Developing a Hospital-Based Resuscitation Program

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Objectives:

- Describe components of a high quality collaborative resuscitation program in a healthcare system
  - Committee structure
  - Committee leadership

- Discuss data collection strategies that can improve patient care outcomes
  - Training & feedback to teams
  - Development of team roles
  - The value of debriefing

Resuscitation Program Structure & Code Blue Committee support

Code Blue Committee Structure

Develop a Charter that defines:

- Annual Code Blue Strategic Plan
  - Goals and Objectives: Developed annually, reviewed quarterly
  - Who does the committee report (accountable) to?
- Committee membership obligations/responsibilities
- Meeting schedule
- Decision making process for code blue committee
- Develops a training program
- Communication plan
- Crash cart maintenance program/equipment needs
- Evaluation process of Code Blue calls

Code Blue Committee Leadership

Administrative/nursing leadership
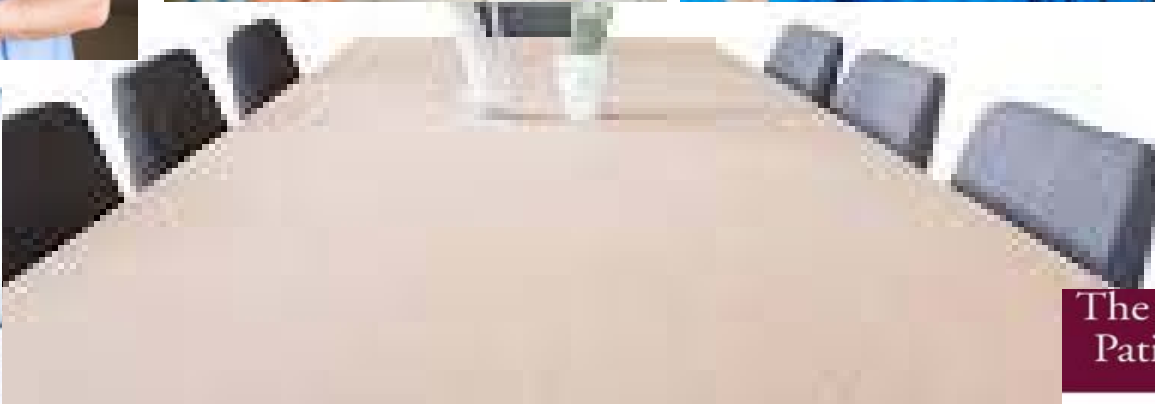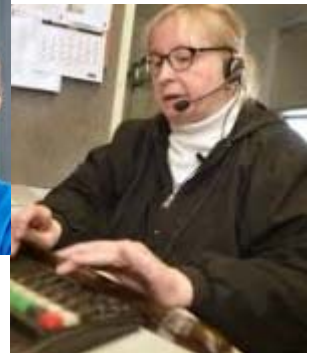
Co-chair; Provider

Physician leadership

Co-chair; A clinical professional

Code Blue Committee Membership

The Essential Guide for Patient Safety Officers
Second Edition

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Where do you stand?

Statistics, performance & staff satisfaction

"You will not improve what you do not measure"

How are hospitals doing?

Outcomes?

A. 8.6%

B. 25.5% ✓

C. 42.6%

D. 58.4%

Types of arrests?

A. PEA & Asystole ✓

B. Vfib & PEA

C. Vtach & Vfib

D. Asystole & Vfib

Mozaffarian D, Benjamin EJ, Go, AS et al; on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics - 2015 update: a report from the American Heart Association. Circulation. 2015;131(4):e29-e322.
Morrison et al (2013); Circulation

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Incidence by Initial Rhythm
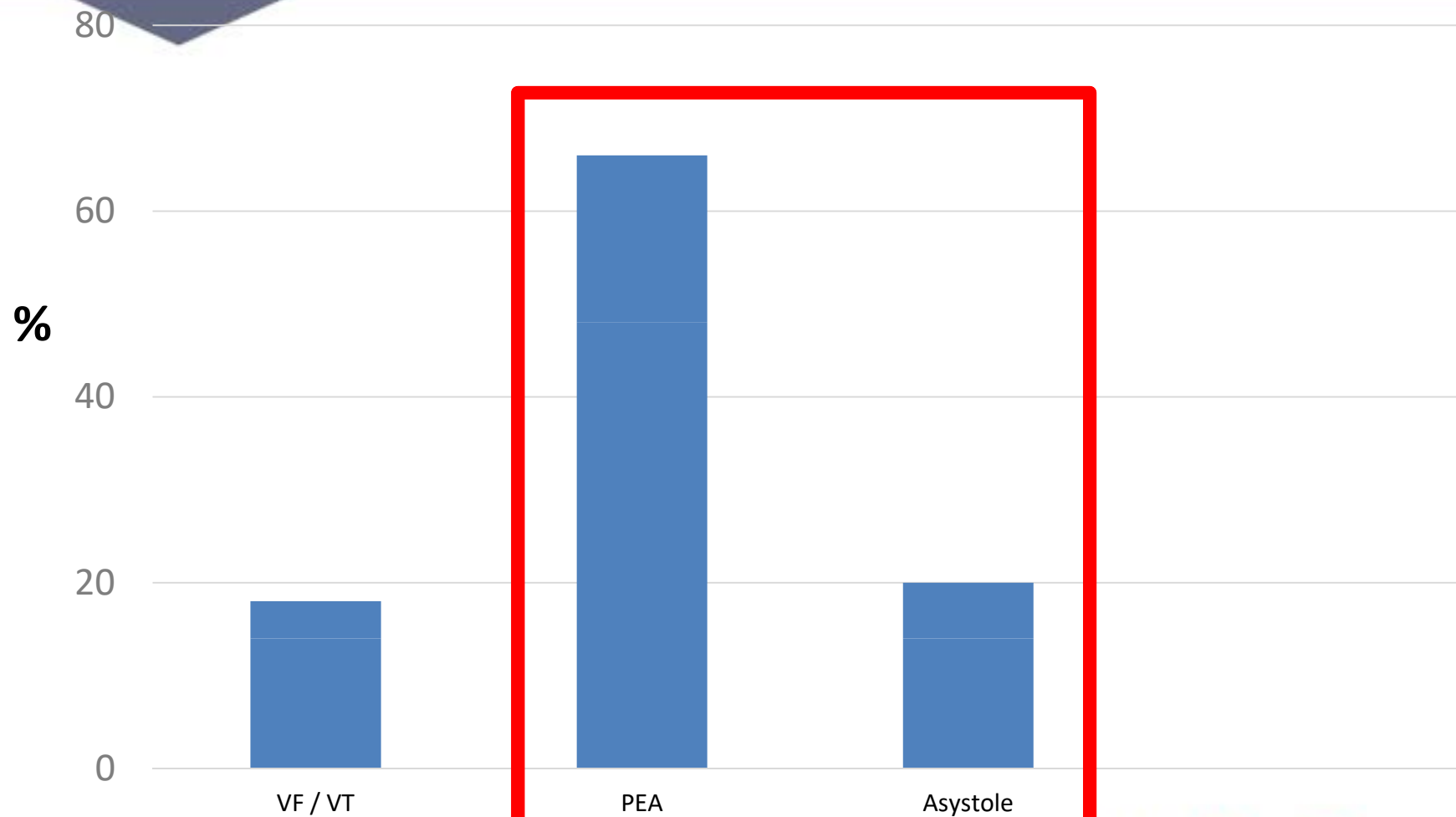
# Definition of In-Hospital Cardiac Arrest

- Occurs in a hospital
  - Whether the patient is admitted or not
- Received chest compressions
- Received defibrillation
- Or, both!

- Exclude arrests in the ED
  - Track ED arrests separately
  - These should not include patients who had a pre-hospital arrest

- Exclude visitors, staff & outpatient status

Leadership Evaluation

Leadership survey: **69%** rated positive leadership qualities as always occurring and **27%** as sometimes occurring
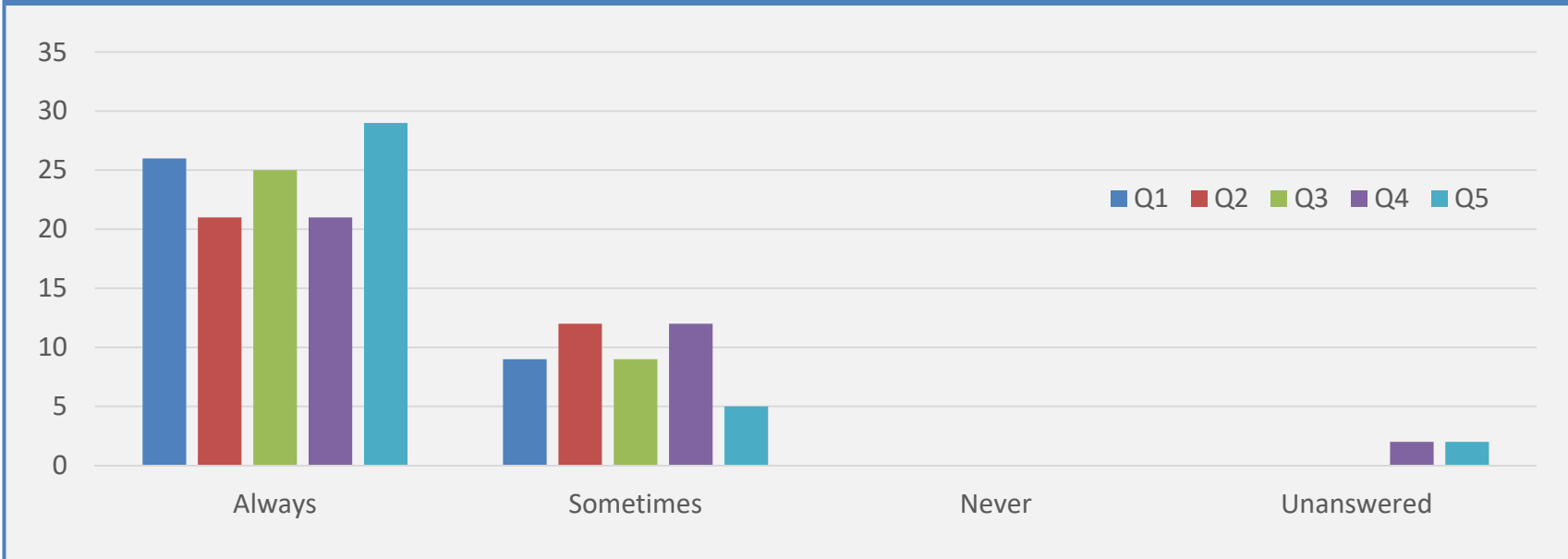
Q1. Was it clear to you who the team leader(s) was during the code?

Q2. Did the team leader successfully communicate the course of action?

Q3. Did you know what your role and responsibilities were during the code?

Q4. Did you know who was serving in what roles on your team?

Q5. Did you feel empowered to speak up/contribute during the code if you had input with the plan?

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Training

Maintenance of competency

Skill Decline in CPR/AED Trainees

% Passing Skills Test

- 100%
- 90%
- 80%
- 70%
- 60%
- 50%
- 40%
- 30%
- 20%
- 10%
- 0%

34%

27%

10%

Figure 1. Average Skill Loss

3 months   6 months   12 month

RQI RESUSCITATION QUALITY IMPROVEMENT™

The innovative competency-based training program for high-quality CPR and improved patient outcomes

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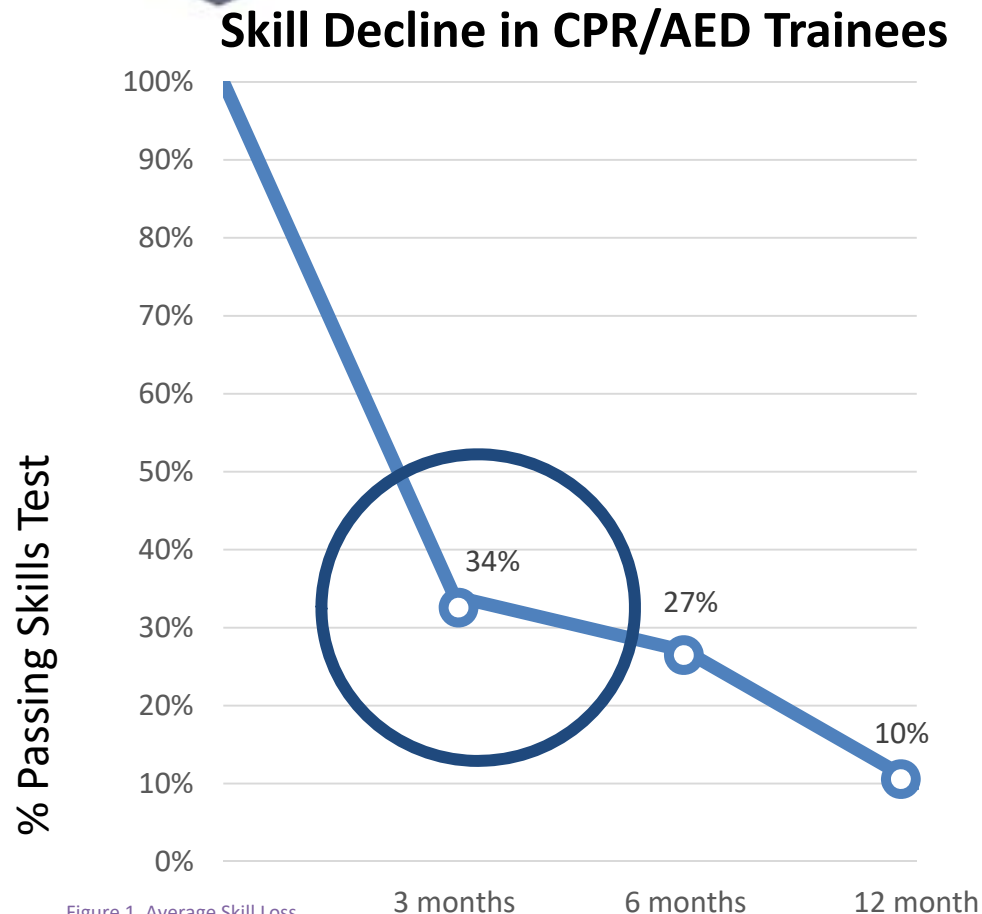
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http://www.heart.org/HEARTORG/General/Resuscitation-Quality-Improvement_UCM_459324_SubHomePage.jsp

Training Program

- Need an ongoing multidisciplinary training program
  - Regular scheduled mock codes
  - Initial & annual individual team role training
    - Code leader training
    - Operations Nurse
    - Defibrillation Nurse
    - Pharmacists
    - Recorders
    - First responders
  - Bi-annual ACLS certification required for all members of the code blue team

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Mock Codes

- Goal 2x/month, day & night shift

- Announced as a real code

- Using "in-situ" code blue simulations

- 85% of mock codes were adult scenarios

- Resuscitation experts observe and evaluate the code using a standardized form

- Debriefing after simulations

What resources does this require?

- ## Low fidelity simulation
  - Minimum 2 people

- ## High fidelity simulation
  - Minimum 3 people

First Responders Responsibilities

- Prepare for code blue team arrival:
  - Locked units have someone at entrance door
  - Hard to find areas….unit staff to provide directions
  - Crash cart in room: Open top 2 drawers (Medications, IV supplies)
  - Open computer to latest labs
  - Set up suction & oxygen
- After code blue team arrival:
  - Primary RN stays in room & provide patient information to code leader
  - CN dismissed; makes sure primary RN assignment is covered
  - Assigns someone to assist with supplies
  - Support unit's staff & patients

Succinct Communication - SBAR

First Responder SBAR to ACLS Team

Situation
What occurred just prior to the patient coding and during the BLS portion of the code?

Background
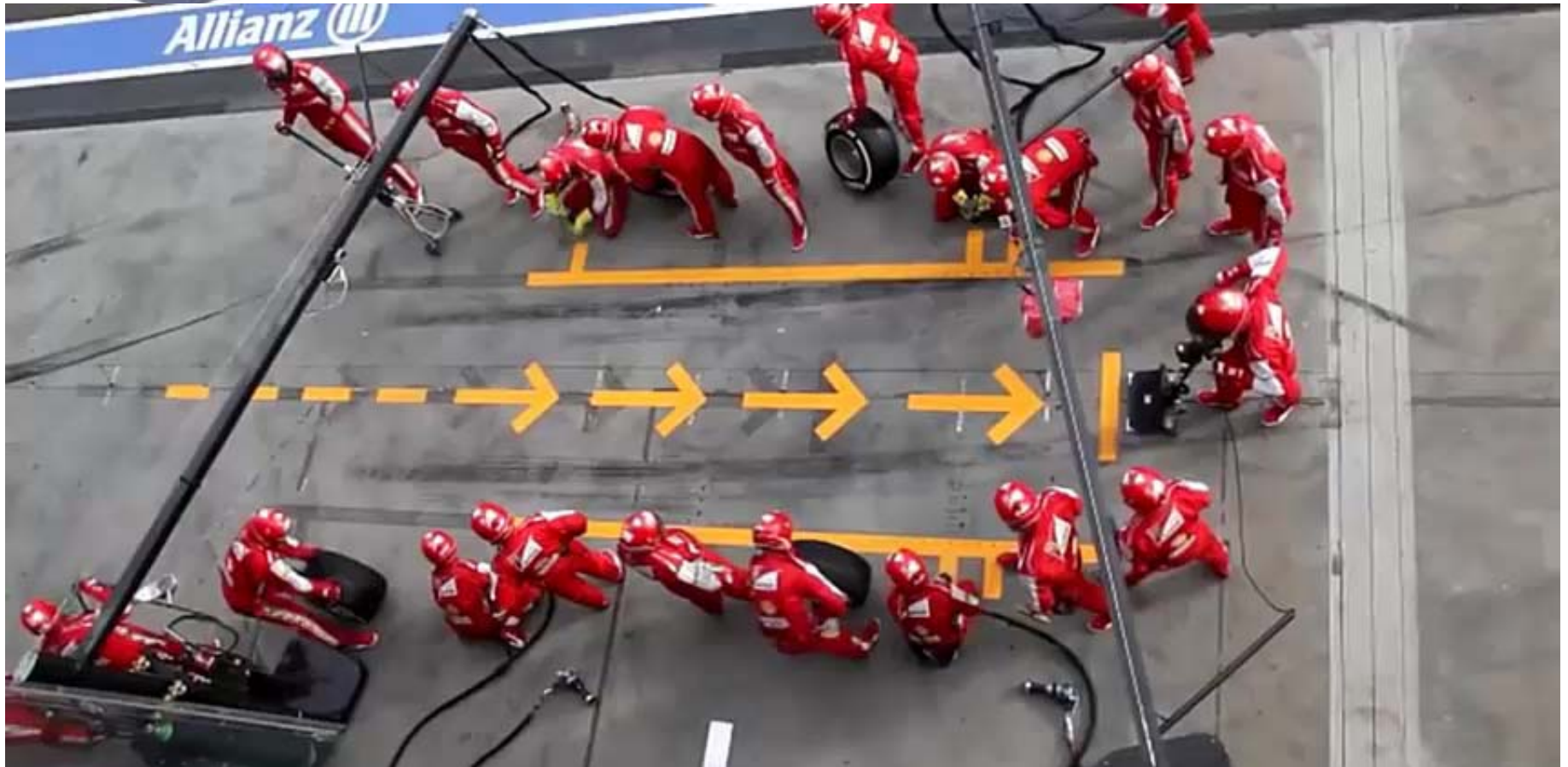Admitting diagnosis & pertinent past medical history

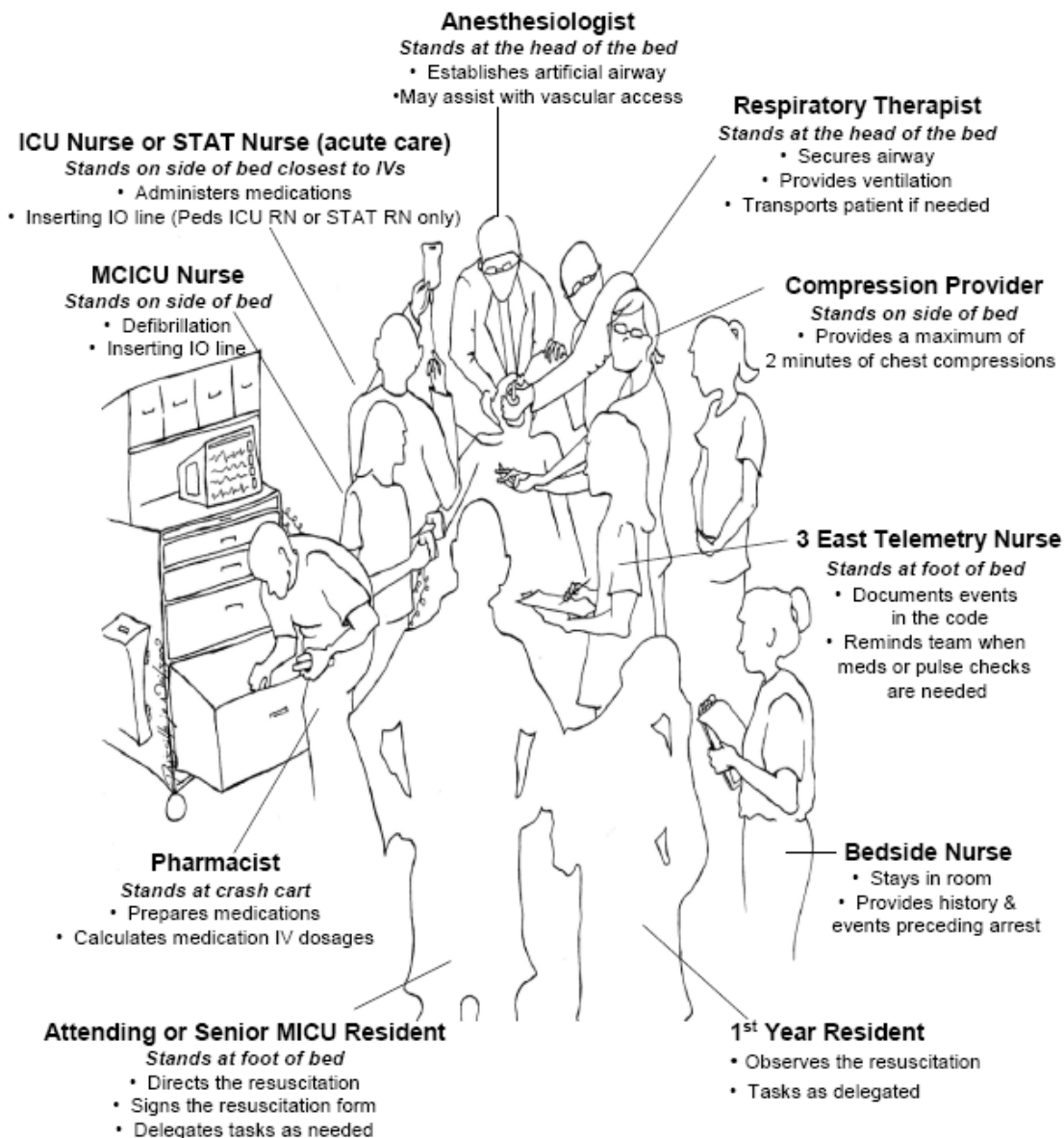**Assessment**
Last vital signs & lab results

Recommendation & Request
Indicate you will stay in the room & ask if the team needs any additional information or equipment

Code Blue Roles

Are humans as important as NASCAR?

Other responders:

- Lab
- Nursing Supervisor
- Security
- Chaplain
- Family

High-Performing Teams

- Have clear roles & responsibilities
- Have strong team leadership
- Have clear, valued & shared vision
- Optimize resources
- Engage in a regular feedback
- Develop a strong sense of collective trust & confidence
- Manage & optimize performance outcomes

Code Blue Roles

- **Code team leader (MCICU R3)**
  - Establishes control and leads resuscitation efforts
  - If ICU fellow/attending, MCICU R3 stands by to
  - Seeks input from other code team members during code
  - Officially announces end of code
  - Reports to accepting MD upon patient transfer, if relevant
  - Contacts family at end of code (if not primary team)
  - Writes code note

- **ICU fellow/attending**
  - **Resource to code leader** on ACLS standards
  - Initiates and coordinates debrief session post-code

- **Anesthesia**
  - Establishes definitive airway and ventilation
  - Manages airway
  - Documents airway interventions
  - Assists with obtaining vascular access as necessary

- **Respiratory therapist**
  - Maintains airway prior to advanced airway placement
  - Assists anesthesiologist with advanced airway placement
  - Applies $EtCO_2$ device

Code Blue Roles

- **Pharmacist**
  - Prepares & hands-off meds and other supplies from the code cart to the team
  - Provides guidance for med dosing / administration
  - Offers clinical judgment on emergency med usage
  - Reviews patient's current meds / labs for contributing factors

- **Recorder RN**
  - Documents assessments and interventions during code
  - Code Narrator: Keeps time between interventions, communicates time intervals, summarizes code process when requested
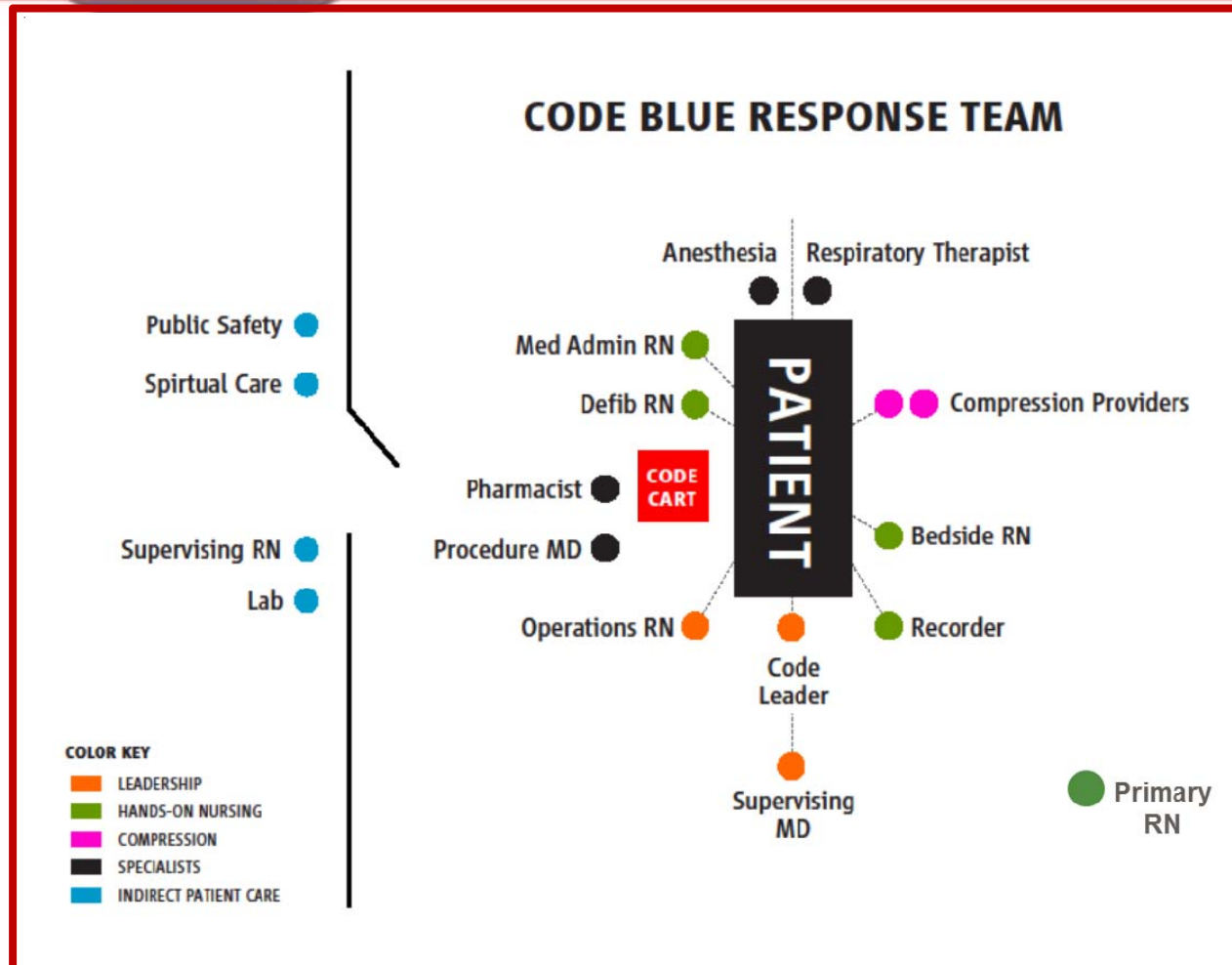
- **Operations RN (MCICU RN)**
  - Ensures each person is at the correct position
  - Ensures that room is set up correctly
  - Ensures that needed supplies are present and being used correctly
  - Encourages calm, quiet, and teamwork
  - Clinical resource/mentor to code blue team members

- **Defibrillation RN**
  - Sets up for defibrillation if not done, switch from AED to ALS defibrillator
  - Performs defibrillation/ cardioversion/TCP
  - Rhythm awareness

Rapid Team Assembly
Predetermined Roles

CODE BLUE RESPONSE TEAM

Public Safety

Spiritual Care

Pharmacist

CODE CART

Supervising RN

Lab

Anesthesia   Respiratory Therapist

Med Admin RN

Defib RN

Compression Providers

PATIENT

Procedure MD

Bedside RN

Operations RN

Recorder

Code Leader

Supervising MD

Primary RN

COLOR KEY
- LEADERSHIP
- HANDS-ON NURSING
- COMPRESSION
- SPECIALISTS
- INDIRECT PATIENT CARE

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ICU RN Role—Operations RN

- Overview scene continuously
- The "lead RN" of the Code Blue Team
- Promotes communication between roles, close loop communication
- Gives suggestions to code leader on treatment course
- Verifies that procedures are being done correctly (i.e. IO insertion)
- Assesses compression quality; backboard, compression fraction
- Requests additional equipment/supplies from floor staff

Effective Code Team Leadership

- Ability to coordinate activities of the members
- Give concise explanations
- Take charge: Announce they are the code leader
- Shared mental model
  - Think out loud
  - Summarize code process
  - Ask for suggestions

- Good communication skills
  - Assertive
  - Respectful communication tools
  - Closed loop communication
    - Give an order
    - Acknowledgement of order by team member
    - Indicate when intervention is completed

Leadership

- Leadership training should be required

- Team strategies & tools to enhance performance & patient safety

Team STEPPS

S – Strategies

T – Tools

E – Enhance

P – Performance

P – Patient

S – Safety

Hunziker et al. Crit Care Med. (2010).

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Communication Loops

1.
CALL OUT

Sender initiates message

2.
CROSS-CHECK

Receiver accepts message, provides feedback confirmation

CLOSED

COMMUNICATION

LOOP

3.
CHECK-BACK

Sender notified of task completion

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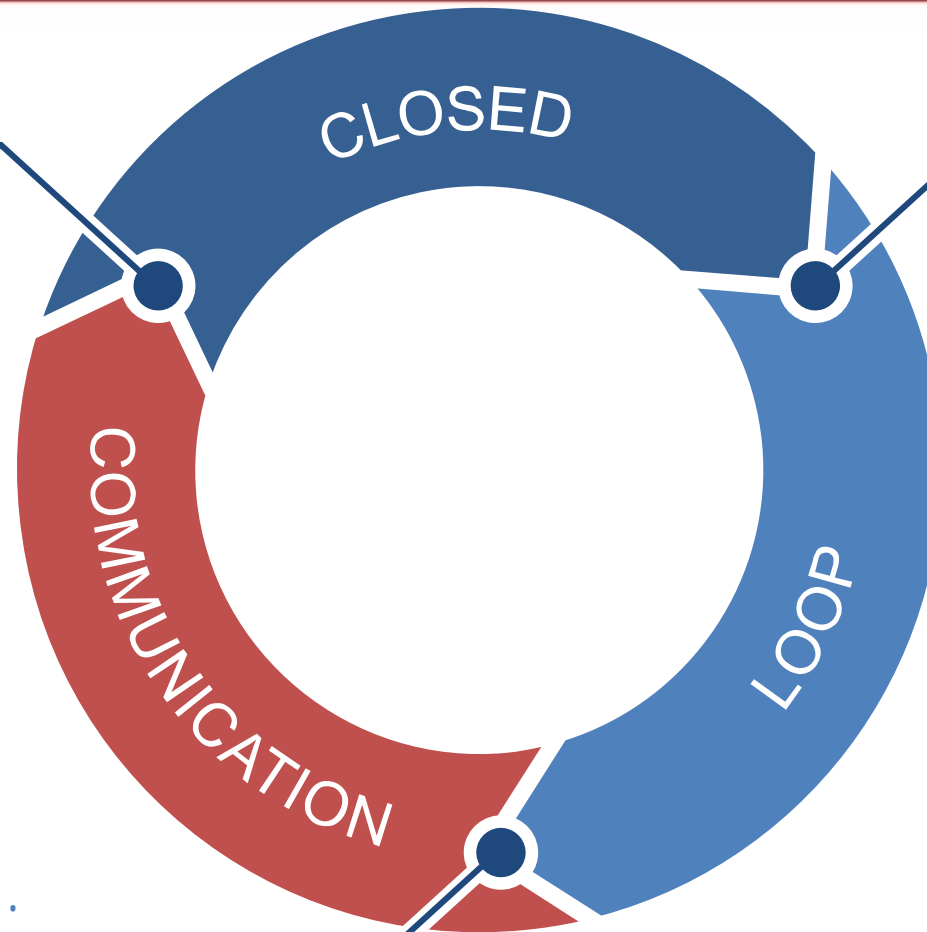
Who shows up to your resuscitations?!

Code Blue Team Identifiers

The Nursing Supervisor is responsible for crowd control

Debriefing
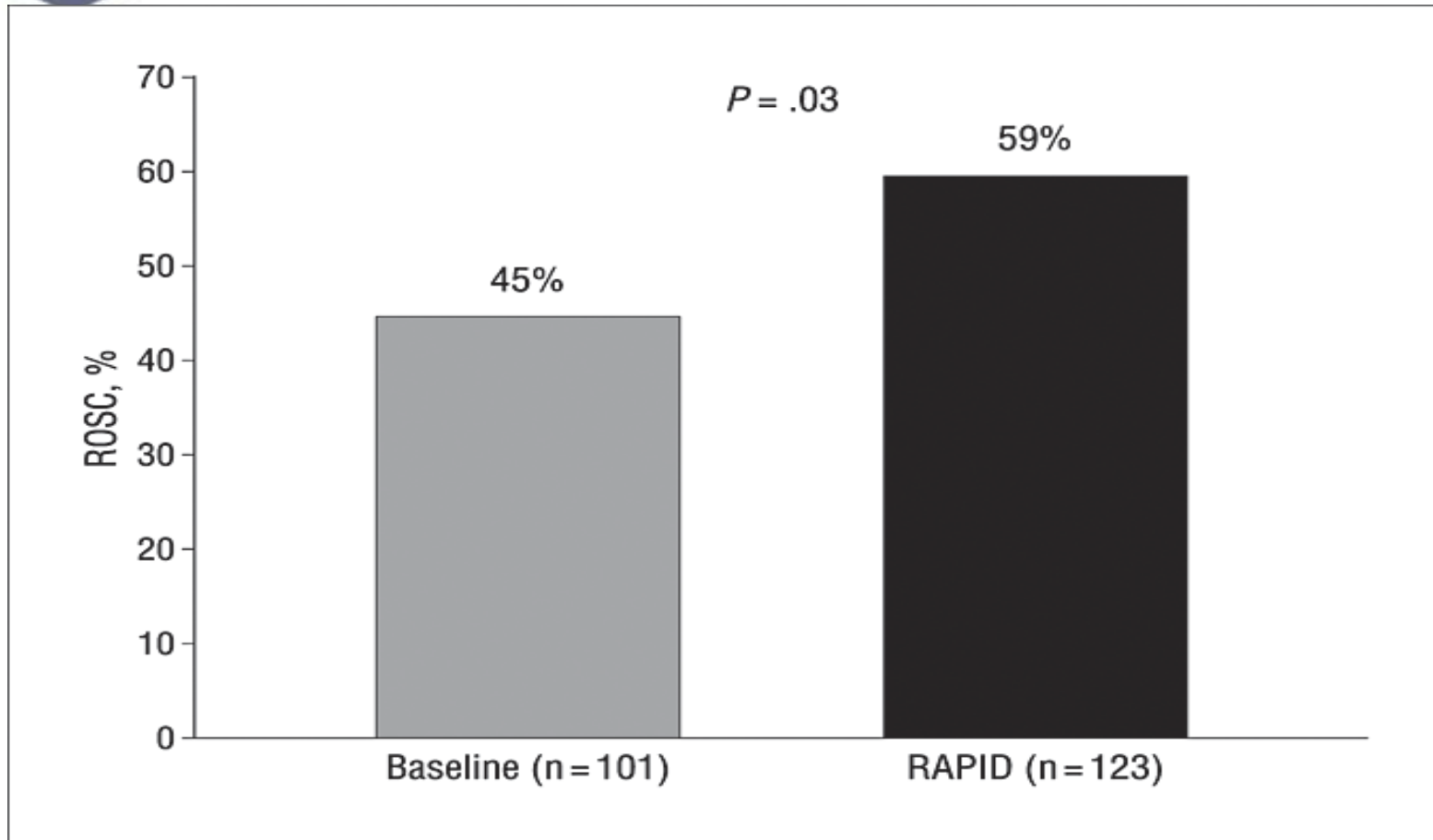# &
Feedback to Teams

Post event & Intra-arrest Feedback

How & where to provide feedback?

- Intra-arrest
- Post-arrest debriefing
- Post-event review
- Training feedback

Debriefings Improve ROSC!

"Hot Debrief"

- Ideal situation:
  Correct bad CPR as it happens
- Download data from devices used during the arrest
- Immediate post-event review

3 questions:

1) What went well?

2) What can we do DIFFERENT next time?

3) Were there any safety or equipment concerns?

2013 CPR Quality Consensus Statement

"Poor quality CPR should be considered a preventable harm"

Meany, Bobrow, Mancini et al (2013) Circulation 128(4):417-435

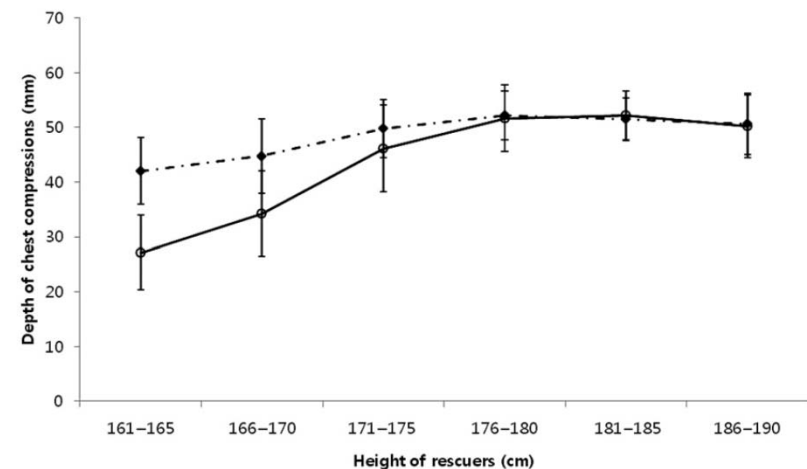ECCU2017

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Compression Quality Feedback

Compression Depth

- Variables that affect compression depth:
  - Bed Height
  - Arm angle to chest
  - Step stool utilization
  - Rescuer's height, weight, gender

Mayrand, et al, Western Journal of Emergency Medicine (2015)
Edelsen, et al, Resuscitation (2012)

"I can never find a step stool!!!!"

# AHA Consensus Recommendation

2013 Consensus Recommendation

"…resuscitation data from the defibrillator or any other device or source documentation that captures data at the scene should be used for feedback to the team."

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Post Event Debriefing – "Cold" Debriefs

- Data automatically downloads from the defibrillator
- Evaluate CPR quality
  - Rate
  - Depth
  - Chest Compression Fraction
- Time to defibrillation
- Peri-shock pauses
- Assisted ventilation rate

"Cold" Debriefing Improves performance

Resuscitation with Actual Performance Integrated Debriefing
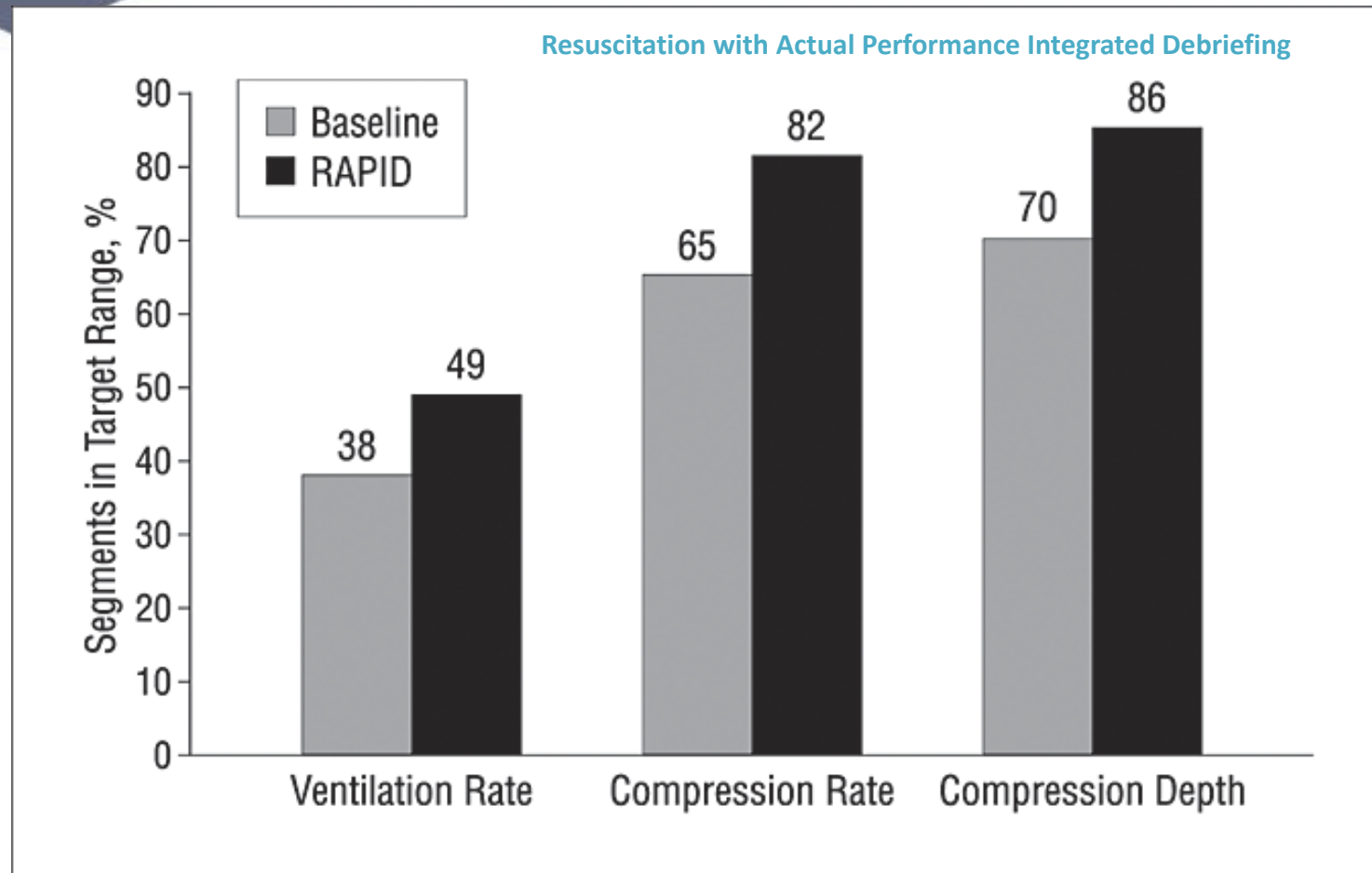
Edelson , 2008

Does debriefing post-event improve outcomes?

Pediatric patients 8 years or older
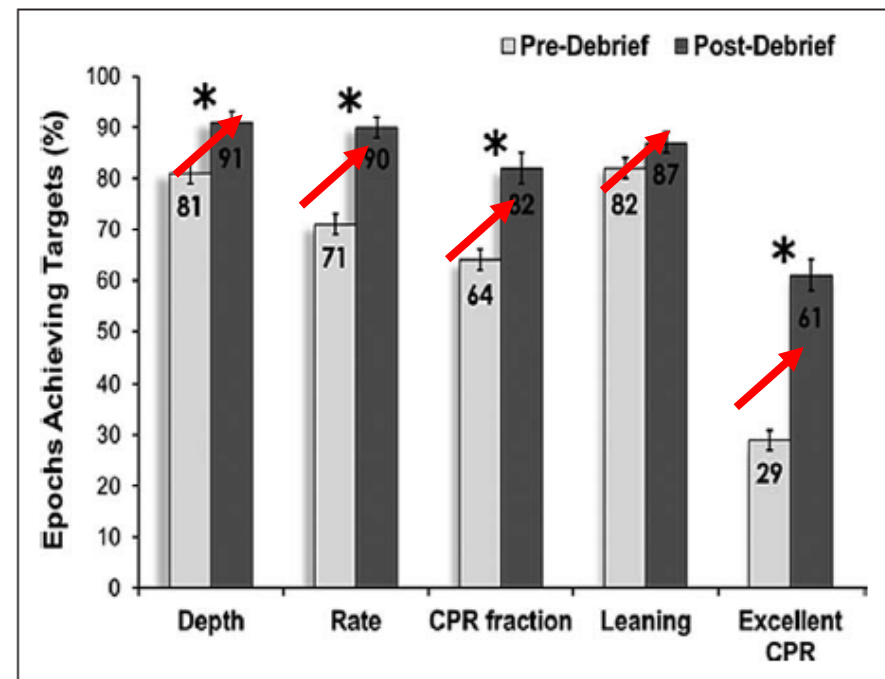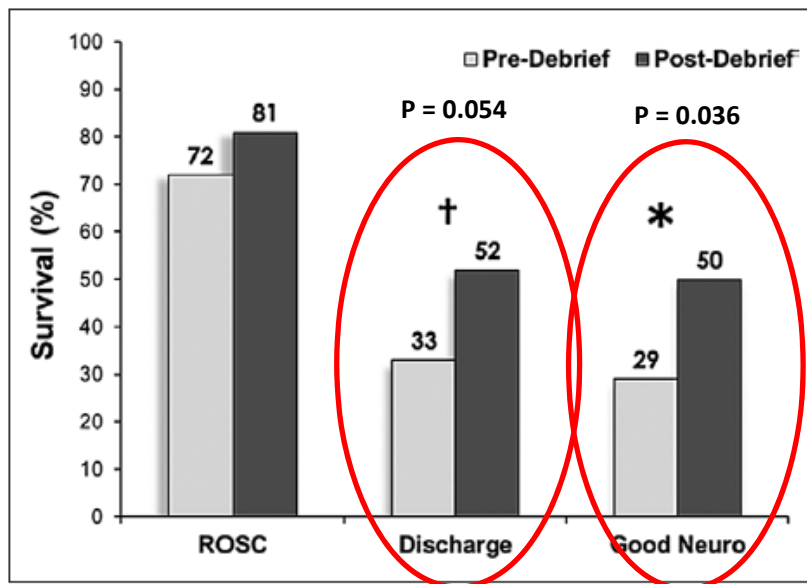119 cardiac arrest events
    60 Control, 59 Intervention
Prospective quality improvement interventional trial

Debriefing: **Safe environment**
- Patient history
- Pre-arrest studies (radiographs, CT scans, labs)
- Quantitative resuscitation data
- Patient Outcome & Summary

Wolfe et al. (2014) Critical Care Medicine 42(7)

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Four Targets: "Excellent CPR"

- Depth ≥ 38 mm
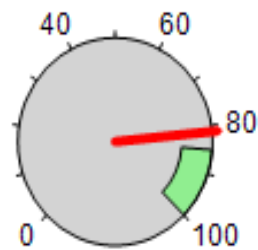- Rate ≥ 100/min
- CPR Fraction > 90%
- Leaning < 10%

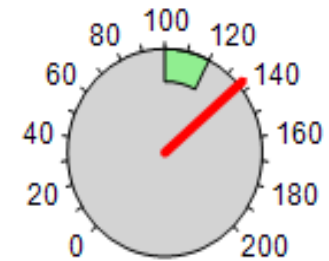Wolfe et al. (2014) Critical Care Medicine 42(7)

Post-Event Review

Compression fraction

**Goal:
at least 80%!**

Compressions Ratio (/total time)

3:54 / 4:48 = 81 %

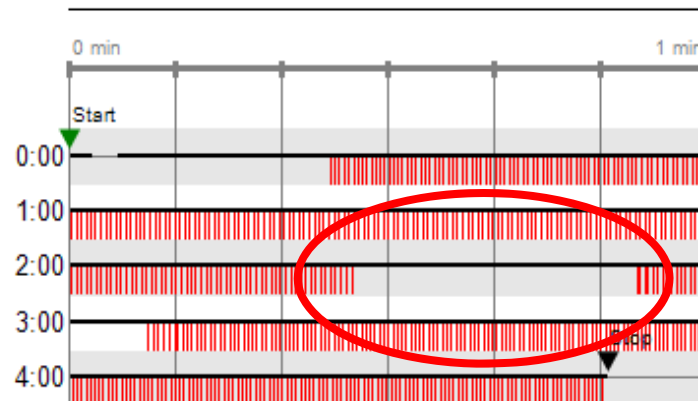**Compression Rate**

137/minute

3:54 / 4:48 = 81 %

137/minute

110/minute

Custom Initial Rhythm, Other

CPR QUIK-VIEW

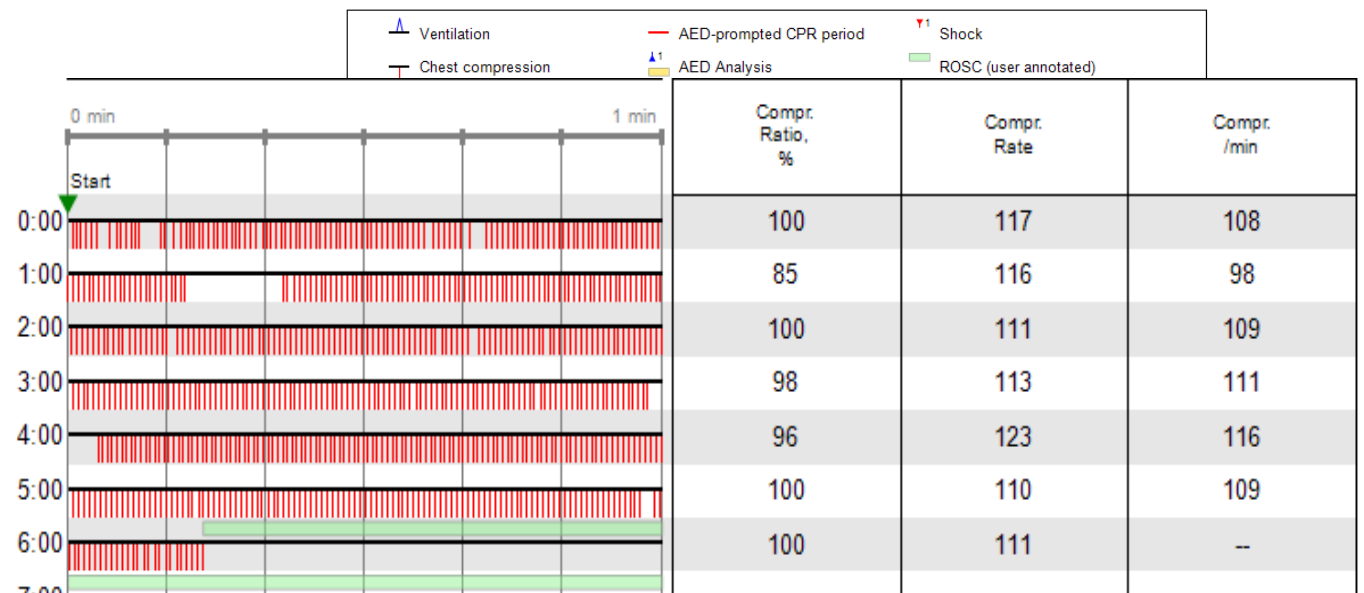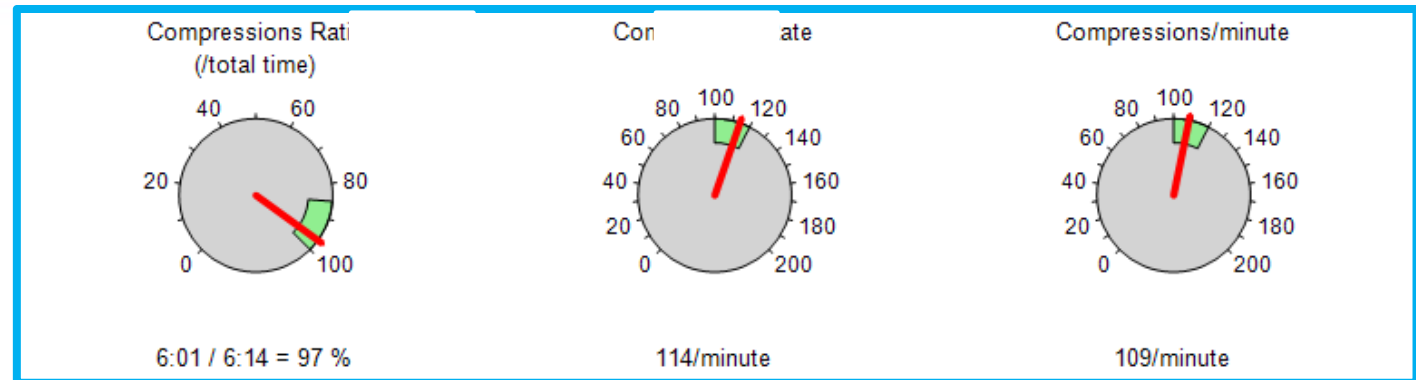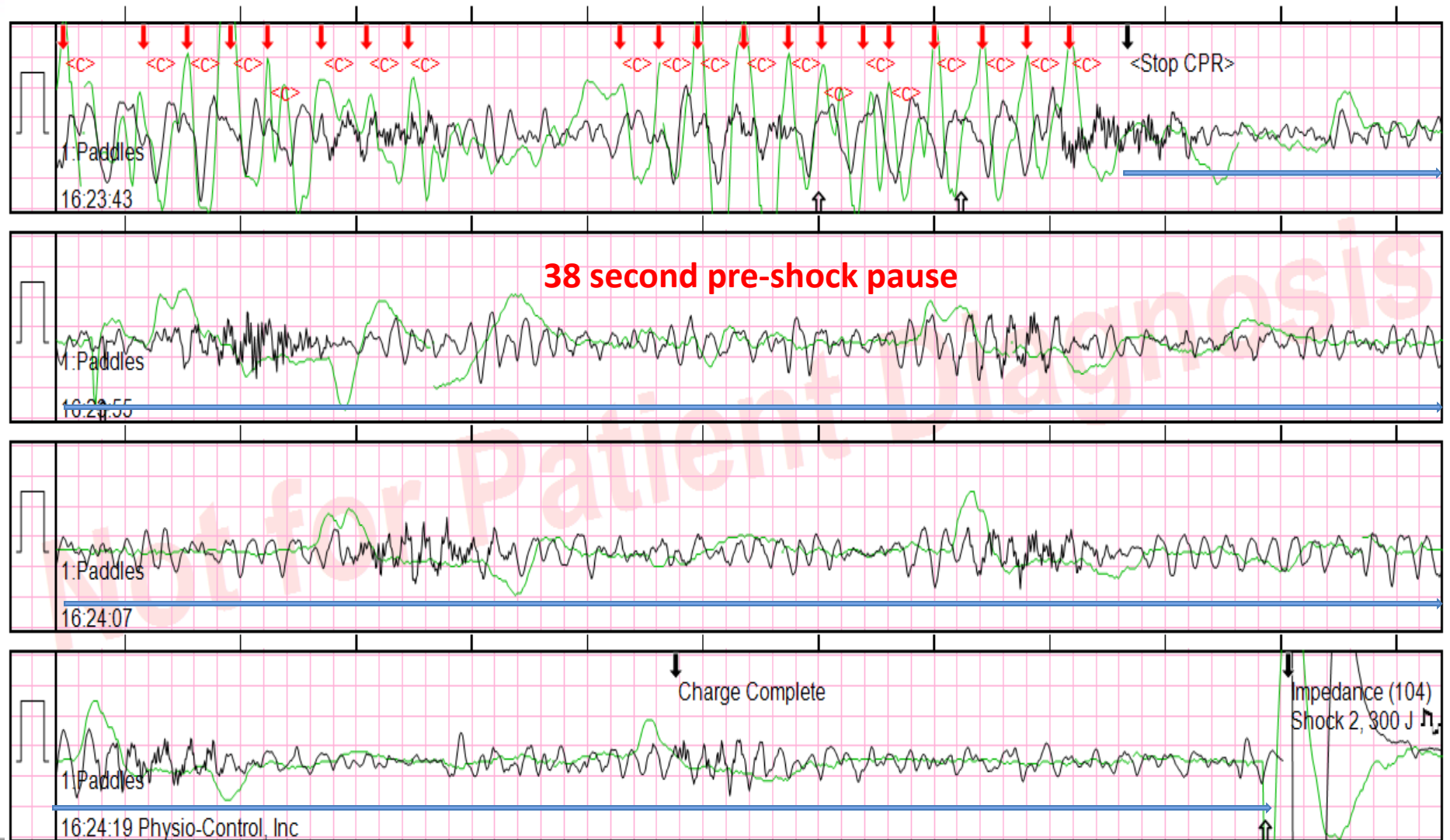Interval Statistics

	Compr. Ratio, %	Compr. Rate	Compr. /min
0:00	62	137	85
1:00	100	129	129
2:00	57	128	73
3:00	89	142	124
4:00	100	143	141

0 min   1 min

Start

2 months after giving feedback

- ED patient with STEMI

- PEA arrest

- Compression fraction?

- What do you think about the rate?

Compressions Ratio (/total time)	Compression Rate	Compressions/minute
6:01 / 6:14 = 97 %	114/minute	109/minute

Initial Rhythm

x1.0 25mm/sec

	Ventilation		AED-prompted CPR period		Shock
	Chest compression		AED Analysis		ROSC (user annotated)

	Compr. Ratio, %	Compr. Rate	Compr. /min
0:00 Start	100	117	108
1:00	85	116	98
2:00	100	111	109
3:00	98	113	111
4:00	96	123	116
5:00	100	110	109
6:00	100	111	--
7:00			

Pre shock pause issues

38 second pre-shock pause

<Stop CPR>

Charge Complete

Impedance (104)
Shock 2, 300 J

Ideal Defibrillation

Decreasing time to defibrillation?

- Code team assignment
- Analyze the rhythm quickly, do not waste time!
- Have the defibrillator charged and ready to go before the end of the 2 minute compression cycle OR,
- Performing CPR while a defibrillator is readied for use is strongly recommended for all patients in cardiac arrest   (AHA - Class I, LOE B)
- **"Hover technique"**
- Compressions will deliver oxygen to the heart likely increasing the likelihood of shock success

The Pause

- If the patient does not survive the code
- Silent recognition of the lost life
- Gives staff a moment to contemplate the passage
- Creates closure
- Slows racing minds

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Bartels (2014) Critical Care Nurse

Summary

To improve patient resuscitation outcomes…

- Strong Code Blue Committee with appointed leadership

- Effective code team leadership

- Rapid code team assembly: Pre-assigned roles

- Using positive team communication tools

- High quality cardiac compressions:
  Use feedback devices

- Structured training program

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