

# IRC 2021

CONGRESSO  
NAZIONALE

16•17•18 DICEMBRE

NUOVE LINEE GUIDA 2021:  
RIANIMAZIONE CARDIOPOLMONARE  
POST-LOCKDOWN



Italian  
Resuscitation  
Council



# La tecnologia a supporto del BLS

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# No conflict of interest.

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The annual incidence of OHCA in Europe is between 67 to 170 per 100 000 inhabitants

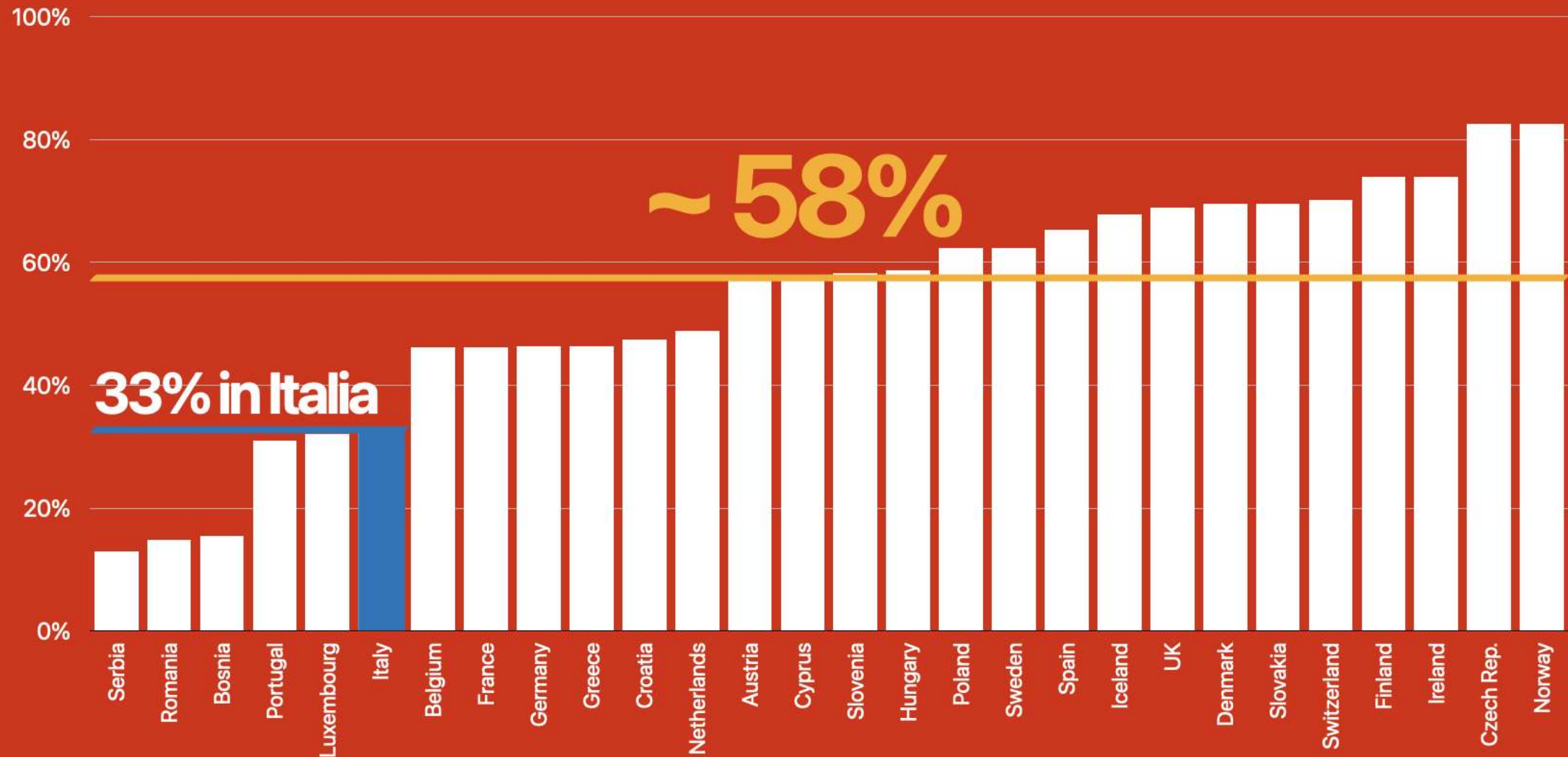




# **solo l'8% sopravvive alla dimissione in Europa**

varia dal 0% al 18% tra i paesi Europei

# Bystander CPR in Europa



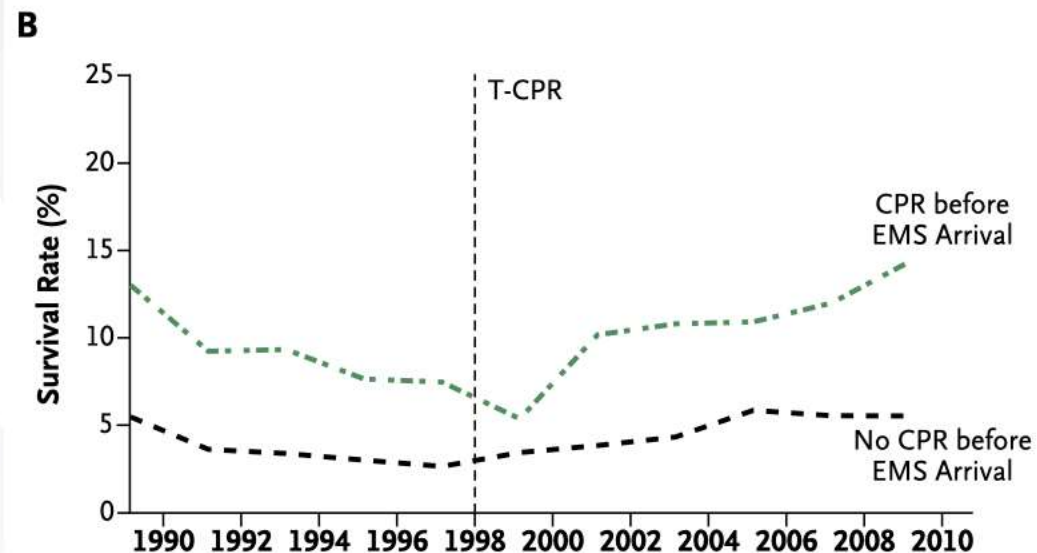
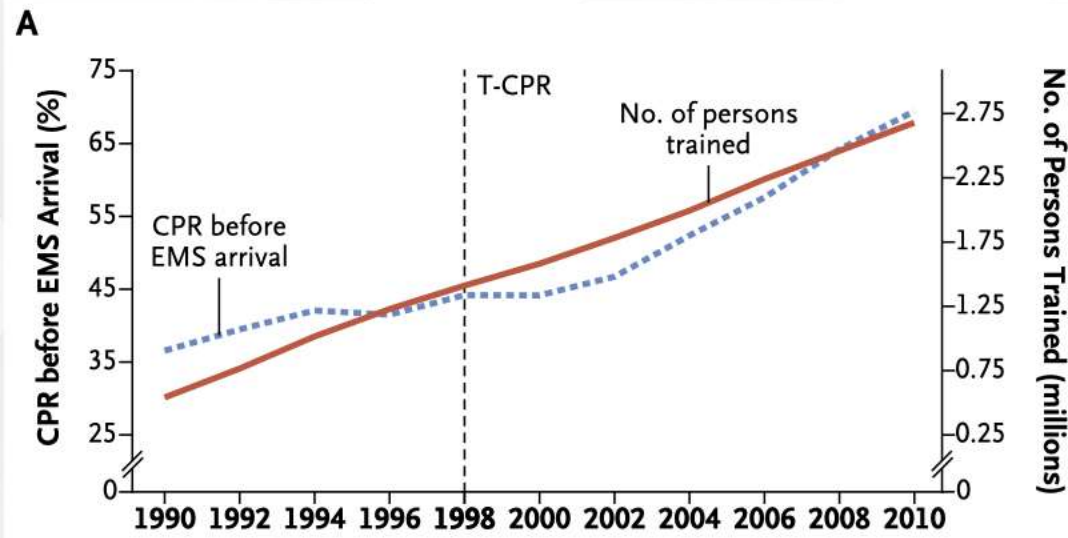
# 28%

**uso di un DAE prima dell'arrivo  
dell'ambulanza in Europa**

varia dal 3.8% al 59% tra i paesi Europei

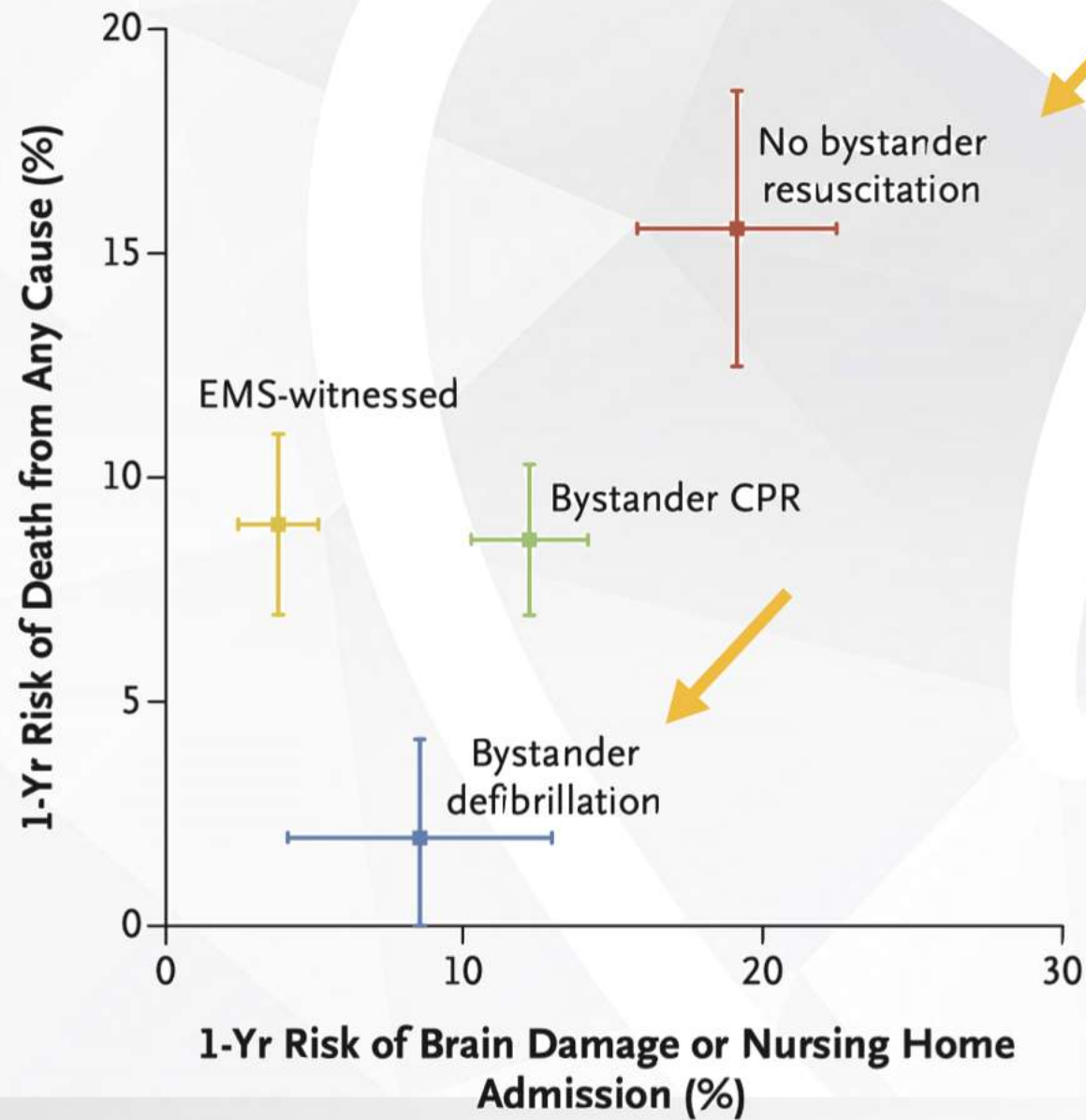


# Sopravvivenza a 30 giorni raddoppiata



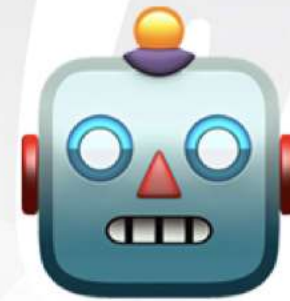
**Table 2. Outcomes of Bystander-Witnessed Ventricular-Fibrillation Arrest of Presumed Cardiac Origin with or without Public-Access Defibrillation.\***

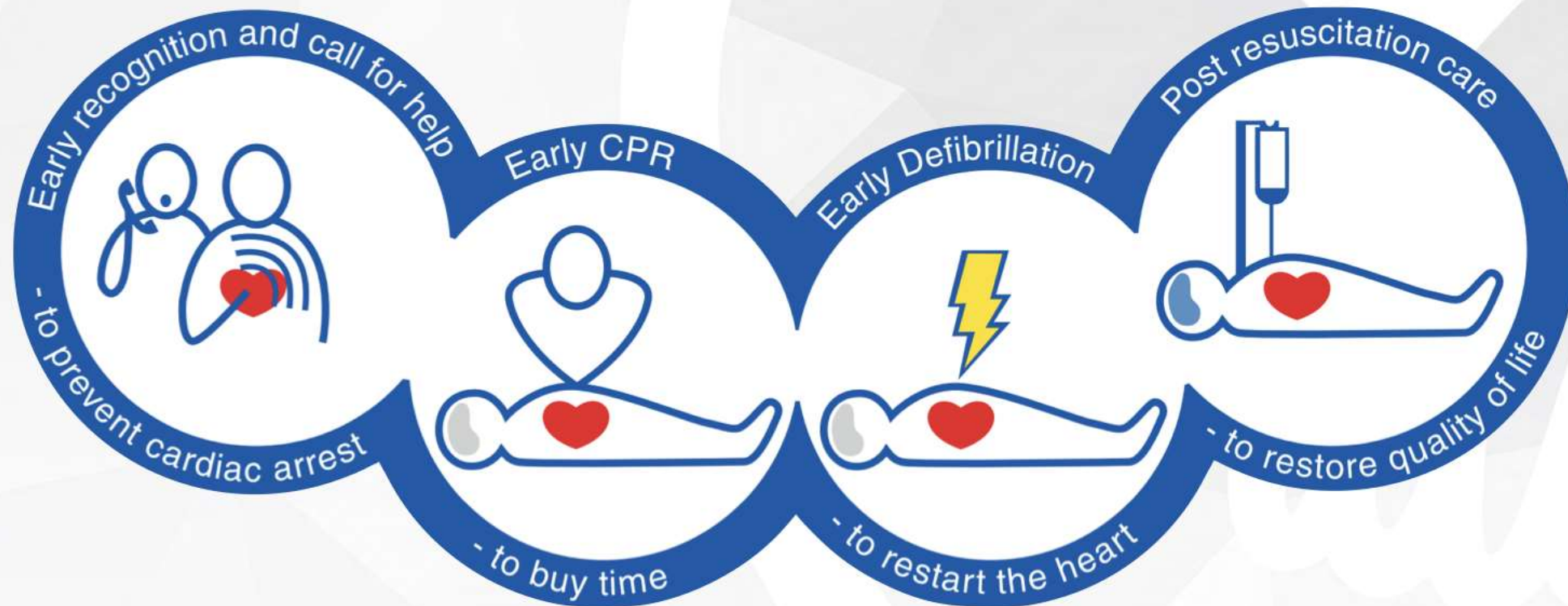
Outcome	Total (N=43,762)	Public-Access Defibrillation (N=4499)	No Public-Access Defibrillation (N=39,263)	Crude Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Return of spontaneous circulation before arrival at hospital — no. (%)	13,660 (31.2)	2232 (49.6)	11,428 (29.1)	2.40 (2.25–2.55)	1.98 (1.84–2.13)†
Survival at 1 mo — no. (%)	12,947 (29.6)	2009 (44.7)	10,938 (27.9)	2.09 (1.96–2.22)	1.66 (1.54–1.79)†
CPC — no. (%)					
1: good cerebral performance	7,521 (17.2)	1539 (34.2)	5,982 (15.2)		
2: moderate cerebral disability	1,365 (3.1)	192 (4.3)	1,173 (3.0)		
3: severe cerebral disability	1,459 (3.3)	118 (2.6)	1,341 (3.4)		
4: coma or vegetative state	2,257 (5.2)	137 (3.0)	2,120 (5.4)		
5: death or brain death	31,160 (71.2)	2513 (55.9)	28,647 (73.0)		
CPC of 1 or 2					
In all patients — no. (%)	8,886 (20.3)	1731 (38.5)	7,155 (18.2)	2.80 (2.63–3.00)	2.03 (1.87–2.20)†
In propensity-score-matched patients — no./total no. (%)	2730/8442 (32.3)	1627/4221 (38.5)	1103/4221 (26.1)	1.77 (1.62–1.94)	1.99 (1.80–2.19)†
By age group — no./total no. (%)					
0–17 yr	207/459 (45.1)	89/141 (63.1)	118/318 (37.1)	2.90 (1.92–4.37)	2.11 (1.24–3.61)‡
18–74 yr	7407/30,569 (24.2)	1446/3104 (46.6)	5961/27,465 (21.7)	3.10 (2.91–3.40)	2.29 (2.09–2.50)‡
≥75 yr	1272/12,734 (10.0)	196/1254 (15.6)	1076/11,480 (9.4)	1.79 (1.52–2.11)	1.29 (1.06–1.56)‡



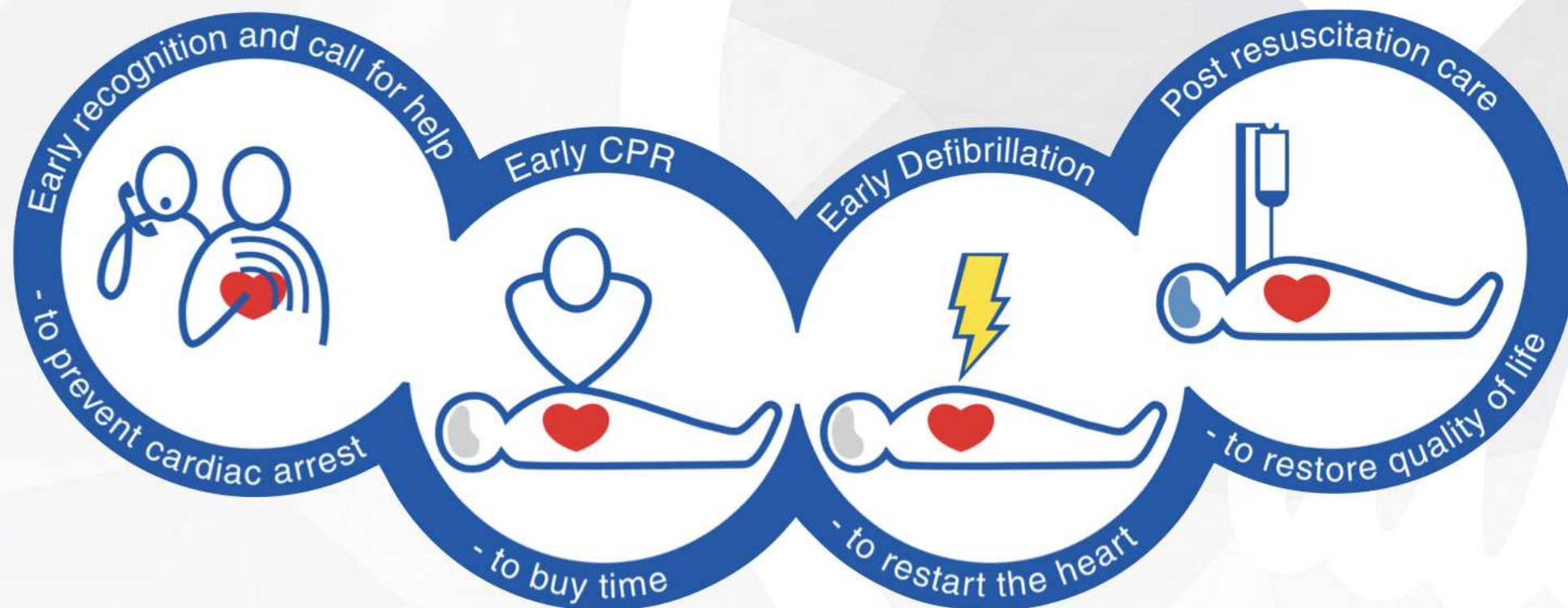


# BLS + Tecnologia





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 **FIRST LINK**

# **Early Recognition and Call for Help**




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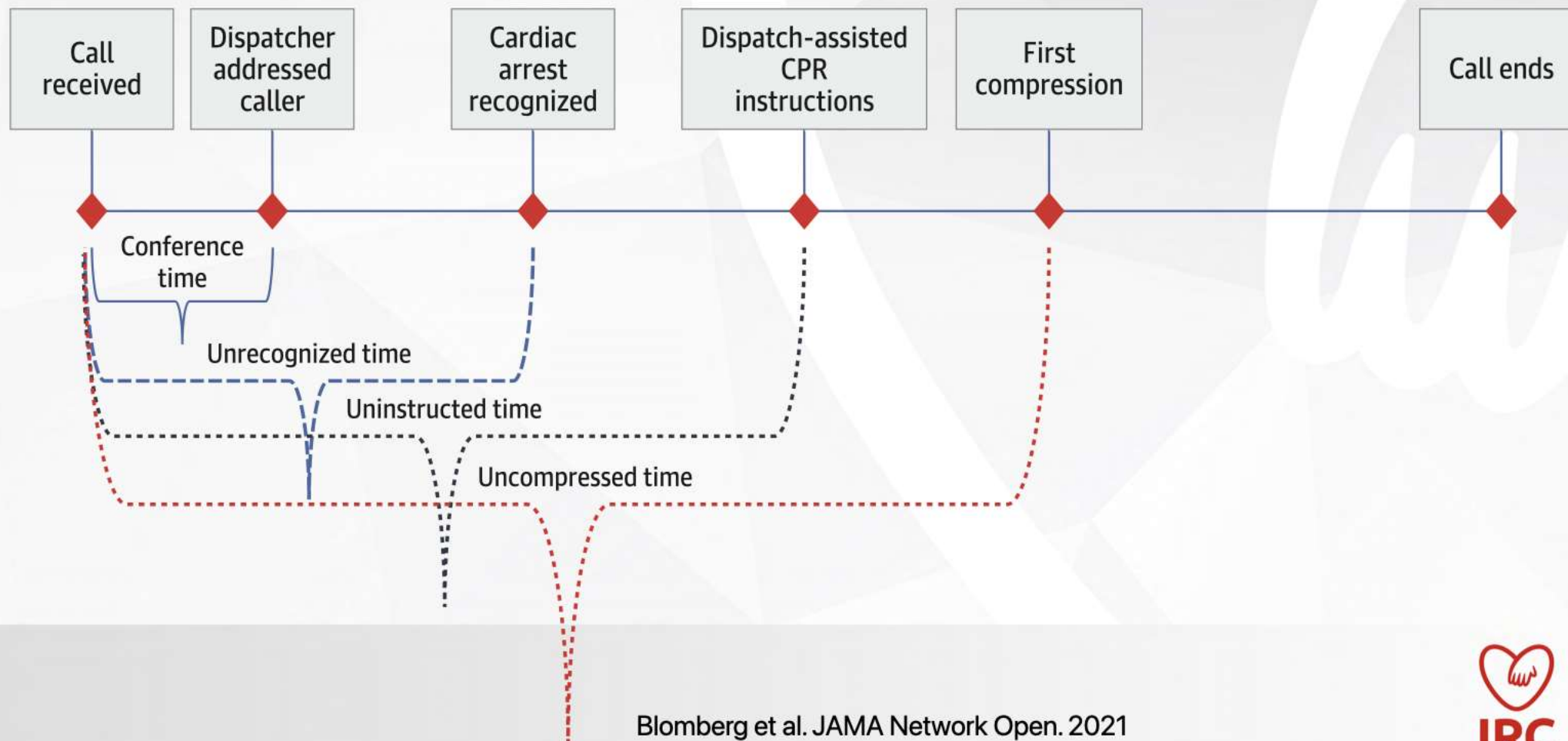


# Early Recognition and Call for Help



- prevenzione dell'arresto cardiaco
- educazione della popolazione
- riconoscimento dell'arresto cardiaco da parte dell'operatore di centrale
- arresti cardiaci non testimoniati 

# Riconoscimento dell'arresto cardiaco da parte dell'operatore di centrale

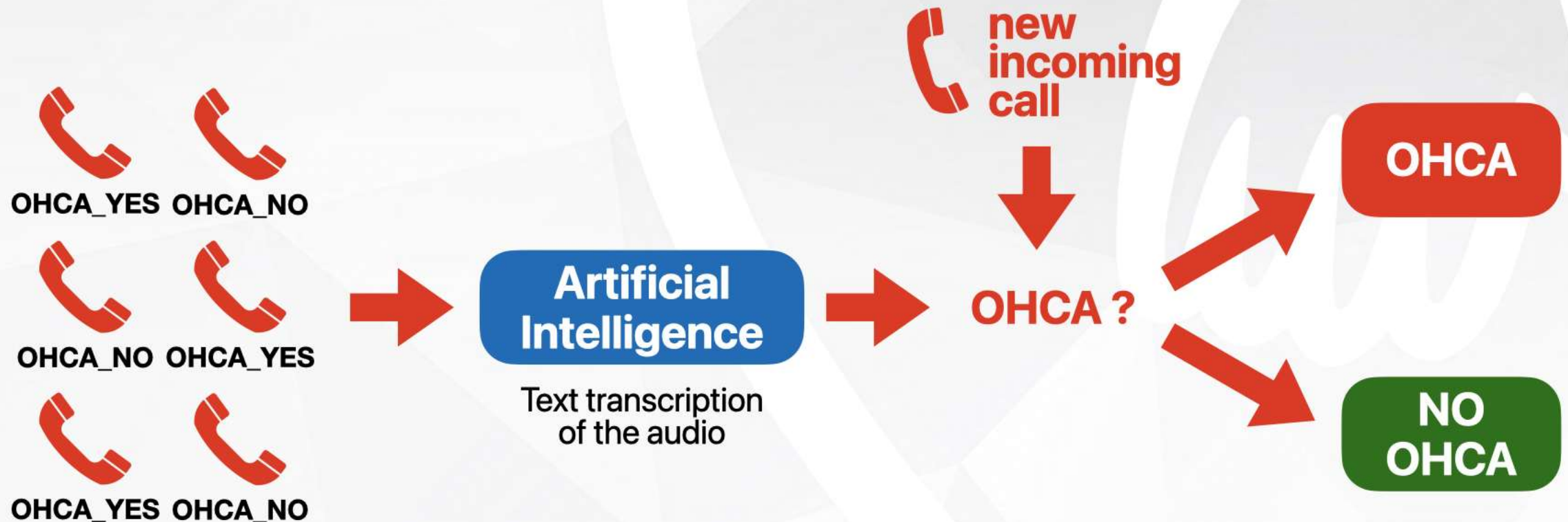


Blomberg et al. JAMA Network Open. 2021



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# Intelligenza artificiale per riconoscere l'arresto cardiaco durante la chiamata



	AI algorithm	Dispatcher
<b>Sensitivity</b> ( $p < 0.001$ )	<b>84%</b>	<b>72%</b>
<b>Specificity</b> ( $p < 0.001$ )	<b>97%</b>	<b>99%</b>
<b>Positive predictive value</b> ( $p < 0.001$ )	<b>20%</b>	<b>33%</b>
<b>Time elapsed</b> ( $p < 0.001$ )	<b>44 sec.</b>	<b>54 sec.</b>

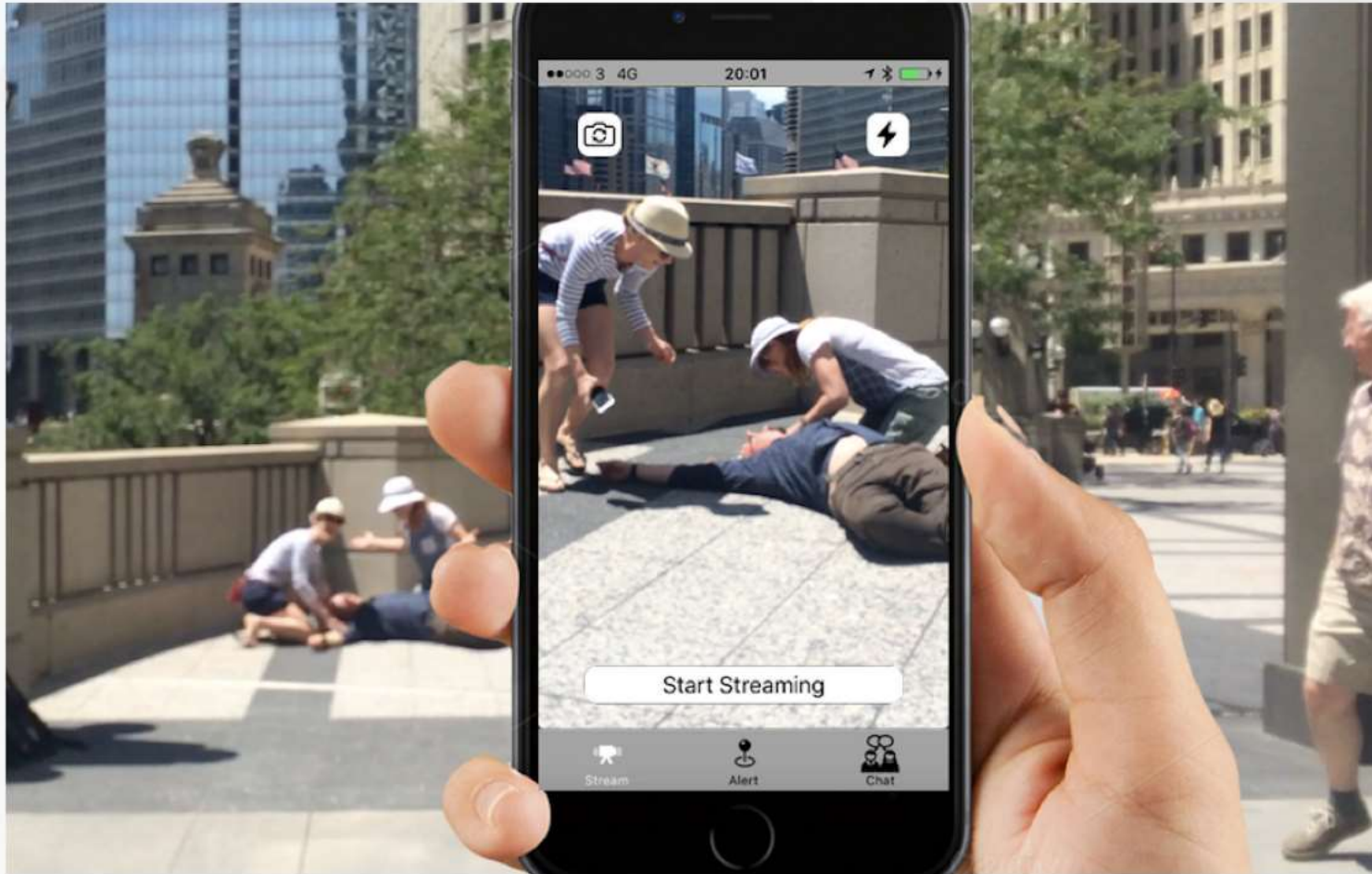
## Effect of Machine Learning on Dispatcher Recognition of Out-of-Hospital Cardiac Arrest During Calls to Emergency Medical Services A Randomized Clinical Trial

Stig Nikolaj Blomberg, MSc; Helle Collatz Christensen, MD, PhD; Freddy Lippert, MD; Annette Kjær Ersbøll, MSc, PhD; Christian Torp-Petersen, MD, PhD; Michael R. Sayre, MD; Peter J. Kudenchuk, MD; Fredrik Folke, MD, PhD

**Table 2. Primary and Secondary Outcomes**

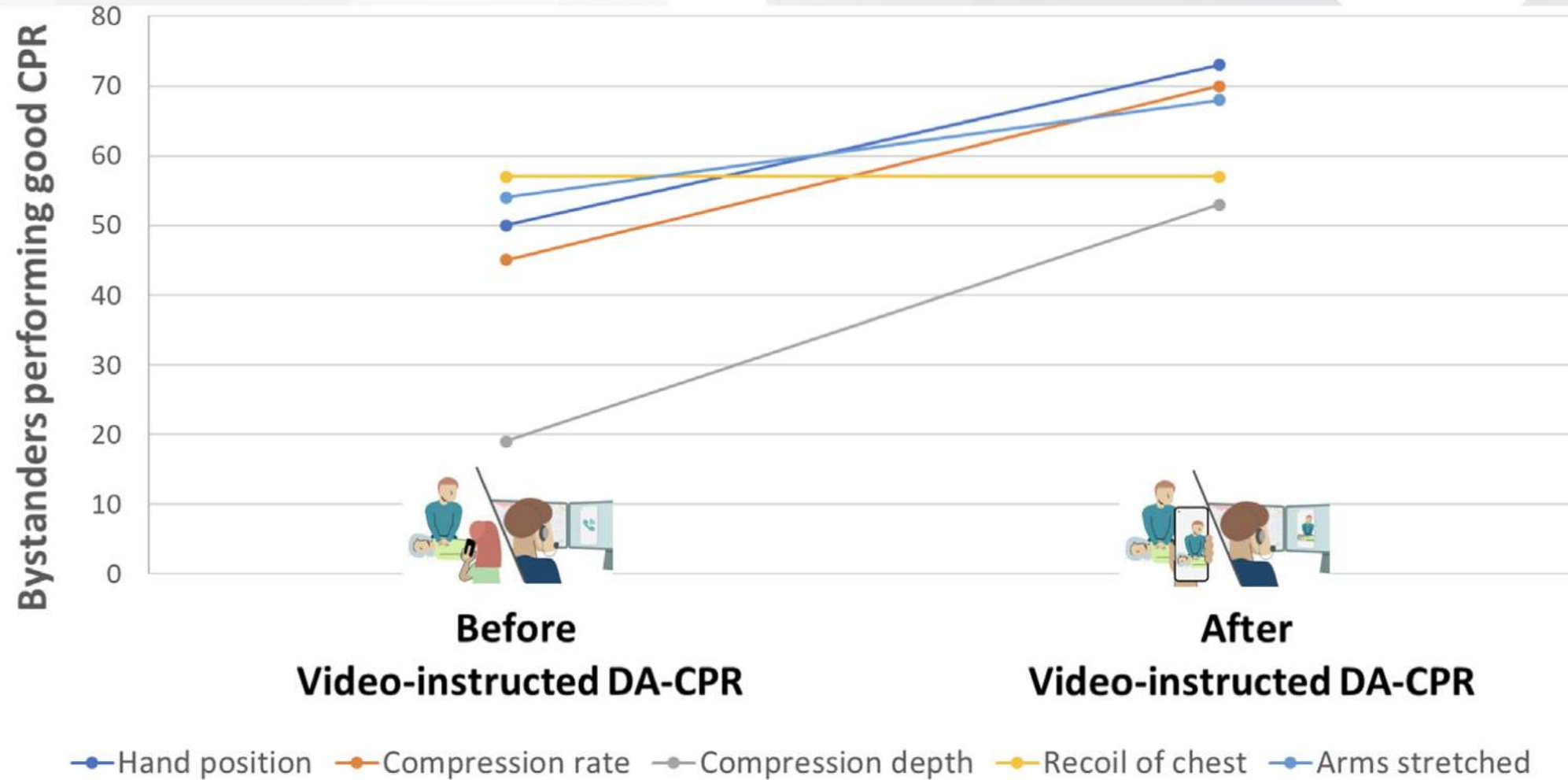
Outcome	Group, mean (SD)		P value
	Control	Intervention	
Eligible for analysis, No. (%)	336 (51.5)	318 (48.5)	.48
Call length, min	6.68 (3.39)	6.94 (3.36)	.35
Alert generated from machine learning model, min <sup>a</sup>	1.33 (1.51)	1.39 (1.32)	.60
Recognition of cardiac arrest, No (%)	304 (90.5)	296 (93.7)	.15
Secondary outcomes			
Time to dispatcher recognition, min	1.70 (1.57)	1.71 (1.63)	.90
DA-CPR instructions started, No. (%)	208 (61.9)	206 (64.8)	.47
Time to DA-CPR, min	2.48 (1.89)	2.52 (1.76)	.82

# Videotelefonata



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# Videotelefonata



# Nessun arresto cardiaco non testimoniato in futuro grazie alla tecnologia?

- 30-50% arresti cardiaci sono non testimoniati
- elevata mortalità
- sopravvivenza <1% se non testimoniato + asistolia





# Smartwatch possono rilevare le cadute e allertare automaticamente 112/118



# Rilevamento dell'arresto cardiaco tramite videosorveglianza e intelligenza artificiale



Scquizzato et al. Resuscitation. 2018  
Douma et al. Resuscitation. 2018



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# Smart speakers rileveranno automaticamente un respiro anormale e attivare 112/118

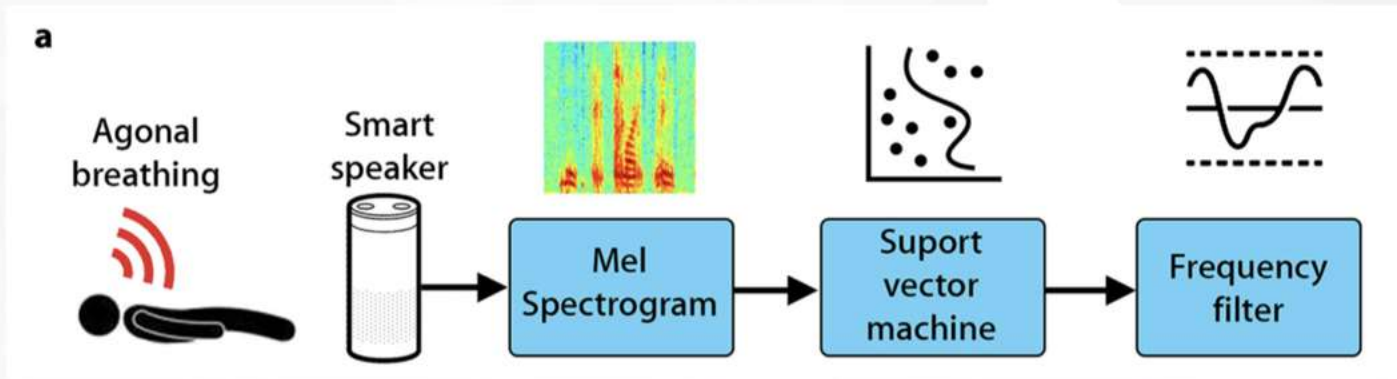
npj | Digital Medicine

[www.nature.com/npjdigitalmed](http://www.nature.com/npjdigitalmed)

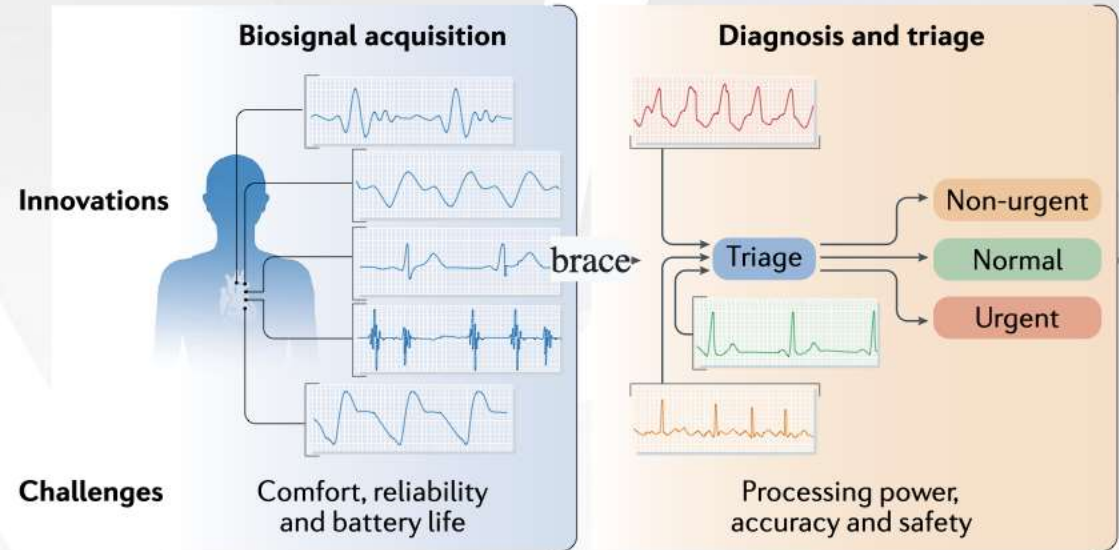
ARTICLE OPEN

## Contactless cardiac arrest detection using smart devices

Justin Chan<sup>1</sup>, Thomas Rea<sup>2,3</sup>, Shyamnath Gollakota<sup>1</sup> and Jacob E. Sunshine<sup>4</sup>

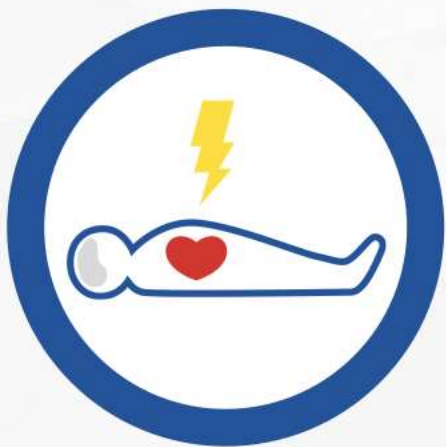


# I wearable devices aiuteranno a prevenire un arresto cardiaco?





 **SECOND LINK**  
**Early CPR**



 **THIRD LINK**  
**Early Defibrillation**



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# App per allertare i first responders



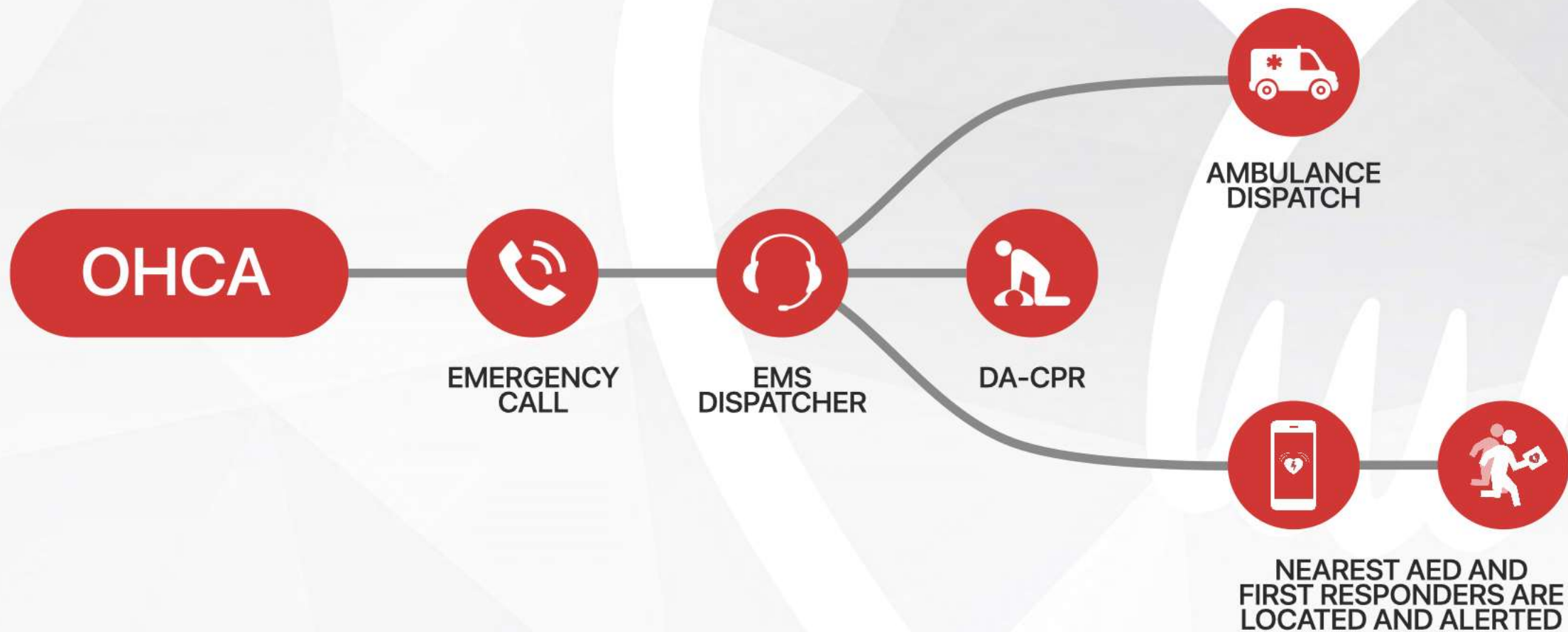
# Chi sono i first responders?



**cittadini che in forma volontaria sono attivi come primi soccorritori in un sistema/rete creata per fornire assistenza non professionale in caso di arresto cardiaco extra-ospedaliero**







# 62%

**dei paesi Europei aveva  
un sistema per allertare  
i first responders**

# 34

**sistemi (app o SMS)  
identificati in Europa per  
allertare first responders**

## ORIGINAL ARTICLE

## Mobile-Phone Dispatch of Laypersons for CPR in Out-of-Hospital Cardiac Arrest

Mattias Ringh, M.D., Märten Rosenqvist, M.D., Ph.D., Jacob Hollenberg, M.D., Ph.D., Martin Jonsson, B.Sc., David Fredman, R.N., Per Nordberg, M.D., Hans Järnbert-Pettersson, Ph.D., Ingela Hasselqvist-Ax, R.N., Gabriel Riva, M.D., and Leif Svensson, M.D., Ph.D.

**Table 2. Primary and Secondary Outcomes.\***

Outcome	Intervention <i>no. of patients/total no. (%)</i>	Control <i>no. of patients/total no. (%)</i>	Difference (95% CI) <i>percentage points</i>	P Value
Primary outcome: bystander-initiated CPR	188/305 (61.6)	172/360 (47.8)	13.9 (6.2 to 21.2)	<0.001
Secondary outcome				
30-day survival	32/286 (11.2)	28/326 (8.6)	2.6 (−2.1 to 7.8)	0.28
Return of spontaneous circulation	90/306 (29.4)	105/361 (29.1)	0.3 (−6.5 to 7.3)	0.93
Shockable rhythm: ventricular fibrillation or ventricular tachycardia	58/301 (19.3)	60/347 (17.3)	2.0 (−4.0 to 8.0)	0.52
Bystander-initiated CPR including CPR performed with telephone instructions	196/305 (64.3)	197/360 (54.7)	9.5 (2.0 to 16.9)	0.01



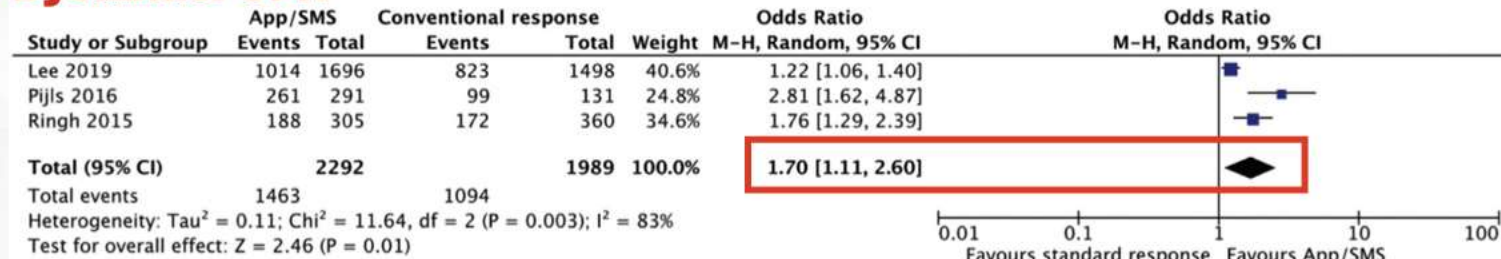
Review

## Enhancing citizens response to out-of-hospital cardiac arrest: A systematic review of mobile-phone systems to alert citizens as first responders

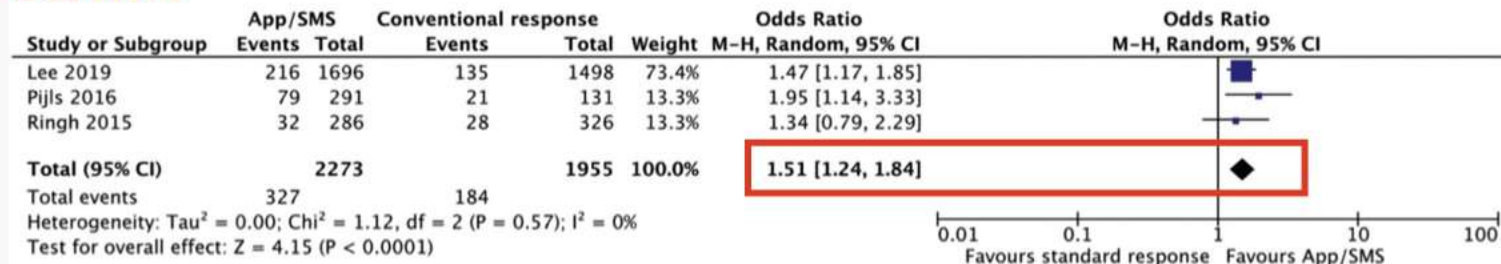


Tommaso Scquizzato<sup>a,b,\*</sup>, Ottavia Pallanch<sup>a</sup>, Alessandro Belletti<sup>a</sup>, Antonio Frontera<sup>c</sup>, Luca Cabrini<sup>d</sup>, Alberto Zangrillo<sup>a,b</sup>, Giovanni Landoni<sup>a,b</sup>

### Bystander CPR



### Survival





# App per trovare il DAE più vicino



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# 78%

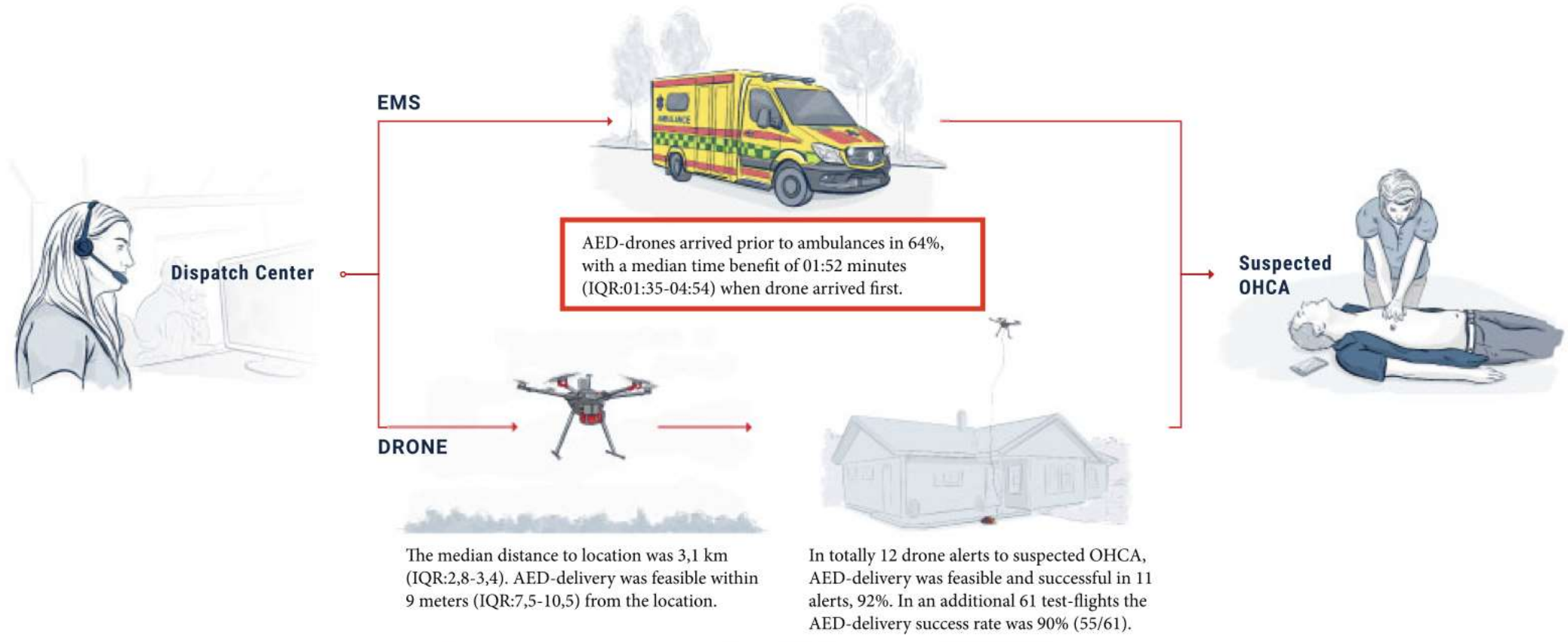
**dei paesi Europei aveva un sistema  
(app, sito web) per mappare e  
localizzare il defibrillatore più vicino**



# Portare il DAE con un drone?



# Nella vita reale?





# Take home message



**L'arresto cardiaco non testimoniato rimane un problema non risolto**



**Inizio della RCP da parte degli astanti ancora non sufficiente**

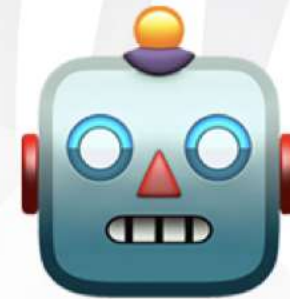


**Utilizzo di un DAE prima dell'arrivo del 118 raro in molti paesi Europei**



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# La tecnologia può aiutare nel riconoscimento, inizio RCP e defibrillazione



# ILCOR/ERC raccomandano di:


- 1** implementare tecnologie per allertare i first responders tramite app o SMS
- 2** sviluppare comunità/gruppi di first responders
- 3** mappare la posizione dei DAE pubblici

## Systems Saving Lives

the **Italian Resuscitation Council** proposals become an Italian law

# THE OUT-OF-HOSPITAL USE OF SEMI-AUTOMATIC AND AUTOMATIC EXTERNAL DEFIBRILLATORS (AED)

**1** **Mandatory placement of AEDs** in public administration offices, public sites (airports, train stations, ports, etc.) and transport systems

Art. 

**2** **AED Placement criteria in public places** (local needs and PAD projects, access and availability, etc.)

Art. 


**3** **Legal protection for lay rescuers** performing bystander CPR and AED use

Art. 


**4** **Mandatory availability and use of AEDs during sport events** (practice and competition) both for professional and amateur teams

Art. 

**5** **CPR education and use of AED in schools** taught to students (age 10-18), teachers, administrative and support staff

Art. 

**6** **Inventory of all AEDs** made by the EMS

Art. 

**7** **A smartphone application** for rescuer recruitment and AED location. National protocol for EMS **dispatch-assisted pre-arrival instructions**

Art. 

**8** **Awareness campaigns** on cardiac arrest and CPR, especially on WRAH occasion (October 16th)

Art. 



Rimini  
**IRC 2021**  
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NUOVE LINEE - GUIDA 2021 -  
RIPARAZIONE - CARATTERISTICHE  
POST-LOCKDOWN



# Grazie per l'attenzione.

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# #SystemSavingLives



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