

Do Response Times Really Matter?



Matt Zavadsky, MS-HSA, EMT

Director of Public Affairs

MedStar Mobile Healthcare, Ft. Worth, TX

Adjunct Faculty

University of Central Florida

College of Health and Public Affairs

What we're gonna do

- Figure out how we got “here”
- Review the science of clinical impact of response times
- Focus on improving response times that matter
- Figure out how to ‘un-get’ here!

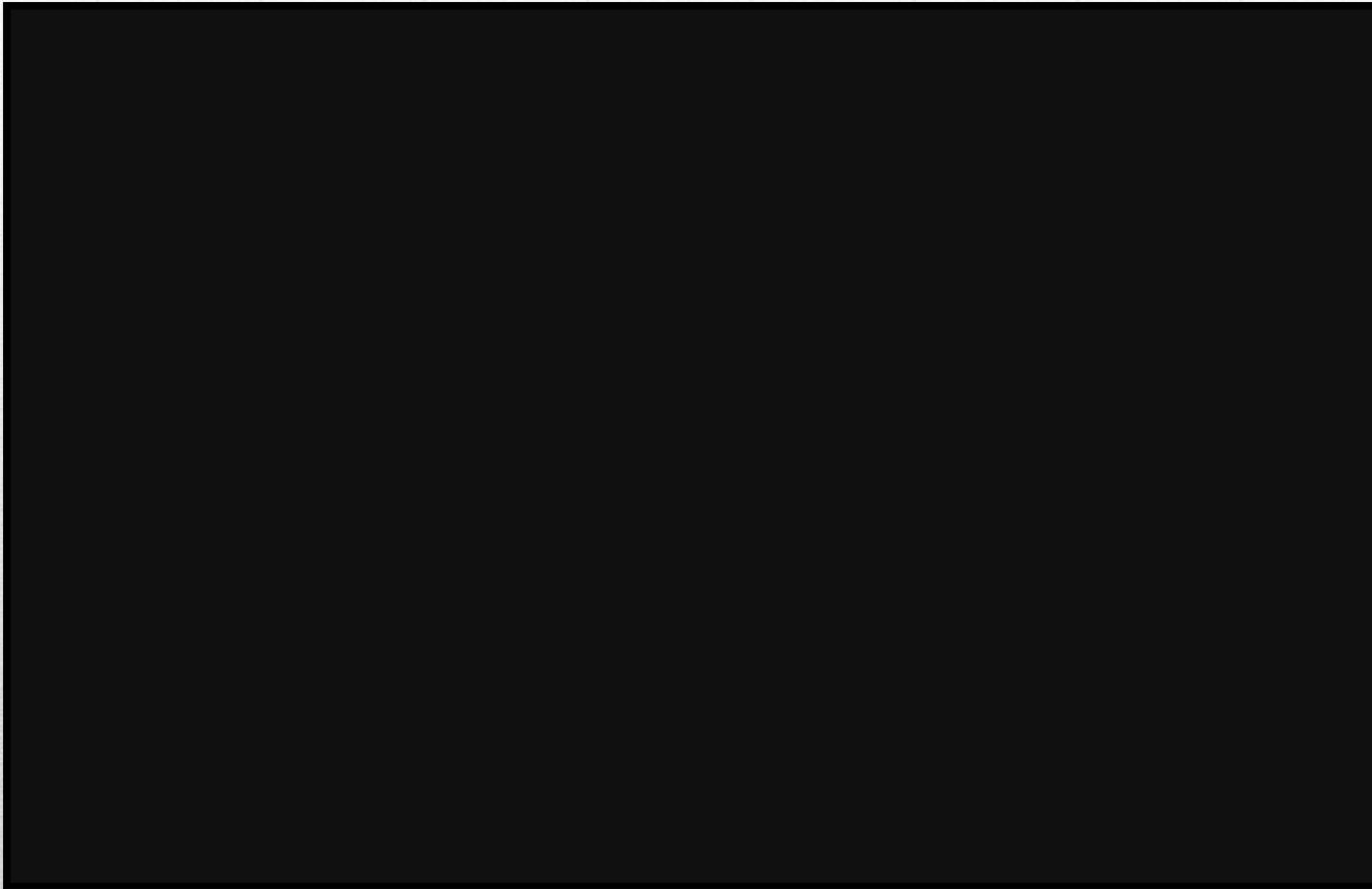
Disclaimer...

- Response time discussions volatile
- Check your weapons
- Set your Phasers on '*stun*'
- Local community discussion!!
- Help them 'look forward' and 'see beyond'





A Word About Texas...



Where did this “Need for Speed” come from...



Cardiac Resuscitation in the Community

Importance of Rapid Provision and Implications for Program Planning

- [Mickey S. Eisenberg](#), MD, PhD;
- [Lawrence Bergner](#), MD, MPH;
- [Alfred Hallstrom](#), PhD

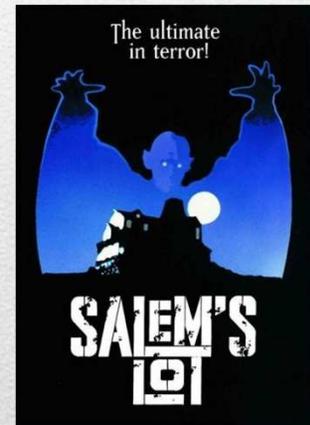
“If CPR was initiated within four minutes and if **definitive care** was provided within eight minutes, 43% of patients survived. If either time was exceeded, the chances of survival fell dramatically.

The time to initiation of CPR and **definitive care** are factors directly influenced by emergency medical service program decisions.

A realistic option to improve time to initiation of CPR is widespread citizen CPR training. A possible option to improve the time to **definitive care** is the training of emergency medical technicians in **defibrillation**.”



1979!!



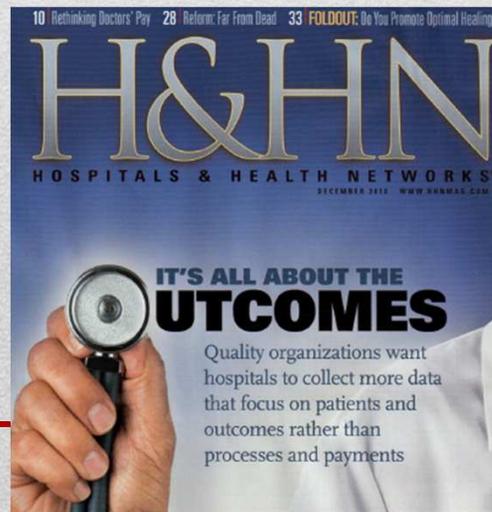
What Matters?

- EMS has a history of “feel good” innovations
 - With little to no scientific basis...
- Good thing we can change!
- MAST pants
- Water bumpers



Measuring *What Matters*

- Patient outcomes...
 - EMS is healthcare
 - Need to look at patient outcomes
- Risk vs. Benefit
 - Is faster really “better”?
 - 74% of crashes occur while driving “HOT”



Consequences of Speed...



Consequences of Speed...



CAEMS Study

Location	Fractile, Average, Both	HOT	COLD
Davenport, IA	Both	7:59	
Fort Wayne, IN	Fractile	8:30	
Fort Worth, TX	Both	9:00	15:00
Kansas City, MO	Fractile	9:00	20:00
Little Rock, AR	Fractile	8:59	12:59
Mecklenburg County, NC	Fractile	10:59	20:00
Nova Scotia, Canada	Fractile	8:59	14:59
Pinellas County, FL	Fractile	10:00	20:00
Reno, NV	Fractile	8:29	29:59
Richmond, VA	Both	8:59	59:59
Tulsa, OK	Fractile	8:59	12:59
Oklahoma City, OK	Fractile	8:59	12:59

The Current Science...

- Paramedic Response Time: Does it affect patient survival
 - 9,559 'unselected' patients
 - Urban setting, *Denver*

CONCLUSIONS:

A paramedic response time within 8 minutes was not associated with improved survival to hospital discharge after controlling for several important confounders, including level of illness severity. However, a survival benefit was identified when the response time was within 4 minutes for patients with intermediate or high risk of mortality. Adherence to the 8-minute response time guideline in most patients who access out-of-hospital emergency services is not supported by these results.



The Current Science...

- Lack of association between pre-hospital response times and patient outcomes
 - 373 study patients >10:59
 - Compared to 373 < 10:59 patients
 - Urban community – 750,000 - *Charlotte*

CONCLUSIONS:

Compared with patients who wait 10:59 minutes or less for ALS response, ***Priority 1 patients who wait longer than 10:59 minutes could experience between a 6% increase and a 4% decrease in mortality***, and do not have an increase in critical procedures performed in the field. ***Our data are most consistent with the inference that neither the mortality nor the frequency of critical procedural interventions varies substantially based on this pre-specified ALS RT.***



The Current Science...

- Optimal defibrillation response intervals for maximum out-of-hospital cardiac arrest survival rates
 - Part of the OPALS Study
 - 9,273 treated cardiac arrest patients
 - 1991 - 1997



Study objective: Many centers optimize their (EMS) systems to achieve a target defibrillation response interval of “call received by dispatch” to “arrival at scene by responder with **defibrillator**” in 8 minutes or less for at least 90% of cardiac arrest cases. The objective of this study was to analyze survival as a function of time to test the evidence for this standard.

Results: Overall survival = 4.2% (392 out of 9,273 cases worked). There was a steep decrease in the first 5 minutes of the survival curve, beyond which the slope gradually leveled off.

- 9 minutes (4.6%; –18 lives)
- 8 minutes (5.9%; 0 lives)
- 7 minutes (7.5%; 23 lives)
- 6 minutes (9.5%; 51 lives)
- 5 minutes (12.0%; 86 lives)



Conclusion: The 8-minute target established in many communities is not supported by our data as the optimal EMS **defibrillation** response interval for cardiac arrest. EMS system leaders should consider the effect of decreasing the 90th percentile defibrillation response interval to less than 8 minutes.

The Current Science...

- Response time effectiveness: comparison of response time and survival in an urban emergency medical services system
 - Carolinas Medical System – 2002
 - Urban county (620,000)
 - 10:59 RT standard for P1 calls
 - 5,424 transports studied
 - 71 did not survive
 - Of those:



Results:

No significant difference in median RTs between survivors (6.4 min) and non-survivors (6.8 min) was noted ($p = 0.10$). “However, mortality risk was 1.58% for patients whose RT exceeded 5 minutes, and 0.51% for those whose RT was under 5 minutes ($p = 0.002$). **The mortality risk curve was generally flat over RT intervals exceeding 5 minutes.**

Conclusion:

In this observational study, emergency calls where RTs were less than 5 minutes were associated with improved survival when compared with calls where RTs exceeded 5 minutes. While variables other than time may be associated with this improved survival, **there is little evidence in these data to suggest that changing this system's response time specifications to times less than current, but greater than 5 minutes, would have any beneficial effect on survival.**



The Current Science...

- **Eight minutes or less: does the ambulance response time guideline impact trauma patient outcome**
 - Evaluate effect of exceeding the 8 min RT guideline on patient survival for victims of traumatic injury treated by an urban paramedic ambulance EMS system and transported to a single Level I trauma center – Denver
 - 3,490 patients evaluated
 - Patients were grouped according to ambulance RT: **< or = 8 min (n = 2450) or > 8 min (n = 1040)**

Results:

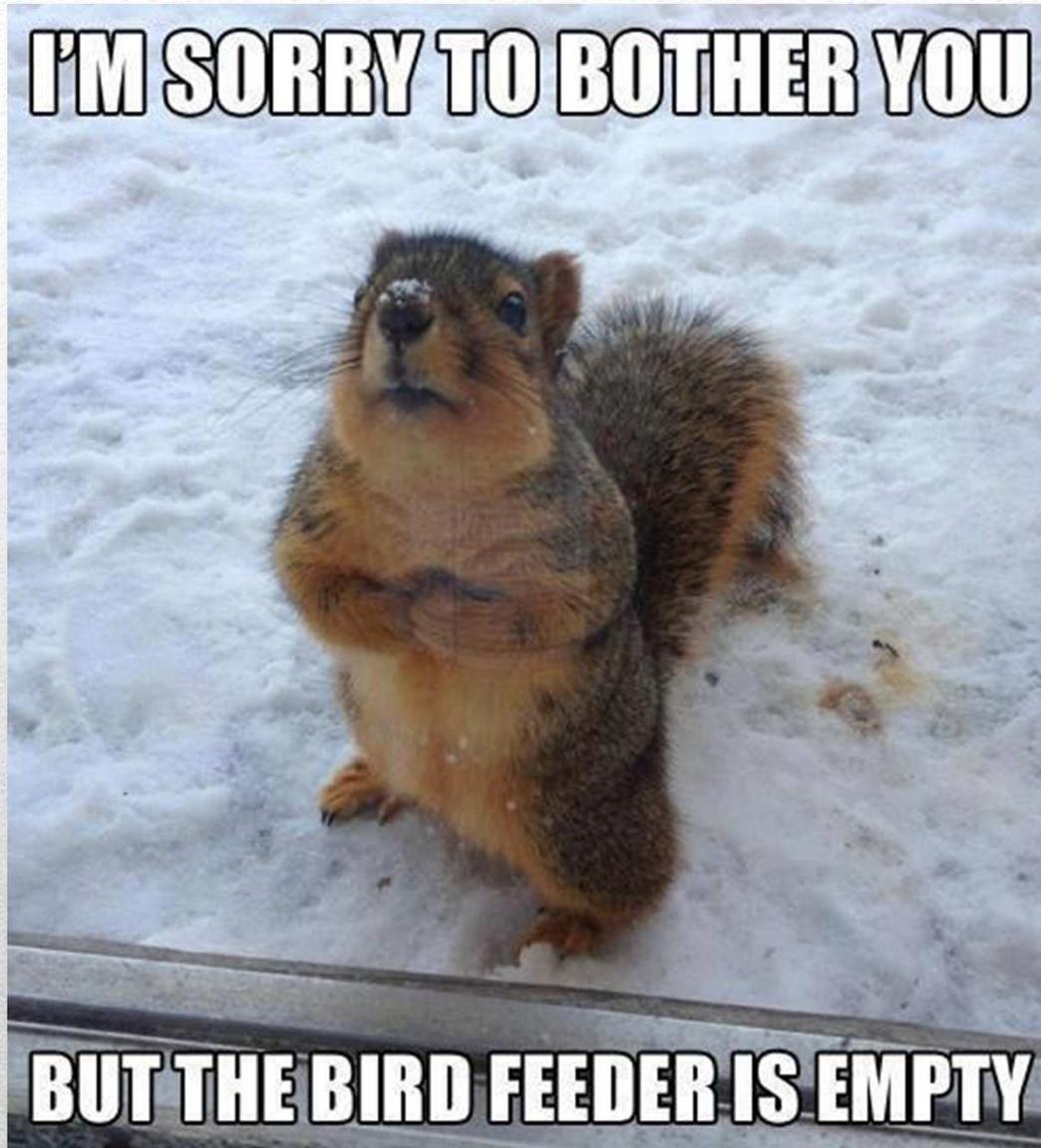
After controlling for other significant predictors, there was no difference in survival after traumatic injury when the 8 min ambulance RT criteria was exceeded (mortality odds ratio 0.81, 95% CI 0.43-1.52). There was also no significant difference in survival when patients were stratified by injury severity score group.

Conclusion:

Exceeding the ambulance industry response time criterion of 8 min does not affect patient survival after traumatic injury.



I'M SORRY TO BOTHER YOU

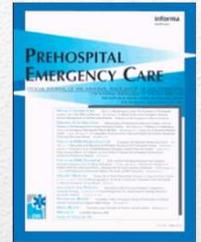


BUT THE BIRD FEEDER IS EMPTY

What do the Eagles Think?

EVIDENCE-BASED PERFORMANCE MEASURES FOR EMERGENCY MEDICAL SERVICES SYSTEMS: A MODEL FOR EXPANDED EMS BENCHMARKING

*A STATEMENT DEVELOPED BY THE 2007 CONSORTIUM
U.S. METROPOLITAN MUNICIPALITIES' EMS MEDICAL DIRECTORS*



“In many jurisdictions, response-time intervals for advanced life support units and resuscitation rates for victims of cardiac arrest are the primary measures of EMS system performance.”

“The association of the former with patient outcomes is not supported explicitly by the medical literature, while the latter focuses on a very small proportion of the EMS patient population and thus does not represent a sufficiently broad selection of patients.”





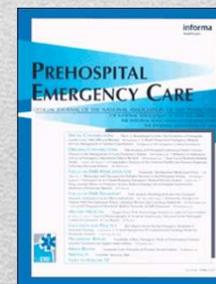
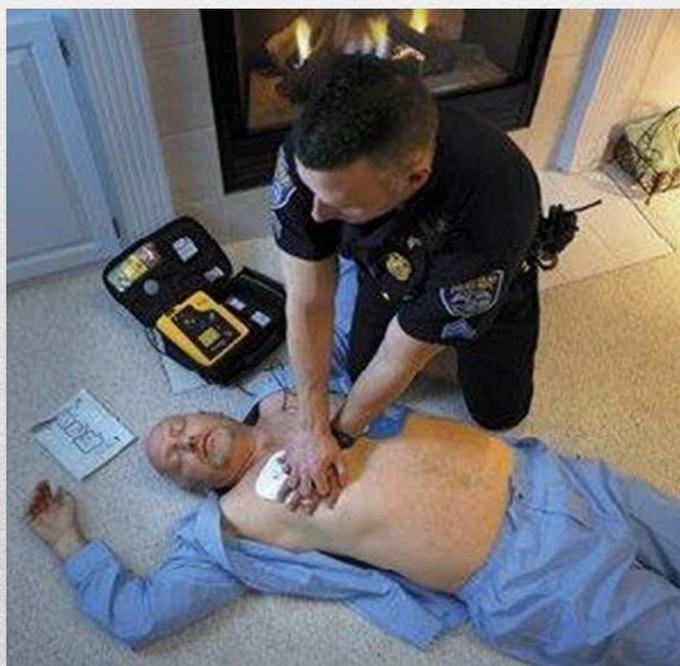
“Over-emphasis upon response-time interval metrics may lead to unintended, but harmful, consequences (e.g., emergency vehicle crashes) and an undeserved confidence in quality and performance...”

“...much of the clinical research utilized to establish an acceptable “advanced life support (ALS) response time interval” was conducted in a period when only paramedics could operate a defibrillator, and the compression component of basic cardiopulmonary resuscitation (CPR) received much less emphasis.”

“Now that basic life support (BLS) providers and lay rescuers can provide rapid automated defibrillation as well as basic CPR, the relative importance of the ALS response-time interval has been challenged, both for cardiac arrest as well as for other clinical conditions.”



“Many communities are still not measuring the intervals for the most important predictive elements for optimal outcome: time elapsed until initiation of basic chest compressions and time elapsed until defibrillation attempts.”



So What!?

- What is the 'cost' of insanity
 - Keep doing the same thing and expecting a different outcome
 - “It’s what the community wants...”

Really??



Well, maybe some communities over-focus on speed?



Time / Quality Tradeoff

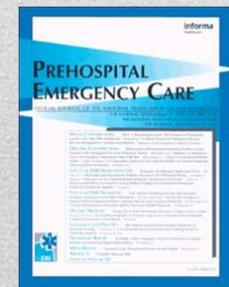
- How do we reduce ALS response times?
 - Add more paramedics!
 - Not a problem, right?



Back to the Eagles...

“As more paramedics are added to a particular system, however, the frequency with which each individual paramedic has the opportunity to assess and manage critically ill or injured patients in the primary or “lead” paramedic role may decrease.

Pragmatically, considering that ALS cases constitute a small minority of all EMS 9-1-1 responses, adding more paramedics into the system may actually reduce an individual paramedic’s exposure to critical decision-making and clinical skill competencies.”



Back to the Science...

- **The effect of paramedic experience on survival from cardiac arrest**
 - Examine the relationship between the years of experience of paramedics and survival from out-of-hospital cardiac arrest.
 - Seattle – 2009
 - All witnessed, out-of-hospital VF cardiac arrests (n = 699) that occurred between January 1, 2002, and December 31, 2006.



RESULTS:

“We found that every additional year of experience of the medic in charge of implementing procedures such as intravenous line insertions, intubations, and provision of medications was associated with a 2% increase in the likelihood of survival of the patient (95% CI: 1.00-1.04). The number of years of experience of the paramedic who did not perform procedures but instead was in charge of treatment decisions was not significantly associated with survival (odds ratio [OR] 1.01, 95% CI: 0.99-1.03). When we combined both paramedics' years of experience, we saw a 1% increase in the odds of survival for every additional year of experience (95% CI: 1.00-1.03).”

CONCLUSIONS:

This study suggests that the amount of experience of the paramedic who performed procedures on cardiac arrest patients was associated with increased rates of survival. However, we did not find an association between survival from VF and the number of years of experience of the paramedic who made treatment decisions.



Does the number of paramedics affect clinical benchmark thresholds?

METHODS:

This was a retrospective review of annual experience profiles for paramedics working during 2001-2005 using the MCEMS patient care record (PCR) database.

The number of patient contacts, role as team leader/report writer, adult and pediatric endotracheal intubations, adult and pediatric intravenous (IV) access initiations, medication administration, and 12-lead electrocardiogram (ECG) acquisitions were analyzed. t-tests and descriptive statistics were performed for comparison with the 1997 study.



Results:

Over the five-year study period, 1,215 paramedic profiles gleaned from 107,524 PCRs documented a total of 297,900 patient contacts.

The 1997 analysis (1987-1996 data) included 1,450 paramedic profiles representing 467,559 patient contacts generated from 172,131 filed PCRs.

All comparable experiences decreased significantly between the 1997 analysis and the current study, except medication administration, which increased 25%.

Conclusion:

These data show a decreased opportunity and a wide variability in the frequency of successfully completed paramedic technical skills and experiences in this EMS system. Limited exposure to critically ill adult and pediatric patients reaffirms that high-risk skills are performed infrequently. A multifaceted approach should be considered for maintaining provider competency.



Emergency Medical Services Advance Life Support Response Times: Lots of Heat, Little Light

“Looking beyond cardiac arrest, few clinical conditions can be identified for which an ALS response standard seems warranted.

The Emergency Medical Services Outcomes Project (EMSOP)... identified seven clinical conditions that account for 65% of all adult EMS transports and seven that account for 85% of all pediatric transports.

Of these, only cardiac arrest, the 2nd least frequent, appears to require rapid EMS response.”

Swor and Cone Commentary

[Acad Emerg Med.](#) 2002 Apr;9(4):320-1



“A wealth of literature has developed identifying the value of first response and early defibrillation on cardiac arrest survival, though it is clear that this value varies from system to system.

It may even be that an effective first-responder system can completely eliminate the need for ALS response time standards.

Future efforts must focus on the incremental effect of ALS on survival after cardiac arrest and other time-sensitive clinical entities.

Communities need such data to create optimal response interval standards, decrease system costs, minimize lights-and siren driving, and evolve cost-effective EMS systems.”



The MedStar Experience

- 48 hours of “COLD” responses in February 2011
 - Cohort of comparable patients from the week before
 - Chest Pain
 - Stroke
 - Trauma Alerts

Chest Pain

Data Point	N=16 HOT Response	N=11 COLD Response
Avg. 1 st Response Time	04:00	05:45
Avg. MedStar Resp. Time	07:30	14:38
Call to Destination Time	39:34	40:11
ALOS	1.7 days	1.6 days
Admit %	30.0%	18.8%
Symptom Onset to 9-1-1 Access (Median)	51.5 mins	184.5 mins

Very Preliminary Results awaiting peer review...

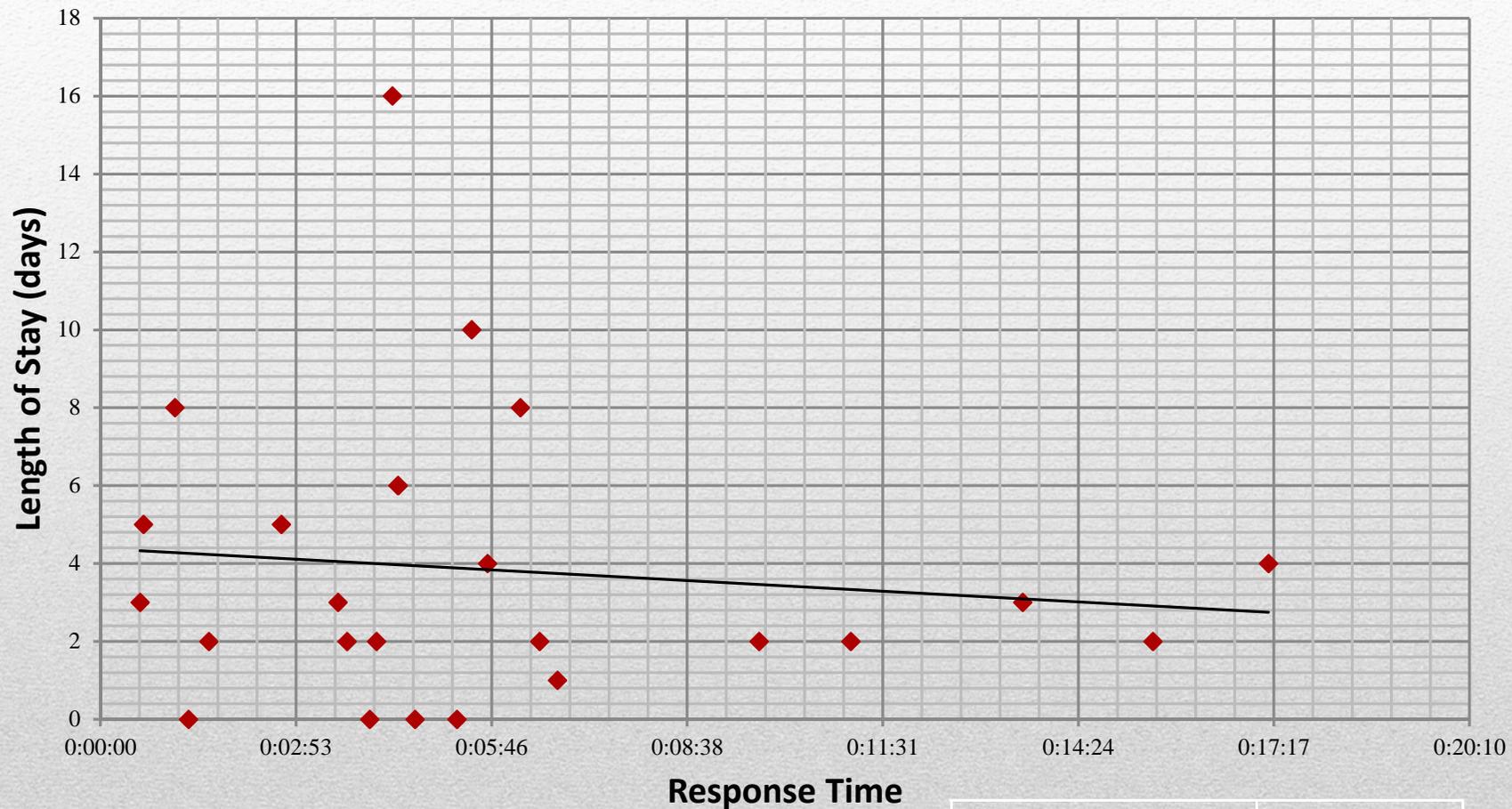


ASM Analysis (2012)

Response	LOS	D/C Date	Receiving Facility	Vital Status	ECG Changes
0:00:35	3	7/17/2012	John Peter Smith Hosp	Alive	STEMI
0:00:38	5	7/9/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:01:06	8	6/23/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:01:18	0	5/3/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:01:36	2	8/2/2012	John Peter Smith Hosp	Alive	STEMI
0:02:40	5	7/15/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:03:30	3	7/25/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:03:38	2	6/24/2012	John Peter Smith Hosp	Alive	STEMI
0:03:58	0	6/2/2012	John Peter Smith Hosp	Deceased	STEMI
0:04:04	2	6/11/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:04:18	16	8/1/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:04:23	6	6/29/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:04:23	6	7/12/2012	Harris Methodist - Fort Worth	Alive	STEMI ; Other anterior AMI, st elevation V1-V5
0:04:38	0	7/25/2012	Harris Methodist - Fort Worth	Deceased	STEMI
0:05:15	0	5/22/2012	Harris Methodist - Fort Worth	Deceased	STEMI
0:05:28	10	7/24/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:05:42	4	5/22/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:06:11	8	7/2/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:06:28	2	5/13/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:06:44	1	6/1/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:09:42	2	8/2/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:11:03	2	7/5/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:13:35	3	7/14/2012	Harris Methodist - Fort Worth	Alive	STEMI
0:15:30	2	6/6/2012	John Peter Smith Hosp	Alive	STEMI
0:17:12	4	7/15/2012	Harris Methodist - Fort Worth	Alive	STEMI



ASM Analysis (2012)



Priority Response January 27-28 2011 (No Ice)

Run Number	Response Times	Chief Complaint	Age	Outcome
110127022	6:02 mins	Cardiac Arrest	76 Years	Field Term
110127132	9:08 mins	Cardiac Arrest	59 Years	DOS/No Attempt
110127097	7:08 mins	Cardiac Arrest	63 Years	DOS/No Attempt
110127274	6:27 mins	Cardiac Arrest	78 Years	Pronounced in ER
110127293	5:22 mins	Cardiac Arrest	73 Years	Pronounced in ER
110127348	6:35 mins	Cardiac Arrest	50 Years	DOS/No Attempt
110128059	6:26 mins	Cardiac Arrest	50 Years	DOS/No Attempt
110128220	4:08 mins	Cardiac Arrest	83 Years	Field Term
110128238	8:00 Mins	Cardiac Arrest	58 Years	DOS/No Attempt

AVG resp. time	6:48 Mins
----------------	-----------

Suspended Priority Response February 3-4 2011 (Ice)

Run Number	Response Times	Chief Complaint	Age	Outcome
110203017	10:15 mins	Cardiac Arrest	76 Years	Field Term
110203034	6:03 mins	Cardiac Arrest	51 Years	DOS/No Attempt
110203402	8:23 mins	Cardiac Arrest	3 Mos	Pronounced in ER
110203379	8:03 mins	Cardiac Arrest	46 Years	Pronounced in ER
110203382	10:30 mins	Cardiac Arrest	92 Years	DOS/No Attempt
110204092	7:13 mins	Cardiac Arrest	83 Years	DOS/No Attempt
110204195	17:23 mins	Cardiac Arrest	66 Years	Pronounced in ER
110204407	3:23 mins	Cardiac Arrest	83 Years	Field Term

AVG resp time	8:16 Mins
---------------	-----------

Very Preliminary Results awaiting peer review...

What does this all Mean?

- For improved clinical outcomes...
 - Very few EMS calls require immediate response
 - That time critical response is CPR/AED
 - Measure call to CPR/AED times as clinical benchmark
 - Invest \$ in THAT process
 - Use \$ saved in a longer ALS response time

What does this all Mean?

- In some cases, the best response time is ***BEFORE*** the call
 - Invest in programs that PREVENT the call
 - Community Health/CHF programs
- Or before dispatching the Calvary
 - Nurse Advice Triage systems (ECNS[®])
- No such thing as an inappropriate request
 - But there is such thing as an ***inappropriate response*** to that request

What does this all Mean?

- Even with Chest Pain...
 - Patients wait too long to call
 - Invest \$ saved in longer ALS into public education on NOT waiting
- Clinical Performance
 - We're trading experience for speed
 - Longer term issues
 - Better to have an experienced medic in 15 minutes vs. inexperienced in 7?



"Remember everyone, his insurance company said no heroic measures."

“Red Ink” Opportunities

- Allows organizations to take on issues that might otherwise be ‘undiscussable’
 - Put down sacred cows that have outlived their usefulness
 - Has the “XX” response time standard outlived it’s usefulness?



“On Monday, Jan. 12, a leaner Cleveland EMS system emerged. Facing a \$23 million city budget gap, the agency saw its ambulances reduced from 18 to 15, and 13 positions eliminated, including six layoffs. **Out of both necessity and a longstanding desire to maximize its resources, the agency determined it would no longer automatically dispatch an ambulance simply because someone dials 9-1-1.**”



February 2010





“Comprehensive call triage in the dispatch center forms the foundation of the agency's new policy. **Specific Bravo, Alpha and Omega calls are held until at least 10 ambulances are open** and life-threatening calls are addressed.

An ambulance will not be dispatched at all for minor complaints (earaches and the like). However, the agency will provide these callers with appropriate referrals and contact numbers to agencies or clinics that can better assist them.”





City of San José Operations Efficiency Diagnostic



PUBLIC SECTOR IBM GLOBAL BUSINESS SERVICES

2012 - The City of San José asked for an operations efficiency diagnostic of three major departments

Police – Fire – Parks & Rec



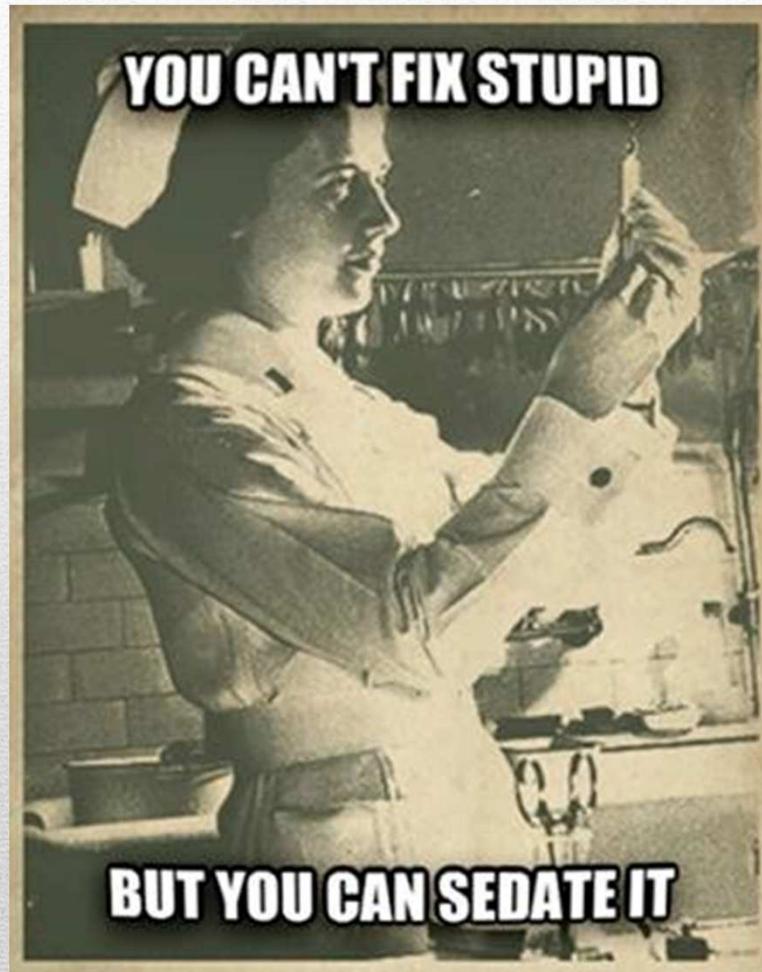
Steve Athey Strategies for Dealing with Dead Horses

- *Buy a stronger whip*
- *Appoint a committee to study the horse*
- *Say things like, “This is the way we have always ridden this horse.”*
- *Change riders*
- *Arrange to visit other sites to see how they deal with dead horses*
- *Create a training session to increase the ability to ride dead horses*
- *Harness several dead horses together for increased speed*
- *Have the CEO declare, “No horse is too dead to beat.”*
- *Form “quality circles” to find uses for dead horses*
- *Promote the dead horse to supervisor*

Moving the Needle

- Community relations issue
 - Public expectation
 - We created this problem
 - We have to fix it
- Begin the dialogue on “what matters”
 - Now more than ever – communities may be willing to listen
 - Budget issues across the U.S.

Local Challenges?



Questions/Comments?

- Thank you for this privilege!!

MZavadsky@medstar911.org

