Thrombolysis in Cardiology – to whom?

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Department of Cardiology

COI

- Speakers fee: Aspen, AZ, Bayer, BMS/Pfizer
- Departmental research grant: AZ

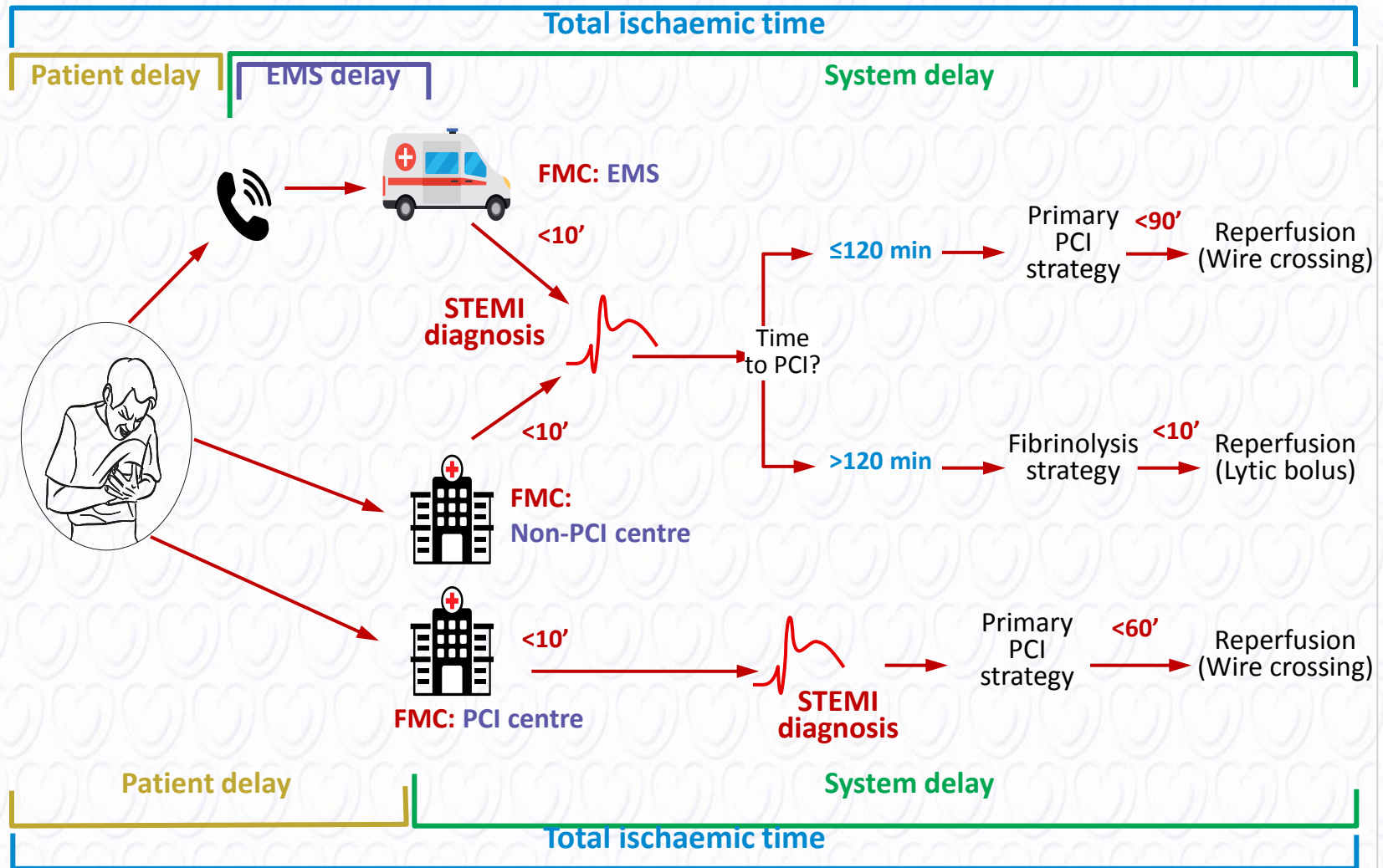# Thrombolysis in Cardiology – to whom?

Very few

Thrombolysis in Cardiology – to whom?

Pulmonary embolism

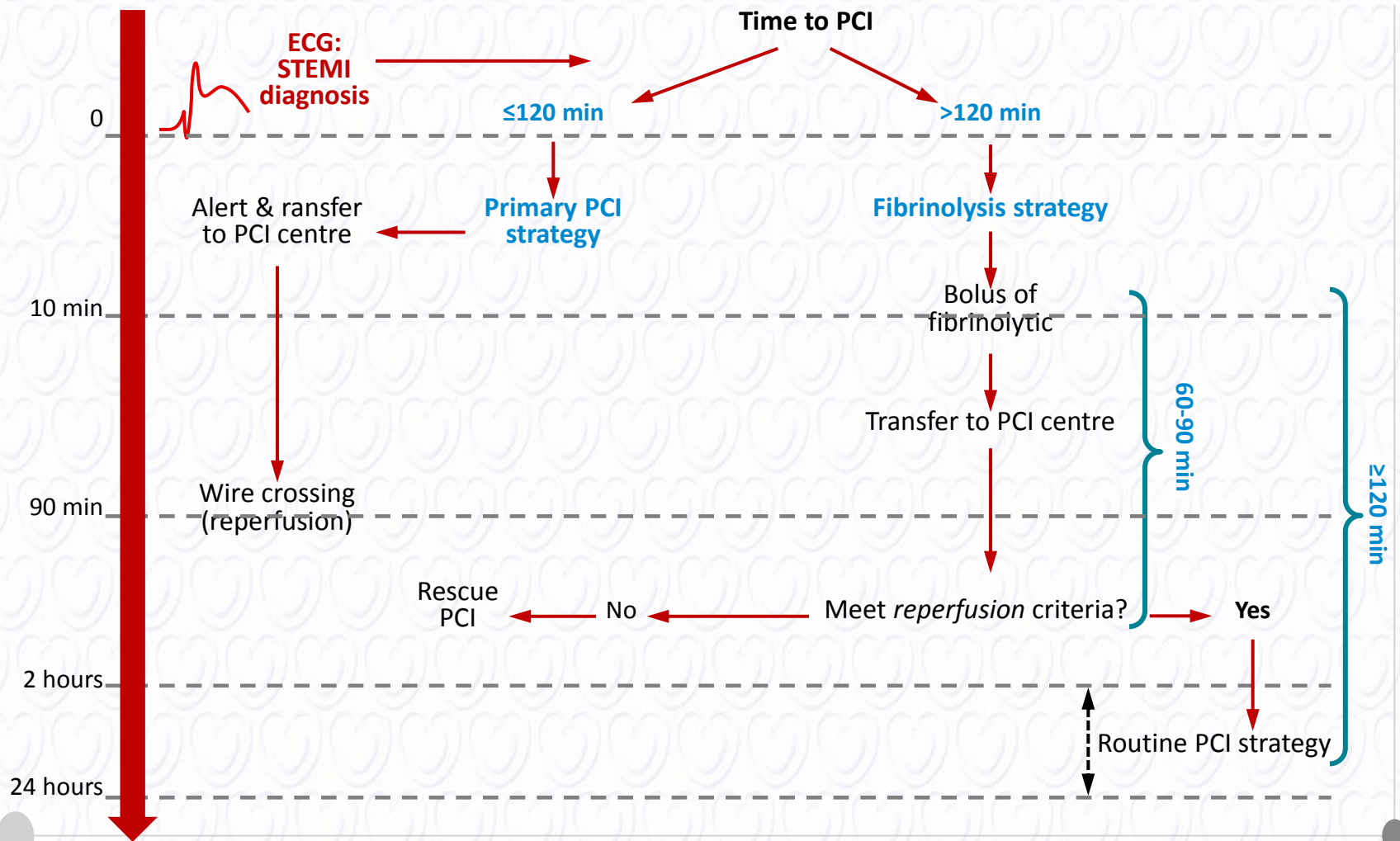# Thrombolysis in Cardiology – to whom?

STEMI

Modes of patient presentation, components of ischaemic time and flowchart for reperfusion strategy selection
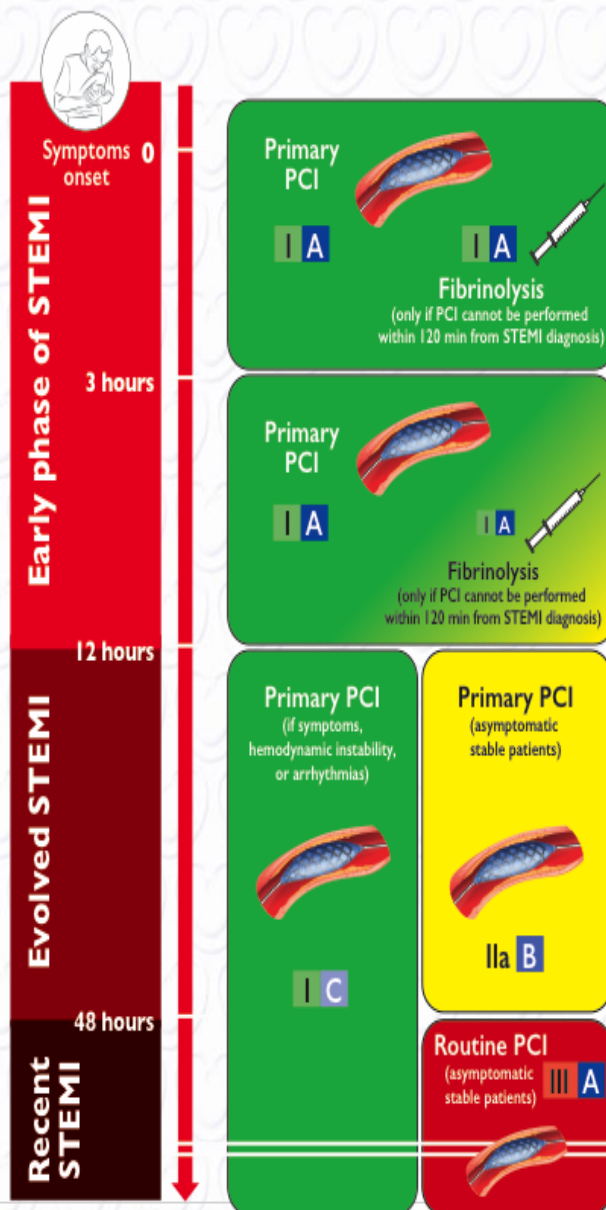
Maximum target times according to reperfusion strategy selection in patients presenting via EMS or in a non-PCI centre

Strategy clock

ECG: STEMI diagnosis

Time to PCI

≤120 min

>120 min

0

Primary PCI strategy

Fibrinolysis strategy

Alert & ransfer to PCI centre

Bolus of fibrinolytic

10 min

Transfer to PCI centre

60-90 min

≥120 min

Wire crossing (reperfusion)

90 min

Rescue PCI

No

Meet *reperfusion* criteria?

Yes

2 hours
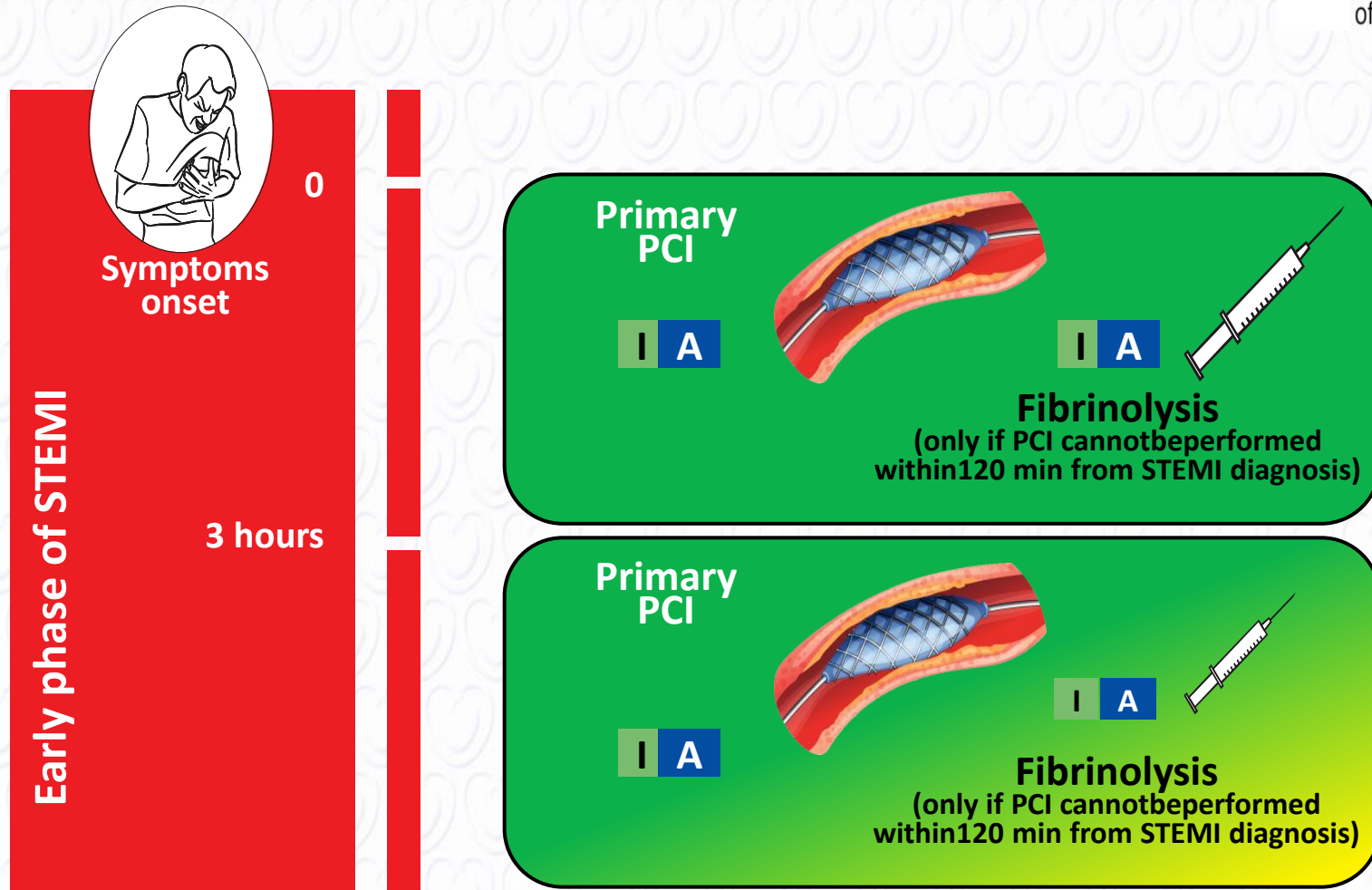
Routine PCI strategy

24 hours

Reperfusion strategies in the infarct-related artery according to time from symptoms onset

Reperfusion strategies in the infarct-related artery according to time from symptoms onset

Early phase of STEMI

Symptoms onset — 0

3 hours

Primary PCI

I A

Fibrinolysis
(only if PCI cannotbeperformed within120 min from STEMI diagnosis)

I A

Primary PCI

I A

Fibrinolysis
(only if PCI cannotbeperformed within120 min from STEMI diagnosis)

I A

Reperfusion therapy

Recommendations	Class	Level
Reperfusion therapy is indicated in all patients with symptoms of ischaemia of ≤12 hours duration and persistent ST-segment elevation.	I	A
A *primary PCI strategy* is recommended over fibrinolysis within indicated timeframes.	I	A
If primary PCI cannot be performed timely after STEMI diagnosis, fibrinolytic therapy is recommended within 12 hours of symptom onset in patients without contra-indications.	I	A

Reperfusion therapy *(continued)*

| Recommendations	Class	Level
In the absence of ST-segment elevation, a *primary PCI strategy* is indicated in patients with suspected ongoing ischaemic symptoms suggestive of myocardial infarction and at least one of the following criteria present: – haemodynamic instability or cardiogenic shock, – recurrent or ongoing chest pain refractory to medical treatment, – life-threatening arrhythmias or cardiac arrest, – mechanical complications of myocardial infarction, – acute heart failure, – recurrent dynamic ST-segment or T-wave changes, particularly with intermittent ST-segment elevation.	I	C

Reperfusion therapy *(continued)*

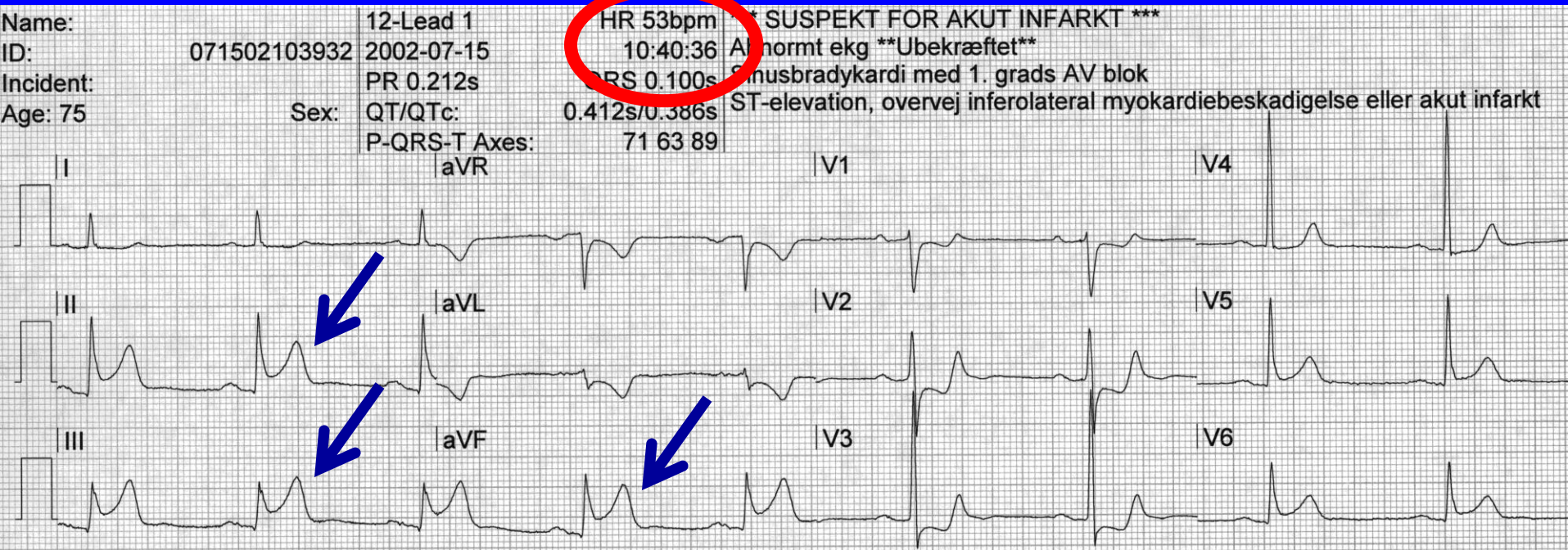| Recommendations	Class	Level
Early angiography (within 24 hours) is recommended if symptoms are completely relieved and ST-segment elevation completely normalized spontaneously or after nitroglycerin administration (provided there are no recurrence of symptoms or ST-segment elevation).	I	C
In patients with time from symptom onset >12 hours, a *primary PCI strategy* is indicated in the presence of ongoing symptoms suggestive of ischaemia, haemodynamic instability, or life-threatening arrhythmias.	I	C
A routine *primary PCI strategy* should be considered in patients presenting late (12-48 hours) after symptom onset.	IIa	B
In asymptomatic patients, routine PCI of an occluded IRA >48 hours after onset of STEMI is not indicated.	III	A
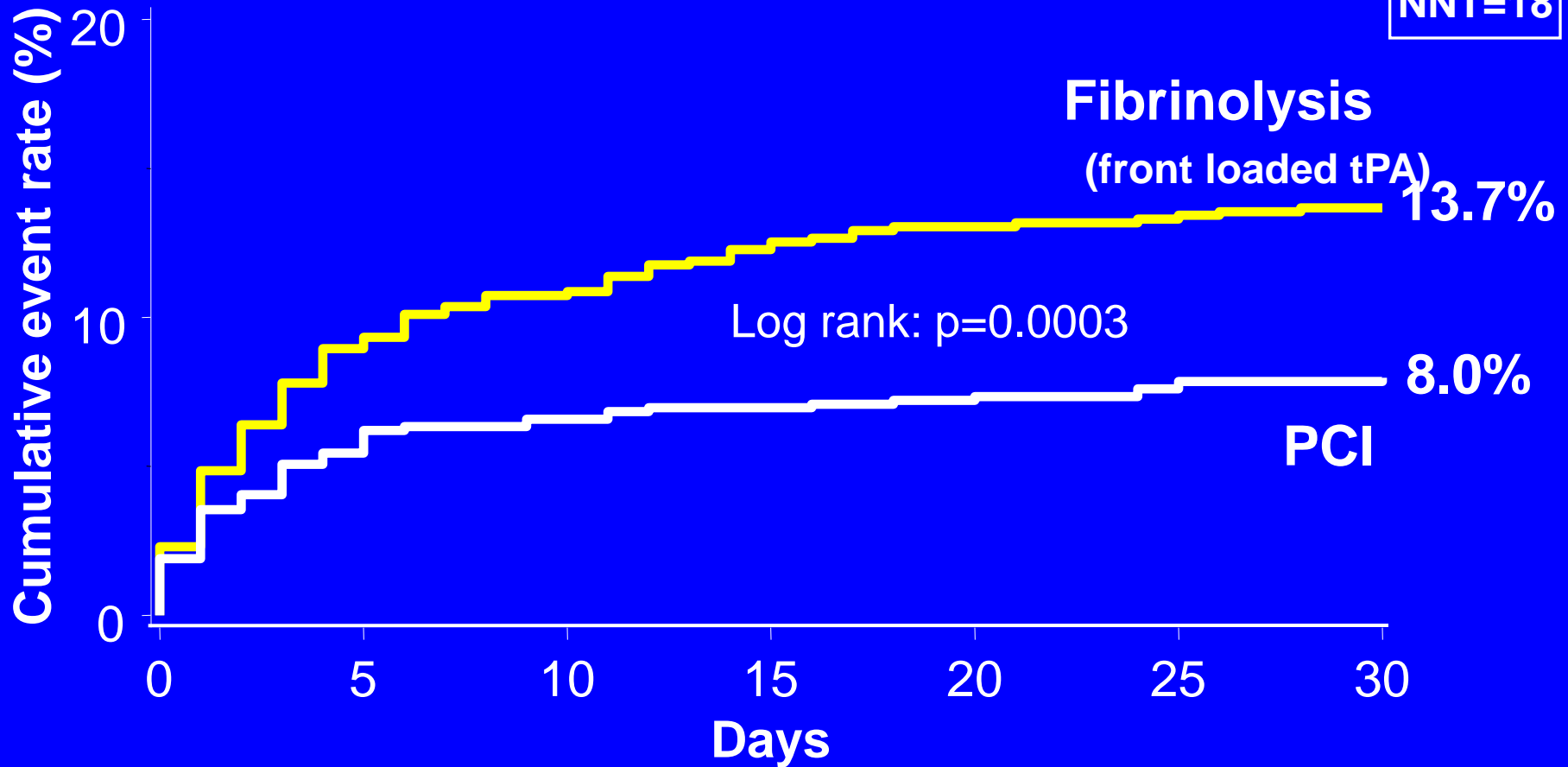
ACUTE STEMI: early diagnosis

Immediate ECG – paramedics or doctors in the ambulance

- Telemedicine
- Prehospital thrombolysis
- Transferral for primary PCI

Example:

Pre-hospital ECG from a 56 year old male with chest pain

Name:
ID: 071502103932
Incident:
Age: 75   Sex:

12-Lead 1
2002-07-15
PR 0.212s
QT/QTc:
P-QRS-T Axes:

HR 53bpm
10:40:36
QRS 0.100s
0.412s/0.386s
71 63 89

*** SUSPEKT FOR AKUT INFARKT ***
Abnormt ekg **Ubekræftet**
Sinusbradykardi med 1. grads AV blok
ST-elevation, overvej inferolateral myokardiebeskadigelse eller akut infarkt

I   aVR   V1   V4
II   aVL   V2   V5
III   aVF   V3   V6

Transmission of A 12-lead ECG To hospital.

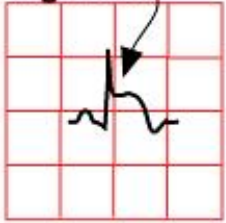Hospital

Call

Ambulance

Phone contact from hospital to patient and paramedic in the ambulance.
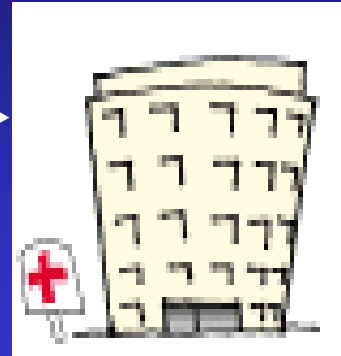
Bypass local hospitals !
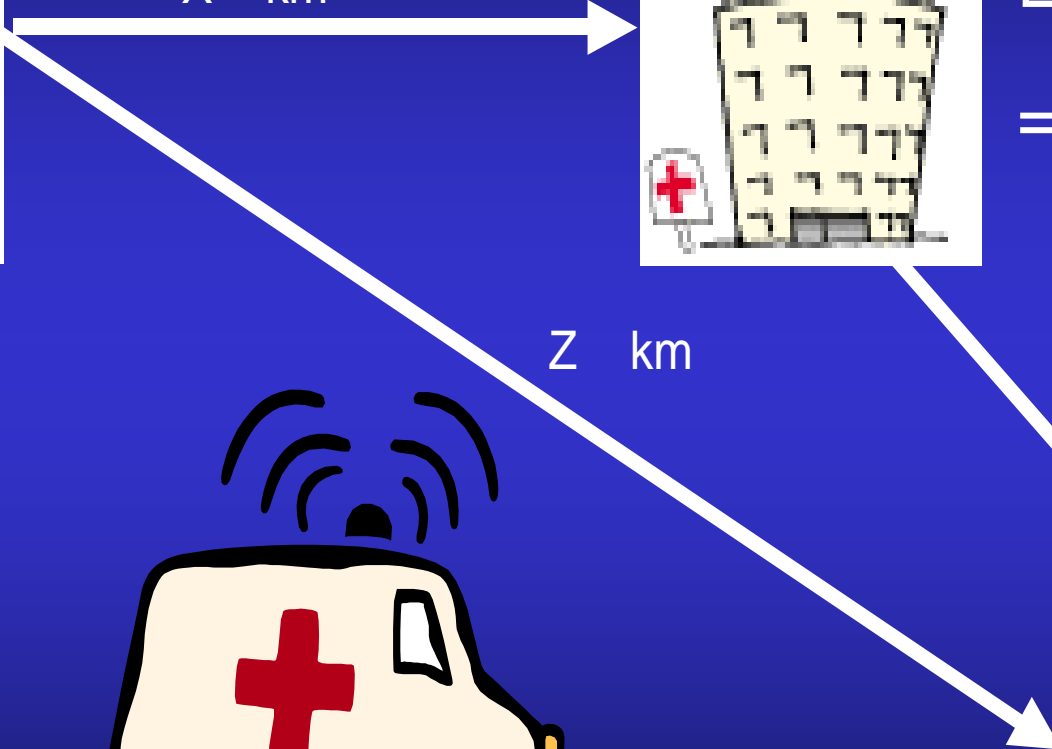

raised ST-segment

X   km

Local Hospital

= 60 min delay

Z   km

Y km

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STEMI

Fibrinolyse er et alternativ til primær PCI, såfremt transporttiden til primær PCI center skønnes at overstige 2 timer.

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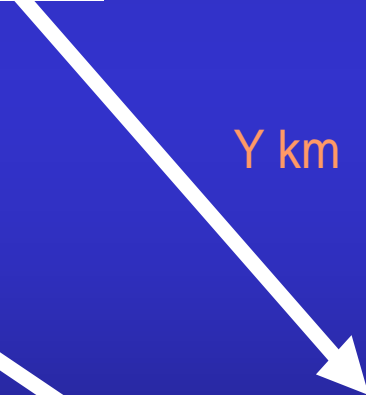
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NBV Appendix 2: Fibrinolysebehandling

- Der kan gives alteplase, reteplase eller tenecteplase.

- Alle tre præparater doseres efter vægt og kombineres med et lavmolekylært heparin (LMH) eller ufraktioneret heparin (UFH)

- Dosering: se NBV

MEDIAN TIMES TO TREATMENT (min)
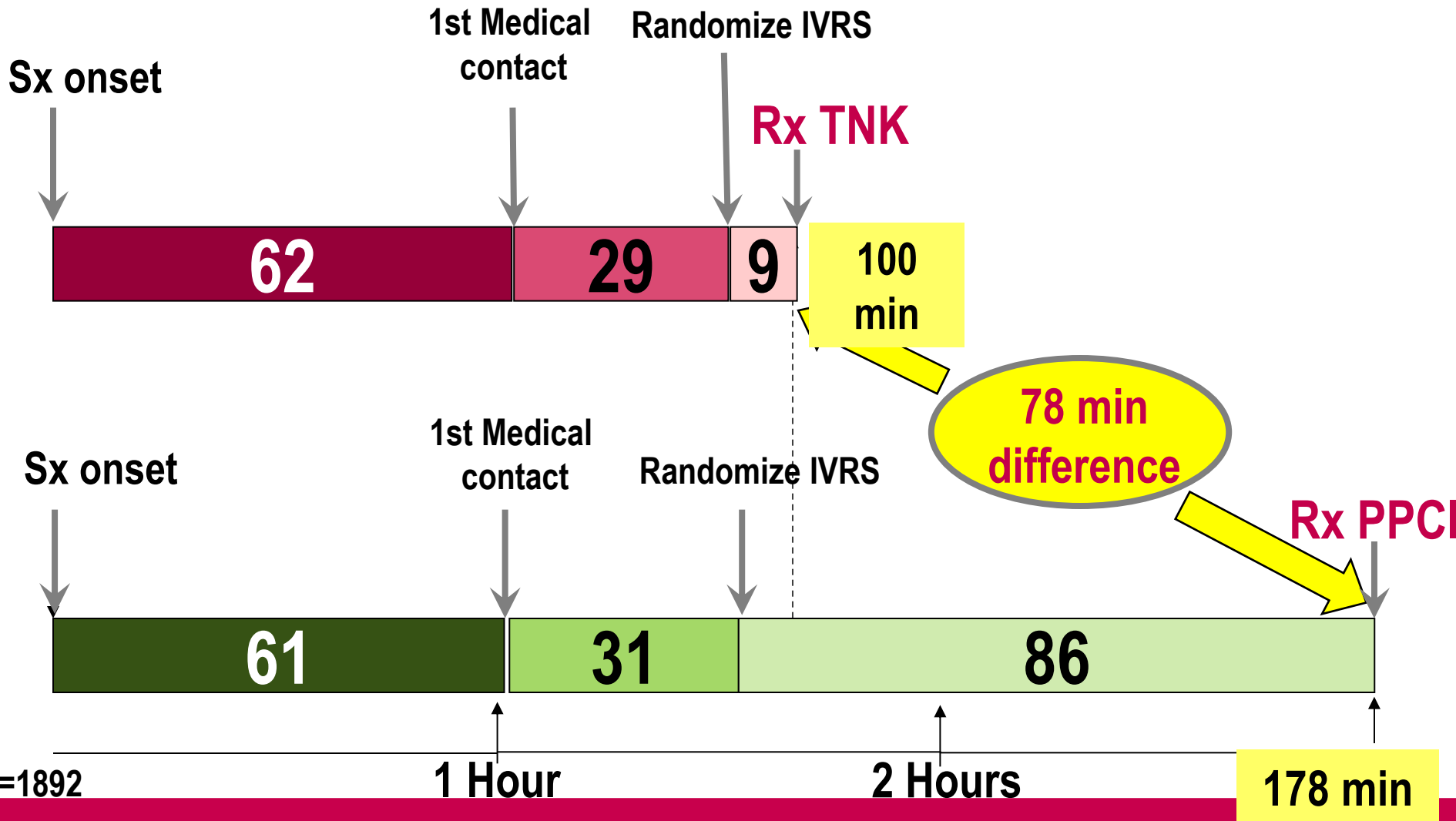
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Reperfusion strategies in the infarct-related artery according to time from symptoms onset *(continued)*

12 hours

Evolved STEMI

48 hours

Recent STEMI

Primary PCI
(if symptoms, hemodynamic instabilicy, or arrhythmias)

I | C

Primary PCI
(asymptomatic stable patients)

IIa | B

Routine PCI
(asymptomatic stable patients)

III | A
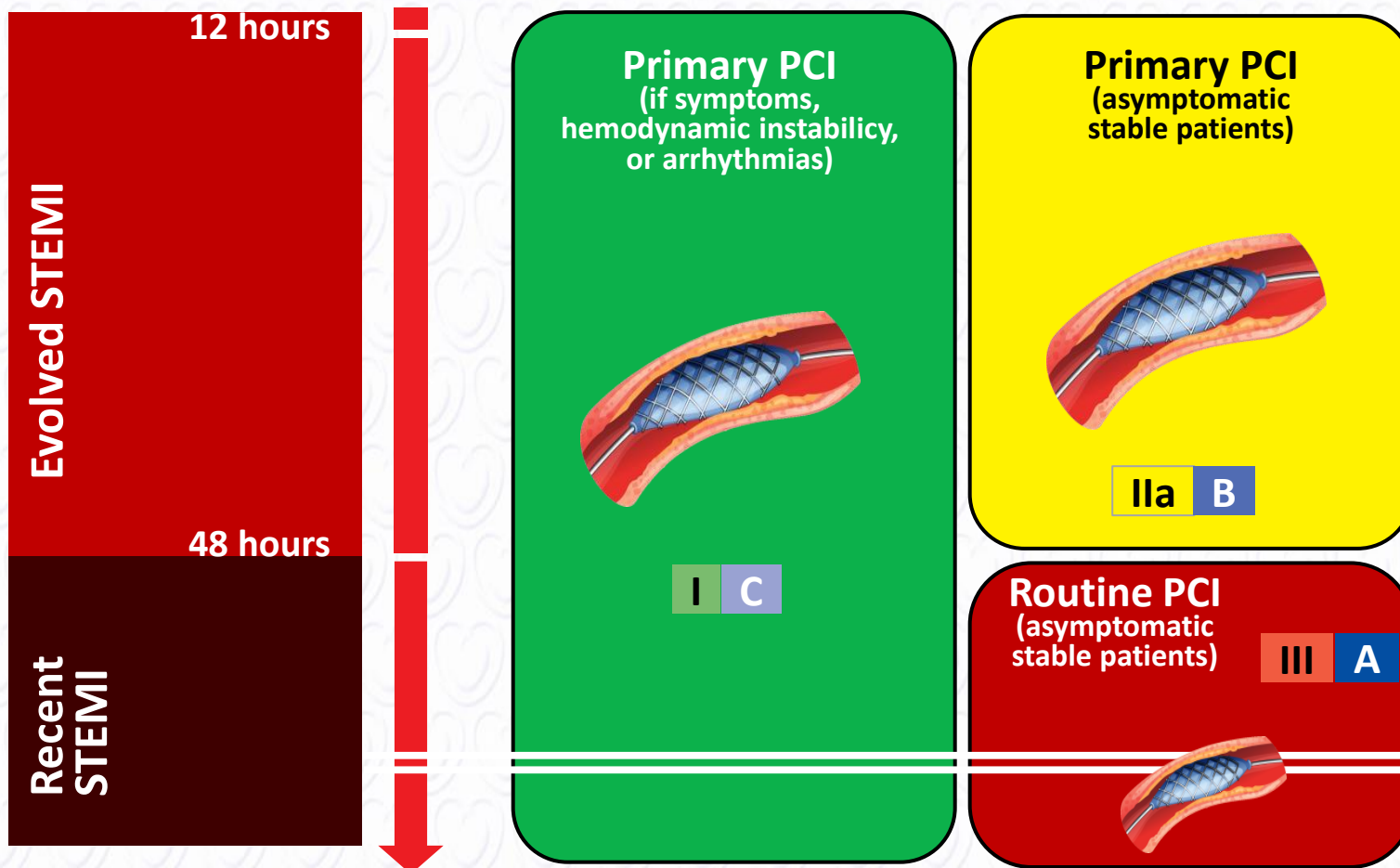
ORIGINAL ARTICLE

Fibrinolysis or Primary PCI in ST-Segment Elevation Myocardial Infarction

Paul W. Armstrong, M.D., Anthony H. Gershlick, M.D., Patrick Goldstein, M.D., Robert Wilcox, M.D., Thierry Danays, M.D., Yves Lambert, M.D., Vitaly Sulimov, M.D., Ph.D., Fernando Rosell Ortiz, M.D., Ph.D., Miodrag Ostojic, M.D., Ph.D., Robert C. Welsh, M.D., Antonio C. Carvalho, M.D., Ph.D., John Nanas, M.D., Ph.D., Hans-Richard Arntz, M.D., Ph.D., Sigrun Halvorsen, M.D., Ph.D., Kurt Huber, M.D., Stefan Grajek, M.D., Ph.D., Claudio Fresco, M.D., Erich Bluhmki, M.D., Ph.D., Anne Regelin, Ph.D., Katleen Vandenberghe, Ph.D., Kris Bogaerts, Ph.D., and Frans Van de Werf, M.D., Ph.D., for the STREAM Investigative Team*

STUDY PROTOCOL

Stream
Strategic Reperfusion Early
After Myocardial Infarction

STEMI <3 hrs from onset symptoms, PPCI <60 min not possible, 2 mm ST-elevation in 2 leads

RANDOMIZATION 1:1 by IVRS, OPEN LABEL

Strategy A: pharmaco-invasive	Strategy B: primary PCI

Ambulance/ER

<75y:full dose

no lytic

Aspirin
Clopidogrel:
LD 300 mg + 75 mg QD
Enoxaparin:
30 mg IV + 1 mg/kg SC
Q12h

After 20% of the planned recruitment, the TNK dose was reduced by 50% among patients ≥75 years of age.

Antiplatelet and antithrombin treatment according to local standards

PCI Hospital

ECG at 90 min: ST resolution ≥ 50%

YES

NO

angio >6 to 24 hrs PCI/CABG if indicated

immediate angio + rescue PCI if indicated

Standard primary PCI

Primary endpoint: composite of all cause death or shock or CHF or reinfarction up to day 30
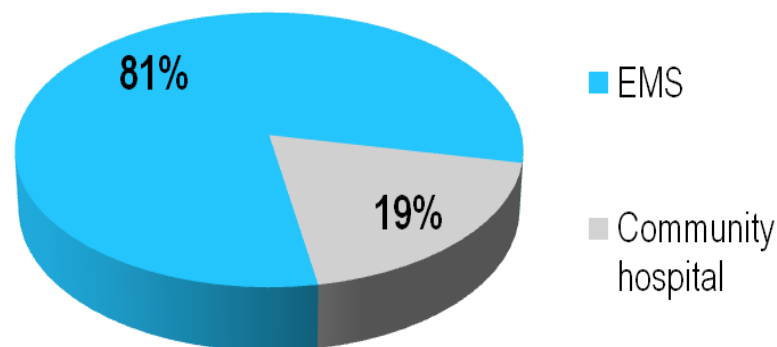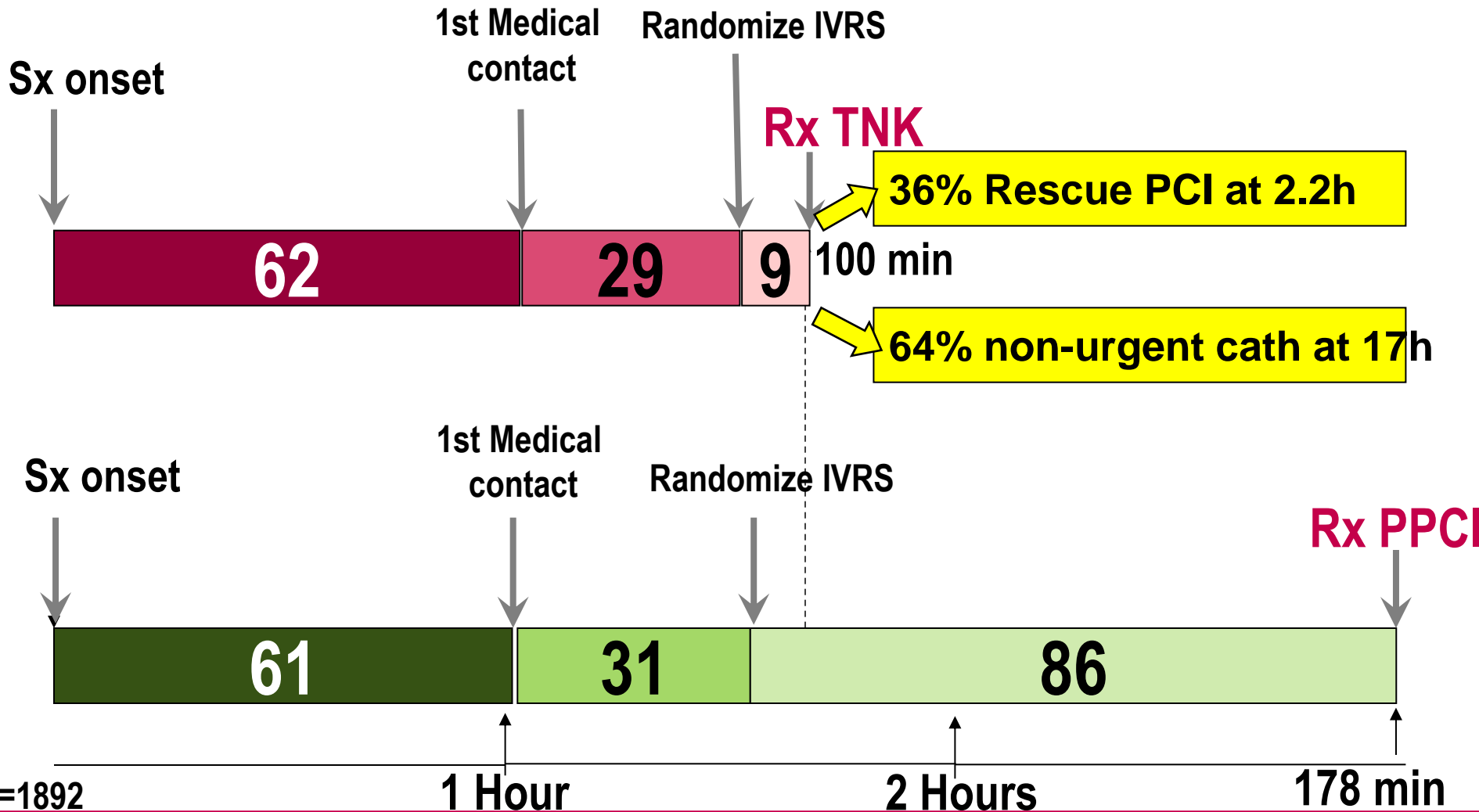
ENROLMENT AND KEY DATES

- 1892 patients randomized by 99 sites in 15 countries

- First patient in: March 19, 2008

- Last patient in: July 26, 2012
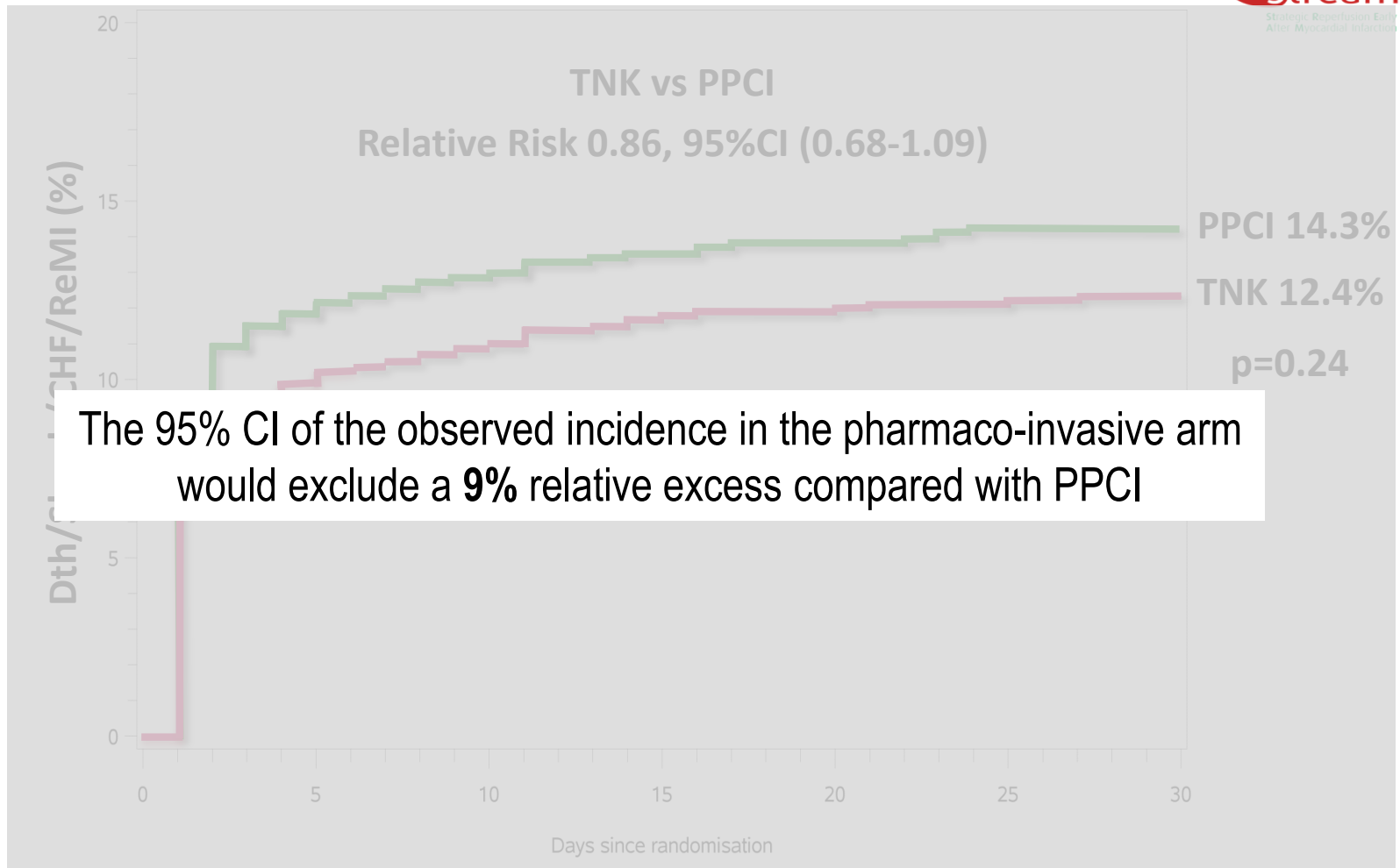
- Last patient out: Sep 7, 2012

Enrolment setting

81% EMS
19% Community hospital

MEDIAN TIMES TO TREATMENT (min)

Stream
Strategic Reperfusion Early
After Myocardial Infarction

Sx onset

1st Medical contact

Randomize IVRS

Rx TNK

| 62 | 29 | 9 | 100 min |

36% Rescue PCI at 2.2h

64% non-urgent cath at 17h

Sx onset

1st Medical contact

Randomize IVRS

Rx PPCI

| 61 | 31 | 86 |

n=1892   1 Hour   2 Hours   178 min

PRIMARY ENDPOINT

TNK vs PPCI

Relative Risk 0.86, 95%CI (0.68-1.09)

PPCI 14.3%

TNK 12.4%

p=0.24

Dth/Sh/CHF/ReMI (%)

The 95% CI of the observed incidence in the pharmaco-invasive arm would exclude a **9%** relative excess compared with PPCI

Days since randomisation

Number at risk							
Tenecteplase 943	848	837	829	827	825	823
Primary PCI 948	836	824	818	815	811	811

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SINGLE ENDPOINTS UP TO 30 DAYS

	Pharmaco-invasive (N=944)	PPCI (N=948)	P-value
All cause death	(43/939) **4.6%**	(42/946) **4.4%**	0.88
Cardiac death	(31/939) **3.3%**	(32/946) **3.4%**	0.92
Congestive heart failure	(57/939) **6.1%**	(72/943) **7.6%**	0.18
Cardiogenic shock	(41/939) **4.4%**	(56/944) **5.9%**	0.13

STROKE RATES

	Pharmaco-invasive	PPCI	P-value
TOTAL POPULATION (N=1892)			
Total stroke	**15**/939 (1.60%)	**5**/946 (0.53%)	0.03
fatal stroke	**7**/939 (0.75%)	**4**/946 (0.42%)	0.39
Haemorrhagic stroke	**9**/939 (0.96%)	**2**/946 (0.21%)	0.04
fatal haemorrhagic stroke	**6**/939 (0.64%)	**2**/946 (0.21%)	0.18
POST AMENDMENT POPULATION (N=1503)			
Total stroke	**9**/747 (1.20%)	**5**/756 (0.66%)	0.30
fatal stroke	**3**/747 (0.40%)	**4**/756 (0.53%)	>0.999
Haemorrhagic stroke	**4**/747 (0.54%)	**2**/756 (0.26%)	0.45
fatal haemorrhagic stroke	**2**/747 (0.27%)	**2**/756 (0.26%)	>0.999

IN-HOSPITAL BLEEDING COMPLICATIONS

	Pharmaco-invasive (N=944)	PPCI (N=948)	P-value
Major non-ICH bleeding	6.5%	4.8%	0.11
Minor non-ICH bleeding	21.8%	20.2%	0.40
Blood transfusions	2.9%	2.3%	0.47