

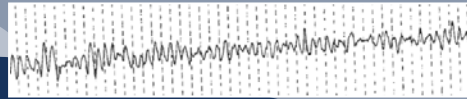
Allina Cardiology Forum 2011

Level 1 Cardiovascular Resuscitation Center

Cardiac Arrest: Just Cool-It

The Minneapolis Heart Institute Experience 2003-2010

Dr. Michael Mooney, FACC, FAHA, FSCAI
Director Interventional Cardiology

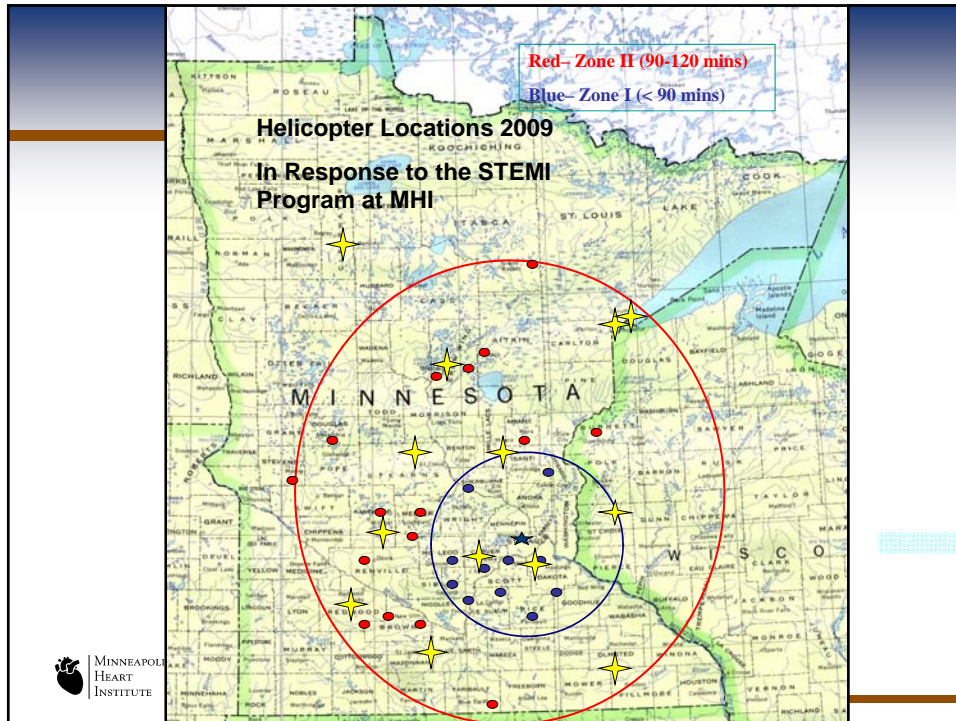


Cardiac Arrest

- **Out-of-hospital cardiac arrest (OOHCA) affects 295,000 people annually in the US**
- **7.9% median survival rate**
- **Anoxic encephalopathy and neurologic deficits are common and disabling - among survivors**
- **Modest gain with CPR advances, many failed clinical trials - BRCT - barbiturates**
- **Enormous public health issue - personal, family & societal burdens**
- **Growing awareness of needed cardio-cerebral protection**



Lloyd-Jones D, Adams R, Carnethon M et al. Heart disease and stroke statistics-2009 update. *Circulation* 2009;119:e21-e181.



Hypothermia Pivotal Studies

The New England
Journal of Medicine

**HACA,
2002**

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INDUCED HYPOTHERMIA AFTER OUT-OF-HOSPITAL CARDIAC ARREST

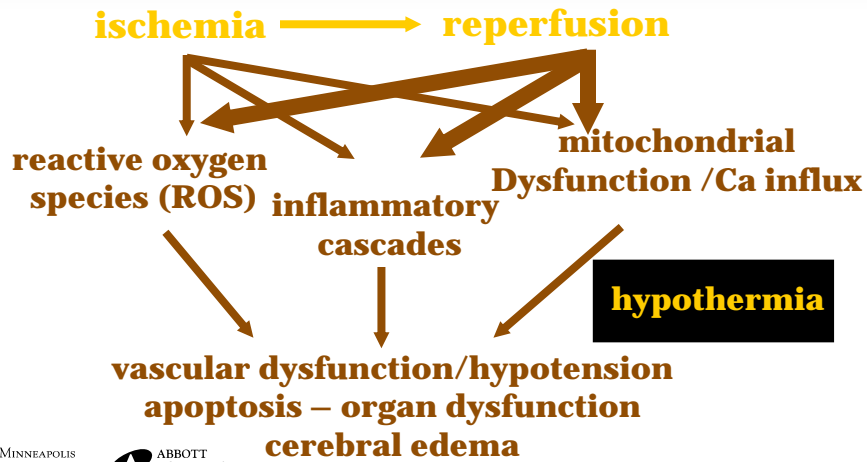
TREATMENT OF COMATOSE SURVIVORS OF OUT-OF-HOSPITAL CARDIAC ARREST WITH INDUCED HYPOTHERMIA

**Bernard,
2002**

STEPHEN A. BERNARD, M.B., B.S., TIMOTHY W. GRAY, M.B., B.S., MICHAEL D. BUIST, M.B., B.S.,
 BRUCE M. JONES, M.B., B.S., WILLIAM SILVESTER, M.B., B.S., GEOFF GUTTERIDGE, M.B., B.S., AND KAREN SMITH, B.Sc.

Hypothermia: mechanisms



*Dr. Abhinav, University of Pennsylvania

Hypothermia Trials: Outcomes

	Hypothermia (%)	Normothermia (%)	RR (95% CI)	P value
<i>Alive at hospital discharge with favourable neurological recovery</i>				
HACA	72/136 (53%)	50/137 (36%)	1.51 (1.14-1.89)	0.006
Bernard	21/43 (49%)	9/34 (26%)	2.65 (1.0-6.88)	0.046
<i>Alive at 6 months with favourable neurological recovery</i>				
HACA	71/136 (55%)	50/137 (39%)	1.44 (1.11-1.76)	0.009



Allina Hospitals & Clinics

ILCOR Advisory Statement

ILCOR Advisory Statement

Therapeutic Hypothermia After Cardiac Arrest An Advisory Statement by the Advanced Life Support Task Force of the International Liaison Committee on Resuscitation

Writing Group

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- Unconscious adult patients with ROSC after out-of-hospital VF cardiac arrest should be cooled to 32°C - 34°C for 12 - 24 hours
- Possible benefit for other rhythms or in-hospital cardiac arrest.



Circulation



JOURNAL OF THE AMERICAN HEART ASSOCIATION

Circulation

CARDIOLOGY PATIENT PAGE

citeTrack

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(Circulation. 2005;112:III-1-III-4)
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Section 1

Hypothermia guidelines

- **New Guidelines – more aggressive, 30' CPR**
- **Full recoil, 30:2**
- **Less defib use**
- **Hypothermia Level II A recommendation**

Consensus on Science

The International Liaison Committee on Resuscitation (ILCOR) was formed in 1993; its mission is to identify and review international scientific knowledge relevant to cardiopulmonary resuscitation (CPR) and emergency cardiovascular care (ECC) and to offer consensus on treatment recommendations.¹ Emergency cardiovascular care includes all responses necessary to treat sudden life-threatening events affecting the cardiovascular and respiratory systems but with a particular focus on sudden cardiac arrest.

- Top
- Toward International Consensus...
- Evidence Evaluation Process
- Management of Conflicts
- Applying Science to Improve...
- Future Directions
- References



Theory meets Practice? – not yet

- **Less than 7% of OOHCA pts get TH - <15,000 of 295,000**
- **Fewer than 300 hospitals have programs or equipment of 6,000 eligible hospitals**
- **Awareness and funding limited – FDA approval and perceived complexity are barriers**
- **Yet innovation and iteration flourish and successful programs lead the way**
- **Research continues – despite challenges b/o enormous persistent unmet need**



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JOURNAL OF THE AMERICAN HEART ASSOCIATION

Therapeutic Hypothermia After Out-of-Hospital Cardiac Arrest : Evaluation of a Regional System to Increase Access to Cooling

Michael R. Mooney, Barbara T. Unger, Lori L. Boland, M. Nicholas Burke, Kalie Y. Kebed, Kevin J. Graham, Timothy D. Henry, William T. Katsiyannis, Paul A. Satterlee, Sue Sendelbach, James S. Hodges and William M. Parham

Circulation 2011, 124:206-214

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Arctic Sun Energy Transfer Pad™ Placement





The Main Concepts a Cardiac Emergency Program

ACCESS

TRANSPORTATION

STREAMLINE CARE

DATA COLLECTION

FEEDBACK

RESEARCH

Prehospital

Outstate Hospital

EMS Transport

Tertiary Center



Neuro-cognitive recovery team



Outcomes

Abbott Northwestern Hospital 72/140 51.4%

Alive at hospital discharge with favourable neurological recovery

- Survival by diagnosis

- STEMI: 49/76 64.5%

- Other: 29/64 45.3%

- Survival by initial rhythm

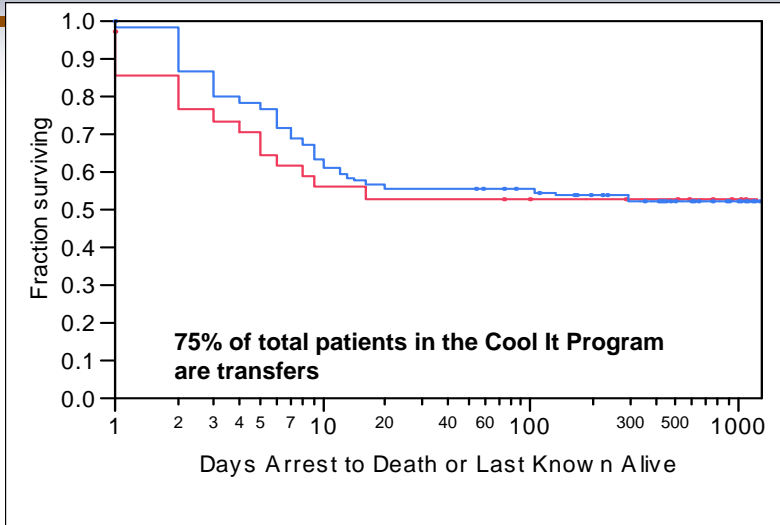
- VF/VT: 68/102 66.7%

- PEA/Asystole: 7/32 21.9%



Transfer Outcomes

Transfer = Blue line, ANW = Red line



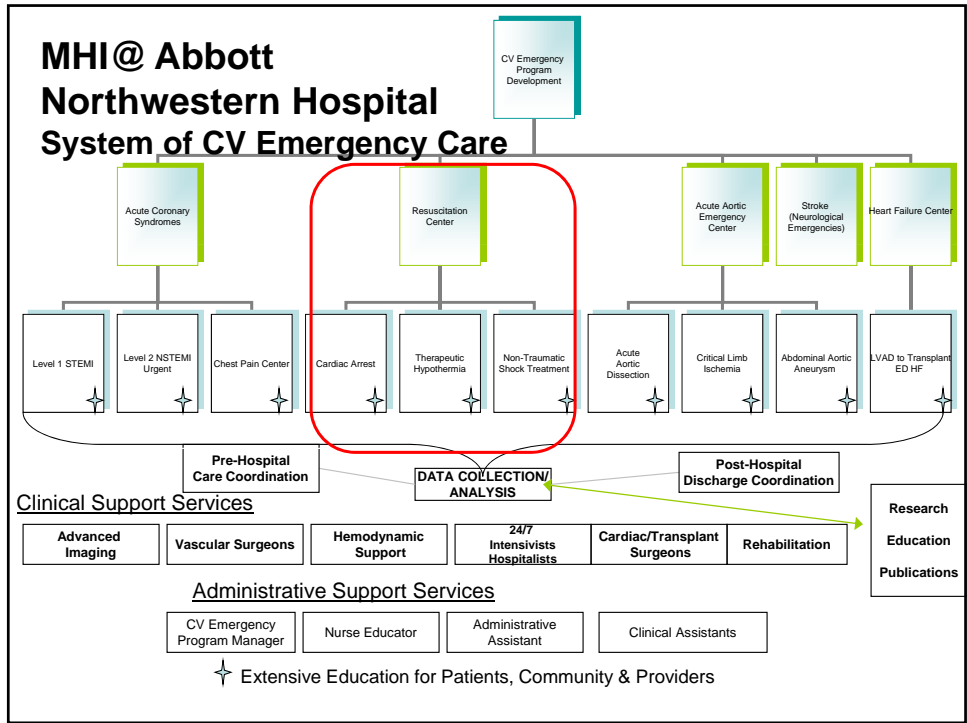
Early Cooling is Critical

Source	Chi Square	DF	P-value
Time ROSC to First Cooling min	5.0785	1	0.0242

Estimate	Lower CL	Upper CL	P-value
1.25	1.06	1.44	0.0081

If the time to first cooling increases by an hour the hazard of death increases 25%.





Cardiovascular Emergency Centers

1. **Advanced care for the complex cardiac emergency patient**
2. **Extensive training with protocolized care**
3. **Collaboration on presenting patient**
4. **Interhospital transfer systems**
5. **Interdisciplinary teams and approach**
6. **Data collection/evaluation/improvements**
7. **Care across continuum**
8. **Communication methods (FEEDBACK)**
9. **Research**
10. **A uniform standard of care is possible uniting a common outcome from rural to metro communities for our most critical CV emergencies**



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