Emergency Medical Services in Singapore

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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**
- Prisons Department
- Commercial and Industrial Security Corporation
- Singapore Corporation of Rehabilitative Enterprises
- Immigration & Checkpoints Authority

Emergency Ambulance Services
Yearly volume of SCDF Ambulance Calls

SCDF Annual Report 2005
Total Emergency Ambulance Service (EAS) Calls

EAS Calls Received (Jan- Dec 2006)

Table 1: Number and Types of Ambulance Calls

<table>
<thead>
<tr>
<th>TYPE OF CALLS</th>
<th>2005</th>
<th>2006</th>
<th>Absolute Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency calls</td>
<td>79,895</td>
<td>87,679</td>
<td>+ 7784</td>
</tr>
<tr>
<td>Non- Emergency Calls</td>
<td>6,046</td>
<td>5,462</td>
<td>- 584</td>
</tr>
<tr>
<td>False Alarms</td>
<td>2,722</td>
<td>2,865</td>
<td>+ 143</td>
</tr>
<tr>
<td>Total</td>
<td>88,663</td>
<td>96,006</td>
<td>+ 7343</td>
</tr>
</tbody>
</table>
Total Emergency Ambulance Service (EAS) Calls

Types of EAS Cases (Jan- Dec 2006)

Table 2: Breakdown of Emergency Ambulance Calls

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>2005</th>
<th>2006</th>
<th>Absolute Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical</td>
<td>54,130</td>
<td>61,221.00</td>
<td>+ 7,091</td>
</tr>
<tr>
<td>Trauma</td>
<td>25,534</td>
<td>26,143.00</td>
<td>+ 609</td>
</tr>
<tr>
<td>Others</td>
<td>231</td>
<td>315.00</td>
<td>+ 84</td>
</tr>
<tr>
<td>Total</td>
<td>79,895</td>
<td>87,679</td>
<td>+ 7,784</td>
</tr>
</tbody>
</table>
## Breakdown on EAS Calls by Types of Cases

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

SCDF Annual Report 2005
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

Caller

Control Room

Incident Site

Fire Stn

Hospital
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

- CCTV (Monitoring)
- Amb 3&4 Div (Monitoring)
- Amb 1&2 Div (Monitoring)
- CallTaker
- Supervisor
- CallTaker
- CallTaker
- CallTaker
- CallTaker
- CallTaker
- CallTaker
- CallTaker
- CallTaker
- CallTaker
- Police / Trg Console
- Police / Trg Console
- DECAM monitoring
- (Monitoring)
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.

<table>
<thead>
<tr>
<th>Response Advisor</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alert</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breathing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Low**
  - Fire
  - Gas
  - BLS
  - ALS
  - Provost
  - Police
  - Rescue
  - HazMat
  - Security
  - Electric
  - Animal Control

- **Medium**
  - Fire
  - Gas
  - BLS
  - ALS
  - Provost
  - Police
  - Rescue
  - HazMat
  - Security
  - Electric
  - Animal Control

- **High**
  - Fire
  - Gas
  - BLS
  - ALS
  - Provost
  - Police
  - Rescue
  - HazMat
  - Security
  - Electric
  - Animal Control
Quality Assurance

SEE THE WHOLE PICTURE—WITH QA ON EVERY CALL

Total Response gives you real-time monitoring, retrospective analysis, and in-depth management reports. The result: insight into your call center you can’t get anywhere else.
Geographical distribution of cardiac arrests
Results - Mean response time and number of fire stations & fire posts by month

![Graph showing mean response time and number of fire stations & fire posts by month. The graph includes a line for mean response time (min) and another for fire stations and fire posts. The x-axis represents the months from Oct '01 to Oct '04, and the y-axes represent the number of fire stations & fire posts and mean response time in minutes.]
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 ± 2.0 (SD)

- Ambulance:
  10.4 min ± 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
IMPROVING DOOR-TO-BALLOON TIMES FOR ACUTE ST ELEVATION MYOCARDIAL INFARCTION IN SINGAPORE

A/Prof Marcus Ong  MBBS (S’pore), FRCS Ed (A&E), MPH, FAMS
Consultant, Director of Research and Senior Medical Scientist
Department of Emergency Medicine, Singapore General Hospital
Office of Research, Duke-NUS GMS
Pre Hospital 12 lead ECG
Essence of Innovation
Proposed system:

SCDF ambulance does 12 lead ECG & transmits to DEM (activate standby)

On-duty Emergency Physician reviews ECG

Emergency physician activates PCI team and catherisation lab or standby for thrombolytics

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

Tan XX
A441
## Project Status: Prehospital 12 lead ECG

### No. of ECGs received by month

<table>
<thead>
<tr>
<th></th>
<th>TTSH</th>
<th>CGH</th>
<th>NUH</th>
<th>SGH</th>
<th>AH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec-08</td>
<td>45</td>
<td>33</td>
<td>29</td>
<td>7</td>
<td>6</td>
<td>120</td>
</tr>
<tr>
<td>Jan-09</td>
<td>74</td>
<td>51</td>
<td>46</td>
<td>11</td>
<td>6</td>
<td>188</td>
</tr>
<tr>
<td>Feb-09</td>
<td>67</td>
<td>38</td>
<td>41</td>
<td>26</td>
<td>4</td>
<td>176</td>
</tr>
<tr>
<td>Mar-09</td>
<td>81</td>
<td>52</td>
<td>34</td>
<td>20</td>
<td>9</td>
<td>196</td>
</tr>
<tr>
<td>Apr-09</td>
<td>67</td>
<td>51</td>
<td>45</td>
<td>21</td>
<td>5</td>
<td>189</td>
</tr>
<tr>
<td>May-09</td>
<td>52</td>
<td>34</td>
<td>36</td>
<td>19</td>
<td>5</td>
<td>146</td>
</tr>
<tr>
<td>Jun-09</td>
<td>48</td>
<td>32</td>
<td>43</td>
<td>12</td>
<td>3</td>
<td>138</td>
</tr>
<tr>
<td>Jul-09</td>
<td>71</td>
<td>45</td>
<td>46</td>
<td>6</td>
<td>2</td>
<td>170</td>
</tr>
<tr>
<td>Aug-09</td>
<td>60</td>
<td>45</td>
<td>53</td>
<td>10</td>
<td>4</td>
<td>172</td>
</tr>
<tr>
<td>Sep-09</td>
<td>78</td>
<td>37</td>
<td>31</td>
<td>11</td>
<td>4</td>
<td>161</td>
</tr>
<tr>
<td>Oct-09</td>
<td>60</td>
<td>39</td>
<td>47</td>
<td>11</td>
<td>3</td>
<td>160</td>
</tr>
<tr>
<td>Total</td>
<td>703</td>
<td>457</td>
<td>451</td>
<td>154</td>
<td>51</td>
<td>1816</td>
</tr>
</tbody>
</table>
## Results: D2B time by phase (Before/After Prehospital ECG)

### D2B Time by Phase (exclusive of ineligible cases)

<table>
<thead>
<tr>
<th>Time (mins)</th>
<th>Before (n= 358)</th>
<th>After (n=30)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door-to-Balloon Time &lt;mean (sd)&gt;</td>
<td>91 (26), Median=88</td>
<td>55 (19), Median=50</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
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