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Kids to Grandparents – What Infant CPR Techniques Make A Difference

Presenters:

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10:35 AM - 11:25 AM



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Presenter Disclosure Information

Jeffrey L. Pellegrino

Kids to Grandparents – What Infant CPR Techniques Make A Difference

FINANCIAL DISCLOSURE:

- None

INTELLECTUAL DISCLOSURE:

- Education, Implementation, & Teams Task Force, ILCOR
- Education Committee, American Red Cross



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Presenter Disclosure Information

Jonathan Epstein

Kids to Grandparents – What Infant CPR Techniques Make A Difference

FINANCIAL DISCLOSURE:

- Employee, American Red Cross

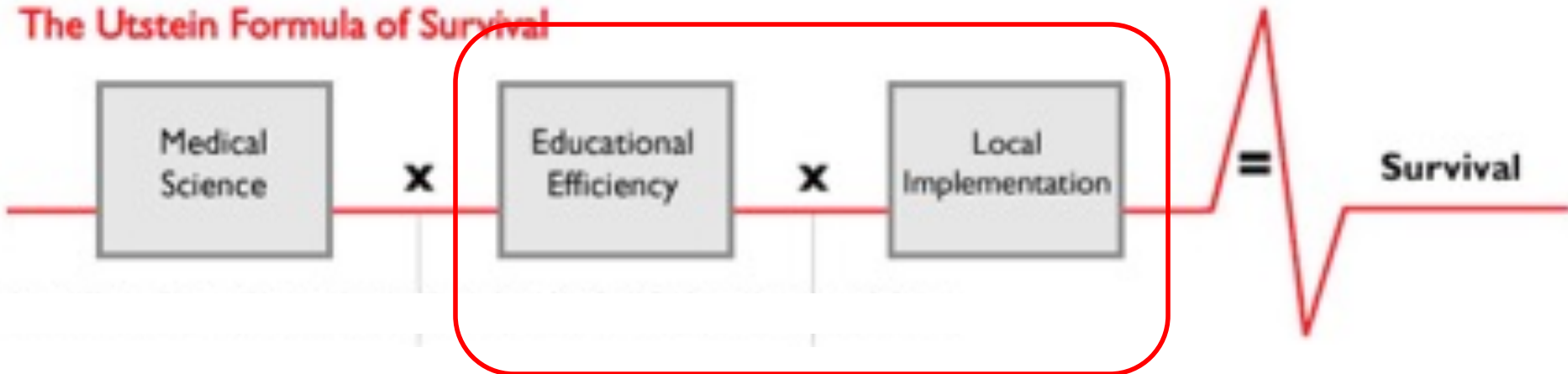


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Chains

The Utstein Formula of Survival





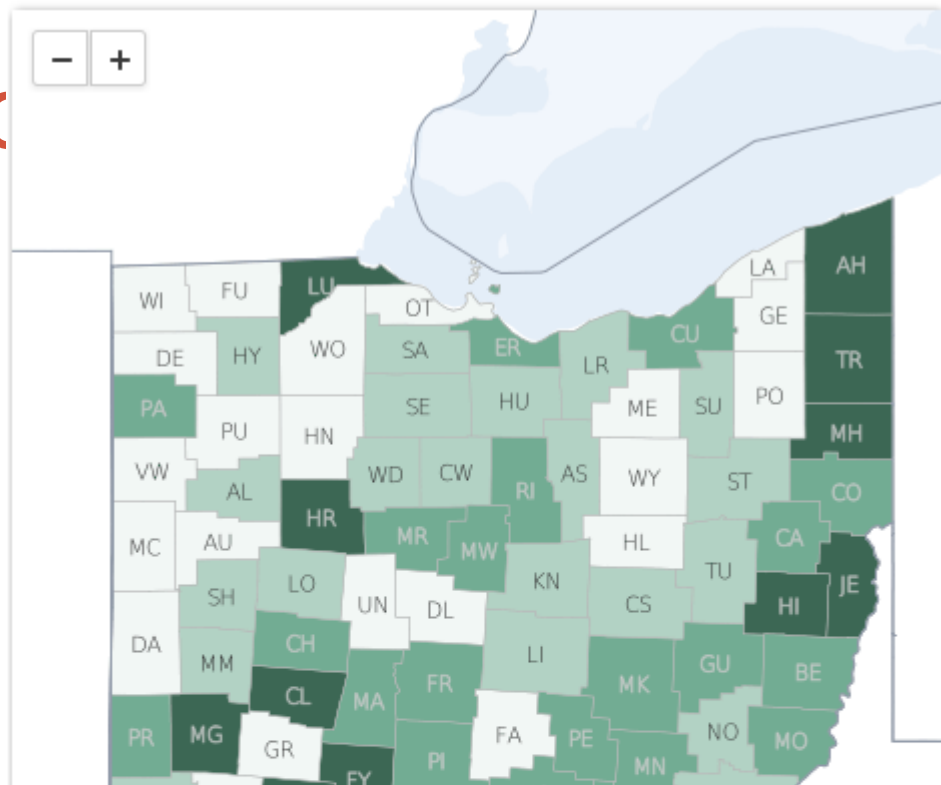
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Who takes c



Overall Rankings in Health Outcomes



Main Sources of Health Information

	# of 1 st Responses	% of 1 st Responses	# of all Responses	% of Answering Respondent
Internet	343	45.5%	441	58.5%
Doctor/Pharmacist/Nurse	184	24.4%	316	41.9%
Friends/Family/Word of Mouth	105	13.9%	243	32.2%
Books/Magazines	24	3.2%	63	8.4%

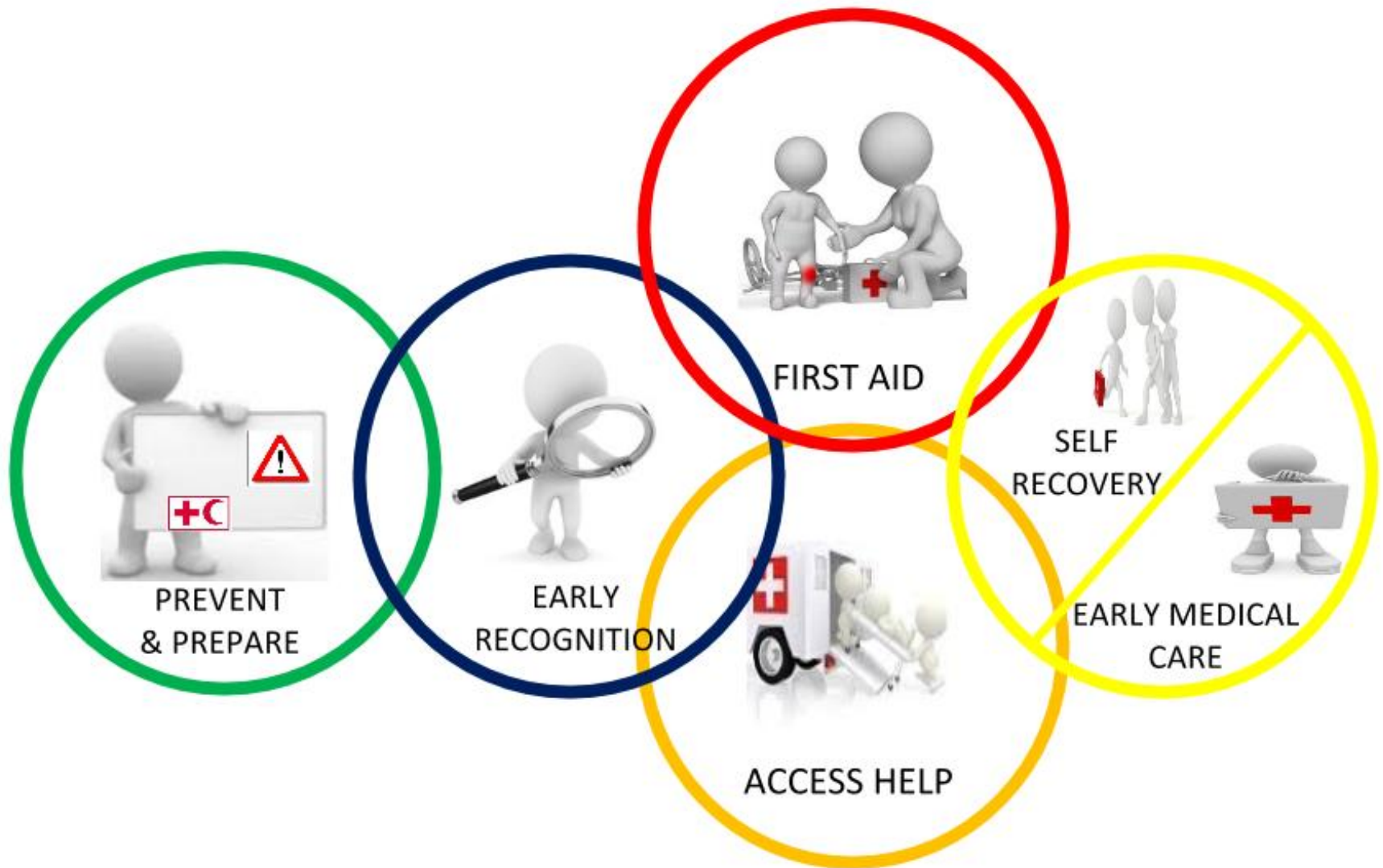
RANK 1 - 22 23 - 44 45 - 66 67 - 88 NOT RANKED (NR)



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Chain of Survival Behaviors





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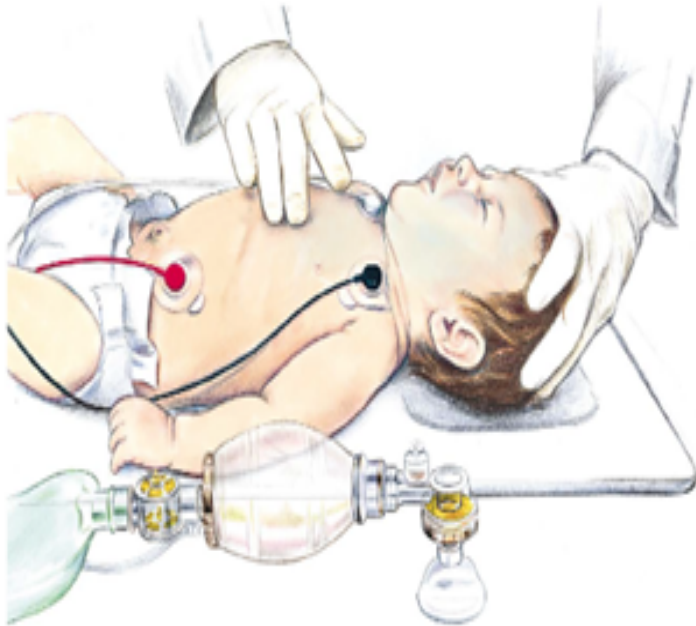
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1963

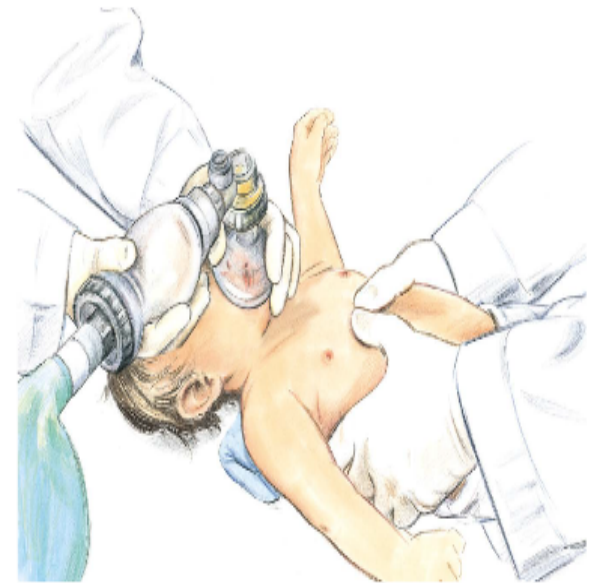


2015 Guidelines

Two-finger chest compression technique in infant (1 rescuer)



Two thumb-encircling hands chest compression in infant (2 rescuers).



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Previous Studies

- Healthcare Providers
- TT superiority in pressures
- Variety of ranges of times

Author(s) , year	Participants	# of participants	Time of test (minutes)	Ventilation included	Compression Depth (TF v TT)
Thaler, & Stobie (1963)	fresh cadaver			compression only	[BP]
Menegazzi, et.al.(1993)	Trained responders	5	1	compression only	[BP]
Dorfsman, et.al. (2000)	Healthcare	21	10	5:1	[BP]
Whitelaw, et al. (2000)	Healthcare	209	2 (only 1 method; randomized)	compression only	18.2% v 19.1% (0.5"-1")
Udassi, et al. (2007)	Healthcare	16:method	5	30:2	No difference
Udassi, et al. (2010)	Healthcare	34	2	30:2	≈12mm v ≈15mm
Martin, et al (2013)	Healthcare	22	2	compression only	≈24mm v ≈34mm
Jiang, et.al (2015)	Healthcare	27	5	30:2	39.25mm v.42.37mm



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Literature Review

- TT chest compressions observed in infant manikins-
superior
 - mean arterial pressure and pulse pressures over 10 minutes CPR. (Dorfsman, Menegazzi, Wadas, & Auble, 2000)
 - compression duty cycle was found inferior over 2 minutes of compressions. (Martin, Kemp, Theobald, Maguire, & Jones, 2013)
 - TT did take 0.6 seconds longer time to deliver two breaths in a lone rescuer scenario, along with a decrease in chest compressions per minute, by 4—in a two minute CPR scenario. (Udassi et.al., 2010)
 - TT produced compression depths at the current guidelines recommendation without negative influence on ventilation, over 5 minutes of CPR; and fatigue appeared earlier in the TF (Jiang et al, 2015)



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ILCOR 2016 Pediatric CoSTR (public comment)

TREATMENT RECOMMENDATION

- We suggest that bystanders provide rescue breaths and chest compressions for infants and children younger than 18 years with OHCA (weak recommendation, very low quality evidence).
- We suggest that if bystanders can't provide rescue breaths as part of CPR for infants and children younger than 18 years with OHCA, they should at least provide chest compressions only (weak recommendation, very low quality evidence).



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Research Question

- Experience of initially trained lay responder using TT and TF in infant CPR (pain, fatigue, preference) over 8-minutes of CPR
- Outcomes of TT and TF in quality CPR as measured by instrumented manikin over 8-minutes of CPR.
- Which characteristics favors a particular technique.

What technique to recommend or combination of techniques to teach at the community/ lay level.



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Crossover experimental study

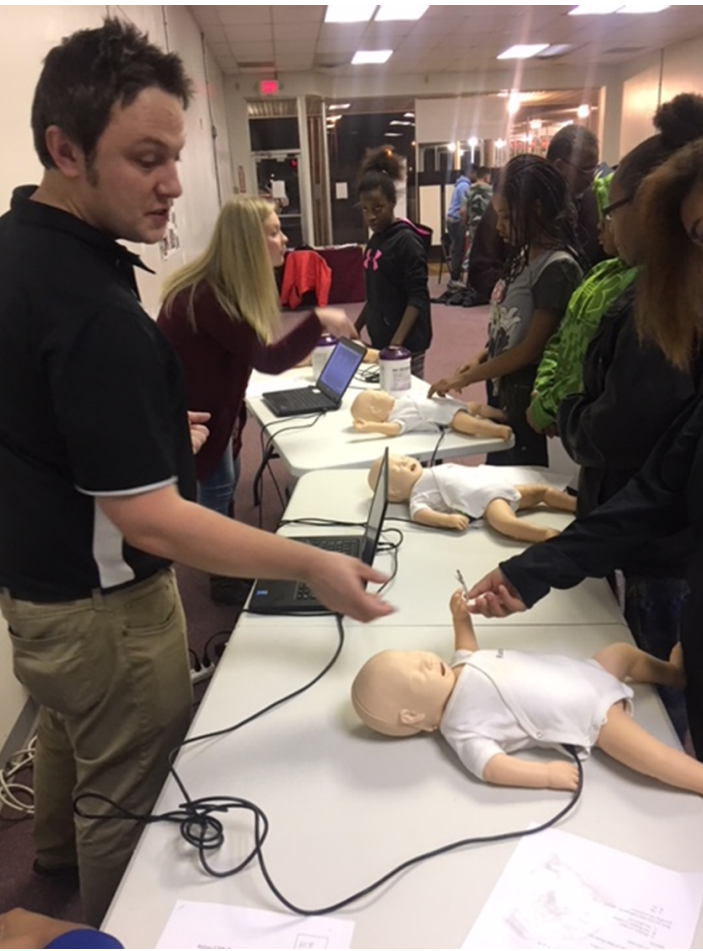
- Minimum 38 individuals who have not received training in infant CPR and not a healthcare provider.
- Participants will learn and demonstrate 8-minutes of cardiopulmonary resuscitation using a 30:2 compression/ventilation ratio to using both the TF and TT—encircling hands techniques with a 30 minutes rest period.



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A Laerdal Resusci Baby QCPR (Laerdal, Stavanger, Norway) manikin equipped with PC SkillReporting System used for measuring and recording cardiopulmonary resuscitation data. Participants also responded to qualitative questionnaire.



Session 1: learns & practices 2-finger method → Infant CPR Knowledge
Session → learns & practices 2-thumb method

Session 2: learns & practices 2-thumb method → Infant CPR Knowledge
Session → learns & practices 2-finger method

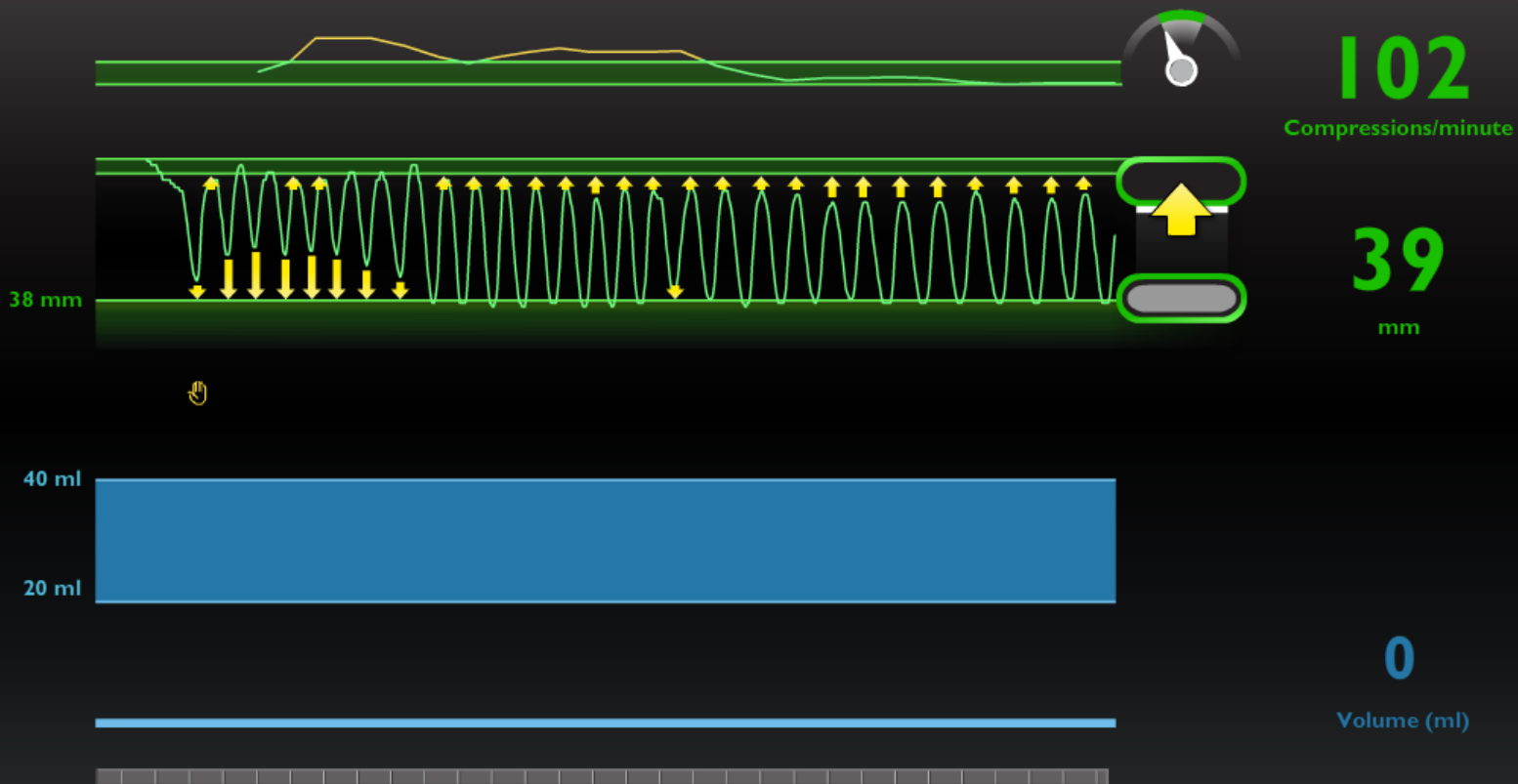


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Resusci Anne Wireless SkillReporter

Settings



QCPR

Results

Start Test



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Sample characteristics of n = 42 participants

<u>Continuous variables:</u>	<u>Mean (SD)</u>	<u>Median</u>
Age (years)	23.1 (11.4)	17.0
Height (cm)	160.4 (9.6)	160.0
Weight (kg)	71.9 (19.2)	68.1
Finger Span (cm)	19.4 (1.6)	19.7
Grip (kg)	28.1 (7.1)	27.6
<u>Categorical variables:</u>	<u>% (n)</u>	
Age Distribution (years)		
16-18	69.0 (29)	-
19-25	4.8 (2)	-
26-45	21.4 (9)	-
46-60	4.8 (2)	-
Gender: Female	95.2 (40)	-



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	Prompt
0 minutes	This infant has no signs of life
2 minutes	Someone has come to help you and you have sent them to call 9-1-1
4 minutes	The person returns and says EMS will arrive in about 4 minutes
6 minutes	You can hear the siren.
8 minutes	EMS arrives and takes over CPR



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Measures of Effects by Compression Method (n = 42)

	CPR Technique ^a			
	TT	TF	Difference ^b (SE)	p ^c
<u>Method Measures:</u>				
Compression Depth (mm)	39.8	37.8	2.0 (0.5)	<0.01
Mean Rate (bpm)	114.1	116.1	-2.0 (1.9)	0.31
Deep Enough Compressions (%)	52.2	51.2	1.4 (5.1)	0.78 ^d
Compressions with Adequate Rate (%)	59.6	57.5	3.7 (4.8)	0.45 ^d
Correct Hand Position (%)	82.8	85.1	-2.3 (-)	0.39 ^e
Total Hands Off Time (seconds)	30.2	27.8	2.4 (-)	0.30 ^e
No Flow Time (seconds)	130.7	128.1	2.6 (-)	0.70 ^e
<u>Self-Report Measures:</u>				
Tiredness Score	3.7	3.9	-0.2 (0.6)	0.98
Pain Score	4.9	5.8	-0.9 (0.5)	0.07

a. TT: Two-Thumb; TF: Two-Finger

b. Matched Measure of Effect.

c. Two-Sided Wald Test p-value, unless specified.

d. Adjusting for ordering of training, due to change in estimate greater than 20%.

e. Ranked-based p-value.



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Attributes by Method Preference (n = 42)

	Preferred Method ^a			
	TT	TF	Difference (SE)	p ^b
<u>Continuous:</u>				
Age (years)	22.3	24.6	-2.3 (-)	0.66 ^c
Height (cm)	160.4	160.4	-0.1 (3.1)	0.98
Weight (kg)	69.0	77.0	-8.0 (-)	0.09 ^c
Finger Span (cm)	19.8	18.8	1.1 (-)	0.33 ^c
Average Grip (kg)	27.6	28.9	-1.3 (2.3)	0.58
<u>Categorical:</u>			Prevalence Ratio	p
Long Nails ^d	70.0%	35.0%	0.5 (0.4)	0.06

a. TT: Two-Thumb; TF: Two-Finger

b. Two-Sided Wald Test p-value, unless specified.

c. Ranked-based p-value.

d. Restricted to 30 individuals with non-missing nail data.



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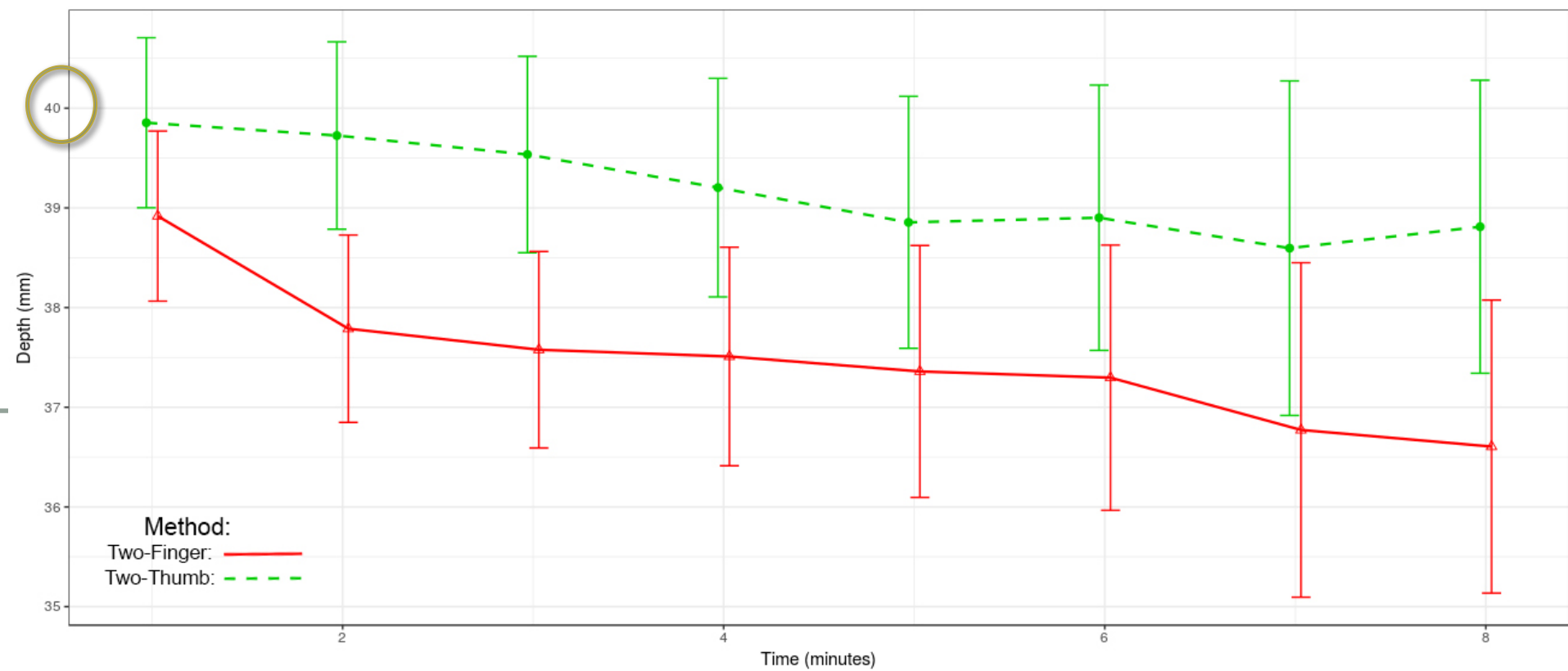


Figure 1: Fatigue by Method



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Limitations



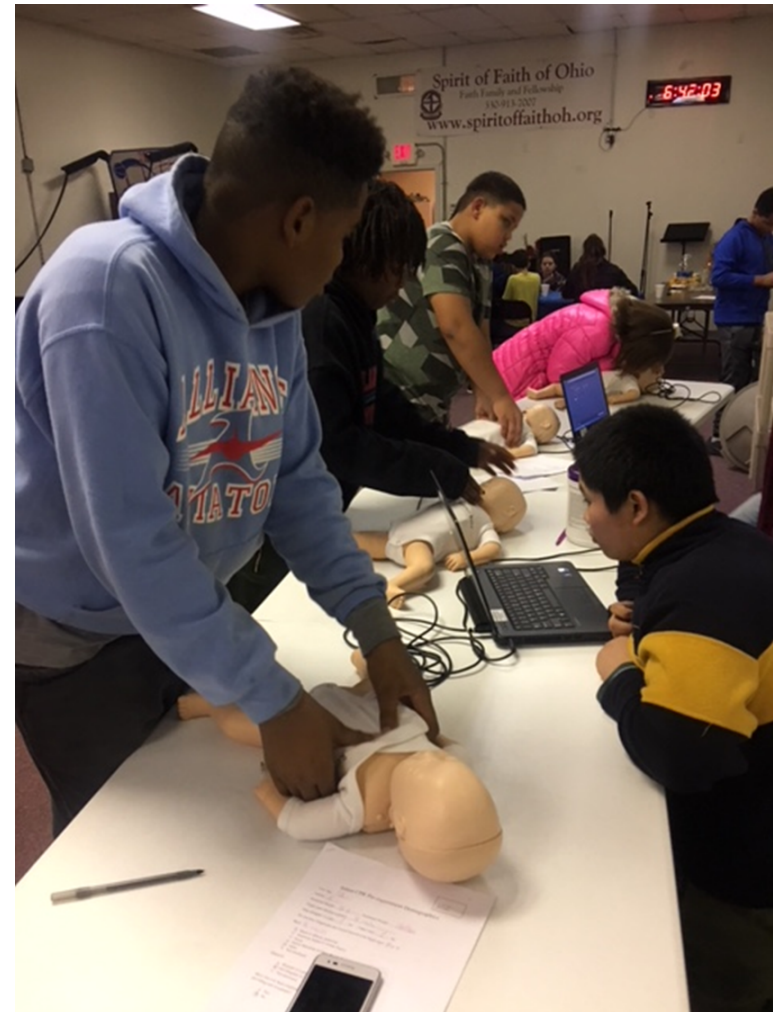


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What do we do next?

- Write up the Community Partner Model
 - Recruitment & Infant Mortality
- Educational process for 2 methods
 - Time, order, feedback devices
- Is 8-minutes reasonable to expect quality?
- Feedback device beneficial for training

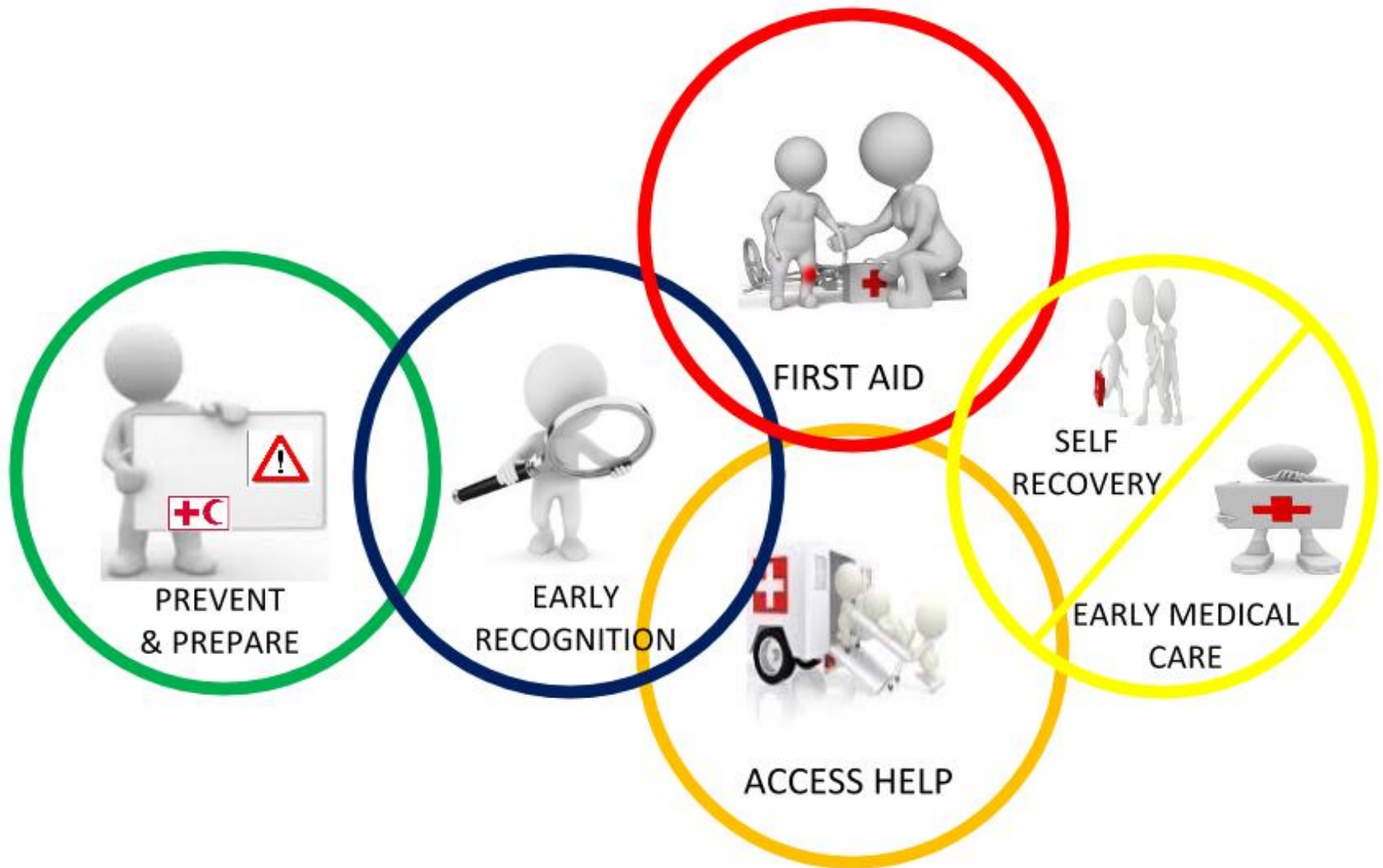




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Chain of Survival Behaviors





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