

# The New European Guidelines on Myocardial Revascularization

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# New ESC/EACTS Guidelines

## Guidelines on myocardial revascularization

The Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

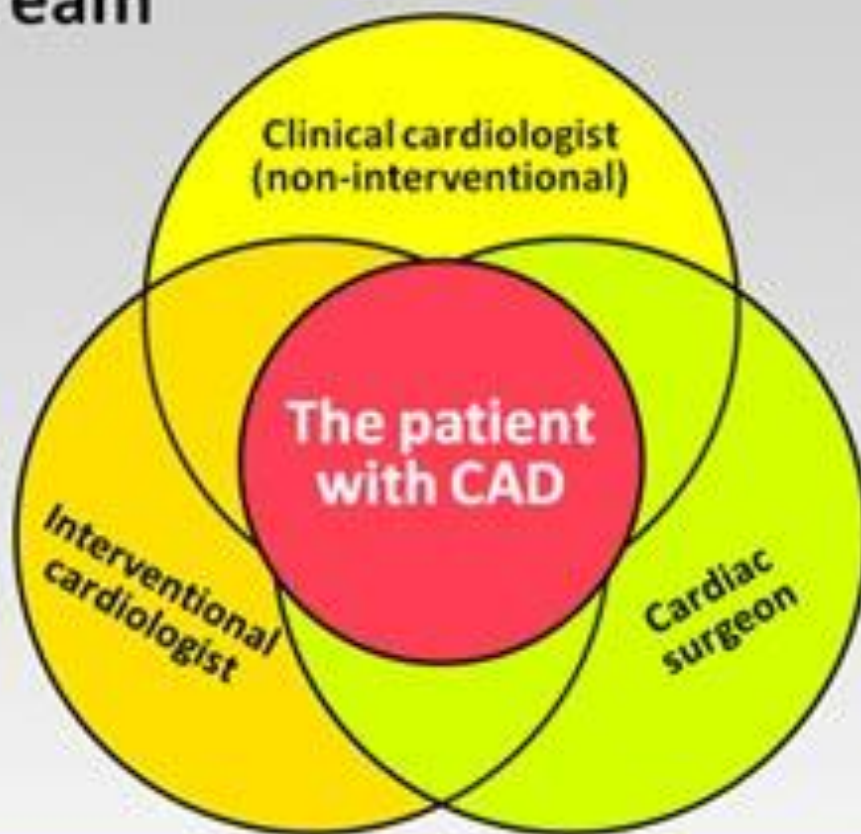
Developed with the special contribution of the European Association for Percutaneous Cardiovascular Interventions (EAPCI)<sup>†</sup>

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# The Heart Team



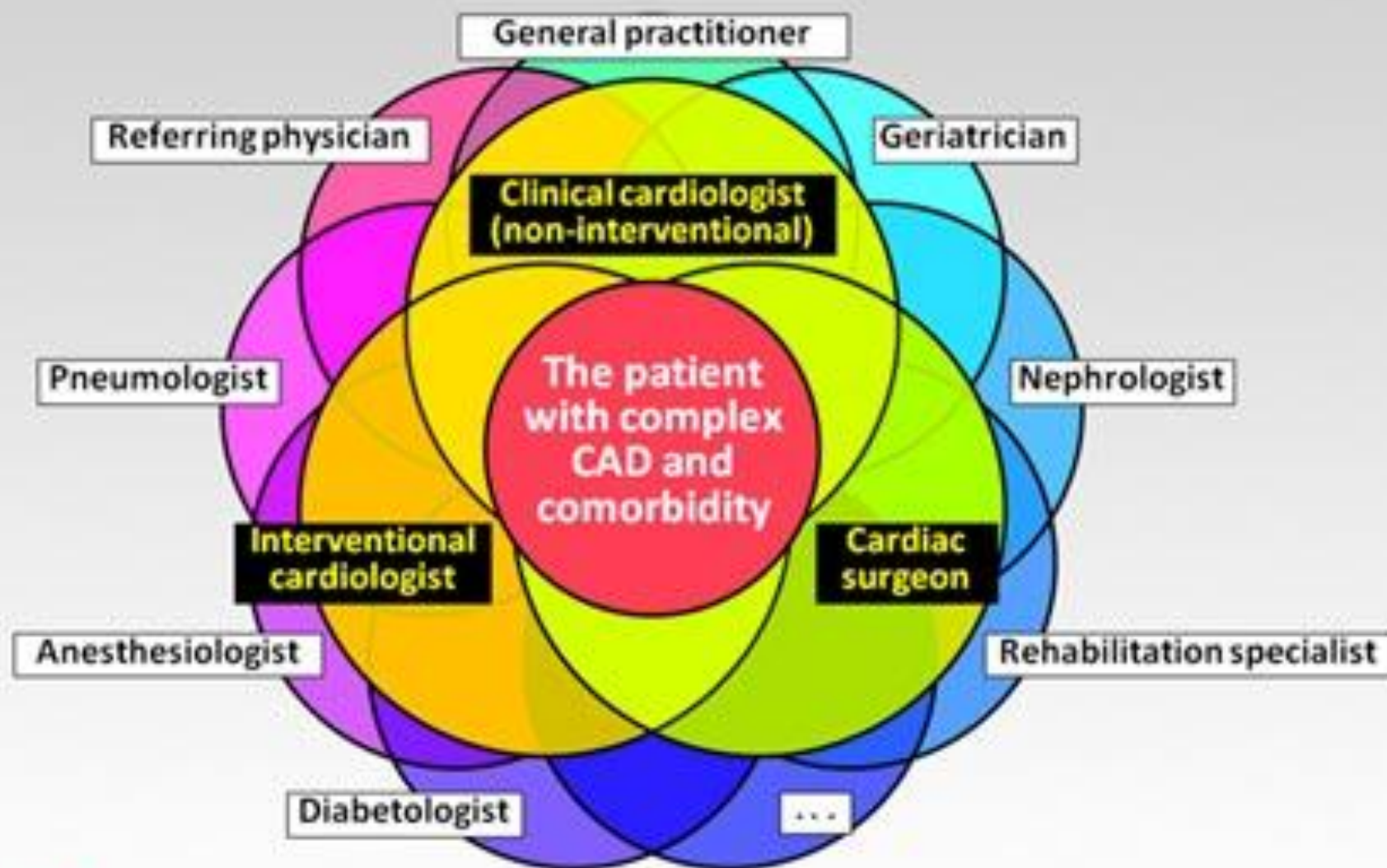
Task force composition = 8 clinical cardiologists (non-interventional)  
+ 9 interventional cardiologists + 8 cardiac surgeons

# Multidisciplinary Decision Pathways: Unstable Patients

	Shock	ACS		
		STEMI	NSTE-ACS	Other ACS
Multidisciplinary decision making	Not mandatory	Not mandatory	Not required for culprit lesion but required for nonculprit vessel(s)	Required
Informed consent	Oral witnessed informed consent or family consent if possible without delay	Oral witnessed informed consent may be sufficient unless written consent is legally required	Written informed consent (if time permits)	Written informed consent



# The Expanded Heart Team



[www.escardio.org/guidelines](http://www.escardio.org/guidelines)

Wijns W, et al. *Eur Heart J*. 2010 Aug 29. [Epub ahead of print]

the heart.org Medscape CME

# Multidisciplinary Decision Pathways: Stable Patients

	Stable MVD	Stable with indication for <i>ad hoc</i> PCI	Patient information
Multidisciplinary decision making	Required	According to predefined protocols	<ul style="list-style-type: none"> <li>• Objective</li> <li>• Unbiased,</li> <li>• Patient-oriented</li> <li>• Evidence-based</li> <li>• Up-to-date,</li> <li>• Reliable</li> <li>• Understandable</li> <li>• Accessible</li> <li>• Relevant</li> <li>• Consistent with legal requirements</li> </ul>
Informed consent	Written informed consent	Written informed consent	
Time to revascularisation	Elective: No time constraints	Elective: No time constraints	
Procedure	Plan most appropriate intervention allowing enough time from diagnostic catheterization to intervention	Proceed with intervention according to institutional protocol defined by local heart team	

# Risk Scores

Patient related factors			Cardiac related factors		
Age (years)	<input type="text" value="0"/>	<input type="text" value="0"/>	Unstable angina <sup>a</sup>	<input type="text" value="No"/>	<input type="text" value="0"/>
Gender	<input type="text" value="Select"/>	<input type="text" value="0"/>	LV function	<input type="text" value="Select"/>	<input type="text" value="0"/>
Chronic pulmonary disease <sup>a</sup>	<input type="text" value="No"/>	<input type="text" value="0"/>	Recent MI <sup>a</sup>	<input type="text" value="No"/>	<input type="text" value="0"/>
Extracardiac arteriopathy <sup>a</sup>	<input type="text" value="No"/>	<input type="text" value="0"/>	Pulmonary hypertension <sup>a</sup>	<input type="text" value="No"/>	<input type="text" value="0"/>
Neurological dysfunction <sup>a</sup>	<input type="text" value="No"/>	<input type="text" value="0"/>	Operation related factors		
Previous Cardiac Surgery	<input type="text" value="No"/>	<input type="text" value="0"/>	Emergency <sup>a</sup>	<input type="text" value="No"/>	<input type="text" value="0"/>
Creatinine > 200 µmol/L	<input type="text" value="No"/>	<input type="text" value="0"/>	Other than isolated CABG	<input type="text" value="No"/>	<input type="text" value="0"/>
Active endocarditis <sup>a</sup>	<input type="text" value="No"/>	<input type="text" value="0"/>	Surgery on thoracic aorta	<input type="text" value="No"/>	<input type="text" value="0"/>
Critical preoperative aortic <sup>a</sup>	<input type="text" value="No"/>	<input type="text" value="0"/>	Post infarct septal rupture	<input type="text" value="No"/>	<input type="text" value="0"/>

Logate

**EuroSCORE**  
EuroSCORE II  
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[www.euroscore.org/calc.html](http://www.euroscore.org/calc.html)

## SYNTAX SCORE



Welcome to the SYNTAX Score website. The SYNTAX Score is a unique tool to score complexity of coronary artery disease. However, it is very important to use this new scoring tool correctly, hence, it is strongly recommended to complete the tutorial first.

**TUTORIAL**  
Knowledge of definite vital. Please use the tutorial prior to first calculator

**CALCULATOR**  
Start using the calculator you have successfully completed the tutorial

[www.syntaxscore.com](http://www.syntaxscore.com)



# Indications for Revascularization in SA or Silent Ischemia

	Subset of CAD by anatomy	Class	Level
For prognosis	Left main > 50%*	I	A
	Any proximal LAD > 50%*	I	A
	2VD or 3VD with impaired LV function*	I	B
	Proven large area of ischemia (> 10% LV)	I	B
	Single remaining patent vessel > 50% stenosis*	I	C
	1VD without proximal LAD and without > 10% ischemia	III	A

	Subset of CAD by anatomy	Class	Level
For symptoms	Any stenosis > 50% with limiting angina or angina equivalent, unresponsive to OMT	I	A
	Dyspnea/CHF and > 10% LV ischemia/viability supplied by > 50% stenotic artery	IIa	B
	No limiting symptoms with OMT	III	C

\*With documented ischemia or fractional flow reserve (FFR) < 0.80 for angiographic diameter stenosis 50%-90%.



# Indications for CABG vs PCI in Stable Patients Suitable for Both Procedures and Low Predicted Surgical Mortality

Subset of CAD by anatomy	Favors CABG	Favors PCI
1VD or 2VD – nonproximal LAD	IIb C	I C
1VD or 2VD – proximal LAD	I A	IIa B
3VD simple lesions, full functional revascularization achievable with PCI, SYNTAX score $\leq 22$	I A	IIa B
3VD complex lesions, incomplete revascularization achievable with PCI, SYNTAX score $> 22$	I A	III A
Left main (isolated or 1VD, ostium/shaft)	I A	IIa B
Left main (isolated or 1VD, distal bifurcation)	I A	IIb B
Left main + 2VD or 3VD, SYNTAX score $\leq 32$	I A	IIb B
Left main + 2VD or 3VD, SYNTAX score $\geq 33$	I A	III B

- In severe CAD, CABG appears to offer a survival advantage and a marked reduction in repeat revascularization.

# Graft Patency Post CABG

Graft	Patency at 1 year	Patency at 4-5 years	Patency at 10-15 years
SVG <sup>a,b</sup>	> 90%	65%-80%	25%-50%
Radial artery <sup>b,c</sup>	86%-96%	89%	Not reported
Left ITA <sup>b,d</sup>	> 91%	88%	88%
Right ITA <sup>b</sup>	Not reported	96%	65%

- The long-term benefit of CABG is maximized with the use of arterial grafts, specifically the ITA.

a. Loop FD, et al. *N Engl J Med*. 1986;314:1-6.

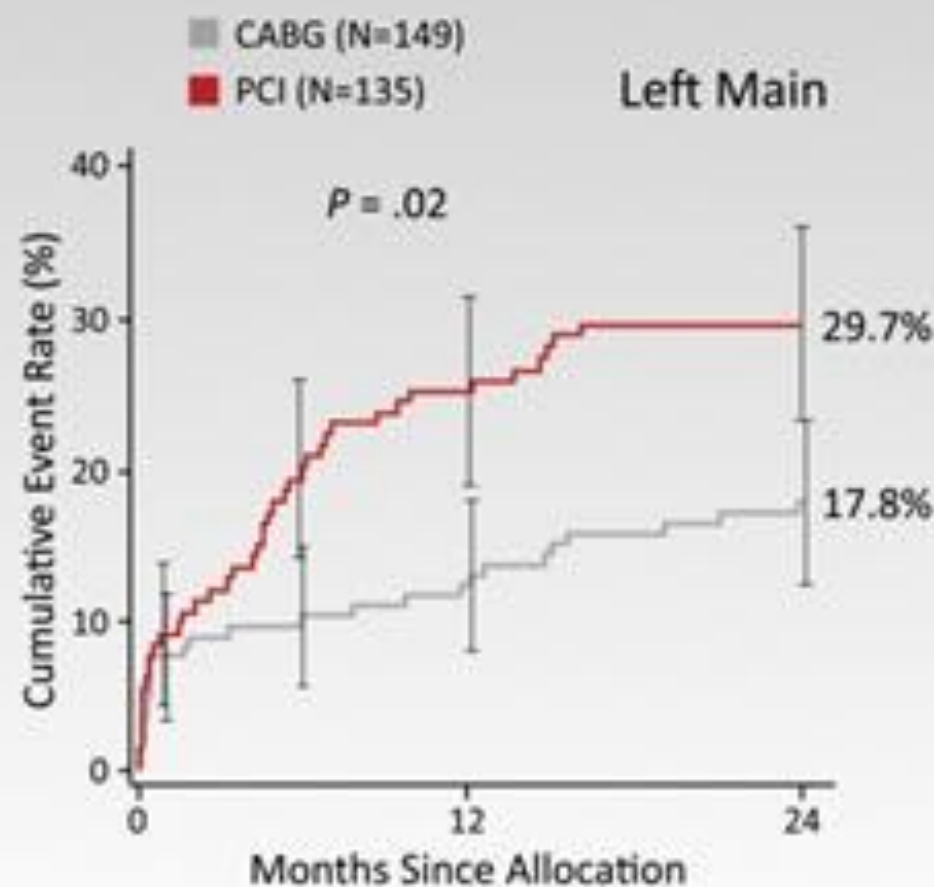
b. Tatoulis J, et al. *Ann Thorac Surg*. 2004;77:93-101.

c. Desai H, et al. *N Engl J Med*. 2004;351:2302-2309.

d. Zhao DX, et al. *J Am Coll Cardiol*. 2009;53:232-241.

# MACCE to 2 Years by SYNTAX Score Tertile

## Left Main SYNTAX Score $\geq 33$



	CABG	PCI	P value
Death	4.1%	10.4%	.04
CVA	4.2%	0.8%	.08
MI	6.1%	8.4%	.48
Death, CVA, or MI	11.5%	15.6%	.32
Revasc.	9.2%	21.8%	.003

Cumulative KM Event Rate  $\pm$  1.5 SE; log-rank P value



# PCI in STEMI: Culprit Lesion

- **With the exception of cardiogenic shock**
  - PCI (whether primary, rescue, or post fibrinolysis) should be limited to the culprit lesion

**Class IIa, level of evidence B**

# Revascularization in NSTEMI-ACS

Specification	Class	Level
An invasive strategy is indicated in patients with: <ul style="list-style-type: none"><li>• GRACE score &gt; 140 or at least 1 high-risk criterion</li><li>• Recurrent symptoms</li><li>• Inducible ischemia at stress test</li></ul>	I	A
An early invasive strategy (< 24 hr) is indicated in patients with GRACE score > 140 or multiple other high-risk criteria	I	A
A late invasive strategy (within 72 hr) is indicated in patients with GRACE score < 140 or absence of multiple other high-risk criteria but with recurrent symptoms or stress-inducible ischemia	I	A
Patients at very high ischemia risk (refractory angina, with associated heart failure, arrhythmias, or hemodynamic instability) should be considered for emergent coronary angiography (< 2 hr)	IIa	C
An invasive strategy should not be performed in patients: <ul style="list-style-type: none"><li>• At low overall risk</li><li>• At a particularly high-risk for invasive diagnosis or intervention</li></ul>	III	A

# Anticoagulation in NSTEMI

NSTE-ACS		Class	Level
Very high risk for ischemia	UFH (+ GP IIb/IIIa antagonists)	I	C
	Bivalirudin (monotherapy)	I	B
Medium-to-high risk for ischemia	UFH	I	C
	Bivalirudin	I	B
	Fondaparinux	I	B
	Enoxaparin	IIa	B
Low-risk for ischemia	Fondaparinux	I	B
	Enoxaparin	IIa	B



# Antithrombotics in NSTEMI

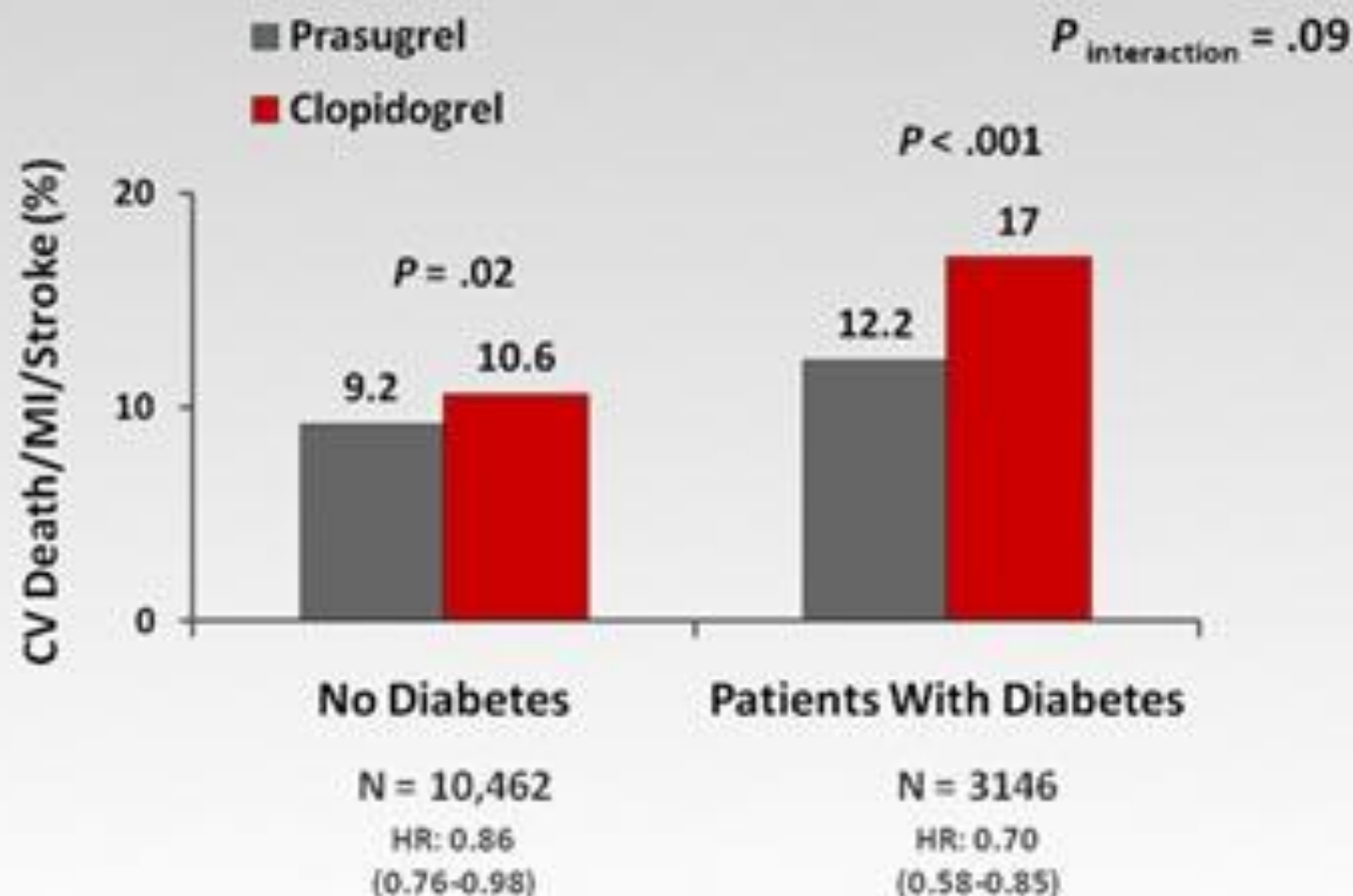
NSTEMI-ACS			
Antiplatelet therapy		Class	Level
	ASA	I	C
	Clopidogrel (with 600-mg loading dose as soon as possible)	I	C
	Clopidogrel (for 9-12 months after PCI)	I	B
	Prasugrel	IIa	B
	Ticagrelor	I	B
	+ GP IIb/IIIa antagonists (in high-risk patients with elevated troponin)		
	Abciximab (with DAPT)	I	B
	Tirofiban, eptifibatide	IIa	B
	Upstream GP IIb/IIIa antagonists	III	B

# Clopidogrel: Black-Box Warning

## DIMINISHED EFFECTIVENESS IN POOR METABOLIZERS

- Effectiveness of clopidogrel depends on activation to an active metabolite by the cytochrome P450 (CYP) system, principally CYP2C19
- Poor metabolizers treated with clopidogrel at recommended doses exhibit higher cardiovascular event rates following ACS or PCI than patients with normal CYP2C19 function
- Tests are available to identify a patient's CYP2C19 genotype and can be used as an aid in determining therapeutic strategy
- Consider alternative treatment or treatment strategies in patients identified as CYP2C19 poor metabolizers

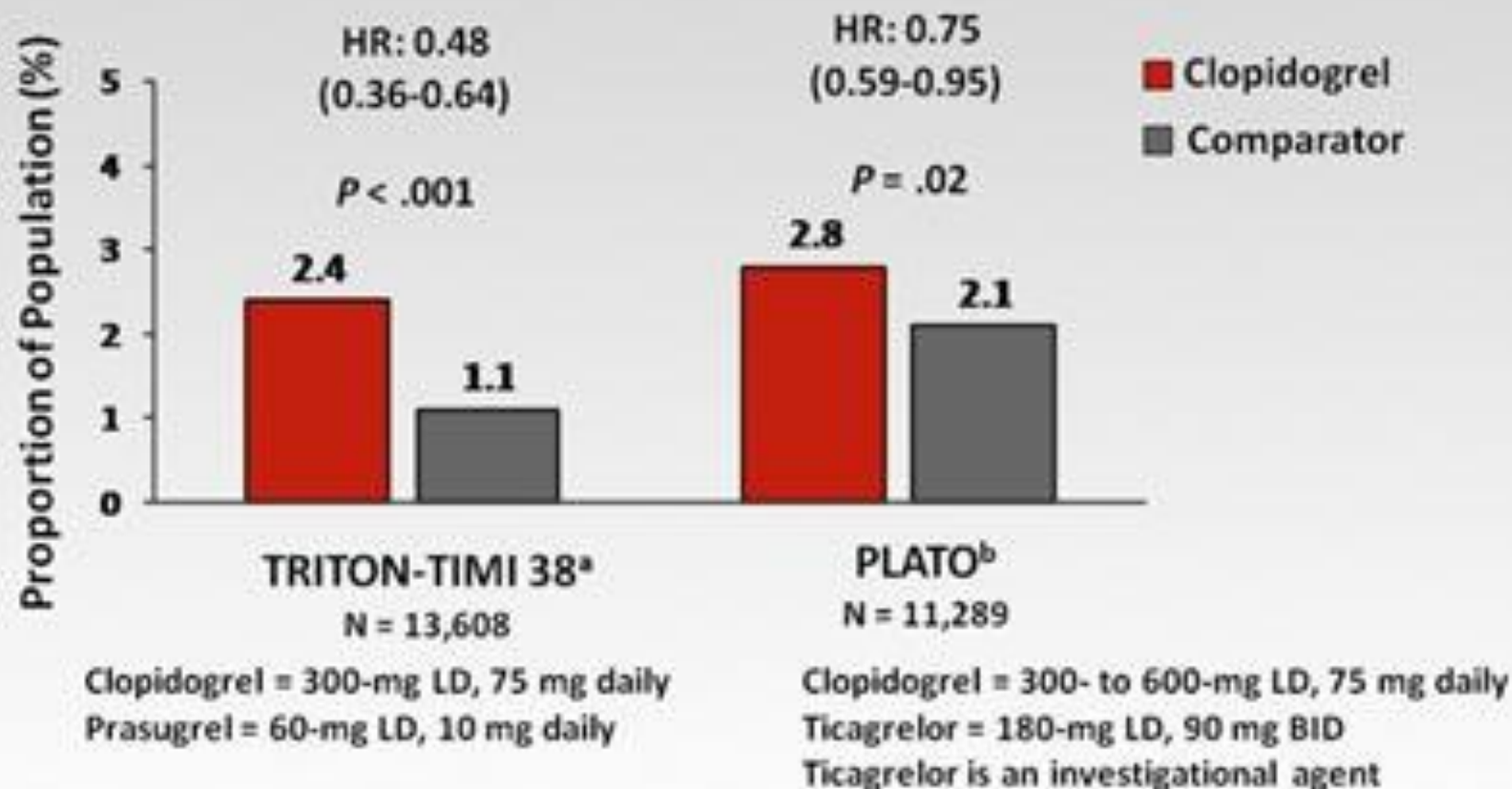
# TRITON-TIMI 38 Diabetes: Efficacy





# Prasugrel and Ticagrelor: Definite/Probable Stent Thrombosis

Neither drug affected by the CYP2C19 polymorphisms that reduce clopidogrel efficacy



# Antiplatelets in ACS

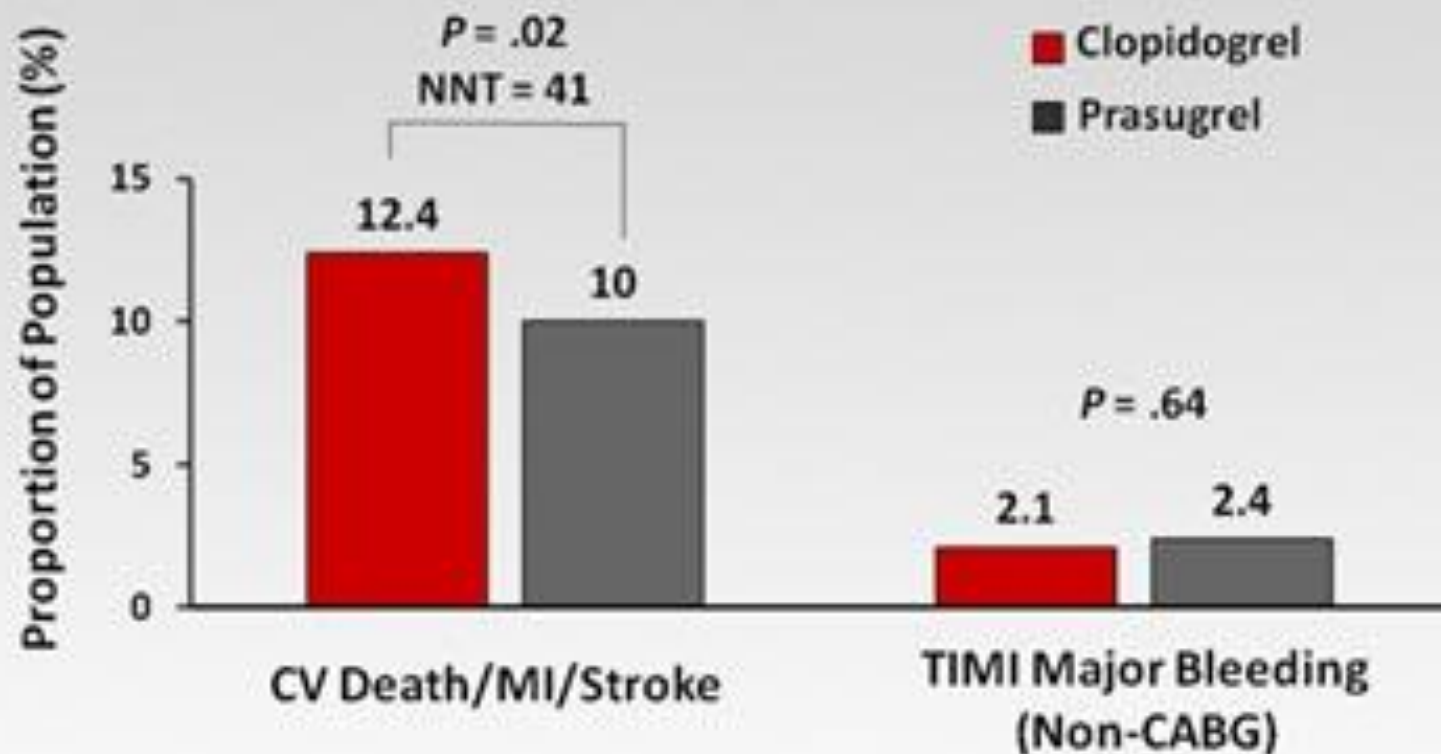
## NSTE-ACS

Antiplatelet therapy		Class	Level
	ASA	I	C
	Clopidogrel (with 600-mg loading dose as soon as possible)	I	C
	Clopidogrel (for 9-12 months after PCI)	I	B
	Prasugrel	IIa	B
	Ticagrelor	I	B

## STEMI

Antiplatelet therapy		Class	Level
	ASA	I	B
	Clopidogrel (with 600-mg loading dose as soon as possible)	I	C
	Prasugrel	I	B
	Ticagrelor	I	B

# TRITON-TIMI 38: Net Clinical Outcomes at 15 Months in STEMI Patients (N = 3534)



Clopidogrel = 300-mg loading, 75 mg daily  
Prasugrel = 60-mg loading, 10 mg daily



# Antithrombotic Drug Use in CKD

## Antiplatelet therapy

ASA	No specific recommendations
Clopidogrel	No information in patients with renal dysfunction
Prasugrel	No dosage adjustment is necessary for patients with renal impairment including patients with end stage renal disease*
Ticagrelor	No dose reduction required in patients with GFR < 60 mL/min/1.73m <sup>2</sup>

CKD = chronic kidney disease

\*Corrected text (erratum in original epub).