

# A Change in Scene-ery: Re-Thinking On-Site Management of Cardiac Arrest?

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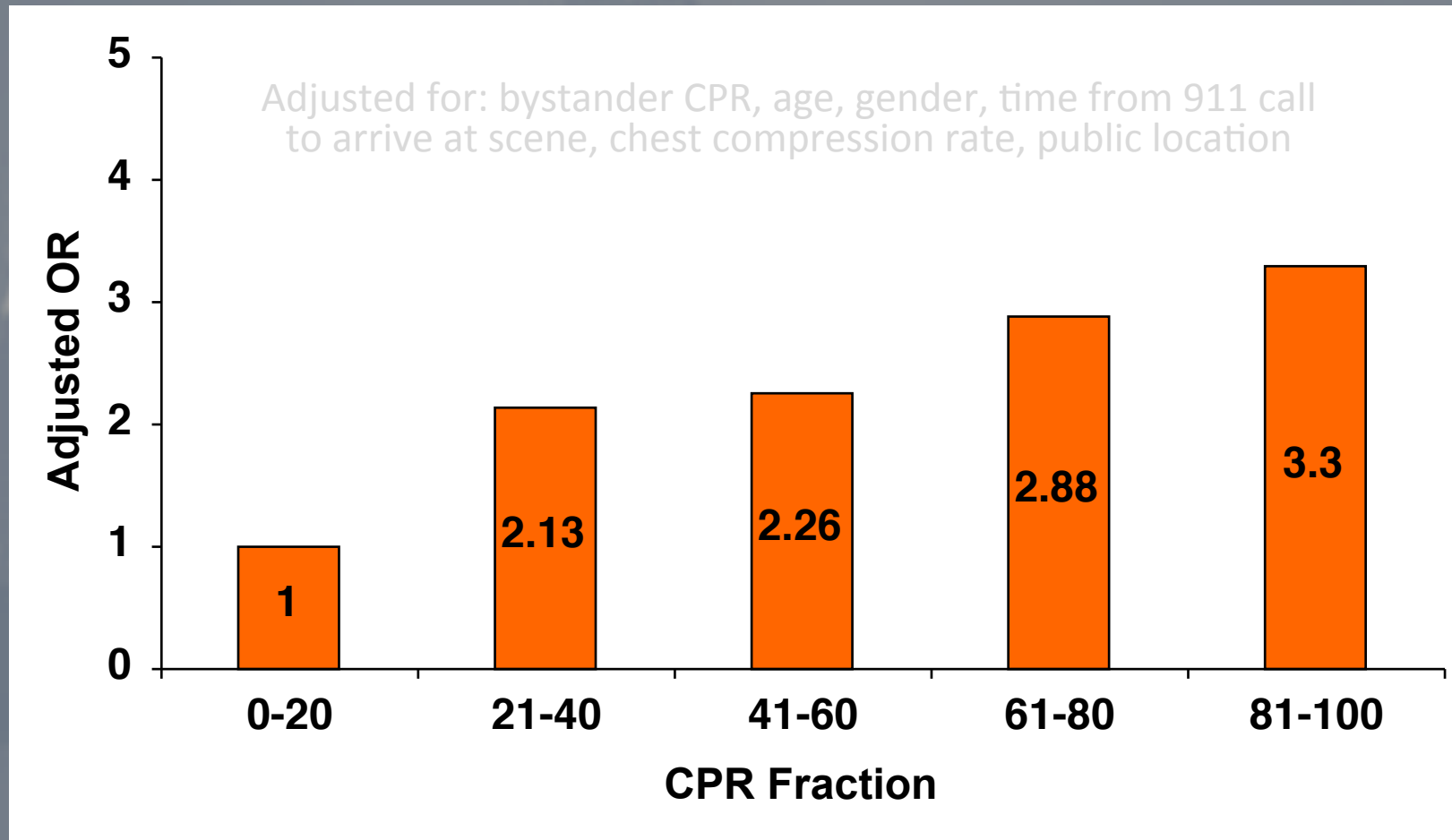
## Resuscitation Science

# Chest Compression Fraction Determines Survival in Patients With Out-of-Hospital Ventricular Fibrillation

Jim Christenson, MD; Douglas Andrusiek, MSc; Siobhan Everson-Stewart, MS; Peter Kudenchuk, MD; David Hostler, PhD; Judy Powell, BSN; Clifton W. Callaway, MD, PhD; Dan Bishop; Christian Vaillancourt, MD, MSc; Dan Davis, MD; Tom P. Aufderheide, MD; Ahamed Idris, MD; John A. Stouffer; Ian Stiell, MD, MSc; Robert Berg, MD; and the Resuscitation Outcomes Consortium Investigators

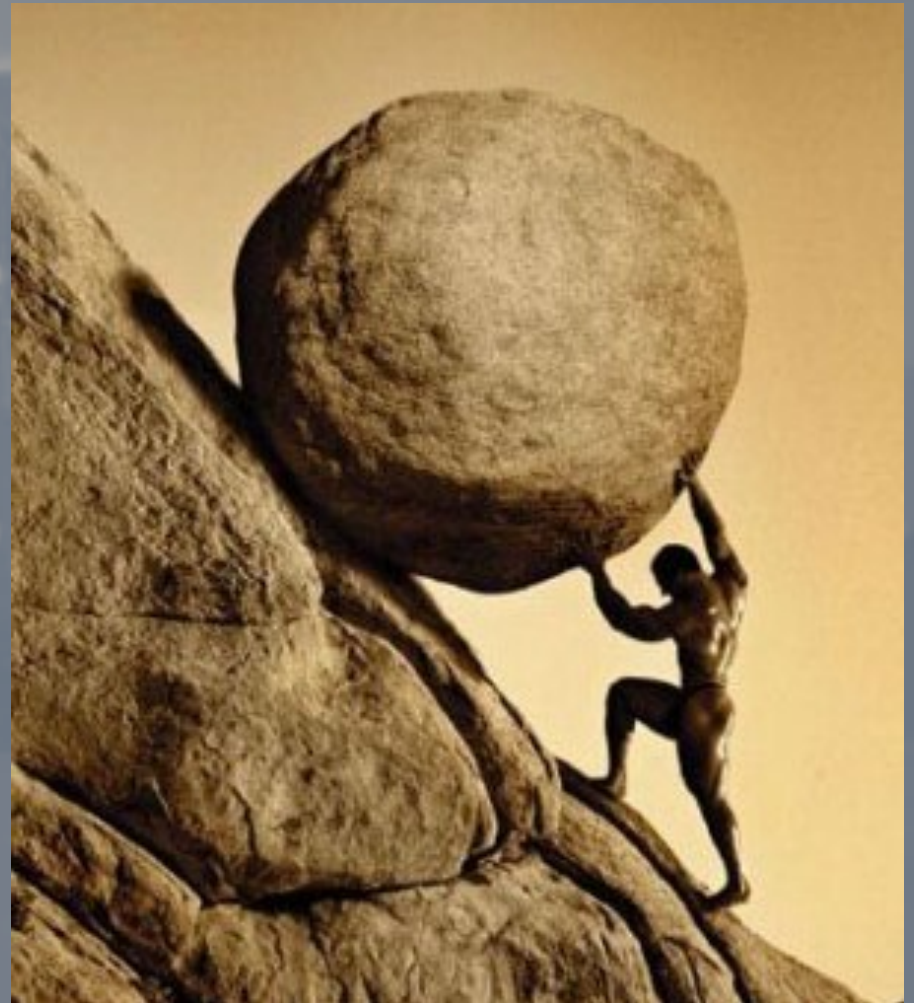
Christenson et al. Circulation 2009

# ROC: Adjusted Odds Ratio of Survival



# Believe in the Fundamentals

- Its about compressions
  - High quality
  - Limited interruption
- Defibrillation
- Controlled ventilation
  
- Everything else is secondary



“The Most Powerful Predictor by far of survival to hospital discharge is return of spontaneous circulation in the field”

Kellerman A. Annals Emerg Med 2010;56:358-61

Last year at Eagles...

# CPR Under the Old Oak Tree: Where Do You Resuscitate YOUR Cardiac Arrest?

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# Under the Oak Tree Take Away

- Focus on the things that matter and work your cardiac arrest where they drop....
- Do not move them until you resuscitate them or decide they are dead....
- Some may benefit from transport to cath lab with compression device in place.

# BANGOR DAILY NEWS

## Portland paramedics skip the ambulance rides, save three times as many lives

By Seth Koenig, BDN Staff

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Portland paramedics have nearly tripled their success rate in the past year of saving patients who have suffered cardiac arrest, in large part by providing emergency services on the scene and avoiding time-consuming ambulance rides to local hospitals.



# NEWS & PERSPECTIVE

## ROSC or Death

*Some EMS Systems Stop Transporting Cardiac Arrest Patients, Perform CPR at Scene, Roadside, Ambulance Bay*

by JOANNE KENEN

*Special Contributor to  
Annals News & Perspective*

**T**he patient was alert and talking as

tal but also in other hospitals in the larger community. And it led to an expanding appreciation that with out-of-hospital cardiac arrest seconds—not minutes, but seconds—count. It's not about on whose turf the patient's heart stopped but about how to improve the dismal

on the patient, and their outcome based on what we know in the science," Dr. Hinchey later said in a follow-up e-mail. "EMS can never replace emergency department care, only supplement it. If done well, everyone benefits, most importantly our patients."

Clifton W. Callaway, MD, PhD, Associate Professor, vice chair of the Department of Emergency Medicine, University of Pittsburgh, served on the advanced cardiac life support subcommittee when the American Heart Association updated its resuscitation guidelines. Dr. Callaway, who describes himself as "aggressive"

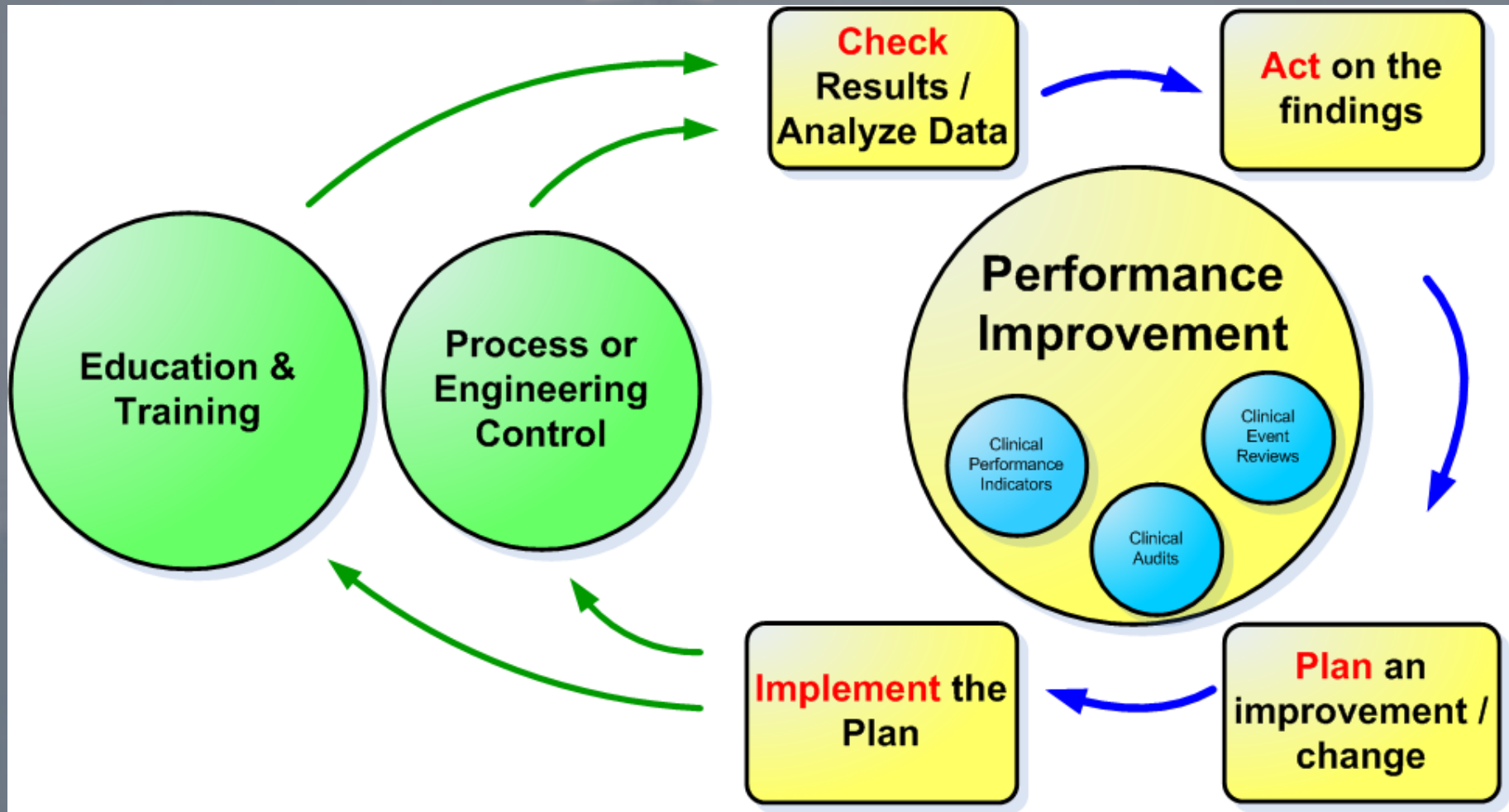
Annals of Emergency Medicine Nov 2011

# A few questions for YOU?

- How many are using a choreographed CPR procedure?
- How many work cardiac arrest on scene?
  - Is there a time limit?
- How many would stop the truck to do CPR?
- How many would do CPR in the parking lot?

How many of you know the quality  
of your CPR?

# Performance Improvement



**Person in Position 4 (P4) always just outside the "Triangle" of CPR**

1. Team Leader Duties
2. May assist with BIAD preparation and securing if needed



**Person in Position 3 (P3) always at patients Head**

1. Opens/clears Airway and insert OPA
2. Assembles/apply BVM and ITD
2. Provides 2 hand mask seal
3. Inserts/secures BIAD (King) & ITD & ETCO<sub>2</sub> after 400 Compressions

**Person in Position 1 (P1) always on patients Right side**

1. Initial patient assessment
2. Initiates 100 compressions
3. Ventilates in off cycle
4. BIAD Preparation in off cycle

**Person in Position 2 (P2) always on patients Left side**

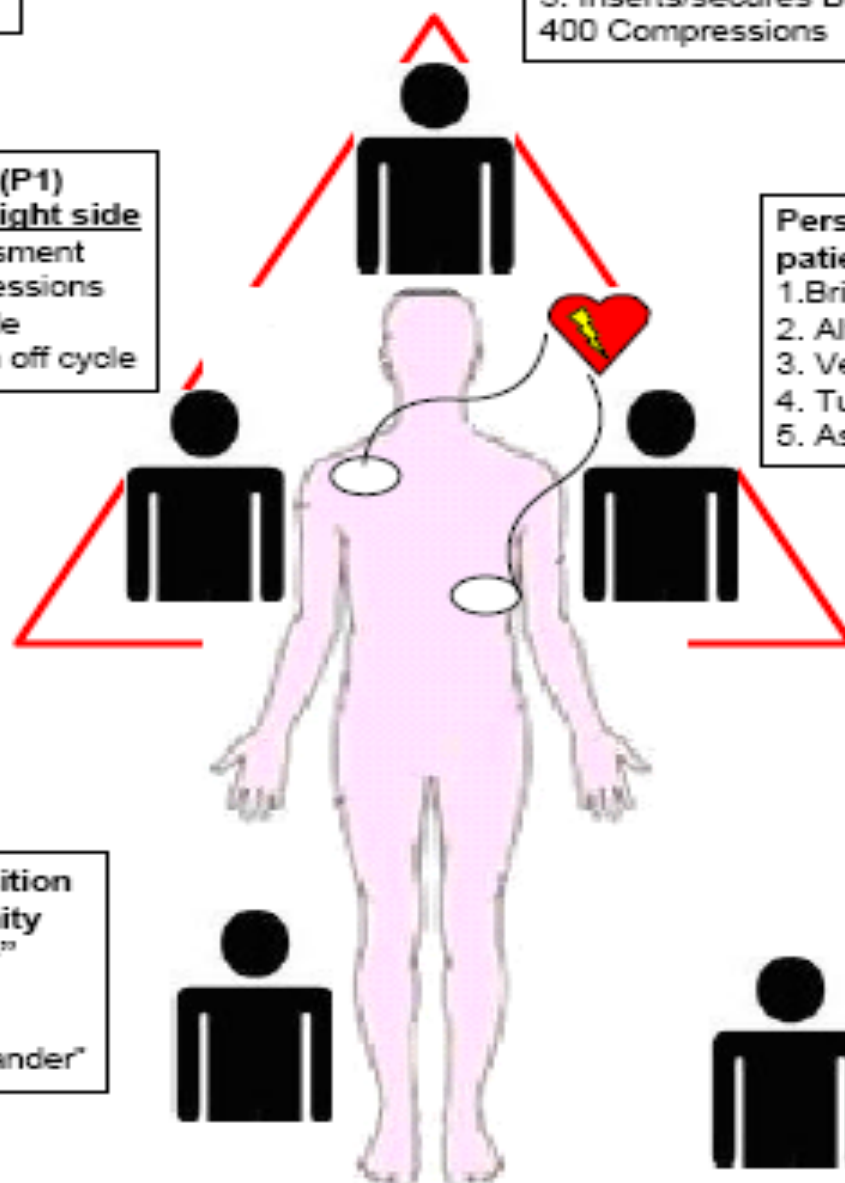
1. Brings and operates AED
2. Alternates 100 compressions with P1
3. Ventilates in off cycle
4. Turns on AED after 200 Compressions
5. Assist with BIAD Preparation if needed

**Advanced Provider in Position 5 (P5) always at an extremity outside the CPR "Triangle"**

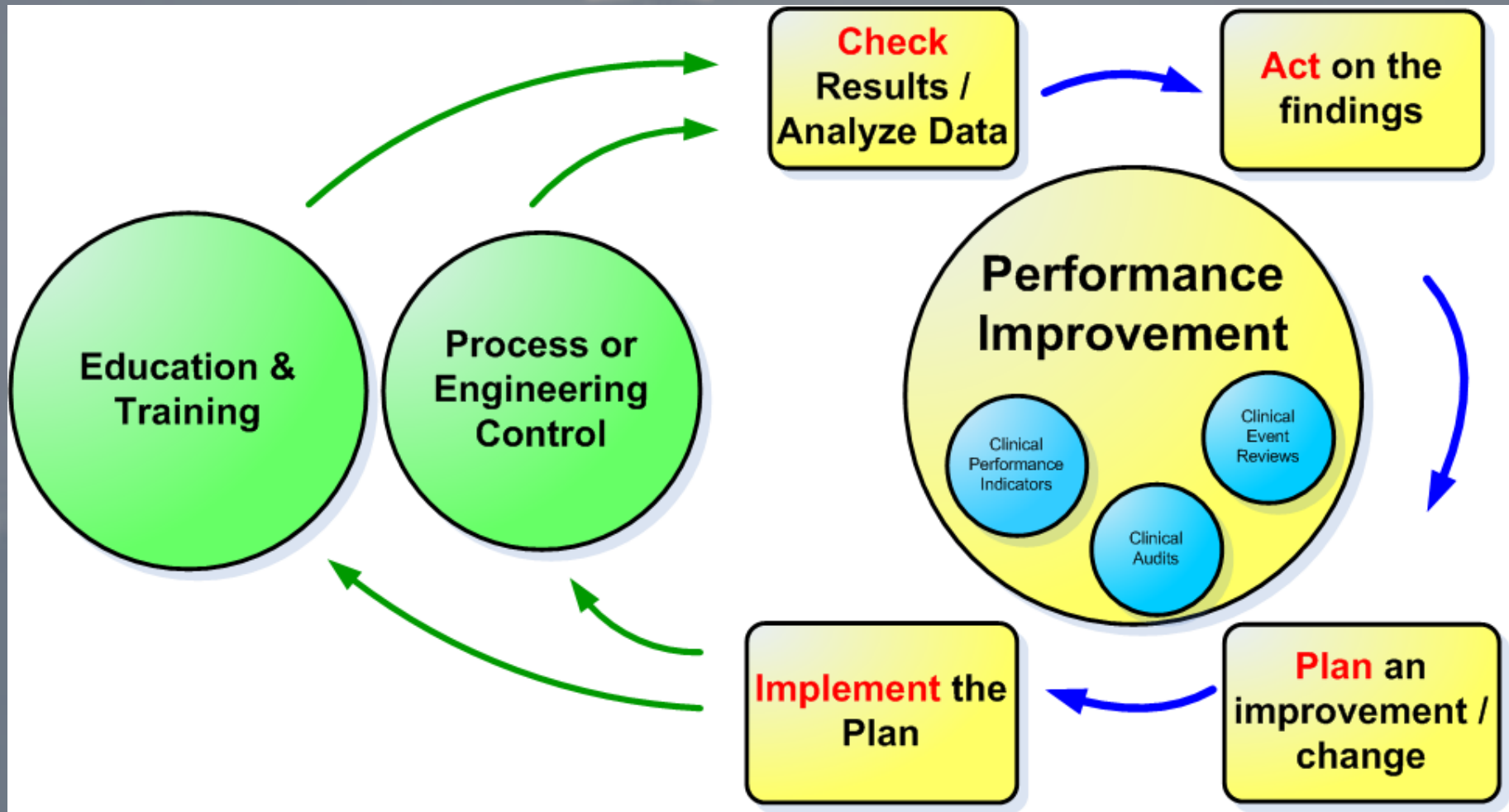
1. Initiates IV/IO access
2. Administers Medications requested by "Code Commander"

**Advanced Provider in Position 6 (P6) always at an area outside the CPR "Triangle" near a lower leg and Operates the Monitor**

1. Code Commander
2. Communicates/Interfaces with Team Leader
3. Makes all Patient treatment decisions



# Performance Improvement



If we are going to be the experts in cardiac arrest resuscitation we should be looking to see that we truly are.

# Provider Feedback

- People will do what you measure...
- Only if you tell them the results
- Measure the things that matter and give feedback that:
  - Has clear goals
  - Is consistent
  - Is timely



# Eagles Responses

- Do you regularly provide feedback to your EMT/ Paramedics about cardiac arrest care?

15-YES 9-OCCASIONAL 8-NO

If yes, is your process standardized?

7-YES

If yes, what mechanism is used to provide feedback?

6-Email 8-In-Person 3-Report

- n=32

# Eagles Responses

- Do you provide “real time” or “immediate post-arrest” feedback to your crews on CPR quality?

8-YES 2-SOON 3-SOME 19-NO

- Do you/your agency have a regular recognition practice to celebrate cardiac arrest successes and survivors?

16-YES 5-SOME 11-NO

# Tailboard Post Event

- Advantages:
  - Gives immediate feedback
  - Interactive/Promotes additional discussion
  - Builds team relationship
- Disadvantages
  - Requires immediate access to data
  - Holds units out of service
  - Must be able to bring providers together

# Cardiac Arrest

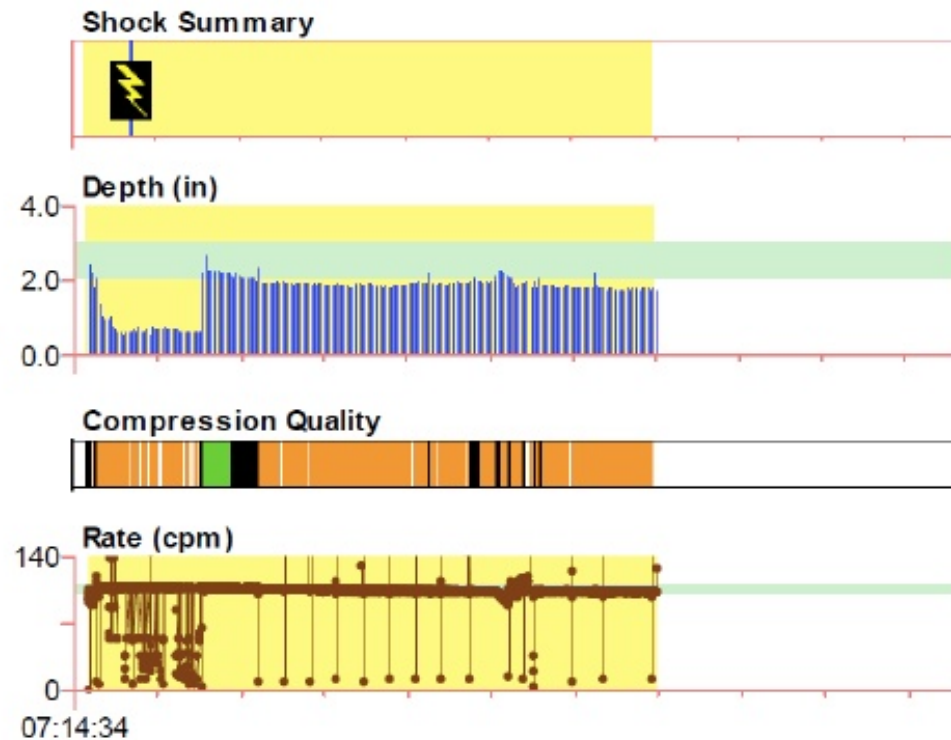
## CPR Performance

# Compression Quality Page

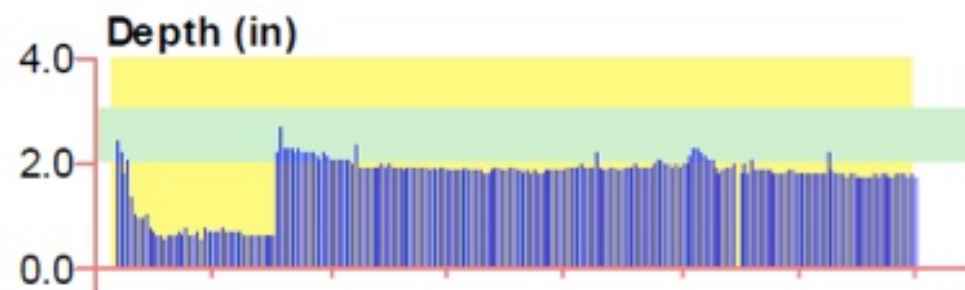
ZOLL® X Series® Defibrillator CPR Analysis  
Patient 0015 2013-11-07 07:14:34

The first page will contain:

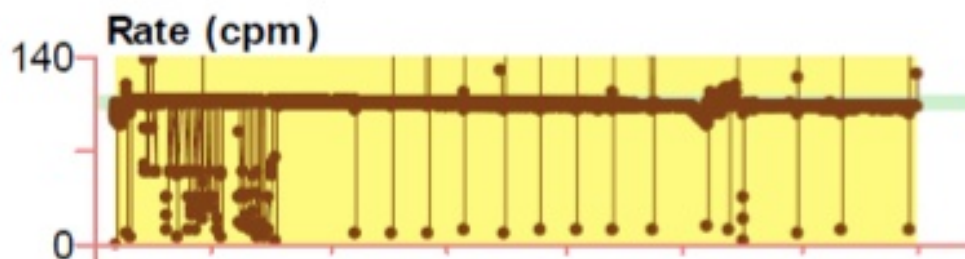
- Shock Summary (This indicates each shock delivered during the use of one monitor)
- 3 Compression Quality indicators
  - Depth
  - Compression Quality
  - Rate (cpm)



# Compression Quality Page Continued



- The green bar is target depth zone and is set at 2.0"-3.0"
- Each blue line indicates a compression



- The green bar is target rate zone and is set at 100-110cpm

07:14:34

# CPR Periods – Key Indicators

	Manual
Time to first compression:	00:01:07
Average time to shock after compressions stopped:	00:00:08
Average time to compressions after shock delivered:	00:00:03
Mean compression depth:	1.70 in
Mean compression rate:	101.91 cpm

- This is the average time from the last compression to the delivery of shock
- This is the average time it took to start the next compression.
- ❖ Our goal is to do our pulse/rhythm check/shock within 10 seconds

This is the mean rate (per minute) at which chest compressions were performed during an uninterrupted series of chest compressions

- ❖ Our goal is to be between 100 and 110 cpm

# CPR Periods

Manual	
Time in compressions:	00:39:42 (89.85 %)
Time not in compressions:	00:04:29 (10.15 %)
Compressions in target:	9.09 %

This number represents the proportion of resuscitation time during which chest compressions were performed

A higher compression ratio signifies an adequate rate and minimal pause during resuscitation. Remember high chest compression fraction is independently associated with better chances of survival.



# CPR Period - Rate

Rate (target zone from 100 to 110 CPM):		
Standard deviation:	13.59 cpm	
Above target zone:	53	(1.31 %)
In target zone:	3737	(92.52 %)
Below target zone:	249	(6.16 %)

Rate:

- In target zone - number of compressions performed within 100 and 110 cpm

# CPR Period Depth

Depth (target zone from 2 to 3 in):		
Standard deviation:	0.42 in	
Above target zone:	0	(0.00 %)
In target zone:	449	(11.12 %)
Below target zone:	3590	(88.88 %)


Depth – 

- In target Zone – is the total number of compressions performed between 2 and 3 inches

# Self-Assessment

Ask yourself the following:

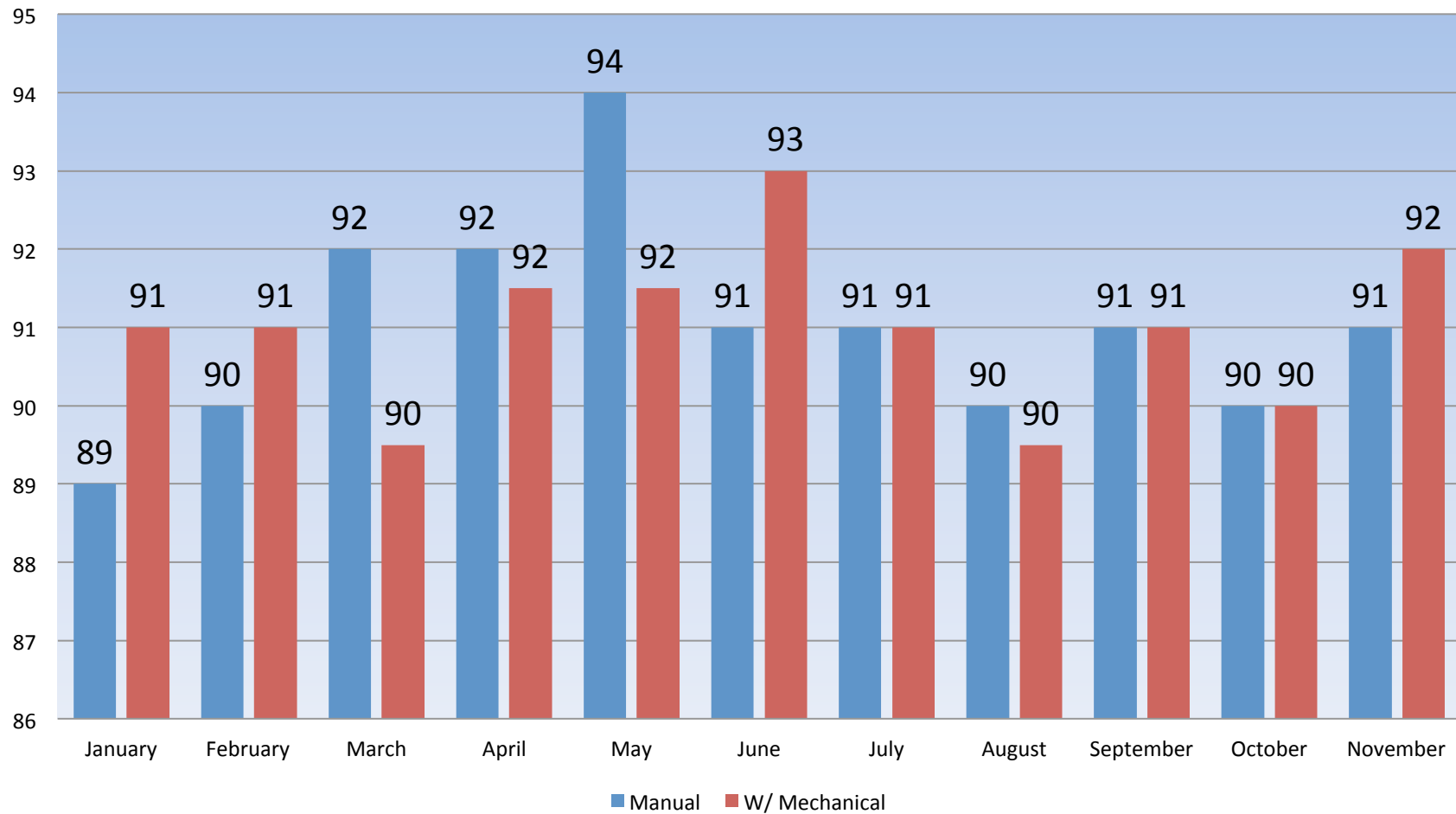
- Was each pause period under 10 seconds?
- Was CPR started immediately after the shock/pulse check?
- Was the monitor charged before each check?
- Was the monitor in paddles during CPR?
- Were effective compressions performed?

A blurred, dark image of a city skyline at night, with lights reflecting on water in the foreground. The image is used as a background for the text.

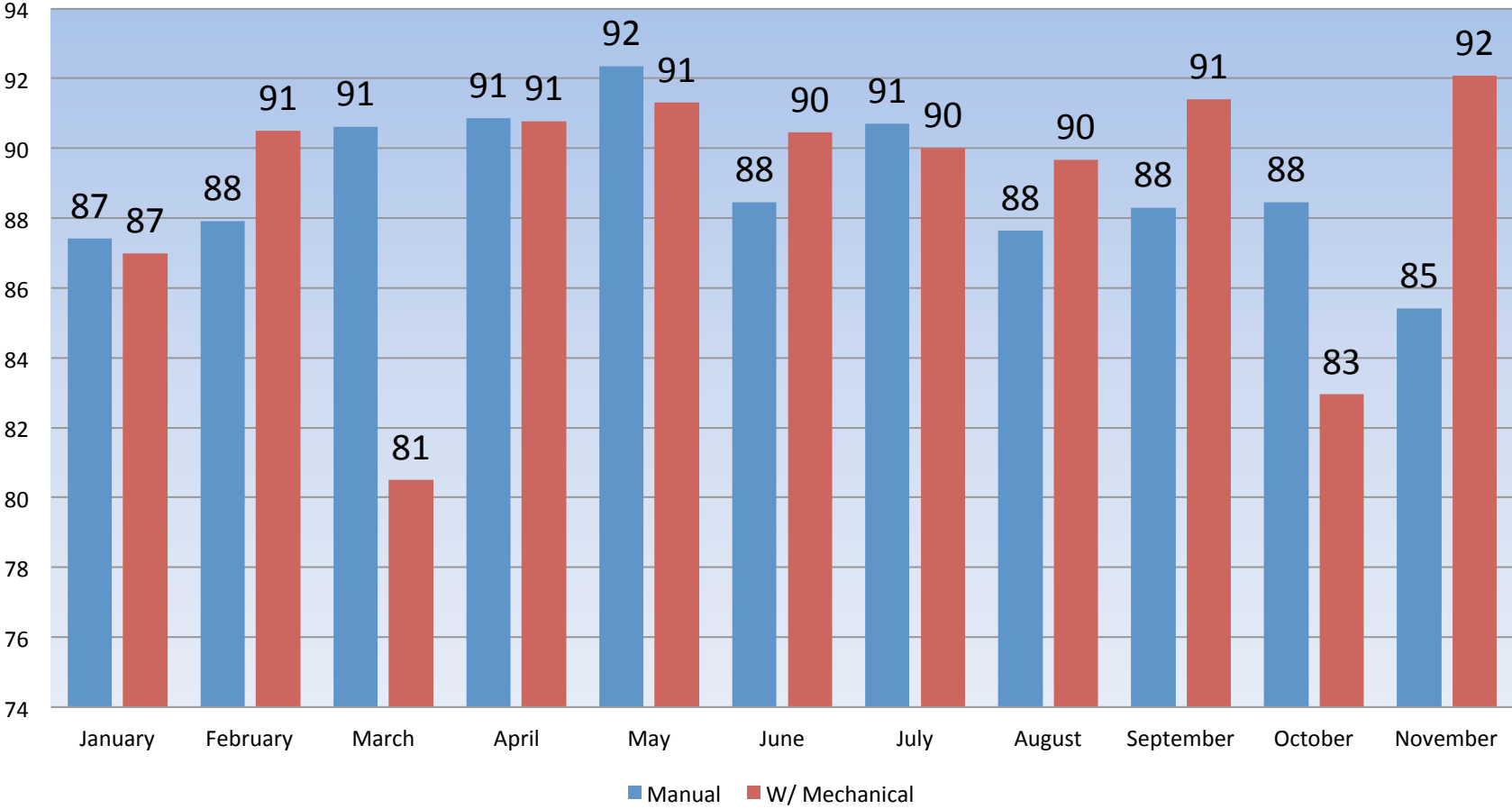
“No matter how beautiful the  
strategy you occasionally have to  
look at the results”

-Winston Churchill

## 2013 ATCEMS CPR Compression Fraction (Median)



## 2013 ATCEMS CPR Compression Fraction (Average)



# Work 'em where they drop?

- We have an engineered process
  - Checklists, metronomes, choreographed CPR
- We have good understanding of what is important in cardiac arrest
- YES!! Work them where they drop!!!

# But....

- We need to measure our performance
- We need to work to refine our process
- Provide feedback to our providers to promote desired behaviors
- Next step is to engage hospital partners
  - Admission rates
  - Completion of resuscitation bundle
  - Discharge status and rates



More on Pit Crew at:  
[atcomdce.org](http://atcomdce.org)



[paul.hinchey@austintexas.gov](mailto:paul.hinchey@austintexas.gov)