# E.M.S. Mythbusters

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BSN: December 2010
BA: English Literature, 1985
RN: staff nurse, emergency department
Saint Elizabeth Regional Medical Center
Lincoln, Nebraska
(original diploma 2003)
EMT-P: 1997
CEN: Certified Emergency Nurse since 2006
First CPR/First Aid Class, 1994

Saint Elizabeth Regional Medical Center
Lincoln, Nebraska

- 250-bed hospital
- 25-bed emergency department
- 30-35K E/R visits/year
  - Regional Burn Unit
  - NICU
  - Magnet Recognition

Bethesda-Chevy Chase (Maryland) Rescue Squad

Lincoln Fire & Rescue

Man burned in explosion at suspected meth lab

BY AARON SANDERFORD
Lincoln Journal Star

Donald and Ronnie Brooks, 36-year-old twins, had just pulled into their sister's northeast Lincoln driveway with groceries Thursday afternoon when they heard the explosion.

Two seconds later a man ran screaming from the house next door, his clothes on fire and smoke coming from the house. They dropped the sacks and ran toward him.

He pleaded for help as they rolled him on the ground and smothered the remaining flames with their arms. Burns on the man's chest spread like a gasoline trail.

Then they watched as two others — a man and woman — ran from the house and disappeared, leaving what police suspect were the remains of a methamphetamine lab.

"I don't know where they went,"

**Lincoln meth labs 2001**

- **2217 N. 67th St.:** Thursday
- **4601 Briarpark Dr.:** Monday — 1 in truck, 1 in garage
- **4833 S. 66th St.:** Jan. 7
- **332 W. Rio Road:** Jan. 31
- **833 S. 46th St.:** Jan. 31

Source: Lincoln Police Department

Donald Brooks said. "I thought it was kinda funny that they didn't stick around."

Ronnie Brooks suffered burns to a hand and forearm trying to help the injured man and required treatment at a hospital.

The unidentified man suffered severe burns over much of his body and was taken to Saint Elizabeth Regional Medical Center, where he remained in "extreme" critical condition, Lincoln Fire Deputy Chief Derald Murrell said.

"We saw him shoot out of that screen on fire from head to toe," Donald Brooks said. "We got his clothes off right away, and it looked like liquid was spreading on him."

Minutes after the kitchen and bathroom fire was extinguished, a yellow line of crime-scene tape lined the whole house at 2217 N. 67th St. Police Chief Tom Casady confirmed suspicions: It was likely a

See BLAST, Page 2A

ERIC GREGORY/Lincoln Journal Star

Lincoln firefighters and paramedics attend to the victim of an explosion and fire in a home at 2217 N. 67th St. Thursday.


## "Evidence-Based Practice in Prehospital Care"

(zzzzzzzzzzzz)

"Since when do nurses care about evidence-based practice?"

## EMS Mythbusters

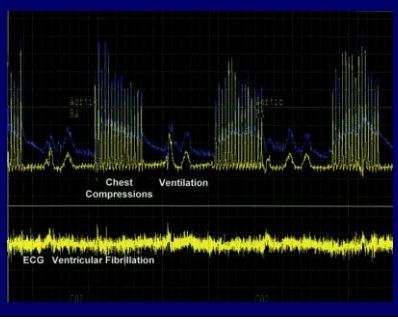
- Look at the process of research.
- Examine current practice in the light of the latest healthcare research.
- Explore the uses of evidence based practice in EMS.
- Discuss directions for change in EMS based on research.

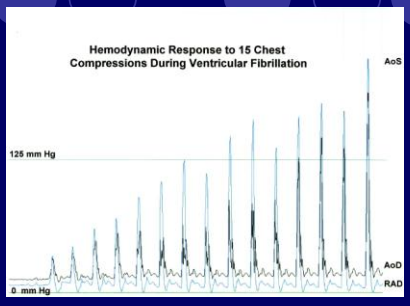
## The case of CPR:

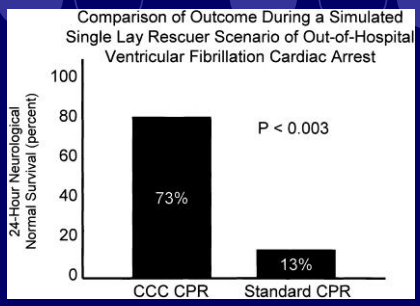
*"Why do they keep changing this stuff ? "*


## Safar 1954


## Aortic pressures during traditional CPR





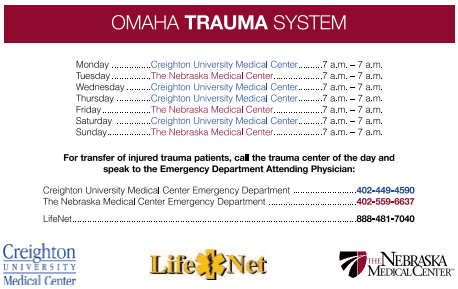




## "Hands only" bystander CPR

- "…It was difficult to get this report published because, frankly, the results were too good to believe…"
- Ewy, 2009

## How research is conducted

- **"Effect of Out-of-Hospital Pediatric Endotracheal Intubation on Survival and Neurological Outcome"**
- Gausche, et al.(JAMA, February 2000)
- Controlled trial
- 830 pediatric patients
- Alternated ETI/BVM with BVM-only
- No difference in survival
- No difference in neurological outcome

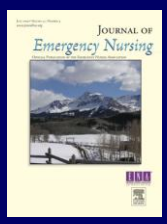


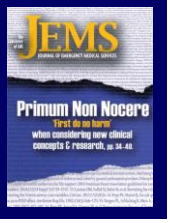

# Statistics

## Who decides the protocols?

- ILCOR
- Class I: Benefit > Risk.
  - Treatment should be performed
- Class IIa: Additional study needed
  - It is reasonable to perform the treatment
- Class IIb: Benefit >/= Risk, additional study needed
  - Treatment may be considered
- Class III: Risk > Benefit
  - Should not be performed

## How do YOU find the research?

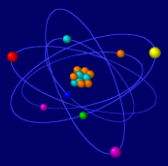






Oxygen:

You' d think that ***THIS*** would be simple….



"MONA greets all chest pain patients."

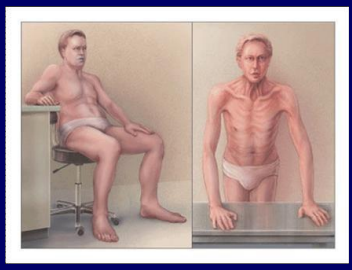
Oxygen is a MEDICATION

- Indications
- Side Effects
- Contraindications

## Oxygen: Known Contraindications

- Paraquat poisoning
- COPD

## COPD:



## Oxygen for $CO_2$ retainers:

Reducing stimulation of the hypoxic drive?

Not really….

- The Haldane Effect
- Ventilation/Perfusion mismatch
- Reduction of the hypoxic drive

## The Haldane Effect

- supplemental oxygen reduces the amount of deoxygenated hemoglobin.
- reduces the capacity of blood to carry carbon dioxide.
- (increased oxygen decreases production of bicarbonate.)

## Ventilation/Perfusion Mismatch

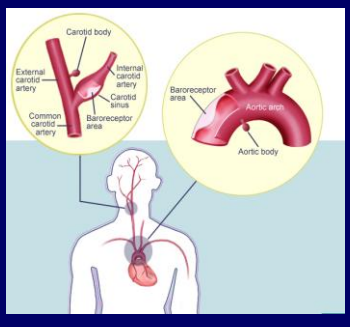
- Under-ventilated lung usually has a low oxygen content which leads to localized vasoconstriction, limiting blood flow to that lung tissue.
- Supplemental oxygen reduces this constriction, leading to POOR VENTILATION-PERFUSION

- This redistribution of blood to areas of the lung with poor ventilation reduces the amount of carbon dioxide eliminated from the system.

## Reduction of Hypoxic Drive

Central chemoreceptors:
Medulla: pH of CSF

## Peripheral chemoreceptors: O2 in blood



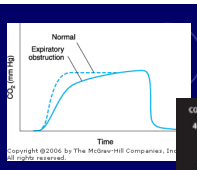

## So…

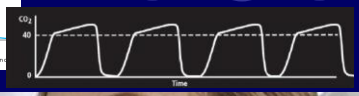
How do we get oxygen into the system without increasing FiO2?

## Looking ahead…

- BIPAP: *Bi-level Positive Airway Pressure*

## ETCO2 detector/ Capnography




## Supplemental Oxygen: What does the research show ?

"MONA greets all chest pain patients."

## Effects of supplemental oxygen

- Increased coronary vascular resistance ~>
  - Reduced coronary blood flow
- Heart rate slowed, systolic BP increased
- Increased free radicals

## American Heart Association 2010 guidelines Acute Coronary Syndromes

- Oxygen should be administered to patients with breathlessness, signs of heart failure, shock, or an arterial oxyhemoglobin saturation <94% (Class I).

"In the absence of compelling evidence for established benefit in uncomplicated cases, ACC/AHA Guidelines have noted that there appeared to be little justification for continuing routine oxygen use beyond 6 hours. There is insufficient evidence to recommend the routine usage of oxygen therapy in patients suffering from an uncomplicated AMI or an ACS without signs of hypoxemia or heart failure."

"Association between arterial hyperoxia following resuscitation from cardiac arrest and in-hospital mortality"

6326 patients over 5 years

Kilgannon, Jones, Shapiro, et al, (2010) JAMA

## The Reseach

- Stroke
- Neonatal resuscitation
- COPD
- Asthma

The research continues….

## Neonatal Resuscitation

- **2010 AHA Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science**
- **Part 15: Neonatal Resuscitation**

"Two meta-analyses of several randomized controlled trials comparing neonatal resuscitation initiated with room air versus 100% oxygen showed increased survival when resuscitation was initiated with air."

- If the baby is bradycardic (HR <60 per minute) after 90 seconds of resuscitation with a lower concentration of oxygen, oxygen concentration should be increased to 100% until recovery of a normal heart rate (Class IIb).

## Strokes and Oxygen

- Ronning, O. & Guldvog, B. (1999)
- 310 patients
- 3 LPM per NC v. room air
- No benefit / no significant difference.

## Bleeding control

- AHA gets into the First Aid business

American Red Cross

## Bleeding control

- AHA gets into the First Aid business

American Heart Association

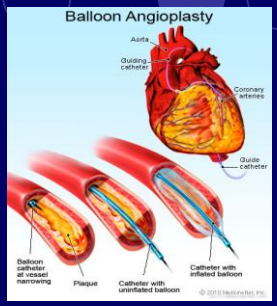
*Learn and Live*

## Bleeding Control: The American Red Cross version

- Direct Pressure
- Elevation of bleeding extremity
- Dressing
- Pressure Points
- T-T-T-T

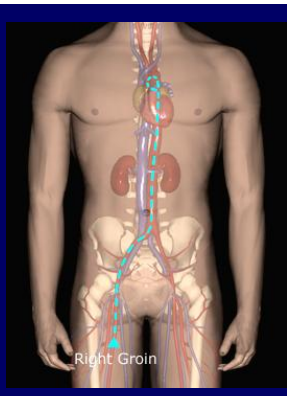
## Bleeding Control
## The AHA version

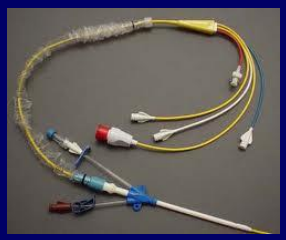
- Direct Pressure…
- We HAVE the evidence.

## Cardiac Catheterization

- The groin approach



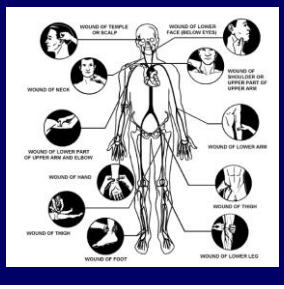



## Bleeding Control

- Elevation: We DON'T have the evidence.

## Bleeding Control

- Pressure Points…still thinking….




## Bleeding Control

- Tourniquets

## Combat tourniquets

# WARNING:

Nasty Photo Ahead
(Isn't that why you came?)

## Shock:

- Trendelenberg:

Common Sense
v.
the Evidence


# Meta-analysis

"The general ***slant*** of the available data seems to indicate that the Trendelenburg position is probably not a good position for resuscitation of patients who are hypotensive."

- Bridges, Jarquin-Valdivia (2005)

## Cervical Spine Immobilization

- …still thinking about this….

## Nexus criteria

(National Emergency X-Radiography Utilization Study)

- There is no posterior midline cervical tenderness
- There is no evidence of intoxication
- The patient is alert and oriented
- There is no focal neurological deficit
- There are no painful distracting injuries (e.g., long bone fracture)

## Disadvantages of C-Spine Precautions (anecdotal & otherwise)

Increases aspiration risk
Makes airway management more difficult
Increases intracranial pressure
Increases the incidence of pressure sores
Is expensive
Increases combativeness in drunk patients
Is time consuming to put people in.
Is difficult to remove without lumbar movement.
Frequently fails to achieve a neutral alignment.

## The Research

- Baylor study (2010): Cadavers
- Washington University study (2008):
  Motion-capture cameras

## Baylor

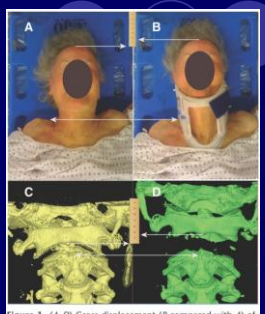



Figure 1. (*A–D*) Gross displacement (*B* compared with *A*) of the head relative to the body (16 mm) when an extrication collar was applied in the presence of a severe instability was consistent with the internal displacements between the occiput and the subaxial cervical spine (14 mm) measured from fine-cut CT examinations in this fresh whole human cadaver (*D* compared with *C*).

## Motion-capture

"Cervical Spine Motion During Extrication: A Pilot Study"

- "…least motion of the cervical spine in subjects who had a cervical collar applied and were allowed to simply get out of the car and lie down on a stretcher…"

MORE c-spine motion

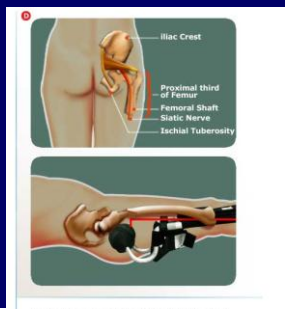
- To long spine board with and without KED

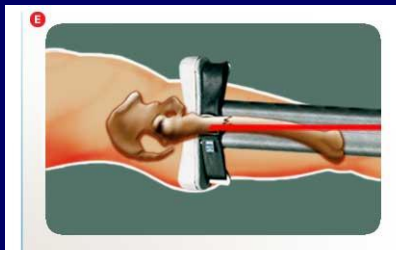
## Traction Splints…

- Hare

- Sager


A
51°
B


D
Iliac Crest
Proximal third of Femur
Femoral Shaft
Siatic Nerve
Ischial Tuberosity


E

Buck's Traction

EMS Myths: Our Final Chapter

Drowning and "Near-Drowning"

## Quiz: True or False?

- A significant number of drownings are "dry drownings": The victim's glottis closes when water contacts it and no water enters the lungs.

## Quiz: True or False?

- Rescuers should do abdominal thrusts on drowning patients to expel aspirated and swallowed water.

## Quiz: True or False?

- Cervical spine immobilization is essential for all drowning patients.

## Quiz: True or False?

- Unresponsive, hypothermic/cold water drowning patients should be rewarmed to normal temperature as quickly as possible.

FALSE
FALSE
FALSE
FALSE!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

**MYTHS!**

## Quiz: True or False?

- A significant number of drownings are "dry drownings": The victim's glottis closes when water contacts it and no water enters the lungs.

- **FALSE!**

## Why this misconception?

- Cardiac arrest
- Respiratory arrest
- Into the water without respiratory effort

…and

No water in the lungs!

## …also…Immersion syndrome

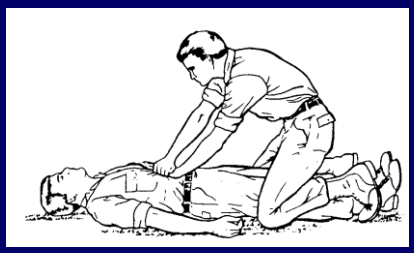
A (surprise) fall into water 40 degrees F or colder.

Immediate VFib or Aysystole

## Quiz: True or False?

- Rescuers should do abdominal thrusts on drowning patients to expel aspirated and swallowed water.

**FALSE!**



## NO ABDOMINAL THRUSTS

- This is a class III recommendation
  - (remember this?)

## Quiz: True or False?

- Cervical spine immobilization is essential for all drowning patients.

**FALSE!**

## C-Spine immobilization is a class III recommendation UNLESS THERE IS A CLEAR HISTORY OF TRAUMA

- Airway, Breathing, Circulation are your priorities!
- Trauma indications:
  - Boating/Jet Ski
  - Diving accident
  - MVC
  - Fall from height

## Washington state study: 2244 submersion victims 1974-1996 Watson, Cummings, Quan, Bratton, Weiss (2001)

- 11 (0.5%) had cervical spine injuries:
- All 11 had:
  - -Clinical signs of injury
    and
  - -History of trauma

## Quiz: True or False?

- Unresponsive, hypothermic/cold water drowning patients should be rewarmed to normal temperature as quickly as possible.

**FALSE!**

## Therapeutic Hypothermia

- Unresponsive, post-arrest patients
- Neuroprotective post ischemia
- Cool to 90 degrees F

- Another Myth: "They aren't dead until they are warm and dead."

## I hope that I got you thinking, BUT…

- Always follow your current, local protocols!

THIS is not the time to discuss protocols….

What do you do next?

- Research.
- Discuss your protocols.

meanwhile

FOLLOW YOUR LOCAL PROTOCOLS

## Questions? Comments?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