GIUSEPPE DOSSETTI:
I VALORI - SVILUPPO E TUTELA DEI DIRITTI
ASSOCIAZIONE CULTURALE ONLUS

CAMERA DEI DEPUTATI
Palazzo Marini - Sala delle Colonne
Via Poli,19 - Roma

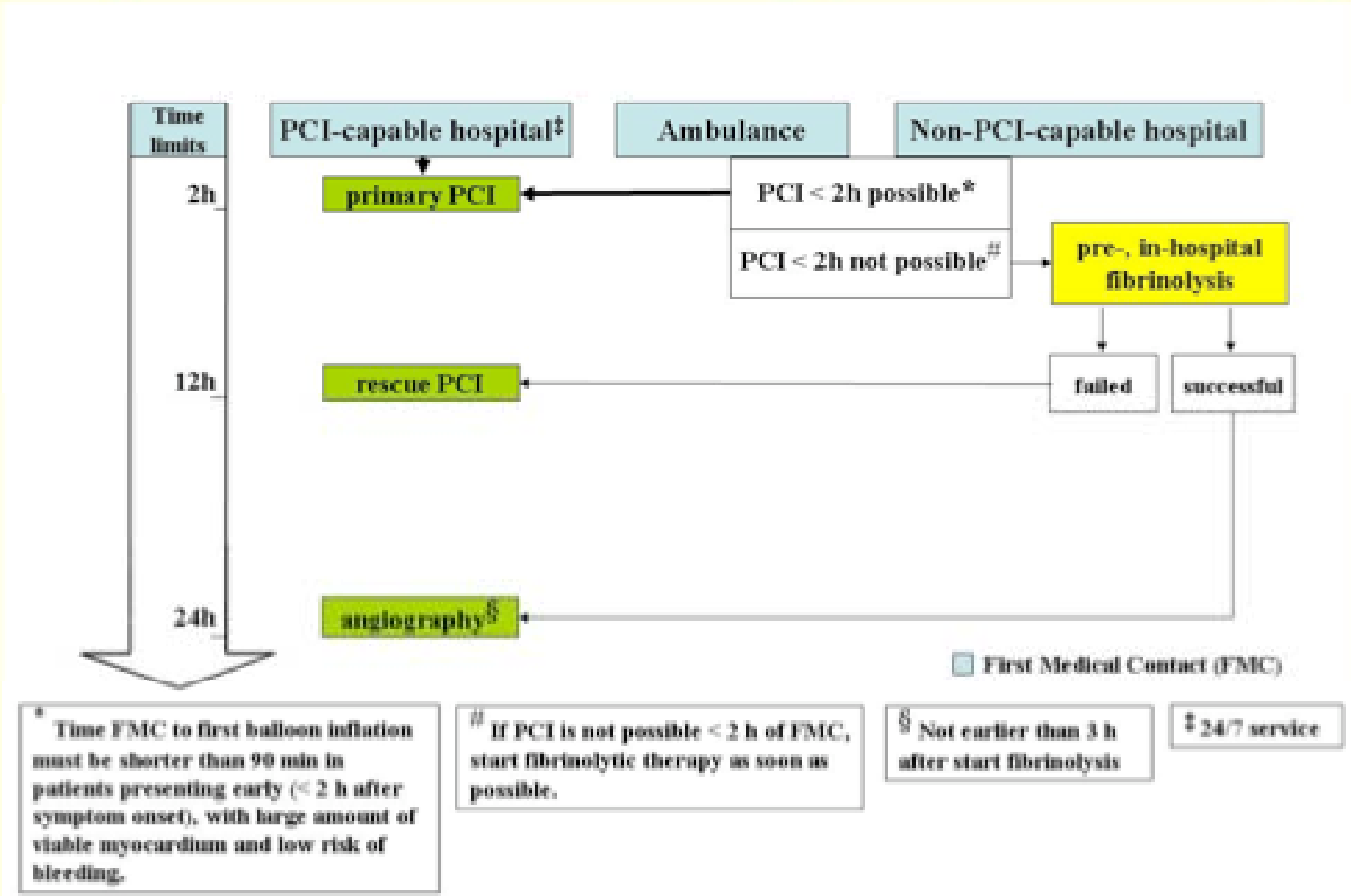
Strategie terapeutiche nell'infarto miocardico acuto. Rivascolarizzazione miocardica e terapia trombolitica: scelte antitetiche o integrate?

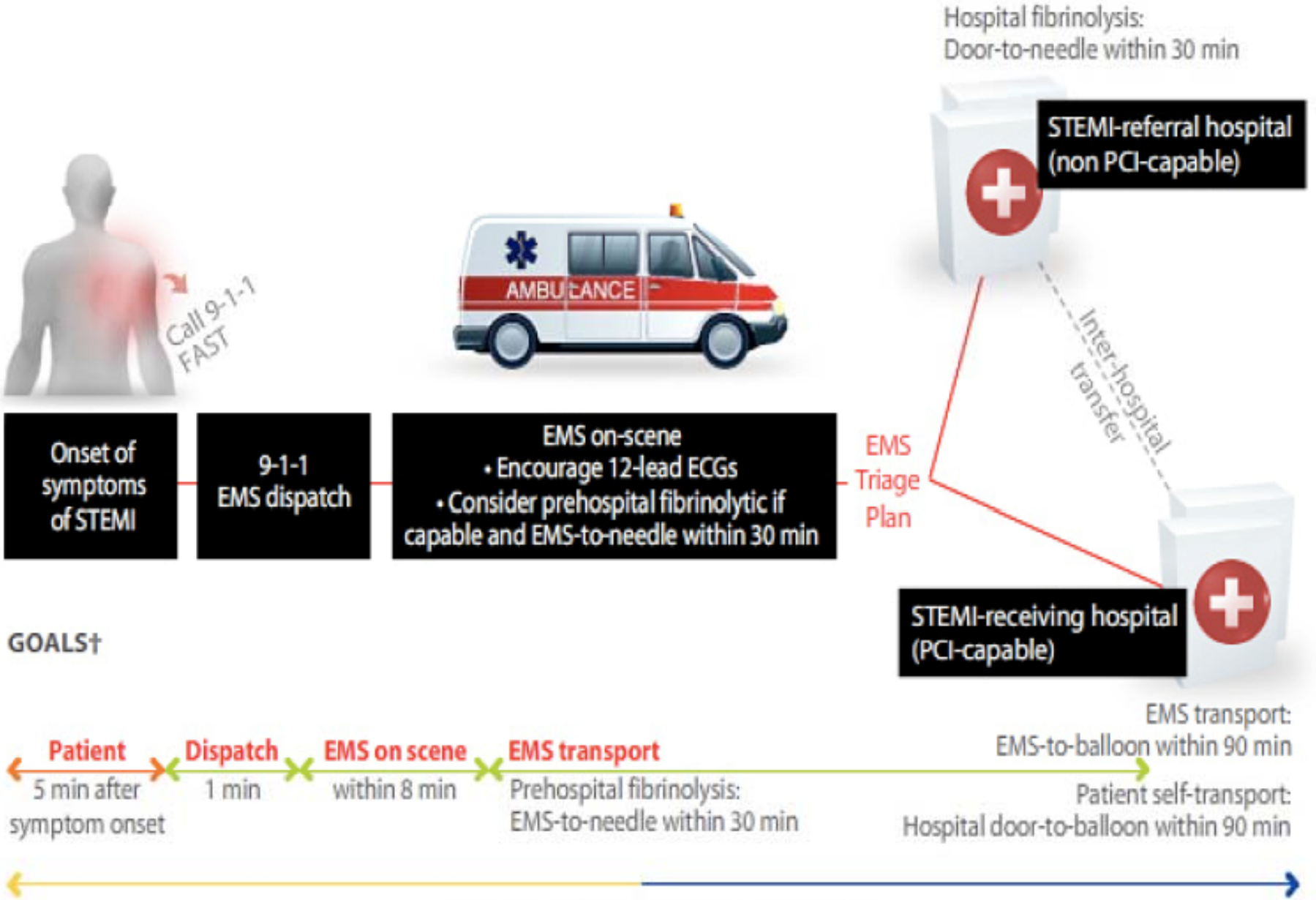
Marco Tubaro

UTIC – Dipartimento Cardiovascolare
Ospedale San Filippo Neri - Roma

mt

Reperfusion Strategies

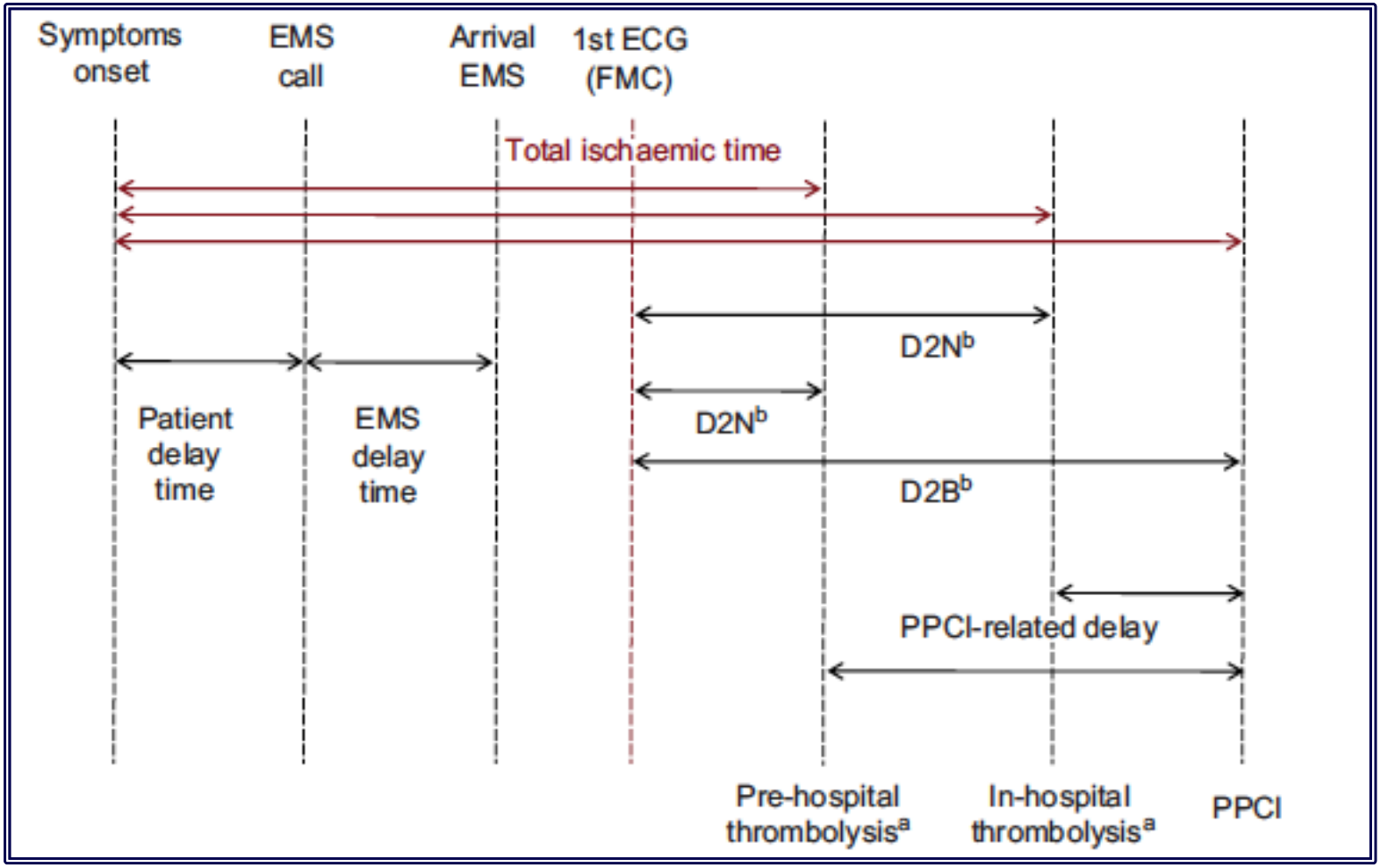




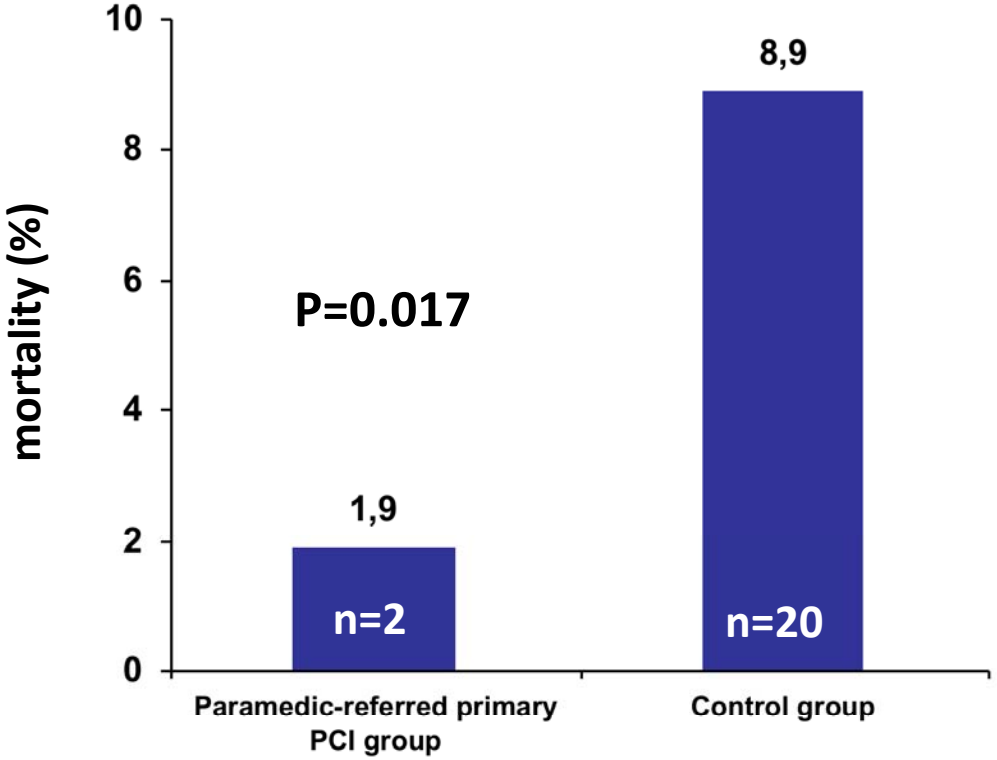
* Golden Hour = First 60 minutes

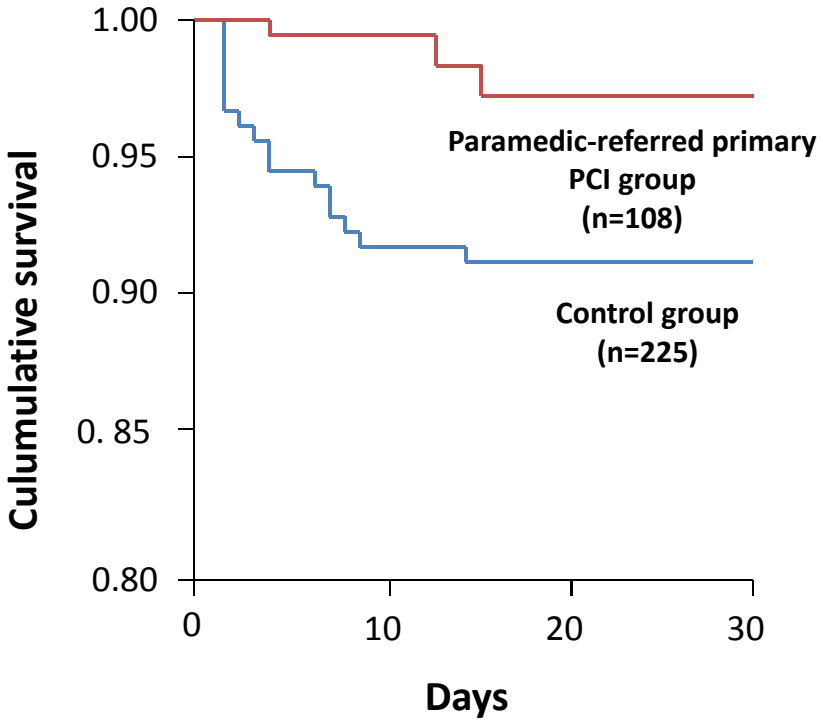
Pre-hospital treatment of STEMI patients. A scientific statement of the Working Group Acute Cardiac Care of the European Society of Cardiology

M. Tubaro[1], N. Danchin[2], P. Goldstein[3], G. Filippatos[4], Y. Hasin[5], M. Heras[6], P. Jansky[7], T. M. Norekval[8], E. Swahn[9], K. Thygesen[10], C. Vrints[11], D. Zahger[12], H. R. Arntz[13], A. Bellou[14], J. E. De La Coussaye[15], L. De Luca[16], K. Huber[17], Y. Lambert[18], M. Lettino[19], B. Lindahl[20], S. McLean[21], L. Nibbe[22], W. F. Peacock[23], S. Price[24], T. Quinn[25], C. Spaulding[26], G. Tatu-Chitoiu[27] & F. Van De Werf[28]



Paramedic-diagnosed STEMI





Le May MR. Am J Cardiol 2006;98:1329-1333

MT

BLITZ: hospital presentation

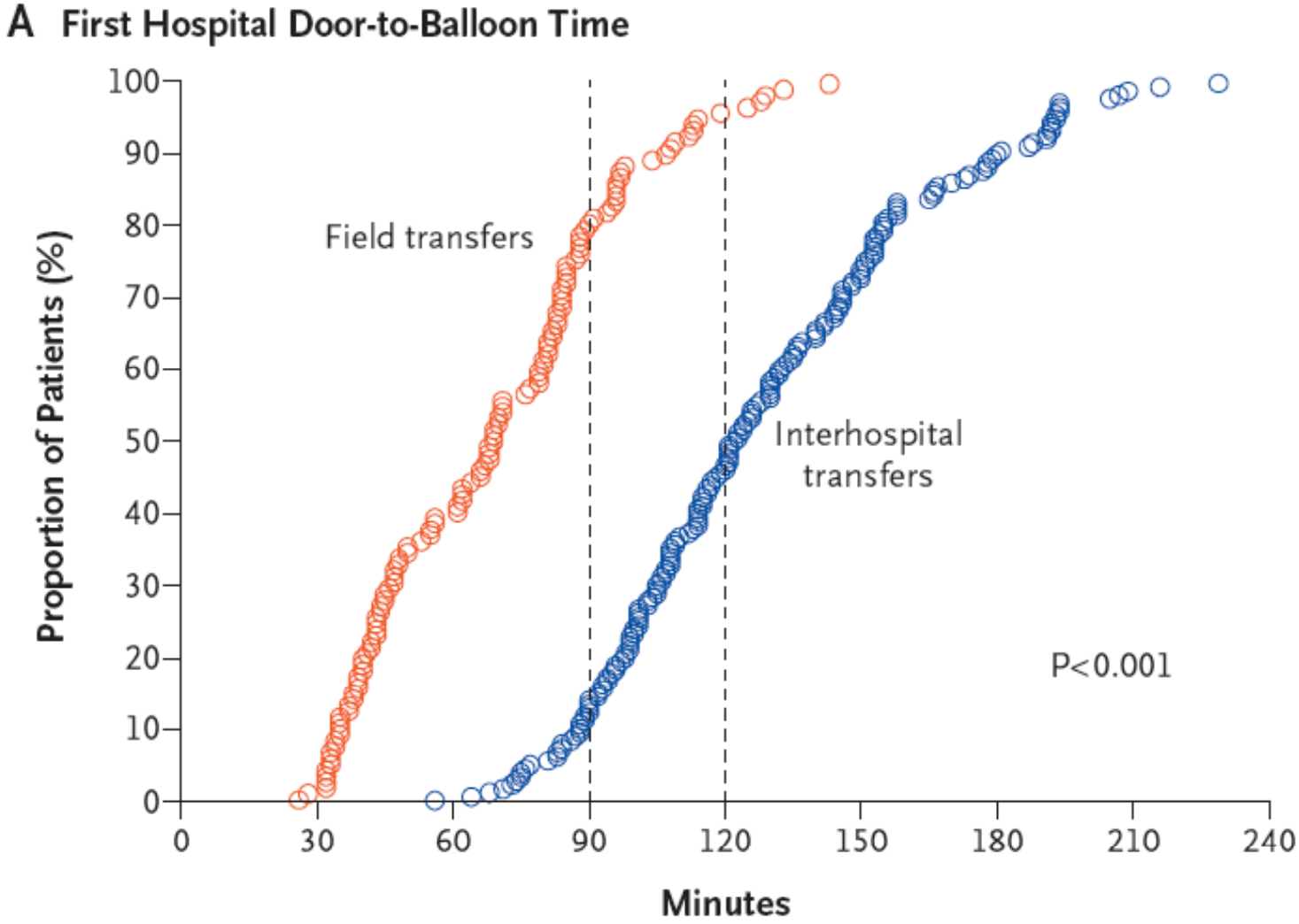
1959 pts, 65% STEMI	n° pts	%	
Direct presentation	654	34	
Indirect presentation	1273	66	
Type of health service[a]			
Territorial emergency services	503	39.5	26 %
Ambulance services	74	5.8	
Emergency territorial physician	156	12.3	
General practitioner	388	30.5	
Police	6	0.5	
Other	157	12.3	

time from onset of symptoms - median 120 min (IQR 60-300)
to hospital arrival - 48 % pts ≤ 2 h
- 76 % pts ≤ 6 h

Di Chiara A. Eur Heart J 2003

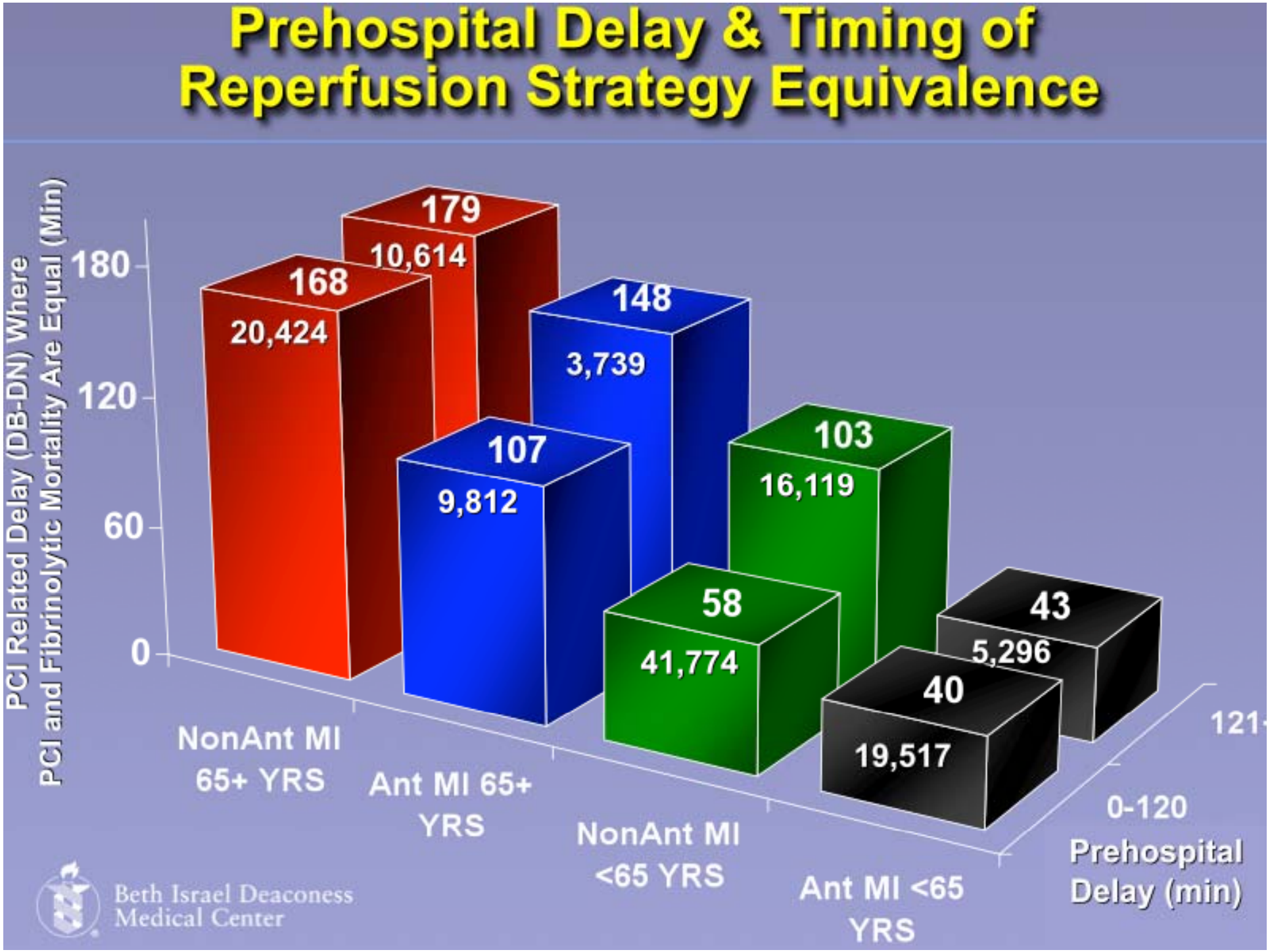
MT

field vs. interhospital transfer

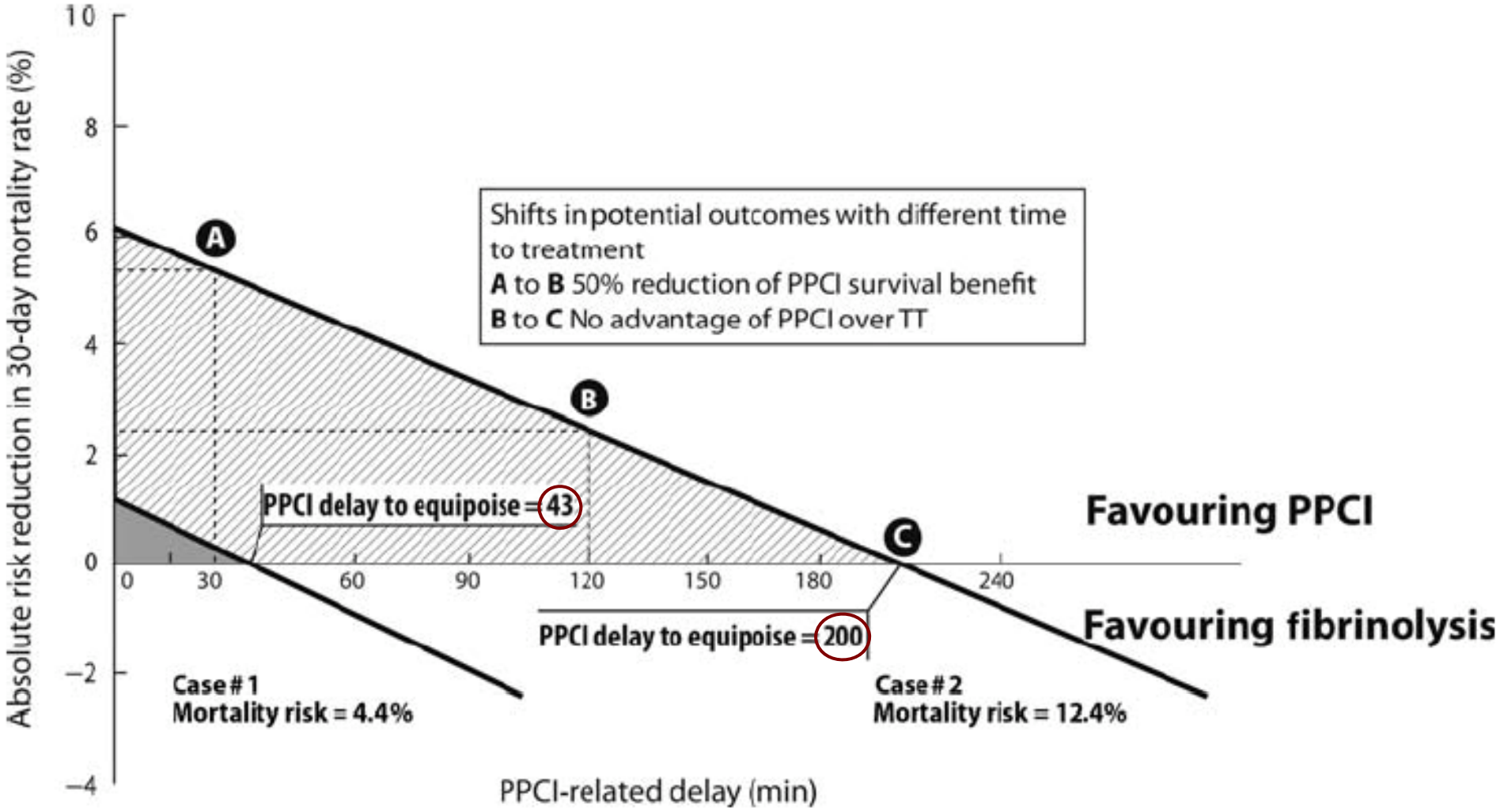


Le May, N Engl J Med 2008

MT


Prehospital Delay & Timing of Reperfusion Strategy Equivalence
PCI Related Delay (DB-DN) Where PCI and Fibrinolytic Mortality Are Equal (Min)
180
120
60
0
179
10,614
168
20,424
148
3,739
107
9,812
103
16,119
58
41,774
43
5,296
40
19,517
NonAnt MI 65+ YRS
Ant MI 65+ YRS
NonAnt MI <65 YRS
Ant MI <65 YRS
121
0-120 Prehospital Delay (min)
Beth Israel Deaconess Medical Center

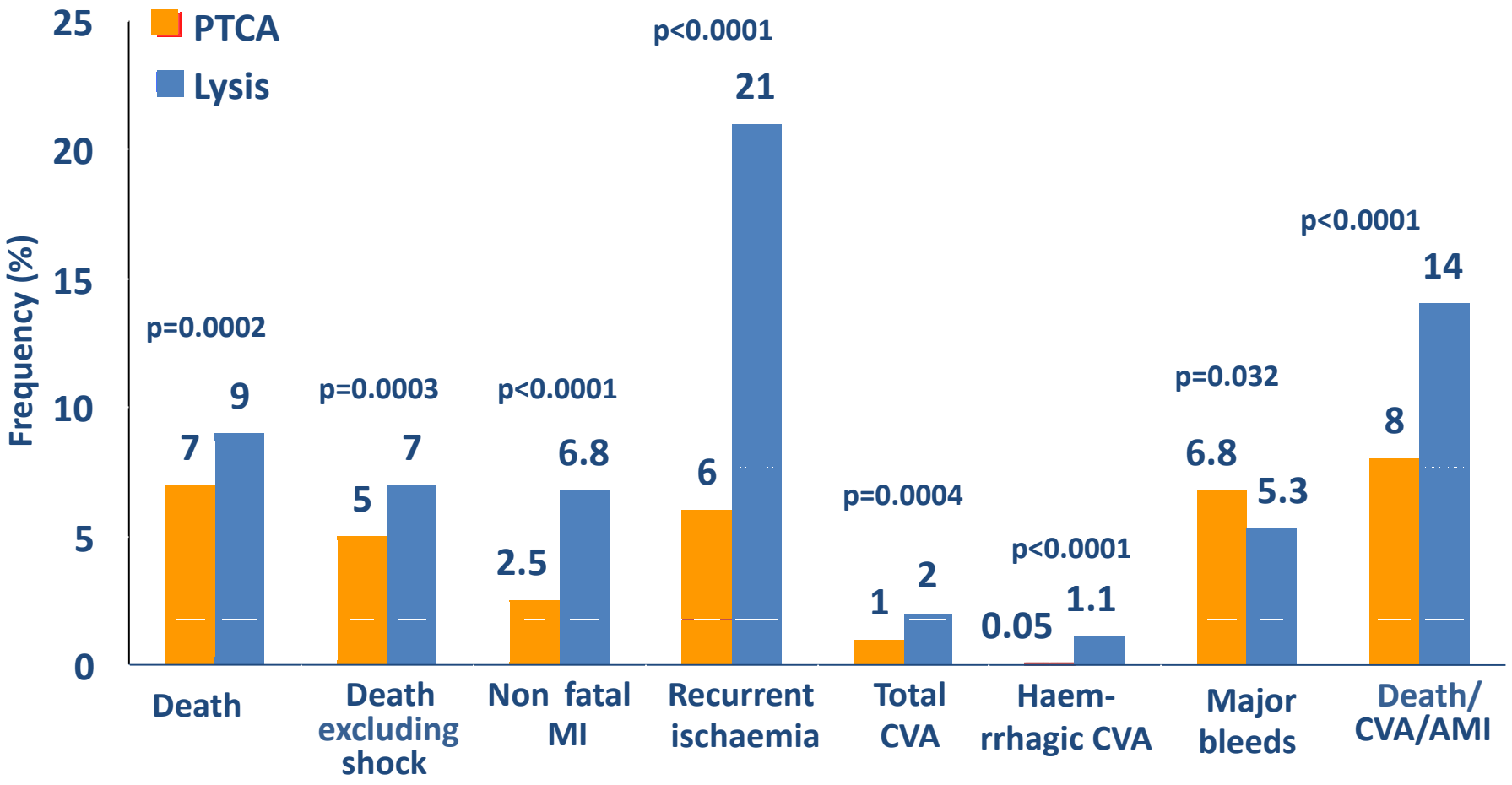
primary PCI vs fibrinolysis: equipoise



Tarantini G. EHJ 2010

MT

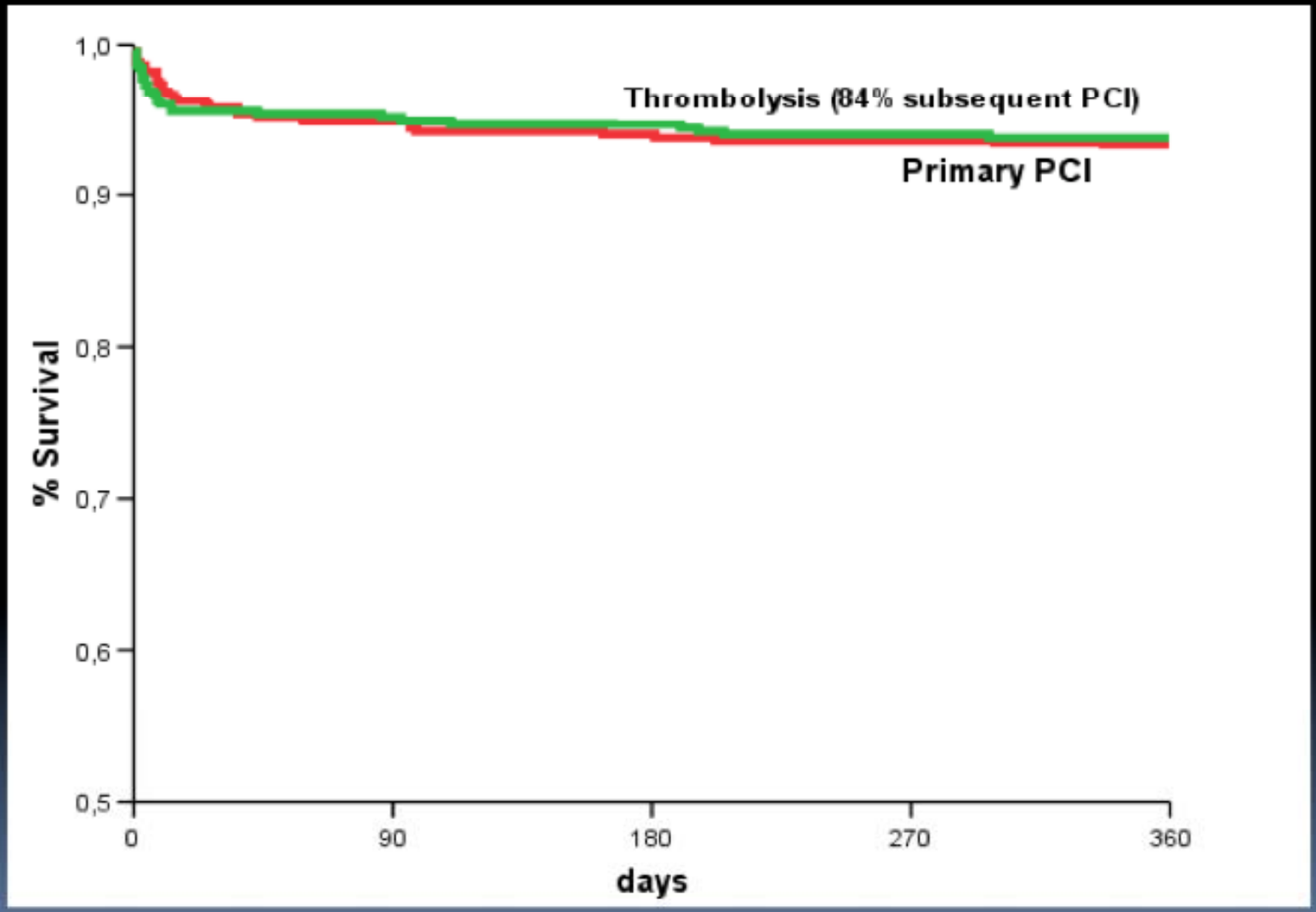
primary PCI vs thrombolytic therapy
-short term outcomes -



Keeley EC, et al. Lancet 2003;361:13–20

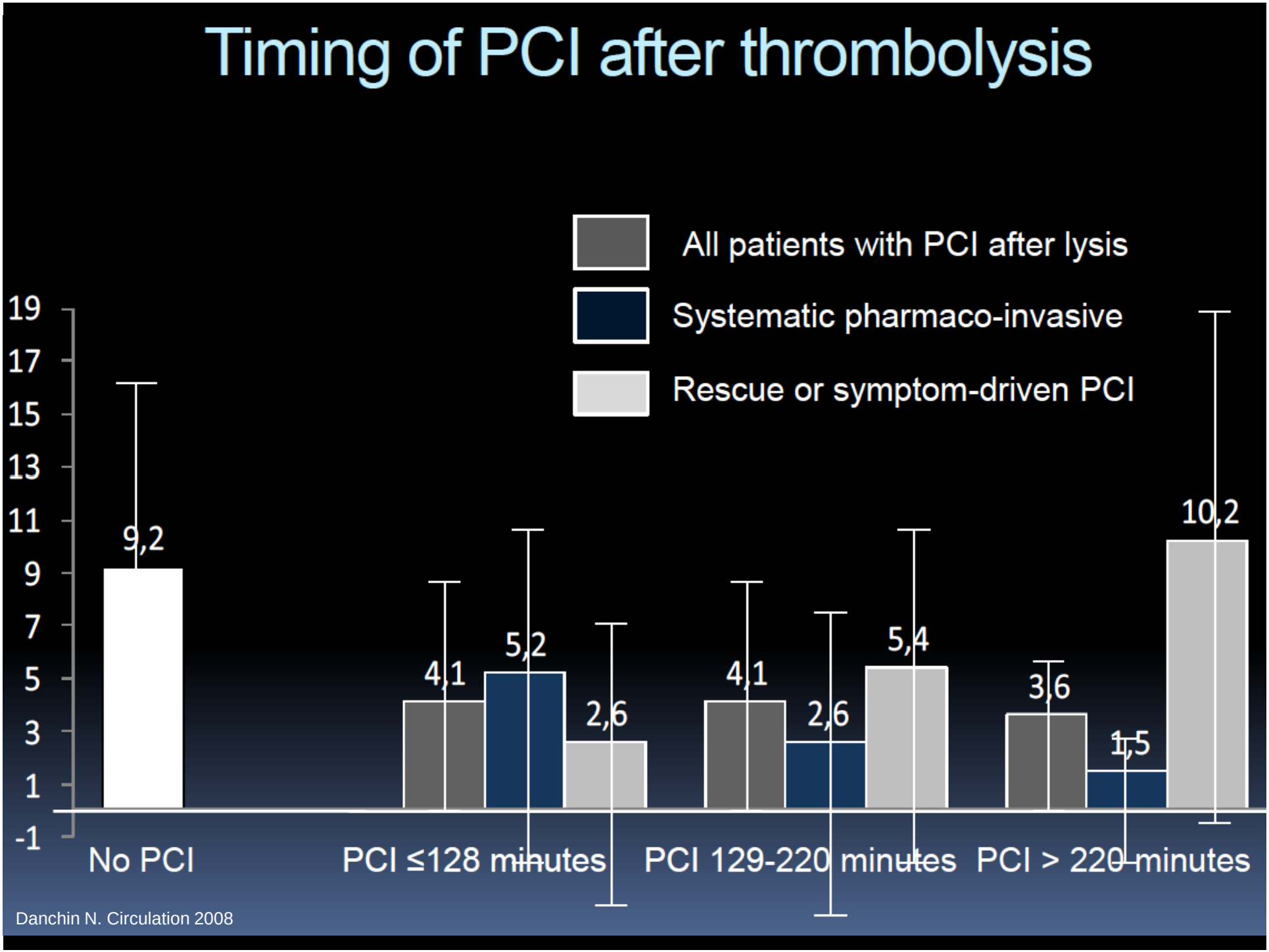
MT

One-year survival in cohorts matched on the propensity score for getting lysis vs PPCI



Danchin N. Circulation 2008

Timing of PCI after thrombolysis

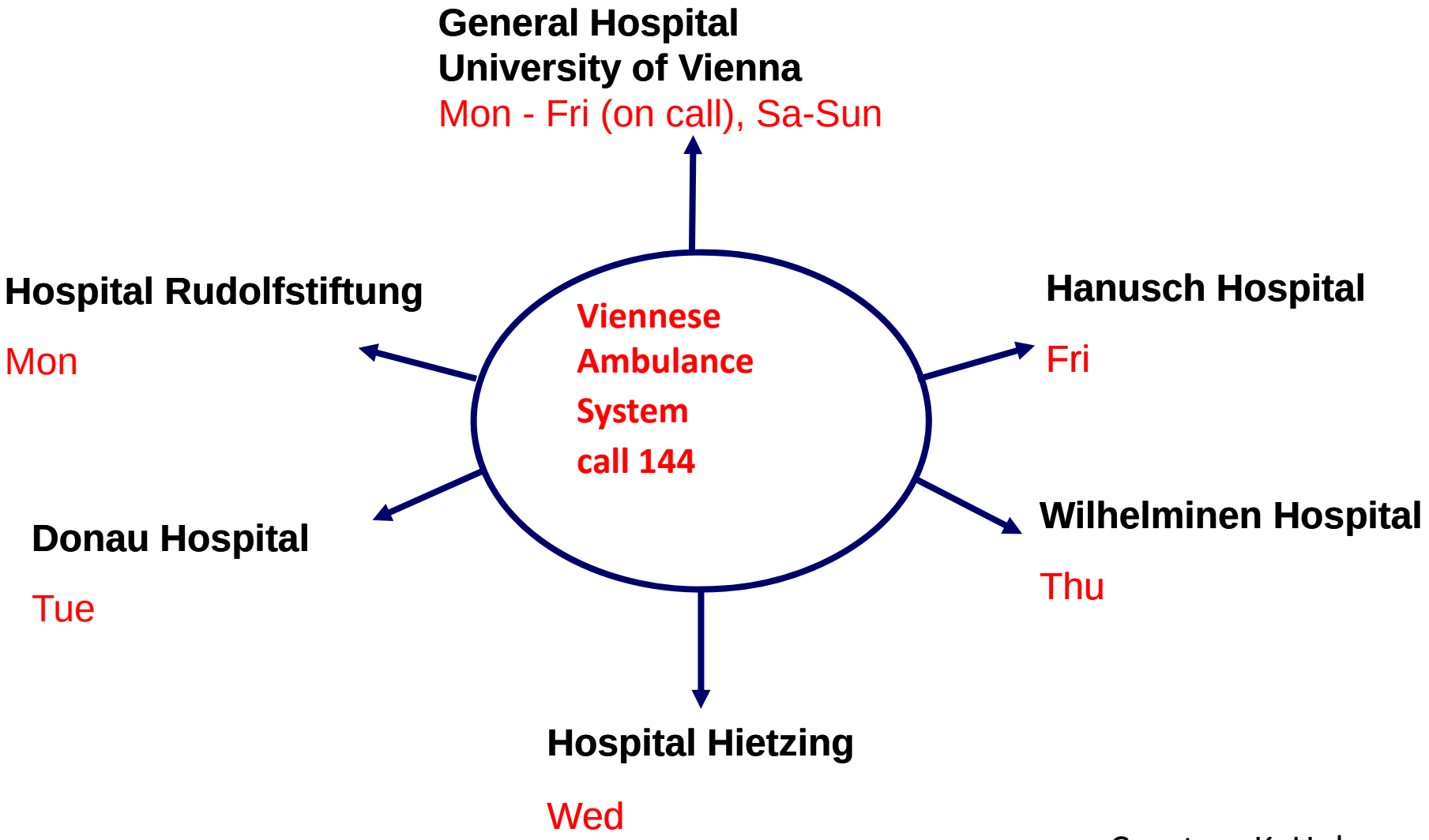


Danchin N. Circulation 2008

Local System of Care: The Vienna model

all cath labs active between 7.00 and 16:00 h

permanent availability of cath labs and teams during non-official catheter times



Courtesy K. Huber

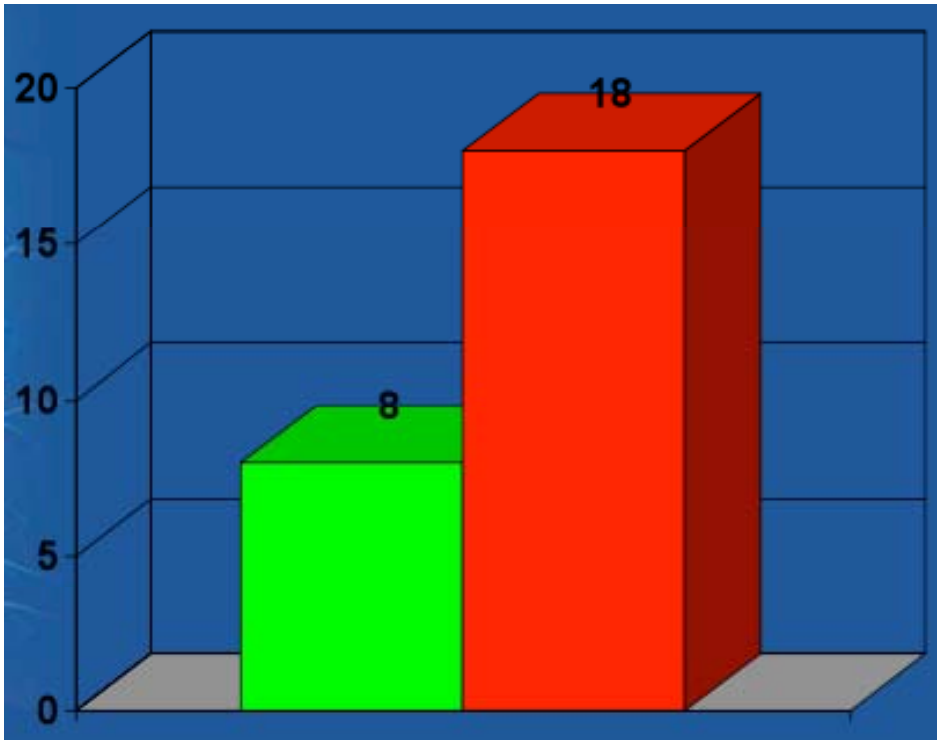
equitable access to care

networking in Czech Republic

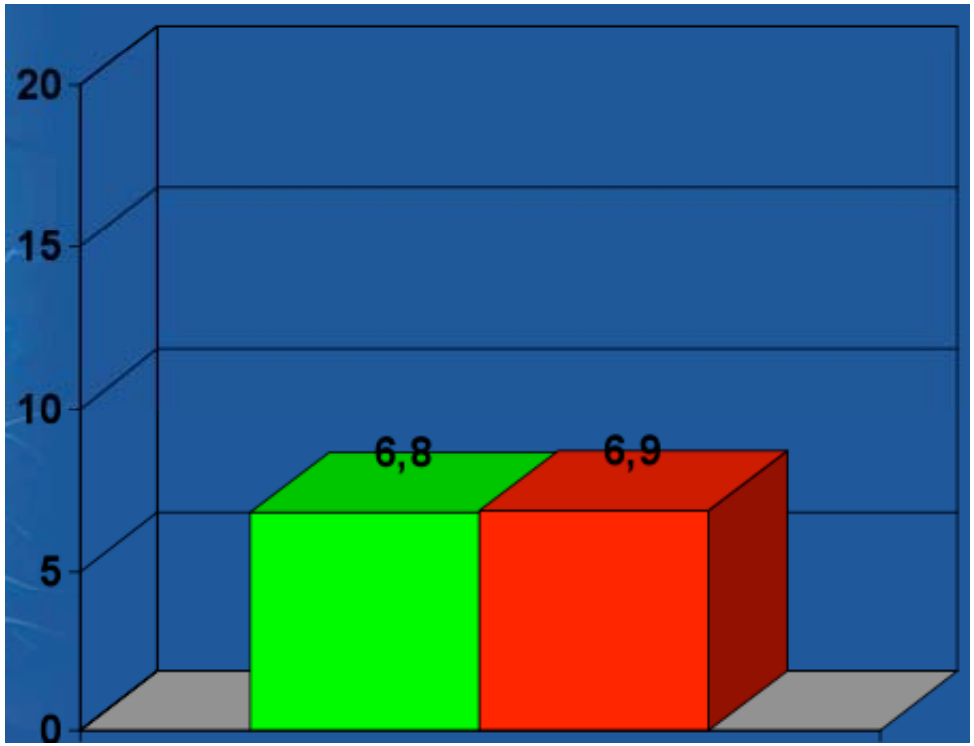
PCI centers

community H
(no cath lab)

1997-99



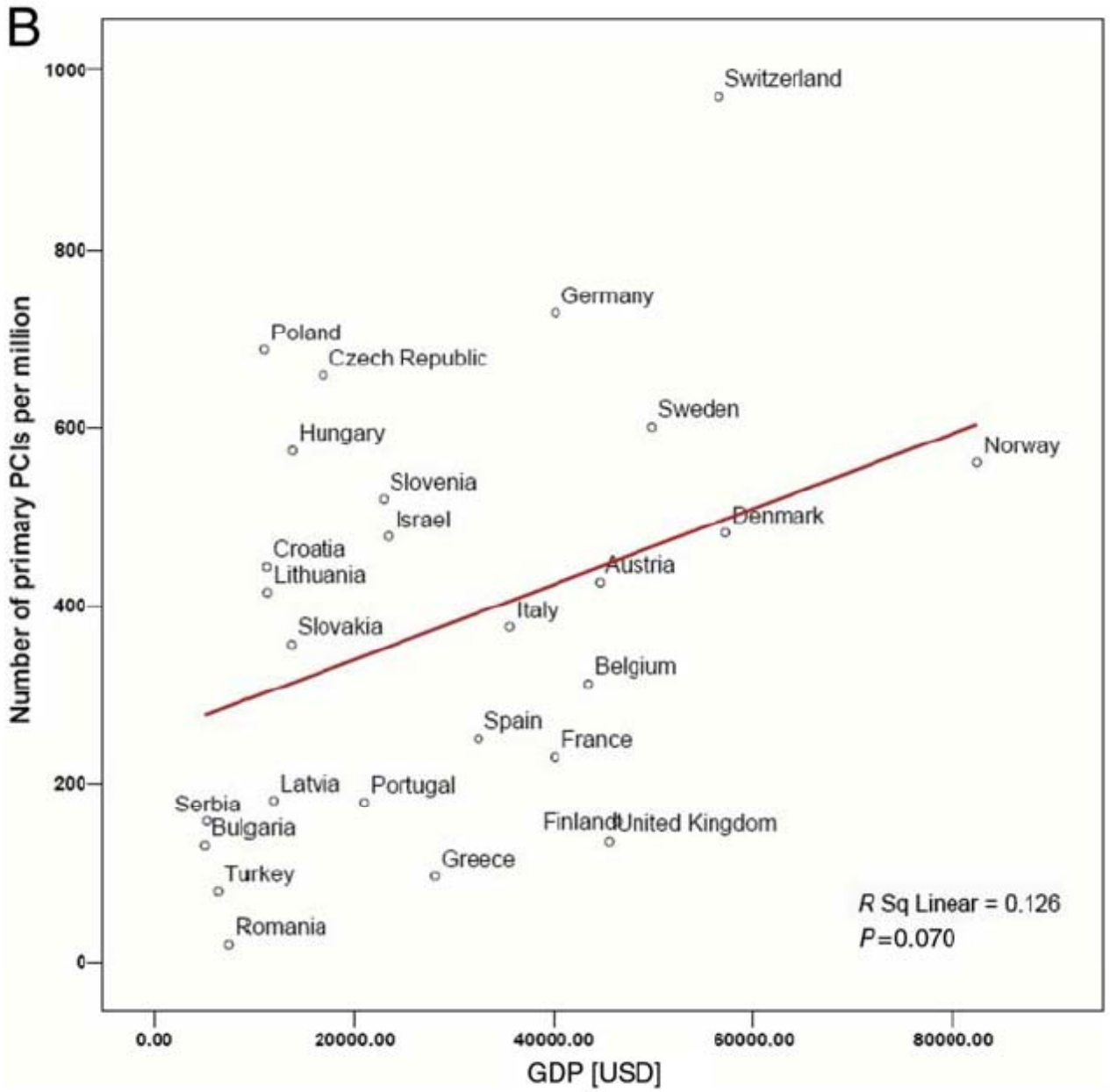
2005



STEMI in-hospital mortality

MT

primary PCI in Europe

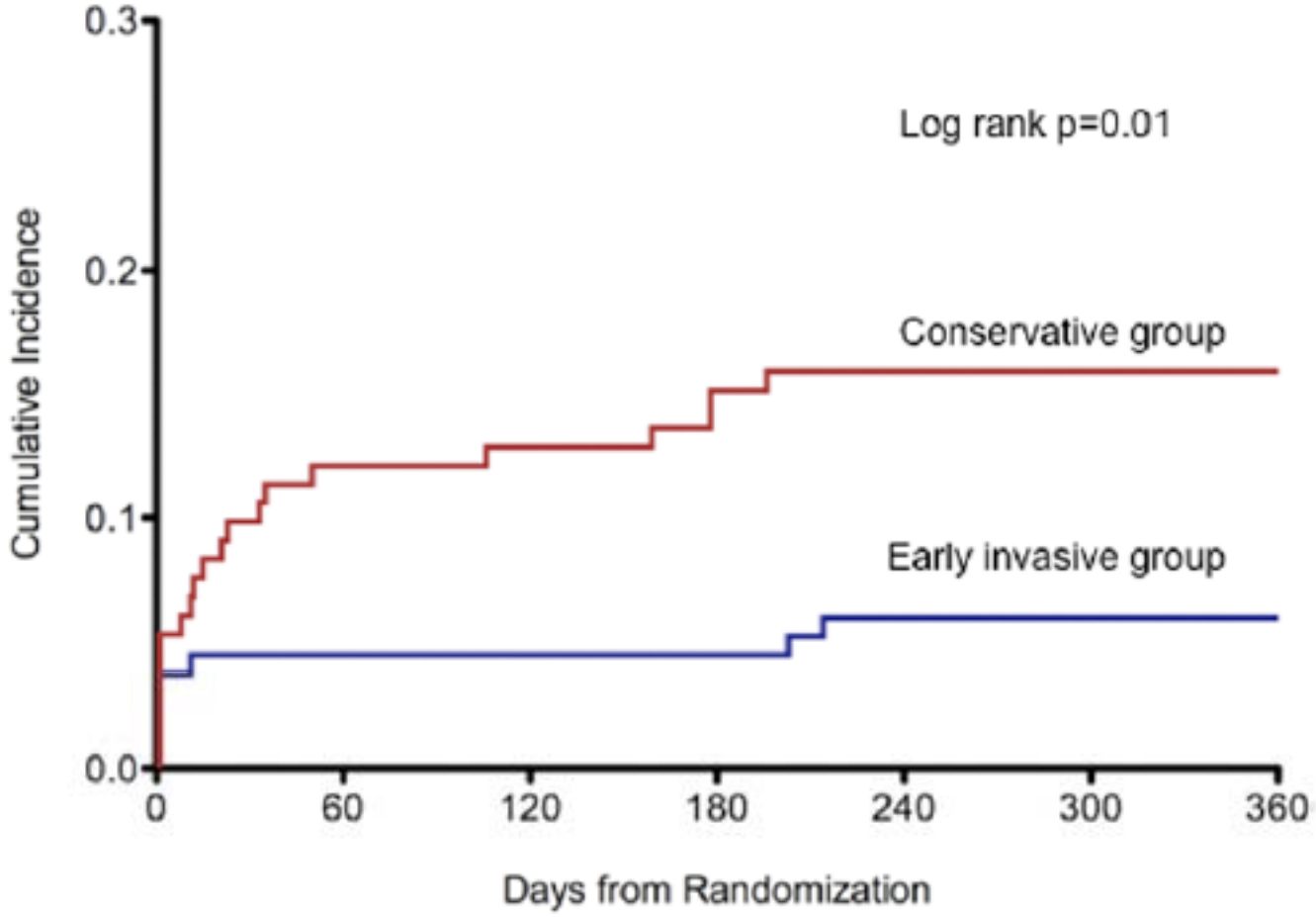


Widimski P, EHJ 2010

MT

NORDISTEMI: thrombolysis and immediate PCI in STEMI

B **Death, reinfarction or stroke**

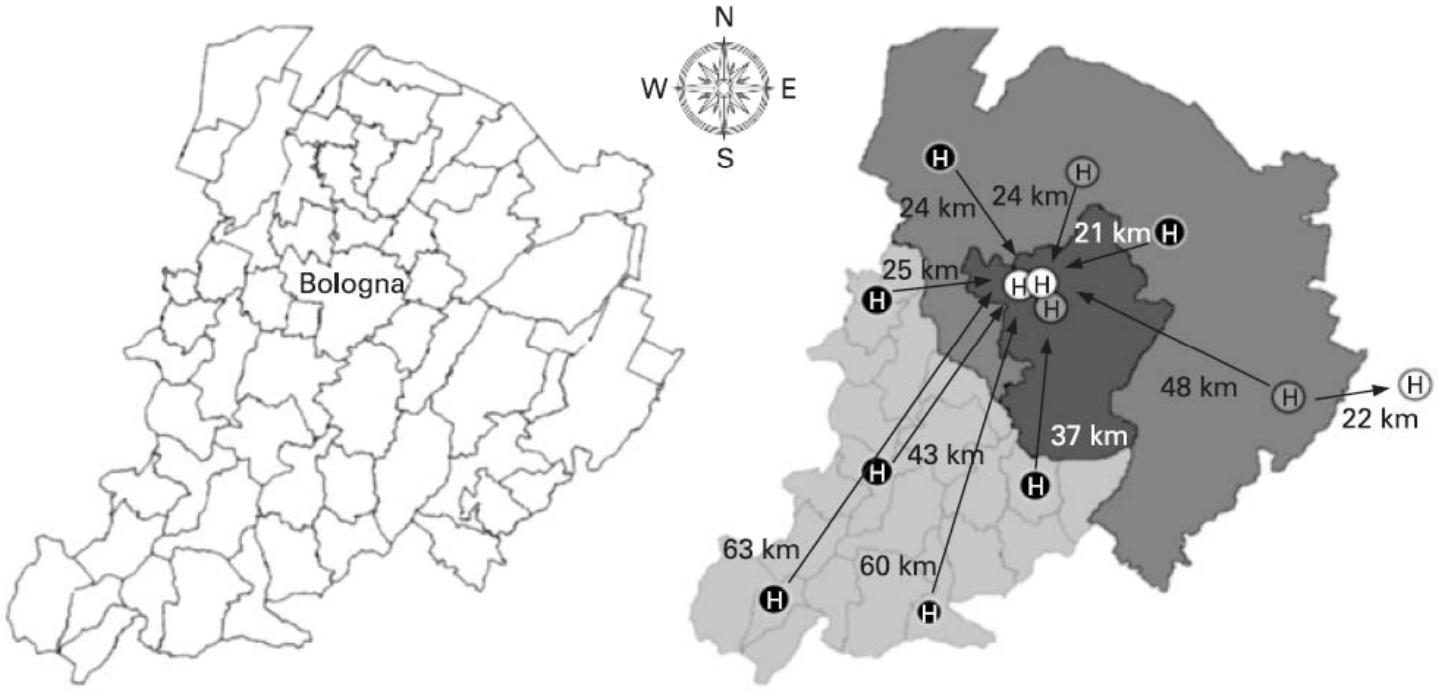


Bohmer, JACC 2009

MT

Bologna network

- reperfusion therapy: 58.4% ⟶ 76.3 %
- in-hospital mortality: 17.0% ⟶ 12.3 %



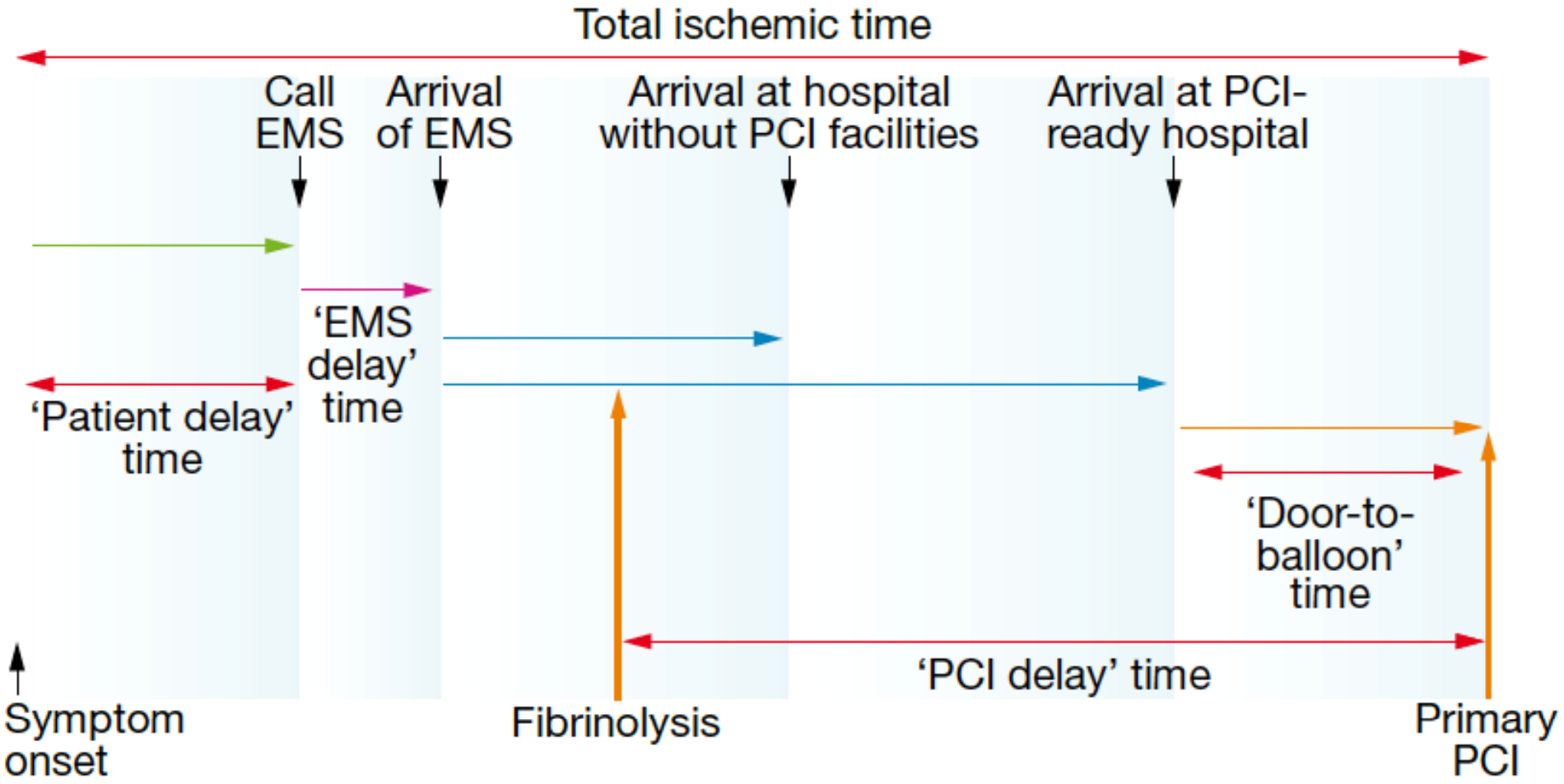
Saia Heart 2009

reti per lo STEMI - conclusioni

- chiara definizione delle aree di interesse
- protocolli scalari a seconda della stratificazione del rischio
- trasporti sicuri con ambulanze appropriatamente equipaggiate in termini di macchinari e personale
- stretta organizzazione di riduzione dei ritardi: ≤ 10 min trasmissione ECG, ≤ 5 min teleconsulto, ≤ 30 min D2N, ≤ 30 min D2B (in ospedale)
- protocolli di trasporto pre-ospedaliero che bypassino gli ospedali senza emodinamica h 24
- bypass del DEA e dell'UTIC in caso di PCI primaria
- stretta cooperazione tra 118, cardiologi e centri ospedalieri
- utilizzare la trombolisi pre-ospedaliera ogniqualvolta sia indicata
- utilizzare tutte le strategie terapeutiche per migliorare l'esito della PCI primaria

Rokos IC. Am Heart J 2006;152:55.

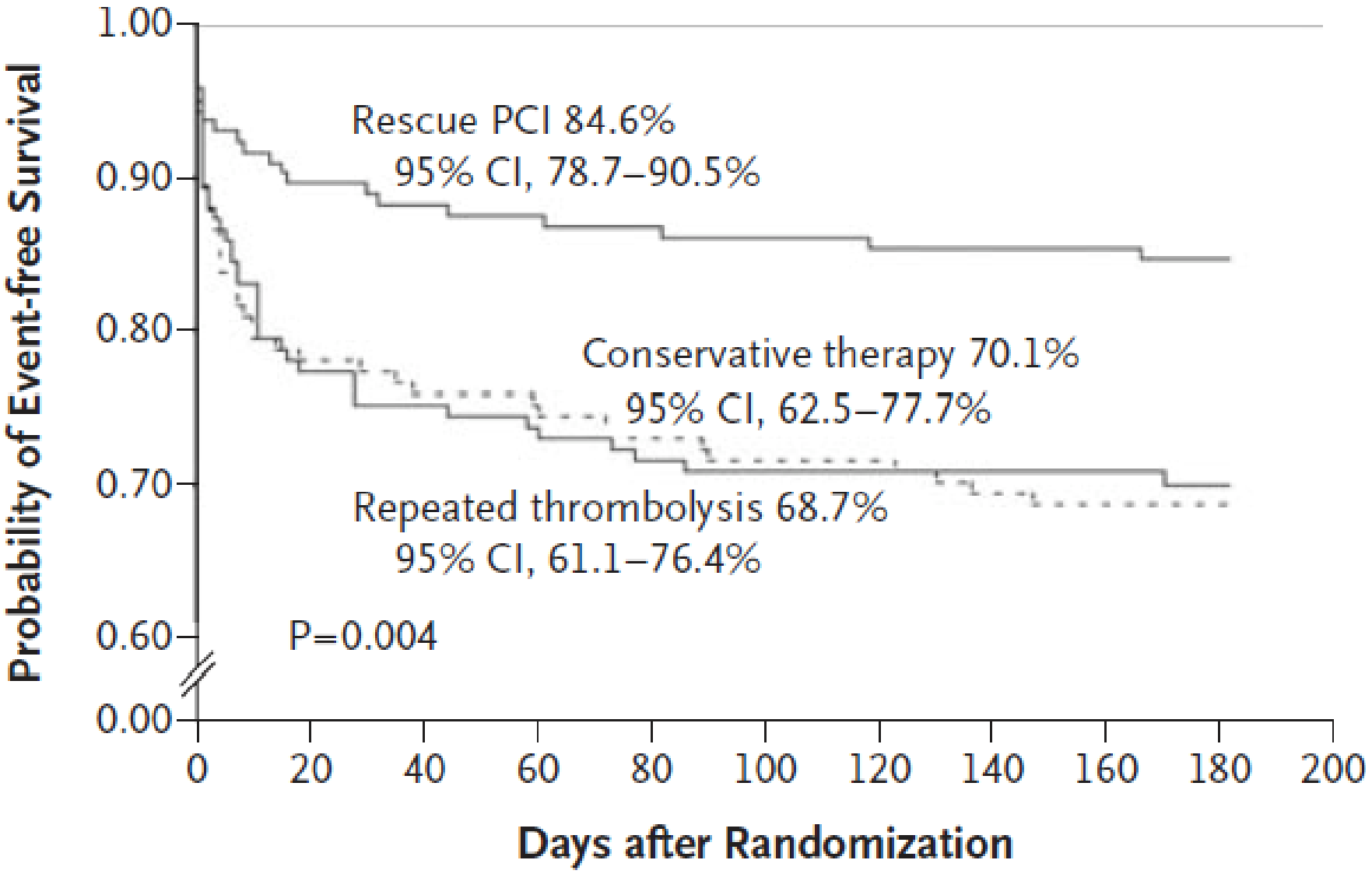
components of total delay in STEMI reperfusion



Fox KAA, Nat Clin Pract CV Med 2008

MT

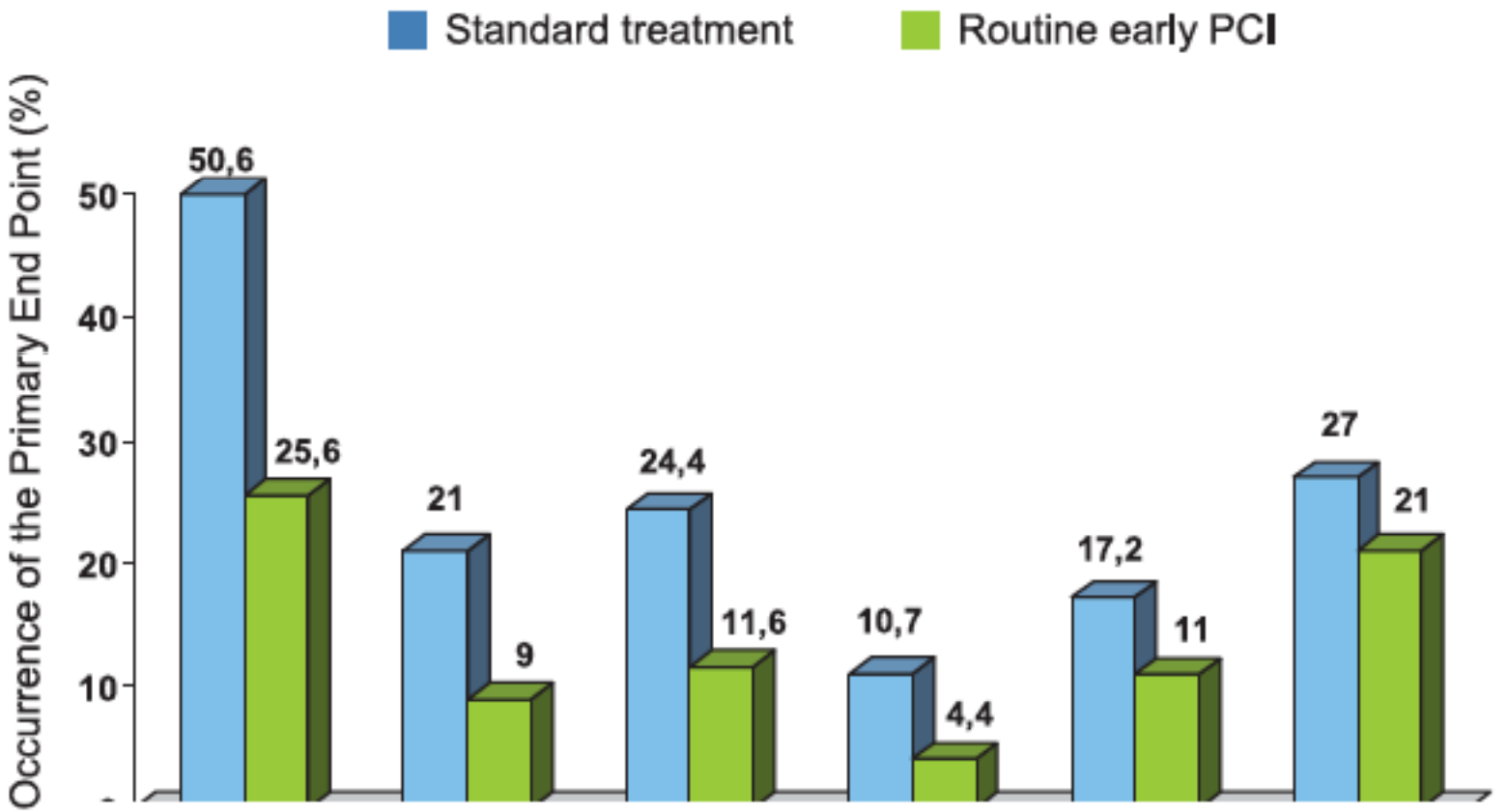
REACT trial: rescue PCI in STEMI



Gershlick AH. N Engl J Med 2005;353:2758.

MT

STEMI: routine early PCI after thrombolysis

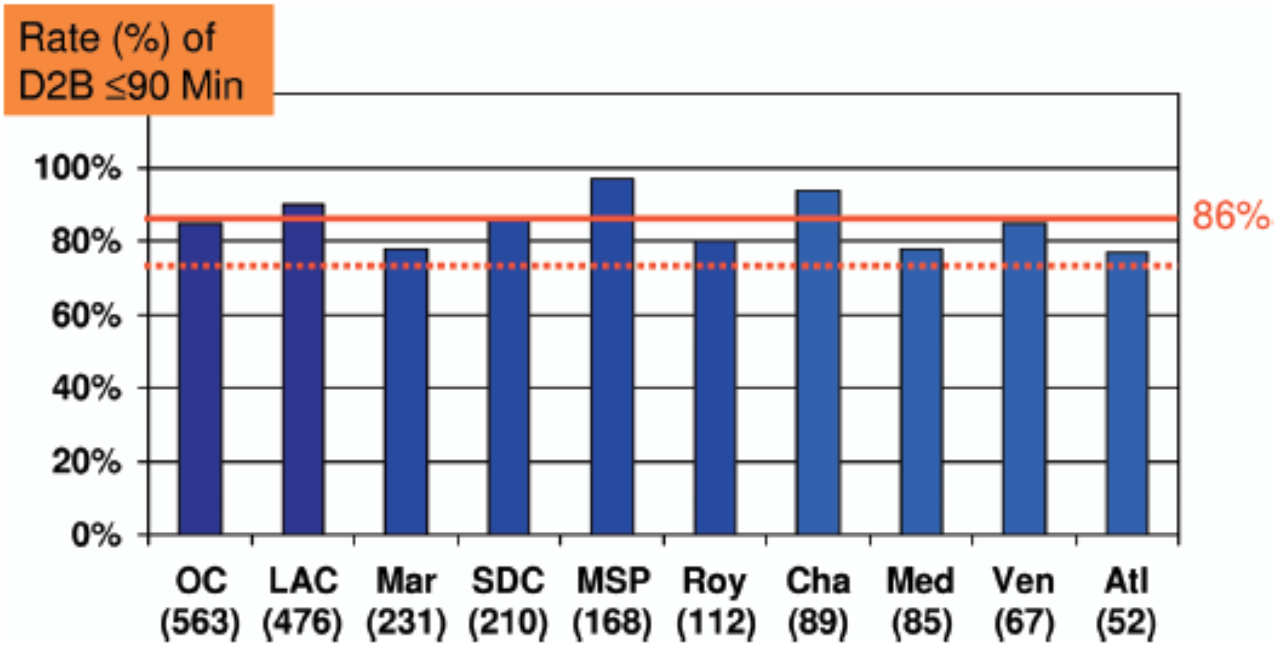


	SIAM-III	GRACIA-1	CAPITAL-AMI	CARESS-in-AMI	TRANSFER-AMI	NORDISTEMI
N	163	500	170	600	1059	266
Time from lysis to early PCI (hours)	3.5	17	1.5	2.3	3.9	2.7

Halvorsen S, Thromb & Haemost 2011

pre-hospital ECG & SRC networks

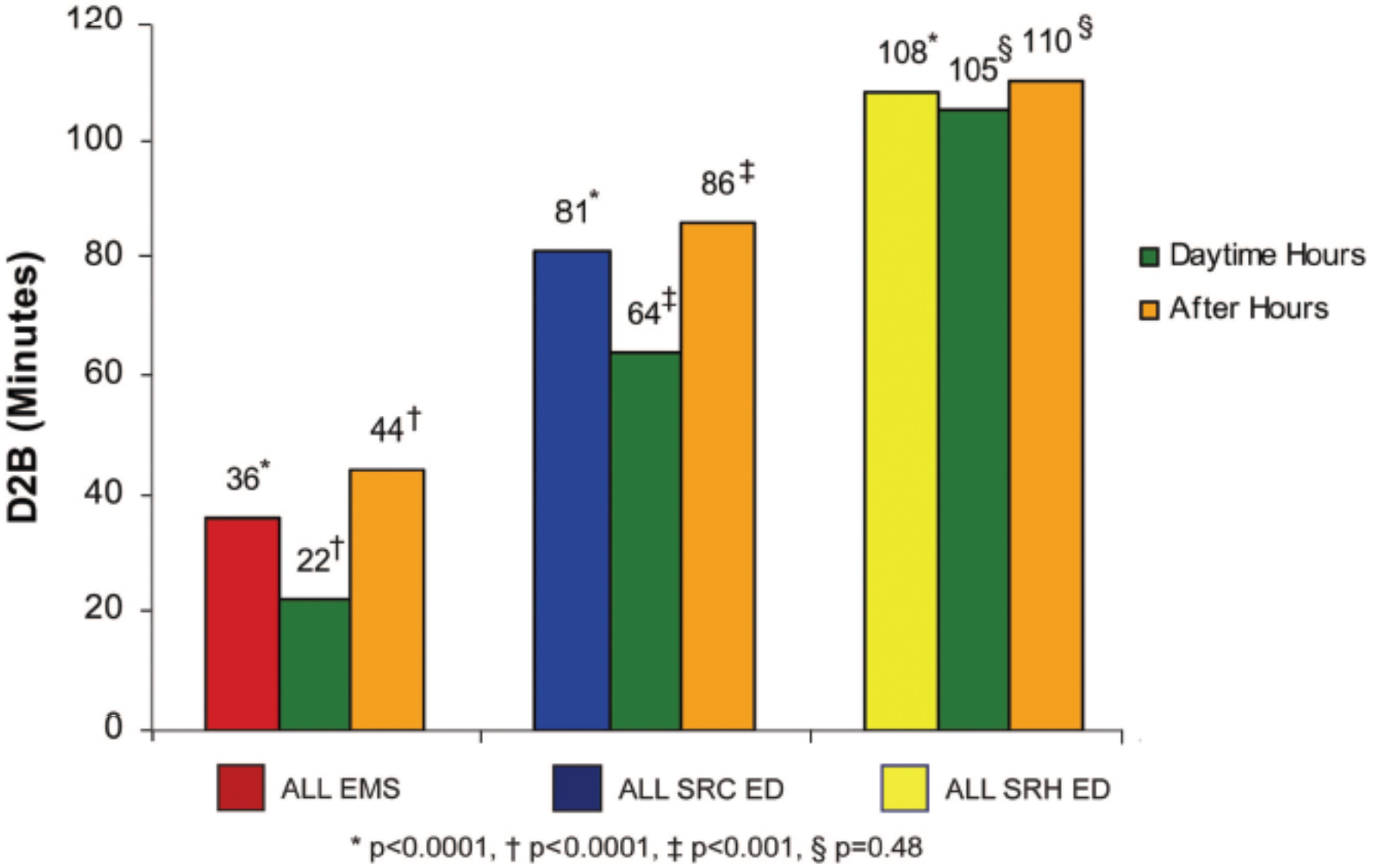




Rokos IC. JACC Intv 2009

MT

PH-ECG and ED bypass in STEMI



Baran, Circ CQO 2010

MT

bypass emergency room

USIC 2000 Registry

	direct admission to ICCU/cath lab	admission via ER
symptom onset to admission (min)	244 ***	292
symptom onset to thrombolysis (min)	204 **	258
symptom onset to PCI (min)	292 **	402
mortality at 5 days (%)	4.9 *	8.6

admission via ER independently predicts mortality: OR 1.67 (1.01-2.75)

Steg PG, Heart 2006

high risk pts (DANAMI-2)

	3 yrs mortality (%)	
	fibrinolysis	primary PCI
low risk #	5.6	8.0
high risk §	36.2	25.3 *

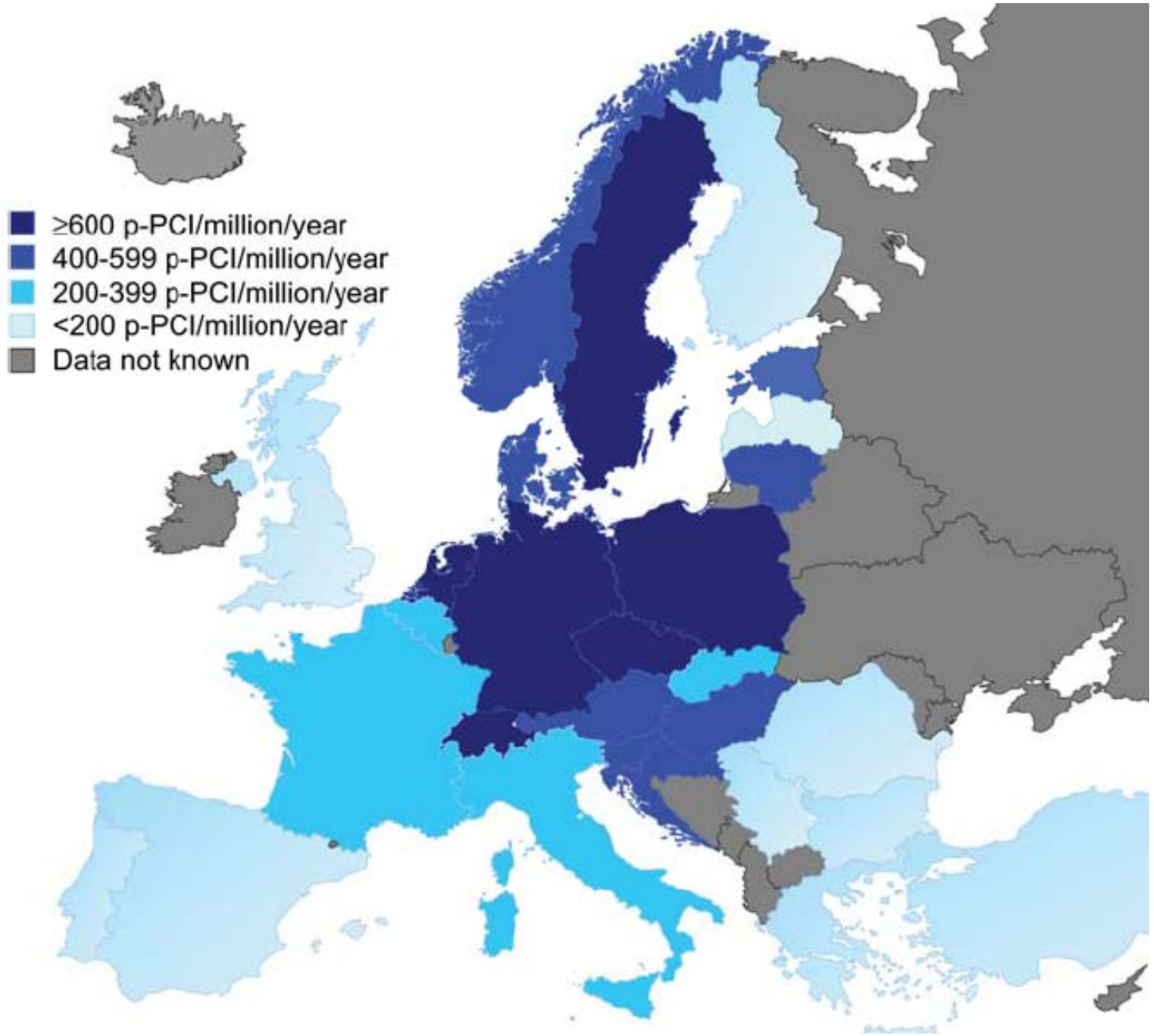
	3 yrs event rate¶ (%)	
	fibrinolysis	primary PCI
low risk #	15.7	13.7
high risk §	45.9	32.3 *

 # TIMI risk score 0-4; § TIMI risk score ≥ 5
¶ death, reinfarction, disabling stroke

Thune JJ, Circulation 2005;112:2017

MT

primary PCI in Europe

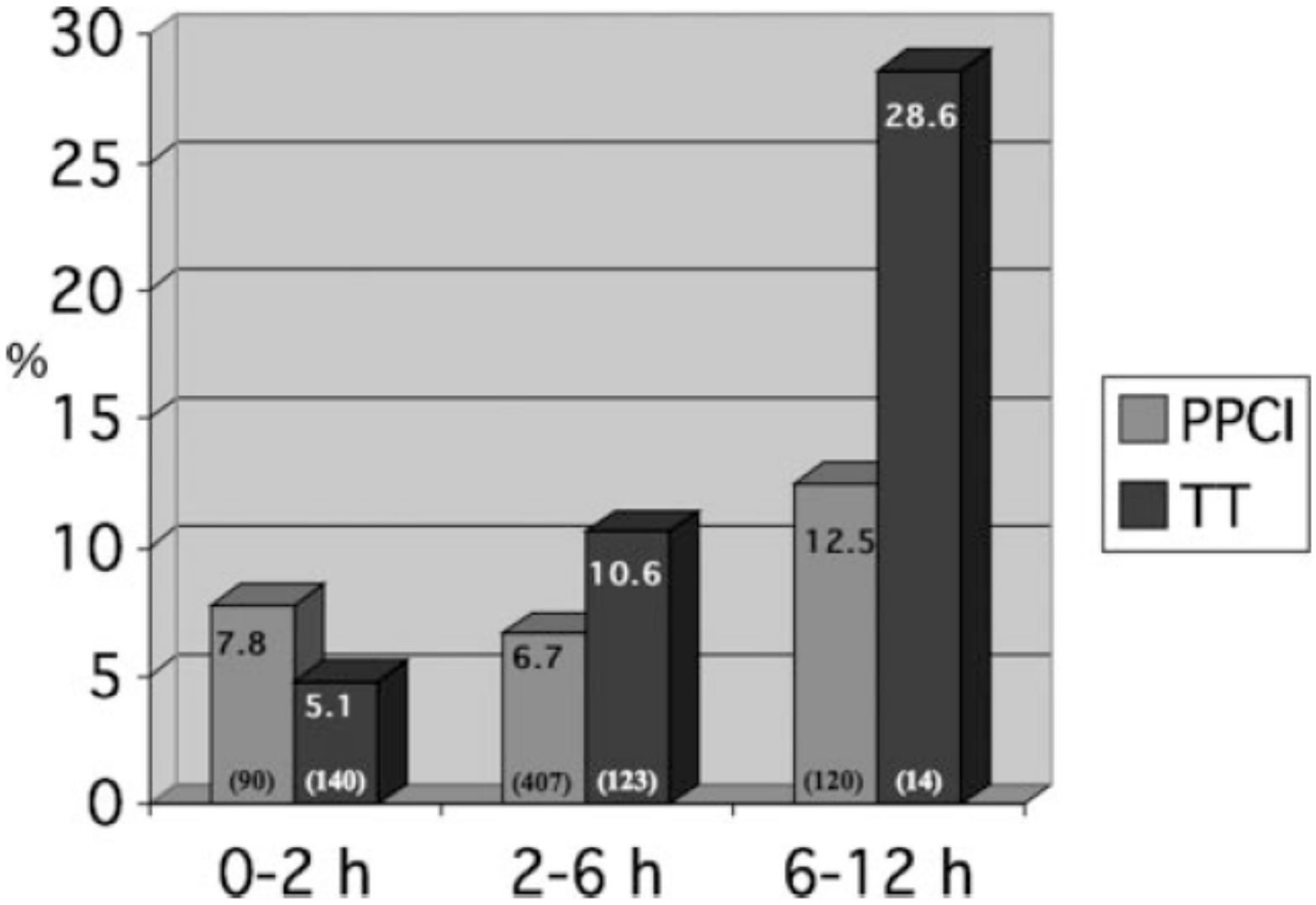


Widimski P, EHJ 2010

MT

time to treatment and mortality

- Vienna STEMI Registry -



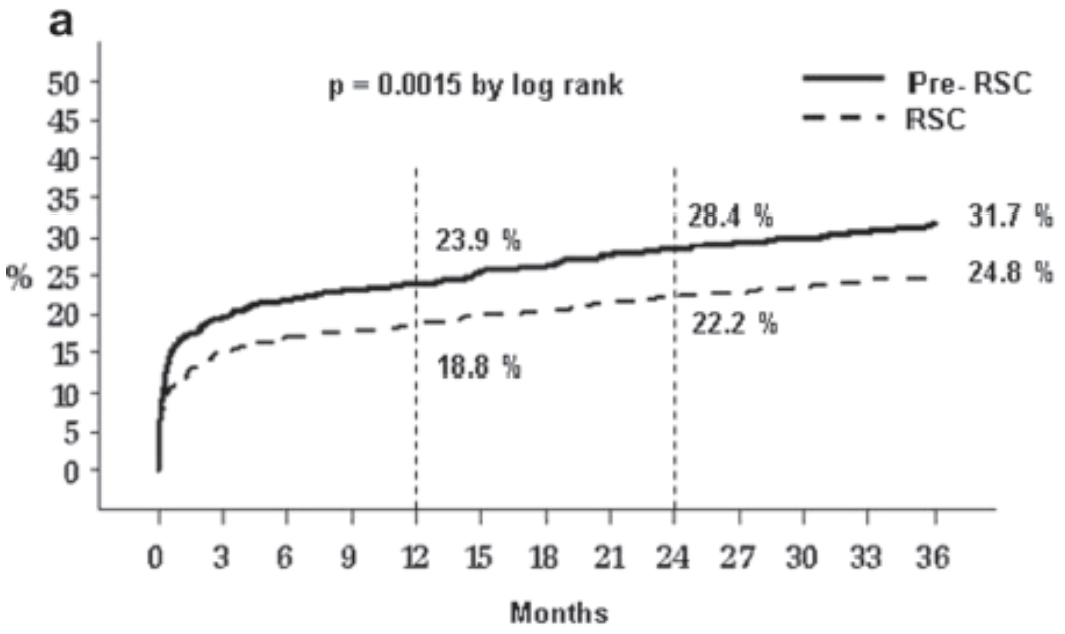
Kalla K, Circulation 2006;113:2398

MT

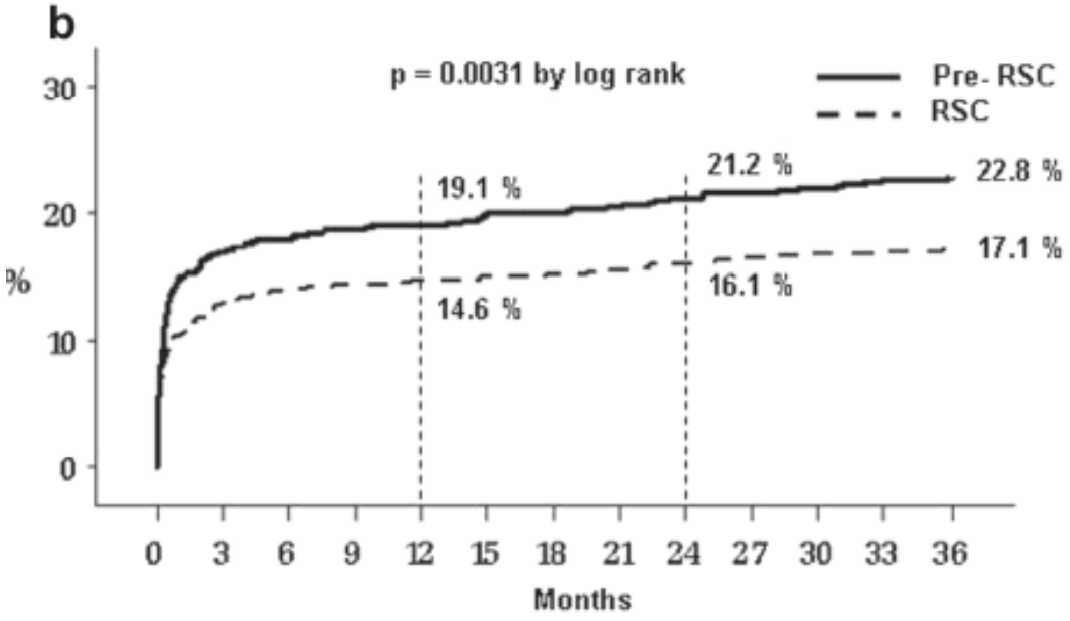
long-term mortality in a regionalized STEMI system of care

Bologna

mortality



cardiac mortality



MT

strategies to reduce D2B time

6 strategies significantly associated with a reduced D2B time

1. cath lab activation by the EMS physician
2. single call to a central page operator
3. ED activates cath lab while patient is *en route*
4. cath lab staff arrival within 20 min from page
5. attending cardiologists always on site
6. real-time data feedback to ED and cath lab staff

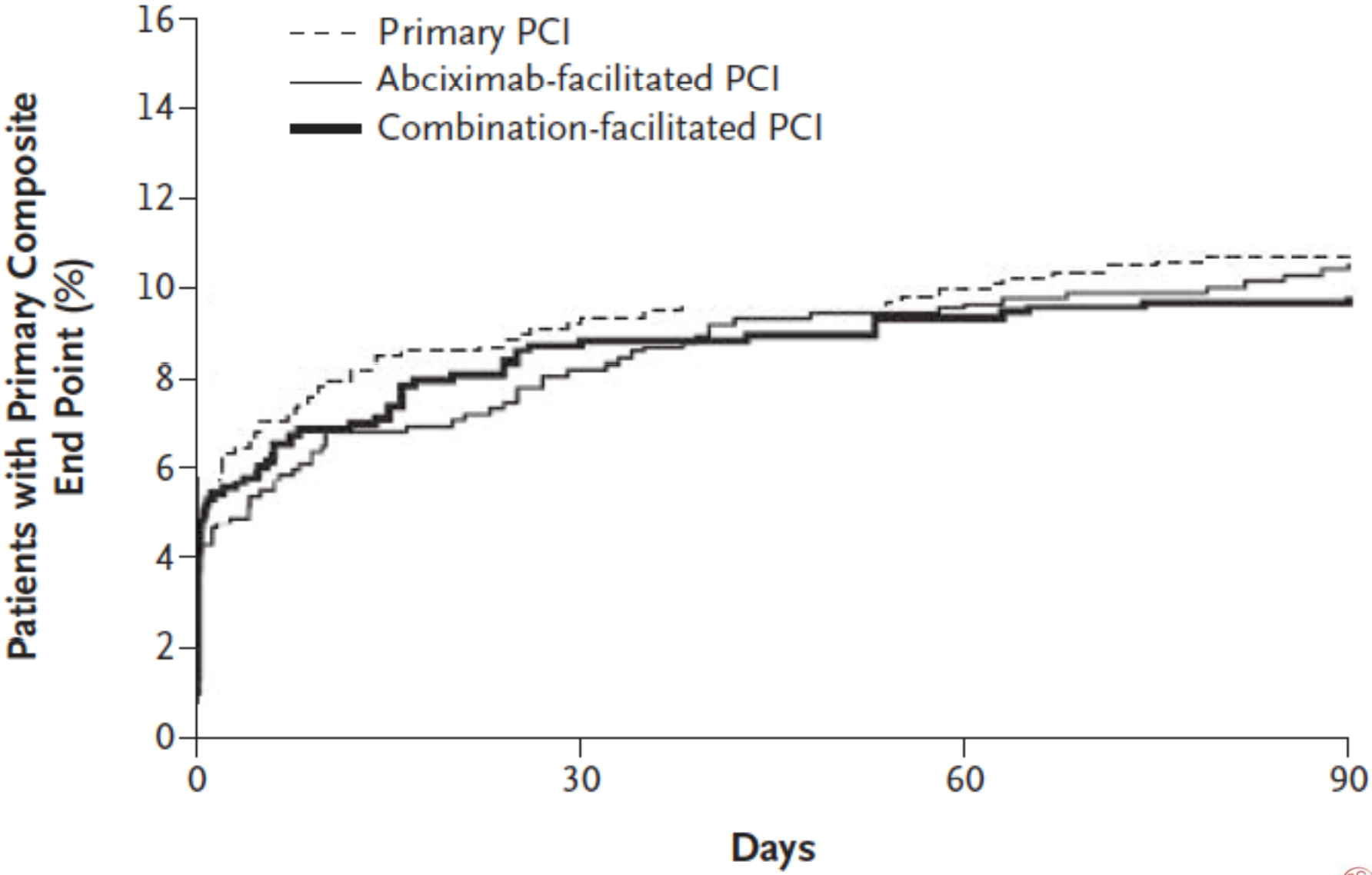
Table 4. Door-to-Balloon Time According to the Number of Key Strategies Used.*

Number of Key Strategies	Hospitals with the Number of Key Strategies (N=362)	Average of Median Door-to-Balloon Times†
	no. (%)	*minutes*
0	137 (37.8)	110
1	130 (35.9)	100
2	56 (15.5)	88
3	31 (8.6)	88
4	8 (2.2)	79

Bradley EH, NEJM 2006

MT

FINESSE: facilitated PPCI in STEMI

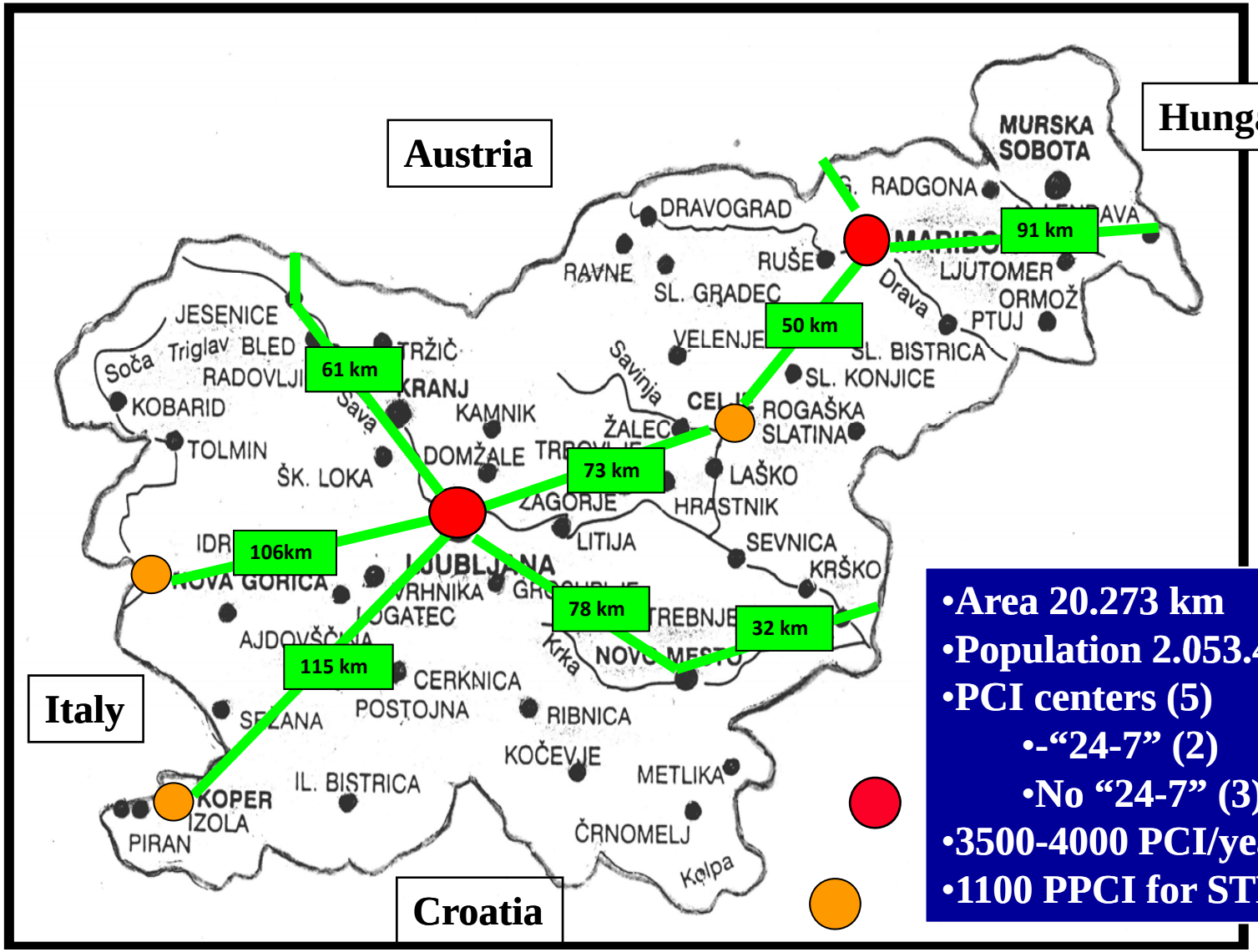


Ellis SG. N Engl J Med 2008

MT

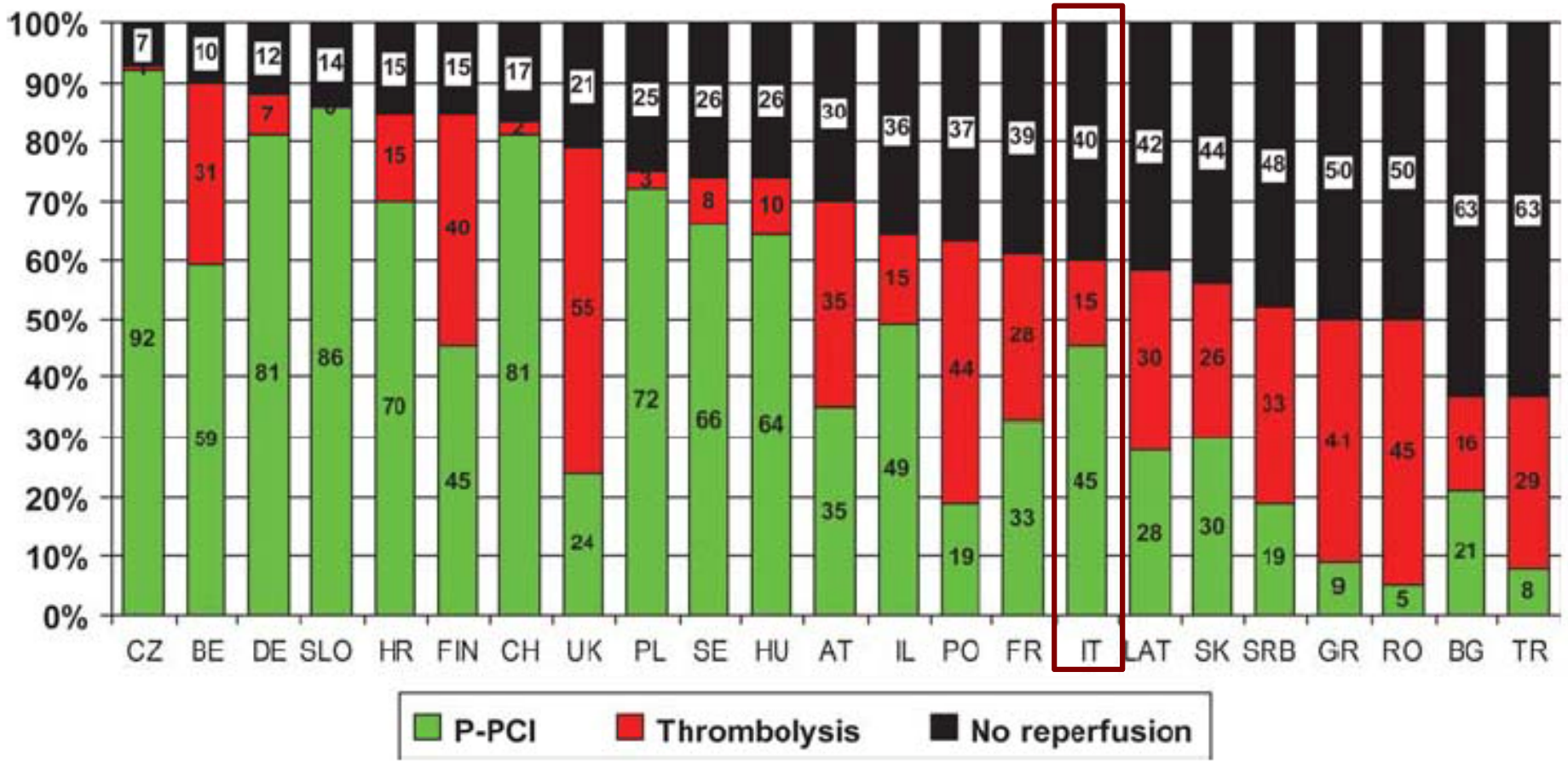
back-up slides

SMALL COUNTRY, HIGHWAYS, ACCEPTABLE TRAFIC, HELICOPTER FOR REMOTE AREAS....



- Area 20.273 km
- Population 2.053.470
- PCI centers (5)
  - -"24-7" (2)
  - No "24-7" (3)
- 3500-4000 PCI/year
- 1100 PPCI for STEMI

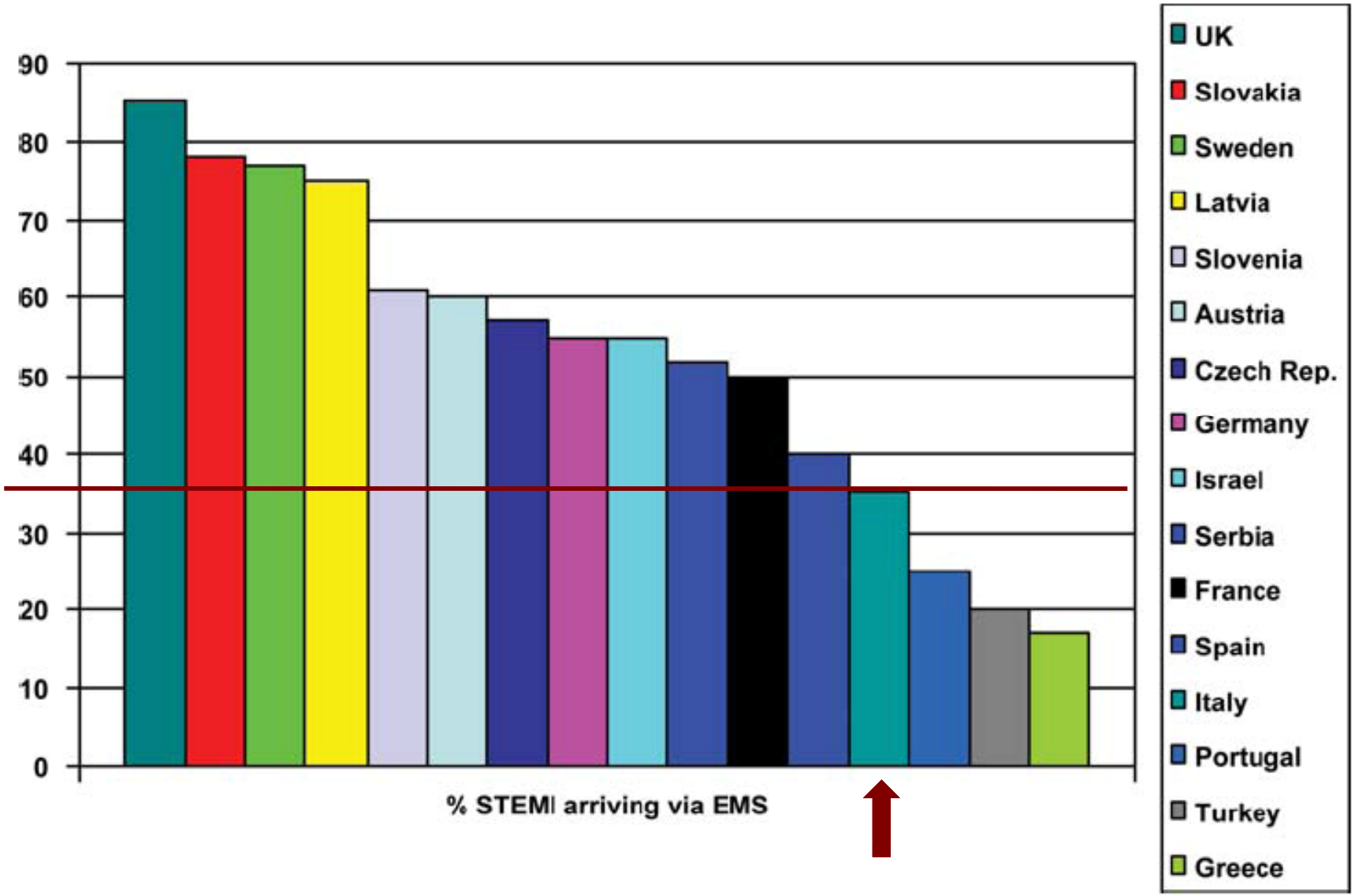
STEMI reperfusion treatment in Europe



Widimski P, EHJ 2010

MT

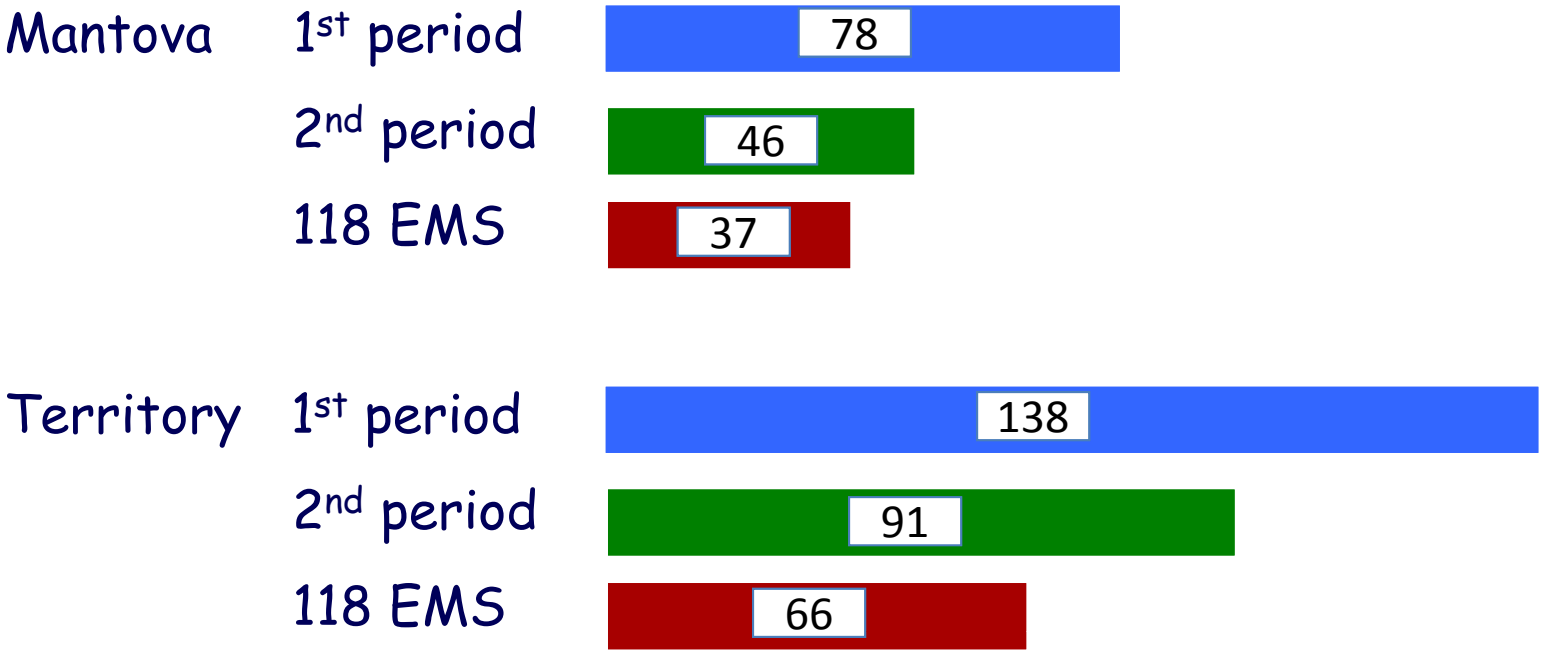
EMS use for STEMI in Europe



Widimski P, EHJ 2010

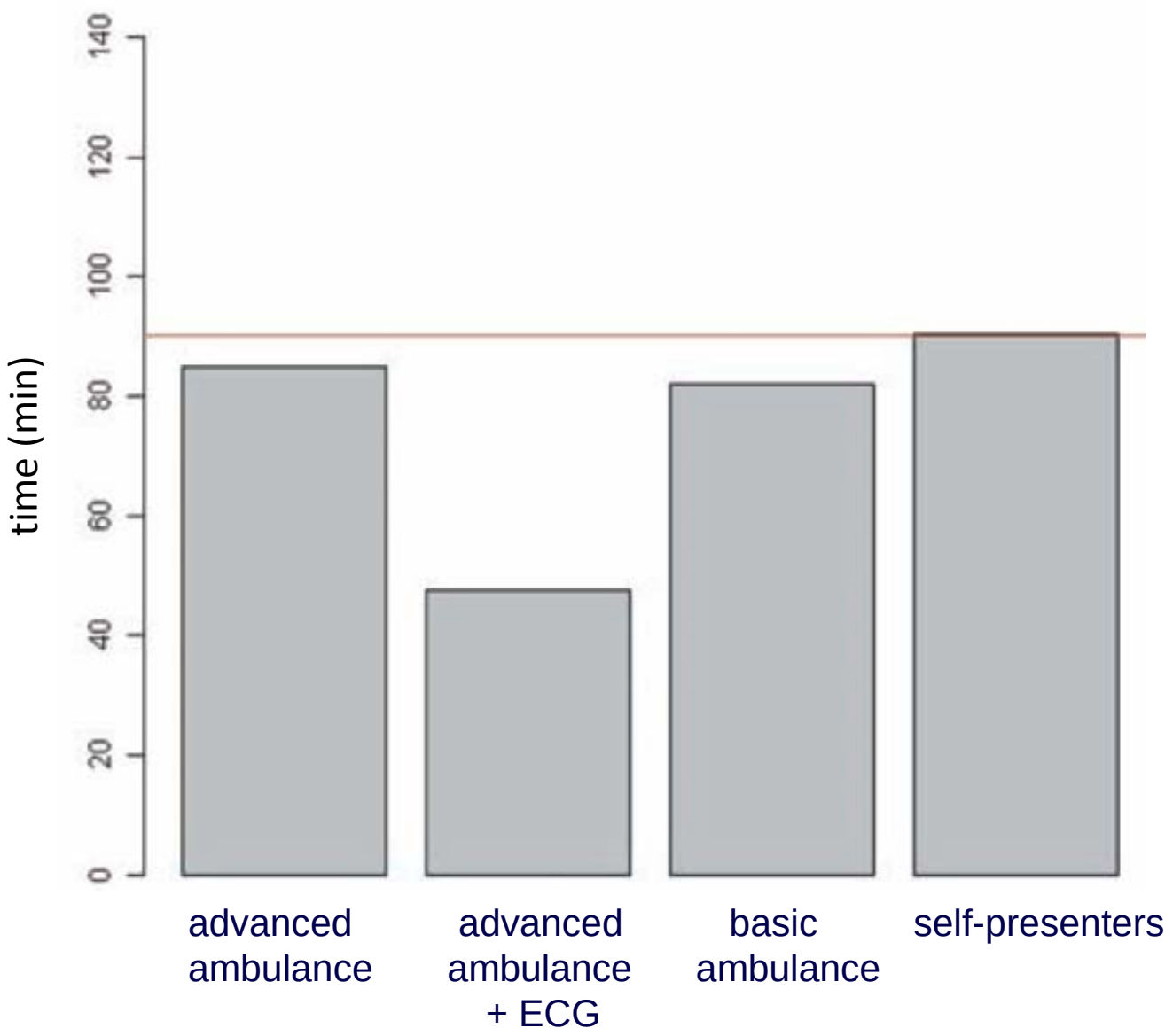
MT

emergency number



Zanini R, Ital Heart J Suppl 2003

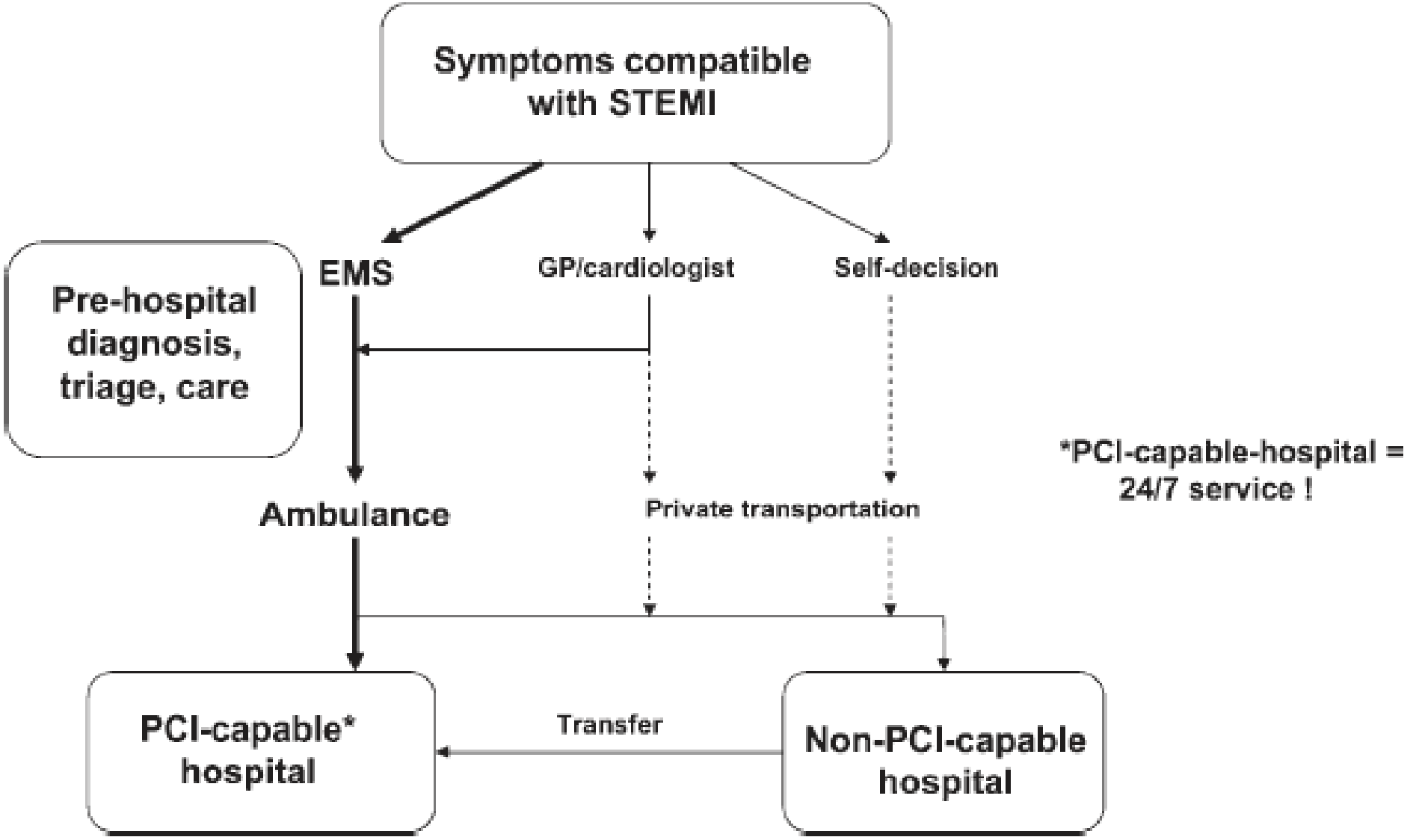
Milan STEMI network



Marzegalli M. G Ital Cardiol 2008

MT

pre-hospital management



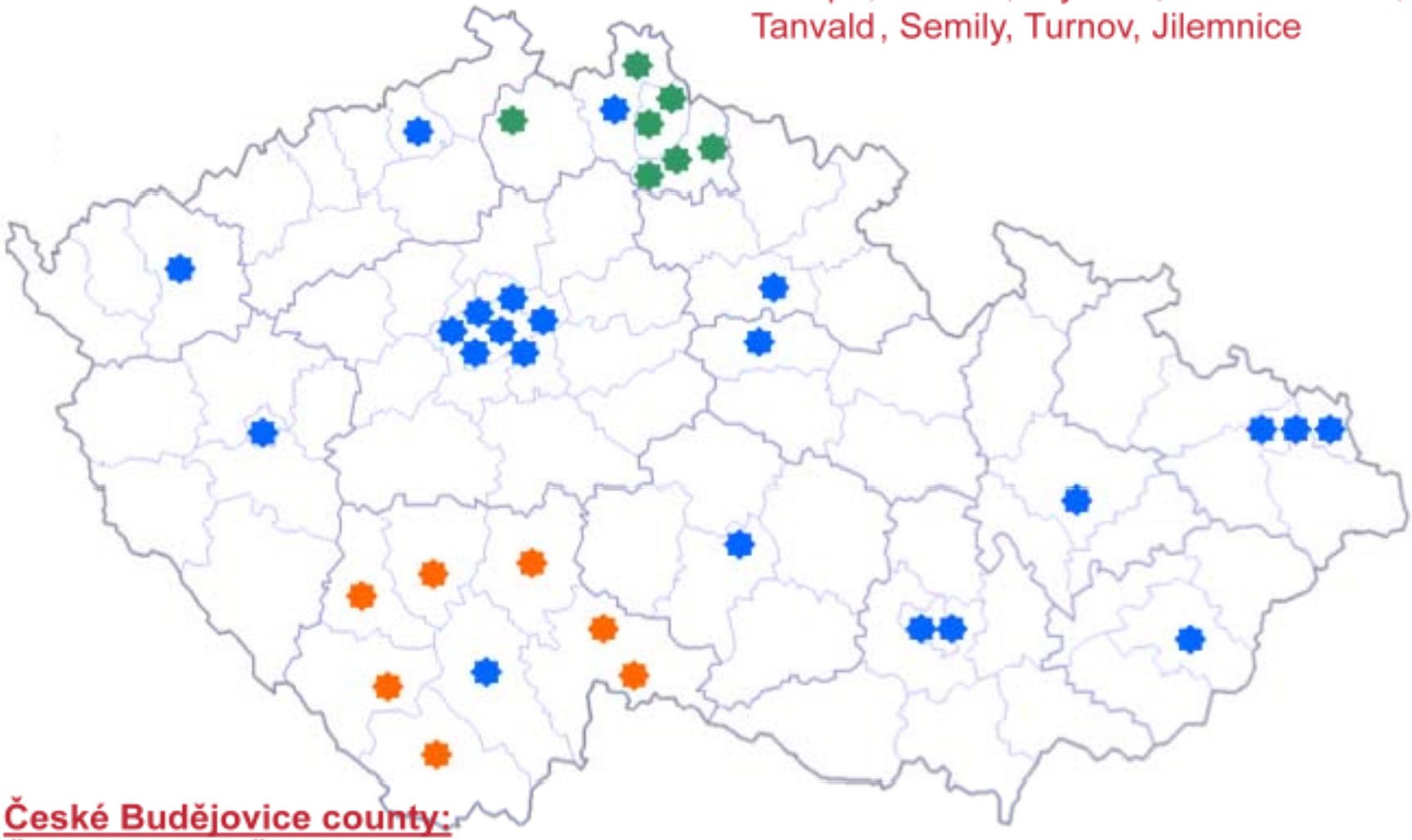
MT

Czech Republic: 22 PCI centers / 10,3 mil.

- each region with > 0,3 mil. population has PCI center
- no place in the country has > 100 km to PCI

Liberec county:

Č. Lípa, Liberec, Frýdlant, Jablonec n.N., Tanvald, Semily, Turnov, Jilemnice

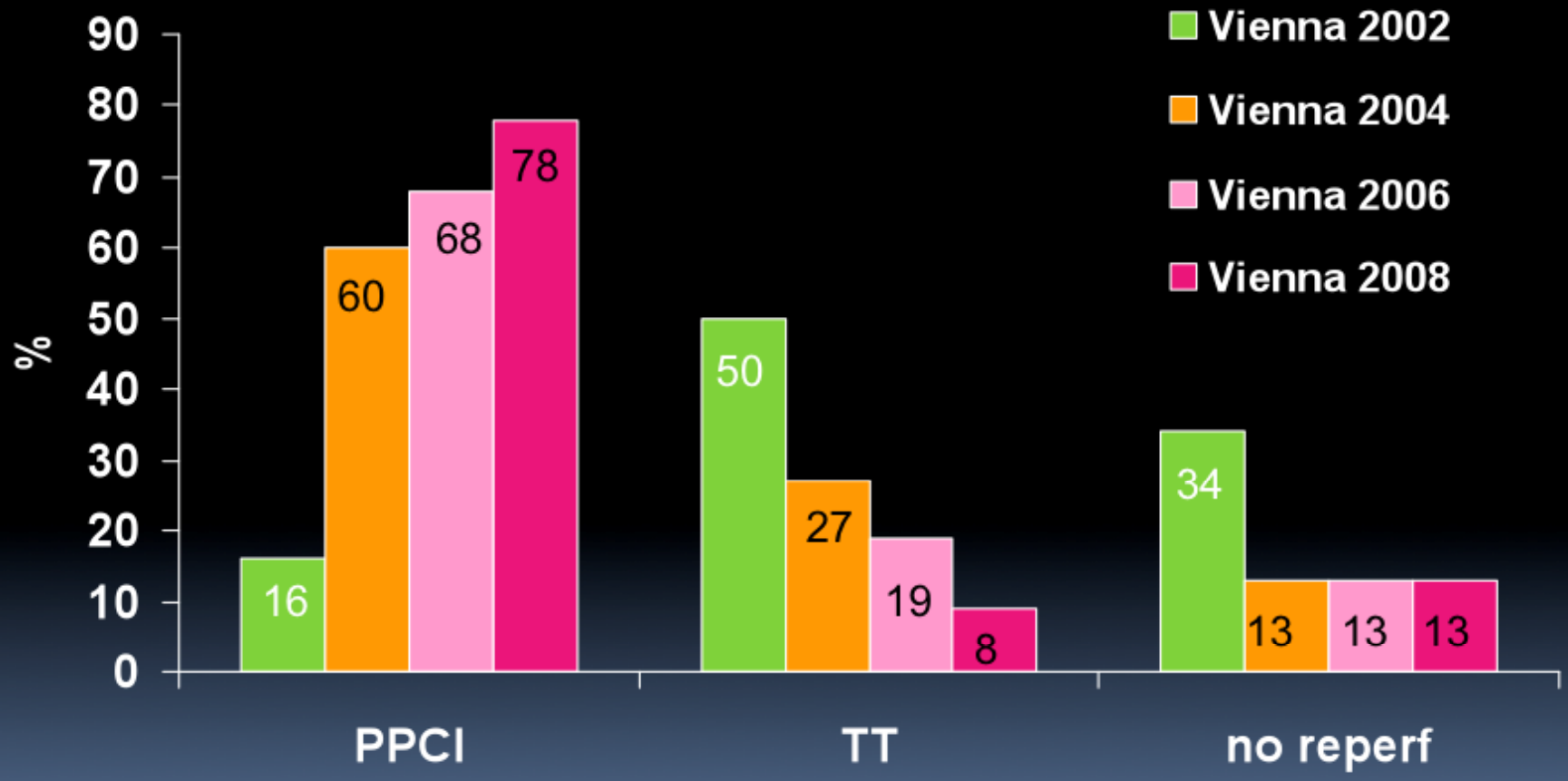


České Budějovice county:

Č. Budějovice, Č. Krumlov, Prachatice, Strakonice, Písek, Tábor, Jindřichův Hradec, Dačice

Vienna STEMI registry

Changes in reperfusion strategies 2002-2008



Courtesy K. Huber

pre-hospital emergency cardiac care

The Lancet, Volume 290, Issue 7510, Pages 271 - 273, 5 August 1967
doi:10.1016/S0140-6736(67)90110-9 Cite or Link Using DOI

A MOBILE INTENSIVE-CARE UNIT IN THE MANAGEMENT OF MYOCARDIAL INFARCTION

J.F. Pantridge M.C., M.D. Belf., F.R.C.P. , J.S. Geddes M.D., B.Sc. Belf.

EDITORIAL COMMENT

Accelerating ST-Segment Elevation Myocardial Infarction Care

Emergency Medical Services Take Center Stage*

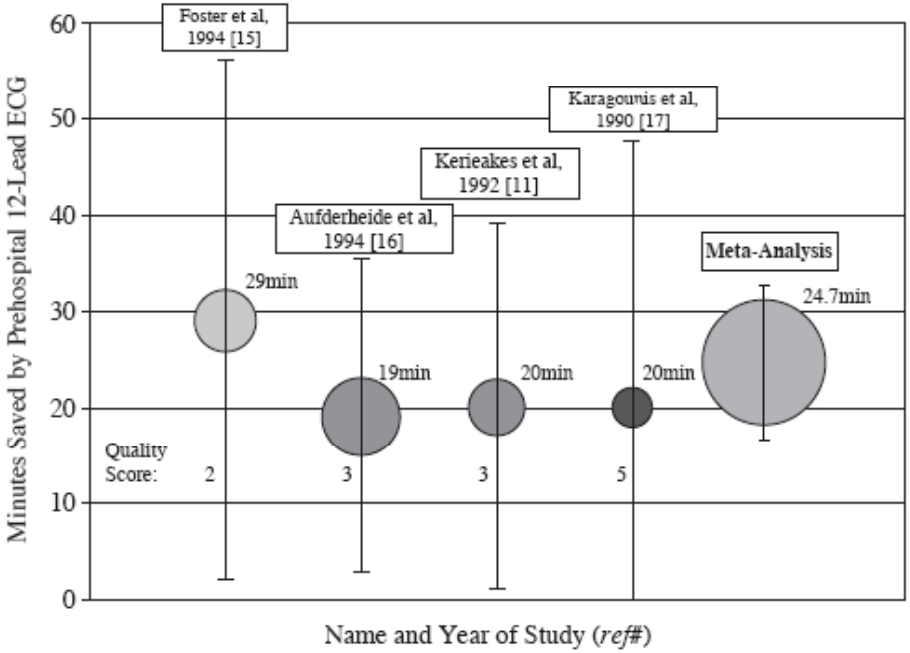
Christopher B. Granger, MD

Durham, North Carolina

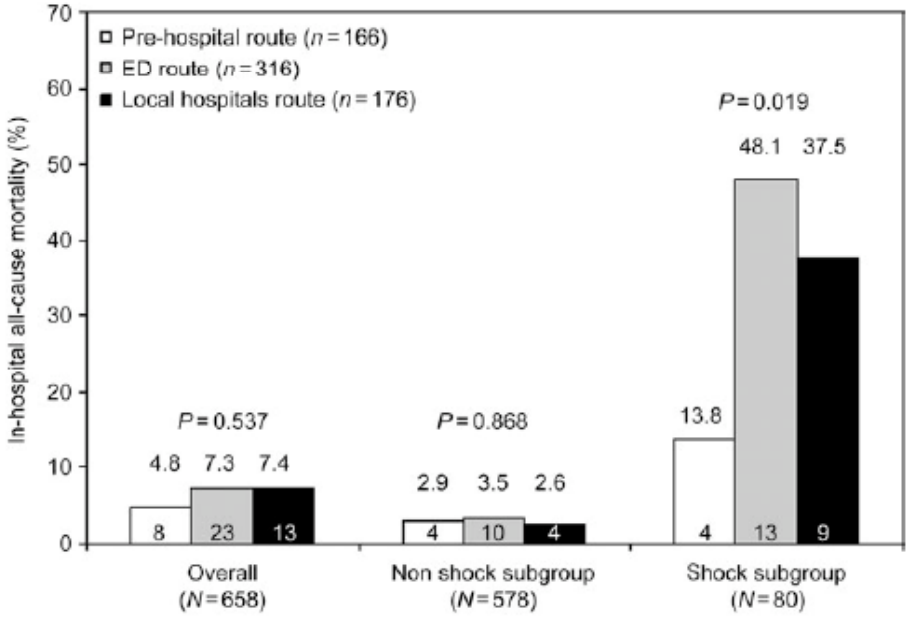
MT

pre-hospital triage

12 leads pre-hospital ECG
- meta-analysis -



cardiogenic shock
- Bologna, Italy -



Brainard AH, Am J Emerg Med 2005

Ortolani P, Eur Heart J 2006

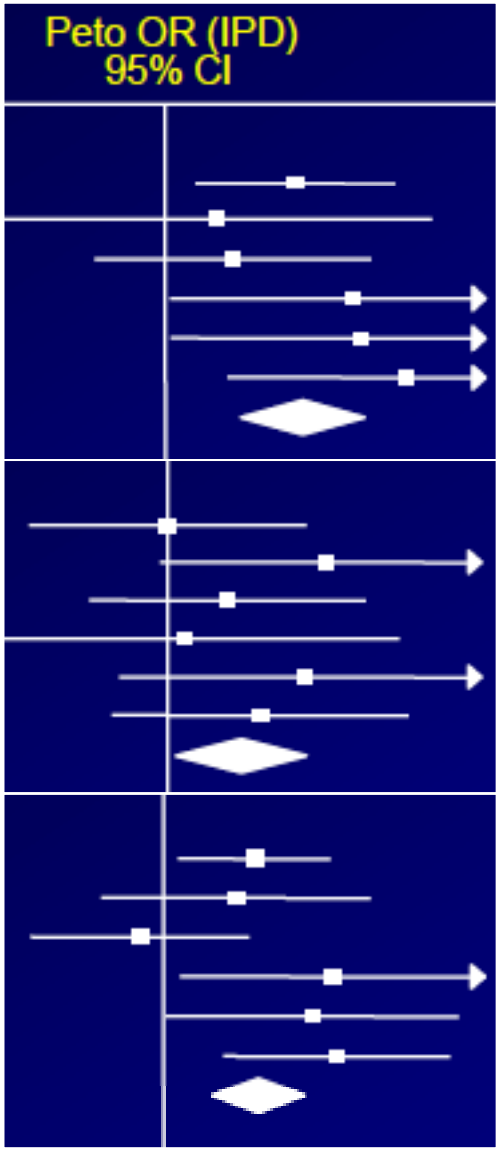
MT

EGYPT: early GPI in P-PCI
- abciximab data -

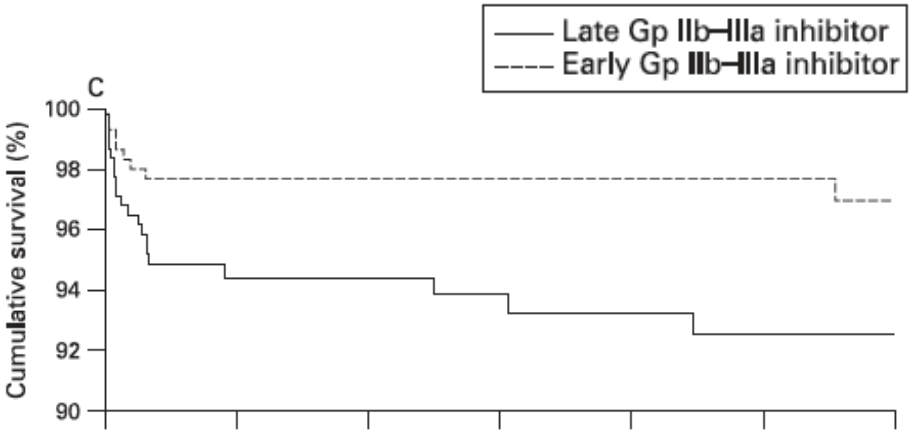
pre-procedural TIMI 3 flow

post-procedural TIMI 3 flow

ST segment resolution



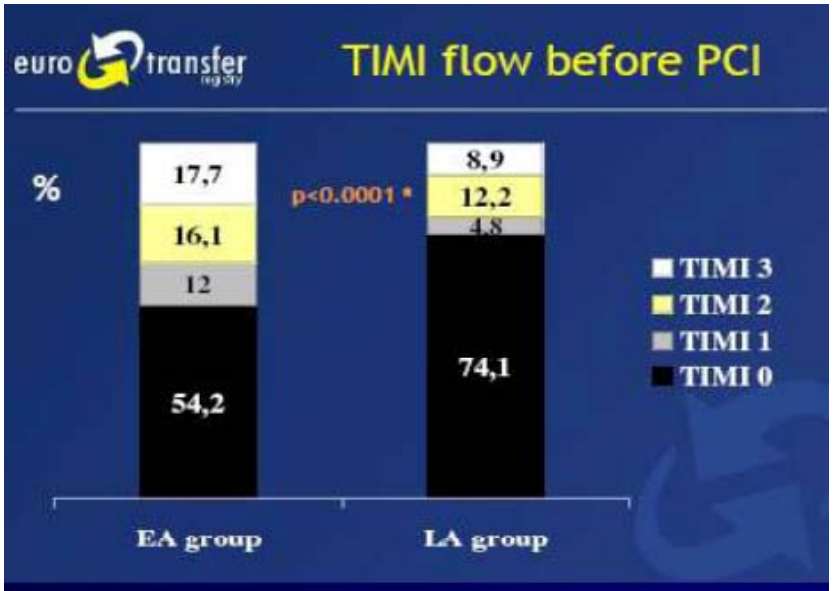
late abcx better early abcx better

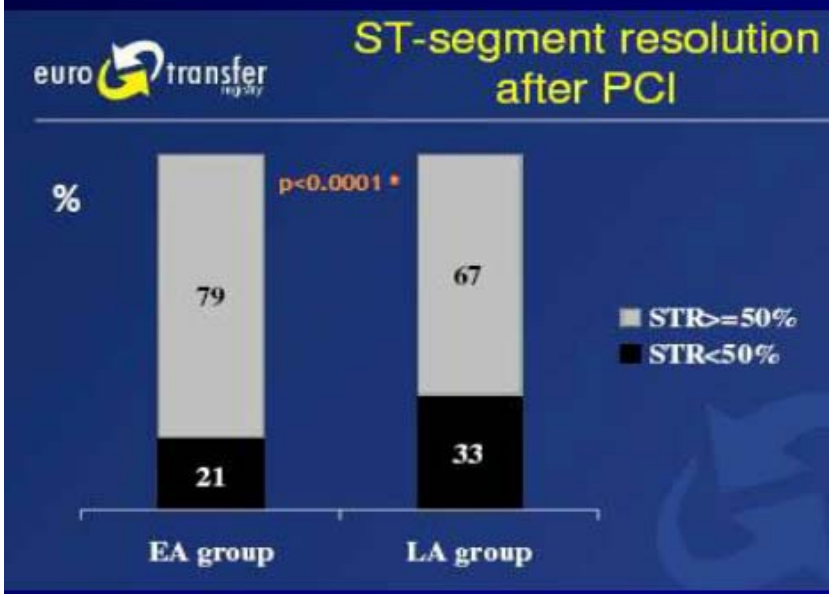


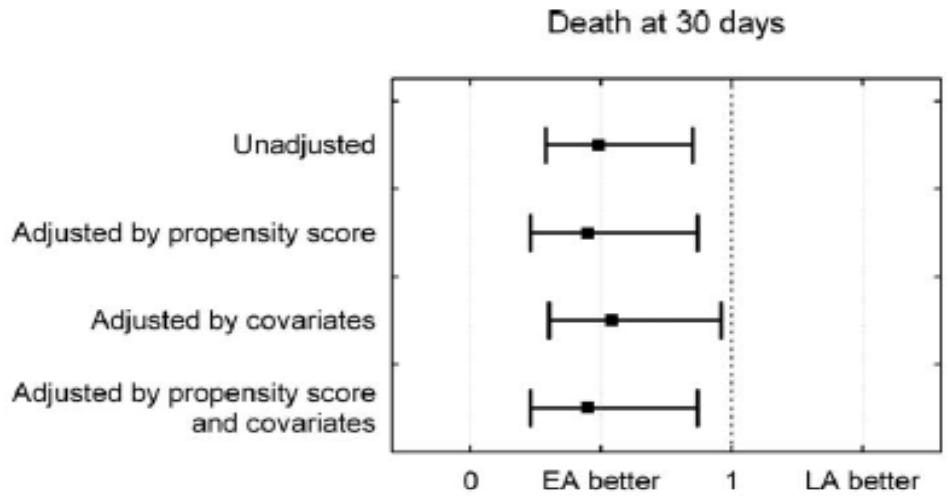
De Luca, Heart 2008

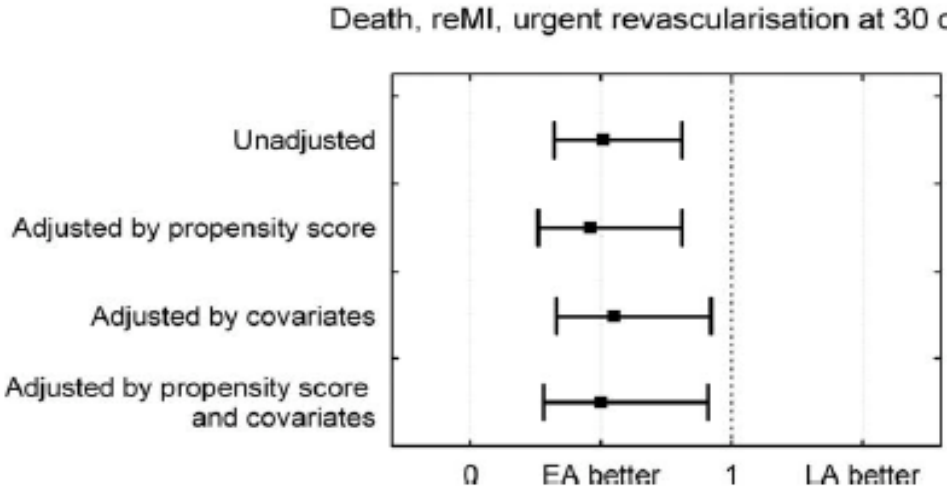
MT

EUROTRANSFER: early abciximab in P-PCI
- European multicentre registry -





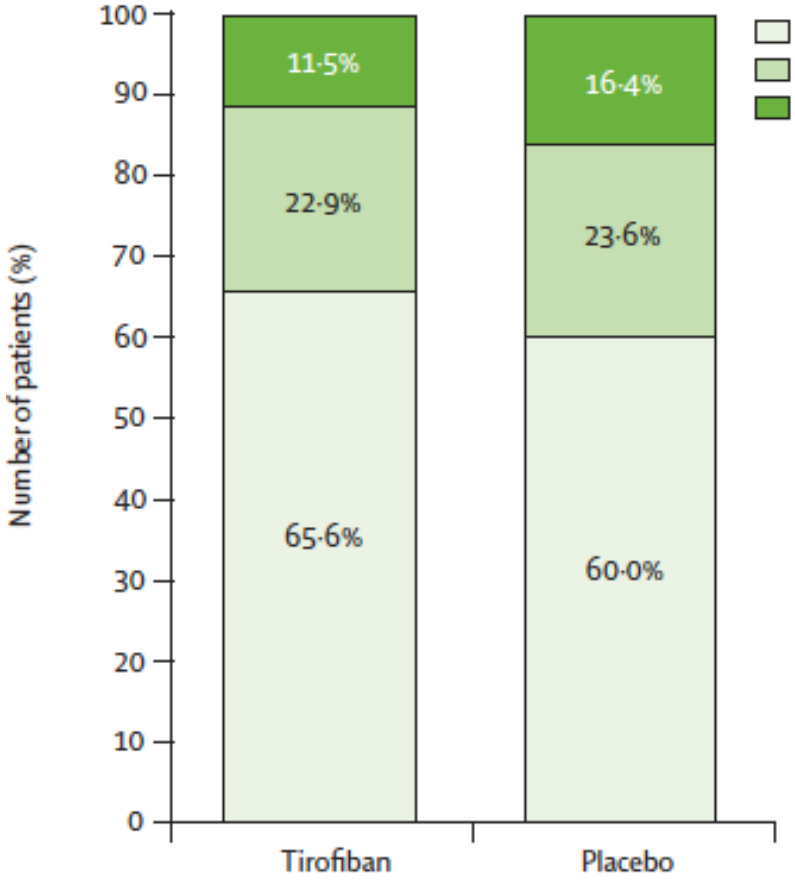




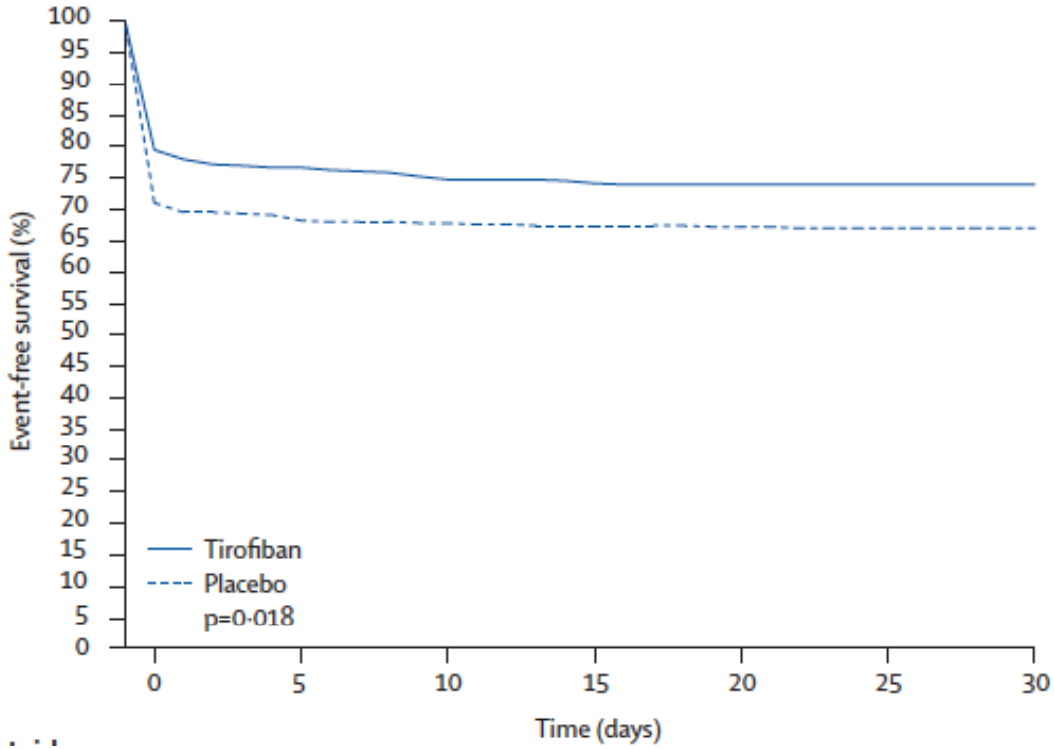
Dudek D, Am Heart J 2008

ON-TIME 2: pre-hospital tirofiban in PPCI in STEMI

ST resolution



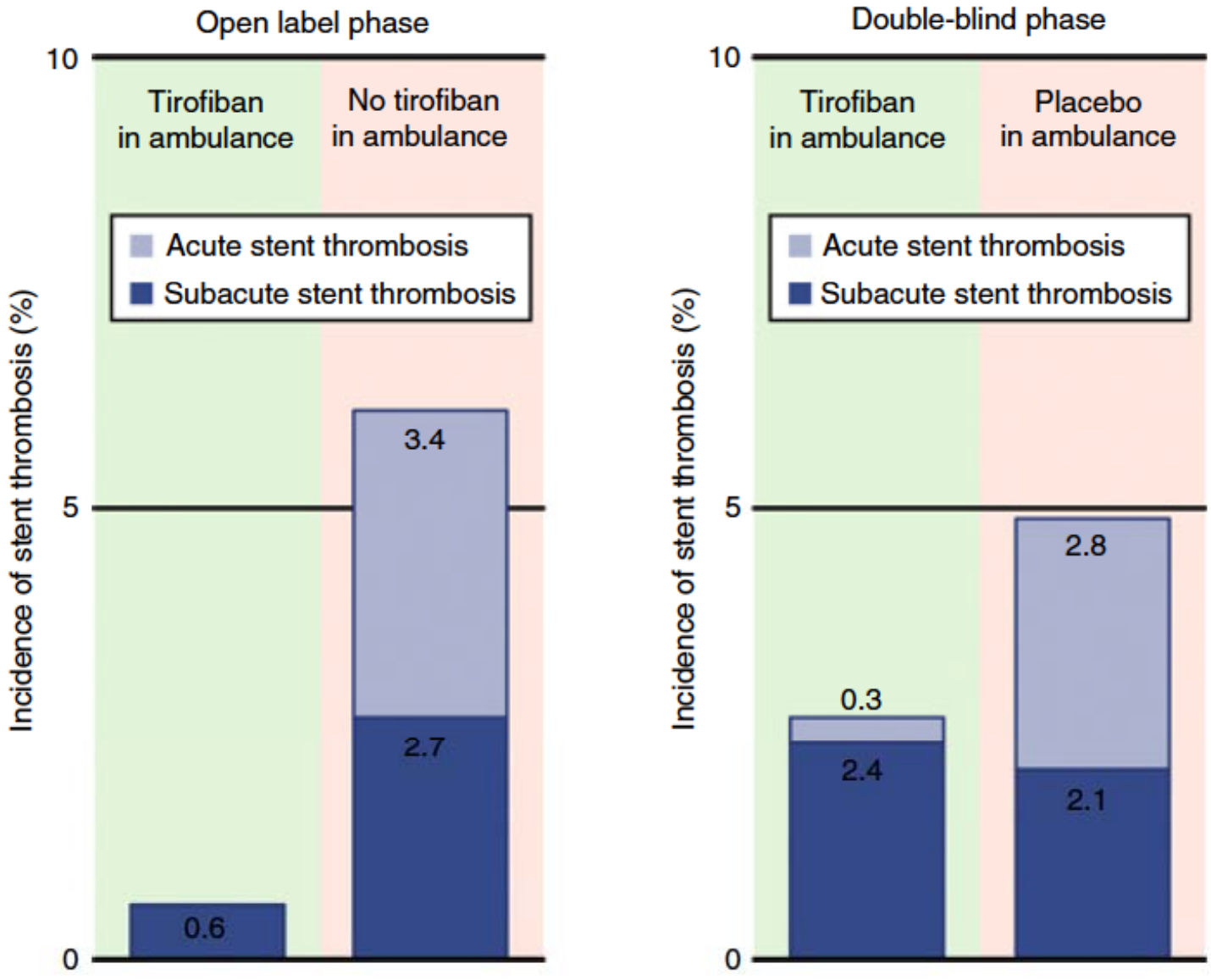
death – reMI – uTVR - bailout tirofiban



van't Hof AWJ, Lancet 2008

MT

On-TIME-2: pre-hospital high-dose tirofiban and early stent thrombosis



Heestermans AACM, J Thromb Haemost 2009

MT

organizzazione per la PCI primaria in Europa

condizione strutturale ottimale:

- 200-800 pPCI/centro/anno
- 50-100 pPCI/operatore/anno
- 0.3-1.1 milioni abitanti/centro pPCI

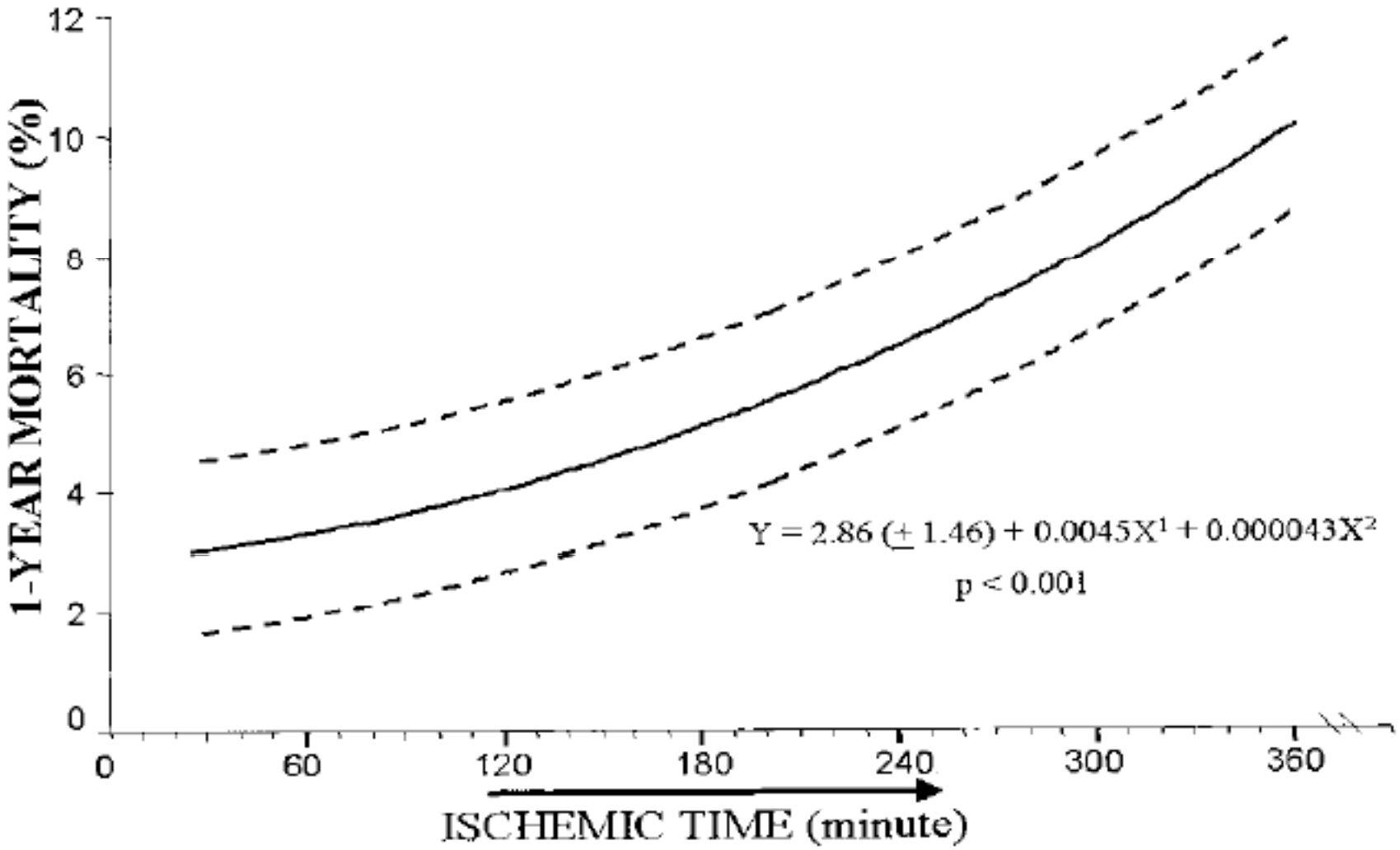
criticità

- personale scarso
- attitudine conservatrice dei cardiologi clinici
- motivazione insufficiente dei cardiologi interventisti
- mancanza di programmi di training
- mancanza di sostegno economico per i progetti di rete ("pay for performance")

Widimski P, EHJ 2010

MT

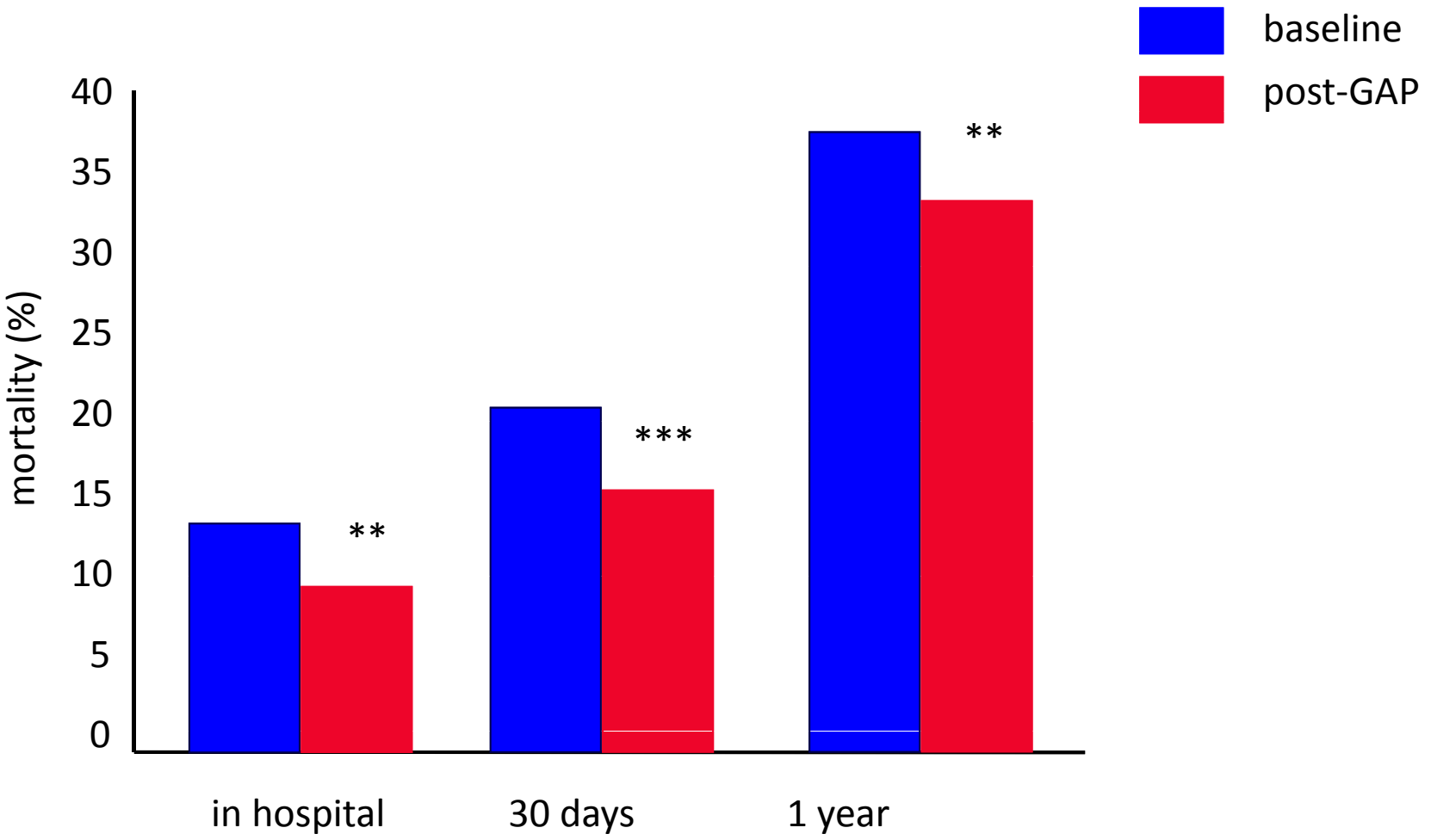
ischaemic time and mortality in P-PCI



De Luca G. Circulation 2004

MT

guidelines applied in practice (GAP) projects

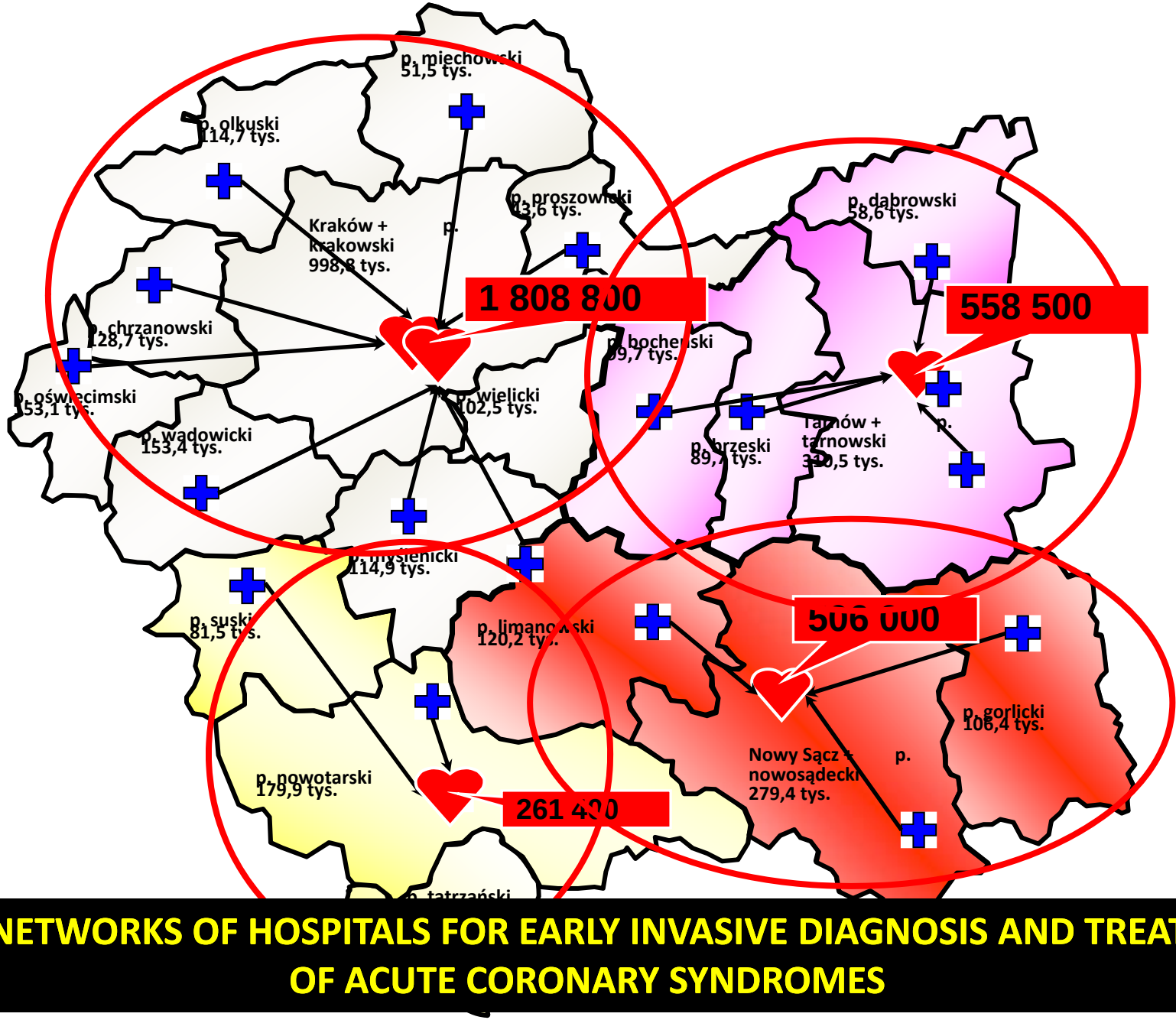


Eagle KA. JACC 2005;46:1242)

TRANSFER-AMI

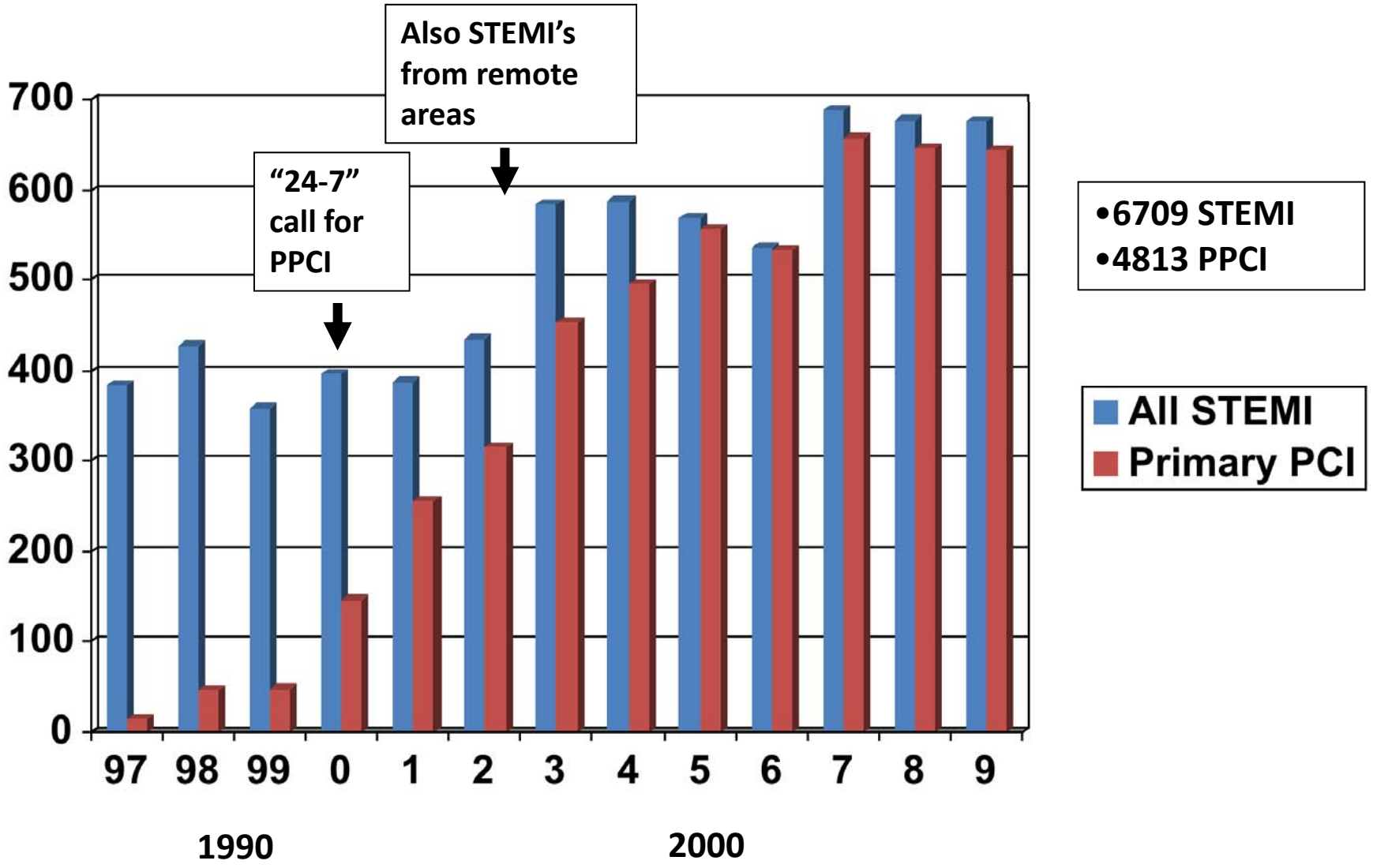
End-point	Standard (%)	Pharmacoinvasive (%)	p
Primary end point	16.6	10.6	0.0013
Death	3.6	3.7	0.94
Reinfarction	6.0	3.3	0.044
Recurrent ischemia	2.2	0.2	0.019
Death/MI/ischemia	11.7	6.5	0.004
New/worsening CHF	5.2	2.9	0.069
Cardiogenic shock	2.6	4.5	0.11

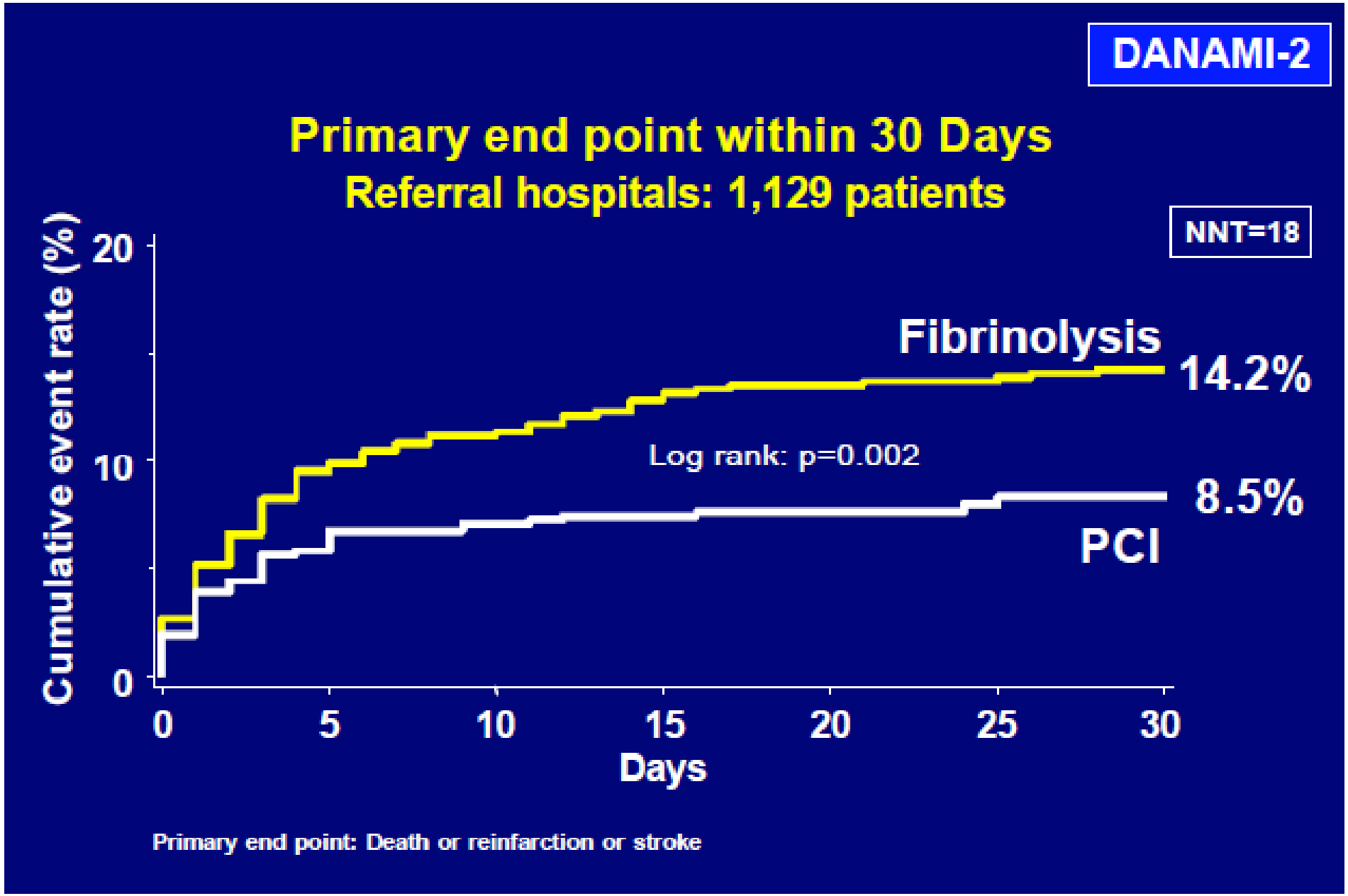
Cantor WJ. ACC 2008 Scientic Sessions/i2 Summit-SCAI Annual Meeting; March 30, 2008; Chicago, IL.



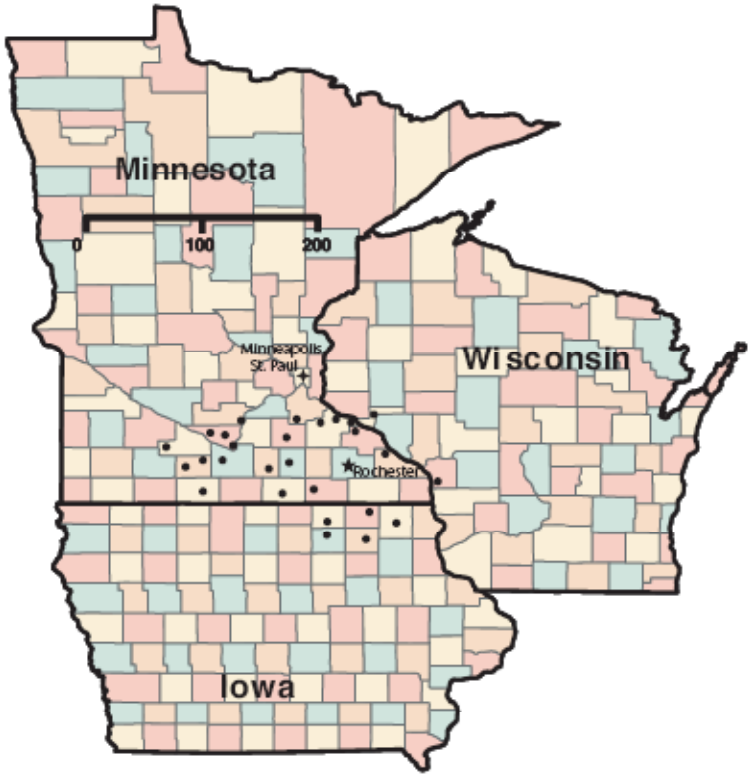
FOUR NETWORKS OF HOSPITALS FOR EARLY INVASIVE DIAGNOSIS AND TREATMENT OF ACUTE CORONARY SYNDROMES

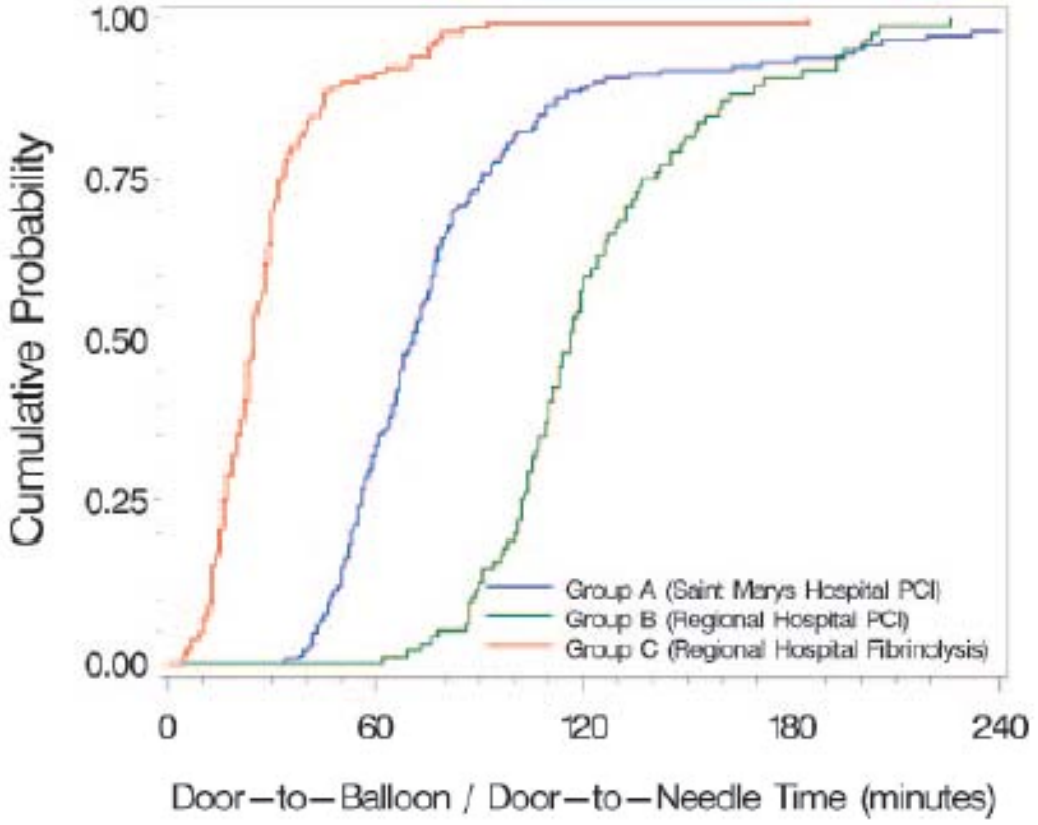
PPCI IN LJUBLJANA-SLOVENIA




DANAMI-2
Primary end point within 30 Days
Referral hospitals: 1,129 patients
NNT=18
Cumulative event rate (%)
20
10
0
Fibrinolysis
14.2%
Log rank: p=0.002
8.5%
PCI
0
5
10
15
20
25
30
Days
Primary end point: Death or reinfarction or stroke

Mayo Clinic STEMI protocol

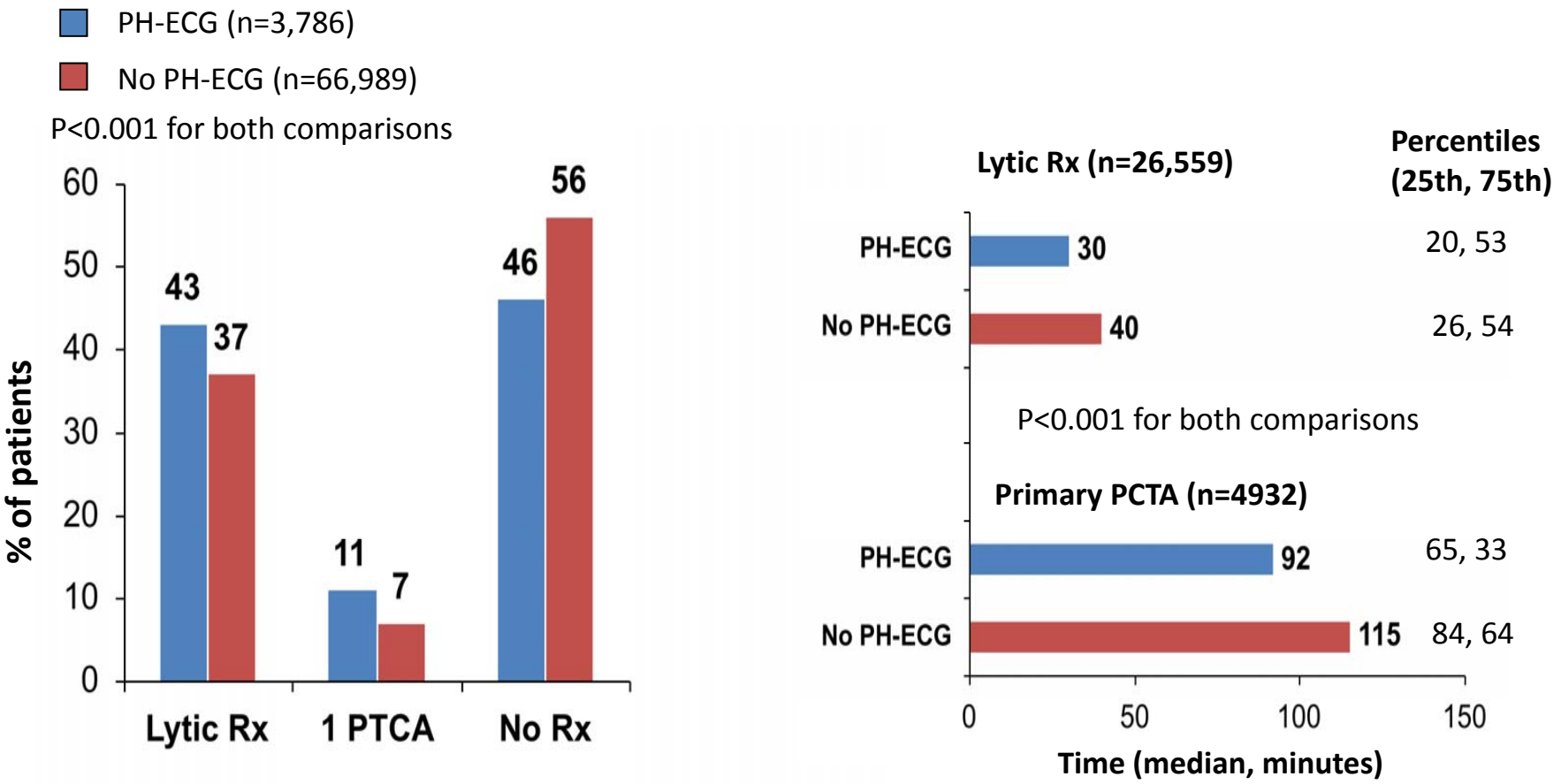




Ting HH, Circulation 2007

MT

NRMI-2: pre-hospital ECG in AMI



Canto JG. J Am Coll Cardiol 1997;29:498-505

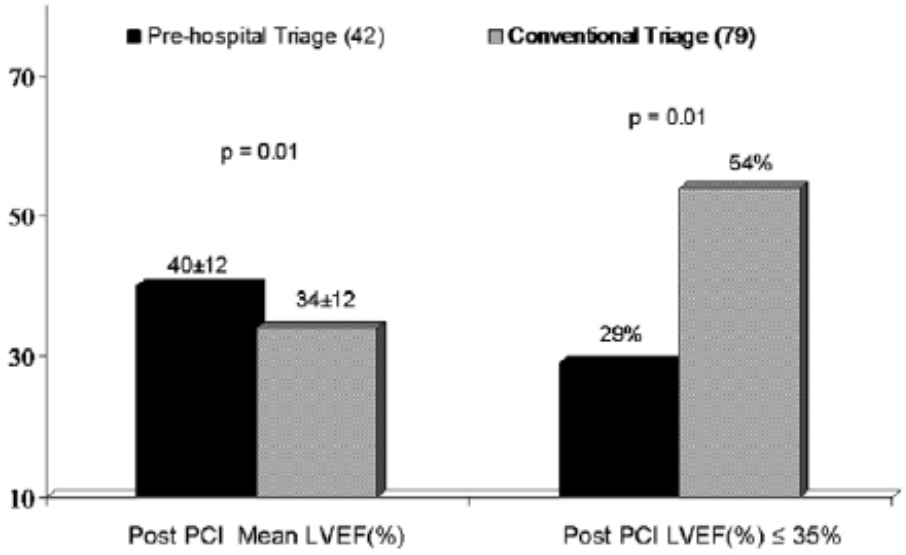
barriers for networks

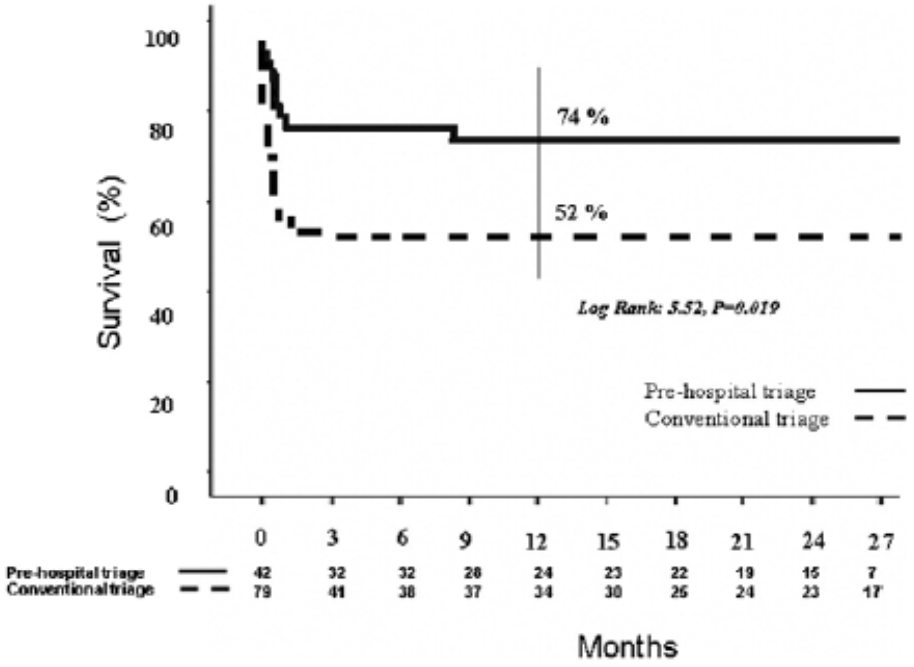
- lack of public awareness
- different technological levels of emergency vehicles
- mandate to deliver to the nearest hospital
- inter-hospital transfer with the "next available" ambulance
- ED diversion
- need to restructure payments

Jacobs AR, Circulation 2007

MT

pre-hospital triage in STEMI pts. with cardiogenic shock





Ortolani P. Am J Cardiol 2007

MT

ECG & triage

	pre-hospital	ED	p
symptoms onset to balloon (median) (min)	154	249	< 0.001
peak CK in early presenters (U/L)	1435	2320	= 0.009
mortality in PCI-treated pts (%)	1.1	8.2	=0.025
overall mortality (%)	1.9	7.3	=0.046

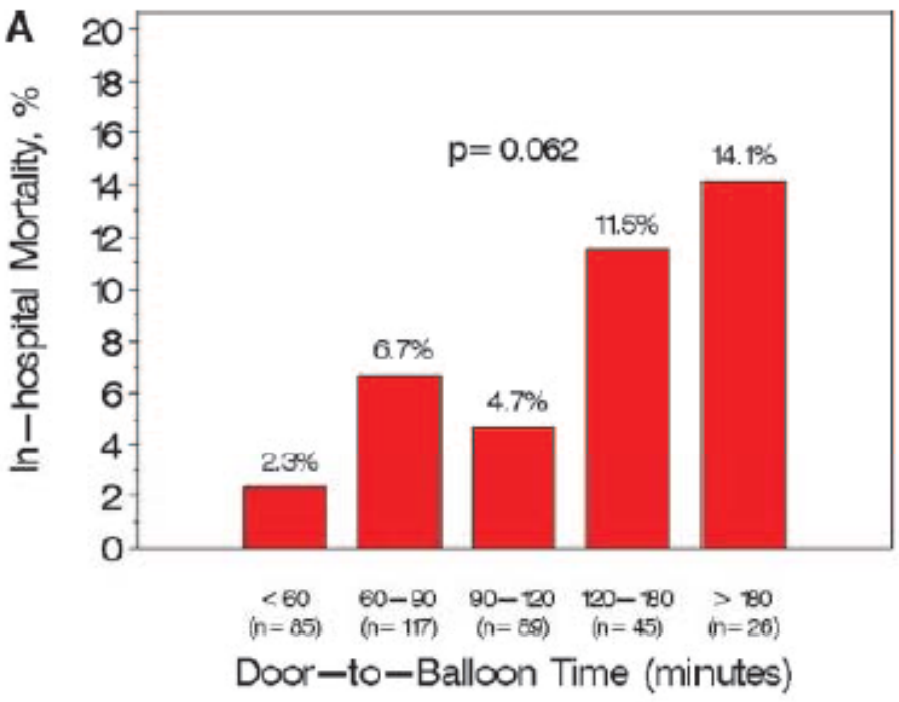
Carstensen S. Eur Heart J 2007

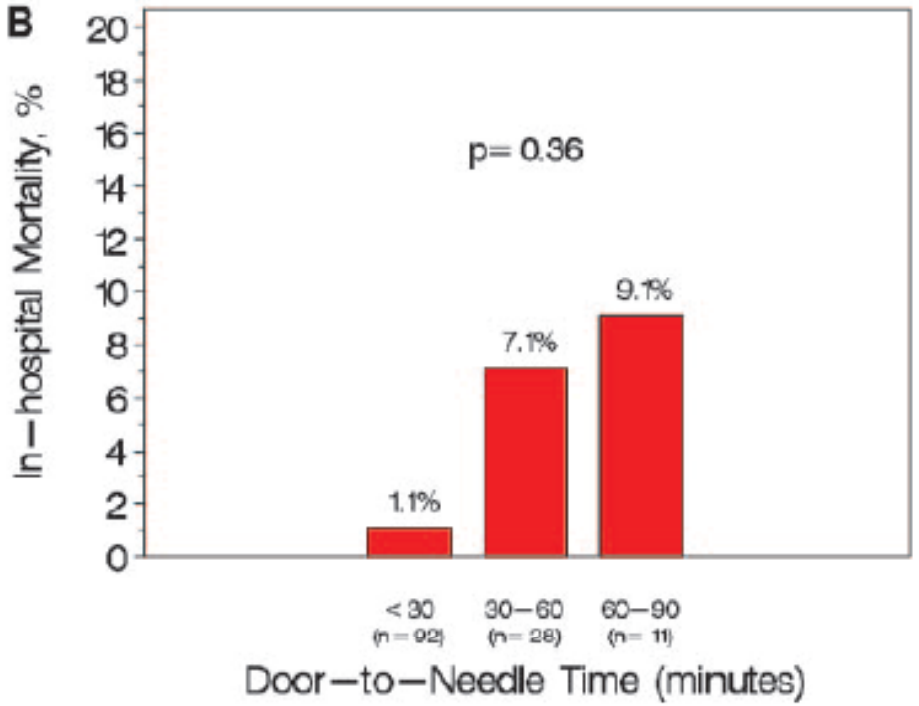
MT

regional system of care: Mayo Clinic STEMI protocol

D2B time < 90 min:
- 75% pts group *A*
- 12% pts group B

D2N time < 30 min:
- 70% pts group *C*

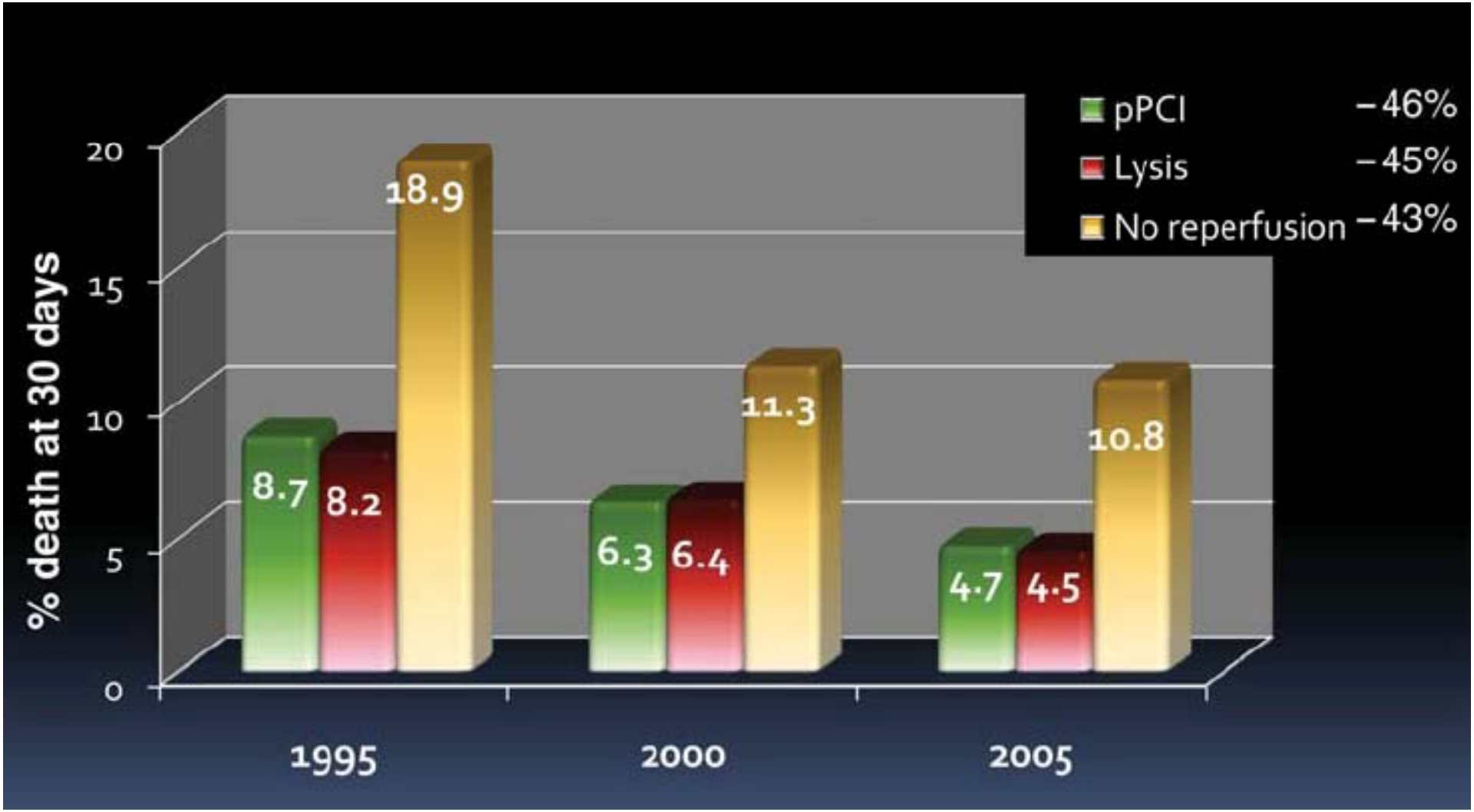




Ting HH, Circulation 2007

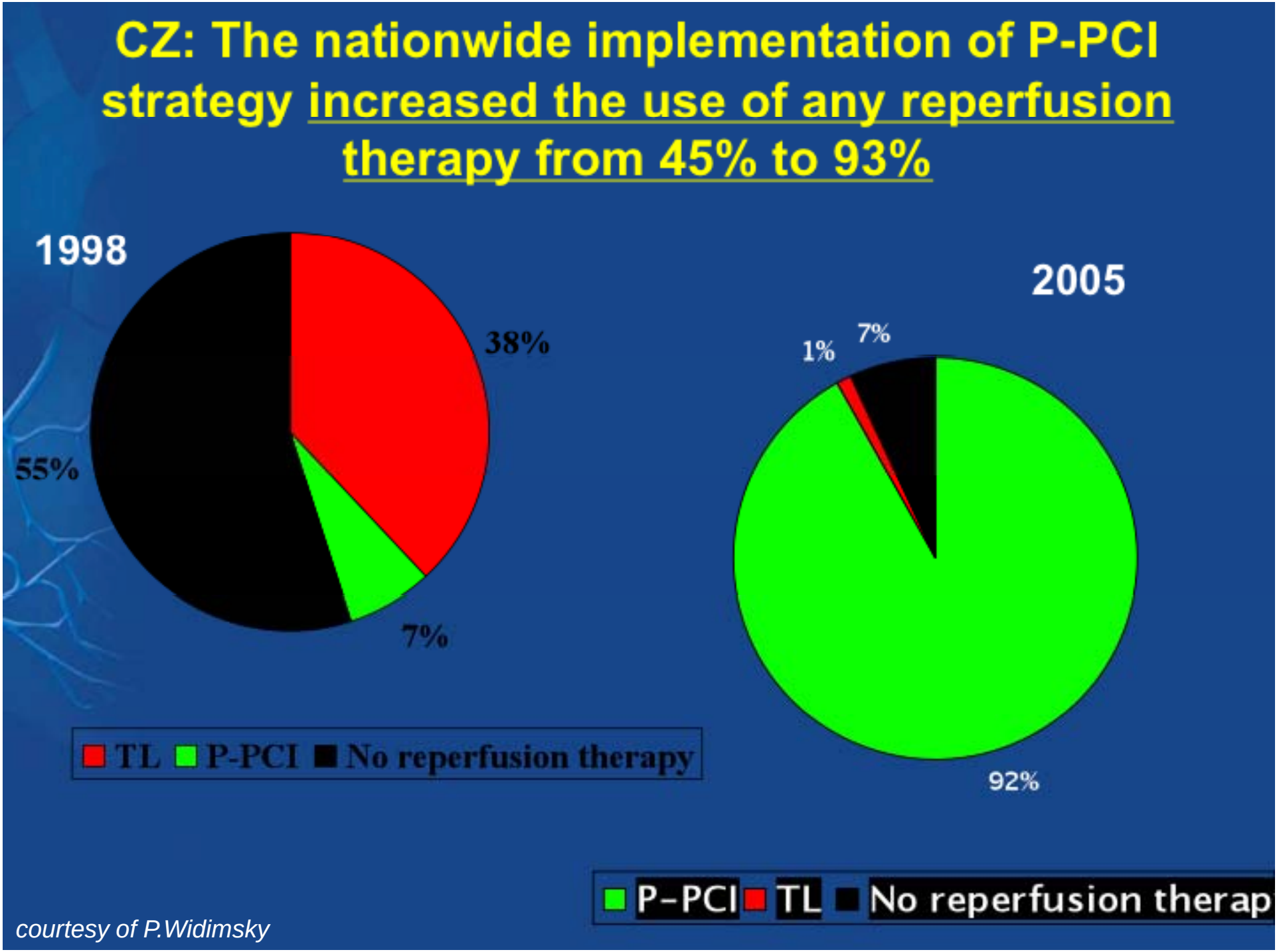
MT

French nationwide surveys on STEMI



Danchin N. Eur Heart J 2010

CZ: The nationwide implementation of P-PCI strategy increased the use of any reperfusion therapy from 45% to 93%



courtesy of P.Widimsky