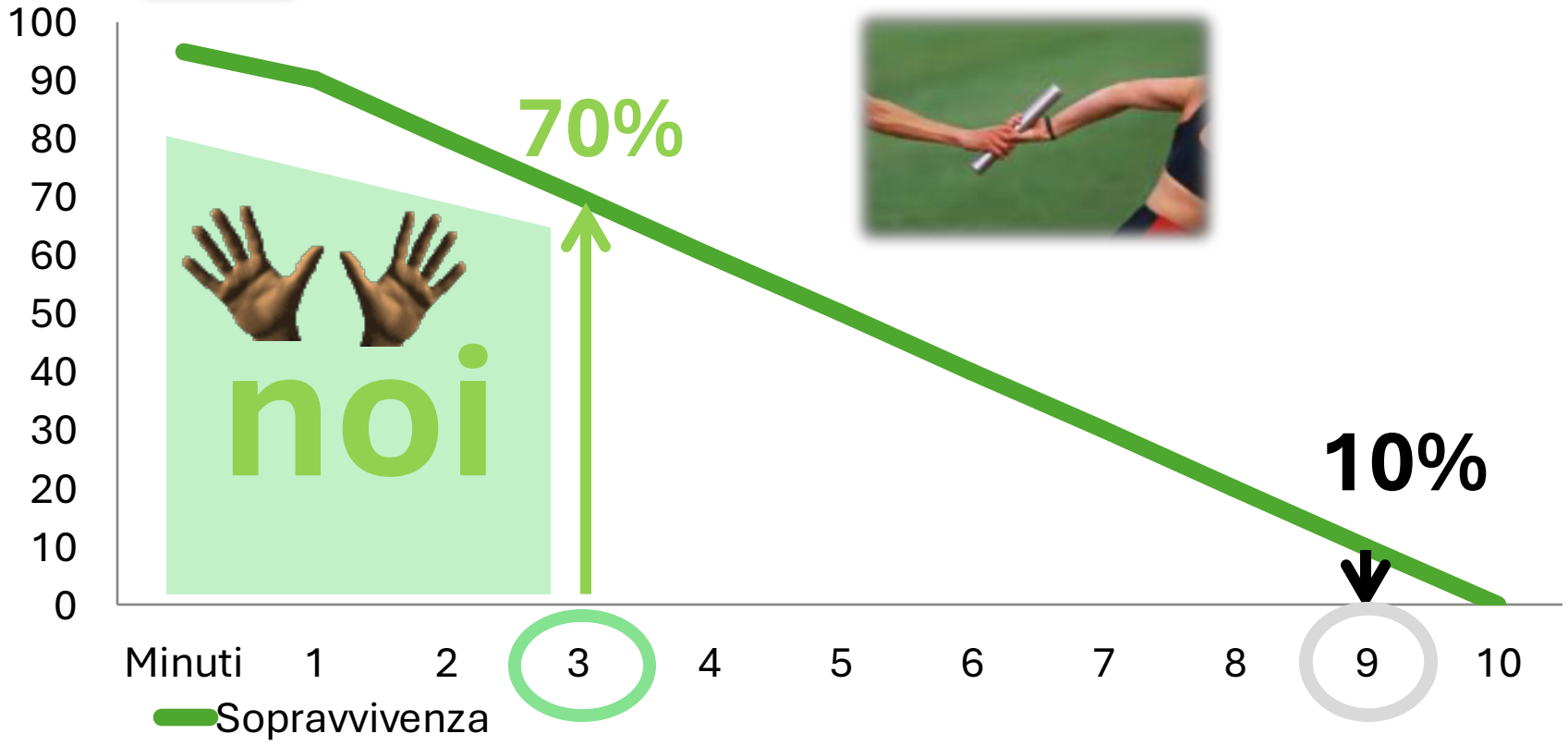
Forum Risk Management
obiettivo sanità salute
20 Years
2005·2025
25-28 NOVEMBRE 2025

Andrea Scapigliati

Arresto Cardiaco: La Patologia Tempo-dipendente

Una corsa contro il tempo



Registry in Europe:

EuReCa ONE European Registry of Cardiac arrest

EuReCa TWO European Registry of Cardiac arrest

EuReCa THREE European Registry of Cardiac Arrest

Study	Time	Countries	OHCA cases	Incidence (100.000/year)	Bystander CPR (%)
EuReCa One	2014 (3 mesi)	27	~10.700	~84	**~47%**
EuReCa Two	2017 (3 mesi)	27	~28.000	~56	**~58%**
EuReCa Three	2022 (3 mesi)	28	~67.000	~64	**~63%**

Epidemiology in resuscitation - ERC Guidelines 2025

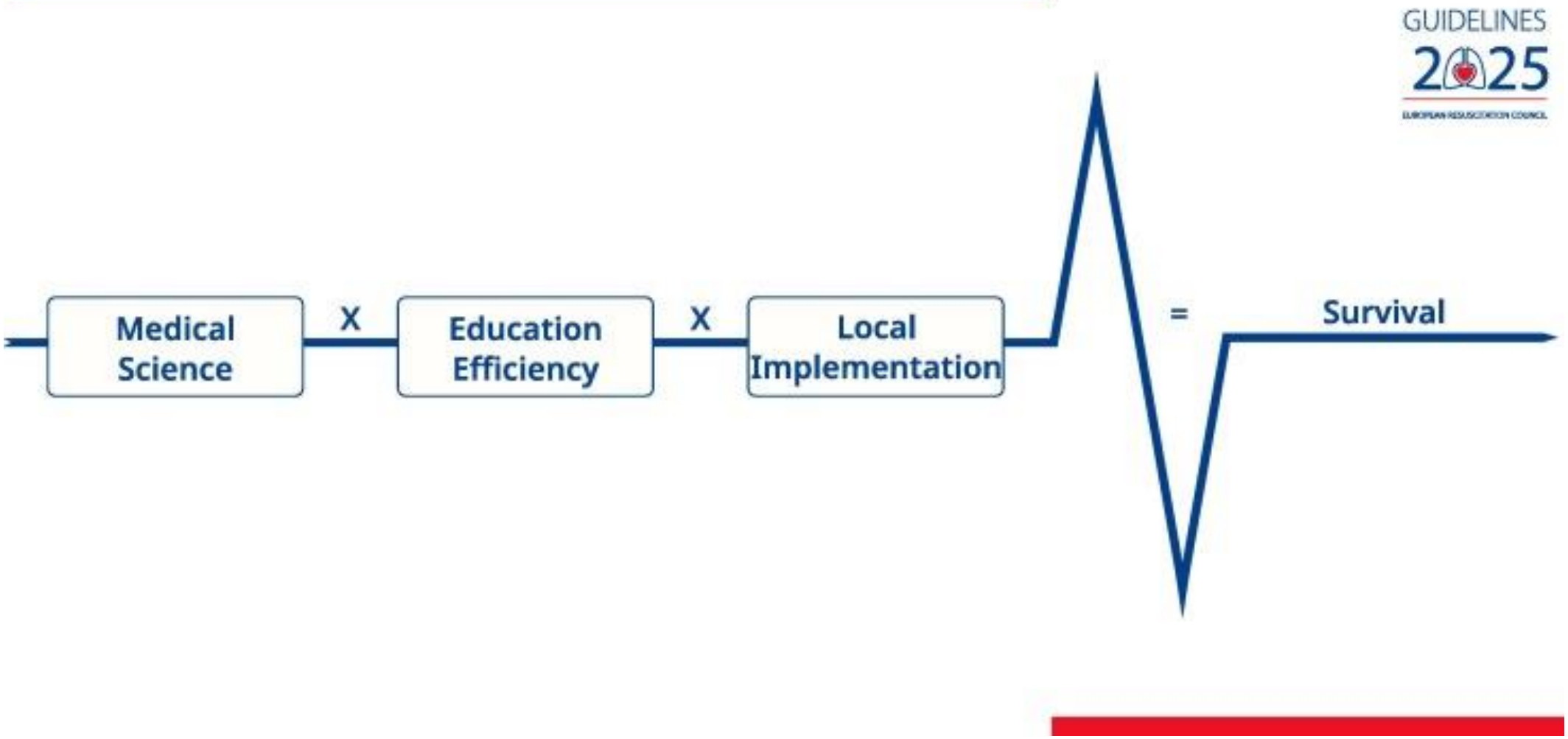
Out-of-Hospital Cardiac Arrest (OHCA)

- **Incidence: 55 per 100,000** inhabitants per year
- **Location: 70%** occur in **private** residences
- **Initial shockable rhythm: ~20%**
- **Bystander CPR: 58%** (range 13–82%)
- **AED use before EMS arrival: 2.6–59%**
- **Average survival: 7.5%** (range 3.1–35%)

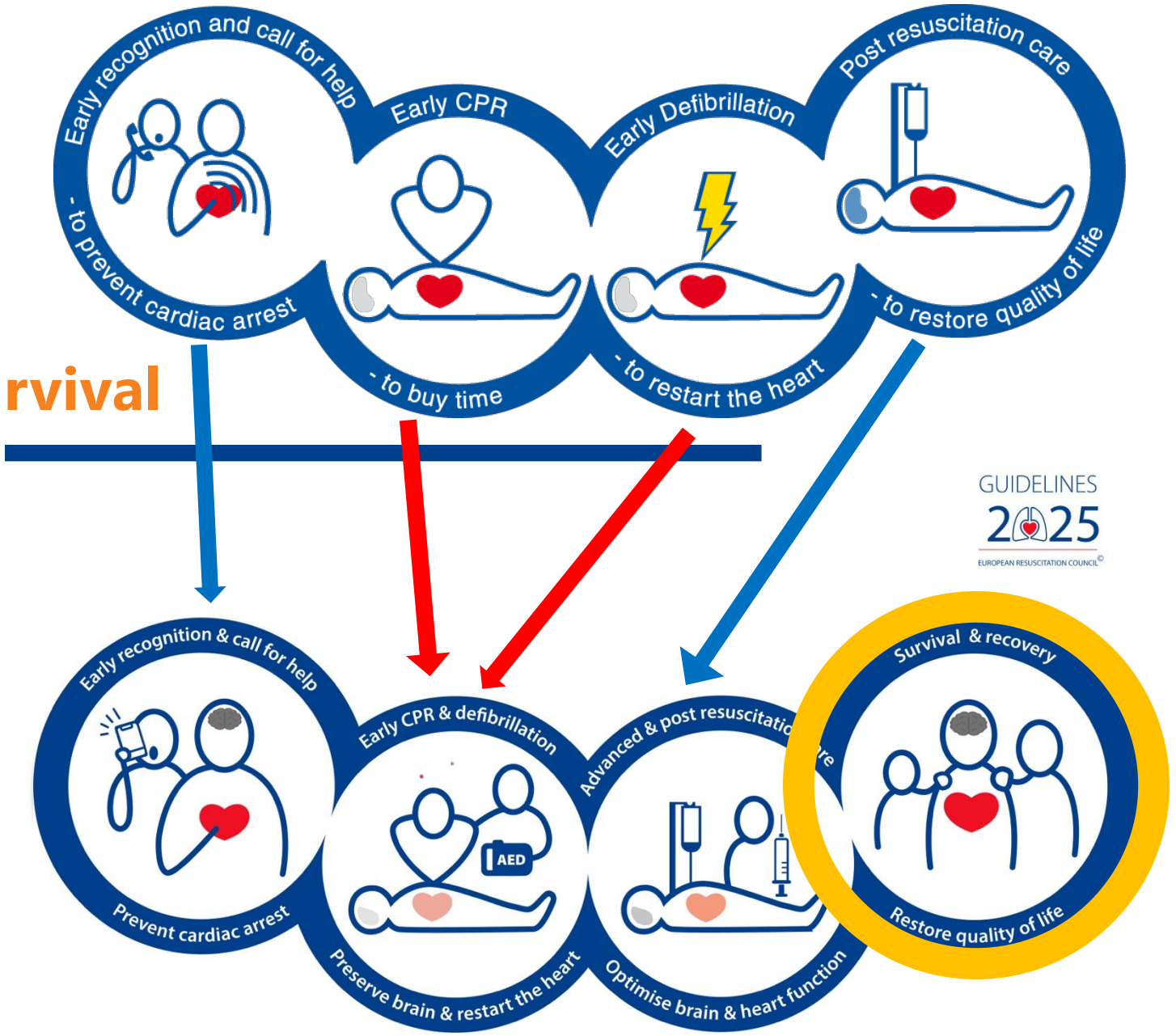
In-Hospital Cardiac Arrest (IHCA)

- **Incidence: 1.5–2.8 per 1000** hospital admissions
- **Survival: 27–62%** (wide variability between systems)
- **Standard internal emergency number** (2222): implemented **in only 2%** of countries

Formula of Survival



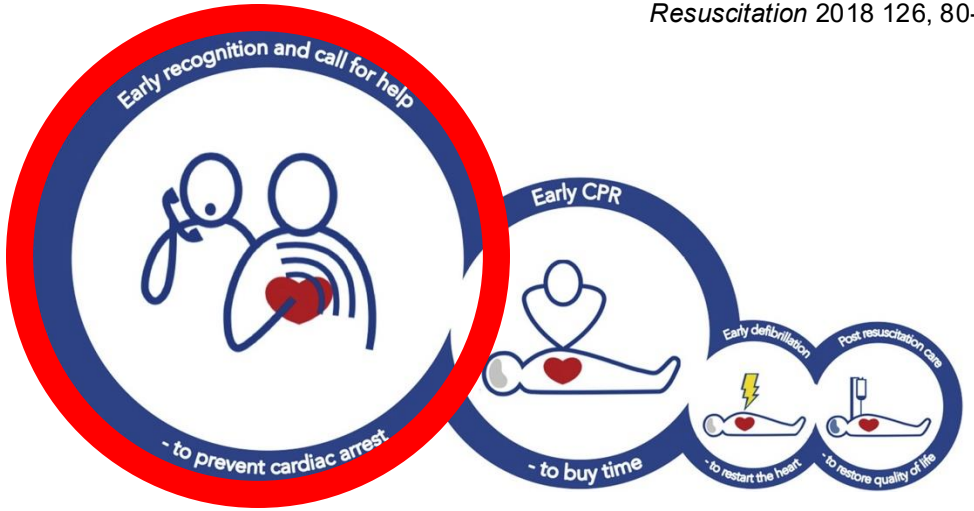
Chain of survival



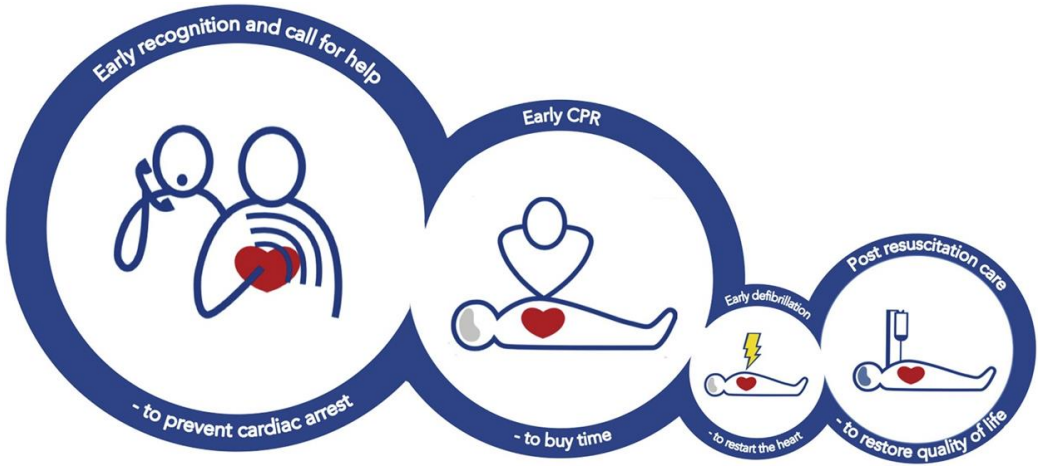
The chain of survival: not all links are equal (in terms of SURVIVAL)

Charles D. Deakin. Resuscitation 2018

Resuscitation 2018 126, 80-82DOI: (10.1016/j.resuscitation.2018.02.012)



Out of Hospital Cardiac Arrest



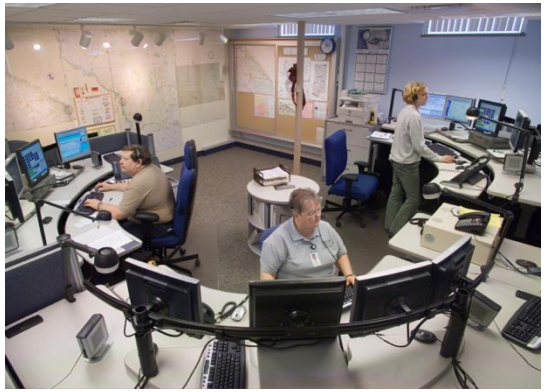
In Hospital Cardiac Arrest

Efficacy Inversely Related to **Costs**

Coute R.A. et al.
Evaluation of National Institutes of Health Cardiac Arrest Research Based on 'Chain of Survival' Links.
Acad Emerg Med.2022;29:1381–1382.

Awareness

Support



Before

Training

During

AED

Review

Willingness to perform bystander cardiopulmonary resuscitation: A scoping review

RESUSCITATION PLUS 4 (2020) 100043

Tasuku Matsuyama[a], Andrea Scapigliati[b], Tommaso Pellis[c], Robert Greif[d,e], Taku Iwami[f,]*

Promote

- **CPR training**
- **Recent Training**
- Hands-on Mass training
- High school **education**
- **Multiple bystanders**
- Family member
- **Compression Only CPR**

Barriers

Victim's

- **Female sex**
- Age
- Vomit, blood, alcohol
- Race

Bystander's

- Bystander Age
- Low socio-economic status
- **Recognition**
- Panic
- **Lack of confidence**
- **Afraid to hurt the victim**
- **Legal issues**
- Communication issues (language, phone)
- Physical issues (bystander/victim position)

Association between public cardiopulmonary resuscitation education and the willingness to perform bystander cardiopulmonary resuscitation: a metropolitan citywide survey

Jeong Woo Son[1], Hyun Wook Ryoo[1], Sungbae Moon[1], Jong-yeon Kim[2], Jae Yun Ahn[1], Jeong Bae Park[1], Kang Suk Seo[1], Jong Kun Kim[1], Yun Jeong Kim[3]

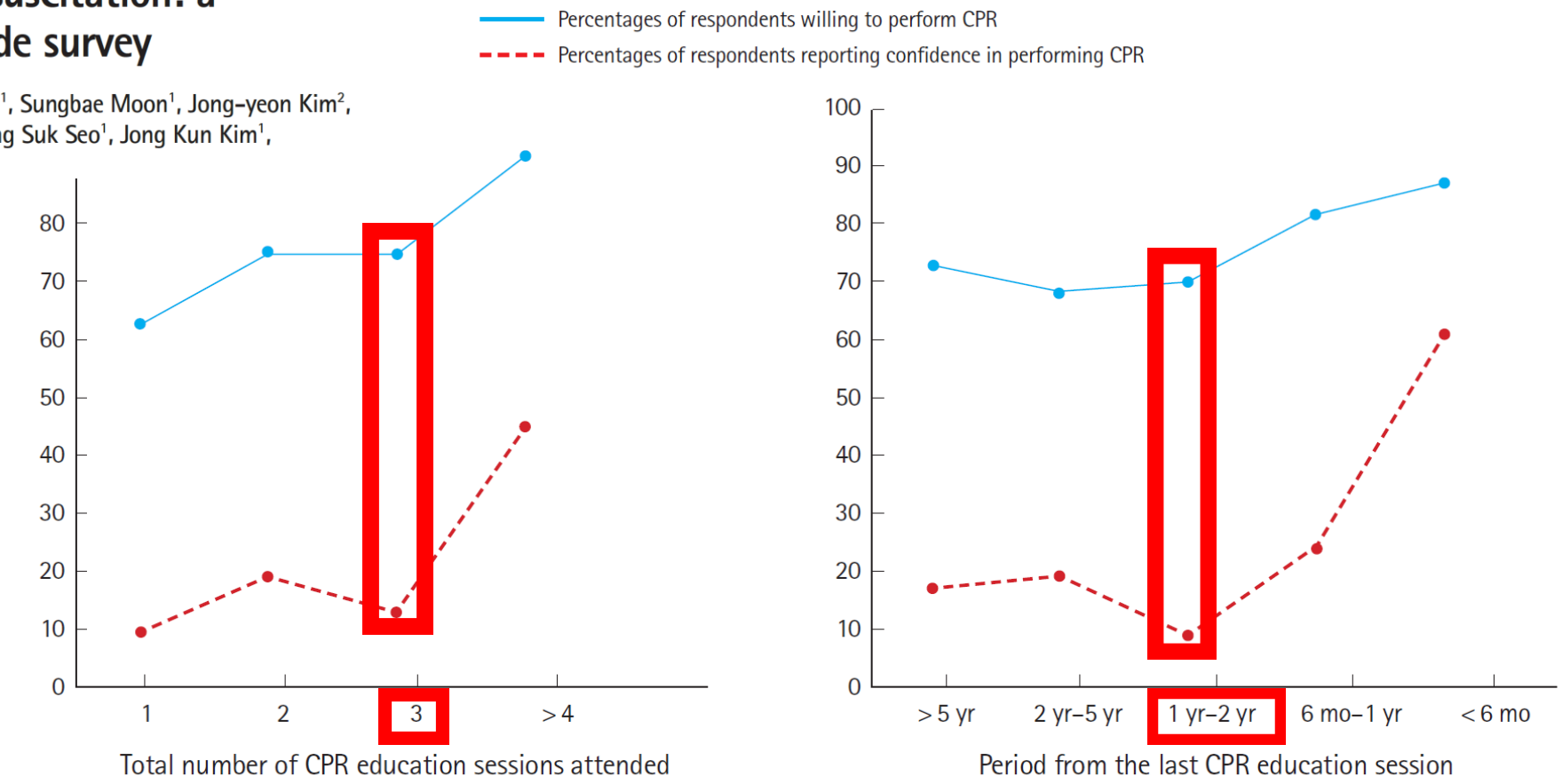


Fig. 1. Trends in the percentages of participants willing to perform cardiopulmonary resuscitation (CPR) and percentages of confidence in performing CPR according to CPR education characteristics.

Japan

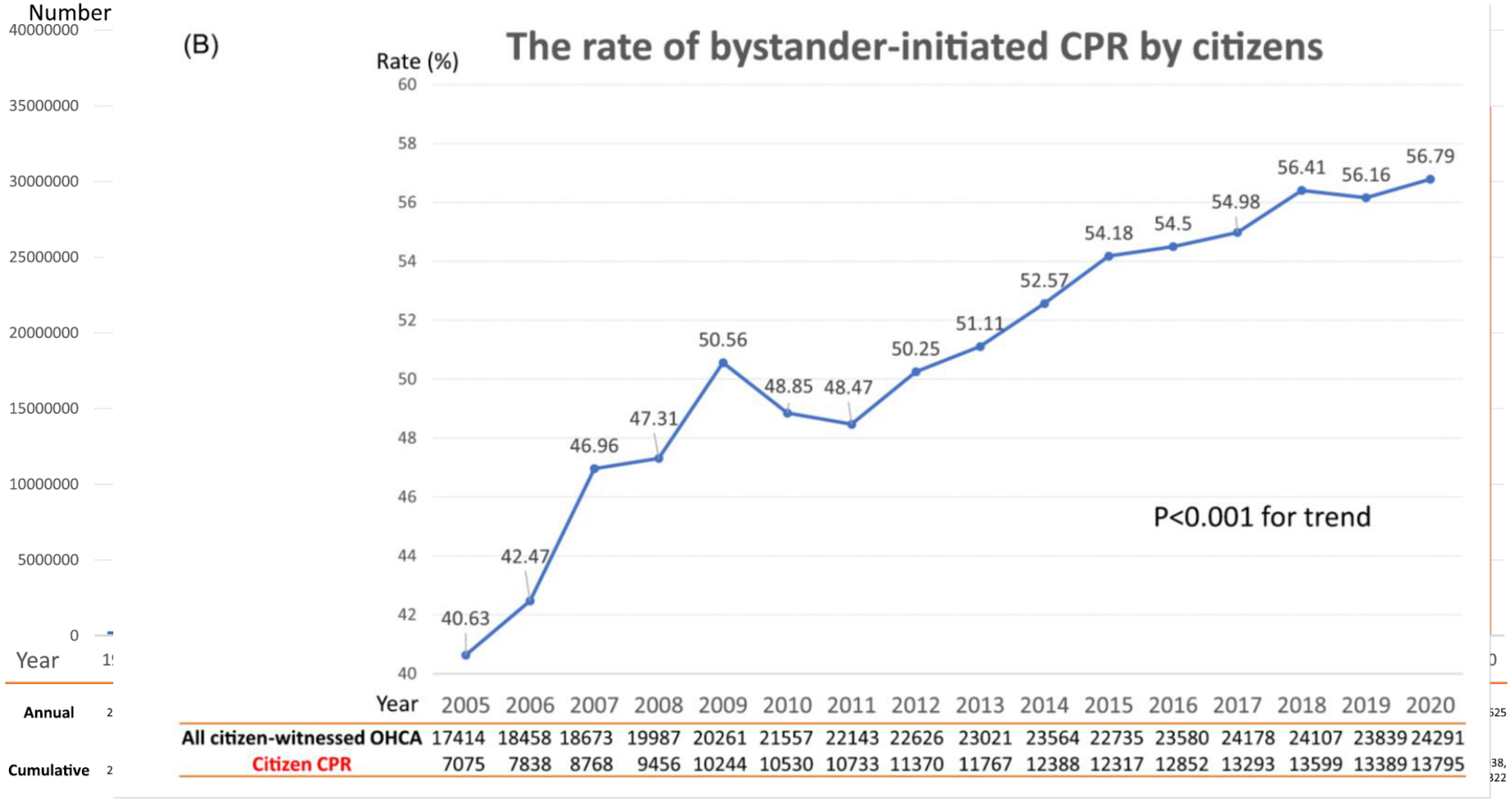
RESUSCITATION 195 (2024) 110116

Clinical paper

Impact of a national initiative to provide civilian cardiopulmonary resuscitation training courses on the rates of bystander intervention by citizens and survival after out-of-hospital cardiac arrest

Tetsuo Yamaguchi[a,c,], Michikazu Nakai[b], Takahide Kodama[a], Masanari Kuwabara[a], Naohiro Yonemoto[c], Takanori Ikeda[c], Yoshio Tahara[c], on behalf of Japanese Circulation Society Resuscitation Science Study JCS-ReSS Group*

(A) Annual and cumulative number of citizens certified for official CPR courses



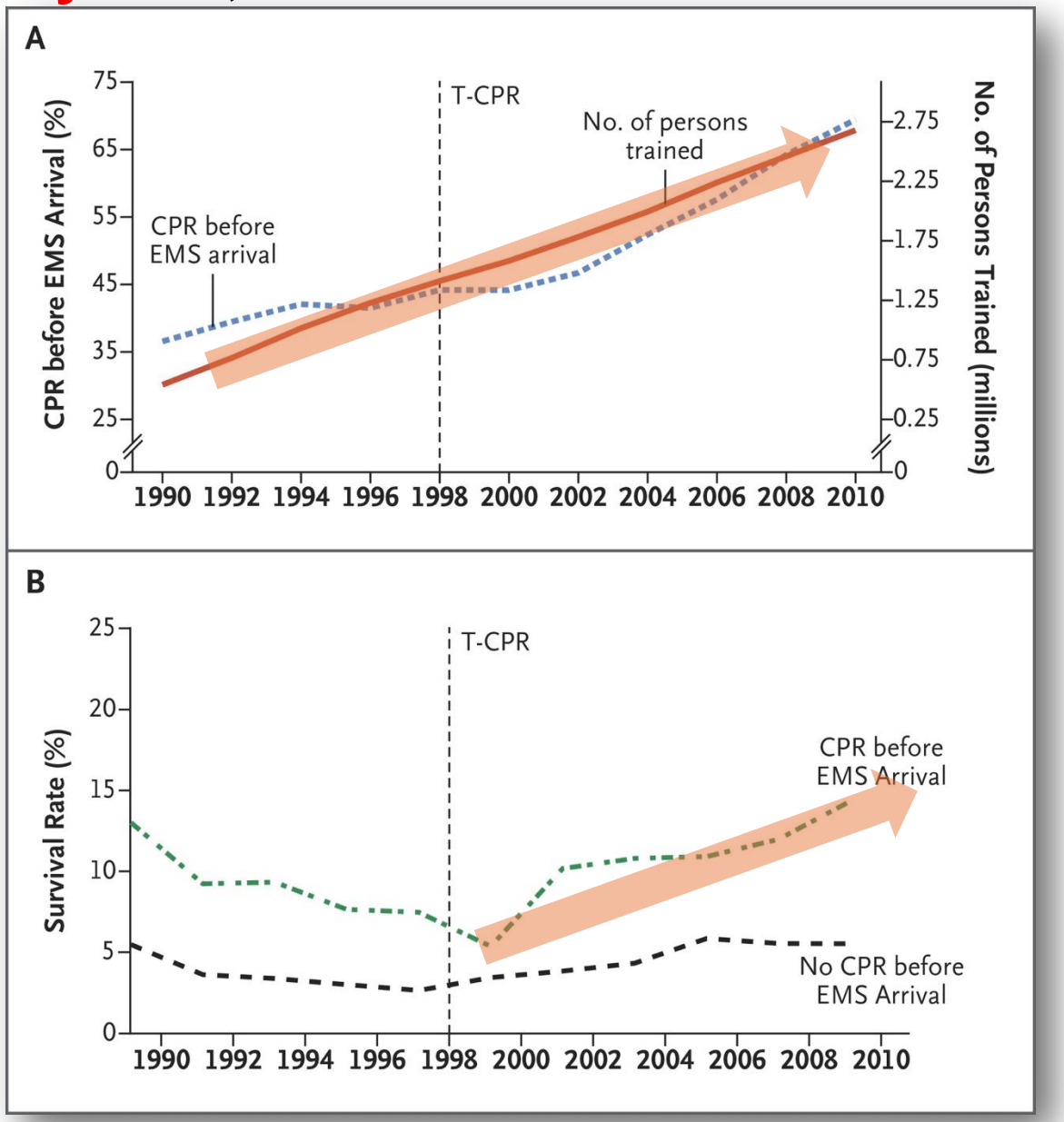
(B)

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
All citizen-witnessed OHCA	17414	18458	18673	19987	20261	21557	22143	22626	23021	23564	22735	23580	24178	24107	23839	24291
Citizen CPR	7075	7838	8768	9456	10244	10530	10733	11370	11767	12388	12317	12852	13293	13599	13389	13795

Changes over Time in CPR Training, the Performance of Early CPR, and Survival Rates in Sweden.

BLS Training
Bystander CPR

Survival



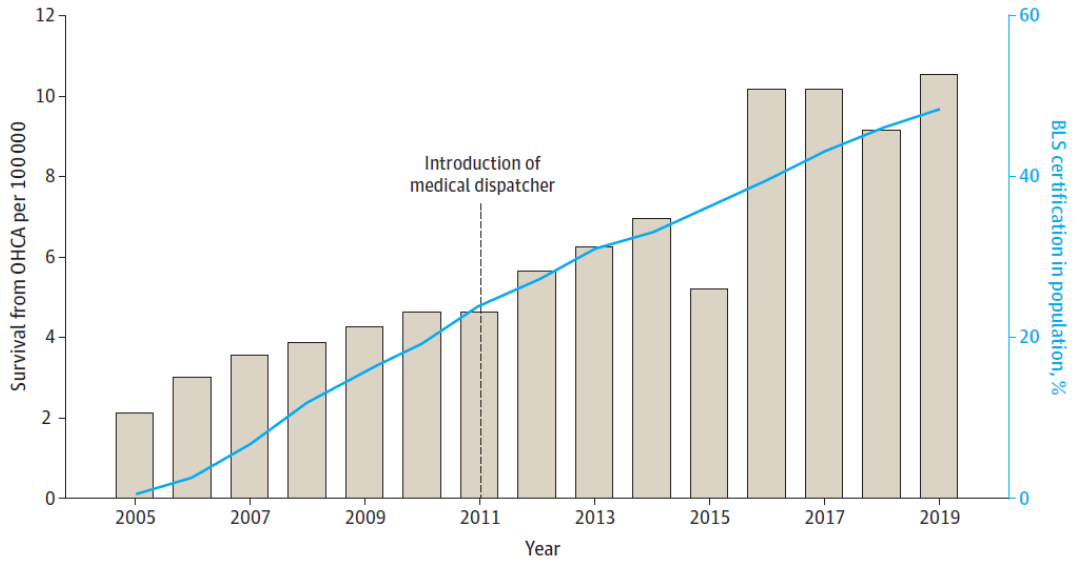
Hasselqvist-Ax I et al.
N Engl J Med 2015;372:2307-2315

The NEW ENGLAND JOURNAL of MEDICINE

Original Investigation | Health Policy

Training in Basic Life Support and Bystander-Performed Cardiopulmonary Resuscitation and Survival in Out-of-Hospital Cardiac Arrests in Denmark, 2005 to 2019

Figure 2. Distribution of Basic Life Support (BLS) Certificates in the Danish Population and Survival From Out-of-Hospital Cardiac Arrest (OHCA), From 2005 to 2019



JAMA Network Open. 2023;6(3):e233338. doi:10.1001/jamanetworkopen.2023.3338

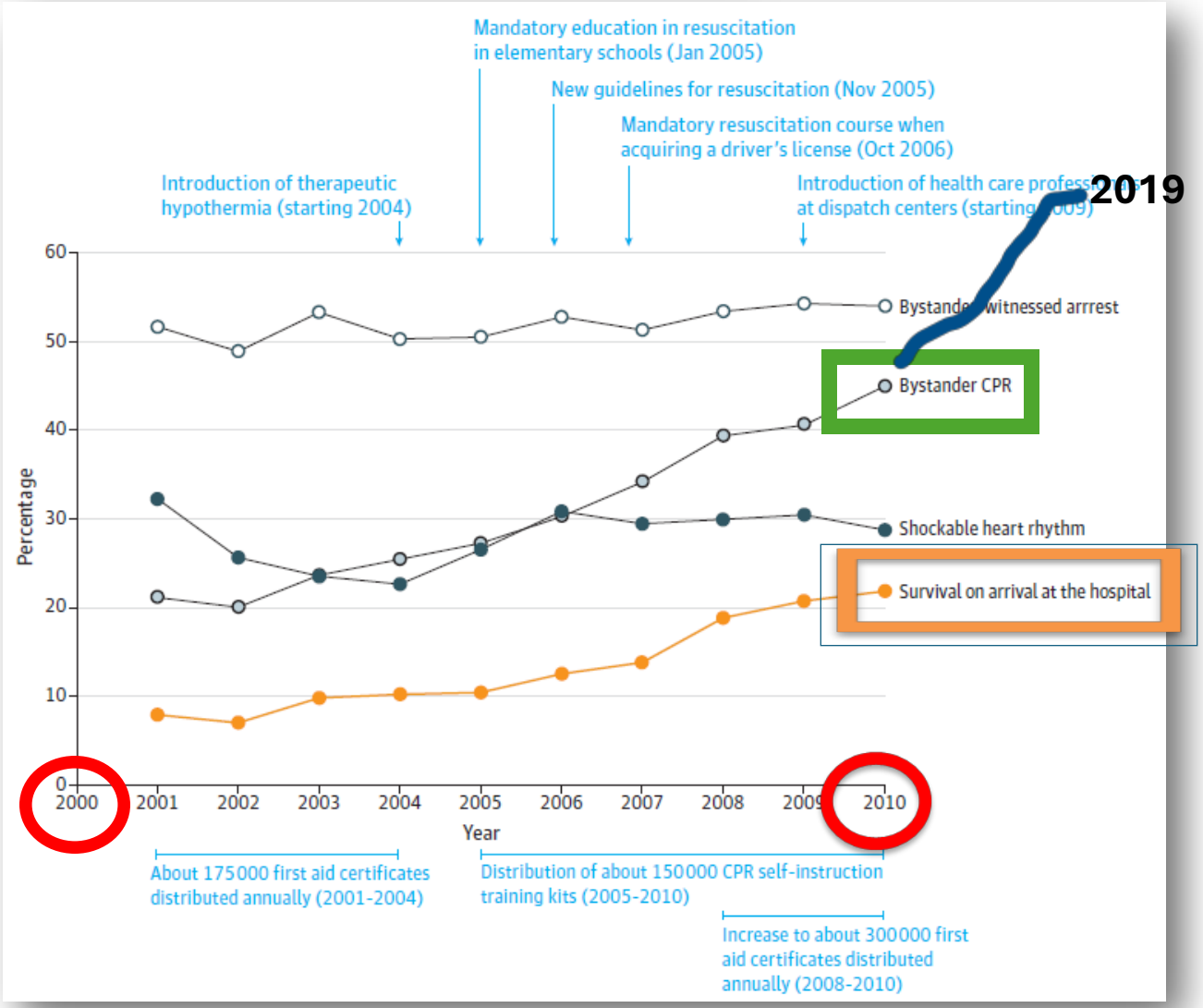
Denmark

5% more BLS **participants** = **14%** more **survivors**

CONCLUSIONS AND RELEVANCE In this cohort study of Danish BLS course participation and survival, a positive association was found between annual rate of mass education in BLS and 30-day survival from OHCA. The association of BLS course participation rate on 30-day survival was mediated by the bystander CPR rate; approximately 60% of the association of BLS course participation rate on 30-day survival was based on factors other than increased CPR rates.

Association of National Initiatives to Improve Cardiac Arrest Management With Rates of Bystander Intervention and Patient Survival After Out-of-Hospital Cardiac Arrest

JAMA. 2013;310(13):1377-1384.



European Resuscitation Council Guidelines 2021: Systems saving lives

RESUSCITATION 161 (2021) 80 –97

Federico Semeraro[a,], Robert Greif[b], Bernd W Böttiger[c], Roman Burkart[d], Diana Cimpoesu[e], Marios Georgiou[f], Joyce Yeung[g], Freddy Lippert[h], Andrew S Lockey[i], Theresa M. Olasveengen[j], Giuseppe Ristagno[k], Joachim Schlieber[l], Sebastian Schnaubelt[m], Andrea Scapigliati[n], Koenraad G Monsieurs[o]*

Community engagement

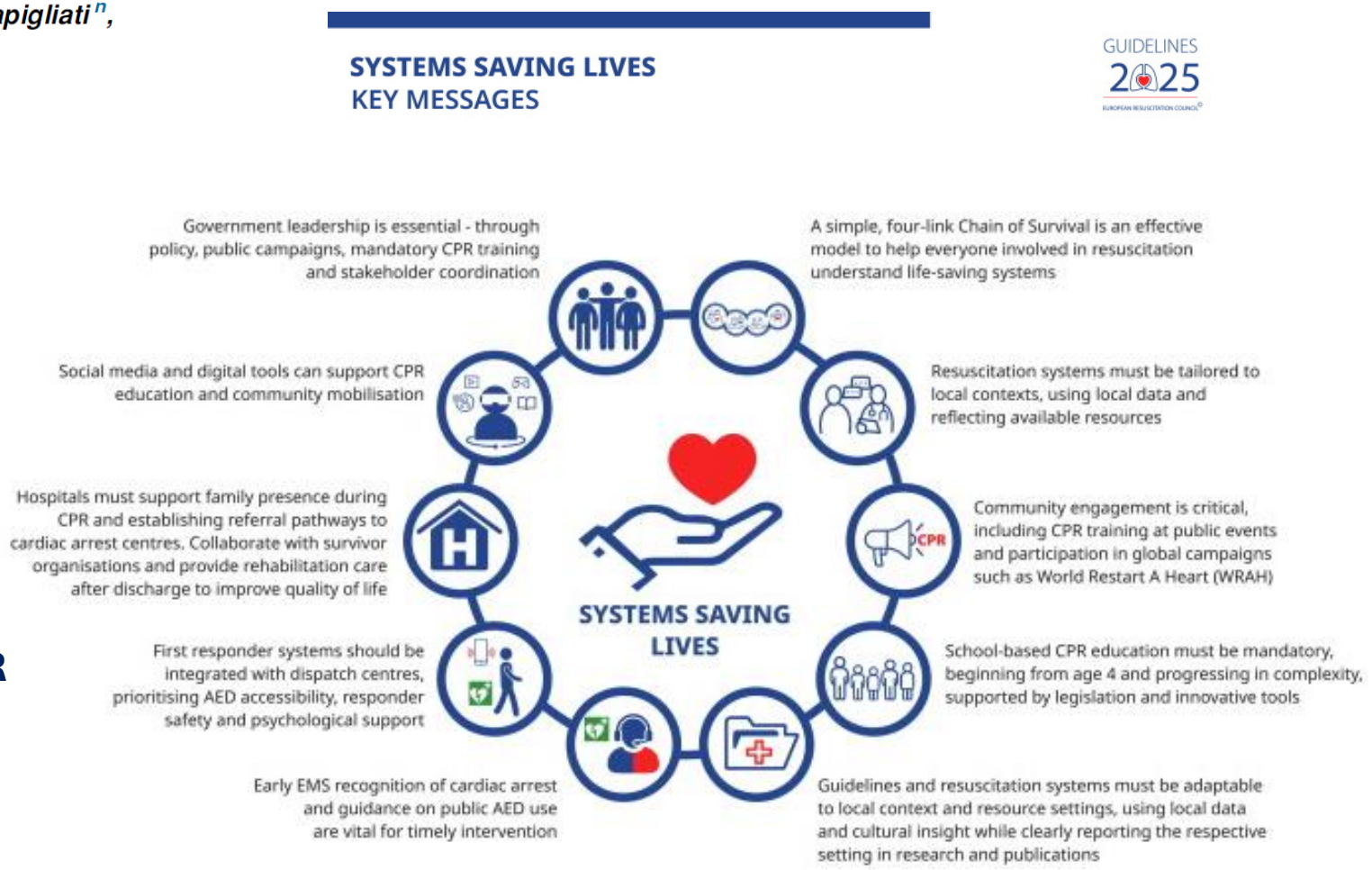
- Campaigns/**Awareness**
- Social **Media**
- **School-based Education**

Legislation and Policy

EMS recognition/Dispatch
First Responders Systems

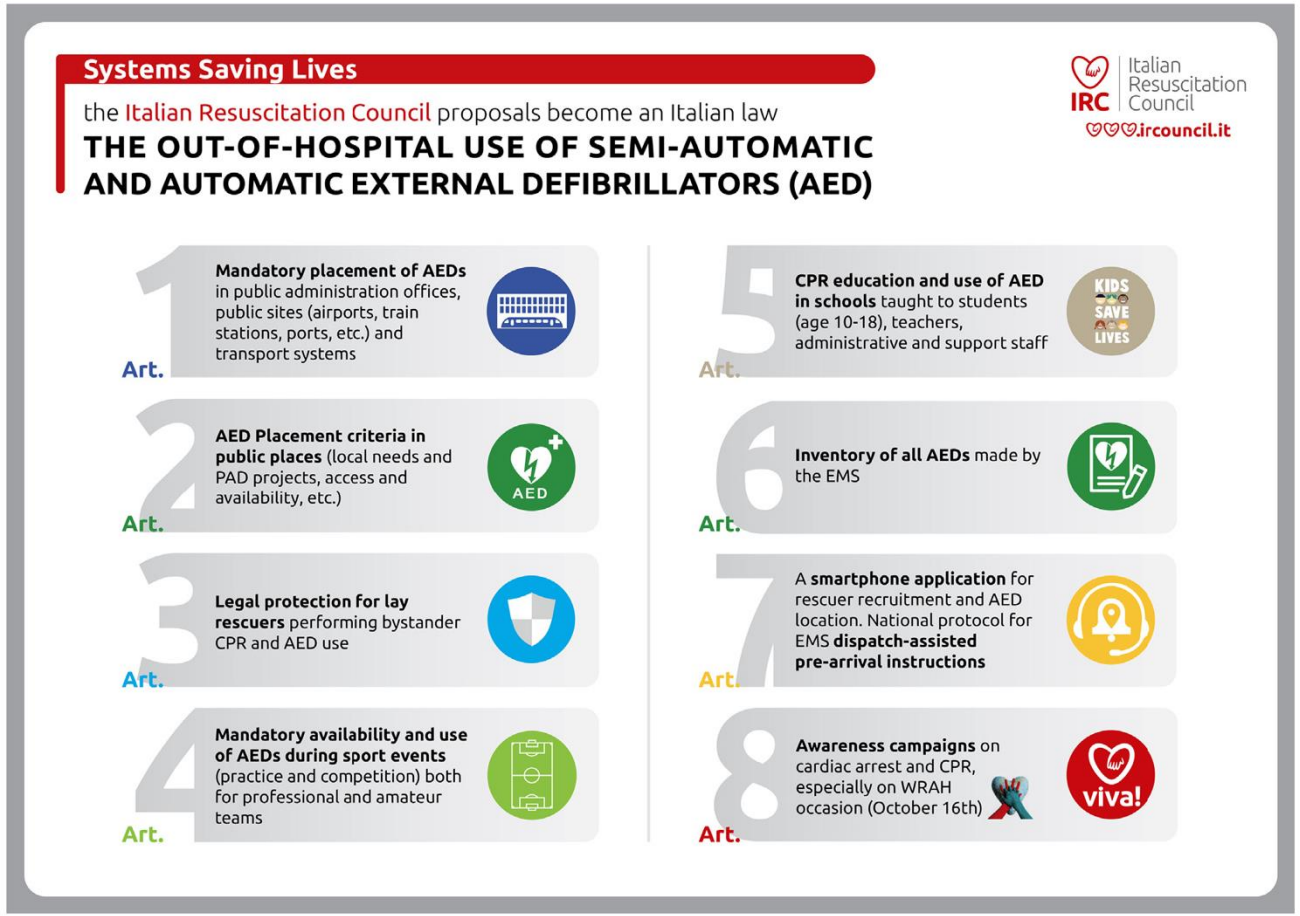
Cardiac Arrest Centres and IH-CPR
Survivors Rehab

Tailored to the local context



The new Italian law "A systems saving lives" the first European former application of ERC 2021 guidelines

Scapigliati A, Semeraro F, Di Marco S, Ristagno G; IRC Executive Committee. Resuscitation. 2021 Oct;167:47-48.



– Systems Saving Lives Italian Law.

RESUSCITATION PLUS 14 (2023) 100390

Available online at www.sciencedirect.com

Resuscitation Plus

journal homepage: www.elsevier.com/locate/resuscitation-plus

Review

A narrative review of European public awareness initiatives for cardiac arrest

Lina Horriar[a,*], *Nadine Rott*[a,b], *Federico Semeraro*[c,d], *Bernd W. Böttiger*[a,b]

In Italy, a law was passed in 2015 for mandatory resuscitation training for schoolchildren in primary and secondary schools nationwide. Furthermore, following the latest ERC guidelines, a "SSL Italian Law" was introduced, matching the new chapter SSL. With this Law, Italy takes a pioneering role in Europe and accelerates the implementation of the SSL concept in the community.[22]

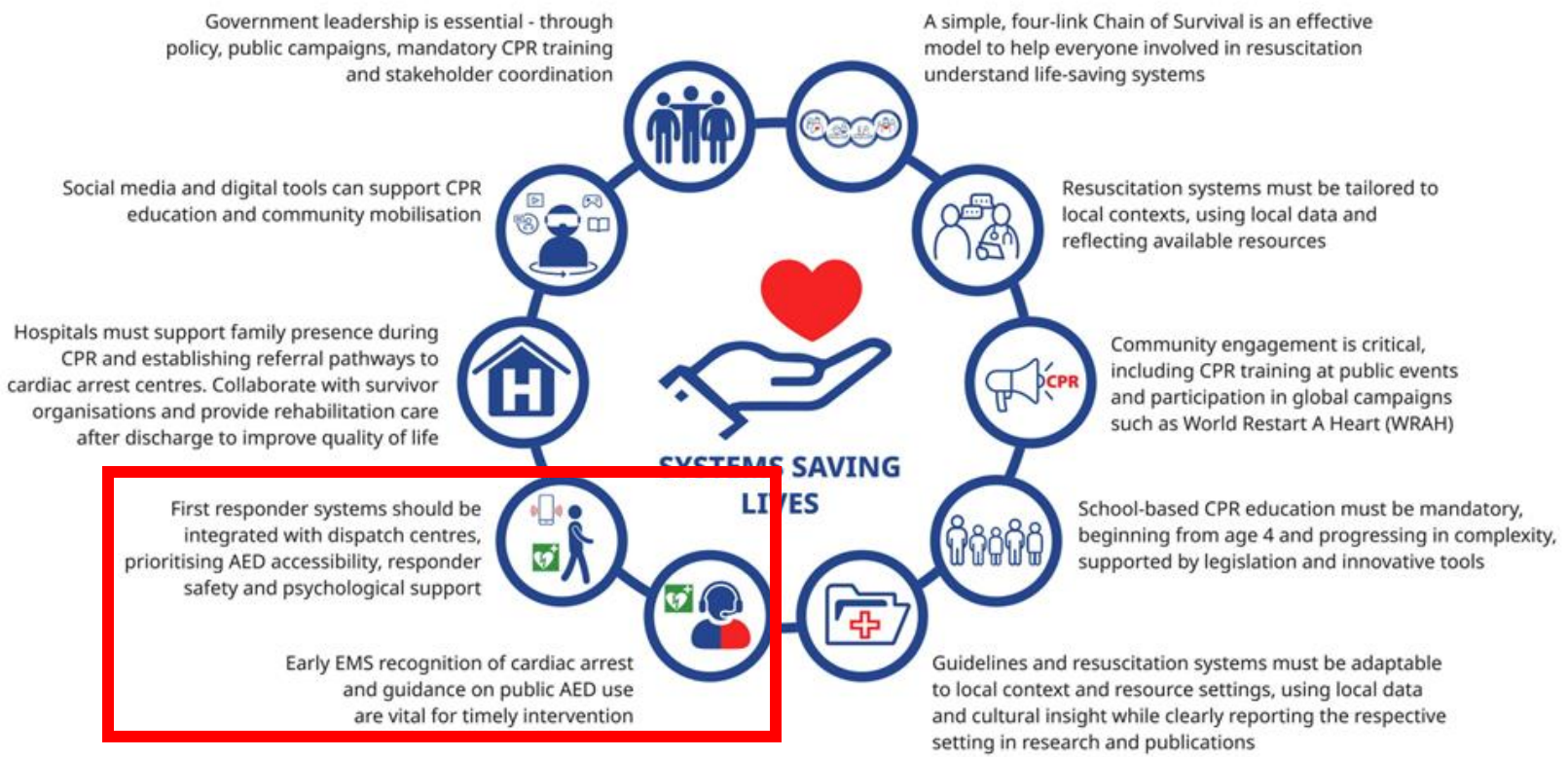
Activation systems

AEDs

Integration with EMS

(dispatch)

Safety and follow up



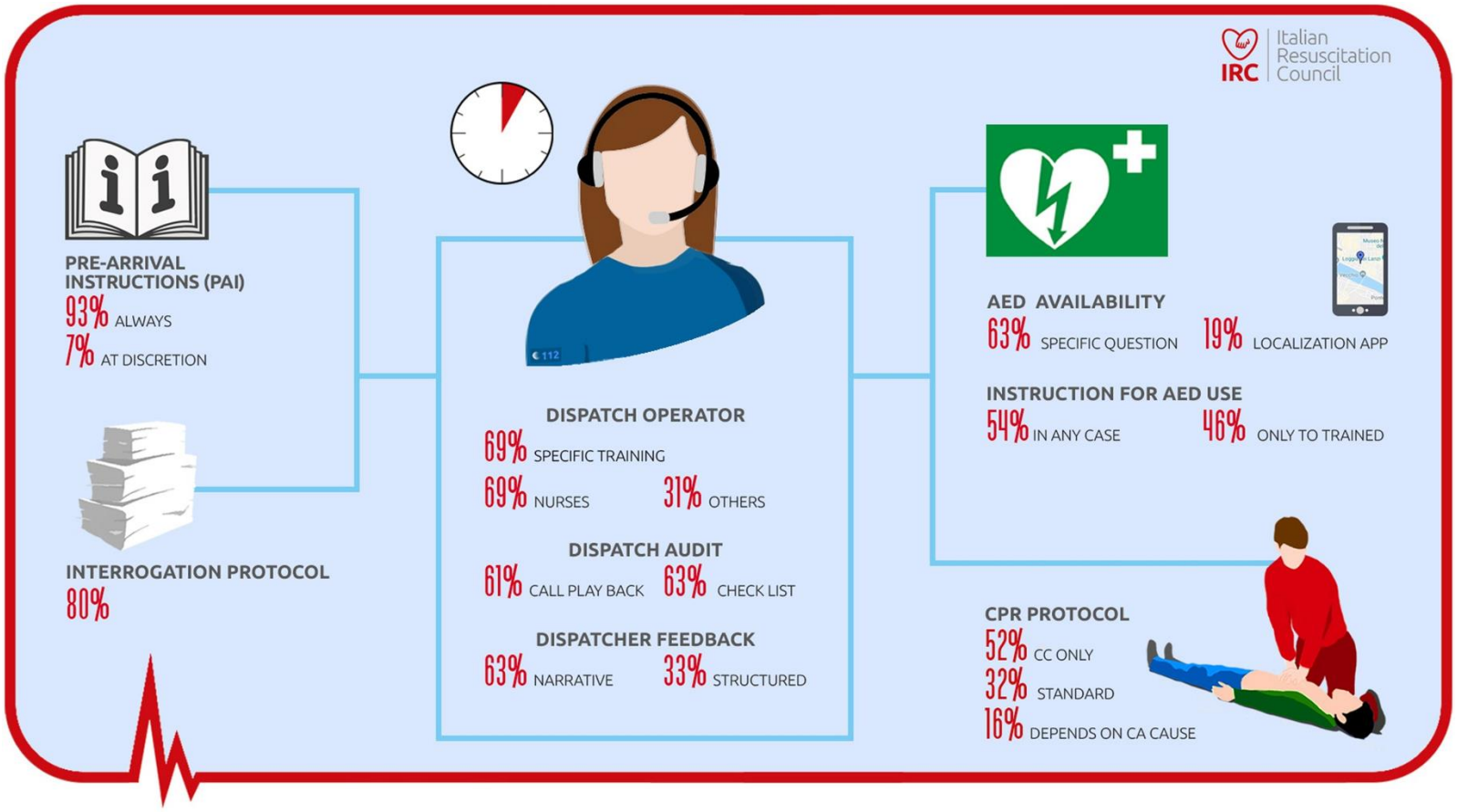
Preparedness for telephone dispatch-assisted cardiopulmonary resuscitation in Italy. A National survey

Di Marco S, Tucci R, Tonelli G, Frione G, Semeraro F, Ristagno G, **Scapigliati A.**

RESUSCITATION 149 (2020) 87 –88

Differences and Variability

*Our survey shows a **heterogeneous** and **suboptimal** picture for PAI and DA-CPR preparedness in Italy.*



Available online at www.sciencedirect.com

Resuscitation Plus

journal homepage: www.elsevier.com/locate/resuscitation-plus

Review

Optimising telecommunicator recognition of out-of-hospital cardiac arrest: A scoping review

Grabmayr AJ. et al.

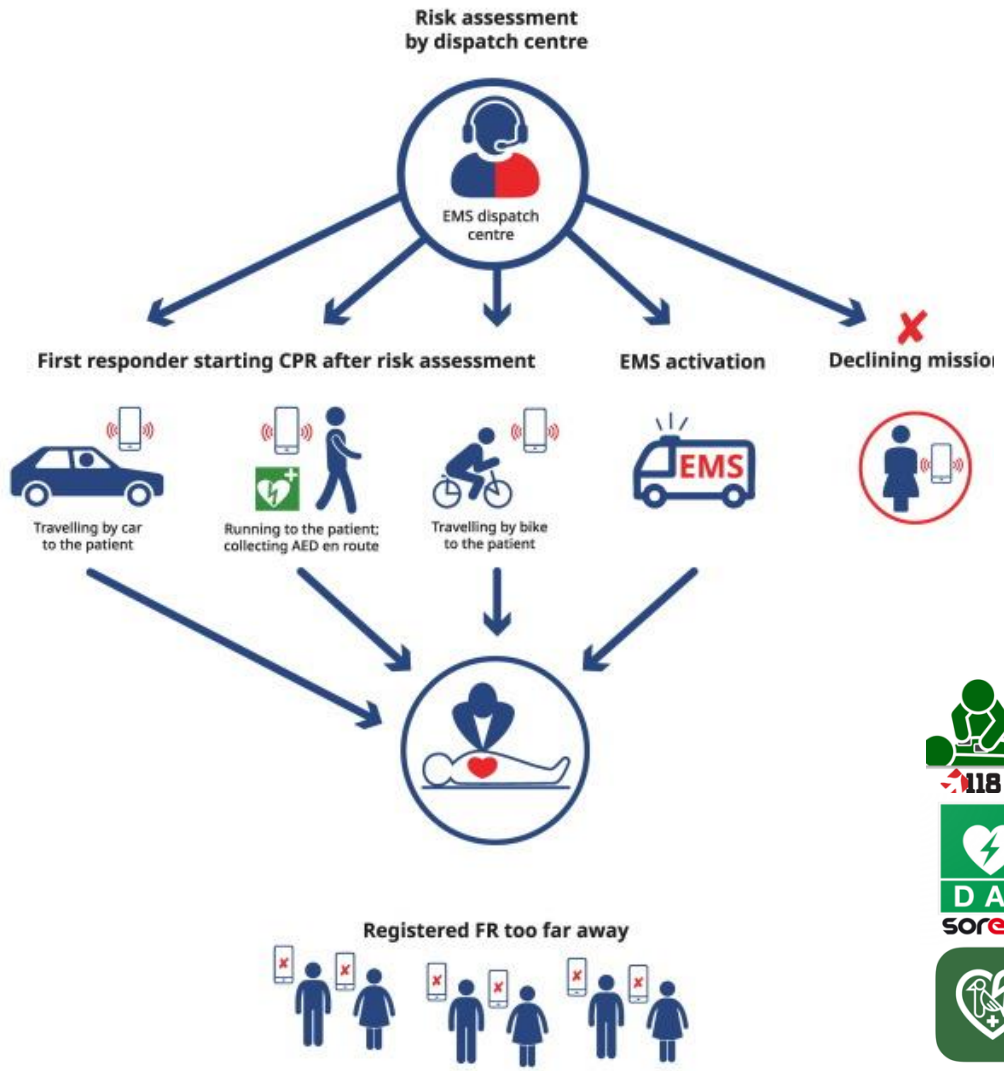
62 studies

Most frequent **barriers to OHCA recognition**:

- **Breathing status**
- **Agonal breathing**
- Caller's **emotional** status
- **Seizures**
- Non-systematic **dispatch protocol**
- **Language**
- Lack of situation awareness

Categories	Subcategories
Factors related to dispatcher-assisted recognition	
Communication between caller and dispatcher (n=16)	1. Caller's emotional state 2. Caller's proximity to OHCA patient 3. Effects of dispatcher behavior and communication with caller 4. Caller's status (health care professional compared with non–health care professional) 5. Effects of language barriers 6. Linguistic format of qualified breathing questions 7. Influence of callers chief complaint and use of trigger words
Symptoms and patient characteristics (n=19)	8. Agonal breathing 9. Patient status 10. Seizures 11. Patient demographics
Interventions to improve dispatcher-assisted recognition	
New technology to improve dispatcher recognition of OHCA (n=7)	12. CCTV 13. Machine learning 14. Smart devices to detect agonal breathing
Quality improvement/implementation of new protocols to improve dispatcher recognition (n=26)	15. MPDS 16. Criterion-based dispatch 17. Breathing 18. Other quality improvement

First Responder Systems



Regione / Stato	Nome App	Allerta First Responder (via 118)	Mappa DAE	Note
Emilia-Romagna	DAE RespondER	✔	✔	App storica, integrata in tutte le Centrali 118 ER.
Friuli-Venezia Giulia	DAE FVG	✔	✔	Gestita da SORES FVG, app ufficiale regionale.
Marche	DAE Marche	✔	✔	Lanciata nel 2025, già centinaia di First Responder attivi.
San Marino	DAE Responder RSM	✔	✔	Collegata al 118 sammarinese, replica modello Emilia-Romagna.

First responder activation systems (Italy)

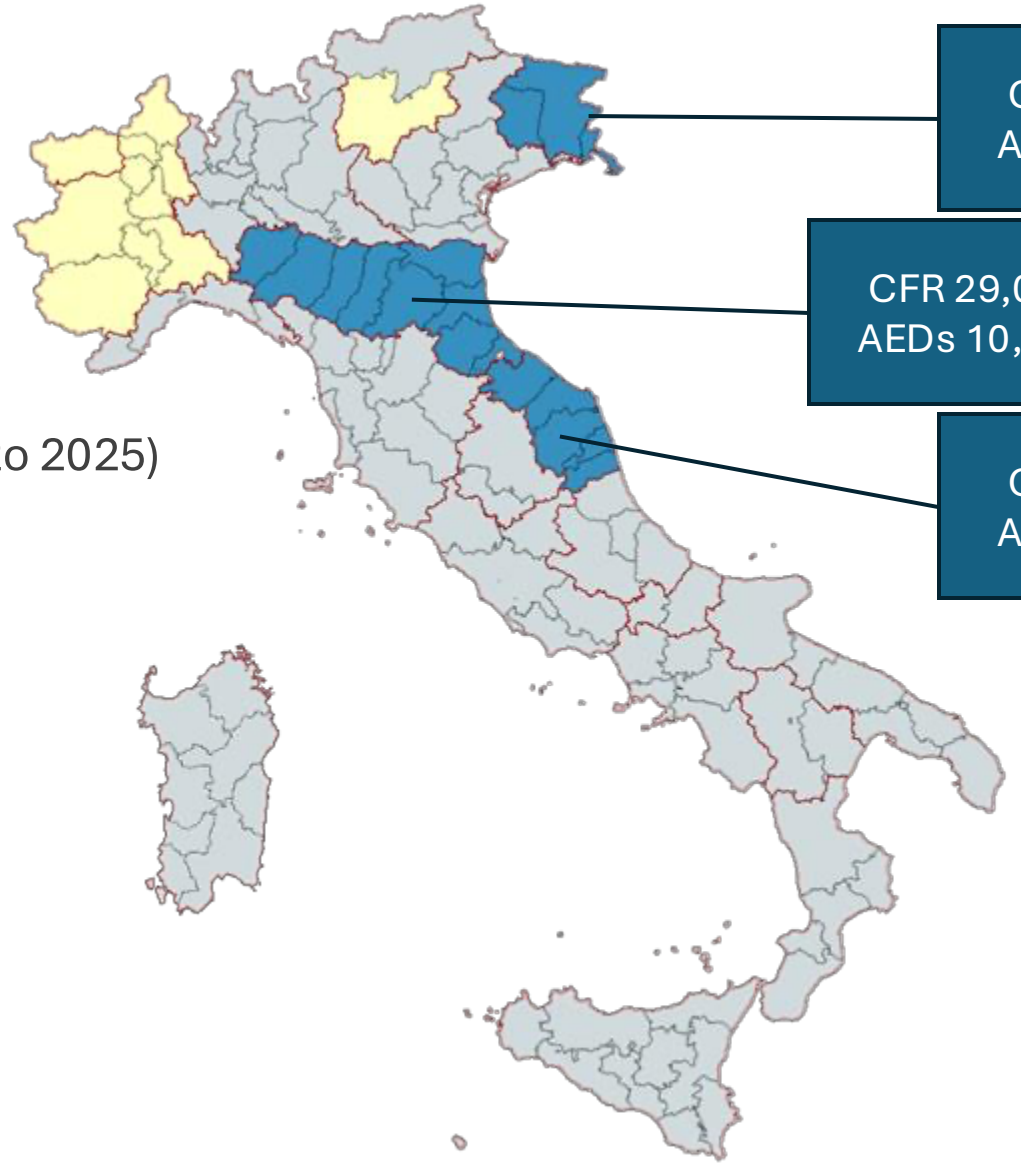
Italy

Emilia-Romagna (2017)

Friuli-Venezia-Giulia (marzo 2025)

Marche (Aprile 2025)

In giallo: work in progress



CFR 2,941
AEDs 2,424

0.2%
0.31
AED/KM²

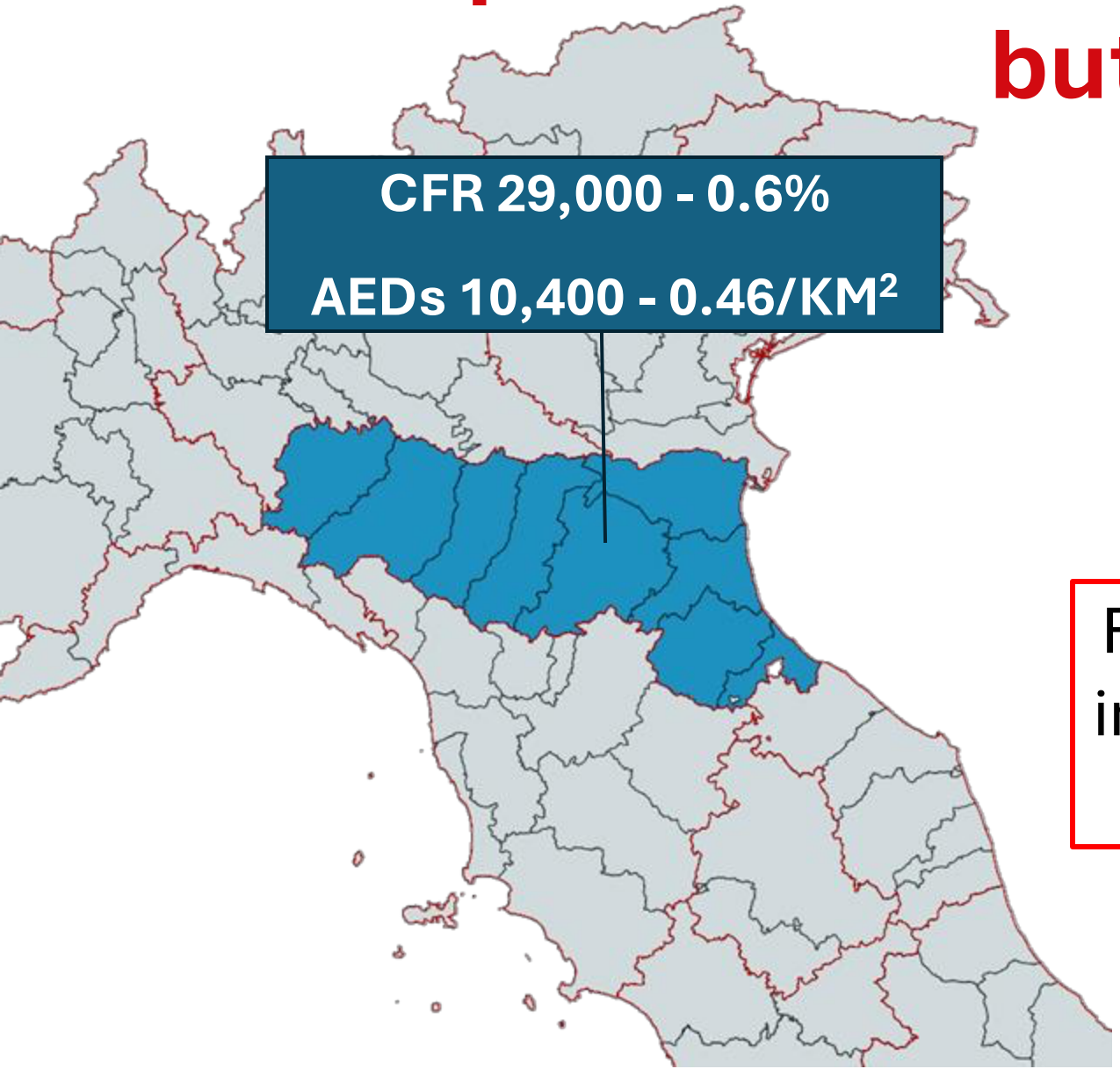
CFR 29,000
AEDs 10,400

0.6%
0.46
AED/KM²

CFR 2,898
AEDs 2,422

0.2%
0.26
AED/KM²

First responder activation systems (Italy, yes but...)



RESUSCITATION 185 (2023) 109746

Available online at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

EUROPEAN RESUSCITATION COUNCIL

ELSEVIER

Clinical paper

Factors associated with the arrival of smartphone-activated first responders before the emergency medical services in Out-of-Hospital cardiac arrest dispatch

First Responders arrived before EMS in 13.4% of dispatches and delivered a shock in 0.9%


2%

First responder activation systems and AEDs

FR systems should be integrated with AED registries and provide directions to nearby

RESUSCITATION 207 (2025) 110514

Available online at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

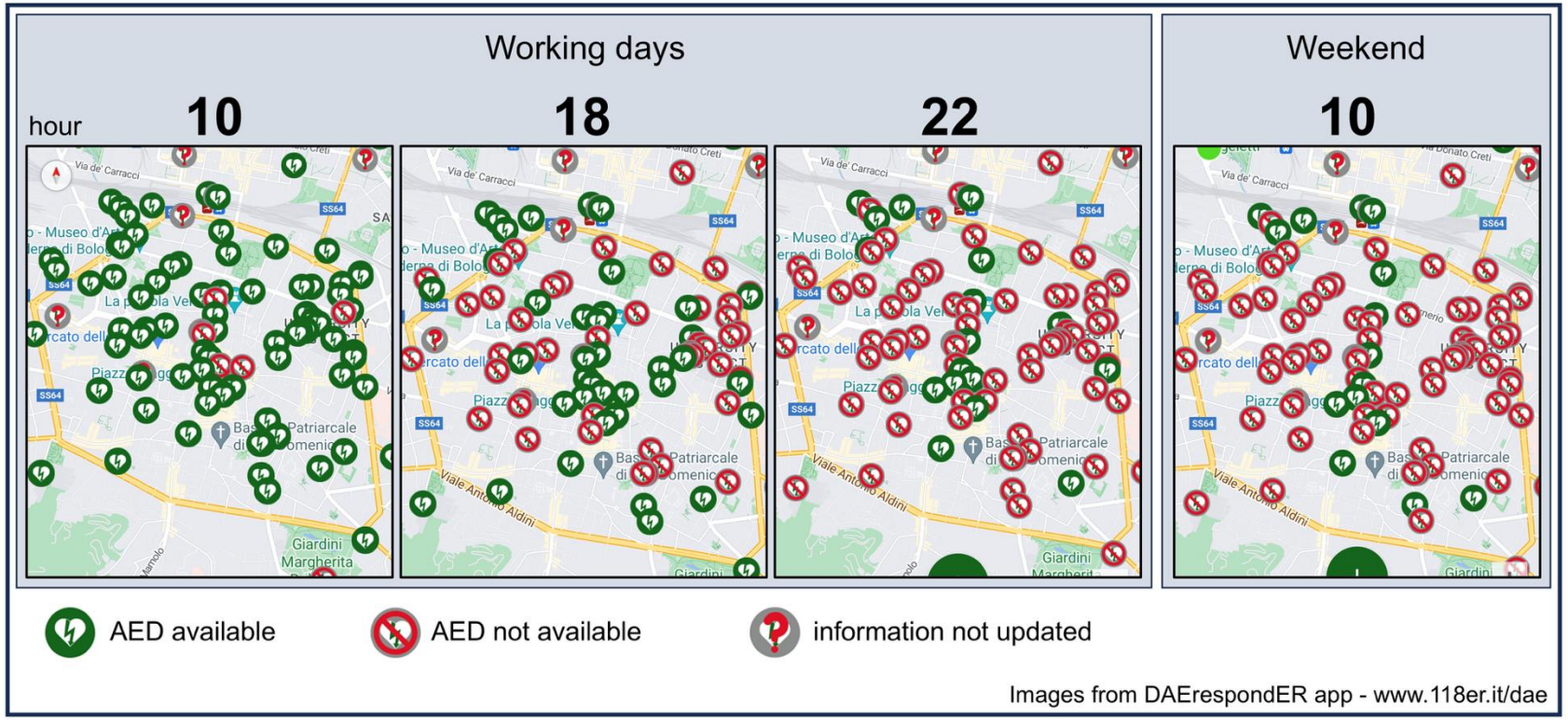
EUROPEAN RESUSCITATION COUNCIL

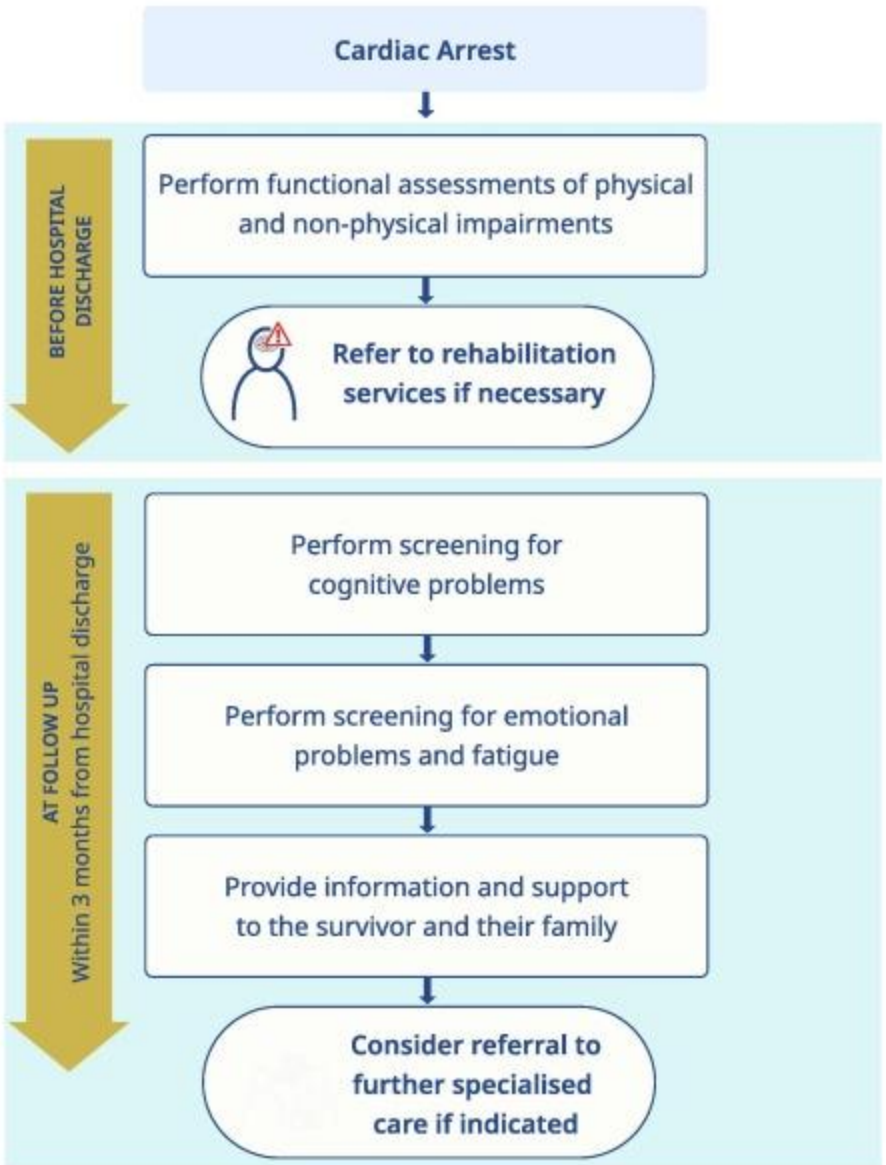
ELSEVIER

Letter to the Editor

Get that AED out! The circadian dilemma of public access defibrillation

#escilo





After dimission:

- 70% *fatigue,*
- 50% *cognitive* impairment,
- 40% *physical* limitations,
- 30% *emotional* disturbances.

Affecting **survivors** and **cosurvivors** (partner, relatives, friends, rescuers).

Support both the **identification** of needs and the **provision** of care.

Adopt a **multidisciplinary** approach.

Thank you