Video-only CPR education for cardiac patient's families before hospital discharge

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Disclosure

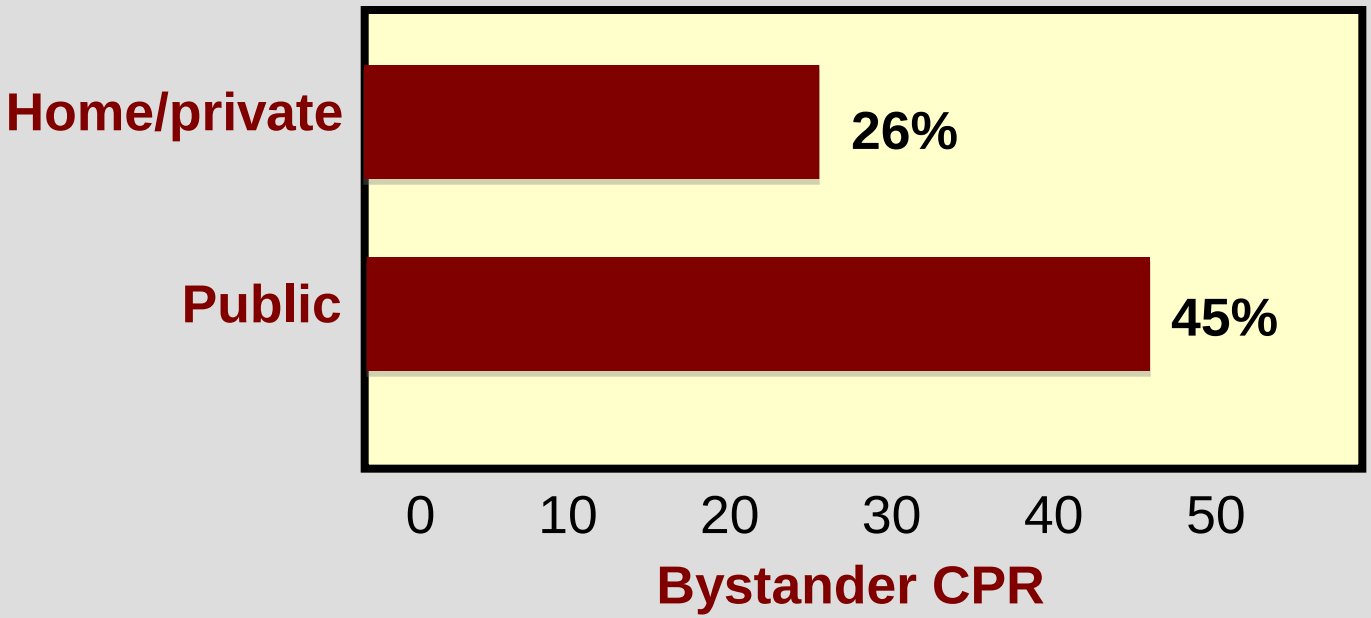
AHA, Mentored Clinical and Population Research grant (PI: Blewer)

NIH R18 grant, HL107217 (PI: Abella)

Low bystander CPR rates

Few cardiac arrest victims receive layperson CPR

There is a striking difference between private / public location



Weisfeldt et al, NEJM 2011

Low bystander CPR rates: major public health problem

AHA Scientific Statement

Reducing Barriers for Implementation of Bystander-Initiated Cardiopulmonary Resuscitation

A Scientific Statement From the American Heart Association for Healthcare Providers, Policymakers, and Community Leaders Regarding the Effectiveness of Cardiopulmonary Resuscitation

Benjamin S. Abella, MD, MPhil; Tom P. Aufderheide, MD, FAHA; Brian Eigel, PhD; Robert W. Hickey, MD, FAHA; W.T. Longstreth, Jr, MD, FAHA; Vinay Nadkarni, MD, FAHA; Graham Nichol, MD, FAHA; Michael R. Sayre, MD; Claire E. Sommargren, RN, PhD, FAHA; Mary Fran Hazinski, RN, MSN, FAHA

Abella et al, Circulation 2008

Low bystander CPR rates
And mismatch of training

Important barriers to obtaining training

AHA Science Advisory

Increasing Cardiopulmonary Resuscitation Provision in Communities With Low Bystander Cardiopulmonary Resuscitation Rates

A Science Advisory From the American Heart Association for Healthcare Providers, Policymakers, Public Health Departments, and Community Leaders

Comilla Sasson, MD, MS, Chair; Hendrika Meischke, PhD; Benjamin S. Abella, MD, MPH, FAHA; Robert A. Berg, MD, FAHA; Bentley J. Bobrow, MD; Paul S. Chan, MD, MSc; Elisabeth Dowling Root, PhD; Michele Heisler, MD, MPH; Jerrold H. Levy, MD, FAHA; Mark Link, MD; Frederick Masoudi, MD, MPH, FAHA; Marcus Ong, MD; Michael R. Sayre, MD, FAHA; John S. Rumsfeld, MD, PhD, FAHA; Thomas D. Rea, MD, MPH, Co-Chair; on behalf of the American Heart

Sasson et al, Circulation, 2013

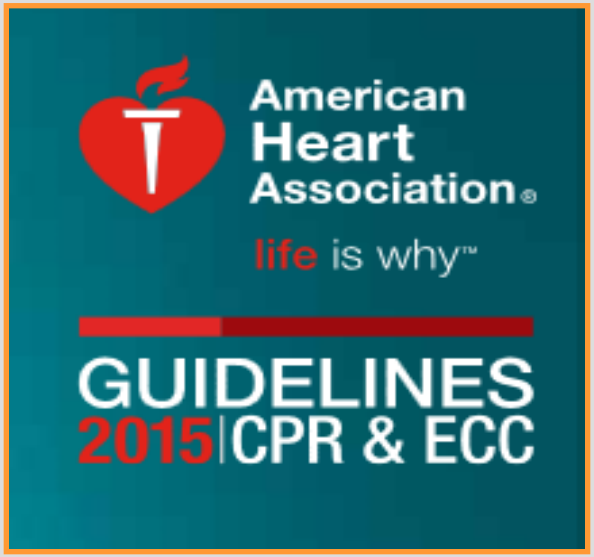
Large socioeconomic and racial disparities in CPR Training (and arrest survival)

Both called for innovative approaches to increase CPR training of the public

The AHA 2015 guidelines: targeted CPR training

Education

Despite significant scientific advances in the care of cardiac arrest victims, there remains considerable variability in survival rates that cannot be attributed to patient characteristics alone. To optimize the likelihood that cardiac arrest victims receive the highest-quality evidence-based care, resuscitation education must use sound educational principles supported by empirical educational research to translate scientific knowledge into practice. While the 2010 AHA education guidelines included implementation and teams in its recommendations, the 2015 AHA education guidelines now focus strictly on education, with implementation and teams being included in other parts of the 2015 Guidelines Update.



Targeted Training

2015 (New): Training primary caregivers and/or family members of high-risk patients may be reasonable.

Why: Studies consistently show high scores for CPR performance by trained family members and/or caregivers of high-risk cardiac patients as compared with those who were untrained.

Hospital wait time

Families waiting for their loved one in the hospital – a captive moment to learn a lifesaving skill?

Penn's hospital-based CPR training program

shm Journal of HOSPITAL MEDICINE www.journalofhospitalmedicine.com

BRIEF REPORT

Cardiopulmonary Resuscitation Training of Family Members Before Hospital Discharge Using Video Self-Instruction: A Feasibility Trial

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Blewer et al, J Hosp Med 2011

CPR training instrument

AHA/Laerdal collaboration

Video Self Instruction (VSI)

< 30 minutes

Emphasis on hands-on practice time

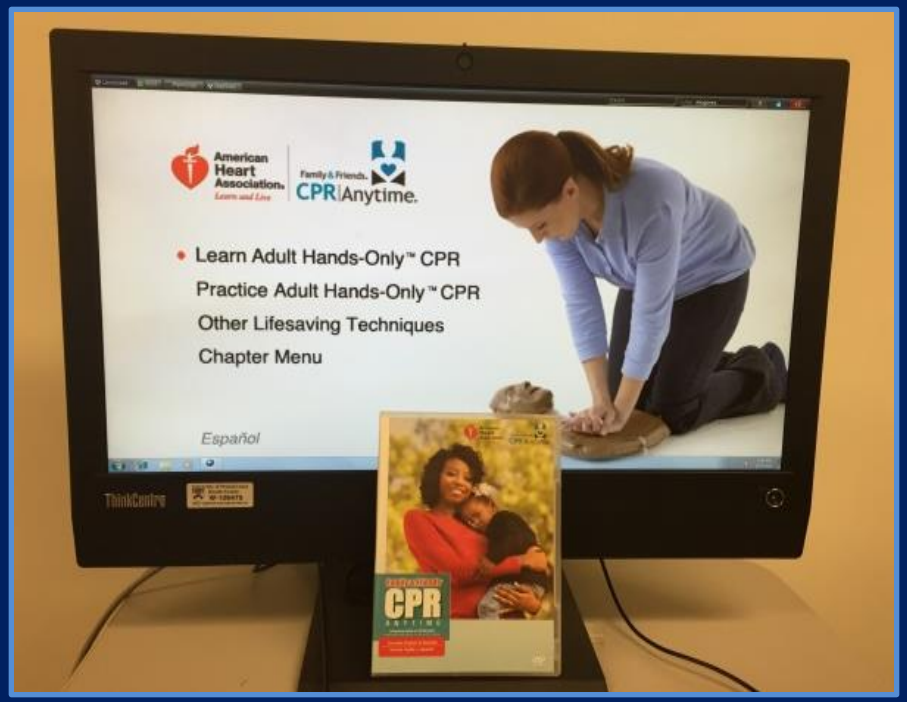
Validated

DVD teaches Hands-only CPR (AHA 2010 Guidelines)

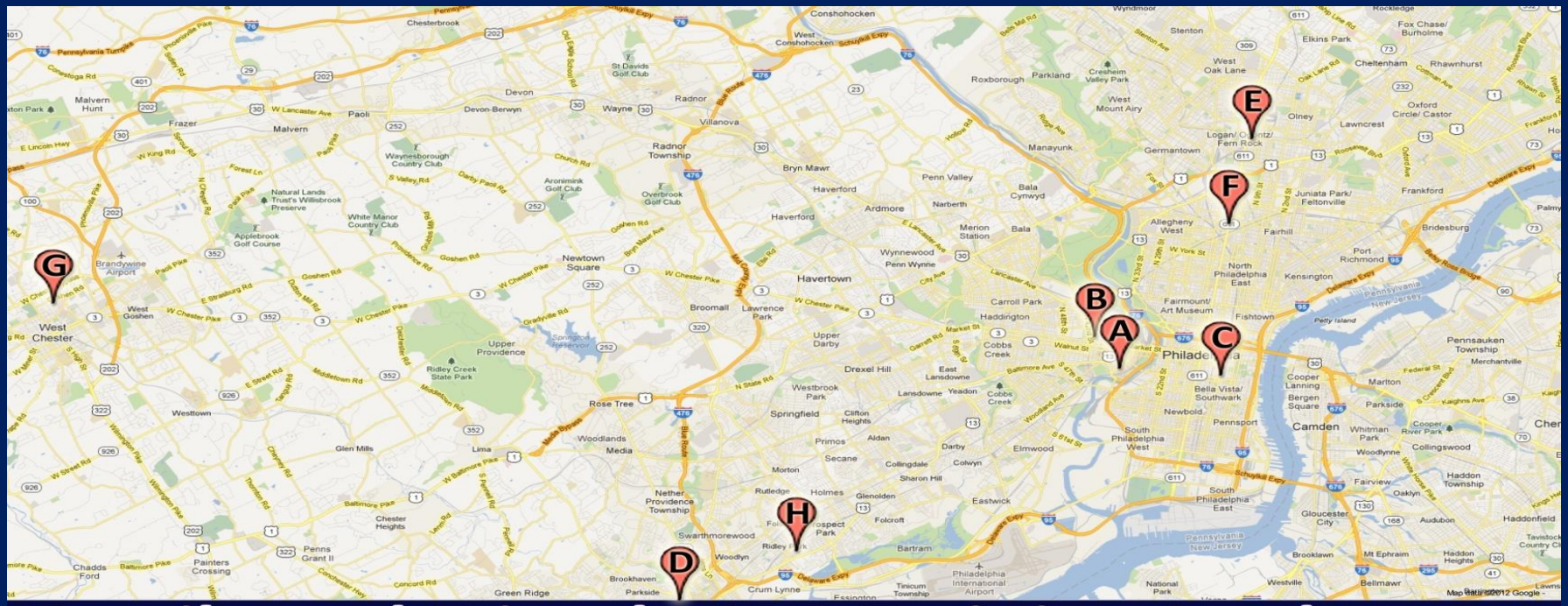
Video-only Education

What is the minimum amount of training required?

Big public health implications if no manikin required…



Eight hospital program: February 2012 – current



Cardiac step-down units, telemetry units, intermediate care units, or observation units

Who offers the training?

CPR instruction was offered to family members of hospitalized cardiac patients by volunteers (staff nurses and students in the health sciences)

Who offers the training?

	Nurse N=167	Student N=93
Age	39±17	20±12
Gender- Female	89%	63%
Classification- Bedside nurse	90%	
Nurse Educator	5%	
Other Nursing Profession	5%	
Pre-med/Pre-health		85%
EMTs		12%
Other student		3%

How are the volunteers recruited?

Nursing personnel were identified by nurse educators, clinical nurse specialists, and nurse managers at participating hospitals.

How are the volunteers recruited?

Students were recruited using pre-medical and pre-health email lists and were screened by study staff through in-person interviews.

Current Project: We offer CPR training on the Cardiac Intermediate Care Unit at the Hospital of the University of Pennsylvania, where volunteers, who are trained but not certified to teach CPR, offer CPR training to family members of eligible patients. Through this targeted training program, many family members of "at risk" patients learned the life-saving skill of CPR.

The goal of the current program is to develop a more sustainable CPR training model by using resources within the hospital, such as volunteers, to offer the life-saving skill of CPR to family members of patients with cardiovascular risk factors.

CPR Training Process: The CPR training can take place anywhere it is convenient- if there is enough space, you can train the individual in the patient's room, or you may take the family member to a nearby family waiting room or conference room. The volunteers will just wheel the cart and equipment into the room of choice and follow a simple four-step process! This is fun, easy and could save a life!

FUN, EASY, and could save a life!

Questions - please contact the Project Manager: Audrey L. Blewer, MPH at Audrey.blewer@uphs.upenn.edu

Principal Investigator: Benjamin S. Abella, MD, MPhil **Project Manager:** Audrey L. Blewer, MPH

Primary Study Site: Center for Resuscitation Science, Hospital of the University of Pennsylvania, Philadelphia, PA 19104

How are the volunteers trained?

Identify and approach a potential family members

Set up the training materials

Mock enrollment scenarios

Shadow “senior volunteers”

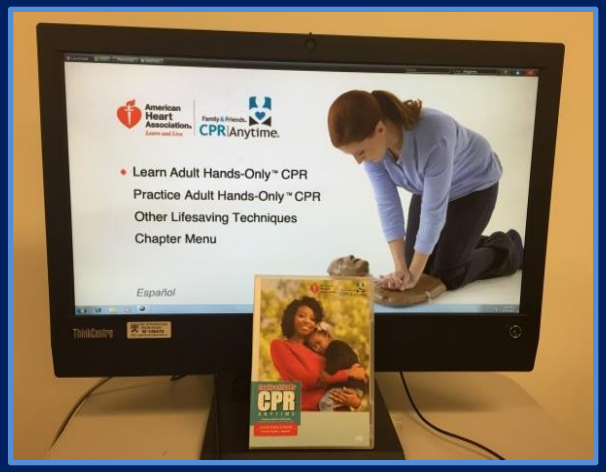
Day-to-day implementation

Nurses periodically approached potential family members and offered them the opportunity to learn CPR before their loved one was discharged.

Students were scheduled under a shift-work model and were asked to take at least one two-hour shift per week.

Research objective

To compare video-only CPR training without a manikin to standard training with a manikin

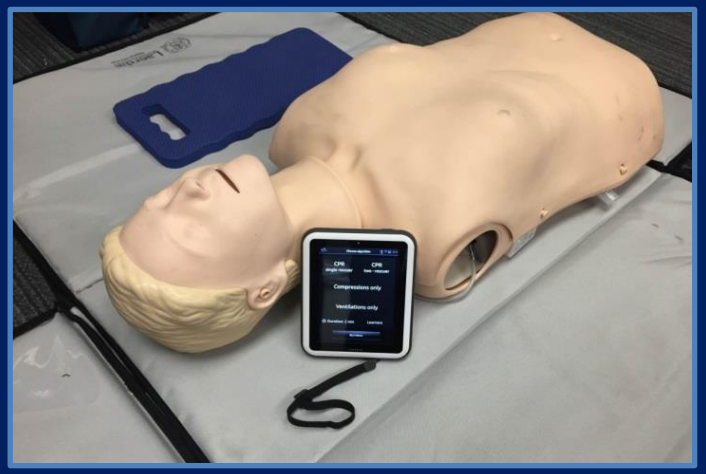


vs

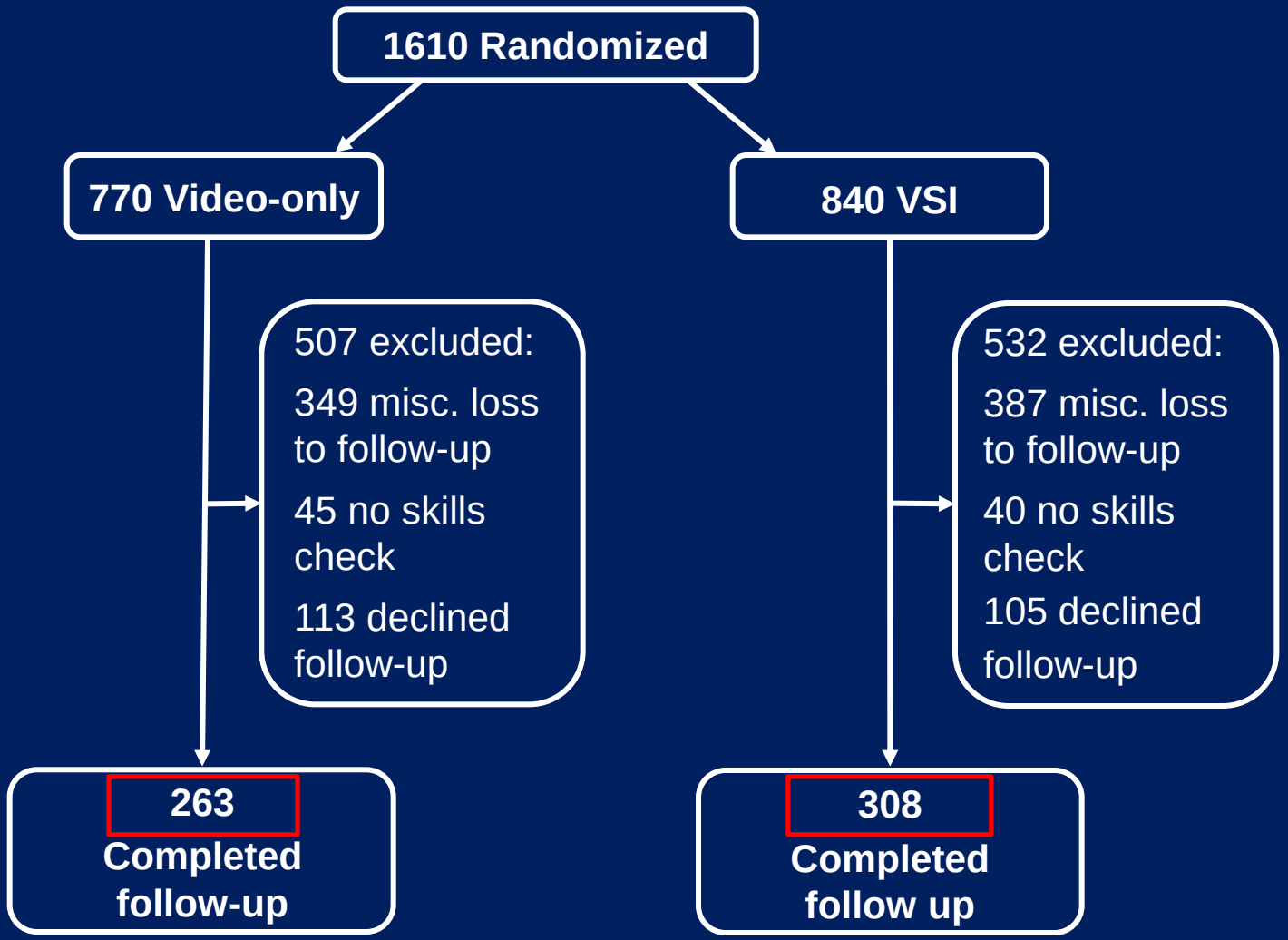
Outcome: chest compression rate and depth at 6 months

Research methods

- Hospitals were block randomized to offering VSI or video-only CPR training
- At 6 months post-training, subjects were asked to complete a brief in-person interview
- Upon completion of the interview, the subject was asked to perform a two-minute CPR skills test on a CPR-recording manikin



Results: Study enrollment from 02/2012-05/2015



Results: Study demographics

	Initial enrollment			Six month skills assessment		
	Video-only n=770	VSI n=840	p-value	Video-only n=263	VSI n=308	p-value
Age	52±15	52±15	0.93	52±14	51±14	0.26
Race, n(%)						
White	442 (58)	457 (55)	0.33	137 (53)	167 (54)	0.94
Black	248 (33)	290 (35)		102 (40)	117 (38)	
Other	69 (9)	88 (10)		19 (7)	23 (8)	
Gender						
Female	547 (73)	609 (73)	0.87	192 (74)	232 (75)	0.74
Male	223 (27)	225 (27)		67 (26)	76 (25)	
Relationship						
Spouse	253 (33)	276 (33)	0.36	91 (35)	109 (36)	0.81
Immediate Family	369 (49)	382 (46)		120 (46)	132 (43)	
Other	135 (18)	170 (21)		50 (19)	63 (21)	

Results; Demographics, continued

	Initial enrollment			Six month skills assessment		
	Video-only n=770	VSI n=840	p-value	Video-only n=263	VSI n=308	p-value
Education						
High School	281 (37)	318 (38)	0.69	91 (35)	107 (35)	0.59
Some College	182 (24)	204 (24)		61 (23)	80 (26)	
College	203 (27)	202 (24)		75 (29)	74 (24)	
Graduate School	95 (12)	113 (14)		35 (13)	47 (15)	
Previous Training						
Never	361 (47)	429 (52)	0.17	122 (47)	144 (47)	0.25
<2 years	63 (8)	60 (7)		19 (7)	31 (10)	
2-5 years	108 (14)	89 (11)		37 (14)	34 (11)	
6-10 years	77 (10)	76 (9)		32 (12)	26 (8)	
>10 years	158 (21)	181 (21)		52 (20)	72 (24)	

Results: CPR skills at 6 month follow-up

	Video-only n=263	VSI n=308	Adjusted Difference┼	p-value
CC Rate (n/min)	88 (85, 90)	89 (87, 91)	1 (-3, 4)	0.76
CC Depth (mm)	40 (39, 42)	45 (44, 47)	5 (3, 7)	<0.01

Mean Chest Compression (CC); ┼ propensity score adjusted with all of the demographics in Table 1.

Discussion

- To our knowledge, this represents the largest prospective trial of long-term retention after CPR training among lay providers
- Video-only training yielded a statistically indistinguishable difference in chest compression rate compared to VSI training
- Mean chest compression depth was significantly lower in the video-only group

The trade off: does this difference in depth matter?

Video-only

Pro: broad dissemination
Con: shallower CC depth

VSI

Pro: deeper CC depth
Con: narrower reach

Compression depth by in-hospital providers:
Mean depth < 45 mm

Table 2. CPR Parameters During Cardiac Arrest Episodes*

	First 5 Minutes of Cardiac Arrest Episode (N = 67)	Complete Cardiac Arrest Episode (N = 67)
Chest compression data		
Compression rate, /min		
Mean (SD)	102 (19)	105 (21)
<80	12.8	10.8
<90	28.1	23.7
>110	36.5	38.7
Compression depth, mm		
Mean (SD)	42 (13)	43 (14)
<38	37.4	36.3
Ventilation data		
Ventilation rate, /min		
Mean (SD)	21 (12)	22 (8)

Abella et al JAMA 2005

Compression depth by out-of-hospital providers:
Mean depth <45 mm

Table 2. Compression depth measurements

	Total (n = 1029)	Site A	Site B	Site C	Site D	Site E	Site F	Site G
Chest compression depth (mm), median (quartile 1, quartile 3)	37.3 (31.6, 43.5)	39 (33, 46)	39 (33, 44)	36 (30, 44)	35 (30, 42)	39 (30, 44)	39 (34, 43)	39 (30,
Mean (SD)	37.9 (10.0)	40 (10)	40 (9)	37 (11)	36 (9)	37 (8)	38 (8)	36 (9)
Compression depth category, % (no.)								

Idris et al CCM 2012

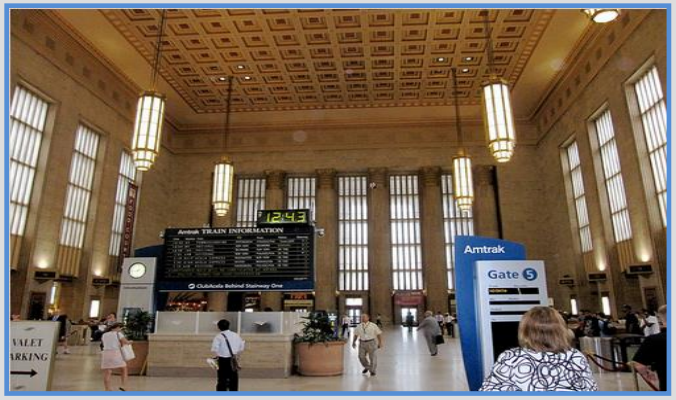
Is this a case where perfect is the enemy of good?

The vision

The video-only education platform opens new possibilities for innovative training of the public – reaching an enormous audience:

Driver's license registration

Airplane safety videos



Train stations or airports

Gas station video consoles

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Andrew Murray, EMT-B

Participating in a hospital-based CPR training program Led to lives saved in our community

- Spring 2012, one of our first year pre-med students trained a wife of a patient in the Hospital of the University of Pennsylvania.
- In September of 2012, the patient suffered a cardiac arrest at home and the wife performed CPR until EMS arrived and transferred him to the nearest hospital.
- *He is alive and well today because of the early, effective bystander CPR and CPR training his loved one received while in the hospital.*
- *20 people have used the skills they learned through this project*