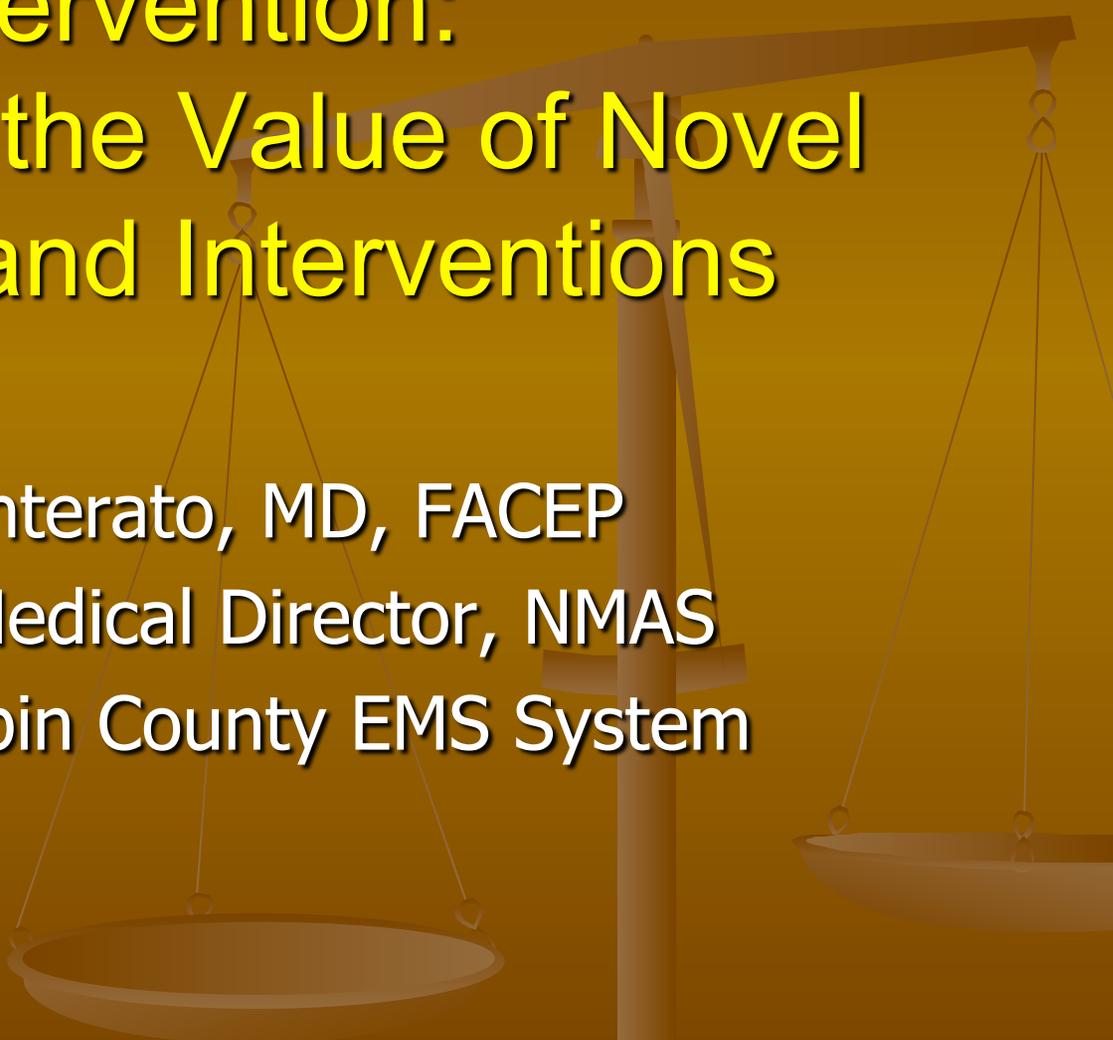


Gadget, Gizmo or Therapeutic Intervention: Navigating the Value of Novel Devices and Interventions

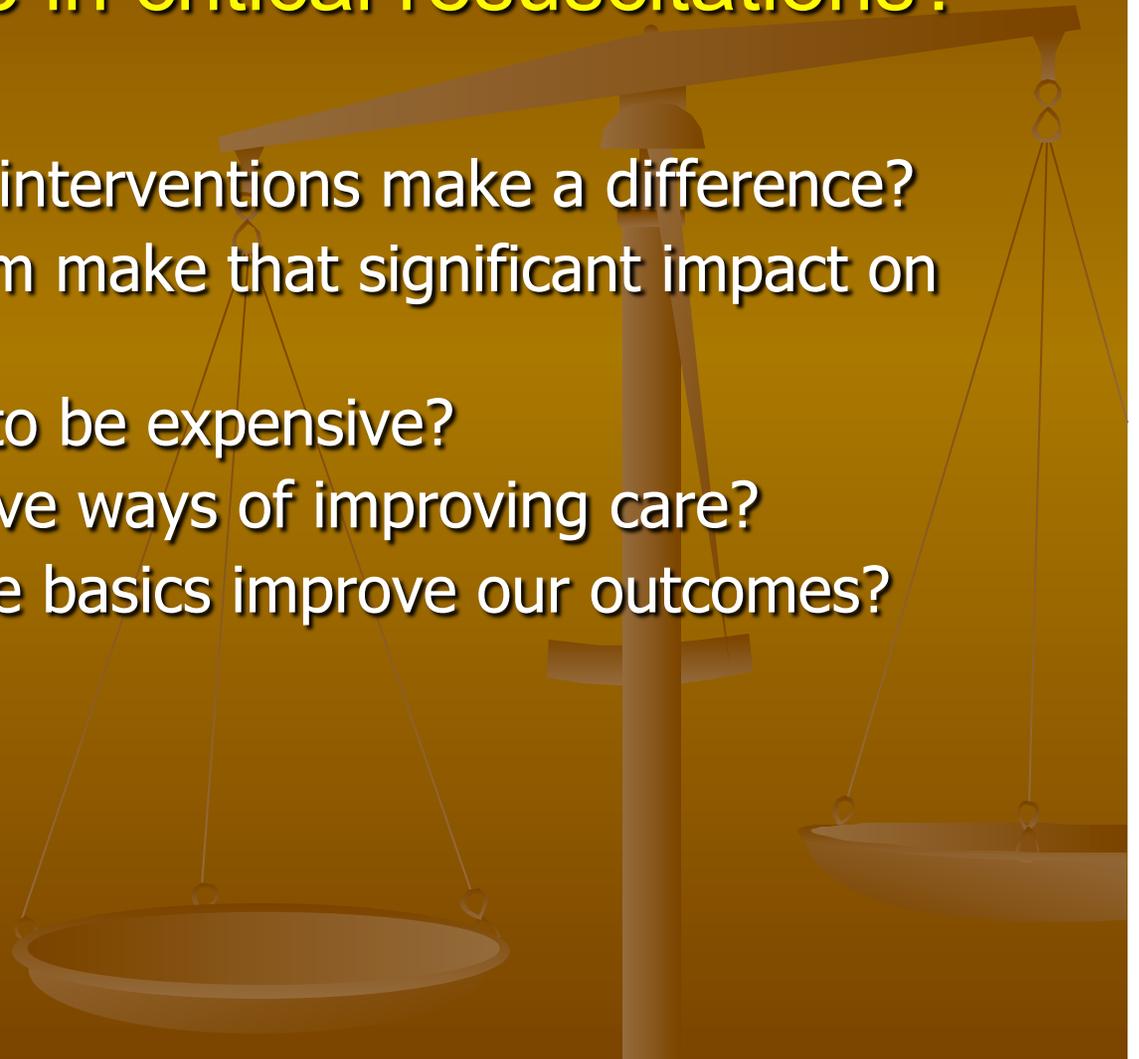


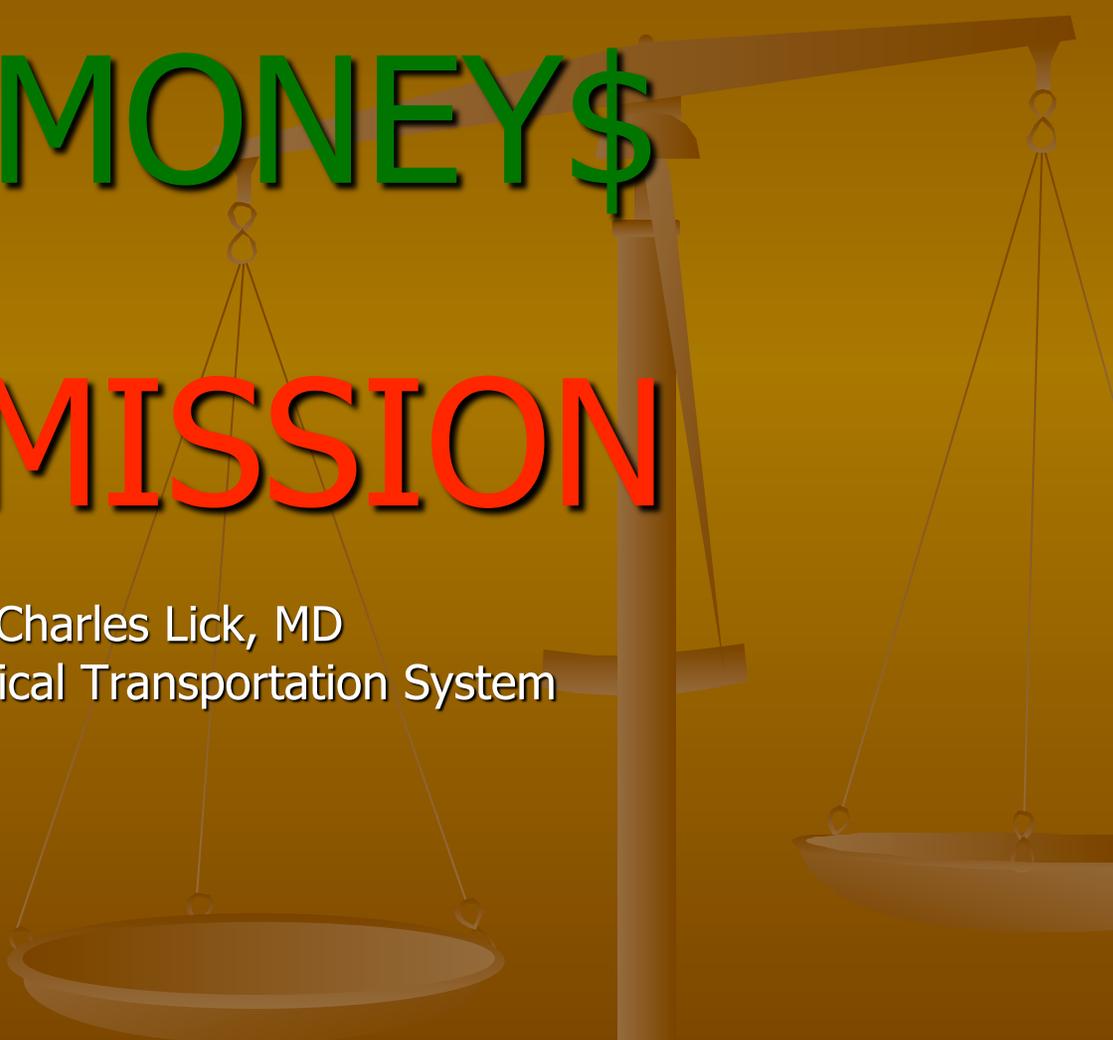
Marc Conterato, MD, FACEP
Associate Medical Director, NMAS
Joint Hennepin County EMS System

THE BUDGET IS CUT AGAIN!

In this environment, can we continue to improve our care in critical resuscitations?

- Can new technology/interventions make a difference?
- Can a “big ticket” item make that significant impact on our quality of care?
- Does it always have to be expensive?
- Are there cost effective ways of improving care?
- Can going back to the basics improve our outcomes?





NO MONEY\$

NO MISSION

Charles Lick, MD
Allina Medical Transportation System

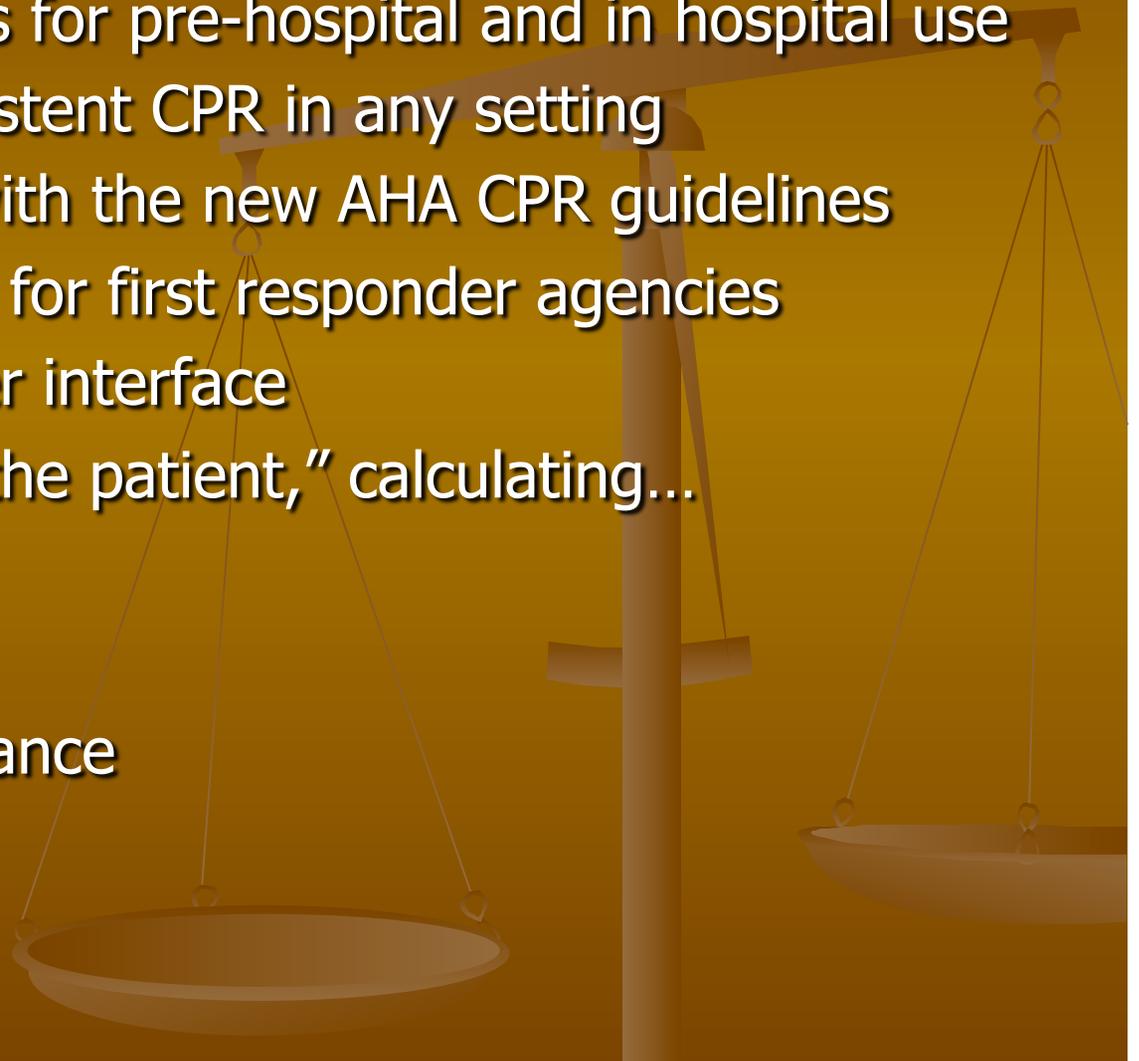
AUTOMATED CPR DEVICES



- LUCAS device (compressed air/battery)
- AutoPulse (battery)
- Life STAT (oxygen)

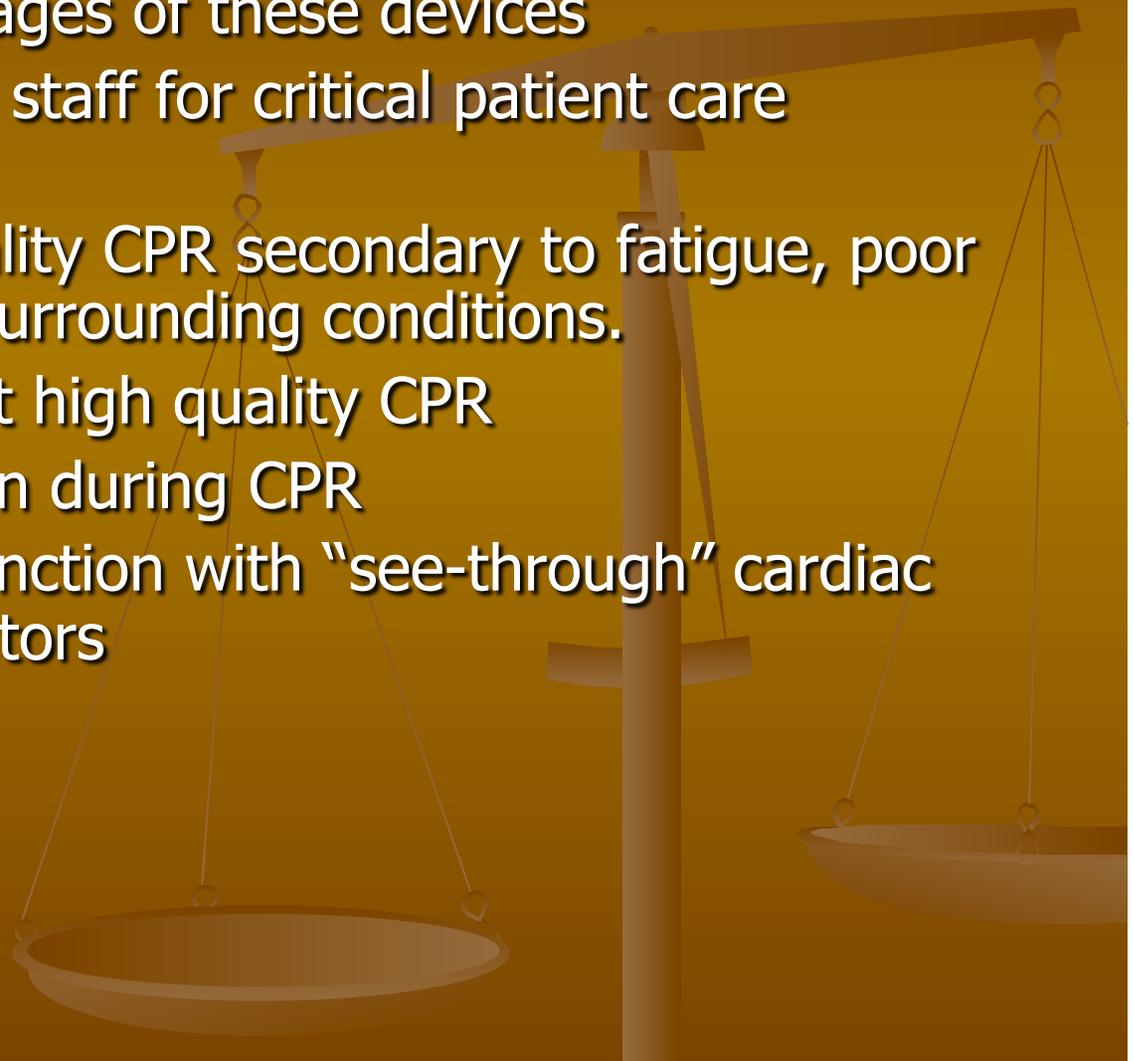
AUTOMATED CPR DEVICES

- Fully portable devices for pre-hospital and in hospital use
- Designed to do consistent CPR in any setting
- All fully compatible with the new AHA CPR guidelines
- Now being advanced for first responder agencies
- Extremely simple user interface
- Automatically “sizes the patient,” calculating...
 - Size
 - Shape
 - Compliance/resistance



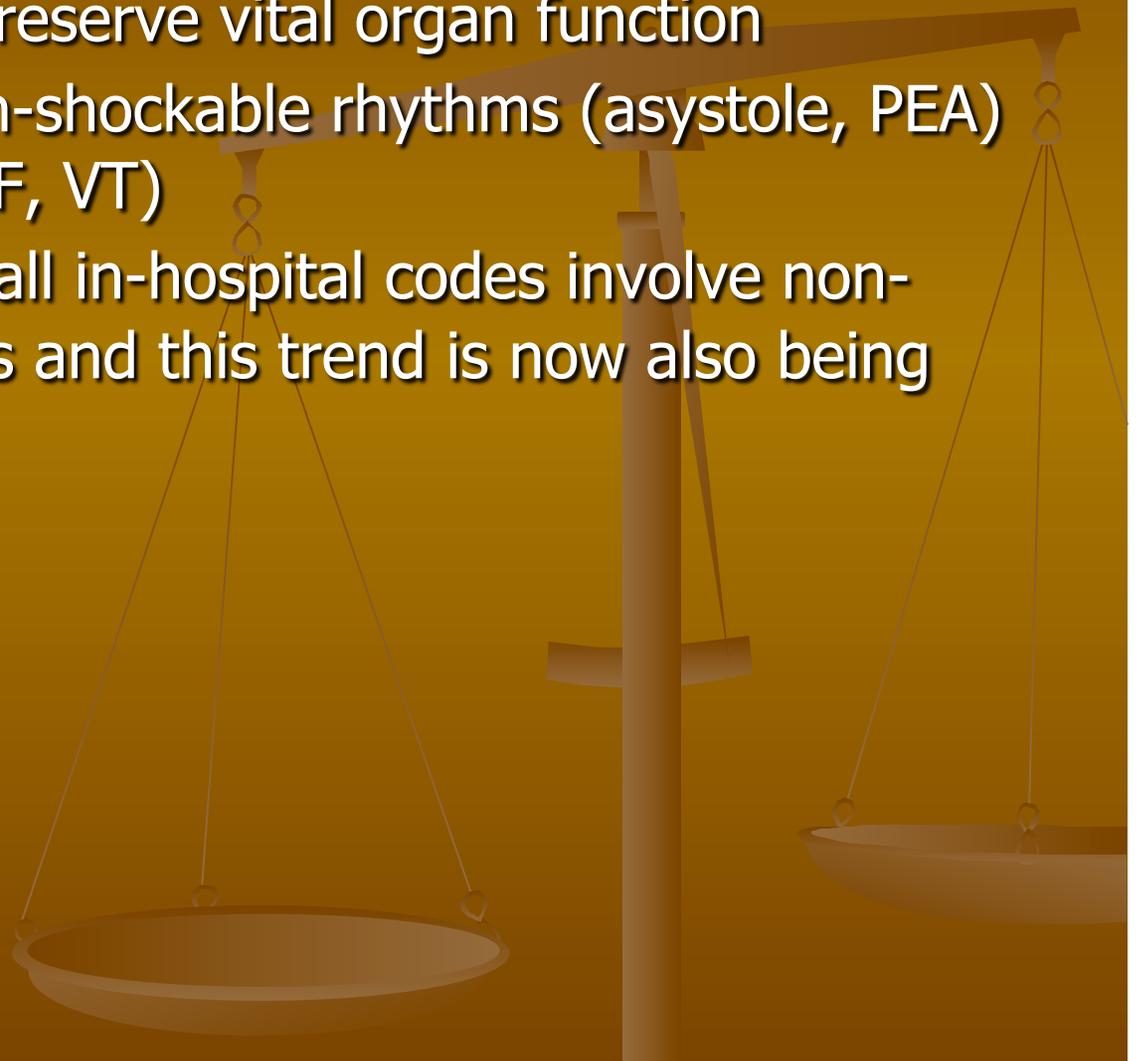
AUTOMATED CPR DEVICES

- What are the advantages of these devices
 - Frees pre-hospital staff for critical patient care interventions
 - Prevents poor quality CPR secondary to fatigue, poor training, difficult surrounding conditions.
 - Delivers consistent high quality CPR
 - Allows defibrillation during CPR
 - Can work in conjunction with “see-through” cardiac monitors/defibrillators



AUTOMATED CPR DEVICES

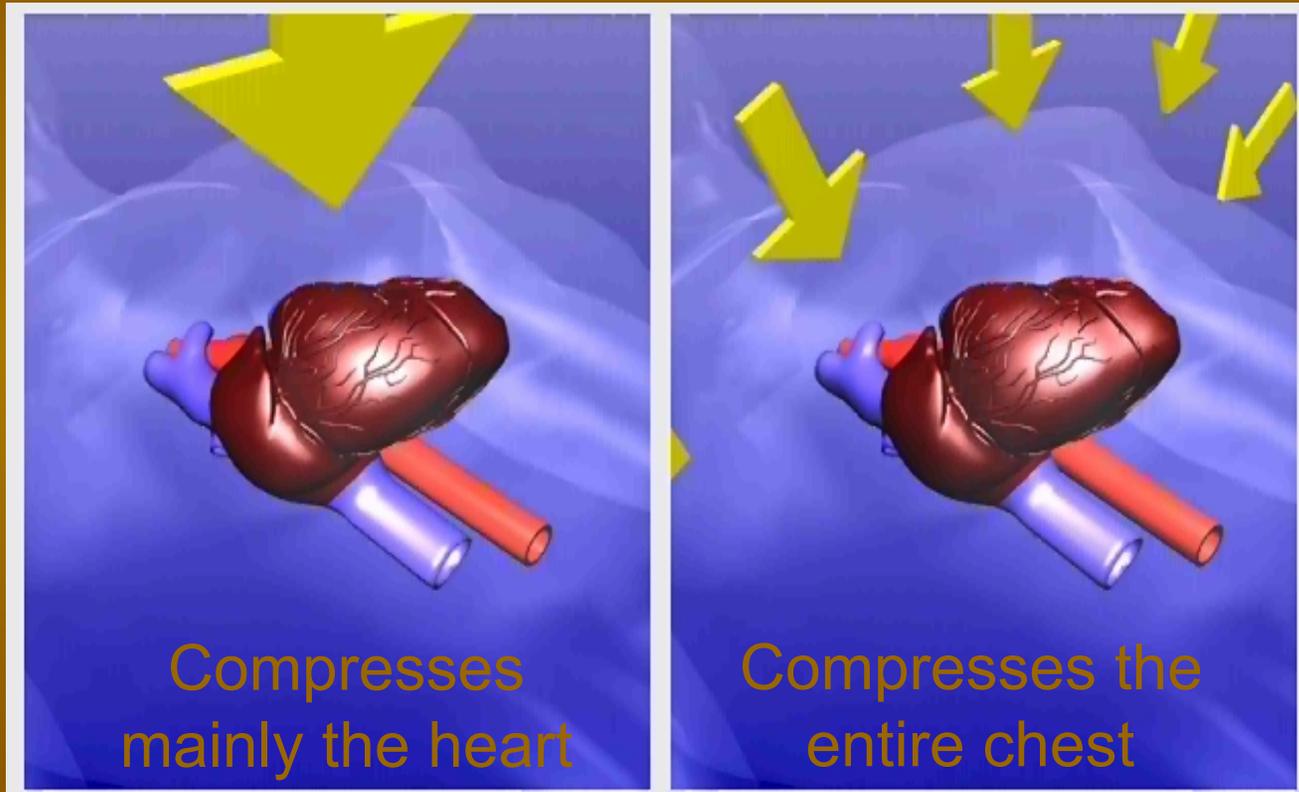
- Provides oxygen to preserve vital organ function
- May help convert non-shockable rhythms (asystole, PEA) to shockable ones (VF, VT)
 - More than half of all in-hospital codes involve non-shockable rhythms and this trend is now also being seen in the field



AUTOMATED CPR DEVICES

Cardiac Pump

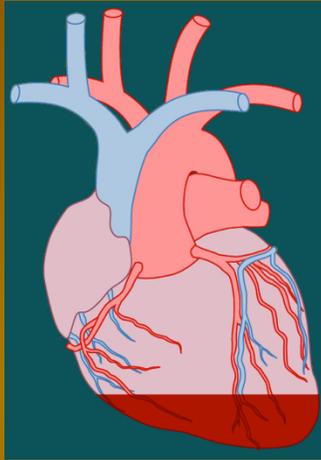
Thoracic Pump



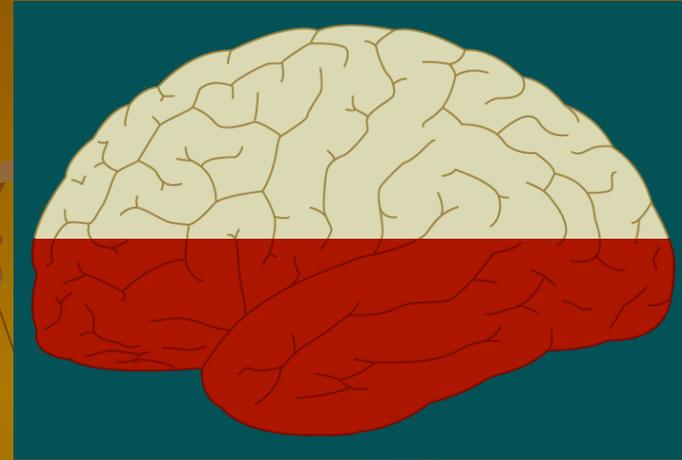
Compresses
mainly the heart

Compresses the
entire chest

AUTOMATED CPR DEVICES



10% - 20% of normal flow

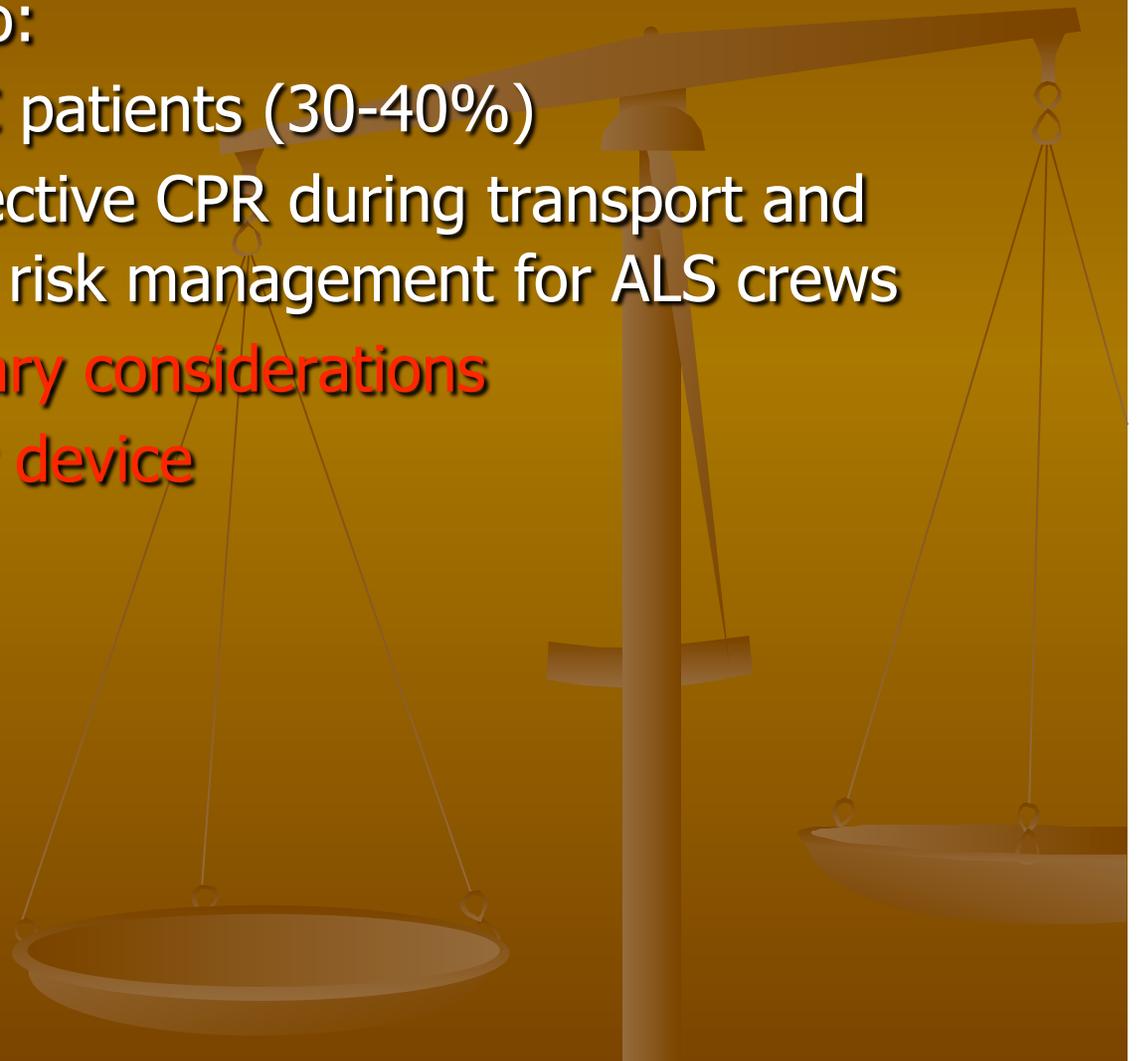


30% - 40% of normal flow

- Optimum manual CPR provides minimal blood flow to the heart and brain.
 - Kern KB *Bailliere's Clinical Anaesthesiology*. 2000;14(3):591-609.

AUTOMATED CPR DEVICES

- Increasing use due to:
 - Re-arrest of ROSC patients (30-40%)
 - Inability to do effective CPR during transport and provide enhanced risk management for ALS crews
 - **Significant monetary considerations**
 - **@ \$12-14K per device**

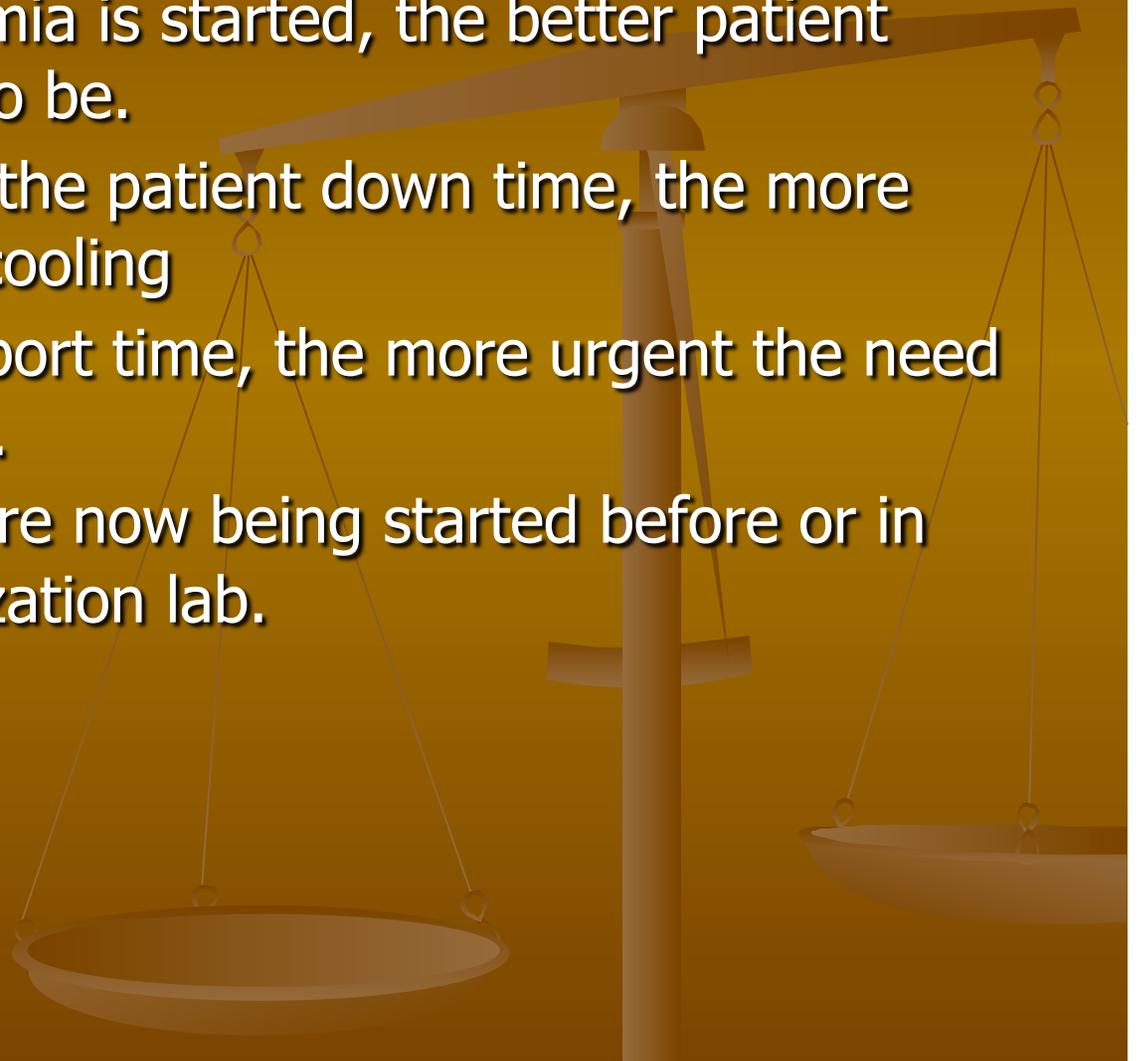




**What about Pre-hospital Cooling?
Where does it fit in?**

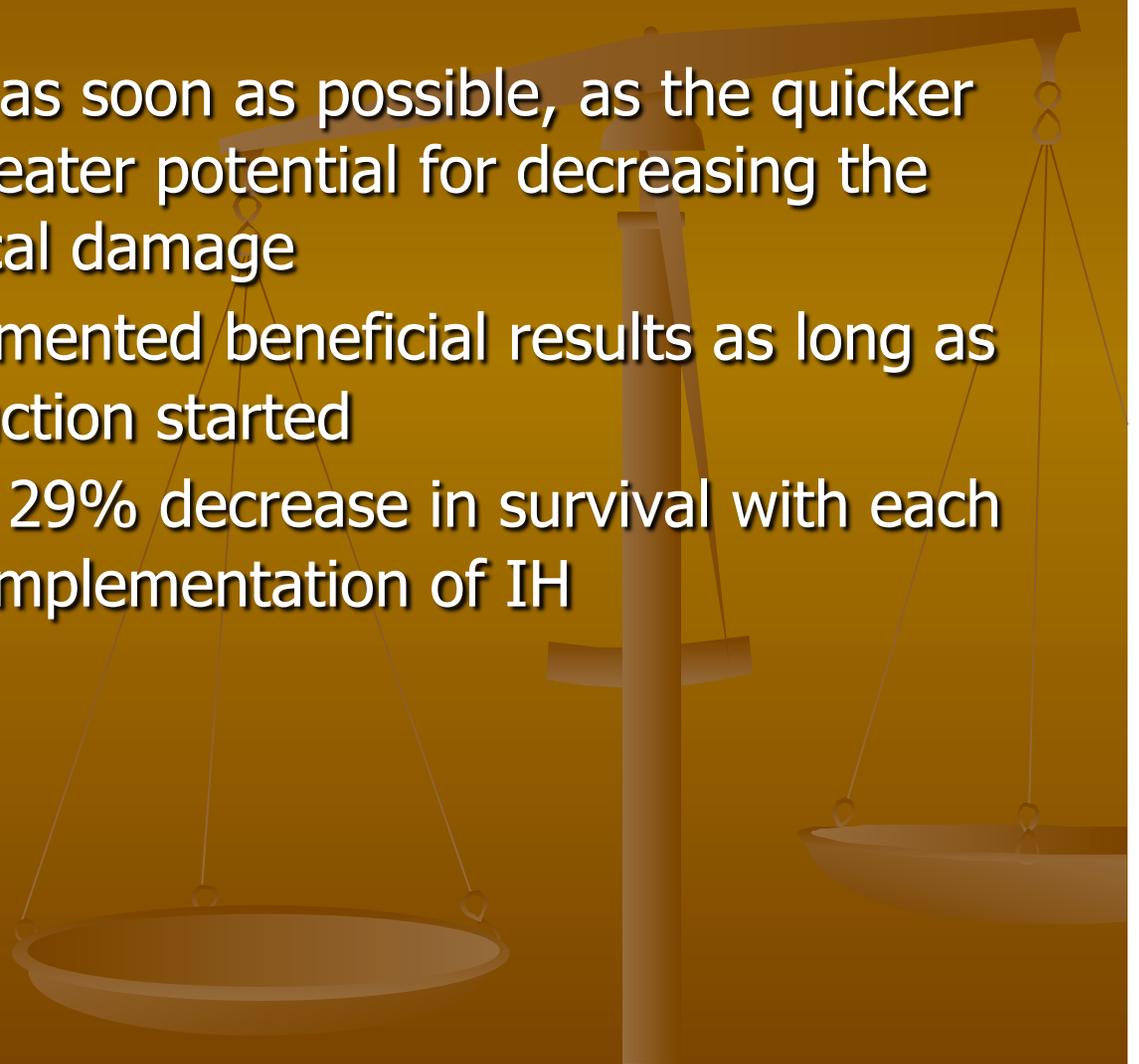
Application of field hypothermia induction

- The earlier hypothermia is started, the better patient outcome is thought to be.
- The more prolonged the patient down time, the more urgent the need for cooling
- The longer the transport time, the more urgent the need for emergent cooling.
- Cooling procedures are now being started before or in the cardiac catheterization lab.

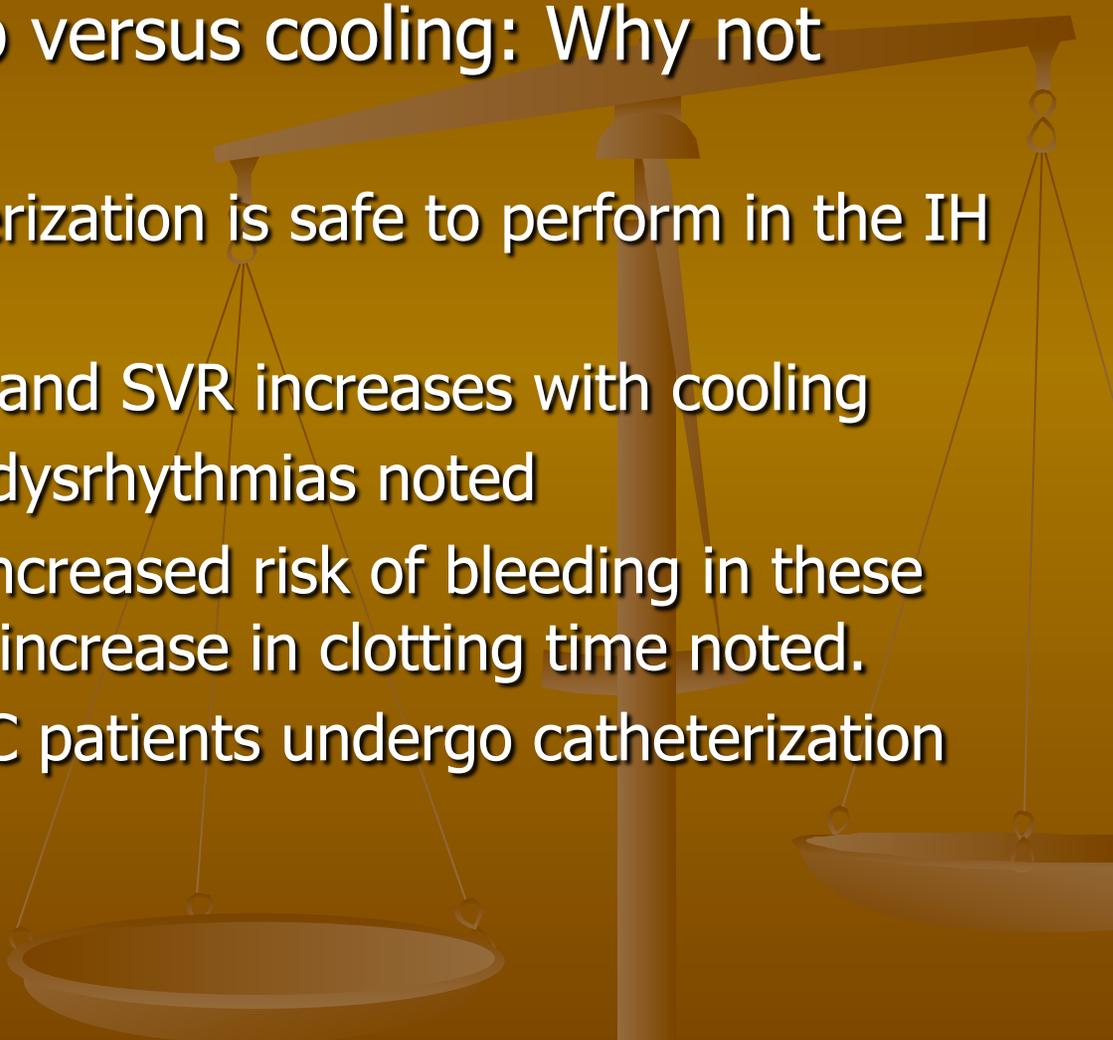


Application of field hypothermia induction

- When to start it
- IH should be started as soon as possible, as the quicker this is started, the greater potential for decreasing the amount of neurological damage
- Original studies documented beneficial results as long as 8-12 hours after induction started
- Recent data shows a 29% decrease in survival with each hour of delay in the implementation of IH



Application of field hypothermia induction

- Cardiac cath lab versus cooling: Why not both?
 - Cardiac catheterization is safe to perform in the IH patient
 - Cardiac output and SVR increases with cooling
 - No increase in dysrhythmias noted
 - No significant increased risk of bleeding in these patients, slight increase in clotting time noted.
 - Should all ROSC patients undergo catheterization and when?
- 

FIELD HYPOTHERMIA APPROACHES

External vests and wraps

EMCOOLS

Vests

Ice packs



FIELD HYPOTHERMIA APPROACHES

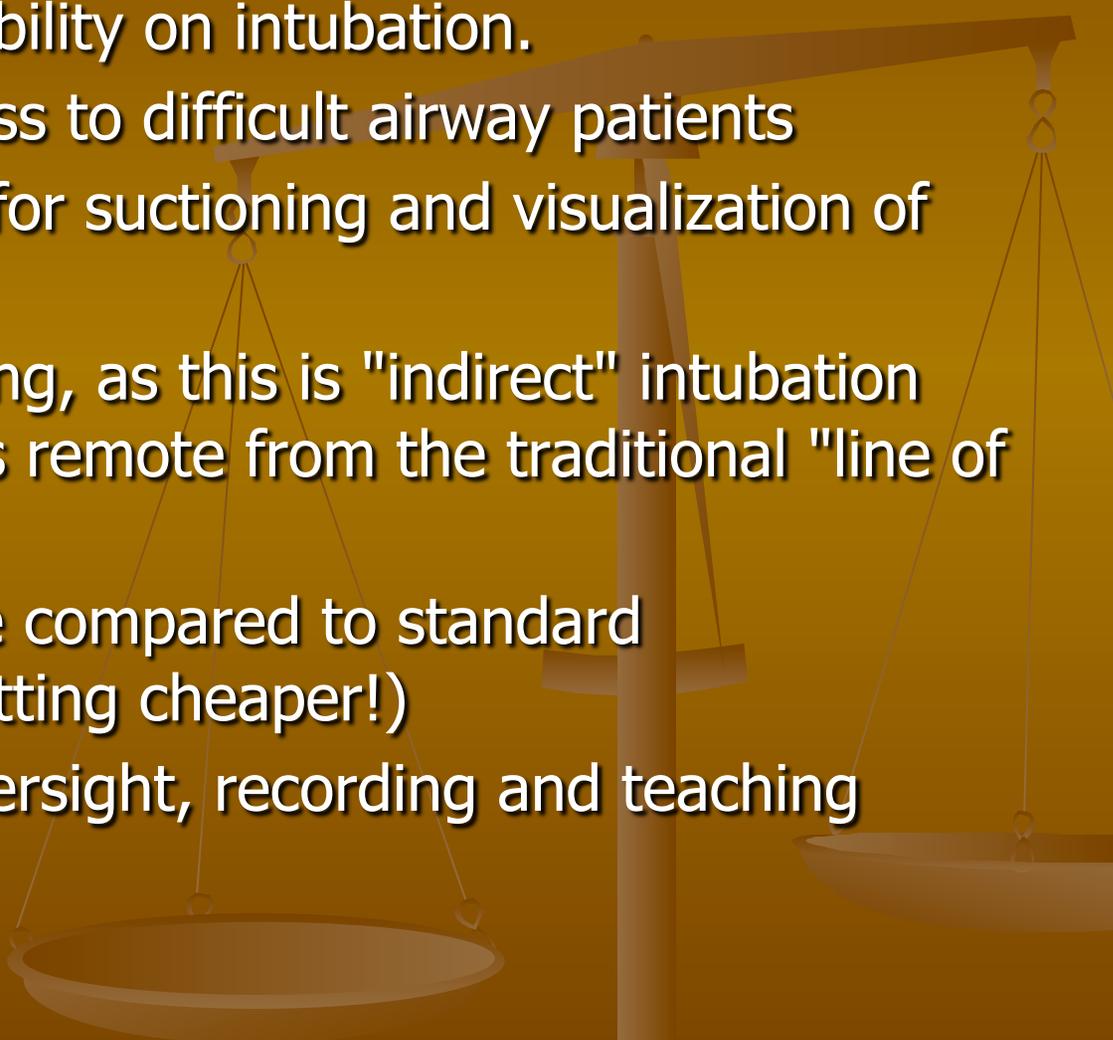
- **CHILLED IVF**
- Easy to transport and bring to patient's side
- Works with current EMS arrest protocols (starting IVs/IOs)
- Doesn't need expensive or specialized equipment



FIELD HYPOTHERMIA APPROACHES: SIMPLE COOLING METHOD

- Chilled IVF to maximum of 20 cc/kg or total 2000 cc (provides a 1-1.5C core temp drop)
- Used with ice packs to groin, axilla and carotid area
- Minimal incidence of inducing pulmonary edema/fluid overload
- Monitor temp to keep between 35-33C, if with prolonged (greater than 60 minute) transport time
- Sedation maybe needed for these patients, and potentially may need paralytics to prevent shivering
- @ \$5 per use

VIDEO-LARYNGOSCOPY

- Enables "stand-off" ability on intubation.
 - Can offer easier access to difficult airway patients
 - Allows better access for suctioning and visualization of foreign bodies
 - Requires some learning, as this is "indirect" intubation and ETT placement is remote from the traditional "line of sight" system
 - Markedly higher price compared to standard laryngoscopy (but getting cheaper!)
 - Allows concurrent oversight, recording and teaching capabilities
- 

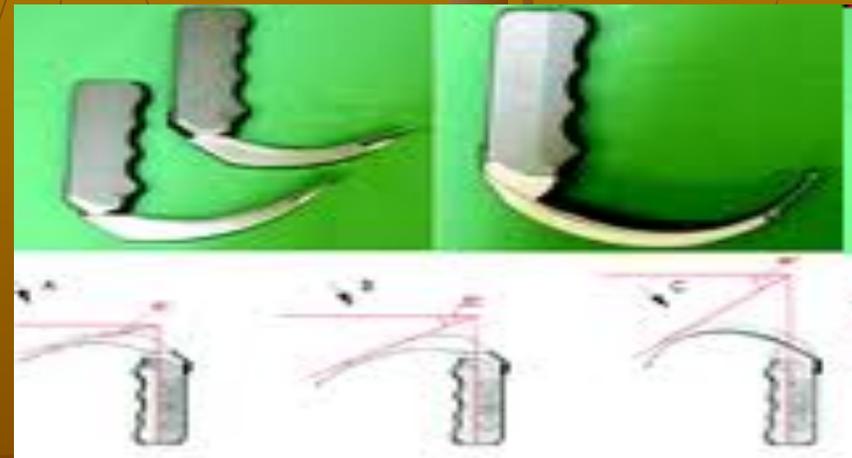
VIDEO-LARYNGOSCOPY

- GLIDESCOPE
- Can intubate from neonate to adult sized patients
- Disposable light source covers isolate video source from airway secretions, so can be used with multiple patients during same event
- > \$15 K



VIDEO-LARYNGOSCOPY

- C-MAC STORZ
- Designed to operate more akin to a direct laryngoscope
- Can allow continuous suctioning to be performed as part of the process
- Can intubate from peds to adult sized patients
- > \$15 K



VIDEO-LARYNGOSCOPY

■ MCGRATH SCOPE

- Designed to operate more akin to a direct laryngoscope
- Much more compact and portable than other video-laryngoscopes
- Relatively small viewing screen as compared to other video-laryngoscopes
- Almost completely water-proof and single blade can be adjusted to use on patients from the peds to adult range
- @ \$5 K



VIDEO-LARYNGOSCOPY

- PENTAX AIRWAY SCOPE
- Designed to operate more akin to a direct laryngoscope
- Much more compact and portable than other video-laryngoscopes
- Relatively small viewing screen as compared to other video-laryngoscopes and uses disposable blades
- @ \$3-5 K



VIDEO-LARYNGOSCOPY

- KING VISION
- Designed to operate more akin to a direct laryngoscope
- Much more compact and portable than other video-laryngoscopes
- Relatively large viewing screen and comparable to more expensive video-laryngoscopes
- Currently only available with adult disposable blades
- @ \$900



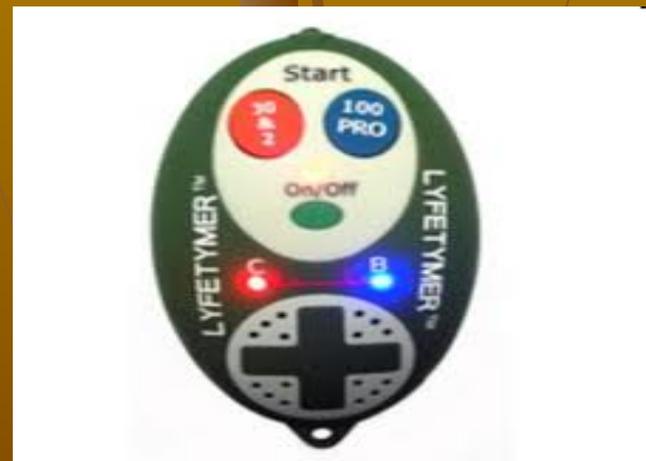
VIDEO-LARYNGOSCOPY

- AIRTRAQ SCOPE
- Can pre-load ETT onto device so can easily pass through cords once visualization occurs
- Disposable blades size specific from peds to adults
- Can be used with a video system, or can function independently using built in lighting system
- @ \$80 per use



VENTILATION CONTROL

- LYFETYMER I AND II
- Provide dependable, continuous timing for ventilation management
- Allows ventilation to be “passed off” to first-responder/bystander
- Enhances our ability to maintain our focus on the “basics”
- Inexpensive and can be used multiple times, as well as provide metronome for delivering CPR (Lyfetymer II only)
- @ \$2 to \$25





SO WHAT IS THE BOTTOM LINE?

Can we find different ways to fund
these gadgets and interventions?

Level 1 Cardiac Arrest Centers (L1CAC) are Clinically and Cost Effective

- Dec 2005, regional referral hospital began offering L1CAC care following pre-hospital or in-hospital arrest.
- Year prior: 33% of admitted pts survived to hospital discharge.
- L1CAC: 52% of admitted pts survived to hospital discharge.
- Survivors: direct margins of ≈\$20,684/pt.
- Non-survivors: direct margins of ≈\$3,329/pt.
- Now current estimate is @\$35,000 surviving patients and @\$8,000 for non-survivors.

STRATEGIES FOR FUNDING: BUILDING PARTNERSHIPS

- EMS-Health system/Hospital partnership
- EMS-Community partnership
- First Responder cooperation/empowerment

- **“FIND YOUR CHAMPION”**



QUESTIONS?

