Dispatch Assisted CPR in Singapore

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CARE Study: EMS Response Time

- Patient collapsed
- Ambulance called
- Ambulance dispatched
- Ambulance arrived at patient's side
- CPR started
- 1st shock given
- ROSC
- Arrival at ED
- Time (Mins): 46.1

Time Points:
- Patient collapsed: 10.6 mins
- Ambulance called: 0.7 mins
- Ambulance dispatched: 9.5 mins
- Ambulance arrived at patient's side: 2.4 mins
- CPR started: 1.8 mins
- 1st shock given: 2.3 mins
- ROSC: 15.6 mins
- Arrival at ED: 3.2 mins
Solution!
Fail....
Only 20% of bystanders perform CPR.
Pre-Hospital Emergency Care (PEC) & EMS - Strategies for Gap Closure

Patient collapse

- Delayed recognition of symptoms
- Poor bystander response

Emergency medical dispatch through 995 calls

- Increasing call volumes (6.7%/ year on average)
- Need for medical prioritisation
- Need for pre-arrival instructions

Ambulance with EMS personnel

- Need for sufficient ambulances
- Need for efficient ambulance deployment/tiered response

Medical oversight

A&E at the nearest RH

Strengthening Oversight and Leadership

Improving Technology

Standards & Regulations

Improving Operations

Professional Development

Increasing Community Responsiveness

- Lack of training and continuing education for EMS personnel including dispatcher

- Need for quality control and assurance
The first first responder: 995
Project Focus
Data Driven Improvement Cycle

Define
- Poor CPR survival

Measure
- DA-CPR rates

Analyse
- Dispatcher survey
- Focus groups

Improve
- DA-CPR workshop
- In service Trg
- Feedback

Control
- Audiotape review
- Coaching
Implementation Process

DA-CPR Courses

In service trainings
DACPR Course
1. Chest compression only CPR - Singapore current protocol

995, what is your ADDRESS?
- a. Do you know the postal code?
- b. What's the nearest street address?
- c. <read back> "The address is_________".

What is your phone number?

How OLD is he?
- (Is it a child or an adult?)

Is the person MALE or FEMALE?

Is he/she awake?

Is he/she breathing normally?

Not breathing:

Not breathing normally
Can you describe it?

If groaning, moaning choking, snoring

=> START CPR

If not, unable to tell:

Is it slow or shallow breathing?
- Yes => START CPR
- No => Bring the phone to his mouth so I can hear it
  If agonal breathing
  => START CPR

Start CPR
- An ambulance is on the way. I need you to start chest compression only-CPR.

Can you put your phone in speaker mode?
- "No"
- OK. Follow my instructions. You may need to put the phone down briefly.
  Do not hang up. Stay on the line with me.
Put the patient on his back on the floor
Kneel by the side of the patient

Shout for help and ask someone to get an AED if one is available

Put YOUR left hand on the center of the chest, and put YOUR right hand on the top of YOUR left hand.
Lean over with your arms straight, lock your elbows, and push down more than 5 cm using your body weight HARD AND FAST

I want you to COMPRESS the CHEST in 10 sets of 10. Count together with me.
1, 2, 3, 4, 5, 6, 7, 8, 9, 10
2, 2, 3, 4, 5, 6, 7, 8, 9, 10
3, 2, 3, 4, 5, 6, 7, 8, 9, 10
Continue to count each time you press

If there is a 2nd rescuer on scene, ask to swap the CPR giver every 200 compressions.
Encourage them to speed up if compressions are not fast enough

If there is one extra person, send him to guide the paramedic to the location when nearby
Continue chest compressions until the paramedic takes over
(or unless the patient wakes up)

Do not give up

(After ca. 50 compressions):
You can stop now, the ambulance has arrived and the paramedics are ready to take over

Change roles
Regular training / practice
Nurses in Dispatch Centre

• QI / QA
• Coaching
• Call Taking
Starting CPR quickly with a script

**Standardised instructions**

- ‘Put your phone in speaker mode’
- ‘Lie the patient on the floor’
- ‘Put YOUR left hand on the middle of HIS chest’
- ‘Put YOUR right hand on top of YOUR left hand’
- ‘Push hard 5cm deep and 100 times a minute’
- ‘Count out loud with me’
- ‘1, 2, 3, 4, 5, 6, 7, 8, 9, 10’
- ‘1, 2, 3, 4, 5, 6, 7, 8, 9, 10...’
Early lessons

• “Are you able to do CPR?”
  – No I can’t
• “Anybody there who can do CPR?”
  – No WE can’t
• “So you are not able to do CPR, is it?”
  – No.
Cultural/Social Barrier

• “But he’s a guy” <female caller>
Confidence in making the diagnosis

• Listen to this call – Raise your hand when it’s clear that the patient needs CPR

• Unconscious ✅ Not breathing ✅
  – 24 seconds

• Check Pulse ❌
  – 37 seconds
Compressing correctly?

- “1,2,3….10”
  - “Up is it?”

- “1,2,3….10”
  - “Then I let go is it?”
Dispatcher related challenges

• Medical knowledge
• Compliance to DA-CPR protocol
• Failure to recognise
• Confidence and persuasion in recruiting bystanders
• Improving positive feedback to dispatchers
Other reasons for “non-compliance”

• Calls routed from other PSAPS
  – 999 (police)
  – Public transport communications centres
• Caller not with patient
• Caller uncooperative / distressed
• Language barrier
Reasons for not starting compressions

- Bystander already doing CPR
- Caller uncooperative / distressed
- Caller not with patient
- Language barrier
- Unable to position patient
- EMS arrived really quickly
Barriers to DACPR

<table>
<thead>
<tr>
<th>Barriers to DACPR</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Couldn't move patient</td>
<td>118 (27)</td>
</tr>
<tr>
<td>Caller refused</td>
<td>64 (15)</td>
</tr>
<tr>
<td>Hung up phone</td>
<td>47 (11)</td>
</tr>
<tr>
<td>Patient's status changed</td>
<td>31 (7)</td>
</tr>
<tr>
<td>Caller left phone</td>
<td>30 (7)</td>
</tr>
<tr>
<td>Overly distraught</td>
<td>23 (5)</td>
</tr>
<tr>
<td>Caller not with patient</td>
<td>20 (5)</td>
</tr>
<tr>
<td>Difficult access to patient</td>
<td>16 (4)</td>
</tr>
<tr>
<td>Language barrier</td>
<td>15 (3)</td>
</tr>
<tr>
<td>Others: Quality of instructions, Technical difficulties, Help arrived</td>
<td>117 (27)</td>
</tr>
</tbody>
</table>
## Effects of Barriers

Effect of encountering barriers during call on reaching key stages of dispatcher assisted cardiopulmonary resuscitation.

<table>
<thead>
<tr>
<th></th>
<th>Total (n = 1157)</th>
<th>No barriers (n = 727)</th>
<th>One or more barriers (n = 430)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognized need for CPR? (%)</td>
<td>1128 (97.5)</td>
<td>720 (99.0)</td>
<td>408 (94.9)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CPR instructions started? (%)</td>
<td>1056 (91.3)</td>
<td>715 (98.3)</td>
<td>341 (79.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Chest compression started? (%)</td>
<td>1007 (87.0)</td>
<td>715 (98.3)</td>
<td>292 (67.9)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

- Reduced recognition
- Reduced instructions
- Reduced compressions

Comparison of time taken to reach key stages of dispatcher-assisted cardiopulmonary resuscitation between calls encountering barriers and calls that did not.

<table>
<thead>
<tr>
<th>Key stages</th>
<th>All</th>
<th>No Barrier</th>
<th>Barrier</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median</td>
<td>Interquartile range</td>
<td>Median</td>
<td>Interquartile range</td>
</tr>
<tr>
<td>Time dispatcher recognizes need for CPR, secs (n = 1032)</td>
<td>62</td>
<td>45–100</td>
<td>60</td>
<td>43–93</td>
</tr>
<tr>
<td>Time dispatcher begins instructions, secs (n = 711)</td>
<td>140</td>
<td>102–190</td>
<td>131</td>
<td>100–175</td>
</tr>
<tr>
<td>Time to first compression, secs (n = 890)</td>
<td>211</td>
<td>164–270</td>
<td>200</td>
<td>160–254</td>
</tr>
</tbody>
</table>

- Prolonged time to recognition
- Prolonged time to instructions
- Prolonged time to compressions

Ho et al, Resuscitation 2016
Closed loop feedback from SCDF ➔ MOH ➔ to the last man on the ground!

To: PM Toh Chin Fong

Regarding Incident: 20120705/0521

Patient’s Particular: Mr. Ng Ban Cheong, S0607250Z, 12/12/1934, Male, Chinese
Location: Blk 523 AMK Ave 5 #05-4192

This was a routine review of cardiac arrest case notes by our MOH appointed EMS physicians and the Department. I would like to feedback to you the outcome of your patient as well as how you had managed the overall situation.

Mr. Ng Ban Cheong was successfully resuscitated by your team! Due to your rapid response and timely actions, he has survived the cardiac arrest and discharged from TTSH on the 8th Aug 2012.
He teaches panicky 995 callers to do CPR

Tuesday, Feb 12, 2013
The Straits Times
By Jalelah Abu Baker
Public outreach

“Survivor Awards”

• Viral Campaign
DACPR and BCPR in Singapore

Harjanto et al, Resuscitation 2016
Good Case

Part 1

Part 2
Ministry of Home Affairs 3i Awards

Home Team Innovation of the Year (Process/Policy) – Platinum Award!!
Public Service 21 Excel Awards

Most Innovative Project / Policy – Silver award!!
State of CPR Training in our Population

- First aid: 3,735 (89.1%), 1,437 (34.3%), 402 (9.6%)
- CPR: 3,464 (82.6%), 1,315 (31.4%), 401 (9.6%)
- AED: 2,397 (57.2%), 449 (10.7%), 155 (3.7%)

- Adults should be trained in life-saving skills
- Have been trained in life-saving skills
- Possess valid certificates for life-saving skills
DARE Program
Would you DARE to save a life?
Pyramid of First Responder Preparedness

CPR/AED instructors

CPR/AED Certified
Anyone who attends and passes an NRC Certified CPR/AED course

DARE Trained
Anyone aged 11 and above who attend DARE training sessions.

Move lay bystanders this way

DARE Aware: Everyone becomes aware of what we teach in DARE through social media, traditional media, or by word of mouth.
DARE to go places

- Schools
- SportsHub
- SCDF Volunteers
- Temasek group
- Private organisations
- Places of worship
- etc
Improving CPR Quality: DARE CPRcard™

- Personal credit card size device
- Addresses major barriers to conducting CPR
- Assists with land-marking
- Provides visual depth indication
- Indicates rate of compressions
- Stores data on quality of chest compressions
1. Dial 995 and send your geo-location at the same time.

2. Know where the nearest AED is located.

3. Sign up as a volunteer responder.

SCDF
The Life Saving Force

myResponder

Available on the App Store

Android app on Google Play

UPEC
UNIT FOR PRE-HOSPITAL EMERGENCY CARE
SINGAPORE

Teng Chiun How
Volunteering since 21 Apr 2015

293
Active Responders

17
Cases since Apr 2015

0
Responses
Activation of first responders

- Alerts first responder (within 400m)
- Ring tone & vibration
- Shows nearby AEDs
- No obligation to respond
  – Respond only when able to
AED Installation by SCDF

• SCDF installing 385 AEDs near lifts

• Trainees will be informed of the nearest unit
AED on Wheels Program

AED On Wheels

Dashboard

- Active Responses: 1013
- Responses Delivered: 228

Cases in Sep: 108
International Multi-Center Controlled Trial of Dispatcher-Assisted Cardio-Pulmonary Resuscitation Intervention Package

Pan-Asian Resuscitation Outcomes Study Phase 2
Pan-Asian Resuscitation Outcomes Study Phase 2

Out-of-Hospital Cardiac Arrest Presenting to the EMS Dispatch in the Asia Pacific

Sites Implementing Dispatcher-assisted Cardiopulmonary Resuscitation (Intervention)

Sites Not Implementing Dispatcher-assisted Cardiopulmonary Resuscitation

Sites
Phase 1 ‘historical’ data (2009-2011)/minimum 6 months ‘run-in’ period before implementation

Basic Package Implementation
- Dispatcher-CPR protocol
- Training program

Comprehensive Package Implementation
- Dispatcher-CPR protocol
- Training program
- Quality measurement tool
- Quality Improvement Program
- Community Education Program

Collection of Out-of-Hospital Cardiac Arrest and Dispatcher CPR data

Phase 1 ‘historical’ data

Collection of Out-of-Hospital Cardiac Arrest data only
Watch this space!