An Ounce of Prehospital Care Saves a Ton of Hospital Care: The Earlier the Intervention, the Better the Results

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Professor of Surgery, Medicine, Pediatrics, Public Health & Riggs Family Chair in Emergency Medicine
The University of Texas Southwestern School of Medicine and the Parkland Emergency-Trauma Center
DALLAS, U.S.A.
The Patient Has a Fractured Fibula....
...on a Mild Sedative.... Can Go Home Tomorrow ...
Program Committee Gets Assistance
Finding This Speaker...
Early Interest in Mouth-to-Mouth ...
Set Me Up for “A.C.L.S.”…. 

… “Alternate Clinical Life Style”
That Brings Us to Today’s First Panel ...
A Focus on the Effects of EMS & Other “Out-of-Hospital” Interventions
Like Most Veterinary Students...

...Doreen Breezes Thru Chapter 9
Introduction

The Traditional Paradigm Has Been That:

“EMS is an Extension of In-Hospital Medical Care”
We Were Bringing Drugs, Airway Devices, etc.

...to the Streets, Bedrooms, Arenas, etc.
Seattle Medic One Program

Seattle Fire Department
Got Exceedingly Sleepless in Seattle....
99% Success Rate within 2 Attempts....

... Correlated with Increased Survival Rates!
Patient Transport to ICU Expedited
Developed Another Perspective...

- Paramedics Set the Tone
- Intubation Set Up ICU Care
- Led to Direct Admits to ICU

At the Same Time...

- Earlier Defibrillation Meant NO Need for Intensive Care
The Earlier the Intervention...

...the Better the Results
Chicago Airport

1st Year’s Experience:

Of 9 VF Cases in the Ticket Counter and Gate Areas ...

- All 9 (100%) Saved
- 6 Had Never Seen an AED
- Most Waking Before EMS
Evolving Paradigm

Better In-Hospital Care Can Be Driven by Out-of-Hospital Care
Therapeutic Hypothermia

It’s Really Cool!

It’s Really Cool!
Tx Hypothermia

- Raleigh & Seattle Experience
- Like the Intubation Experience, Patients Arrived at the Hospital with Therapy Already Started...
- Drove Hospital Training & Compliance
More Patients Survived!!
The MITI Study

- Door to Needle Time at Hospitals was >90 minutes
- Decided to Compare to Out-of-Hospital Administration
- Found No Difference ....
- ...Because Almost all Cases Tx’d < 70 min of 9-1-1 Call (pre & in-hospital)
In 2004 ...

The U.S. NIH Sent Out an RFA to Establish a Network of 10 Cities in North America That Would Drive National Priorities in Terms of Uncovering New Ways to Save More Lives following Sudden Cardiac Arrest and Trauma
Besides Salaries for Expert Personnel to Capture the Data and Outcomes …

**Acquired Monitoring Equipment:**

for example, the ability to Capture Sec. to Sec. Performance of CPR

… Recorded and Measured on Computers!
How Did the First Trial of a Device Go?
Very Interesting Results …

No Advantage

In Survival Chances from the ITD Itself ….

…But Survival Rates ↑↑↑

A 55% Improvement in Dallas Alone!
So Why ?
Key Finding of Early Studies

**i.e., The More Time Medics Spend Doing Chest Compressions, Then the Better the SURVIVAL RATE!!**

Chest Compression Fraction Determines Survival in Patients With Out-of-Hospital Ventricular Fibrillation

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**Figure 3.** Smoothing spline representing the incremental probability of survival corresponding to a linear increase in chest compression fraction.
With the NIH Funded Monitoring Systems, We Gave On-Going Feedback to Medics!

Minimally Interrupted Cardiac Resuscitation by Emergency Medical Services for Out-of-Hospital Cardiac Arrest

Bentley J. Bobrow, MD
Lani L. Clark, BS
Gordon A. Ewy, MD
Vatsal Chikani, MPH
Arthur B. Sanders, MD

Context  Out-of-hospital cardiac arrest is a major public health problem.
Objective  To investigate whether the survival of patients with out-of-hospital cardiac arrest would improve with minimally interrupted cardiac resuscitation (MICR), an alternate emergency medical services (EMS) protocol.
Following Feedback, Re-Training and...

More Re-Training:

2006

2009
## Impact on Dallas Area Outcomes

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<th>2006</th>
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Grants help make Dallas County one of best places to suffer cardiac arrest

10:24 PM CST on Friday, February 26, 2010
By JASON ROBERSON / The Dallas Morning News

Steven Shelley is grateful for a federal grant that helped Dallas County medics and firefighters save more cardiac arrest patients last year and send them back to work.

Public Health

Cardiac care gets a jolt

County goes from one of the worst to one of the best places for a heart to stop

Steven Shelley is grateful for a federal grant that helped Dallas County medics and firefighters save more cardiac arrest patients last year and send them back to work. After finishing a four-hour shift of moving boxes up and down ladders, the 46-year-old warehouse manager in Carrollton told co-workers he was grabbing a bite to eat. After finishing a four-hour shift of moving boxes up and down ladders, the 46-year-old warehouse manager in Carrollton told co-workers he was grabbing a bite to eat.
Similarly, in the Trauma Studies …

• Although No Dramatic Differences Were Found at Study End …
• Overall Survival Rates Reportedly Increased from Baseline Rates

(Final data and Statistical Analysis still being reviewed)
Acute Administration of I.V. Estrogen

Shown to Provide Significant Protection (up to 60%)
The Earlier the Intervention...  
...the Better the Results
So What Does This All Have to Do With the Emergency Department?
Prehospital Resuscitation Avoids Lengthy, Disruptive ER Resuscitations

... Better Odds That They Will Not Only Wake Up in the ICU Sooner ...
...Now More Likely to Avoid an ICU!
Also ...
Time-Consuming Transfers Avoided ... and Better CQI for Timeliness (unloads ER)
Evolving Portable Prehospital Interventions ...

Avoid Complications(?); Save $$$
How Dispatch Data Can Not Only Save Lives...

... But Also Spare the ED!
In Summary...
THE DEAD SHALL BE RAISED.
On the Road to the 22nd Century...
Make Life Better....

...for Future Generations !!!
Thank You !!
But Also Remember...

It’s Good Business Too...
To Make Your City the Safest City in Which to Be Resuscitated...
The Earlier the Intervention... 

...the Better the Results
Today-- "CPR" also Includes AEDs
CPR QUIK-VIEW

Interval Statistics

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The EZ-IO Revolution
Ground-Breaking Technology
The EZ-IO Revolution
Superior Technology
“City of Dallas ...

We’re No Dummies !! ”
Simplified Scheme of the Mechanisms After Ischemia

Effects of mild hypothermia

- Ca** cycling
- Delayed neuronal death
- Vascular compression
- Swelling
- Acidosis
- Lactate
- Anaerobic glycolysis
- ATP hydrolysis
- Inhibition of energy depletion
- Mitochondrion overload
- Proteolysis
- Xanthine oxidase
- NO production
- cNOS
- Genomic responses
- Calcium influx
- Polyamines
- Cytokines
- Metabotropic receptors
- PGD2
- IP3
- NMDA receptors
- BBB permeability
- Leukotrienes
- NADPH oxidases
- Endoperoxides
- Hypoperfusion
- NO
- Reflow
- BBB
- Edema
- Calcium mobilisation
- Calcium
- Inositol 1,4,5-trisphosphate
- Protein synthesis
- Protein phosphorylation
- Mitochondrial dysfunction
- Free radicals
- Apoptosis
- Killer proteins
- Heat stress
- Genes
- IEGs
- Lipolysis
- Polyamines
- Cytokines
- Metabotropic receptors
Induced Hypothermia (33°C)


- 73 Out-of-Hospital Cardiac Arrest Patients Cooled to 33°C for 12 hours

![Graph showing survival rates for control and hypothermia groups.](image)
Induced Hypothermia (32-34°C)

Cooled to 32 – 34 °C for 24 hours

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<th>Hypothermia</th>
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<td>100%</td>
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*Good Neuro Recovery*
p< .05
We Decide What You Do!!
I Guess Not Everyone Thinks that this Cold Therapy is Always a Good Thing!

Left Out in the Cold!!
Like ETI....

...Start It In the Field!
...Start It In the Field!
Other Items

ITD
QCPR
STEMI Centers
ROC Studies
On the Road to the 22nd Century...
Thank You !!
In-Hospital Care – An Extension of EMS: Reversing the Traditional Paradigm

Edward M. Racht, MD

Immediate Past Medical Director, Austin Travis County EMS System
and
Immediate Past Chair, GETAC Texas Department of State Health Services

Vice President of Medical Affairs and Chief Medical Officer, Piedmont-Newman Health System, Atlanta
Smile, Shorty !

Dr. Leonard Cobb
1st Medical Director,
Seattle Fire Dept.
First MAD Programs ...

“Manhole Access Defibrillation”
There Were Early Warning Signs...
Pepe’s Parents

Circa 1956

© Pepe 2007 National EMS Medical Directors Course
The Roots of Modern EMS ...
the 1960’s

In the Beginning...

There Were These Two New Epidemics...
So What Made These 2 Epidemics Different?
Required Immediate Attention . . .

Outside of the Hospital
Please Note:

This is a Bad Sign in Some Countries
Street Smarts

• Understood Hazards
• Modified Priorities
• Became Creative
My Story Begins....

...Sleepless in Seattle
Brought to the Hospital Ward
The EZ-IO Revolution
Rapidly Moving to 1st Line

EZ-IO Insertion
Health Volunteers
The U.S. National Institutes of Health
Resuscitation Outcomes Consortium

- National Heart, Lung, and Blood Institute
- National Institute for Neurological Disorders and Stroke
- Canadian Institutes of Health Research
- U.S. Department of Defense
- Defence Research and Development Canada
- American Heart Association
- Heart and Stroke Foundation of Canada
Among > 100 Highly Competitive City-University Partnerships that Applied…

- The Dallas Area *BioTel* System (incl. Dallas & other member Cities) was 1 of only 7 Major U.S. Municipal Sites Chosen
- Dallas Was Designated a Center of Excellence for Resuscitation Medicine and Related Research
- This Meant Unique Federal Funding for Training, New Life-Saving Equipment, Data Collection and Additional Medical Oversight
- And the Hope for --- *A Life-Saving Effect* !
While the Percentages Seem Small…

Because of the Large #’s Treated…

…This Translates into Dozens of More Lives Saved in Dallas Area

…and Hundreds Across the Numerous ROC Jurisdictions