

SPECIAL REPORT

# Up to 206 Million People Reached and Over 5.4 Million Trained in Cardiopulmonary Resuscitation Worldwide: The 2019 International Liaison Committee on Resuscitation World Restart a Heart Initiative

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**ABSTRACT:** Sudden out-of-hospital cardiac arrest is the third leading cause of death in industrialized nations. Many of these lives could be saved if bystander cardiopulmonary resuscitation rates were better. “All citizens of the world can save a life—CHECK—CALL—COMPRESS.” With these words, the International Liaison Committee on Resuscitation launched the 2019 global “World Restart a Heart” initiative to increase public awareness and improve the rates of bystander cardiopulmonary resuscitation and overall survival for millions of victims of cardiac arrest globally. All participating organizations were asked to train and to report the numbers of people trained and reached. Overall, social media impact and awareness reached up to 206 million people, and >5.4 million people were trained in cardiopulmonary resuscitation worldwide in 2019. Tool kits and information packs were circulated to 194 countries worldwide. Our simple and unified global message, “CHECK—CALL—COMPRESS,” will save hundreds of thousands of lives worldwide and will further enable many policy makers around the world to take immediate and sustainable action in this most important healthcare issue and initiative.

**Key Words:** “World Restart a Heart” ■ cardiac arrest ■ cardiopulmonary resuscitation ■ International Liaison Committee on Resuscitation ■ lay resuscitation

“**A**ll citizens of the world can save a life—CHECK—CALL—COMPRESS.” With these words, the International Liaison Committee on Resuscitation launched the 2019 global “World Restart a Heart (WRAH)” initiative to increase public awareness and

improve the rates of bystander cardiopulmonary resuscitation (CPR) and overall survival for millions of victims of cardiac arrest globally.<sup>1,2</sup>

Sudden out-of-hospital cardiac arrest is the third leading cause of death in industrialized nations.<sup>3</sup> Many

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## Nonstandard Abbreviations and Acronyms

<b>CPR</b>	cardiopulmonary resuscitation
<b>WRAH</b>	World Restart a Heart

of these lives could be saved if bystander CPR rates were improved.<sup>4–8</sup> In the absence of CPR, the chances of survival after out-of-hospital cardiac arrest are reduced by 10% every minute, as opposed to a reduction of only 2% to 3% per minute with CPR. As the response times for emergency medical services can sometimes exceed 10 minutes, this demonstrates the importance of swift bystander action.<sup>4–8</sup> The importance of this is further highlighted by the fact that up to 70% of out-of-hospital cardiac arrests are witnessed by family members, friends, and other bystanders. Thus, the potentially lethal gap in time before emergency medical services personnel reach the patient can be successfully bridged in most cases by laypeople.<sup>4–9</sup> Effective CPR is easy to learn, and laypeople are unlikely to cause harm by attempting it. Bystander CPR increases the patient's chances of survival by 3-fold,<sup>4,5,7</sup> meaning that it is a simple solution to improve survival and good neurological outcome following out-of-hospital cardiac arrest. Despite this, bystander CPR rates are <20% in many countries.<sup>6,8</sup>

The European Restart a Heart initiative was first established by the European Resuscitation Council on October 16, 2013, and occurs on an annual basis. In 2018, the International Liaison Committee on Resuscitation expanded the concept to its global network of resuscitation councils and renamed it "World Restart a Heart" (<http://www.ilcor.org/wrah>).<sup>1,2</sup> The goal for WRAH is to achieve lay bystander resuscitation rates of at least 50% in every country, and this would hopefully result in hundreds of thousands of lives being saved every year worldwide.<sup>1,2</sup> In 2019, all 7 International Liaison Committee on Resuscitation member organizations (American Heart Association, European Resuscitation Council, Heart and Stroke Foundation of Canada, Australian and New Zealand Committee on Resuscitation, Resuscitation Council of Southern Africa, InterAmerican Heart Foundation, and Resuscitation Council of Asia) participated in WRAH. They were joined by Resuscitation Councils representing India and Sri Lanka and the Arabic Resuscitation Councils. In addition, the International Federation of the Red Cross and Red Crescent, the World Federation of Societies of Anaesthesiologists, and the European Society of Anaesthesiology actively participated in WRAH 2019. Tool kits and information packs were circulated to 194 countries worldwide.

The detailed numbers of lay people trained in CPR for WRAH 2019 are presented in the Table. Overall,

social media messaging impacted on as many as 206 million people. When measuring the impact of Twitter, "reach" is the total number of people who see the content and "impressions" are the number of times the content is displayed. The cumulative number on Twitter of the official #WorldRestartaHeart Twitter hashtag and its variants (#restartaheart and #restartaheartday) was 168.6 million, measured using Keyhole (<https://keyhole.co/about-us/>). However, some users may have used multiple hashtags within one tweet. The remainder of the social media impact total comprised the reach on other social media platforms (eg, Facebook and Instagram). In addition, >5.4 million people were trained in CPR worldwide

**Table. Lay People Trained in CPR During WRAH 2019**

Organization/Region	Country	No. Trained in CPR	Total
European Resuscitation Council	United Kingdom	291 000	494 402
	Poland	150 560	
	Germany	30 000	
	Italy	15 000	
	Slovenia	4200	
	Belgium	2538	
	Malta	654	
	Romania	450	
Heart and Stroke Foundation of Canada	Canada	2500	2500
Australian and New Zealand Council on Resuscitation	Australia	1000	3500
	New Zealand	2500	
American Heart Association*	United States	7900	7900
Resuscitation Council of Asia	Japan	2 480 000	4 371 143
	Taiwan	1 782 676	
	Singapore	61 590	
	Korea	46 877	
India		500 268	500 268
Sri Lanka		3703	3703
Pan Arab Resuscitation Council	Saudi Arabia	4742	5242
	Oman	500	
InterAmerican Heart Foundation	Brazil	1936	5936
	Peru	4000	
Resuscitation Council of Southern Africa	South Africa	10 000	10 000
International Federation of the Red Cross and Red Crescent	Worldwide	27 276	27 276
Total			5 431 870

Numbers trained in CPR as reported by the participating organizations. CPR training included traditional and hands-only CPR training performed individually or in group settings. CPR indicates cardiopulmonary resuscitation; and WRAH, World Restart a Heart.

\*American Heart Association (AHA) training numbers are from the "AHA traveling Hands-Only mobile tour" in 2019.

in 2019. Initiatives ranged from national awareness campaigns and mass training events to specific national strategies to deliver training to schoolchildren. The training events were not limited to a single day, although October 16, 2019, was used to celebrate and publicize the event. A description of the events that took place in each region and country can be found at <https://ilcor.org/wrah/wrah-2019>.

We hope that our simple and unified global message, “CHECK—CALL—COMPRESS,”<sup>1,2,6,7</sup> will further enable many policy makers around the world to take immediate and sustainable action in this most important healthcare issue and initiative. This has been achieved in many countries by the mandatory inclusion of CPR training on a school curriculum,<sup>10</sup> but any initiative that broadens the availability of CPR training is welcomed. WRAH 2020 will be another great opportunity to build on the success of WRAH 2019: “All citizens of the world can save a life—All that is needed is two hands.”

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Dr Böttiger is European Resuscitation Council (ERC) Treasurer and was ERC Board Director Science and Research until 2020; Chairman, German Resuscitation Council (GRC); Founder, German Resuscitation Foundation; Associated Editor, *European Journal of Anaesthesiology*; Speakers Honorarium from FoMF, Zoll, and Bard; Chairman, GRC; Board Member, German Society of Interdisciplinary Intensive Care and Emergency Medicine; Associated Editor, *Resuscitation*. Dr Carmona is in charge of the project Kids Save Lives Brazil. Dr Castrén is the Honorary Secretary of the International Liaison Committee on Resuscitation (ILCOR). Dr Hoover is employed by the American Heart Association. Dr Kern is the immediate past Chair of the American Heart Association Emergency Cardiovascular Care Committee. Dr Khan is Chairman of the National Cardiopulmonary Resuscitation Committee in the Kingdom of Saudi Arabia, and he is in charge of the project Makkah Almukarramah Heart Safe City. Dr Levi is employed by the American Heart Association. Dr Lim is Treasurer of the Resuscitation Council of Asia and Chairman of the Singapore Resuscitation and First Aid Council. Dr Lockey is Vice President of the Resuscitation Council (United Kingdom). Dr Nakagawa is in charge of the project Kids Save Lives Brazil. Dr Nation is employed as Chief Executive by the New Zealand Resuscitation Council. Dr Neumar is ILCOR Co-Chair and has received National Institutes of Health research funding (R34 HL130738, R44 HL091606, K12 HL133304, and R01 HL133129) and industry research support from PhysioControl (equipment support for laboratory and clinical research). Dr Nolan is Chair of the ERC and Editor-in-Chief of *Resuscitation*. Dr Perkins is Co-Chair of ILCOR and ERC Board Director ILCOR and Guidelines. Dr Sales is employed by the American Heart Association. Dr Semeraro is ILCOR Basic Life Support (BLS) Task Force Member and ERC Science and Education Committee BLS Co-Chair. Dr Toporas is employed by Heart & Stroke Canada. Dr van Grootven is employed by the ERC. Dr Wong is employed by Heart & Stroke Canada. The remaining authors have no disclosures to report.

## REFERENCES

1. Böttiger BW, Lockey A. World Restart a Heart initiative: all citizens of the world can save a life. *Lancet*. 2018;392:1305.
2. Böttiger BW, Lockey A, Aickin R, Bertaut T, Castren M, de Caen A, Censullo E, Escalante R, Gent L, Georgiou M, et al. Over 675,000 lay people trained in cardiopulmonary resuscitation worldwide—the “World Restart a Heart (WRAH)” initiative 2018. *Resuscitation*. 2019;138:15–17. Epub 2019.
3. Taniguchi D, Baernstein A, Nichol G. Cardiac arrest: a public health perspective. *Emerg Med Clin North Am*. 2012;30:1–12.

4. Wissenberg M, Lippert FK, Folke F, Weeke P, Malta Hansen C, Frischknecht Christensen E, Jans H, Anders Hansen P, Lang-Jensen T, Olesen JB, et al. 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;310:1377–1384.
5. Kragholm K, Wissenberg M, Mortensen RN, Hansen SM, Malta Hansen C, Thorsteinsson K, Rajan S, Lippert F, Folke F, Gislason G, et al. Bystander efforts and 1-year outcomes in out-of-hospital cardiac arrest. *N Engl J Med*. 2017;376:1737–1747.
6. Kitamura T, Kiyohara K, Nishiyama C, Kiguchi T, Kobayashi D, Kawamura T, Iwami T. Chest compression-only versus conventional cardiopulmonary resuscitation for bystander-witnessed out-of-hospital cardiac arrest of medical origin: a propensity score-matched cohort from 143,500 patients. *Resuscitation*. 2018;126:29–35.
7. Riva G, Ringh M, Jonsson M, Svensson L, Herlitz J, Claesson A, Djärv T, Nordberg P, Forsberg S, Rubertsson S, et al. Survival in out-of-hospital cardiac arrest after standard cardiopulmonary resuscitation or chest compressions only before arrival of emergency medical services: nationwide study during three guideline periods. *Circulation*. 2019;139:2600–2609.
8. Gräsner JT, Wnent J, Herlitz J, Perkins GD, Lefering R, Tjelmeland I, Koster RW, Masterson S, Rossell-Ortiz F, Maurer H, et al. Survival after out-of-hospital cardiac arrest in Europe—results of the EuReCa TWO study. *Resuscitation*. 2020;148:218–226.
9. Perkins GD, Ji C, Deakin CD, Quinn T, Nolan JP, Scomparin C, Regan S, Long J, Slowther A, Pocock H, et al. A randomized trial of epinephrine in out-of-hospital cardiac arrest. *N Engl J Med*. 2018;379:711–721. Epub 2018.
10. Böttiger BW, Semeraro F, Altemeyer KH, Breckwoldt J, Kreimeier U, Rücker G, Andres J, Lockety A, Lippert FK, Georgiou M, et al. KIDS SAVE LIVES: school children education in resuscitation for Europe and the world. *Eur J Anaesthesiol*. 2017;34:792–796.