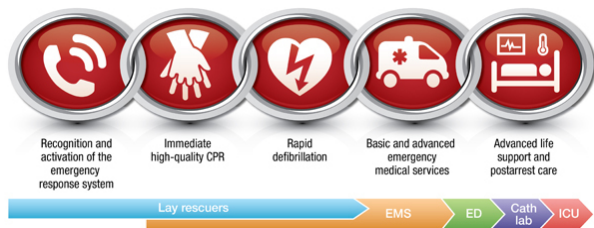


Maine EMS and Out of Hospital Cardiac Arrest Care 2010 – 2016

Shaun St. Germain, EMT-P
Maine EMS Director
Matthew Sholl, MD, MPH, FACEP
Maine EMS Medical Director



EMS Makes a Difference

EMS Makes a Difference:

1) Available resource in any community

EMS Makes a Difference:

2) Most Proximate to the Event

EMS Makes a Difference:

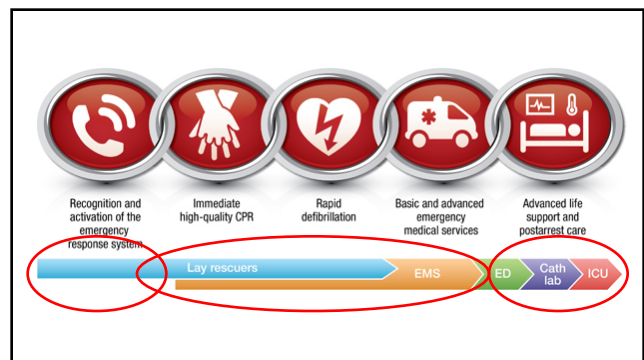
- 3) Can recognize life threatening/time sensitive illnesses

EMS Makes a Difference:

- 4) Can provide life stabilizing/saving therapies

EMS Makes a Difference:

- 5) Can activate systems of care with significant downstream benefits



Once
upon
a
time...



6TH NEW YORK SYMPOSIUM ON
NEUROLOGICAL EMERGENCIES &
NEUROCRITICAL CARE





Maine Cardiac Arrest Survival Project
Vision Statement

The Maine Cardiac Arrest Survival Project (MCASP) is a collaborative, multi-agency, public-private cooperative whose goal is to increase cardiac arrest survival in the state of Maine. To affect this goal, MCASP aims to achieve the following objectives:

- 1) Improve public awareness regarding the importance of early, effective, cardio-cerebral resuscitation and increase the number of laypersons trained in CCR, Hands Only CPR and CPR
- 2) Improve public access to early defibrillation and AEDs
- 3) Educate and train EMS providers in new AHA guidelines for resuscitation that emphasize basic skills including minimally interrupted three compressions, a phased model of resuscitation and appropriate airway and breathing management
- 4) Facilitate the recording of cardiac arrests as a reportable event reflected in prehospital data
- 5) Offer decision making support for Emergency Medicine physicians throughout the state that provides inclusion and exclusion criteria for appropriateness of therapeutic hypothermia and offers guidance and support for patient management
- 6) Creation of systems that facilitate transport of cardiac arrest patients to centers that can offer therapeutic hypothermia and, when appropriate, access to cardiac catheterization
- 7) Increase access to therapeutic hypothermia across the state

Goal Statement

By achieving the above objectives, the MCASP hopes to realize a three-fold increase in the survivability from cardiac arrest.



Circulation American Heart Association
JOURNAL OF THE AMERICAN HEART ASSOCIATION
Learn and Live..

Part 1: Executive Summary: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care
John M. Field, Mary Fran Hazinski, Michael R. Sayre, Leon Chameides, Stephen M. Schexnayder, Robin Hemphill, Ricardo A. Samson, John Kattwinkel, Robert A. Berg, Farhan Bhanji, Diana M. Cave, Edward C. Jauch, Peter J. Kudenchuk, Robert W. Neumar, Mary Ann Peberdy, Jeffrey M. Perlman, Elizabeth Sinz, Andrew H. Travers, Marc D. Berg, John E. Billi, Brian Eigel, Robert W. Hickey, Monica E. Kleinman, Mark S. Link, Laurie J. Morrison, Robert E. O'Connor, Michael Shuster, Clifton W. Callaway, Brett Cucchiara, Jeffrey D. Ferguson, Thomas D. Rea and Terry L. Vanden Heek

Circulation 2010;122:S640-S656

DOI: 10.1161/CIRCULATIONAHA.110.970889

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CARDIAC ARREST OR DYSRHYTHMIAS

BASIC

1. If, as appropriate, ventilate if patient is in respiratory arrest.
2. Initiate CPR immediately to cardiac arrest until AED available.
3. Attach AED if cardiac arrest. Do not withhold CPR while waiting for defibrillation equipment.
4. Request A&T.

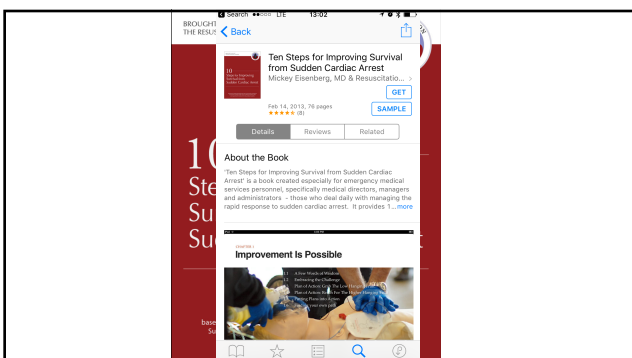
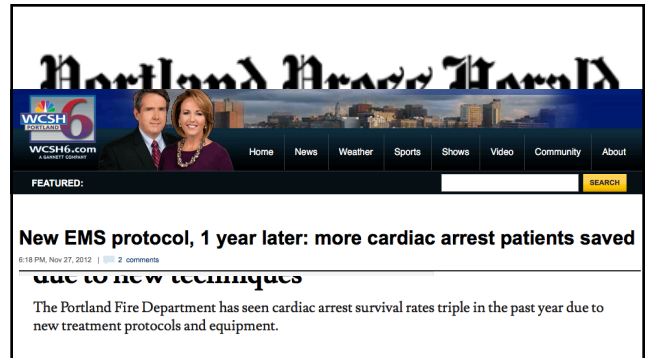
INTERMEDIATE / CRITICAL CARE / PARAMEDIC

5. Cardiac monitor and treat arrhythmias following the appropriate algorithm and your training and level of licensure.
 - a. Ventricular Fibrillation/Pulsatile Ventricular Tachycardia "Red 12"
 - b. Wide-Complex Tachycardia "Red 14"
 - c. Asystole "Red 16"
 - d. Bradycardia/Asystole "Red 17"

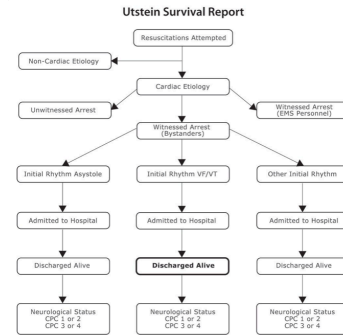
REMEMBER: Effective chest compressions are one of the most important therapies for the pulseless patient - Effective is defined as: a rate of at least 100 compressions/minute, depth of at least 2.0 inches, allow for complete chest recoil, no interruptions, and avoid excessive ventilations. Also, consider resuscitating the patient on scene rather than moving to the ambulance, when appropriate, as the effectiveness of chest compressions is decreased during patient movement.

Note: The algorithms for cardiac arrest or arrhythmias in the following pages reflect the NASEMSO Medical Direction and Practice Board's interpretation of AHA guidelines, as they should be used in the prehospital setting.

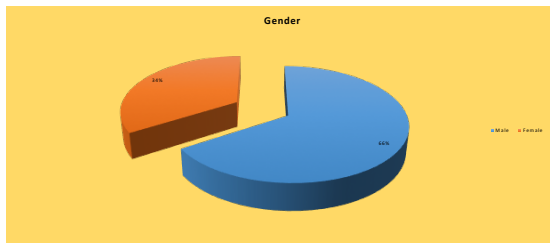
Page 5



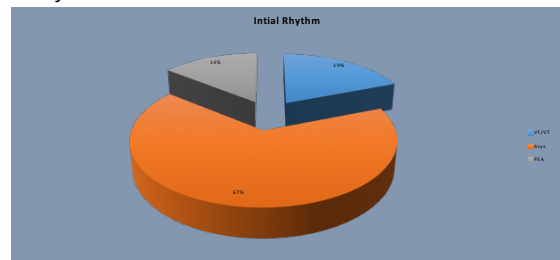
STEP 1 Establish a Cardiac Arrest Registry



Maine EMS 2013 Cardiac Arrest Survival QI Project



Maine EMS 2013 Cardiac Arrest Survival QI Project



Maine EMS 2013 Cardiac Arrest Survival QI Project

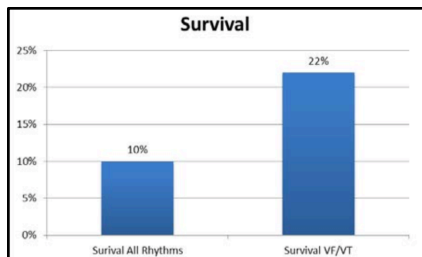


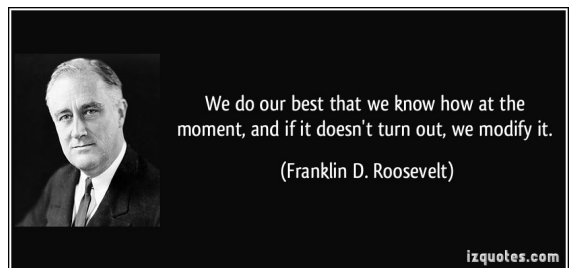
Table 1. a. 2013 survival data by county and resuscitation status.

| County | Resuscitated | Not Resuscitated | Survival (%) |
|------------------------|--------------|------------------|--------------|
| New York, NY (16) | 1,048,202 | 13,531 | 17.1 |
| Chicago, IL (15) | 1,041,000 | 10,400 | 16.8 |
| London, UK (14) | 1,041,000 | 10,400 | 16.8 |
| Los Angeles, CA (13) | 1,041,000 | 10,400 | 16.8 |
| San Francisco, CA (12) | 1,041,000 | 10,400 | 16.8 |
| San Diego, CA (11) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (10) | 1,041,000 | 10,400 | 16.8 |
| San Antonio, TX (9) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (8) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (7) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (6) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (5) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (4) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (3) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (2) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (1) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (0) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-1) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-2) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-3) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-4) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-5) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-6) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-7) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-8) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-9) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-10) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-11) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-12) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-13) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-14) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-15) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-16) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-17) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-18) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-19) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-20) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-21) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-22) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-23) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-24) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-25) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-26) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-27) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-28) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-29) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-30) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-31) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-32) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-33) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-34) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-35) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-36) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-37) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-38) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-39) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-40) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-41) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-42) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-43) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-44) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-45) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-46) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-47) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-48) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-49) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-50) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-51) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-52) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-53) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-54) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-55) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-56) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-57) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-58) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-59) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-60) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-61) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-62) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-63) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-64) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-65) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-66) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-67) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-68) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-69) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-70) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-71) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-72) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-73) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-74) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-75) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-76) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-77) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-78) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-79) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-80) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-81) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-82) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-83) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-84) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-85) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-86) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-87) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-88) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-89) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-90) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-91) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-92) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-93) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-94) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-95) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-96) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-97) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-98) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-99) | 1,041,000 | 10,400 | 16.8 |
| San Jose, CA (-100) | 1,041,000 | 10,400 | 16.8 |

Lessons
Learned

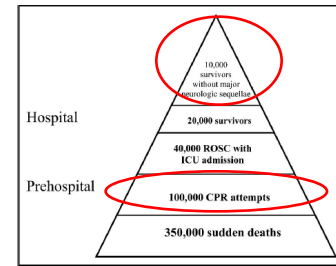


WANT NEED
↓
MUST HAVE



STEP 2 Implement Dispatcher Assisted CPR with Ongoing Training & QI

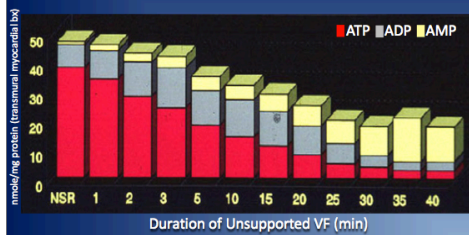
Figure 1. Survival rates after cardiac arrest remain low in patients who recover spontaneous circulation



Curr Op Crit Care 2004;10:208-212

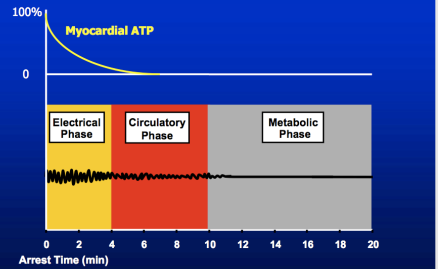
Adenosine Nucleotide Concentrations During VF

n = 10 swine (~10 samples/time period)



Hansen RJ. Ann Emerg Med 1991;20:333-9

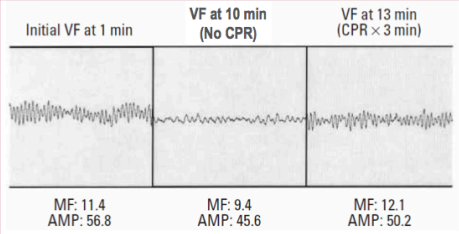
Three Phase Model of Resuscitation



Weisfeldt ML, Becker LB. JAMA 2002; 288:3035-8

Changes in VF Waveform With and Without 3 Minutes of Pre-shock CPR

n= 32 swine



MF = VF median frequency in Hz; AMP = VF amplitude in mV

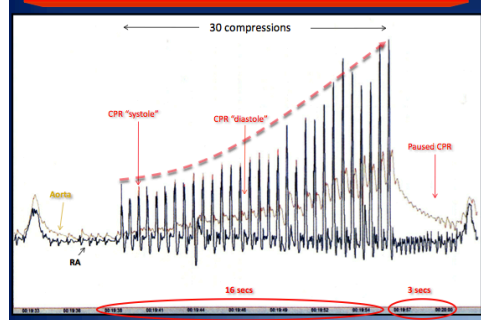
Burns BA. Ann Emerg Med 1993;20:543-50

STEP 3 Implement High Performance CPR with Ongoing Training & QI

PAY ATTENTION TO DETAIL

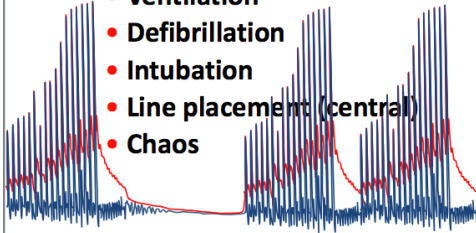


The Price of CPR Pauses



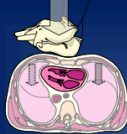
Causes of CPR Pauses

- Ventilation
- Defibrillation
- Intubation
- Line placement (central)
- Chaos



Compression

- Increased intrathoracic pressure
- Ejects blood from heart and lungs
- "Good" compression increases forward output and BP



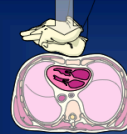
Decompression (recoil)

- Decreased intrathoracic pressure
- Refilling of heart and lungs
- "Good" recoil → ↑ vacuum → ↑ refilling → ↑ forward output



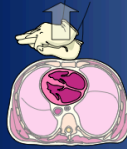
Compression

- Increased intrathoracic pressure
- Ejects blood from heart and lungs
- "Good" compression increases forward output and BP
- Tissue perfusion

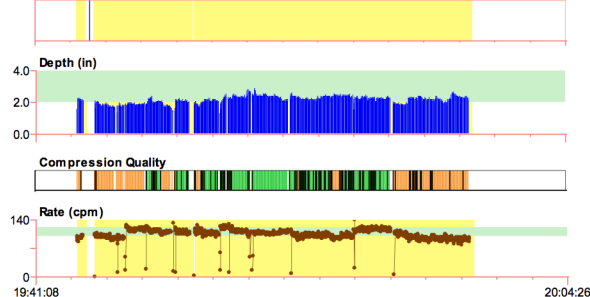


Decompression (recoil)

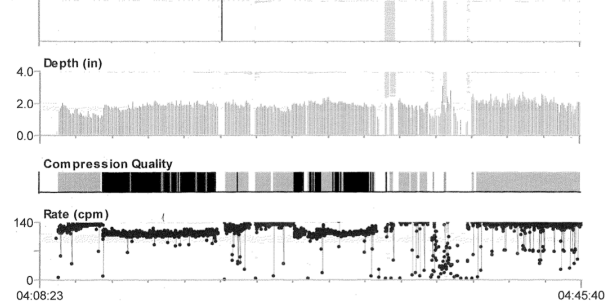
- Decreased intrathoracic pressure
- Refilling of heart and lungs
- "Good" recoil → ↑ vacuum → ↑ refilling → ↑ forward output
- Coronary and tissue perfusion

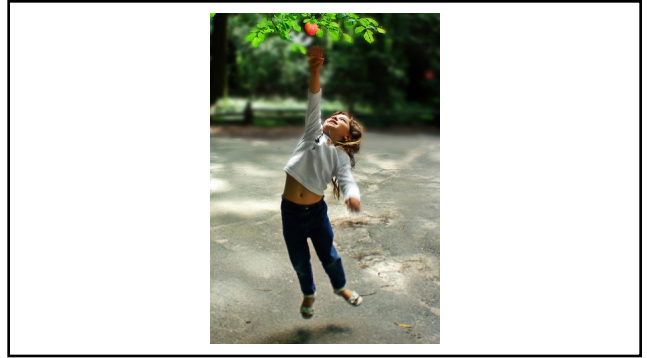


Shock Summary

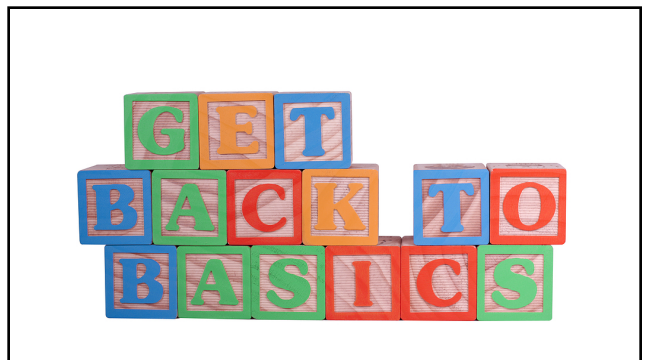


Shock Summary





- STEP 4 Implement Rapid Dispatch
- STEP 5 Voice Record All Attempted Resuscitations
- STEP 6 Begin A Program in Police Defibrillation
- STEP 7 Establish a Public Access Defibrillation Program
- STEP 8 Supplemental Funding & Support for Training & QI
- STEP 9 Institute Hypothermia in All Receiving Hospitals
- STEP 10 Work Toward A Culture of Excellence





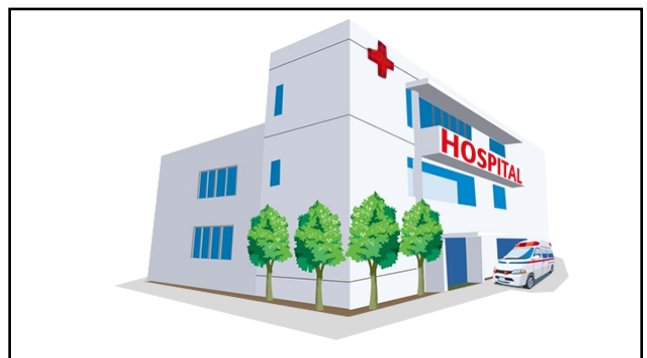
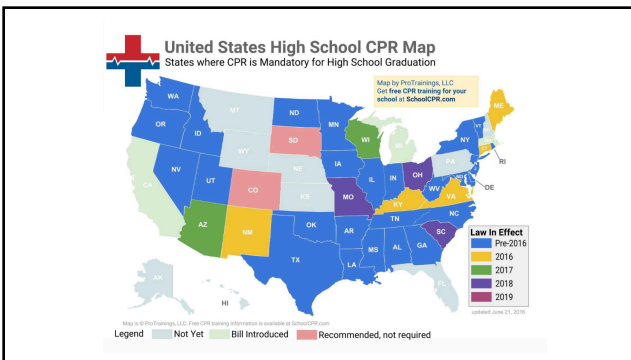




PHOTO: UNKNOWN / GETTY IMAGES
Updated: Today at 12:08 AM

Deering High basketball coach dies at 34

Brendan Conway is remembered as a 'tender-hearted' man who gave much to the community.

By Jessica Hall jhall@pressherald.com
Staff Writer

Brendan Conway, the basketball coach for Deering High School's freshman boys team, died Thursday night while playing basketball. He was 34.

Conway, a sales agent for Maine Real Estate Network in South Portland, had been a Deering coach for more than 10 years. He also had been a student at Deering, where he was captain of the basketball and tennis teams. He graduated in 1997.

The cause of death was not immediately known. Conway was playing basketball at East End Community School with the Casco Bay Basketball League when he was stricken about 10 p.m. Thursday.

Conway was healthy with no known medical conditions, said his sister-in-law Jo Conway. Results of an autopsy were not yet known, she said.



NEWS Posted September 9, 2013 INCREASE FONT SIZE 

Portland firefighters to be recognized for saving colleague

Fifteen first responders and dispatchers jumped into action when a fire lieutenant had a heart attack at work.

