The FirstAED global positioning system organizes a first responder team with distinct roles and ensures the possibility for early cardiopulmonary resuscitation and defibrillation.

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Declaration of interest

• Teaching for MSD and Sanofi Aventis.
• Developed FirstAED GPS technology.
Background
Cardiac Arrest – the bridge connected Langeland Island

- ~13,000 inhabitants
- Long distances to the two nearest hospitals (55 km, 90 km)
- Long ambulance response times (30% ≥ 15 minutes)
- 95 AEDs available around the clock, distance < 2 km.
- 60-80% of cardiac arrests occur at home
- Lay rescuers response times (≥ 10 minutes)
- Bystander CPR provided by 215 trained first responders
Purpose – Cardiac Arrest

• GPS tracking of trained volunteer first responders
• At least one of the first responders and the AED need to arrive not just earlier than the traditional ambulance, but within 5-6 minutes of the initial call
• The system establish an emergency team of 3 first responders with distinct roles

Typical current logistics flow

1-1-2 call  Call taking  Dispatch  First responder/ AED transport  First responder CPR  Ambulance/ Paramedic arrival

< 300-360 Seconds
How does it work?

**Dispatch Centre**
Intelligent and easy to use tool for alarming the geographically closest first responders for medical emergencies, and other types of call-outs. Includes reporting and statistics on cases.

**First responders**
Intelligent and easy to use smartphone application with AED locations, GPS tracking and team organization (+more)

**Citizen alarm (option)**
1-1-2

**AEDs**
Management of the AEDs and cabinets, or other hardware, for optimal visibility during the dark hours, 24-7 access and theft prevention.
First responders involved in all 1-1-2 emergency call

• Cardiac arrest
• Acute illness
• Accident
• Fire/ traffic accident
• Other
Action: Emergency call - Cardiac Arrest - 2 weeks ago

Dispatch Center iPad – GPS tracking

- All first responders  
  (n= 215 (purple pushpins))

- AED’s  
  (n = 95 (green pushpins))

- Emergency Call  
  Activate dispatching – GPS Tracking  
  (touch red marker)
Emergency Medical Dispatch Centre - Cardiac Arrest

20 seconds
Nearest first responders are called based on actual GPS position

35 seconds
3 most optimum responders are automatically chosen and assigned roles

275 seconds
You can see the location and roles of all the first responders
Arrival times are GPS decided
First responder telephone:  Emergency call - Cardiac Arrest

1. Collect the AED (code 1234)
2. Go for the emergency place
## Key results of the 24 months: Dispatch categories

<table>
<thead>
<tr>
<th>Alarm type</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute illness</td>
<td>591</td>
<td>~ 82.3 %</td>
</tr>
<tr>
<td>Accident</td>
<td>55</td>
<td>~ 7.7 %</td>
</tr>
<tr>
<td>Cardiac Arrest</td>
<td>32</td>
<td>~ 4.4 %</td>
</tr>
<tr>
<td>Fire/ traffic accident</td>
<td>25</td>
<td>~ 3.5 %</td>
</tr>
<tr>
<td>Others</td>
<td>15</td>
<td>~ 2.1 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>718</strong></td>
<td></td>
</tr>
</tbody>
</table>
## Results: Response times

<table>
<thead>
<tr>
<th>Task</th>
<th>Median Time seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Person On Site</td>
<td>249 sec. [1-1297 sec.]</td>
</tr>
<tr>
<td>AED On Site</td>
<td>347 sec. [1-1996 sec.]</td>
</tr>
<tr>
<td>Ambulance/paramedic On Site</td>
<td>802 sec. [93-2692 sec.]</td>
</tr>
</tbody>
</table>

Median Response time – Langeland

n = 718
## Results: Arrival – Number of first responders

<table>
<thead>
<tr>
<th>Arrival On Site</th>
<th>Team</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 first responders</td>
<td>X</td>
<td>89.1 %</td>
</tr>
<tr>
<td>2 first responders</td>
<td>X</td>
<td>7.1 %</td>
</tr>
<tr>
<td>1 first responders</td>
<td></td>
<td>3.0 %</td>
</tr>
<tr>
<td>0 first responders</td>
<td></td>
<td>0.8 %</td>
</tr>
</tbody>
</table>
Results: AED On Site

<table>
<thead>
<tr>
<th>AED On Site</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>710</td>
<td>98.9%</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
<td>1.1%</td>
</tr>
</tbody>
</table>
Response times:
First responder versus paramedics/ambulances

24 months data - response times

<table>
<thead>
<tr>
<th>Time Range</th>
<th>First Responder</th>
<th>Paramedic/Ambulance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-240 Sec.</td>
<td>313</td>
<td>9</td>
</tr>
<tr>
<td>241-480 Sec.</td>
<td>282</td>
<td>110</td>
</tr>
<tr>
<td>481-720 Sec.</td>
<td>60</td>
<td>170</td>
</tr>
<tr>
<td>721-960 Sec.</td>
<td>10</td>
<td>172</td>
</tr>
<tr>
<td>961-1200 Sec.</td>
<td>2</td>
<td>130</td>
</tr>
<tr>
<td>1201-1440 Sec.</td>
<td>1</td>
<td>62</td>
</tr>
<tr>
<td>1441-1680 Sec.</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>1681+</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

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Key results of the first 24 months

- 8 Cardiac arrests
  - 5 survived, 3 survived more than 30 days.
- 8 Respiratory insufficiency
  - 7 survived more than 30 days.
- 29 AMI
  - All survived more than 30 days.
- 3 Hangings
  - 1 survived more than 30 days.
- 2 Divers with decompression sickness (Complete restituted).
- 1 Subarachnoid haemorrhage (Complete restituted).
- 1 Sea rescue (Complete restituted).
Conclusion:

• The FirstAED GPS app technology entails a significant reduction in first responder median response times from more than 10 minutes before to 4 minutes 9 seconds after.

• FirstAED organizes the three first responders in an emergency team with distinct roles.

• FirstAED activate the AED cabinets (unlock, sound & flash light).