



# TIME DELAY AND PERFORMANCE OF CPR IN SURF LIFEGUARDS

- After simulated cardiac arrest due to drowning

Andreas Claesson  
RN, Paramedic, Lifeguard

The Sahlgrenska Academy



## ARTICLE IN PRESS

American Journal of Emergency Medicine (2010) xx, xxx–xxx



The  
American Journal of  
Emergency Medicine

[www.elsevier.com/locate/ajem](http://www.elsevier.com/locate/ajem)

Original Contribution

### Delay and performance of cardiopulmonary resuscitation in surf lifeguards after simulated cardiac arrest due to drowning

Andreas Claesson RN<sup>a,\*</sup>, Tomas Karlsson<sup>b</sup>, Ann-Britt Thorén PhD<sup>c</sup>, Johan Herlitz MD<sup>d</sup>

<sup>a</sup>Kungälv Ambulance Service, SE-442 40 Kungälv, Sweden

<sup>b</sup>Institute of Medicine, Department of Molecular and Clinical Medicine/Cardiology, Sahlgrenska University Hospital, SE-413 45 Göteborg, Sweden

<sup>c</sup>School of Health and Caring Sciences, Linnaeus University, SE-35195 Växjö, Sweden

<sup>d</sup>Institute of Medicine, Department of Molecular and Clinical Medicine/Cardiology, Sahlgrenska University Hospital, SE-413 45 Göteborg, Sweden

Received 7 June 2010; accepted 27 June 2010

The Sahlgrenska Academy



## COI

The study was supported by the  
Laerdal foundation of acute medicine



The Sahlgrenska Academy



## JOINT VENTURE

- ✓ **University of Gothenburg,**  
- The Sahlgrenska academy
- ✓ **Swedish Lifesaving Society – SLS**  
- Tylösand Surf lifesaving club



The Sahlgrenska Academy









## AIM

To describe time delay during surf rescue

Compare quality of cardiopulmonary resuscitation (CPR) before and after exertion in surf lifeguards.



The Sahlgrenska Academy

  
UNIVERSITY OF GOTHENBURG

*Resuscitation. 2004 Oct;63(1):25-31.*

### **In-water resuscitation--is it worthwhile?**

[Szpilman D](#), [Soares M](#).

*Fire Department of Rio de Janeiro-Drowning Resuscitation Center of Barra da Tijuca (CBMERJ-GMAR-GSE), Av. das Américas 3555, Bloco 2, sala 302, Rio de Janeiro RJ 22793-004, Brazil. szpilman@globo.com*

### **Final Outcome** (survival without sequels)

*IWR*  $N=19$

52.6%

*Non-IWR*  $n=27$

7.4%,  $P < 0.001$

The Sahlgrenska Academy

  
UNIVERSITY OF GOTHENBURG

Ann Emerg Med. 1995 Sep;26(3):300-3.

## Decay in quality of closed-chest compressions over time.

[Hightower D](#), [Thomas SH](#), [Stone CK](#), [Dunn K](#), [March JA](#).

Department of Emergency Medicine, East Carolina University School of Medicine, Greenville, North Carolina, USA.

Minute:	1	2	3	4	5
Correct % :	92.9	67.1	39.2	31.2	18

The Sahlgrenska Academy



Resuscitation (2008) 77, 95–100



available at [www.sciencedirect.com](http://www.sciencedirect.com)



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



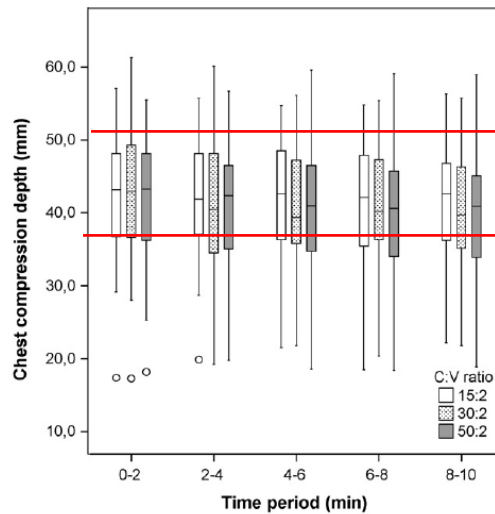
MANIKIN AND SIMULATION STUDY

### Quality of chest compressions during 10 min of single-rescuer basic life support with different compression: ventilation ratios in a manikin model<sup>☆</sup>

Conrad Arnfinn Bjørshol<sup>a,\*</sup>, Eldar Søreide<sup>a,b</sup>, Tor Harald Torsteinbø<sup>c</sup>, Kristian Lexow<sup>a</sup>, Odd Bjarte Nilsen<sup>d,e</sup>, Kjetil Sunde<sup>f</sup>

The Sahlgrenska Academy





The Sahlgrenska Academy


  
UNIVERSITY OF GOTHENBURG

## STUDY SUBJECTS

**N = 40 Surf lifeguards**  
26 Men/ 14 Women

**Mean age:** 26.2 years  
**Mean weight:** 74.6 kg  
**Mean length:** 176.5 cm  
**CPR instructors:** 60 %

**All lifeguards were trained in CPR, 2005 guidelines within 2 months prior to testing**



The Sahlgrenska Academy


  
UNIVERSITY OF GOTHENBURG

# PROTOCOL

## Test 1 - Rested

CPR 10 minutes (single rescuer - manikin)

## Test 2 - Exerted

Rescue of 80 kg victim 100 meters from beach  
+ CPR 10 minutes (single rescuer – manikin)

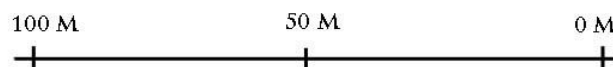


The Sahlgrenska Academy

  
UNIVERSITY OF GOTHENBURG

# CONDITIONS

<b>Buoy placed at:</b>	100 meters
<b>Wind speed less than:</b>	4 m/s
<b>Wave height less than:</b>	0.5 meters
<b>First IWR at:</b>	50 meters
<b>CPR at:</b>	On beach



## Delay times (min.)

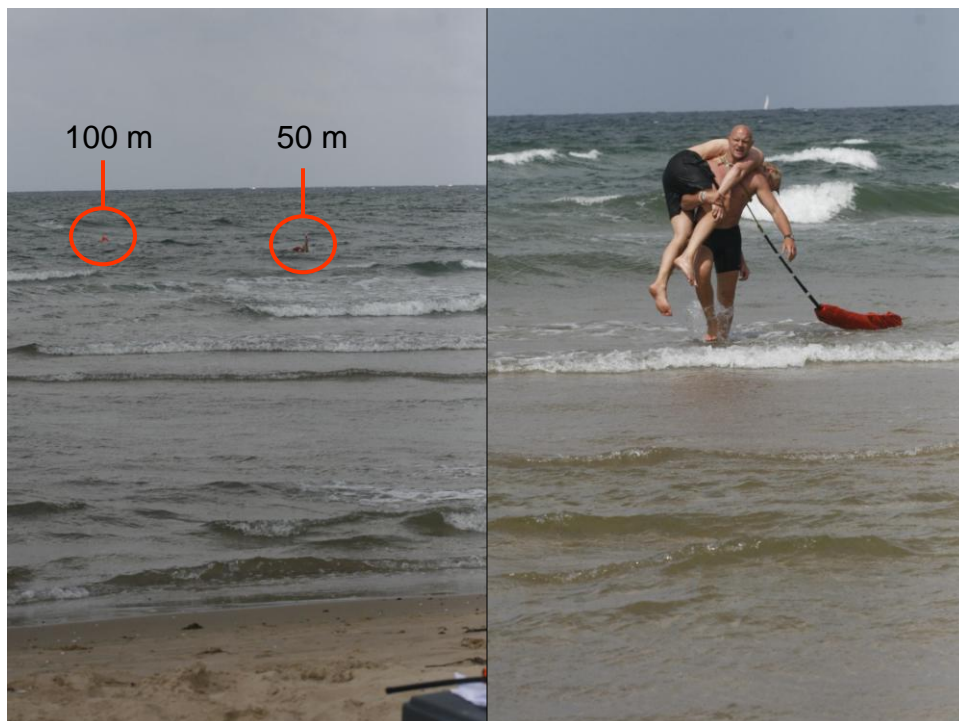
Results – (mean values)

	All (n=40)	Men (n=26)	Women (n=14)	p*
<b>Beach to victim (0-100)</b>	1.20	1.15	1.26	0.01
<b>Time to IWR (0-100-50)</b>	2.25	2.22	2.31	0.11
<b>Time to CPR (0-100-0)</b>	4.18	4.05	4.45	0.004

p\* = Difference men and women

The Sahlgrenska Academy

UNIVERSITY OF GOTHENBURG





## Compressionrate / minute (Mean $\pm$ SD)

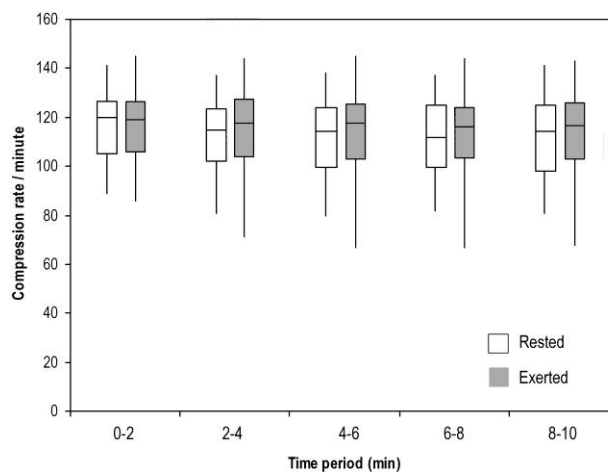
	0-2 min	8-10 min	p*
<b>Rested lifeguards</b>	116.2 ( $\pm$ 13.4)	113.2 ( $\pm$ 14.7)	0.001
<b>Exerted lifeguards</b>	117.2 ( $\pm$ 14.3)	114.1 ( $\pm$ 16.1)	0.0008

( ILCOR 2005 Guidelines = 100 / minute )

The Sahlgrenska Academy



## Compression rate / minute



The Sahlgrenska Academy



## Actual compressions minute (Mean $\pm$ SD)

	0-2 min	8-10 min	p*
<b>Rested lifeguards</b>	80.0 ( $\pm$ 8.6)	78.2 ( $\pm$ 8.5)	0.008
<b>Exerted lifeguards</b>	81.4 ( $\pm$ 9.4)	79.6 ( $\pm$ 9.4)	0.047

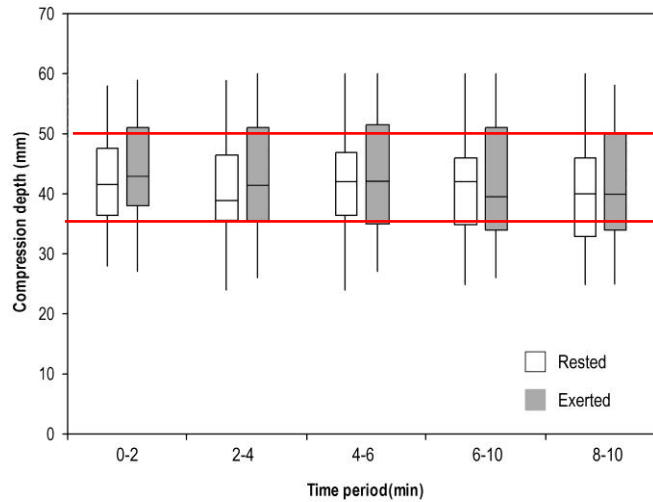
( ILCOR 2005 Guidelines = preferably 80 /minute mm. )

## Compression depth mm. (Mean $\pm$ SD)

	0-2 min	8-10 min	p*
<b>Rested lifeguards</b>	42.6 ( $\pm$ 7.8)	40.8 ( $\pm$ 9.3)	0.02
<b>Exerted lifeguards</b>	44.2 ( $\pm$ 8.7)	41.5 ( $\pm$ 9.1)	0.0008

( ILCOR 2005 Guidelines = 38-51 mm. )

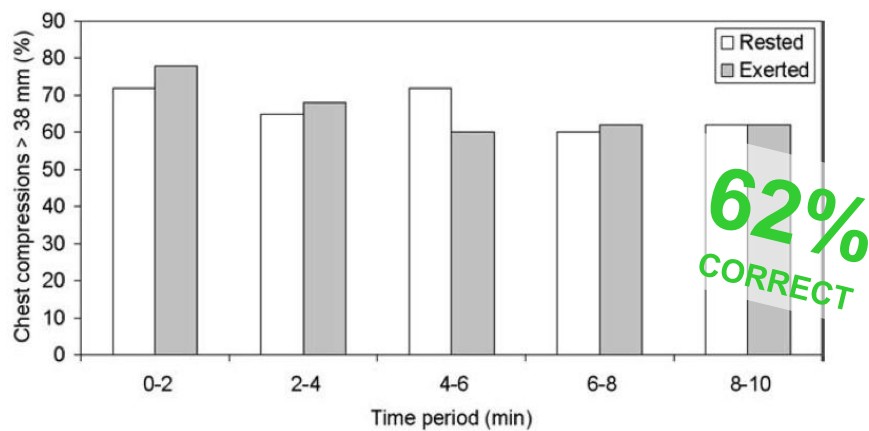
## Compression depth



The Sahlgrenska Academy


 UNIVERSITY OF GOTHENBURG

## Chest compressions > 38mm



The Sahlgrenska Academy


 UNIVERSITY OF GOTHENBURG

## Other factors

Factor	p*
Sex	N.S
Age	N.S
Weight	N.S
CPR instructor	N.S

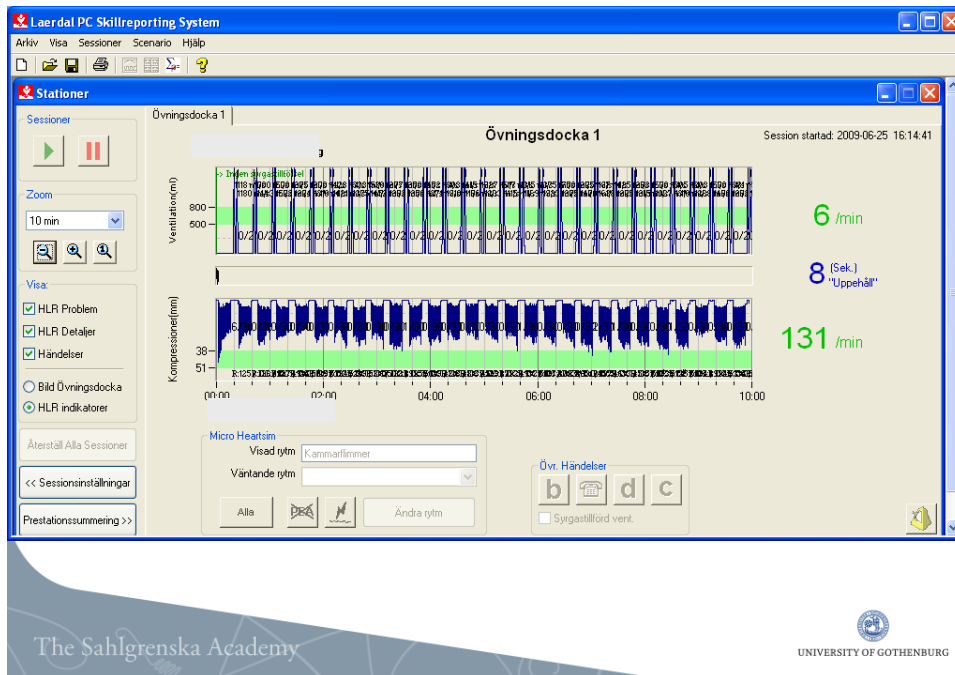
## Discussion

**Manikin study, bias compared to real life scenarios?**

**Confounders for evaluating CPR quality?  
Motivation, muscular memory, teaching techniques etc.**

**ILCOR Guidelines 2010 = Depth: 50 - 60 mm. Rate: 100 – 120 /minute**

**Is CPR tiring? Not for all!**



## Conclusion

- ✓ It took twice the time to bring the victim back to shore as reaching him, men were significantly faster.
- ✓ CPR quality was identical before and after rescue – 62% correct
- ✓ The exertion of a surf rescue, did not affect the quality of CPR
- ✓ Model for lifesaving organisations worldwide to regularly evaluate quality of CPR.



**TIME DELAY AND PERFORMANCE  
OF CPR IN SURF LIFEGUARDS**  
- After simulated cardiac arrest due to drowning

andreas.claesson@telia.com

The Sahlgrenska Academy

