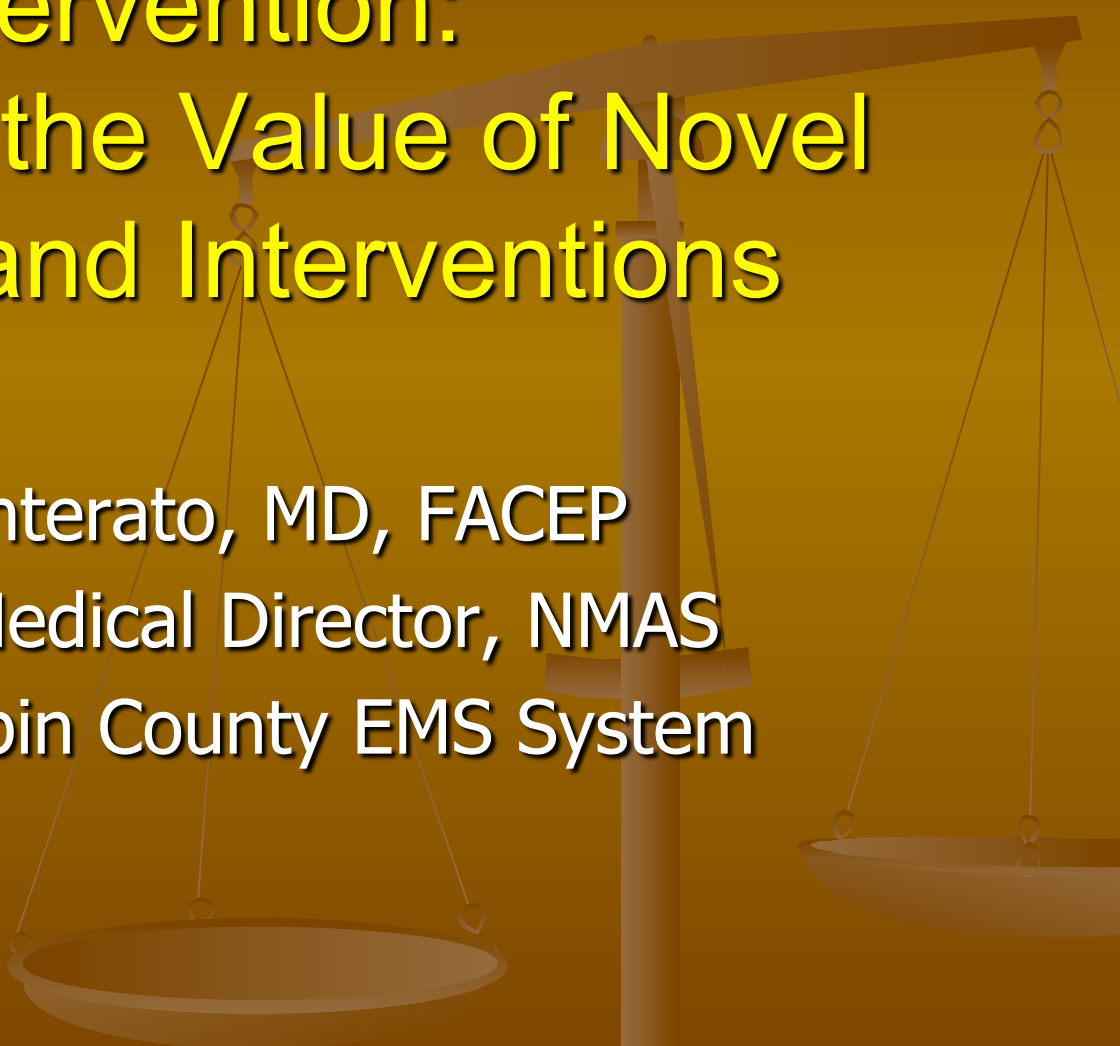


# Gadget, Gizmo or Therapeutic Intervention: Navigating the Value of Novel Devices and Interventions

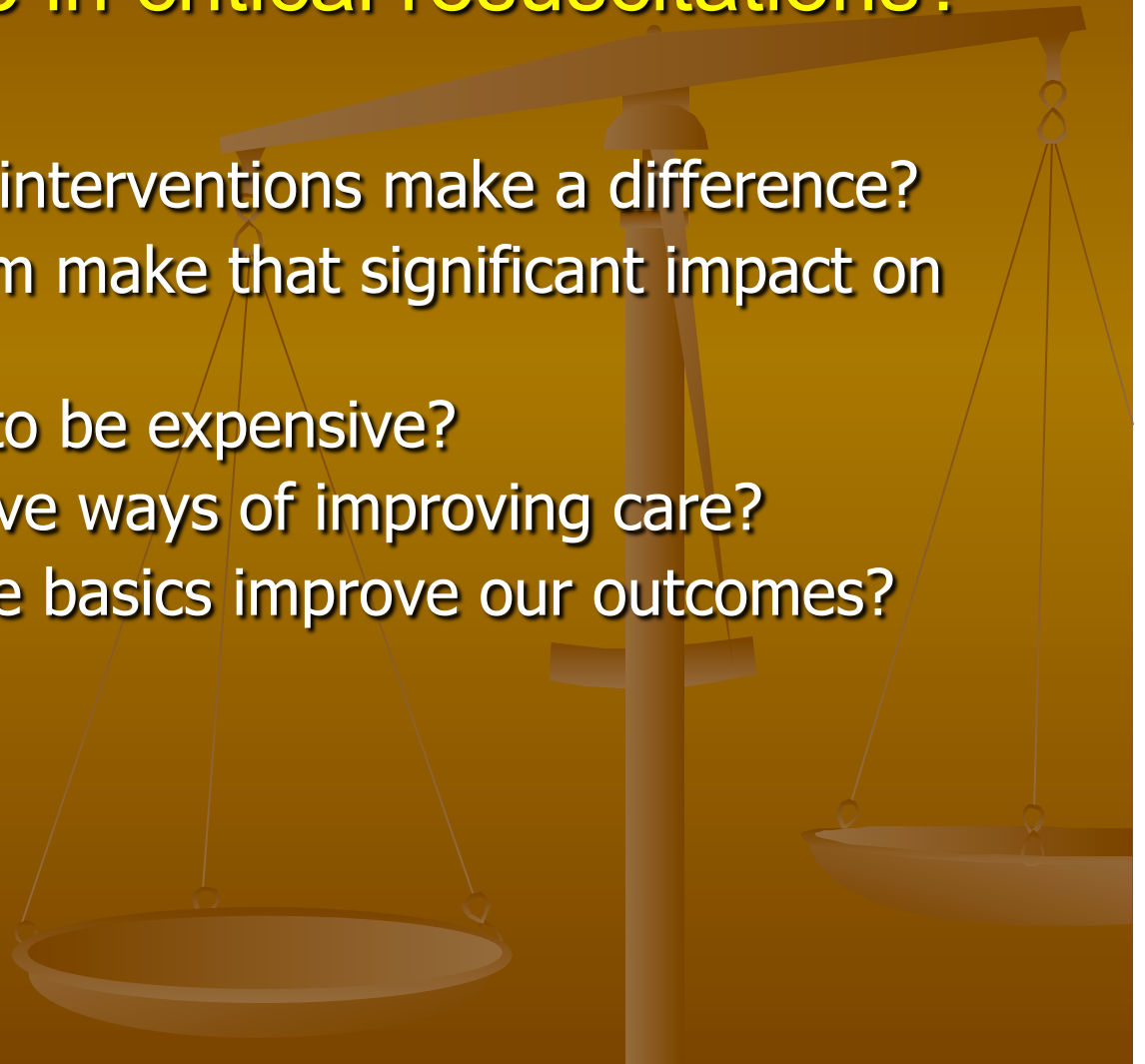


Marc Conterato, MD, FACEP  
Associate Medical Director, NMAS  
Joint Hennepin County EMS System

# 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

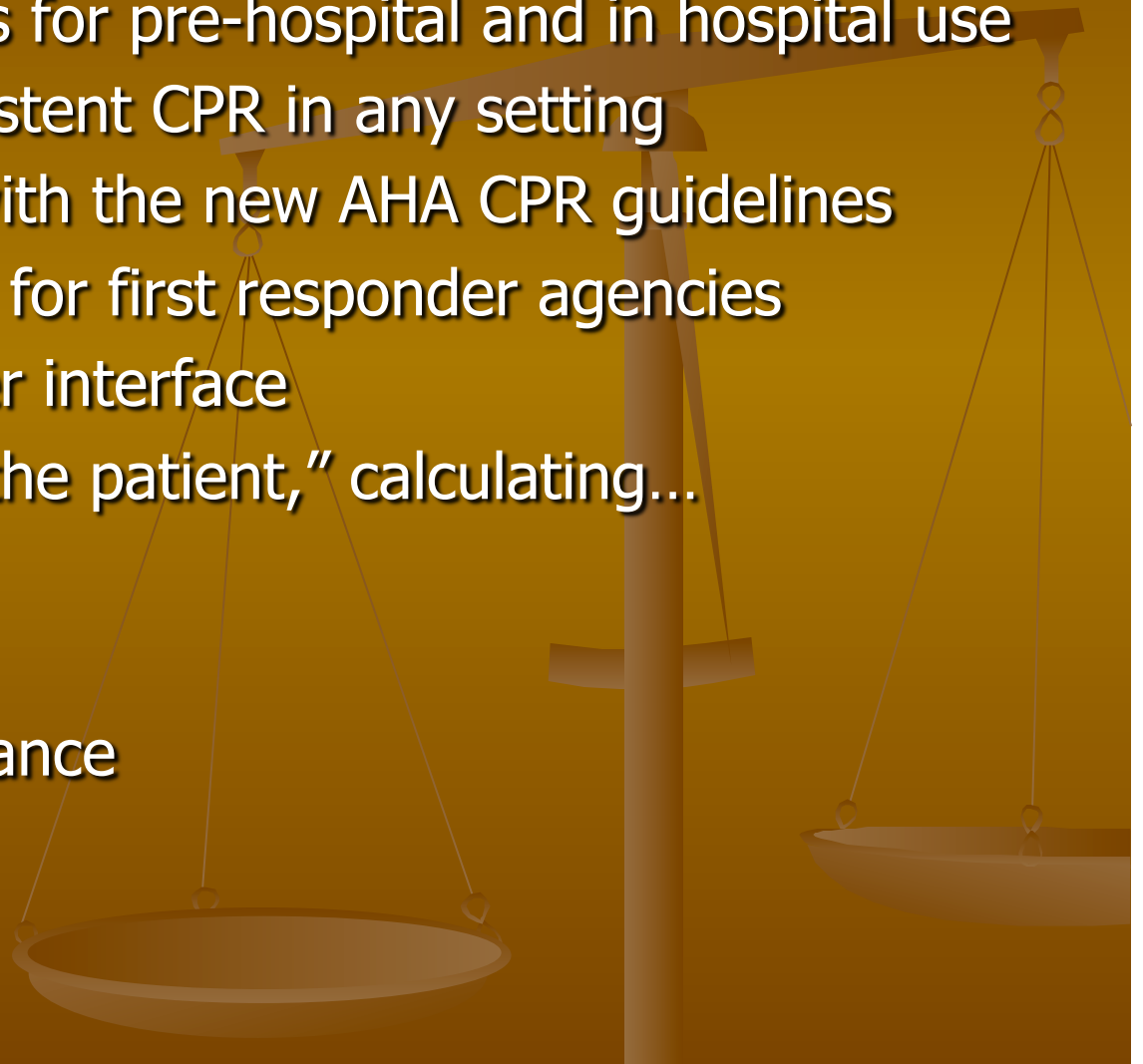
# AUTOMATED CPR DEVICES



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

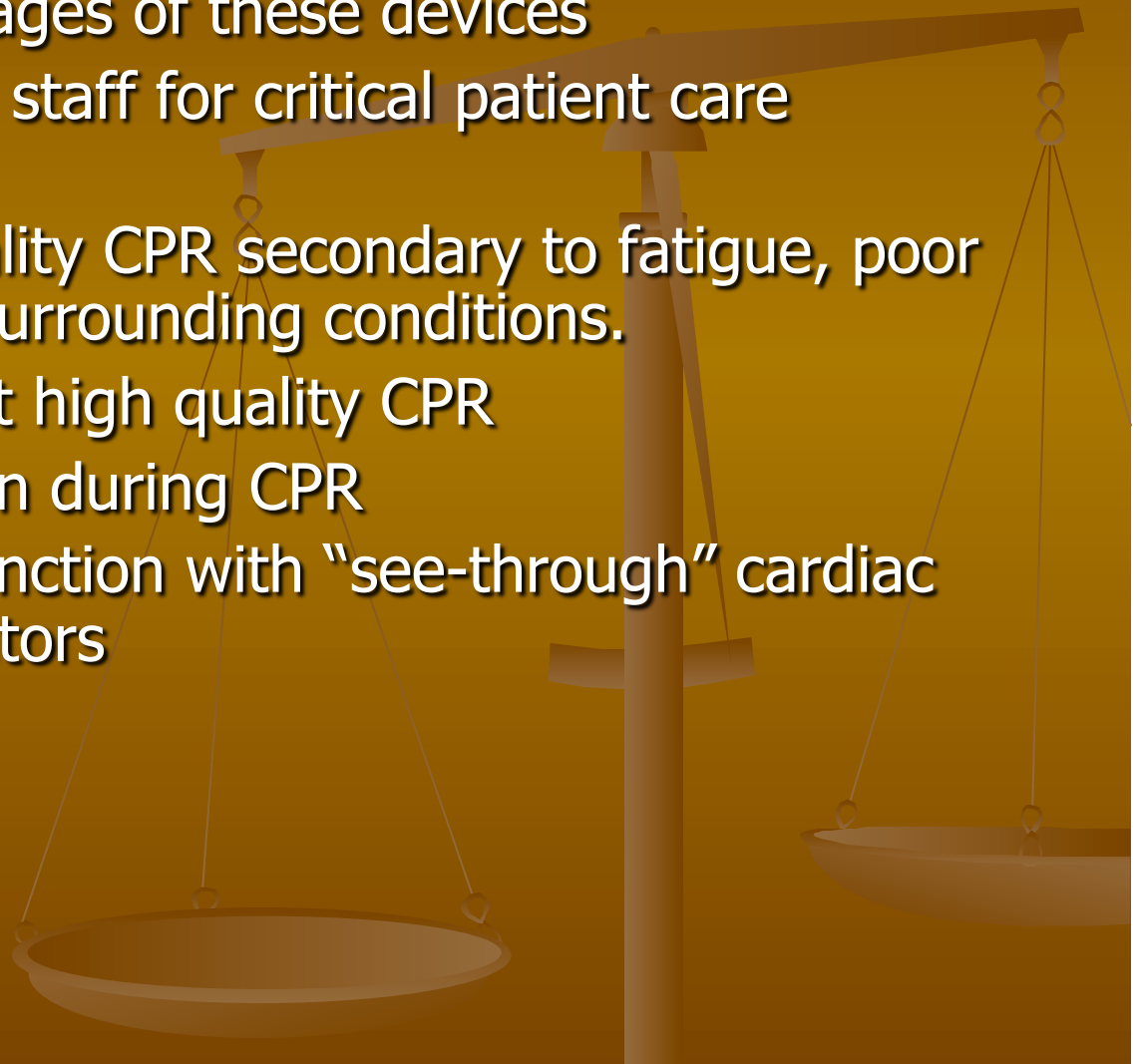
# AUTOMATED CPR DEVICES

- 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



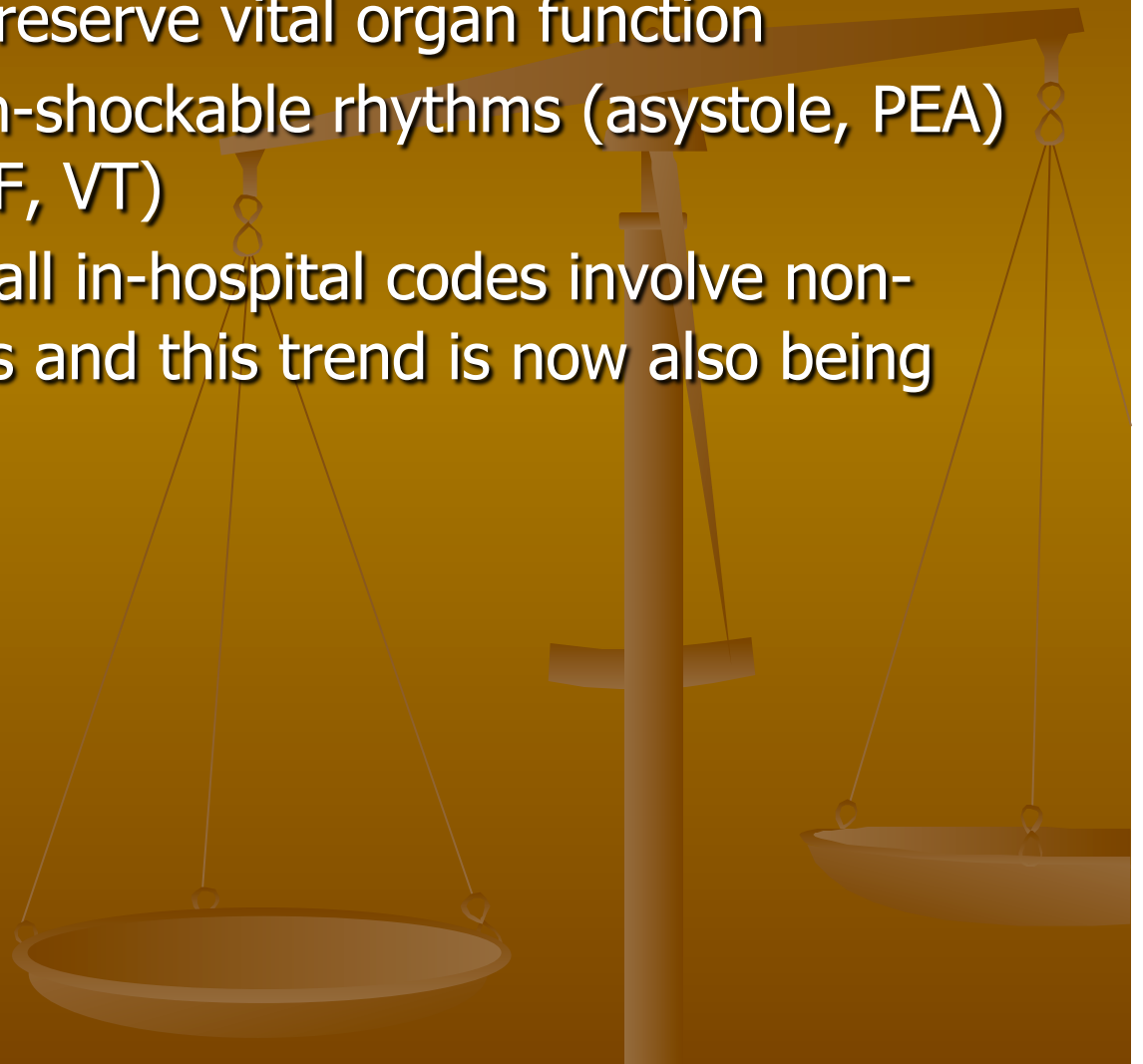
# AUTOMATED CPR DEVICES

- 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



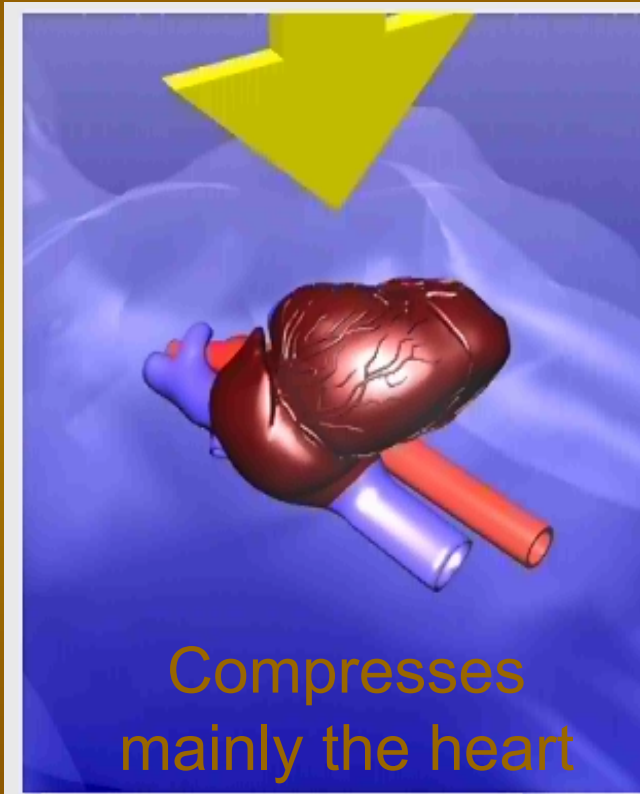
# AUTOMATED CPR DEVICES

- 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

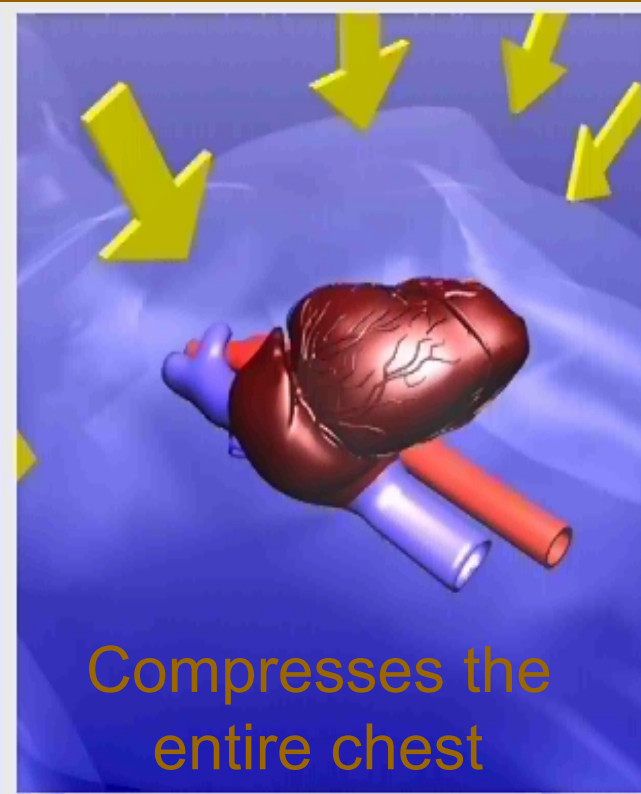


# AUTOMATED CPR DEVICES

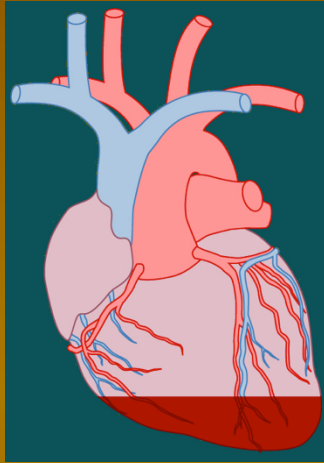
Cardiac Pump



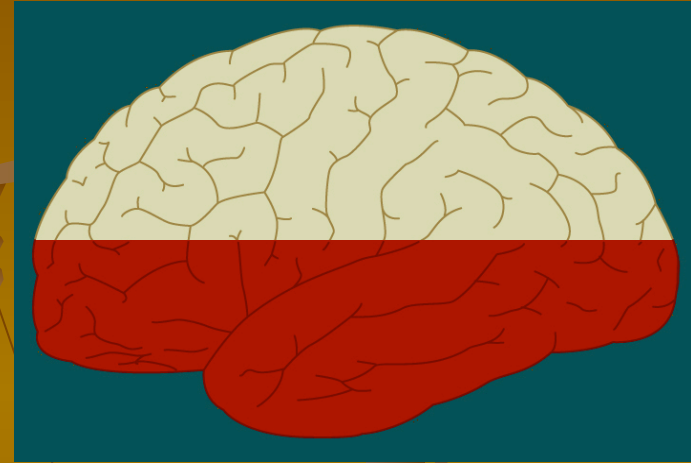
Thoracic Pump



# AUTOMATED CPR DEVICES



10% - 20% of normal flow

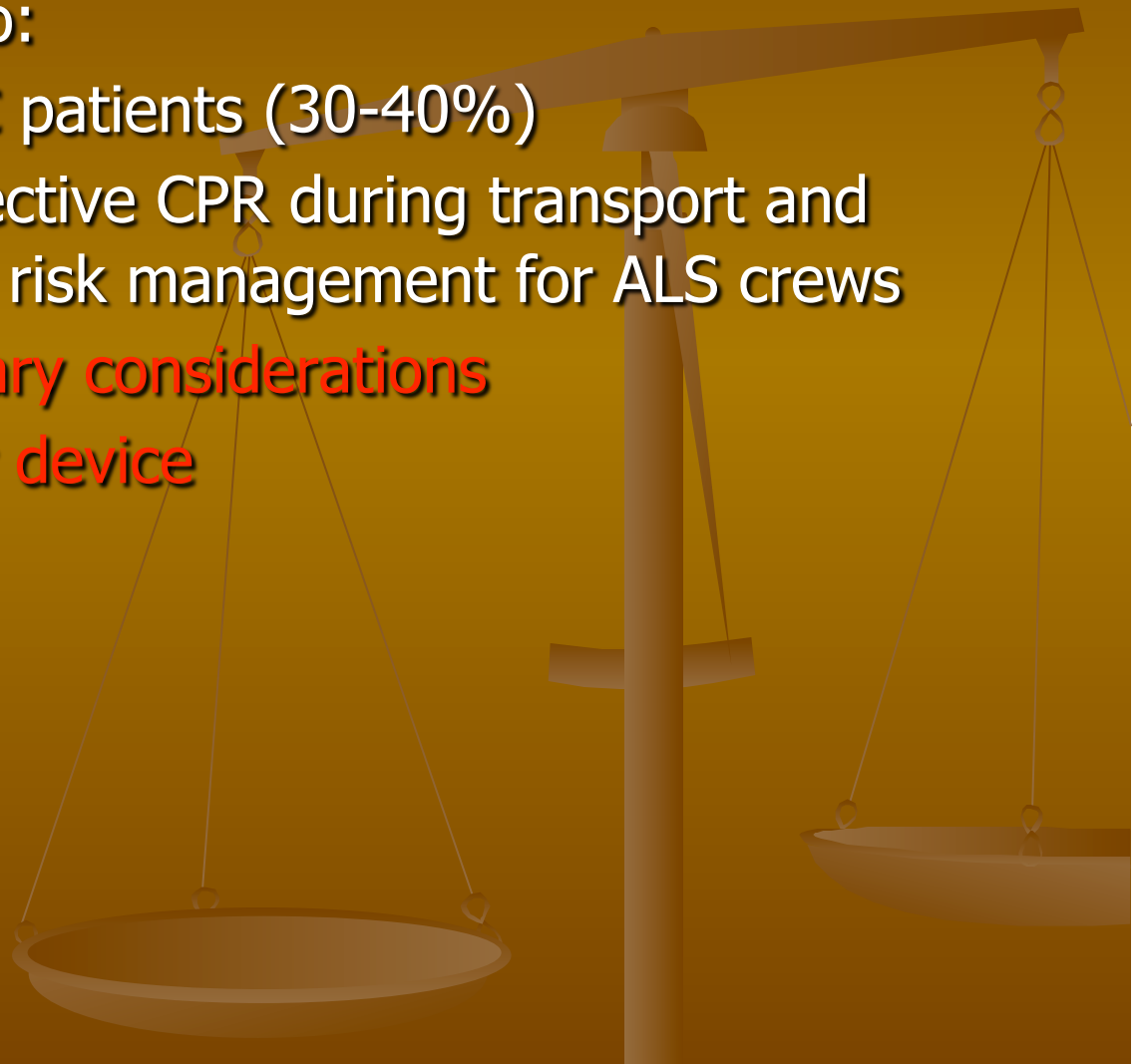


30% - 40% of normal flow

- 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

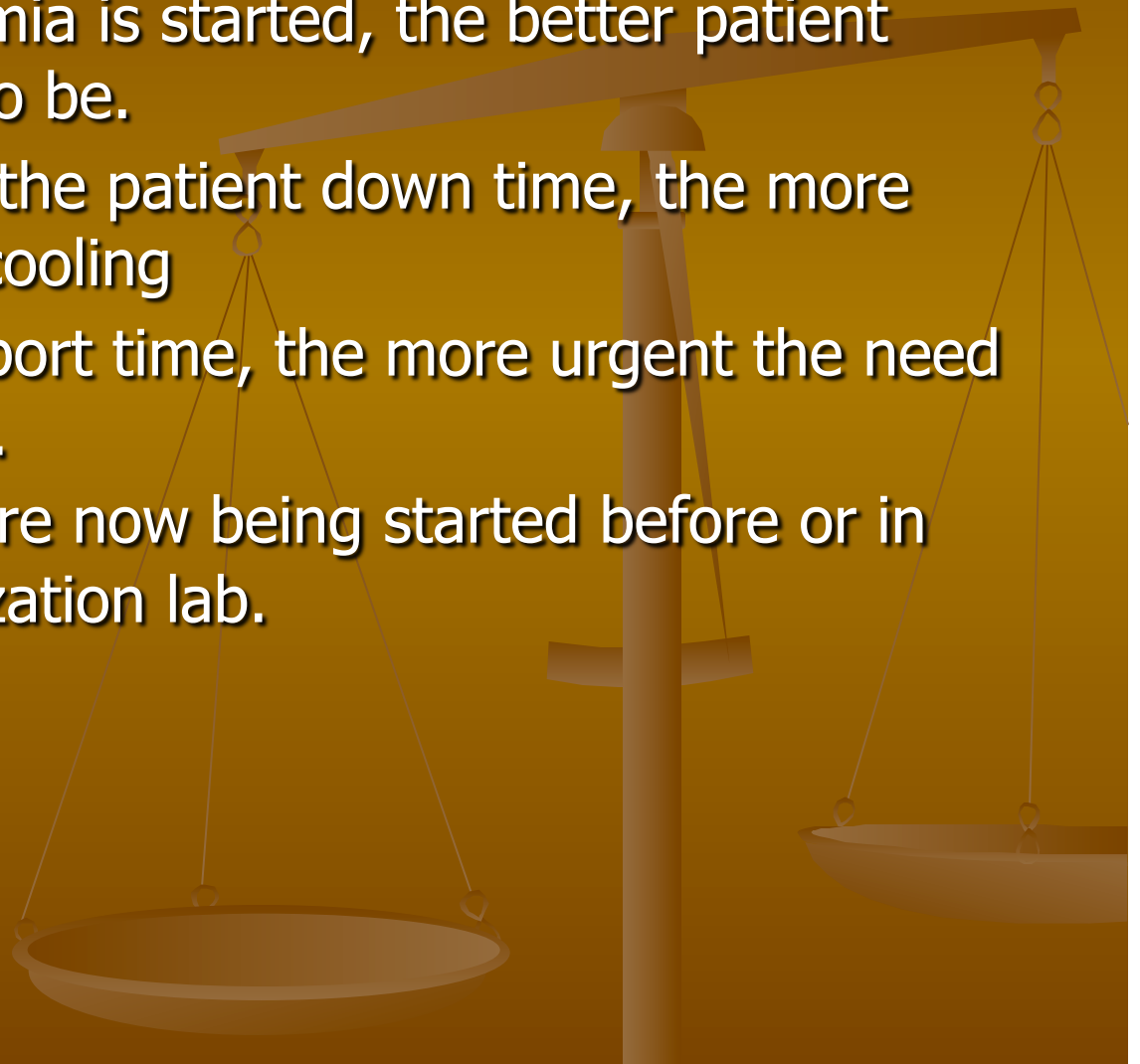




**What about Pre-hospital Cooling?  
Where does it fit in?**

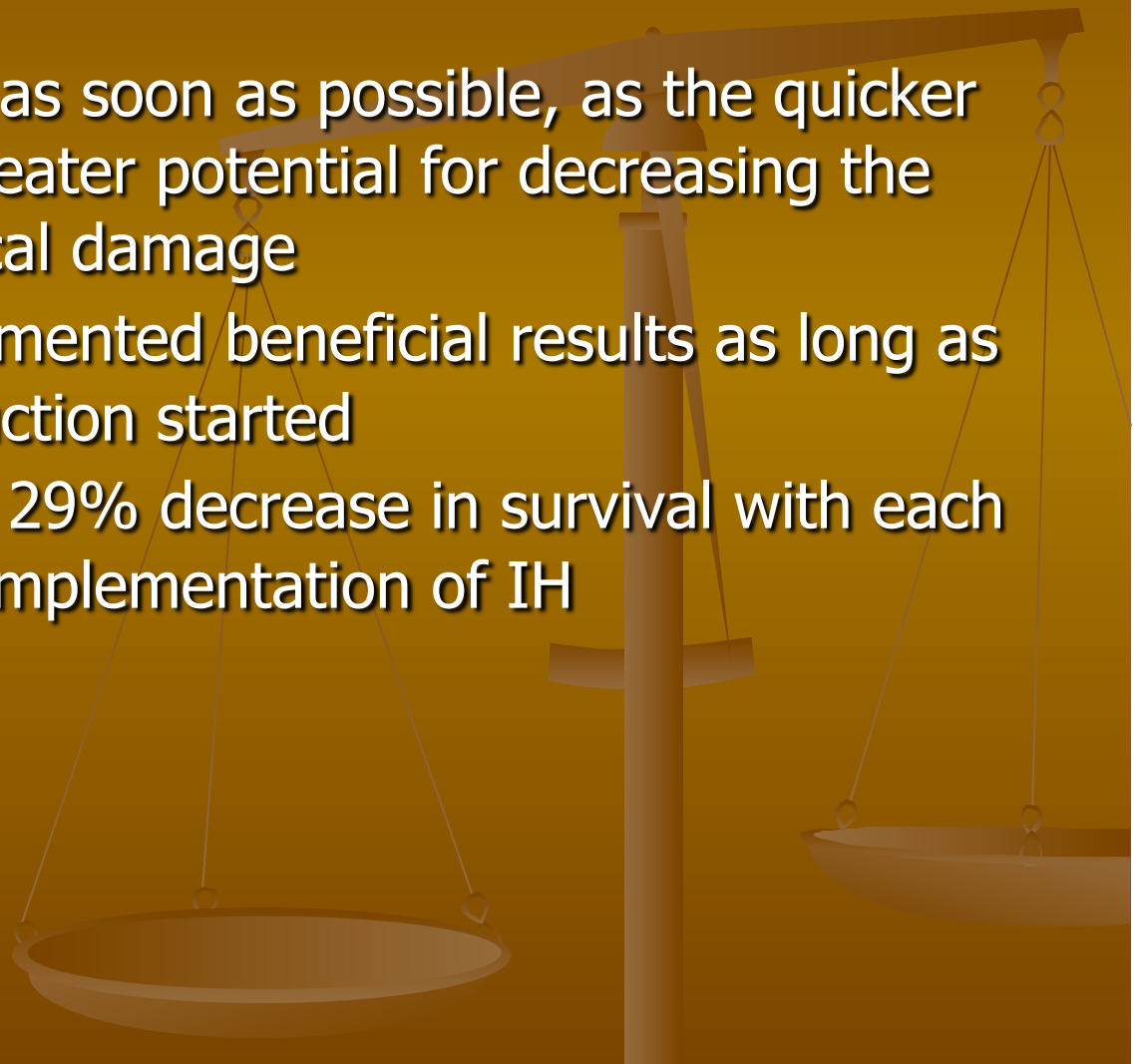
# Application of field hypothermia induction

- 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.



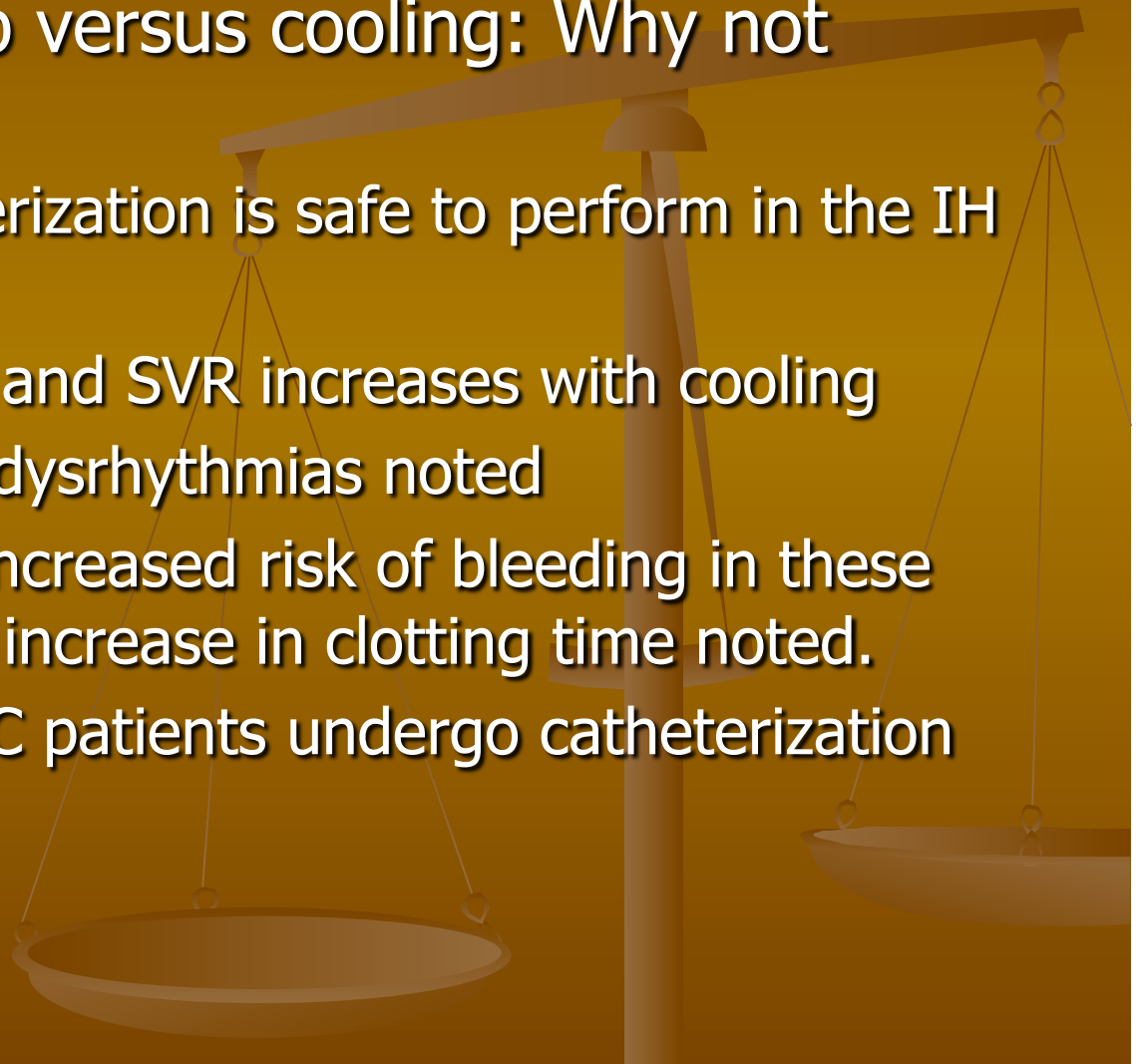
# Application of field hypothermia induction

- 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

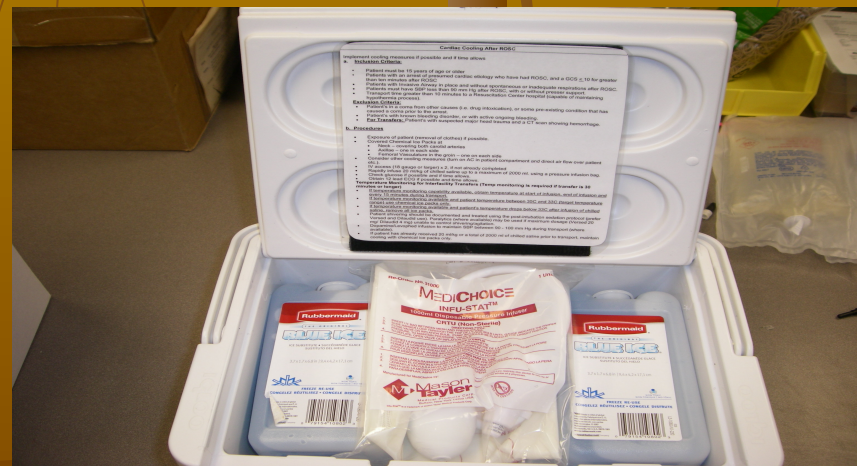
Vests

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

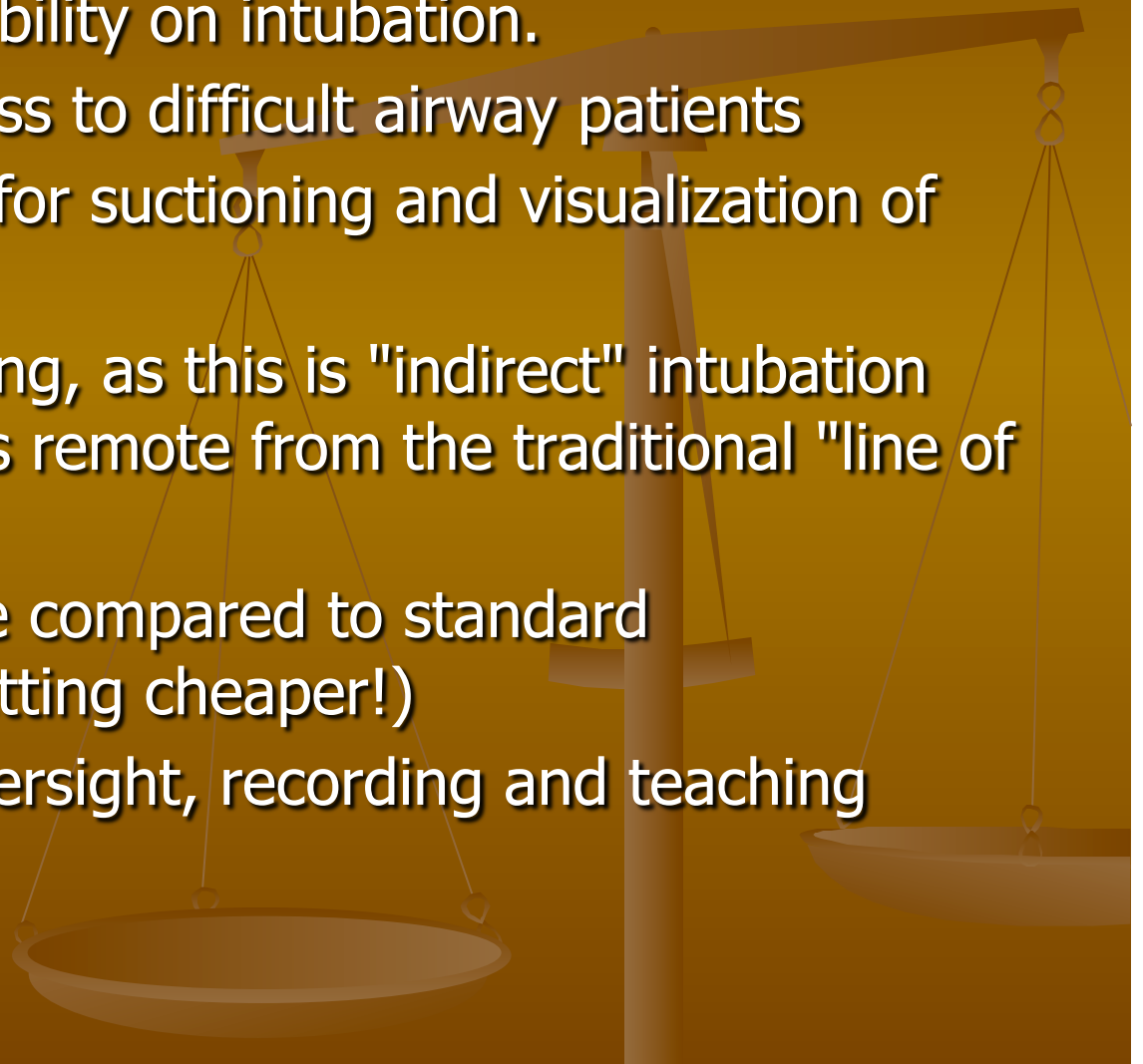


# FIELD HYPOTHERMIA APPROACHES: SIMPLE COOLING METHOD

- 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



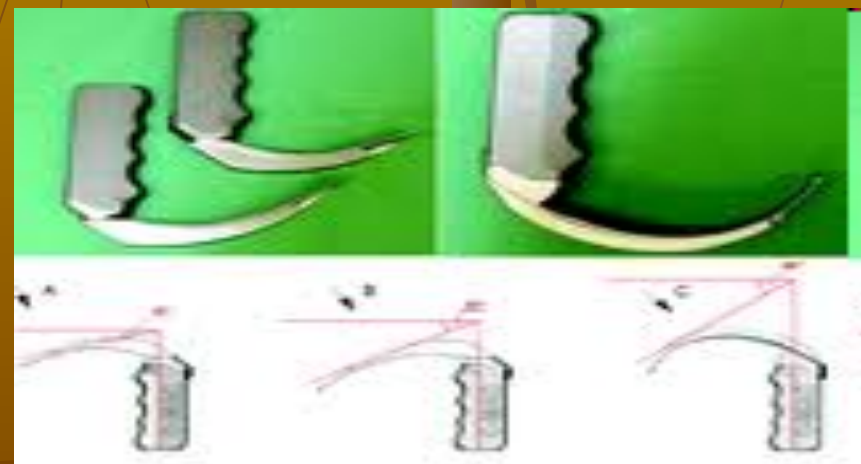
# VIDEO-LARYNGOSCOPY

- 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



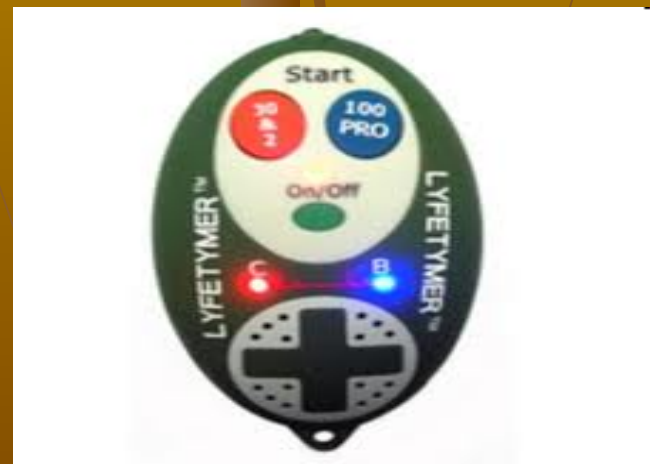
# VIDEO-LARYNGOSCOPY

- **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?

