

ФГБНУ  
«Федеральный научно-клинический центр  
реаниматологии и реабилитологии»

# Насколько эффективно симуляционное обучение

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*д.м.н., заместитель директора-руководитель*

*НИИ общей реаниматологии имени В.А. Неговского ФНКЦ РР*

НИИ общей реаниматологии им. В.А. Неговского ФНКЦ РР





Рекомендации по проведению  
реанимационных мероприятий  
Европейского совета по реанимации  
(пересмотр 2015 г.)

Под редакцией  
члена-корреспондента РАН  
Мороза В. В.

*3-е издание, переработанное и дополненное*

Москва  
2016

<http://cprguidelines.eu>

[www.rusnrc.com](http://www.rusnrc.com)

[https://cprguidelines.eu/  
guidelines-public-  
comment](https://cprguidelines.eu/guidelines-public-comment)

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Contents lists available at ScienceDirect

Resuscitation

journal homepage: [www.elsevier.com/locate/resuscitation](http://www.elsevier.com/locate/resuscitation)



Part 8: Education, implementation, and teams  
2015 International Consensus on Cardiopulmonary Resuscitation and  
Emergency Cardiovascular Care Science with Treatment  
Recommendations<sup>☆</sup>

Judith C. Finn<sup>\*,1</sup>, Farhan Bhanji<sup>1</sup>, Andrew Lockey, Koenraad Monsieurs, Robert Frengley,  
Taku Iwami, Eddy Lang, Matthew Huei-Ming Ma, Mary E. Mancini, Mary Ann McNeil,  
Robert Greif, John E. Billi, Vinay M. Nadkarni, Blair Bigham, on behalf of the Education,  
Implementation, Teams Chapter Collaborators<sup>2</sup>

Circulation

**AHA SCIENTIFIC STATEMENT**

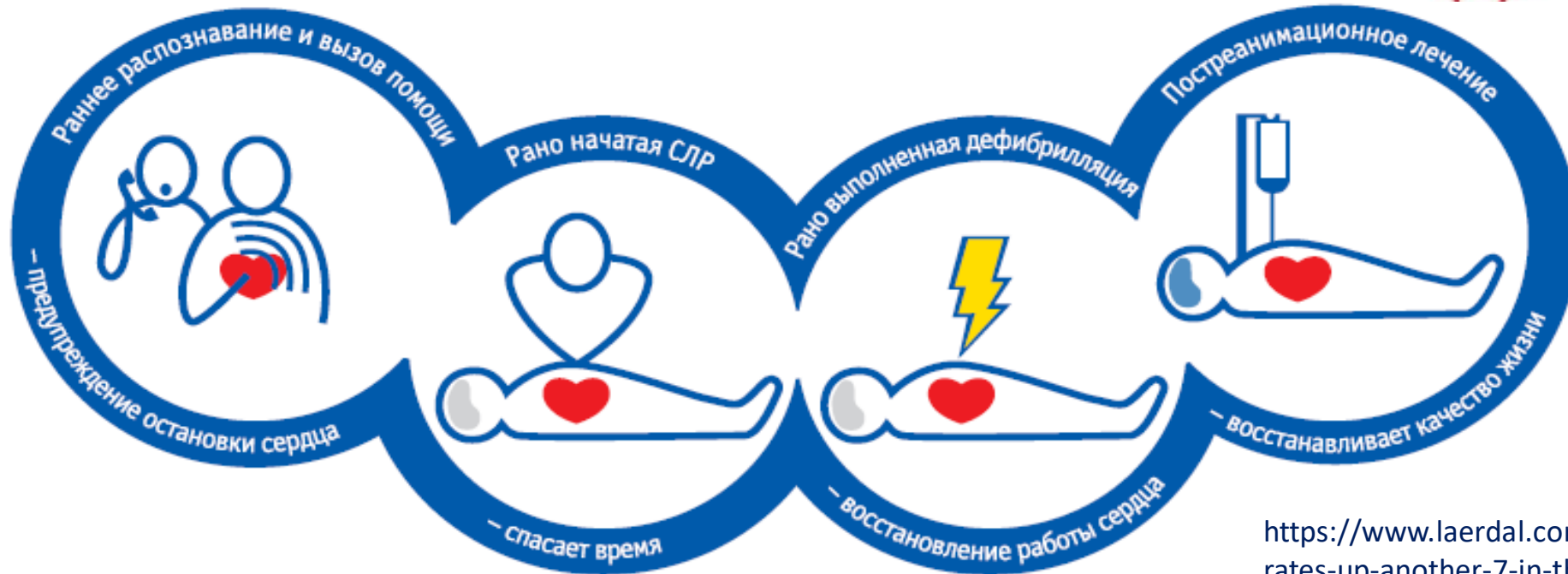
## Resuscitation Education Science: Educational Strategies to Improve Outcomes From Cardiac Arrest

A Scientific Statement From the American Heart Association

*Circulation*. 2018;138:00–00. DOI: 10.1161/CIR.0000000000000583



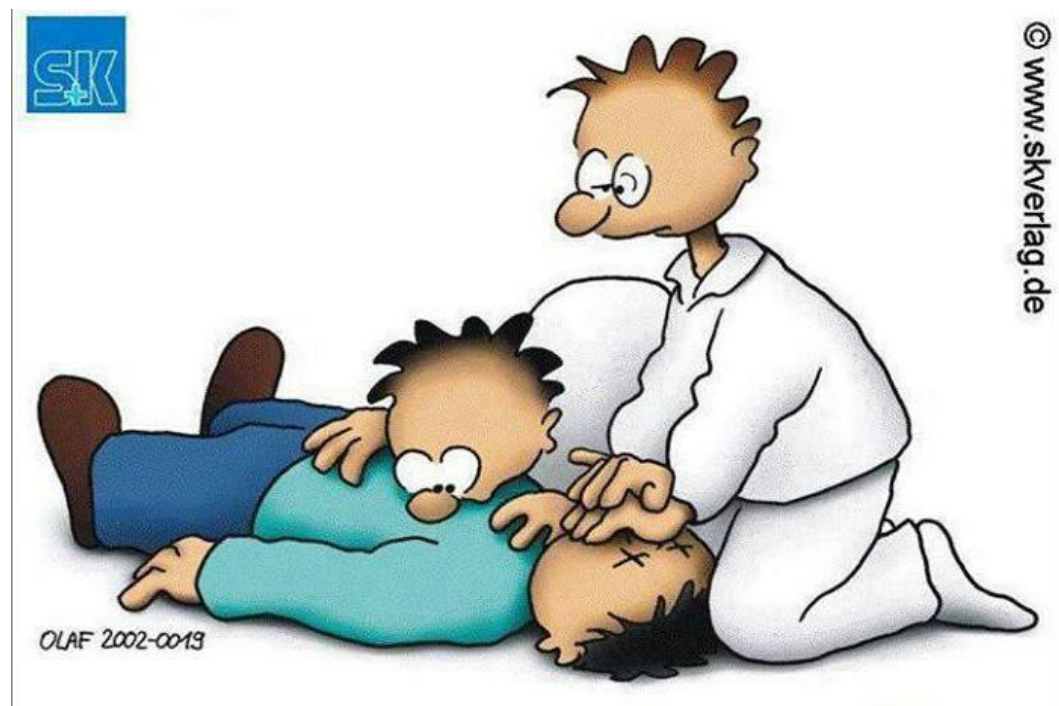
# The Utstein Formula of Survival



<https://www.laerdal.com/docid/48812701/Survival-rates-up-another-7-in-the-Stavanger-region>



# Тренинг и регулярный ретренинг!



НИИ общей реаниматологии им. В.А. Неговского ФНКЦ РР





**BLS**

BASIC LIFE SUPPORT



**ILS**

IMMEDIATE LIFE SUPPORT



**ALS**

ADVANCED LIFE SUPPORT



**BLS-I**

BASIC LIFE SUPPORT - INSTRUCTOR



**EPILS**

EUROPEAN PAEDIATRIC IMMEDIATE LIFE SUPPORT



**EPALS**

EUROPEAN PAEDIATRIC ADVANCED LIFE SUPPORT



**NLS**

NEWBORN LIFE SUPPORT

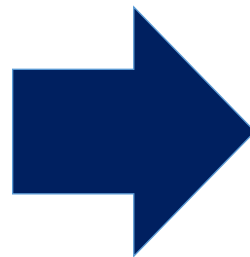


**GIC**

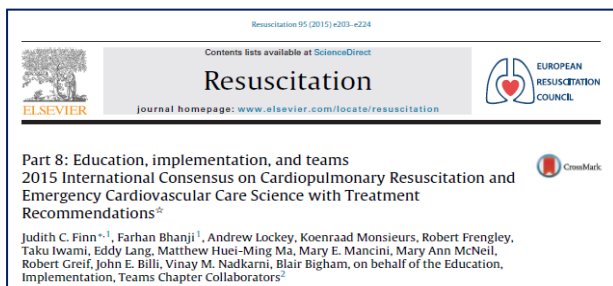
GENERIC INSTRUCTOR COURSE



- Методы обучения (?)
- Уровень реалистичности оборудования (?)
- Пре-курс подготовка (?)
- Нетехнические навыки, командный тренинг (?)
- Интервалы ретренинга (?)
- Методы дебрифинга (?)
- Медиа-технологии (?)



- ✓ Знания
- ✓ Желание проводить СЛР
- ✓ Качество СЛР
- ✓ Закрепление навыка (окончание курса, 2 нед., 3-12 мес.)
  
- ✓ **Исходы в клинике ???**



- Данные по исходам в клинике – не более 5% исследований сферы медицинского образования
- Улучшение знаний и навыков, но умеренное влияние на клинические исходы; большое количество методологических проблем

[[Zendejas B.](#) et al. Patient outcomes in simulation-based medical education: a systematic review. [J Gen Intern Med.](#) 2013 Aug;28(8):1078-89; Cook D. et al. Technology-enhanced simulation for health professions education: a systematic review and meta-analysis. [JAMA.](#) 2011;306:978–88; Cook D. et al. Comparative Effectiveness of Instructional Design Features in Simulation-based Education: Systematic Review and Meta-analysis. [Med Teach.](#) 2012; Online early (doi:10.3109/0142159X.2012.714886)].





Level	Description of Study Methodology (Typically in a With/Without Simulation Training Intervention Study Design)	Comments or Examples
0	No measurement of learner performance	Questionnaire of reaction to simulation or change in knowledge
1	Performance measured during simulation only	Can they do better in a simulation?
2	Performance measured during actual clinical care	Can they do better in clinical practice
3	Measurement of improvement in patient outcome	Do patients actually fare better?
3' (cost effectiveness)	Measurement of the cost of the intervention and the outcome and monetary benefit	Does the intervention yield a net saving of money (with/without also improving outcome)?
4	Measurement of dissemination of the intervention to sites beyond trial sites	Can the intervention be spread elsewhere successfully?
5	Measurement of the adoption of the intervention in regular practice	Can the intervention be widely adopted?
6	Measurement of population health outcome	Will it make an impact on the patient population as a whole?

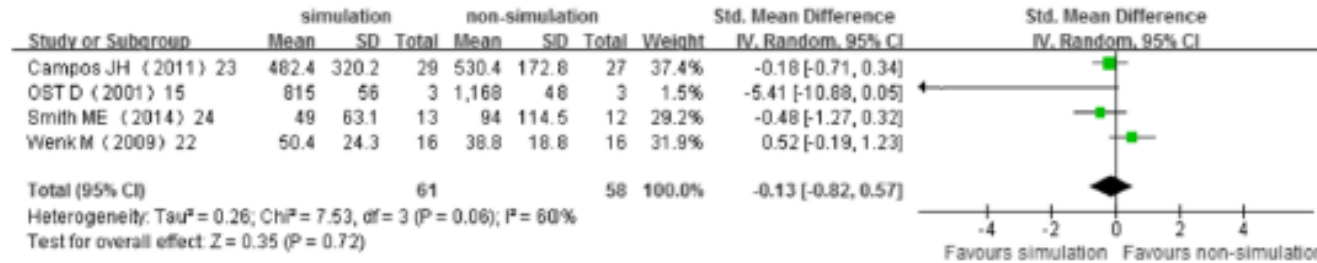




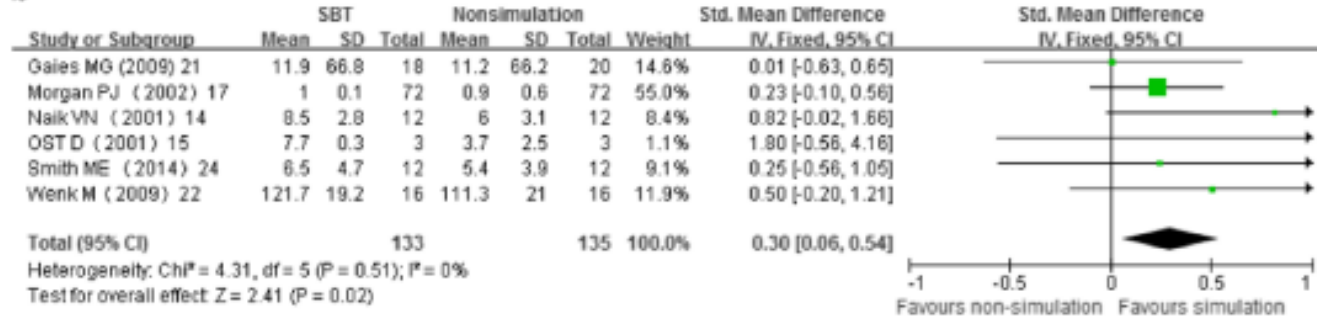
# Airway management education: simulation based training versus non-simulation based training-A systematic review and meta-analyses

Yanxia Sun<sup>1\*</sup>, Chuxiong Pan<sup>1\*</sup>, Tianzuo Li<sup>2</sup> and Tong J. Gan<sup>3</sup>

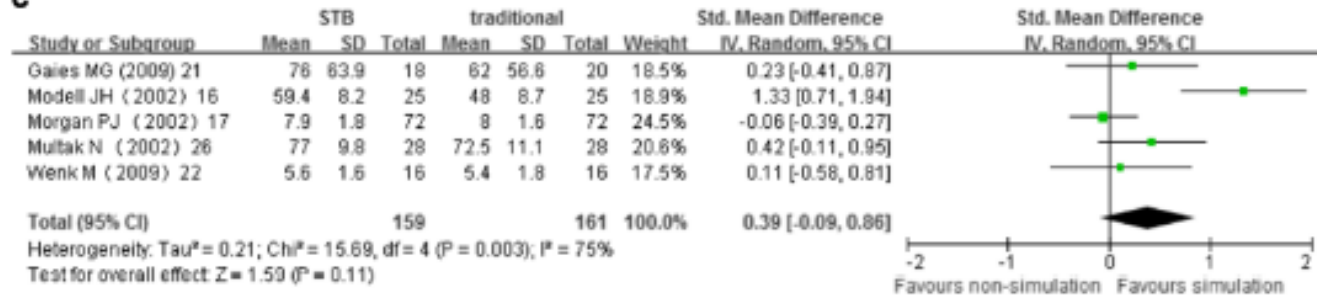
**a**



**b**



**c**

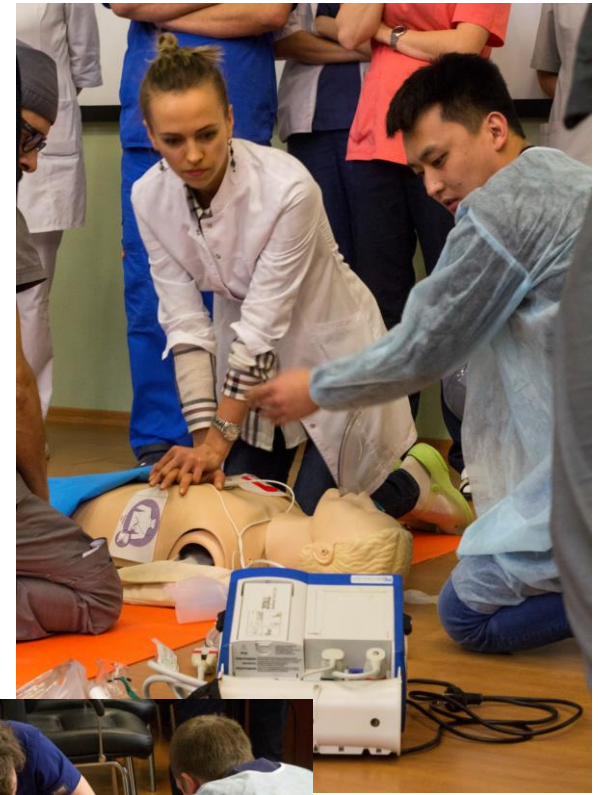
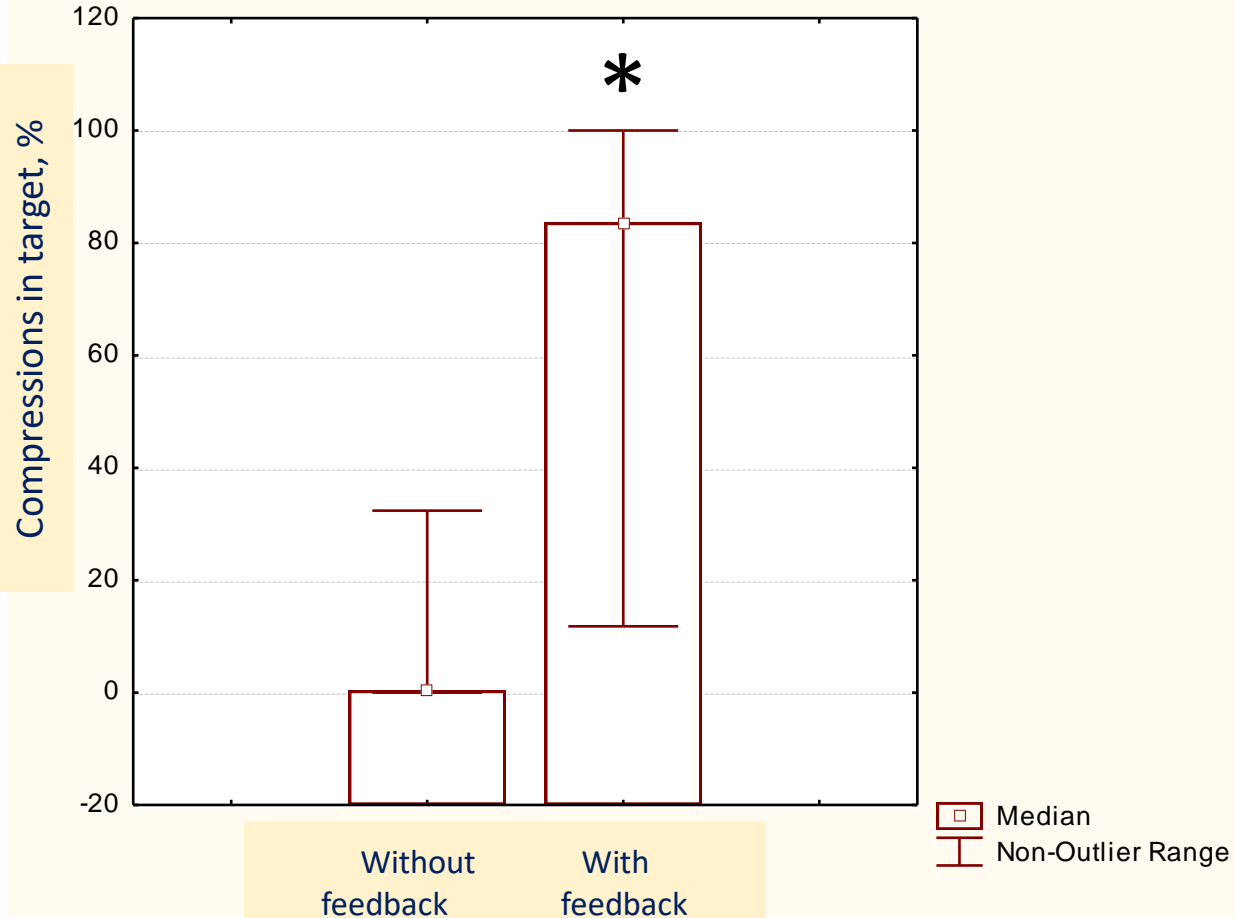


Our findings supported the previous evidence that SBT are enjoyable and attractive instruments for airway management training [29]. However, clinical or knowledge advantage remains a significant concern to justify the implementation of simulation in a medical program. In the current systematic review, we could not demonstrate the benefit of any group in time-skill improvement and knowledge acquisition. Although trainees in SBT group showed a significant improvement in performance behaviors, this did not translate into increased success rate in clinical setting. Moreover, three of included studies showed that the skills decay significantly in both SBT and NSBT groups and the between-group differences were no longer evident at follow-up assessment. Those findings demonstrate that

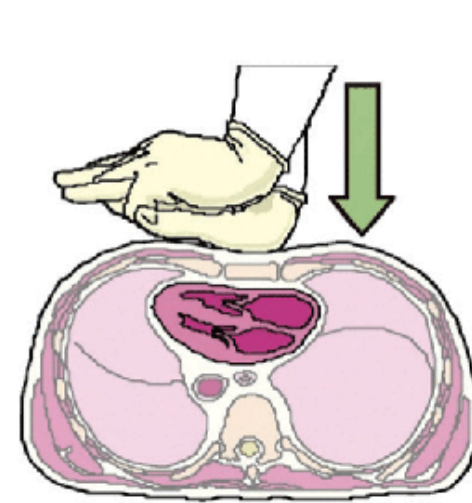
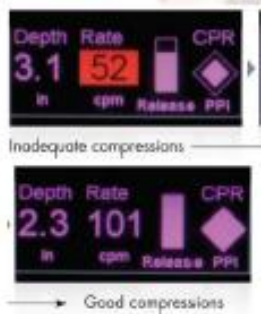
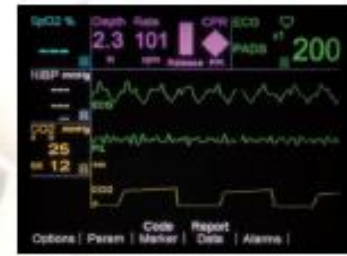
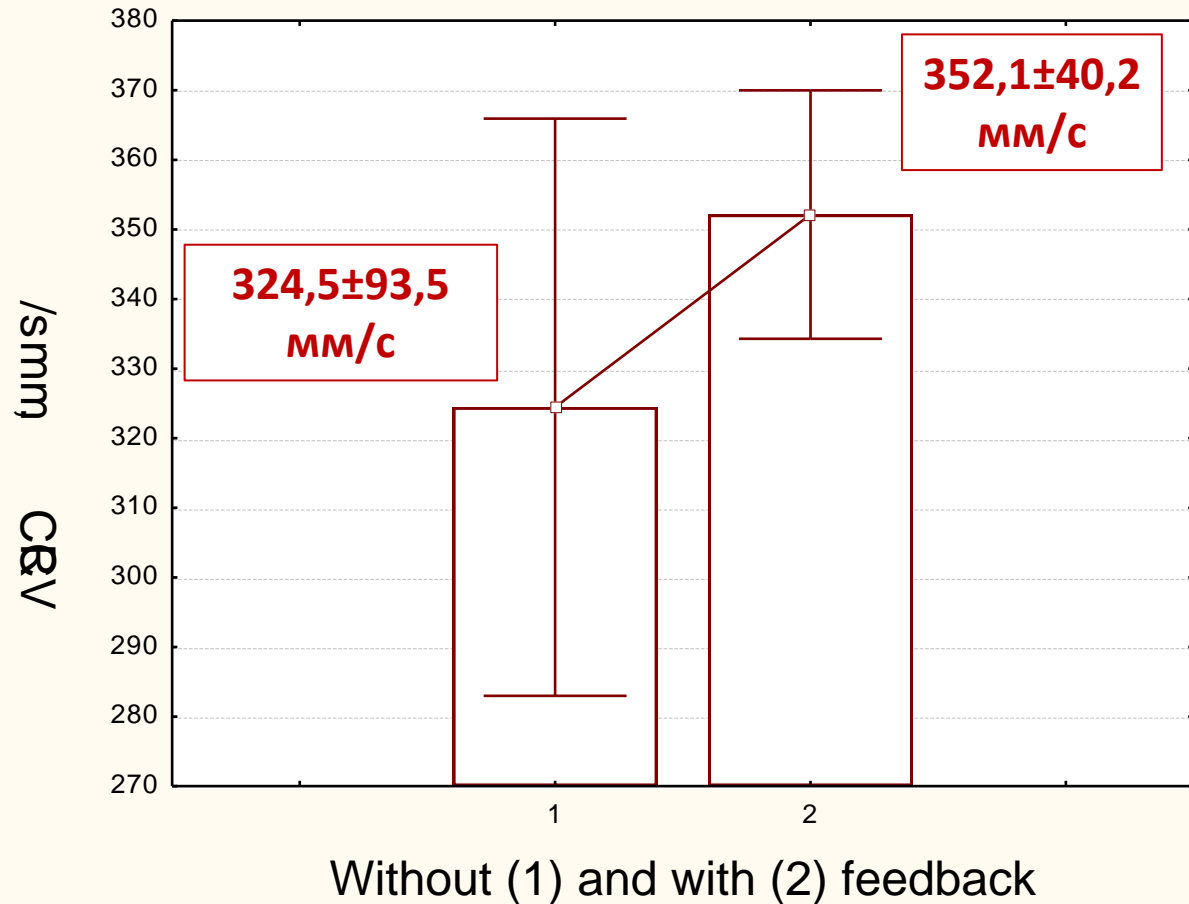


# Эффективность...

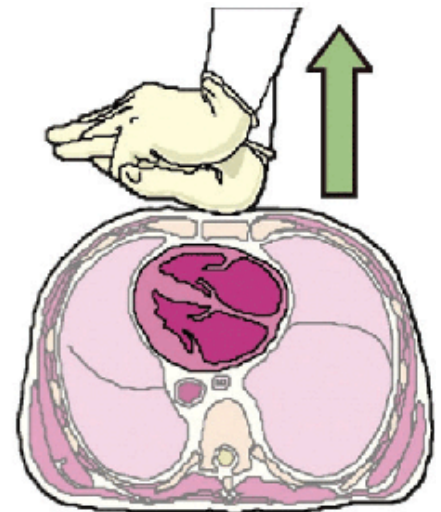
*частота, глубина, фракция компрессий...*



# Скорость декомпрессии грудной клетки (CCRV)



a) Compression



b) Decompression

<http://www.jems.com/articles/supplements/special-topics/perfusion-demand/improving-survival-cardiac-arrest-using-0.html>

<https://doi.org/10.1016/j.resuscitation.2018.07.231>



The Influence of Scenario-Based Training and Real-Time  
Audiovisual Feedback on Out-of-Hospital Cardiopulmonary  
Resuscitation Quality and Survival From Out-of-Hospital  
Cardiac Arrest

Bentley J. Bobrow, MD; Tyler F. Vadeboncoeur, MD; Uwe Stolz, PhD, MPH; Annemarie E. Silver, PhD; John M. Tobin, CEP;  
Scott A. Crawford, EMT-B; Terence K. Mason, RN; Jerome Schirmer, CEP; Gary A. Smith, MD; Daniel W. Spaite, MD

Параметры СЛР	До	После
Глубина (см)	<b>4,34</b>	<b>5,08</b>
Частота (компрессии/минуту)	<b>128</b>	<b>106</b>
Фракция СЛР(%)	<b>66.2</b>	<b>83.7</b>
Паузы до/после разряда (сек)	<b>42.7</b>	<b>21.3</b>
Частота вентиляций (/мин)	<b>11.7</b>	<b>9.5</b>





Part 8: Education, implementation, and teams  
2015 International Consensus on Cardiopulmonary Resuscitation and  
Emergency Cardiovascular Care Science with Treatment  
Recommendations<sup>☆</sup>



Judith C. Finn<sup>\*,1</sup>, Farhan Bhanji<sup>1</sup>, Andrew Lockey, Koenraad Monsieurs, Robert Frengley,  
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Implementation, Teams Chapter Collaborators<sup>2</sup>



ILCOR Consensus Statement

ILCOR Scientific Knowledge Gaps and Clinical Research Priorities for  
Cardiopulmonary Resuscitation and Emergency Cardiovascular Care: A  
Consensus Statement<sup>☆</sup>



Monica E. Kleinman, Gavin D. Perkins, Farhan Bhanji, John E. Billi, Janet E. Bray,  
Clifton W. Callaway, Allan de Caen, Judith C. Finn, Mary Fran Hazinski, Swee Han Lim,  
Ian Maconochie, Peter Morley, Vinay Nadkarni, Robert W. Neumar, Nikolaos Nikolaou,  
Jerry P. Nolan, Amelia Reis, Alfredo F. Sierra, Eunice M. Singletary, Jasmeet Soar, David Stanton,  
Andrew Travers, Michelle Welsford, David Zideman

**Нет исследований, доказывающих влияние симуляционных курсов на  
качество СЛР в клинике или выживаемость пациентов**

*Consensus on science*

No studies addressed the critical outcomes of **skill performance**  
**in actual resuscitations** or **survival of patients**.





ELSEVIER

TRAINING AND EDUCATIONAL PAPER



## Advanced cardiac life support training improves long-term survival from in-hospital cardiac arrest<sup>☆</sup>

Miguel Antonio Moretti<sup>a</sup>, Luiz Antonio Machado Cesar<sup>a</sup>,  
Amit Nusbacher<sup>a</sup>, Karl B. Kern<sup>b,\*</sup>, Sergio Timerman<sup>a</sup>,  
José Antonio Franchini Ramires<sup>a</sup>

### Частота оживления

Обученный (ACLS) персонал – 43,4% vs. необученный (ACLS) персонал – 27,1% (**p=0,04**)

### Выживаемость до выписки из стационара

Обученный (ACLS) персонал – 31,7% vs. необученный (ACLS) персонал – 20,6% (p=0,23)

### 30-суточная летальность

Обученный (ACLS) персонал – 26,8% vs. необученный (ACLS) персонал – 5,9% (**p=0,02**)

### Летальность 1 год

Обученный (ACLS) персонал – 21,9% vs. необученный (ACLS) персонал – 0% (**p=0,002**)





Clinical paper

## Adherence to advanced cardiovascular life support (ACLS) guidelines during in-hospital cardiac arrest is associated with improved outcomes<sup>☆</sup>

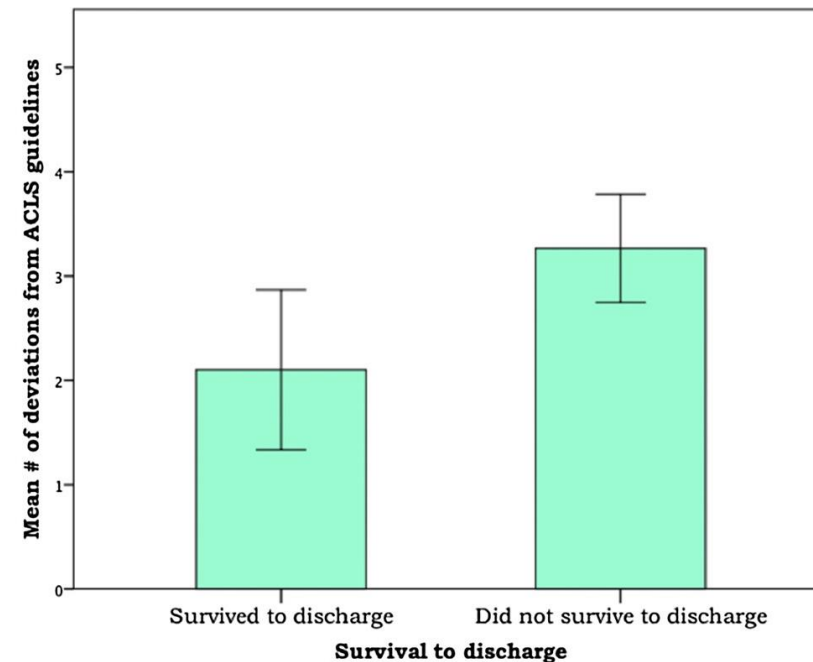
Kimia Honarmand<sup>a,b,c</sup>, Chantal Mepham<sup>c</sup>, Craig Ainsworth<sup>b,d</sup>, Zahira Khalid<sup>a,c,\*</sup>

<sup>a</sup> Division of Internal Medicine, Department of Medicine, McMaster University, Hamilton, Canada

<sup>b</sup> Hamilton Health Sciences Centre, Hamilton, Canada

<sup>c</sup> St. Joseph's Healthcare, Hamilton, Canada

<sup>d</sup> Division of Cardiology, Department of Medicine, McMaster University Hamilton, Canada



Outcome	Number of deviations Mean (SD)
Survived to hospital discharge	2.1 (SD 1.7) n=20
Did not survive event	3.3 (SD 3.1) n=140







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Resuscitation

journal homepage: [www.elsevier.com/locate/resuscitation](http://www.elsevier.com/locate/resuscitation)



Review

## Impact of adult advanced cardiac life support course participation on patient outcomes—A systematic review and meta-analysis



Andrew Lockey<sup>a,\*</sup>, Yiqun Lin<sup>b</sup>, Adam Cheng<sup>b</sup>

<sup>a</sup> *Calderdale & Huddersfield Foundation Trust, Salterhebble, Halifax HX3 0PW, UK*

<sup>b</sup> *University of Calgary, KidSim-ASPIRE Research Program, Section of Emergency Medicine, Department of Pediatrics, Alberta Children's Hospital, 2888 Shaganappi Trail NW, Calgary, Alberta T3B 6A8, Canada*



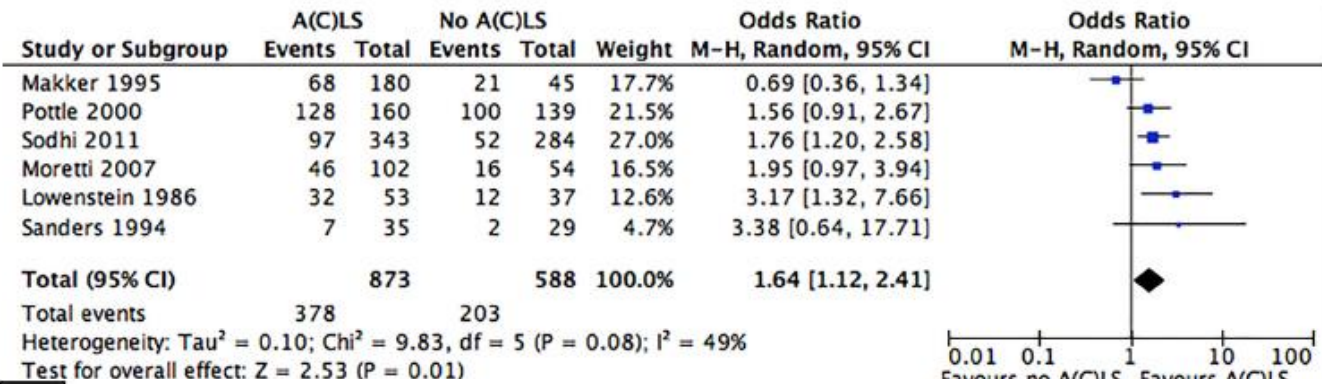


Review

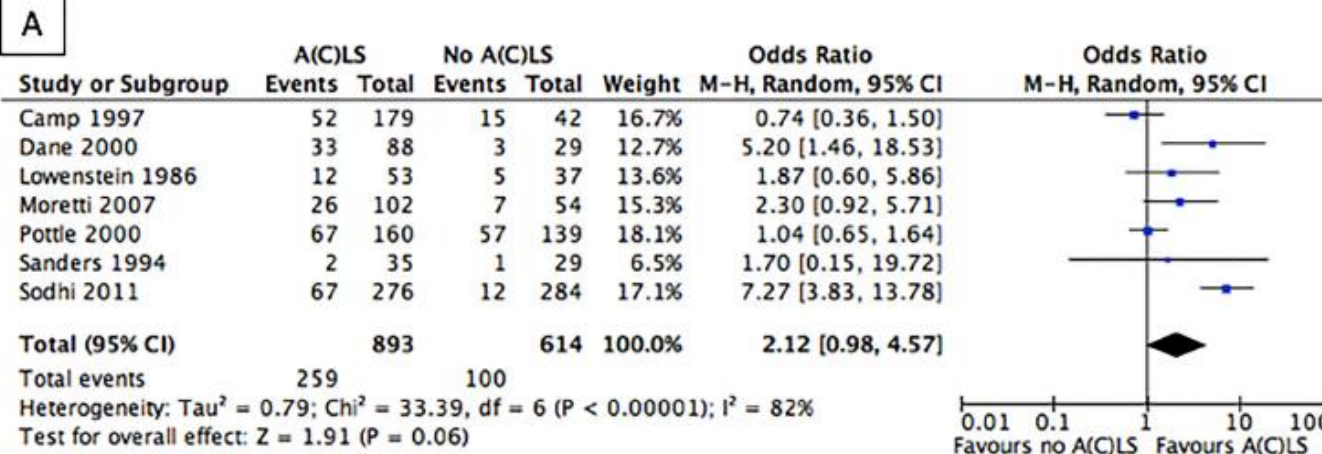
Impact of adult advanced cardiac life support course participation on patient outcomes—A systematic review and meta-analysis

Andrew Lockey<sup>a,\*</sup>, Yiqun Lin<sup>b</sup>, Adam Cheng<sup>b</sup>

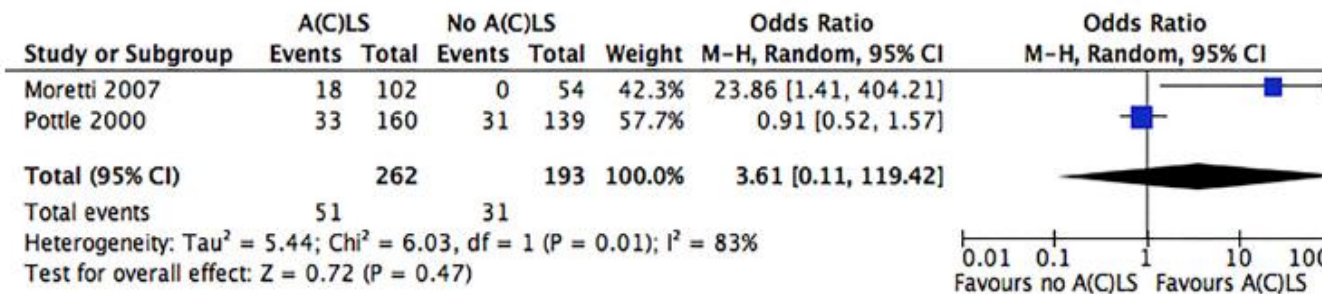
<sup>a</sup> Calderdale & Huddersfield Foundation Trust, Salford, Halifax HX3 0PW, UK  
<sup>b</sup> University of Calgary, Killam-ASPIC Research Program, Section of Emergency Medicine, Department of Pediatrics, Alberta Children's Hospital, 2888 Shaganappi Trail NW, Calgary, Alberta T2B 0A6, Canada



# ROSC



# До выписки из стационара



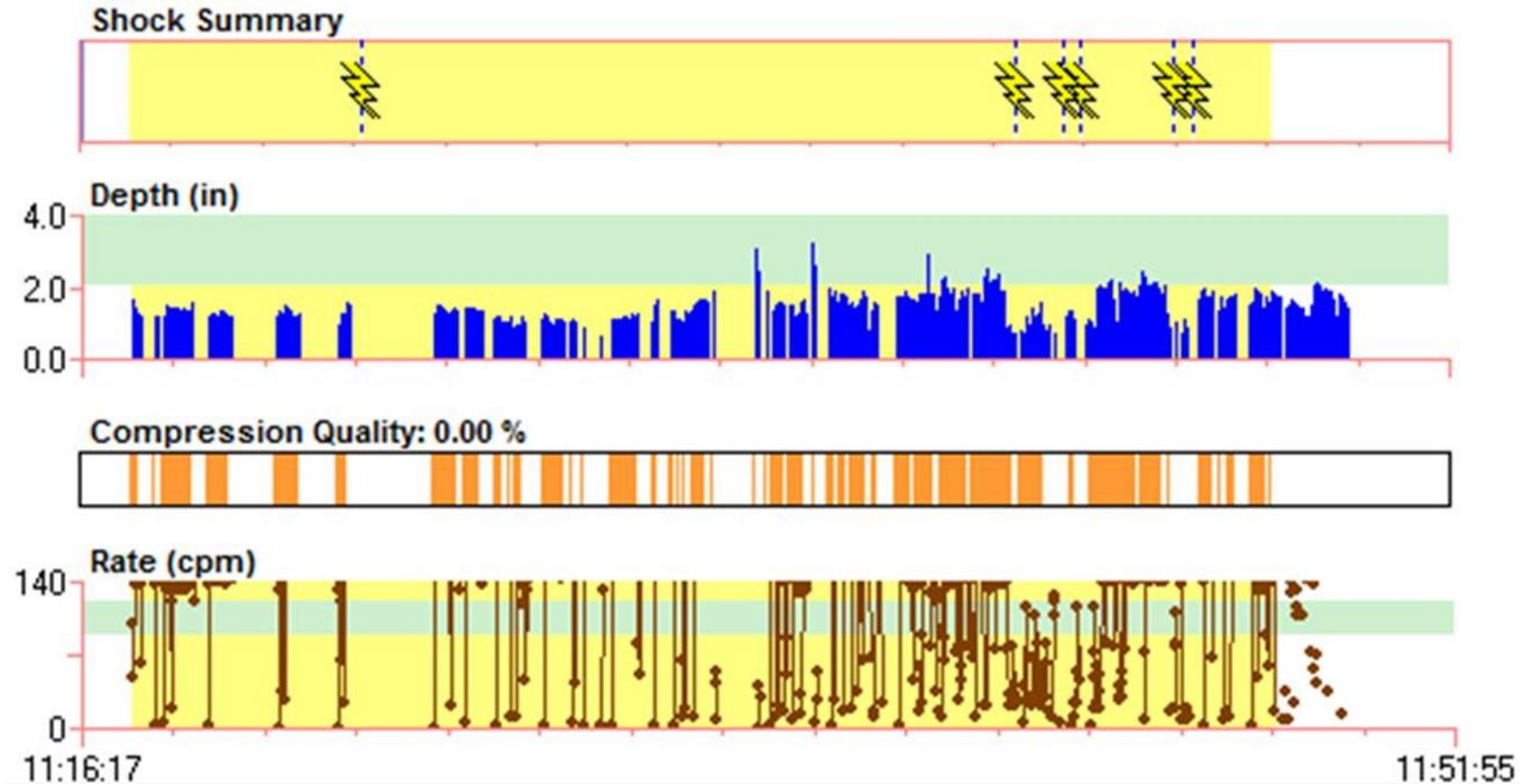
# 1 год



# ДО

The Influence of Scenario-Based Training and Real-Time Audiovisual Feedback on Out-of-Hospital Cardiopulmonary Resuscitation Quality and Survival From Out-of-Hospital Cardiac Arrest

Bentley J. Bobrow, MD; Tyler F. Vadeboncoeur, MD; Uwe Stolz, PhD, MPH; Annemarie E. Silver, PhD; John M. Tobin, CEP; Scott A. Crawford, EMT-B; Terence K. Mason, RN; Jerome Schirmer, CEP; Gary A. Smith, MD; Daniel W. Spalte, MD



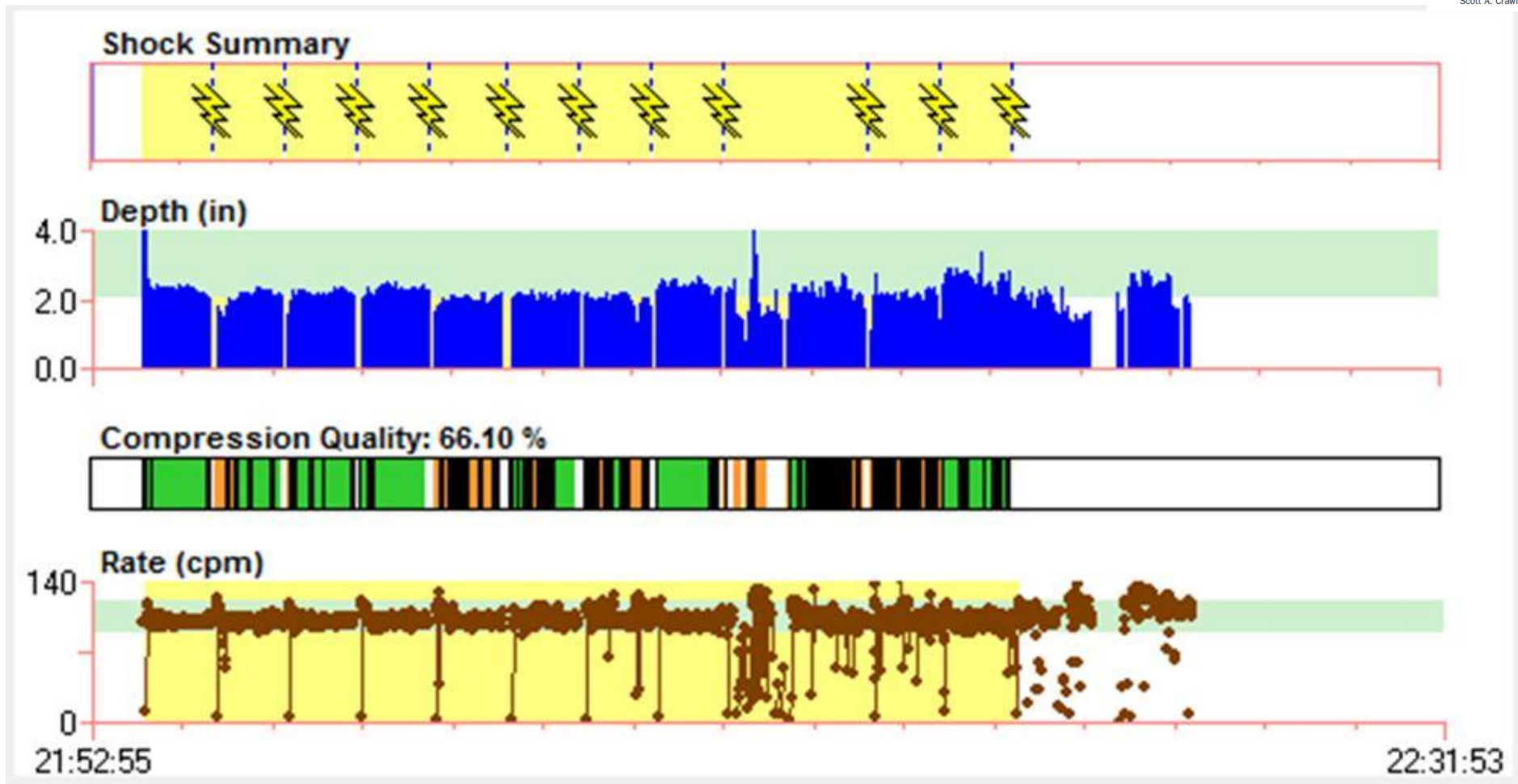
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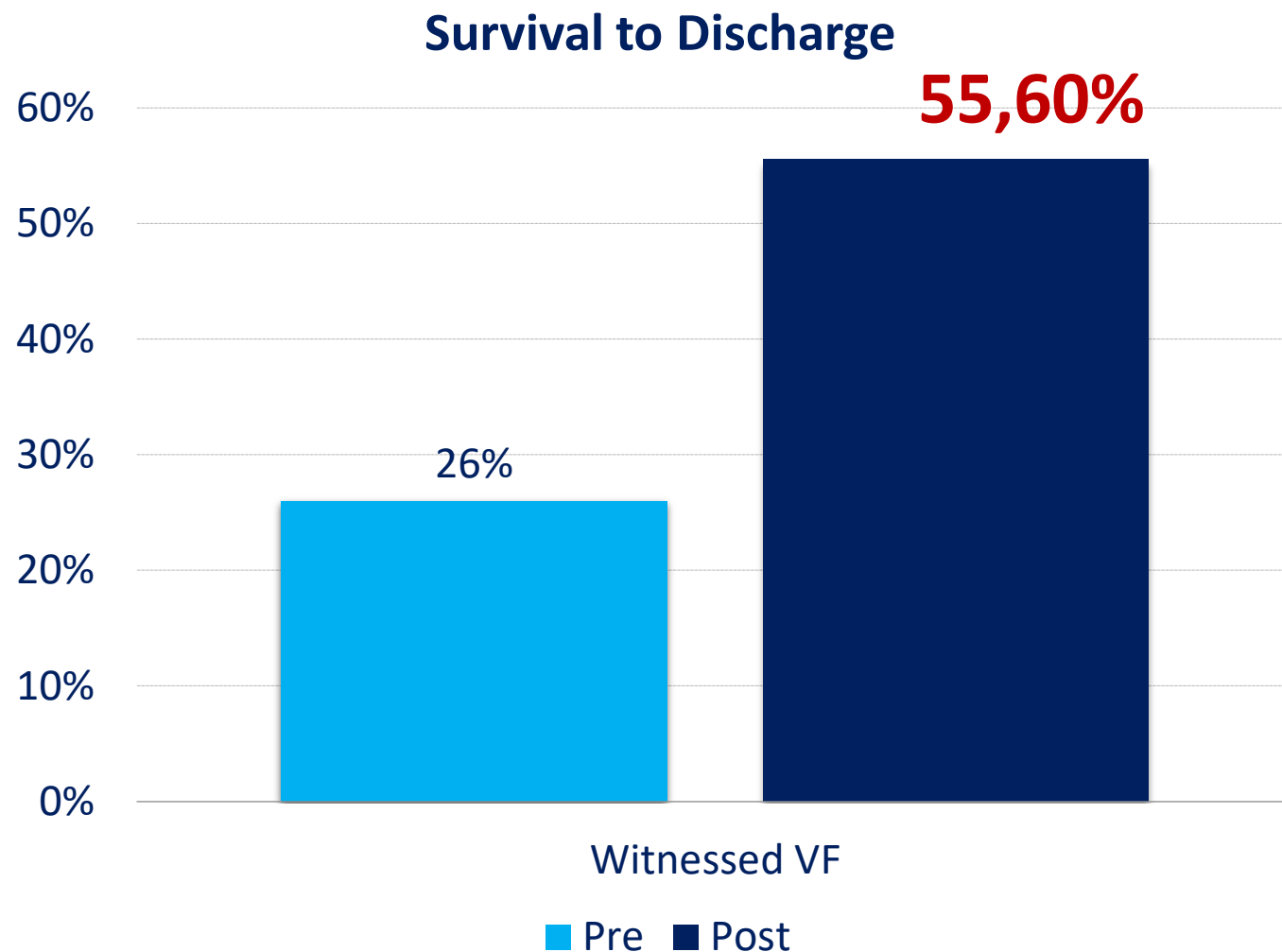
# ПОСЛЕ

The Influence of Scenario-Based Training and Real-Time Audiovisual Feedback on Out-of-Hospital Cardiopulmonary Resuscitation Quality and Survival From Out-of-Hospital Cardiac Arrest

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# Исходы при ФЖ, развившейся при свидетелях



All-rhythms survival increased from 8.7% to 13.9%

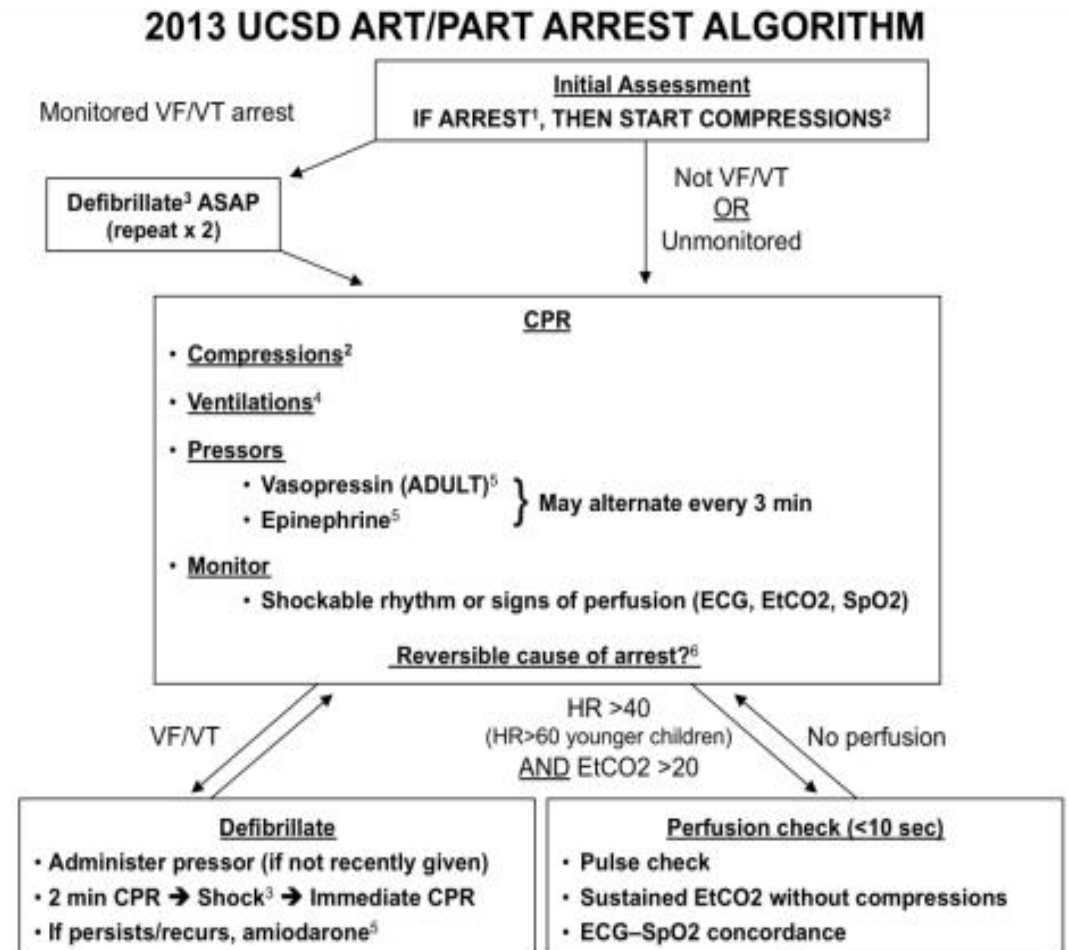


# Evidence: Davis et al.

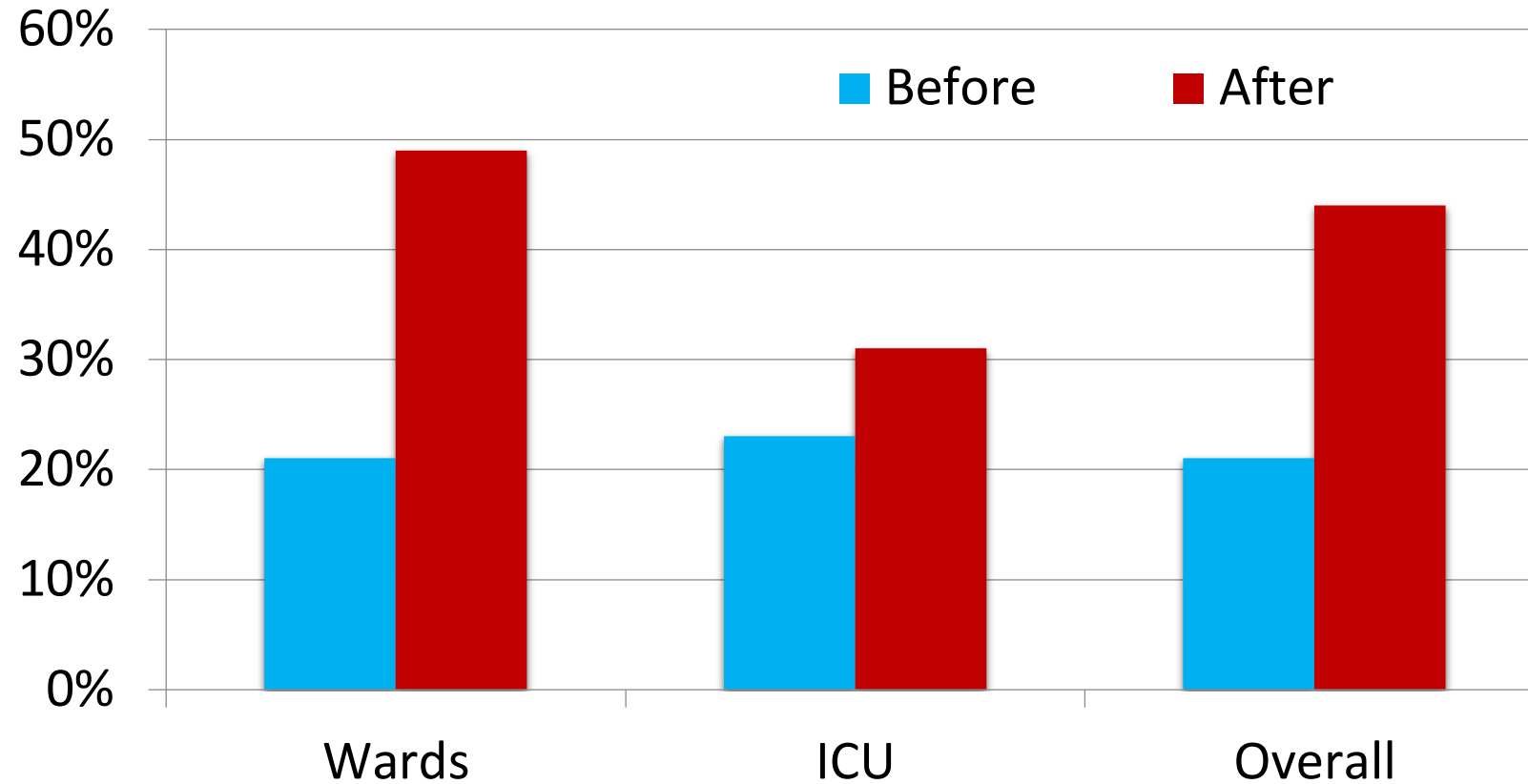
Instituted “a resuscitation bundle” to improve outcomes from in-hospital arrest including CPR feedback and new simplified training algorithms (ART) focused on High-Quality CPR in non-perfusing patients.

***High-quality CPR increased the survival to discharge of in-hospital cardiac arrest to 49%***

University of California San Diego (UCSD) Medical Center



# Survival to hospital discharge: The UCSD Experience



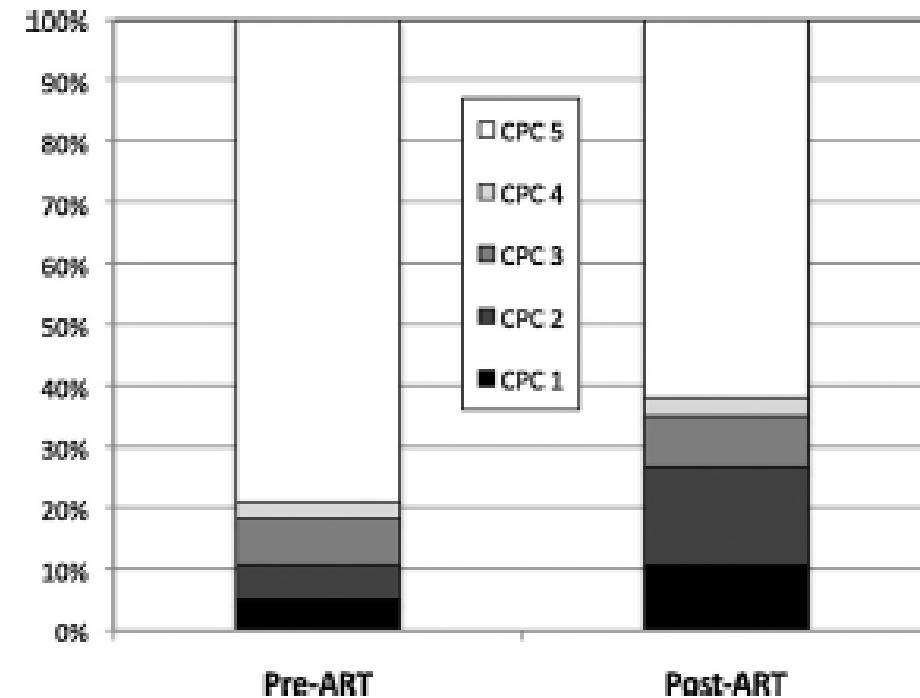
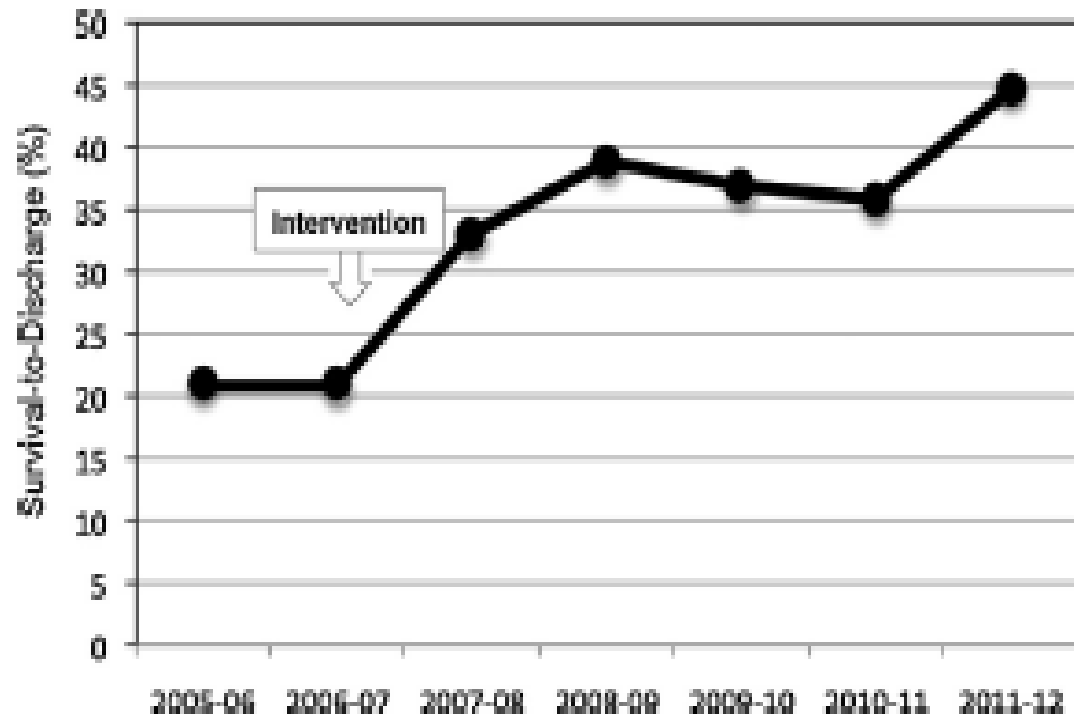
Davis D. et al Abstract: ReSS, AHA 2009



Table 2

Primary outcomes of survival-to-hospital discharge and good neurological outcome at discharge comparing the pre- and post-intervention cohorts.

Outcomes	Pre-intervention (%)	Post-intervention (%)	Unadjusted odds ratio (95% CI)	Adjusted <sup>a</sup> odds ratio (95% CI)	Adjusted p-value
Survival to discharge	38/182 (20.9)	142/374 (38.0)	2.3 (1.6, 3.7)	2.2 (1.4, 3.4)	<0.001
Good neurologic outcome <sup>b</sup>	19/182 (10.4)	99/374 (26.5)	2.7 (1.9, 5.2)	3.0 (1.7, 5.3)	<0.001

<sup>a</sup> Adjusted for age, gender, occurrence during peak hours (7 a.m. to 5 p.m.), initial shockable rhythm, location of arrest (ICU versus non-ICU).<sup>b</sup> Cerebral performance category 1 or 2

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RESUSCITATION  
COUNCIL

Clinical paper

A performance improvement-based resuscitation programme reduces arrest incidence and increases survival from in-hospital cardiac arrest<sup>☆</sup>



Daniel P. Davis<sup>a,\*</sup>, Patricia G. Graham<sup>b</sup>, Ruchika D. Husa<sup>c,d</sup>, Brenna Lawrence<sup>e</sup>, Anushirvan Minokadeh<sup>f</sup>, Katherine Altieri<sup>g</sup>, Rebecca E. Sell<sup>h</sup>

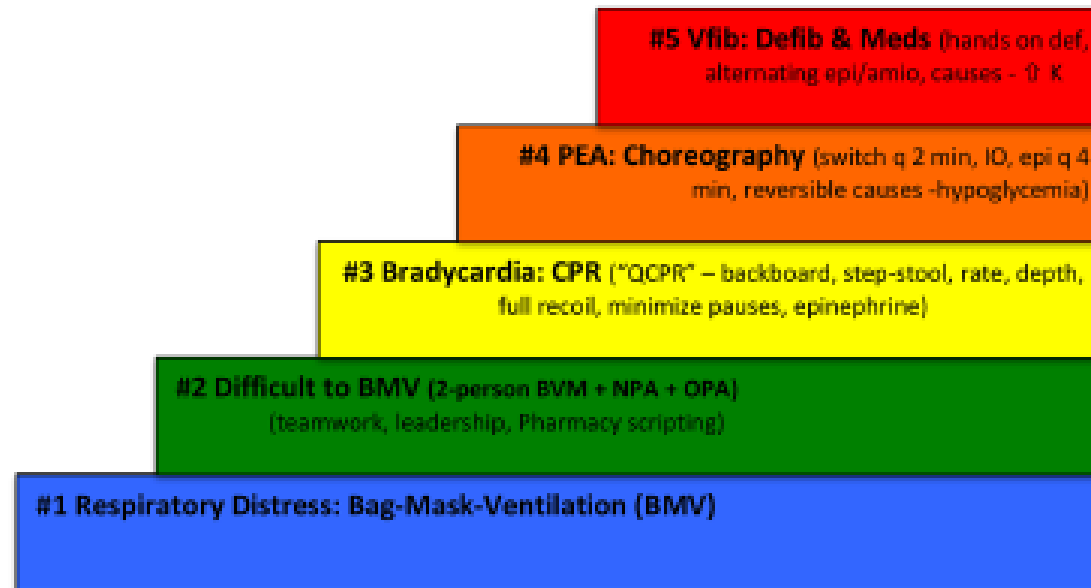




# Rapid Cycle Deliberate Practice in Medical Education - a Systematic Review

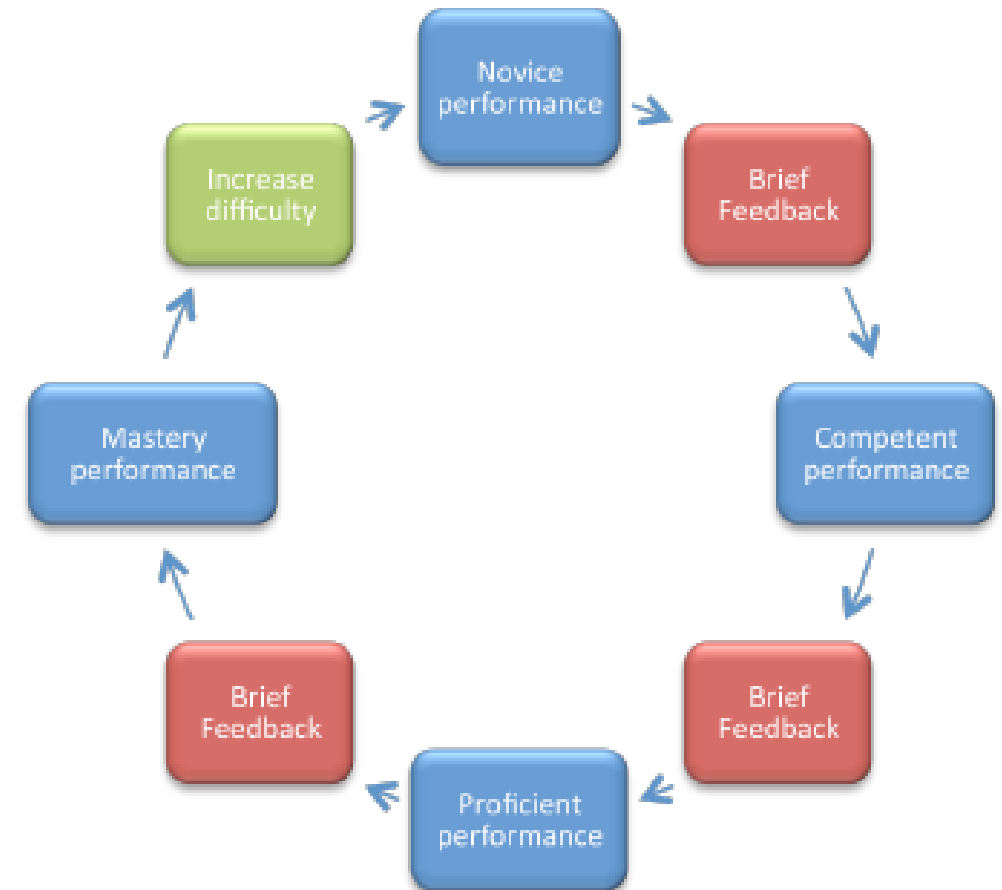
Jillian Taras<sup>1</sup>, Tobias Everett<sup>2</sup>

1. Anesthesiology Resident, University of Toronto, Canada 2. Department of Anesthesia, The Hospital for Sick Children, University of Toronto



After Lemke, et al. with permission (Lemke, et al., 2014)

Taras J, Everett T (April 19, 2017) Rapid Cycle Deliberate Practice in Medical Education - a Systematic Review. Cureus 9(4): e1180. DOI 10.7759/cureus.1180



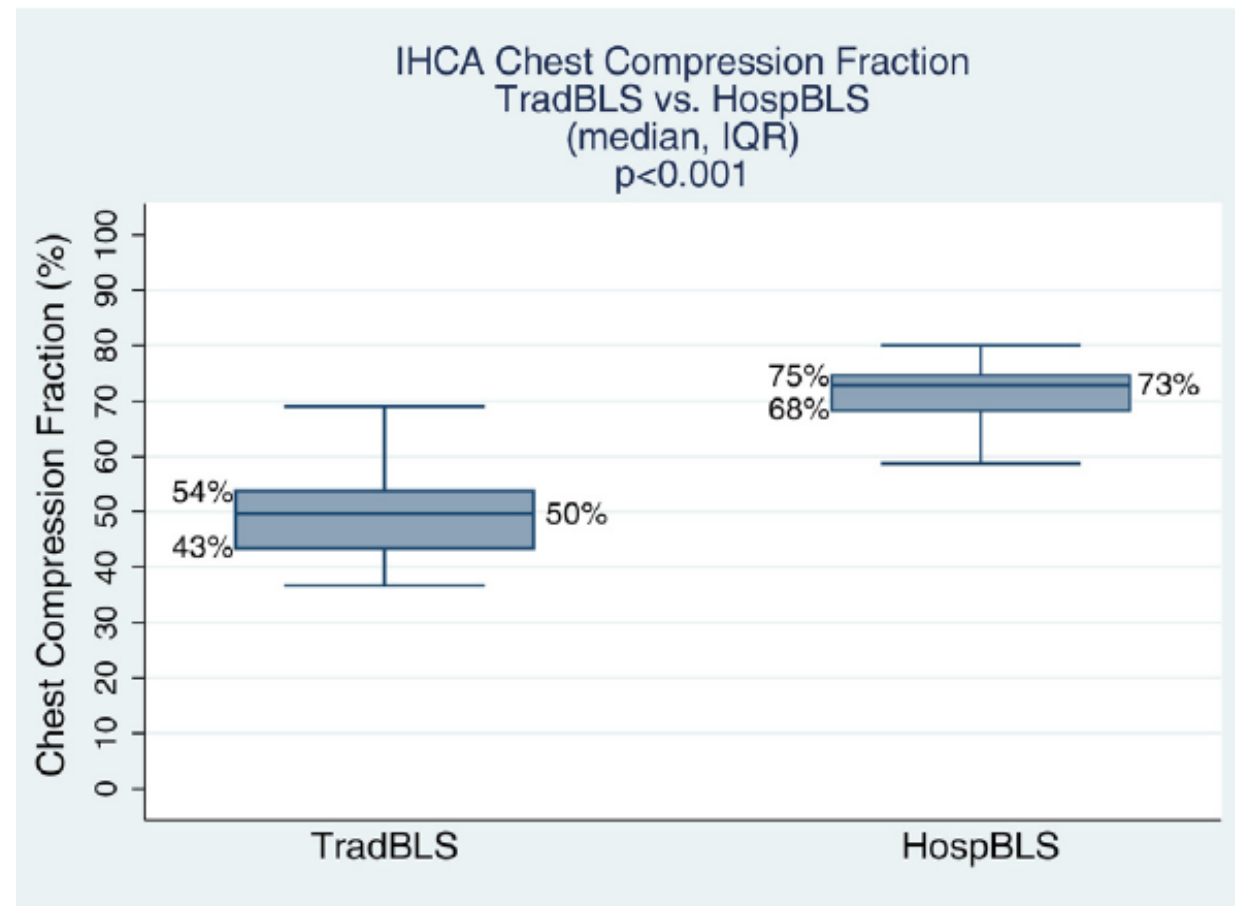
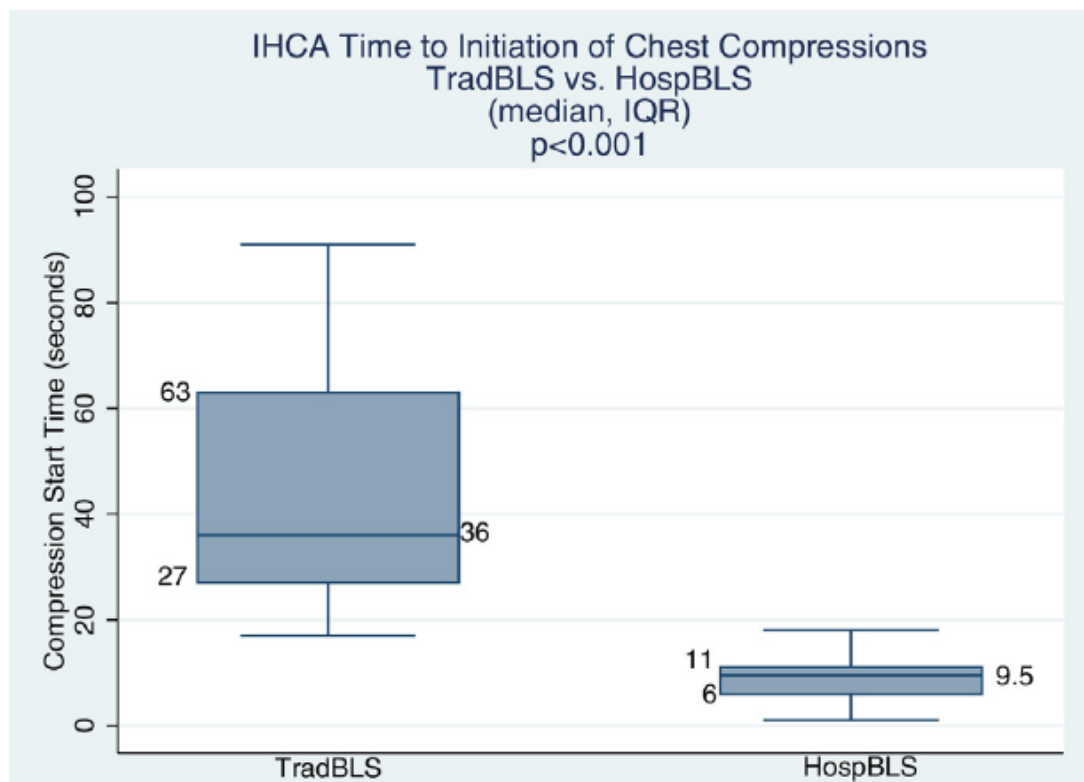


Simulation and education

Integration of in-hospital cardiac arrest contextual curriculum into a basic life support course: a randomized, controlled simulation study

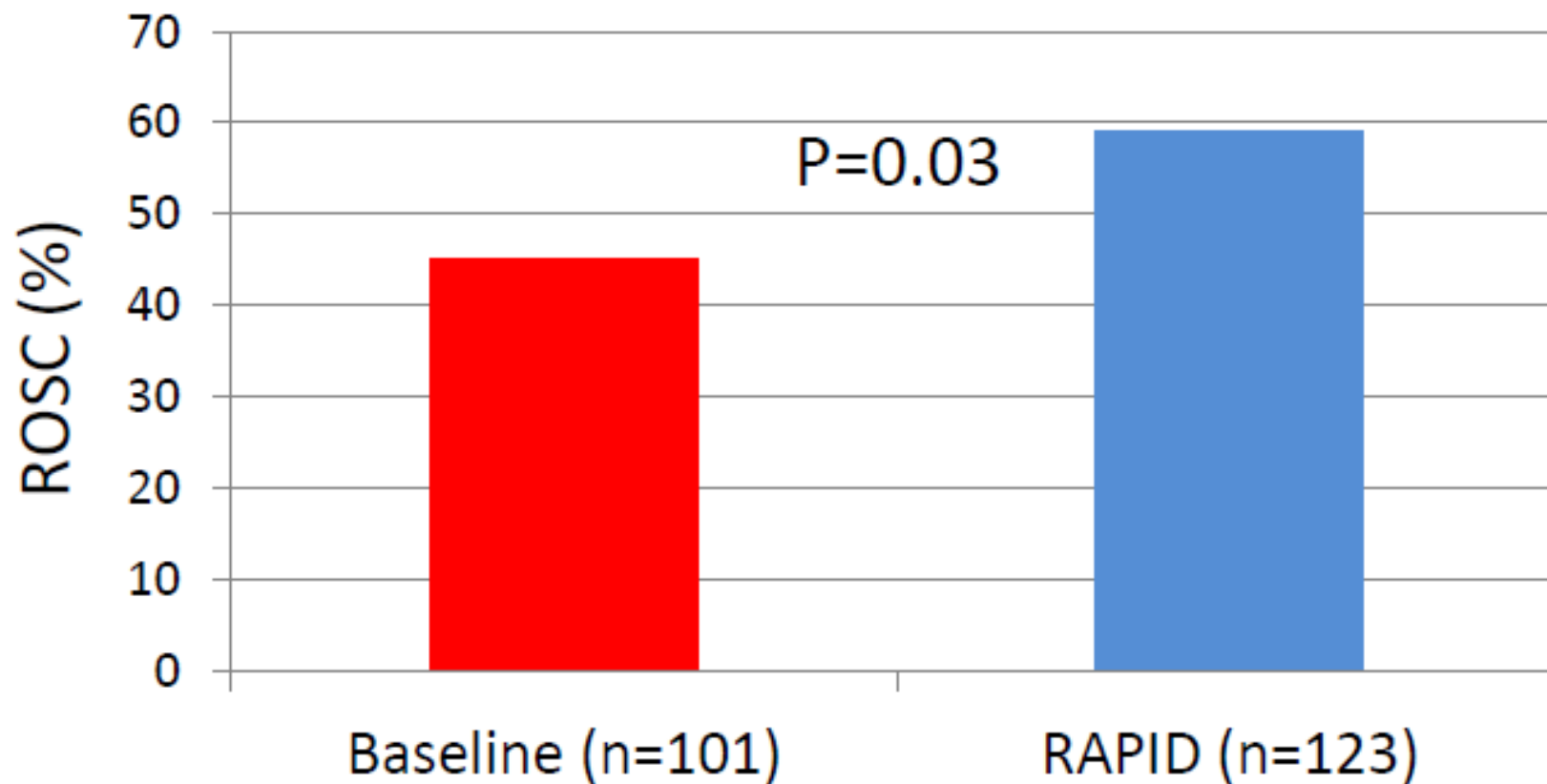


Elizabeth A. Hunt<sup>a,b,c,d,e,\*</sup>, Jordan M. Duval-Arnould<sup>a,b,d,e</sup>, Nnenna O. Chime<sup>a,b</sup>, Kareen Jones<sup>f,g</sup>, Michael Rosen<sup>a,b</sup>, Merona Hollingsworth<sup>h</sup>, Deborah Aksamit<sup>i</sup>, Marida Twilley<sup>j</sup>, Cheryl Camacho<sup>e</sup>, Daniel P. Noguee<sup>a</sup>, Julianna Jung<sup>a,e,j</sup>, Kristen Nelson-McMillan<sup>a,b,c,e</sup>, Nicole Shilkofski<sup>a,b,c,e</sup>, Julianne S. Perretta<sup>a,b,e</sup>



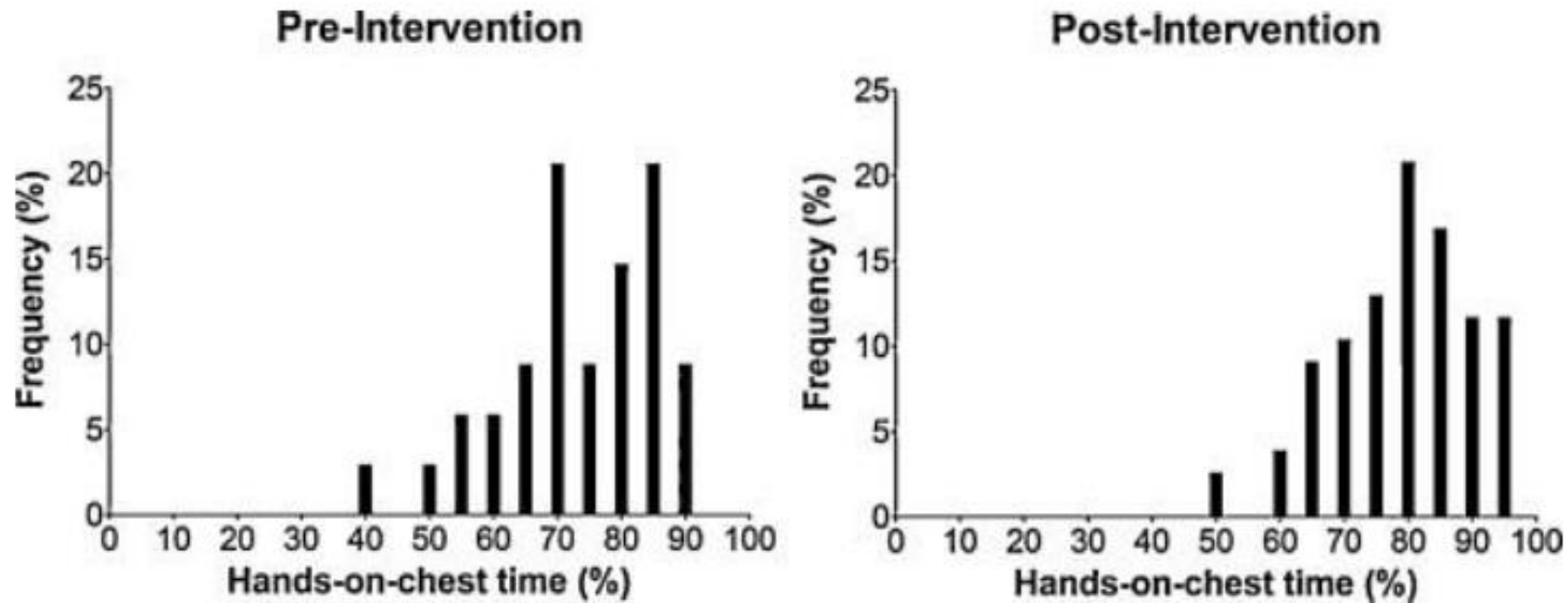
## Improving In-Hospital Cardiac Arrest Process and Outcomes With Performance Debriefing

Edelson DP, Litzinger B, Arora V, et al (Univ of Chicago, Chicago, IL; et al)  
*Arch Intern Med* 168:1063-1069, 2008





Clinical paper

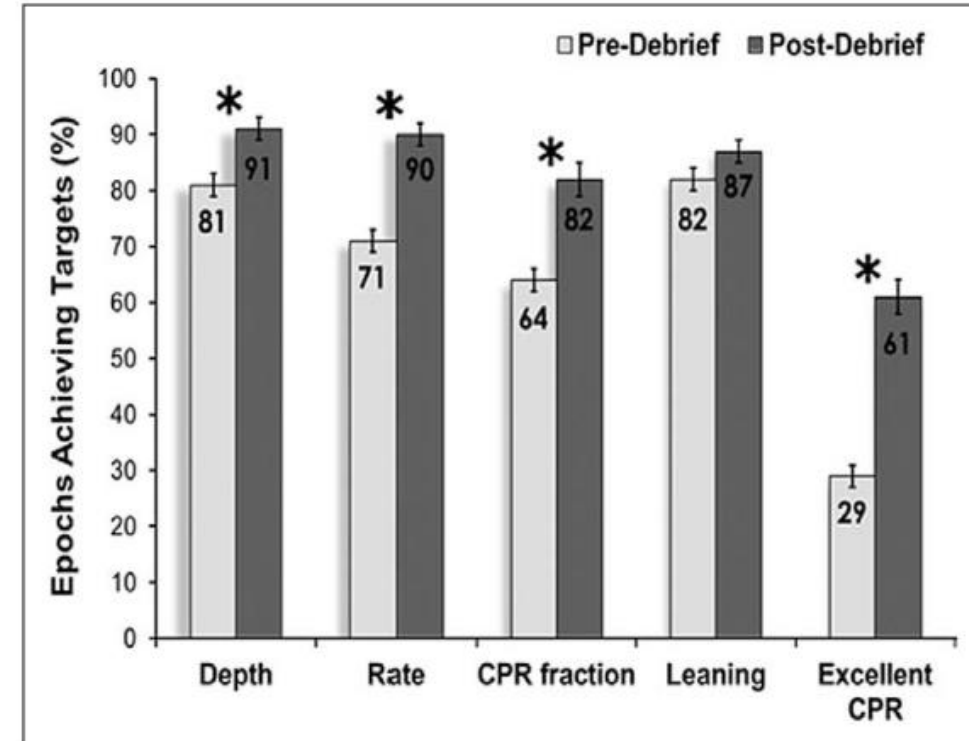
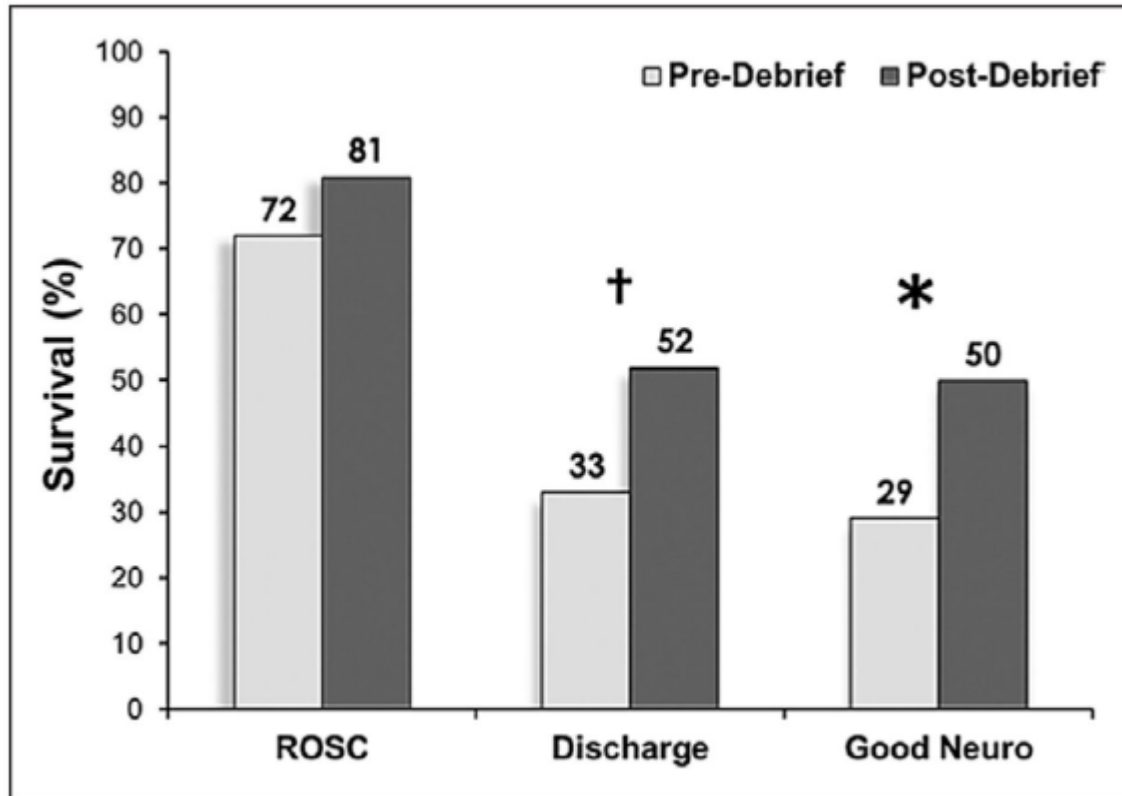
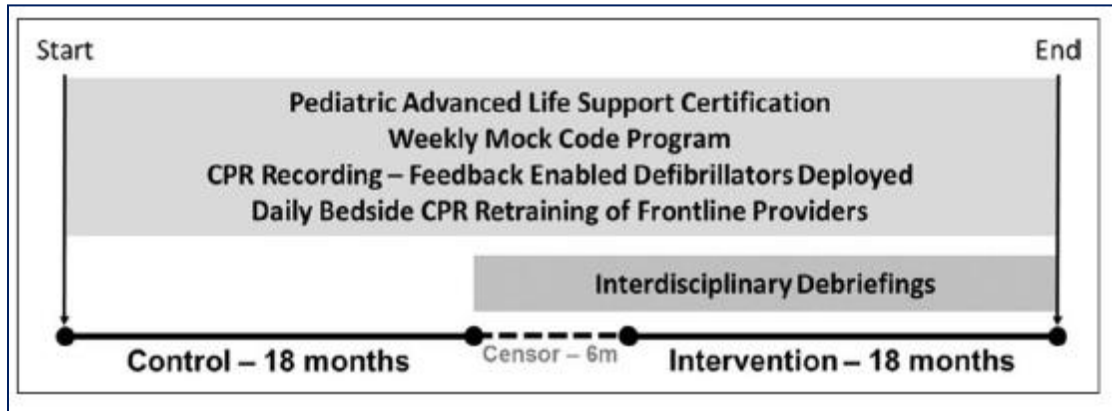
Resuscitation feedback and targeted education improves quality of pre-hospital resuscitation in Scotland<sup>\*</sup>R.M. Lyon<sup>a,\*</sup>, S. Clarke<sup>b</sup>, D. Milligan<sup>c</sup>, G.R. Clegg<sup>d</sup>

Mean hands-on chest time: 73.0% vs 79.3% ,  $p = 0.007$



## Interdisciplinary ICU Cardiac Arrest Debriefing Improves Survival Outcomes

Heather Wolfe, MD<sup>1</sup>, Carleen Zebuhr, MD<sup>2</sup>, Alexis A. Topjian, MD, MSCE<sup>1</sup>, Akira Nishisaki, MD, MSCE<sup>1</sup>, Dana E. Niles, MS<sup>1</sup>, Peter A. Meaney, MD, MPH<sup>1</sup>, Lori Boyle, RN, BSN, CCRN<sup>1</sup>, Rita T. Giordano, RRT-NPS<sup>1</sup>, Daniela Davis, MD, MSCE<sup>1</sup>, Margaret Priestley, MD<sup>1</sup>, Michael Apkon, MD<sup>1</sup>, Robert A. Berg, MD<sup>1</sup>, Vinay M. Nadkarni, MD, MS<sup>1</sup>, and Robert M. Sutton, MD, MSCE<sup>1</sup>





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Resuscitation

journal homepage: [www.elsevier.com/locate/resuscitation](http://www.elsevier.com/locate/resuscitation)

Clinical paper

## An evaluation of three methods of in-hospital cardiac arrest educational debriefing: The cardiopulmonary resuscitation debriefing study<sup>☆</sup>



Keith Couper<sup>a,b</sup>, Peter K. Kimani<sup>b</sup>, Robin P. Davies<sup>a</sup>, Annalie Baker<sup>a</sup>, Michelle Davies<sup>a</sup>, Natalie Husselbee<sup>a</sup>, Teresa Melody<sup>a</sup>, Frances Griffiths<sup>b</sup>, Gavin D. Perkins<sup>a,b,\*</sup>

<sup>a</sup>Heart of England NHS Foundation Trust, Birmingham, B9 5SS, UK

<sup>b</sup>Warwick Medical School, University of Warwick, Coventry, CV4 7AL, UK

	Pre-intervention (Nov 2011–May 2013)	Post-intervention (Sept 2013–July 2014)
Hospital one	Weekly group debriefing <sup>a</sup>	Monthly group debriefing <sup>a</sup>
Hospital two	No debriefing <sup>a</sup>	Oral personal debriefing <sup>a</sup>
Hospital three	No debriefing	Written Feedback <sup>a</sup>

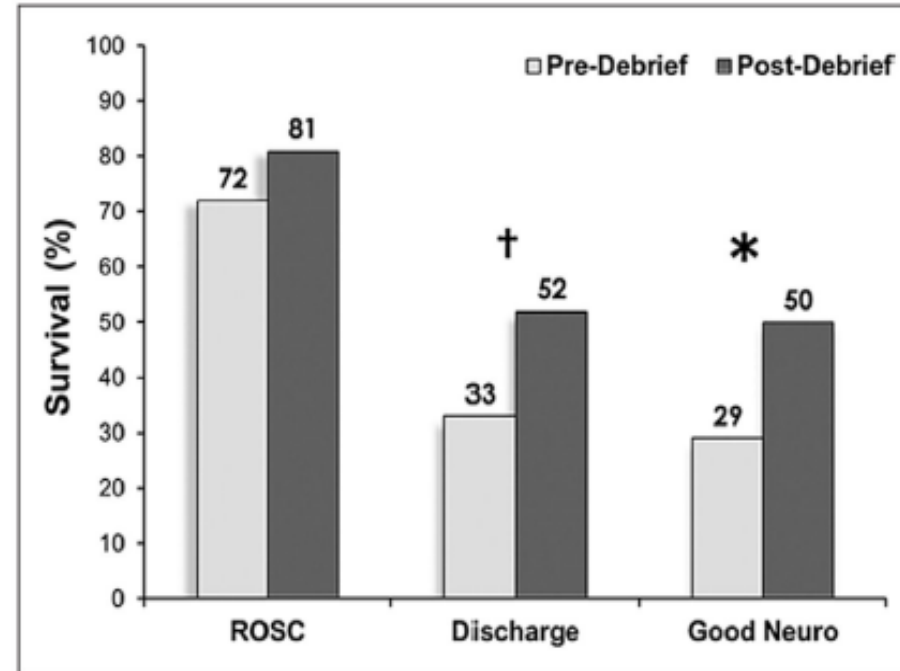
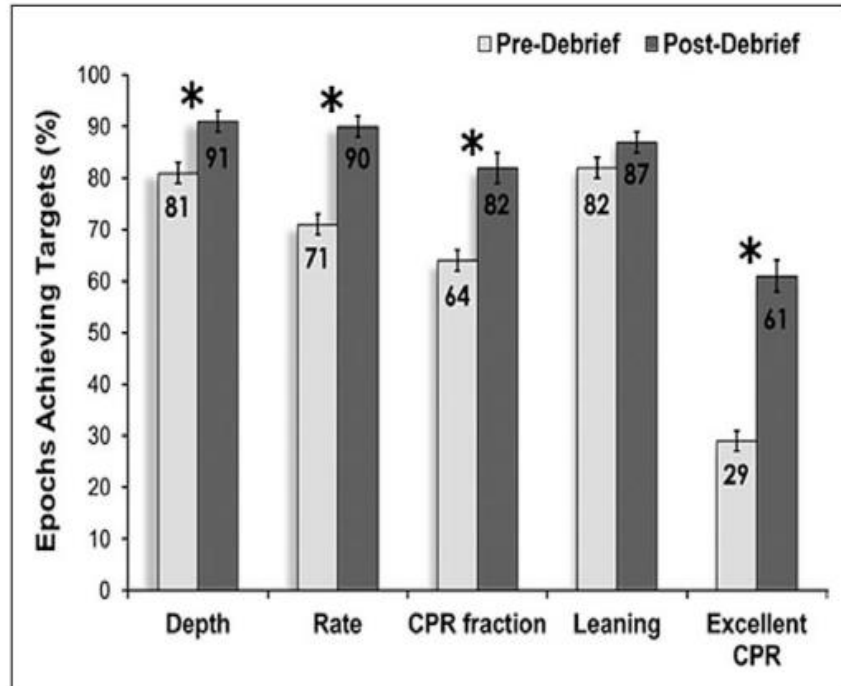
**Нет влияние метода  
дебрифинга на клинические  
исходы**



# Дебрифинг

## Interdisciplinary ICU Cardiac Arrest Debriefing Improves Survival Outcomes\*

Heather Wolfe, MD<sup>1</sup>; Carleen Zebuhr, MD<sup>2</sup>; Alexis A. Topjian, MD, MSCE<sup>1</sup>;  
Akira Nishisaki, MD, MSCE<sup>1</sup>; Dana E. Niles, MS<sup>1</sup>; Peter A. Meaney, MD, MPH<sup>1</sup>;  
Lori Boyle, RN, BSN, CCRN<sup>1</sup>; Rita T. Giordano, RRT-NPS<sup>1</sup>; Daniela Davis, MD, MSCE<sup>1</sup>;  
Margaret Priestley, MD<sup>1</sup>; Michael Apkon, MD<sup>1</sup>; Robert A. Berg, MD<sup>1</sup>; Vinay M. Nadkarni, MD, MS<sup>1</sup>;  
Robert M. Sutton, MD, MSCE<sup>1</sup>

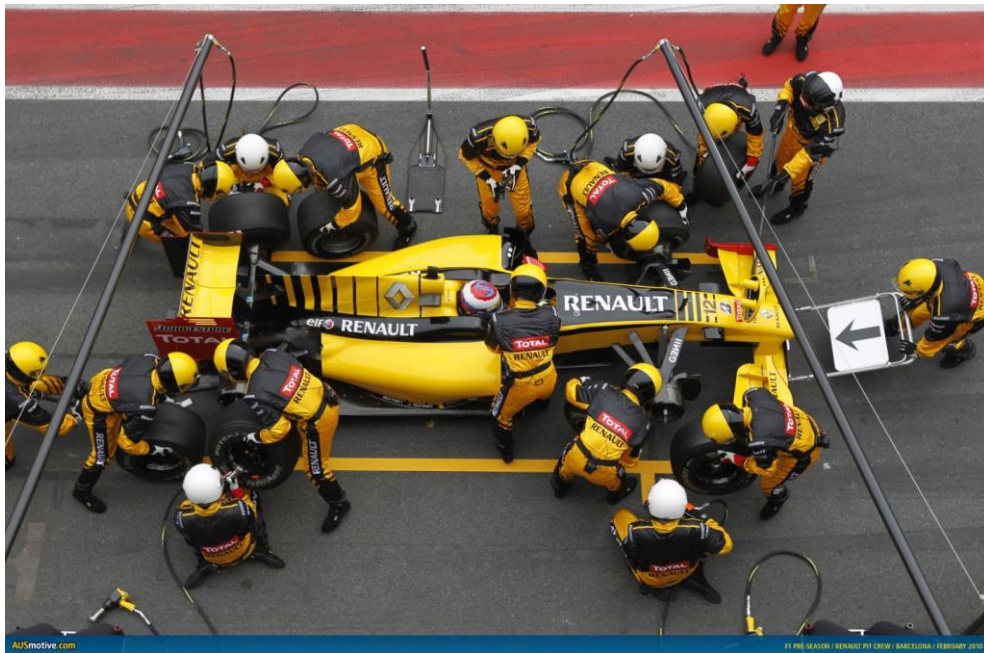


[Crit Care Med.](#) 2014 Jul;42(7):1688-95.

**Interdisciplinary ICU cardiac arrest debriefing improves survival outcomes\*.**

[Wolfe H et al.](#)





## Teaching psychomotor skills in the twenty-first century: Revisiting and reviewing instructional approaches through the lens of contemporary literature

Delwyn Nicholls<sup>a,b</sup>, Linda Sweet<sup>a</sup>, Amanda Muller<sup>a</sup> and Jon Hyett<sup>c,d</sup>

<sup>a</sup>Faculty of Medicine, Nursing and Health Science, Flinders University, Adelaide, Australia; <sup>b</sup>Sydney Ultrasound for Women, Sydney, Australia; <sup>c</sup>RPA Women and Babies, Royal Prince Alfred Hospital, Sydney, Australia; <sup>d</sup>Discipline of Obstetrics, Gynaecology and Neonatology, Faculty of Medicine, University of Sydney, Sydney, Australia

### Treatment recommendations

**We suggest that team and leadership training be included as part of ALS training for healthcare providers (weak recommendation, low-quality evidence).**

Resuscitation 95 (2015) e203–e224

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Part 8: Education, implementation, and teams  
2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations<sup>2\*</sup>

Judith C. Finn<sup>1</sup>, Farhan Bhanji<sup>1</sup>, Andrew Lockey, Koenraad Monsieurs, Robert Frengley, Taku Iwami, Eddy Lang, Matthew Huei-Ming Ma, Mary E. Mancini, Mary Ann McNeil, Robert Greif, John E. Billi, Vinay M. Nadkarni, Blair Bigham, on behalf of the Education, Implementation, Teams Chapter Collaborators<sup>2</sup>

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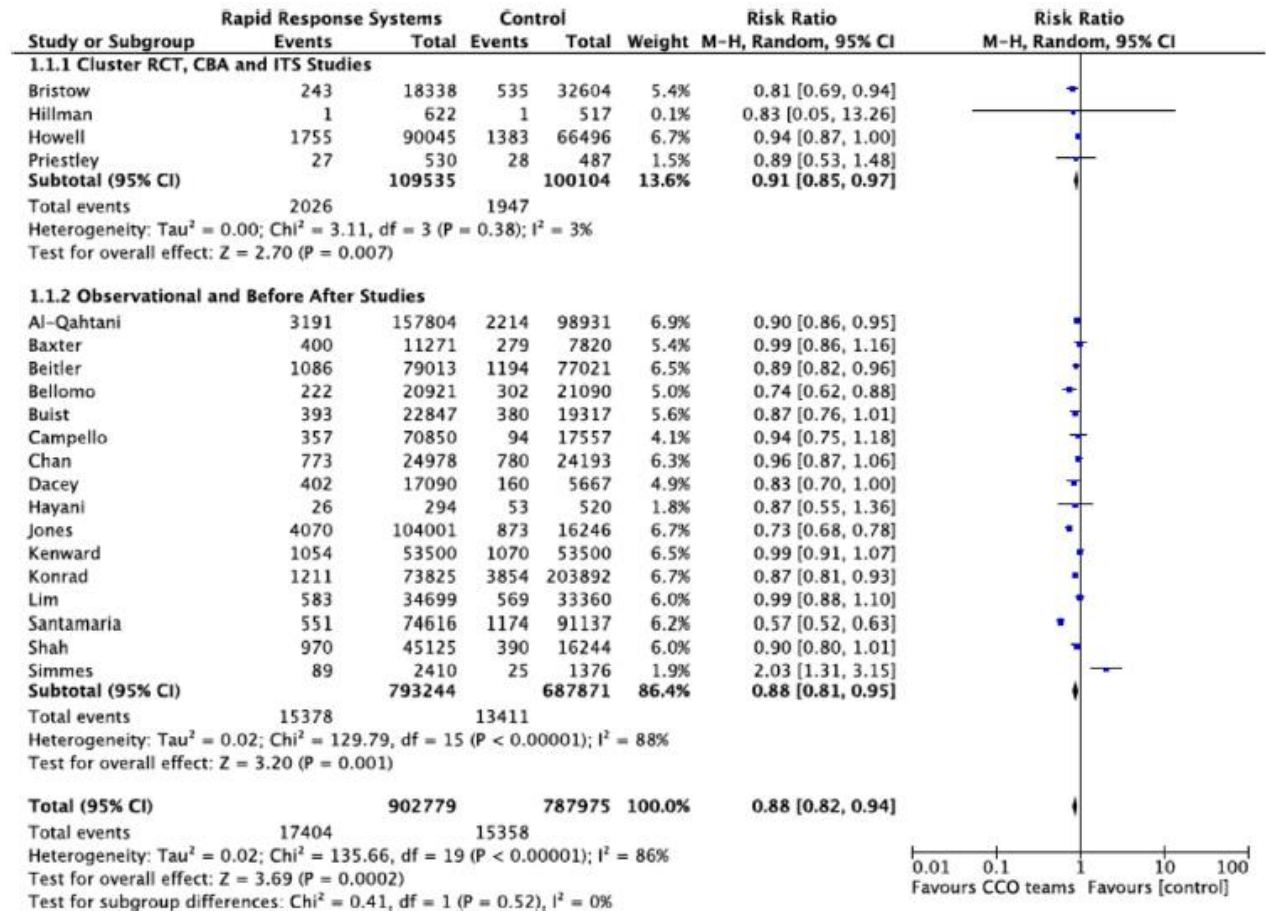






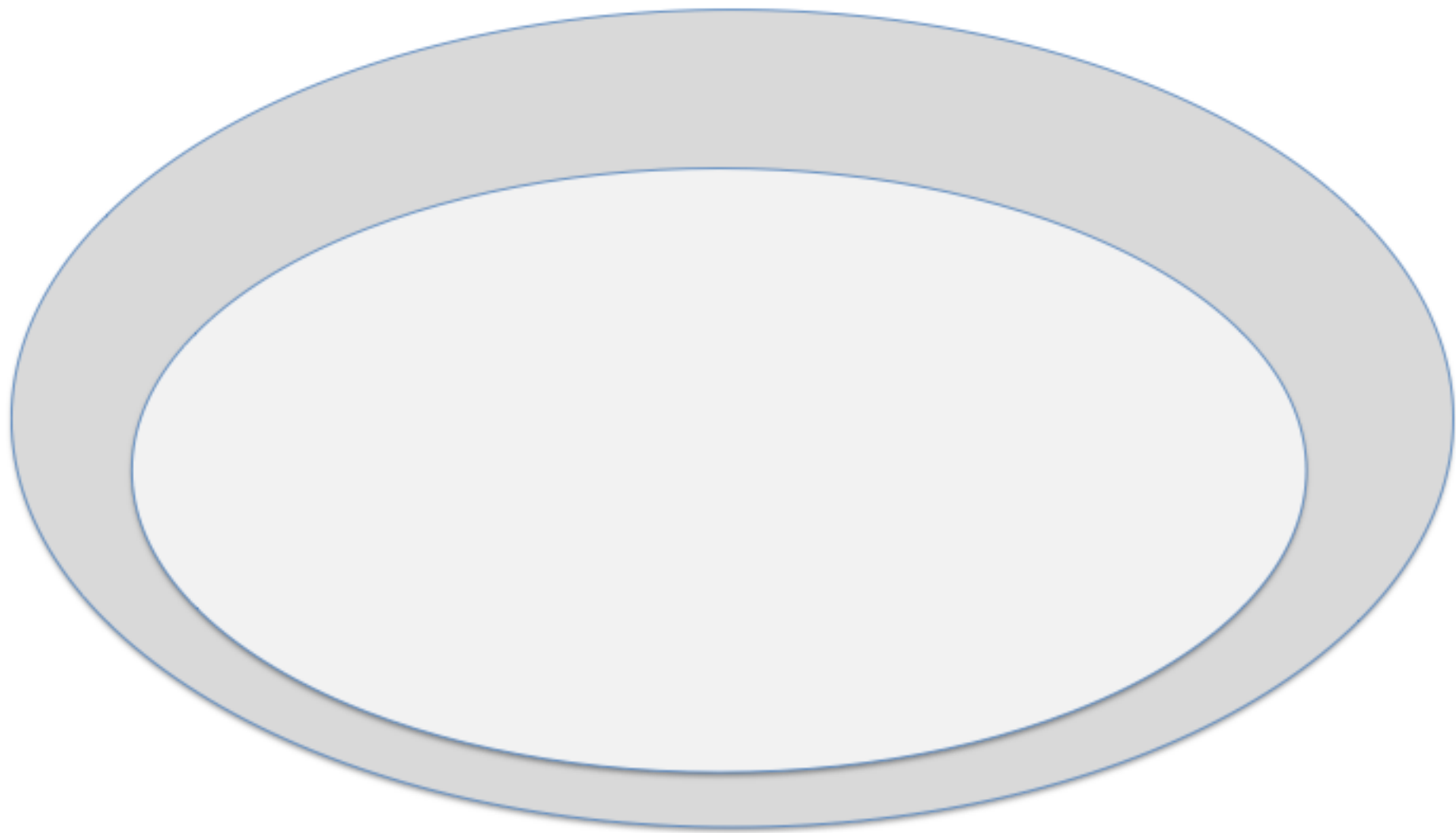
# Rapid response systems: a systematic review and meta-analysis

Ritesh Maharaj<sup>1,2,3\*</sup>, Ivan Raffaele<sup>2</sup> and Julia Wendon<sup>1,2</sup>



**Conclusion:** Rapid response systems were associated with a reduction in hospital mortality and cardiopulmonary arrest. Meta-regression did not identify the presence of a physician in the rapid response system to be significantly associated with a mortality reduction.







Рекомендации по проведению  
реанимационных мероприятий  
Европейского совета по реанимации  
(пересмотр 2015 г.)

Под редакцией  
члена-корреспондента РАН  
Мороза В. В.

*3-е издание, переработанное и дополненное*

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Сведения об образовательной организации

Версия для слабовидящих

СВЕДЕНИЯ ОБ ОБРАЗОВАТЕЛЬНОЙ ОРГАНИЗАЦИИ ▾ ОБРАЗОВАНИЕ ▾ ПОСТУПАЮЩИМ ▾ КОНТАКТЫ

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