Monthly Community Training Classes

Be a Lifesaver

Learn Continuous Chest Compression CPR

The University of Arizona. Sarver Heart Center

UMC University Medical Center

www.heart.arizona.edu

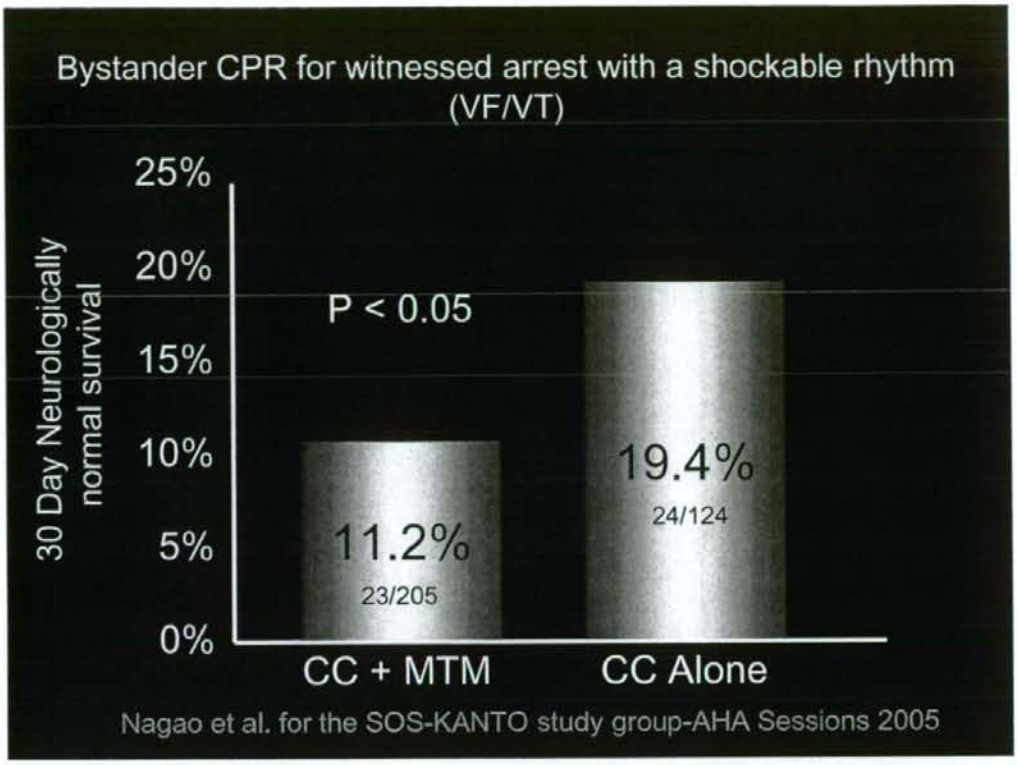
Continuous Chest Compressions Clinical Data

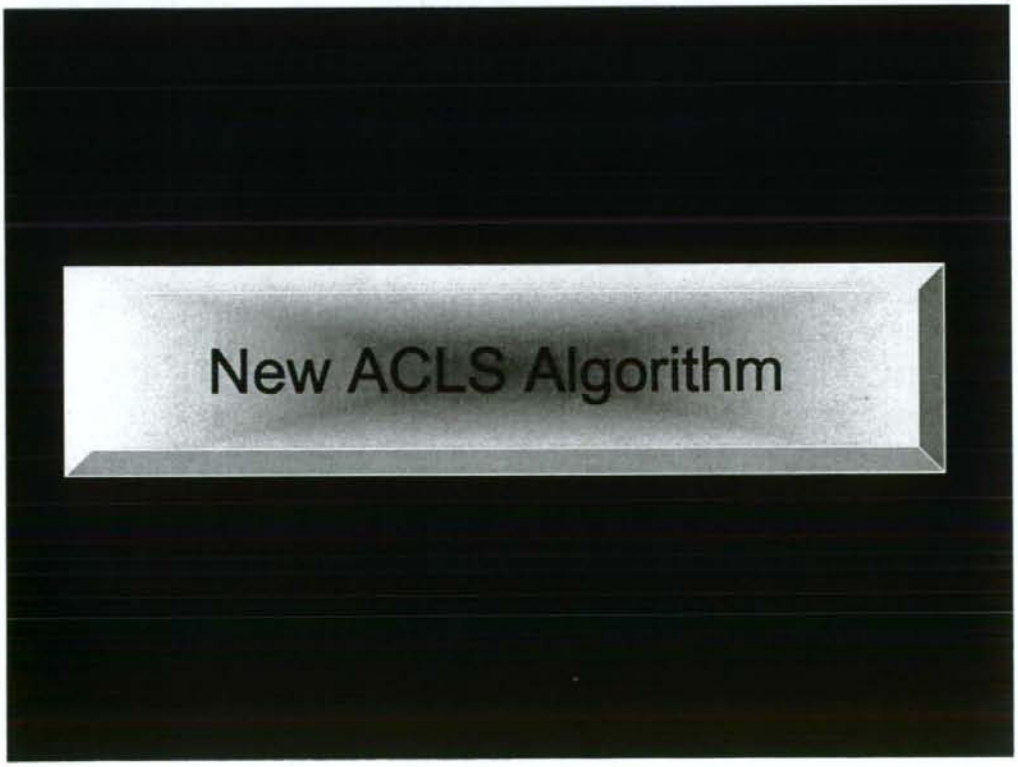
For witnessed,
unexpected collapse
in adults

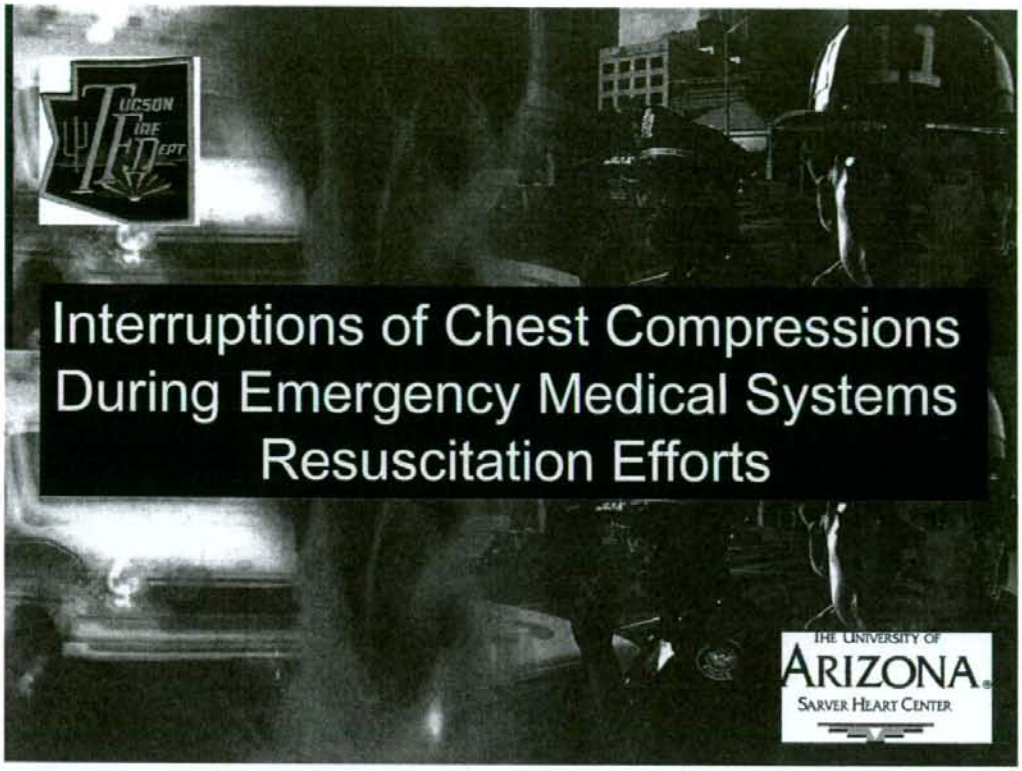
Cardiopulmonary Resuscitation by Bystanders with Chest Compression Only (SOS-KANTO): An Observational Study.

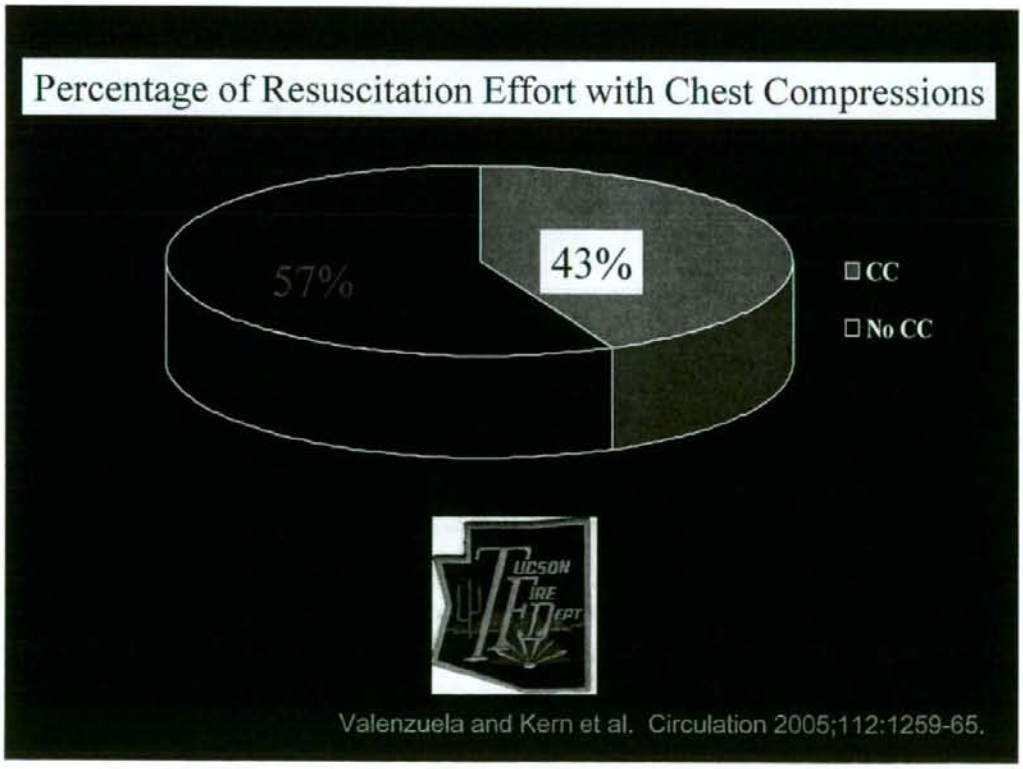
- Prospective, multi-center observational clinical trial
- N = 9,592 Cardiac Arrests in 58 communities
- Primary endpoint: 30 day Survival with favorable Neurological outcome (CPC 1 or 2)

SOS-Kanto Study Group. Lancet 2007;369:920-926


Bystander CPR for witnessed arrest with a shockable rhythm (VF/VT)
30 Day Neurologically normal survival
25%
20%
15%
10%
5%
0%
P < 0.05
11.2%
23/205
19.4%
24/124
CC + MTM
CC Alone
Nagao et al. for the SOS-KANTO study group-AHA Sessions 2005

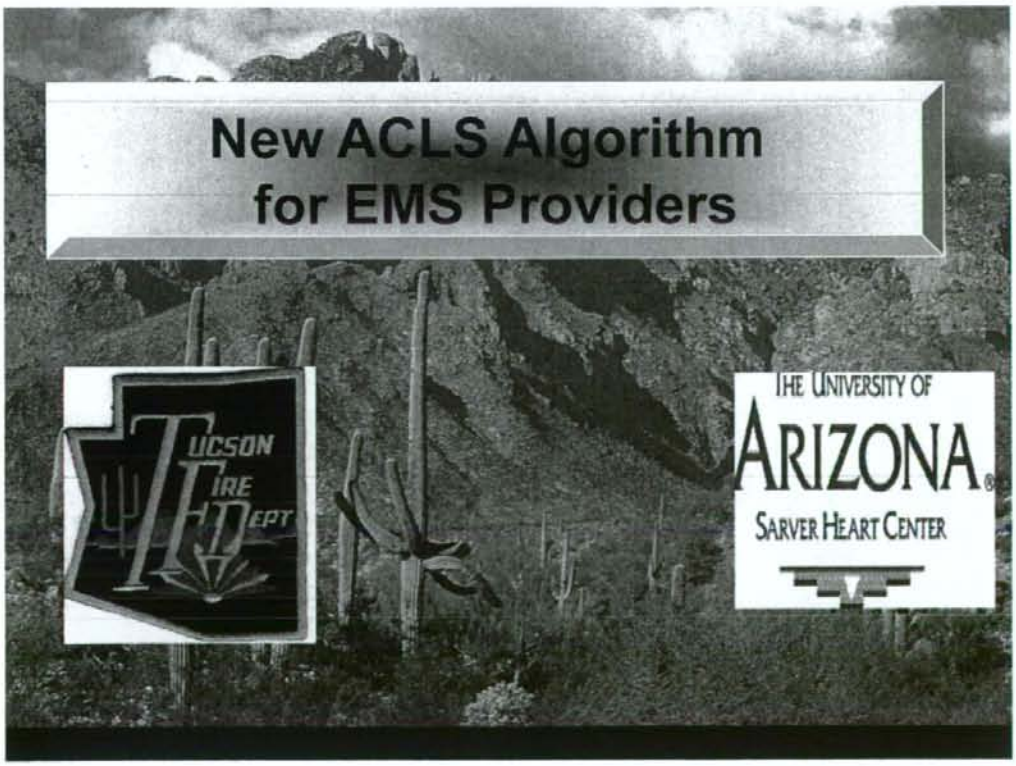

New ACLS Algorithm

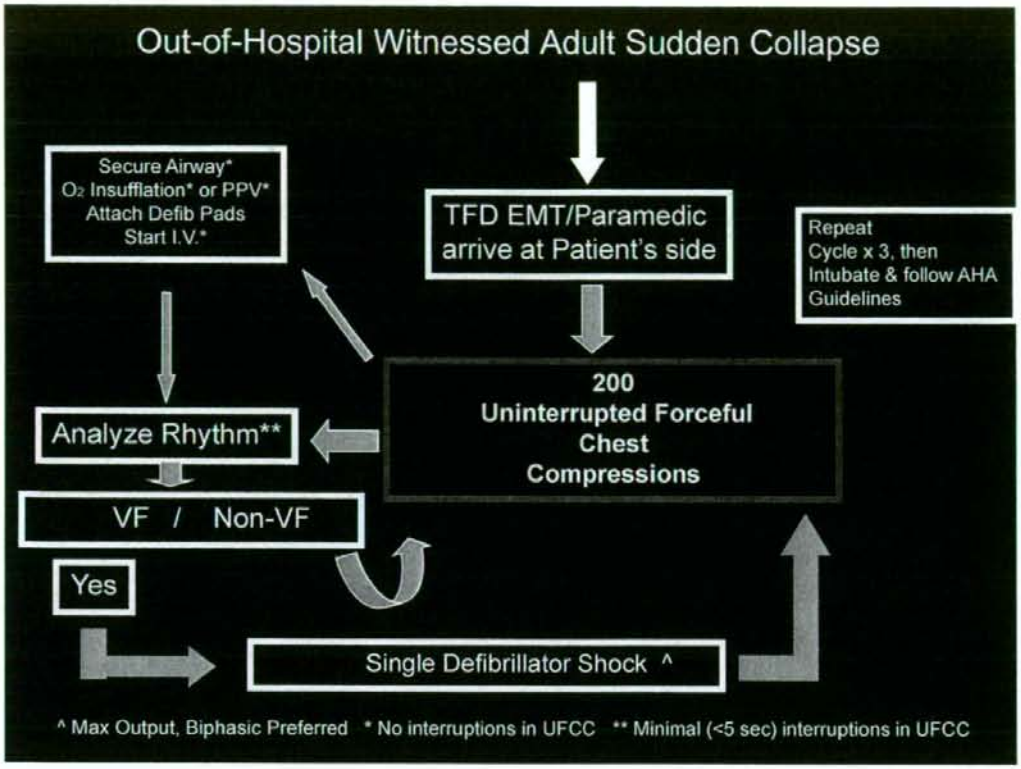

Interruptions of Chest Compressions
During Emergency Medical Systems
Resuscitation Efforts
THE UNIVERSITY OF
ARIZONA
SARVER HEART CENTER

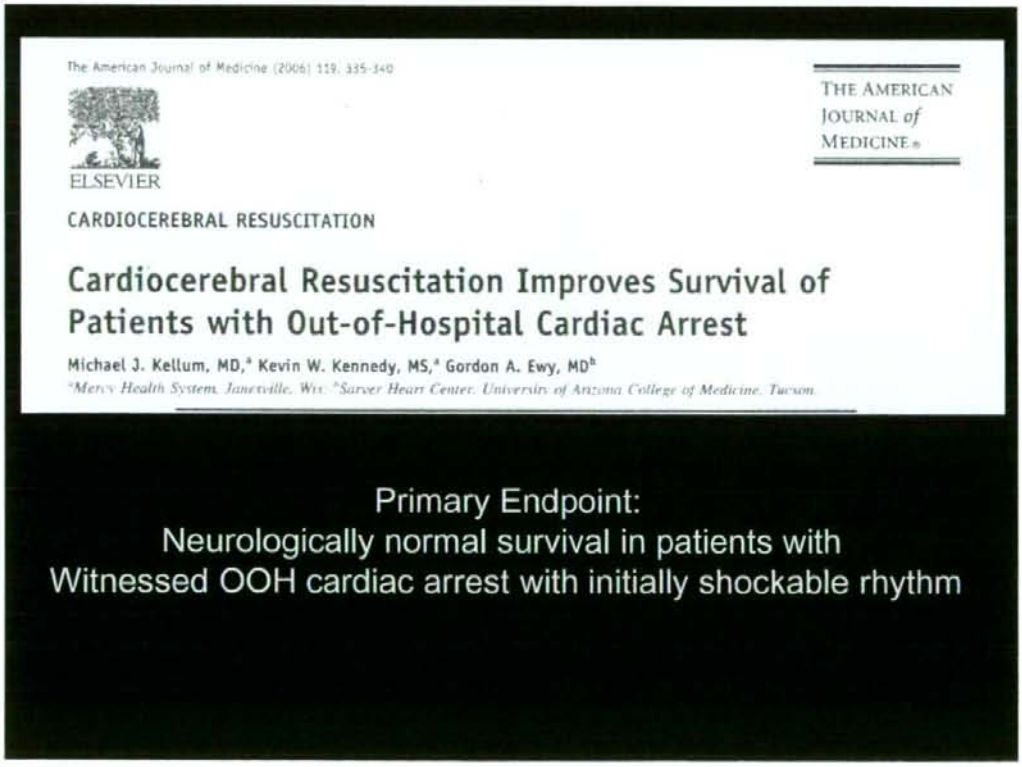

Percentage of Resuscitation Effort with Chest Compressions
57%
43%
CC
No CC
Valenzuela and Kern et al. Circulation 2005;112:1259-65.

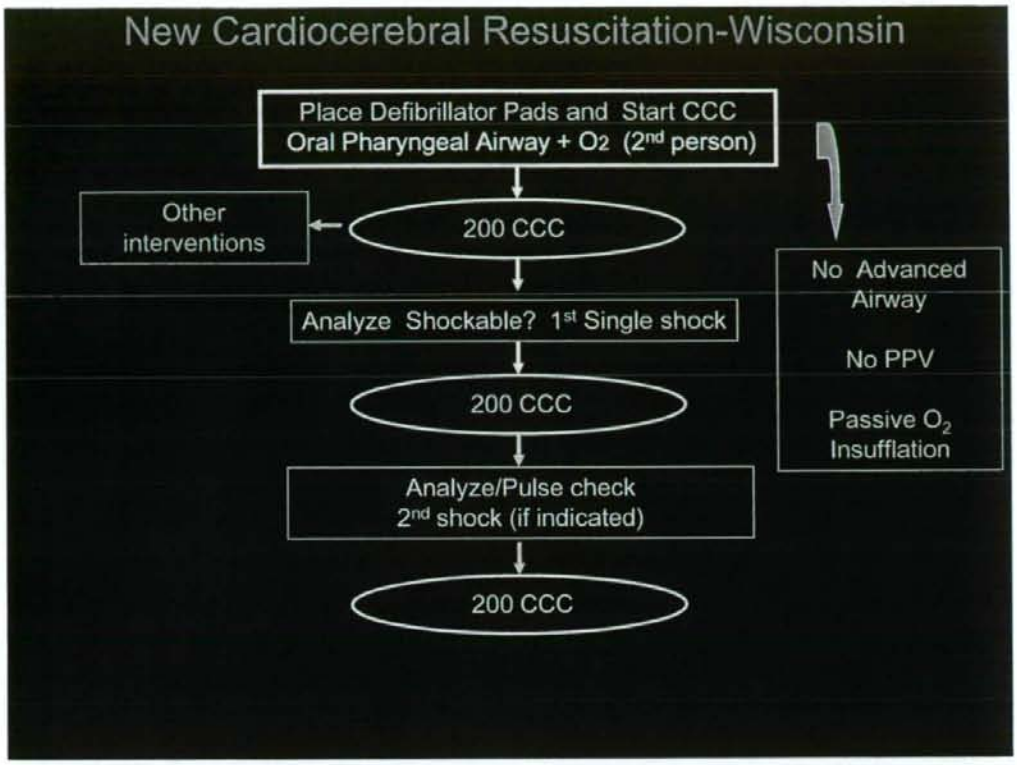
Longest period with CC (sec)	122 (68,206)
Average period with CC (sec)	55 (43,74)
Longest period without CC (sec)	172 (109,246)
Average period without CC (sec)	57 (40,78)

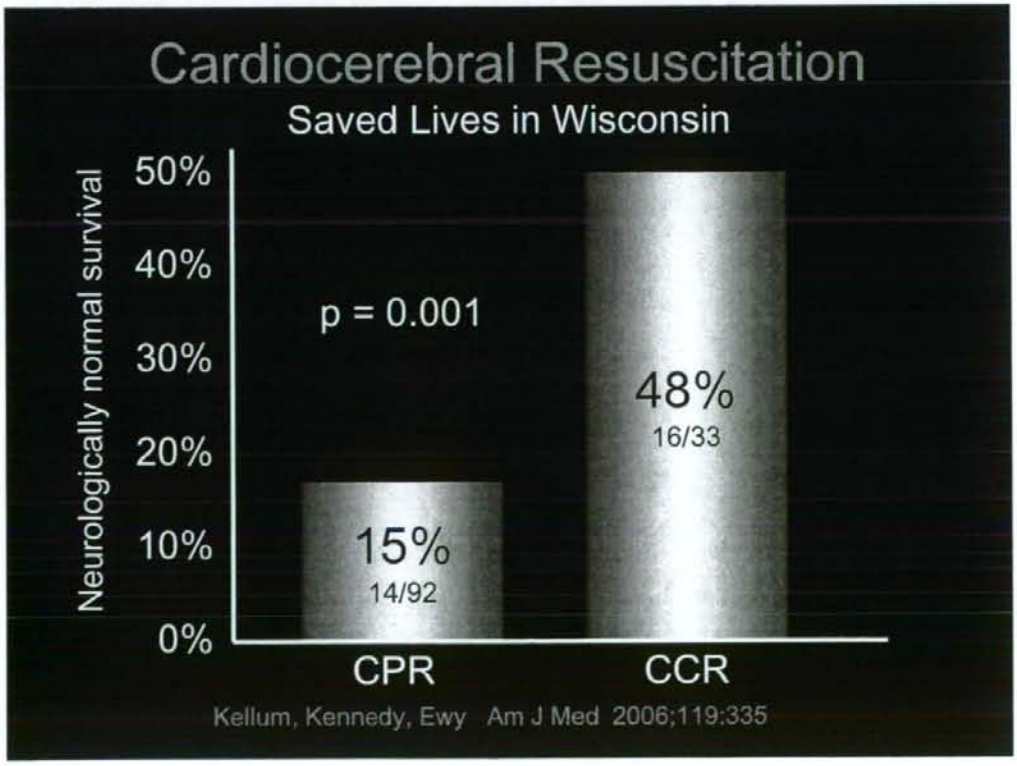
Time interval data is reported as median (25%, 75%)




Out-of-Hospital Witnessed Adult Sudden Collapse
Secure Airway*
O2 Insufflation* or PPV*
Attach Defib Pads
Start I.V.*
TFD EMT/Paramedic arrive at Patient's side
Repeat
Cycle x 3, then
Intubate & follow AHA Guidelines
200
Uninterrupted Forceful
Chest
Compressions
Analyze Rhythm**
VF / Non-VF
Yes
Single Defibrillator Shock ^
^ Max Output, Biphasic Preferred * No interruptions in UFCC ** Minimal (<5 sec) interruptions in UFCC


The American Journal of Medicine (2006) 119, 335-340
ELSEVIER
THE AMERICAN JOURNAL of MEDICINE
CARDIOCEREBRAL RESUSCITATION
Cardiocerebral Resuscitation Improves Survival of Patients with Out-of-Hospital Cardiac Arrest
Michael J. Kellum, MD,[a] Kevin W. Kennedy, MS,[a] Gordon A. Ewy, MD[b]
[a]Mercy Health System, Janesville, Wis. [b]Sarver Heart Center, University of Arizona College of Medicine, Tucson
Primary Endpoint:
Neurologically normal survival in patients with
Witnessed OOH cardiac arrest with initially shockable rhythm


New Cardiocerebral Resuscitation-Wisconsin
Place Defibrillator Pads and Start CCC
Oral Pharyngeal Airway + O2 (2nd person)
Other interventions
200 CCC
Analyze Shockable? 1st Single shock
200 CCC
Analyze/Pulse check
2nd shock (if indicated)
200 CCC
No Advanced Airway
No PPV
Passive O2 Insufflation

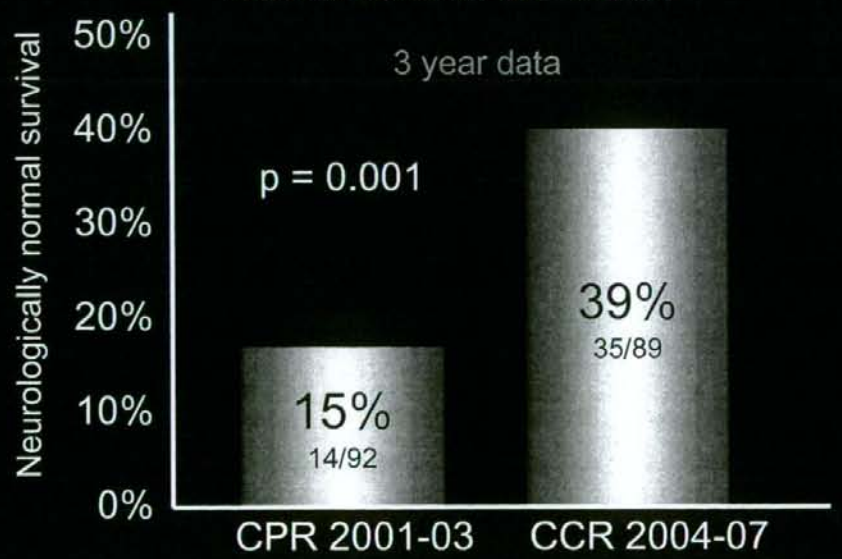

Cardiocerebral Resuscitation
Saved Lives in Wisconsin
Neurologically normal survival
50%
40%
30%
20%
10%
0%
p = 0.001
48%
16/33
15%
14/92
CPR
CCR
Kellum, Kennedy, Ewy Am J Med 2006;119:335

Too Good to be True?

- Hawthorne effect?
- Non-randomized
- Historical Controlled

Cardiocerebral Resuscitation

Saved Lives in Wisconsin



Kellum, Kennedy, Ewy. Ann Emerg Med 2008

Cardiocerebral Resuscitation

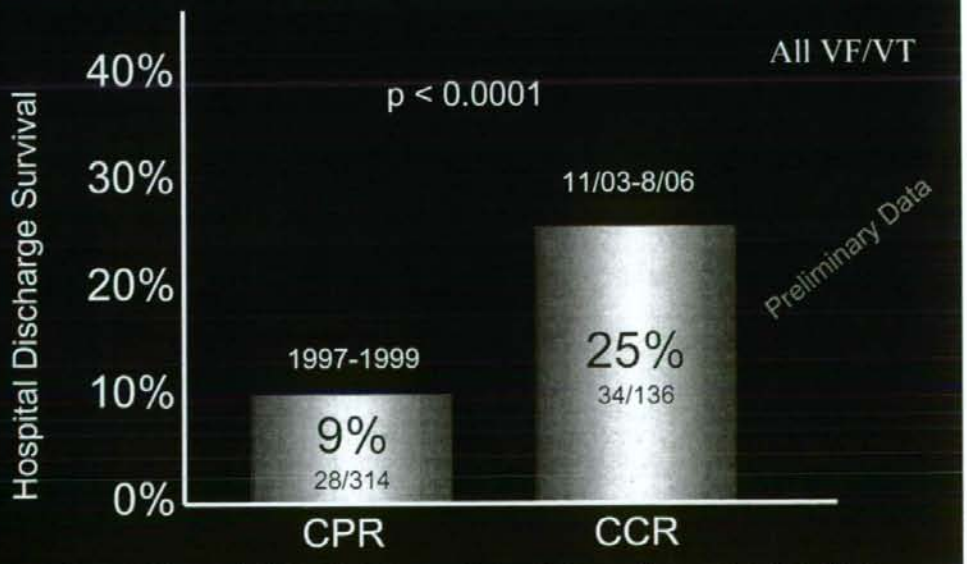
Three Pillars

1. Chest Compression Only for witnessed unexpected collapse in adults
2. New Cardiocerebral Resuscitation ACLS algorithms for dispatchers and EMS personnel
3. Post Re... ...mild

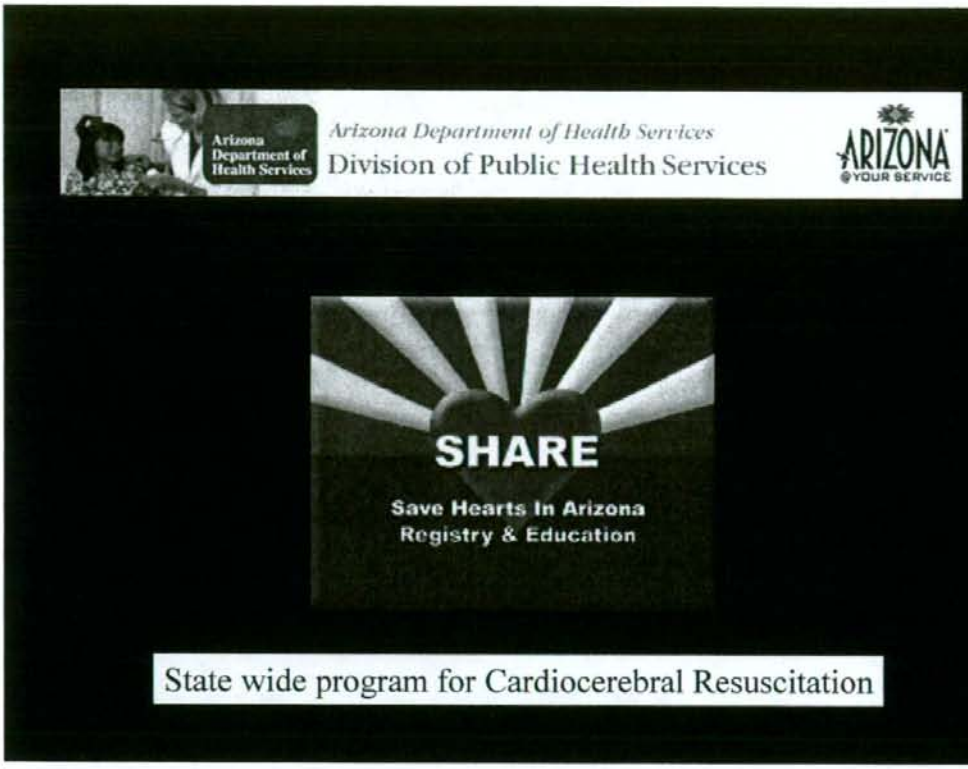
What happened if both 1. and 2. are combined in a community?

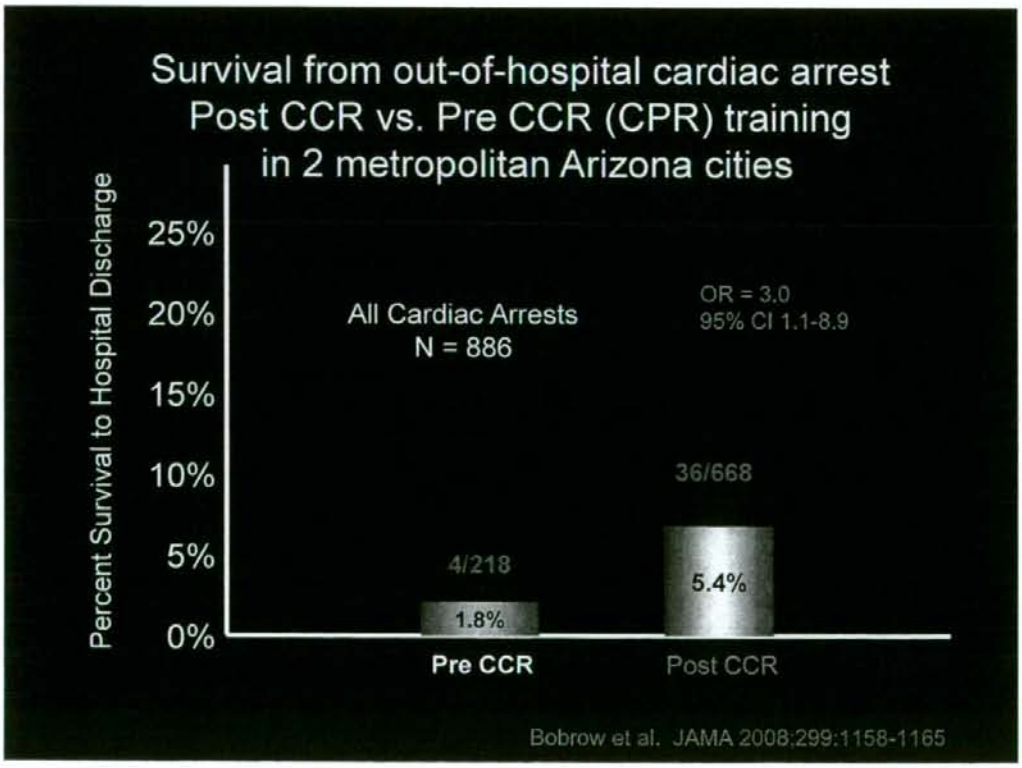
Cardiocerebral Resuscitation

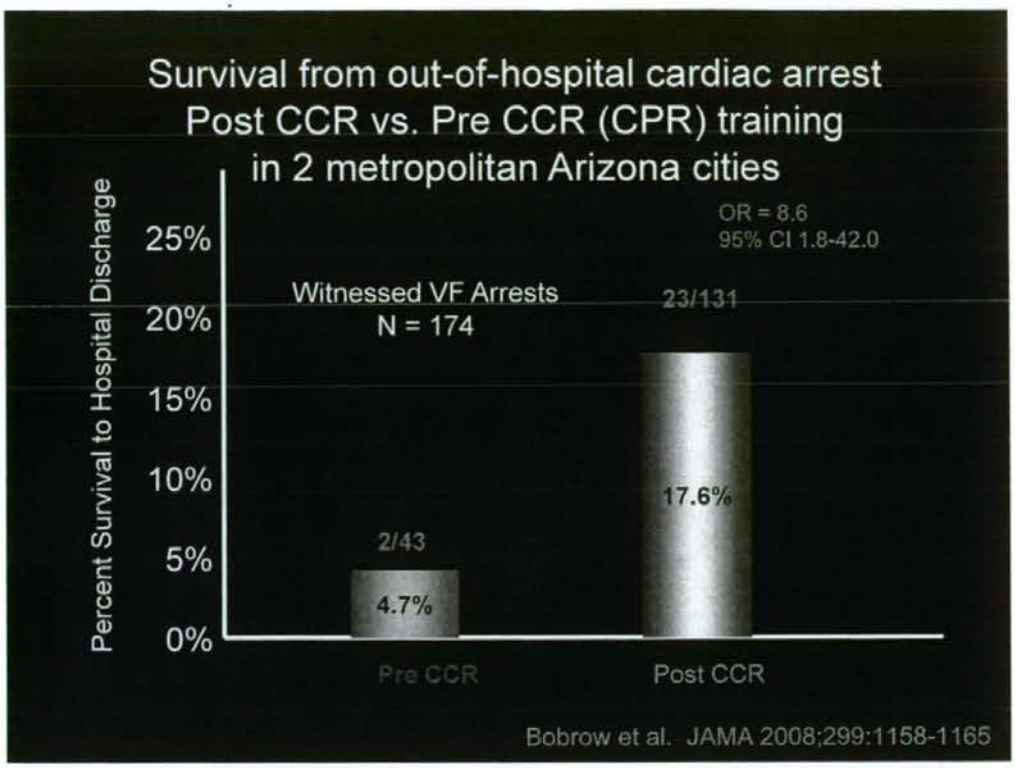
Saved Lives Tucson

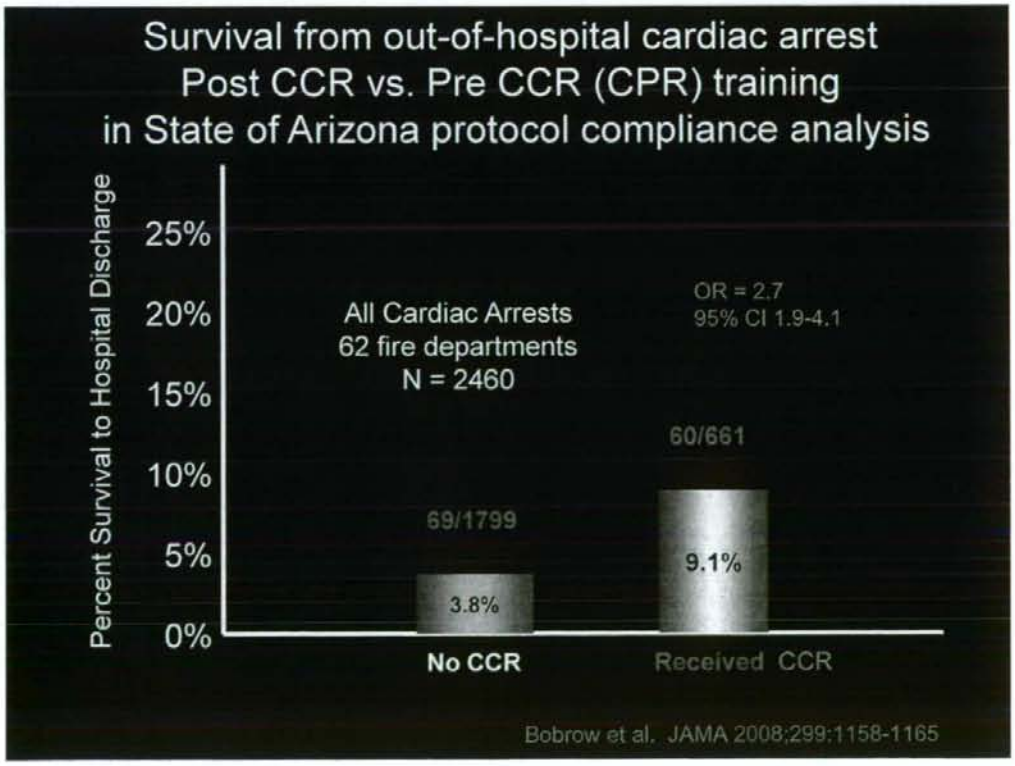


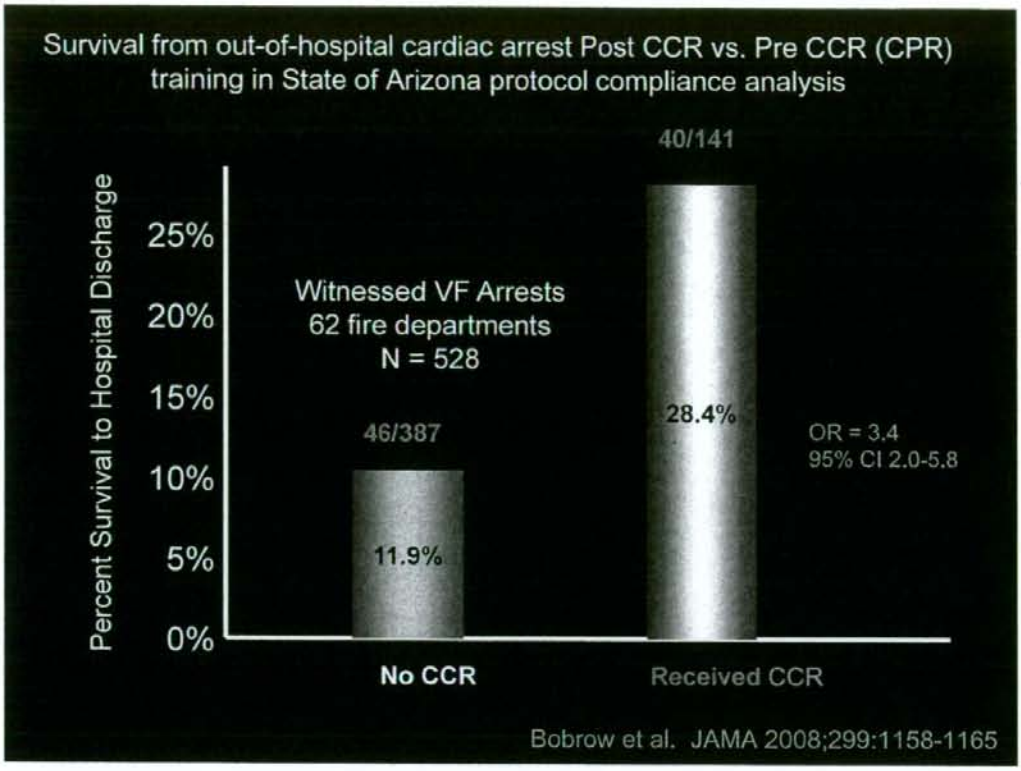
Terry Valenzuela MD AHA Resuscitation Science Symposium Nov 2006


Arizona Department of Health Services
Arizona Department of Health Services
Division of Public Health Services
ARIZONA
YOUR SERVICE
SHARE
Save Hearts In Arizona
Registry & Education
State wide program for Cardiocerebral Resuscitation


Survival from out-of-hospital cardiac arrest
Post CCR vs. Pre CCR (CPR) training
in 2 metropolitan Arizona cities
Percent Survival to Hospital Discharge
25%
20%
15%
10%
5%
0%
All Cardiac Arrests
N = 886
OR = 3.0
95% CI 1.1-8.9
36/668
5.4%
4/218
1.8%
Pre CCR
Post CCR
Bobrow et al. JAMA 2008;299:1158-1165

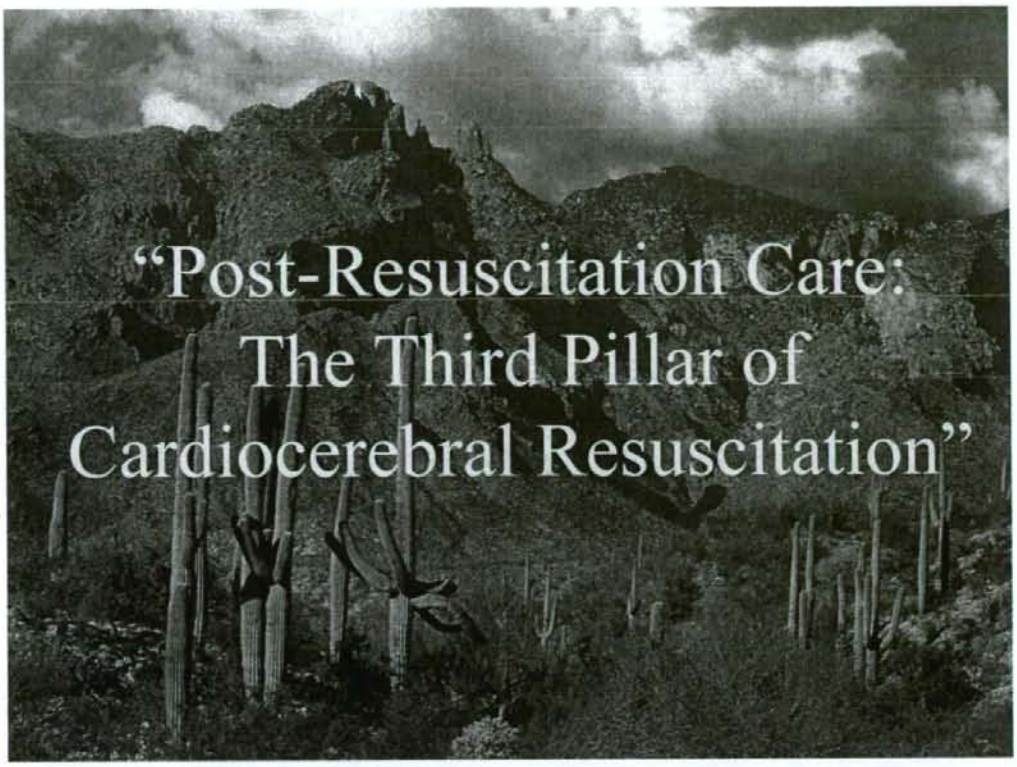

Survival from out-of-hospital cardiac arrest
Post CCR vs. Pre CCR (CPR) training
in 2 metropolitan Arizona cities
Percent Survival to Hospital Discharge
25%
20%
15%
10%
5%
0%
OR = 8.6
95% CI 1.8-42.0
Witnessed VF Arrests
N = 174
23/131
17.6%
2/43
4.7%
Pre CCR
Post CCR
Bobrow et al. JAMA 2008;299:1158-1165


Survival from out-of-hospital cardiac arrest
Post CCR vs. Pre CCR (CPR) training
in State of Arizona protocol compliance analysis
Percent Survival to Hospital Discharge
25%
20%
15%
10%
5%
0%
All Cardiac Arrests
62 fire departments
N = 2460
OR = 2.7
95% CI 1.9-4.1
60/661
9.1%
69/1799
3.8%
No CCR
Received CCR
Bobrow et al. JAMA 2008;299:1158-1165



Cardiocerebral Resuscitation

- Chest Compressions-only for Lay Rescuers:
  - "Doubled" Survival (11% to 19%)--Japan
- New ACLS Algorithm
  - "Tripled" Survival (15% to 48%)—Rural Wisconsin
  - Persistent near "Tripling" of Survival (15% to 40%) at 3 yrs
- Cardiocerebral Resuscitation– 2 Step Approach
  - "Tripled" Survival (9% to 25%)—Tucson, Arizona
  - "Tripled" Survival (5% to 18%)—Phoenix, Arizona



Post Resuscitation Challenge

- Only 25-50% of those initially resuscitated survive to leave the hospital!
- Truism: Can't survive if don't first resuscitate, but likewise - if you don't survive to leave the hospital haven't gained anything from earlier successful resuscitation

Deaths Post Resuscitation

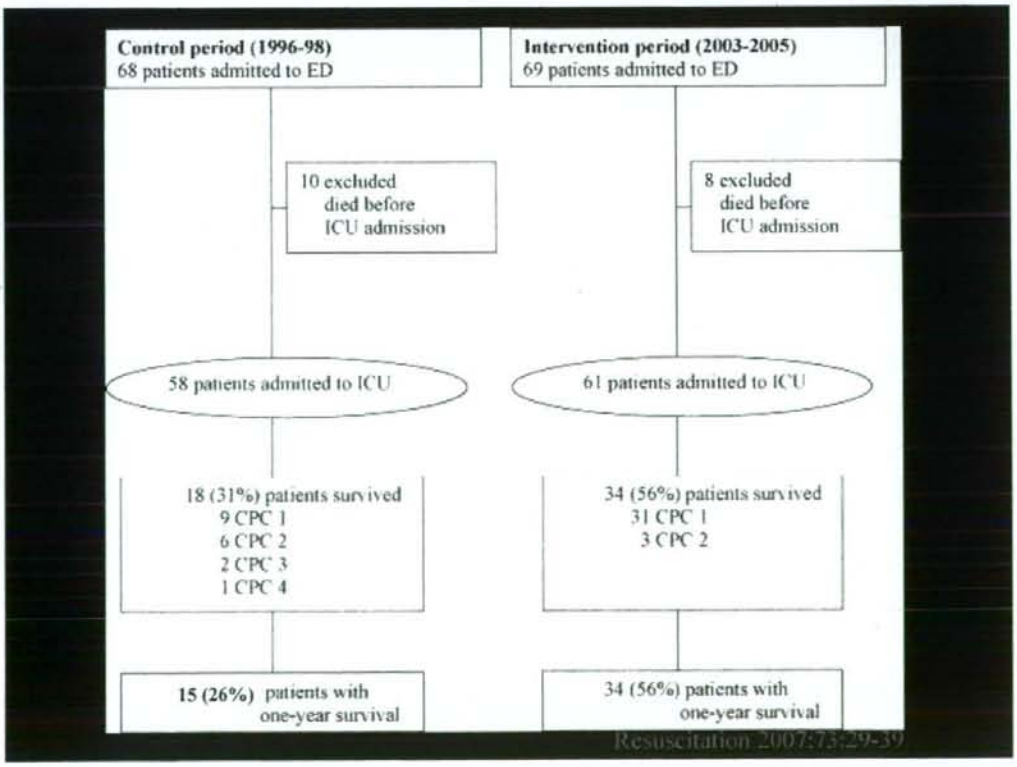
- About 1/3 are from CNS injury
- About 1/3 from Myocardial injury
- And about 1/3 from variety of causes, i.e. infection, multi-organ failure, etc.

Schoenenberger et al. Arch Intern Med 1992;154:2433

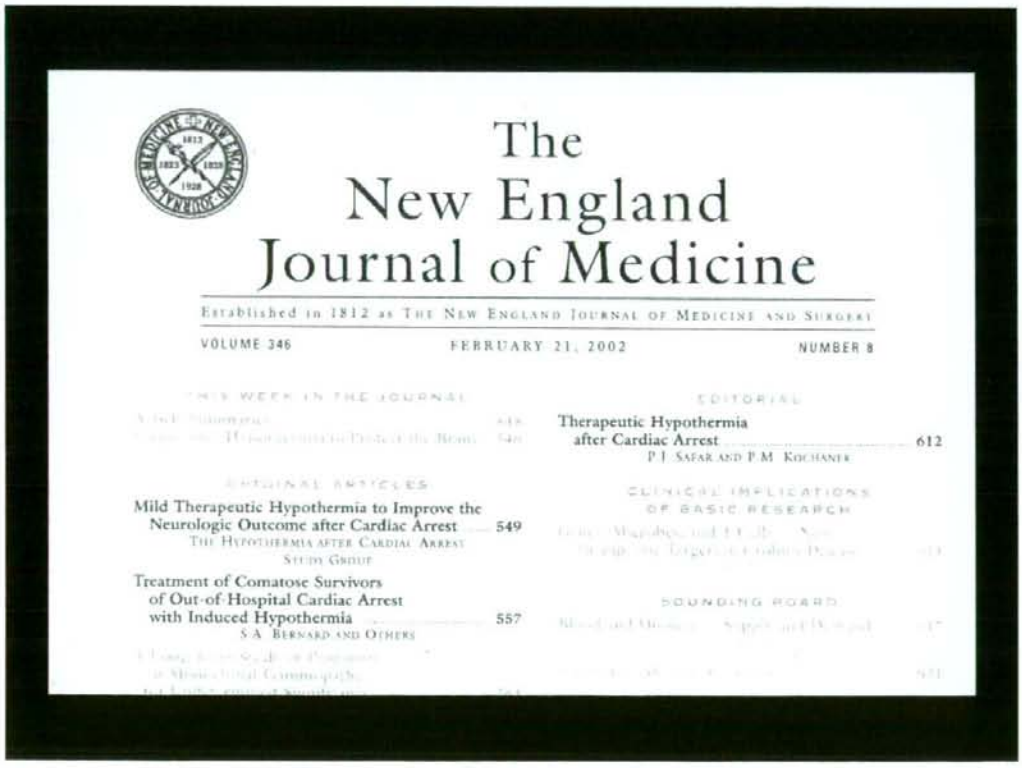
Can Anything Be Done About these Post Resuscitation Deaths?

Norway Experience

- Found their own survival to discharge was only 26% of all those initially resuscitated
- NOT GOOD ENOUGH!
- Formalized Approach to Post Resuscitation Care:
  - Therapeutic Hypothermia
  - PCI when indicated
  - Ventilation Control
  - Glucose Control
  - Hemodynamic Control



Therapeutic Hypothermia Post Resuscitation



The New England Journal of Medicine

Established in 1812 as The New England Journal of Medicine and Surgery

VOLUME 346 FEBRUARY 21, 2002 NUMBER 8

EDITORIAL

Therapeutic Hypothermia after Cardiac Arrest 612
P.J. Safar and P.M. Kochanek

ORIGINAL ARTICLES

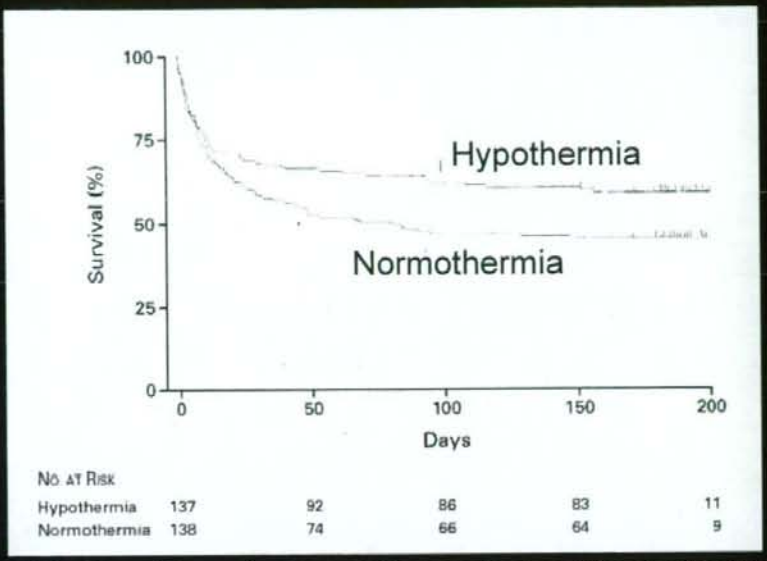
Mild Therapeutic Hypothermia to Improve the Neurologic Outcome after Cardiac Arrest 549
The Hypothermia after Cardial Arrest Study Group

Treatment of Comatose Survivors of Out-of-Hospital Cardiac Arrest with Induced Hypothermia 557
S.A. Bernard and Others

CLINICAL IMPLICATIONS OF BASIC RESEARCH

BOUNDING BOARD

Hypothermia for Coma After Cardiac Arrest



Dr. Fritz Sterz, Vienna, Austria and The Hypothermia After Cardiac Arrest Study Group, *N Engl J Med* 2002; 346:549-556

Sunde et al.

- In the Interventional period (2003-05):
  - 47/61 (77%) had coronary angiography
    - 45/47 (96%) had documented coronary disease
    - 37 of 45 had total occlusions including
      - 16/37 (43%) LAD
      - 11/37 (30%) CX
      - 10/37 (27%) RCA
  - 30/61 (49%) had reperfusion
    - 27/30 had PCI
    - 3/30 had CABG

Resuscitation 2007;73:29-39

Sunde et al.

- Coronary angiography
  - Major indication was ST-elevation on admission ECG or strong suspicion for an MI as underlying etiology of the cardiac arrest

Resuscitation 2007;73:29-39

Sunde et al.

- Significant improvement in survival, with an aggressive and standardized approach to post resuscitation care
- Reperfusion therapy (PCI or CABG) had the most profound effect on outcome (Adjusted OR = 4.47)
  - Patients were transported directly from ED to the PCI Suite when clinically stable!

Resuscitation 2007;73:29-39

Sunde et al.

Doubled survival (26% to 56%)

Neurological status of survivors:

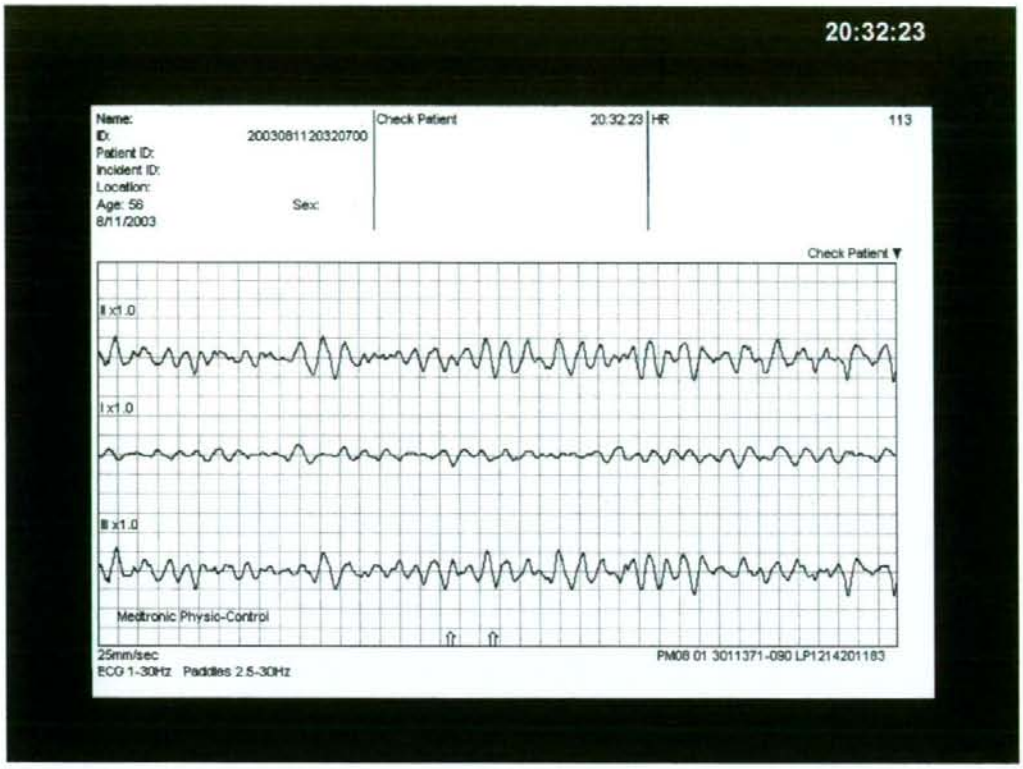
31/34 (91%) were CPC = 1

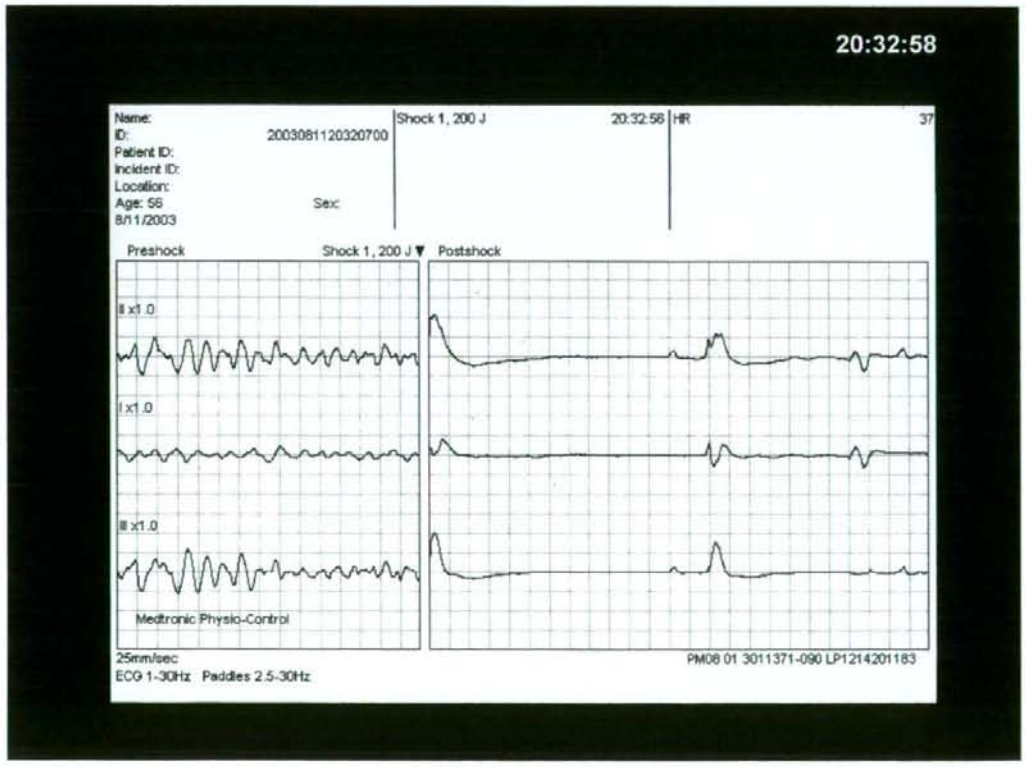
3/34 (9%) were CPC = 2

Resuscitation 2007;73:29-39

Keys to Improving Survival to Hospital Discharge

- Good BLS/ACLS for rapid ROSC
- Therapeutic mild hypothermia for those comatose following resuscitation
- Think "Cardiac"/Look for "Cardiac"
  - 1. Early 12 lead ECG
  - 2. Early cardiac catheterization/PCI


20:32:23
Name:
ID:
2003081120320700
Patient ID:
Incident ID:
Location:
Age: 56
Sex:
8/11/2003
Check Patient
20:32:23
HR
113
Check Patient
II x1.0
I x1.0
III x1.0
Medtronic Physio-Control
25mm/sec
ECG 1-30Hz Paddles 2.5-30Hz
PM08 01 3011371-090 LP1214201183


20:32:58
Name:
ID:
2003081120320700
Patient ID:
Incident ID:
Location:
Age: 56
Sex:
8/11/2003
Shock 1, 200 J
20:32:58
HR
37
Preshock
Shock 1, 200 J
Postshock
II x1.0
I x1.0
III x1.0
Medtronic Physio-Control
25mm/sec
ECG 1-30Hz Paddles 2.5-30Hz
PM08 01 3011371-090 LP1214201183