

Emergency Cardiac Care

- a new subspecialty within
Emergency Medicine



Prof V. Anantharaman
Department of Emergency Medicine
Singapore General Hospital

Objectives

- Heart disease is a common event and of concern to EM
- Why have ECC as a defined sub-division
- Types of cardiovascular issues relevant to EM
- Fellowship
- International networks

Causes of Mortality – Singapore 2004

• Cancer	27.1%
• Ischaemic Heart Disease	18.8%
• Pneumonia	14.1%
• Cerebrovascular Disease	9.8%
• Accidents, Poisoning, Violence	6.5%
• Other Heart Diseases	4.2%
• COPD	3.1%

Source: Singapore Health Facts, 2005 produced by Ministry of Health, Singapore

Cardiac Arrest Statistics

- # of AMI per annum 2,400
- # of OHCA per annum 1,000
- Survival rates (2004) 2.7%
- # of IHCA per annum 2,600
- In-hospital survival rate 30.0%

Cardiovascular Emergencies -- types

- Acute Coronary Syndromes
 - Out-of-hospital
 - In-hospital
 - Chest Pain patients
- Arrhythmias
- Heart Failures
- Cardiac Arrests
- Thrombosis / Embolism
- Hypertensive Emergencies
- Cerebrovascular Emergencies

Development of Cardiology

- Invasive Cardiology
- Nuclear Cardiology
- Electro-physiology
- Inpatient cardiology
- Elective cardiology

Where do cardiac emergencies occur?

- Out – of – hospital
 - Residences
 - Public Places
 - GP clinics
 - Ambulances
- Emergency Department
- General non-cardiology wards

Issues in Cardiac Emergencies

- Morbidity
 - Slow recognition and unnecessary delay in emergency care results in poor functional cardiovascular status
- Too many in the hospital staying too long
 - Expensive and take up valuable inpatient beds more needed by more sick patients
- Mortality
 - Unacceptably high death rate for cardiac arrests in and out of hospital
 - Cardiac arrest survivors have reasonable life span
- Lack of dedicated persons outside of hospital
 - No financial incentive for initial management of cardiac emergencies
- No Recognition for Research providers in these areas

There is a need for Emergency Medicine to focus on Emergency cardiac care as one of her principal areas of interest

- Significant numbers
- Definite potential to move the pace of care of these illnesses to a level that is consistent with better care of patients
- Emergency Physicians are best positioned to make this contribution
- Requirement and scope for increased expertise and skill in this area to influence these changes.

Scope of Emergency Cardiac Care (ECC)

- Cardiac Life Support
- Pre-hospital emergency cardiac presentations
- Chest Pain
- Acute Coronary Syndromes
- Heart failure
- Cardiac Arrhythmias
- Hypertensive emergencies / urgencies
- Vascular Thrombosis / Embolism

Emergency Cardiac Care

- Clinical services
- Education & Training
- Research

ECC Clinical Services

- Organisation and use of ED facilities in cardiac emergencies / cardiac arrest
- Hands-on experience in the Emergency Cardiac Care Unit (Heart ER)
- Co-ordination and communication between paramedics and ED staff with regards to delivery of pre-hospital emergency cardiac care

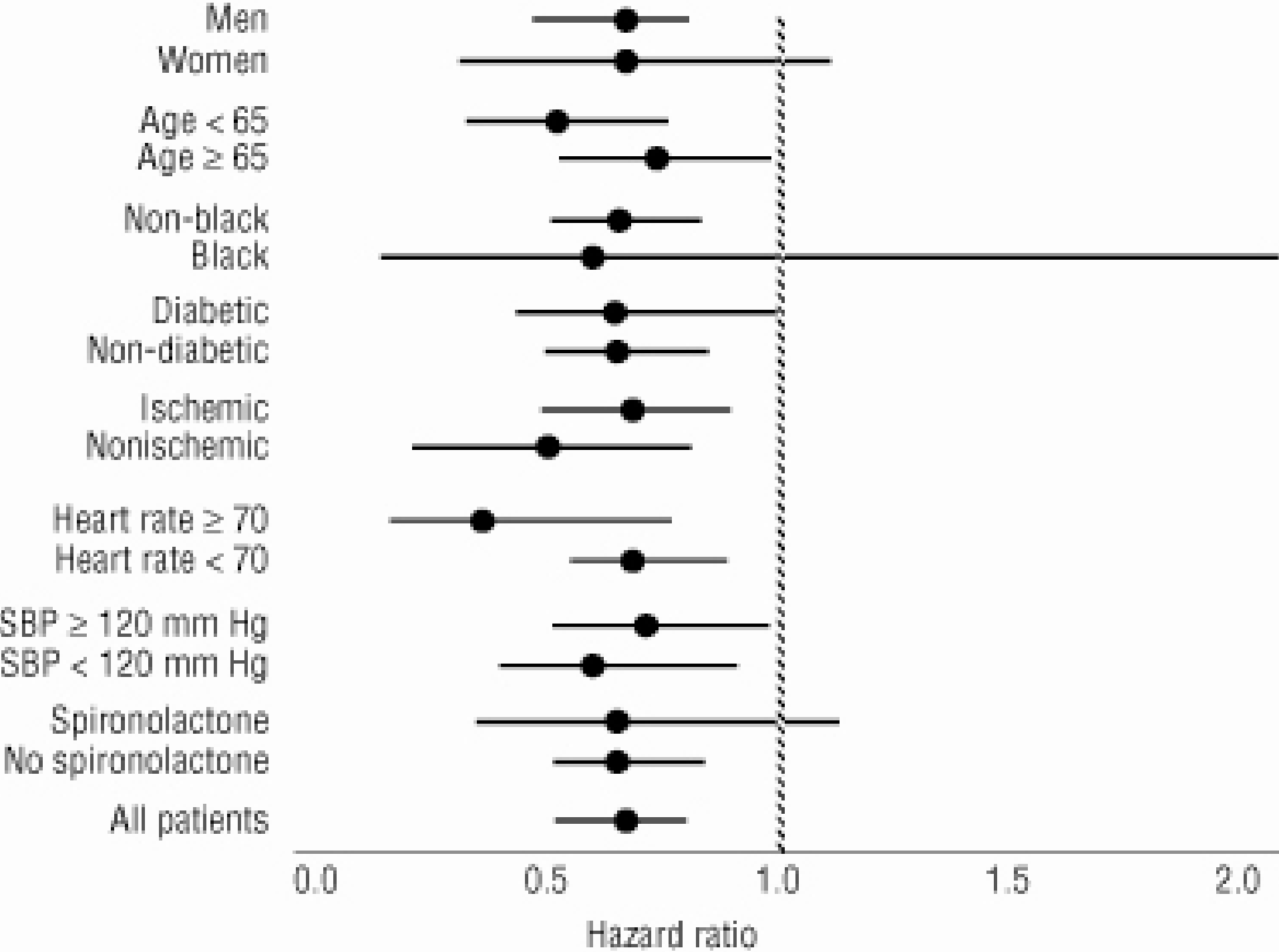


ECC Clinical Services

- Management of various cardiovascular conditions in the ED:
 - Acute coronary syndromes
 - Heart failure
 - Cardiac arrhythmias
 - All chest pains
- Performing procedures
 - Ultrasound
 - CT Scans

Research activities

- SVT Trials
- Tissue Magnesium in Acute Myocardial Infarction
- ACTION study
- iTrACS
- Pro-BNP
- Pre-hospital Defib Outcome study
- ED evaluation of door to balloon times for STEMI
- HiLoBED

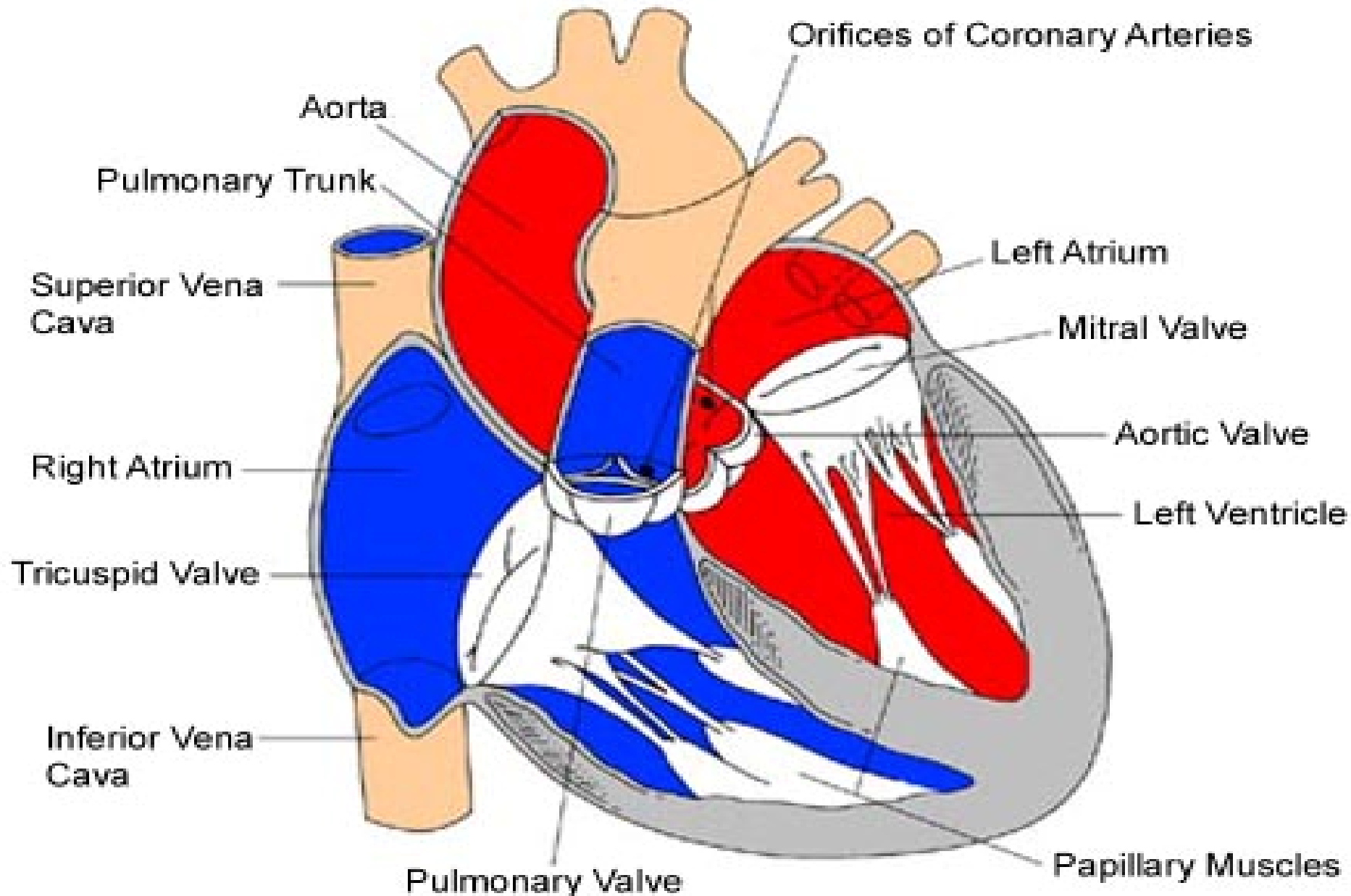


Emergency Cardiac Imaging

- Ultrasound
 - Detection of pericardial effusion and tamponade
 - Assessing cardiac activity in patients with hypotension and pulselessness
 - Estimation of cardiac indices
- Stress Scanning
 - Detection of ischaemic zones and regional wall motion abnormalities



Interior View of the Heart



Pre-hospital Cardiac Emergencies

- Sites of cardiac arrest and cardiac emergencies in the community
- Call centre telephone advice for cardiac emergency calls
- Training of pre-hospital personnel in basic life support skills, e.g. CPR, AED
- Intervening to reduce time to first-shock in the pre-hospital environment
- EMS research
- Development of pre-hospital ECG transmission to receiving hospitals
- Development of cardiac emergency protocols for ambulance crew
- Audit of pre-hospital cardiac arrest management



Cardiac Life Support

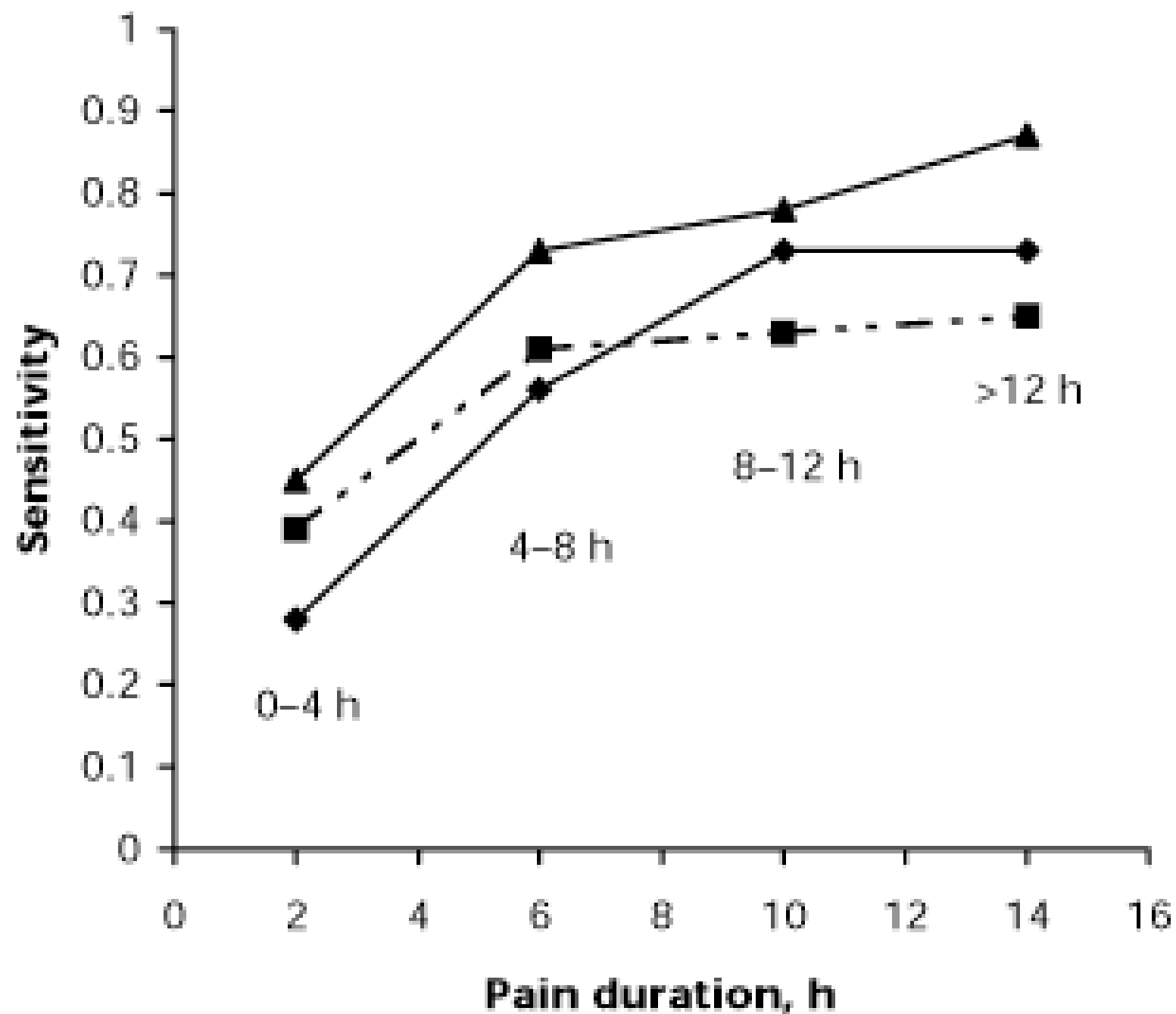


- Instructor in BCLS, AED, ACLS
- Setting standards in monitoring and overseeing in-hospital cardiac arrest management
- Organisation of cardiac resuscitation within the ED
- Involvement in training of medical and health professionals and also community in life support skills
- Involvement in National Resuscitation Council activities

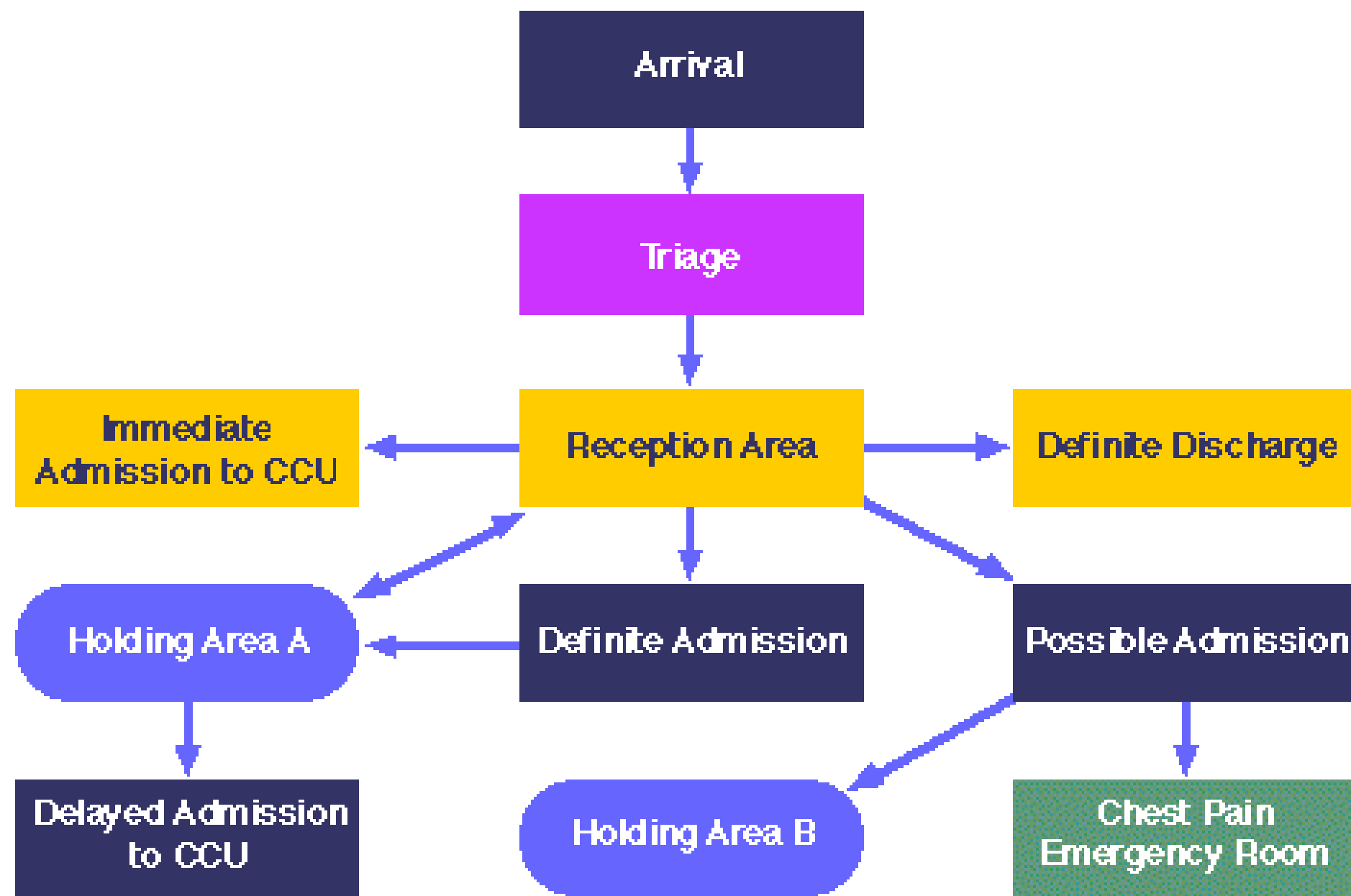


Chest Pain / Acute Coronary Syndromes

- Development of chest pain and ACS protocols within the ED
- Monitoring and development of measures to reduce D2N and D2B times within the hospital
- Organisation of ED-based chest pain units
- Training in performance and reading of Exercise Stress testing and Stress nuclear scans
- Development greater accuracy in chest pain stratification within the ED



ED Chest Pain Processes



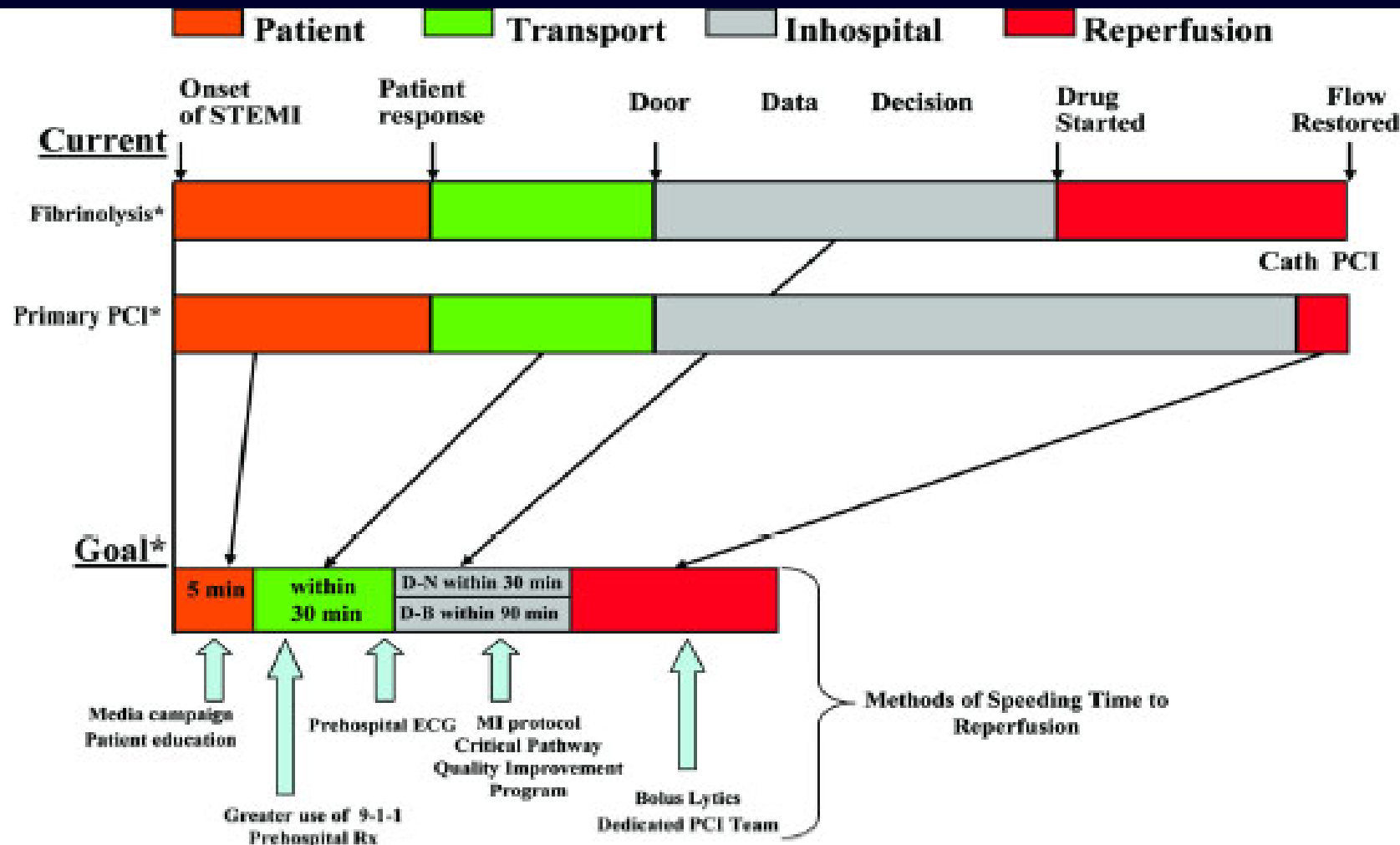
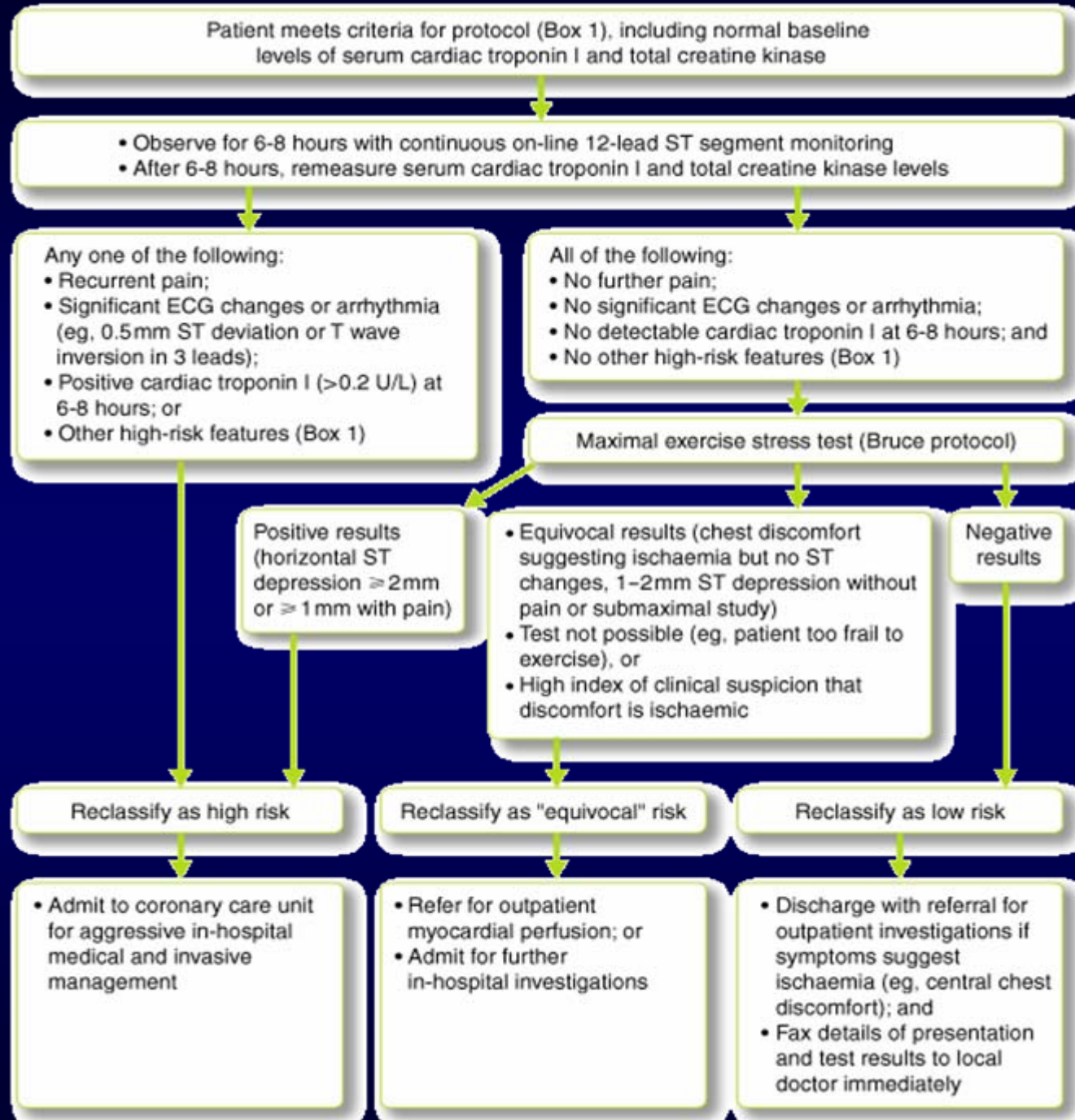


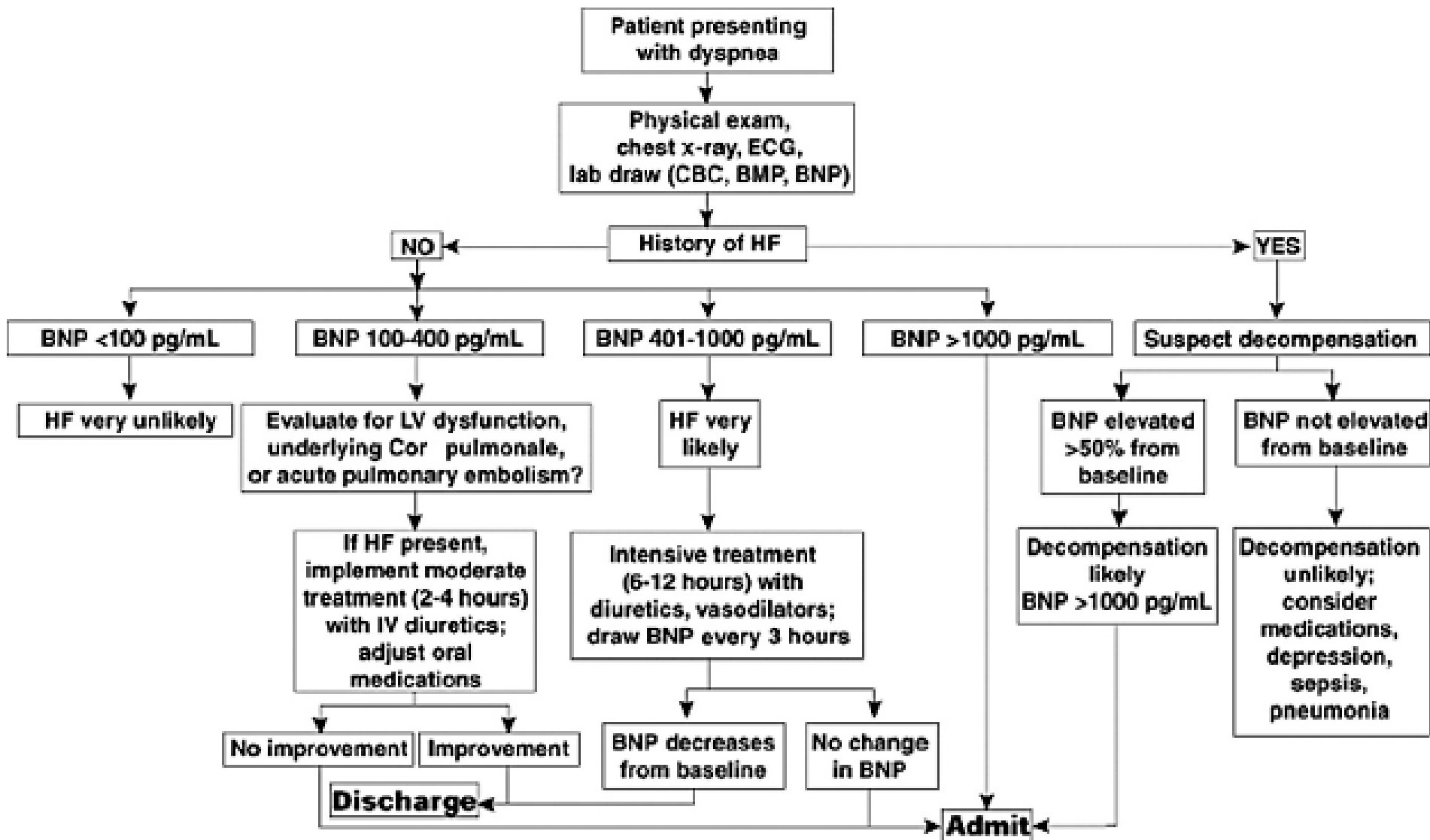
Figure 7. Major components of time delay between onset of symptoms from ST-elevation MI and restoration of flow in the infarct artery. Plotted sequentially from left to right are shown the time for patients to recognize symptoms and seek medical attention, transportation to the hospital, in-hospital decision-making, and implementation of reperfusion strategy, in time for restoration of flow once the reperfusion strategy has been initiated. The time to initiate fibrinolytic therapy is the "door-to-needle" (D-N) time; this is followed by the period of time required for pharmacologic restoration of flow. More time is required to move the patient to the catheterization laboratory for a percutaneous coronary interventional (PCI) procedure, referred to as the "door-to-balloon" (D-B) time, but restoration of flow in the epicardial infarct artery occurs promptly after PCI. At the bottom are shown a variety of methods for speeding the time to reperfusion along with the goals for the time intervals for the various components of the time delay. Cath = catheterization; PCI = percutaneous coronary intervention; min = minutes; ECG = electrocardiogram; MI = myocardial infarction; Rx = therapy. *These bar graphs are meant to be semiquantitative and not to scale. Modified with permission from Cannon et al. J Thromb Thrombol 1994;1:27-34 (180).



Heart Failure

- Early and accurate detection of heart failure in the ED
- Use of investigational modalities in heart failure diagnosis
- Management of mild heart failure in the ED Cardiac Care Unit
- Participation in development of heart failure protocols within the hospital

Use of BNP in the ED



Cardiac Arrhythmias

- Pharmacological and non-pharmacological therapy of cardiac arrhythmias within the ED
- Use of pacing techniques
- Development of research projects in emergency cardiac arrhythmias, e.g. for SVT, VF, AF
- Multi-centre local and international research opportunities
- Development of arrhythmia registries



Hypertensive emergencies / urgencies

- Early Identification and initiation of management for moderate and severe hypertension
- Ambulatory control of moderate hypertension within 24 hours in the ED
- Minimizing admissions of such patients to the in-patient areas
- Research in the initial control of moderate and severe hypertension

Cardiovascular thrombosis / embolism

- Early diagnosis of DVT and its ambulatory management
- Early diagnosis of PE and initial care
- Initiating anti-thrombotic therapy in susceptible individuals

Fellowship in Emergency Cardiac Care

- To prepare the EP for a career as a leader in this subspecialty
- Duration: 1 year
- Content:
 - Formal skills training courses / programs where emphasis will be on management of MI, arrhythmias and heart failure
 - Management of an ED-based chest pain diagnostic unit
 - Short attachment to the Emergency Ambulance services and familiarization with ambulance ECC protocols
 - Familiarization with and use of ECC protocols
 - Participation in conduct of basic and advanced life support training programs
 - Conducting research in an area of ECC till completion
 - Participating with assigned mentor in admin support of ECC

Fellowship in Emergency Cardiac Care

- Minimum Entry Requirements

- Be a certified EM specialist with ≥ 2 years post board cert
- Be actively involved in clinical emergency medicine
- Provide evidence of interest in further education in ECC

- Number of Places Available Per Year

- Two at any one time

- Funding

- To seek own funding before start of clinical attachment, which includes housing, meals and personal expenses
- Tuition fees at SIN \$ 1,000 per month + \$500 admin fee

Emergency Cardiac Care Branch

Department of Emergency Medicine



- **Services**
 - A 7-bedded Emergency Cardiac Care Unit
 - Protocols for AMI and Unstable Angina
 - Protocols for SVT, fast AF
- **Education**
 - ECG workshops
 - leads BCLS and AED Programs at SGH and NRC
- **Research**
 - SVT
 - HiLoBED
 - BNP
 - D2B and D2N
 - Vectorcardiography
 - ACTION
 - Audit of Pre-hospital Heartsave program



Emergency Medicine Cardiac Research and Education Group



W. Brian Gibler, MD, *Chairman*
University of Cincinnati
Cincinnati, Ohio



V. Anantharaman, MD
Singapore General Hospital
Singapore

James W. Hoekstra, MD
Wake Forest University
Winston Salem, North Carolina

Tom P. Aufderheide, MD
Medical College of Wisconsin
Milwaukee, Wisconsin

Judd E. Hollander, MD
University of Pennsylvania Hospital
Philadelphia, Pennsylvania

Roberto R. Bassan, MD
Pro-Cardiaco Hospital
Rio de Janeiro, Brazil

Brian R. Holroyd, MD
University of Alberta Hospitals
Edmonton, Alberta, Canada

Herman H. Delooz, MD, PhD
University Hospital
Gasthuisberg
Leuven, Belgium

Shingo Hori, MD
Keio University
Tokyo, Japan

Masatoshi Oba, MD, PhD
Furukawa City Hospital,
Japan

Deborah B. Diercks, MD
U.C. Davis Medical Center
Sacramento, California

Francois P. Sarasin, MD
Hospital Cantonal
Geneva, Switzerland

CARDIOVASCULAR AND NEUROVASCULAR EMERGENCIES:
Advances in Diagnosis and Treatment
SAEM Satellite Symposium Thursday May 17, 2007 (6-8am)

Diagnostic Utility of Multidetector CT in the Evaluation of ED Patients with Chest Pain
David F. M. Brown, MD, Assoc. Professor, Associate Chief
Emergency Medicine, New General Hospital

Optimal Management of STEMI: The Role of Anti-thrombotic and Antiplasmin Agents
James W. Hoekstra, MD, Chairman
Emergency Medicine, Wake Forest University

Implementing Door-to-Ballroom Times: The STEEP Initiative
Corey M. Sola, MD, Chairman
Emergency Medicine, Vanderbilt University

What's New in the ED Management of Aortic Dissection?
J. Douglas Kirk, MD, Professor and Vice Chair
Emergency Medicine, UC Davis Medical Center

Diagnosis of TIA and Stroke in the ED: How Can the Complex Be Made Simple?
Brian A. Scutt, MD, Assistant Professor
Emergency Medicine, University of Cincinnati

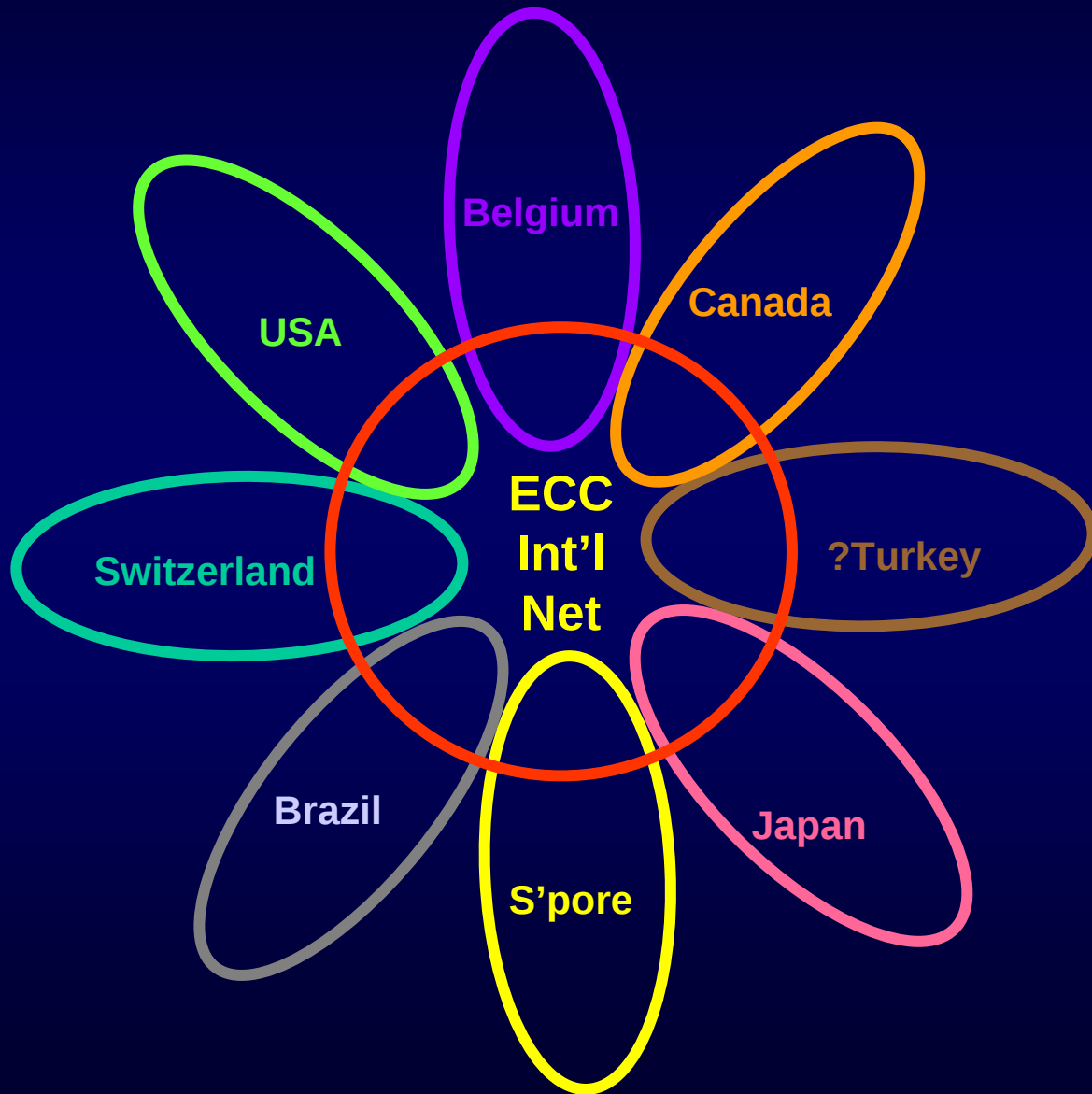
Treating Ischemic and Hemorrhagic Stroke: Why the Controversy?
Arthur M. Pandolfi, MD, Associate Professor
Emergency Medicine, University of Cincinnati

MODERATOR:
W. Brian Gibler, MD, Chairman
Emergency Medicine, University of Cincinnati
President, EMCRI-ED International

Sherraton Hotel and Towers
Chicago Ballroom 10
Thursday, May 17, 2007: 6:00 am - 8:00 am
ON-SITE REGISTRATION AVAILABLE!
COMPLIMENTARY EVENT | BREAKFAST PROVIDED

EMCREG International

International ECC Network



1. Guidelines
2. Share Protocols
3. Joint Research
4. Common Curricula
5. Mutual Recognition
6. Common agenda for development
7. Continuing interactions

International Conferences on Emergency Medicine (ICEM)

- 1986 – Britain
- 1988 – Australia
- 1990 – Canada
- 1992 -- USA
- 1994 – Britain
- 1996 – Australia
- 1998 – Canada
- 2000 -- USA
- 2002 – Britain
- 2004 – Australia
- 2006 – Canada
- 2008 -- USA
- 2010 – Singapore
- 2012 – Ireland

- **AREAS OF INTEREST** (list not comprehensive)
- **1. General Emergency Medicine**
- **2. Emergency Cardiac Care**
- **3. Emergency Trauma Care**
- **4. Emergency Toxicology**
- **5. Disaster Medicine**
- **6. Emergency Pre-hospital Care**
- **7. Emergency Observation Medicine**
- **8. Paediatric Emergency Medicine**
- **9. Emergency Geriatrics**
- **10. Emergency Imaging**
- **11. Administration of Emergency Care**
- **12. IT in Emergency Care**
- **13. Critically Appraised Topics (CATs) / Best Evidenced Topics (BETs) / Evidence Based Medicine / Knowledge Translation (KT)**
- **14. Medico-Legal and Ethical Perspectives in Emergency Medicine**
- **15. Emergency Airway Management**
- **16. Emergency Medicine Education**
- **17. Resuscitation**
- **18. International Emergency Medicine**
- **19. Miscellaneous topics in Emergency Medicine**

Thank You