



Emergency Medical Services in **S**INGAPORE

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Local Emergency Medical Services (EMS) System

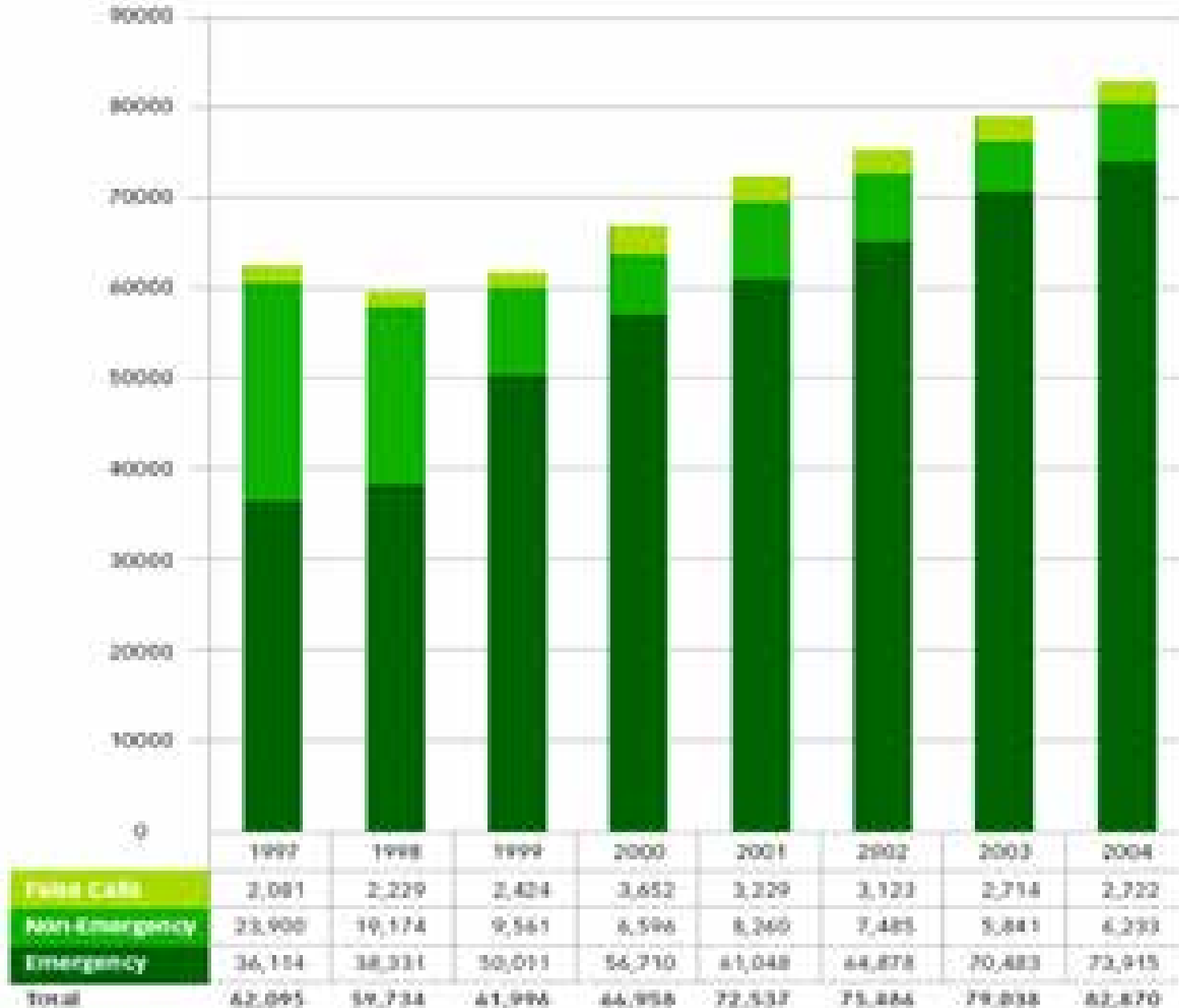
- ↓ Run by the Singapore Civil Defence Force
- ↓ Currently operating 36 ambulances in 14 stations and 10 satellite stations
- ↓ Single tier system
- ↓ Able to provide BCLS and defibrillation using Automated External Defibrillators (AEDs)



Ministry of Home Affairs (Home Team)

-  Singapore Police Force
-  Central Narcotics Bureau
-  Internal Security Department
-  **Singapore Civil Defence Force** → **Emergency Ambulance Services**
-  Prisons Department
-  Commercial and Industrial Security Corporation
-  Singapore Corporation of Rehabilitative Enterprises
-  Immigration & Checkpoints Authority

Volume of EAS Calls (1997-2004)



**Yearly
volume of
SCDF
Ambulance
Calls**

Total Emergency Ambulance Service (EAS) Calls

EAS Calls Received (Jan- Dec 2006)

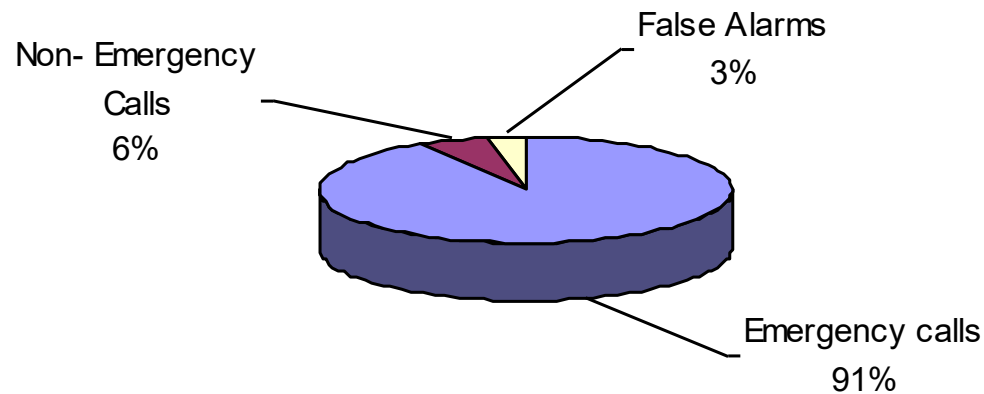


Table 1: Number and Types of Ambulance Calls

TYPE OF CALLS	2005	2006	Absolute Change
Emergency calls	79,895	87,679	+ 7784
Non- Emergency Calls	6,046	5,462	- 584
False Alarms	2,722	2,865	+ 143
Total	88,663	96,006	+ 7343

Total Emergency Ambulance Service (EAS) Calls

Types of EAS Cases (Jan- Dec 2006)

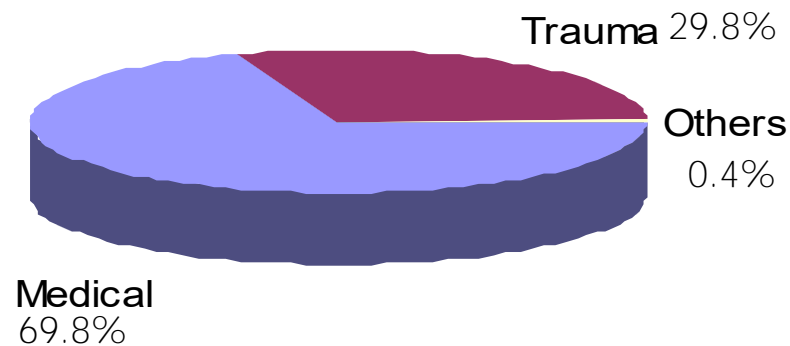


Table 2: Breakdown of Emergency Ambulance Calls

DESCRIPTION	2005	2006	Absolute Change
Medical	54,130	61,221.00	+ 7, 091
Trauma	25,534	26,143.00	+ 609
Others	231	315.00	+ 84
Total	79,895	87,679	+ 7, 784

Breakdown on EAS Calls by Types of Cases

Description	Jan-Dec 2003	Jan-Dec 2004	Absolute change	% change
Medical (1)	47,023	50,178	+3155	+6.7
Trauma (2)	26,087	26,227	+140	+0.5
Maternity (3)	686	481	-205	-29.9
Others (4)	2528	3,262	+734	+29.0
Genuine Calls (1+2+3+4)	76,324	80,148	+3,824	+5.0
False Alarm	2,714	2,722	+8	+0.3
Total	79,038	82,870	+3,832	+4.8

Medical Oversight

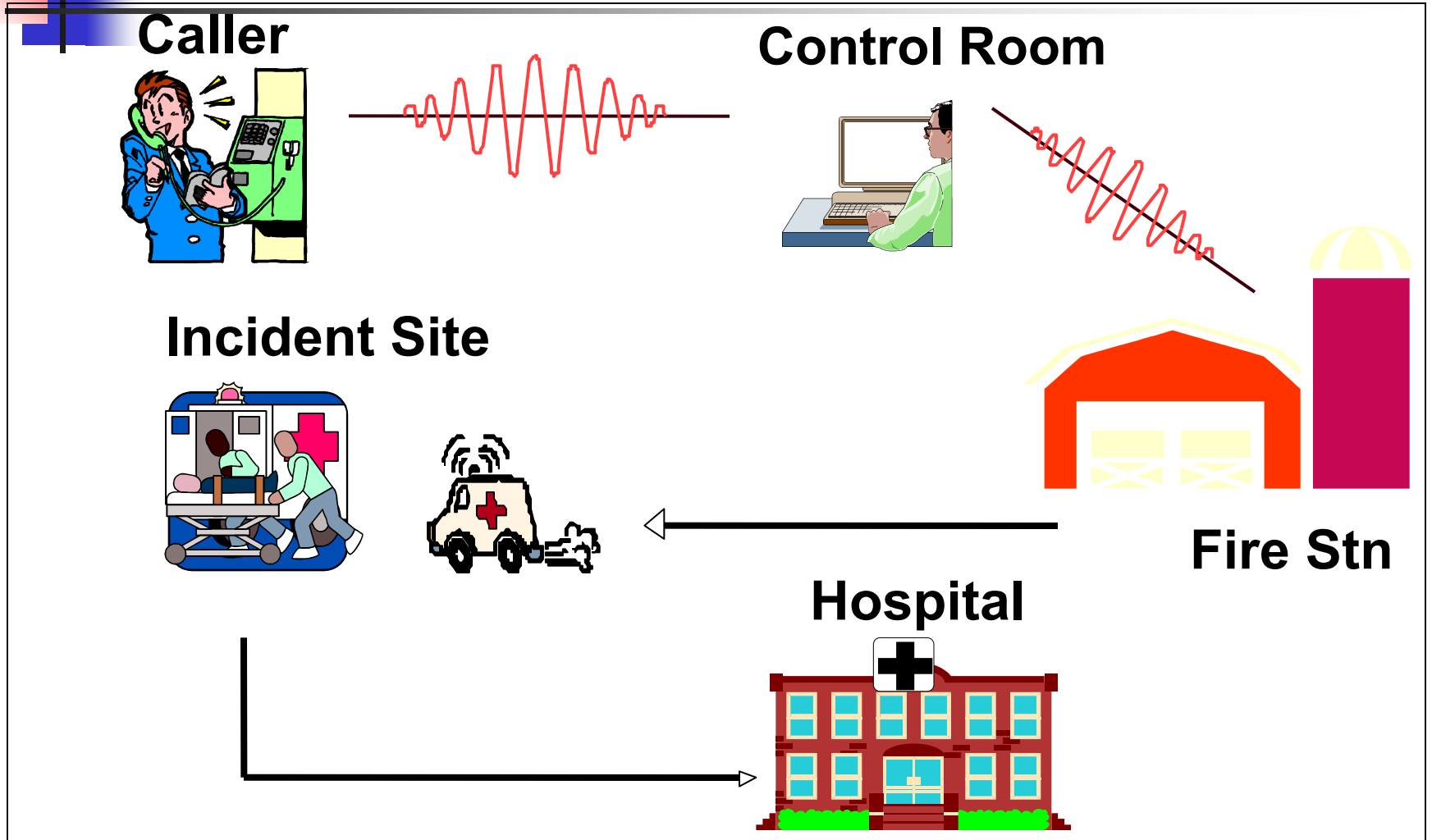
- SCDF Medical Advisory Committee (MAC)
- Indirect medical control of paramedics following strict protocols written and approved by MAC
- Audit and review of treatment and procedures
- Training and CME
- Competency and certification

Pre-Hospital Emergency Care Dispatch Mechanism

No. to Call:

- **EMS + Fire Brigade** 995
- **Police** 999
- **Non Emergency Ambulance** 1777
- **SARS Ambulance** 933

DESPATCH SYSTEM: AMBULANCE



Emergency Medical Dispatch

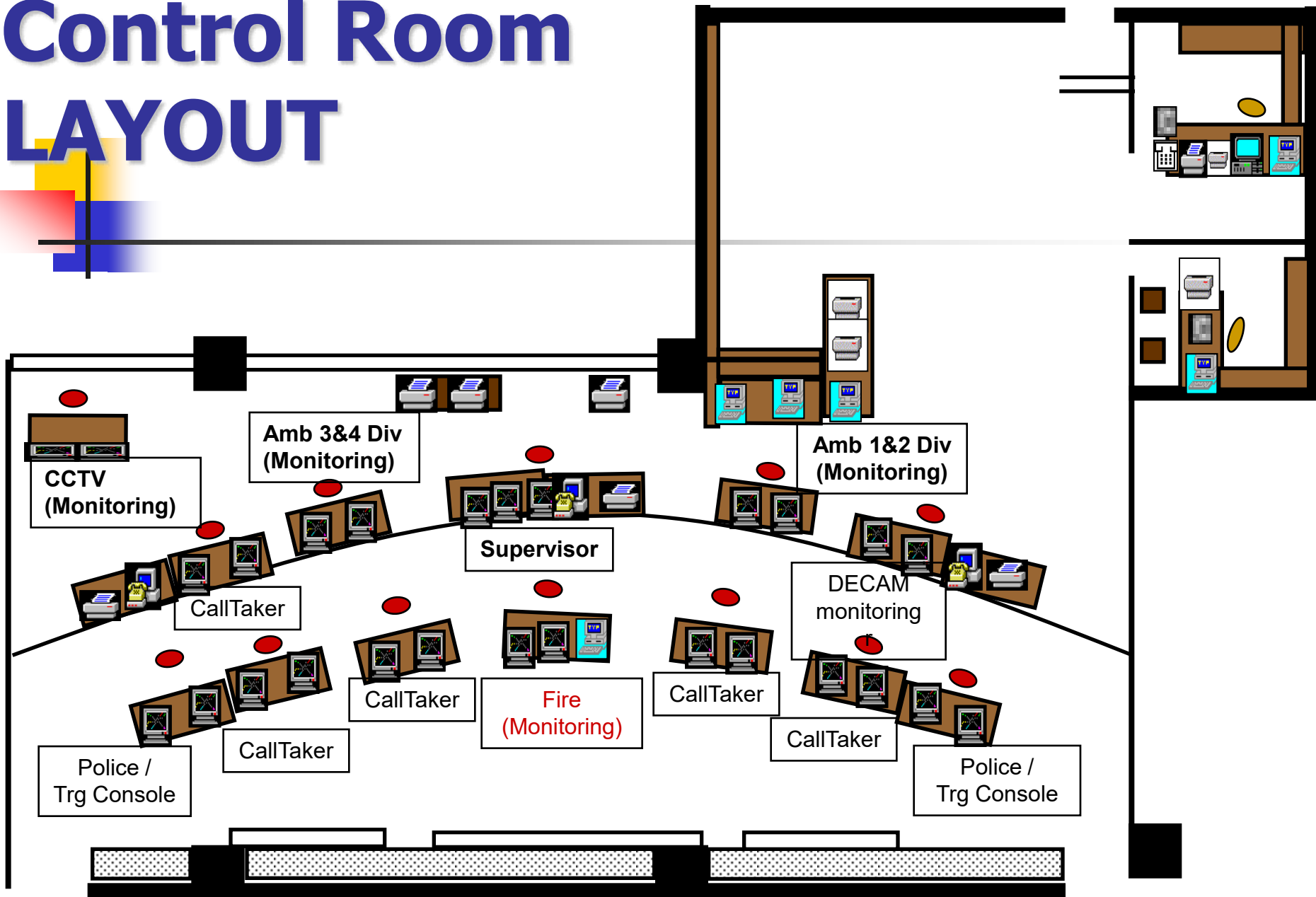
- Caller ID
- Automatic location tracing (address database)
- Computer assisted dispatch and ambulance monitoring
- GPS navigation and location tracking
- Emergency Medical Dispatchers







Control Room LAYOUT





Vehicle: Vehicle Accident Call center: 555 North St Call type: 2nd Party Incident Code: Highway 502
Call number: 1234-567-8900 Accident description: Car crash

Safety First!
Do NOT approach the scene unless absolutely safe to do so.

Handling Submerged Vehicle Incidents

If the vehicle is floating on the surface of the water:

Order the victim(s) to release airlocks.

Hold them for removal(s).

Multiple vehicles:
- Multiple
- Single vehicle
- Submerged vehicle
- Vehicle in
- Vehicle in, driver
- Vehicle in, passengers
- Vehicle in, pedestrian
- Vehicle in, vehicle








Rate:
1
2
3
4
5 or more

Use a grade:
Four star
Five star

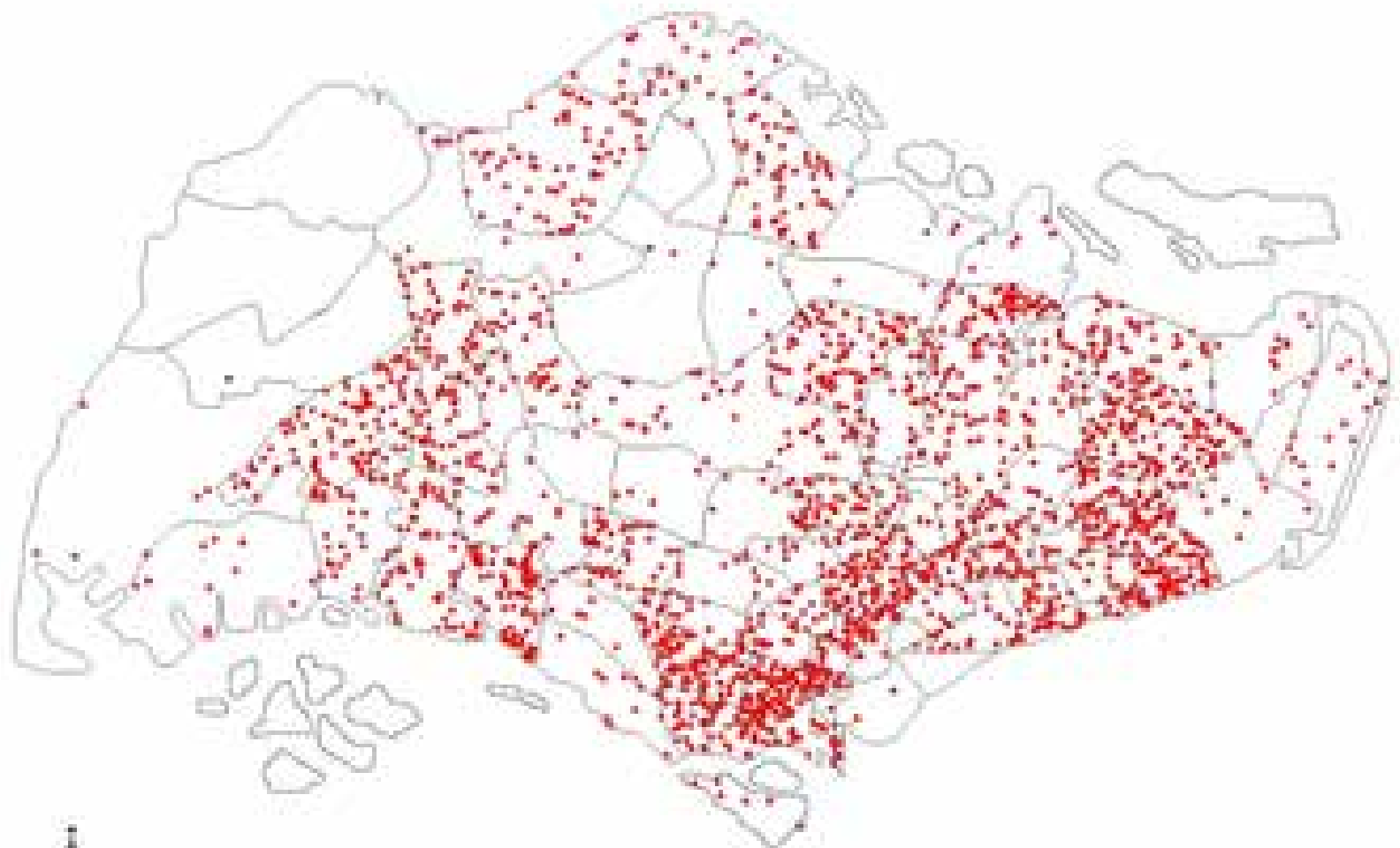
Response Prioritization

NOW YOU CAN TRULY DISPATCH SMARTER

Dispatch recommendations based on conditions at the scene of an incident—for more intelligent use of resources.

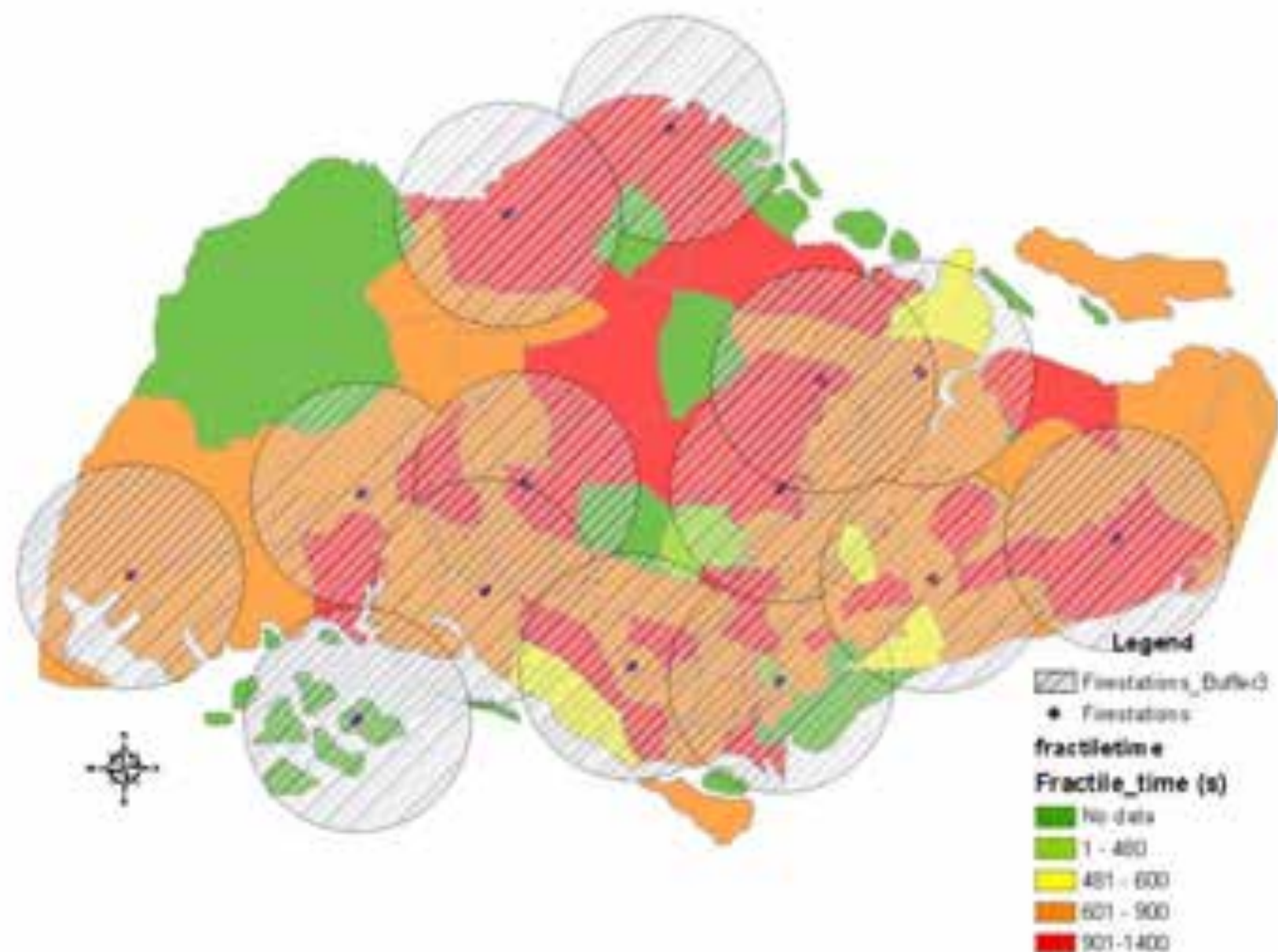
Response Advisor			
	Low	Medium	High
Alert			
Breathing			●
Gender			●
			EMS EMS ALS
	 	 	 
	Fire Gas BLS ALS Provost Police Rescue HazMat Security Electric Animal Control	Fire Gas BLS ALS Provost Police Rescue HazMat Security Electric Animal Control	Fire Gas BLS ALS Provost Police Rescue HazMat Security Electric Animal Control

Geographical distribution of cardiac arrests

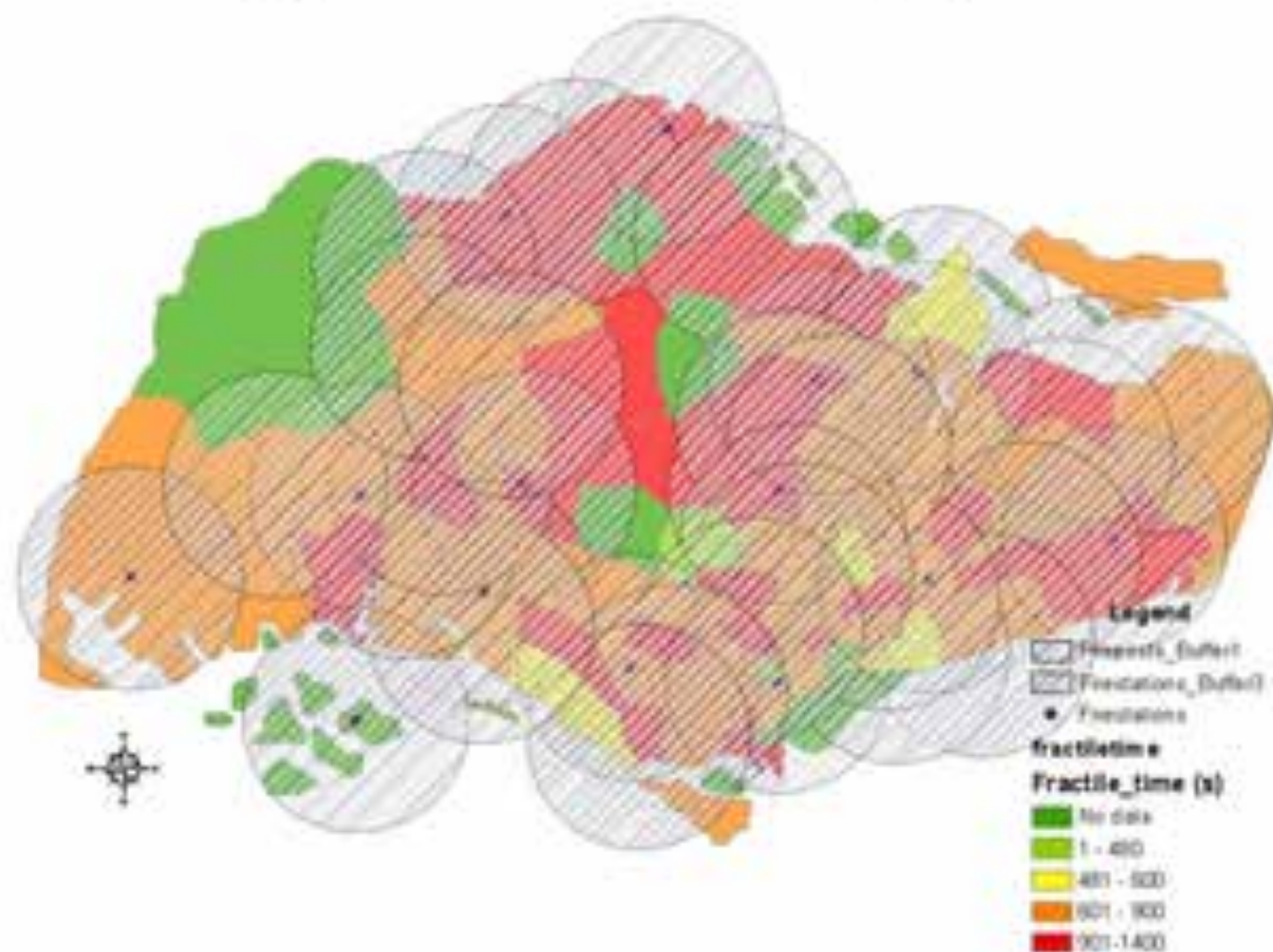


Legend
postalcodes
1 Dot = 1
Arrests

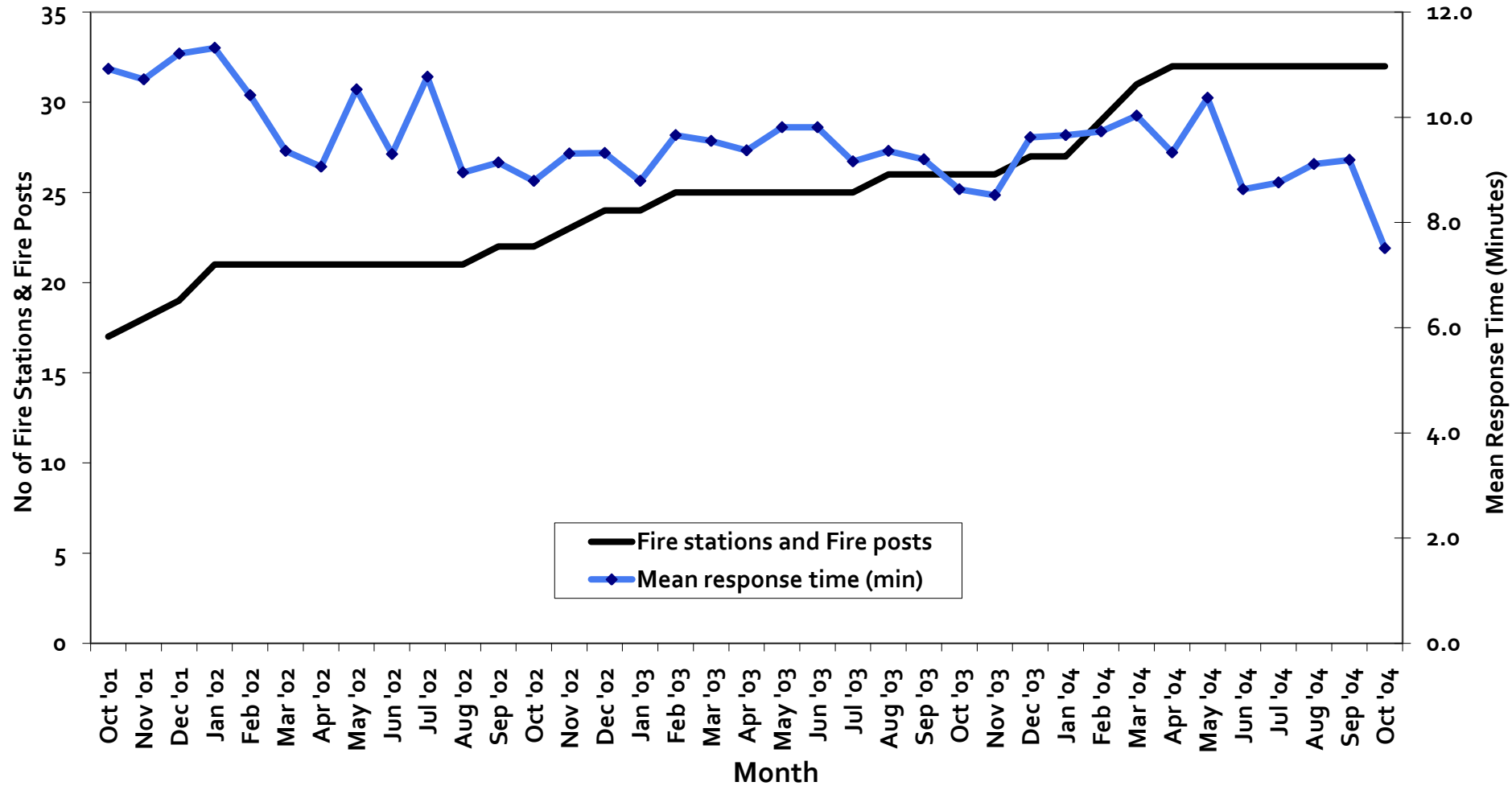
Singapore Ambulance Deployment



Singapore Ambulance Deployment



Results - Mean response time and number of fire stations & fire posts by month



Results

- Monthly mean response time decreased significantly as the number of fire stations/fire posts increased (Spearman's rank correlation coefficient, $r: -0.405$, $p=0.013$)
- Response times decreased from a monthly mean of 10.3 minutes at the beginning to 7.5 minutes at the end of the study.

SCDF Paramedics

- Since 1996, ambulances manned by specifically trained paramedics (roughly equivalent to North American EMT-I)
- Replacing ambulance officers (nurses)
- Undergo an 18 month training including theory, hospital and ambulance attachments
- ITE Higher NITEC paramedic course 2008



Early defibrillation

- Most important intervention affecting mortality
- Advent of the Automated External Defibrillator

- Easy to use
- Step by step instructions
- Voice prompts



1995: First Five Years of Pre-Hospital Automatic Defibrillation Project in Singapore



Fast Response Paramedic (FRP)

↓ One-man crew, equipped with AED

↓ Currently 9 FRPs in service

↓ Shown to reduce response times by an average of almost 5 minutes

↓ Plans to position FRPs in more satellite stations

Mean Response Time

- Fast Response Paramedics:
(9 motorcycles based in 9 fire stations)

5.5 min \pm 2.0 (SD)

- Ambulance:
10.4 min \pm 5.4 (SD)



Emergency Medical Services (EMS)



- **'Single' Tier System**
- **36 ambulance based in 14 fire stations and 10 satellite stations**
- **Ambulance Unit**
 - Paramedic (1)**
 - CPR, BTLS
 - Bag Valve Mask Ventilation
 - Limited I/V drug, (10% dextrose) no intubation
 - Medic (1)**
 - Driver (1)**

Early basic and advanced care

- Oxygen
- Airway adjuncts
- Immobilise fractures and spinal injuries
- IV fluids
- Tamponade bleeding
- Laryngeal mask airway
- Aspirin (Oral)
- Salbutamol
- Dextrose
- GTN
- Adrenaline (intravenous)
- Oxytocin
- Diazepam for seizures



14-17 September
Valencia, SPAIN 2009

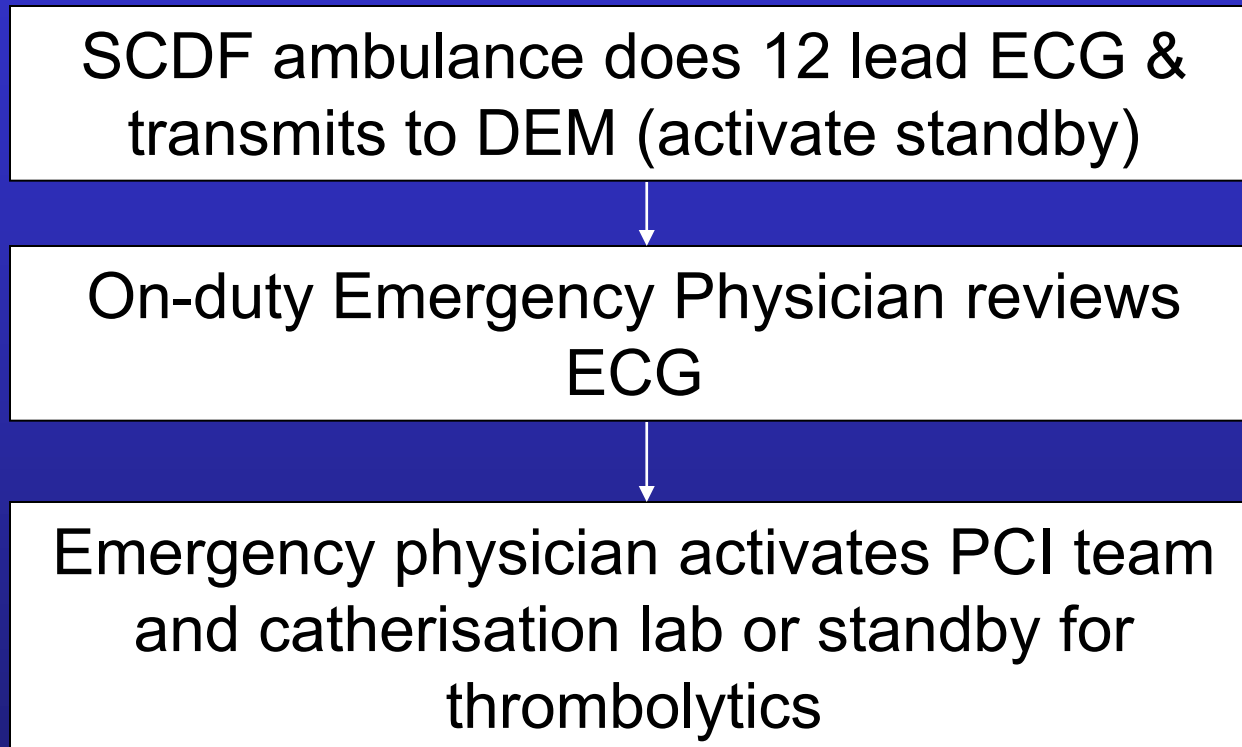
IMPROVING DOOR-TO-BALLOON TIMES FOR ACUTE ST ELEVATION MYOCARDIAL INFARCTION IN SINGAPORE

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Pre Hospital 12 lead ECG Essence of Innovation

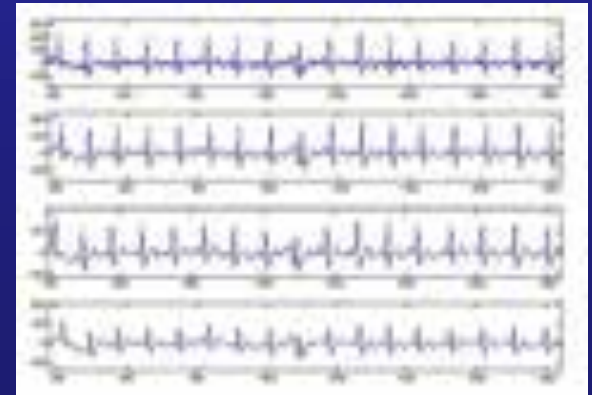
Proposed system :



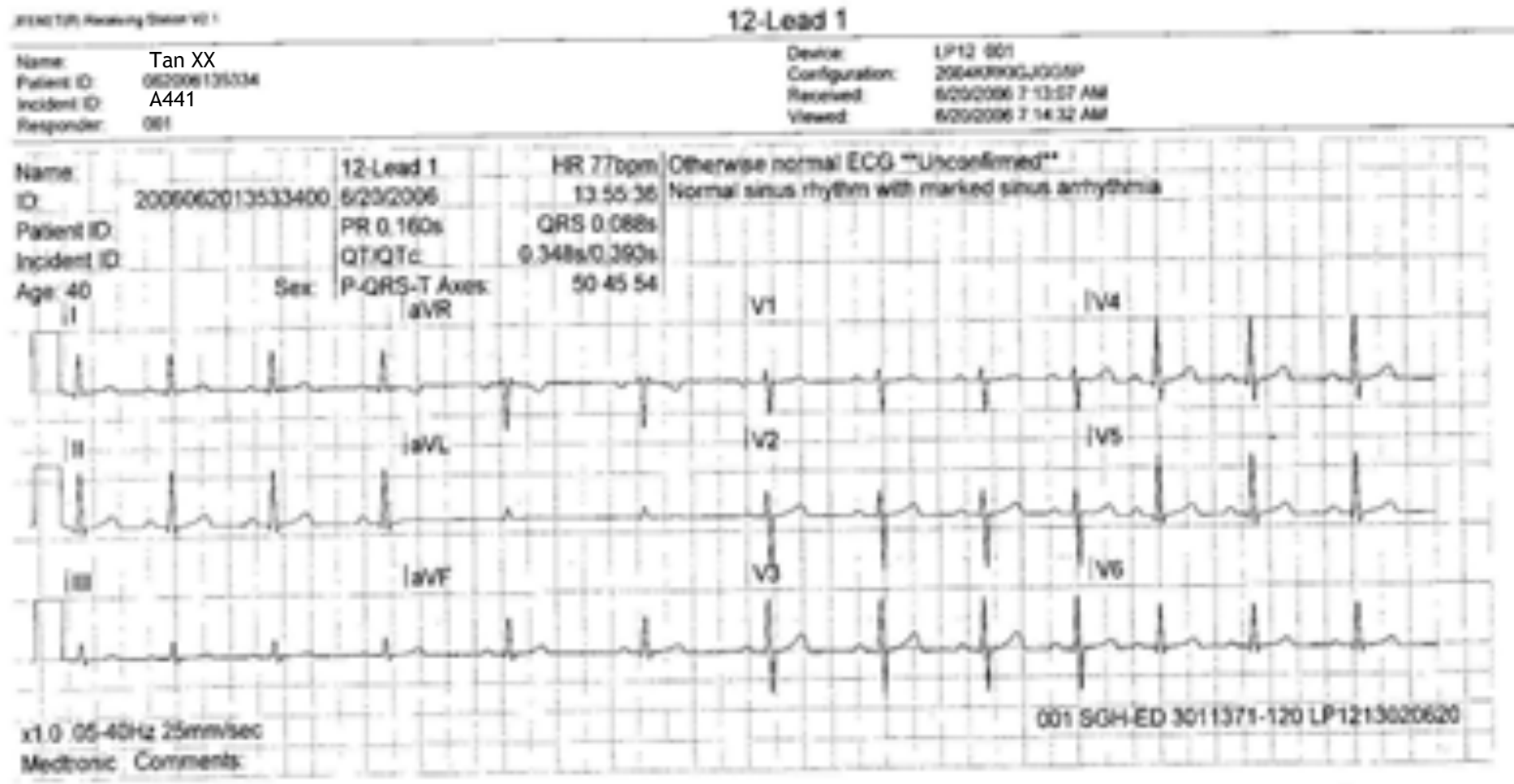
It is hypothesized that this system will significantly reduce D2B times. Positive experience of similar trials in USA/Europe

Essence of Innovation

- LifePak 12 defibrillators upgraded with cellular modem card for wireless ECG transmission
- Upon receiving patient's ECG, the DEM can standby for the ambulance arrival and allow earlier activation of PCI for eligible patients, thus decreasing D2B/D2N time.



Sample of ECG Received



Project Status: Prehospital 12 lead ECG

No. of ECGs received by month



	TTSH	CGH	NUH	SGH	AH	Total
Dec-08	45	33	29	7	6	120
Jan-09	74	51	46	11	6	188
Feb-09	67	38	41	26	4	176
Mar-09	81	52	34	20	9	196
Apr-09	67	51	45	21	5	189
May-09	52	34	36	19	5	146
Jun-09	48	32	43	12	3	138
Jul-09	71	45	46	6	2	170
Aug-09	60	45	53	10	4	172
Sep-09	78	37	31	11	4	161
Oct-09	60	39	47	11	3	160
Total	703	457	451	154	51	1816

Results: D2B time by phase (Before/After Prehospital ECG)



D2B Time by Phase (exclusive of ineligible cases)

Time (mins)	Before (n= 358)	After (n=30)	<i>p</i> -value
Door-to-Balloon Time <mean (sd)>	91 (26), Median=88	55 (19), Median=50	<0.001

Pre-hospital Emergency Care

5 Year Plan (2009 – 2014)



Overview of 5 Year Plan

□ Vision

- For Singapore to possess a **world-class** Pre-hospital Emergency Care (PEC) system, **readily accessible** to all, and providing **excellent patient outcomes**.



Overview of 5 Year Plan

□ Aims

- To develop a coherent and viable framework for collaboration and coordination in the long-term development of PEC in Singapore.
- To promote public responsiveness in pre-hospital emergencies.
- To strengthen Singapore's PEC to world-class standards.
- To ensure that PEC is seamlessly integrated into the healthcare system.
- To create a supportive environment for research into PEC to improve health outcomes.

Strategic Imperatives

Leadership & Oversight

Community
Responsiveness

Ambulance
Responsiveness

ED
Responsiveness

Skills
Development

Technology

PEC System