

Acute Myocardial Infarction Prehospital networks and management

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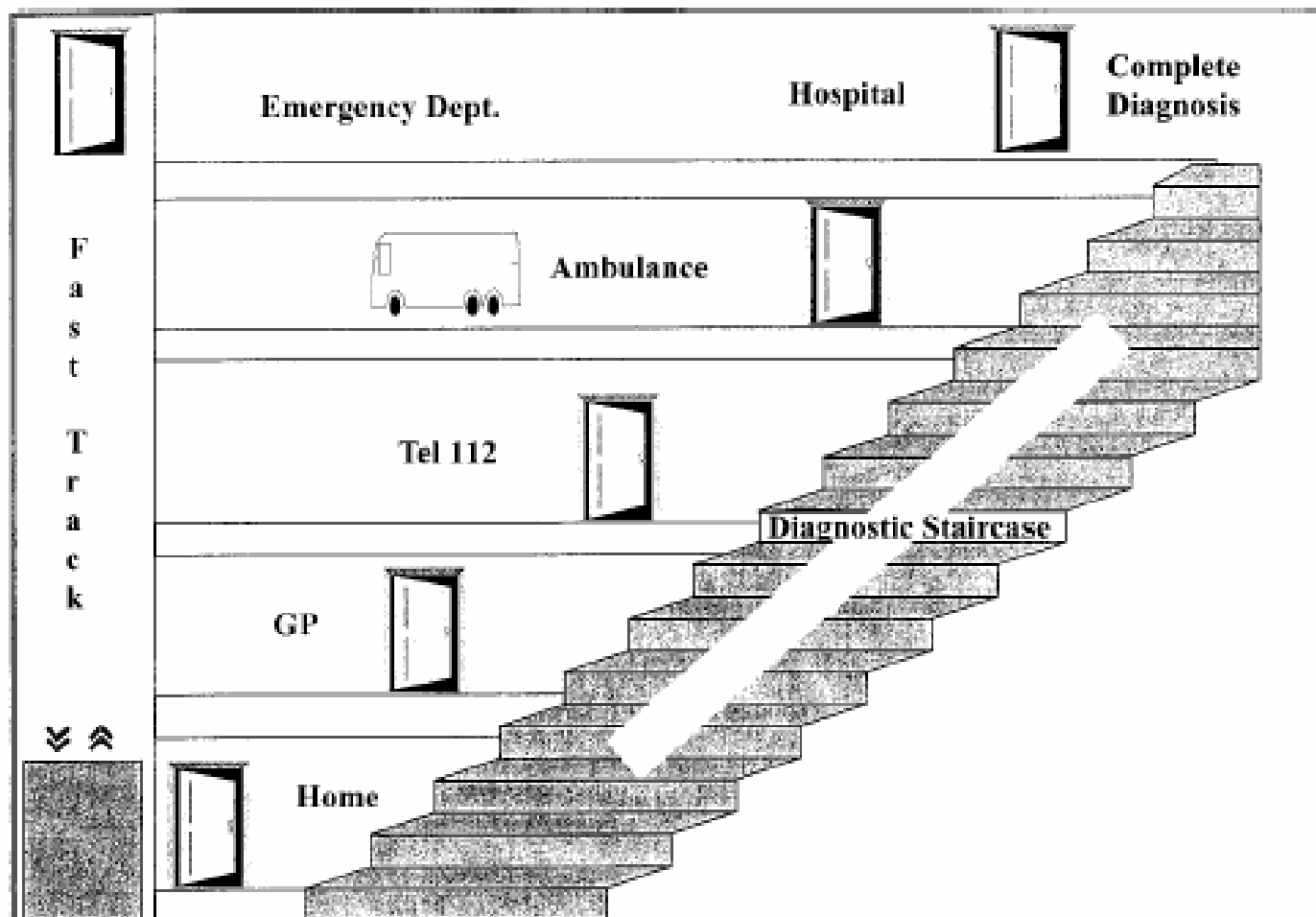


Figure 1 The five doors representing five different levels of decision making.

Systematic review of interventions (n=11) to reduce patient delay

- No evidence that media/public education campaigns reduced delay, but did increase the number of emergency switchboard calls and emergency department visits

Kainth Emerg Med J 2004;21:506

Factors related to delay times in patients with acute chest pain

Predictors in multiple regression analysis:

	OR	p
Dull pain	2.12 (1.11-4.04)	0.023
Contacted GP	2.81 (1.53-5.15)	0.001
Contacted ES	0.45 (0.26-0.80)	0.007

ES=emergency service

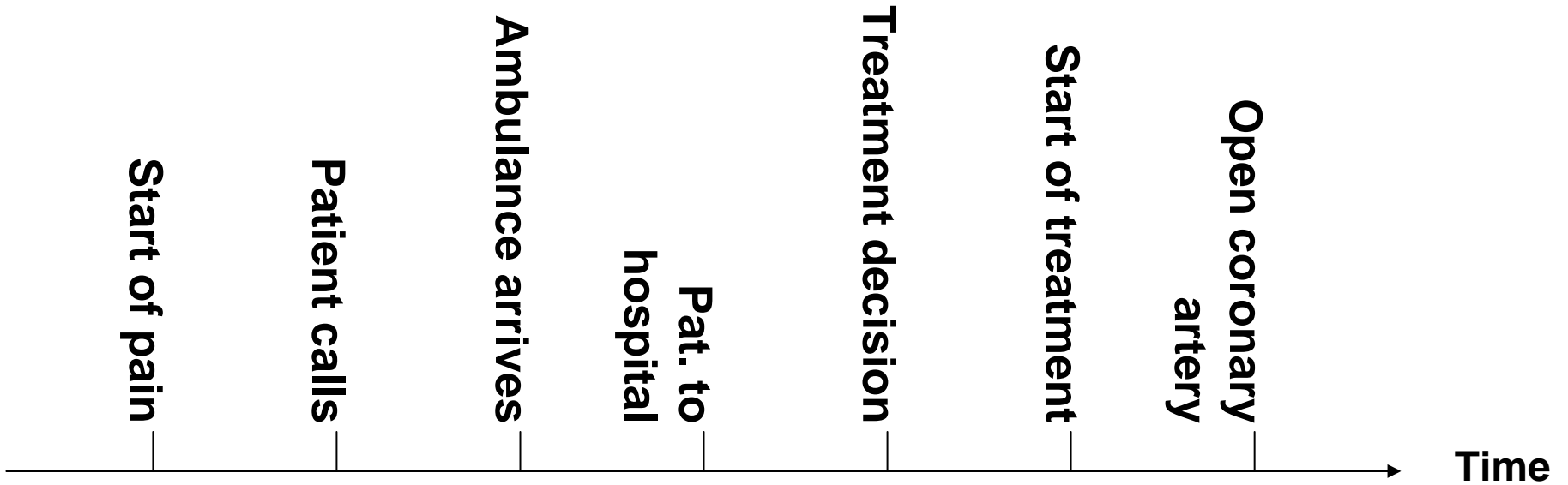
Johansson Heart and Lung 2004

Western Norway – use of 113 for acute chest pain

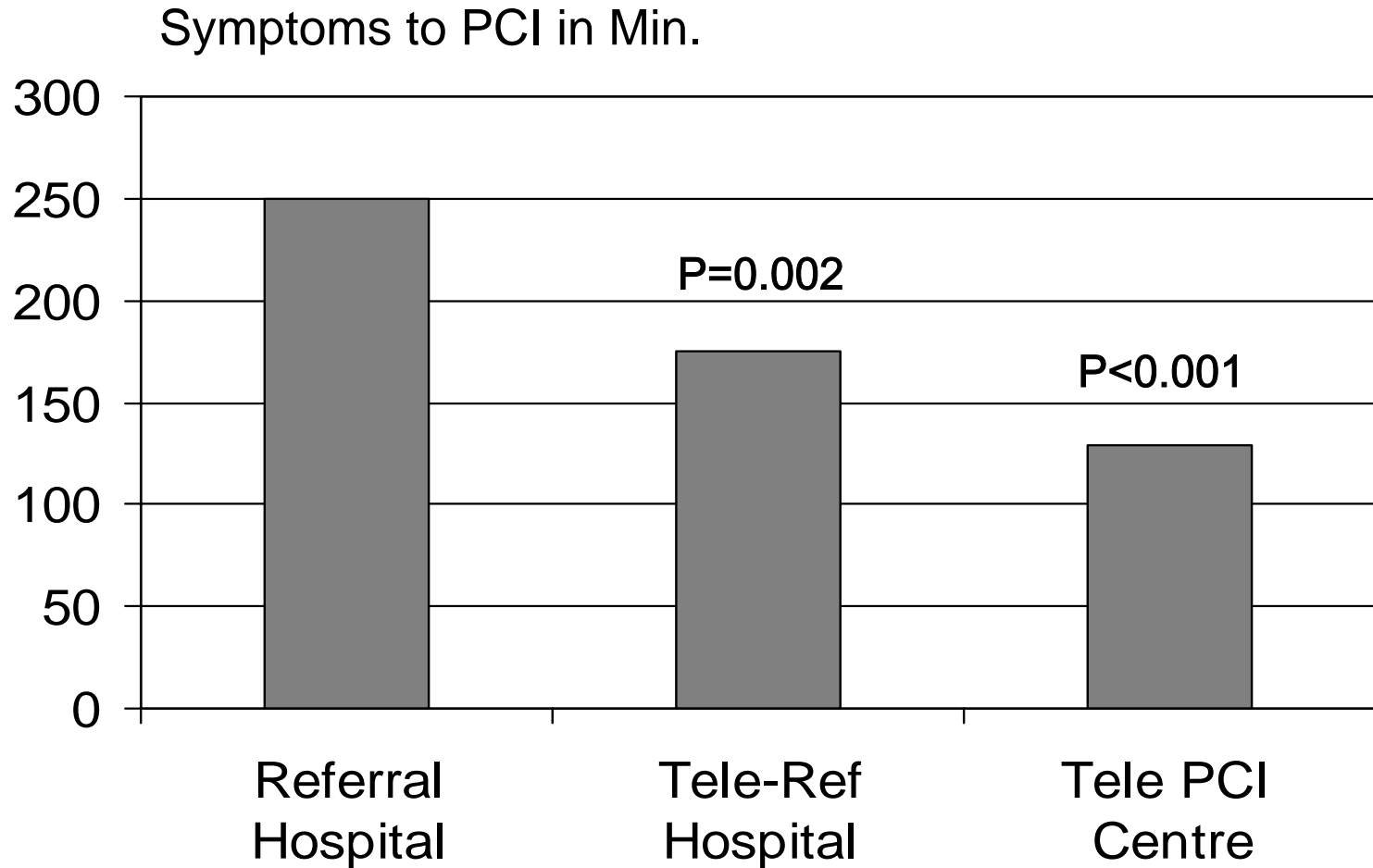
- Patient/relative/GP on call calls 113: 60%
- Admitted via own GP (113): 15%
- Other 25%

- No media- or public chest pain education campaigns in the region, however GPs and patients are aware that the ambulance or helicopter may provide a diagnosis and treatment

Chest pain: Important time cascade



Importance of Pre-Hospital STEMI-Diagnosis



Organising prehospital networks

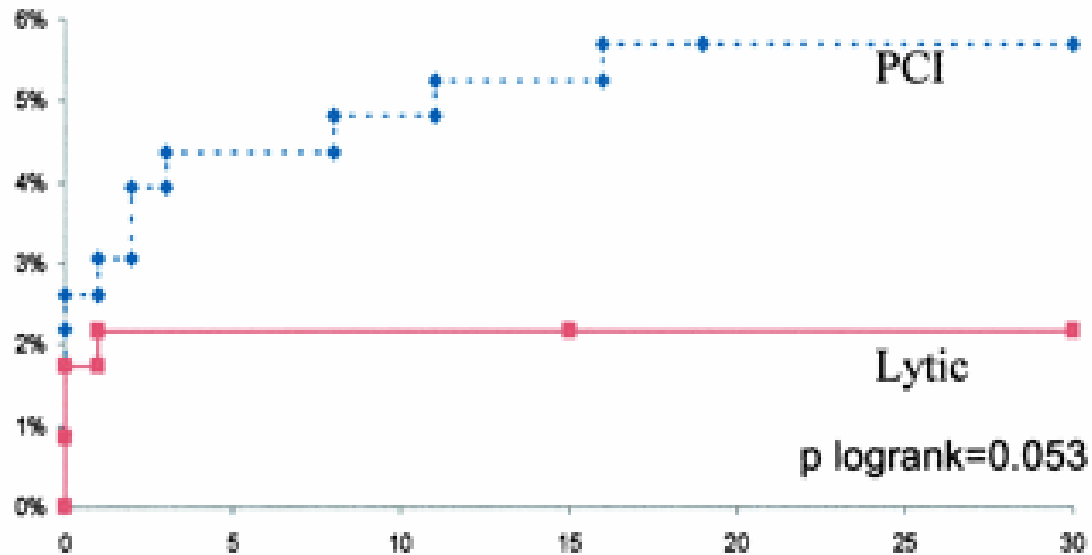
- Target population definition (ACS)
- Assessment of treatment alternatives via national scientific working group
- Cost analysis - national working group
- Development of flow chart and patient logistics (local working group with cardiologist and intensive care anaesth.)
- Organising and teaching paramedics
- New PCI centres - a randomised study

Results - Meta-analysis

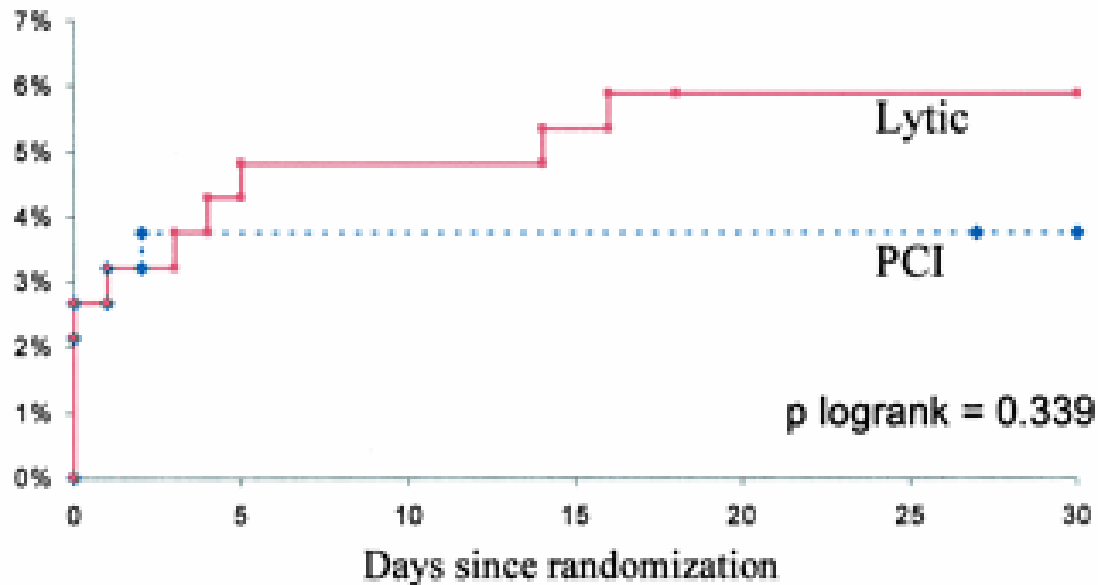
	Tr.lyse	PCI	Red.	NNT	OR	p
Death	7,3%	5,4%	1,9%	53	0,72	0,005
Reinfarct.	6,6%	2,5%	4,1%	24	0,37	<0,001
Stroke	2,0%	0,7%	1,3%	75	0,40	<0,001
Combined	14,1%	7,8%	6,3%	16	0,51	<0,001

CAPTIM study Circ 2003

Delay < 2 hours

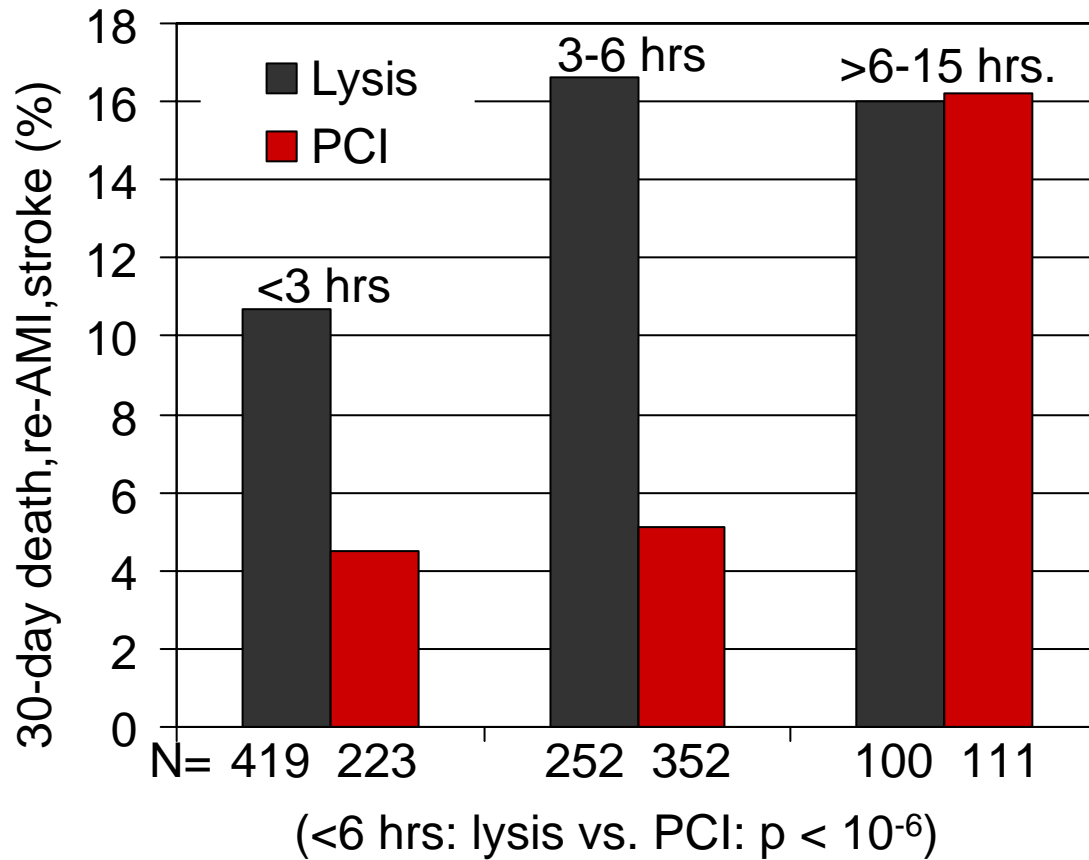


Delay ≥ 2 hours



DANAMI – 2 (subgroup analysis)

Time from symptom-onset to reperfusion treatment vs. event rate.

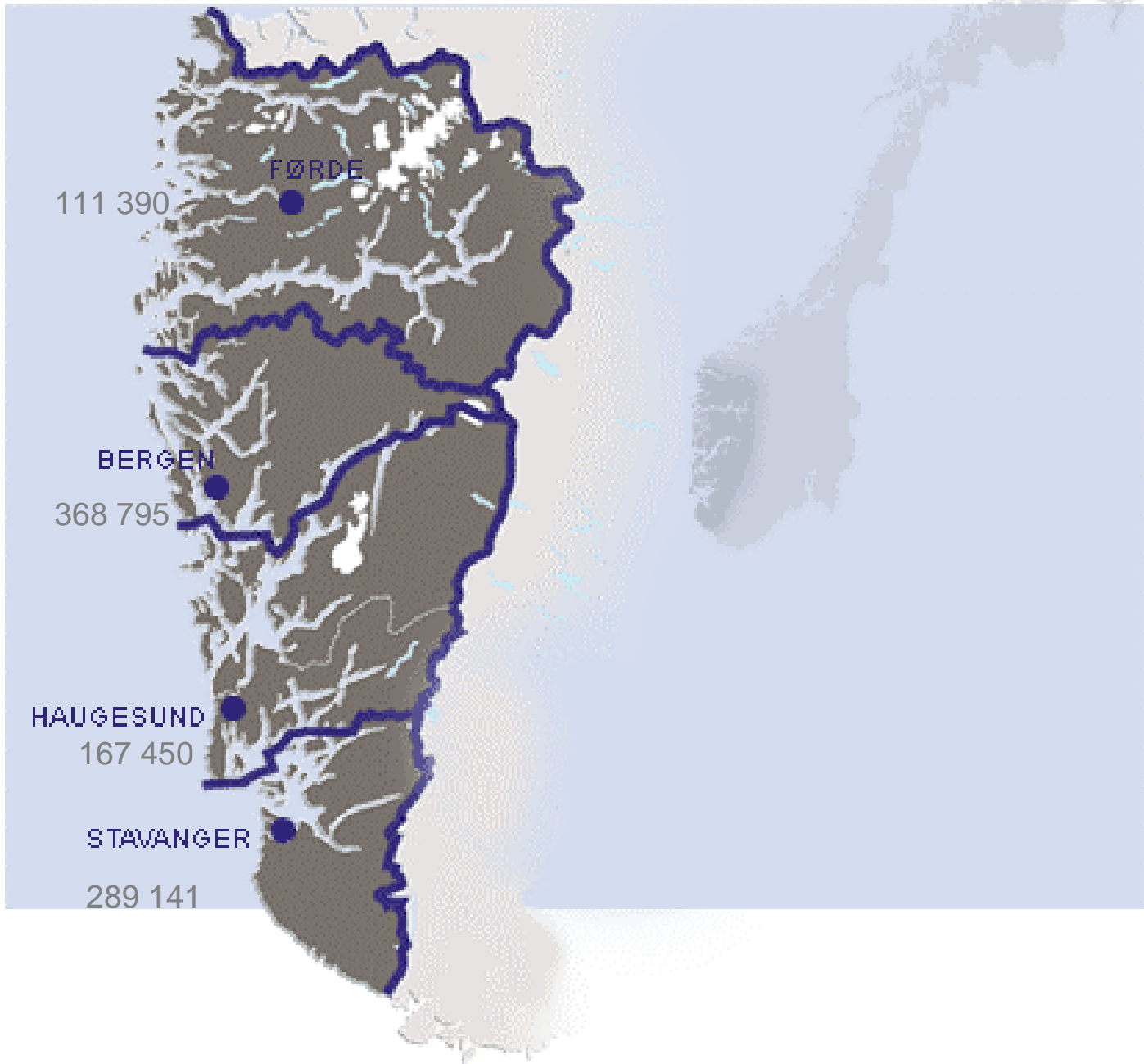


How many STEMI admitted within 12 hours in a population?

- 1.5 per week per 100.000 inhabitants
 - 15 per week per million including nights, weekends, holidays, etc
 - approximately 2 per 24 hours

Organised training of paramedics

- 6 hours training in taking and sending EKG
- 7 hours training in administering thrombolysis
- Official certification is issued
- All ambulances and helicopters equipped with EKG transmission

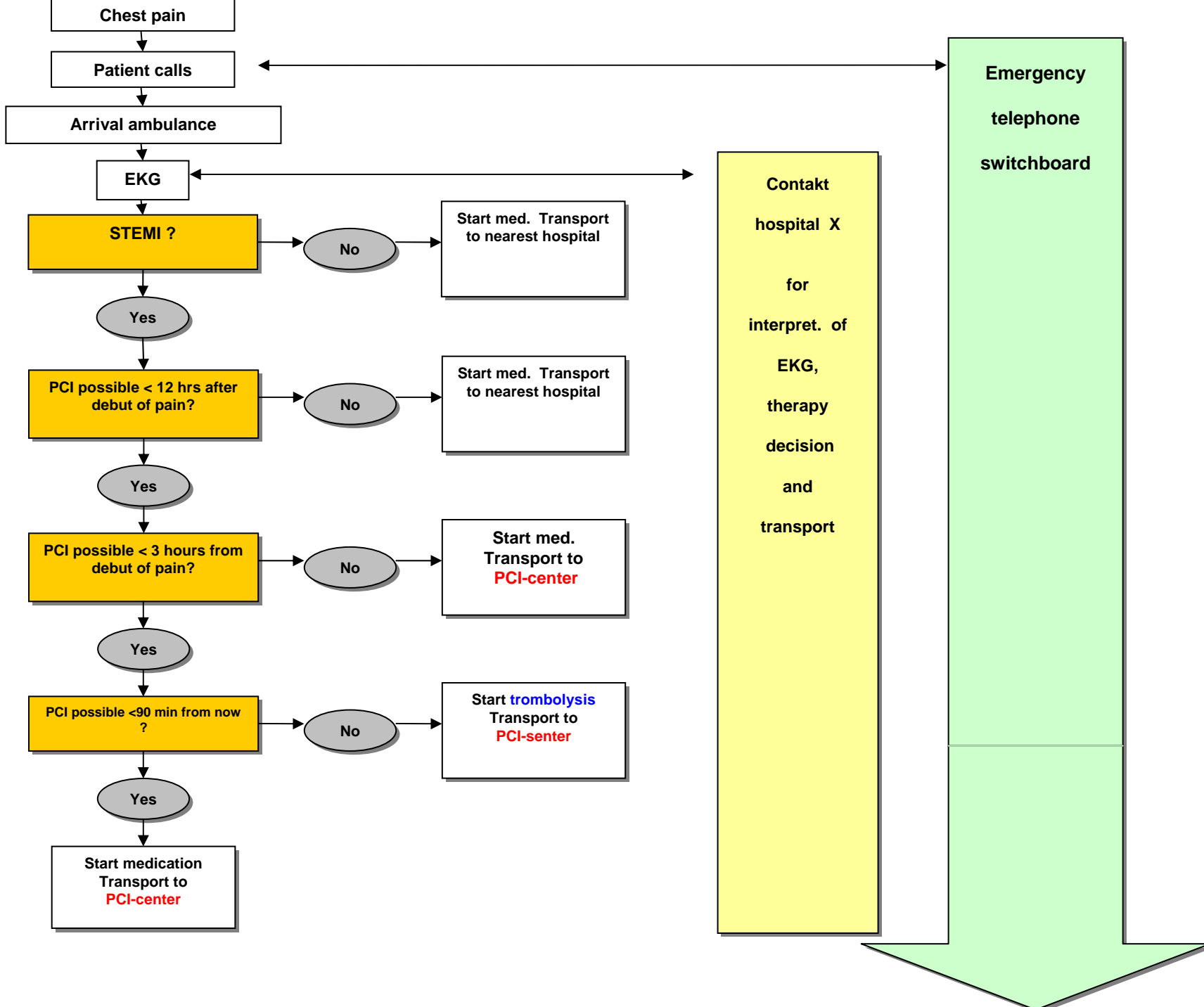


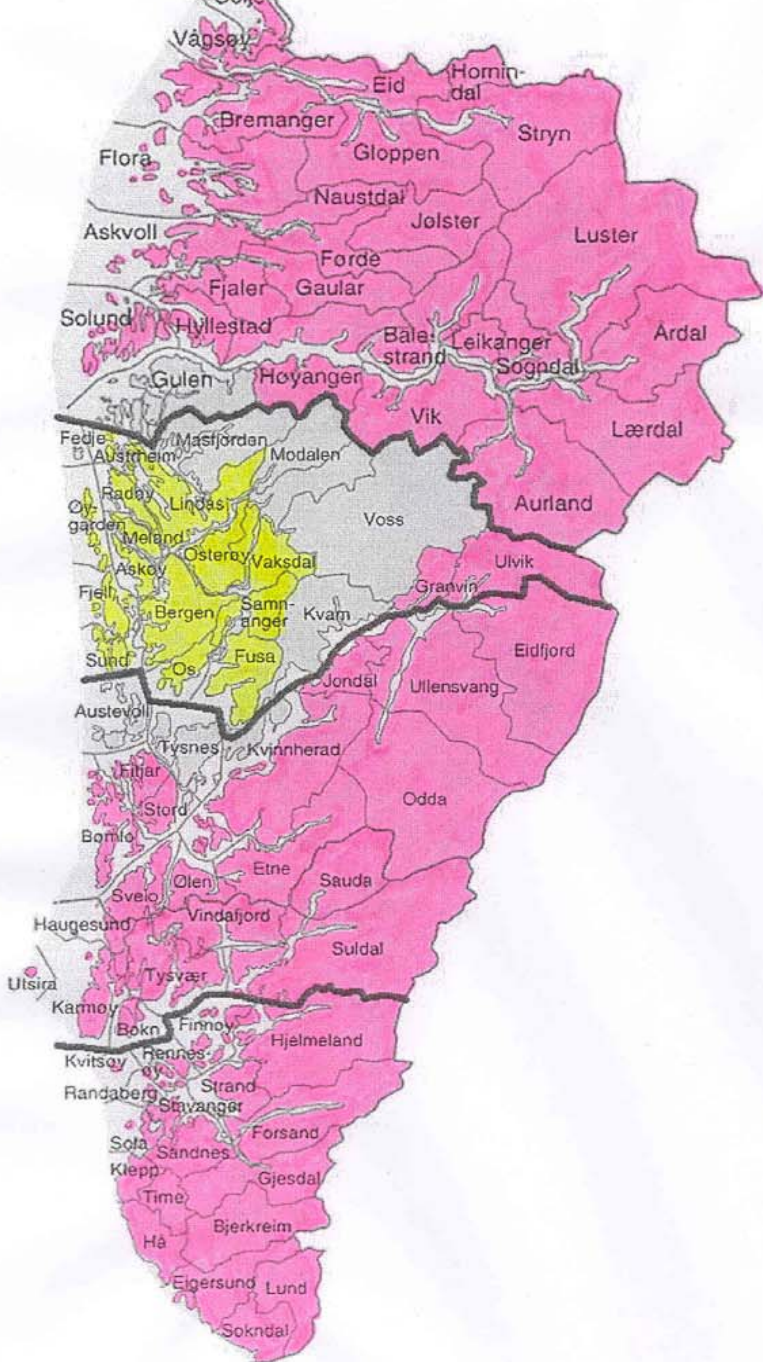






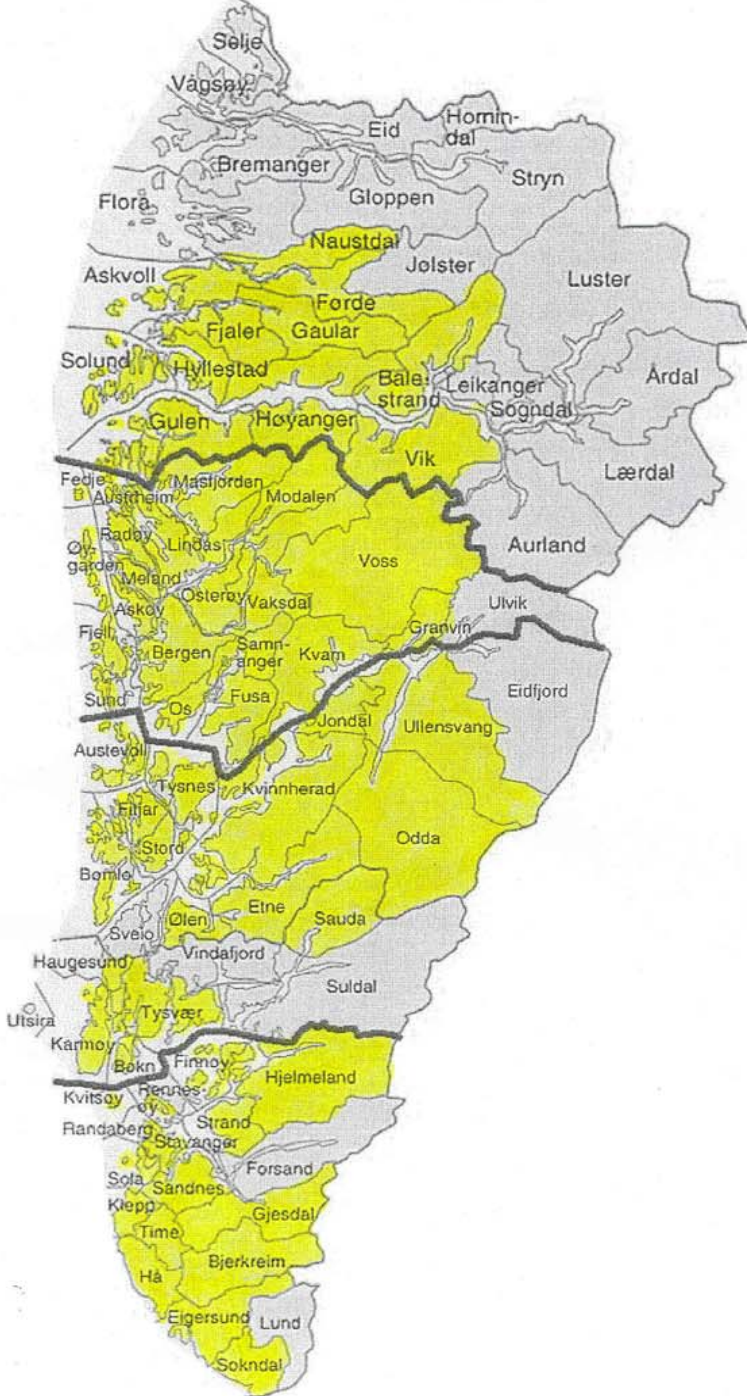






**Regional PCI center only
Not helicopter weather**

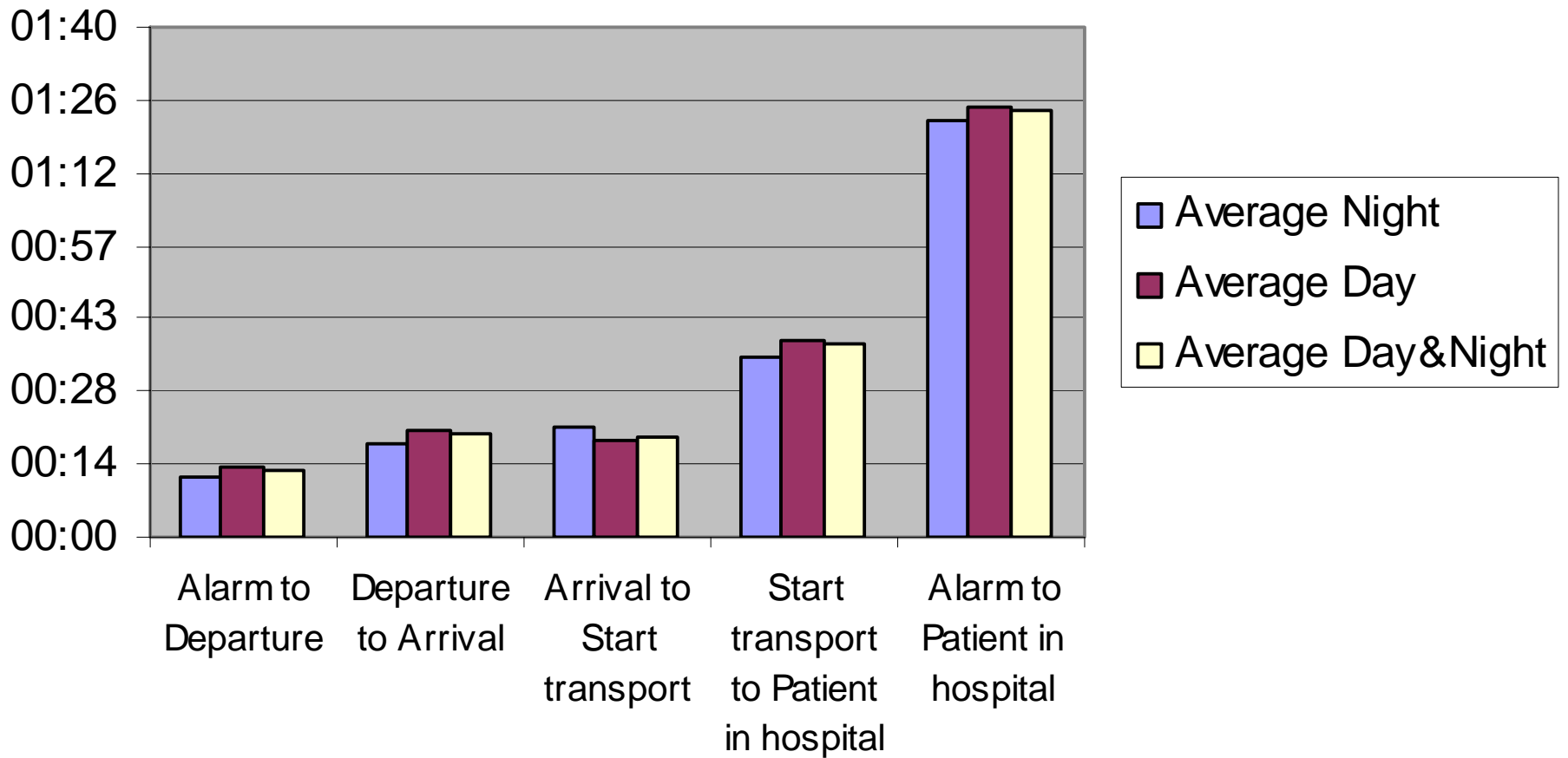
	Time between PCI or T	Therapy decision
Green:	<90 min	Primary PCI
Red:	>120 min	Thrombolysis
Grey:	90-120 min	Circumstantial



Regional and community PCI center Helicopter weather

	Time between PCI or T	Therapy decision
Green:	<90 min	Primary PCI
Red:	>120 min	Thrombolysis
Grey:	90-120 min	Circumstantia

Helicopter transport



Transport times STEMI

- Bergen (helicopter*) 35 min.
total (alarm to hospital) 82 min.
- Air PAMI (amb./ helicopter) 33 min.
- Danami-2 32 min.
- Prague-2 48 min.

*Cut-off point for decision on helicopter vs ambulance is 15 min. delay

Ischemia time and door-to-balloon

- NSTEMI door-to-balloon 38 hrs
- STEMI (helicopter) ischemia 246 mins

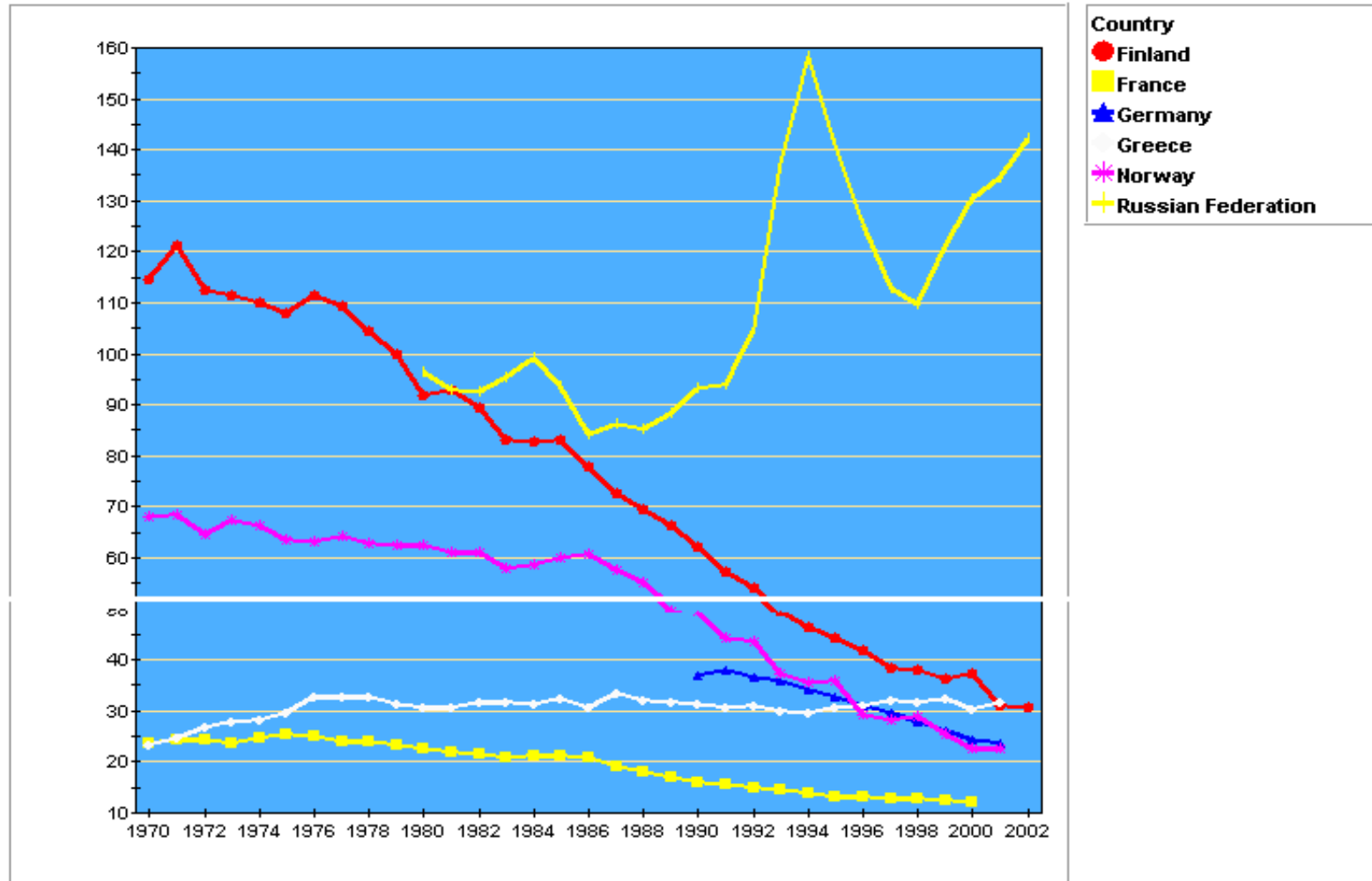
Time Delays in Central Copenhagen

Symptom to 112	50 (1-115)
112 to MD-Ambulance Arrival	7 (3-12)
Ambulance Arrival to ECG	9 (1-18)
ECG to Departure	9 (2-22)
Departure to Arrival Rigshospitalet	10 (2-15)
Total: Symptom to Arrival at Rigshospitalet	85

N=136/24; Figures are minutes (range)

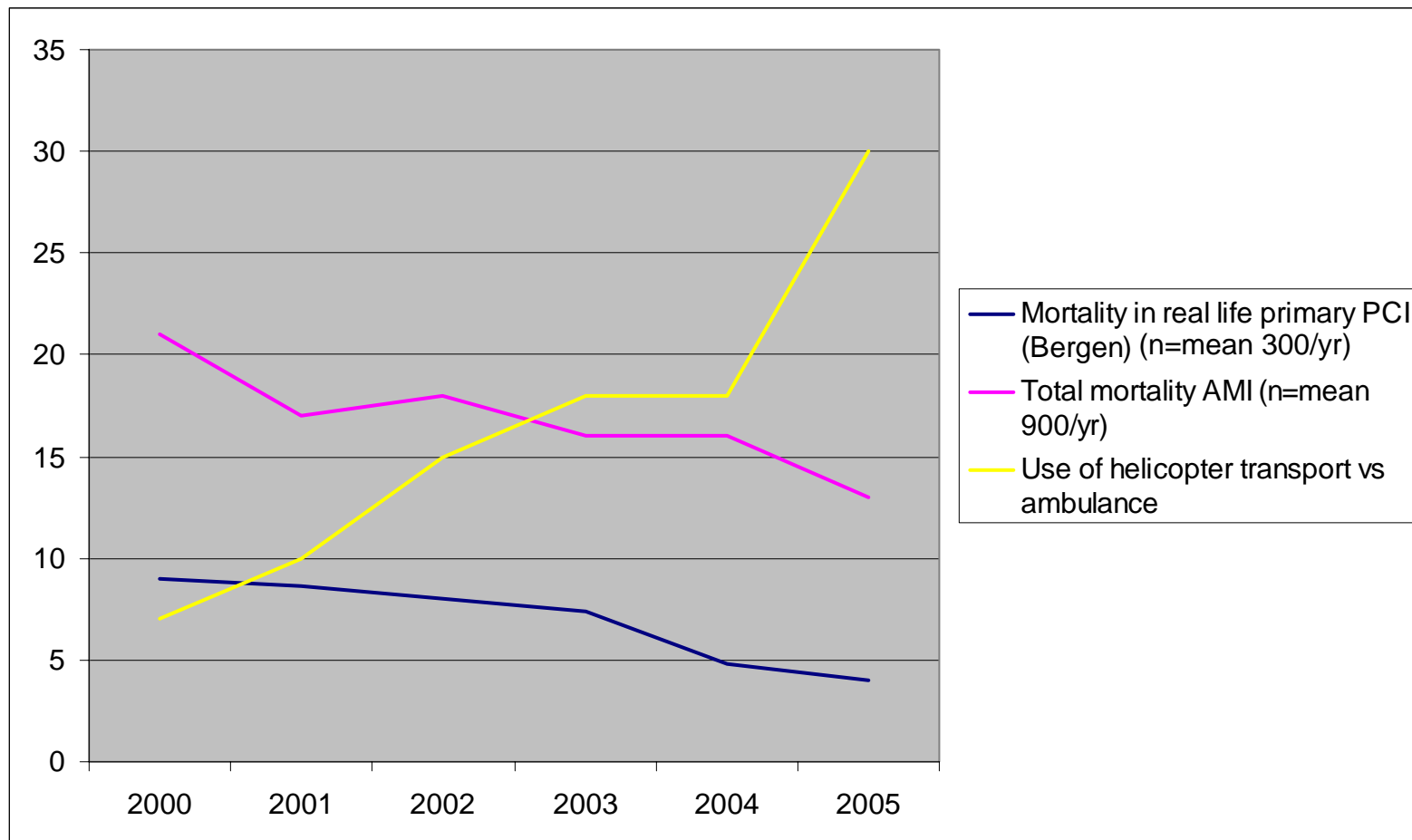
Standardized death rates

SDR, ischaemic heart disease, 0-64 per 100000
1970-2002 - Both Sexes



Mortality at 30 days

% total AMI mortality, primary PCI mortality, and % helicopter transport

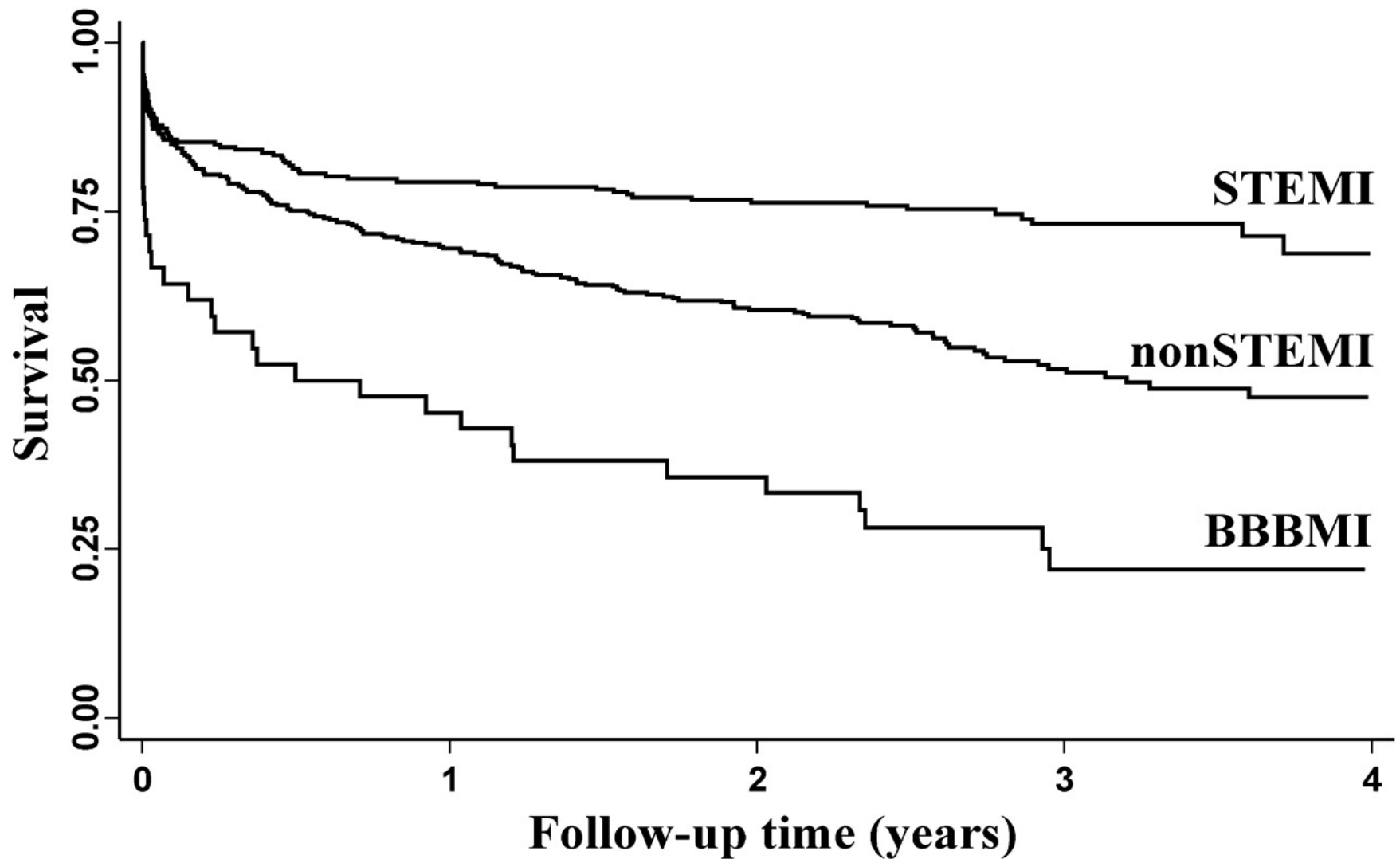


Nygård O, Nordrehaug JE

Cost analysis PCI vs thrombolysis in AMI

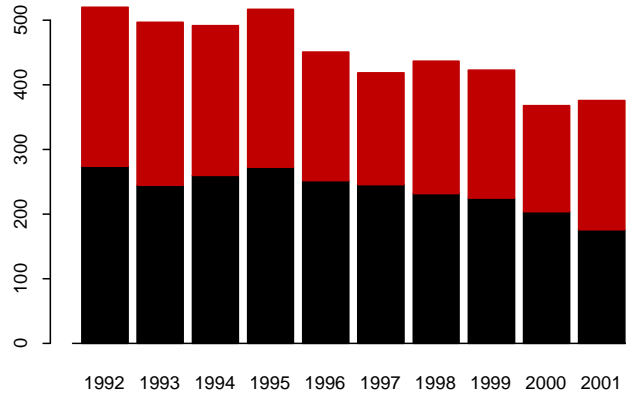
- Simulation model: complete lifelong follow-up of both treatment groups until all patients are dead
- For a 65 yr old man life expectancy was 8.3 yrs vs 7.6 (PCI vs lytic)
- Lifetime cost was 20.000 vs 30.000 Euro, helicopter 24.000 vs 30.000
- PCI was the dominant strategy with lower cost and superior health benefit

Unadjusted survival curves for different categories of AMI (results remained sign after adjustment)

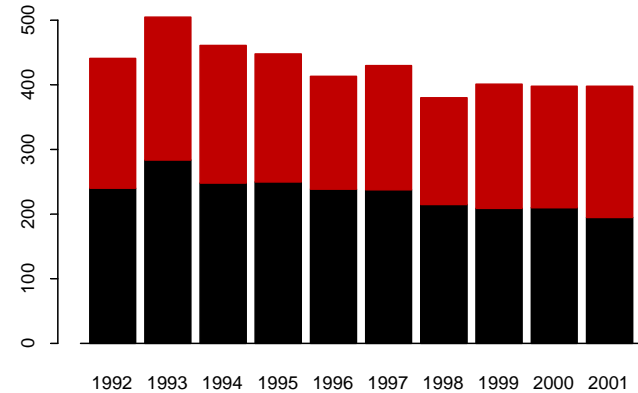


AMI mortality in / outside hospital Western Norway 1992 - 2001

70+ yrs

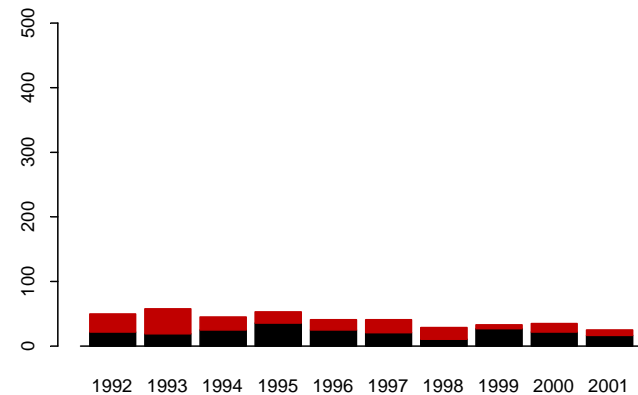
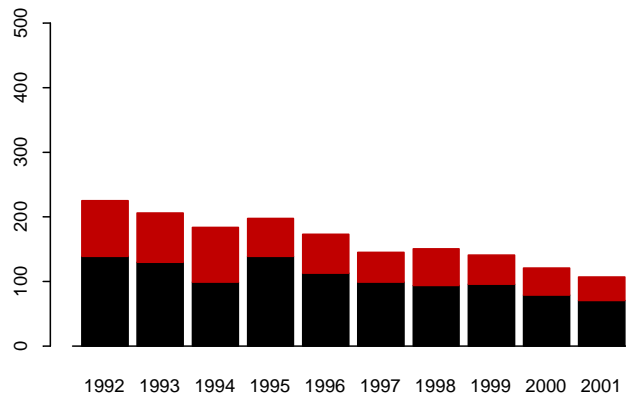


Men



Women

40-69 yrs



Conclusions

- Prehospital transmission of EKG reduces treatment delay times for patients with STEMI
- Efficient networks using emergency centrals, ambulances and helicopters make primary PCI available to large groups of patients with STEMI, also in rural areas, within acceptable ischemia times.

Conclusions

- PCI carries less cost and higher health benefit than thrombolysis even if helicopter transport is used, but helicopter transport confers some time delay before the cost effect is seen
- The reduced life-time cost induced by PCI is diminished by offering the saved hospital bed capacity to other patient groups, this will increase cost of total health care