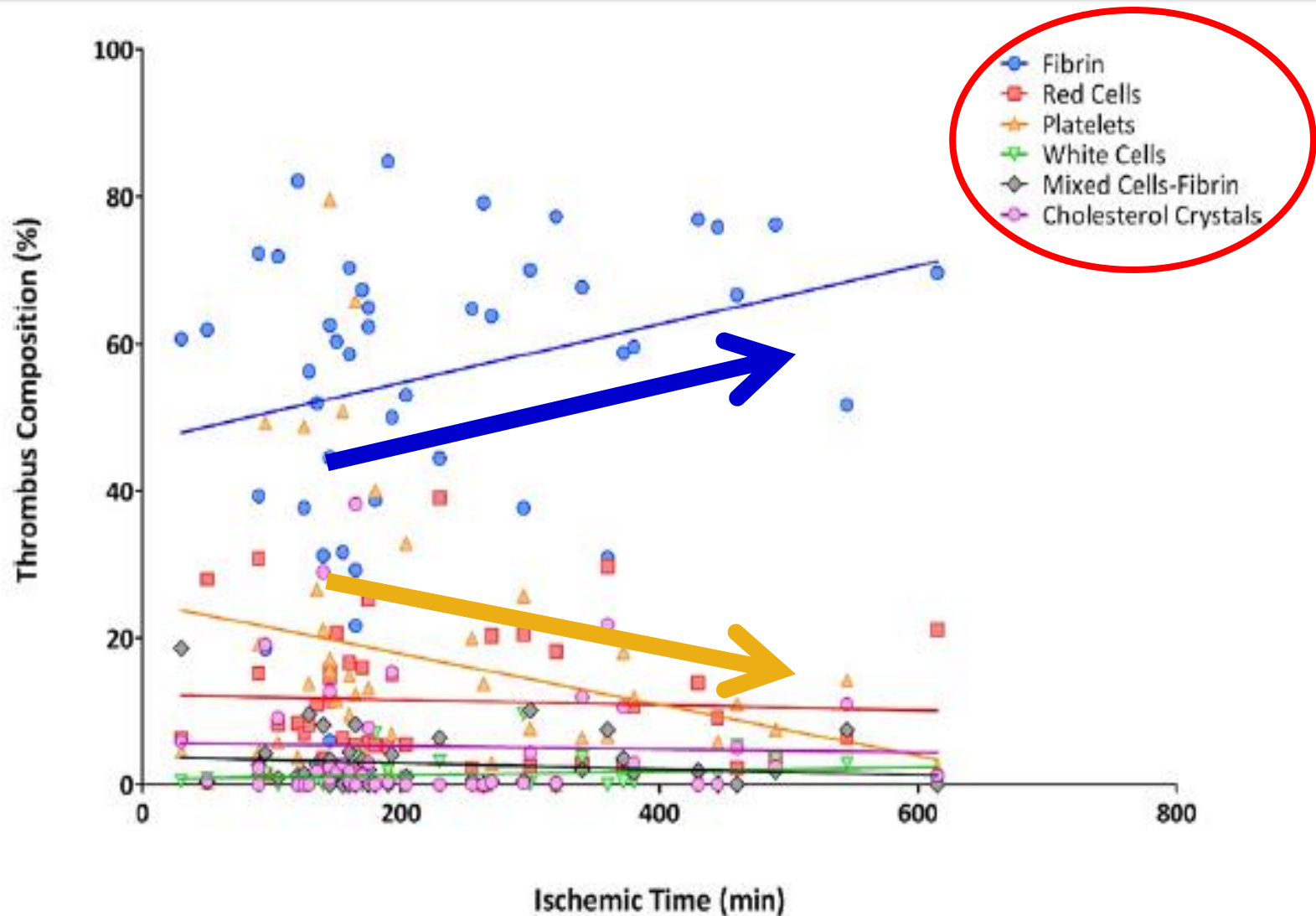


Blood Component

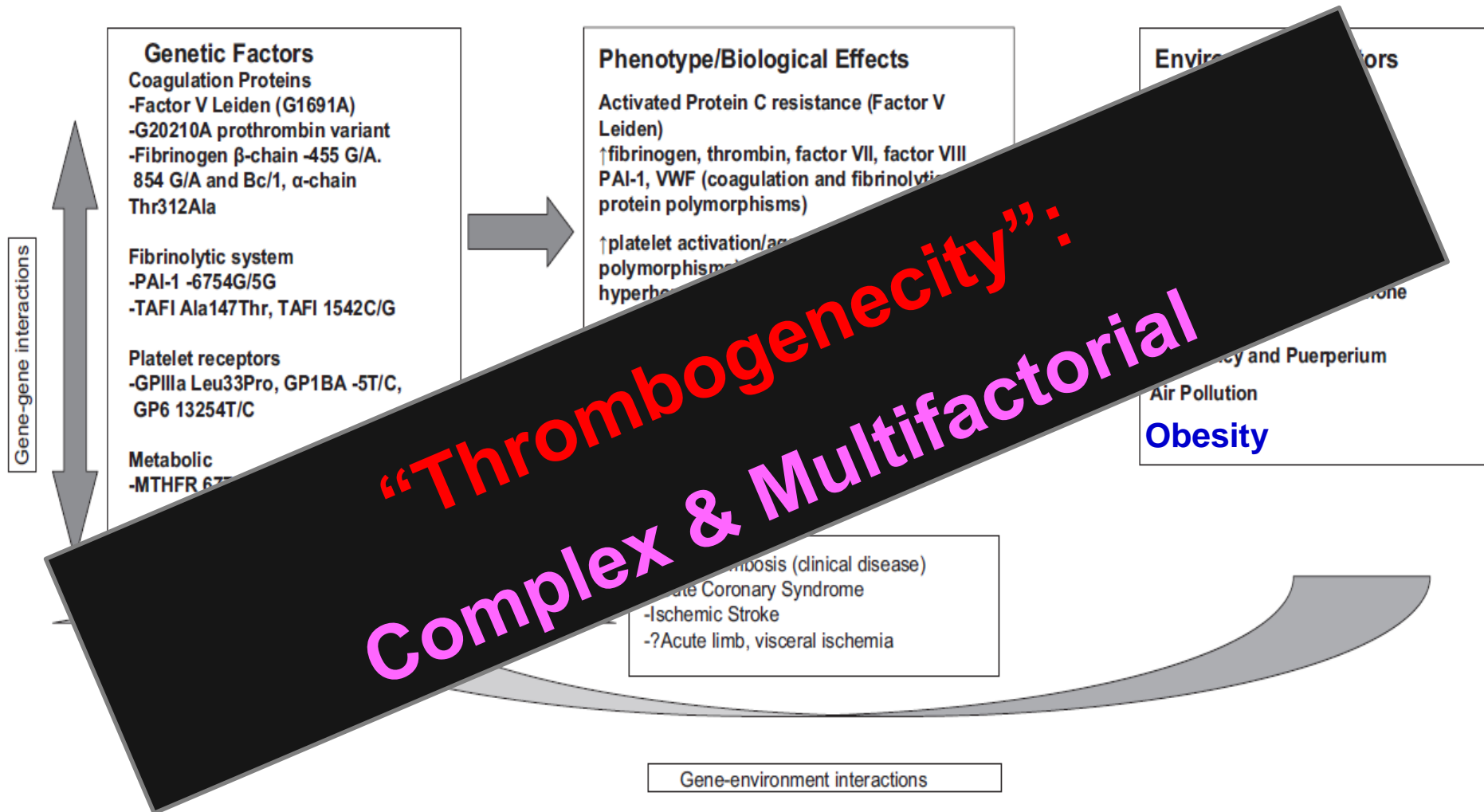
Platelet: 1~2% of Blood volume



Thrombus Composition in STEMI (n=45)



Pathophysiology of Hypercoagulable State



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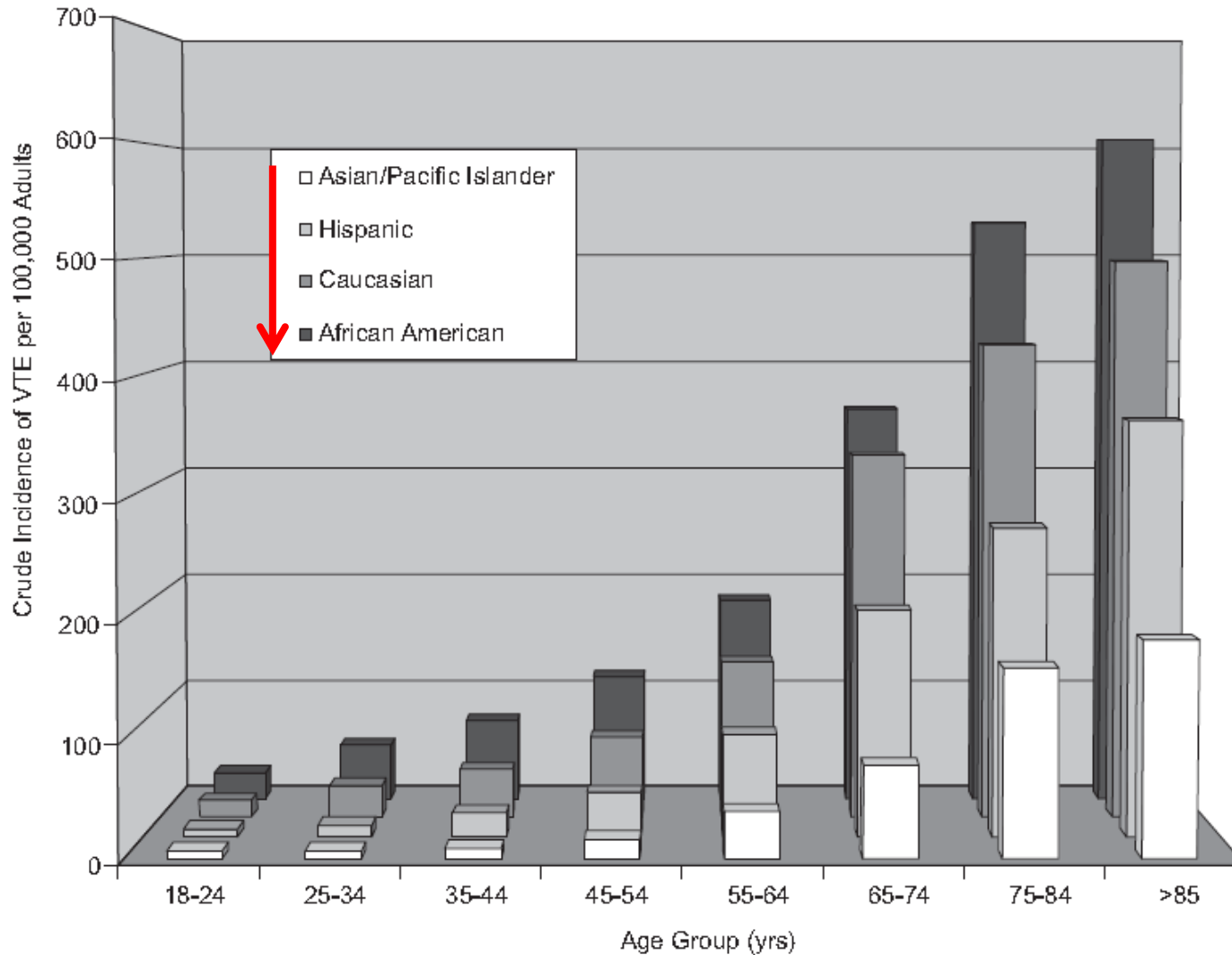
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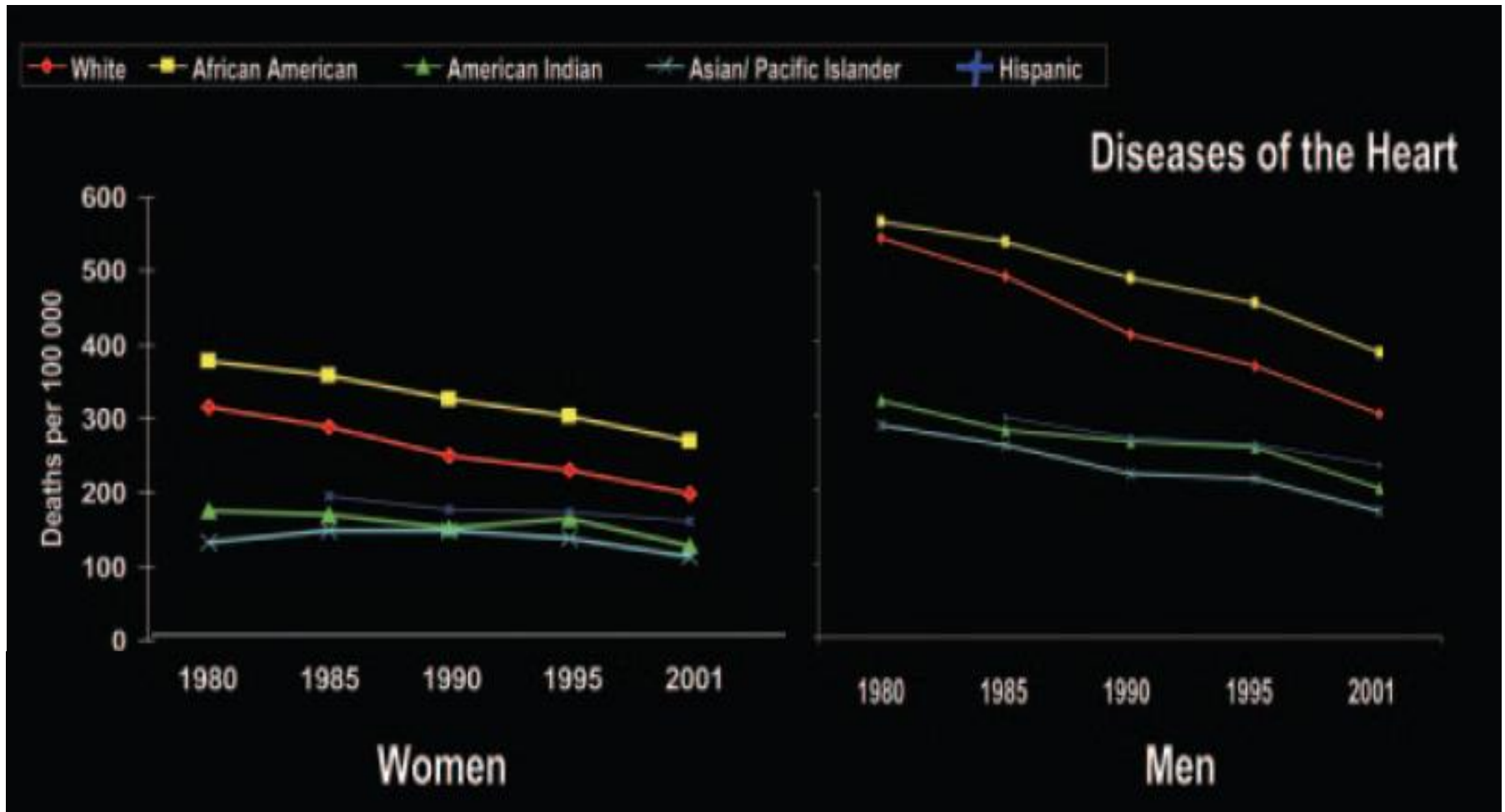
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Incidence of VTE by Racial Groups



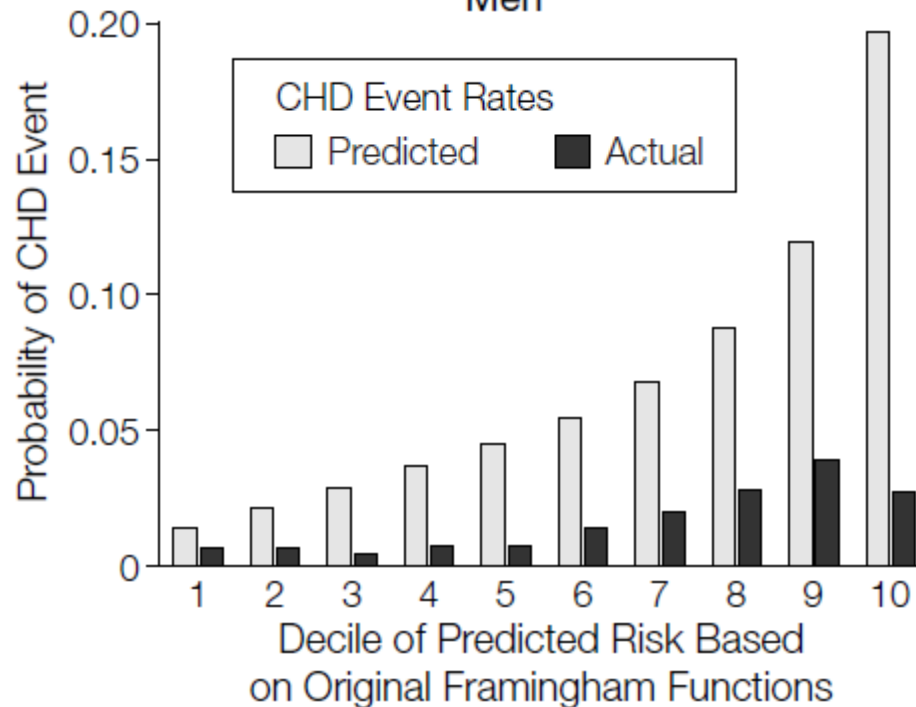
Death Rates Due to Heart Disease by Race: 1980 to 2001. Age adjusted to the 2000 US population



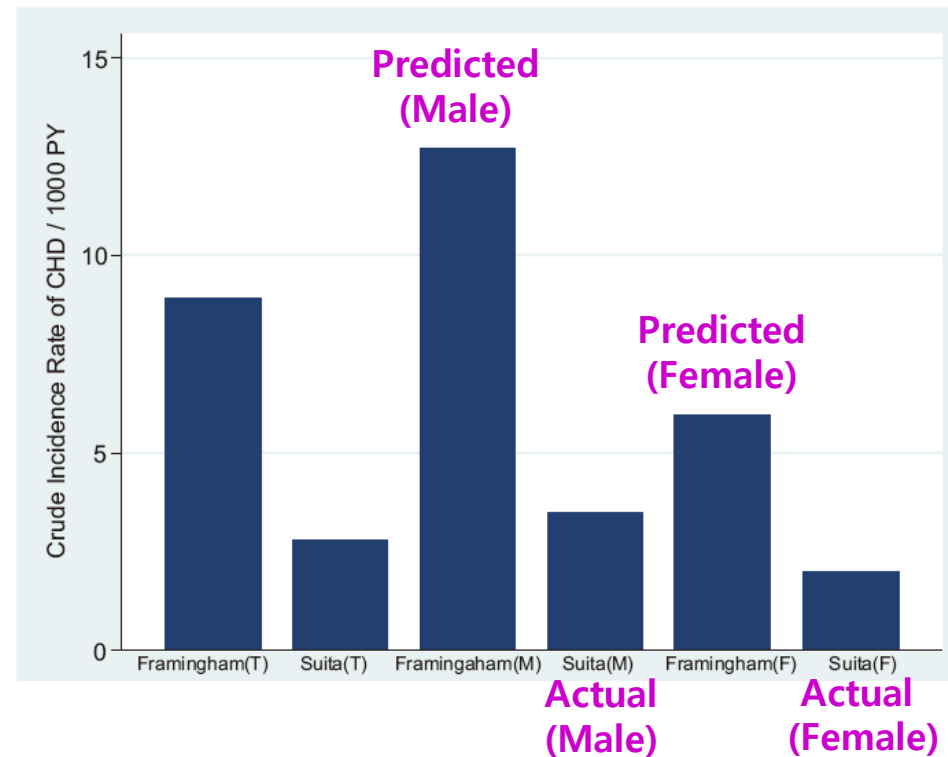
Same “Framingham Risk Score”: Different Risk of Coronary Heart Disease in East Asians vs. Westerners

China

Men

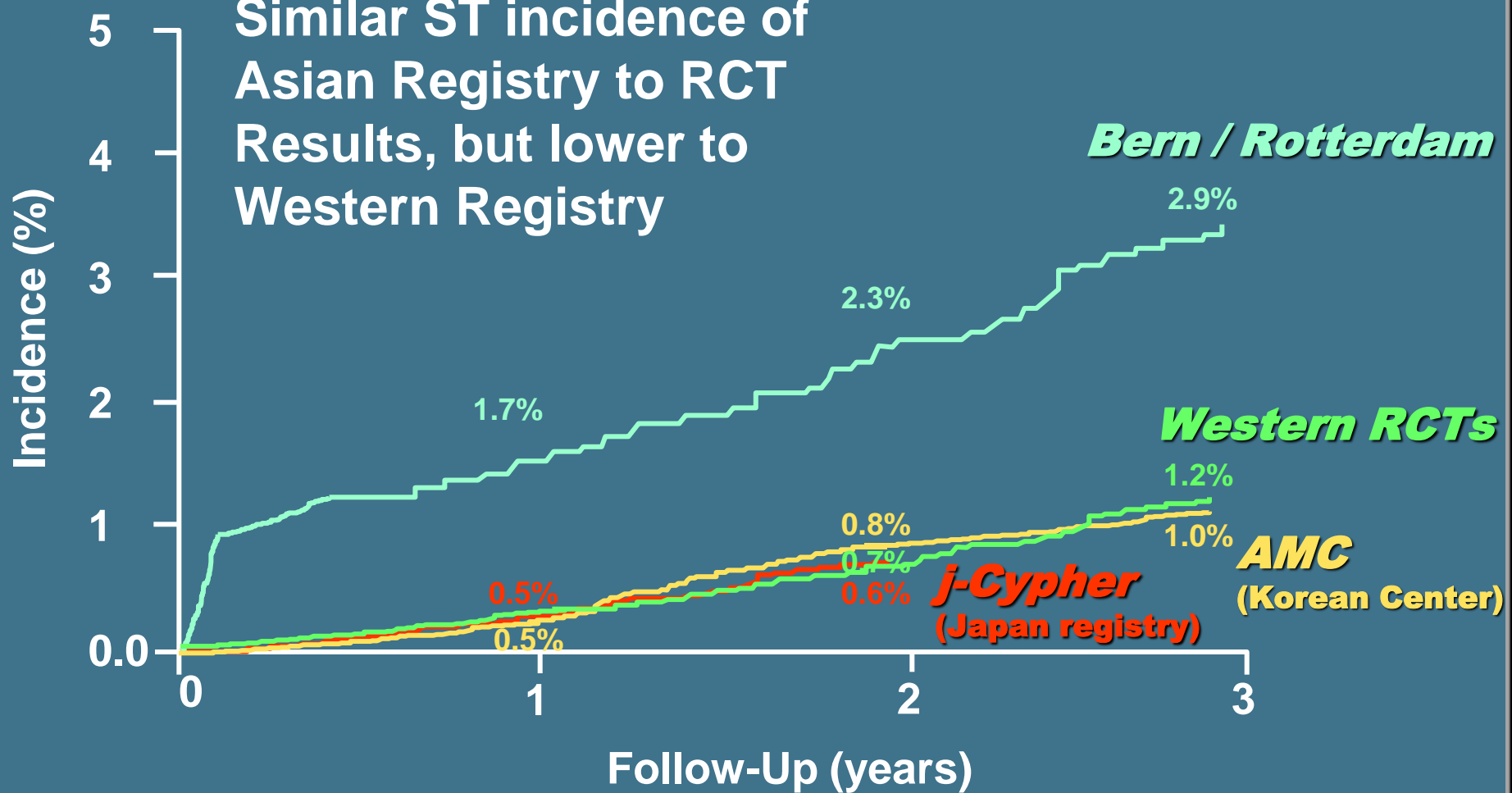


Japan



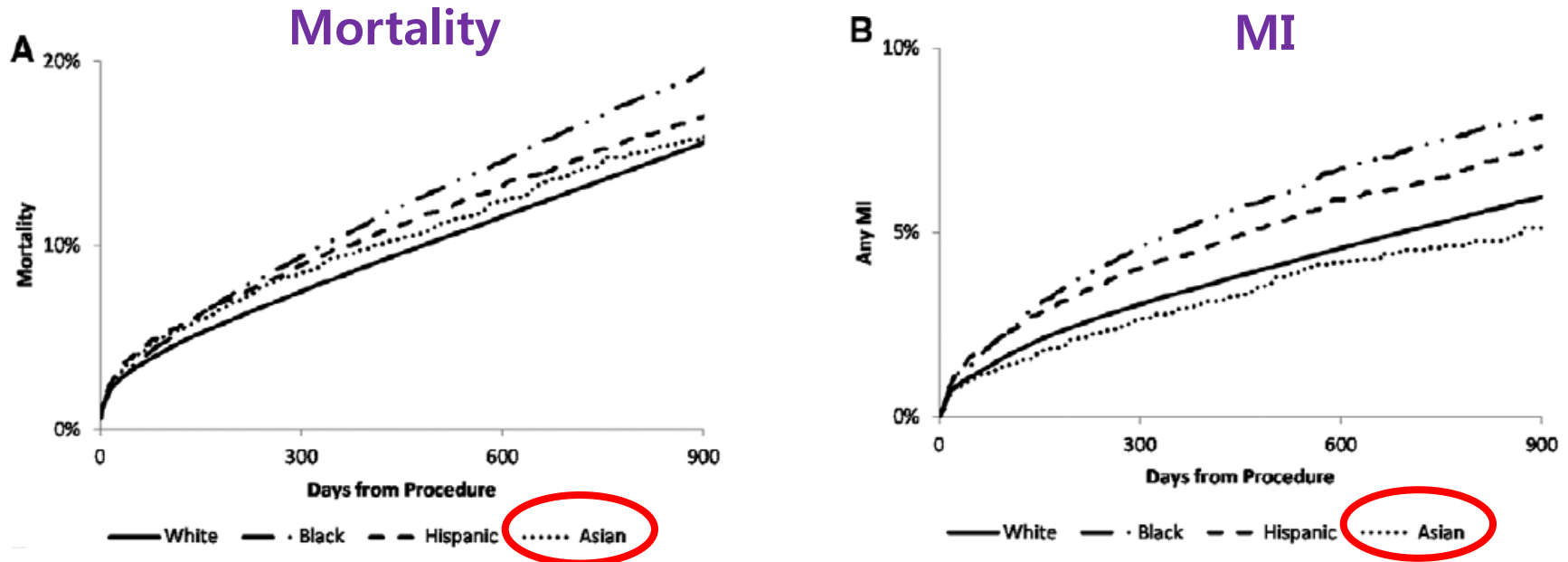
Racial difference of Stent Thrombosis After 1st Generation DES Implantation

Similar ST incidence of Asian Registry to RCT Results, but lower to Western Registry



Racial Difference in Death/MI after PCI:

NCDR Data from US Population (2004-2008, n = 423,965)



White vs.	Adjusted HR	95% CI	P
-----------	-------------	--------	---

Death/MI risk
by racial group:
White vs. Others

Asian	0.890	0.822-0.963	0.004
Black	1.120	1.083-1.157	< 0.001
Hispanic	1.083	1.030-1.139	0.002



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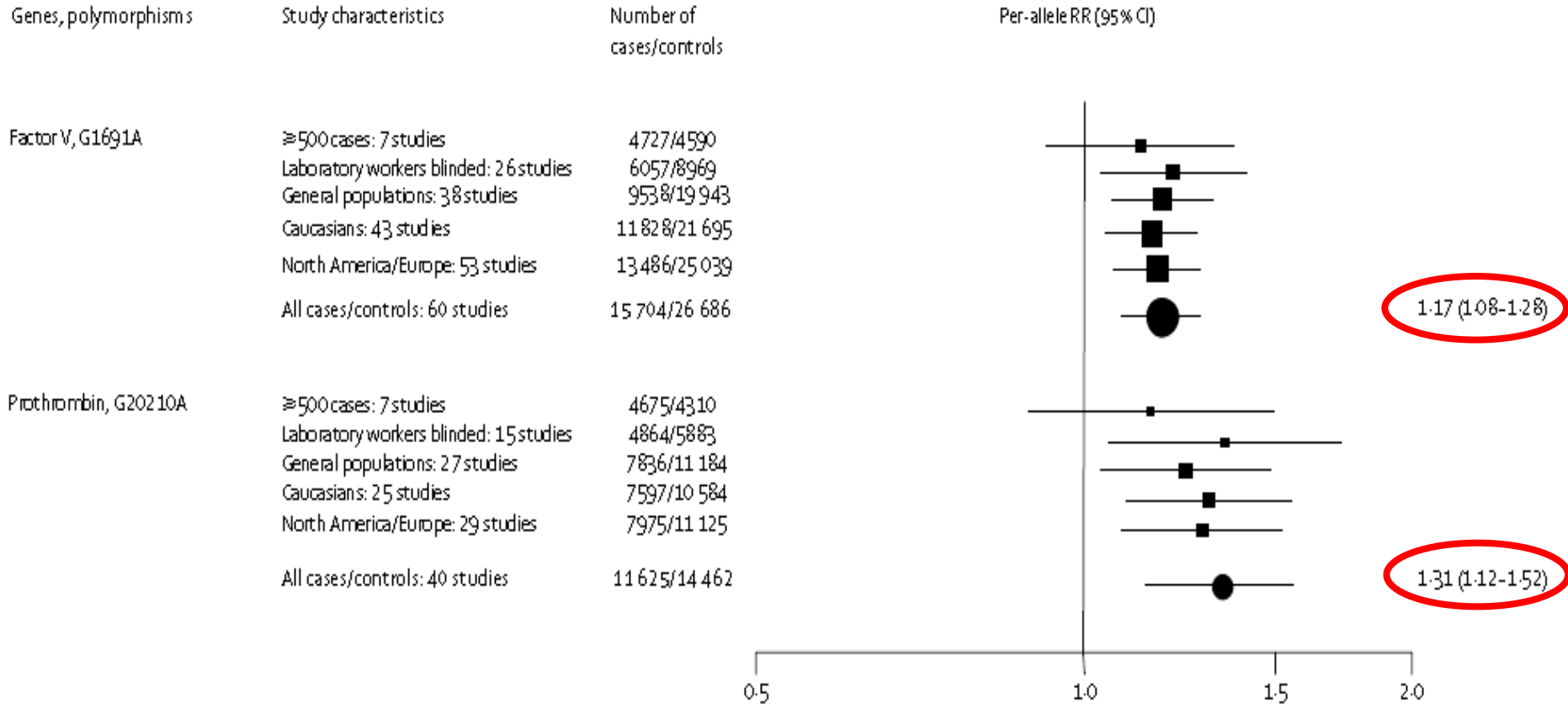
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Coagulation SNPs Increase Risk of CAD



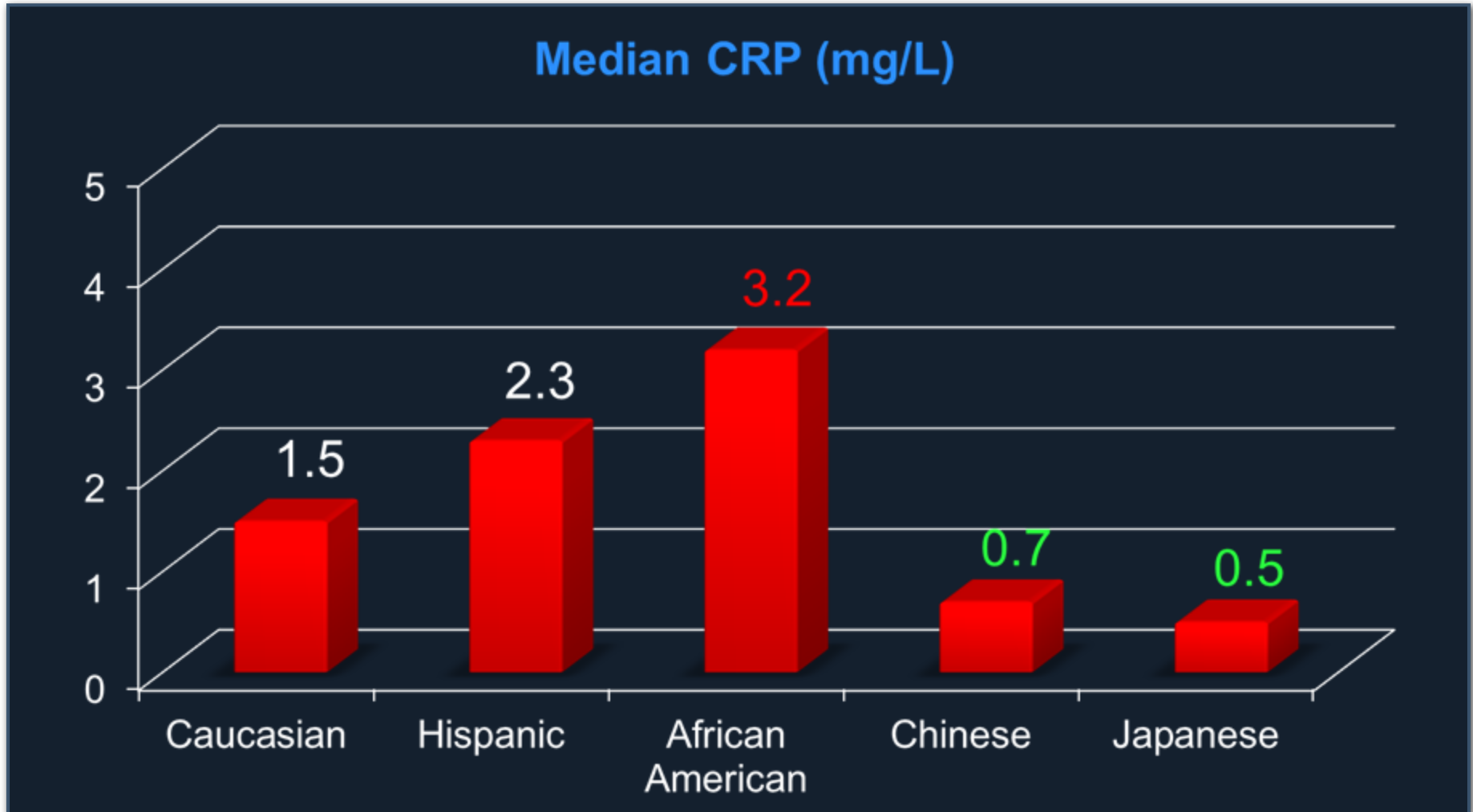
East Asian Population:

Low prevalence of Factor V & Prothrombin SNPs



Ethnic Difference in CRP level:

SWAN Study (3154 women w/o known CVD and hormone therapy)



Hemostatic & Endothelial Markers by Races:

MESA study (US citizen: healthy men cohort)

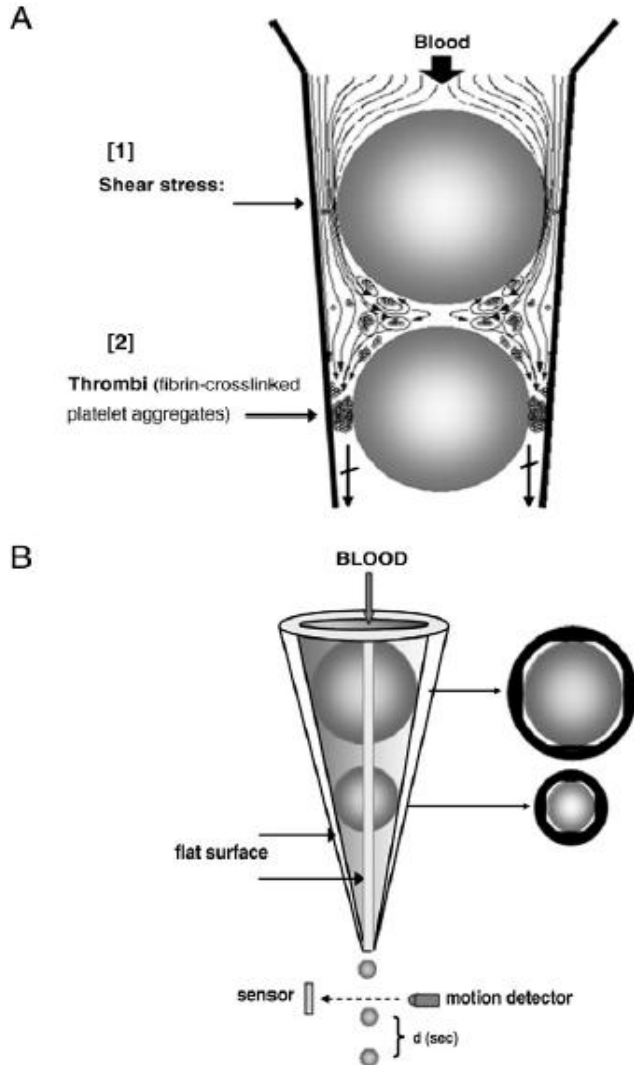
	Caucasian (n = 2599)	Hispanic (n = 1864)	Black (n = 1481)	Chinese (n = 803)
Fibrinogen (mg/dL)	329	344	334	317
Factor VIII (%)	153	150	172	153
D-dimer (ug/mL)	0.20	0.20	0.23	0.15
PAI-1 (ng/mL)	20.4	20.1	14.2	18.4
vWF (%)	136	140	152	144
ICAM-1 (ng/mL)	285	282	252	233
E-selectin (ng/mL)	57.0	56.9	61.8	50.8

* Adjusted for age, education, individual income, and site.

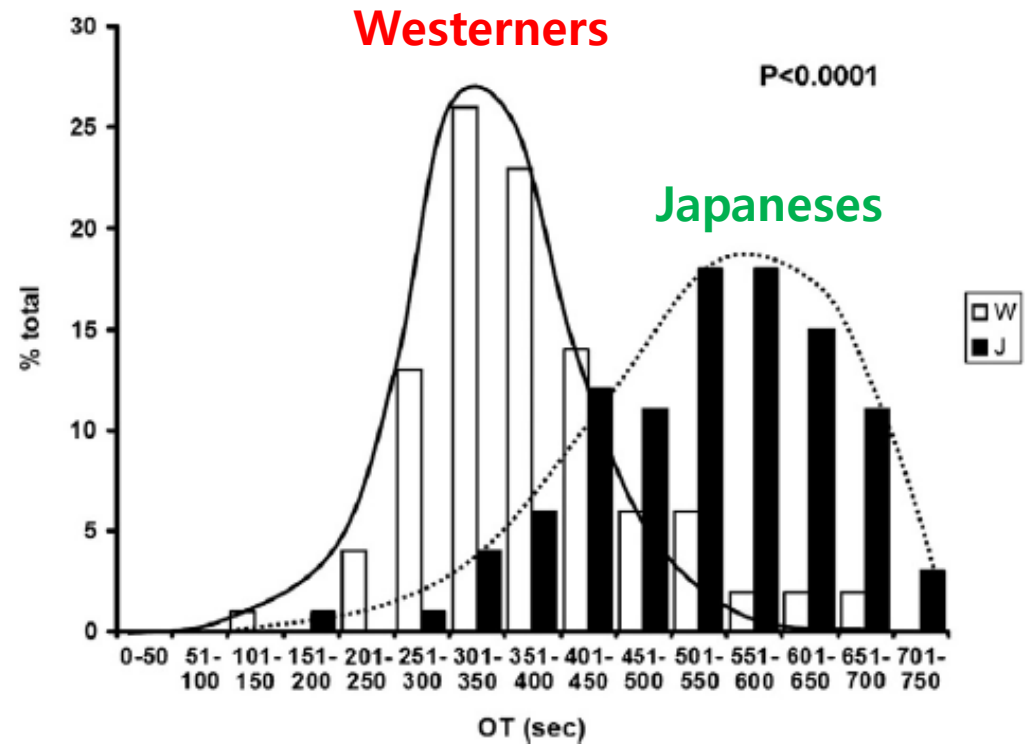


Comparison of Platelet-Fibrin Clot Strength: Japanese vs. Western Healthy Volunteers

Global Thrombosis Test



Occlusion Time (sec)



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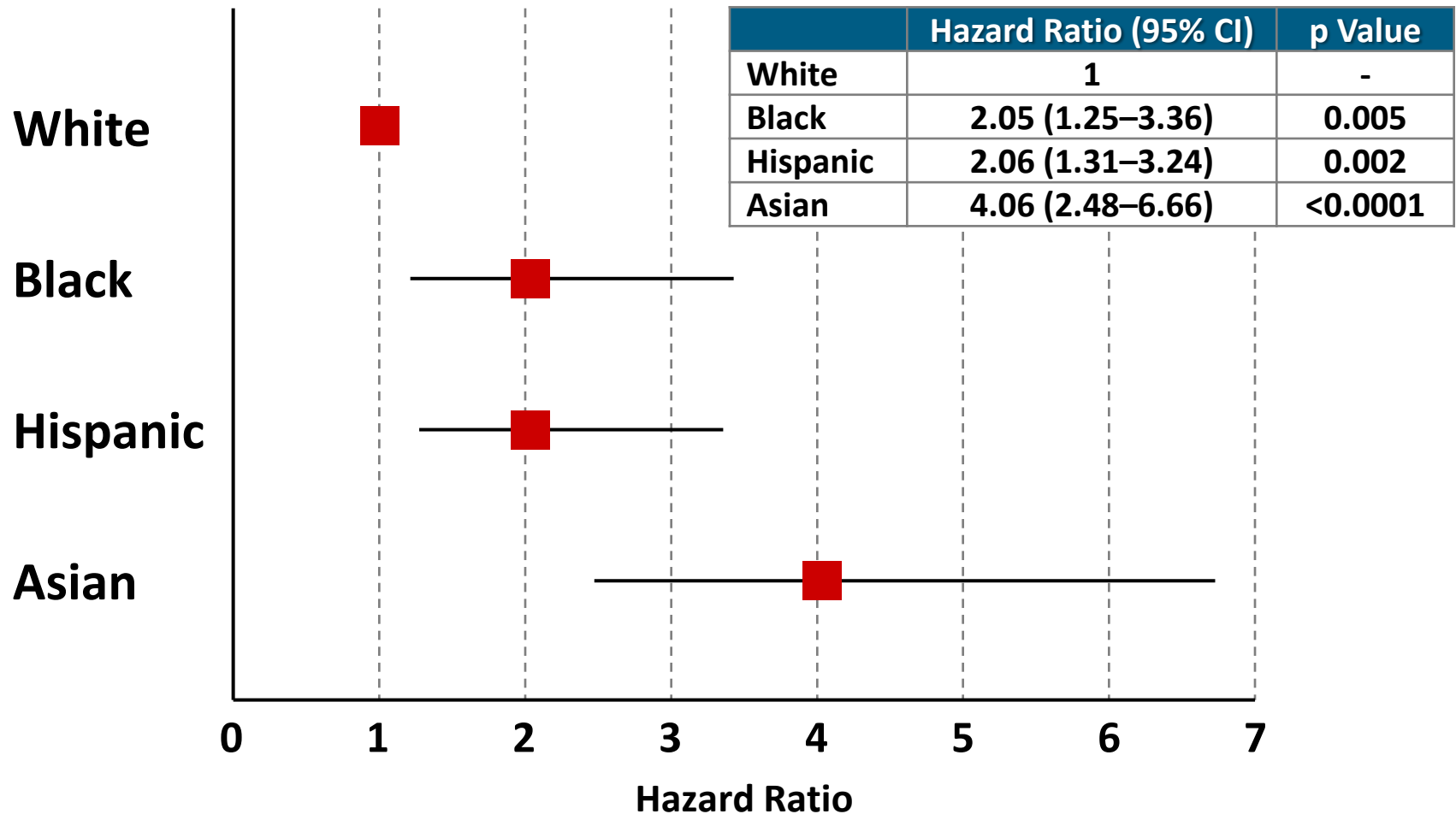
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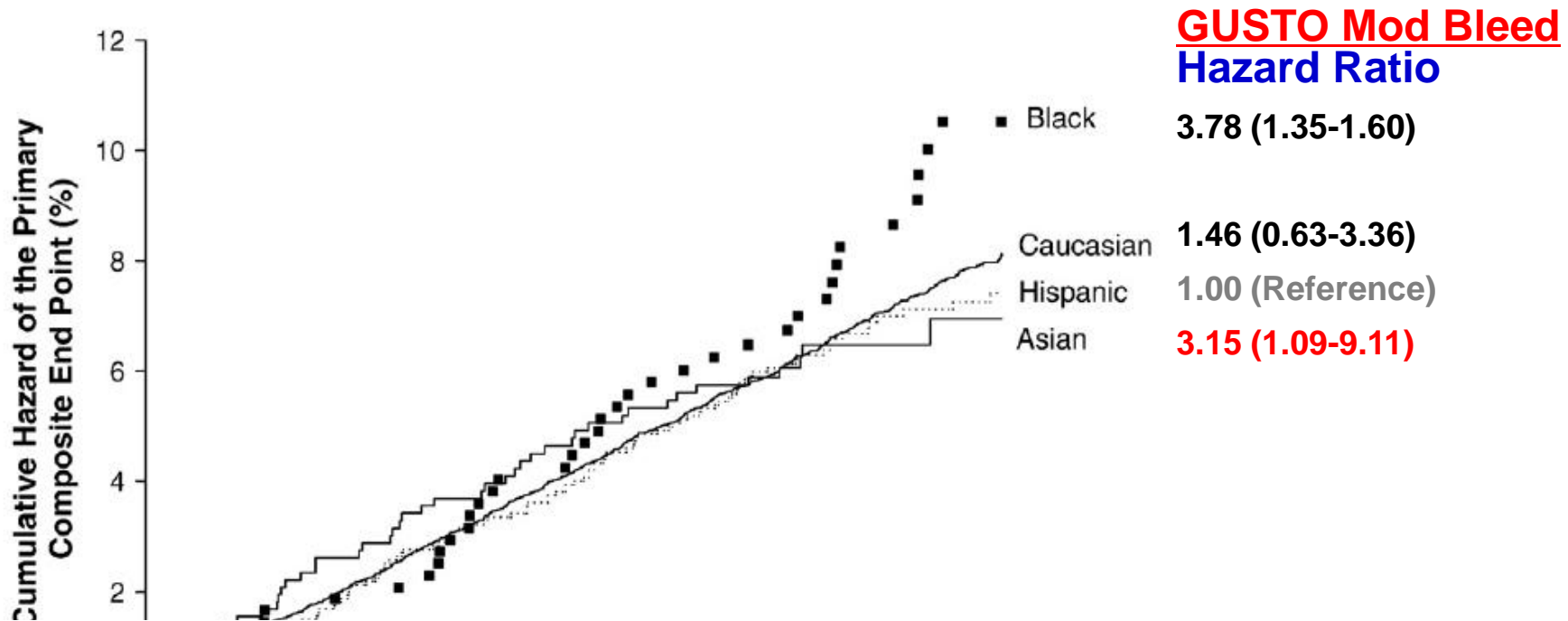
ICH Risk on Warfarin by Racial Group:

Hospitalized Pts with First-time AF (18,867 US citizens)



Ischemic and Bleeding Risks on DAPT:

CHARISMA Subanalysis by Racial Group



During antithrombotic therapy,
“East Asians” have shown **lower**
thrombophilia and high bleeding tendency
compared with Western population.

“East Asian Paradox”

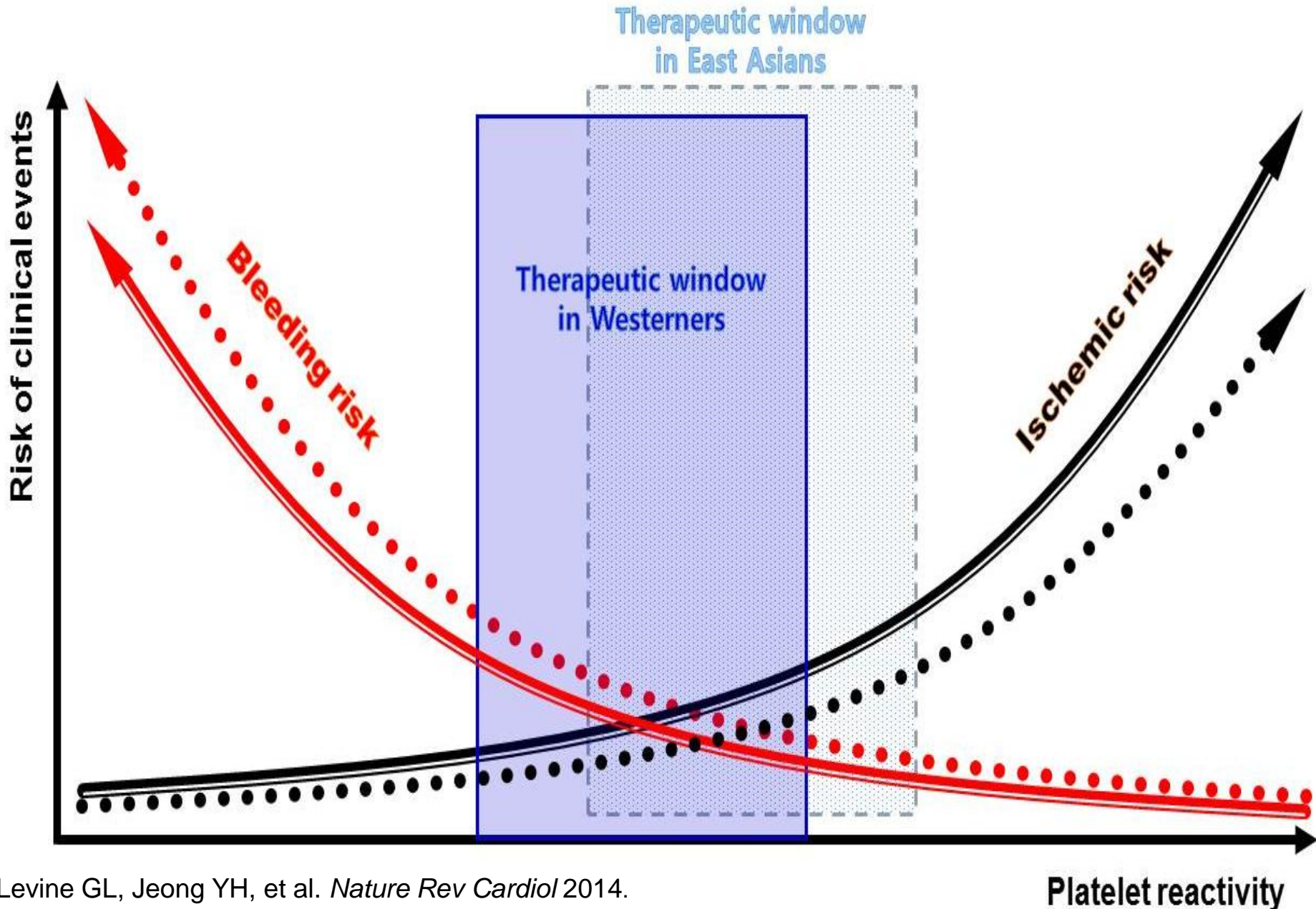
EXPERT CONSENSUS DOCUMENT

World Heart Federation expert consensus statement on antiplatelet therapy in East Asian patients with ACS or undergoing PCI

Glenn N. Levine, Young-Hoon Jeong, Shinya Goto, Jeffrey L. Anderson, Yong Huo, Jessica L. Mega, Kathryn Taubert and Sidney C. Smith Jr

Abstract | Guideline recommendations on the use of dual antiplatelet therapy (DAPT) in patients with acute coronary syndromes and in those undergoing percutaneous coronary intervention (PCI) have been formulated by both the ACC/AHA and the ESC. These recommendations are based primarily on large, phase III, randomized, controlled trials of the P2Y₁₂ inhibitors clopidogrel, prasugrel, and ticagrelor. However, few East Asian patients have been included in the trials to assess the use of these agents, particularly the newer agents prasugrel and ticagrelor. Additionally, an increasing body of data suggests that East Asian patients have differing risk profiles for both thrombophilia and bleeding compared with white patients, and that a different ‘therapeutic window’ of on-treatment platelet reactivity might be appropriate in East Asian patients. Furthermore, a phenomenon referred to as the ‘East Asian paradox’ has been described, in which East Asian patients have a similar or even a lower rate of ischaemic events after PCI compared with white patients, despite a higher level of platelet reactivity during DAPT. Recognizing these concerns, the World Heart Federation has undertaken this evidence-based review and produced this expert consensus statement to determine the antiplatelet treatment strategies that are most appropriate for East Asian patients.

Therapeutic Window on Antiplatelet Tx



Relationship Between PRU and Post-PCI Outcome

Korea: ROC curve analysis for HPR (total n = 3,844)

Study	Cohort	EP	Cutoff
ACCEL-LOADING-ACS (Randomized)¹	NSTE-ACS (n=218); emergent PCI	1-mo MACE	PRU ≥ 288 % inhibition ≤ 12%
Zhang et al. (Registry)²	NSTE-ACS (n=228); emergent PCI	1-mo MACE	PRU > 272
Ko et al. (Registry)³	All comer (n=222); PCI	1-mo MACE	PRU ≥ 275
CILON-T (Randomized)⁴	All comer (n=960); DES implantation	6-mo MACE	PRU ≥ 252.5
Ahn et al. (Registry)⁵	All comer (n=1226); stenting	12-mo MACE	Non-AMI: no cutoff AMI: PRU > 272

Different cutoff of HPR between races

PRU: Westerners (208~235) vs. East Asians (~275)

¹Jeong YH, et al. *TCTAP 2012 LBCT*; ²Zhang HZ, et al. *Platelets* 2013; ³Ko YG, et al. *Am Heart J.* 2011;161:383.; ⁴Suh JW, et al. *JACC.* 2011;57:280.; ⁵Ahn SG, et al. *JACC Cardio Interv* 2012;5:259.; ⁶Park KW, et al. *Am J Cardiol.* 2011;108:1556.; ⁷Jin HY, et al. *Int J Cardiol* 2013;168:207.

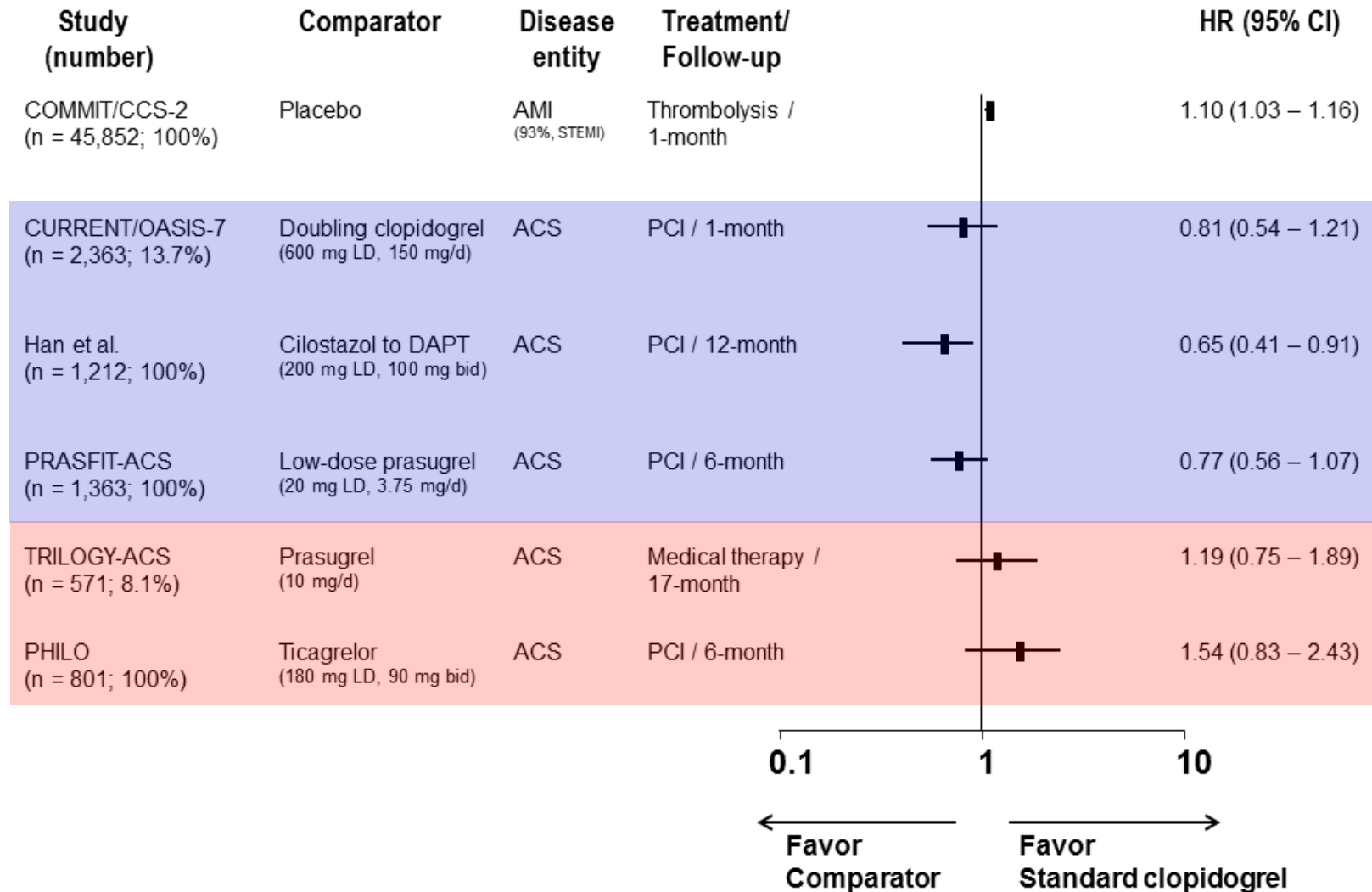
Different Response of CV Drugs by Race:

Effect of P2Y₁₂ Inhibitor Btw East Asians vs. Westerners

	Clopidogrel	Prasugrel	Ticagrelor
<i>PK & PDs</i>	↓ 20-30%	↑ 20-30% (After BW adjustment)	↑ 20-30% (After BW adjustment)
<i>Cause</i>	<i>CYP2C19</i> genotype	?	?

RCTs: Comparator vs. Standard-dose CLPD

East Asian ACS Patients



East Asians \approx 1.5 billion people



- **Thrombogenicity:** East Asians < Westerners
- **Atherothrombotic risk:** East Asians < Westerners
- **Bleeding risk:** East Asians > Westerners
- **Different CV drug response:** East Asians vs. Westerners
- Unmet need to solve this important health issue
“Race-based tailored therapy”

**Thanks for
your attention**

