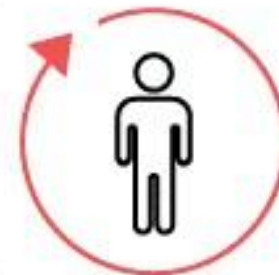


Optimized Chain of Survival

優化生命之鏈



**Recognize Cardiac
Arrest & Activate
Emergency Response**

Initiate CPR

**Rapid
Defibrillation**

**Advanced
Resuscitation**

**Post-Cardiac
Arrest Care**

Recovery

Department of Emergency Medicine, Taipei Veterans General Hospital

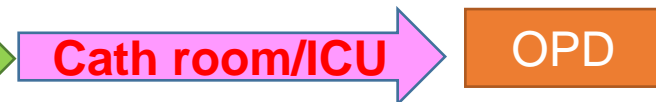
Faculty of Medicine, National Yang-Ming University

EMS Medical Director, Fire Department of Taipei City

Ying-Ju, Chen MD PHD

Chain of Survival

- Out-of-Hospital Cardiac Arrest (OHCA) is a common public health concern that affects approximately 360 000 patients per year in US
- ➔ Survival after OHCA varied between US regions (4.2%–19.8%)
- ➔ only 3% to 7% recovering to their precardiac arrest functional status
- ➔ Low survival rate
- ➔ Survival is disparate with 15 fold differences

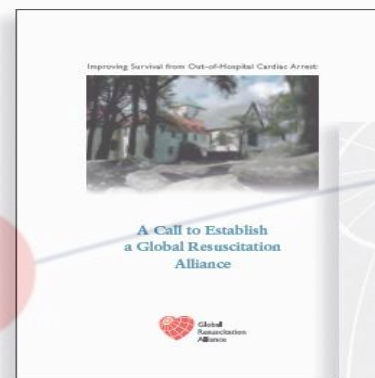




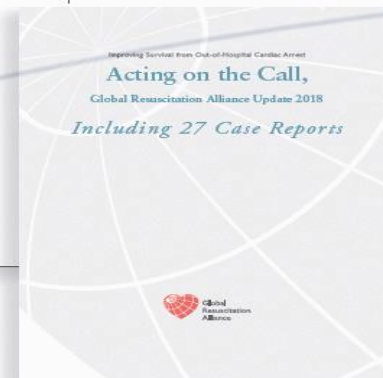
Global
Resuscitation
Alliance

GRA 於2017年5月20日至21日
在哥本哈根舉行的EMS2017大會上，更新原始方案

03



Call to Action 2016



Acting on the Call 2018

02

GRA 於2016 年5月28日至29日
在哥本哈根 EMS2016 大會正式啟動並制定具體方案

01

2015 年6月6日至7日
在挪威烏德斯坦 (Utstein) 修道院舉行的一個會議上，首次提出成立全球復甦聯盟(Global Resuscitation Alliance, GRA)

全球復甦聯盟GRA的信念

- 社區可以而且必須做得更好。
- 通過遵守和實施最佳的做法，社區可以將心跳停止的存活率提高50%。
- 全球復甦聯盟將幫助EMS 領導者了解最佳實踐，並在他們社區提供有助於提高存活率的工具。

The EMS system

If you've seen one EMS system, you've seen one EMS system.

Ten Programs to Improve Cardiac Arrest Survival

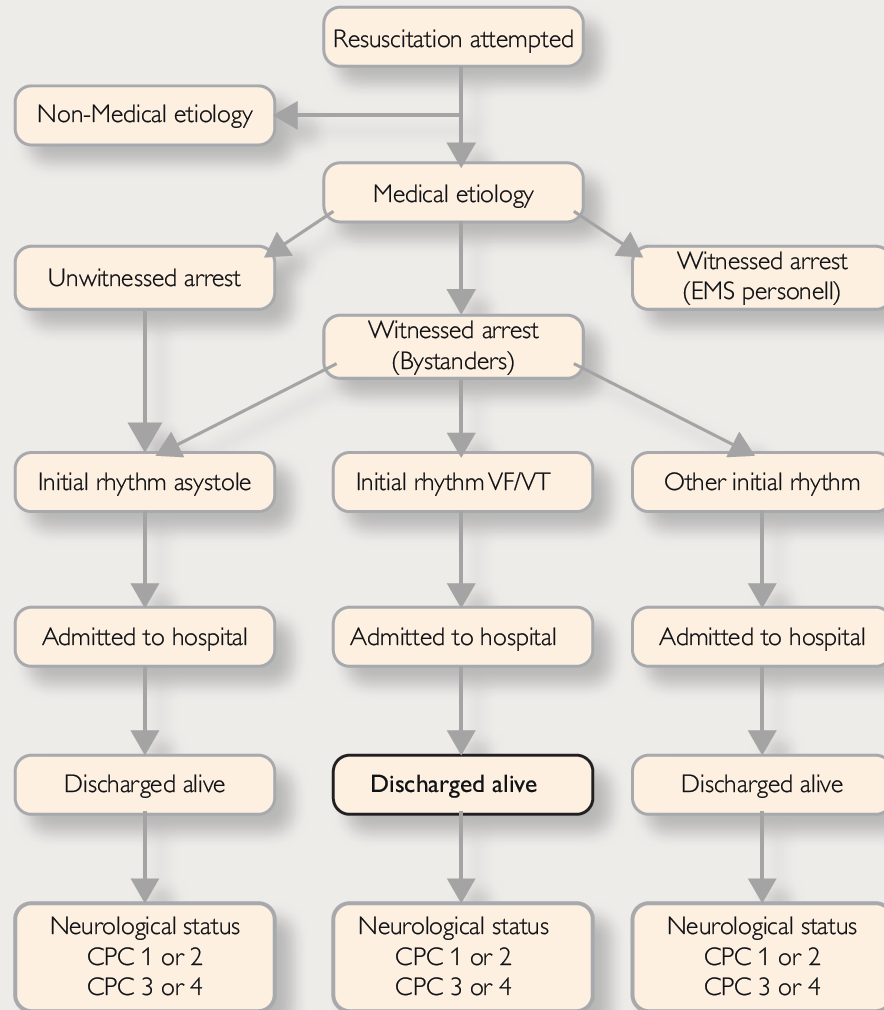
1. Establish a cardiac arrest registry
2. Begin Telephone-CPR with ongoing training and QI
3. Begin high-performance EMS CPR with ongoing training and QI
4. Begin rapid dispatch
5. Measure professional resuscitation using the defibrillator recording (and voice if possible)
6. Begin an AED program for first responders, including police officers, guards, and other security personnel.
7. Use smart technologies to extend CPR and public access defibrillation programs to notify volunteer bystanders who can respond to nearby arrest to provide early CPR and defibrillation
8. Make CPR and AED training mandatory in schools and the community
9. Work toward accountability – submit annual reports to the community
10. Work toward a culture of excellence



- Cardiac arrest registry
- Telecommunicator CPR
- High-performance CPR
- Rapid dispatch

Lower Hanging Fruit

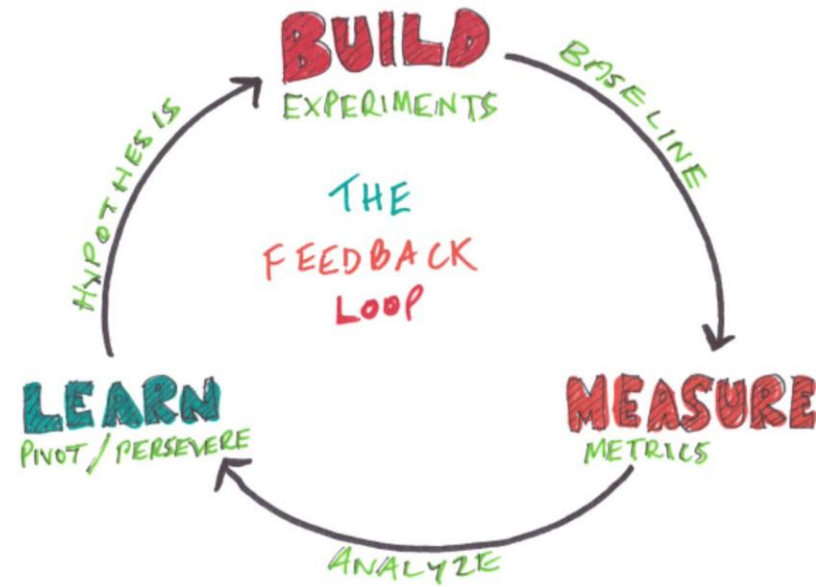
Simplified Utstein Survival Report



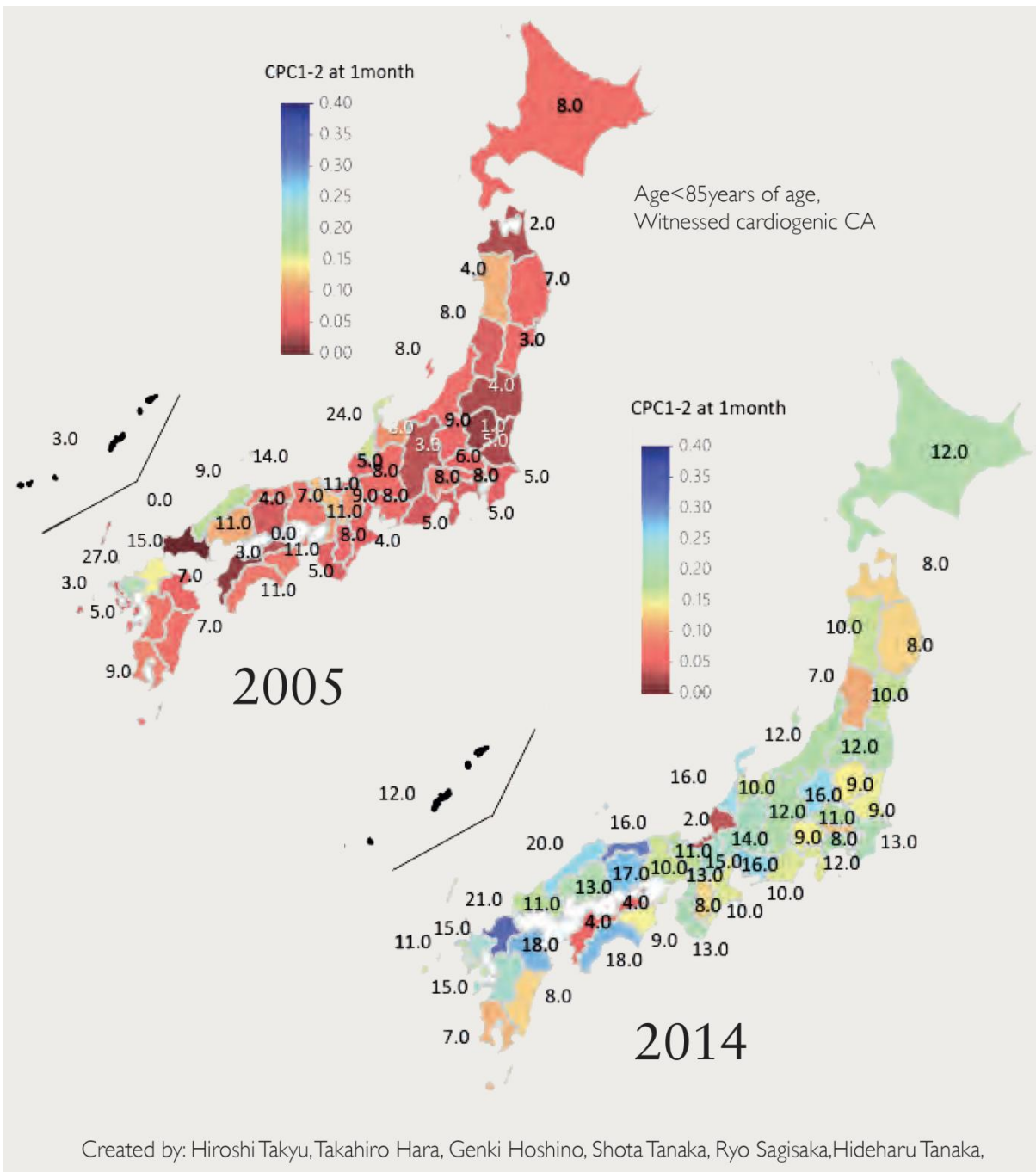
“A registry measures more than whether the patient lives or dies, but all aspects related to the care.”

1. Cardiac Arrest Registry

- Basis for all improvement
- Requires core resources
- Feedback to providers
- Benefit of Hawthorne effect
- Must involve hospitals



1. Cardiac Arrest Registry



- In Japan, a national Utstein based registry for all OHCA was established in 2005.
- Around 130,000 cases have been registered every year, totaling over 1.3 million cases by end of 2017.
- The survival rate of witnessed cardiogenic cardiac arrest improved from 3.3% in 2005 → 7.2% in 2014.



- 2008 規劃設計
- 2010.06 上線
- 台北，(新北)，台南，桃園，台中，高雄

Table 1. Outcome before and after e-Registry

<i>Shockable</i>			
	After(N=177)	Before(N=583)	P
2hr ROSC	43.1%	40.0%	0.23
Discharge	24.1%	19.4%	0.10
fCPC	15.4%	5.9%	<0.001
<i>Non-shockable</i>			
	After(N=1329)	Before(N=4953)	P
2hr ROSC	29.6%	25.4%	0.001
Discharge	5.0%	3.9%	0.04
fCPC	1.0%	0.3%	0.001

2019/07/12 18:54:37

國BC東亞新聞

直接幫她做CPR

台北

七旬婦嘴唇發紫命危!消防"視訊"

*"Every call is a cardiac arrest
until proven otherwise."*

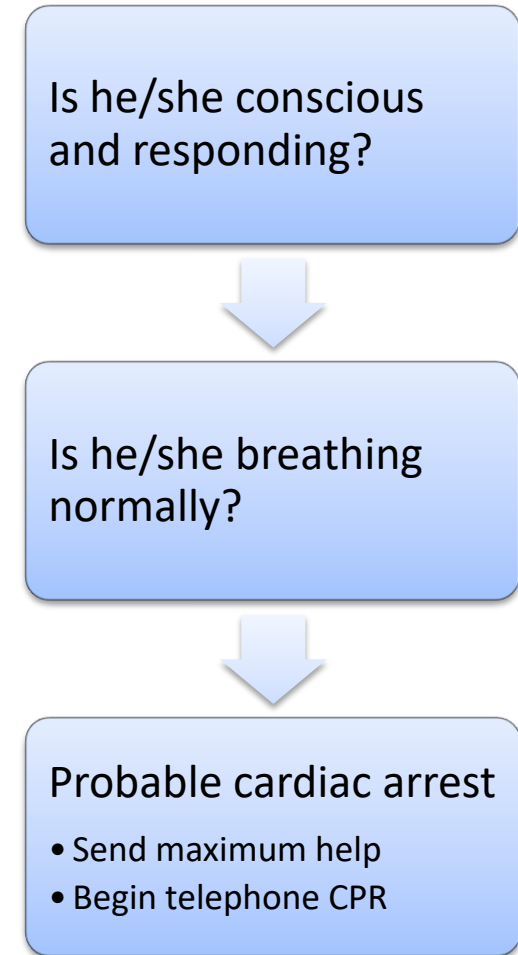
除非另有證據，否則每通報
案電話都是OHCA。

2. Dispatcher Assisted CPR

1. Commitment to T-CPR
2. Train and Provide Continuing Education in T-CPR for all Telecommunicators
3. Conduct Ongoing Quality Improvement (QI) for all Calls in which a Cardiac Arrest is Confirmed by EMS Personnel and in which Resuscitation is Attempted
4. Connection to EMS Agency
5. Designated Medical Director
6. Recognition for Outstanding Performance

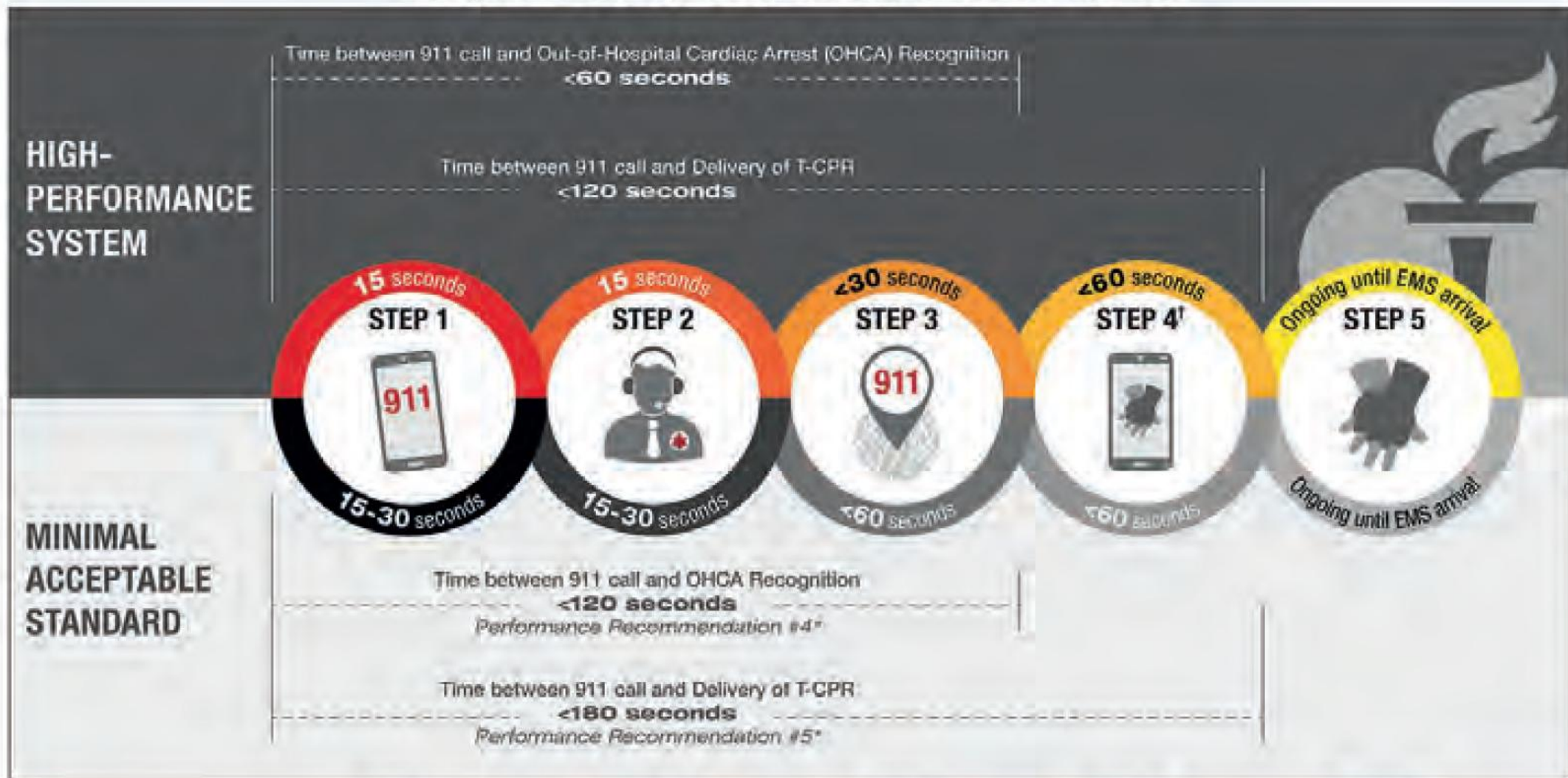
2. Dispatcher Assisted CPR

- All Caller Interview
- Performance standards
- Quality feedback is essential
 - % recognition of cardiac arrest
 - % delivering instructions
 - Time to CA recognition
 - Time to first compression



2. Dispatcher Assisted CPR

Telephone CPR (T-CPR) Time Interval Standards



STEP 1

911 call connects to Primary Public Safety Answering Point (PSAP)

STEP 2

Primary PSAP connects to Emergency Medical Dispatch (EMD) PSAP

STEP 3

Address acquisition

STEP 4

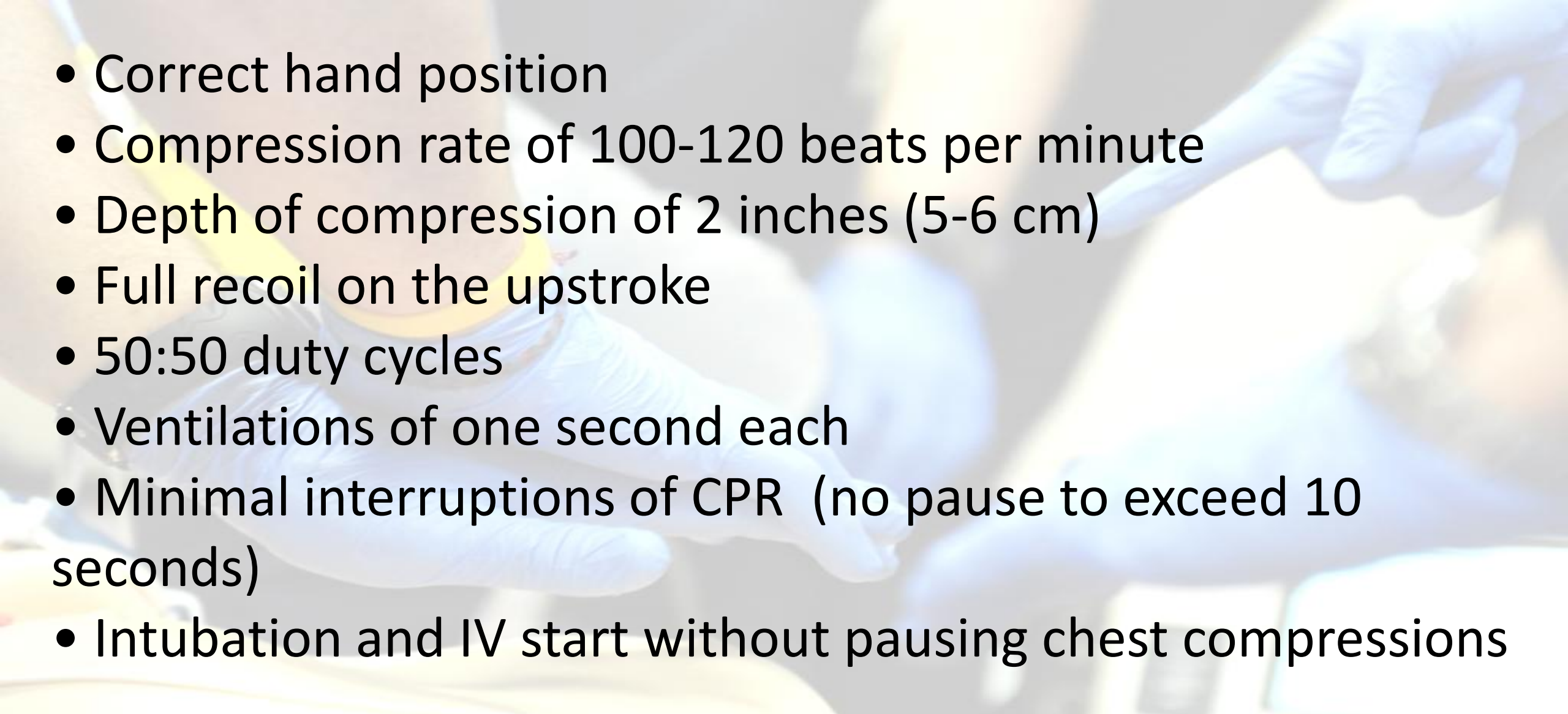
Recognition of OHCA
1. Call taker verbally recognizes OHCA
2. Instructions started for T-CPR

STEP 5

Delivery of first T-CPR compression and continued T-CPR support

	AHA 高標	AHA 及格	消防署	台北 2018	台北 2017	台北 2012
派車	< 30秒	< 60秒	< 60秒	35秒	38秒	n/a
辨識	< 60秒	< 120秒	< 60秒	45秒	49秒	n/a
成功率(註)	95%	n/a	80%	76.1%	68.5%	60.8%
壓胸	< 120秒	< 180秒	< 180秒	176秒	161秒	n/a
成功率(註)	75%	n/a	60%	73.9%	70.8%	58.6%

2. Dispatcher Assisted CPR

- 
- Correct hand position
 - Compression rate of 100-120 beats per minute
 - Depth of compression of 2 inches (5-6 cm)
 - Full recoil on the upstroke
 - 50:50 duty cycles
 - Ventilations of one second each
 - Minimal interruptions of CPR (no pause to exceed 10 seconds)
 - Intubation and IV start without pausing chest compressions

3. High Performance CPR

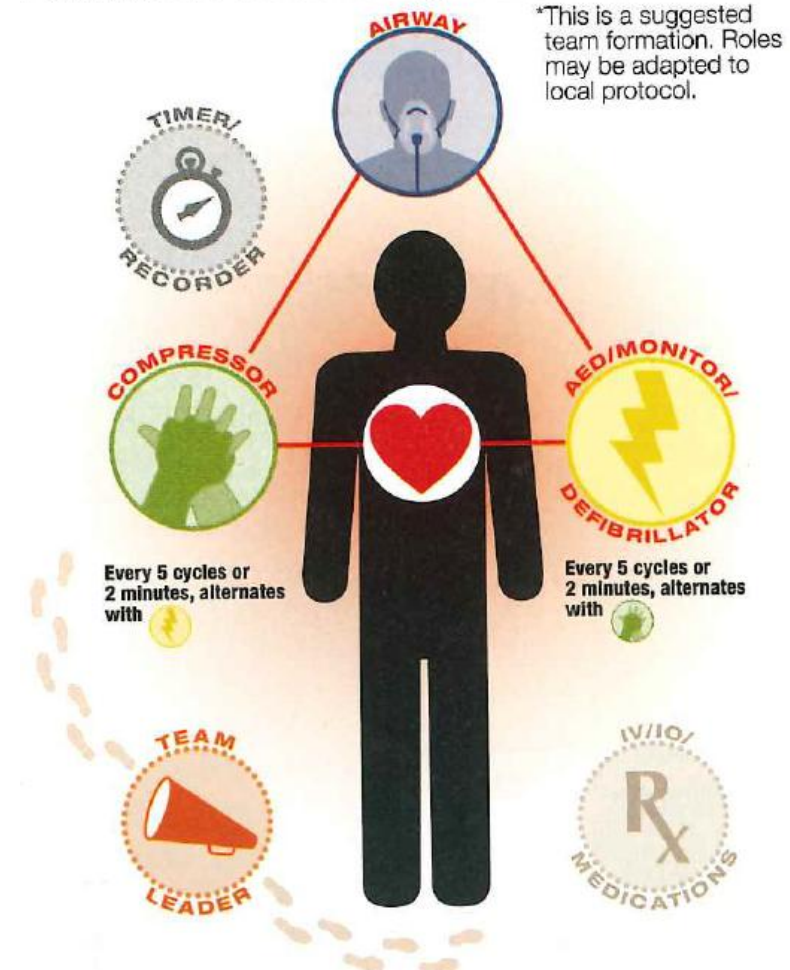
Performance Goals:

- Chest compressions given >90% of the available time
- Rate 100-120 compressions per minute
- Depth (if measurable) 5 cm
- Full recoil on the upstroke
- Pre-charging defibrillator prior to rhythm assessment
- CPR immediate after shock
- No pause in CPR greater than 10 seconds
- Intubation and IV start without stopping CPR
- “Practice like you play” to performance standards

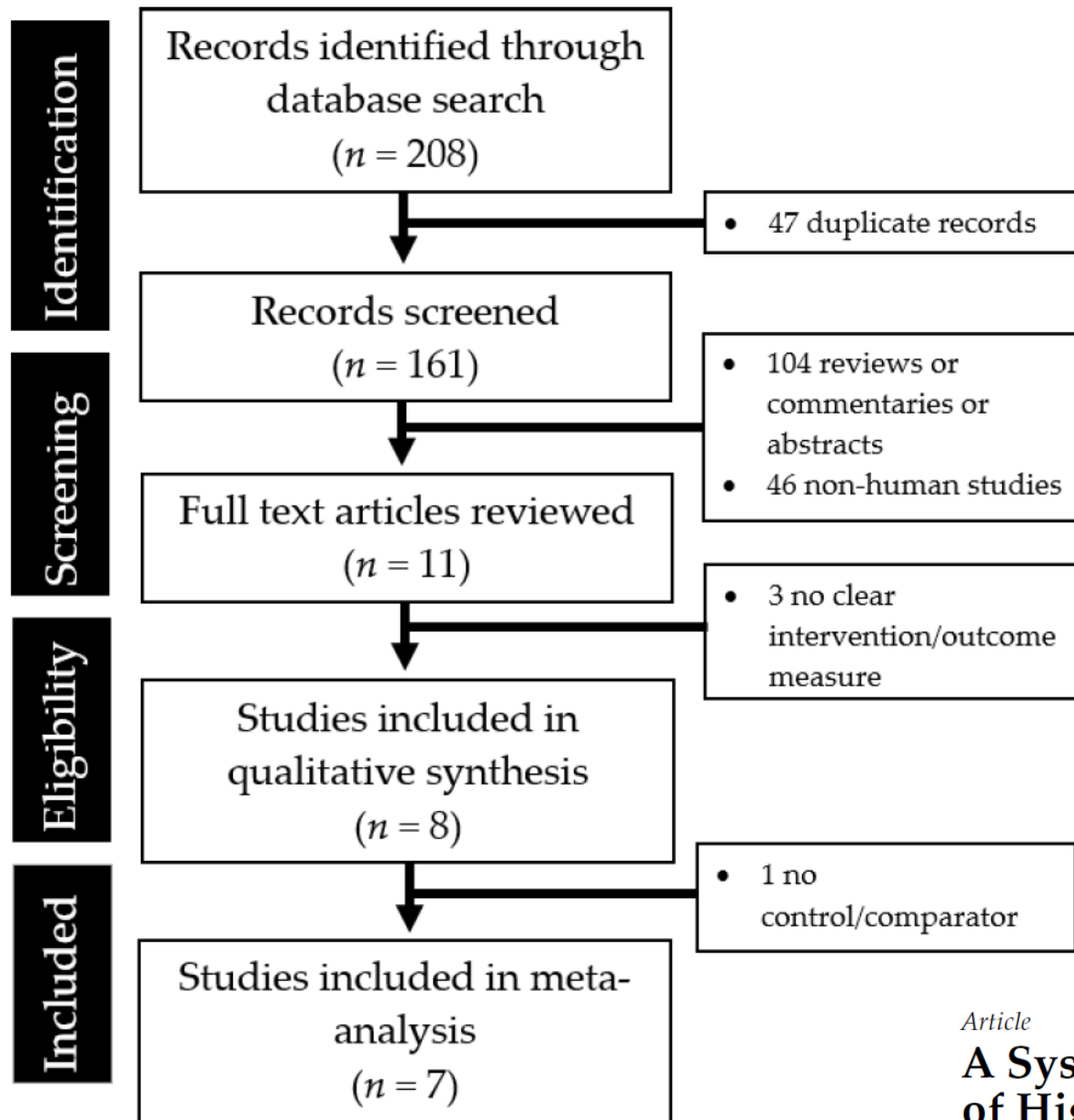




Positions for 6-Person High-Performance Teams*




3. High Performance CPR-pit crew



Article

A Systematic Review and Meta-Analysis of the Implementation of High-Performance Cardiopulmonary Resuscitation on Out-of-Hospital Cardiac Arrest Outcomes

Qin Xiang Ng ^{*}, Ming Xuan Han, Yu Liang Lim and Shalini Arulanandam

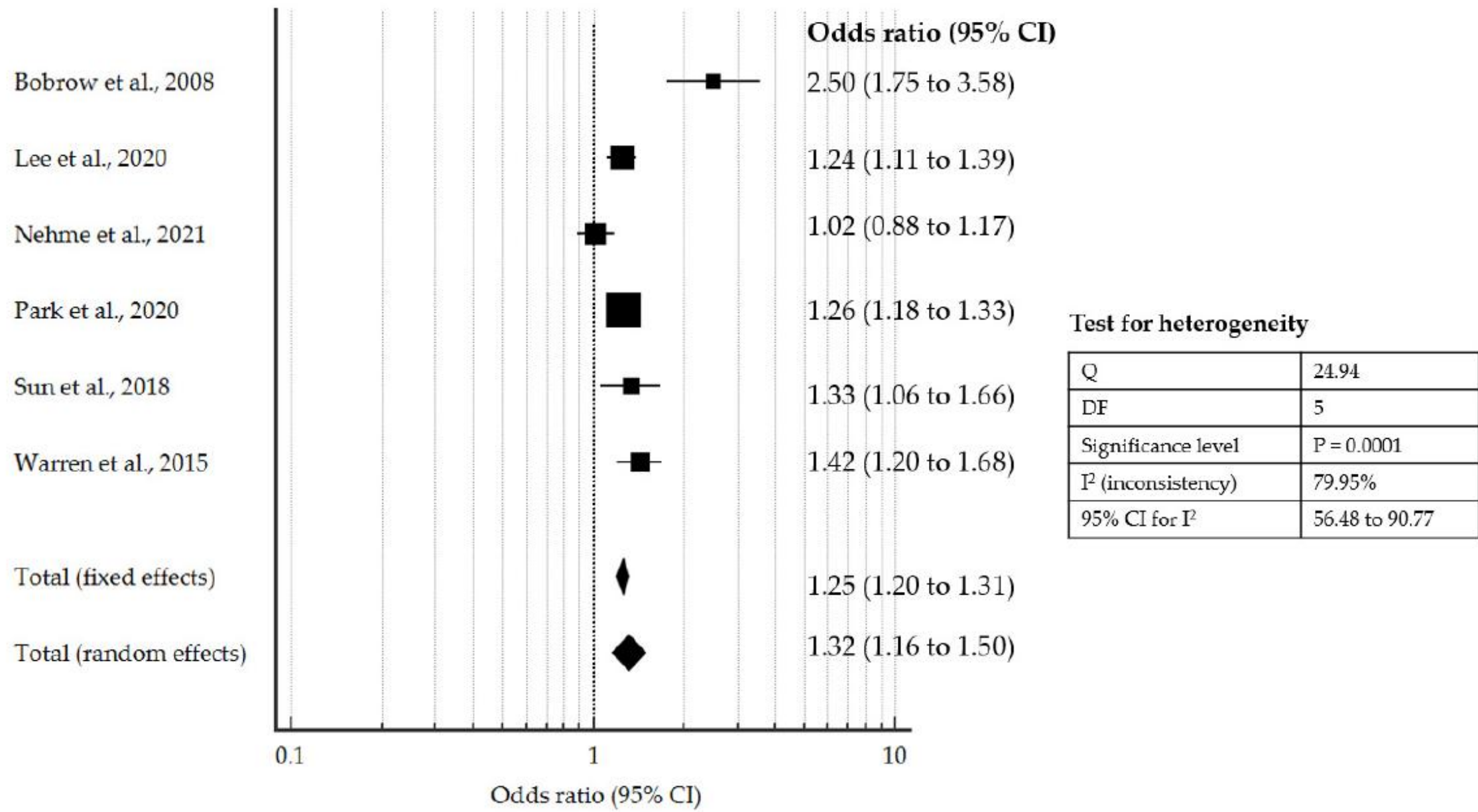


Figure 2. Forest plot showing pooled OR for survival-to-discharge with HP CPR or similar intervention compared to controls [12,14,16,20–22].

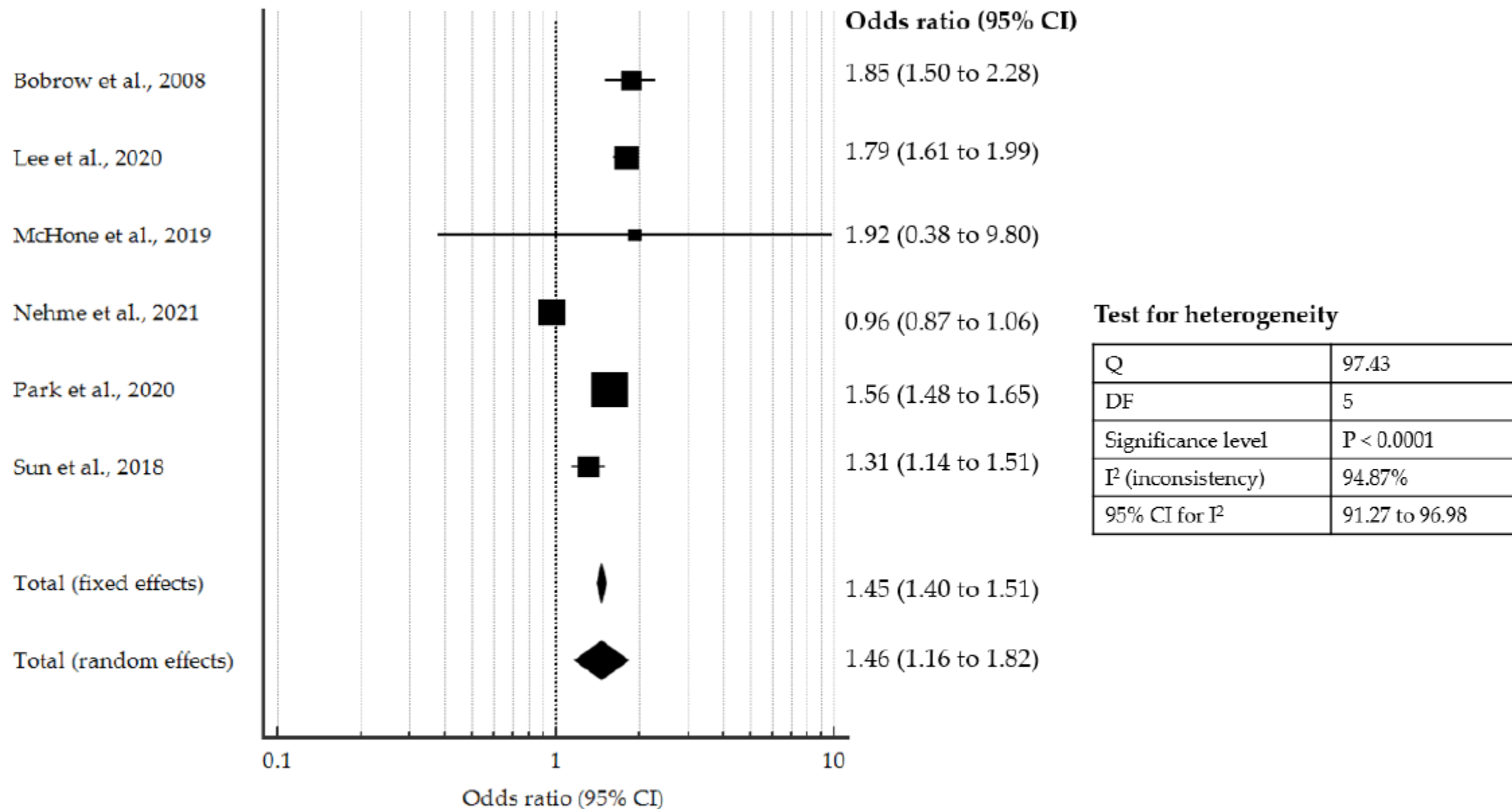


Figure 3. Forest plot showing pooled OR for any ROSC with HP CPR or similar intervention compared to controls [12,14–16,20,21].

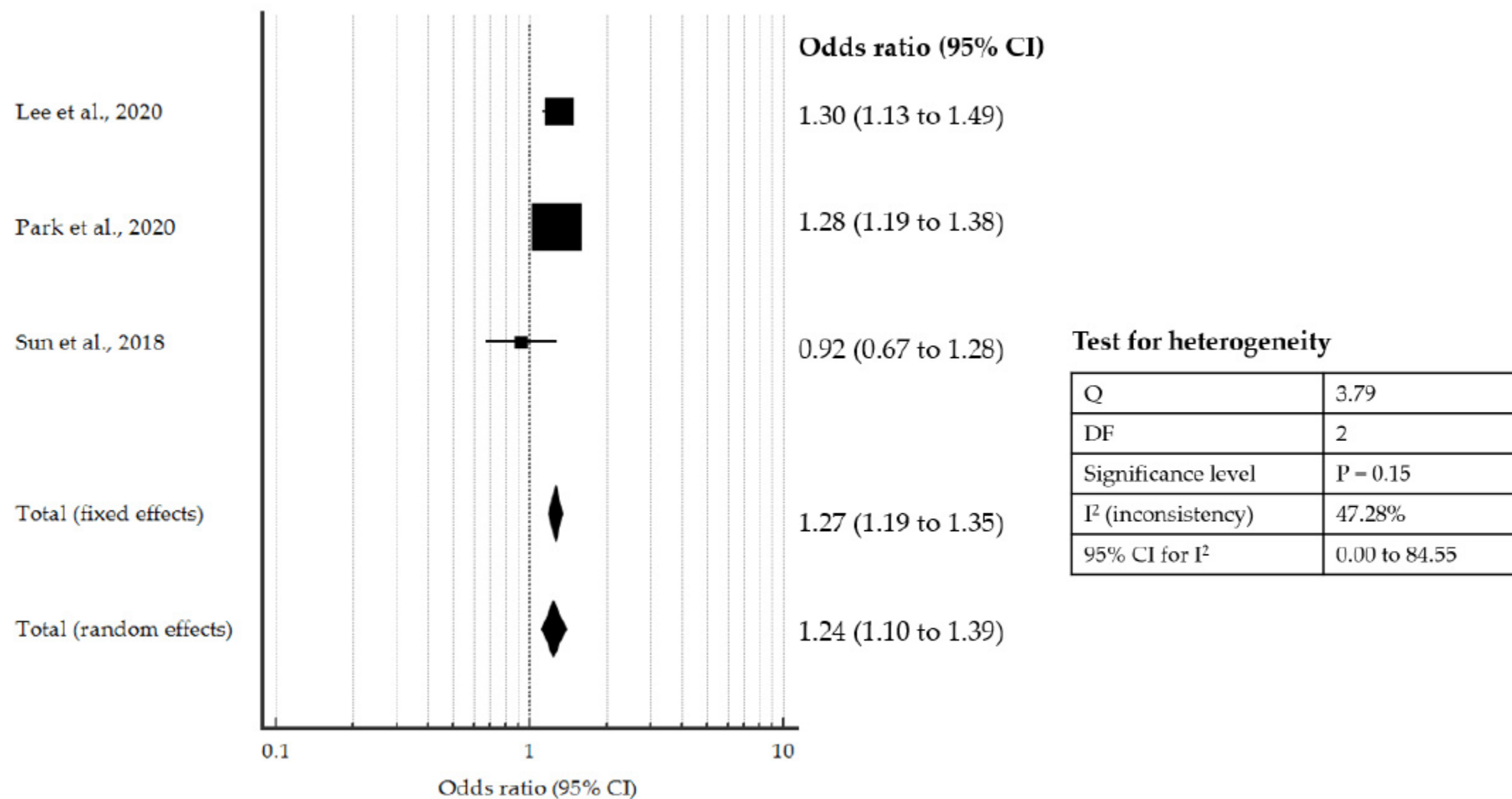


Figure 4. Forest plot showing pooled OR for good neurological outcomes with HP CPR or similar intervention compared to controls [14,20,21].

4. Rapid Dispatch





從「電話鈴響的第1聲」到「派遣」 的時間

派遣時間定義

Symptoms Triggering Rapid Dispatch:

- Unconscious
- Difficulty breathing
- Stroke symptoms
- Chest pain
- Seizure
- Major trauma
- Diabetic hypoglycemia

- In King County rapid dispatch is used in approximately 30 % of EMS calls
➔ Dispatch time < 15 seconds

4. Rapid Dispatch

- Begin to send some help as soon as **as it is clear any help is needed.**
 - Can send initial responder prior to completion of the entire question sequence
- **Establish performance standards – 60 seconds**
- Package with T-CPR (DA-CPR)



4. Rapid Dispatch



- Measurement of professional resuscitation
- Co-responder CPR & defibrillation
- Smart technologies for CPR and AED
- CPR/AED training in schools and community
- Accountability to community
- Culture of excellence

Higher Hanging Fruit

Recommendations for CPR Feedback and Monitoring		
COR	LOE	Recommendations
2b	B-R	1. It may be reasonable to use audiovisual feedback devices during CPR for real-time optimization of CPR performance.
2b	C-LD	2. It may be reasonable to use physiological parameters such as arterial blood pressure or end-tidal CO ₂ when feasible to monitor and optimize CPR quality.

- 在 CPR 期間使用視聽回饋裝置，以便即時發揮最好的 CPR 效果是合理的做法。
- RCT Study：透過聲音回饋來監測按壓深度以及胸部回彈情況，IHCA 病人的出院存活率會提高 25% (54% versus 28.4%; $P < 0.001$)。

5. Measurement of Resuscitations

何時開始CPR? 何時開始AED?



出勤到交接

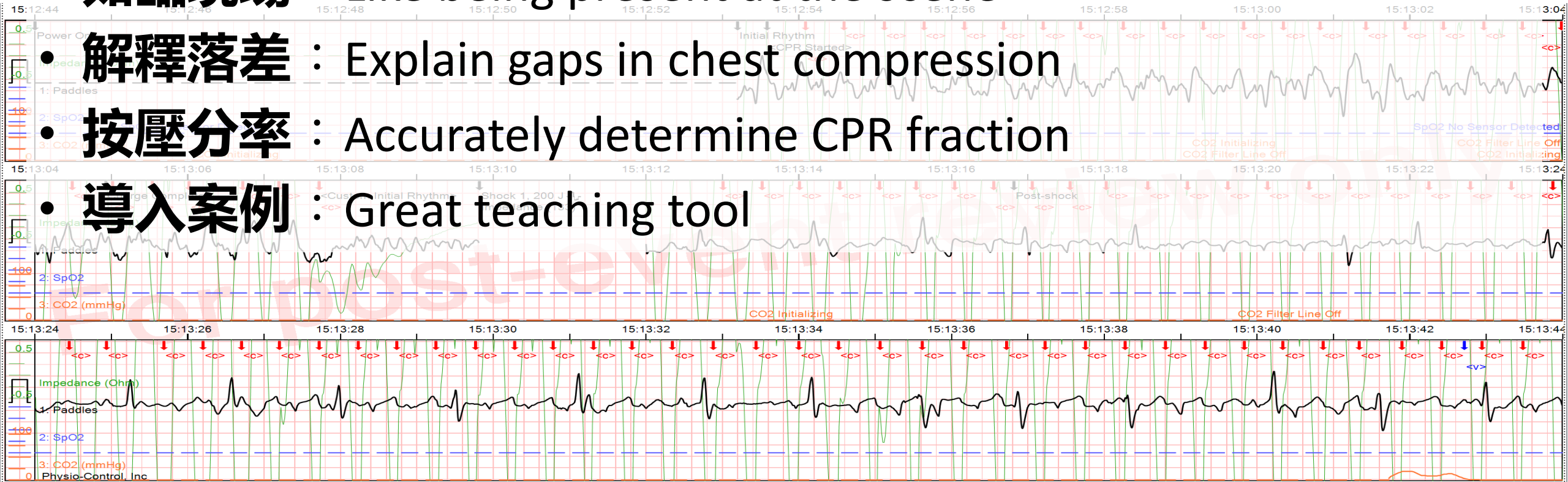
開機到醫院

上車到醫院

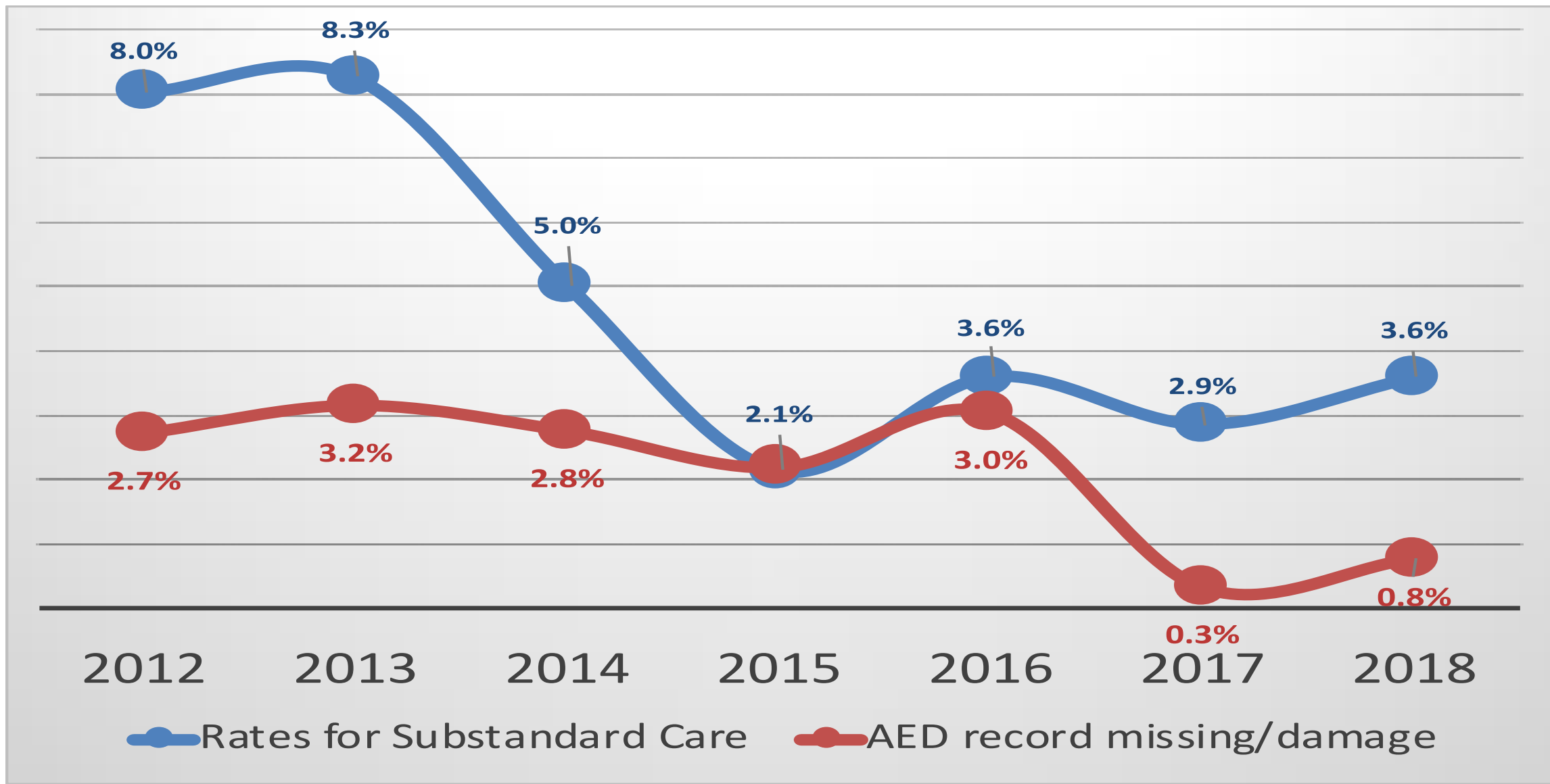
5. Measurement of Resuscitations

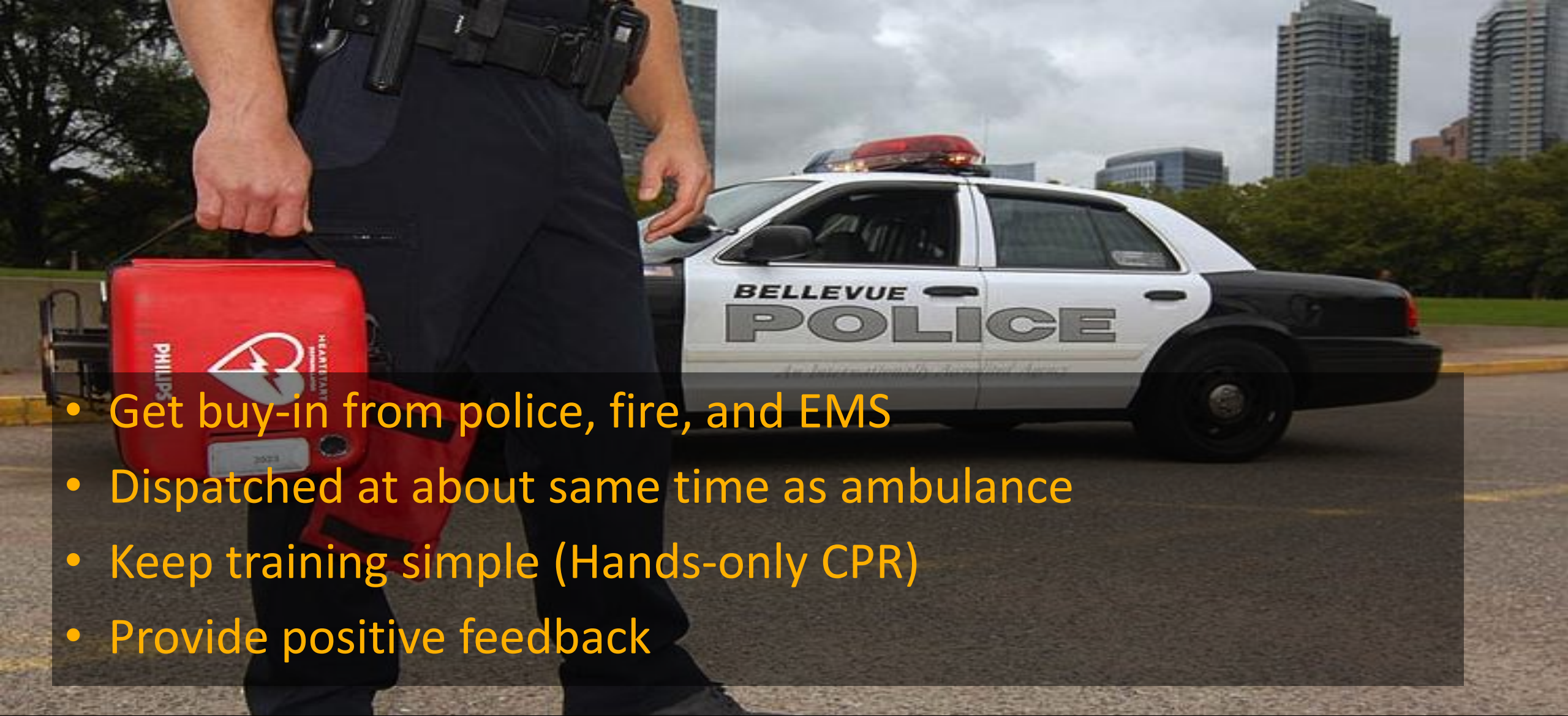


- **全部回顧** : Review all resuscitations!
- **如臨現場** : Like being present at the scene
- **解釋落差** : Explain gaps in chest compression
- **按壓分率** : Accurately determine CPR fraction
- **導入案例** : Great teaching tool



5. Measurement of Resuscitations



- 
- A police officer in a dark uniform is walking towards the camera, carrying a red Philips HeartStart AED in their right hand. The officer's belt is visible, showing a holster and other equipment. In the background, a white and black Bellevue Police car is parked on a street. The car has "BELLEVUE POLICE" written on its side and a red and blue emergency light bar on the roof. The scene is set in an urban area with tall buildings and trees in the distance under a cloudy sky.
- Get buy-in from police, fire, and EMS
 - Dispatched at about same time as ambulance
 - Keep training simple (Hands-only CPR)
 - Provide positive feedback

6. Police / Fire Co-Responder

Mobile Phone Technologies to Alert Bystanders of Events Requiring CPR

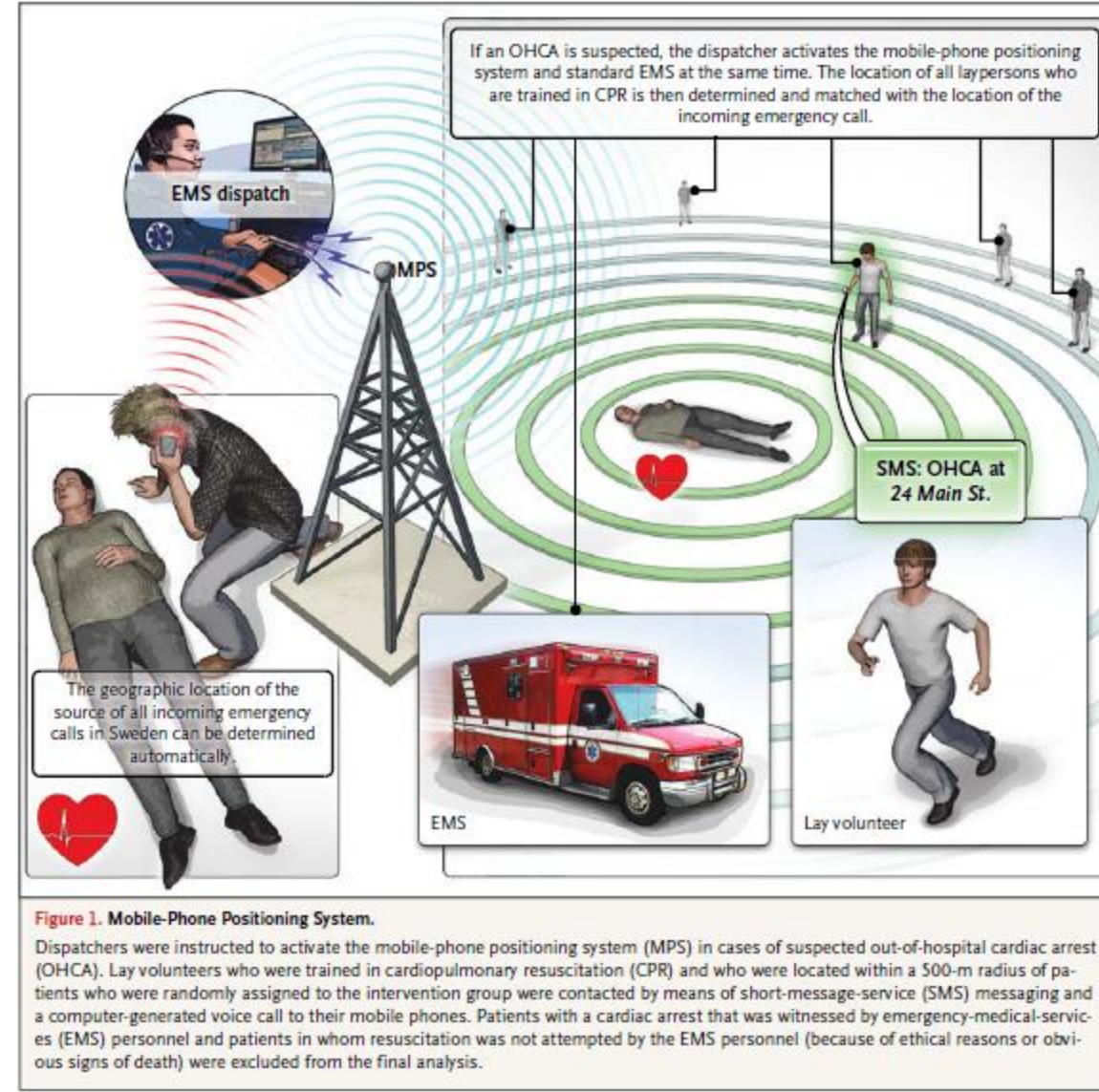
Recommendation for Mobile Phone Technologies to Alert Bystanders of Events Requiring CPR		
COR	LOE	Recommendation
2a	B-NR	1. The use of mobile phone technology by emergency dispatch systems to alert willing bystanders to nearby events that may require CPR or AED use is reasonable. ¹⁻⁷

透過**智慧型手機應用程式或簡訊**提醒通知一般民眾施救者可**加快旁人的應變時間、提高旁觀者 CPR 施行率、縮短去顫時間並提高 OHCA 病人的出院存活率**。

7. Smart Technology-全民守護者

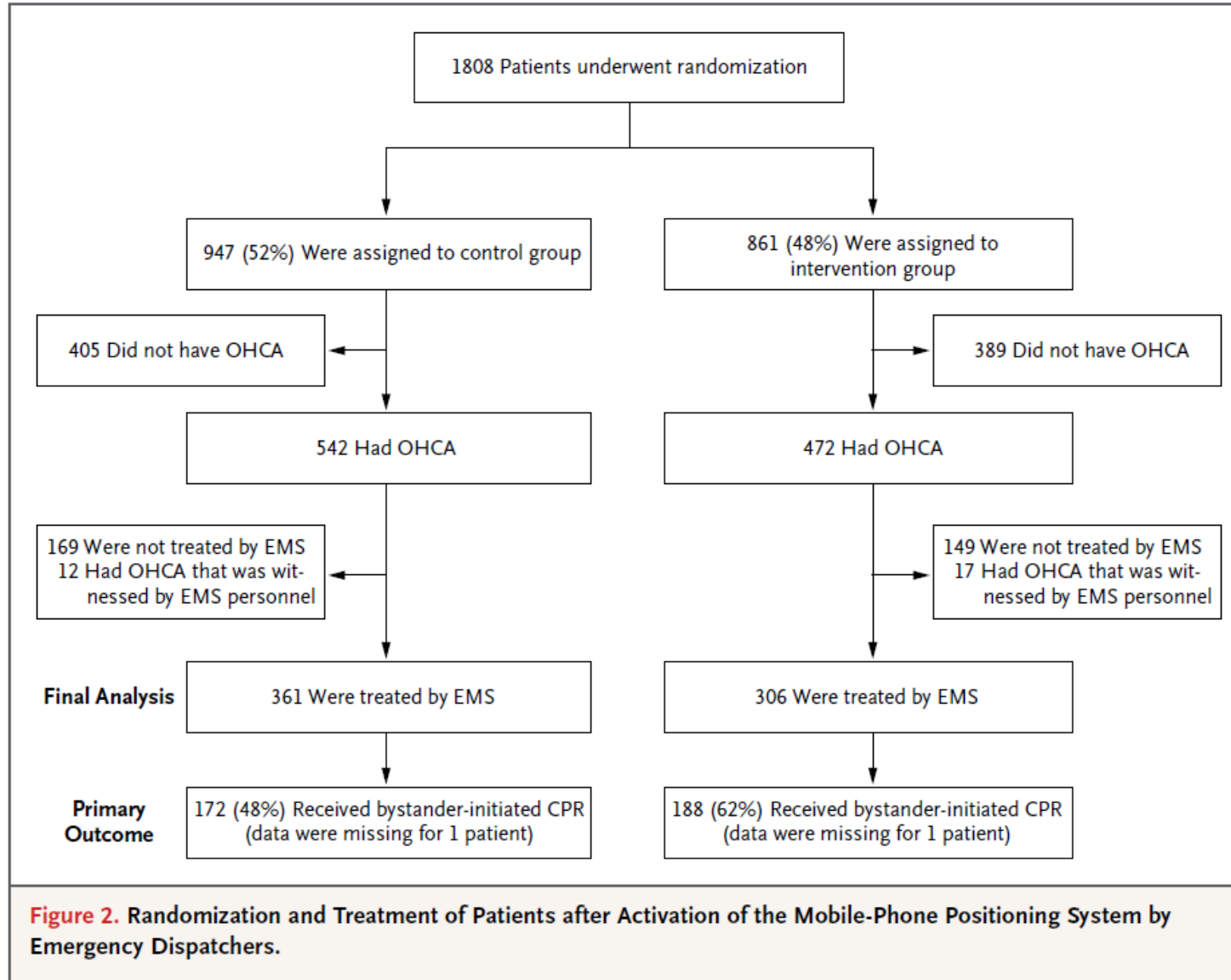
Benefit shown in Stockholm in June 2015

- Alert the public
- Smartphone apps exist for this task
- PulsePoint, SMS Lifesavers, GoodSAM
- Benefit shown in Stockholm in June 2015
- AED Registry might help – Premise information in CAD system, at minimum



7. Smart Technology-全民守護者

Benefit shown in Stockholm in June 2015



7. Smart Technology-全民守護者

Benefit shown in Stockholm in June 2015

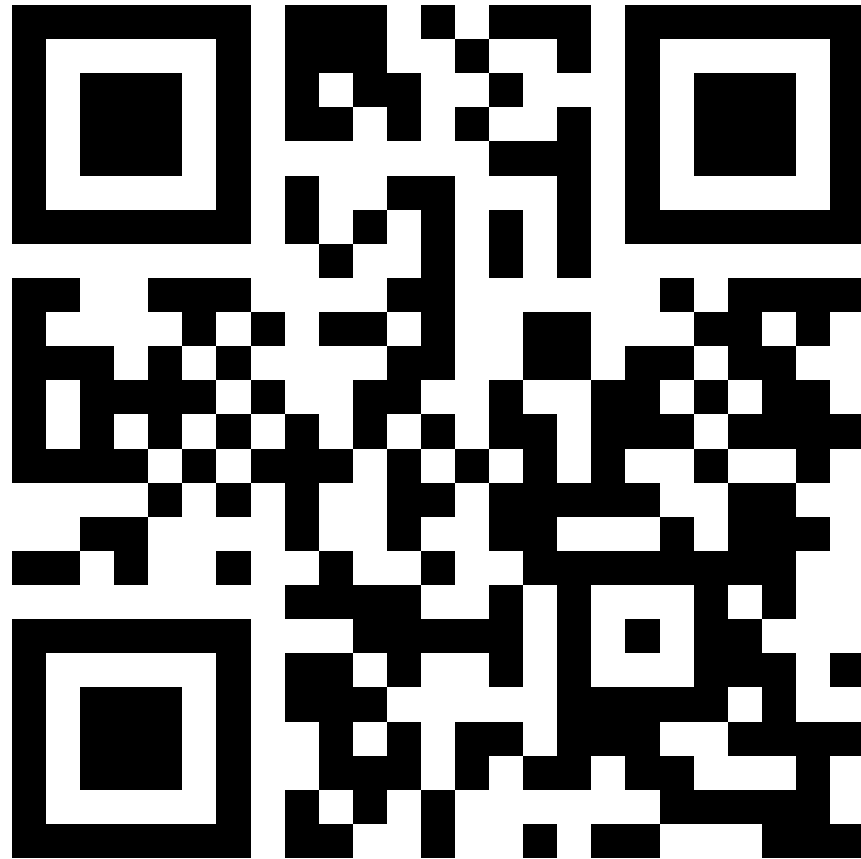
Table 2. Primary and Secondary Outcomes.*

Outcome	Intervention	Control	Difference (95% CI)	P Value
	<i>no. of patients/total no. (%)</i>		<i>percentage points</i>	
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

* CI denotes confidence interval.

7. Smart Technology-全民守護者

Benefit shown in Stockholm in June 2015

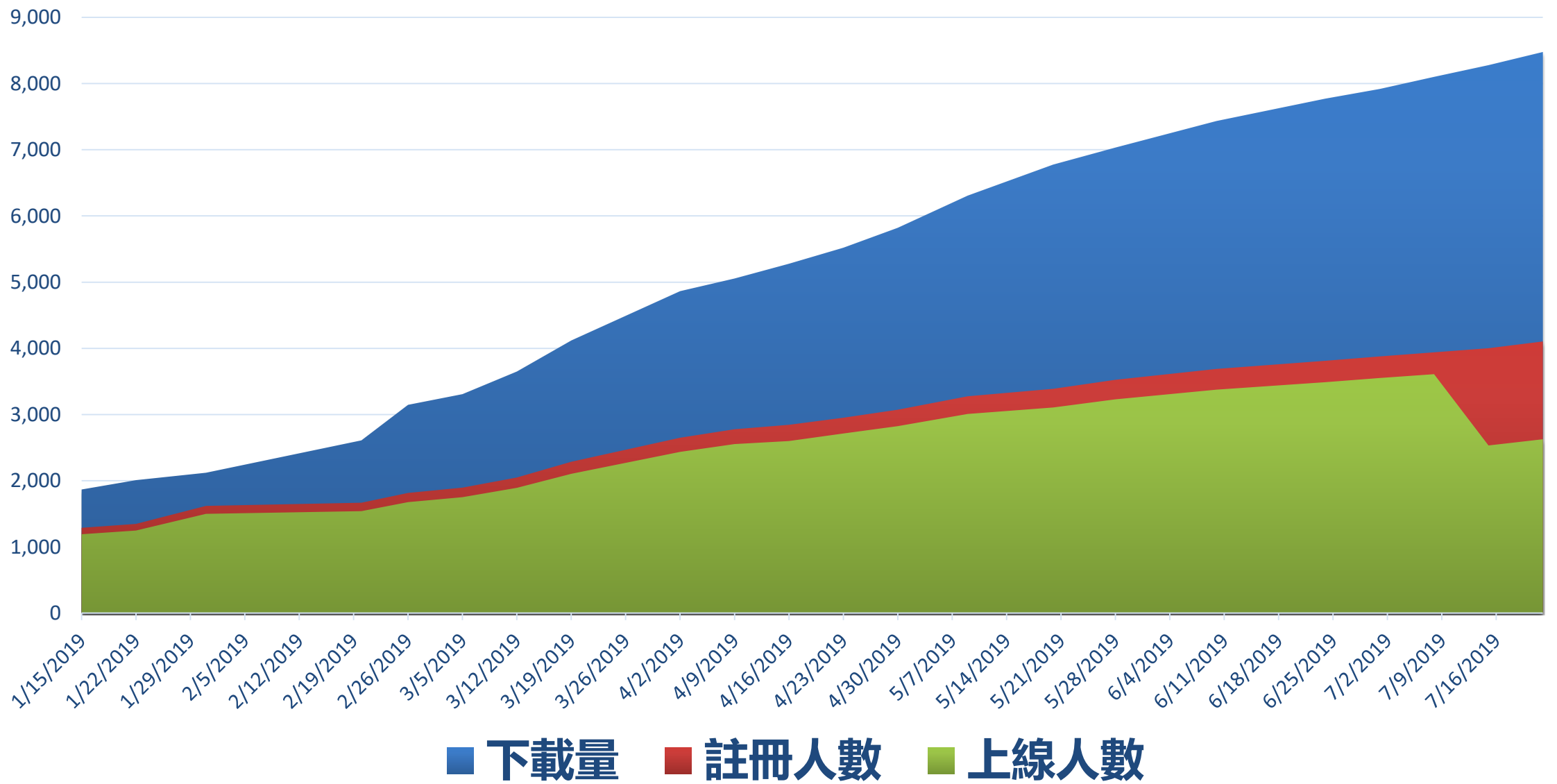


全民守護者

<https://reurl.cc/WL9547>

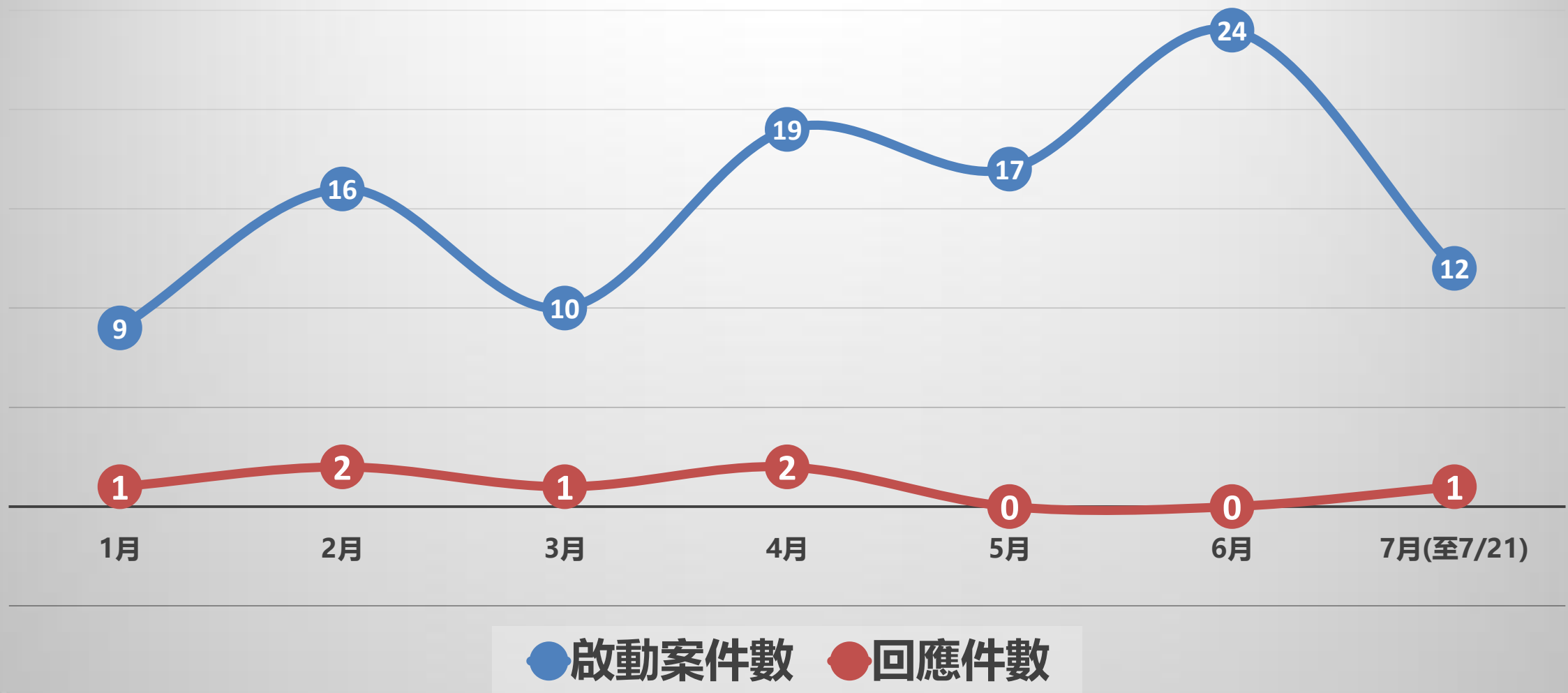
7. Smart Technology-全民守護者

Benefit shown in Stockholm in June 2015

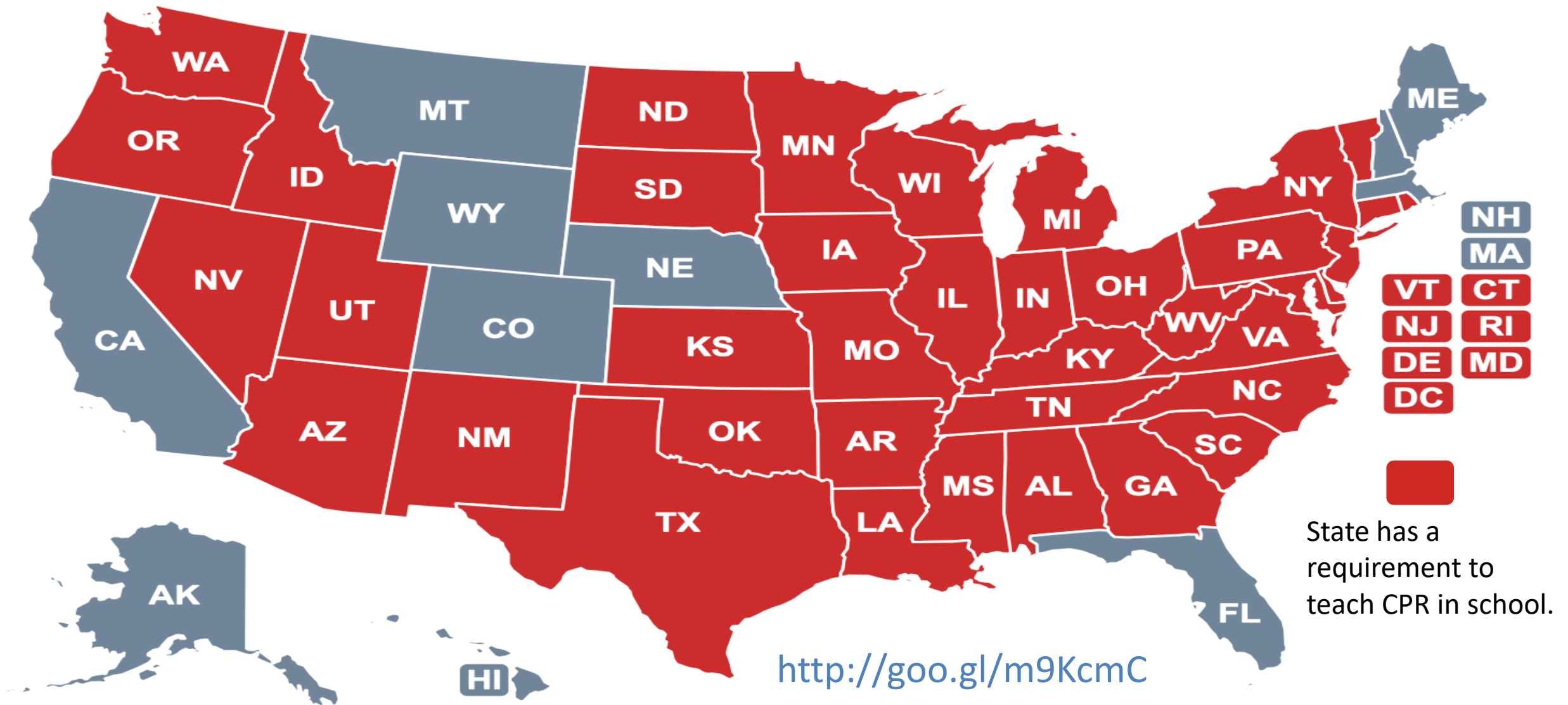


7. Smart Technology-全民守護者

Benefit shown in Stockholm in June 2015



7. Smart Technology-全民守護者



8. School and Community CPR-USA

Public Health
Seattle & King County



Division of
**Emergency
Medical
Services** 

2018 Annual Report

to the King County Council
September 2018

9. Accountability

2017 Highlight: Overall survival to hospital discharge based on arrest before or after arrival of EMS personnel and initially monitored cardiac arrest rhythm:

Initial Cardiac Arrest Rhythm	Patients Treated	Patients Survived To Hospital Discharge	Percent Survived
Arrest Before Arrival of EMS	1,084	210	19%
Ventricular Fibrillation/ Tachycardia (VF/VT)	302	146	48%
Asystole	463	11	2%
PEA	268	47	18%
Not Shockable, but unknown if PEA or asystole	43	4	9%
Initial Cardiac Arrest Rhythm Unknown	8	2	25%
Arrest After Arrival of EMS	131	41	31%
Ventricular Fibrillation/ Tachycardia (VF/VT)	78	18	64%
Asystole	2	4	18%
PEA	73	17	23%
Not Shockable, but unknown if PEA or asystole	4	2	50%
Unknown	2	0	0%
Total	1,215	251	21%

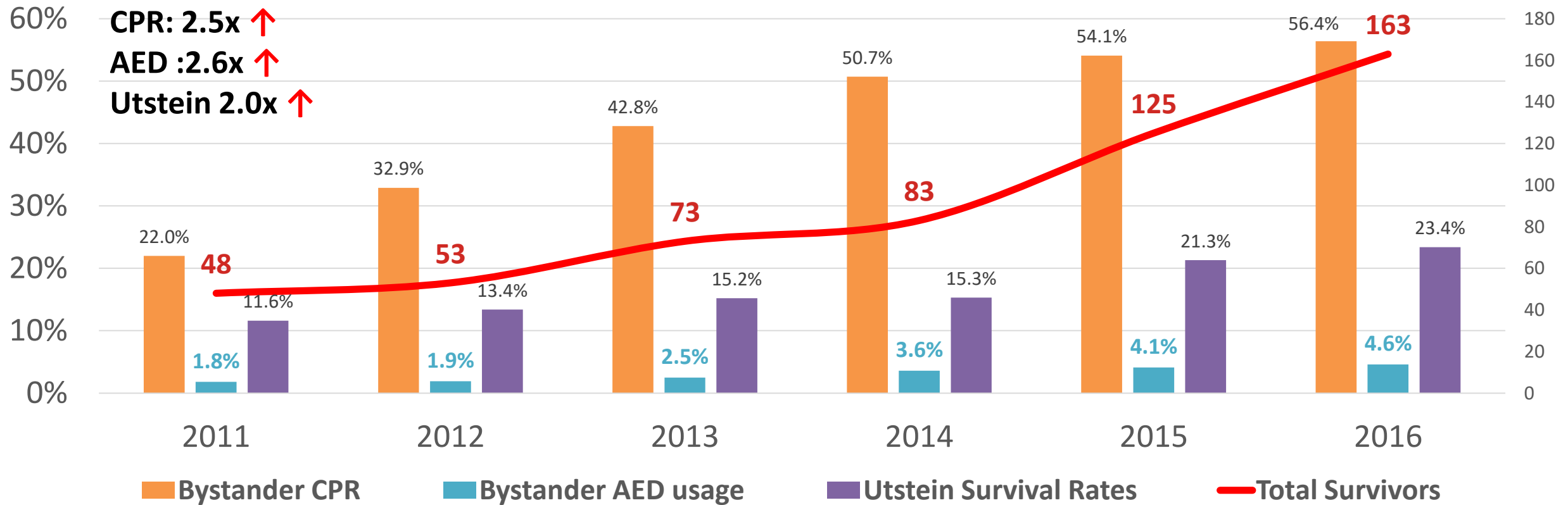
- Transparency
- Accountability
- Community involvement and engagement

Utstein Group: Survival to hospital discharge for arrests due to heart disease, witnessed by bystanders (excludes EMS-witnessed arrests), with an initial heart rhythm of VF or VT:

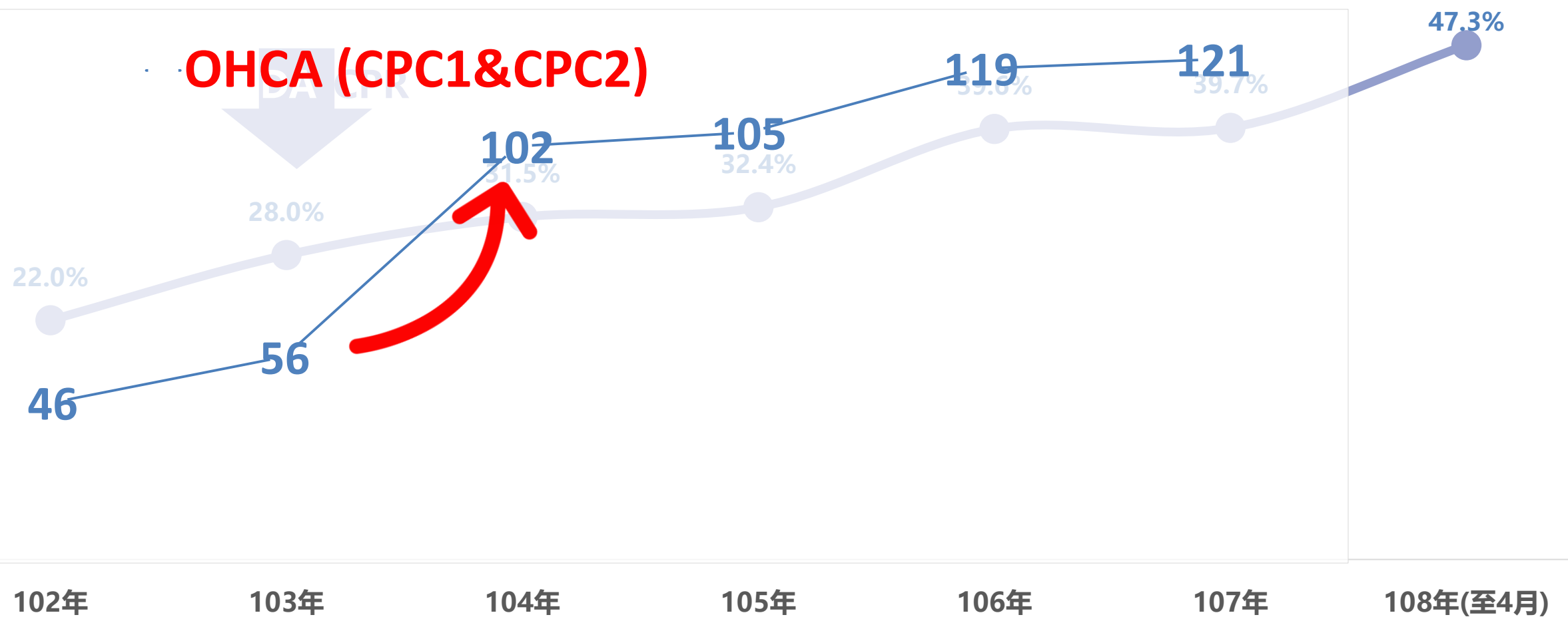
Year	2017	2013-2017
Survival Rate	115/205 (56%)	525/962 (55%)

9. Accountability-Seattle & King County

Bystander CPR, AED usage rates and OHCA survival 2011-2016 in Singapore



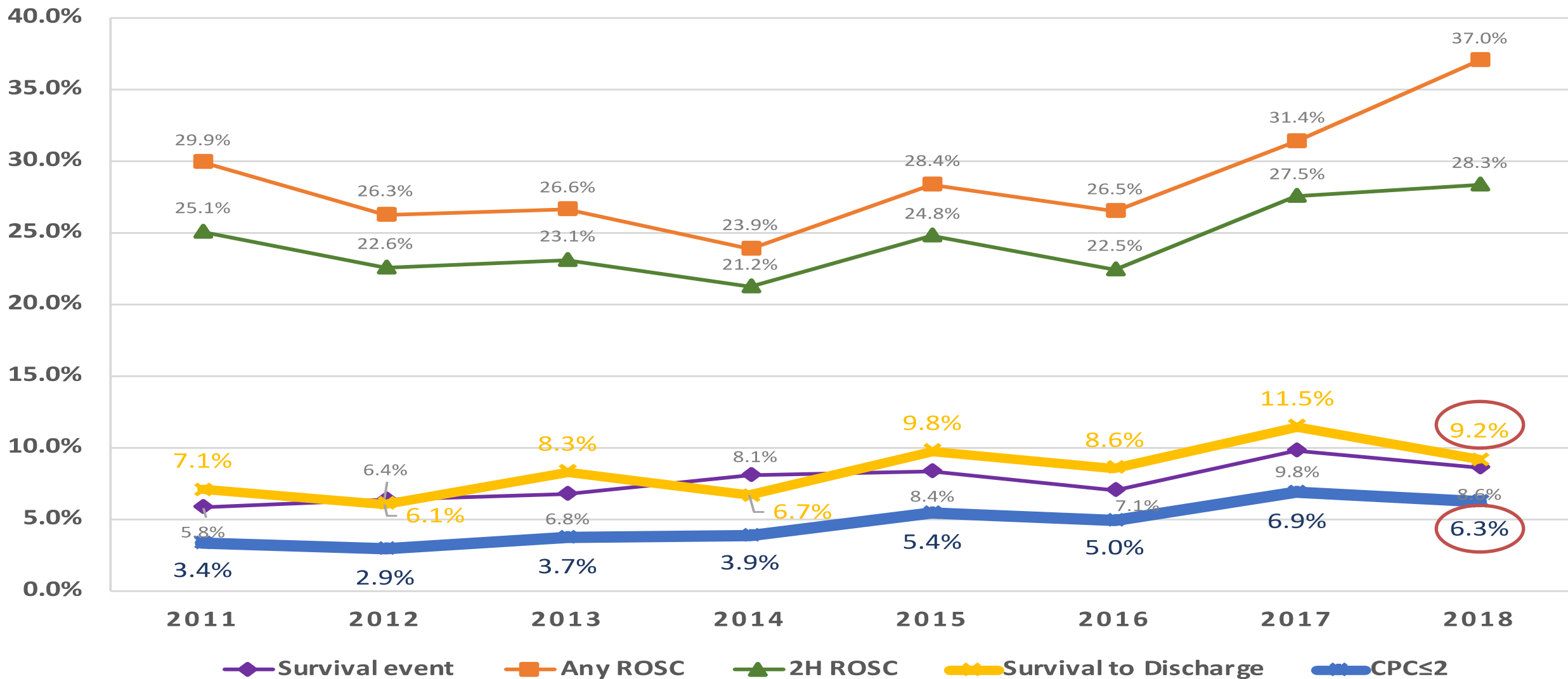
9. Accountability- Singapore



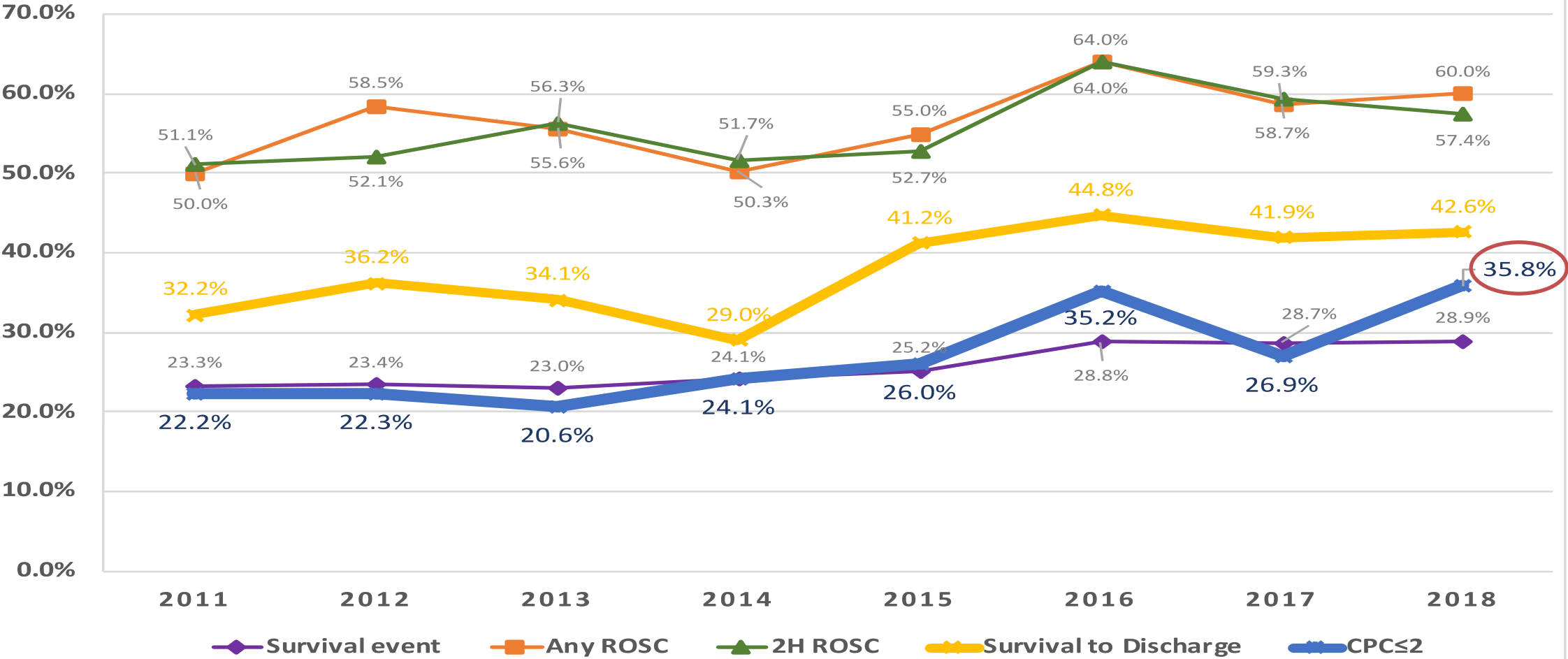
9. Accountability- Taipei

台北市 效果指標 (整體表現)

All age, all causes, EMS treated and Resuscitation attempted

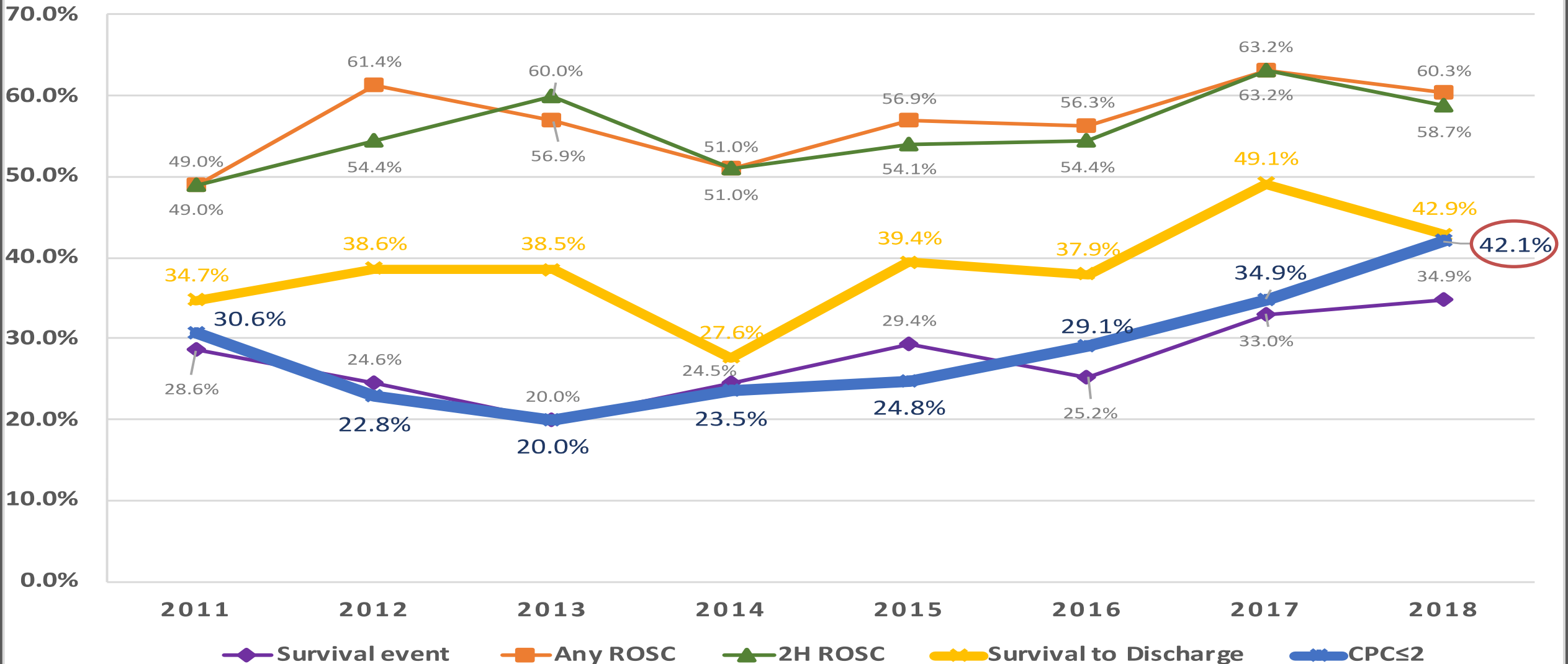


台北市 效益指標 (精確表現)
 Non-EMS witnessed, Bystander Witnessed, Shockable



台北市 效益指標 (精確表現)

Non-EMS witnessed, Bystander CPR, Shockable



生命之框

生命之鏈



Team

Agreed upon goals

Feedback

Leadership

10. Culture of Excellence

HOSPITAL

- Cardiac resuscitation Center
- Extracorporeal CPR
- Post cardiac arrest care
- Recovery and Survivorship After Cardiac Arrest

Cardiac Resuscitation Center

- 2014 Arizona Cardiac Resuscitation Center
 - ❑ Therapeutic hypothermia
 - ❑ Primary PCI
 - ❑ +/- ECMO
 - ❑ Bypass 20 min

EMERGENCY MEDICAL SERVICES/ORIGINAL RESEARCH

Statewide Regionalization of Postarrest Care for Out-of-Hospital Cardiac Arrest: Association With Survival and Neurologic Outcome

Daniel W. Spaite, MD*; Bentley J. Bobrow, MD; Uwe Stolz, PhD, MPH; Robert A. Berg, MD; Arthur B. Sanders, MD;
Karl B. Kern, MD; Vatsal Chikani, MPH; Will Humble, MPH; Terry Mullins, MBA; J. Stephan Stapczynski, MD;
Gordon A. Ewy, MD; for the Arizona Cardiac Receiving Center Consortium[†]

*Corresponding Author. E-mail: dan@aemrc.arizona.edu.

Cardiac Resuscitation Center

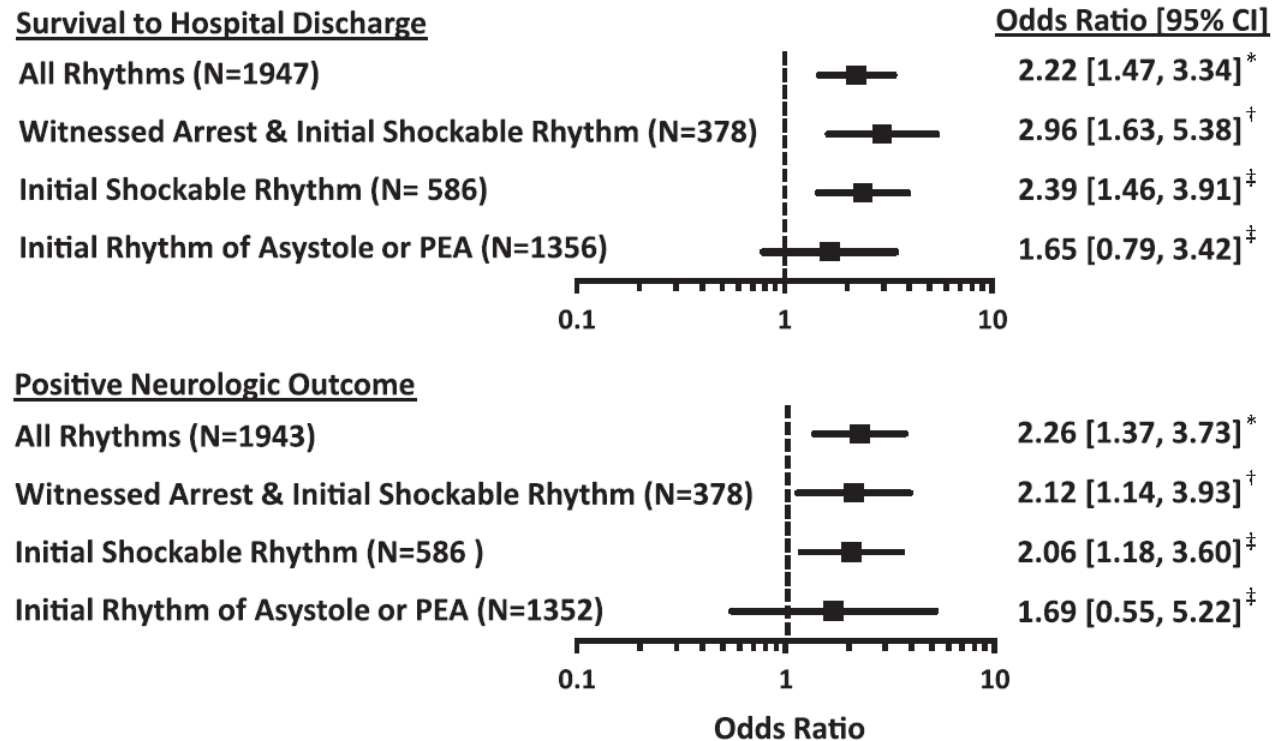


Figure. Comparison of outcomes for the after intervention period versus the before intervention period. Forest plots showing aOR for survival and survival with favorable functional outcome for the after intervention period versus the before intervention period (OR >1 favors the after period) for the entire study population (all rhythms) and several subgroups. ^{*}OR adjusted for the following: age, sex, EMS response interval, witnessed arrest, initial rhythm on EMS arrival, bystander CPR provision, location of OHCA, and EMS use of MICR. [†]OR adjusted for the following: age, sex, EMS response interval, bystander CPR provision, location of OHCA, and EMS use of MICR. [‡]OR adjusted for the following: age, sex, EMS response interval, witnessed arrest, bystander CPR, location of OHCA, and EMS use of MICR.

Cardiac resuscitation Center

Cardiac Arrest Centers

Recommendation for Cardiac Arrest Centers		
COR	LOE	Recommendation
2a	C-LD	1. A regionalized approach to post–cardiac arrest care that includes transport of acutely resuscitated patients directly to specialized cardiac arrest centers is reasonable when comprehensive postarrest care is not available at local facilities. ^{1–10}

Cardiac resuscitation Center

Table 1. Resuscitation Center Criteria

Level I
Must meet all requirements of an STEMI receiving center
Is a designated hospital champion for cardiac resuscitation
Actively participates in multidisciplinary group to monitor, provide feedback, and improve cardiac resuscitation process and outcome
Implements and maintains standard triage and treatment protocols for patient who received cardiac resuscitation consistent with AHA guidelines
Works with EMS medical direction and cardiac resuscitation referral centers to develop cardiac resuscitation treatment plan
Initiates hypothermia as soon as possible when indicated
Initiates cardiology consult as soon as possible
Universal 24 h/d, 7 d/wk acceptance of cardiac resuscitation patients regardless of diversion status of ED
Has plan to treat simultaneous cardiac resuscitation patients
Has plan for and ability to treat rearrest, including mechanical CPR or pharmacological support
Is capable of assessing need for ICD placement and providing appropriate follow-up
Defers assessment of prognostication and withdrawal of care for at least 72 h after cardiac resuscitation
Participates in regional or national quality improvement program to monitor and improve cardiac resuscitation care processes and outcome
Integrates plans for return of the patient to the local community for follow-up care after discharge from the cardiac resuscitation receiving hospital on a routine basis
Provides CPR training for community with the goal of achieving bystander CPR rates >50%
Provides CPR, ACLS, and PALS training for appropriate staff
Has external certification, not self-designation, as part of cardiac resuscitation system of care
Should include at least compression-only CPR training for all employees (The AHA hands-only campaign produces short, easy-to-understand videos to help the general public learn compression-only CPR [http://cpr.heart.org/AHA/ECC/CPRAndECC/Programs/HandsOnlyCPR/UCM_475516_CPR-Demos-and-Videos.jsp])

24 h/d, 7d/wks

Extracorporeal CPR

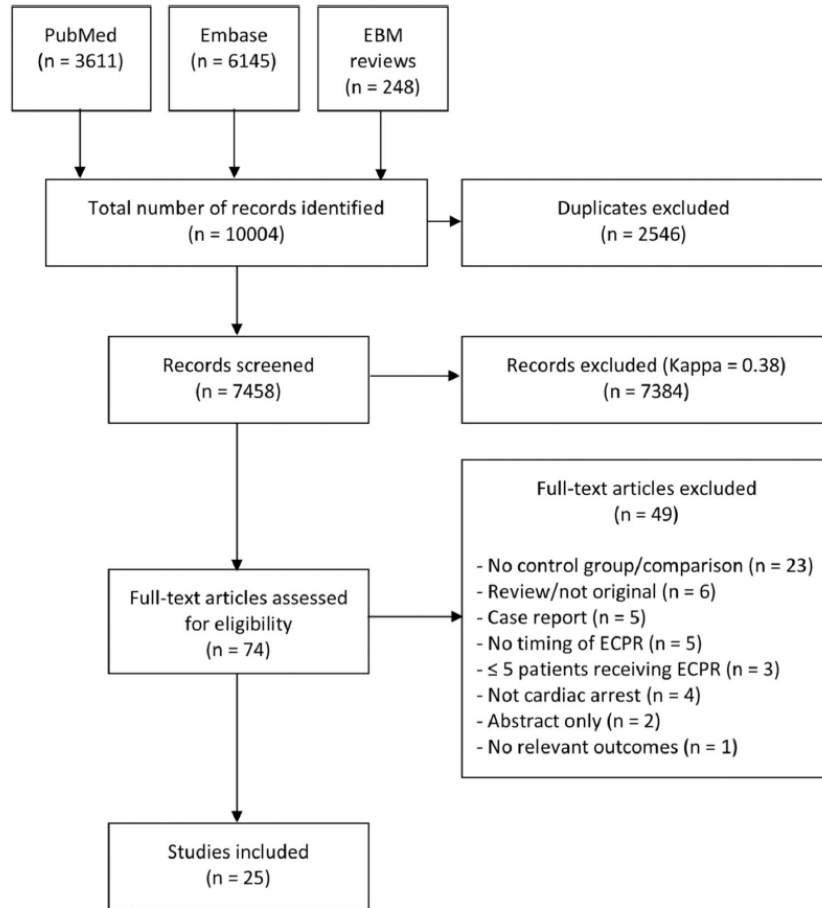


Fig. 1.
PRISMA diagram.

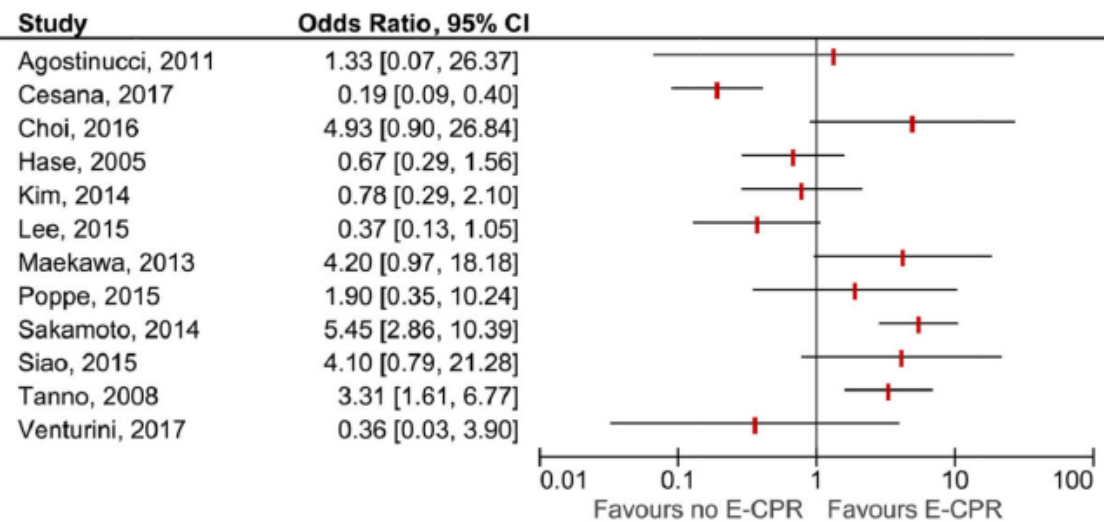
Out of 7458 screened records, 74 articles were assessed for eligibility, and 25 studies were included.

Extracorporeal cardiopulmonary resuscitation for cardiac arrest: A systematic review

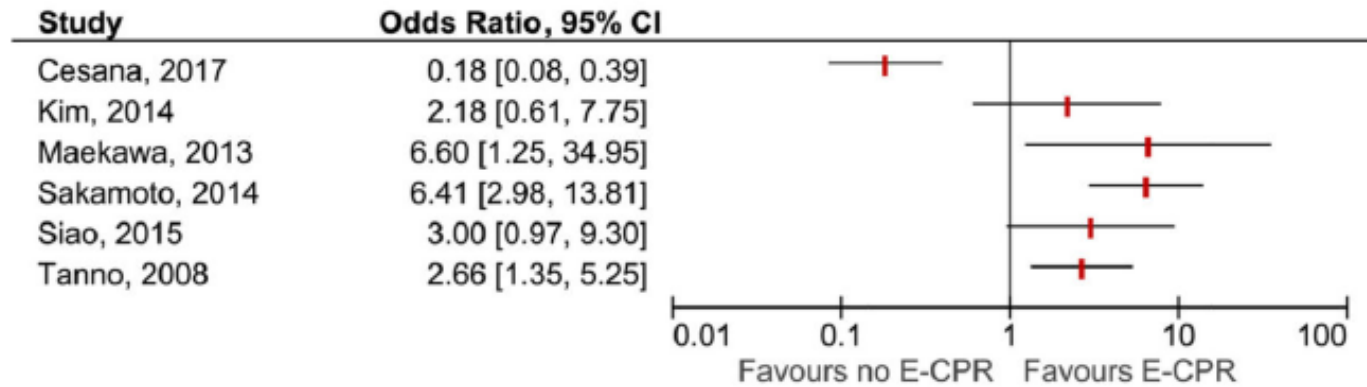
Mathias J. Holmberg^{a,b}, Guillaume Geri^{c,d}, Sebastian Wiberg^{b,e}, Anne-Marie Guerguerian^f, Michael W. Donnino^{b,g}, Jerry P. Nolan^h, Charles D. Deakinⁱ, Lars W. Andersen^{a,b,*}, and International Liaison Committee on Resuscitation's (ILCOR) Advanced Life Support and Pediatric Task Forces

Extracorporeal CPR

A Adult OHCA: Survival to hospital discharge/one month



B Adult OHCA: Long-term survival

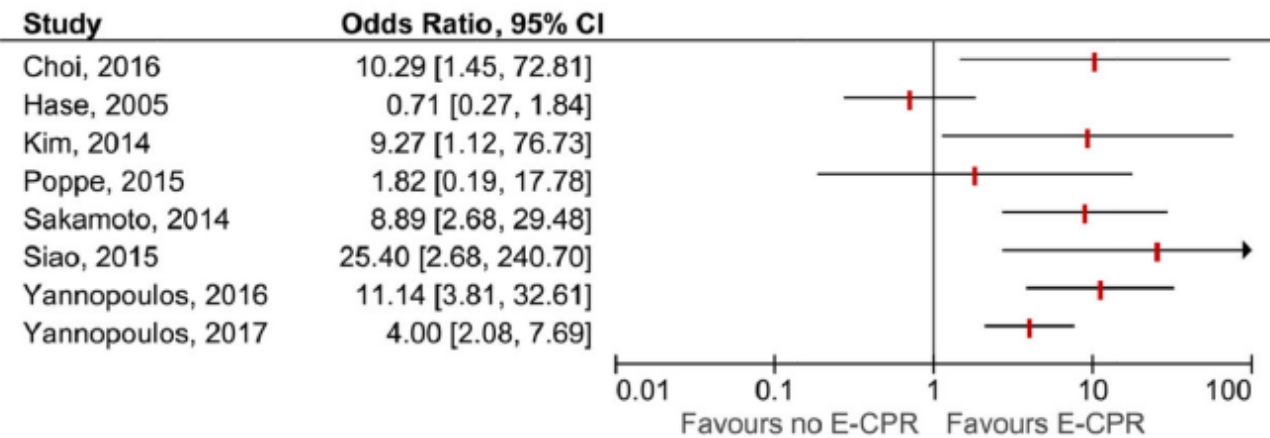


Extracorporeal cardiopulmonary resuscitation for cardiac arrest: A systematic review

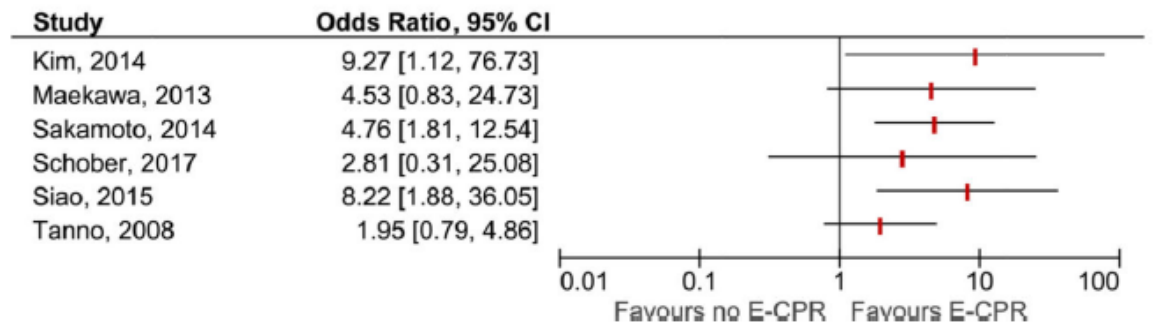
Mathias J. Holmberg^{a,b}, Guillaume Geri^{c,d}, Sebastian Wiberg^{b,e}, Anne-Marie Guerguerian^f, Michael W. Donnino^{b,g}, Jerry P. Nolan^h, Charles D. Deakinⁱ, Lars W. Andersen^{a,b,*}, and International Liaison Committee on Resuscitation's (ILCOR) Advanced Life Support and Pediatric Task Forces

Extracorporeal CPR

C Adult OHCA: Favorable neurological outcome at hospital discharge/one month



D Adult OHCA: Long-term favorable neurological outcome



Extracorporeal cardiopulmonary resuscitation for cardiac arrest: A systematic review

Mathias J. Holmberg^{a,b}, Guillaume Geri^{c,d}, Sebastian Wiberg^{b,e}, Anne-Marie Guerguerian^f, Michael W. Donnino^{b,g}, Jerry P. Nolan^h, Charles D. Deakinⁱ, Lars W. Andersen^{a,b,*}, and International Liaison Committee on Resuscitation's (ILCOR) Advanced Life Support and Pediatric Task Forces

Extracorporeal CPR

- ECPR can be used as a salvage therapy for refractory cardiac arrest that does not respond to conventional Advanced Cardiac Life Support (ACLS) therapies.
- ECPR can be deployed for both in-hospital and out-of-hospital cardiac arrest patients :
 - Out-of-hospital cardiac arrest survival salvaged with ECPR is about 20%.
 - In survivors, the neurological outcomes generally fall into CPC categories 1 or 2.

Stub, D. *et al.* Refractory cardiac arrest treated with mechanical CPR, hypothermia, ECMO and early reperfusion (the CHEER trial). *Resuscitation* **86**, 88–94 (2015). [[PMID25281189](#)]

Patricio, D. *et al.* Comparison of extracorporeal and conventional cardiopulmonary resuscitation: a retrospective propensity score matched study. *Crit Care* **23**, 27 (2019). [[PMID30691512](#)]

Extracorporeal CPR

General Inclusion criteria

INCLUSION CRITERIA*
Age + Time in min < 100 (ambulance call time to time of decision in min)** <i>alternatively Time only <60min</i>
Witnessed cardiac arrest
Shockable initial rhythm
Bystander CPR within 5 min
No known end-stage disease

**Does not apply to accidental hypothermia ** ROSC <20min is considered continuous cardiac arrest; ROSC >20min is considered as separate arrests, the longer cardiac arrest time is taken*

Extracorporeal CPR

- Factors at the bedside that almost certainly favor exclusion
 - Age >65
 - End-tidal CO₂ less than 10 mmHg
 - Femoral cannulation impossible (e.g. iliofemoral occlusion / occluded IVC filter / severe peripheral vascular disease)
 - Known aortic regurgitation > mild
 - Presence of pericardial effusion or tamponade with suspected aortic dissection

Stub, D. *et al.* Refractory cardiac arrest treated with mechanical CPR, hypothermia, ECMO and early reperfusion (the CHEER trial). *Resuscitation* **86**, 88–94 (2015). [[PMID25281189](#)]

Patricio, D. *et al.* Comparison of extracorporeal and conventional cardiopulmonary resuscitation: a retrospective propensity score matched study. *Crit Care* **23**, 27 (2019). [[PMID30691512](#)]

Extracorporeal CPR

Criteria fulfilled	Survival*	Recommendation
5/5	~ 46%	Reasonable inclusion
4/5	~ 12%	
3/5	~0%	Extremely infrequent on compassionate basis
2/5	~0%	
1/5	~0%	

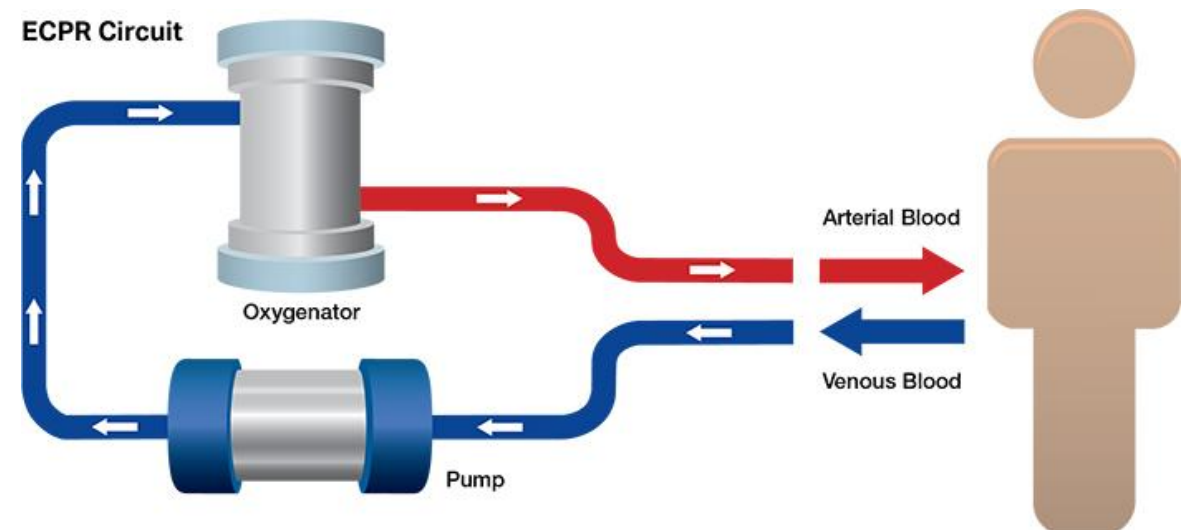
* Only OHCA, local experience Victorian ambulance and The Alfred ECPR program

Extracorporeal CPR

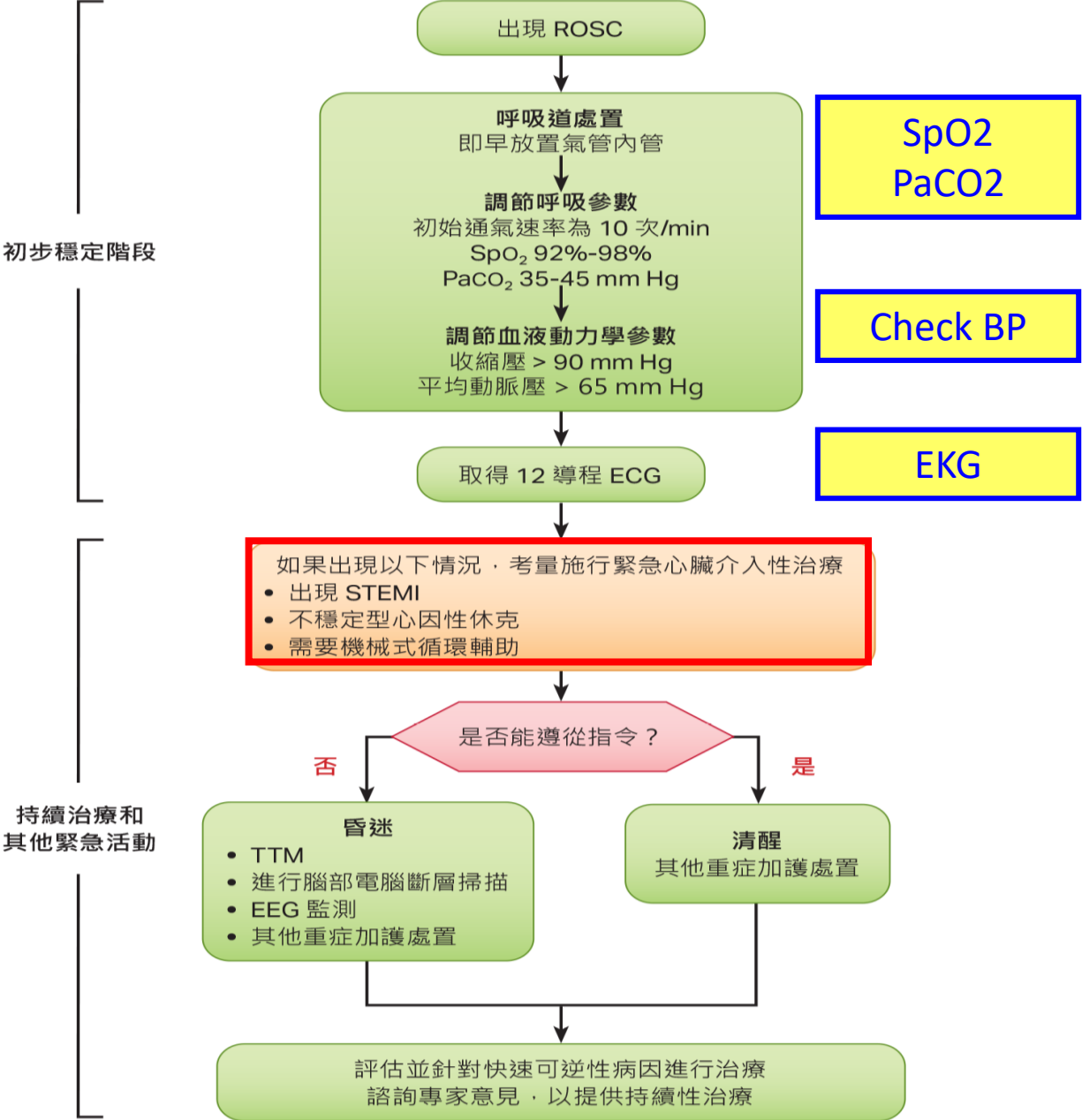
Extracorporeal CPR

Recommendation for Extracorporeal CPR		
COR	LOE	Recommendation
2b	C-LD	1. There is insufficient evidence to recommend the routine use of extracorporeal CPR (ECPR) for patients with cardiac arrest. ECPR may be considered for select cardiac arrest patients for whom the suspected cause of the cardiac arrest is potentially reversible during a limited period of mechanical cardiorespiratory support.

- 沒有足夠證據支持於心跳停止病人**常規使用ECPR**。
- ECPR可於**具有可能可逆性原因**之心跳停止時**短期使用**。
(2b-C-LD)



成人心臟停止後照護流程



初步穩定階段

ROSC 後期間持續施行心肺復甦，這些活動多數可以同時進行。但是，若必須判定這些活動的優先順序，請遵循以下步驟：

- **呼吸道處置**：透過波形二氧化碳濃度監測或二氧化碳計量測定，確認並監測氣管內管放置位置
- 調節呼吸參數：透過滴定法調節 FIO₂，使 **SpO₂ 達到 92% 至 98%**；一開始每分鐘通氣 10 次；持續透過滴定法調節 **PaCO₂，使其達到 35-45 mm Hg**
- 調節血液動力學參數：給予晶體溶液和/或血管升壓劑或強心劑，以達到收縮壓 **> 90 mm Hg 或平均動脈壓 > 65 mm Hg** 的目標

成人心臟停止後照護流程

持續治療和其他緊急活動

這些評估必須同時進行，目標體溫管理 (TTM) 作為心臟介入性治療中優先考慮的決策。

- 緊急心臟介入性治療：即早評估 12 導程心電圖 (ECG)；考量血液動力學參數，以利確定心臟介入性治療
- TTM：如果病人無法依照指令動作，須儘速施行 TTM；一開始先利用具備反饋迴路的降溫裝置，使體溫降至攝氏 32-36°C 並維持 24 小時
- 其他重症加護處置
 - 持續監測核心體溫 (食道、直腸、膀胱)
 - 維持正常氧濃度、正常二氧化碳濃度和正常血糖
 - 提供持續或間歇性腦波圖 (EEG) 監測
 - 提供肺保護性通氣

H 和 T 開頭名詞

Hypovolemia 低血溶

Hypoxia 缺氧

Hydrogen ion (acidosis) 氫離子(酸中毒)

Hypokalemia/hyperkalemia 低血鉀/
高血鉀

Hypothermia 低體溫

Tension pneumothorax 張力性氣胸

Tamponade, cardiac 心包填塞

Toxins 毒素

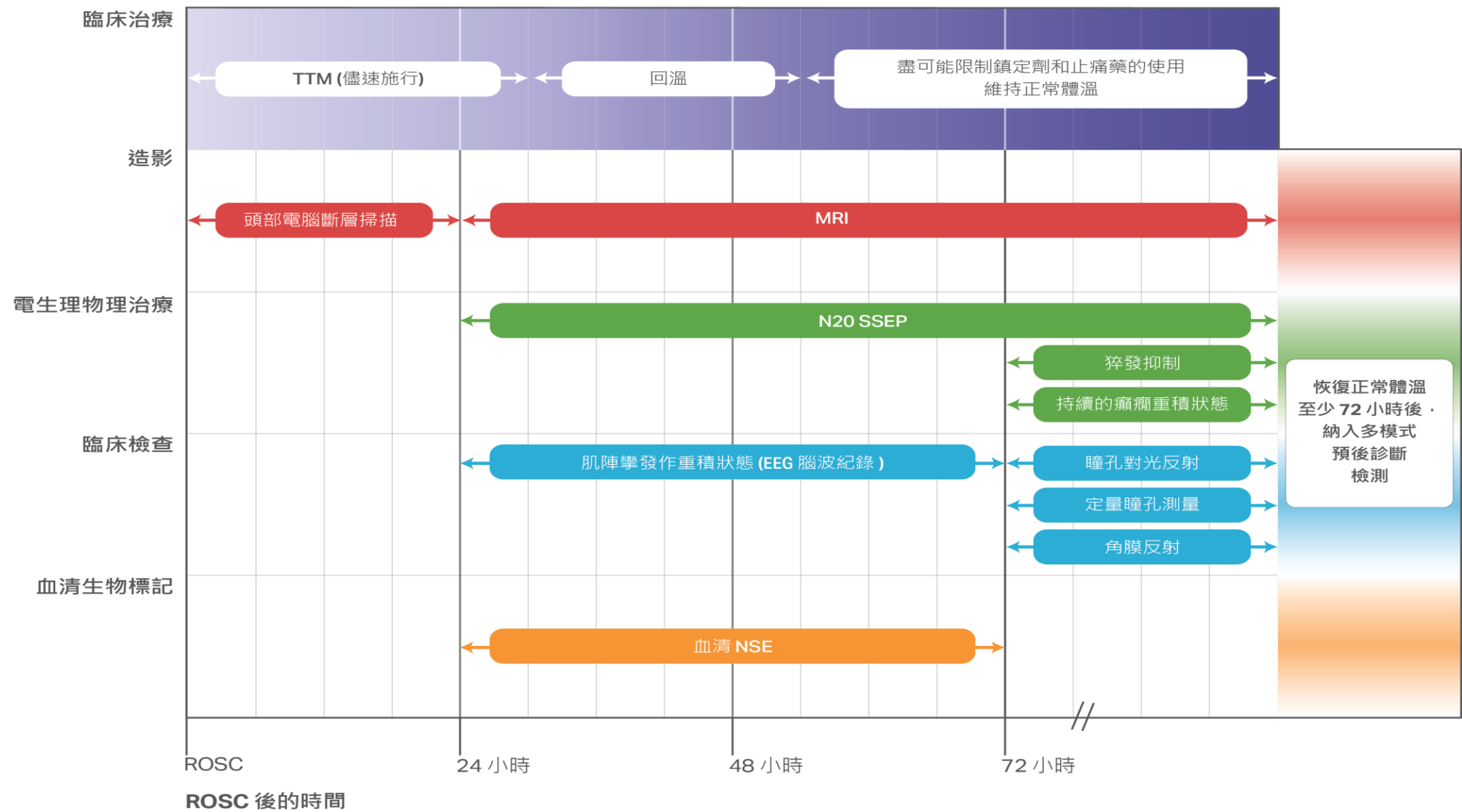
Thrombosis, pulmonary 肺栓塞

Thrombosis, coronary 冠狀動脈栓塞

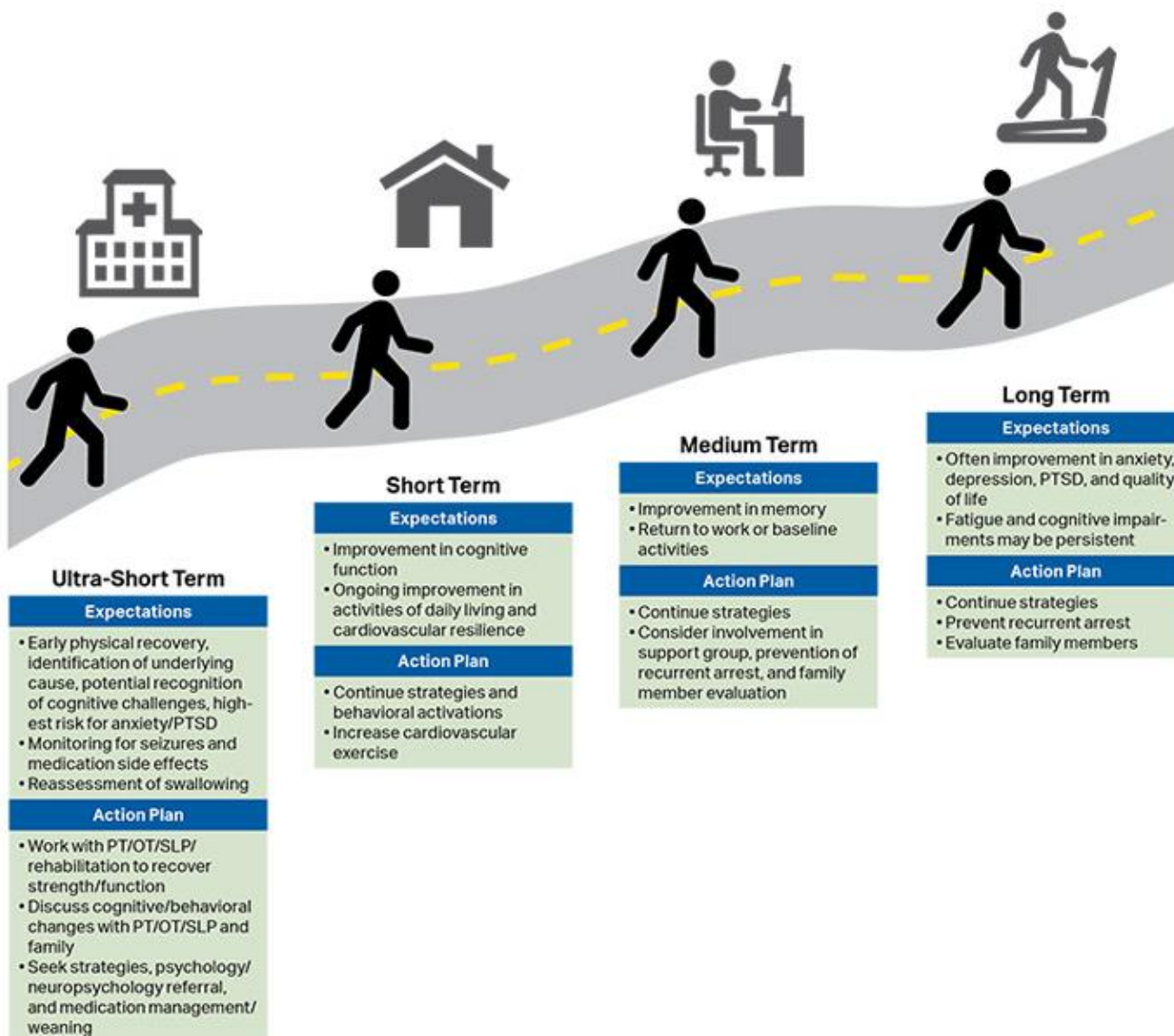
心臟停止後神經功能預後

- 應對心跳停止恢復後**仍昏迷**之病人，進行**多模式**神經預後評估，且不依賴單一檢查結果。*(1-B-NR)*
- 應當在病人**恢復正常體溫至少 72 小時後**，進行神經預後評估評估。*(2a-B-NR)*
- 「2020 年準則」評估了 **19 種不同的儀器治療以及具體結果**，並列出各自的證據。

成人心臟停止後-多模式神經功能預後建議方法



Recovery and Survivorship After Cardiac Arrest



- 建議心臟停止存活者在**出院前接受身體、神經、心肺功能與認知障礙方面的多模式復健評估與治療**。(1-C-LD)
- 建議心臟停止存活者及其**照護者接受全面性跨職系診療的出院規劃**，包括醫療與復健治療建議以及恢復正常活動/工作的期望。(1-C-LD)
- 建議心臟停止存活者及其**照護者接受焦慮、抑鬱、創傷後壓力與疲倦方面的結構化評估**。(1-B-NR)
- 在心臟停止事件後，對**一般民眾施救者、EMS 施行者和醫院的醫護人員**進行事後簡報，並安排轉診以接受後續的情緒性支持，可能對上述人員的**身心健康有益**。(2b-C-LD)

全球復甦聯盟GRA | 付諸十行

1. 建立心跳停止登錄系統
2. 實施電話指導CPR，並持續訓練與品質改善
3. 實施高效能EMS CPR，並持續訓練與品質改善
4. 開始推動快速派遣
5. 使用電擊器記錄專業復甦（若可能的話，也同時錄音）
6. 進行第一反應者AED計畫，包括警察，警衛和其他保安人員
7. 運用智慧科技進一步推展民眾CPR與公眾電擊器計畫，通知心跳停止病人周遭的志願者前往，以進行早期CPR與電擊去顫
8. 將CPR與AED訓練列為學校與社區的必修課程
9. 當責：向社區提供年度報告
10. 努力實現卓越文化

