

# Management of STEMI in era of Reperfusion

## Eagles 2007

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# STEMI in US

ST Segment Elevation Myocardial Infarction  
(STEMI) ~500 K per year



# Thrombolysis

- Works best in first 1-2 hours on fresh thrombus
- Opens vessel with TIMI 3 flow 60-70 % of time
- Risk of bleed (ICH)



# Primary Percutaneous Coronary Intervention (PCI)

- Definition: PCI done for STEMI
- Achieves 90% patency with TIMI 3 flow
- Not as time sensitive as thrombolysis



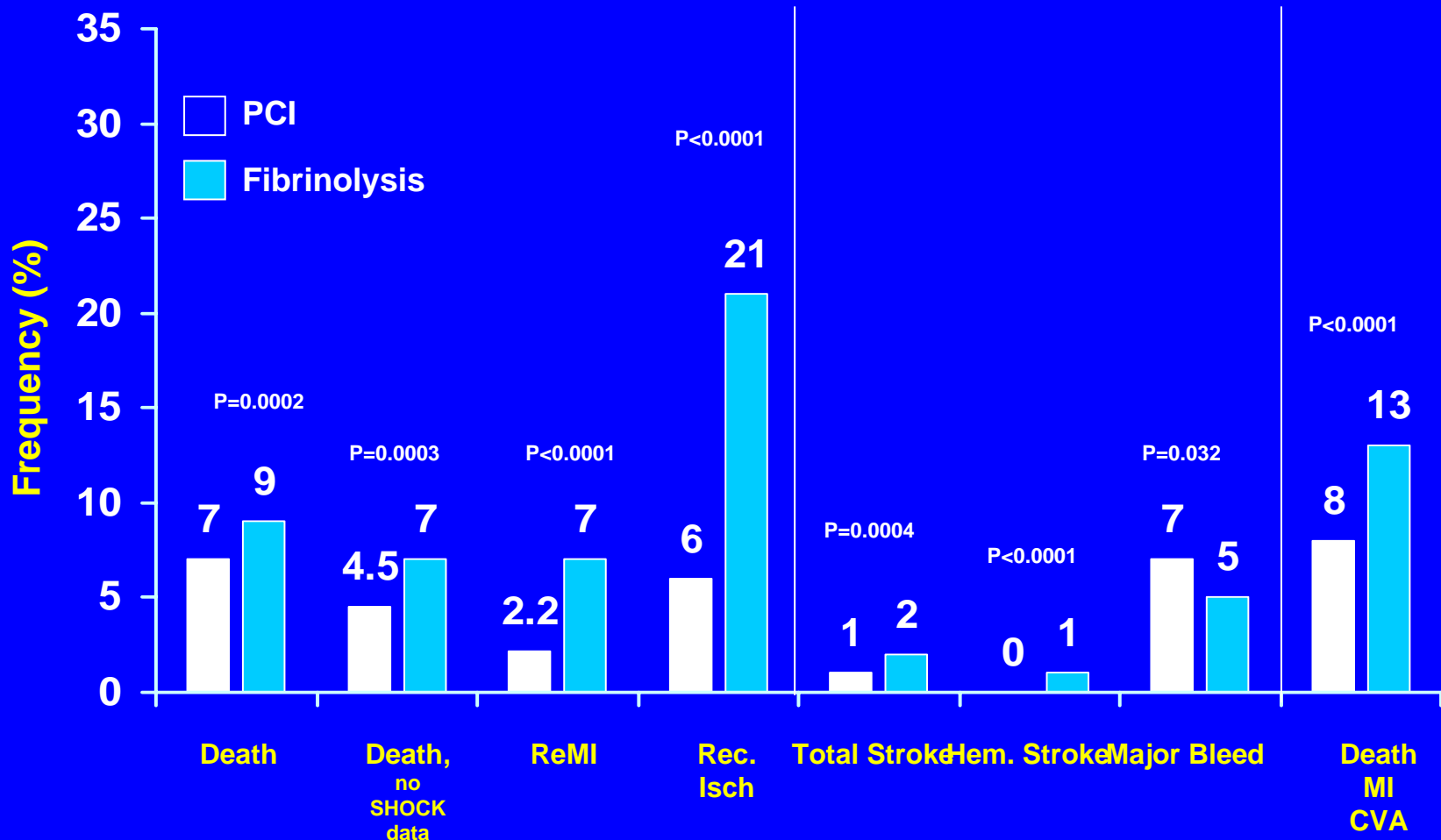
# Superiority of Percutaneous Coronary Intervention (PCI) over In Hospital Thrombolysis for STEMI

- 33% Reduction in death,  
Reinfarction  
and stroke

( *Keeley ,Lancet 2003* )



# PCI vs Fibrinolysis: Short Term Clinical Outcomes (23 RCTs)



**N = 7,739**

Keeley E. et al., *Lancet* 2003; 361:13-20.



# Swedish STEMI Registry

- >26,000 STEMI's between 1999-2004  
Stenstrand-JAMA October 11,2006

Superiority of PCI over prehospital and inhospital thrombolysis-lower mortality and reinfarction rate at 30 days and 1 year



# Swedish Registry (cont)

- PCI superior even in first hour after symptom onset
- PCI superior with delay between potential thrombolysis and PCI up to 4 hours





# Problems in US STEMI Care

- Currently 30% of Recognized STEMI's receive no form of Reperfusion
- Currently only 25% of hospitals are PCI capable



# Systematic Approach to STEMI

- Patients
- EMS
- PCI and non PCI Hospitals
- Emergency Physicians
- Cardiologists
- Payors
- Public Health
- AHA
- Local, Regional & National plans with registries & QI



# Urban STEMI Care Systems

Urban-tertiary hospitals become PCI centers (much like trauma centers)





# Boston

population

600,000 at night ;1.2 million by day

nine 911 receiving hospitals

six are PCI centers





# Boston Pre hospital Care

Fire first responders  
1600 firefighters

3<sup>rd</sup> service EMS  
215 EMT B's  
65 EMT P's





# Boston STEMI Program

- STEMI's transported only to PCI hospitals (since 7/2003)
- Hospitals' Performance Data kept in Registry-  
goals: D2B < 90 min 75 %  
PCI > 90%
- EMS lead committee follows data q 6 months
- Tracking of non STEMI cardiac patients to ensure they go to PCI & non PCI hospitals



# Boston EMS Recognition and Triage of STEMI's

Categorize cardiac patients into-

**STEMI:** cath lab readies on EMS entry note, patient bypasses emergency department

**Possible STEMI:** EP/Cards reviews ekg before contacting cath lab

In both cases EMS goes to STEMI center

**Non-STEMI:**to nearest hospital







Name: WILSON,INDIA 12-Lead 2  
ID: 2005032711421900 3/27/2005 11:48:14  
Patient ID:  
Incident ID: 050860110  
Age: 57 Sex: F

ECG override: Data quality prohibits interpretation.

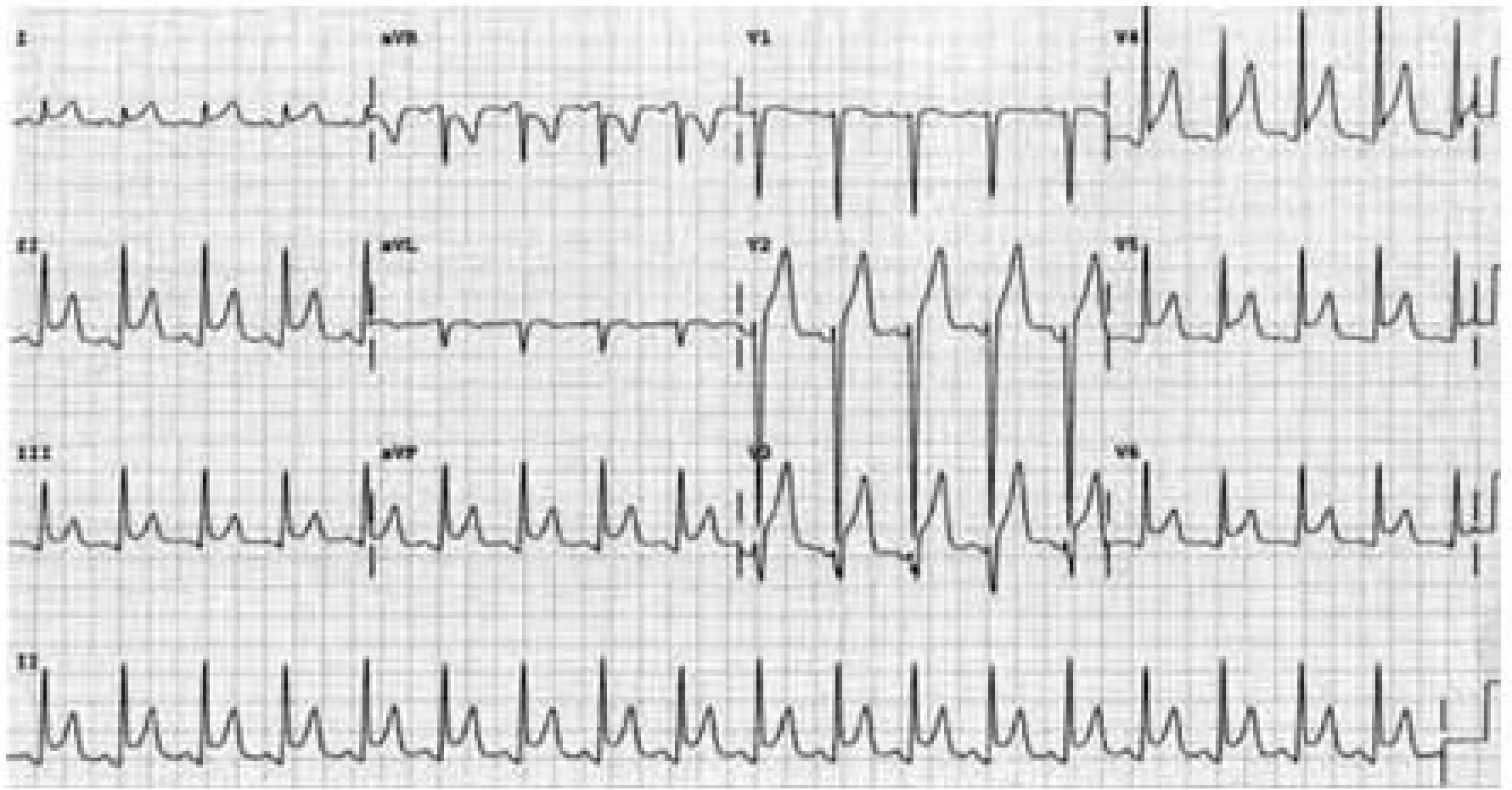


x1.0 .05-150Hz 25mm/sec

Medtronic Physio-Control Comments:

BOSTON EMS RT# 301 1371-095 LP1212443813





# Boston STEMI Demographics

- Age, median: 61 ( 197)
- Sex, % female: 31.5% (64/203)



# Catheterization/Revascularization

Immediate catheterization: 89.4% (177/198)

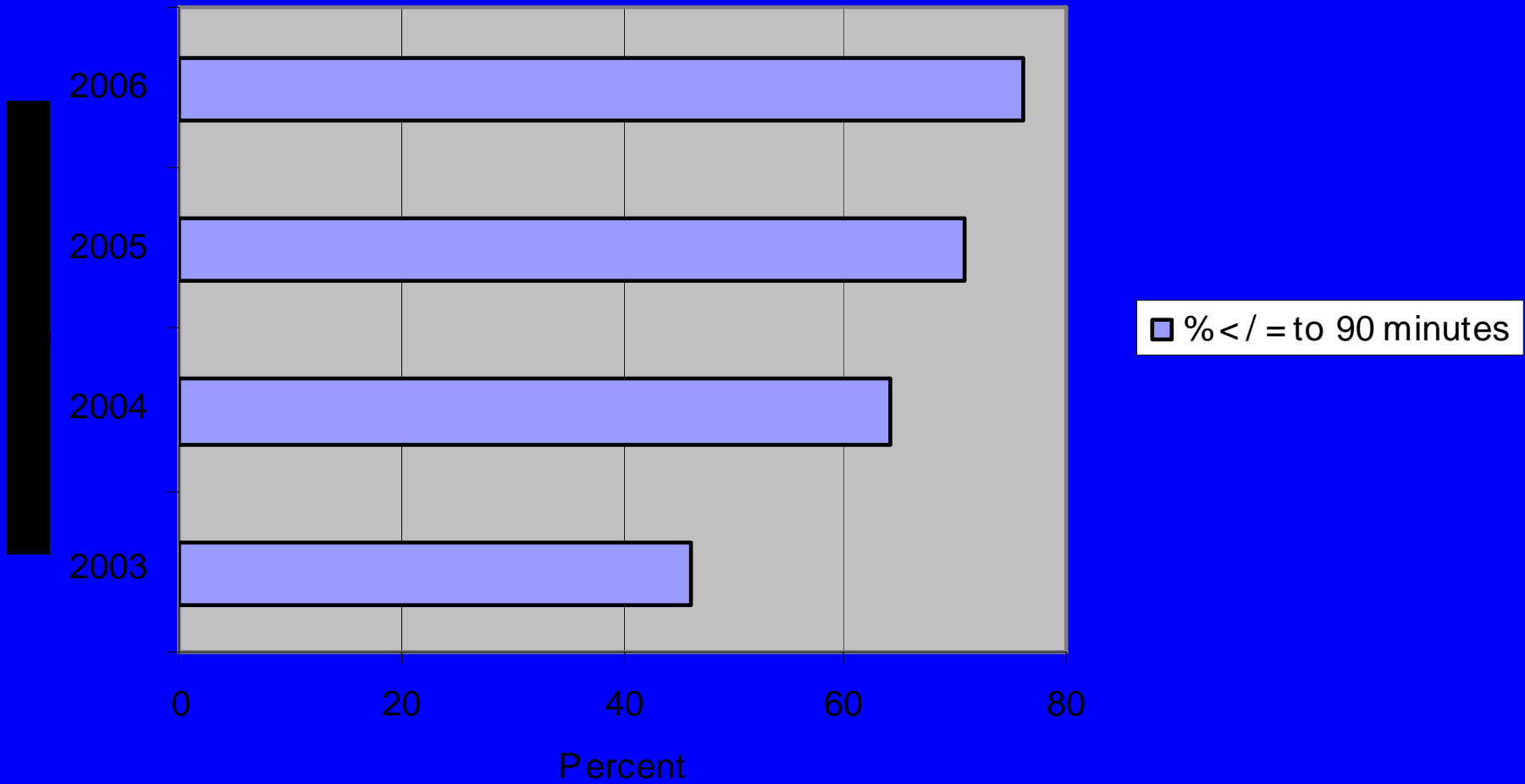
Primary PCI: 84.3% (167/198)

Early CABG: 3.0% (6/197)

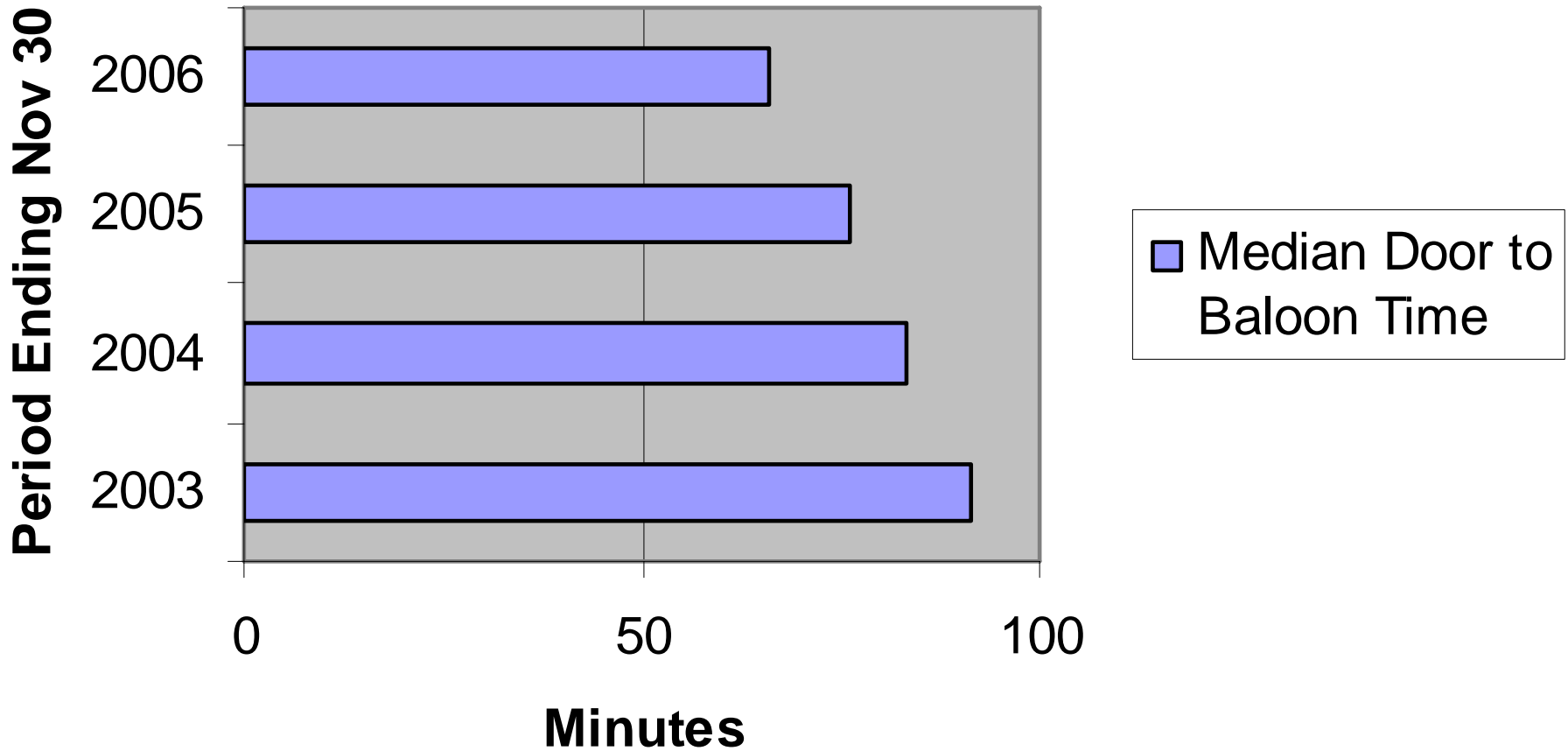
Early revascularization (PCI or CABG): 87.3%  
(173/198)



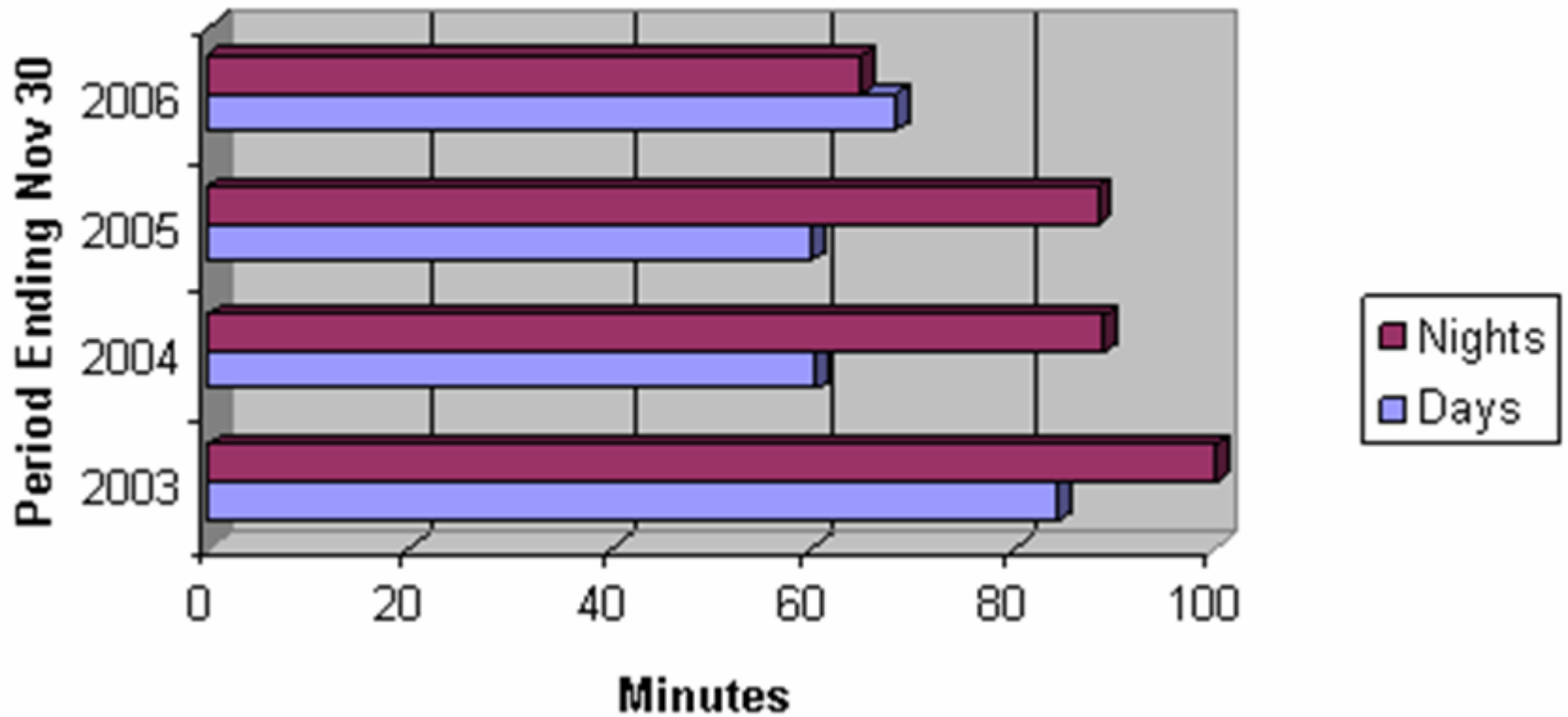
# Door to Baloon Less / Equal 90 Minutes



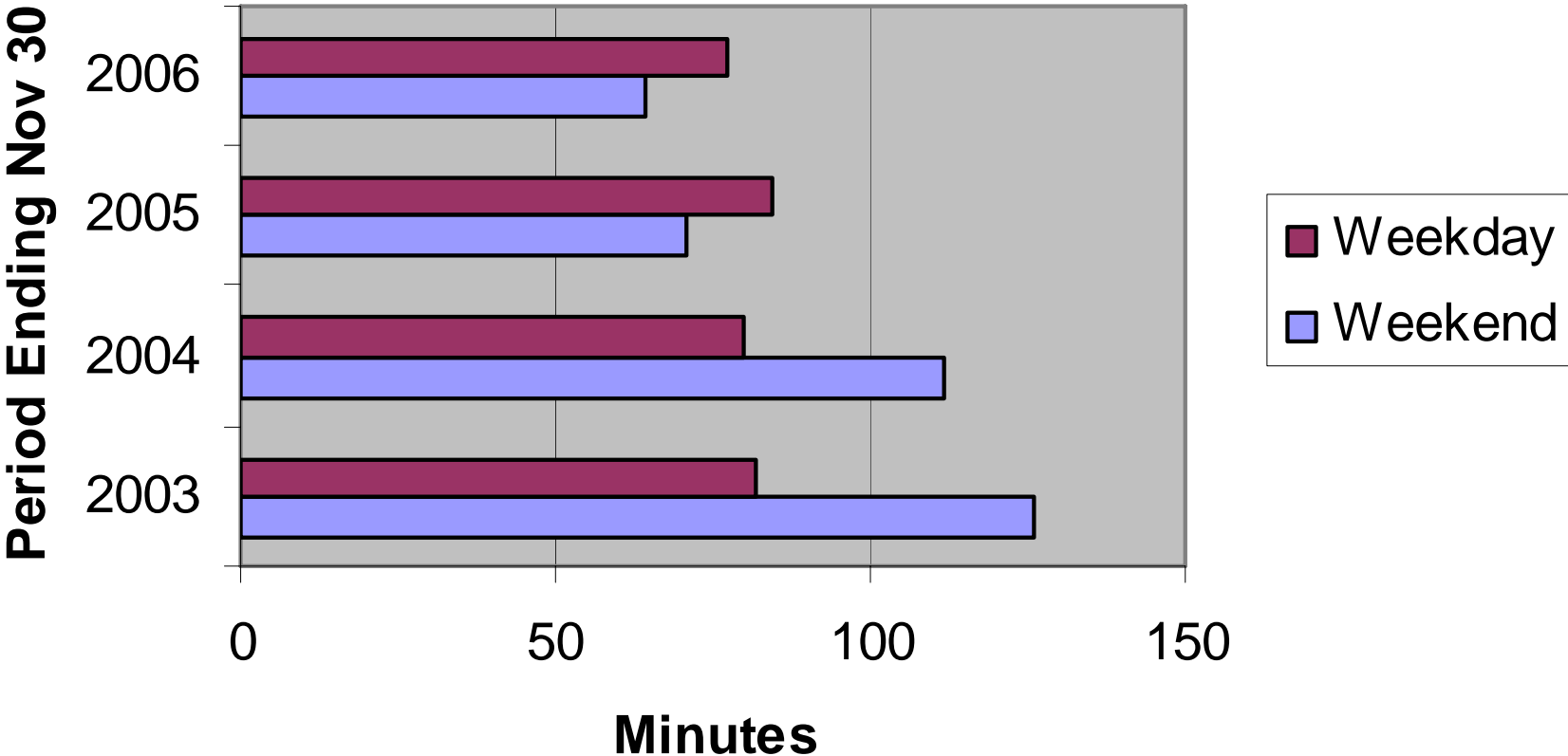
# Median Door to Baloon Time



## Median Door to Baloon Time Day vs Night



# Median Door to Baloon Time - Minutes





# Regional STEMI care systems-EMS

- 12 lead with transmission to hospital
- ASA
- NTG
- B blocker



# EMS

- “STEMI Alert” to receiving hospital
- Transport to PCI center if <60 minutes away
- If PCI center > 60 minutes away:  
transport to non PCI hospital  
consider prehospital thrombolysis if  
symptom onset < 2 hours
- Interfacility transport (ground or air)



# Regional STEMI Care Systems- Hospitals

regional PCI centers

non PCI hospitals:

- timely transfer to Regional PCI hospitals
- thrombolysis if < 2 hrs after symptom onset & timely transfer to PCI facility not possible



# Danami

Door of non PCI hospital to balloon at PCI hospital-

Median time: 90min



# In the US...

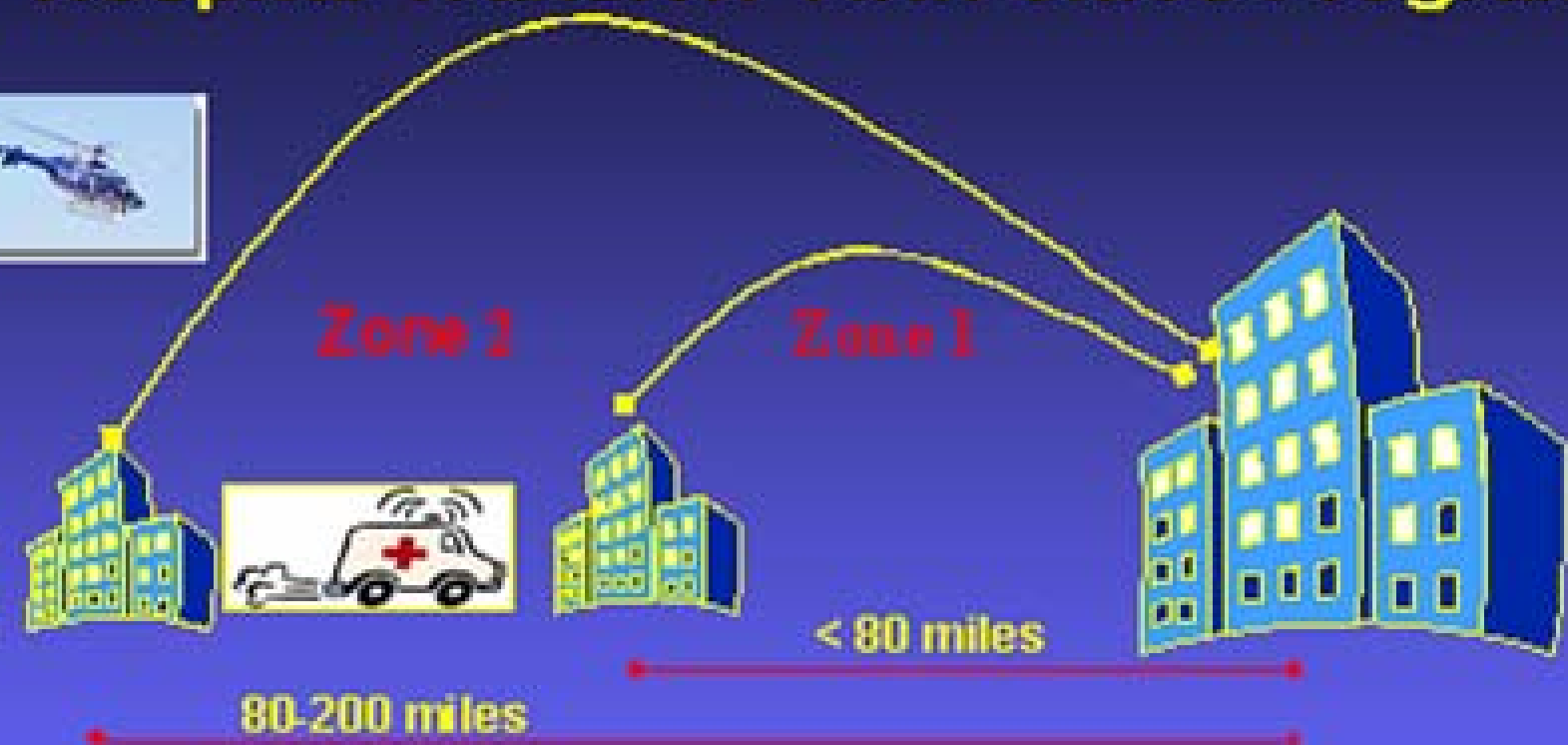
- Only 4% of STEMI patients transferred from one hospital to another for PCI have door (of first hospital ) to balloon (at second hospital) of <90 min
- Median D2B time 180 min
- Bulk of time delays was long interfacility transport time

## NRMI 3





# Hospital Transfer: Twin Cities Program



Hospital w/o PCI

Hospital w/o PCI

Acute MI centers

Facilitated PCI:  
Lytic and transfer  
(ASA, clopidogrel,  
heparin, 1/2 TNK)

Transfer for  
Primary PCI  
(ASA, clopidogrel,  
heparin)

Primary PCI

PC- Tim Her

