Ο ρόλος των αυτόματων εξωτερικών απινιδωτών: Η πρώτη εμπειρία από τη χώρα μας

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No conflict of interest
Automated External Defibrillators (AEDs)

- First use 1947 Claude Beck, Cleveland
- Development 1960 Frank Pantridge, Belfast, Northern Ireland
- Easy to use
- Fast defibrillation
- No need for special skills
- Reliability
- Availability
- Liability
- Benefit
Survival Benefit

Bystander-Initiated Cardiopulmonary Resuscitation in the Management of Ventricular Fibrillation

ROBERT D. THOMPSON, M.D., ALFRED R. HILLIER, M.D., AND DAVID A. COFF, M.D.

1973-76 HMC
Survival Benefit

Figure 3  Change in the proportion of patients who (a) received bystander cardiopulmonary resuscitation (CPR), (b) were admitted to hospital alive and (c) survived to 1 month, among all patients found in ventricular fibrillation or pulseless ventricular tachycardia between 1992 and 2009.
# Survival Benefit

## Original Investigation

**Association of Bystander and First-Responder Intervention With Survival After Out-of-Hospital Cardiac Arrest in North Carolina, 2010-2013**

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**Figure 2. Outcomes Among Patients Who Received Out-of-Hospital Cardiopulmonary Resuscitation and Defibrillation**

### A. Return of spontaneous circulation

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Initiated CPR</th>
<th>Defibrillation</th>
<th>No. of Patients</th>
<th>No. of Events</th>
<th>Unadjusted OR (95% CI)</th>
<th>Favors EMS-Initiated CPR and Defibrillation Effect</th>
<th>Favors Alternate CPR and Defibrillation Effect</th>
<th>Adjusted OR (95% CI)*</th>
<th>Favors EMS-Initiated CPR and Defibrillation Effect</th>
<th>Favors Alternate CPR and Defibrillation Effect</th>
<th>Adjusted OR (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS</td>
<td>EMS</td>
<td></td>
<td>158</td>
<td>72</td>
<td>1.27 (0.85-1.94)</td>
<td>•</td>
<td>•</td>
<td>1.24 (0.81-1.55)</td>
<td>•</td>
<td>•</td>
<td>1.29 (0.95-1.77)</td>
</tr>
<tr>
<td>First responder</td>
<td>EMS</td>
<td></td>
<td>232</td>
<td>89</td>
<td>1.41 (1.00-2.00)</td>
<td>•</td>
<td>•</td>
<td>1.29 (0.85-1.97)</td>
<td>•</td>
<td>•</td>
<td>1.30 (0.90-1.93)</td>
</tr>
<tr>
<td>Bystander</td>
<td>EMS</td>
<td></td>
<td>432</td>
<td>150</td>
<td>1.33 (0.93-1.93)</td>
<td>•</td>
<td>•</td>
<td>1.30 (0.90-1.93)</td>
<td>•</td>
<td>•</td>
<td>1.30 (0.90-1.93)</td>
</tr>
<tr>
<td>First responder</td>
<td>Bystander</td>
<td></td>
<td>132</td>
<td>43</td>
<td>1.11 (0.90-1.38)</td>
<td>•</td>
<td>•</td>
<td>1.30 (0.90-1.93)</td>
<td>•</td>
<td>•</td>
<td>1.30 (0.90-1.93)</td>
</tr>
<tr>
<td>Bystander</td>
<td>Bystander</td>
<td></td>
<td>133</td>
<td>49</td>
<td>1.30 (1.20-3.06)</td>
<td>•</td>
<td>•</td>
<td>1.30 (1.20-3.06)</td>
<td>•</td>
<td>•</td>
<td>1.30 (1.20-3.06)</td>
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</tbody>
</table>

### B. Survival to discharge

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Initiated CPR</th>
<th>Defibrillation</th>
<th>No. of Patients</th>
<th>No. of Events</th>
<th>Unadjusted OR (95% CI)</th>
<th>Favors EMS-Initiated CPR and Defibrillation Effect</th>
<th>Favors Alternate CPR and Defibrillation Effect</th>
<th>Adjusted OR (95% CI)*</th>
<th>Favors EMS-Initiated CPR and Defibrillation Effect</th>
<th>Favors Alternate CPR and Defibrillation Effect</th>
<th>Adjusted OR (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS</td>
<td>EMS</td>
<td></td>
<td>158</td>
<td>70</td>
<td>1.39 (1.21-1.59)</td>
<td>•</td>
<td>•</td>
<td>1.27 (1.13-1.42)</td>
<td>•</td>
<td>•</td>
<td>1.27 (1.13-1.42)</td>
</tr>
<tr>
<td>First responder</td>
<td>EMS</td>
<td></td>
<td>232</td>
<td>75</td>
<td>1.53 (0.98-2.47)</td>
<td>•</td>
<td>•</td>
<td>1.48 (0.92-2.36)</td>
<td>•</td>
<td>•</td>
<td>1.48 (0.92-2.36)</td>
</tr>
<tr>
<td>Bystander</td>
<td>EMS</td>
<td></td>
<td>432</td>
<td>149</td>
<td>1.70 (1.53-1.90)</td>
<td>•</td>
<td>•</td>
<td>1.12 (1.05-1.19)</td>
<td>•</td>
<td>•</td>
<td>1.12 (1.05-1.19)</td>
</tr>
<tr>
<td>First responder</td>
<td>Bystander</td>
<td></td>
<td>132</td>
<td>41</td>
<td>2.34 (1.79-3.09)</td>
<td>•</td>
<td>•</td>
<td>1.12 (1.05-1.19)</td>
<td>•</td>
<td>•</td>
<td>1.12 (1.05-1.19)</td>
</tr>
<tr>
<td>Bystander</td>
<td>Bystander</td>
<td></td>
<td>133</td>
<td>48</td>
<td>2.44 (1.83-3.21)</td>
<td>•</td>
<td>•</td>
<td>1.12 (1.05-1.19)</td>
<td>•</td>
<td>•</td>
<td>1.12 (1.05-1.19)</td>
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</table>

### C. Favorable neurological outcome

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Initiated CPR</th>
<th>Defibrillation</th>
<th>No. of Patients</th>
<th>No. of Events</th>
<th>Unadjusted OR (95% CI)</th>
<th>Favors EMS-Initiated CPR and Defibrillation Effect</th>
<th>Favors Alternate CPR and Defibrillation Effect</th>
<th>Adjusted OR (95% CI)*</th>
<th>Favors EMS-Initiated CPR and Defibrillation Effect</th>
<th>Favors Alternate CPR and Defibrillation Effect</th>
<th>Adjusted OR (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS</td>
<td>EMS</td>
<td></td>
<td>158</td>
<td>70</td>
<td>1.44 (0.90-2.34)</td>
<td>•</td>
<td>•</td>
<td>1.37 (0.85-2.19)</td>
<td>•</td>
<td>•</td>
<td>1.37 (0.85-2.19)</td>
</tr>
<tr>
<td>First responder</td>
<td>EMS</td>
<td></td>
<td>232</td>
<td>70</td>
<td>1.50 (0.90-2.49)</td>
<td>•</td>
<td>•</td>
<td>1.37 (0.85-2.19)</td>
<td>•</td>
<td>•</td>
<td>1.37 (0.85-2.19)</td>
</tr>
<tr>
<td>Bystander</td>
<td>EMS</td>
<td></td>
<td>432</td>
<td>149</td>
<td>1.74 (1.09-2.80)</td>
<td>•</td>
<td>•</td>
<td>1.64 (1.02-2.65)</td>
<td>•</td>
<td>•</td>
<td>1.64 (1.02-2.65)</td>
</tr>
<tr>
<td>First responder</td>
<td>Bystander</td>
<td></td>
<td>132</td>
<td>41</td>
<td>2.79 (1.70-4.44)</td>
<td>•</td>
<td>•</td>
<td>1.64 (1.02-2.65)</td>
<td>•</td>
<td>•</td>
<td>1.64 (1.02-2.65)</td>
</tr>
<tr>
<td>Bystander</td>
<td>Bystander</td>
<td></td>
<td>133</td>
<td>48</td>
<td>2.85 (1.83-4.00)</td>
<td>•</td>
<td>•</td>
<td>1.64 (1.02-2.65)</td>
<td>•</td>
<td>•</td>
<td>1.64 (1.02-2.65)</td>
</tr>
</tbody>
</table>

CPR indicates cardiopulmonary resuscitation; EMS, emergency medical services. The odds ratios (ORs) were generated from the imputed data sets and therefore correspond to all patients who were defibrillated (n = 1048).  
*Adjusted for age and sex.
Survival Benefit

**Figure 1.** Changes over Time in CPR Training, the Performance of Early CPR, and Survival Rates.

Panel A shows the number of persons in Sweden who were trained in cardiopulmonary resuscitation (CPR) and the proportion of patients in whom CPR was started before the arrival of emergency medical services (EMS). Panel B shows the survival rate when CPR was given and when CPR was not given before EMS arrival. In both panels, the vertical line (T-CPR) indicates the year in which telephone-assisted CPR was introduced in Sweden.

### Table 2: Subgroup Analysis of Survival Rates

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Survival Rate CPR before EMS Arrival (%)</th>
<th>Survival Rate CPR before EMS Arrival (%)</th>
<th>Patients with CPR before EMS Arrival (%)</th>
<th>CHA2DS2-VASc Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>8.9</td>
<td>14.5</td>
<td>18.6</td>
<td>15.53</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;35 yr</td>
<td>9.6</td>
<td>12.7</td>
<td>6.841</td>
<td>5.941</td>
</tr>
<tr>
<td>≥35 yr</td>
<td>8.8</td>
<td>6.9</td>
<td>8.011</td>
<td>5.291</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>8.1</td>
<td>6.3</td>
<td>4.042</td>
<td>4.155</td>
</tr>
<tr>
<td>Male</td>
<td>8.1</td>
<td>6.2</td>
<td>10.995</td>
<td>11.083</td>
</tr>
<tr>
<td>Cause of cardiac arrest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCA</td>
<td>8.2</td>
<td>11.5</td>
<td>10.265</td>
<td>10.452</td>
</tr>
<tr>
<td>Non-SCA</td>
<td>8.4</td>
<td>8.3</td>
<td>3.214</td>
<td>3.269</td>
</tr>
<tr>
<td>Location of cardiac arrest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At home</td>
<td>8.5</td>
<td>5.9</td>
<td>10.783</td>
<td>8.244</td>
</tr>
<tr>
<td>Other location</td>
<td>6.7</td>
<td>14.6</td>
<td>3.345</td>
<td>6.083</td>
</tr>
<tr>
<td>Initial ECG rhythm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VF or VT</td>
<td>9.4</td>
<td>21.1</td>
<td>6.544</td>
<td>5.908</td>
</tr>
<tr>
<td>Asystole or PEA</td>
<td>1.5</td>
<td>11.2</td>
<td>9.467</td>
<td>8.594</td>
</tr>
<tr>
<td>Year of cardiac arrest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990-1995</td>
<td>8.6</td>
<td>6.7</td>
<td>3.82</td>
<td>2.629</td>
</tr>
<tr>
<td>1996-2000</td>
<td>8.0</td>
<td>6.9</td>
<td>4.187</td>
<td>3.163</td>
</tr>
<tr>
<td>2001-2005</td>
<td>8.6</td>
<td>10.7</td>
<td>3.523</td>
<td>3.929</td>
</tr>
<tr>
<td>2006-2011</td>
<td>5.5</td>
<td>13.4</td>
<td>3.563</td>
<td>5.278</td>
</tr>
</tbody>
</table>

ECC, electrocardiography; PEA, pulseless electrical activity; VF, ventricular fibrillation; VT, ventricular tachycardia.
2015 CARES (Cardiac Arrest Registry to Enhance Survival) National Survival Report for emergency medical services treated nontraumatic cardiac arrest, the survival rate to hospital discharge was

- 10.6% for adults >18 years old,
- 23.5% for children 13 to 18 years old,
- 16.6% for children >1 to 12 years old, and
- 6.2% for children <1 year old
Way of use

- Emergency medical services AED programs
- Police AED programs
- Public access defibrillation programs
- Smart phone apps for notification of cardiac arrest
- AEDs for use in private homes
- AEDs in medical and dental practices
Way of use in Greece

- Emergency medical services AED programs
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Way of use in Greece

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Way of use in Greece

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The Greek statistics

- Number of AEDs?
- Location of AEDs?
- Follow up of AED use?
- Number of BLS providers?
- Public education and awareness?
- Athens Int.Airport: 7 times per year use
Number and Location of AEDs

- 222 AEDs
- 38 airports (15 international)
- >10 shopping centres
- Police stations, municipalities
- >600 military stations
- >2000 cardiologists

Πηγή: www.kidssavelives.gr
Follow up of AEDs
Number of BLS providers

- 38 course centres
- >360 directors
- >2000 instructors
- >200,000 providers

Πηγή: European Resuscitation Council (www.erc.edu)
Conclusions

- Educational base
- Need for more awareness
- Need for a registry
  - Hellenic Society of Cardiology
  - National Emergency Medical System
  - Hospitals
  - Police
  - Municipalities
Thank you very much for your attention