



2nd Annual EMS Medical Directors' Conference



Indiana State
Department of Health



@INDTrauma #EMSMDConf2015

Thank you to our supporters!



Indiana University Health

ESKENAZI
HEALTH



@INDTrauma #EMSMDConf2015



Welcome

Dr. Jerome Adams

Indiana State Department of Health



Indiana State
Department of Health

@INDTrauma #EMSMDConf2015

@JeromeAdamsMD



Welcome

Director David Kane

Indiana Department of Homeland Security



@INDTrauma #EMSMDConf2015 #Kane



Public Policy Updates

Art Logsdon

Indiana State Department of Health



Indiana State
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#Logsdon



Indiana's Trauma System

Updates from ISDH



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A news anchor with a mustache and a blue background with 'CHANNEL 4 NEWS TEAM' logos.

THIS JUST IN.....

**THERE ARE SHARKS
IN THE OCEAN.**

Objectives:

- Highlights from the 2015 Trauma Tour.
- Updates on:
 - Triage & Transport Rule.
 - Trauma Registry Rule.
- Describe the National Violent Death Reporting System (NVDRS) project from the CDC and ISDH's involvement with the grant.
- Health-related legislation from 2015 session.

**I MOUSTACHE YOU A
QUESTION**

**BUT I'M SHAVING IT FOR
LATER**

Indiana's Trauma System



Indiana Trauma Facts

- Injury – or trauma, as we often refer to it – is the No. 1 killer of Hoosiers under the age of 45.
- More than 4,409 died from injuries in Indiana in 2013.
 - Fifth leading cause of death overall.
 - Contributed to nearly 7% of all deaths in Indiana.
- Nearly 32,000 Hoosiers are hospitalized every year from injuries.
- About 11 people per day died from injuries in Indiana during the years 2009-2013.



State Government Leadership

- Governor
 - Mike Pence
- State Health Commissioner
 - Jerome M. Adams, MD, MPH
- Deputy Commissioner
 - Jennifer Walthall, MD, MPH
- Chief of Staff
 - Eric Miller
- Assistant Commissioner, Health & Human Services Commission
 - Arthur L. Logsdon, JD

Division of Trauma and Injury Prevention Staff

- Katie Hokanson
 - Director
- Jessica Skiba
 - Injury Prevention Epidemiologist
- Murray Lawry
 - Manager, EMS Registry / INVDRS Coroner Records Coordinator
- Ramzi Nimry
 - Manager, Performance Improvement
- Camry Hess
 - Data Analyst
- Rachel Kenny
 - INVDRS Epidemiologist
- John O'Boyle
 - INVDRS Law Enforcement Records Coordinator



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Division of Trauma and Injury Prevention

Mission:

To develop, implement and provide oversight of a statewide comprehensive trauma care system that:

- Prevents injuries.
- Saves lives.
- Improves the care and outcomes of trauma patients.

Vision:

Prevent injuries in Indiana.

Indiana's Trauma System Rules

1. Triage and Transport Rule (EMS Commission)
 - Right patient, right place, right time.
 - “In the process of ACS verification”.
2. Trauma Registry Rule
 - EMS, hospitals and rehabilitation hospitals must report data to ISDH.
3. Designation Rule (yet to be promulgated)
 - State approval process of trauma centers.

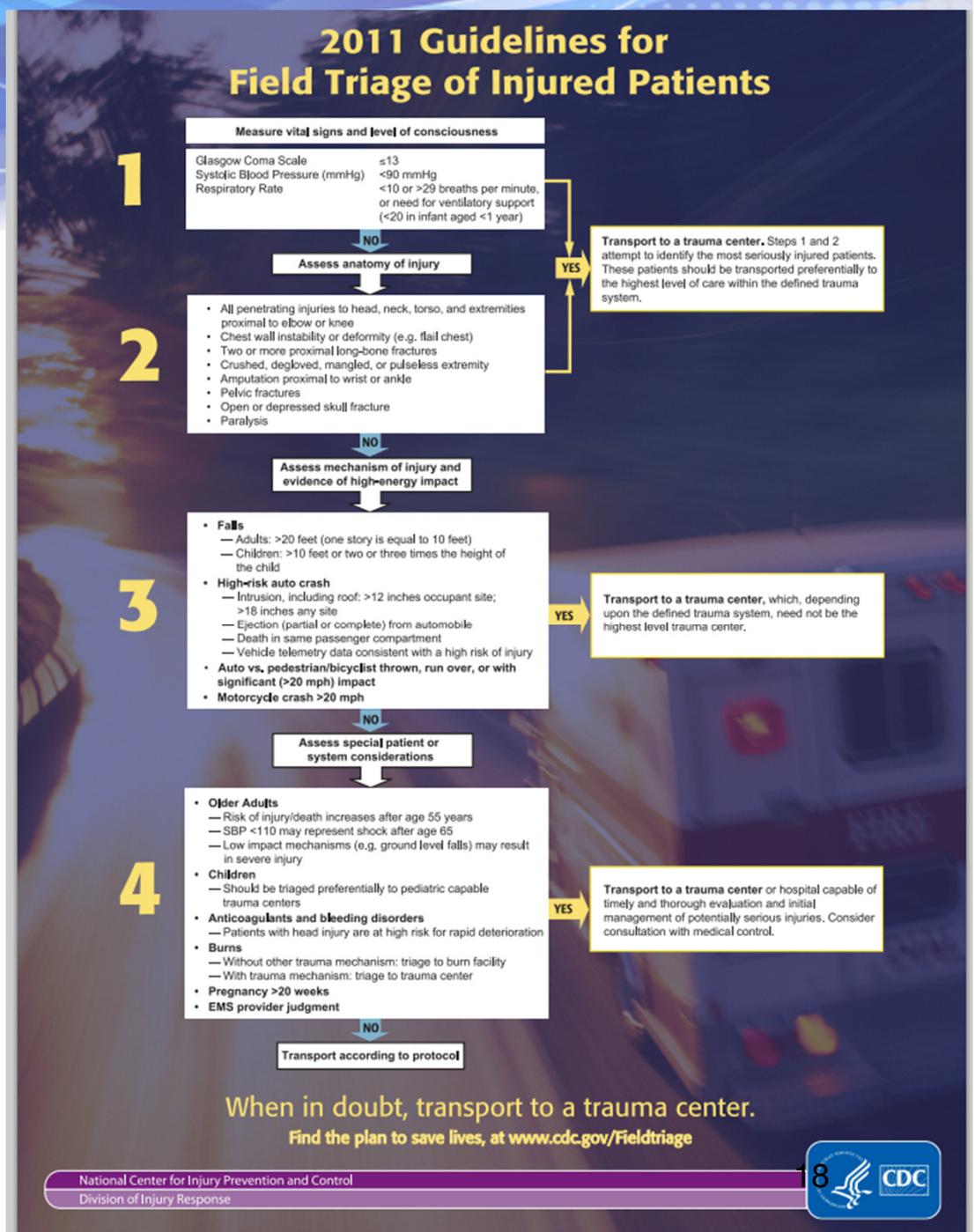
Triage & Transport Rule

- The most seriously injured patients should go to a trauma center no matter how long it takes to get them there.
- EMS Commission's rule offers two qualifications to this:
 - If the patient's life is in danger.
 - If the nearest trauma center is more than 45 minutes away.
- Competent patients always have the right to decide where to be taken.

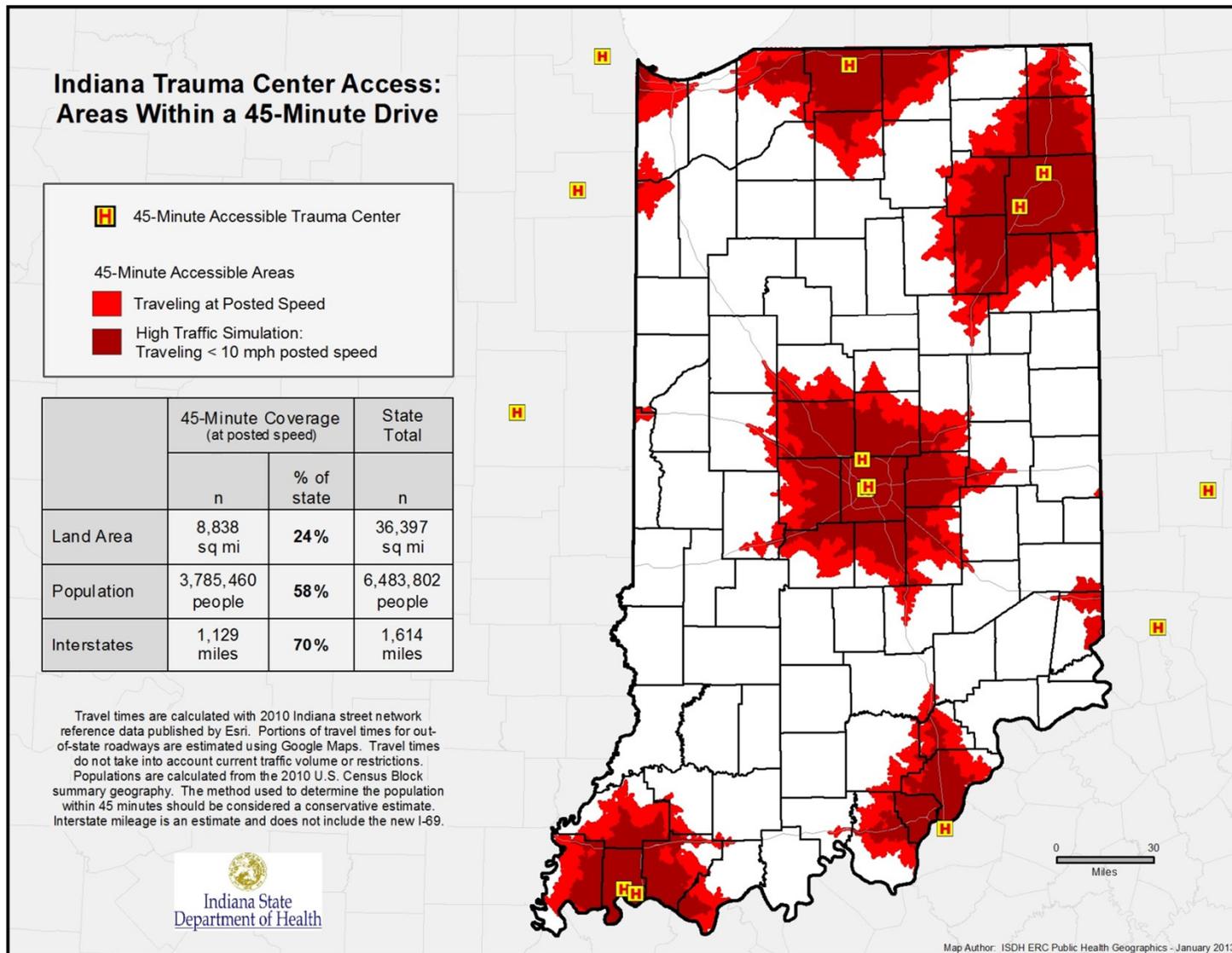
The most seriously injured patients should go to a trauma center no matter how long it takes to get them there.

http://www.cdc.gov/fieldtriage/pdf/decisionscheme_poster_a.pdf

@INDTrauma



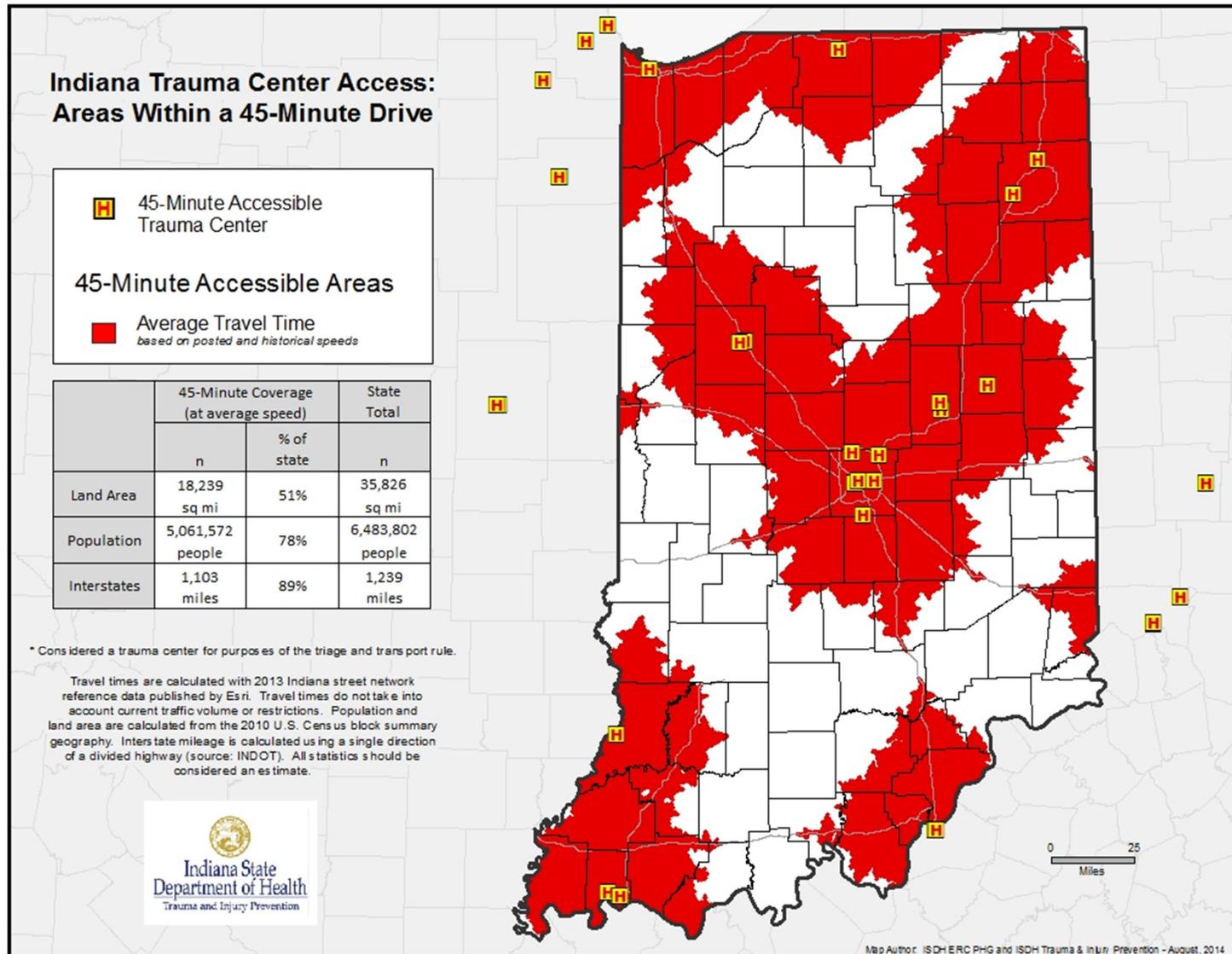
Trauma Center Access in Indiana (January 2013)



In the Process Trauma Centers

Facility Name	Level	Adult / Pediatric	“In the Process” Date*	1 Year Review Date**	ACS Consultation Visit Date	ACS Verification Visit Date
IU Health – Ball Memorial	III	Adult	08/16/2013	N/A	06/2013	05/15-05/16, 2014
Franciscan St. Elizabeth East	III	Adult	12/20/2013	02/20/2015	02/12-02/13, 2015	<i>Tentative: December 2015</i>
St. Vincent Anderson	III	Adult	12/20/2013	02/20/2015	11/12-11/13, 2014	<i>Tentative: November 2015</i>
IU Health – Arnett	III	Adult	02/14/2014	N/A	04/30-05/01, 2013	04/29-04/30, 2014
Community Hospital Anderson	III	Adult	06/20/2014	08/21/2015	TBD	May 2016
Good Samaritan	III	Adult	06/20/2014	08/21/2015	05/19-05/20, 2015	TBD
Community East	III	Adult	08/20/2014	10/30/2015	<i>Tentative: January 2016</i>	TBD
Community North	III	Adult	08/20/2014	10/30/2015	TBD	TBD
Community South	III	Adult	08/20/2014	10/30/2015	<i>Tentative: January 2016</i>	<i>Tentative: August 2016</i>
Methodist Northlake	III	Adult	08/20/2014	10/30/2015	TBD	TBD

Trauma Center Access in Indiana (August 2014)



Trauma Registry Rule

- Rule that requires these providers to report data to the trauma registry:
 - EMS providers.
 - All hospitals with EDs.
 - Rehabilitation hospitals.



Trauma Registry Rule

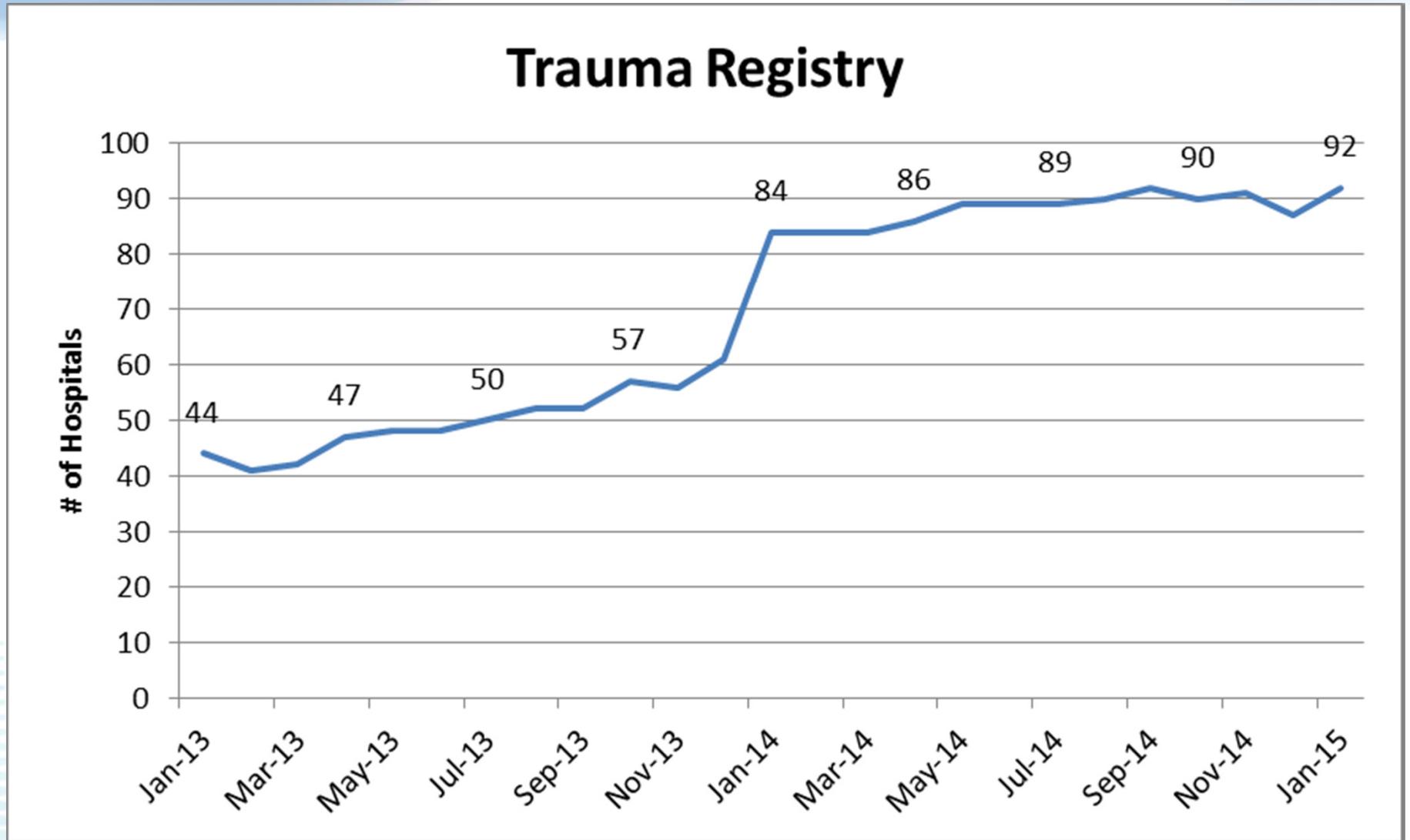
- Rule that requires these providers to report data to the trauma registry:
 - EMS providers.
 - National EMS Information System (NEMSIS) Silver.
 - 15th of the month.
 - All hospitals with EDs.
 - National Trauma Data Standard (NTDS).
 - Quarterly.
 - Rehabilitation hospitals.
 - CMS – Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI).
 - Quarterly.
- Rule also permits ISDH to grant any person involved in a legitimate research activity to request access to confidential information.







ISDH Trauma Registry Data

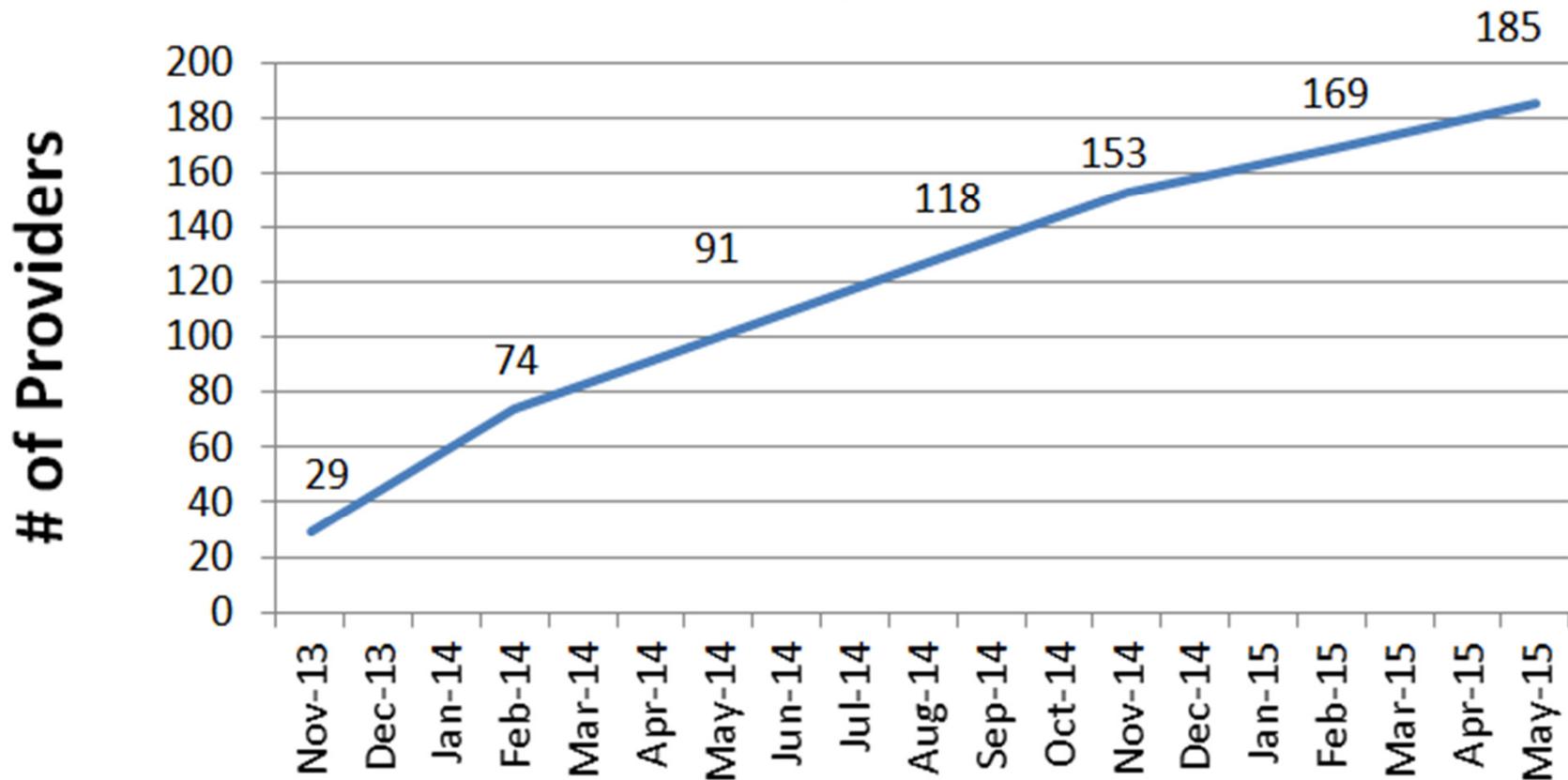


EMS Registry Timeline

- Summer 2012: ISDH internal discussions of an EMS Registry.
 - The CDC Preventive Health Block Grant funds utilized for this one-time purchase.
- January 2013: Installed EMS database.
- February 2013: Pilot project begins.
- November 24, 2013: Trauma Registry Rule.
- July 1, 2015: Hand over EMS registry and responsibilities to IDHS.

ISDH EMS Registry Data

EMS Registry



WHY WOMEN LIVE LONGER THAN MEN

1. Because of stuff like this:



THIS IS WHY WOMEN



LIVE LONGER THAN MEN

Indiana's Journey - 2014

- The ISDH hosted the first statewide EMS Medical Director's Conference.
- IU Health Arnett Hospital and IU Health Ball Memorial Hospital became the state's first ACS verified level III trauma centers.
- The ISDH received \$1.4 million from the Centers for Disease Control and Prevention (CDC) to gather critical data on violent deaths using the National Violent Death Reporting System (NVDRS).

Indiana's Journey - 2015

- The ISDH hosted the first statewide injury prevention conference.
- The ISDH applied for CDC Prescription Drug Overdose Prevention for States Funding Opportunity Announcement
- Developing Injury Prevention Resource Guide



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Legislative Wrap-Up



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Newborn safety incubators

- HEA 1016—“baby boxes”
 - Device designed to permit someone to anonymously place a newborn in the device intending to leave the newborn and another to remove the newborn and take custody of it.
 - Requires Children’s Commission to submit report by 1/1/16 on policies regarding abandoned children.
 - Requires ISDH to submit report by 1/1/16 with recommendations re: design, installation, registration, signage, enforcement and other policies re: creation and use of newborn safety incubators.



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Civil immunity—Volunteer health care providers

- **HEA1145—“health shield bill”**
 - Will be legal to voluntarily provide “health care services” and be immune from liability if:
 - You are licensed as a physician/PA/dentist/nurse/advanced practice nurse/optometrist/podiatrist.
 - You provide the service voluntarily, without compensation, within the scope of your license and at a location determined to be appropriate and listed on the health care volunteer registry.
 - Provider notifies the patient that the provider is immune from civil liability.
 - Patient signs a waiver acknowledging provider is immune from civil liability.
 - The provider is listed on the health care volunteer registry.
 - Must register with Professional Licensing Agency, which is implementing this law.
 - “Health care services”= Routine dental services, injections, suturing of minor lacerations, incisions of boils or superficial abscesses.
 - Not included are abortions or the prescribing of a controlled substance or scheduled drug.

Overdose intervention drugs

- **SEA406—“Naloxone bill”**
 - Allows for broader distribution of Naloxone (which reverses the effects of opioid overdoses).
 - Can be prescribed directly to someone at-risk of opioid overdose or to their family/friends or by standing order and be immune from civil liability.
 - Dispensing of Naloxone must be registered with the state trauma registry.
 - ISDH is developing a protocol for registration.

Spinal Cord and Brain Injury Fund

- **SEA166**
 - Purposes of the Fund—administered by ISDH—have been:
 - Fund research re: treatment/care of spinal cord/brain injuries
 - Develop a statewide trauma system
 - New purposes of the Fund—fund post acute extended treatment and services for an individual with spinal cord/brain injuries and facilities that offer such services.
 - Fund breakdown:
 - 10-15% (money in fund) for spinal cord treatment/facilities
 - 10-15% (money in fund) for brain injury treatment/facilities
 - Up to 50% for state trauma system development
 - What remains is for research grant purposes

ISDH agency bill

- **SEA461**
 - Child Fatality Review Teams—responsibility for conducting a review lies with the county team in the county where the incident occurred
 - Emergency Medical Technicians can now check blood glucose with a finger stick.
 - Needle exchange bill also a part of the ISDH agency bill (in response to HIV outbreak in Scott County).



Indiana Violent Death Reporting System (INVDRS)

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CDC Grant

Collecting Violent Death Information Using the National Violent Death Reporting System (NVDRS)

- Established in 2002



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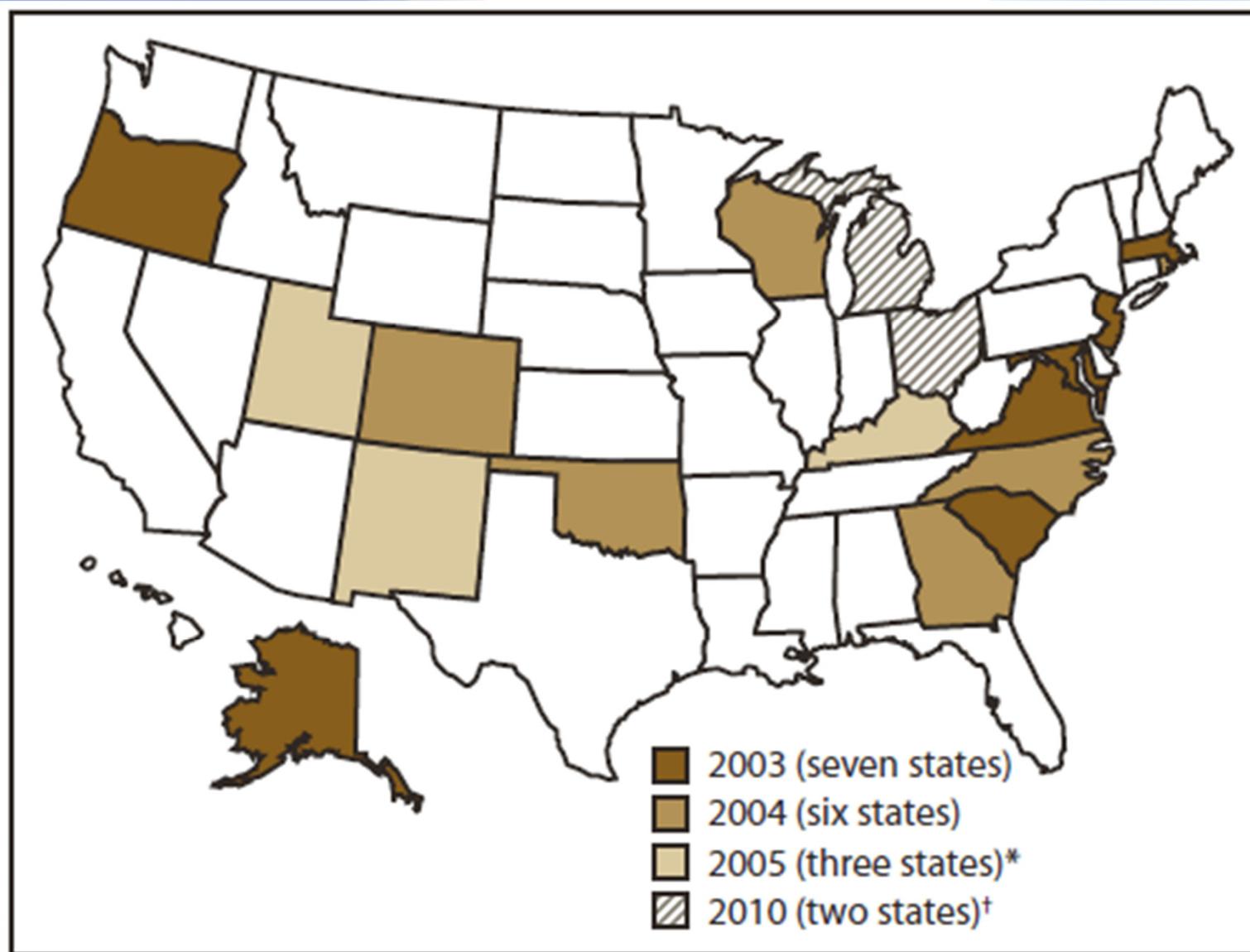
NVDRS

- National, ongoing, state-based surveillance system
- Data collected by states through partnerships
- Data for informing prevention efforts
- Comprehensive information on violent deaths in participating states
 - Incident-based system

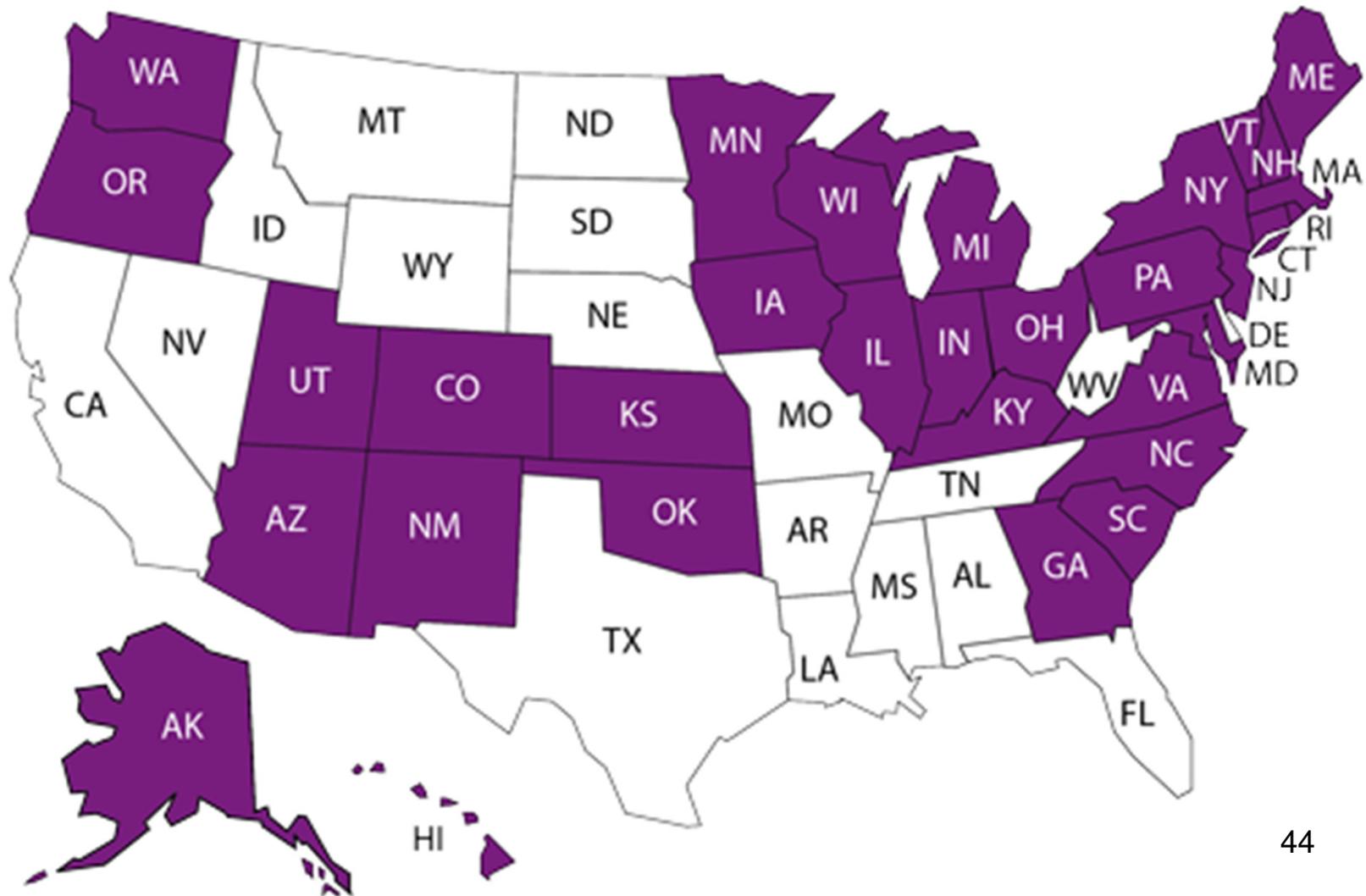


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Previously Funded States



32 States Funded in 2014



INVDRS

- Indiana Violent Death Reporting System
- Database to monitor and track trends of violent deaths in Indiana
- Data for informing local prevention efforts



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What is a Violent Death?

- A death that results from the intentional use of physical force or power, threatened or actual, against:
 - Oneself
 - Another person
 - A group or community



Manners of Violent Death

- Suicide
- Homicide
- Undetermined Intent
- Unintentional Firearm Death
- Legal Intervention
- Terrorism



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Four Primary Objectives

1. Create and update a plan to implement INVDRS in Indiana
2. Collect and abstract comprehensive data on violent deaths from:
 - Death Certificates
 - Coroner reports
 - Law enforcement records
 - Optional Modules:
 - *Child Fatality Review*
 - Intimate Partner Violence
 - Drug Overdose/Poisonings



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Four Primary Objectives, Cont'd

3. Disseminate aggregate INVDRS data to stakeholders, the public, and CDC's multi-state database
4. Explore innovative methods of collecting, reporting, and sharing data
 - Improve timeliness and greater utilization of data for prevention efforts

Year 1 Pilot

- Collect data on deaths that occurred in 6 counties:
 - **Marion**
 - **Allen**
 - **Lake**
 - **Vanderburgh**
 - **St. Joseph**
 - **Madison**
- Selected based on rank of number of violent deaths in 2010
- Collect data on all child deaths (<18 years)

After Pilot

- Expand to all counties in Indiana to collect all violent deaths
- Deaths as of January 1, 2016
 - **More** complete database to monitor and track trends of violent deaths in Indiana
 - **More** data for informing local prevention efforts



2015 Trauma Tour



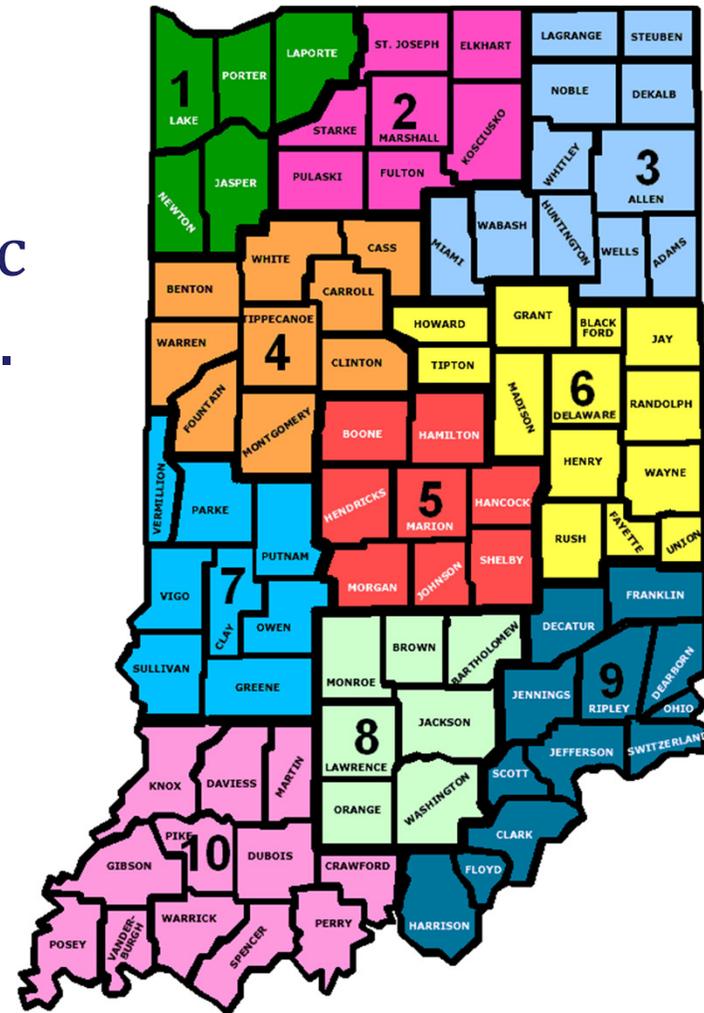
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2015 Trauma Tour Locations

Tour stops held in all 10 Public Health Preparedness Districts.



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2015 Trauma Tour Details

- Timeframe: June, July, August
- Audience:
 - Trauma Stakeholders
 - Local hospitals
 - Local EMS/Fire Department
 - County health departments
 - focus on injury prevention and education
 - Elected officials
 - Local police/sheriff
 - Local rehab facilities
 - Local agencies on aging



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2015 Trauma Tour Details (Continued)

- Format:
 - ***NEW*** Trauma Registry Refresher session
 - Displays/information booths
 - Formal presentation
 - Q&A session

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Trauma Tour - Goals

- Update on the developments of the trauma system.
- Clarify the levels of trauma centers in Indiana.
- Clarify state rules.
- Describe the National Violent Death Reporting System (NVDRS) project from the CDC and ISDH's involvement with the grant.





Questions?



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Public Policy Updates

Mike Garvey

Indiana Department of Homeland Security



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#Garvey



INDIANA DEPARTMENT OF HOMELAND SECURITY

EMERGENCY MEDICAL SERVICES
MEDICAL DIRECTORS CONFERENCE
2015

POLICY UPDATE



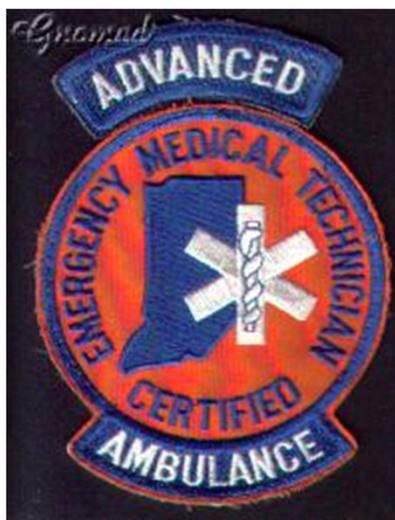


Contact Information

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EMS Personnel



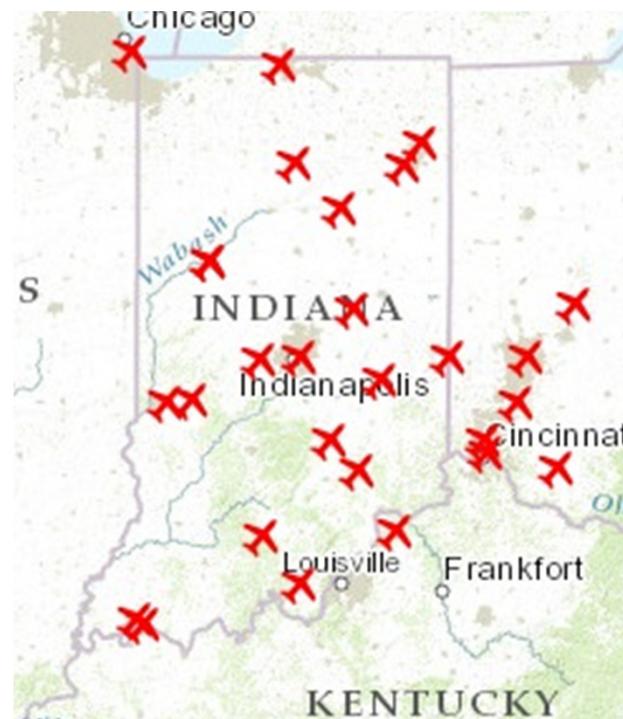
EMS Personnel	2014	2015	
Emergency Medical Responder	5,083	4,887	<196>
Emergency Medical Technician	14,950	14,679	<271>
Advanced EMT	329	438	109
Paramedic	4,164	4,246	82
	24,526	24,250	<276>





Indiana Air Ambulance Helicopters

- 15 Certified Air Ambulance Providers
 - Operating 35 Certified Rotocraft
 - 7 located in contiguous states





Legislative Updates from 2015

- Senate Enrolled Act No. 461
 - “Basic Life Support” now includes the use of Glucometers
 - With Protocols and Training
 - Emergency Medical Technicians (EMTs)
 - Emergency Medical Responders (EMRs)
- Blood glucose monitoring that is not more invasive than a capillary sampling using a lancet. (IC 16-18-2-33.5(10))





Naloxone

- 2014 Legislation (Senate Enrolled Act No. 227)
 - Allow all Law Enforcement, Firefighters, EMS Personnel to administer.
- 2015 Legislation (Senate Enrolled Act No. 406)
 - Added a reporting requirement through the Trauma Registry System (ISDH)



Update in Trauma Care

- Hartford Consensus
 - Use of Tourniquets
 - Use of Hemostatic Agents
- Commission has approved for use by all EMS personnel.



Community Paramedicine

Community Paramedicine/Mobile Integrated Health Care summit was conducted December 19, 2014

160 people attended

Rural Health Innovation Collaborative - will be sending a survey to all paramedics





12 Lead Non-rule policy

The EMS Commission interprets IC 16-18-2-33.5 (a)(11):
Basic Life Support

The acquisition and transmission of a 12-lead electrocardiogram, without continuous monitoring or interpretation or both, for the purposes of early physician interpretation, diagnosis and activation of interventional therapies is basic life support.





EMS Systems Reassessment

- At the request of the IDHS
- July 7,8,9, 2015
- Conducted by the Technical Assistant Team assembled by NHTSA Office of EMS





EMS Assessment - Recommendations

- Priority by Assessment Team
 - Provide liability protection for EMS provider medical directors
 - Develop standards for the designation of specialty medical facilities including trauma, stroke, burn, STEMI and pediatric facilities
 - The IDHS and the Indiana EMS Commission should seek explicit statutory authority to conduct FBI fingerprint-based criminal background checks for all candidates for licensure at the EMR, EMT, Advanced EMT and Paramedic levels.



- Establish a fee structure for provider and personnel licensing that meets the intent of the Indiana General Assembly
- Formalize the role, responsibility and authority of the state EMS medical director
- Develop a review process for all deviations from the trauma field triage and transportation destination protocol as part of an overall statewide quality assurance program
- Develop a regionally-implemented statewide quality assurance program utilizing EMS Compass-National EMS Performance Measures as appropriate



- Adopt the National Registry testing process for all levels
- Consider the creation of other advisory groups (for example rural EMS, and air medical) to ensure that specific interests and stakeholders are given adequate consideration
- Consider the creation of a rural EMS task force to clearly identify issues of concern for the more rural portions of Indiana, and develop long term solutions for sustainability



Strategic Plan

- Next Steps to develop Strategic Plan
 - Survey to conduct a labor –market analysis
 - In the process of prioritizing the recommendations
 - 59 Total Recommendation
 - Some will be implemented other will not
 - Conduct Webinars
 - August 27, 2015
 - Stakeholder input on NHTSA recommendations



Strategic Plan

- With EMS Stakeholders, EMS Commission, IDHS, Partners develop:
 - Implementation Plans
 - Review Process
 - Implementation Metrics
- Rule rewrites, Proposed Legislation, Policies and Procedures



National Compass Project



Using Data to Make a Difference

The EMS Compass initiative is not simply about designing performance measures for the present. EMS Compass will create a process for the continual design, testing and evaluation of performance measures—and guidance for how local systems can use those measures to improve—so EMS can continue to provide the highest quality care to patients and communities in the future.

www.emscompass.org



District's 1, 2, 4
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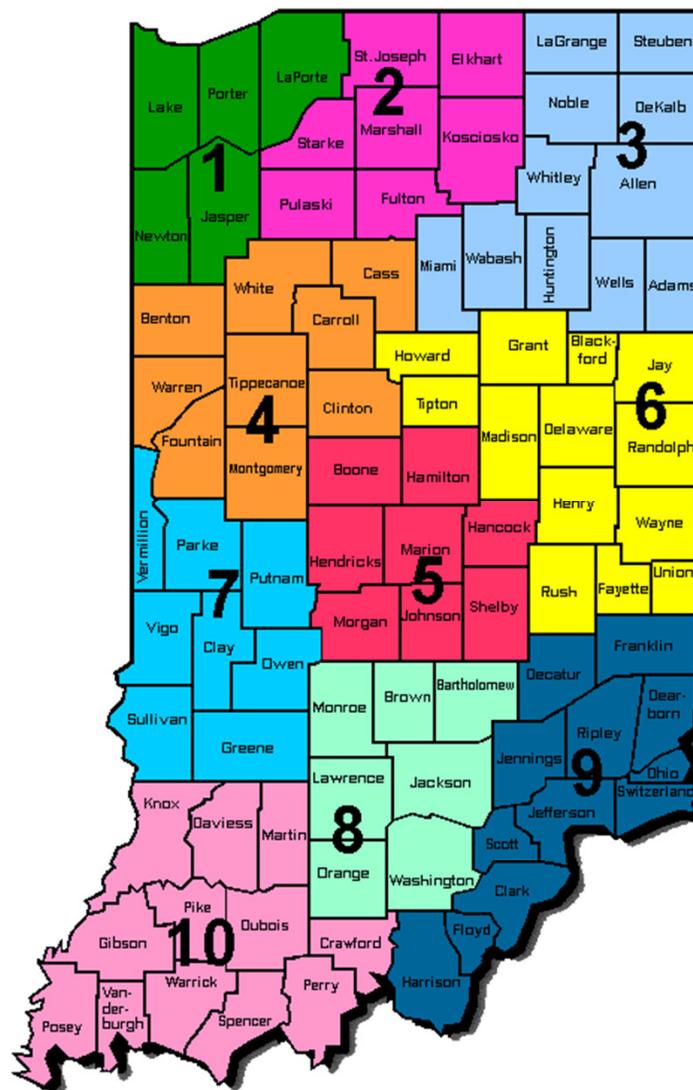
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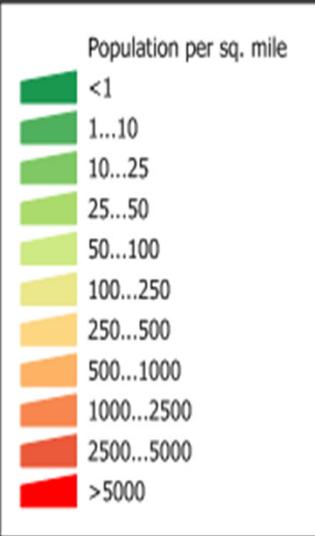
Regional Medical Direction - Panel

Dr. Michael Olinger, State EMS Medical Director

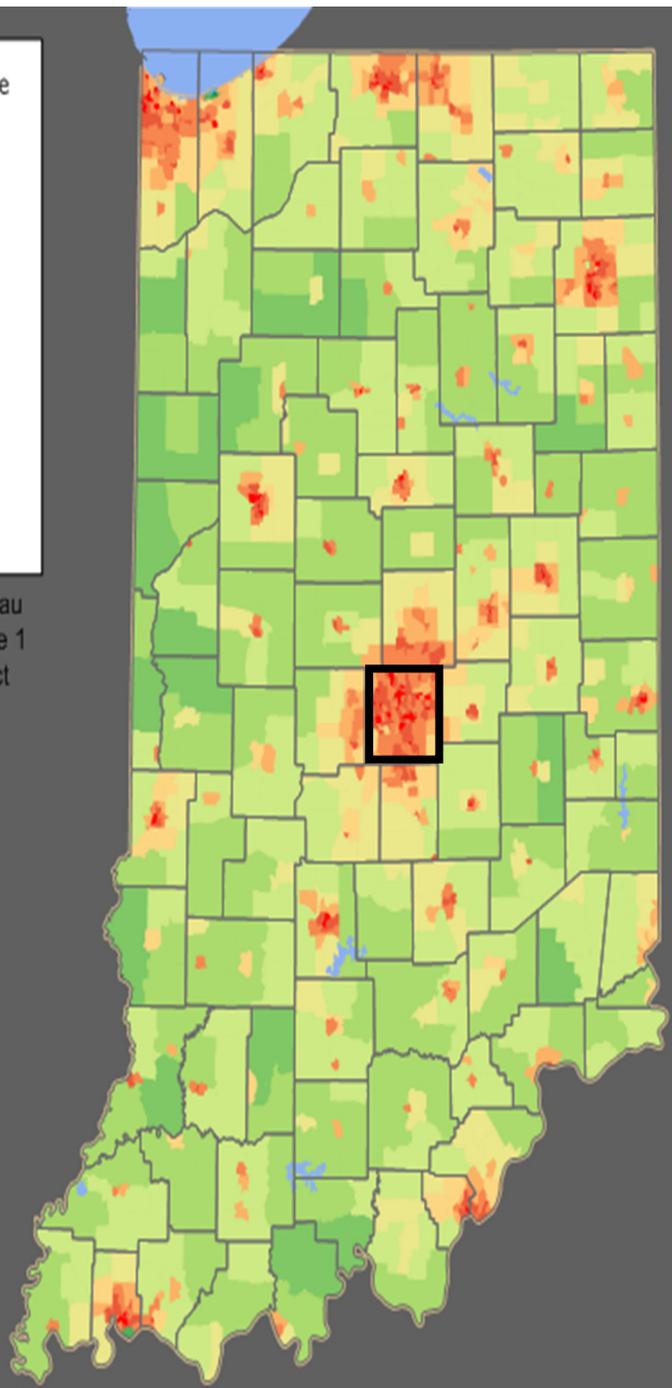
Dr. David Cummins, Porter Health

*Dr. Sara Brown, Professional Emergency
Physicians, Inc. (PEP)*

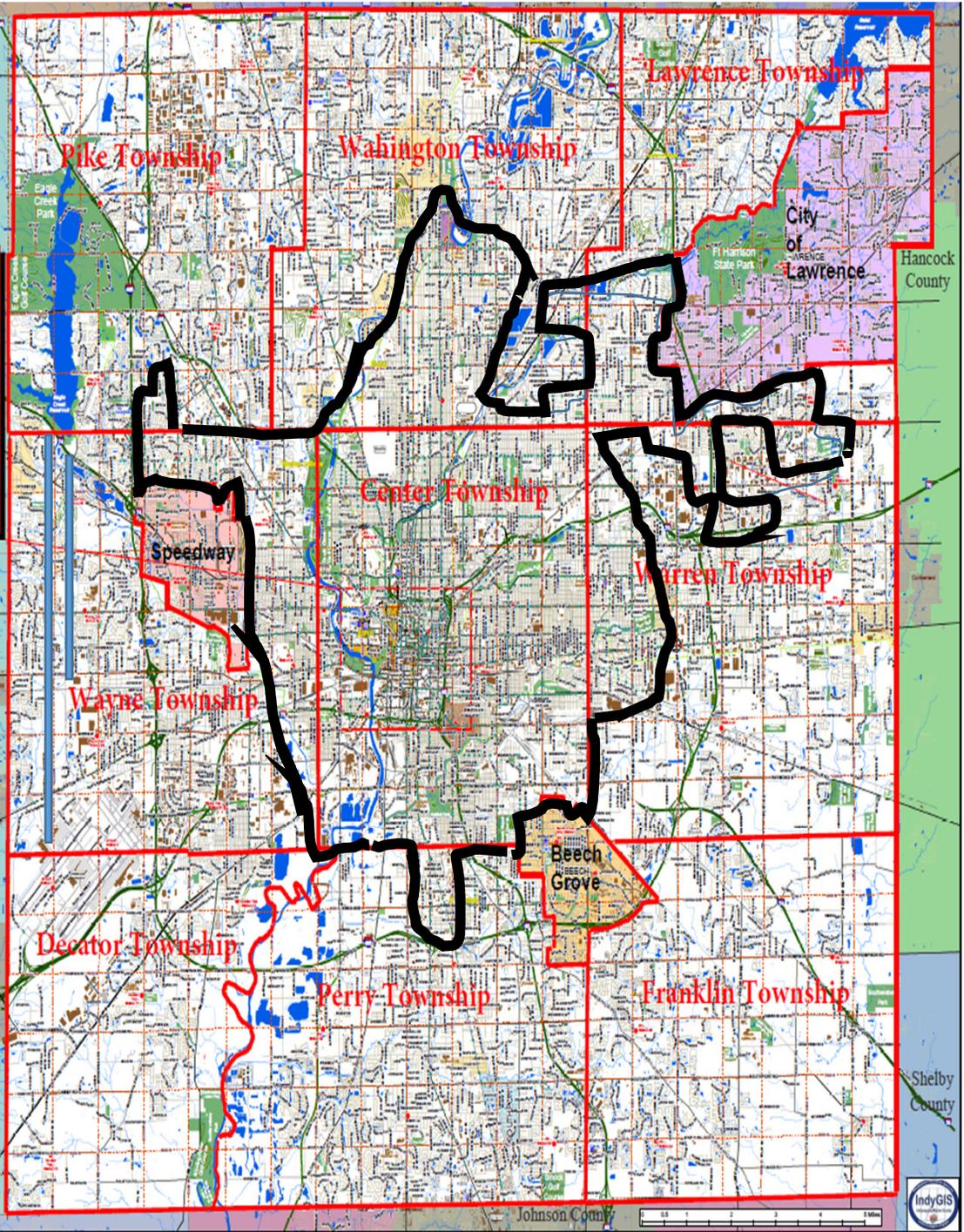
**Development of
Comprehensive
Regional EMS Protocols:
The Indianapolis Experience**



Source: U.S. Census Bureau
Census 2010 Summary File 1
population by census tract



Marion Co./ Indianapolis, Indiana



Hendricks
County

Hancock
County

Shelby
County

Johnson County

Legend

- | | |
|----------------------|---------------------------|
| --- Address Grid | Recreation Feature |
| Airfield Tarmac Type | Baseball Diamond |
| Helipad | Football Field |
| Parking | Soccer Field |
| Ramp | Softball Diamond |
| Runway | River/Lake |
| Taxiway | Ditch |
| Building | Stream |
| < 10,000 sq.ft. | Cultural District |
| > 10,000 sq.ft. | Broad Ripple Village |
| BEECH GROVE | Danmian Canal/WRSP |
| LAWRENCE | Fountain Square |
| SOUTHPORT | Mass. Avenue |
| SPEEDWAY | Wholesale District |
| Fire Station | Collector/Local Street |
| Golf Course | Expressway |
| Greenway Trail | Interstate Highway |
| Hospital | Primary Arterial |
| Included Town | Secondary Arterial |
| IndyGo Bus Stop | Secondary Arterial (2 Ln) |
| Park Property | Township Boundary |
| Railroad | |



Methodist Hospital Indianapolis



1991

800 Bed Tertiary Care Hospital

Level I Trauma Center

**Only Emergency Medicine Residency Program
in Indiana**

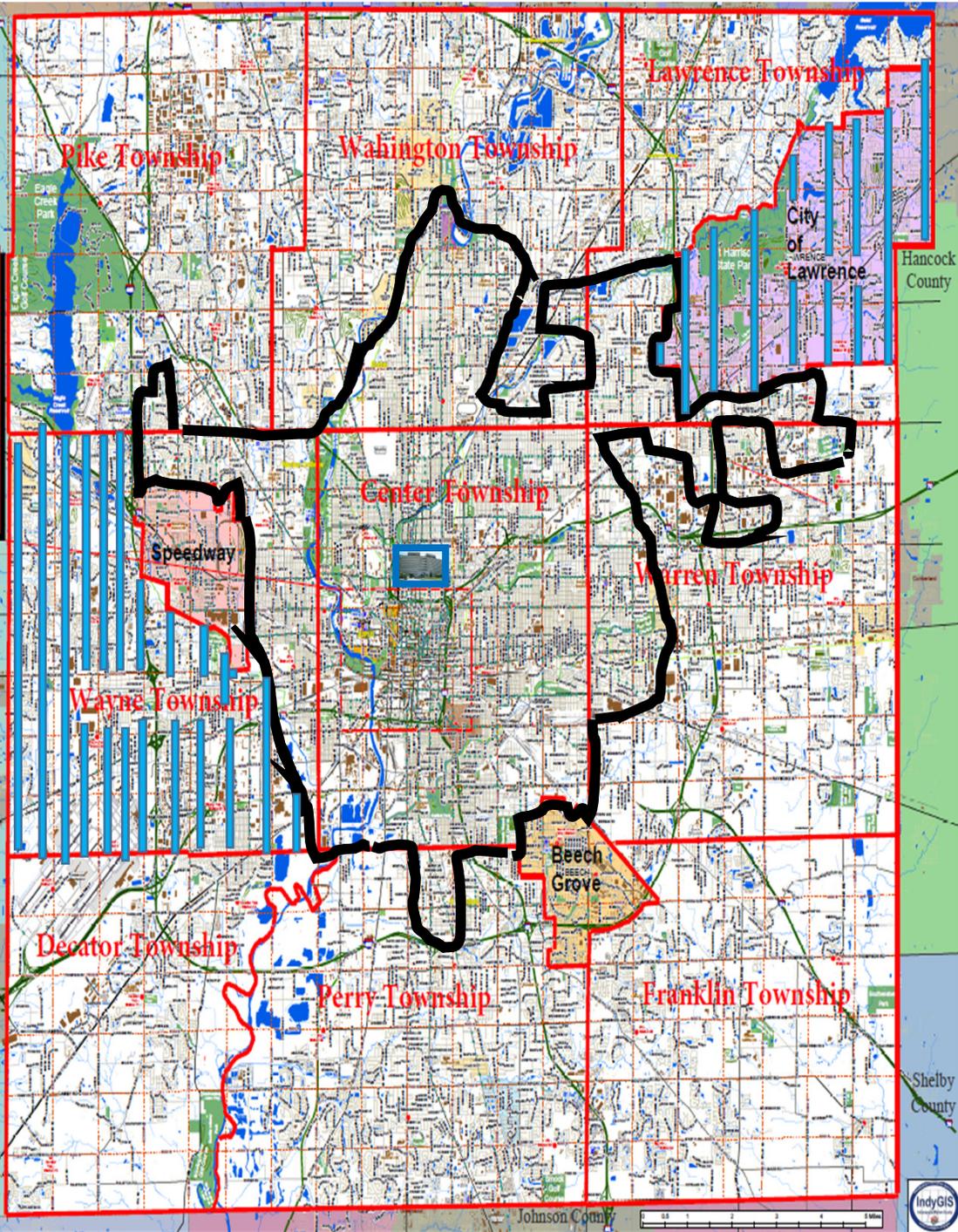
Home of Lifeline Aeromedical: Only air medical in Central Indiana

**Paramedic Education Program accredited by CAHEA affiliated
with Ball State College**

Medical Director EMS: Mike Olinger MD, FACEP



Marion Co./ Indianapolis, Indiana



Hendricks
County

Hancock
County

Shelby
County

Johnson County

Legend	
--- Address Grid	Recreation Feature
Airfield Tarmac Type	Baseball Diamond
Helipad	Football Field
Parking	Soccer Field
Ramp	Softball Diamond
Runway	River/Lake
Taxiway	Ditch
Building	Stream
< 10,000 sq.ft.	Cultural District
> 10,000 sq.ft.	Broad Ripple Village
BEECH GROVE	Dam/Canal/WRSP
LAWRENCE	Fountain Square
SOUTHPORT	Mass. Avenue
SPEEDWAY	Wholesale District
Fire Station	Collector/Local Street
Golf Course	Expressway
Greenway Trail	Interstate Highway
Hospital	Primary Arterial
Included Town	Secondary Arterial
IndyGo Bus Stop	Secondary Arterial (2 Ln)
Park Property	Township Boundary
Railroad	



Wishard Memorial Hospital



1991

- 274 Bed Teaching Hospital for IU School of Medicine
- Level I Trauma Center
- No Emergency Medicine. ER staffed by Residents of the Different Disciplines
- Home of Wishard Ambulance Service Oldest Ambulance Service in Midwest
- Allied Health EMT and paramedic training program affiliated with IU
- Medical Director EMS: Rolly McGrath, MD Intensivist

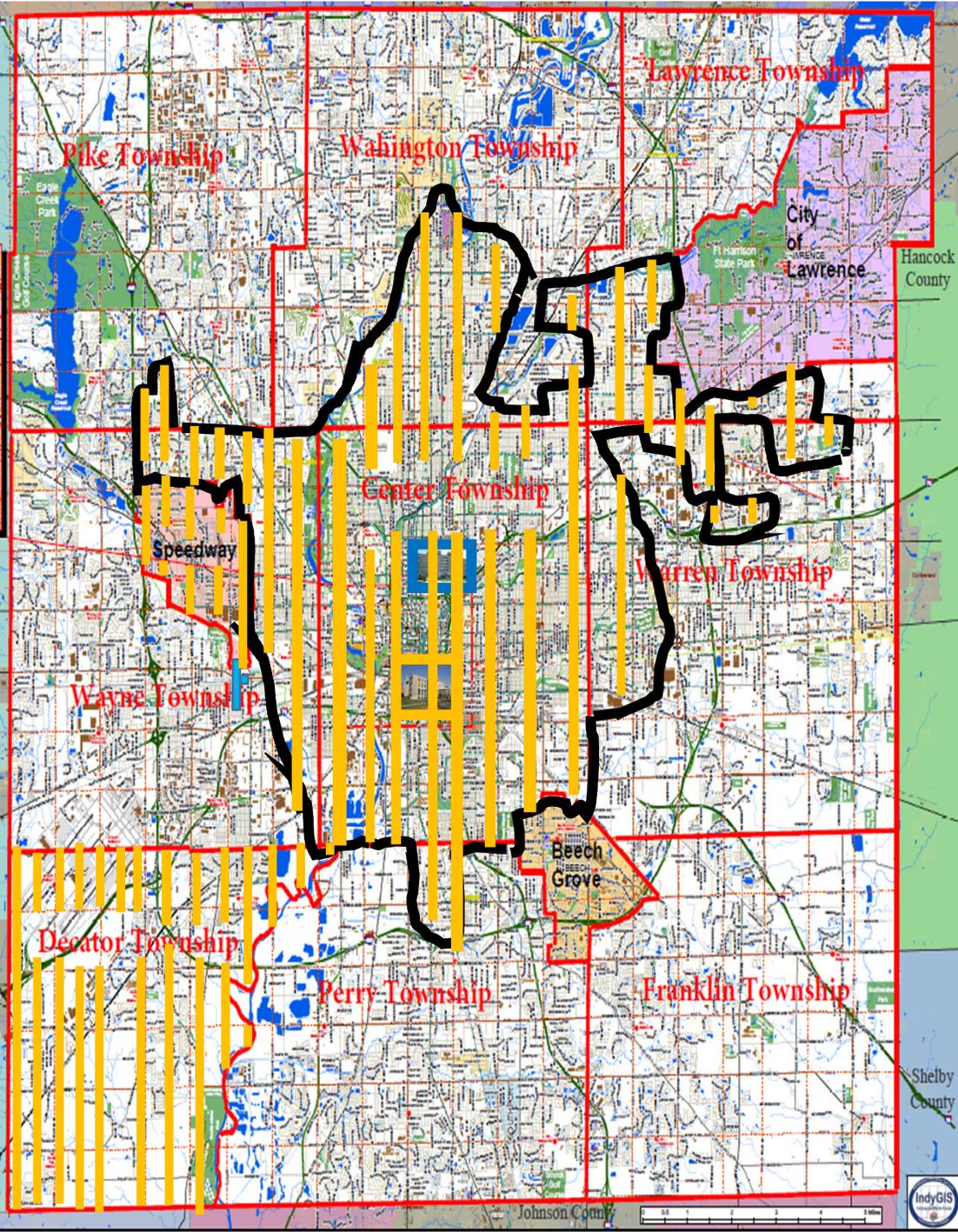


Marion Co./ Indianapolis, Indiana



Legend

--- Address Grid	Recreation Feature
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• Hospital	Primary Arterial
• Included Town	Secondary Arterial
• IndyGo Bus Stop	Secondary Arterial (2 Ln)
• Park Property	Township Boundary
--- Railroad	



Community



1991

263 Bed General Medical and Surgical Hospital

1981 2nd largest hospital in Indianapolis with ~800 beds

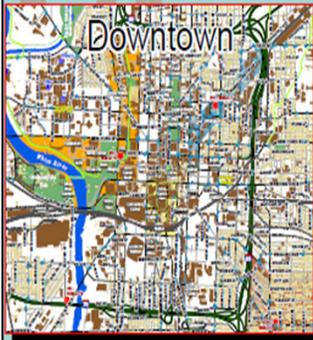
1985 Community North opened and Community East began downsizing

Emergency Department Staffed by a stable group of EM trained MDs

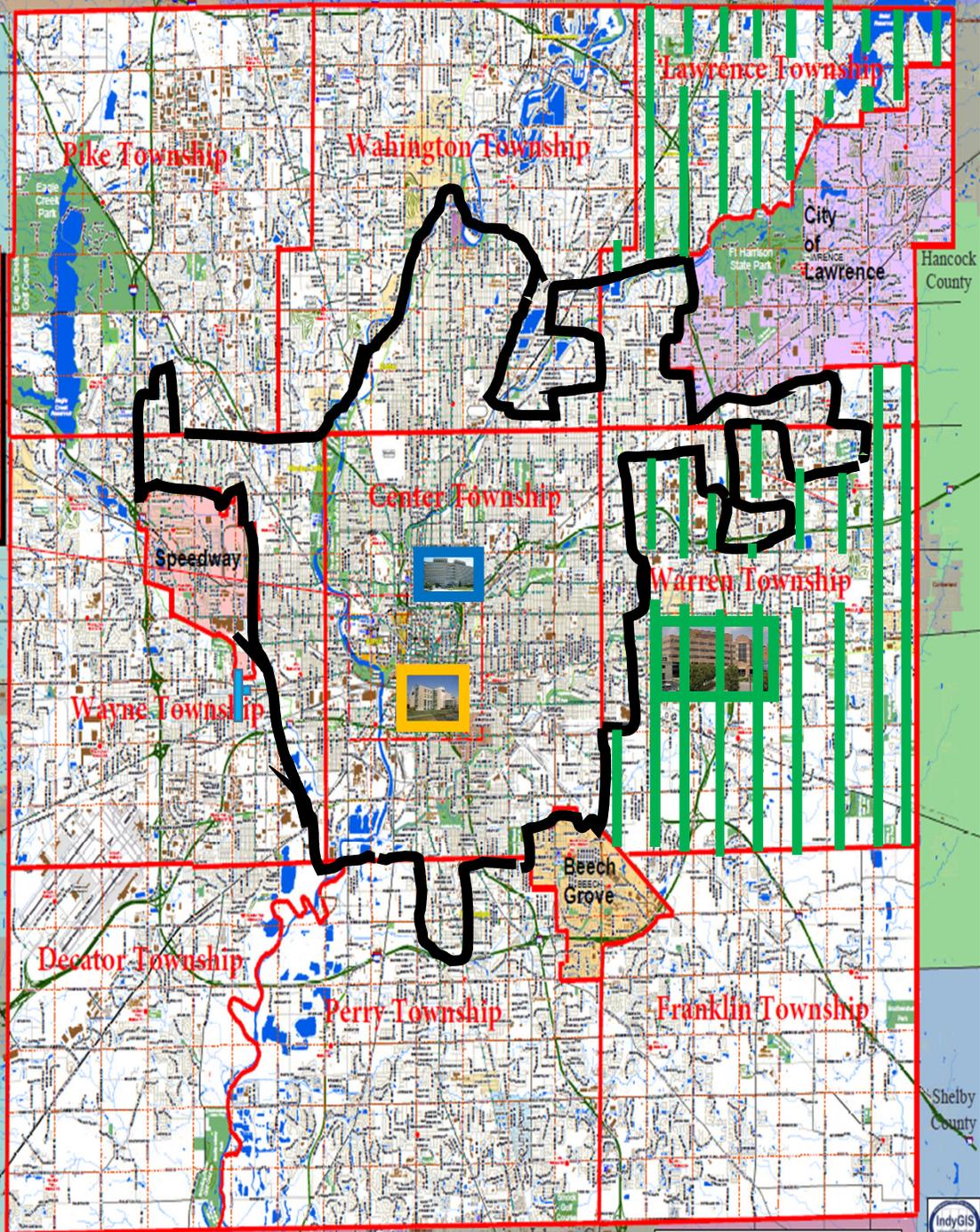
Allied Health EMT and paramedic training programs

Medical Director EMS: Eric Vonderhoe MD, Recent graduate of the Methodist EM Residency

Marion Co./ Indianapolis, Indiana



Legend	
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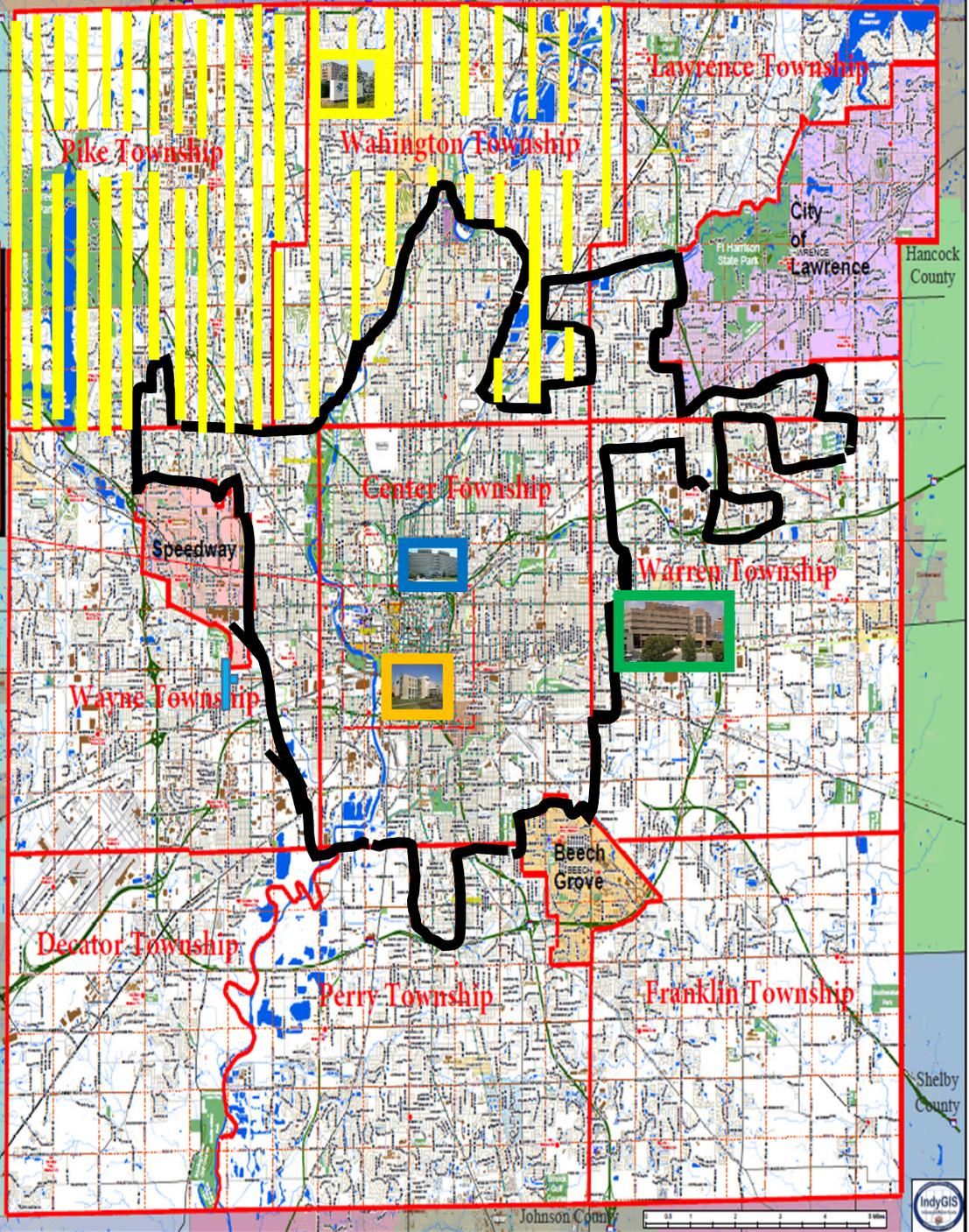
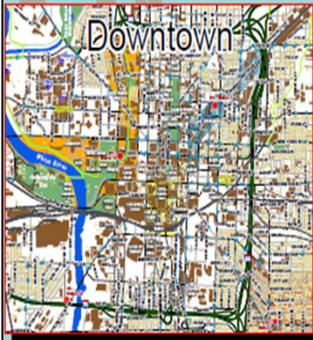
St. Vincent Hospital



1991

- 757 Bed Hospital General Medicine and Surgery
- Ascension Health: Largest catholic Health Care System
- ED staffed by stable group, most EM trained
- Allied Health EMT and Paramedic Training Program
- Medical Director EMS: Bob Lew MD; Internist practiced EM

Marion Co./ Indianapolis, Indiana



Legend

- | | |
|----------------------|---------------------------|
| --- Address Grid | Recreation Feature |
| Airfield Tarmac Type | Baseball Diamond |
| ▨ Helipad | Football Field |
| ▭ Parking | Soccer Field |
| ▭ Ramp | Softball Diamond |
| ▭ Runway | River/Lake |
| ▭ Taxiway | Ditch |
| Building | Stream |
| ■ < 10,000 sq.ft. | Cultural District |
| ■ > 10,000 sq.ft. | Broad Ripple Village |
| ■ BEECH GROVE | Dwntwn Canal/WRSP |
| ■ LAWRENCE | Fountain Square |
| ■ SOUTHPORT | Mass. Avenue |
| ■ SPEEDWAY | Wholesale District |
| ● Fire Station | Collector/Local Street |
| ● Golf Course | Expressway |
| ● Greenway Trail | Interstate Highway |
| ● Hospital | Primary Arterial |
| ● Included Town | Secondary Arterial |
| ● IndyGo Bus Stop | Secondary Arterial (2 Ln) |
| ● Park Property | Township Boundary |
| ● Railroad | |



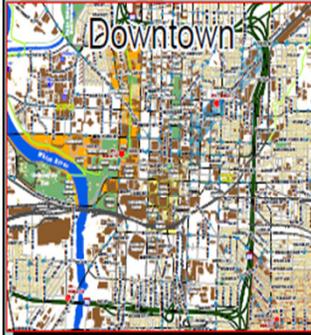
Saint Francis Hospital, Beech Grove



1991

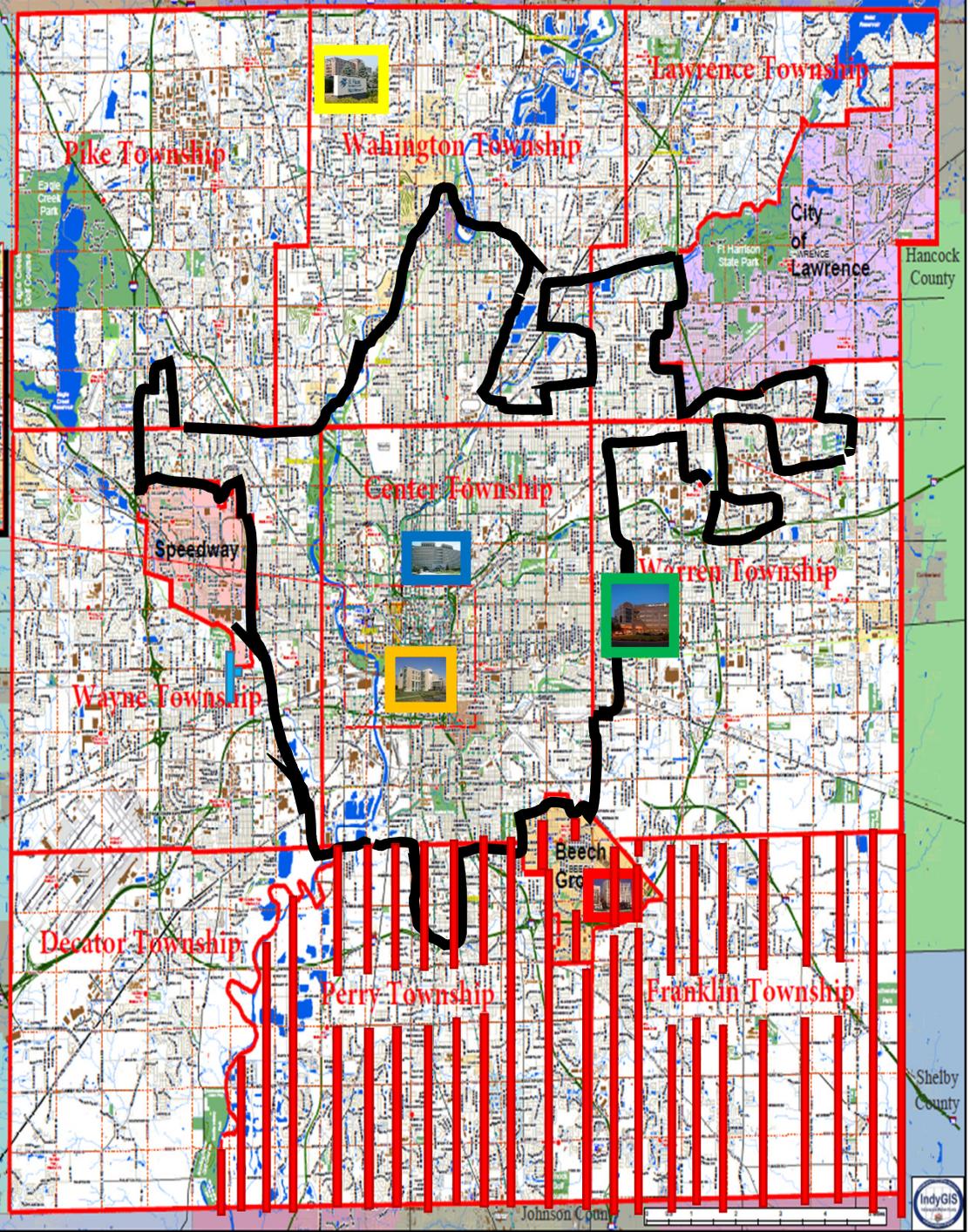
**486 bed general medicine and surgery Hospital
ER Staffed by stable Group of EM trained
physicians, Most are graduates from the
Methodist program
Allied Health EMT and paramedic training
programs
EMS Medical Director: Mike Russel, MD;
recent graduate from the Methodist
Residency**

Marion Co./ Indianapolis, Indiana

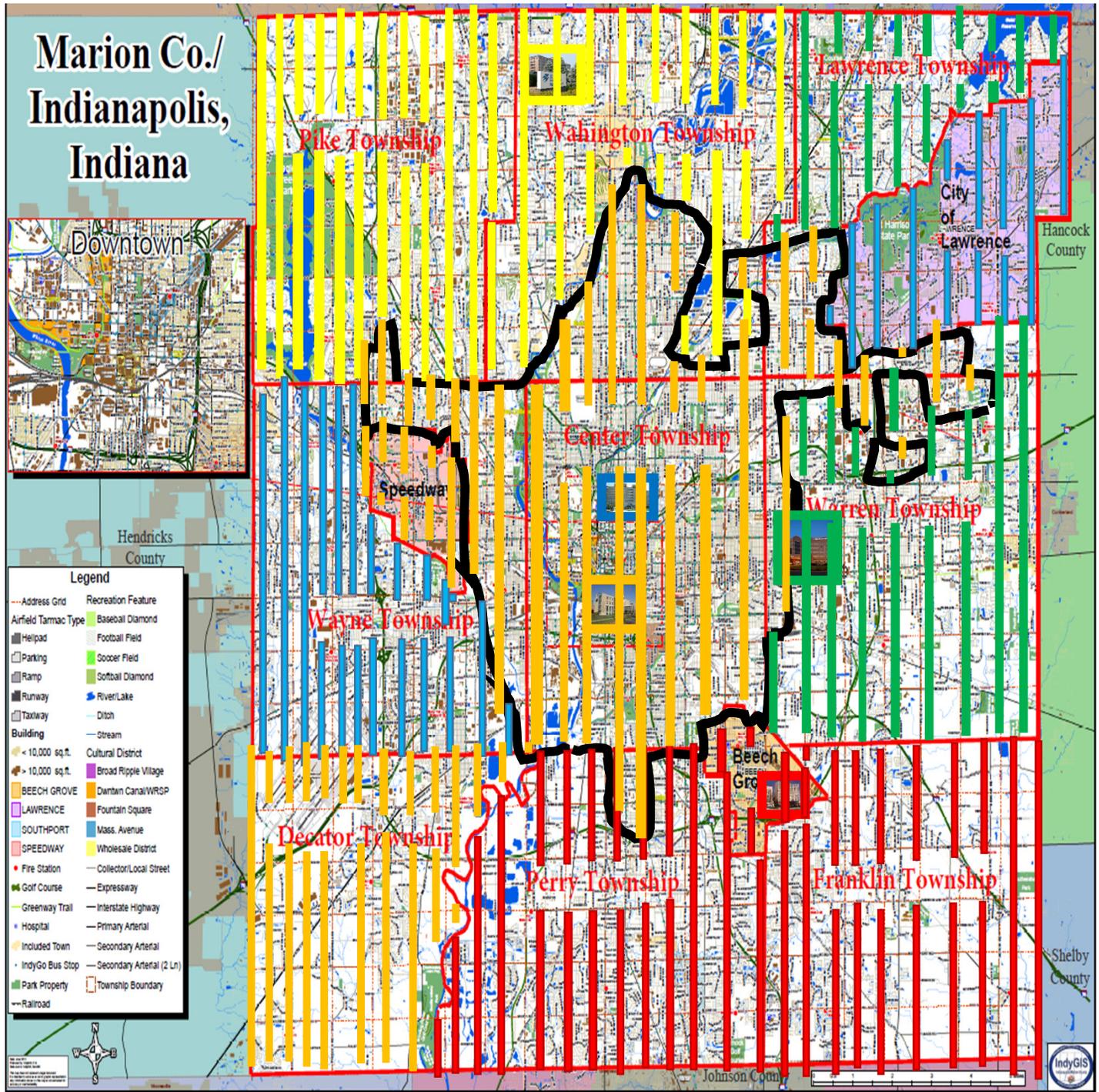


Legend

--- Address Grid	Recreation Feature
Airfield Tarmac Type	Baseball Diamond
Helipad	Football Field
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IndyGo Bus Stop	Secondary Arterial (2 Ln)
Park Property	Township Boundary
Railroad	



Marion Co./ Indianapolis, Indiana



Legend

- | | |
|----------------------|---------------------------|
| --- Address Grid | Recreation Feature |
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| Included Town | Secondary Arterial |
| IndyGo Bus Stop | Secondary Arterial (2 Ln) |
| Park Property | Township Boundary |
| Railroad | |



Facts on the Ground 1991

- **Stiff Competition existed between Hospitals to Attract Patients**
- **Especially Between the two Level I Trauma Centers that needed the trauma patients**
- **Firm Belief by Administrators that Ambulances Direct Patients to Hospitals**
- **Corollary: If an Ambulance Service gets Sponsorship and Medical Direction from a hospital they will preferentially take patients to that hospital**
- **Having the most advanced, cutting edge protocols will attract Providers to that hospital for medical direction**
 - **Wishard Hospital is teaching medics how to do saphenous vein cut downs for venous access, so Methodist has proposed teaching Central Venous Access through the Subclavian Vein**
 - **Incorporating RSI into protocols**
- **Five separate sets of protocols for twelve public safety agencies and 5 private ambulance companies within Marion County**



**Not
Safe**

Principles

- We will only adopt protocols that apply therapies which improve patient's outcome. Evidence based when possible.
- The unified protocols will be a consensus document: all medical directors must agree or the protocol does not get adopted
- We will limit the choice of pharmaceuticals to one in a class; balancing efficacy and cost.

Battles

- MAST
- IV Fluid Resuscitation in Uncontrolled Hemorrhagic Shock
- Asymptomatic Profound Hypertension

Thank you and good luck

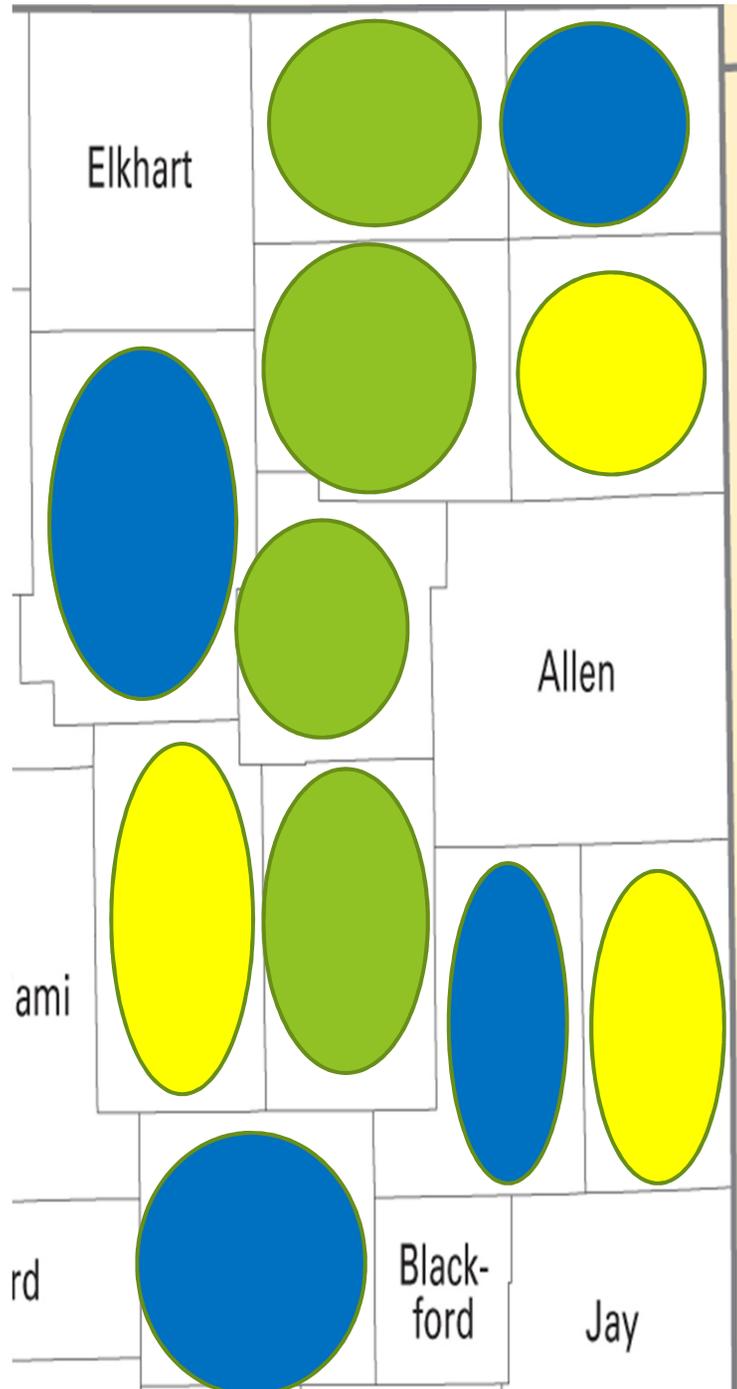


Northeast Indiana EMS Regional Protocol Project

2006 - 2015

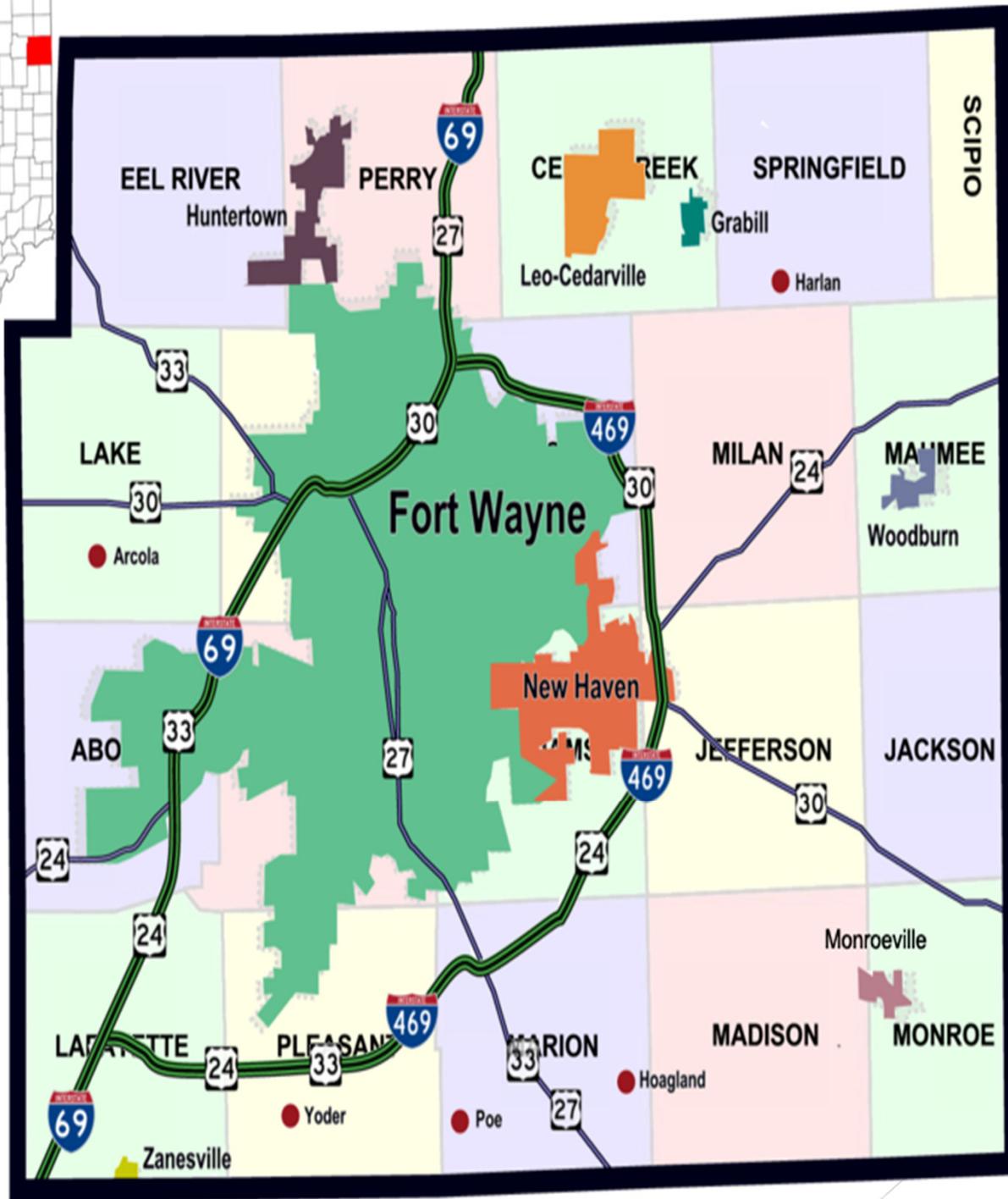
Sara Brown, MD FACEP

August 19, 2015



Independent
Hospital /
EM Group

Political Boundaries



Allen County

Benefits

- ▶ 9-11-2001
- ▶ Katrina 2005
- ▶ Local Mutual Aid
- ▶ Many providers work for more than one agency
- ▶ Standard of Care
- ▶ “NO”
- ▶ Limit medications used regionally
 - ▶ ER benefit
 - ▶ Know the medications well
 - ▶ 2 benzos / 2 opiates
 - ▶ Cost savings
 - ▶ Diversion risks
- ▶ Specialists

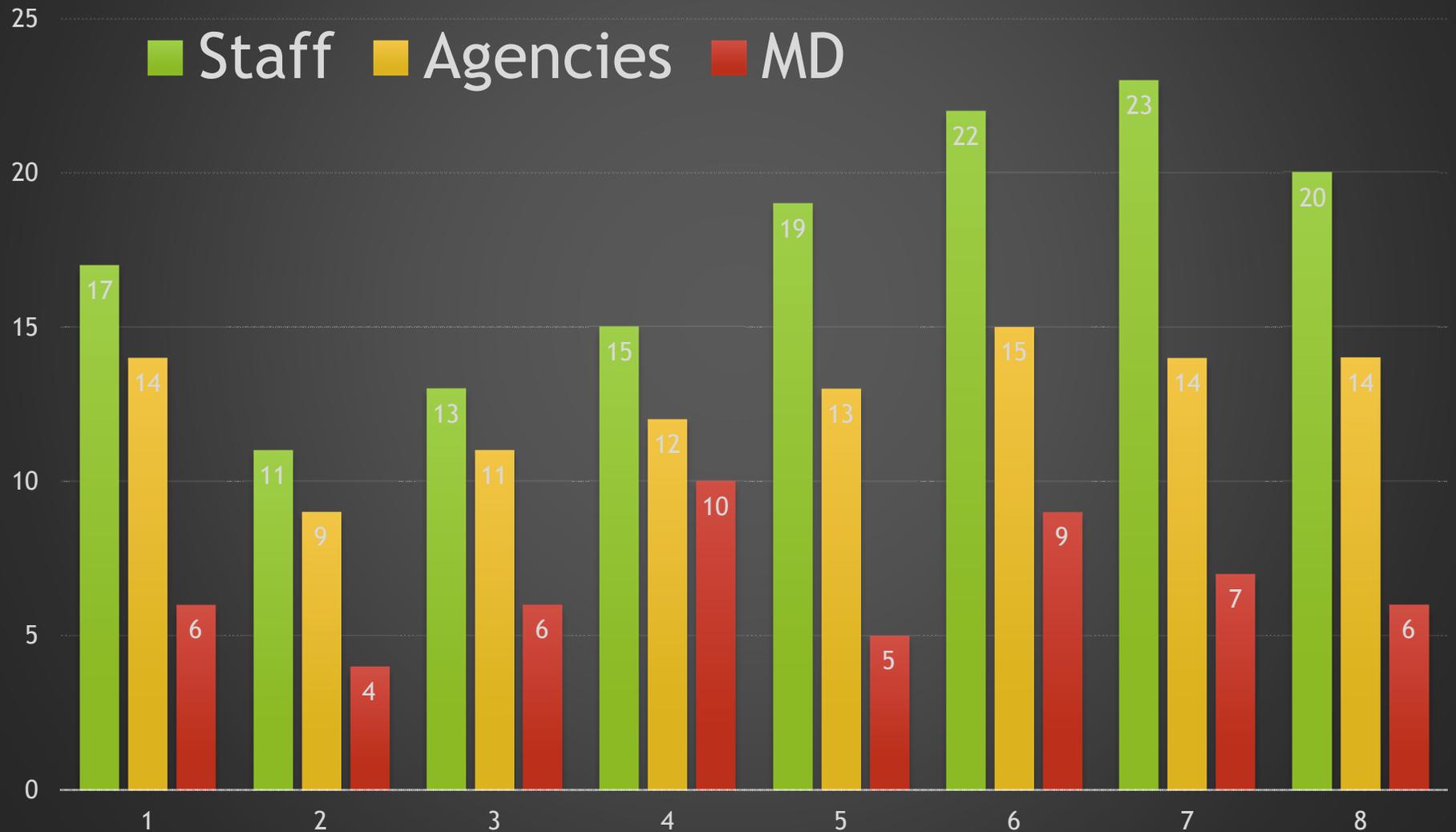
Ground Rules

- ▶ Opinion vs. Evidence Based Medicine
- ▶ Vote?
 - ▶ One vote per agency
 - ▶ Agree to disagree
- ▶ Concern of “taking over”
 - ▶ Avoid destination discussions
- ▶ Minimum Standard

Format

- ▶ Outline
- ▶ Quick Reference During Critical Situations
- ▶ Limited words
- ▶ Standing Orders vs Operational Guidelines

Attendance



Agencies Involved

- ▶ Aboite EMS
- ▶ Fort Wayne Fire Dept
- ▶ Hoagland EMS
- ▶ Hometown EMS
- ▶ Northeast
- ▶ Poe
- ▶ Southwest
- ▶ Washington Township
- ▶ Woodburn Fire

▶ Ivy Tech

- ▶ Adams County EMS
- ▶ Dekalb EMS
- ▶ LifeMed EMS
- ▶ Marion General EMS
- ▶ Miami County EMS
- ▶ Multi-Township EMS
- ▶ New Haven
- ▶ Parkview Huntington
- ▶ Parkview Lagrange
- ▶ Parkview Noble
- ▶ Parkview Whitley
- ▶ TRAA
- ▶ Wabash Fire
- ▶ Wells County

- ▶ Lutheran Air
- ▶ Parkview Samaritan

- ▶ Ball Memorial Hospital
- ▶ Dupont Hospital
- ▶ Kosciusko Hospital
- ▶ Lutheran Hospital
- ▶ Parkview Hospital
- ▶ Parkview Noble Hospital

Transport Destination

- ▶ Initially avoided transport destination discussions
- ▶ 2008 STEMI Destination Position Statement from EM / Cardiology
- ▶ 2009 CDC Trauma Triage Destination
- ▶ Burn Center

2007

- ▶ Cervical Spine Stabilization / Clearance
- ▶ (ACE Inhibitors in CHF)
- ▶ (Buccal Midazolam)
- ▶ (STEMI Bypass)
 - ▶ One ALS county did not have 12 lead capability
- ▶ (Hypothermia in Cardiac Arrest)
- ▶ Stroke Care

2008

- ▶ (Tourniquets)
- ▶ STEMI destination
 - ▶ Position document from EM / Cardiology
- ▶ Stroke Care
 - ▶ 'Optional Medications'
 - ▶ Xopenex
- ▶ Therapeutic Hypothermia
 - ▶ Ice Packs
- ▶ (Minimally Interrupted Cardiac Resuscitation)

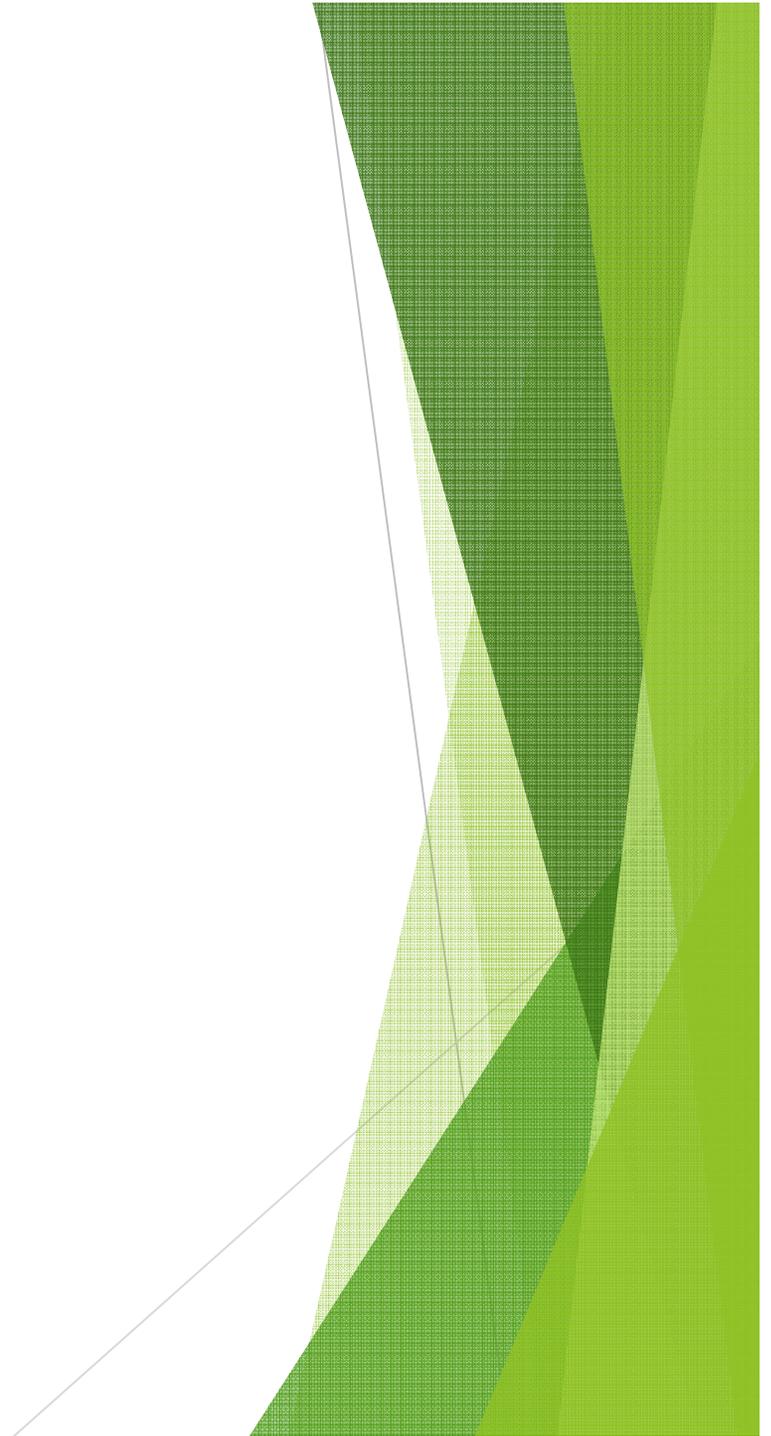
2009

- ▶ Therapeutic Hypothermia
 - ▶ Ice packs
- ▶ (CCR)
- ▶ (Lasix in CHF)
- ▶ (Morphine in ACS)
- ▶ STEMI
- ▶ Trauma Triage (CDC Guidelines)
- ▶ (Tourniquets)
- ▶ (Crush Injury Protocol)
- ▶ Intranasal Medications

2010

▶ CCR

▶ IO for Advanced EMT



2011

- ▶ AHA Changes 2010
 - ▶ CCR
 - ▶ (Snakebites)
 - ▶ Excited Delirium

2012

- ▶ Definition of Intubation attempt
- ▶ Hyperoxygenation
 - ▶ References
- ▶ Drug Shortages
- ▶ Trauma Arrest

2013

- ▶ Spinal Stabilization
- ▶ CPR during transport
- ▶ Termination of Resuscitation
- ▶ STEMI heparin
- ▶ Seizures
 - ▶ RAMPART

2014

▶ Pediatric Protocols

▶ TXA

▶ Norepinephrine

▶ Sepsis /SIRS screen

▶ POST

▶ (Ketamine)

▶ (Iced Saline)

▶ (Double Sequential
Defibrillation)

2015

- ▶ D10
- ▶ Ketamine
 - ▶ ED only
- ▶ (Pediatric Handtevy)
- ▶ TXA
- ▶ Termination of Resuscitation
 - ▶ Up to 45 minutes
- ▶ Hemostatic gauze

Break



Indiana University Health

ESKENAZI
HEALTH



@INDTrauma

#EMSMDConf2015

#coffeebreak



Imagine a World without Backboards and Collars

Dr. Marvin Wayne, Bellingham Fire Department



Pediatric Updates

Dr. Elizabeth Weinstein, IU School of Medicine

@INDTrauma

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#Peds

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Pediatric EMS Literature Update

Elizabeth Weinstein, MD

Deputy Medical Director, Pediatrics Indianapolis EMS
Associate Professor Clinical Emergency Medicine and
Pediatrics, IU School of Medicine



INDIANA UNIVERSITY

DEPARTMENT OF EMERGENCY MEDICINE
School of Medicine

No Disclosures

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Objectives

Work Force

Pediatric Population

Anaphylaxis

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***“Everything is harder. Period.
History’s harder, physical exam is
harder. Treatments are harder. IV
access is harder. Everything is
harder.”***

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Pediatric Educational Needs Assessment for Urban and Rural EMTs, PEC 2011

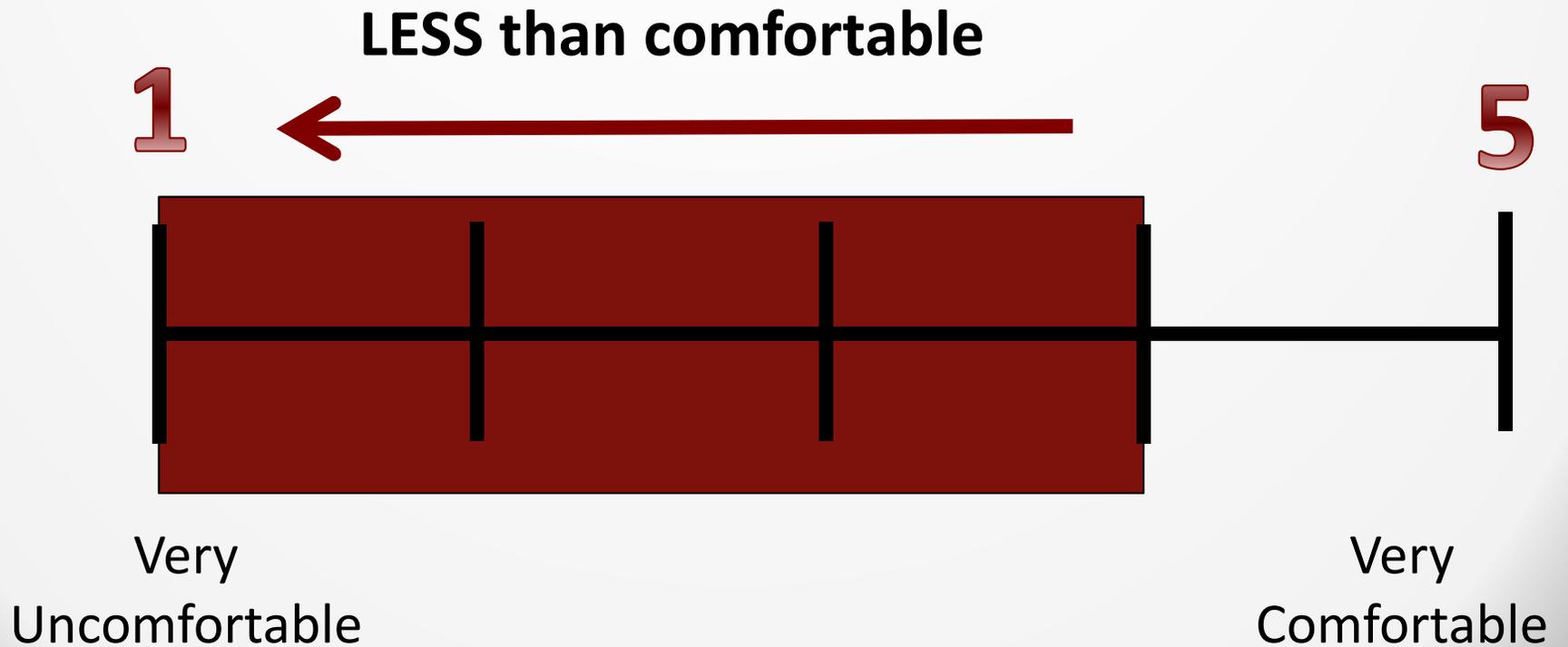
- Survey of Oregon EMS Providers
- 219/313 completed
- All levels of provider
- Average of 14 years of experience

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Educational Needs, 2011



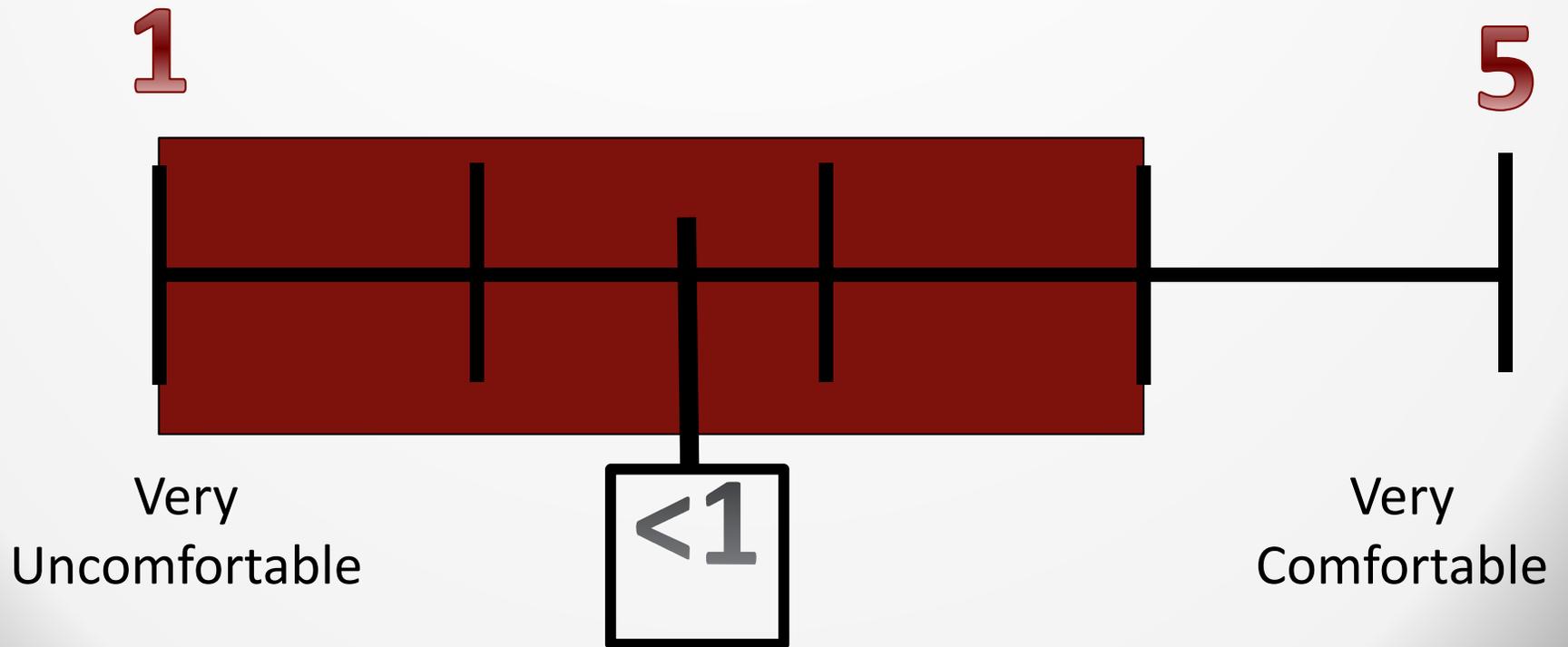
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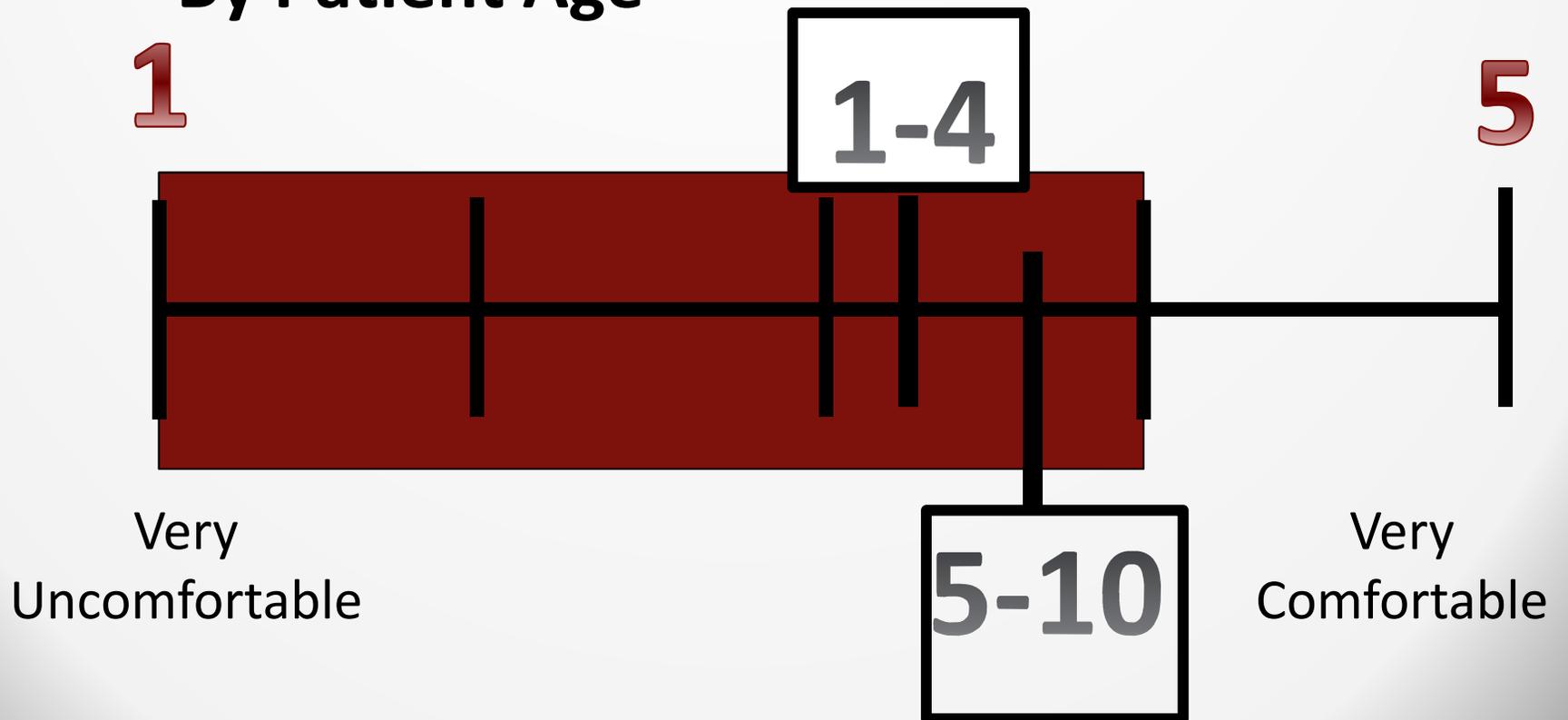
Educational Needs, 2011

By Patient Age



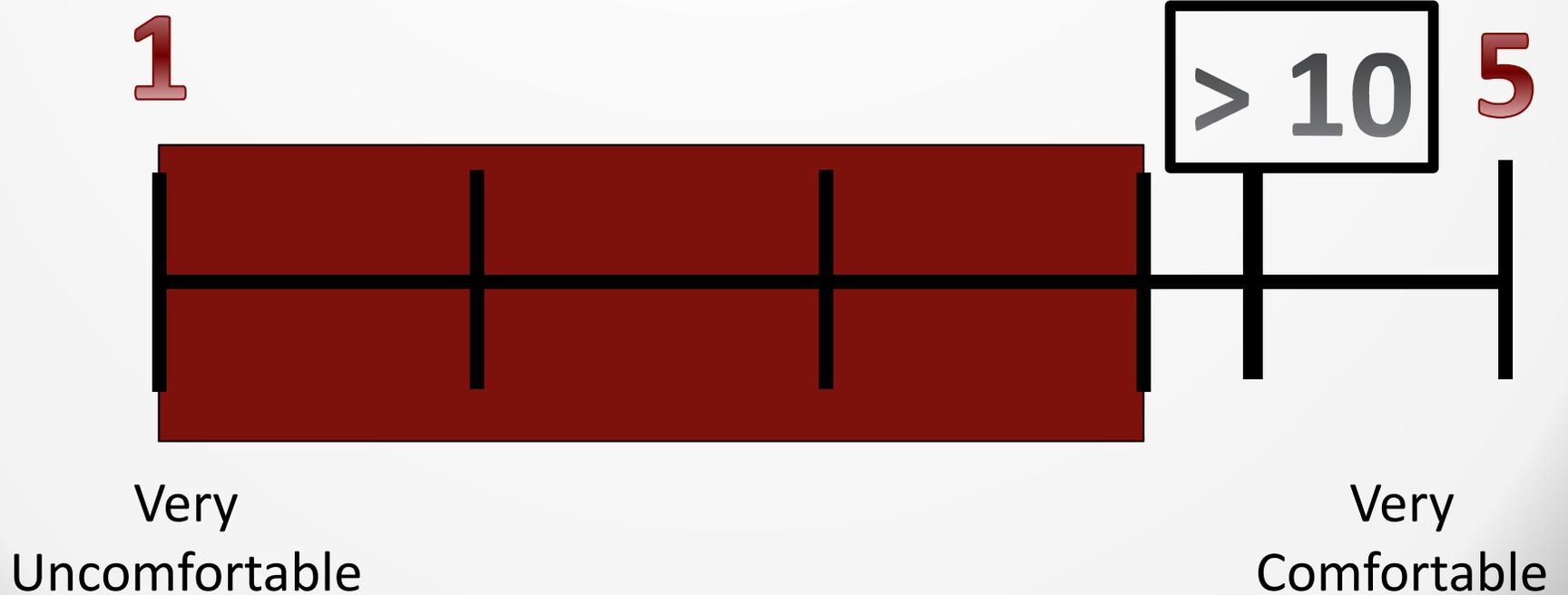
Educational Needs, 2011

By Patient Age



Educational Needs, 2011

By Patient Age



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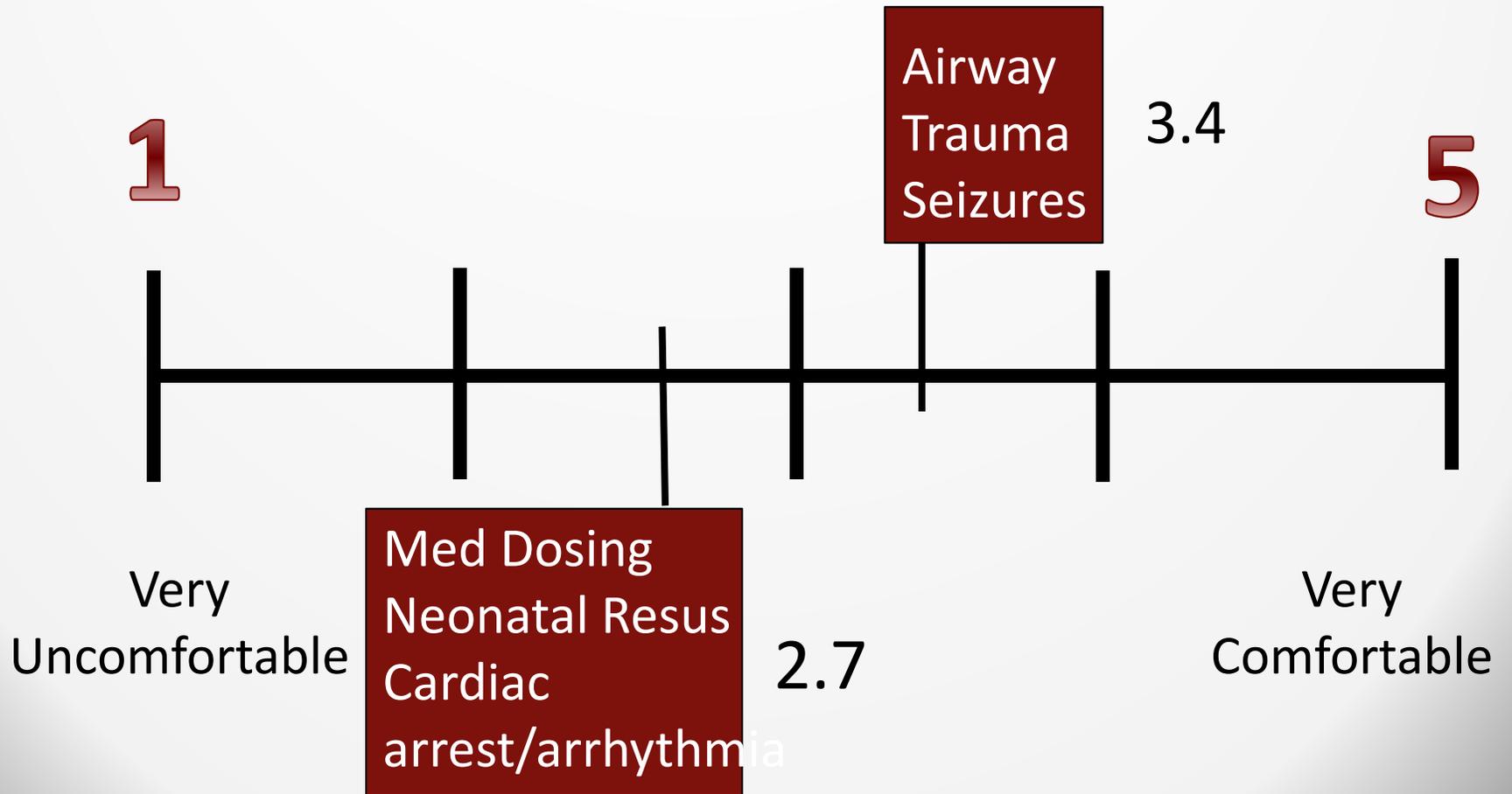
Only **28%** reported that they
were **comfortable** or **very**
comfortable with pediatrics

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Educational Needs, 2011



Other Educational Assessments

- Priorities for education:

- Airway management
- Neonatal Resuscitation
- Decision making

Skills

- Airway
- Med delivery
- IV/IO
- Immobilization

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76% wanted more peds
education

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Required Pediatric Education Hours

	EMT	Paramedic
Recertification	63%	67%

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Required Pediatric Education Hours

	EMT	Paramedic
Initial Certification	7.5 hours	24 hours
Recertification	4 hours	8 hours

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Summary of Provider Needs

- **More education**
- **Airway, Neonatal Resus & decision making**
- **THE VERY YOUNG**
- **Cardiac arrest**
- **Various Procedures**

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Old News: Children account for ~ 10% of EMS runs nationally

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Prehospital Pediatric Care: Opportunities for Training, Treatment and Research, PEC 2015

- Retrospective review
- NEMESIS compliant Database
- Large metropolitan EMS system
- Pediatric Runs (<19 yrs)

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Prehospital Pediatric Care, 2015

- 9,956 transports (8.7% total calls)
- 44% ALS
- 23% lights and sirens
- Average on-scene time 16 minutes
- Average transport time 11 minutes

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Prehospital Pediatric Care, 2015

Top complaints (NEMESIS categories)

- Other 16.1%
- Respiratory distress (13.7%)
- Seizure (12.4%)
- Blunt trauma (12%)

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Prehospital Pediatric Care, 2015

TABLE 1. The 20 most common primary working assessments by patient age

Primary working assessment	All ages n = 9,956	<1 year n = 1,081	1 to <5 years n = 2,243	5 to <10 years n = 1,264	10 to <15 years n = 1,685	15 to <19 years n = 3,683
1. Other	1,598	232 (2nd)	286 (3rd)	178	271 (2nd)	631 (1st)
2. Respiratory distress*	1,359	419 (1st)	412 (2nd)	121	134	273 (3rd)
3. Seizure*	1,239	79 (3rd)	535 (1st)	183 (3rd)	178 (3rd)	264
4. Trauma – blunt*	1,191	44	163	194 (2nd)	319 (1st)	471 (2nd)
5. Asthma*	794	23	190	258 (1st)	135	188
6. Trauma unidentified (minor)*	458	17	46	65	122	208

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Pediatric Prehospital Care, 2015

Interventions:

- Glucometry (16.9%)
- Medication delivery (13.6%)
 - Seizure, asthma, trauma
- IV placement (11.5%)
- C-spine immobilization (3.8%)
- CPR (0.4%)
- BVM (0.4%)
- Advanced Airway (0.4%)
- Traction Splint (<0.1%)

Characteristics of the Pediatric Patients Treated by the PECARN Affiliated EMS Agencies, PEC 2014

- 14 agencies
- 11 states
- 2 HEMS
- 12 Ground (514,880 transports)
- NOT all agencies provided all data

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PECARN, 2014

- Average age 9.6 years
- 53% Male
- 48% ALS Transports

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PECARN, 2014

Top Calls Ground EMS:

- **Trauma 26%**
- **Respiratory Distress 10.9%**
- **Pain nonchest/nonabdomen 10.5%**
- **Seizure 9%**

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PECARN, 2014

< 1 year of life (11.4%)

- Respiratory distress (22.4%)
- Trauma (12.6%)
- General illness (16.2%)

- **Cardiac arrest (4%)**

PECARN, 2014

1-5 years (22.6%)

- Trauma (22.8%)
- Seizure (18%)
- Respiratory distress (12.6%)

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PECARN, 2014

Top Interventions

- Vascular access 14%
- Asthma meds 3%
- Pain meds < 1%
- Assisted ventilation < 1%
- Seizure medications < 1%
- Advanced airway < 1%
- CPR < 1%

Out-of-hospital pediatric airway management in the U.S., Resuscitation 2015

2012 NEMESIS Data from 40 states

- Patients < 18 years old
- 949,301 pediatric care events
- 42,936 (4.5%) airway interventions

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Pediatric Airway, 2015

14, 107 (1.5 %) invasive airway interventions

- ETI (3124)
- BVM (2884)
- Other ventilation (8881)
- Extraglottic (389)
- CPAP/BiPAP (649)
- Cricothyroidotomy (62)

Pediatric Airway, 2015

Other airway interventions:

- OP 2114
- NP 13,710
- Neb 9061
- Suction 5755
- FB removal 20

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Pediatric Airway, 2015

Intubation

- 29.9% in kids < 1 year old
- 83.6% in urban areas
- 1st pass success: 68.9% (81.1% overall)
- Quant. capnography was used in 22.2%

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Pediatric Airway, 2015

35% of the cardiac arrests in the cohort occurred in children < 1 year

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- **Respiratory, trauma, seizure**
- **Cardiac arrest < 1**
- **Procedures in the very young**
- **Airway management**
- **Overall procedural competency**

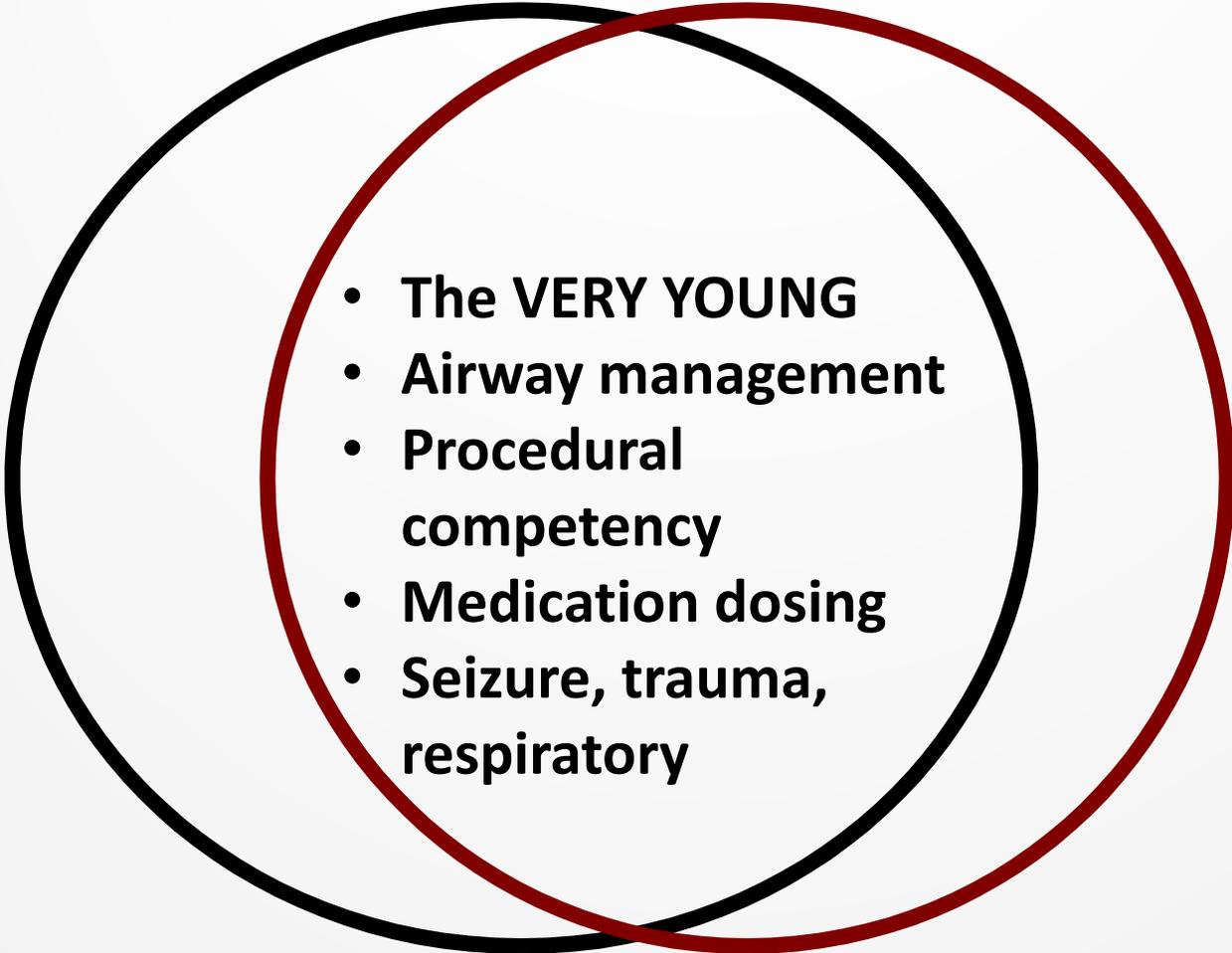
Provider Identified Needs

- **More education**
- **Airway, Neonatal Resus & decision making**
- **THE VERY YOUNG**
- **Cardiac arrest**
- **Various Procedures**

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- 
- **The VERY YOUNG**
 - **Airway management**
 - **Procedural competency**
 - **Medication dosing**
 - **Seizure, trauma, respiratory**

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Anaphylaxis is on the rise...

From 2006 – 2009, hospital encounters increased from 25,000 to 30,000 annually. ISMA in 2014, cited 82,000 annually.

Time to Epinephrine matters most

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Pediatric Anaphylaxis Management in the Prehospital Setting, PEC 2014

- Retrospective chart review
- 218 cases
- Defined by 2006 Second National Institute of Allergy and Infectious Disease/Food Allergy and Anaphylaxis Network Symposium Consensus Statement

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1. Acute onset of illness involving skin, mucosal tissue, or both (hives, pruritis, flushing, swollen lips, tongue, uvula [including subjective symptoms of throat pain, itching, tightness^a]) and at least one of the following:
 - A. Respiratory compromise (dyspnea, wheeze, stridor, hoarseness, reduced peak expiratory flow, hypoxemia)
 - B. Reduced blood pressure (BP)^b or associated symptoms of end-organ dysfunction (syncope, incontinence)
2. Two or more of the following that occur rapidly after exposure to a likely allergy:
 - A. Involvement of the skin–mucosal tissue (described above)
 - B. Respiratory compromise (described above)
 - C. Reduced BP or associated symptoms (described above)
 - D. Persistent gastrointestinal symptoms (crampy abdominal pain, vomiting)
3. Reduced BP after exposure to known allergen for that patient

Pediatric Anaphylaxis Management in the Prehospital Setting, PEC 2014

- 90 of 218 via EMS
 - 44 received epi prior to EMS arrival
 - 7 did not meet 2006 anaph.criteria
 - **14/39 (36%) remaining had epi by EMS**

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Peds Anaphylaxis, 2014

The 39

- 41% received diphenhydramine
- 36% received Epi
- 32% received albuterol
- 14% received oxygen
- 5 % received IVF

*Mean time from EMS arrival on scene to
ED: 28 minutes*

Peds Anaphylaxis, 2014

- 117 with parents at time of reaction
 - 48 had parental/self admin of epi
- 13 were seen in PMD office all had epi
- 26 at school
 - 18 (69%) got epi from school RN

School RN had higher rates of admin c/w ems and parents (p=0.016)

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Peds Anaphylaxis, 2014

NO difference in epi admin based on organ systems involved or allergen

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Peds Anaphylaxis, 2014

Protocol used by MOST responding agencies:

Establish IV and start fluids

Severe Respiratory Distress

Albuterol

Benadryl

Severe Cardiopulmonary Compromise

IM Epi

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Peds Anaphylaxis, 2014

The 39

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- 5 % received IVF

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Anaphylaxis Knowledge Among Paramedics: Results of a National Survey PEC 2012

- Cross-sectional on-line survey
- Recognition of anaphylaxis
- Confidence in management abilities
- Management decisions
- Random sample through NREMT
 - 3,537 respondents (36.6% response rate)
 - 82.5% \geq 5 years experience

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Anaphylaxis Knowledge, 2012

- 98.9% correctly identified classic
- 2.9% identified atypical case

- Overall, 10-20% have no skin findings

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Anaphylaxis Knowledge, 2012

Overall, 10-20% have no skin findings

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97.1% confident in management

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Only 46.2 % identified epi as
initial drug!

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Anaphylaxis

- Bottom line. We suck at this.
- Need better protocols.
- Need better education.

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Take Home

- Provider self assessment and population characteristics can drive education and protocol development
- Give EPI

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Questions

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References

1. Cottrell, E et al. Understanding Safety in Prehospital Emergency Medical Services for Children. *Pediatr Emer Care* 2014; 18 (3): 350-358.
2. Drayna, P et al. Prehospital Pediatric Care: Opportunities for Training, Treatment, and Research. *Pediatr Emer Care* 2015; 19 (3): 441-447.
3. Fleischman, R et al. Pediatric Educational Needs Assessment for Urban and Rural Emergency Medical Technicians. *Pediatr Emer Care* 2011; 27 (12): 1130-1135.
4. Gausche-Hill, M et al. Paramedics Accurately Apply the Pediatric Assessment Triangle to Drive Management. *Pediatr Emer Care* 2014; 18(4): 520-530.
5. Hansen, M et al. Children's Safety Initiative: A National Assessment of Pediatric Educational Needs Among Emergency Medical Services Providers. *Pediatr Emer Care* 2015; 19 (2): 287-291.
6. Hansen M et al. Out-of-hospital pediatric airway management in the United States. *Resuscitation* 2015; 90: 104-110.
7. Jacobson, R et al. Anaphylaxis Knowledge Among Paramedics: Results of a National Survey. *Pediatr Emer Care* 2012; 16 (4): 527- 534.
8. Lerner, E. et al. Characteristics of the Pediatric Patients Treated by the Pediatric Emergency Care Applied Research Network's Affiliated EMS Agencies. *Pediatr Emer Care* 2014; 18 (1): 52-59.
9. Ngo, T et al. EMSC Program Manager Survey on Education of Prehospital Providers. *Pediatr Emer Care* 2014; 18(3): 424-428.
10. Tiyyagura, et al Pediatric Anaphylaxis Management in the Prehospital Setting. *Pediatr Emer Care* 2014; 18 (1): 46-51.



EMS Case Reports from Emergency Medicine Residents

Dr. Andrew Stevens, IU School of Medicine



@INDTrauma #IndianaEMSMD2015 #casestudy #Stevens

173

Disclosure

- **There are no relevant financial relationships to disclose**
- **Topics discussed in this lecture are components of the emergency medicine core curriculum as defined in the 2007 Model of the Clinical Practice of Emergency Medicine (American Board of Emergency Medicine (ABEM) website)**
- **The content of this lecture was developed following an extensive literature search and is the most up to date, evidence-based information available**



INDIANA UNIVERSITY

DEPARTMENT OF EMERGENCY MEDICINE

Division of Out-of-Hospital Care
School of Medicine



**EMS Case Reports:
IU School of Medicine
Department of Emergency
Medicine
EMS Track Residents**

Andrew C. Stevens, M.D.

Assistant Professor Emergency Medicine

Longitudinal Emergency Medical Services Track Curriculum For Emergency Medicine Residents Improves EMS Medical Direction Career Placement

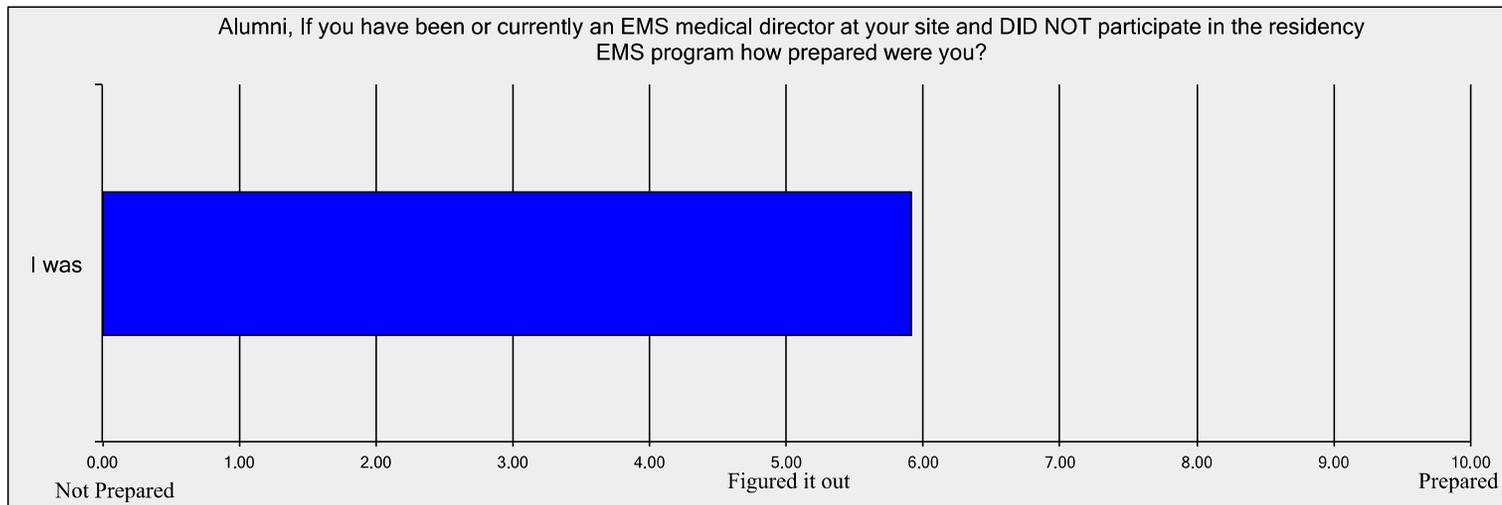
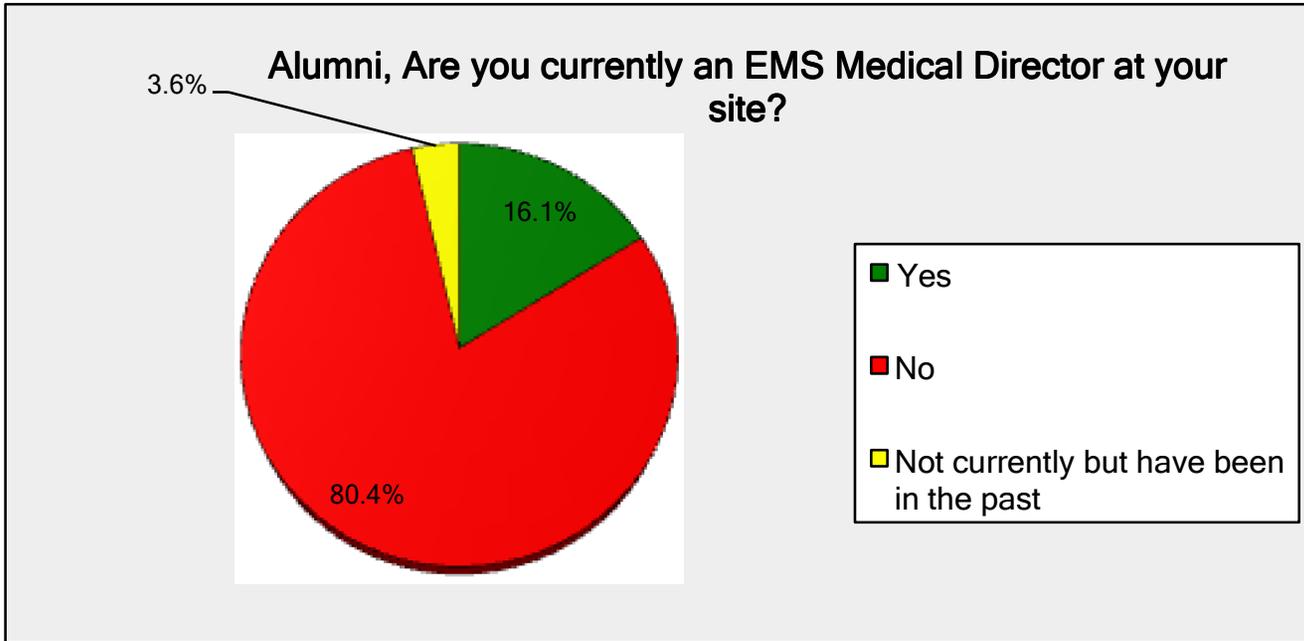
Andrew Stevens MD, Dan O'Donnell MD, Charlie Miramonti MD, Michael Olinger MD
Division Out of Hospital Care, Indiana University School of Medicine, Indianapolis,
Indiana

The Journal of Emergency Medicine. August 2011; 4(2): 207.

#IndianaEMSMD2015 #casestudy #Stevens

INTRODUCTION

- All residency trained emergency medicine (EM) physicians participate in mandated emergency medical services (EMS) education.
- Often EM physicians are asked to assume medical director roles.
- We hypothesized that longitudinal EMS resident education provides a better model for career sustaining EMS medical director concepts.



METHODS

We designed a survey to assess baseline EMS medical directorship participation. The survey was electronically administered to a cohort of EM alumni from a single academic EM institution. Survey feedback was utilized in developing a novel curriculum in 2010. This longitudinal EMS track curriculum requires residents to assume a 2-year EMS medical directorship in a large urban EMS system. Graded experience is acquired through the following components:

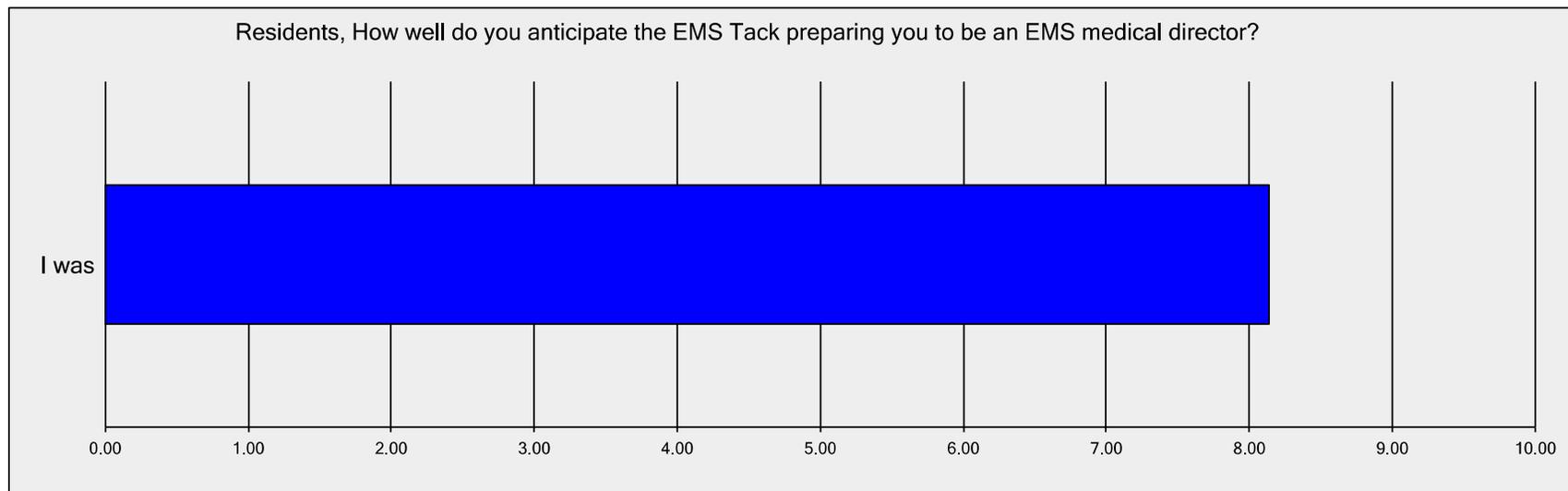
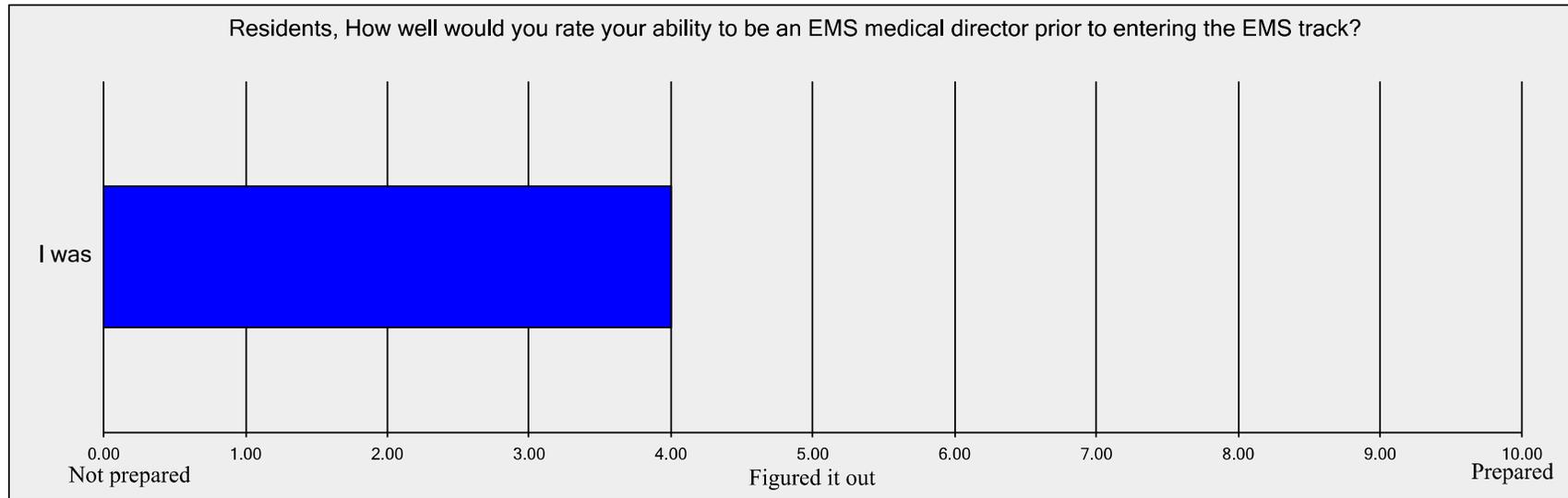
1. Active member of a resident-paramedic pre-hospital ambulance unit (PGY-2)
2. Independent pre-hospital supervisory provider unit (PGY-3)
3. Participation in an EMS subspecialty niche
 - i) Motorsports Medicine
 - ii) Tactical EMS
 - iii) Mass Gathering Medicine
 - iv) Aeromedicine
4. Quarterly meetings, improvement projects, faculty mentors
5. Completion of scholarly and administrative projects
6. Completion of the National Association of EMS Physicians-Medical Directors' Course as a capstone experience

We surveyed alumni and residents to evaluate the effectiveness of this curriculum on EMS aptitude.

Department of Emergency Medicine



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RESULTS

Pre Track Survey: 56 alumni participated in the survey (37% response rate) of these, 11 (19%) self identified as EMS medical directors.

Post Curriculum: Thirty-Two residents have completed the EMS track curriculum from 2010 to 2015 and of these, 24 (75%, $p < 0.0001$) were successfully placed. Fifteen (63%) as EMS medical directors and 9 (37%) as fellows post graduation

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CONCLUSIONS

- Longitudinal EMS track curricula with graded responsibilities provides a better model to teach director skills during residency.
- This model enhances EMS career development and better prepares emergency medicine resident graduates for fellowship and medical director roles.

The future...



Class of 2017: 18 of 20 (90%) participation in the EMS Track

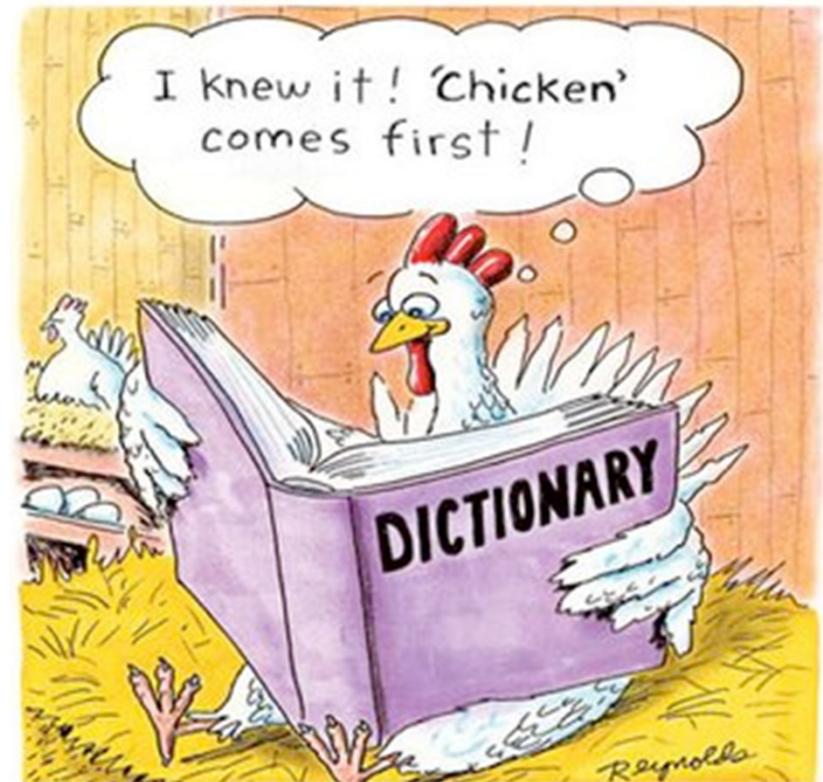


Traumatic Cardiac Arrest – A case of the chicken or the egg.. AKA the crash or the arrest...

Kacey Kronenfeld, MD
PGY3, Indiana University
Emergency Medicine Residency

Disclosure

- There are no relevant financial relationships to disclose
- The content of this lecture was developed following an extensive literature search and is the most up to date, evidence-based information available



Called to scene of single car MVC

22yoAAM driver
SUV at witness
reported high
speeds

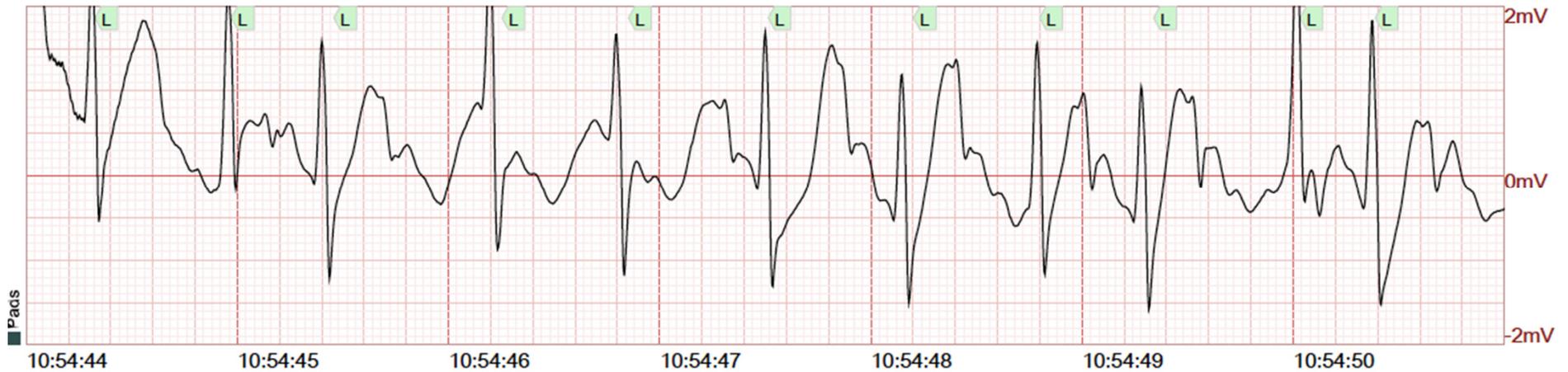




- Patient apneic, unresponsive, pulseless
- SHOULD RESUSCITATION BE INITIATED??

- AED attached → 2 shocks given
- C-collar placed, IV access obtained, 1 round epi given, open IVF
- King airway placed with EtCO2
44

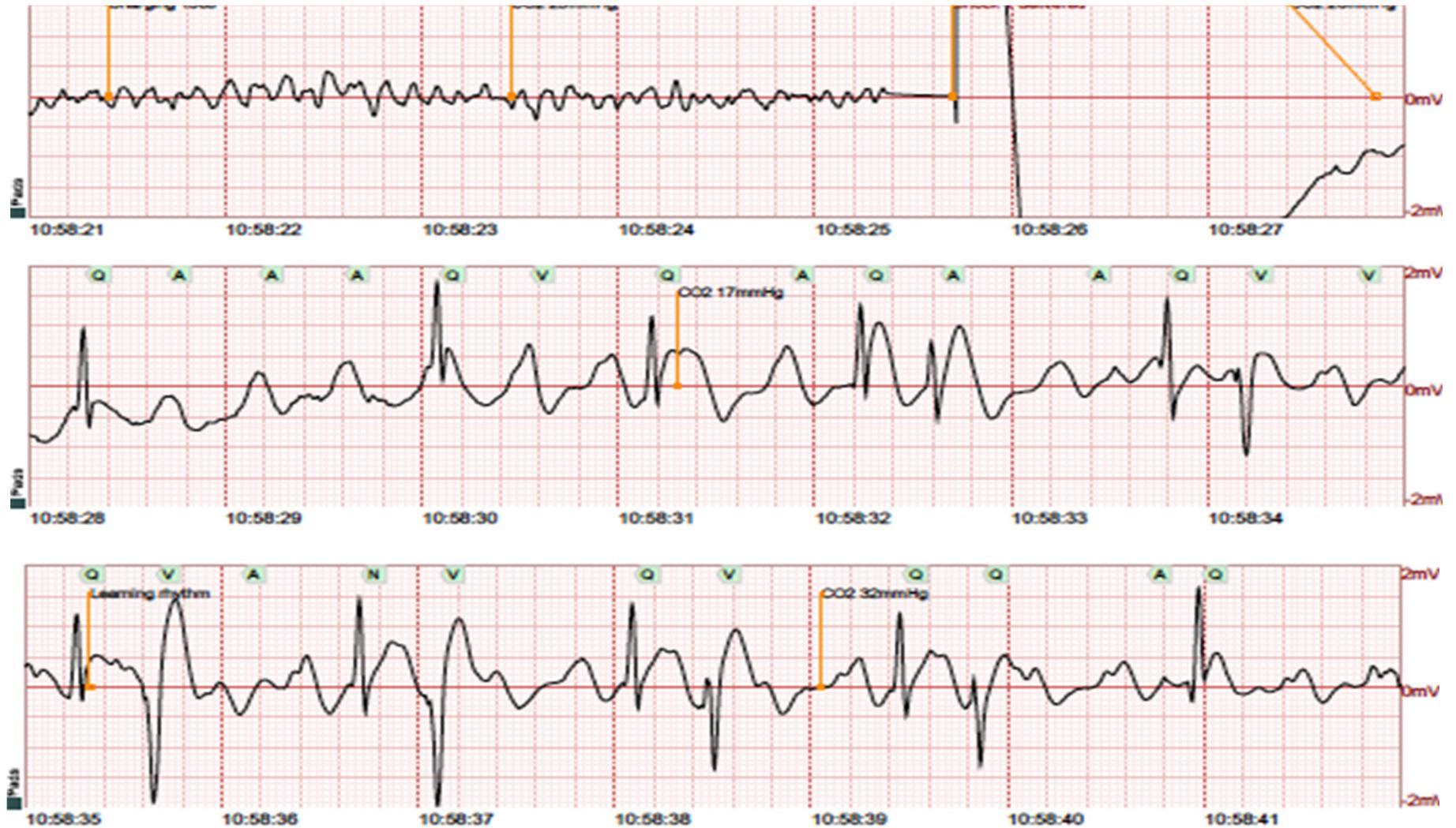




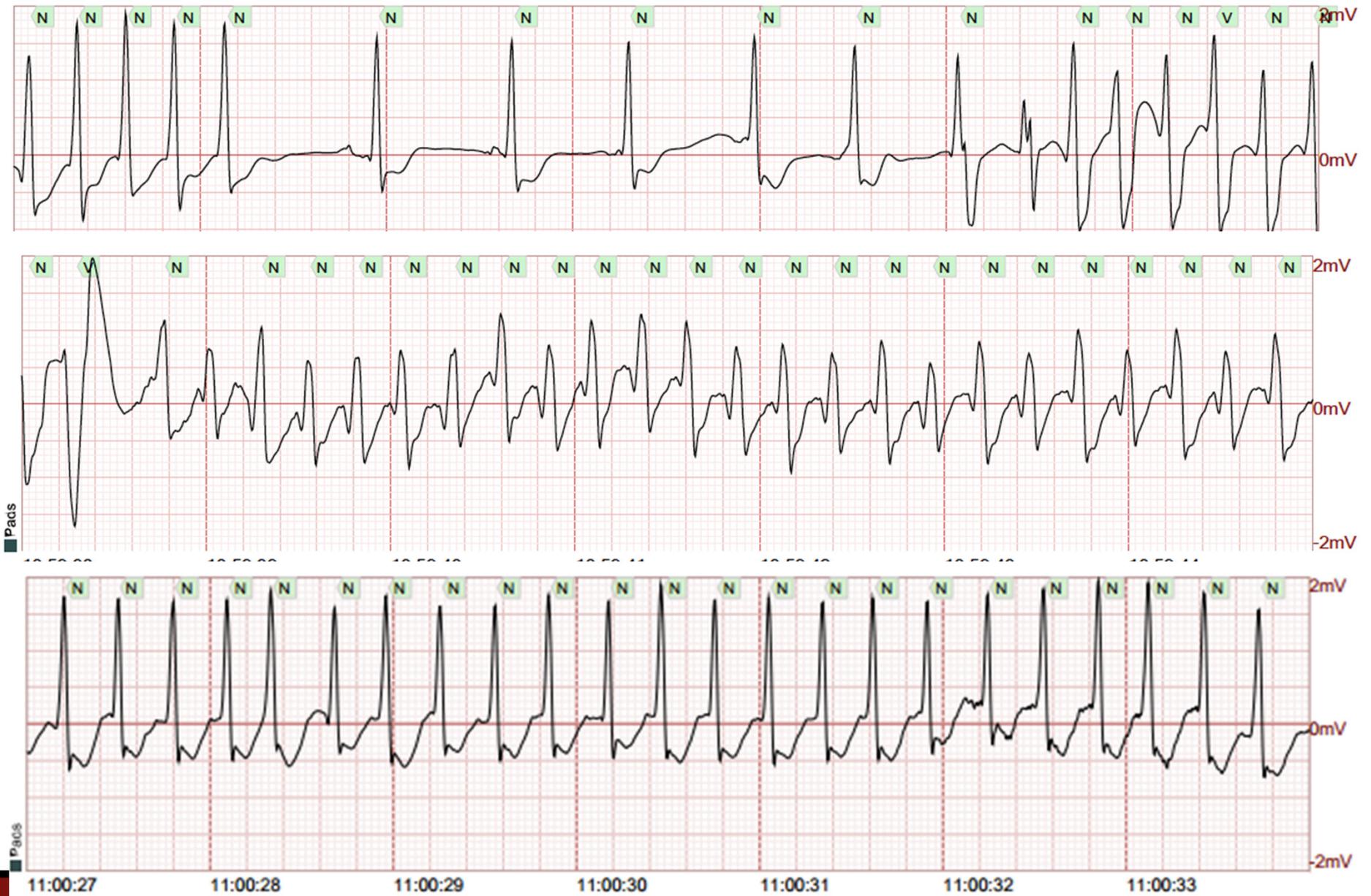
- SHOULD RESUSCITATION EFFORTS BE CONTINUED?
- WHAT ETIOLOGIES ARE WE CONCERNED ABOUT?

PHYSICAL EXAM

- Skin: two small lacerations to face, no active bleeding
- Pulm: breath sounds bilaterally, EtCO₂ good waveform
- Abd: distended
- GU: urinary incontinence
- Otherwise unremarkable



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- Amiodarone 150mg IV push given en route to ED
- **WOULD YOU HAVE GIVEN AMIODARONE?**

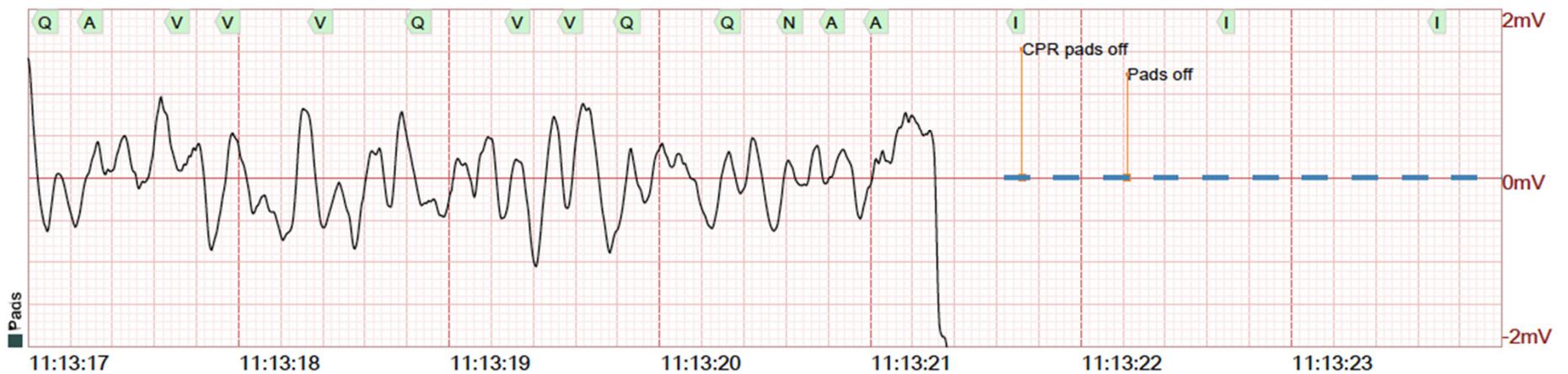
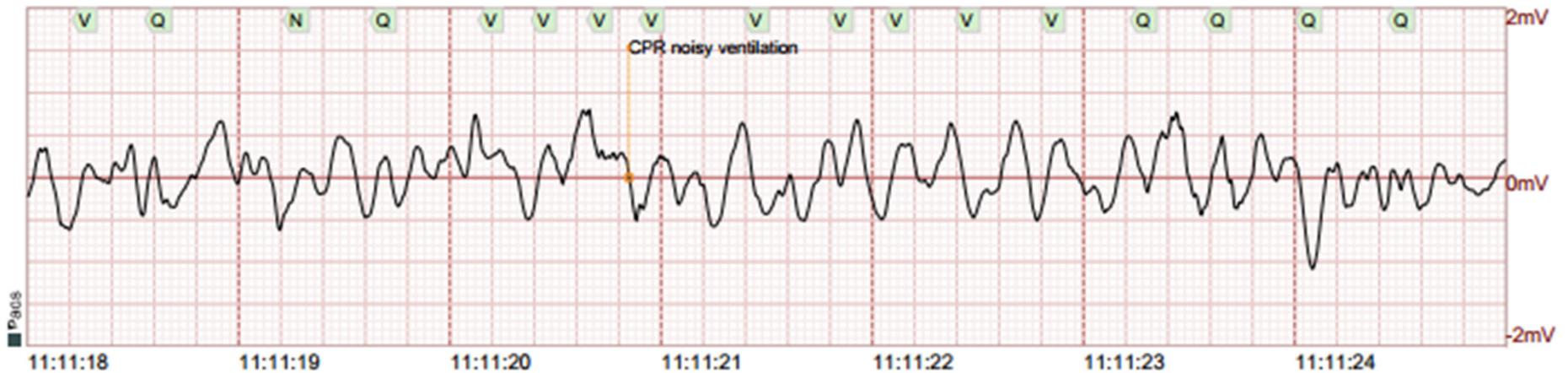


PULLING INTO THE PARKING LOT...



- Unable to obtain blood pressure, pulses lost
- Sinus PEA → CPR resumed, additional IV access obtained, 1mg Epi given

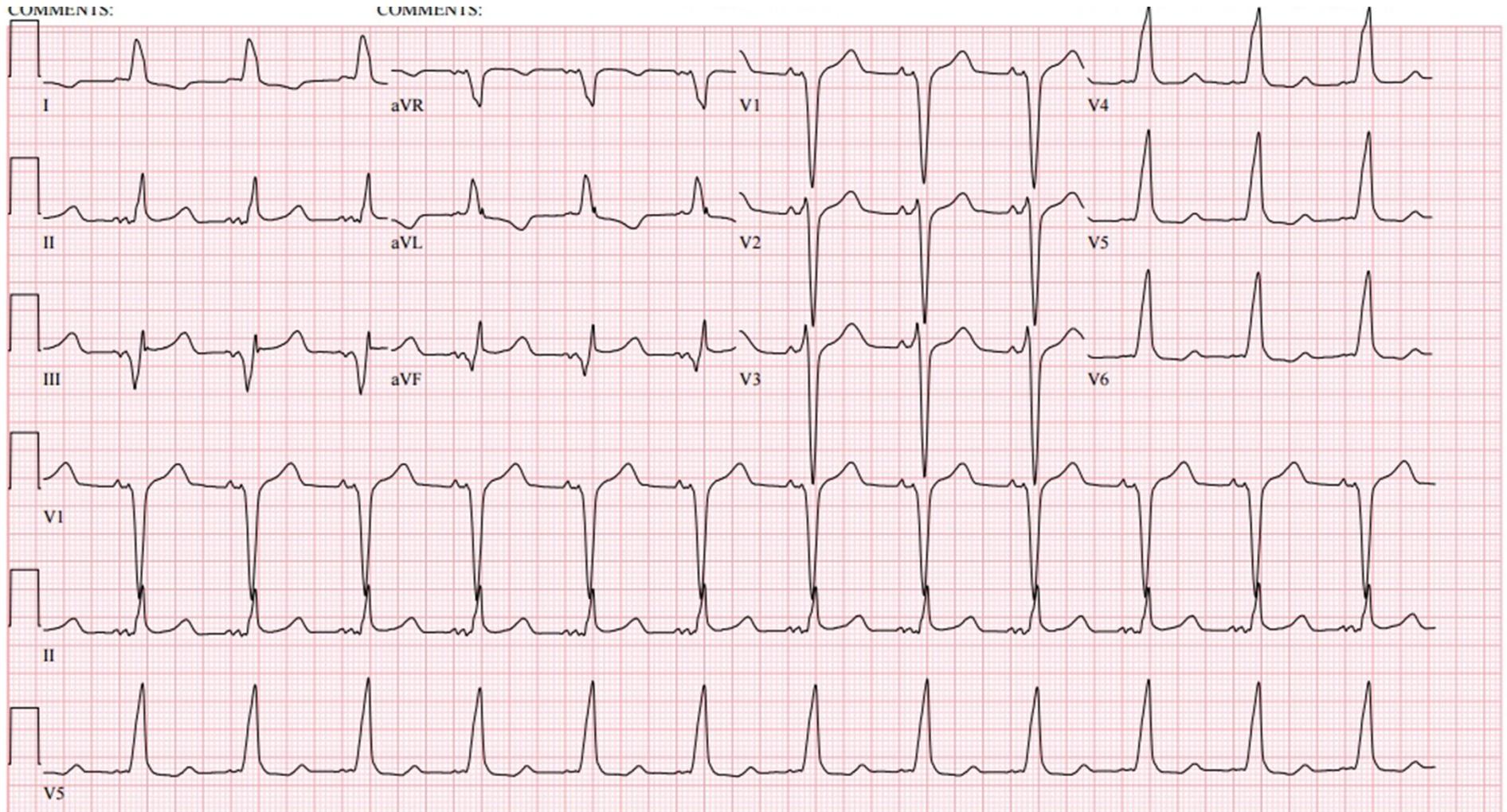
HAND OFF...



Case resolution

- ROSC was obtained in the ED after a total of approximately 30 minutes of CPR
- No traumatic injuries were found
- Admitted to the ICU





Case resolution

- Underwent ablation of 2 accessory pathways
- Prolonged complicated ICU stay
 - Acute stress cardiomyopathy with EF 30%
 - LE DVT with ischemic areas on right foot
 - Left thalamic stroke with residual balance issues
 - Acute respiratory failure with pneumonia, pneumothorax
 - Acute kidney failure
 - Selective mutism
- Released 2.5 weeks after admission walking, talking wearing a LifeVest
 - Amnestic to event – last remembers his sister's wedding 2 weeks prior!

Discussion

- 22yoM with cardiac arrest – Is this heart disease? Is it something else?
- Traumatic arrest? Police had a pulse, but pulseless upon arrival of EMS – should we have worked the arrest? Is this a traumatic arrest? Chicken or the egg...

Indianapolis EMS Cardiac Arrest Stats 2014

	Etiology	Age 18-29	Age 30-39
	Presumed Cardiac		
	Male	6	5
	Female	3	0
	Respiratory		
	Male	4	3
	Female	2	3
	Not Known		
	Male	12	18
	Female	14	12
	Total	41	41

38%
43%

Total Working
Total ROSC
Total Transpor

Figure 1. Distribution of causes of SD ≤ 40 years in the general population in clinicopathological series published between 1990 and mid-2009 using various definitions of SD (n=486 and n=1342).^{5,9,15–20} The left part of the graph shows the distribution of cardiac, noncardiac, and unknown causes of SD ≤ 40 years in the general population when the clinicopathological series using the usual definition of SD, that is, natural unexpected death within 1 hour of the onset of symptoms, and published between 1990 and mid 2009 are pooled.

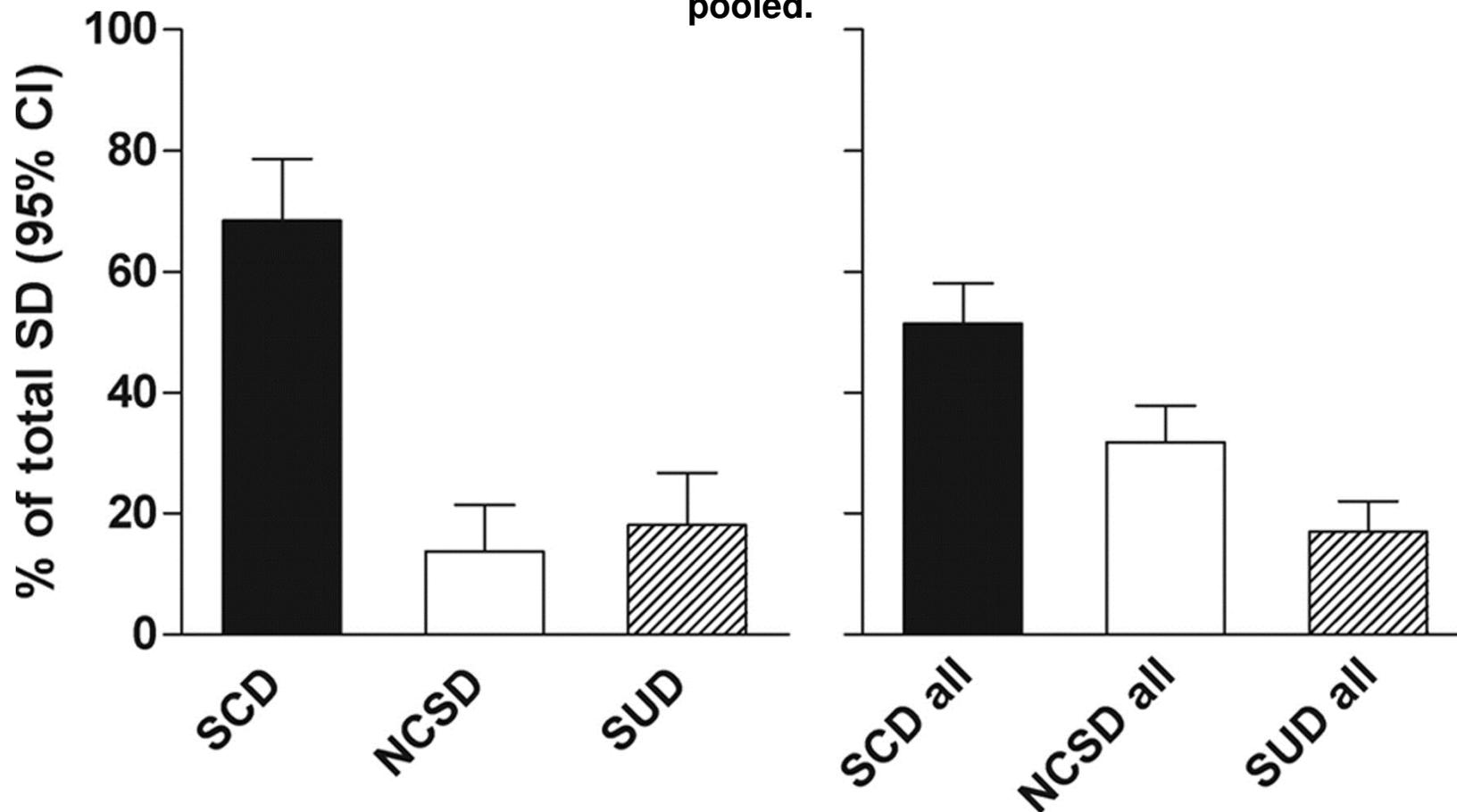
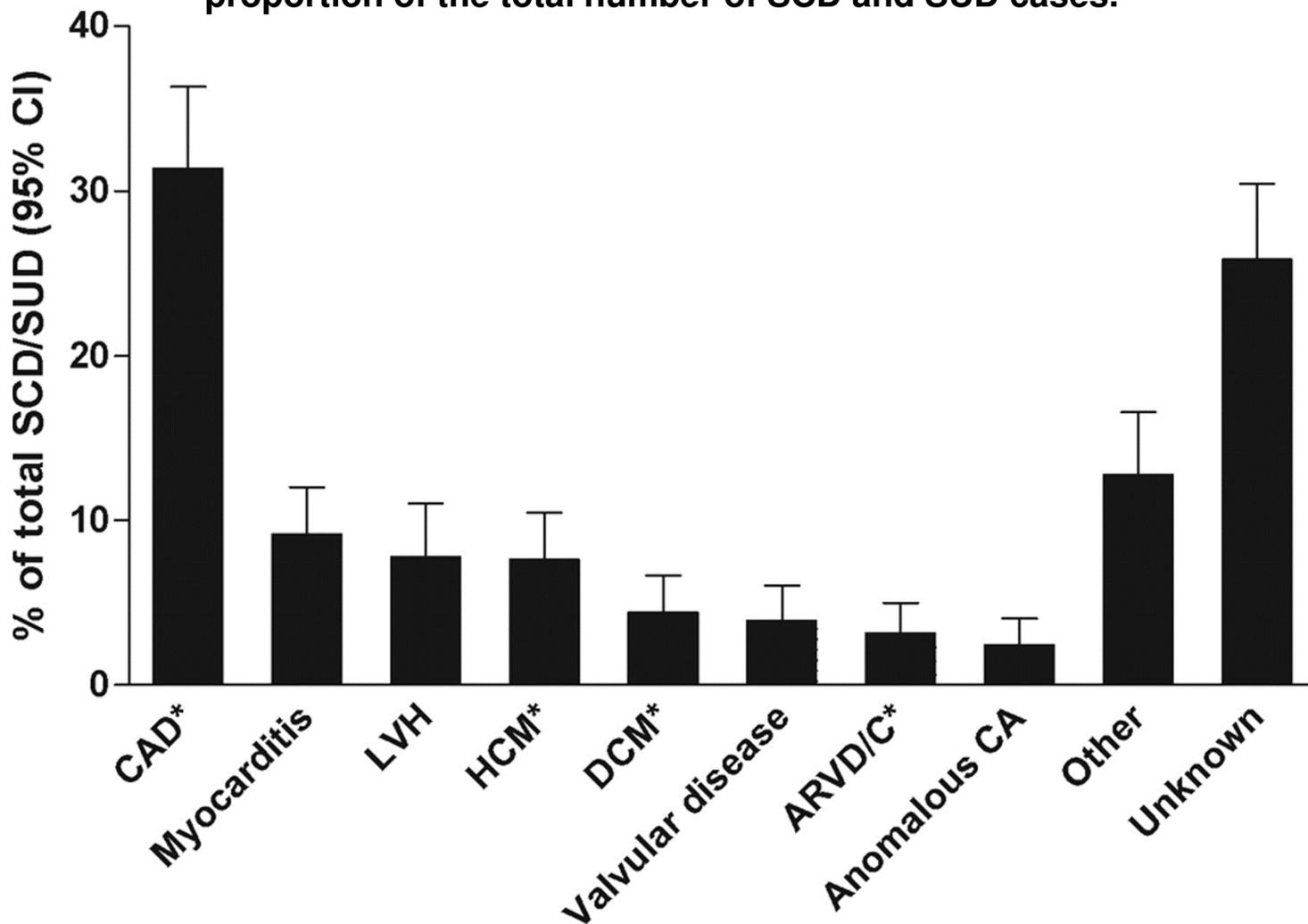


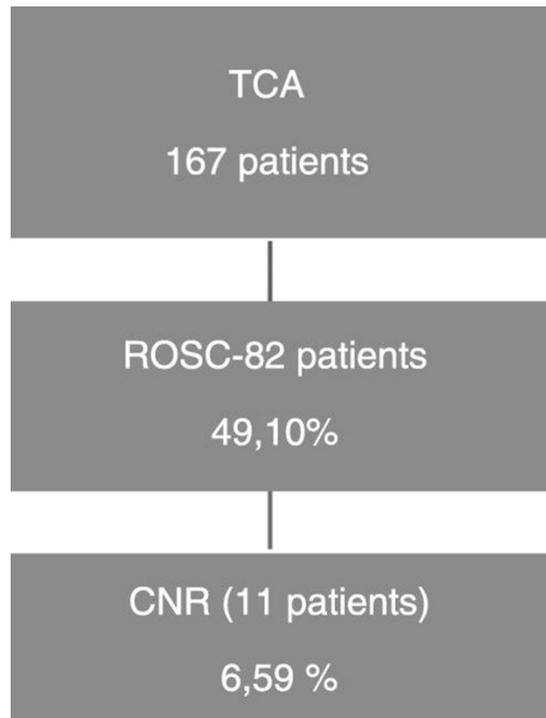
Figure 2. Distribution of causes of SCD \leq 40 years in the general population in clinicopathological series published between 1990 and mid-2009 (n=1573 to 2286).^{5,9,17,19–21,23–26} Displayed are the weighted mean proportions (95% CI) per cause of death as a proportion of the total number of SCD and SUD cases.



When should we initiate ACLS in possible traumatic cardiac arrests?

- French study 2009
 - 129 patients
 - 24.8% achieved ROSC
 - 3.9% alive after 24 hours
 - 1 patient alive after a year
 - **94.6% of these patients were GSWs
- 2006 Retrospective review of state trauma registry over 5 years
 - 89 patients
 - 80% blunt trauma (mortality 97%)
 - 20% penetrating trauma (89%)
 - 4 patients survived to discharge

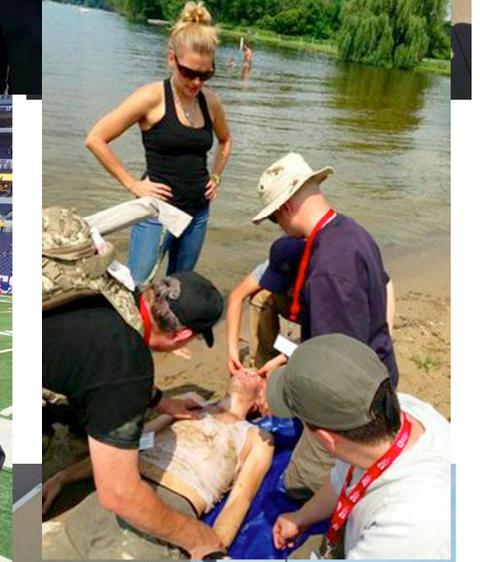
2013 – Retrospective Cohort Study out of Spain



NAEMSP and ACSCOT guidelines for termination of CPR

- Resuscitation efforts may be withheld in any blunt trauma patient who, based on out-of-hospital personnel's thorough primary assessment, is found apneic, pulseless, and without organized ECG activity upon the arrival of EMS at the scene
- Cardiopulmonary arrest patients in whom the mechanism of injury does not correlate with clinical condition suggesting a non-traumatic cause of the arrest should have standard resuscitation initiated

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Case Conference:

Recognizing Concerning Abdominal Pain

Kyle Roth, MD
IUEM – PGY3

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#Roth

Dispatched for “Abdominal Pain”

- Upon arrival, patient unable to get out of bed so facility key used to gain entry
- 68yowm c/o RLQ abdominal pain
 - Sharp, 10/10, constant, 20 minute duration
 - Different than his chronic abdominal pain
 - Recent left nephrectomy 1 month ago
 - On hemodialysis but missed “a few” appts recently
 - No n/v/d, fevers
 - Recently started Colace for constipation

Case Continued

- Exam:
 - VS obtained – not significantly abnormal
 - +RUQ and RLQ tenderness
 - Otherwise unremarkable exam
- Transported BLS to local ED

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Transition of Care:



- Patient placed in back hallway bed
- Report given to RN and MD without incident

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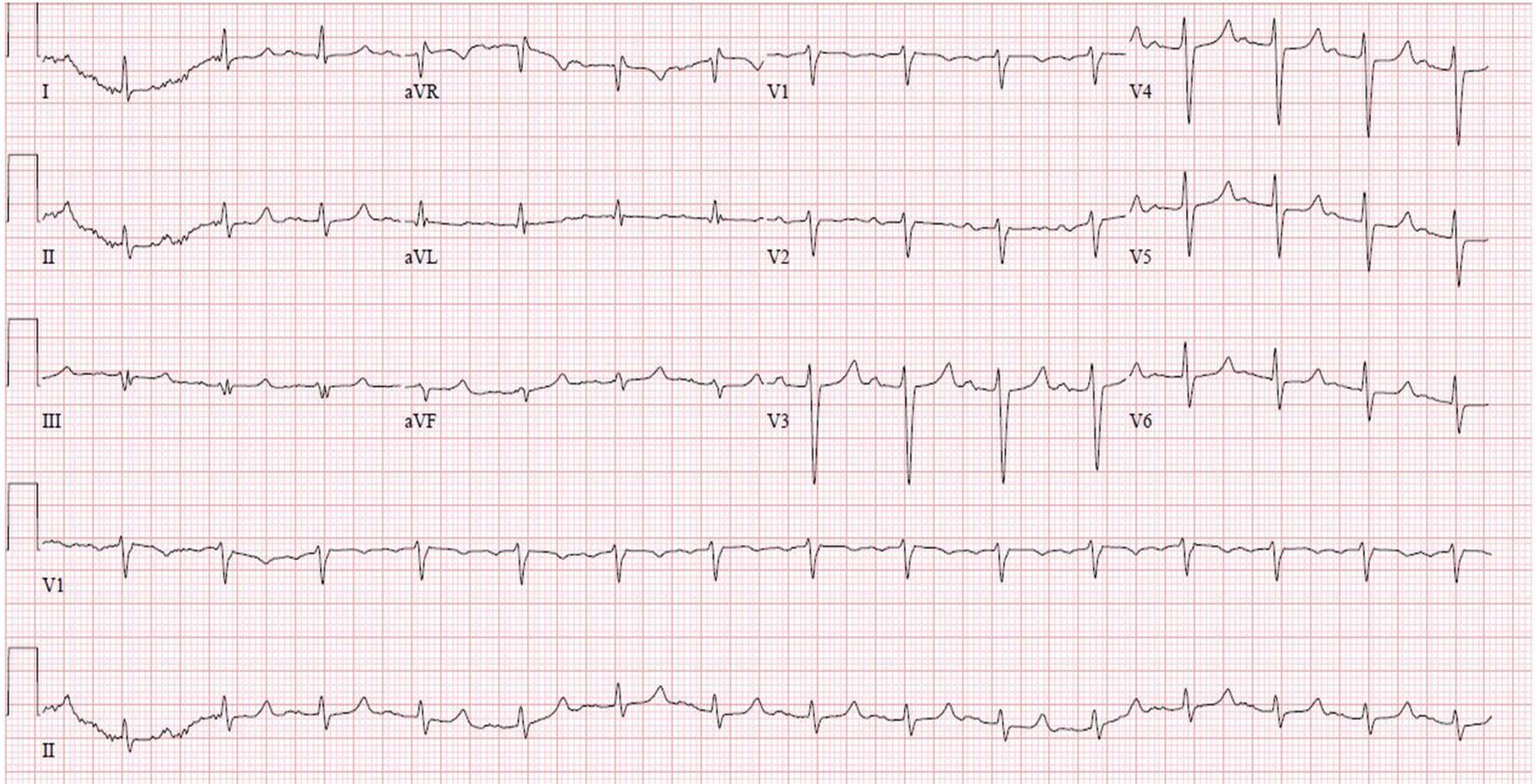
Timeout for some CQI:

- BLS vs. ALS
- Comorbidities
 - ESRD patient requiring HD!!!
- Any interventions PTA to ED?
 - EKG, cardiac monitor, IV, etc.?
- Bias?
 - Acute on chronic abdominal pain
 - Triageed appropriately?

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#Roth

ED Course:



ED Course

- SIGNIFICANT right FLANK tenderness
 - Different from chronic abdominal pain
- Vitals noted
 - BP stable mid 90s
 - HR upper limits normal but eventually became tachycardic 100-110s
- Labs...
 - Hyperkalemia ($K^+ = 7$)
- Disposition
 - Easy...Admit for dialysis

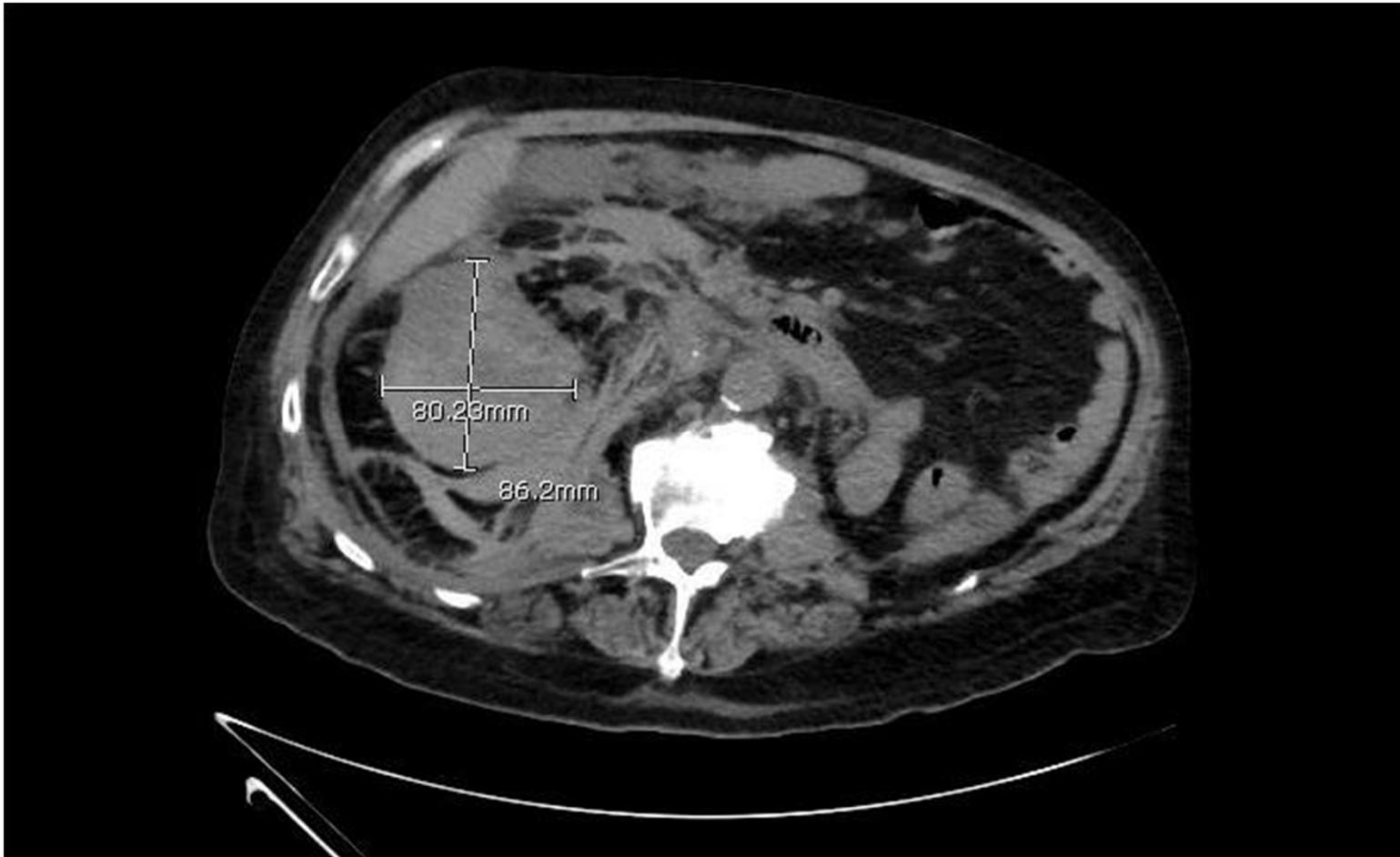
But what about that

Abdominal/Flank Pain & Worsening Vital Signs

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#Roth

More Workup



Upgrade

- Spontaneous right kidney hemorrhage
 - Hgb – 5.6
- Urology and IR consulted
 - Admitted to ICU and taken for embolization
- Eventually discharged ~10days later

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Lessons Learned

- Importance of recognizing “different” pain
- Don’t ignore comorbidities and/or recent surgery
- Medics can greatly influence triage bias

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Questions?

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#Roth

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**If There's Any Medical Personnel Onboard,
Please Hit Your Call Button:**

**In-Flight Emergencies and the Resources
Available**

Annellyssa Johnson MD

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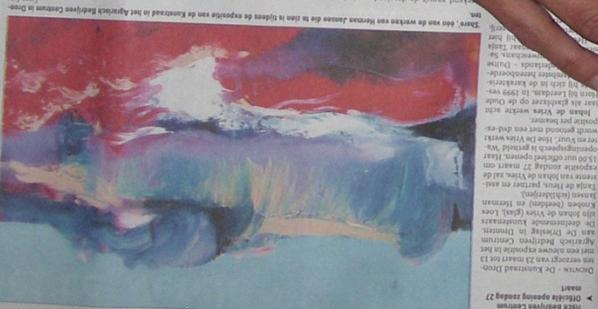




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Expositie Kunstraad vol water en vuur



De kunstenaar van de expositie
De kunstenaar van de expositie is een jonge kunstenaar die zich richt op het gebruik van water en vuur in zijn werken. Hij heeft een unieke stijl die zowel de schoonheid van water als de kracht van vuur weerspiegelt. Zijn werken worden tentoongesteld in de Kunstraad, een gerenommeerd kunstgalerie in de stad.

ZONDAG 27 MAART OPEN

Obolink	329,-
Obolink	150,-
Obolink	99,-
Obolink	38,-
Obolink	180,-

Nieuwe kozijnen?

www.riezbos.nl

Boom reizen

Voordeelmanagement inclusief toegang tot Sluipak Beaks Bergen

Family Fun in gezellig Brabant

Maak een leuke dag van uw vakantie met gezin en vrienden. Het Brabantse landschap is prachtig en de activiteiten zijn divers en leuk.

Speciale lezerijspij € 49,- per persoon

Op basis van een reservering van € 29,- per kind (van 11 jaar). Het is een geweldige manier om de natuur te ontdekken.

EEN

De wereld is groot en de mogelijkheden zijn eindeloos. Het is tijd om te ontdekken wat er allemaal te zien is.

nieuwe

De wereld is groot en de mogelijkheden zijn eindeloos. Het is tijd om te ontdekken wat er allemaal te zien is.

1995-2011

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AVOER VERSTOPT

Bel: 0321-313723

In-Flight Emergencies

- The true number of in-flight emergencies is unknown
- British Medical Journal in 2000
 - 1/11,000 passengers
- New England Journal of Medicine 2013
 - $\frac{3}{4}$ had medical personnel

Legal Protection

- Good Samaritan Law
- Aviation Medical Assistance Act

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Equipment

- Aviation Medical Assistance Act
 - Crew trained in CPR
 - Defibrillator
 - Emergency Medical Kit

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Emergency Medical Kit

- Stethoscope
- Antiseptic wipes
- Gauze
- Gloves
- Tape
- Scissors
- Band-Aids
- Thermometer
- BP cuff
- OP airway
- Syringes w/ needles
- IV kits
- BVM
- Oxygen tank
- Mouth to mouth resuscitation mask
- Umbilical cord clamp
- Urinary Catheter

Medications

- Epinephrine 1:1000
- Antihistamine
- D50
- Nitroglycerin
- Analgesics
- Anticonvulsants
- Aspirin
- Major Analgesic
- Bronchodilator
- Atropine
- Steroid
- Diuretic
- Normal saline
- Antiemetic
- Beta Blocker
- Medications for postpartum bleeding

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Medications

- **Epinephrine 1:1000**
- **Antihistamine**
- **D50**
- **Nitroglycerin**
- **Analgesics**
- Anticonvulsants
- **Aspirin**
- Major Analgesic
- **Bronchodilator**
- Atropine
- **Steroid**
- Diuretic
- **Normal saline**
- **Antiemetic**
- Beta Blocker
- Medications for postpartum bleeding

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ГЛАВНОЕ –
НАЙТИ
СВОЮ
РАБОТУ
ВОВРЕМЯ*
JOB.RU





To Detour the Plane or Not?

- Ground-based medical support systems are widely used by airlines
 - STAT-MD Communications Center
 - MedLink
- Detour decisions are ultimately up to the pilot

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QUESTIONS?

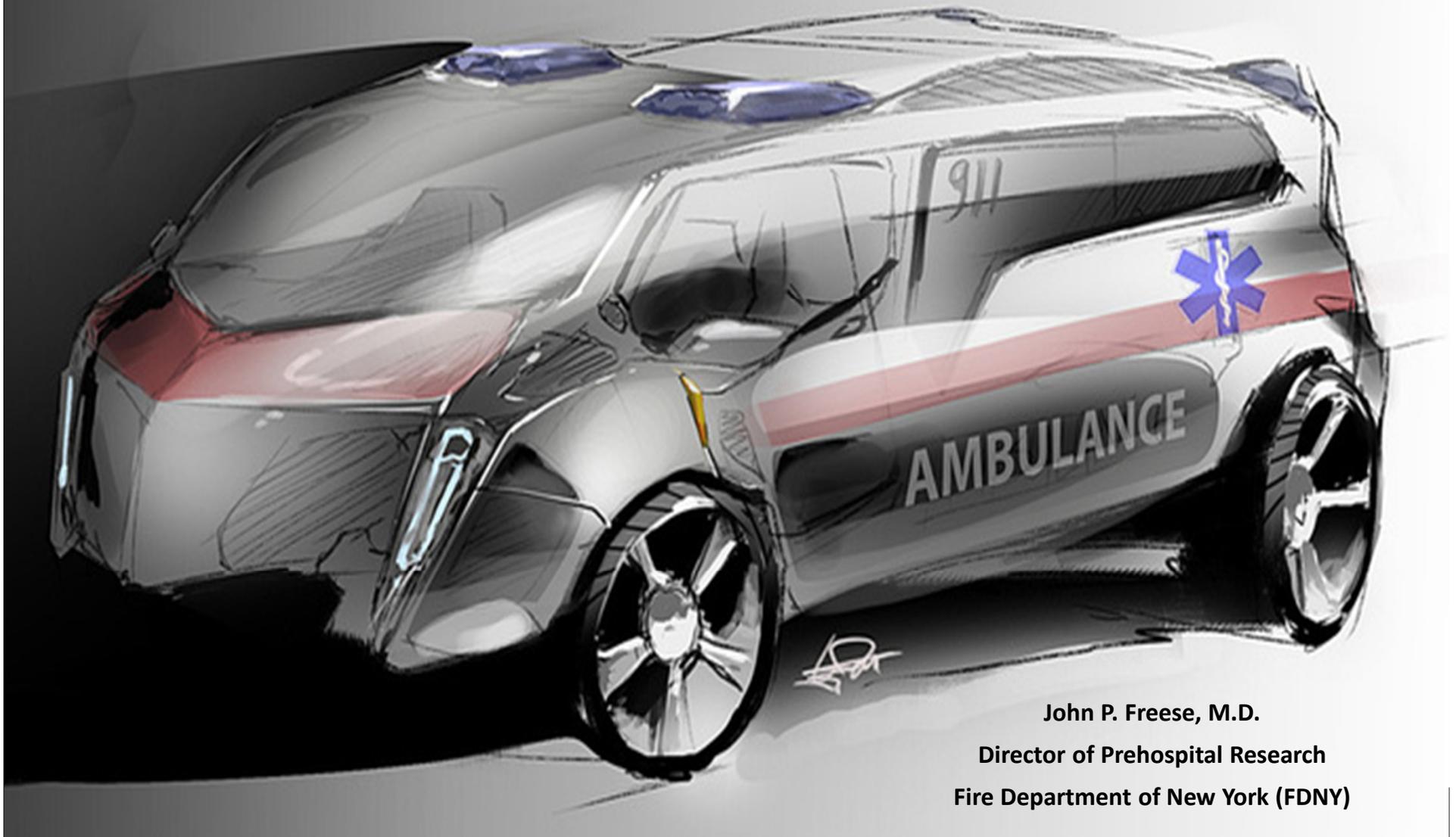




Future Direction in EMS and Out-of-Hospital Care: the New York City experience

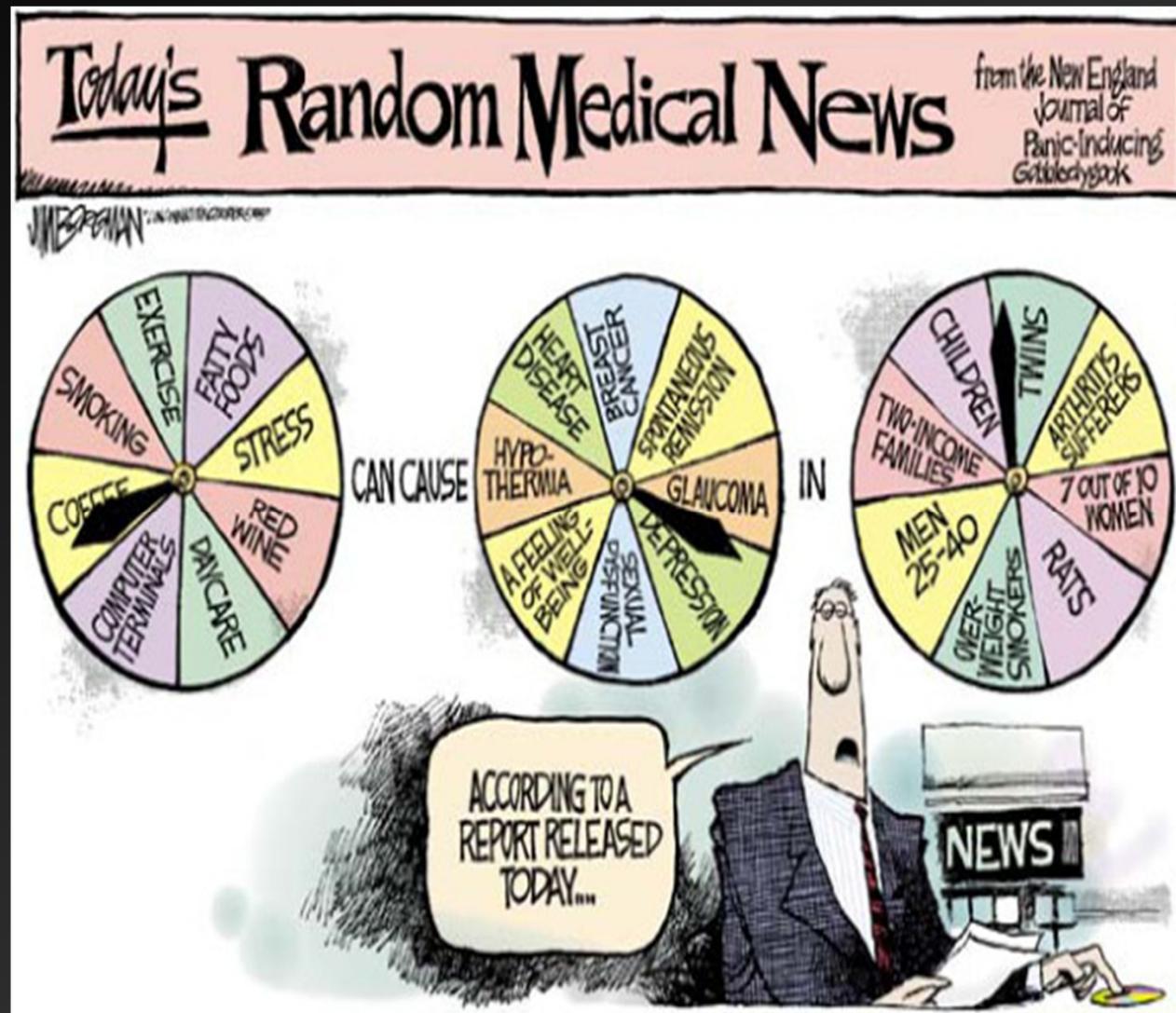
Dr. John Freese, New York EMS System

Future Directions in EMS and Out-of-Hospital Care: The New York City Experience



John P. Freese, M.D.
Director of Prehospital Research
Fire Department of New York (FDNY)

Evidence-Based Presentation



Evidence-Based



Postprandial dip
Postprandial hyperglycemia
Postprandial hypotension
Postprandial thermogenesis



Postprandial regurgitation



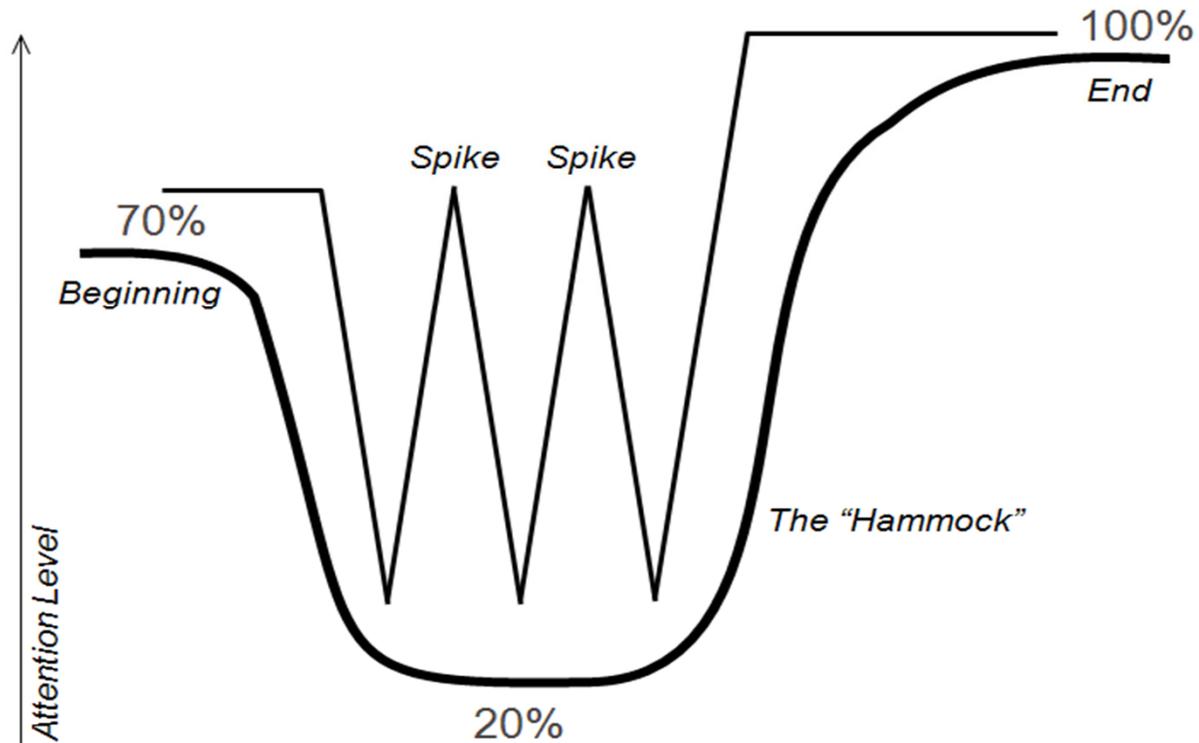
Postprandial pain
Postprandial somnolence
Postprandial lecture attendance



The Hammock Effect

Figure 1

Human Attention: The Hammock and Spikes



Source: *Conversations that Win the Complex Sale*

Six Mini-Lectures

Putting Our Data to Use

BLS Isn't So Basic Anymore

You Can't Talk About That!

Gizmos, Gadets and Godsend

What Really Matters in Resuscitation

The Machines of Today / Tomorrow

New York City EMS



New York City EMS

Fire Department of New York (FDNY)

- 15,870 personnel

- nearly 11,000 firefighters

- over 3,300 EMTs and paramedics

- over 1,500 civilian employees

- responsible for the delivery of
prehospital medical care in

including contracting with hospitals



New York City EMS

FDNY EMS Municipal Unit Location Chart												
Company	1	2	3	4	5	6	7	8	9	10	11	12
4	01B	01C	01D	01E	01F	01G	01H	01I	01J	01K	01L	01M
8	08A	08B	08C	08D	08E	08F	08G	08H	08I	08J	08K	08L
10	10A	10B	10C	10D	10E	10F	10G	10H	10I	10J	10K	10L
14	14A	14B	14C	14D	14E	14F	14G	14H	14I	14J	14K	14L
15	15A	15B	15C	15D	15E	15F	15G	15H	15I	15J	15K	15L
17	17A	17B	17C	17D	17E	17F	17G	17H	17I	17J	17K	17L
18	18A	18B	18C	18D	18E	18F	18G	18H	18I	18J	18K	18L
19	19A	19B	19C	19D	19E	19F	19G	19H	19I	19J	19K	19L
20	20A	20B	20C	20D	20E	20F	20G	20H	20I	20J	20K	20L
26	26A	26B	26C	26D	26E	26F	26G	26H	26I	26J	26K	26L
55	55A	55B	55C	55D	55E	55F	55G	55H	55I	55J	55K	55L
31	31A	31B	31C	31D	31E	31F	31G	31H	31I	31J	31K	31L
32	32A	32B	32C	32D	32E	32F	32G	32H	32I	32J	32K	32L
35	35A	35B	35C	35D	35E	35F	35G	35H	35I	35J	35K	35L
38	38A	38B	38C	38D	38E	38F	38G	38H	38I	38J	38K	38L
3	3A	3B	3C	3D	3E	3F	3G	3H	3I	3J	3K	3L
44	44A	44B	44C	44D	44E	44F	44G	44H	44I	44J	44K	44L
57	57A	57B	57C	57D	57E	57F	57G	57H	57I	57J	57K	57L
58	58A	58B	58C	58D	58E	58F	58G	58H	58I	58J	58K	58L
45	45A	45B	45C	45D	45E	45F	45G	45H	45I	45J	45K	45L
46	46A	46B	46C	46D	46E	46F	46G	46H	46I	46J	46K	46L
47	47A	47B	47C	47D	47E	47F	47G	47H	47I	47J	47K	47L
48	48A	48B	48C	48D	48E	48F	48G	48H	48I	48J	48K	48L
4	4A	4B	4C	4D	4E	4F	4G	4H	4I	4J	4K	4L
50	50A	50B	50C	50D	50E	50F	50G	50H	50I	50J	50K	50L
52	52A	52B	52C	52D	52E	52F	52G	52H	52I	52J	52K	52L
53	53A	53B	53C	53D	53E	53F	53G	53H	53I	53J	53K	53L
54	54A	54B	54C	54D	54E	54F	54G	54H	54I	54J	54K	54L
22	22A	22B	22C	22D	22E	22F	22G	22H	22I	22J	22K	22L
23	23A	23B	23C	23D	23E	23F	23G	23H	23I	23J	23K	23L
40	40A	40B	40C	40D	40E	40F	40G	40H	40I	40J	40K	40L
43	43A	43B	43C	43D	43E	43F	43G	43H	43I	43J	43K	43L

911 EMS System

FDNY

- CFR: 198

FDNY EMS

- BLS: 158

- ALS: 78

- Officers:

35

Voluntary EMS

- BLS: 80

- ALS: 50

FDNYEMS Voluntary Unit Location Chart												
Company	1	2	3	4	5	6	7	8	9	10	11	12
01	01A	01B	01C	01D	01E	01F	01G	01H	01I	01J	01K	01L
03	03A	03B	03C	03D	03E	03F	03G	03H	03I	03J	03K	03L
11	11A	11B	11C	11D	11E	11F	11G	11H	11I	11J	11K	11L
13	13A	13B	13C	13D	13E	13F	13G	13H	13I	13J	13K	13L
14	14A	14B	14C	14D	14E	14F	14G	14H	14I	14J	14K	14L
15	15A	15B	15C	15D	15E	15F	15G	15H	15I	15J	15K	15L
16	16A	16B	16C	16D	16E	16F	16G	16H	16I	16J	16K	16L
17	17A	17B	17C	17D	17E	17F	17G	17H	17I	17J	17K	17L
18	18A	18B	18C	18D	18E	18F	18G	18H	18I	18J	18K	18L
20	20A	20B	20C	20D	20E	20F	20G	20H	20I	20J	20K	20L
22	22A	22B	22C	22D	22E	22F	22G	22H	22I	22J	22K	22L
23	23A	23B	23C	23D	23E	23F	23G	23H	23I	23J	23K	23L
28	28A	28B	28C	28D	28E	28F	28G	28H	28I	28J	28K	28L
29	29A	29B	29C	29D	29E	29F	29G	29H	29I	29J	29K	29L
83	83A	83B	83C	83D	83E	83F	83G	83H	83I	83J	83K	83L
88	88A	88B	88C	88D	88E	88F	88G	88H	88I	88J	88K	88L
41	41A	41B	41C	41D	41E	41F	41G	41H	41I	41J	41K	41L
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95	95A	95B	95C	95D	95E	95F	95G	95H	95I	95J	95K	95L
31	31A	31B	31C	31D	31E	31F	31G	31H	31I	31J	31K	31L
33	33A	33B	33C	33D	33E	33F	33G	33H	33I	33J	33K	33L
34	34A	34B	34C	34D	34E	34F	34G	34H	34I	34J	34K	34L
35	35A	35B	35C	35D	35E	35F	35G	35H	35I	35J	35K	35L
45	45A	45B	45C	45D	45E	45F	45G	45H	45I	45J	45K	45L
77	77A	77B	77C	77D	77E	77F	77G	77H	77I	77J	77K	77L
51	51A	51B	51C	51D	51E	51F	51G	51H	51I	51J	51K	51L
53	53A	53B	53C	53D	53E	53F	53G	53H	53I	53J	53K	53L
59	59A	59B	59C	59D	59E	59F	59G	59H	59I	59J	59K	59L
60	60A	60B	60C	60D	60E	60F	60G	60H	60I	60J	60K	60L
62	62A	62B	62C	62D	62E	62F	62G	62H	62I	62J	62K	62L
92	92A	92B	92C	92D	92E	92F	92G	92H	92I	92J	92K	92L

New York City EMS

ARREST	1	DUAL	CFR	PEDSTR	3	BLS Rescue	INJURY	5
CHOKER	1	DUAL	CFR	GYNMAJ	3	BLS	OBLAB	5
DROWN	2	DUAL	CFR	PD13C	3	BLS	MEDRXN	5
ANAPH	2	ALS	CFR	SHOT	3	BLS	CHILDA	6
STATEP	2	ALS	CFR	STAB	3	BLS	MVA	6
UNC	2	ALS	CFR	UNKNOW	3	BLS	OTHER	6
UNCRF	2	ALS	CFR	CVA	4	BLS	RAPE	6
ASTHMA	2	ALS	H/CFR	DRUG	4	BLS	SEIZR	6
DIFFBR	2	ALS		FIRE75	4	BLS	SICK	6
DIFFRF	2	ALS		FIRE76	4	BLS	SICKRF	6
MEDVAC	2	ALS		FIRE77	4	BLS	BURNMI	7
TRAUMA	2	BLS	Rescue	HEAT	4	BLS	DOA	7
JUMPDN	2	BLS	CFR	MVAINJ	4	BLS	EDP	7
VENOM	2	BLS	CFR	RESPIR	4	BLS	INJMIN	7
CVAC	2	BLS		OBMIS	4	BLS	JUMPUP	7
OBCOMP	2	BLS		PEDRF	4	BLS	PD13	7
ALTMEN	3	ALS		SICPED	4	BLS	SICMIN	7
BURNMA	3	ALS	CFR	ABDPN	5	BLS	SPEVNT	8
CARD	3	ALS	CFR	AMPMIN	5	BLS	STNDBY	8
ELECT	3	ALS	CFR	COLD	5	BLS	STRANS	8
INBLED	3	ALS		GYNHEM	5	BLS	DDOA	9
AMPMAJ	3	BLS	CFR	GYNMIN	5	BLS		
INJMAJ	3	BLS	CFR	HYPTN	5	BLS		
OBOUT	3	BLS	CFR	INHALE	5	BLS		

New York City EMS



New York City EMS

On-Line Medical Control (OLMC)

- FDNY

- 24-hour central operation
- two to three paramedics on duty at all times

- one Captain and one Lieutenant

- one OLMC physician on duty at all

times

assurance

- central hub for real-time quality

FDNY EMS Medical Direction

- Chief Medical Director
- Five Division Medical Directors (one per borough)
- Two EMS Fellows
- 19 OLMC physicians
- Office of Medical Affairs Staff (civilian and uniformed)
- voluntary hospital medical directors



New York City EMS



Bill de Blasio
Mayor

FIRE DEPARTMENT

City of New York

Statistics



Daniel A. Nigro
Commissioner

Citywide Performance Indicators

01/01/14 - 12/31/14

Citywide Ambulance Incidents & Runs							
	Segment			Ambulance Tours			
	1	1 - 3	1 - 8		ALS	375.5	
Number of Incidents	26,460	483,391	1,352,766		BLS	667.1	
Avg Resp Time MM:SS	05:21	06:50	09:23				
Ambulance Runs	54,792	600,259	1,530,712		TOTAL	1,042.6	
	Segment						
	2	3	4	5	6	7	8
Number of Incidents	279,539	177,392	245,238	272,404	232,032	116,034	3,667
Ambulance Runs	334,850	210,617	264,730	290,997	245,908	121,962	6,856

Putting Our Data to Use



Bill de Blasio
Mayor

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City of New York

Statistics



Daniel A. Nigro
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Citywide Performance Indicators

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Putting Our Data to Use

Indiana Trauma Registry Pre-Hospital Data Report

April 1, 2014—March 31, 2015

151 Total Providers Reporting 262,140 Incidents

Average Run Mileage

Obs	Destination	Miles
1	Mileage to Scene	3.8
2	Mileage to Destination	3.9
3	Mileage to Ending	2.0

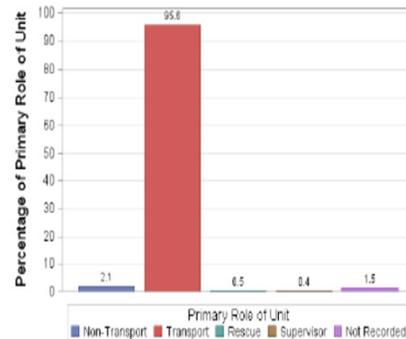
Total Mileage 9.7

Average Run Time

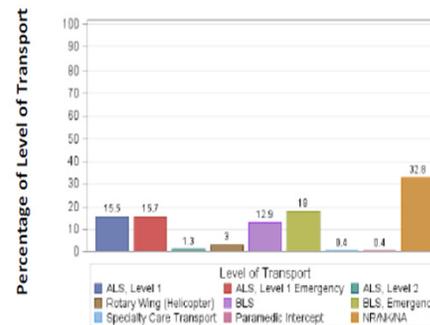
Obs	Destination	Minutes	Begin	Missing	End	End_Missing
1	Time to Departure	2.49	E05_04	0.30%	E05_05	2.60%
2	Time to Scene	8.73	E05_05	2.60%	E05_06	4.00%
3	Time to Patient	2.83	E05_06	4.00%	E05_07	21.4%
4	Time with Patient	15.06	E05_07	21.4%	E05_09	14.1%
5	Time to Destination	18.59	E05_09	14.1%	E05_10	19.7%
6	Back in Service	23.08	E05_10	19.7%	E05_11	0.20%
7	Total Run Time	64.49	E05_04	0.30%	E05_11	0.20%

Variables may be found in the NEMSIS V2 Data Dictionary

Primary Role of Unit



Level of Transport



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EMS Response Times Worry Officials

FDNY chief says harsh weather accounted for slowed responses in February

Putting Our Data to Us

CBS New York

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News

FDNY Commissioner Blames February Ambulance Response Time Increase On Snow, Ice

March 24, 2015 2:46 PM

Related Tags: ambulance, ambulance response time, Daniel Rign, Emergency, FDNY, Rich Lamb

NEW YORK (CBSNewYork) — Ambulance response

JEMS The Institute of Emergency Medical Services

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Exclusives Treatment Considerations for Patients Usin...

FDNY ambulances took 2 minutes longer to respond to emergencies in February compared to last year, fire chief says

BY ERIN DURKIN / NEW YORK DAILY NEWS / Tuesday, March 24, 2015, 6:03 PM

Mayor to bolster funding to cut ambulance response times

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AP Associated Press
Feb 09, 2015 at 12:30 PM

FDNY EMTs Claim New Technology is Slowing Ambulance Response Times

Tablet troubles complicate patient information and the in-service process

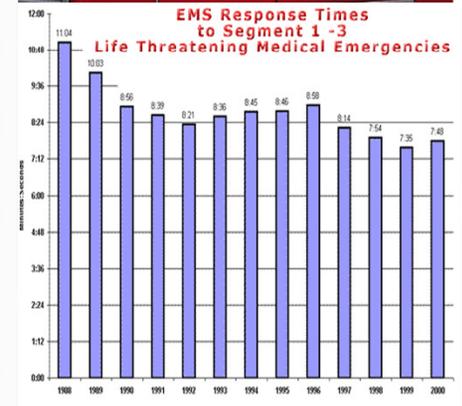
A move to modernize city ambulance records has become a technical nightmare for city EMTs, who told The Post

FDNY ambulances take nearly 10 minutes to get to emergencies

By Yoav Gonen March 27, 2014 | 1:29pm



Once an emergency call is placed, Fire Department ambulances take 9 minutes and 22 seconds to arrive.



FDNY's True Response Time Unmasked

FDNY'S Pre-UCT Calculation Method

9-11 Call Time + FDNY Dispatch + FDNY Travel Time = Avg Response Time
 :05 avg + :45 avg + 4:00 avg = 4:50

Under Previous System
 FDNY Reported Response as Only: 4:45*

*By Starting the clock only when call is sent to FDNY Dispatch

FDNY'S UCT Calculation Method

9-11 Call Time + FDNY Dispatch + FDNY Travel Time = Avg Response Time
 1:15 avg + :15 avg + 4:00 avg = 5:30

Yet FDNY Reports Response as Only: 4:15*

*By Starting the clock only when call is sent to FDNY Dispatch

- FDNY Response Times Under UCT Have Gone Up, Not Down As City Contends.
- The City's Deliberately False Statistics Are Part Of An Attempt To Justify Closing Firehouses In 2010.
- The City's Enron-Style Accounting Now Raises Questions About Other Statistics They Are Trumpeting.

POLITICO NEW YORK beta

Fire response times have slowed, mayor's report shows

A fire truck stationed outside Penn Station. (AP Photo/Mark Lennihan)

By SALLY GOLDENBERG 8:46 p.m. | Feb. 24, 2015

Response times to fires and life-threatening emergencies slowed a bit during the first four months of Fiscal Year 2015, according to data released Tuesday.

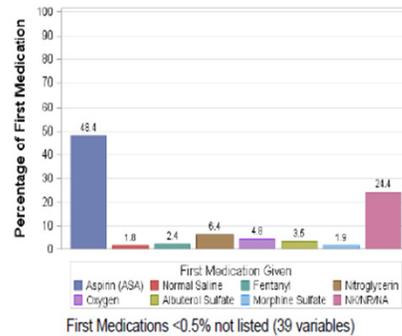
The FDNY clocked an average response time of four minutes, 10 seconds from July

Putting Our Data to Use

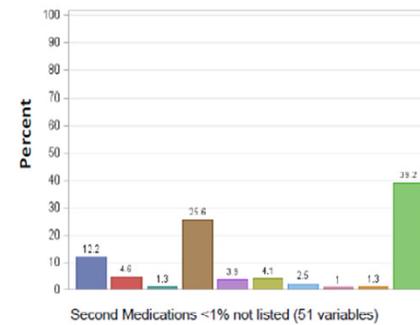
8

Indiana Trauma Registry Pre-Hospital Data Report
 April 1, 2014—March 31, 2015
 151 Total Providers Reporting 262,140 Incidents

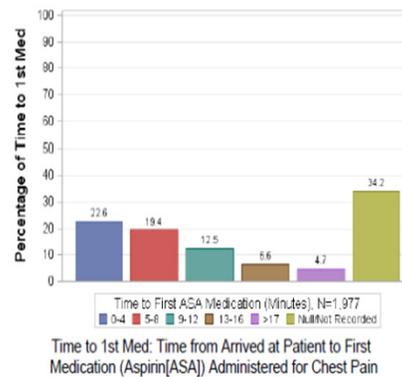
First Medication Given for Chest Pain



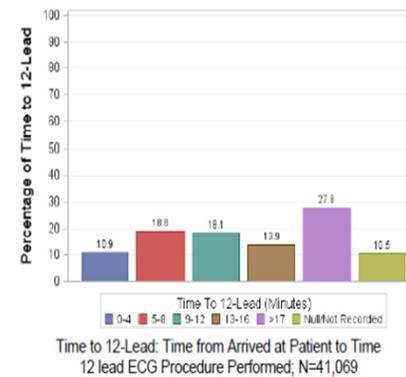
Second Medication Given for Chest Pain



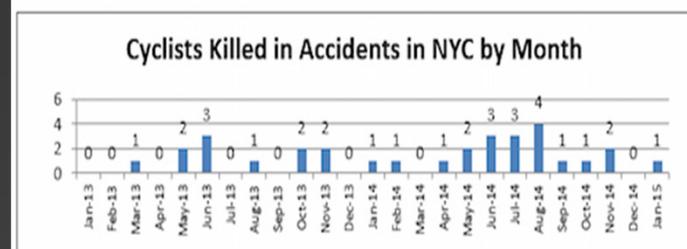
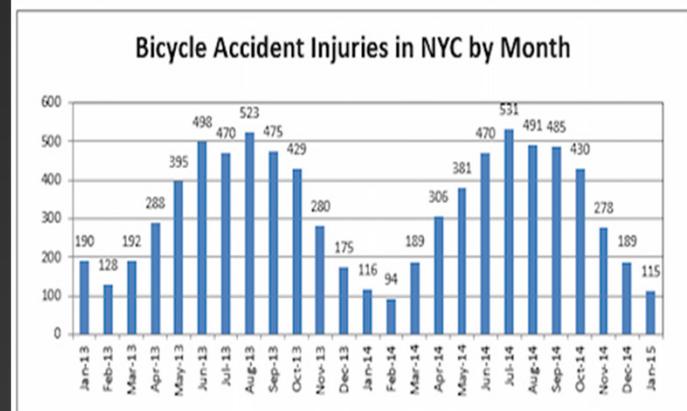
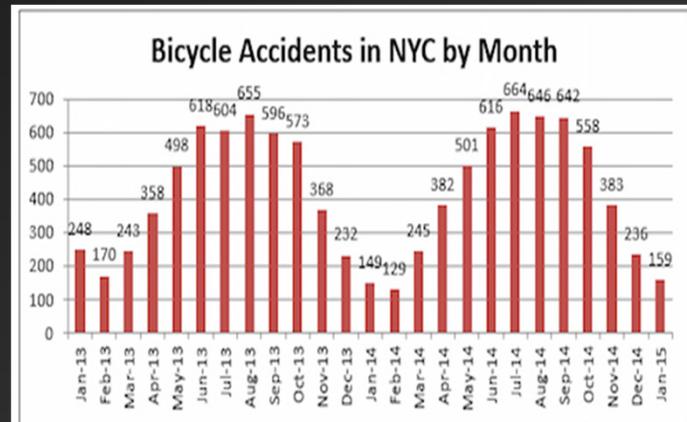
Time to First ASA Medication (Minutes)



Time to 12-Lead (Minutes)



Putting Our Data to Use



Putting Our Data to Use

Indoor Air 2015
wileyonlinelibrary.com/journal/ina
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INDOOR AIR
doi:10.1111/ina.12227

Summer indoor heat exposure and respiratory and cardiovascular distress calls in New York City, NY, U.S.

Abstract Most extreme heat studies relate outdoor weather conditions to human morbidity and mortality. In developed nations, individuals spend ~90% of their time indoors. This pilot study investigated the indoor environments of people receiving emergency medical care in New York City, NY, U.S., from July to August 2013. The first objective was to determine the relative influence of outdoor conditions as well as patient characteristics and neighborhood sociodemographics on indoor temperature and specific humidity ($N = 764$). The second objective was to determine whether cardiovascular or respiratory cases experience hotter and more humid indoor conditions as compared to controls. Paramedics carried portable sensors into buildings where patients received care to passively monitor indoor temperature and humidity. The case-control study compared 338 respiratory cases, 291 cardiovascular cases, and 471 controls. Intuitively, warmer and sunnier outdoor conditions increased indoor temperatures. Older patients who received emergency care tended to occupy warmer buildings. Indoor-specific humidity levels quickly adjusted to outdoor conditions. Indoor heat and humidity exposure above a 26 °C threshold increased (OR: 1.63, 95% CI: 0.98–2.68, $P = 0.056$), but not significantly, the proportion of respiratory cases. Indoor heat exposures were similar between cardiovascular cases and controls.

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Key words: Extreme heat, Emergency medical service, Temperature, Humidity, Indoor, Case-control study.

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publication 12 June 2015.

Practical Implications

There is limited evidence directly linking indoor heat exposure to health outcomes. By partnering with emergency medical services, the study design observes indoor conditions of people receiving emergency care. The study design efficiently targets vulnerable populations. The results suggest people may suffer from hot indoor environments even during 'moderate' summer periods.

Quality and Outcomes

From Door-to-Balloon Time to Contact-to-Device Time: Predictors of Achieving Target Times in Patients With ST-Elevation Myocardial Infarction

Robert O. Roswell, MD; Brian Greet, MD; Parin Parikh, MD; Andrea Mignatti, MD; John Freese, MD; Iryna Lobach, PhD; Yu Guo, MS; Norma Keller, MD; Martha Radford, MD; Sripal Bangalore, MD, MHA

Department of Medicine, Leon H. Charney Division of Cardiology (Roswell, Greet, Parikh, Mignatti, Lobach, Guo, Keller, Radford, Bangalore), New York University School of Medicine, New York, New York; Fire Department of New York (Freese), Brooklyn, New York

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ABSTRACT

Background: The 2013 American College of Cardiology Foundation/American Heart Association ST-segment elevation myocardial infarction (STEMI) guidelines have shifted focus from door-to-balloon (D2B) time to the time from first medical contact to device activation (contact-to-device time [C2D]).

Hypothesis: This study investigates the impact of prehospital wireless electrocardiogram transmission (PHT) on reperfusion times to assess the impact of the new guidelines.

Methods: From January 2009 to December 2012, data were collected on STEMI patients who received percutaneous coronary interventions; 245 patients were included for analysis. The primary outcome was median C2D time in the PHT group and the secondary outcome was D2B time.

Results: Prehospital wireless electrocardiogram transmission was associated with reduced C2D times vs no PHT: 80 minutes (interquartile range [IQR], 64–94) vs 96 minutes (IQR, 79–118), respectively, $P < 0.0001$. The median D2B time was lower in the PHT group vs the no-PHT group: 45 minutes (IQR, 34–56) vs 63 minutes (IQR, 49–81), respectively, $P < 0.0001$. Multivariate analysis showed PHT to be the strongest predictor of a C2D time of <90 minutes (odds ratio: 3.73, 95% confidence interval: 1.65–8.39, $P = 0.002$). Female sex was negatively predictive of achieving a C2D time <90 minutes (odds ratio: 0.23, 95% confidence interval: 0.07–0.73, $P = 0.01$).

Conclusions: In STEMI patients, PHT was associated with significantly reduced C2D and D2B times and was an independent predictor of achieving a target C2D time. As centers adapt to the new guidelines emphasizing C2D time, targeting a shorter D2B time (<50 minutes) is ideal to achieve a C2D time of <90 minutes.

Introduction

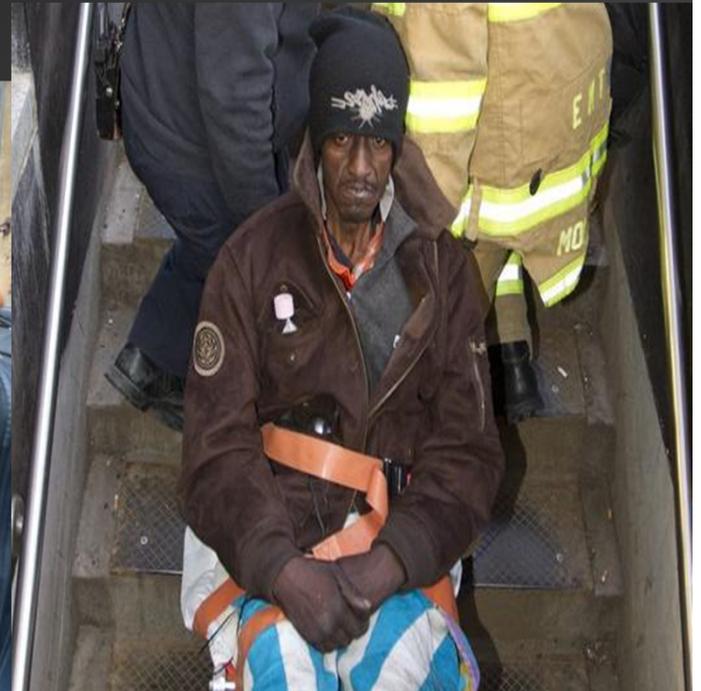
Rapid myocardial perfusion, either with fibrinolytic therapy or percutaneous coronary intervention (PCI), is the standard of care in patients presenting with an ST-segment elevation myocardial infarction (STEMI). In patients treated for STEMI, longer times to reperfusion have been associated with higher mortality.^{1,2} The time from hospital entry to reperfusion therapy, which includes aspiration thrombectomy and other interventions to restore coronary flow, for STEMI patients undergoing primary PCI is commonly referred to as door-to-balloon (D2B) time. This

guideline measure has been incorporated as a publicly reported hospital performance measure by the Centers for Medicare & Medicaid Services (CMS) and the Joint Commission, and should be within 90 minutes.³ In the 2013 American College of Cardiology Foundation/American Heart Association STEMI guidelines, the terminology and focus have changed; it is now recommended that time from first medical contact in the field to device activation (contact-to-device time [C2D]) be <90 minutes.⁴ It is unknown how feasible it is for STEMI centers to meet this new reperfusion time or what steps can be taken to reach a C2D time <90 minutes.

Putting Our Data to Use

One Example: FDNY Known Patient Initiative

- Bellevue Hospital
- Department of Homeless Services
- FDNY EMS



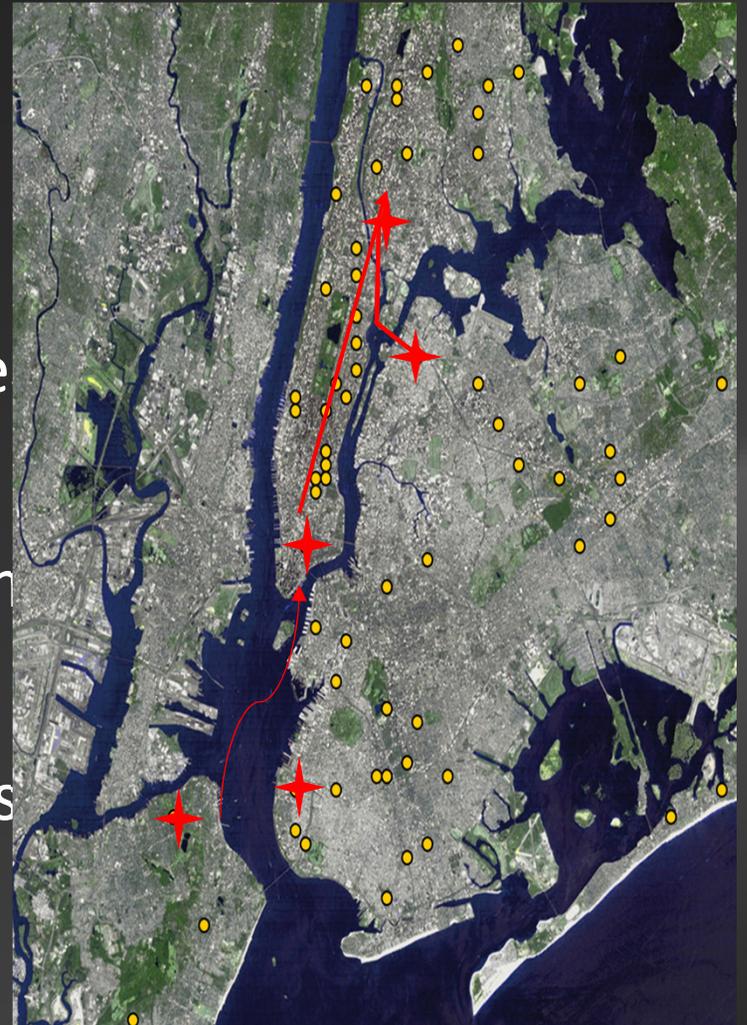
Putting Our Data to Use

Case history – “A Busy Day”

JM is a 34 yo black male

- sickle cell crisis
- ~50 EMS transports per year
- often elopes from the ED
- five hospitals, five boroughs

Doesn't have sickle cell disease



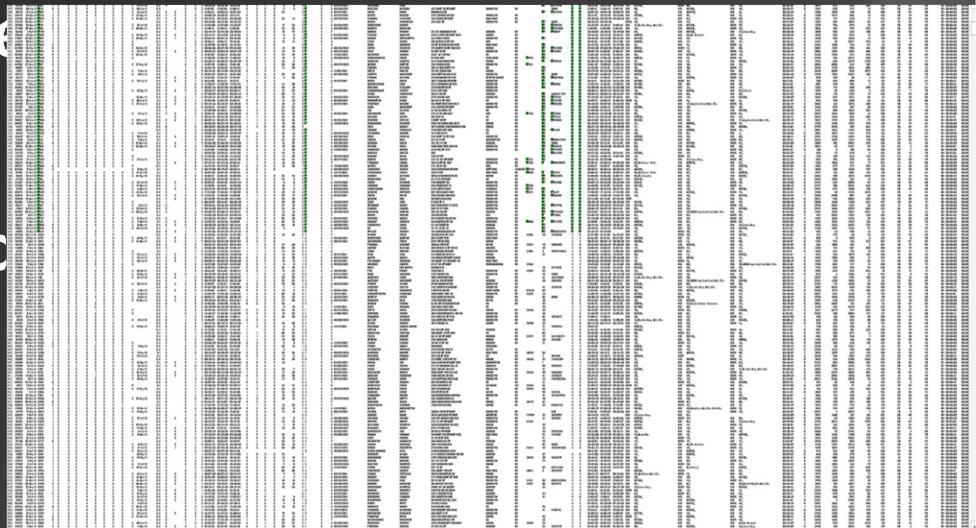
Putting Our Data to Use

Source: FDNY electronic prehospital care report (ePCR) database

Dates: 11/1/2005 – 10/31/2010

N: 3,236,347 unique patients

98.5% with a single EMS call



Putting Our Data to Use

“Known Patient”: average of five or more FDNY EMS contacts annually

N: 2,753 patients

- average 48 contacts per patient

- 132,149 total contacts

- 124,462 transports



Putting Our Data to Use

High Risks vs “normal EMS patients”

- mental health history: >50%
- substance abuse: >60%
- environmental factors: >70% homelessness
- 2% cardiac arrest incidence (0.06% national average)
- 2.5% suicide attempts (0.1% national average)



Putting Our Data to Use

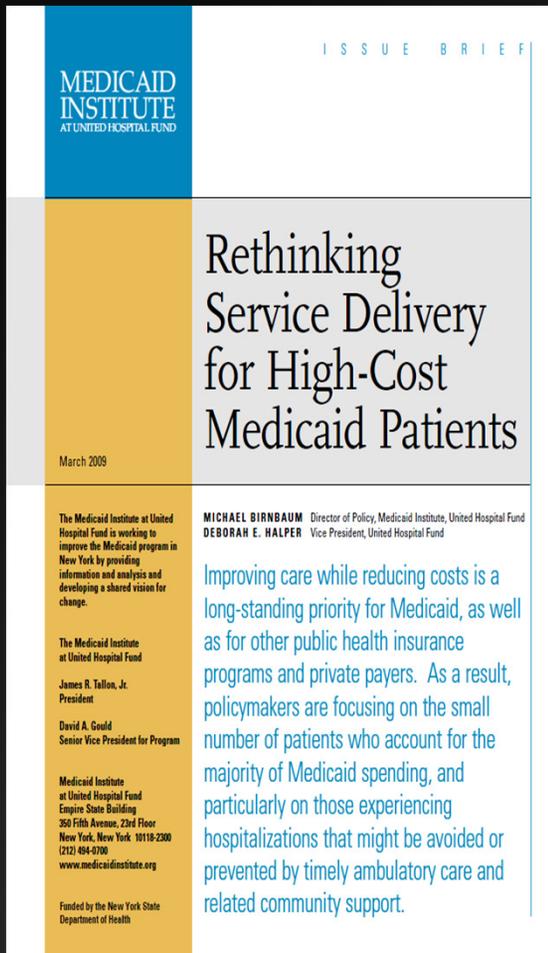
High Costs

- 50% uninsured or underinsured (43% Medicaid)
- EMS transport bills: \$64,609,375
- ED payments: \$65,161,050
- In-patient costs: \$83,755,928

Total costs (excluding physician charges) =
\$213,526,353 (\$42,705,270.60)



Putting Our Data to Use



Pilot Program – Bellevue Hospital

- housing
- access to services
- established care
- 67% reduction in ED visits
- 45 % reduction in inpatient

admissions

Expansion to other hospitals
Citywide diversion of “known patients” to “base hospitals”

Putting Our Data to Use

The future of EMS includes using our “numbers” for...

... accountability.

... transparency.

... care for subgroups of patients,
vulnerable populations, etc.

... public health initiatives.

... an understanding that EMS is SO
much more than response
times.



BLS Isn't So Basic Anymore



BLS Isn't So Basic Anymore

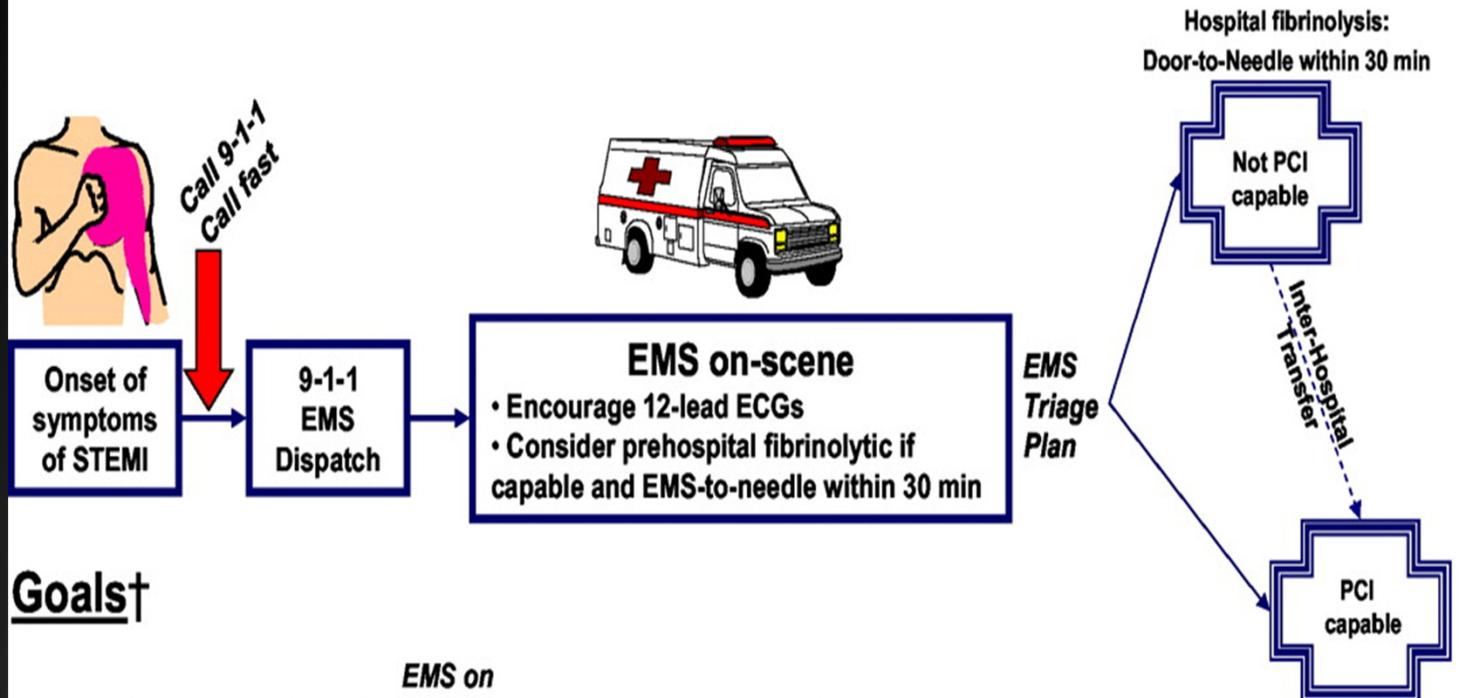
The expanding role of EMT-Bs....

- EKG application**
- Autoinjector use**
- Intranasal Medications**
- Oral Medications**

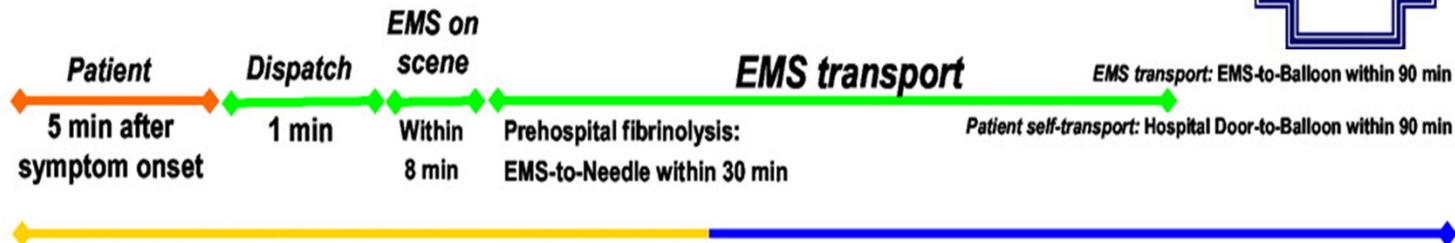


BLS Isn't So Basic Anymore

Panel A



Goal†



Total ischemic time: Within 120 min*

*Golden Hour = First 60 minutes

BLS Isn't So Basic Anymore

Paramedic interpretation of 12-lead EKGs for STEMI

- continues to gain acceptance
- among paramedics asked to review 5 cases (3 STEMI, 2

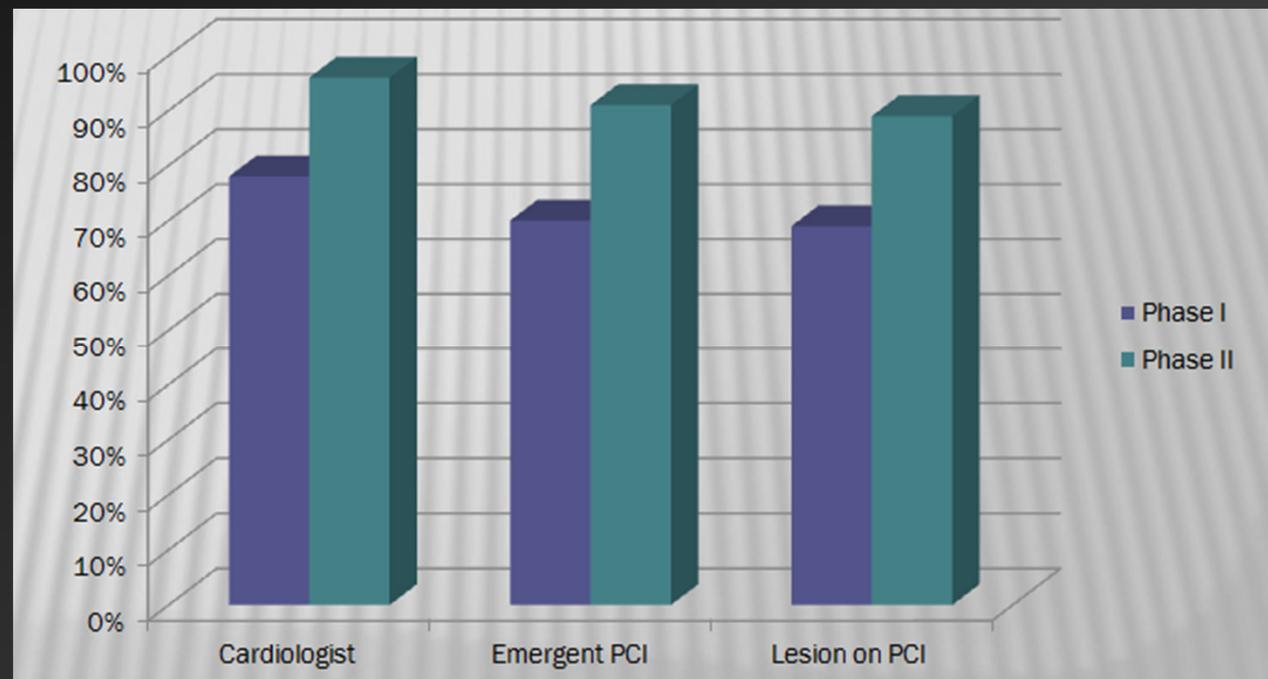
NSTEMI)

- sensitivity for STEMI: 92.6% (95% CI 88.9–95.1)
- specificity: 85.4% (79.7–89.8)
- 14.9% NSTEMIs were incorrectly read as STEMI
- 12.0% NSTEMI with cath lab inappropriately activated

BLS Isn't So Basic Anymore

Phase I – Paramedic interpretation

Phase II – Transmission for ED physician over read



BLS Isn't So Basic Anymore

- **Acute Cardiac Ischemia – Time Insensitive Predictive Instrument (ACI-TIPI)**
- **The four clinical factors are:**
 - Patient's age (yrs.)
 - Patient's gender
 - The presence or absence of chest pain or pressure, or left arm pain
 - Whether chest pain or equivalent symptom is the patient's most important presenting symptom
- **The three ECG features are:**
 - The presence or absence of pathological or significant Q waves
 - The presence and degree of ST segment elevation or depression
 - The presence and degree of T wave elevation or inversion

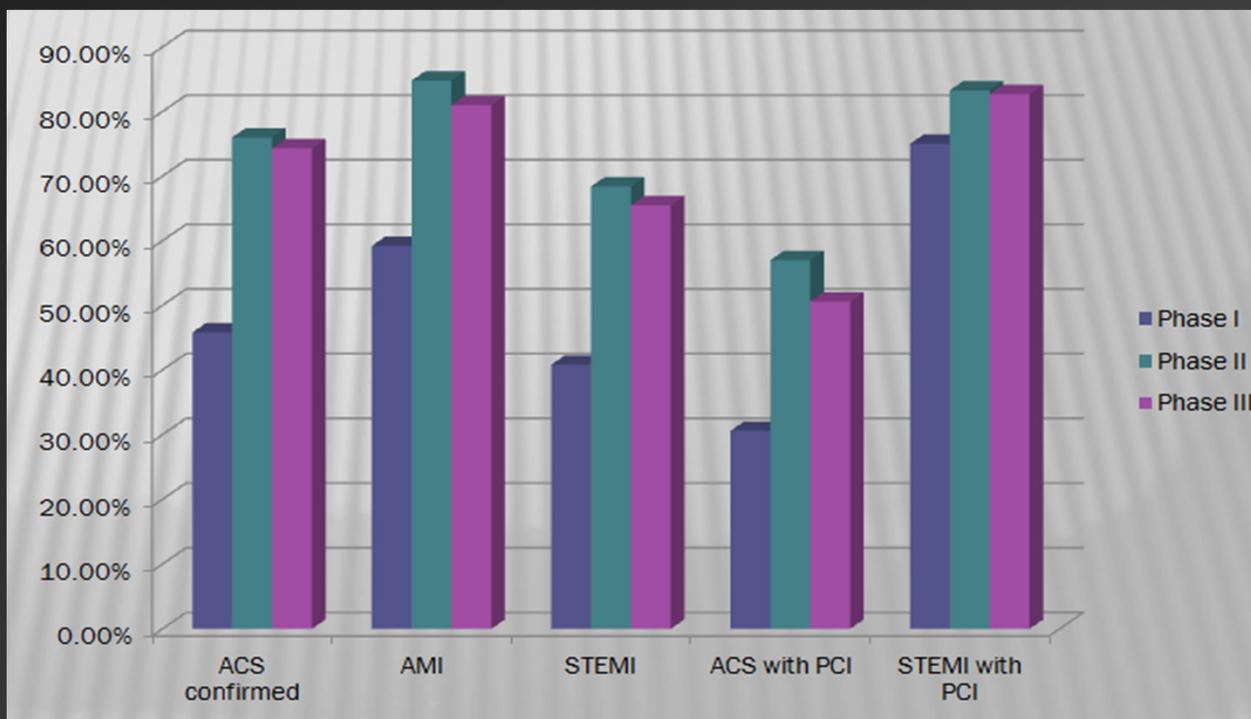
BLS Isn't So Basic Anymore

Phase I – Paramedic interpretation with ACI-TIPI provided

Phase II – ACI-TIPI cut-off of 75%

Phase III – Expanded ACI-TIPI rule to other services

Selker, Prehosp Emerg
Care, 2011



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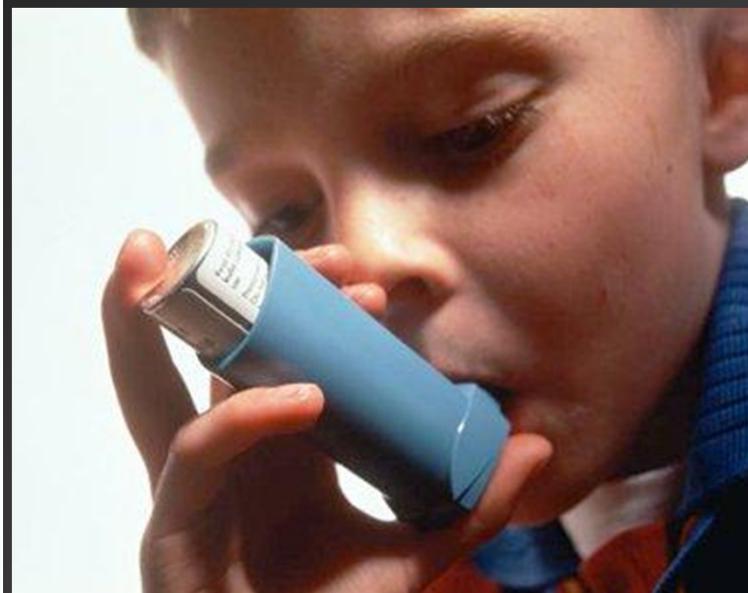
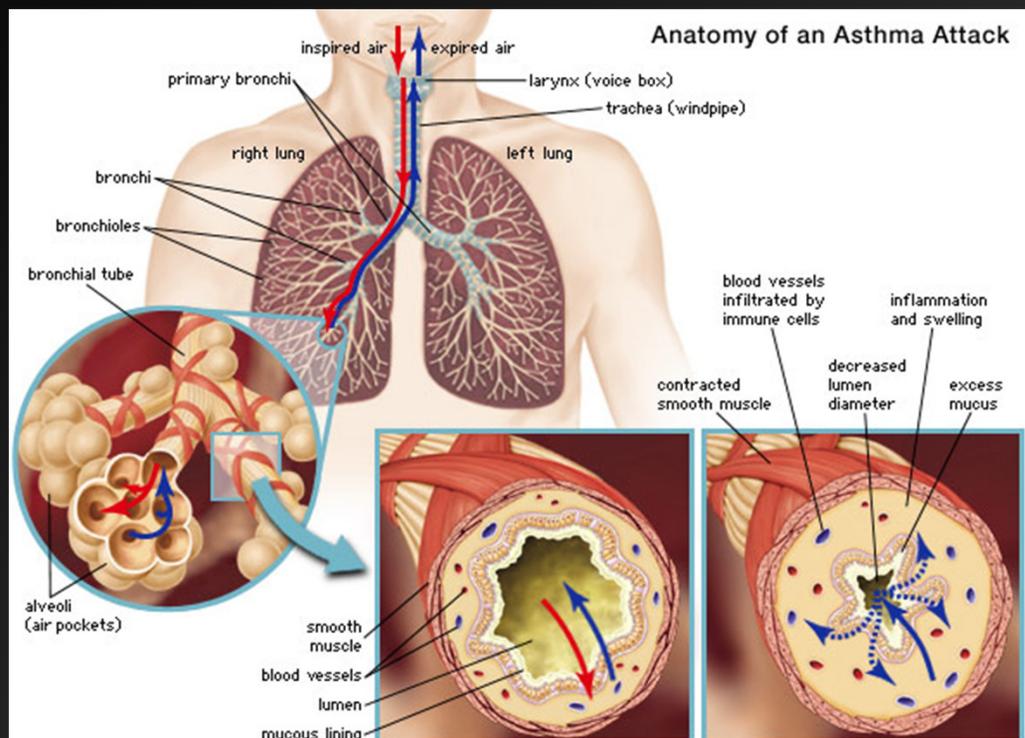
Combining transmission possibility with ACI-TIPI

Can BLS providers transmit EKGs?

- EMT-B and EMT-I providers
- 12-lead placement, EKG acquisition, transmission
- 98.9% successful transmission
- 98.9% proper lead placement
- 95.5% diagnostic quality
- no increase in scene time

Werman, Am J Emerg Med, 2011

BLS Isn't So Basic Anymore



BLS Isn't So Basic Anymore

**Emergency Medical
Technician-Basic:**

**National Standard
Curriculum**



BLS Isn't So Basic Anymore

Asthma Management by BLS Providers

396

Rahoward et al • ALBUTEROL ADMINISTRATION BY BLS PROVIDERS

CLINICAL INVESTIGATIONS

Out-of-Hospital Administration of Albuterol for Asthma by Basic Life Support Providers

Neal J. Richmond, MD, Robert A. Silverman, MD, Monique Kusick, EMT-B, Luis Malalana, EMT-P, Jules Wnukur, BS

Abstract

Background: Each year, approximately 40,000 patients with acute asthma are transported by the Fire Department of New York City (NYC) Emergency Medical Services (EMS). Out-of-hospital administration of bronchodilator therapy has, however, been restricted by scope of practice to advanced life support (ALS) providers. Since the rapid availability of ALS units cannot always be assured, some individuals with acute asthma may receive only basic life support (BLS) measures in the field. **Objectives:** To determine that basic emergency medical technicians (EMT-Bs) are able to effectively administer nebulized albuterol to asthma patients in the out-of-hospital environment. **Methods:** This was a prospective, observational cohort study of 91-1 asthma calls received by the NYC EMS system for patients between the ages of 1 and 65 years. Baseline peak expiratory flow rate (PEFR) and other clinical

measures were obtained prior to and following BLS administration of one or two treatments with nebulized albuterol. **Results:** Data were available for 5,201 patients over a one-year study period. One out-of-hospital albuterol treatment was given in 40%, while 40% of the patients received two. The PEFRs increased from 40.4% predicted (SD ±21.9) to 54.8% predicted (SD ±26.1), for a posttreatment improvement of 14.4% points (95% CI = 13.8 to 15.1). Other clinical outcome measures, including dyspnea index, respiratory rate, and use of accessory muscles, also showed improvement. **Conclusions:** This study demonstrates that EMT-Bs can effectively administer albuterol to acute asthma patients in the out-of-hospital environment. **Key words:** asthma, acute disease, albuterol, prehospital emergency care, services, emergency medical. *ACADEMIC EMERGENCY MEDICINE* 2008; 12:396-403.

In New York City (NYC), more than 40,000 people who have asthma are transported each year in response to calls to the 9-1-1 system. As is the case in many emergency medical services (EMS) systems, administration of pharmacologic bronchodilator therapy is restricted by scope of practice to higher-level paramedic or other advanced life support (ALS) providers, who are trained in medication administration. However, while the majority of asthma patients might benefit from out-of-hospital bronchodilator therapy, the rapid availability of paramedic or other ALS units cannot always be assured. As a result, certain asthma patients may receive only basic life support (BLS) measures from basic emergency medical technicians (EMT-Bs) prior to the arrival of ALS, or prior to transport to a receiving hospital facility. Since pharmacologic intervention by EMT-Bs has previously been limited to oxygen administration, an expanded

scope of practice for these BLS providers might be of particular benefit to this population of patients with previously limited access to such care. While the efficacy and safety of bronchodilator therapy in the treatment of asthma-induced bronchospasm have been clearly demonstrated, little attention has focused on the issue of such agents by BLS providers in the out-of-hospital environment. Furthermore, there has been a paucity of attempts to test or challenge currently accepted dogma on out-of-hospital scope of practice.

A one-year demonstration project that incorporated administration of beta-agonists by BLS units to asthma patients as standard care was conducted in NYC. In this study we report the ability of BLS providers to effectively administer beta-agonists to acutely ill asthma patients in the out-of-hospital setting.

METHODS

Study Design. This was a prospective, observational cohort study of 9-1-1 asthma calls received by the NYC EMS system for patients between the ages of 1 and 65 years. The Fire Department of New York and the Institutional Review Board of Long Island Jewish Medical Center approved this study. The institutional review board waived the requirement for written informed consent.

Study Setting and Population. This study was based on a one-year citywide demonstration project

From the Office of Medical Affairs, Emergency Medical Services, New York City Fire Department (NR, MK, LM, Brooklyn, NY; Luis Malalana, Monique Kusick, Emergency Medical Services (NR), Louisville, KY; and the Department of Emergency Medicine, Long Island Jewish Medical Center (NR, RAC, BS), New Hyde Park, NY. Received August 14, 2004; revision received December 14, 2004; accepted December 15, 2004. Address correspondence and reprint requests: Neal J. Rahoward, MD, Long Island Jewish Emergency Medical Services, 4755, 34th St., L.I.C., L.I.C., NY 11432. Fax: 917-574-6022; e-mail: neal.rahoward@lijuhealth.org; dr.n.r11@jama.2004.0.0.0.

BLS Dispatch (ASTHMA-B)	ALS Dispatch (DIFFBR)
Patient is 2-60 years old	High risk populations (defined as age < 2 or age > 60)
Can speak in full sentences	Cannot speak in complete sentences
Does not have chest pain or heart problems	New onset chest pain or cardiac history
No past intubation for breathing problems, and does not have a tracheostomy	Previous intubation or tracheostomy (history of severe asthma exacerbation)
May have an asthma attack or history of asthma	Signs of shock (cool, moist skin)

BLS Isn't So Basic Anymore

January 1, 1999 – January 1, 2000

- 3,351 patients given albuterol by BLS
- took the national curriculum concept of “facilitated MDI administration” and expanded it to nebulized albuterol

TABLE 3. Clinical Response to Basic Life Support Administration of Albuterol (pre and post Albuterol)

	Pre Albuterol (±SD)	Post Albuterol (±SD)	Mean Change in Value (95% CI of Difference)
PEFR* % predicted, age ≥5 years	40.4% (±21.0)	54.8% (±26.0)	14.4 (13.8, 15.1)
PEFR % predicted, age <15 years	53.1% (±36.2)	73.7% (±51.5)	20.5 (17.6, 23.4)
PEFR % predicted, age ≥15 years	39.1% (±20.7)	53.0% (±24.5)	13.9 (13.2, 14.6)
Respiratory rate—breaths/min	25.3 (±5.0) breaths/min	22.5 (±4.5) breaths/min	-2.8 (-3.0, -2.7)
Dyspnea Index score† ‡	6.8 (±2)	4.7 (±2.5)	-2.1 (-2.2, -2.0)
Pulse—beats/min	101 (±18) beats/min	100 (±17) beats/min	-0.8 (-1.1, -0.4)
Systolic blood pressure	130 (±24) mm Hg	128 (±22) mm Hg	-1.3 (-1.6, -0.9)
Accessory muscle use	46%	21%	-25 (-23, -27)
Ability to speak in full sentences†	72%	90%	18 (16, 20)

*PEFR = peak expiratory flow rate.

†Age 5 years or older.

‡Modified Borg dyspnea index 0-10 (0 = least severe, 10 = most severe).



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2010

- DIFFBR (ALS) 110,565

- ASTHMB (BLS) 21,067

- RESPIR (BLS) 22,410

=====

154,042

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And the “risk” is minimal:

ASTHMB calls per month = 1,568

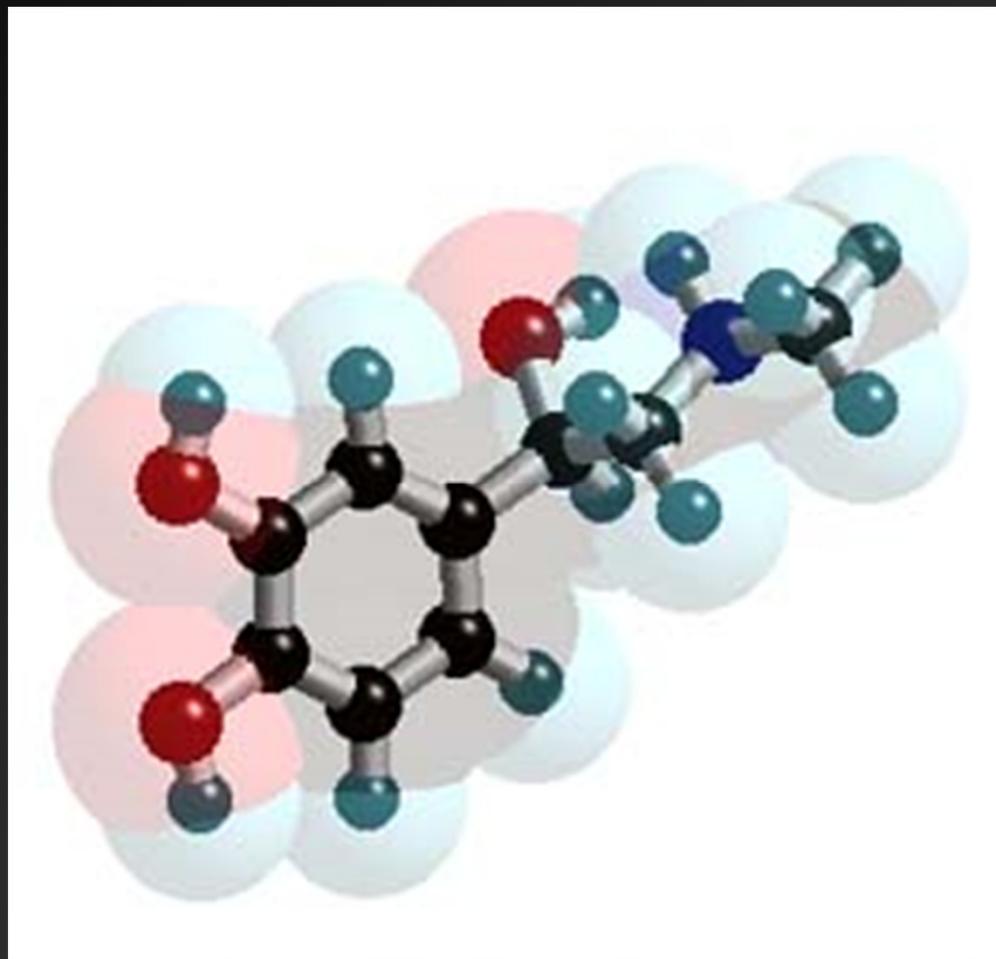
ASTHMB with ALS request = 70 (4.4%)

ASTHMB requiring ALS rx** = 9 (0.6%)

ASTHMB requiring only epi = 5 (55.6%)

**=ETI, BVM, CPR, or epinephrine

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“In 2007, about 4,900 EMS calls in the city were responding to reports of anaphylactic reactions,” notes Robert Pacenza, executive director of the Food Allergy Initiative (FAI), a national nonprofit organization that supports food allergy research, education, and public policy initiatives. “FAI is encouraging the New York State Regional Emergency Services Medical Council to mandate that all New York City basic life support-level ambulances carry epinephrine auto-injectors. Thousands of children carry them and know how to use them. There’s no reason why only advanced life support-level ambulance personnel are required to carry and are trained to administer epinephrine. Basic life support EMTs should as well.”

January 29th hearing to focus on improving emergency services, [restaurant safety](#)

New York, NY, January 27, 2009—In 2007, two-year-old Mason Menin nearly died after eating salmon during a [family vacation](#). “His throat began to close and he was gasping

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Fact: ~4,900 allergic reactions / anaphylactic reactions dispatched by the FDNY

Fact: Allergic reactions / anaphylaxis is an ALS call in NYC

ARREST	1	DUAL	CFR	PEDSTR	3	BLS Rescue	INJURY	5
CHOKER	1	DUAL	CFR	GYNMAJ	3	BLS	OBLAB	5
DROWN	2	DUAL	CFR	PD13C	3	BLS	MEDRXN	5
ANAPH	2	ALS	CFR	SHOT	3	BLS	CHILDA	6
STATEP	2	ALS	CFR	STAB	3	BLS	MVA	6
UNC	2	ALS	CFR	UNKNOW	3	BLS	OTHER	6
UNCRF	2	ALS	CFR	CVA	4	BLS	RAPE	6
ASTHMA	2	ALS	H/CFR	DRUG	4	BLS	SEIZR	6
DIFFBR	2	ALS		FIRE75	4	BLS	SICK	6
DIFFRF	2	ALS		FIRE76	4	BLS	SICKRF	6
MEDVAC	2	ALS		FIRE77	4	BLS	BURNMI	7
TRAUMA	2	BLS	Rescue	HEAT	4	BLS	DOA	7
JUMPDN	2	BLS	CFR	MVAIJ	4	BLS	EDP	7
VENOM	2	BLS	CFR	RESPIR	4	BLS	INJMIN	7
CVAC	2	BLS		OBMIS	4	BLS	JUMPUP	7
OBCOMP	2	BLS		PEDRF	4	BLS	PD13	7
ALTMEN	3	ALS		SICPED	4	BLS	SICMIN	7
BURNMA	3	ALS	CFR	ABDPN	5	BLS	SPEVNT	8
CARD	3	ALS	CFR	AMPMIN	5	BLS	STNDBY	8
ELECT	3	ALS	CFR	COLD	5	BLS	STRANS	8
INBLED	3	ALS		GYNHEM	5	BLS	DDOA	9
AMPMJ	3	BLS	CFR	GYNMIN	5	BLS		
INJMAJ	3	BLS	CFR	HYPTN	5	BLS		
OBOUT	3	BLS	CFR	INHALE	5	BLS		

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FDNY to Carry Epi on BLS Units

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Lisa Bell, EMT-B, Deputy Editor | Thursday, April 2, 2009

Today, Fire Commissioner Nicholas Scoppetta announced plans to begin carrying doses of epinephrine on all Fire Department of New York (FDNY) ambulances, including its 163 BLS units, to treat patients in anaphylactic shock.

FEATURED IN

- 4 Amish Children Die When Buggy Flips In Ky. Creek
- Pennsylvania Paramedic, Dispatcher Felled by H...
by H...

NYC gov always open

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NEW YORK CITY FIRE DEPARTMENT

FOR IMMEDIATE RELEASE: APRIL 3, 2009

PRESS RELEASES / 2009

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FDNY EMS TO BEGIN CARRYING EPINEPHRINE ON ALL AMBULANCES

Fire Commissioner Nicholas Scoppetta today announced plans to begin carrying doses of epinephrine on all FDNY ambulances as an additional precautionary life-saving tool. FDNY already carries the drug on Advanced Life Support (ALS) ambulances – which comprise about a third of the fleet – where it is administered by paramedics to treat patients in anaphylactic shock. Under the new policy, emergency medical technicians on Basic Life Support (BLS) ambulances will carry "EpiPens," which contain a ready-to-administer standard dose of epinephrine.

"New Yorkers already receive the best emergency medical care around. We're constantly looking for ways to make it even better and anticipate every possible scenario," Commissioner Scoppetta said. "Placing EpiPens on Basic Life Support ambulances provides an additional safeguard for anyone out there at risk for anaphylactic shock."

Although 911 calls for anaphylactic shock typically receive an ALS ambulance, BLS crews could be asked to respond to those cases if a distressed caller gives incomplete or inaccurate information to an emergency dispatcher. In rare cases where an ALS ambulance is further from the scene of such an emergency, a BLS ambulance might be first on scene and could use the EpiPen to administer the drug to an anaphylactic shock patient sooner.

Anaphylactic shock, brought on by severe allergic reactions, causes rapid constriction of the airway and can lead to respiratory failure. Epinephrine prevents worsening of the airway constriction and stimulates the heart to continue beating, and may be life-saving. The change should take effect in the coming months.

Press Contact: Francis X. Gribbon & Steve Ritea, (FDNY) (718) 999-2056

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2010

Allergic reaction / anaphylaxis – 5,958

Epi-Pen administrations by BLS = 0

BLS Isn't So Basic Anymore



BLS Isn't So Basic Anymore

When faced with a critical asthmatic,
would you rather that BLS use:



BLS Isn't So Basic Anymore

12 months – ALS administration of epinephrine for acute asthma exacerbations

- 235 patients
- mean age: 25.7 (range 1-79)
- no change in MAP
 - average systolic pressure decreased
 - only 5 patients experience an increase in SBP
- HR decreased for most patients
- no ischemic changes noted on EKGs
- BVM ventilation was able to be discontinued for 1/3 of patients following epinephrine administration
- only one death reported

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THE REGIONAL EMERGENCY MEDICAL SERVICES COUNCIL OF NEW YORK CITY, INC.

Revision/Update of REMAC Prehospital Treatment & Transport Protocols

407

WHEEZING

For patients over one (1) year of age who are experiencing exacerbation of asthma or wheezing.

1. Assess the airway
2. Administer oxygen
3. Monitor breathing

NOTE: IF PATIENT EXHIBITS SIGNS OF IMMINENT RESPIRATORY FAILURE, REFER TO PROTOCOL #401 – ADULT RESPIRATORY DISTRESS/FAILURE OR #450 – PEDIATRIC RESPIRATORY DISTRESS/FAILURE.

4. Do not permit physical activity
5. Place the patient in a Fowler's or Semi-Fowler's position
6. Assess the following prior to administration of the first nebulized treatment:
 - Vital signs
 - Patient's ability to speak in complete sentences
 - Accessory muscle use
 - Wheezing
7. Administer Albuterol Sulfate 0.083%, one (1) unit dose or 3 cc via nebulizer at a flow rate that will deliver the solution over 5 minutes to 15 minutes. Do not delay transport to complete medication administration.
8. Begin transport.

NOTE: FOR PATIENTS IN SEVERE RESPIRATORY DISTRESS, CALL FOR ADVANCED LIFE SUPPORT ASSISTANCE. DO NOT DELAY TRANSPORT.

9. If symptoms persist, Albuterol Sulfate 0.083% may be repeated twice for a total of three (3) doses, with the third occurring during transport.
10. If the patient is having severe respiratory distress or shock and is under 33 years of age, administer 0.3 mg Epinephrine (ONE DOSE ONLY) via an auto-injector.

NOTE: ADMINISTRATION OF EPINEPHRINE VIA AUTO-INJECTOR MUST BE REPORTED TO ON-LINE MEDICAL CONTROL AND YOUR AGENCY'S MEDICAL DIRECTOR AS SOON AS POSSIBLE

11. Contact On-Line Medical Control for authorization to administer a second administration of 0.3 mg Epinephrine via an auto-injector, if needed.
12. Upon completion of patient treatment or transfer of patient care to an ALS Provider or a 911 Receiving Hospital, reassess the patient. See Step # 6.

New Protocol

- allows epi autoinjector use for patients in severe distress (i.e. in need of ventilation) and age <33

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2010

- DIFFBR (ALS) 110,565

- ASTHMB (BLS) 21,067

- RESPIR (BLS) 22,410

=====

154,042

Epi-Pen administrations by BLS : 29

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Question of efficacy

Onset after administration of naloxone

IN: 4.2 minutes

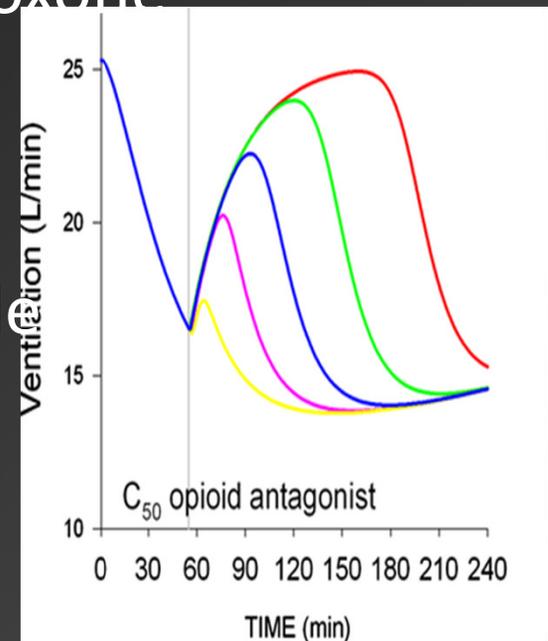
IV: 3.7 minutes

Onset after arrival at patient's side

IN: 8 minutes

IV: 10 minutes

IN has no risk of needlesticks



BLS Isn't So Basic Anymore

Narcotics remain a significant cause of morbidity and mortality

In most systems, ALS providers can give IV / IM naloxone

IN recently introduced for ALS

But why not BLS?

BLS Isn't So Basic Anymore

What makes this an ALS skill?

Right drug

Right dose

Right route

Right time

Right patient

BLS Isn't So Basic Anymore

What could make this a BLS skill?

Right drug

Education

Right dose

Prefilled syringe

Right route

Only one option

Right time

Education

Right patient

Education

BLS Isn't So Basic Anymore

Intranasal Administration of Naloxone by the EMT-Basic: FDNY Proposal for a New York State Demonstration Project

Until recently, the administration of medications by the EMT-B had been limited to a select number of oral medications (aspirin, oral glucose) and the assisted administration of an equally select number of medications that were limited by the requirement that they be the patient's own medications (albuterol metered dose inhaler, sublingual nitroglycerin, and intramuscular epinephrine [autoinjector](#)).

That scope of practice was then expanded via a New York State demonstration project in which the ability of the EMT-B to administer nebulized albuterol sulfate was shown to be safe and effective. This project affirmed the ability of the EMT-B to deliver time-sensitive therapy to patients whose disease state may not have otherwise tolerated either prolonged transport / scene times or the delayed arrival of ALS providers capable of delivering such therapy. We herein propose a further expansion of the EMT-B scope of practice, allowing both the addition of another noninvasive route of medication administration and the administration of another time-sensitive pharmacologic intervention.

According to the City's Medical Examiner's Office, New York City suffered a total of 7,451 deaths related to drug overdoses between 1990 and 1998. In fact, since 1993, the estimated 900 accidental opioid overdoses that occurred annually place this cause of death as one of the top ten citywide causes of mortality, surpassing the number of annual homicide deaths within the City.

The problem of illicit substance use is further compounded by the number patients actively enrolled in opioid dependence treatment programs. New York State estimates suggest that there is one patient enrolled in a methadone treatment program for every four patients using illicit opioids. This data is consistent with New York City, where there are an estimated 160,000 heroin abusers, and an estimated to be another 40,000 patients enrolled in out-patient methadone programs.

In addition to increased use of illicit substances, the noted increase in heroin purity raises additional concern for accidental overdoses that may present as altered mental status and/or respiratory compromise. Prior to 1988, the average purity of the heroin found in New York City was less than 10%, and more recently has reportedly increased to over 60% purity.

Patients who suffer opioid overdoses may be appropriately treated by ALS providers with opioid antagonists such as naloxone (Narcan), in addition to basic life support maneuvers such as assisted ventilation. In the absence of such ALS personnel, treatment may be limited to [ventilatory](#) support, a therapy with potential to provide both benefit (i.e. improved ventilation) and harm (i.e. gastric insufflation, induced emesis).

In calendar year 2006, FDNY data identified 1,112 cases for which BLS arrived on scene first and for whom naloxone was ultimately given upon ALS arrival. For these patients,

an average of 9.7 minutes elapsed between the arrival of the BLS and ALS units, respectively. This time interval presents an opportunity for patient deterioration, and yet may also provide a window of therapeutic opportunity for properly equipped and trained BLS providers to administer intranasal naloxone. This data is consistent with a recently published study out of Seattle in which the mean time lapse between the arrival of a BLS provider and a subsequently requested ALS provider for patients suffering from an opioid overdose exceeded sixteen minutes.

The New York SEMAC and New York City REMAC have already approved the use of intranasal naloxone as an acceptable alternative to either intravenous or intramuscular administration. These decisions were supported by published data demonstrating both the efficacy and safety of intranasal naloxone administration. This route also provides

Proposed BLS Intranasal Narcan Project – 2007

- CY2006: 1,112 BLS cases for which ALS administered naloxone
- 9.7 min interval from BLS to ALS arrival

Blocked by the unions

BLS Isn't So Basic Anymore

THE REGIONAL EMERGENCY MEDICAL SERVICES COUNCIL OF NEW YORK CITY, INC.



NYC REMAC	
Advisory No.	2014-03
Title:	BLS Provider Administration of Intra-Nasal Naloxone
Issue Date:	
Effective Date:	Immediate
Supersedes:	n/a
Page:	1 of 2

The Regional Emergency Medical Advisory Committee (REMAC) of New York City is responsible to develop, approve and implement prehospital treatment and transport protocols for use within the five boroughs of the City of New York. The Regional Emergency Medical Advisory Committee (REMAC) of New York City operates under the auspices of Article Thirty of the New York State Public Health Law.

Attached is the NYC REMAC REVISED Altered Mental State protocol (#411). Also provided is a

NYC NYC Resources 311 Office of the Mayor

NEW YORK CITY FIRE DEPARTMENT

Published: July 01, 2014

FDNY Firefighters and EMTs Begin Carrying Intranasal Naloxone



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The New York Times Science

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Emergency Antidote, Direct to Addicts



Needs from an exchange program. Some states now offer syringes and naloxone.

By DAN HURLEY
Published: December 11, 2007

Among the growing numbers of researchers and public health officials advocating a daring new strategy to put an injectable antidote for heroin overdoses directly into the hands of addicts, few have the credibility of Mark Kinzly.

TWITTER
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SINGLE PAGE

THE BANANA REPUBLIC MAD STYLE COCKTAIL PARTY

BLS Isn't So Basic Anymore



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So BLS can...

- ... safely carry and administer IN naloxone
- ... treat the adverse effects of opioid agents
- ... and do treat a wide range of painful conditions (medical and trauma)

Setting aside the regulatory / paperwork

... BLS IN fentanyl?

Other IN drugs? Versed? Glucagon? Ke

Immunizations?



"In this laboratory we're always pushing the envelope to the Max."

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Oral Dissolving Tablets

- Zofran for nausea / vomiting?
- Orapred for asthma / wheezing?
 - POSTSAC study



BLS Isn't So Basic Anymore

Adult vs. Pediatric Skill Utilization for Asthma (2006-12)

Nebulized beta agonist therapy

Adult 113,511 (3% overall)

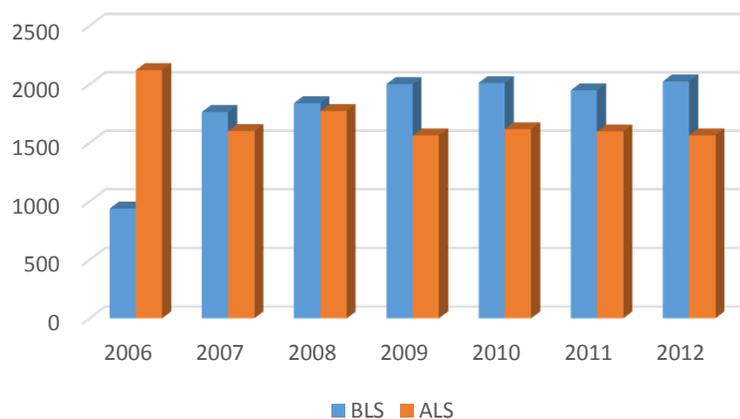
Pediatric 29,806 (5.6% overall)

Parenteral Corticosteroids

Adult 15,857 13.97%

Pediatric 274 0.92%

Pediatric NBA Administration by Unit Type



BLS Isn't So Basic Anymore

Adult vs. Pediatric Skill Utilization (2006-12)

AED Application			Frequency per provider
	Adult	7,018	1 every 2.3 years
	Pediatric	150	1 every 107.3 years
Defibrillation (ALS)			
	Adult	7,763	1 per year
	Pediatric	243	1 every 34.6 years
IV / Saline Lock			
	Adult	310,002	37 per year
	Pediatric	7,260	1 every 14 months
Endotracheal Intubation			
	Adult	20,039	2.4 per year
	Pediatric	431	1 every 19.5 years

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Prehospital Oral Steroids for the Treatment of Status Asthmaticus in Children (POSTSAC) Study

Began June 1, 2014 and is expected to continue through February 29, 2016

As of last night...

2,821 patients screened

1394 to steroids arm

- 224 "included" and received steroids

1427 randomized to no steroids arm

- 361 "included" and received no steroids

Implementation, safety, efficacy...

BLS Isn't So Basic Anymore

One more (unstated) goal

POSTSAC utilizes....

... an "ALS" medication

... via a BLS skill set (oral med)

... for an incredibly common condition

... treated >50% of the time in NYC by BLS

... and in >50% of the country by providers in systems without ALS capability

And will now include data on use of both Orapred and Orapred ODT (10/1)

BLS Isn't So Basic Anymore

The future of BLS care will include...

... expanded care through use of technology.

... use of existing skills with more broad application.

... use of “ALS medications” by BLS routes of administration.

... reimbursement requirements that require medical care rather than just transport.

You Can't Talk About That!



You Can't Talk About That!

Yes - eliminated the skill from the prehospital setting	0.00%
-Yes - limited the use of the skill to a subset of paramedics	10.34%
-No - considering the elimination of the skill from the prehospital setting	10.34%
-No - considering limited use of the skill by a subset of paramedics	20.69%
-No - would consider its elimination but value my job and prefer not to be burned in effigy	34.48%
-No - do not believe there is a need to eliminate or limit use of the skill at this time	37.93%

You Can't Talk About That!



Paramedics intubate...

... in unusual positions,
... in difficult scenarios,
... with bystanders, friends,
family, and pets watching,
... and under scrutiny that
most in-hospital providers
never experience.

And most do it very well.

You Can't Talk About That!

And then we ask them to...

- ... package the patient,
- ... carry them down stairs, around corners,
over the river and through the woods,
- ... into an ambulance,
- ... drive them across town,
- ... with lights and sirens,
- ... unload them,
- ... and bring them to us in the ED.

And all of that without losing a tube.



You Can't Talk About That!

Misplaced Endotracheal Tubes by Paramedics in an Urban Emergency Medical Services System

From the Department of Emergency Medicine, JFK Medical Center, Atlantis, FL, and Department of Emergency Medicine, Orlando Regional Medical Center, Orlando, FL, and University of Florida College of Medicine, Gainesville, FL.†*

Steven H. Katz, MD*
Jay L. Falk, MD†

See editorial, p. 62.

Study objective: To determine the incidence of unrecognized, misplaced endotracheal tubes inserted by paramedics in a large urban, decentralized emergency medical services (EMS) system.

Orlando, Florida

- 25% (27/108) of endotracheal tubes misplaced
 - 67% (18/27) – esophageal
 - 33% (9/27) - hypopharyngeal
- Misplaced rate among medical patients = 14%
- Misplaced rate among trauma patients = 37%
- Protocols at the time required EtCO₂ confirmation (actual use was another matter).

You Can't Talk About That!

FOCUS ON ENDOTRACHEAL INTUBATION

UNRECOGNIZED MISPLACEMENT OF ENDOTRACHEAL TUBES BY GROUND PREHOSPITAL PROVIDERS

David D. Wirtz, MD, MPH, Christine Ortiz, MD, David H. Newman, MD, Inna Zhitomirsky

ABSTRACT

Objective. Endotracheal intubation by emergency medical services (EMS) is well established. Esophageal misplacement is a catastrophic complication that has until recently been studied by using methods that have called into question the accuracy of the reported data. The purpose of our study was to determine the incidence of unrecognized endotracheal tube misplacement, reasons for deferred intubations in the field, and to report outcomes in those patients with unrecognized misplacement. **Methods.** This was a prospective observa-

to hospital discharge. **Conclusion.** The rate of esophageal misplacement of endotracheal tubes in the prehospital environment in our urban setting and the poor clinical course of patients with unrecognized misplacement is consistent with previous reports, suggesting that the benefit of prehospital airway management does not clearly supercede the potential risks. **Key words:** intubation, intratracheal; prehospital emergency care; allied health personnel; emergency medical technicians.

PREHOSPITAL EMERGENCY CARE 2007;11:213-218

In one Manhattan hospital...

132 intubations during study period (pre-EtCO₂)

12 misplaced tubes (11 esophageal, 1 hypopharynx) = 9%

Additional 20 were placed in the right mainstem = 17%

You Can't Talk About That!

Sex	Age	Prehospital information	ED detection method	Field device	ED presentation; ED course	Final diagnosis; outcome
M	21	Blunt trauma, vitals present*	Laryngoscopy, ETCO ₂	None	Cardiac arrest; <u>declared dead</u>	—
F	48	Found in cardiac arrest	Laryngoscopy, ETCO ₂	None	Declared <u>dead</u>	—
F	85	Altered mental status, hypoxia	ETCO ₂	None	Breathing; admitted**	Sepsis; <u>died (1 day)</u>
F	65	Dyspnea, vitals present*	Laryngoscopy, ETCO ₂	None	Cardiac arrest; admitted	Emphysema; <u>died (6 days)</u>
M	57	Dyspnea, vitals present*	Laryngoscopy, ETCO ₂	None	Cardiac arrest; admitted	Unknown
None			Breathing; admitted		Overdose; discharged (9 days)†	
F	80	Found in traumatic arrest	ETCO ₂ , gastric contents in tube	None	Declared <u>dead</u>	—
M	72	AMS, vitals present*	Laryngoscopy, ETCO ₂	ETCO ₂	Cardiac arrest; admitted	SAH; <u>died (10 days)</u>
F	8	Found in cardiac arrest	ETCO ₂	None	Declared <u>dead</u>	—
F	52	Overdose, unresponsive	ETCO ₂	None	Breathing; <u>admitted</u>	<u>Overdose; discharged (9 days)†</u>
M	88	Found in cardiac arrest, resuscitated, vitals present*	ETCO ₂	None	Cardiac arrest; admitted	CHF; <u>died (12 days)</u>

ETCO₂ = end-tidal CO₂ capnometry; SAH = subarachnoid hemorrhage; CHF = congestive heart failure.

*At time of tube placement.

**Only patient not reintubated in emergency department.

†Neurologically intact at discharge.

You Can't Talk About That!

EMERGENCY MEDICAL SERVICES/ORIGINAL RESEARCH

The Effectiveness of Out-of-Hospital Use of Continuous End-Tidal Carbon Dioxide Monitoring on the Rate of Unrecognized Misplaced Intubation Within a Regional Emergency Medical Services System

Salvatore Silvestri, MD
George A. Ralls, MD

From the Departments of Emergency Medicine, Orlando Regional Medical Center, Orlando, FL (Silvestri, Ralls, Thundiyil, Rothrock, Semin, Carter, Falk); University of Florida College of Medicine, Gainesville, FL (Silvestri, Rothrock, Falk); Office of the Medical

153 patients with prehospital intubation

- 61% with waveform capnography
- 39% without capnography

Unrecognized esophageal intubation rate

- 23% without capnography
- 0% with capnography

Mortality rate among patients with esophageal intubation and without spontaneous respiration = 100%.

Elapsed Time	Systolic B/P	Diastolic	Pulse	Respir.	Pain (0-10)
05	100	60	80	20	0
SPO2	Temperature	GCE	GCV	GCM	GST
Breathing		Circulation (skin)		Pupils	
Quality	Lung Sounds	Color	Temp.	L	R
<input type="checkbox"/> Normal	<input type="checkbox"/> Clear	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal	<input type="checkbox"/> Reacts	<input type="checkbox"/> Reacts
<input type="checkbox"/> Labored	<input type="checkbox"/> Rales	<input type="checkbox"/> Cyanotic	<input type="checkbox"/> Hot	<input type="checkbox"/> Sluggish	<input type="checkbox"/> Sluggish
<input type="checkbox"/> Shallow	<input type="checkbox"/> Wheeze	<input type="checkbox"/> Pale	<input type="checkbox"/> Cool	<input type="checkbox"/> Unreactive	<input type="checkbox"/> Unreactive
<input type="checkbox"/> Irregular	<input type="checkbox"/> Rhonchi	<input type="checkbox"/> Flush	<input type="checkbox"/> Cold	<input type="checkbox"/> Dilated	<input type="checkbox"/> Dilated
	<input type="checkbox"/> Diminish	<input type="checkbox"/> Jaundice	<input type="checkbox"/> Rash	<input type="checkbox"/> Constricted	<input type="checkbox"/> Constricted
	<input checked="" type="checkbox"/> Absent	Radial Pulse (A)	Cap. Refill (P)	Mental Status	
		<input type="checkbox"/> Present	<input type="checkbox"/> ≤ 2 Sec	<input type="checkbox"/> A <input type="checkbox"/> V <input type="checkbox"/> P <input type="checkbox"/> U	

Elapsed Time	Systolic B/P	Diastolic	Pulse	Respir.	Pain (0-10)
10	100	60	80	20	0
Breathing		Circulation (skin)		Pupils	
Quality	Lung Sounds	Color	Temp.	L	R
<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Clear	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal	<input type="checkbox"/> Reacts	<input type="checkbox"/> Reacts
<input type="checkbox"/> Labored	<input type="checkbox"/> Rales	<input type="checkbox"/> Cyanotic	<input type="checkbox"/> Hot	<input type="checkbox"/> Sluggish	<input type="checkbox"/> Sluggish
<input type="checkbox"/> Shallow	<input type="checkbox"/> Wheeze	<input type="checkbox"/> Pale	<input type="checkbox"/> Cool	<input type="checkbox"/> Unreactive	<input type="checkbox"/> Unreactive
<input type="checkbox"/> Irregular	<input type="checkbox"/> Rhonchi	<input type="checkbox"/> Flush	<input type="checkbox"/> Cold	<input type="checkbox"/> Dilated	<input type="checkbox"/> Dilated
	<input type="checkbox"/> Diminish	<input type="checkbox"/> Jaundice	<input type="checkbox"/> Rash	<input type="checkbox"/> Constricted	<input type="checkbox"/> Constricted
	<input checked="" type="checkbox"/> Absent	Radial Pulse (A)	Cap. Refill (P)	Mental Status	
		<input type="checkbox"/> Present	<input type="checkbox"/> ≤ 2 Sec	<input type="checkbox"/> A <input type="checkbox"/> V <input type="checkbox"/> P <input type="checkbox"/> U	

Elapsed Time	Systolic B/P	Diastolic	Pulse	Respir.	Pain (0-10)
15	100	60	80	20	0
Breathing		Circulation (skin)		Pupils	
Quality	Lung Sounds	Color	Temp.	L	R
<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Clear	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal	<input type="checkbox"/> Reacts	<input type="checkbox"/> Reacts
<input type="checkbox"/> Labored	<input type="checkbox"/> Rales	<input type="checkbox"/> Cyanotic	<input type="checkbox"/> Hot	<input type="checkbox"/> Sluggish	<input type="checkbox"/> Sluggish
<input type="checkbox"/> Shallow	<input type="checkbox"/> Wheeze	<input type="checkbox"/> Pale	<input type="checkbox"/> Cool	<input type="checkbox"/> Unreactive	<input type="checkbox"/> Unreactive
<input type="checkbox"/> Irregular	<input type="checkbox"/> Rhonchi	<input type="checkbox"/> Flush	<input type="checkbox"/> Cold	<input type="checkbox"/> Dilated	<input type="checkbox"/> Dilated
	<input type="checkbox"/> Diminish	<input type="checkbox"/> Jaundice	<input type="checkbox"/> Rash	<input type="checkbox"/> Constricted	<input type="checkbox"/> Constricted
	<input checked="" type="checkbox"/> Absent	Radial Pulse (A)	Cap. Refill (P)	Mental Status	
		<input type="checkbox"/> Present	<input type="checkbox"/> ≤ 2 Sec	<input type="checkbox"/> A <input type="checkbox"/> V <input type="checkbox"/> P <input type="checkbox"/> U	

Elapsed Time	Crew	Treatment #	Med #	Dose	Measure #	Route #	Use #	Total Use	Rhythm #	Condition	Comments
06	2		60	40	0	15	41	1			40 V vasopresin
07	2		27	25	0	2	41	1			25g D50
12	2		32	1.00	10	41	62	5			1mg epi x 5
28	2		51	88	00	13	41	1			88 mg @ sodium bicarb
05	2	04							01		asystole
07	2		47	2.00	24	41					40 Normal saline

FLOW CHART

CAD #

[Redacted]

[Redacted]



Narrative History: Key Words - (Onset, Provokes, Quality, Radiates, Severity, Position, Changes En Route, Medications)

PMH: Asthma Chronic Renal Failure Cardiac Diabetes Frail / Deconditioned Hypertension IV Drug Use Seizure Disorder Tracheostomy
 Amputee Cancer COPD CVA / Stroke Dialysis HIV / AIDS Incontinent Psychiatric Hx. Substance Abuse Tuberculosis

Special Conditions: Bed Confined Non-Ambulatory Required Stretcher Valid DNR

Allergies: No known allergies PMHx → Schizophrenia

Medications: Unknown Risperdal

Obvious Death Decomposition Dependent Lividity Rigor Mortis Mortal Injury

Cardiac Arrest Information
 Witnessed By: PD CFR / EMS Other
 ROSC: PD CFR / EMS Other

Prior to this Unit's Patient Contact

CPR was started by:	Minutes Since Arrest	AED was used by:
<input type="checkbox"/> Bystander	<input type="checkbox"/>	<input type="checkbox"/> PD
<input type="checkbox"/> Family	CPR Started	<input type="checkbox"/> CFR
<input type="checkbox"/> PD	<input type="checkbox"/>	<input type="checkbox"/> EMS
<input checked="" type="checkbox"/> CFR	CPR Stopped	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> EMS	<input type="checkbox"/>	Minutes Since 1st AED Shock
<input type="checkbox"/> Medical	<input type="checkbox"/>	<input type="checkbox"/>

upon arrival found 29 y/o female supine, in care of [Redacted], CPR in progress. As per BLS, pt was resisting arrest by PD + became pulseless + apneic. Cardiac monitoring reveals asystole, pt intubated + receive 40 NS, 40u vasopressin, 25g D50, 1mg epi x 5, + 58 meq sodium bicarb as per med control. CPR continued w/o change in status. Pt skin cool, pale + moist, ⊖ injury noted, ⊕ edema. Pt Txp to #134 w/o incident, CPR enroute.

Chief Complaint: Cardiac arrest

Have the patient's symptoms appeared or gotten worse in the last 72 hours? Yes No

Presumptive Diagnosis: cardiac arrest

Continuation Form

Time of Contact	OLMC Physician	Reason For Contact	OLMC Terminate Time	ED Chart Number
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> RMA <input type="checkbox"/> Consult <input type="checkbox"/> Orders <input type="checkbox"/> Transport Decision <input type="checkbox"/> Onscene Triage	<input type="checkbox"/>	<input type="checkbox"/>

Crew #	C.S. Administered By - Signature	Witness Signature / Title	Amount Wasted	# Vials Used	OLMC Physician	URN	SO
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Overview

Case ID:	[REDACTED]	Site of collapse:	
Time zone:	(GMT-05:00) Eastern Time (US & Canada)	Detail:	[REDACTED]
Case date and time:	[REDACTED] 10:57:04 PM	Reference ID:	[REDACTED]
		Institution:	FDNY EMS

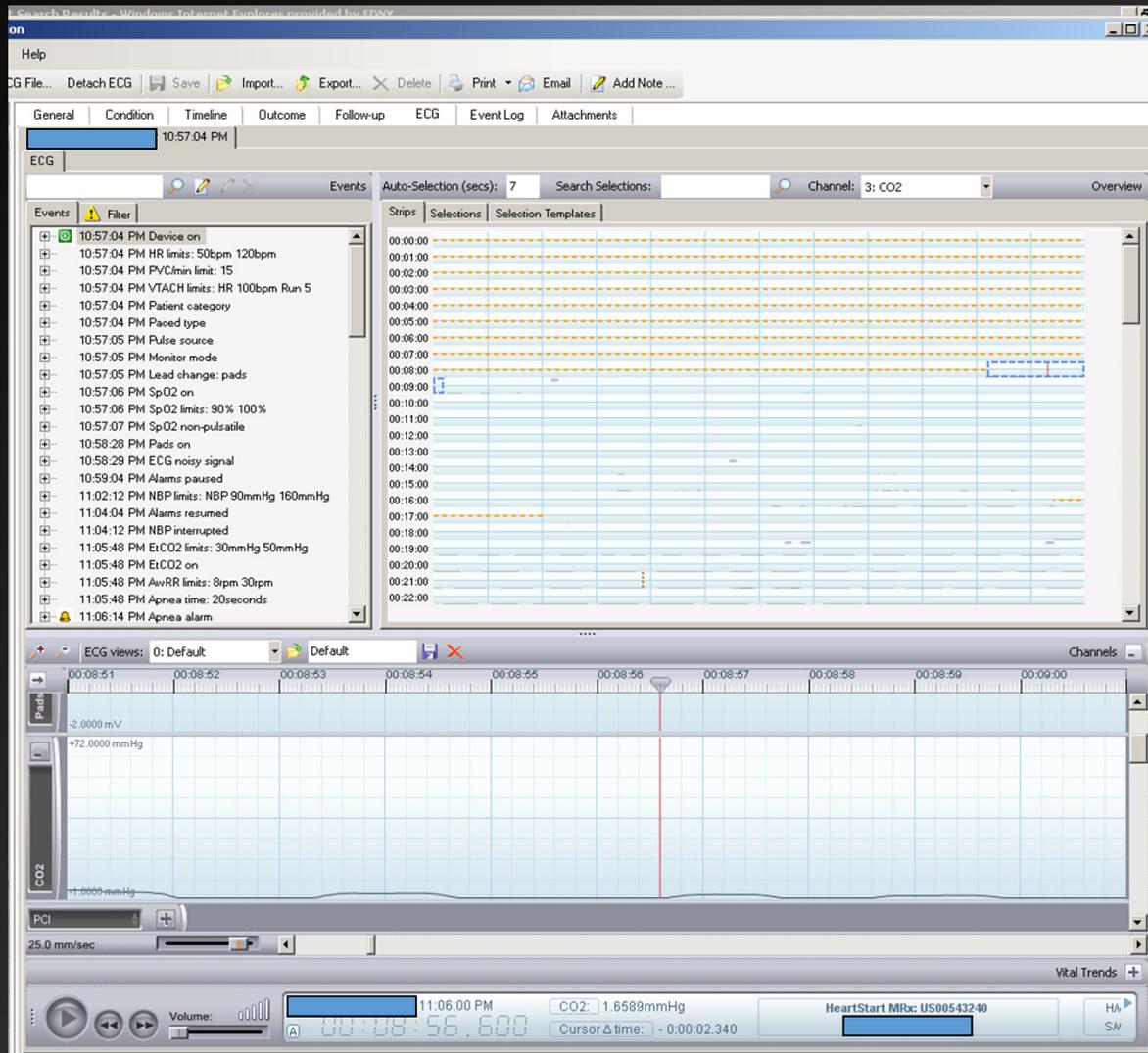
Defibrillators

Adjusted "On" Time	Recorded "On" Time	Defibrillator Type	Serial Number	Shocks
[REDACTED]	10:57:04 PM	HeartStart MRx	US00543240	0

Patient

Patient ID:	[REDACTED]	Date of birth:	
First name:	[REDACTED]	Age:	29 years
Middle name:	[REDACTED]	Height:	0 in.
Last name:	[REDACTED]	Weight:	0 lbs., 0 oz.
		Gender:	Female
		Race:	





on
 Help
 G File... Detach ECG Save Import... Export... Delete Print Email Add Note ...

General Condition Timeline Outcome Follow-up ECG Event Log Attachments

Heart: [redacted] 10:57:04 PM

ECG

Events Filter

- 10:57:04 PM Device on
- 10:57:04 PM HR limits: 50bpm 120bpm
- 10:57:04 PM PVC/min limit: 15
- 10:57:04 PM VTACH limits: HR 100bpm Run 5
- 10:57:04 PM Patient category
- 10:57:04 PM Paced type
- 10:57:05 PM Pulse source
- 10:57:05 PM Monitor mode
- 10:57:05 PM Lead change: pads
- 10:57:06 PM SpO2 on
- 10:57:06 PM SpO2 limits: 90% 100%
- 10:57:07 PM SpO2 non-pulsatile
- 10:58:28 PM Pads on
- 10:58:29 PM ECG noisy signal
- 10:59:04 PM Alarms paused
- 11:02:12 PM NBP limits: NBP 90mmHg 160mmHg
- 11:04:04 PM Alarms resumed
- 11:04:12 PM NBP interrupted
- 11:05:48 PM EtCO2 limits: 30mmHg 50mmHg
- 11:05:48 PM EtCO2 on
- 11:05:48 PM AwRR limits: 8rpm 30rpm
- 11:05:48 PM Apnea time: 20seconds
- 11:06:14 PM Apnea alarm

Auto-Selection (secs): 7 Search Selections: Channel: 3: Compressions

Strips Selections Selection Templates

ECG views: 0: Default Default Channels

Pads
 -2.0000 mV
 +72.0000 mmHg

CO2
 -1.0000 mmHg

PCI
 25.0 mm/sec

Vital Trends

11:13:42 PM
 CO2: 45.1689mmHg
 HeartStart MRx: US00543240
 HA
 SA
 00:16:38.200
 Cursor Δ time: + 0:00:04.222

You Can't Talk About That!



8 June 2010

The future direction of airway management in the London Ambulance Service

Pre-hospital airway management in general, and endotracheal intubation in particular, has been the subject of much debate over the past few years. This has generated both audits and research, predominantly in the United States. In June 2008 the JRCALC airway management working group reviewed the existing literature and published its recommendations.

The conclusion of this paper is that "ET intubation can no longer be recommended as a mandatory component of paramedic practice and should not be continued to be practised in its current format". The paper goes on to recommend the increasing use of supraglottic airway devices (SAD) such as the LMA and i-Gel.

Training requirements and challenges

There is also evidence that to achieve a 90 per cent success rate at intubation, a minimum of 57

You Can't Talk About That!

If we are going to continue, we need more than a laryngoscope.

- video laryngoscopy**
- QA**
- initial and continuing training**
- skill maintenance data**

The future of intubation...

... is in question.

Gizmos, Gadget and Godsend



Gizmos, Gadget and Godsend

“That it will ever come into general use, notwithstanding its value, is extremely doubtful; because its beneficial application requires much time and gives a good bit of trouble both to the patient and the practitioner; because its hue and character are foreign and opposed to all our habits and associations.”



Gizmos, Gadget and Godsend

Active Compression-Decompression CPR

“There is insufficient evidence to recommend for or against the routine use of ACD-CPR. ACD-CPR may be considered for use when providers are adequately trained and monitored (Class IIb, LOE B).”



Gizmos, Gadget and Godsend

Active Compression-Decompression CPR

2,740 patients enrolled in a clinical trial

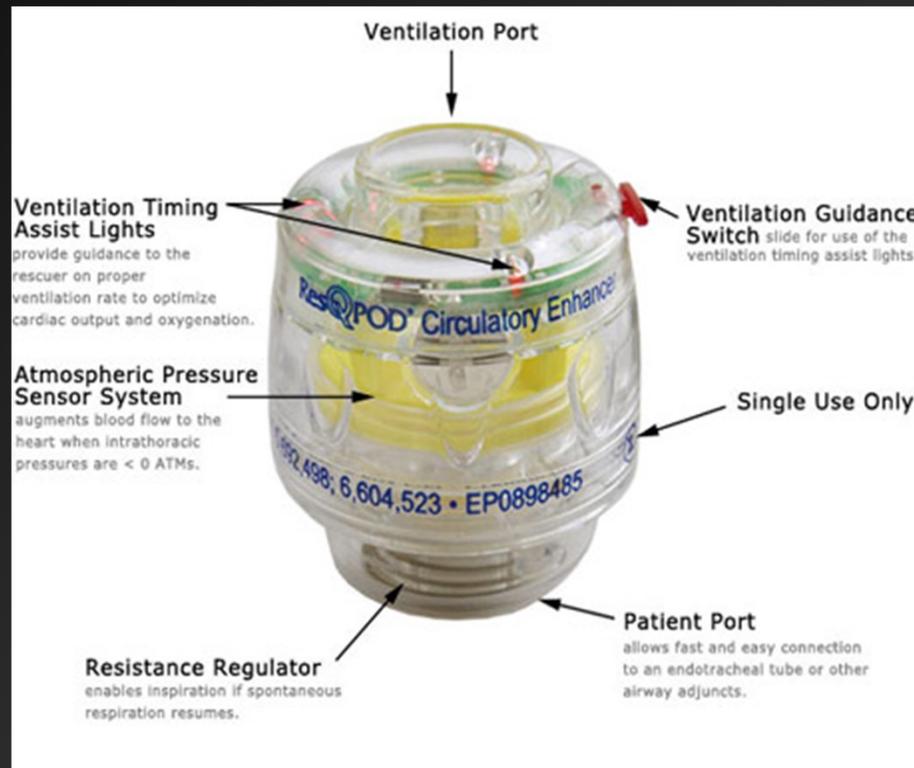
- standard CPR
- CPR with ACD and ITD

Survival improved: 9% vs. 6%



Aufderheide, Lancet, 2011

Gizmos, Gadget and Godsend



Gizmos, Gadget and Godsend

Impedance Threshold Device

Another sound concept:

- prevents overinflation
- **one-way valve allows air to escape with each compression**
- results in an increase in negative intrathoracic pressure
- **improves venous return to the heart**
- also improves cerebral perfusion by pulling CSF into the thorax, thereby reducing ICP

Gizmos, Gadget and Godsend



Impedance Threshold Device

“One meta-analysis of pooled data from both conventional CPR and ACD-CPR randomized trials⁸³ demonstrated improved ROSC and short-term survival associated with the use of an ITD in the management of adult out-of-hospital cardiac arrest patients but no significant improvement in either survival to hospital discharge or neurologically intact survival to discharge.”

Three cohort studies with historic controls that implemented 2005 Guidelines plus ITD demonstrated improved survival to hospital discharge for out-of-hospital cardiac arrest.⁸⁴⁻⁸⁶ It was not possible to determine the relative contribution of the ITD to the improved outcome. The use of the ITD may be considered by trained personnel as a CPR adjunct in adult cardiac arrest (Class IIb, LOE B).”

Gizmos, Gadget and Godsend

Impedance Threshold Device

8718 patients randomized to ITD or “sham” ITD.

Found no survival difference: 5.8% vs 6%.



Aufderheide, NEJM, 2011

Gizmos, Gadget and Godsend

No definitive study



Demonstrated as part of “package” in some studies to improve outcome

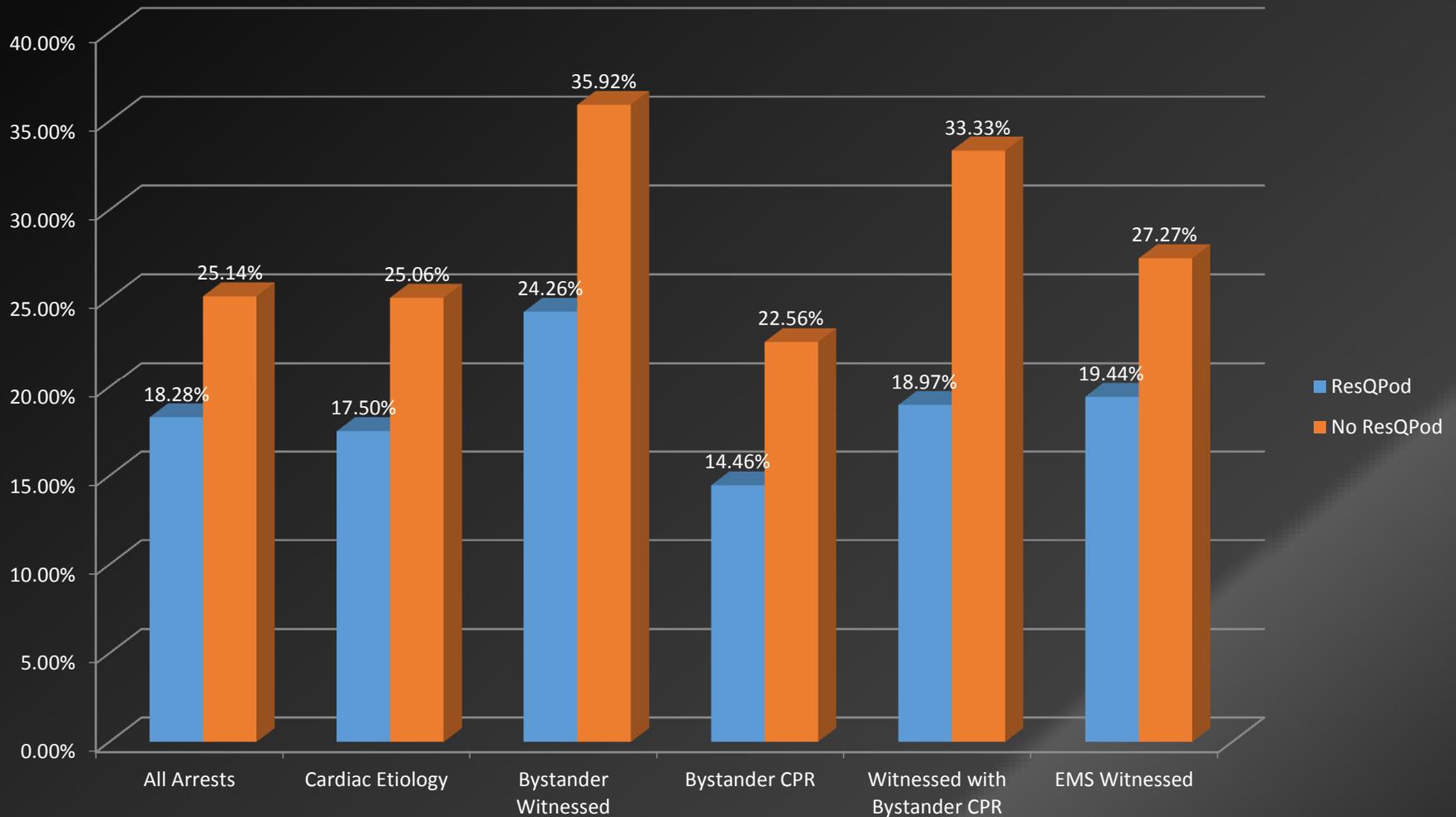
Class IIb, LOE B

Cave, Circulation, 2010, 122

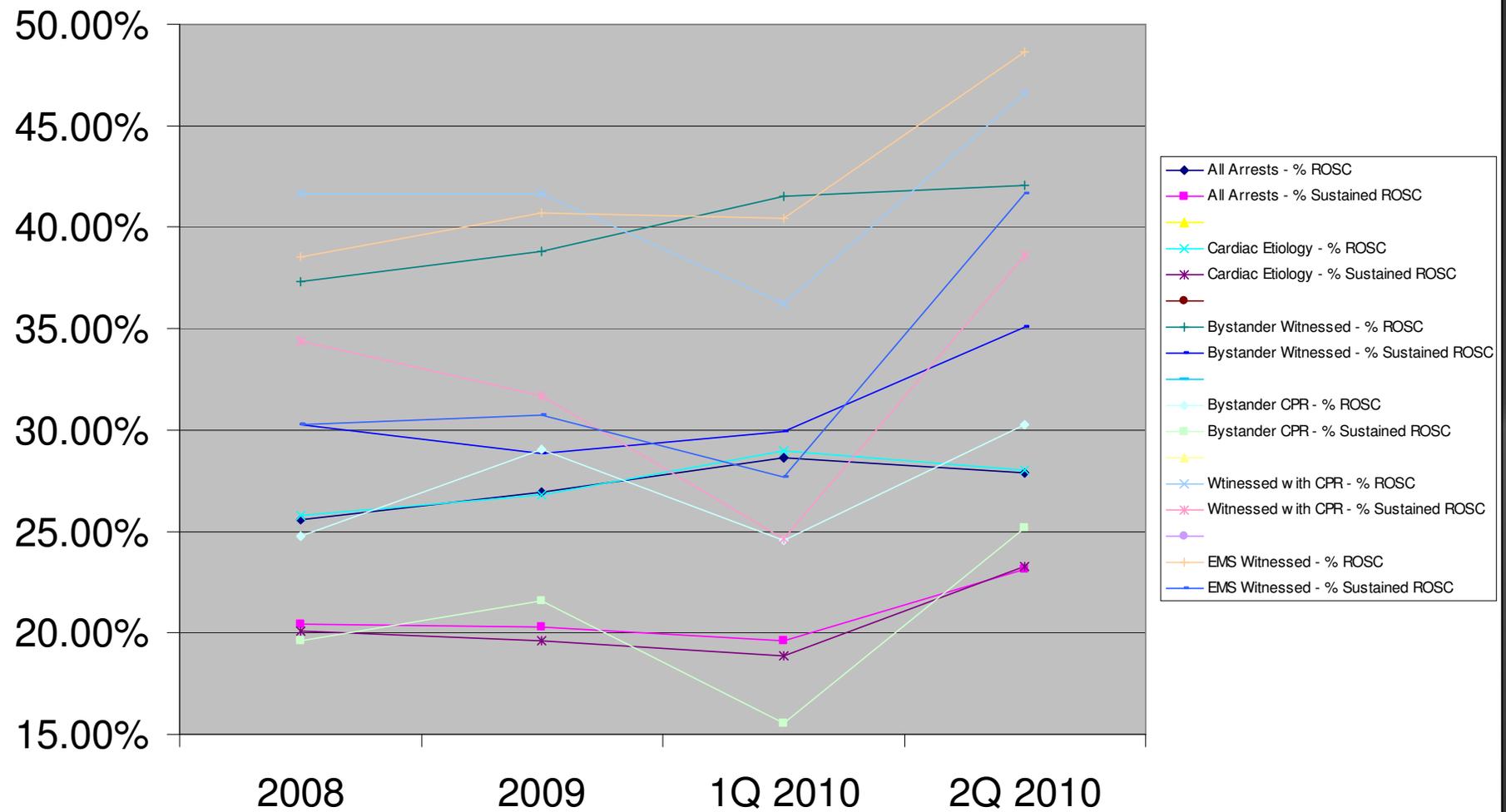
FDNY decision = we tried it

Gizmos, Gadget and Godsend

Sustained ROSC



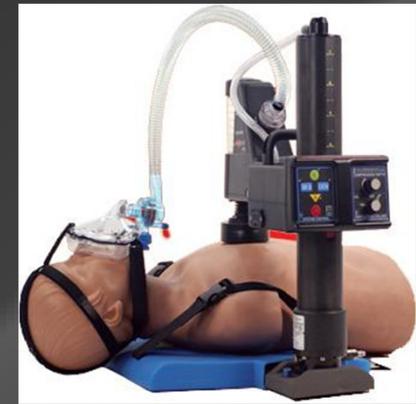
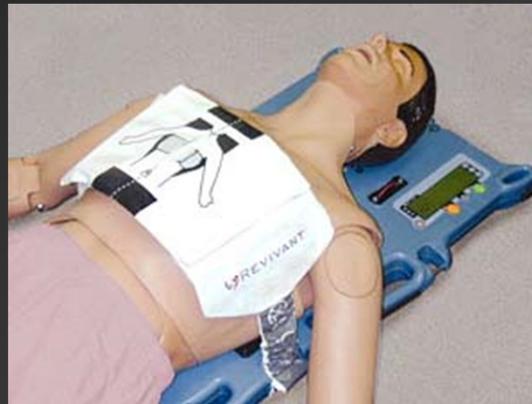
Gizmos, Gadget and Godsend



Gizmos, Gadget and Godsend

Mechanical CPR Devices

No study to date has shown a survival advantage for any device.



Gizmos, Gadget and Godsend

Mechanical CPR Devices

“There is insufficient evidence to support or refute the routine use of mechanical piston devices in the treatment of cardiac arrest.

However, there is insufficient evidence to support the routine use of the LDB in the treatment of cardiac arrest.”

Gizmos, Gadget and Godsend

Mechanical CPR Device

CIRC Trial

4,231 patients received mechanical CPR (Autopulse) or standard CPR

High-quality compressions via Autopulse produced outcomes similar to high-quality manual CPR.

Gizmos, Gadget and Godsend

Mechanical CPR Devices

““The CIRC trial confirms the link between high-quality CPR and survival from cardiac arrest,” said Richard A. Packer, CEO of ZOLL. “It tells us EMS services must employ a strategy to improve CPR.”

The AutoPulse provides a proven alternative to the significant incremental investments in training, personnel, and processes required to achieve the quality of manual CPR delivered during the trial.”

Gizmos, Gadget and Godsend

The future of EMS includes expanded technology...

... for the delivery of care.

... to allow for performance measurement.

... that will enhance care in austere environments (i.e. the back of an ambulance).

... to replace human performance when needed (e.g. ECMO, mechanical CPR during transport)

But must be implemented in an evidence-based, appropriate manner!

What Really Matters in Resuscitation



What Really Matters in Resuscitation

Drugs

Amiodarone

Lidocaine

Epinephrine

Vasopressin

Sodium Bicarb

Bretylum

Calcium Chloride

Beta Blockers

GIK

Isoproterenol

Interventions

Intubation

Oxygen

Passive Ventilation

Leg Elevation

Abdominal Compression

Delayed Defibrillation

Bstander CPR Instruction

Intraosseous Access

Cricothyroidotomy

Alternative Airways

Technology

Mechanical piston CPR

ITD

Biphasic Defibrillation

MAST

Ventilators

Autopulse

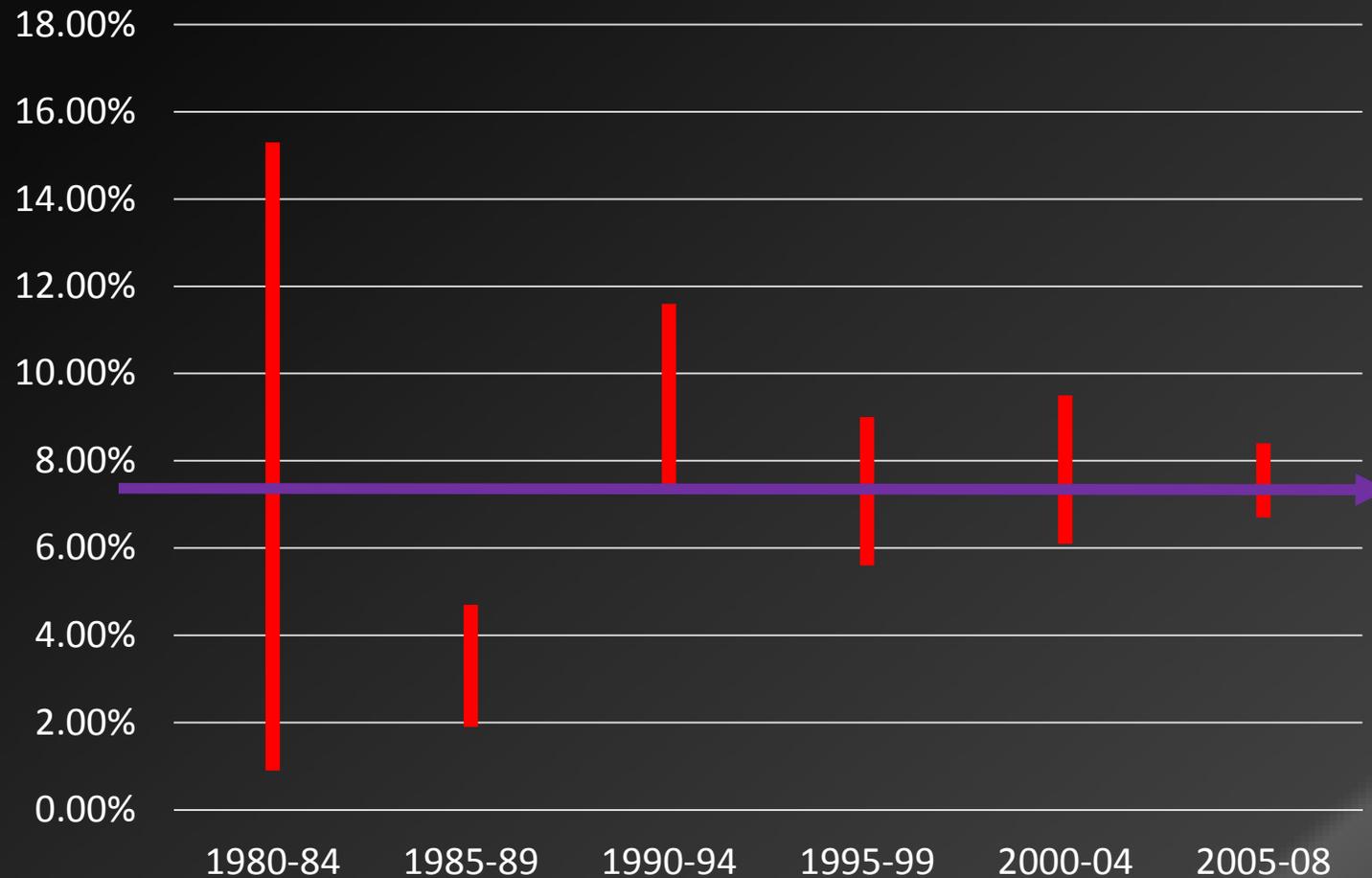
LUCAS device

ACD-CPR Devices

IAC-CPR

ECMO

What Really Matters in Resuscitation



Sasson, et al. Circ Cardiovasc Qual Outcomes. 2010 Jan;3(1):63-81

What Really Matters in Resuscitation

Ensuring quality CPR through real-time CPR feedback

- compression depth – at least 2”
- compression rate – at least 100/min
- complete recoil
- duty cycle (compression fraction)
- limiting interruptions <10 sec
- appropriate ventilation <10/min



What Really Matters in Resuscitation

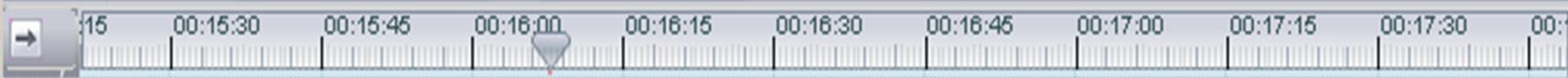


CPR performance training

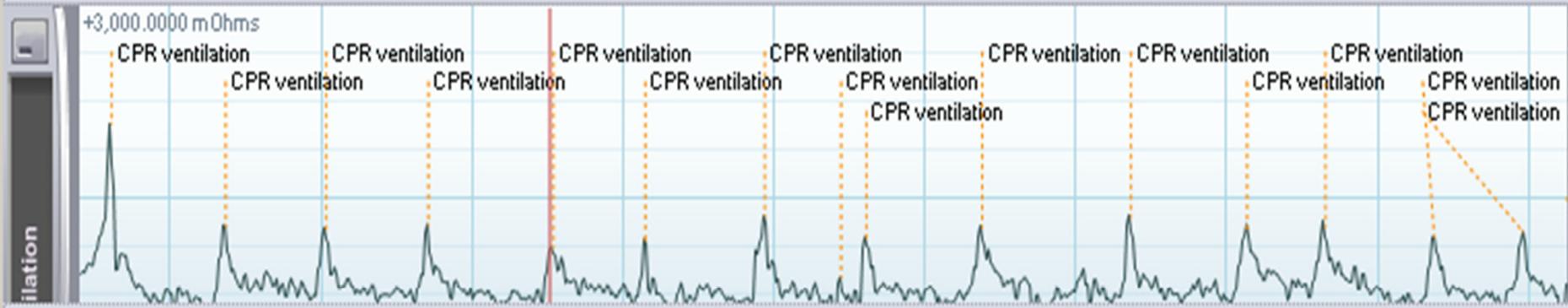
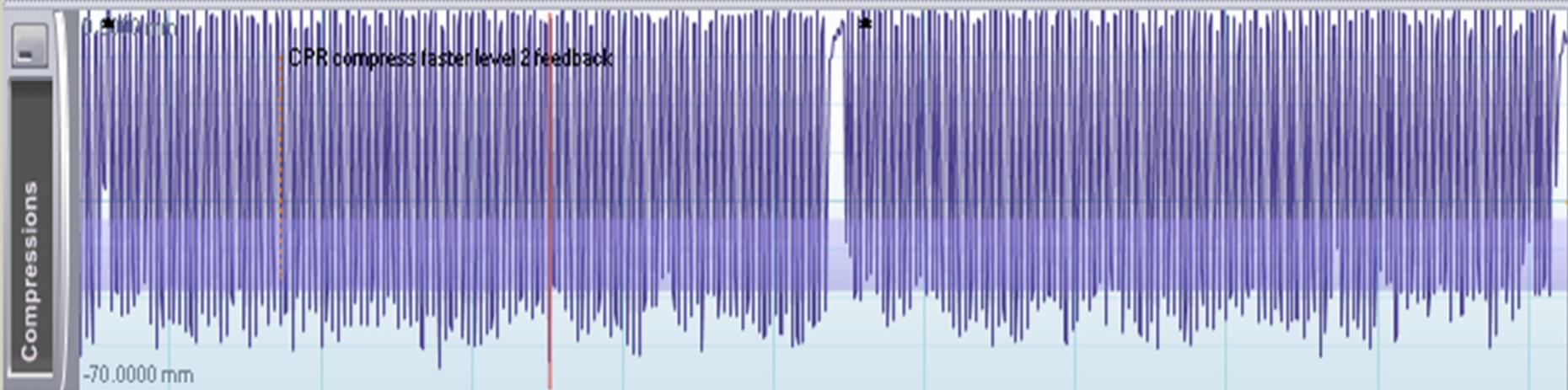
Real-time CPR feedback

- visual prompts

- audio prompts



CO2 +



1.3 mm/sec

Vital Trends

Volume: [Volume Control Icon]

Ventilation: ---

Cursor Δ time: - 0:00:00.000

00:16:07.957

He: [Arrow Icon]

Episode Summary:

Episode start time	[REDACTED]
Total length of episode	00:26:44.2
Total number of shocks	0
Time device on	[REDACTED]
Time device off	[REDACTED]
Total time excluded from statistical calculations	00:00:00.0

Compression Data:

Total number of compressions	2724
Total compressions with adequate depth	2467
Total compressions with insufficient depth	257
Total compressions with incomplete release	523
Average compression rate [/min] [90-120]	118
Average compression depth [mm] [38-51]	48
Adequate depth [%]	90.6
Average compression counts [/min]	102

Ventilation Data:

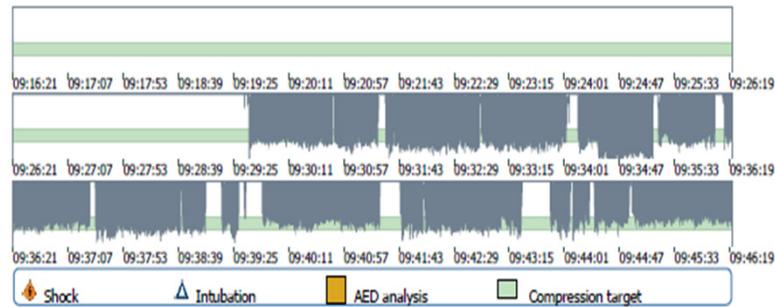
Total number of ventilations	0
Total time before intubation	-
Total time after intubation	-
Average ventilation rate before intubation [/min]	-
Average ventilation rate after intubation [/min]	-
Total with too short inflation time	-

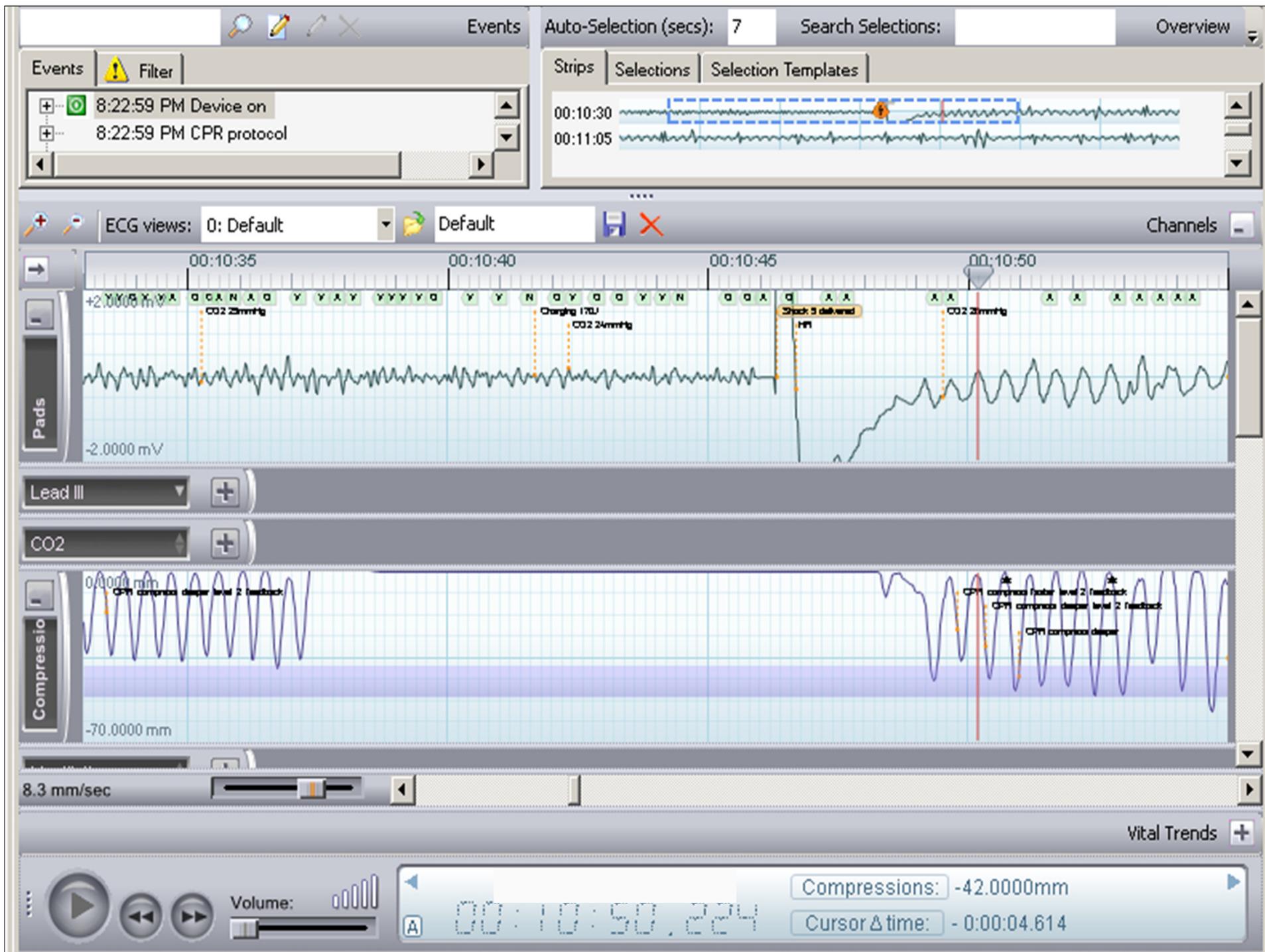
No Flow Time:

Flow time [%]	86.4
Average no flow time before shock [s]	00:00:00.0
Average no flow time after shock [s]	00:00:00.0
No flow time	00:03:38.5

Defibrillation Data:

Time from power on to first shock	00:00:00.0
Total analysis and shock delivery time	00:00:00.0
Average analysis and shock delivery time	00:00:00.0





Episode Summary:

Episode start time	[REDACTED]
Total length of episode	00:39:11.9
Total number of shocks	12
Time device on	[REDACTED]
Time device off	[REDACTED]
Total time excluded from statistical calculations	00:00:00.0

Compression Data:

Total number of compressions	3509
Total compressions with adequate depth	1958
Total compressions with insufficient depth	1551
Total compressions with incomplete release	1076
Average compression rate [/min] [90-120]	118
Average compression depth [mm] [38-51]	39
Adequate depth [%]	55.8
Average compression counts [/min]	90

Ventilation Data:

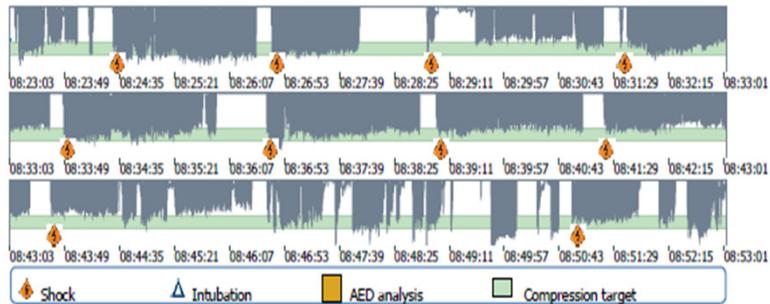
Total number of ventilations	0
Total time before intubation	-
Total time after intubation	-
Average ventilation rate before intubation [/min]	-
Average ventilation rate after intubation [/min]	-
Total with too short inflation time	-

No Flow Time:

Flow time [%]	75.7
Average no flow time before shock [s]	00:00:19.3
Average no flow time after shock [s]	00:00:01.9
No flow time	00:09:30.3

Defibrillation Data:

Time from power on to first shock	00:01:28.1
Total analysis and shock delivery time	00:00:00.0
Average analysis and shock delivery time	00:00:00.0



What Really Matters in Resuscitation

ORIGINAL CONTRIBUTION

Quality of Cardiopulmonary Resuscitation During Out-of-Hospital Cardiac Arrest

Lee WJ, MD, PhD
 Jo Kemner-Johansen, MD
 Helge M Alstad, BEng
 Håkan Sverbe, MD
 Leif Svensson, MD
 Bob Fellows, MD
 Peter Andrew-Scott, MD, PhD

SINCE THE FIRST EVIDENCE-BASED guidelines for cardiopulmonary resuscitation (CPR) were published 30 years ago¹ (with the latest update in 2010^{2,3}), health care professionals in and out of the hospital have been trained accordingly around the world. The importance of CPR, defined as chest compressions and ventilation, for survival of cardiac arrest patients has been demonstrated,⁴ and there are indications that the quality of CPR performance influences the outcome.^{5,6}

When scored on mannequins, CPR quality performed by lay rescuers and health care professionals tends to deteriorate significantly within a few months after training,^{7,8} but data is known about the quality of clinical performance on patients. Aulderhorde et al⁹ recently observed short periods with inappropriately high ventilation rates during advanced cardiac life support (ACLS), and van Alem et al¹⁰ found long pauses in CPR when live responders used automated external defibrillators.

We therefore studied the performance of paramedics and nurse anesthetists during out-of-hospital ACLS by continuously monitoring all chest compressions and ventilations during resuscitation.

See also pp 305 and 363, and Patient Page.

Context Cardiopulmonary resuscitation (CPR) guidelines recommend target values for compressions, ventilations, and CPR time intervals allowed for rhythm analysis and defibrillation. There is little information on adherence to these guidelines during advanced cardiac life support in the field.

Objective To measure the quality of out-of-hospital CPR performed by ambulance personnel, as measured by adherence to CPR guidelines.

Design and Setting Case series of 176 adult patients with out-of-hospital cardiac arrest treated by paramedics and nurse anesthetists in Stockholm, Sweden, London, England, and Ålesund, Norway, between March 2002 and October 2003. The defibrillators recorded chest compressions via a sternal pad fitted with an accelerometer and ventilators by changes in thoracic impedance between the defibrillator pads, in addition to standard event and electrocardiographic recordings.

Main Outcome Measure Adherence to international guidelines for CPR.

Results Chest compressions were not given 48% (95% CI, 45%-51%) of the time without spontaneous circulation; the percentage was 38% (95% CI, 34%-41%) when adding the time necessary for electrocardiographic analysis and defibrillation. Combining these data with a mean compression rate of 121/min (95% CI, 118-124/min) when compressions were given resulted in a mean compression rate of 64/min (95% CI, 61-67/min). Mean compression depth was 34 mm (95% CI, 33-35 mm); 28% (95% CI, 24%-32%) of the compressions had a depth of 38 mm to 51 mm (guidelines recommendation), and the compression part of the duty cycle was 42% (95% CI, 41%-42%). A mean of 11 (95% CI, 11-12) ventilations were given per minute. Sixty-one patients (35%) had return of spontaneous circulation, and 5 of 6 patients discharged alive from the hospital had normal neurological outcomes.

Conclusions In this study of CPR during out-of-hospital cardiac arrest, chest compressions were not delivered half of the time, and most compressions were too shallow. Electrocardiographic analysis and defibrillation accounted for only small parts of intervals without chest compressions.

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resuscitation episodes using online defibrillators installed to collect such data.

METHODS

Patient Inclusion and Recruitment

The study was approved by the regional ethics committees for Ålesund, Norway, Stockholm, Sweden, and London, England. Informed consent for inclusion in the study was waived and decided by these committees in accordance with paragraph 26 in the Declaration of Helsinki.¹¹ The study was a case series involving patients older than

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(Reprinted) JAMA, January 19, 2005; 293:305-311

CPR Performance by Prehospital Providers

Compression rate	121/min
No flow time (%)	48%
Effective compression rate	64/min
Shallow compressions	62%
Effective compressions (proper depth and complete release)	28%

What Really Matters in Resuscitation

ORIGINAL CONTRIBUTION

Quality of Cardiopulmonary Resuscitation During Out-of-Hospital Cardiac Arrest

Lars W. Li, MD, PhD
 Jo Kemner-Johansen, MD
 Helge M. Alstad, BEng
 Håkan Swahn, MD
 Leif Swennes, MD
 Bob Fellows, MD
 Peter Andreas Søren, MD, PhD

SINCE THE FIRST GUIDELINES and guidelines for cardiopulmonary resuscitation (CPR) were published 30 years ago¹ (with the latest update in 2010)² health care professionals in and out of the hospital have been trained accordingly around the world. The importance of CPR, defined as chest compressions and ventilation, for survival of cardiac arrest patients has been demonstrated,³ and there are indications that the quality of CPR performance influences the outcome.^{4,5}

When viewed on a macroscopic scale, CPR quality performed by lay rescuers and health care professionals tends to deteriorate significantly within a few months after training,^{6,7} but data is scarce about the quality of clinical performance on patients. Aulander et al⁸ recently observed short periods with inappropriately high ventilation rates during advanced cardiac life support (ACLS), and van Alem et al⁹ found long periods in CPR when life responders used automated external defibrillators.

We therefore studied the performance of paramedics and nurse anesthetists during out-of-hospital ACLS by continuously monitoring all chest compressions and ventilations during resuscitation episodes using online defibrillators installed to collect such data.

Context. Cardiopulmonary resuscitation (CPR) guidelines recommend target values for compressions, ventilations, and CPR time intervals allowed for rhythm analysis and defibrillation. There is little information on adherence to these guidelines during advanced cardiac life support in the field.

Objective. To measure the quality of out-of-hospital CPR performed by ambulance personnel, as measured by adherence to CPR guidelines.

Design and Setting. Case series of 176 adult patients with out-of-hospital cardiac arrest treated by paramedics and nurse anesthetists in Stockholm, Sweden, London, England, and Ålesund, Norway, between March 2002 and October 2002. The defibrillators recorded chest compressions via a sternal pad fitted with an accelerometer and ventilators by changes in thoracic impedance between the defibrillator pads, in addition to standard event and electrocardiographic recordings.

Main Outcome Measure. Adherence to international guidelines for CPR.

Results. Chest compressions were not given 48% (95% CI, 45%-51%) of the time without spontaneous circulation; the percentage was 38% (95% CI, 35%-41%) when adding the time necessary for electrocardiographic analysis and defibrillation. Combining these data with a mean compression rate of 121/min (95% CI, 118-124/min) when compressions were given resulted in a mean compression rate of 64/min (95% CI, 61-67/min). Mean compression depth was 34 mm (95% CI, 33-35 mm); 28% (95% CI, 24%-32%) of the compressions had a depth of 38 mm to 51 mm (guidelines recommendation), and the compression part of the duty cycle was 42% (95% CI, 41%-42%). A mean of 11 (95% CI, 11-12) ventilations were given per minute. Sixty-one patients (35%) had return of spontaneous circulation, and 5 of 6 patients discharged alive from the hospital had normal neurological outcomes.

Conclusions. In this study of CPR during out-of-hospital cardiac arrest, chest compressions were not delivered half of the time, and most compressions were too shallow. Electrocardiographic analysis and defibrillation accounted for only small parts of intervals without chest compressions.

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CPR Performance by Prehospital Providers

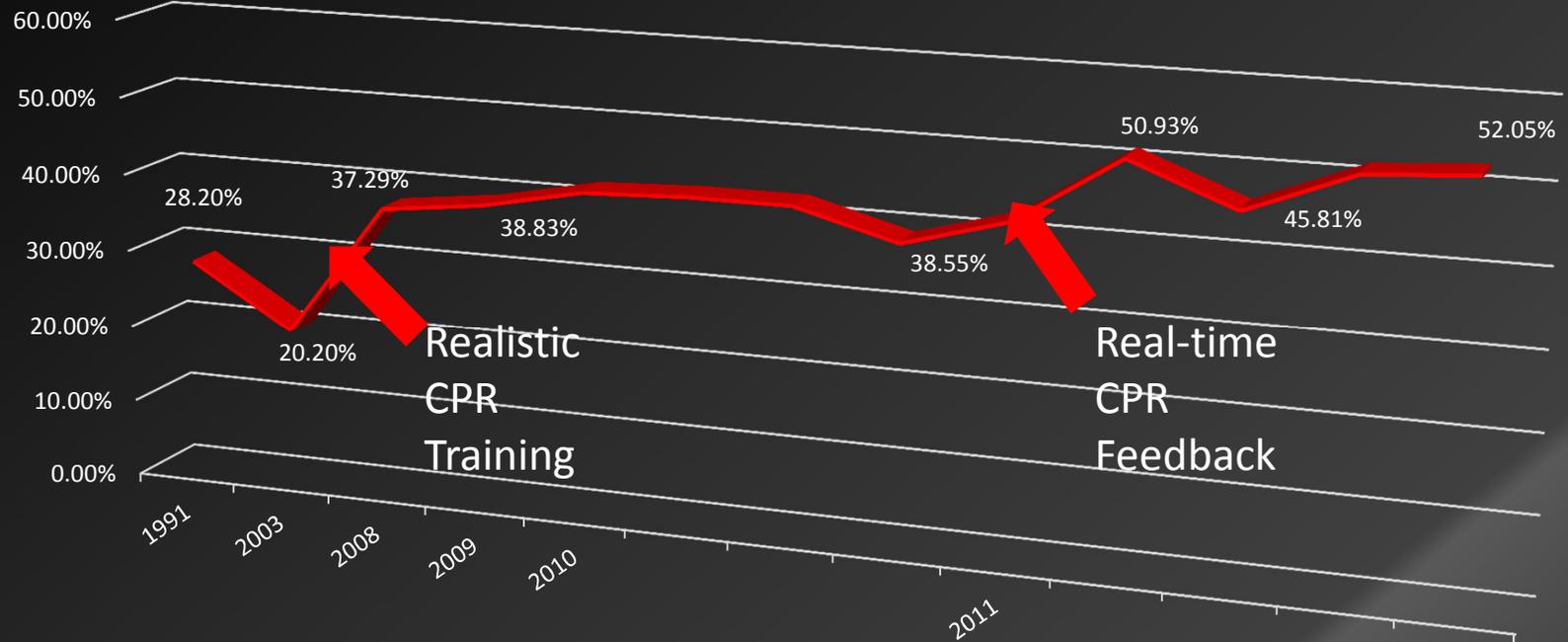
	JAMA	NYC
Compression rate	121/min	123/min
No flow time (%)	48%	30%**
Effective compression rate	64/min	85/min* *
Shallow compressions	62%	47%**
Effective compressions (proper depth and complete release)	28%	53%**

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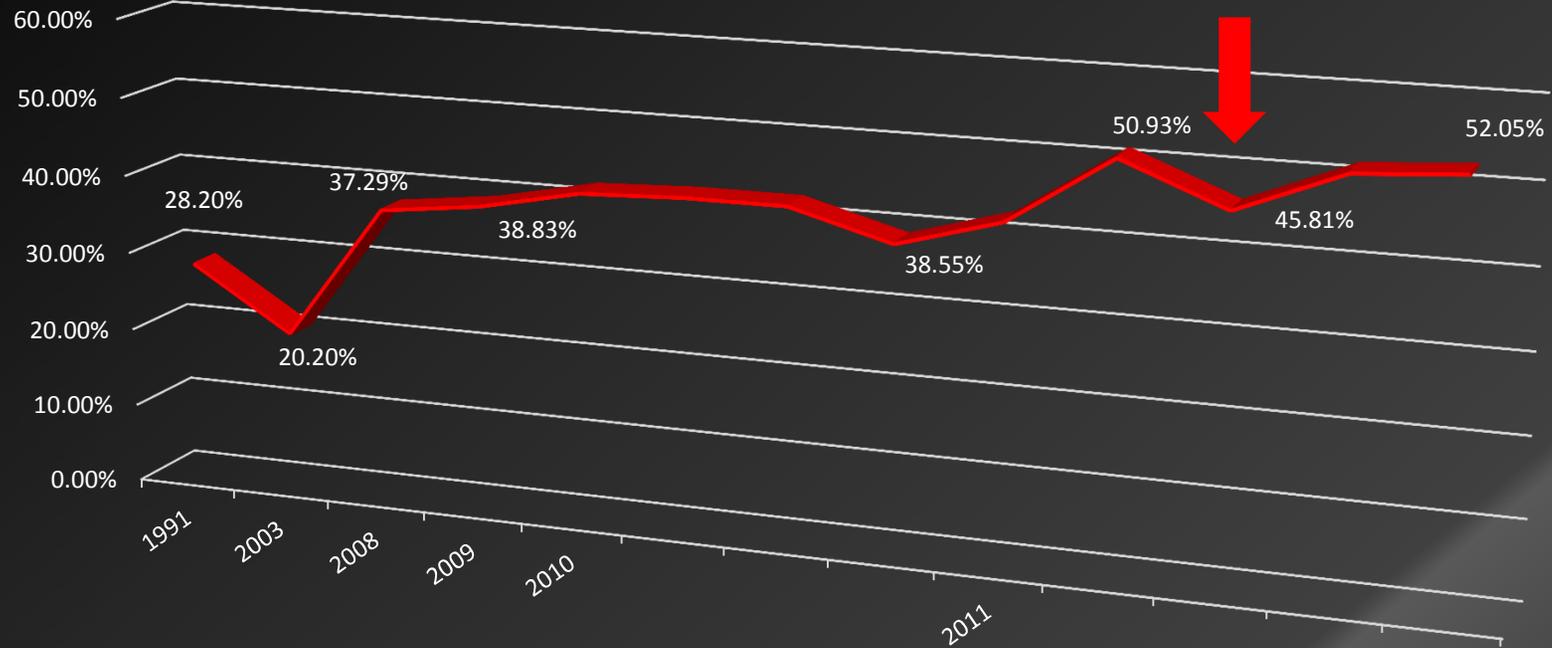
What Really Matters in Resuscitation

Bystander Witnessed Arrests, Cardiac Etiology - ROSC



What Really Matters in Resuscitation

Bystander Witnessed Arrests, Cardiac Etiology - ROSC



What Really Matters in Resuscitation

Annals of Emergency Medicine, 2013

- Two-phase study
- CPR monitoring
- A-V CPR feedback
- Feedback improved CPR and outcomes
 - rate, depth, compression fraction, pre-shock pauses, ventilation rate
 - overall survival (8.7% → 13.9%)
 - witnessed VF survival (26.3% → 55.6%)

EMERGENCY MEDICAL SERVICES/ORIGINAL RESEARCH

The Influence of Scenario-Based Training and Real-Time Audiovisual Feedback on Out-of-Hospital Cardiopulmonary Resuscitation Quality and Survival From Out-of-Hospital Cardiac Arrest

Bentley J. Bobrow, MD; Tyler F. Vadeboncoeur, MD; Uwe Stolz, PhD, MPH; Armemarie E. Silver, PhD; John M. Tobin, CEP; Scott A. Crawford, EMT-B; Terence K. Mason, RN; Jerome Schimmer, CEP; Gary A. Smith, MD; Daniel W. Spalte, MD

Study objective: We assess whether an initiative to optimize out-of-hospital provider cardiopulmonary resuscitation (CPR) quality is associated with improved CPR quality and increased survival from out-of-hospital cardiac arrest.

Methods: This was a before/after study of consecutive adult out-of-hospital cardiac arrest. Data were obtained from out-of-hospital forms and defibrillators. Phase 1 included 18 months with real-time audiovisual feedback disabled (October 2008 to March 2010). Phase 2 included 16 months (May 2010 to September 2011) after scenario-based training of 373 professional rescuers and real-time audiovisual feedback enabled. The effect of interventions on survival to hospital discharge was assessed with multivariable logistic regression. Multiple imputation of missing data was used to analyze the effect of interventions on CPR quality.

Results: Analysis included 484 out-of-hospital cardiac arrest patients (phase 1 232; phase 2 252). Median age was 68 years (interquartile range 56-79); 66.5% were men. CPR quality measures improved significantly from phase 1 to phase 2: Mean chest compression rate decreased from 128 to 106 chest compressions per minute (difference -23 chest compressions; 95% confidence interval [CI] -26 to -19 chest compressions); mean chest compression depth increased from 1.78 to 2.15 inches (difference 0.36 inches; 95% CI 0.28 to 0.47 inches); median chest compression fraction increased from 66.2% to 83.7% (difference 17.6%; 95% CI 15.0% to 20.1%); median pre-shock pause decreased from 26.9 to 15.5 seconds (difference -11.4 seconds; 95% CI -15.7 to -7.2 seconds); and mean ventilation rate decreased from 11.7 to 9.5/minute (difference -2.2/minute; 95% CI -3.9 to -0.5/minute). All-cause survival increased from phase 1 to phase 2 (20/231, 8.7% versus 35/252, 13.9%; difference 5.2%; 95% CI -0.4% to 10.8%), with an adjusted odds ratio of 2.72 (95% CI 1.15 to 6.41), controlling for initial rhythm, witnessed arrest, age, minimally interrupted cardiac resuscitation protocol compliance, and provision of therapeutic hypothermia. Witnessed arrests/shockable rhythms survival was 26.3% (15/57) for phase 1 and 55.6% (20/36) for phase 2 (difference 29.2%; 95% CI 9.4% to 49.1%).

Conclusion: Implementation of resuscitation training combined with real-time audiovisual feedback was independently associated with improved CPR quality, an increase in survival, and favorable functional outcomes after out-of-hospital cardiac arrest. [Ann Emerg Med. 2013;xxxxx.]

Please see page XX for the Editor's Capsule Summary of this article.

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INTRODUCTION

Background and Importance

Communities in North America report wide disparities in outcomes from out-of-hospital cardiac arrest.^{1,2} Although many report poor outcomes, several have achieved significantly higher survival rates³⁻⁵ that are likely a result of multiple factors, with one possible component being out-of-hospital cardiopulmonary resuscitation (CPR) quality. There is preclinical and clinical evidence demonstrating that high-quality CPR (defined by the hemodynamically important components chest compression

depth,^{6,7} chest compression fraction,⁸⁻¹¹ pre-shock pause,¹⁴⁻¹⁶ chest compression release velocity [“recoil”],^{17,18} chest compression rate,^{13,20} and ventilation²¹) improves outcomes. Although the 2010 American Heart Association (AHA) Guidelines place a clear emphasis on minimally interrupted, high-quality CPR, it remains to be determined whether individual communities can improve outcomes by systematically improving the CPR quality delivered by out-of-hospital providers.

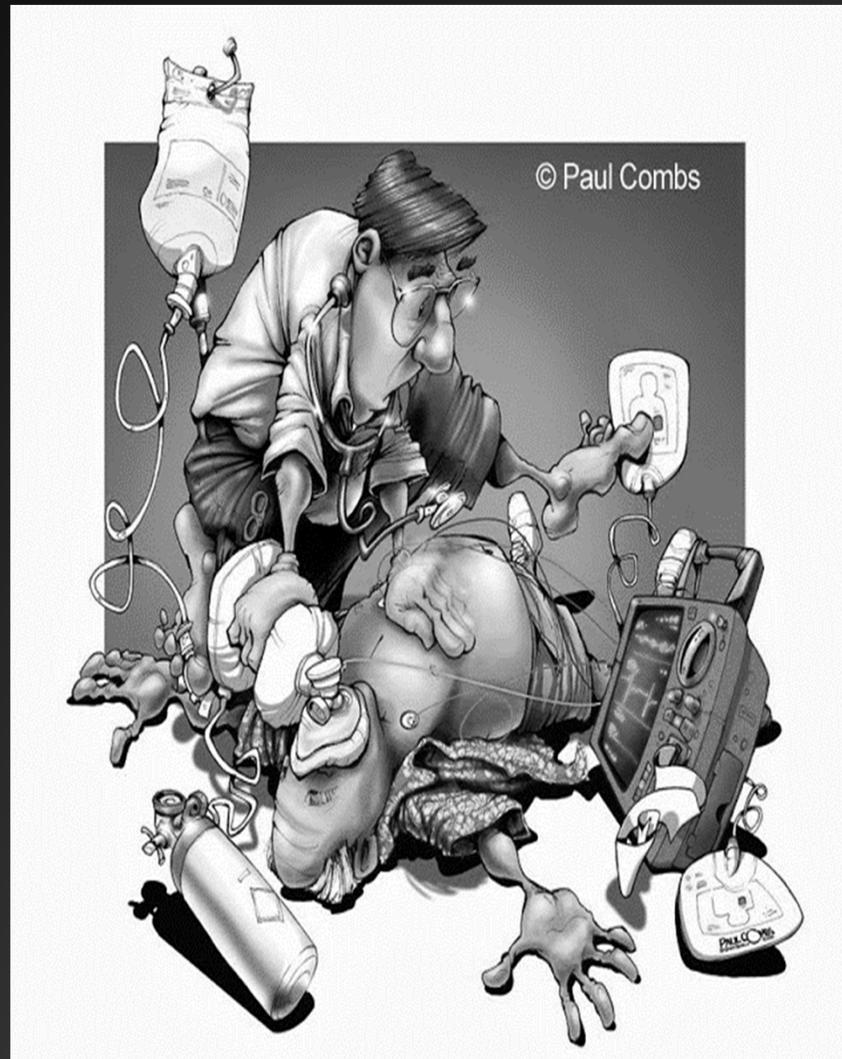
In addition to novel approaches to CPR training, real-time audiovisual feedback has been shown to improve CPR quality in

What Really Matters in Resuscitation

The future of resuscitation will require attention to detail when it comes to compressions.

- Measurement
- Data
- Real-time feedback
- Real-time QA
- Further understanding of best performance (i.e. duty cycle)
- Measurements of perfusion to guide care

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EDITORIALS

LABORATORY INVESTIGATION

Immediate Countershock Versus Cardiopulmonary Resuscitation Before Countershock in a 5-Minute Swine Model of Ventricular Fibrillation Arrest

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See also p 1389.

1434 JAMA, March 10, 2005—Vol 293, No. 11 (Supplement)

ORIGINAL CONTRIBUTION

Defibrillation to Give Basic Cardiopulmonary Resuscitation to Patients With Out-of-Hospital Ventricular Fibrillation

Context: Defibrillation as soon as possible is the key to successful resuscitation in out-of-hospital ventricular fibrillation. A nonrandomized study of immediate defibrillation might improve the outcome.

Objective: To determine the effect of immediate defibrillation on survival in out-of-hospital ventricular fibrillation.

Design and Setting: Prospective, randomized, controlled trial in a teaching hospital emergency department.

Patients and Participants: 100 patients with out-of-hospital ventricular fibrillation.

Interventions: Immediate defibrillation (n = 50) vs. immediate cardiopulmonary resuscitation (n = 50).

Measurements and Main Results: Survival to hospital discharge was significantly higher in the defibrillation group (50%) compared with the CPR group (20%).

Conclusions: Immediate defibrillation significantly improved survival in out-of-hospital ventricular fibrillation.

Keywords: defibrillation, cardiopulmonary resuscitation, out-of-hospital ventricular fibrillation.

See editorial, p 622.

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ORIGINAL CONTRIBUTION

Out-of-Hospital Defibrillation With Automated External Defibrillators: Postshock Analysis Should Be Delayed

Context: The American Heart Association recommends that a rhythm analysis be done immediately after each defibrillation attempt. However, shock is often followed by electrical instability (VF) or ventricular electrical activity before ventricular fibrillation (VF) is restored.

Objective: To determine the effect of delayed rhythm analysis on survival in out-of-hospital ventricular fibrillation.

Design and Setting: Prospective, randomized, controlled trial in a teaching hospital emergency department.

Patients and Participants: 100 patients with out-of-hospital ventricular fibrillation.

Interventions: Immediate defibrillation with delayed rhythm analysis (n = 50) vs. immediate defibrillation with immediate rhythm analysis (n = 50).

Measurements and Main Results: Survival to hospital discharge was significantly higher in the delayed rhythm analysis group (50%) compared with the immediate rhythm analysis group (20%).

Conclusions: Delayed rhythm analysis significantly improved survival in out-of-hospital ventricular fibrillation.

Keywords: defibrillation, cardiopulmonary resuscitation, out-of-hospital ventricular fibrillation.

See editorial, p 278.

Author Affiliations: Department of Emergency Medicine, Harborview Medical Center, Seattle, Wash. Received for publication May 2, 2005; accepted for publication May 19, 2005.

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Guidelines - 2005		
	Delayed Defibrillation	VF Waveform Analysis
ILCOR	A 1 ½ to 3-minute period of CPR before attempting defibrillation may be considered in adults with out-of-hospital VF or pulseless VT and EMS response (call to arrival) intervals >4 to 5 minutes. ¹	VF waveform analysis has the potential to improve the timing and effectiveness of defibrillation attempts... but is not yet available to assist rescuers. ¹
ERC	It is reasonable for EMS personnel to give a period of about 2 min of CPR (i.e. about five cycles at 30:2) before defibrillation in patients with prolonged collapse (>5min). ²	If optimal defibrillation waveforms and the optimal timing of shock delivery can be determined in prospective studies, it should be possible to prevent the delivery of unsuccessful high-energy shocks and minimise cardiac injury. This technology is under active development and investigation . ²
AHA	EMS system medical directors may consider implementing a protocol that would allow EMS responders to provide about 5 cycles (about 2 minutes) or CPR before defibrillation of patients found by EMS personnel to be in VF, particularly when the EMS system call-to-response interval is >4 to 5 minutes. ³	At present there is insufficient evidence to recommend for or against analysis of VF ECG characteristics (Class Indeterminate). ³

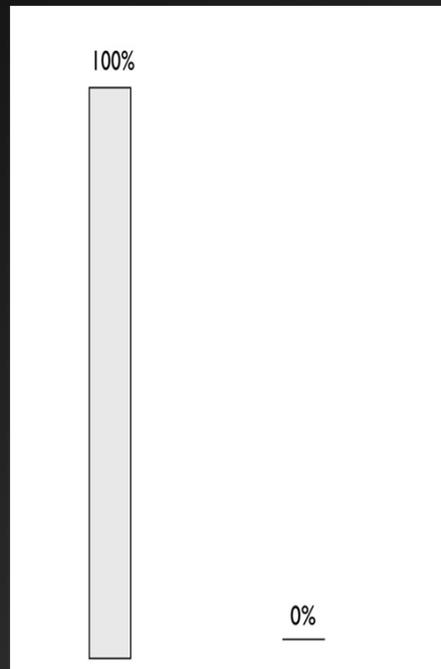
1. International Liaison Committee on Resuscitation. Guidelines for Resuscitation 2005, Section 3: Electrical therapies: Automated external defibrillators, defibrillation, cardioversion, and pacing. Resuscitation. 2005; 67: 102-104.

2. Deakin CD, Nolan JP, Peberth AA, et al. Guidelines for Resuscitation 2005, Section 3: Electrical therapies: Automated external defibrillators, defibrillation, cardioversion, and pacing. Resuscitation. 2005; 67: 102-104.

3. American Heart Association. Electrical Therapies: Automated external defibrillators, defibrillation, cardioversion, and pacing. Circulation. 2005; 112: IV-35 – IV-46.

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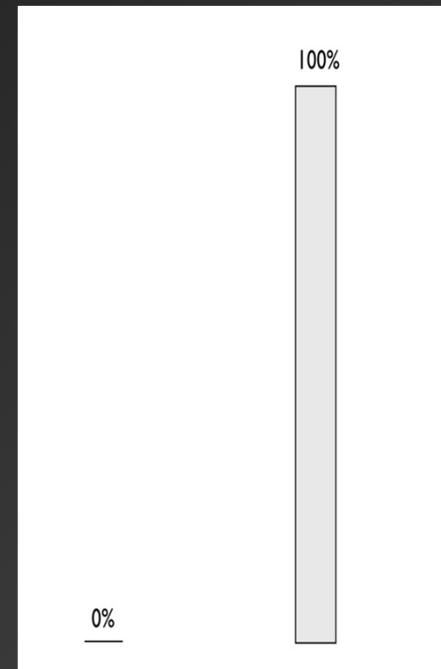
Shock First Protocol



Benefit from
Immediate Defib

Benefit from
CPR Prior to Defib

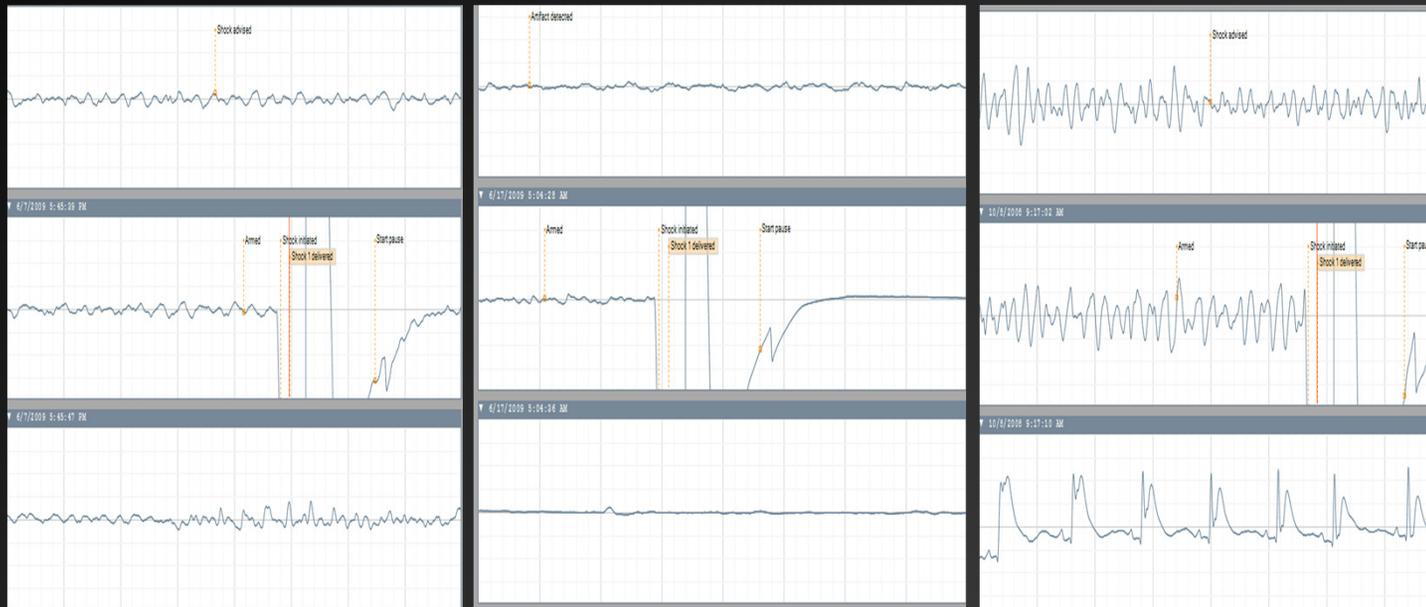
CPR First Protocol



Benefit from
Immediate Defib

Benefit from
CPR Prior to Defib

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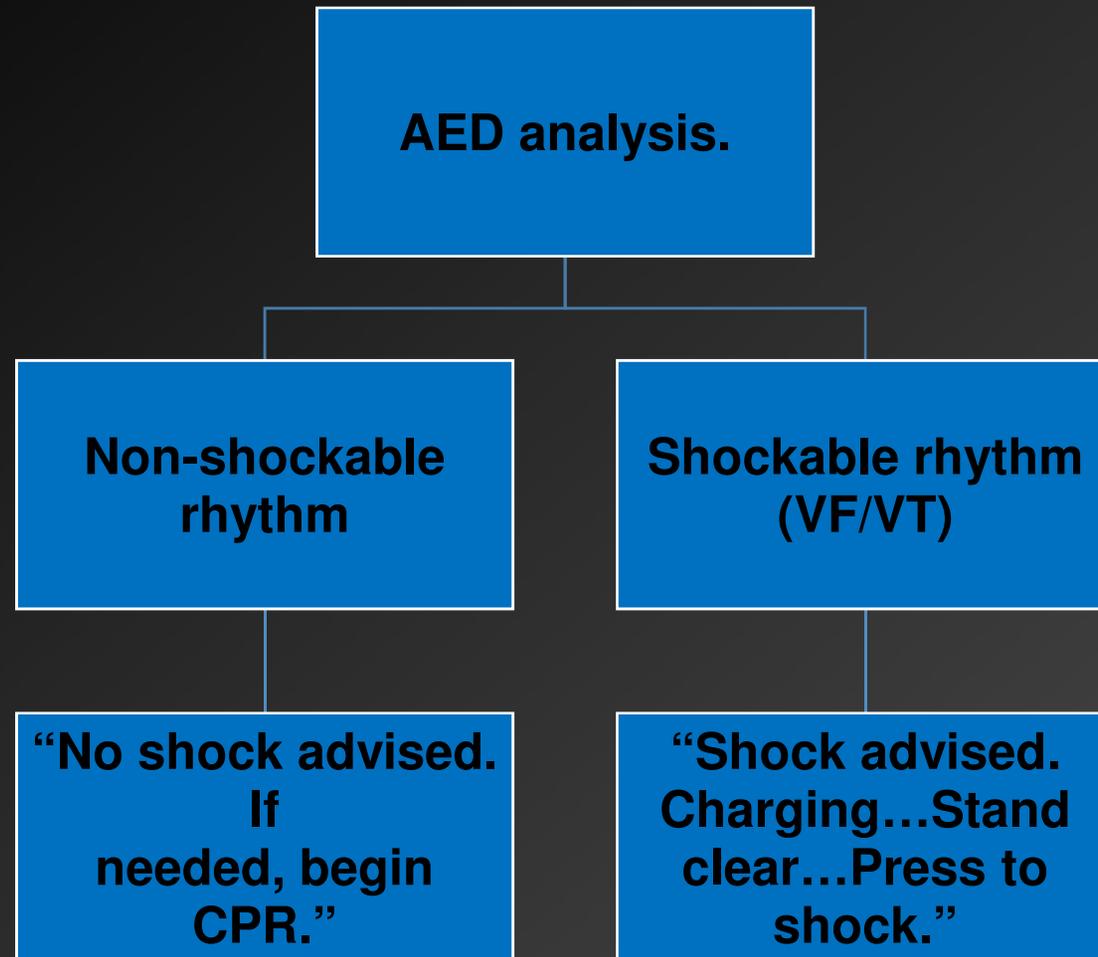


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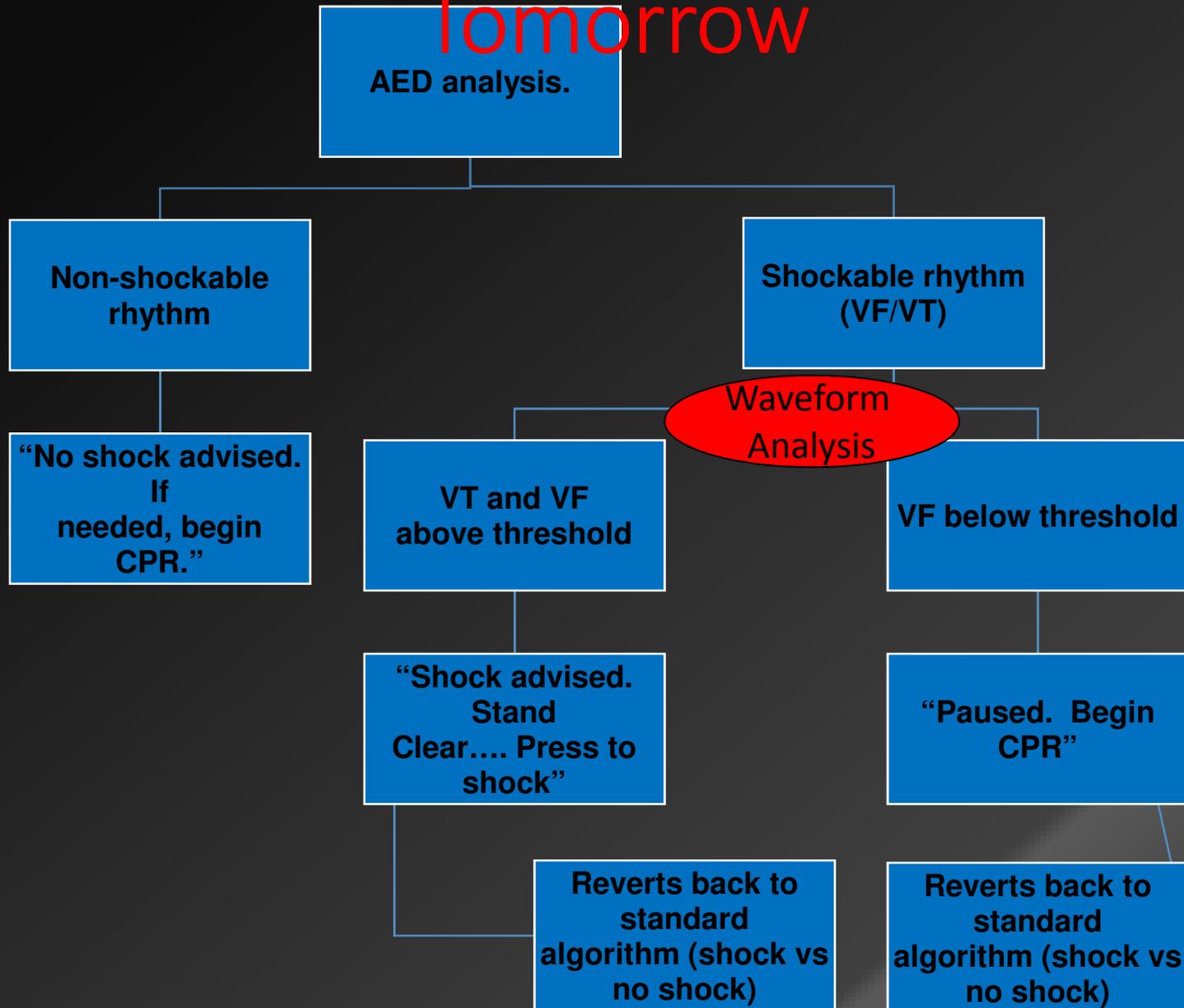


London		New York City
7.5 million	Estimated Population	8.4 million
>620 sq mi	Square Miles	305 sq mi
Tiered response	EMS Structure	Tiered response
70	EMS Stations	32
>5,000	EMS Personnel	>13,000
1,025,366	EMS Incidents	1,236,730
328,616	Life-Treatening EMS Incidents	444,920
4,062	Resuscitations Attempted	7,417

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Resuscitation Science

Waveform Analysis–Guided Treatment Versus a Standard Shock-First Protocol for the Treatment of Out-of-Hospital Cardiac Arrest Presenting in Ventricular Fibrillation

Results of an International Randomized, Controlled Trial

John P. Freese, MD; Dawn B. Jorgenson, PhD; Ping-Yu Liu, PhD; Jennifer Innes; Luis Matallana, EMFP; Krishnakant Nammi, MS; Rachael T. Donohoe, PhD; Mark Whitbread; Robert A. Silverman, MD, MS; David J. Prezant, MD

Background—Ventricular fibrillation (VF) waveform properties have been shown to predict defibrillation success and outcomes among patients treated with immediate defibrillation. We postulated that a waveform analysis algorithm could be used to identify VF unlikely to respond to immediate defibrillation, allowing selective initial treatment with cardiopulmonary resuscitation in an effort to improve overall survival.

Methods and Results—In a multicenter, double-blind, randomized study, out-of-hospital cardiac arrest patients in 2 urban emergency medical services systems were treated with automated external defibrillators using either a VF waveform analysis algorithm or the standard shock-first protocol. The VF waveform analysis used a predefined threshold value below which return of spontaneous circulation (ROSC) was unlikely with immediate defibrillation, allowing selective treatment with a 2-minute interval of cardiopulmonary resuscitation before initial defibrillation. The primary end point was survival to hospital discharge. Secondary end points included ROSC, sustained ROSC, and survival to hospital admission. Of 6738 patients enrolled, 987 patients with VF of primary cardiac origin were included in the primary analysis. No immediate or long-term survival benefit was noted for either treatment algorithm (ROSC, 42.5% versus 41.2%, $P=0.70$; sustained ROSC, 32.4% versus 33.4%, $P=0.79$; survival to admission, 34.1% versus 36.4%, $P=0.46$; survival to hospital discharge, 15.6% versus 17.2%, $P=0.55$, respectively).

Conclusions—Use of a waveform analysis algorithm to guide the initial treatment of out-of-hospital cardiac arrest patients presenting in VF did not improve overall survival compared with a standard shock-first protocol. Further study is recommended to examine the role of waveform analysis for the guided management of VF.

Clinical Trial Registration—URL: <http://www.clinicaltrials.gov>. Unique Identifier: NCT00555106. (*Circulation*. 2013;128:995-1002.)

Key Words: atrial fibrillation ■ cardiopulmonary resuscitation ■ defibrillation, electric ■ resuscitation

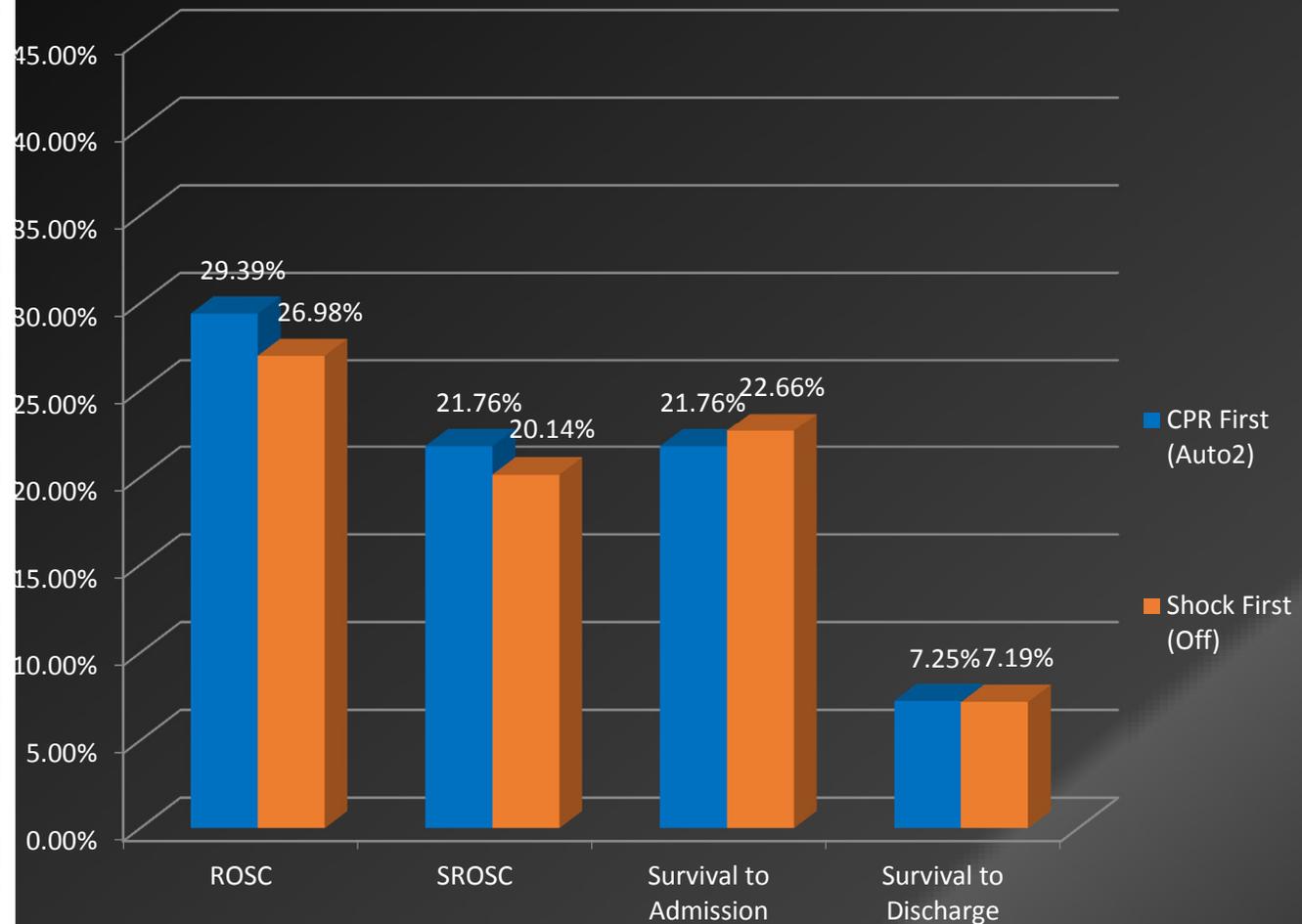
More than 50 years have passed since the first description of successful transthoracic defibrillation for the treatment of ventricular fibrillation (VF), and it has been >40 years since defibrillators were first introduced into the prehospital setting in the United States and United Kingdom.^{1,2} However, despite decades of experience and >500,000 cardiac arrests annually in the United States and Europe, the optimal strategy for the initial management of VF has yet to be defined.^{3,4}

Clinical Perspective on p 1002

Immediate defibrillation had long been considered the standard treatment for VF.⁵ In 2002, Weisfeldt and Becker⁶

suggested a 3-phase model for VF that included an electrical, a circulatory, and a metabolic phase, with immediate defibrillation being the optimal treatment for only the first phase in which the interval from the onset of VF to the time of defibrillation is of short duration. At about the same time, initial studies were published that described the use of delayed defibrillation or a period of cardiopulmonary resuscitation (CPR) before the initial defibrillatory shock as a means to improve survival for VF of longer duration.^{5,8}

This concept of delayed defibrillation was included in the 2005 resuscitation guidelines as a treatment option to be “considered in adults with out-of-hospital ventricular



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Correspondence to John P. Freese, MD, Chief Medical Director, Fire Department of New York, 9 MetroTech Center, 4W-1 Brooklyn, NY 11201. E-mail: jfreese@fdny.gov or jfreese@fdny.com

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Guidelines - 2010

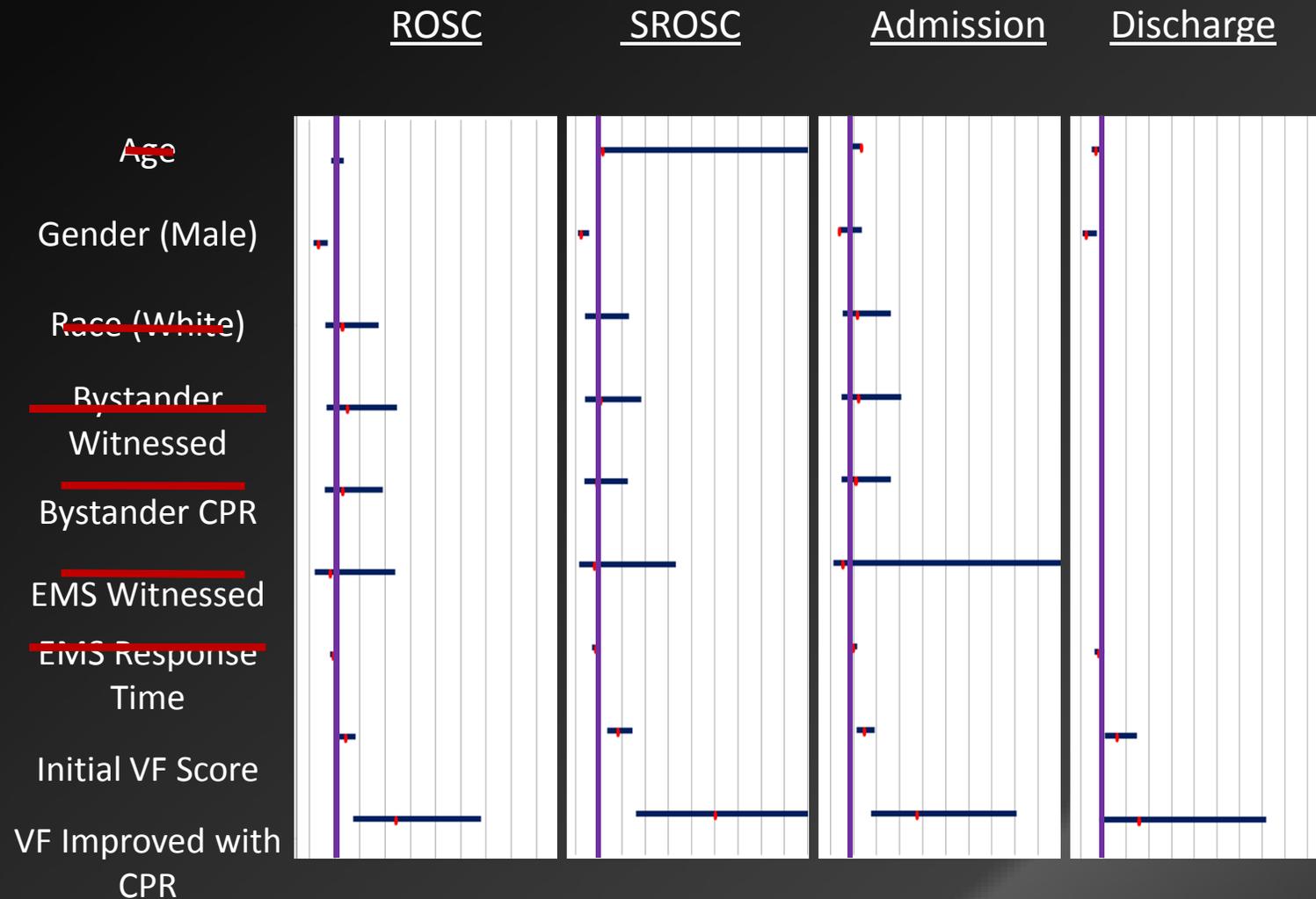
	Delayed Defibrillation	VF Waveform Analysis
ILCOR	There is inconsistent evidence to support or refute delay in defibrillation to provide a period of CPR (90 s to 3 min) for patients in non-EMS witnessed VF/pulseless VT cardiac arrest. ¹	There is insufficient evidence to support routine use of VF waveform analysis to guide defibrillation management in adult cardiac arrest in- or out-of-hospital. ¹
ERC	...in any cardiac arrest they have not witnessed, EMS personnel should provide good-quality CPR while a defibrillator is retrieved, applied and charged, but routine delivery of a pre-specified period of CPR (e.g. 2 or 3 min) before rhythm analysis and a shock is delivered is not recommended. ²	If optimal defibrillation waveforms and the optimal timing of shock delivery can be determined in prospective studies, it should be possible to prevent the delivery of unsuccessful high-energy shocks and minimise cardiac injury. This technology is under active development and investigation but current sensitivity and specificity is insufficient to enable introduction of VF waveform analysis into clinical practice. ²
AHA	There is insufficient evidence to determine if 1 1/2 to 3 minutes of CPR should be provided prior to defibrillation. EMS system medical directors may consider implementing a protocol that allows EMS responders to provide CPR while preparing for defibrillation of patients found by EMS personnel to be in VF	The value of VF waveform analysis to guide defibrillation management is uncertain (Class IIb, LOE C).

1. Sunde K, Jacobs I, Deakin C, et al. Part 6: Defibrillation. 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Life Support Algorithms. Resuscitation. 2010; 81S: e71-e85.

2. Deakin CD, et al. Part 6: Defibrillation. European Resuscitation Council Guidelines for Resuscitation 2010. Section 3: Electrical Therapies: Automated external defibrillators, manual defibrillators, and pacing. Resuscitation. 2010; 81: 1293-1304.

3. Link MS, Atkins BL, Passaro RS, et al. Part 6: Electrical Therapies: Automated external defibrillators, defibrillation, cardioversion, and pacing. 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010; 122 (Suppl 3): S76-S85.

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	Waveform Analysis With Decreased VF Score (n=99)	Waveform Analysis With Increased VF Score (n=105)	<i>P</i>
Age, median (range), y	63 (18–97)	65 (28–96)	0.20
Male sex, n (%)	77 (78)	75 (71)	0.33
White race, n (%)	52 (53)	58 (55)	0.78
EMS witnessed, n (%)	7 (8)	5 (5)	0.56
Bystander witnessed, n (%)	73 (74)	80 (76)	0.87
Bystander CPR, n (%)	23 (23)	32 (30)	0.27
Response time, median (range), min	4.4 (2–15)	4.78 (1–20)	0.30
Initial VF score (normalized)	0.069 (0.028–0.104)	0.069 (0.019–0.104)	0.41
ROSC achieved at any point, n (%)	19 (19)	44 (42)	<0.001
SROSC	13 (13)	35 (33)	<0.001
Hospital admission	11 (11)	38 (36)	<0.001
Live discharge from hospital	5 (6)	11 (10)	0.13

The Machines of Today / Tomorrow

Resuscitation Science

Waveform Analysis–Guided Treatment Versus a Standard Shock-First Protocol for the Treatment of Out-of-Hospital Cardiac Arrest Presenting in Ventricular Fibrillation

Results of an International Randomized, Controlled Trial

John P. Freese, MD; Dawn B. Jorgenson, PhD; Ping-Yu Liu, PhD; Jennifer Innes; Luis Matallana, EMFP; Krishnakant Nammi, MS; Rachael T. Donohoe, PhD; Mark Whitbread; Robert A. Silverman, MD, MS; David J. Prezant, MD

Background—Ventricular fibrillation (VF) waveform properties have been shown to predict defibrillation success and outcomes among patients treated with immediate defibrillation. We postulated that a waveform analysis algorithm could be used to identify VF unlikely to respond to immediate defibrillation, allowing selective initial treatment with cardiopulmonary resuscitation in an effort to improve overall survival.

Methods and Results—In a multicenter, double-blind, randomized study, out-of-hospital cardiac arrest patients in 2 urban emergency medical services systems were treated with automated external defibrillators using either a VF waveform analysis algorithm or the standard shock-first protocol. The VF waveform analysis used a predefined threshold value below which return of spontaneous circulation (ROSC) was unlikely with immediate defibrillation, allowing selective treatment with a 2-minute interval of cardiopulmonary resuscitation before initial defibrillation. The primary end point was survival to hospital discharge. Secondary end points included ROSC, sustained ROSC, and survival to hospital admission. Of 6738 patients enrolled, 987 patients with VF of primary cardiac origin were included in the primary analysis. No immediate or long-term survival benefit was noted for either treatment algorithm (ROSC, 42.5% versus 41.2%, $P=0.70$; sustained ROSC, 32.4% versus 33.4%, $P=0.79$; survival to admission, 34.1% versus 36.4%, $P=0.46$; survival to hospital discharge, 15.6% versus 17.2%, $P=0.55$, respectively).

Conclusions—Use of a waveform analysis algorithm to guide the initial treatment of out-of-hospital cardiac arrest patients presenting in VF did not improve overall survival compared with a standard shock-first protocol. Further study is recommended to examine the role of waveform analysis for the guided management of VF.

Clinical Trial Registration—URL: <http://www.clinicaltrials.gov>. Unique Identifier: NCT00555106. (*Circulation*. 2013;128:995-1002.)

Key Words: atrial fibrillation ■ cardiopulmonary resuscitation ■ defibrillation, electric ■ resuscitation

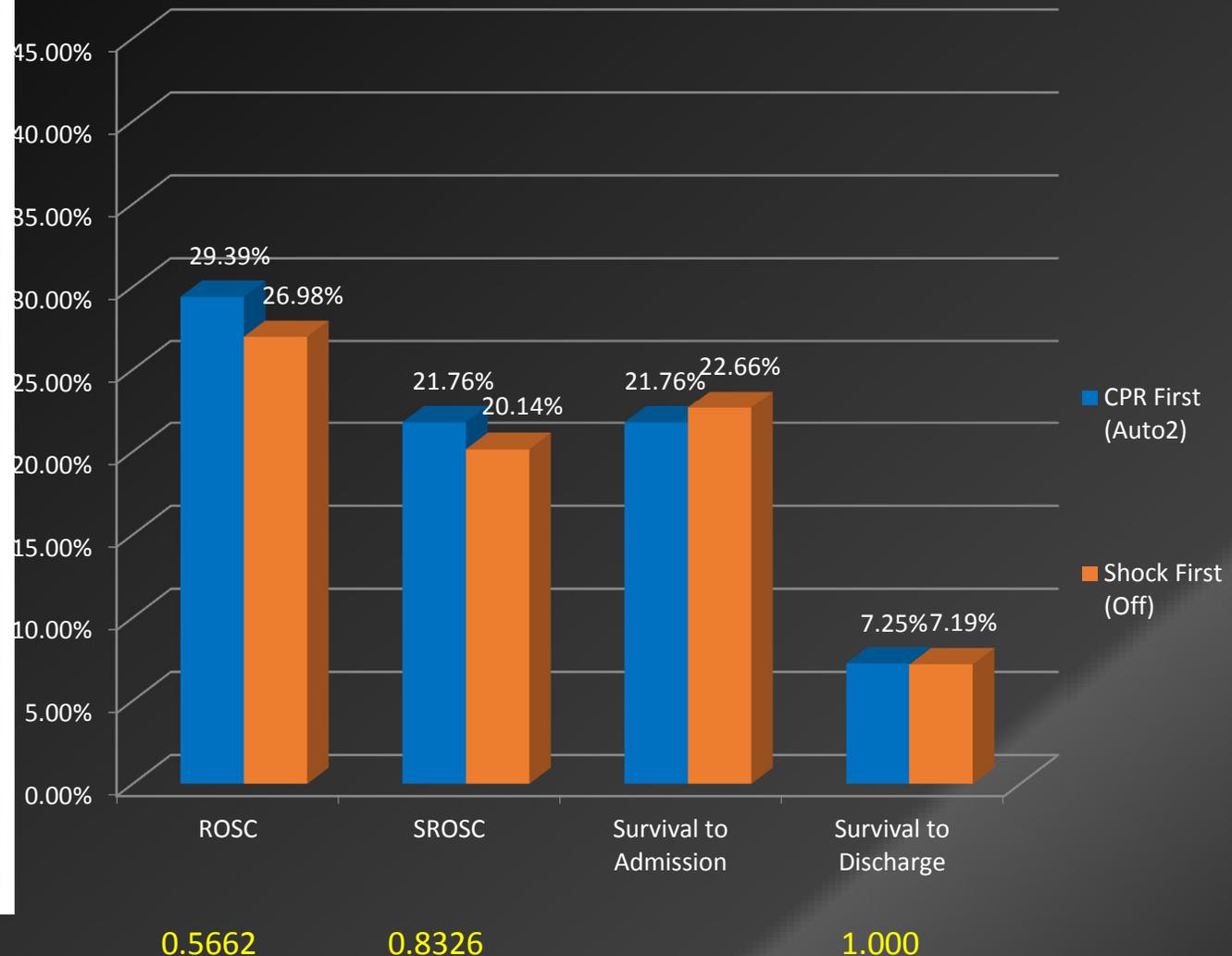
More than 50 years have passed since the first description of successful transthoracic defibrillation for the treatment of ventricular fibrillation (VF), and it has been >40 years since defibrillators were first introduced into the prehospital setting in the United States and United Kingdom.^{1,2} However, despite decades of experience and >500,000 cardiac arrests annually in the United States and Europe, the optimal strategy for the initial management of VF has yet to be defined.^{3,4}

Clinical Perspective on p 1002

Immediate defibrillation had long been considered the standard treatment for VF.⁵ In 2002, Weisfeldt and Becker⁶

suggested a 3-phase model for VF that included an electrical, a circulatory, and a metabolic phase, with immediate defibrillation being the optimal treatment for only the first phase in which the interval from the onset of VF to the time of defibrillation is of short duration. At about the same time, initial studies were published that described the use of delayed defibrillation or a period of cardiopulmonary resuscitation (CPR) before the initial defibrillatory shock as a means to improve survival for VF of longer duration.^{5,8}

This concept of delayed defibrillation was included in the 2005 resuscitation guidelines as a treatment option to be “considered in adults with out-of-hospital ventricular



Received March 22, 2012; accepted May 7, 2013.
 From the Office of Medical Affairs, First Department of New York, Brooklyn, NY (J.P.F., L.M., D.J.P.); Philips Healthcare, Seattle, WA (D.B.J., K.N.); Fred Hutchinson Cancer Research Center, Seattle, WA (P.-Y.L.); London Ambulance Service, London, UK (J.L., R.T.D., M.W.); Department of Emergency Medicine, Long Island Jewish Medical Center, New Hyde Park, NY (R.A.S.); and Pulmonary Medicine Division, Department of Medicine, Montefiore Medical Center and Albert Einstein College of Medicine, Bronx, NY (D.J.P.).
 Correspondence to John P. Freese, MD, Chief Medical Director, Fire Department of New York, 9 MetroTech Center, 4W-1 Brooklyn, NY 11201. E-mail: jfreese@fdny.gov or jfreese@fdny.com.
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 Circulation is available at <http://circ.ahajournals.org> DOI: 10.1161/CIRCULATIONAHA.113.002373

The Machines of Today / Tomorrow

Resuscitation Science

Waveform Analysis–Guided Treatment Versus a Standard Shock-First Protocol for the Treatment of Out-of-Hospital Cardiac Arrest Presenting in Ventricular Fibrillation

Results of an International Randomized, Controlled Trial

John P. Freese, MD; Dawn B. Jorgenson, PhD; Ping-Yu Liu, PhD; Jennifer Innes; Luis Matallana, EMTP; Krishnakant Nammi, MS; Rachael T. Donohoe, PhD; Mark Whitbread; Robert A. Silverman, MD, MS; David J. Prezant, MD

Background—Ventricular fibrillation (VF) waveform properties have been shown to predict defibrillation success and outcomes among patients treated with immediate defibrillation. We postulated that a waveform analysis algorithm could be used to identify VF unlikely to respond to immediate defibrillation, allowing selective initial treatment with cardiopulmonary resuscitation in an effort to improve overall survival.

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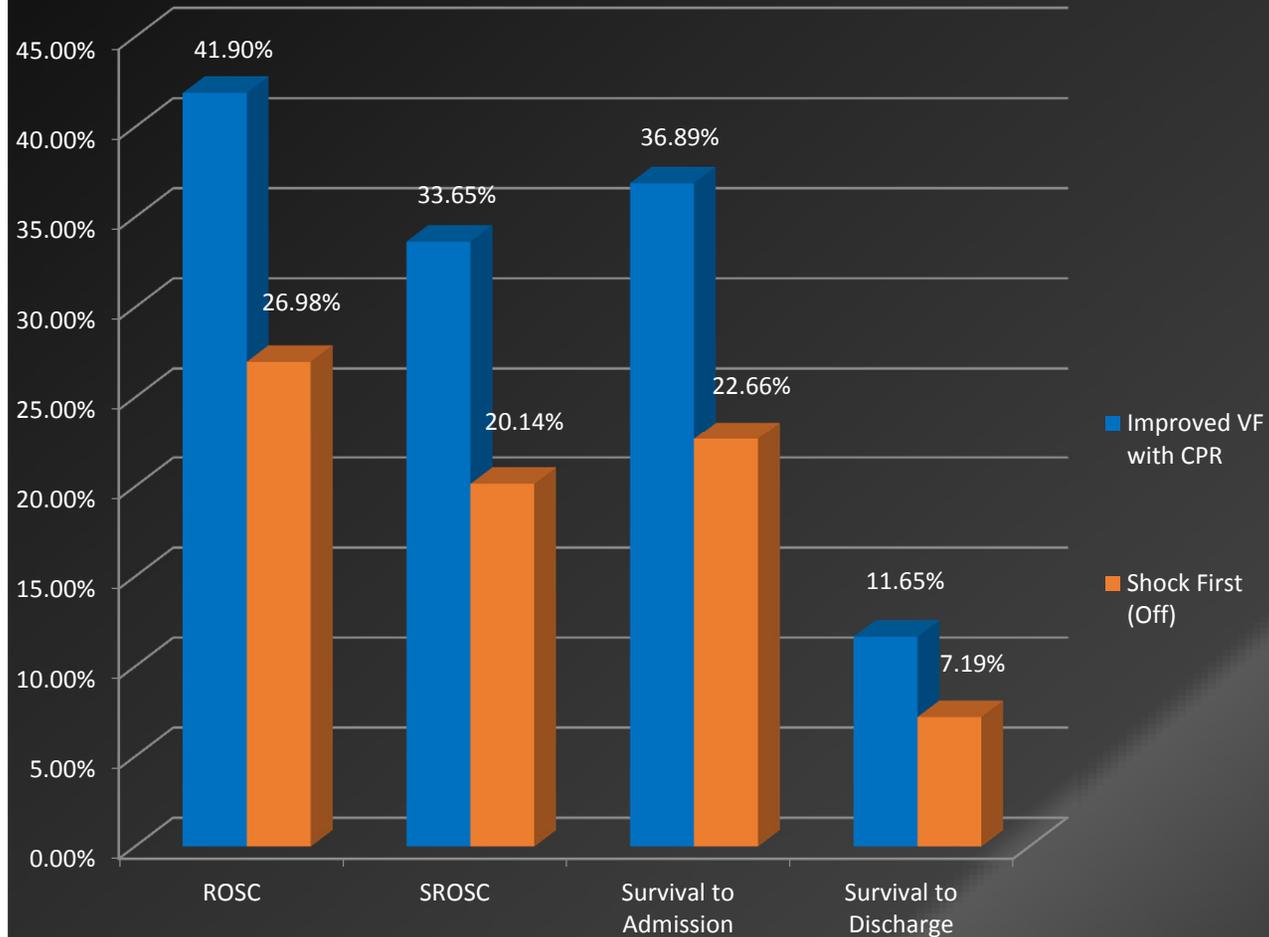
Correspondence to John P. Freese, MD, Chief Medical Director, Fire Department of New York, 9 MetroTech Center, 4W-1 Brooklyn, NY 11201. E-mail: jfreese@fdny.gov or jfreese@fdny.com

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Circulation is available at <http://circ.ahajournals.org>

DOI: 10.1161/CIRCULATIONAHA.113.002273

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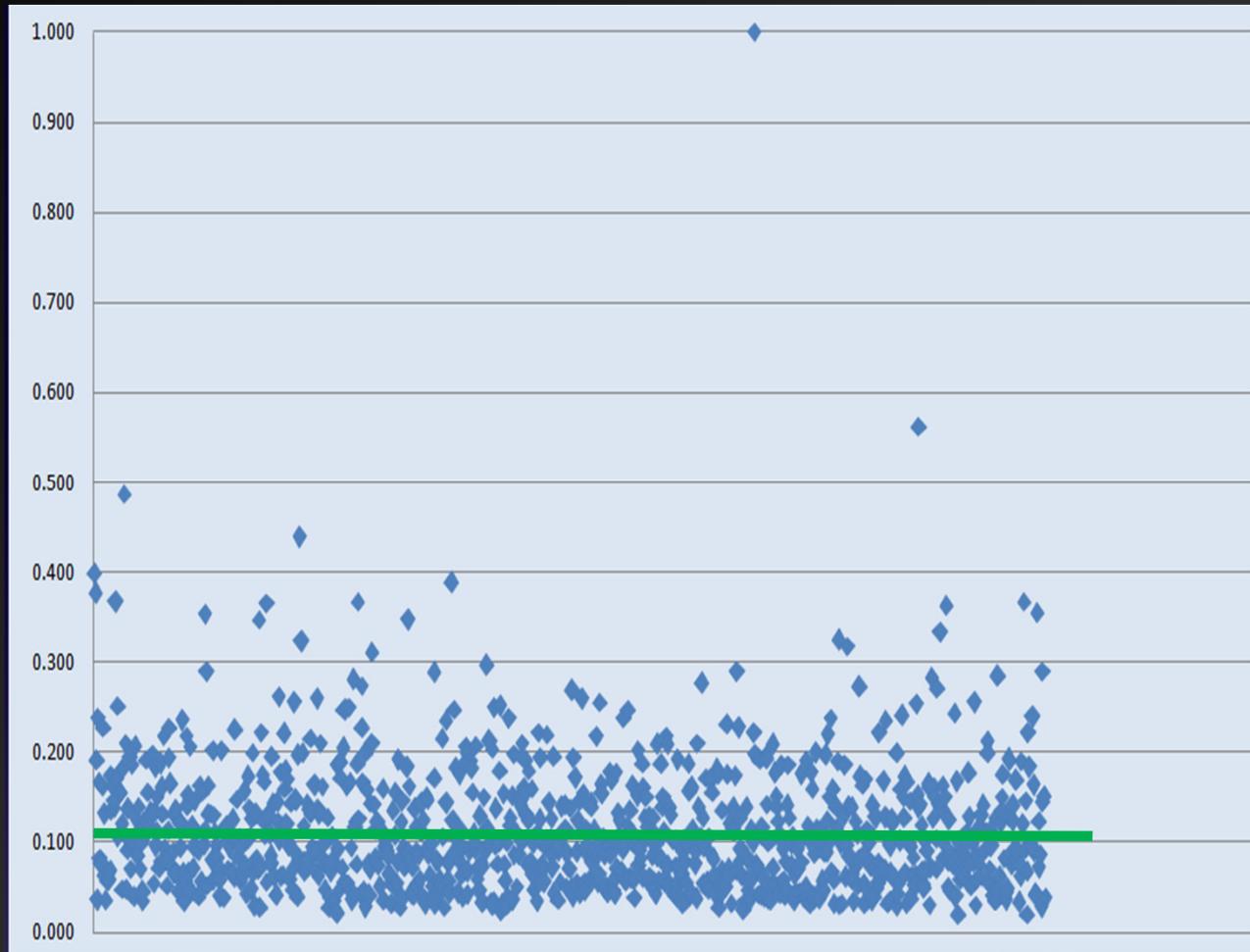
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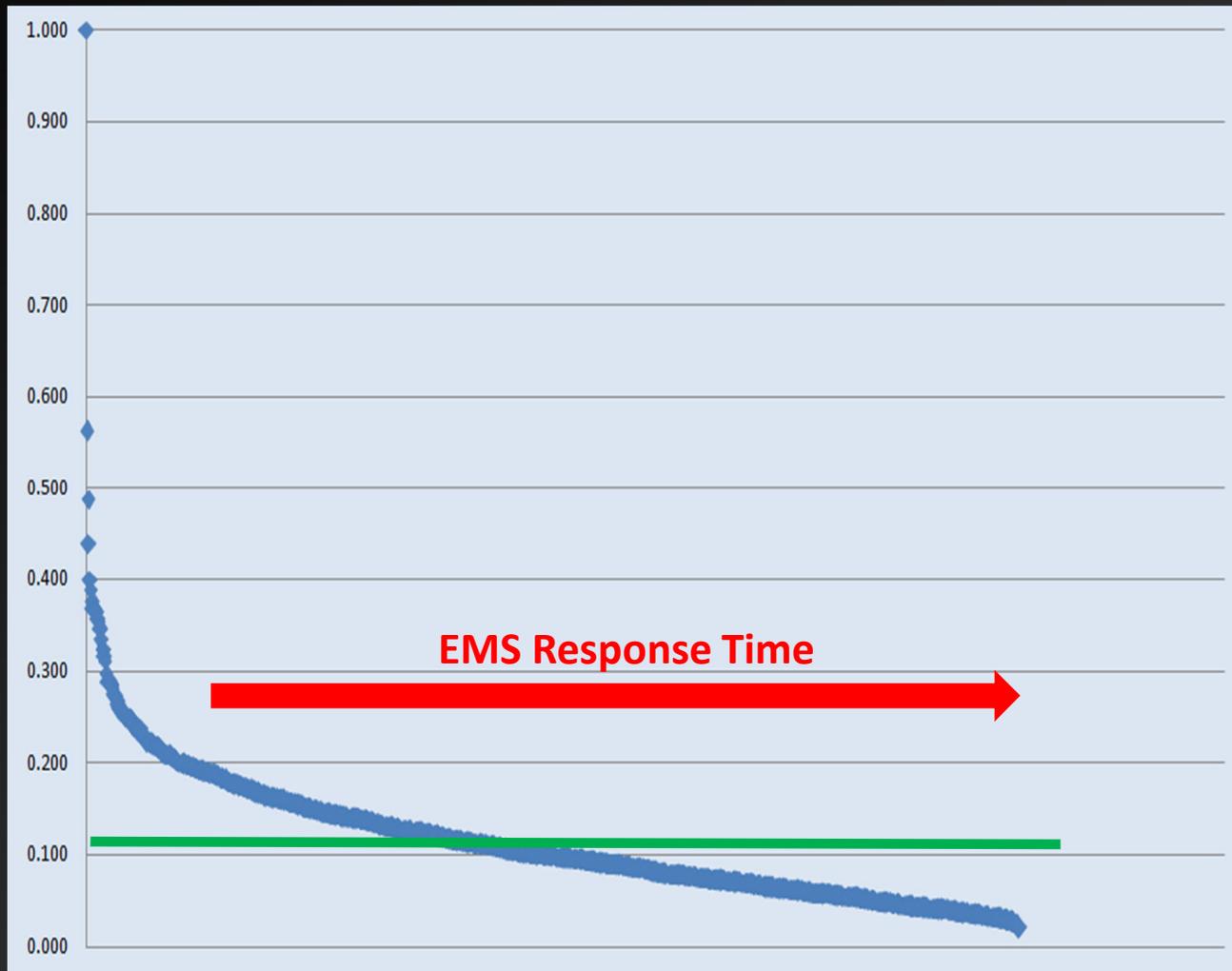
“Real knowledge
is to know the extent
of ones ignorance.”

Confucius

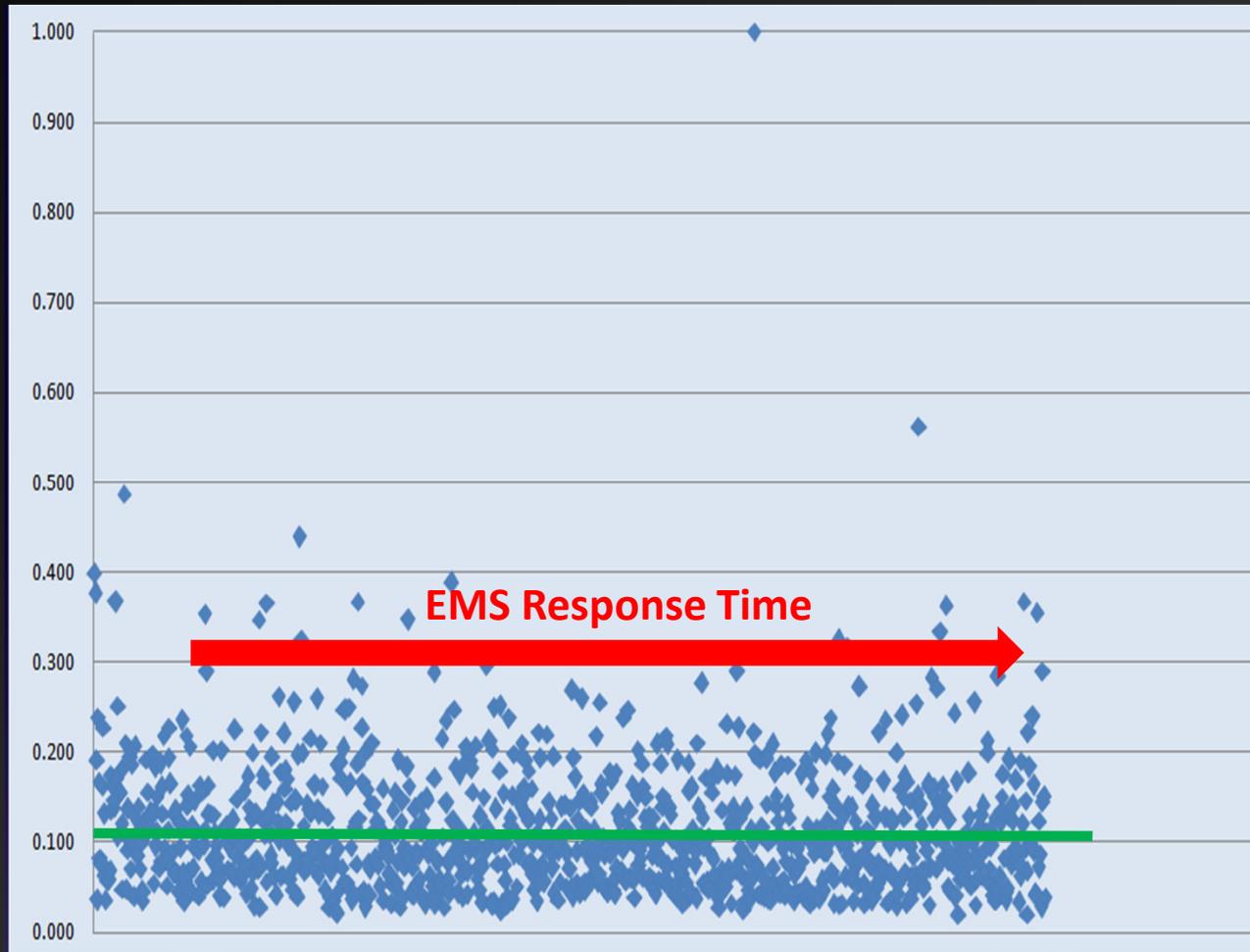
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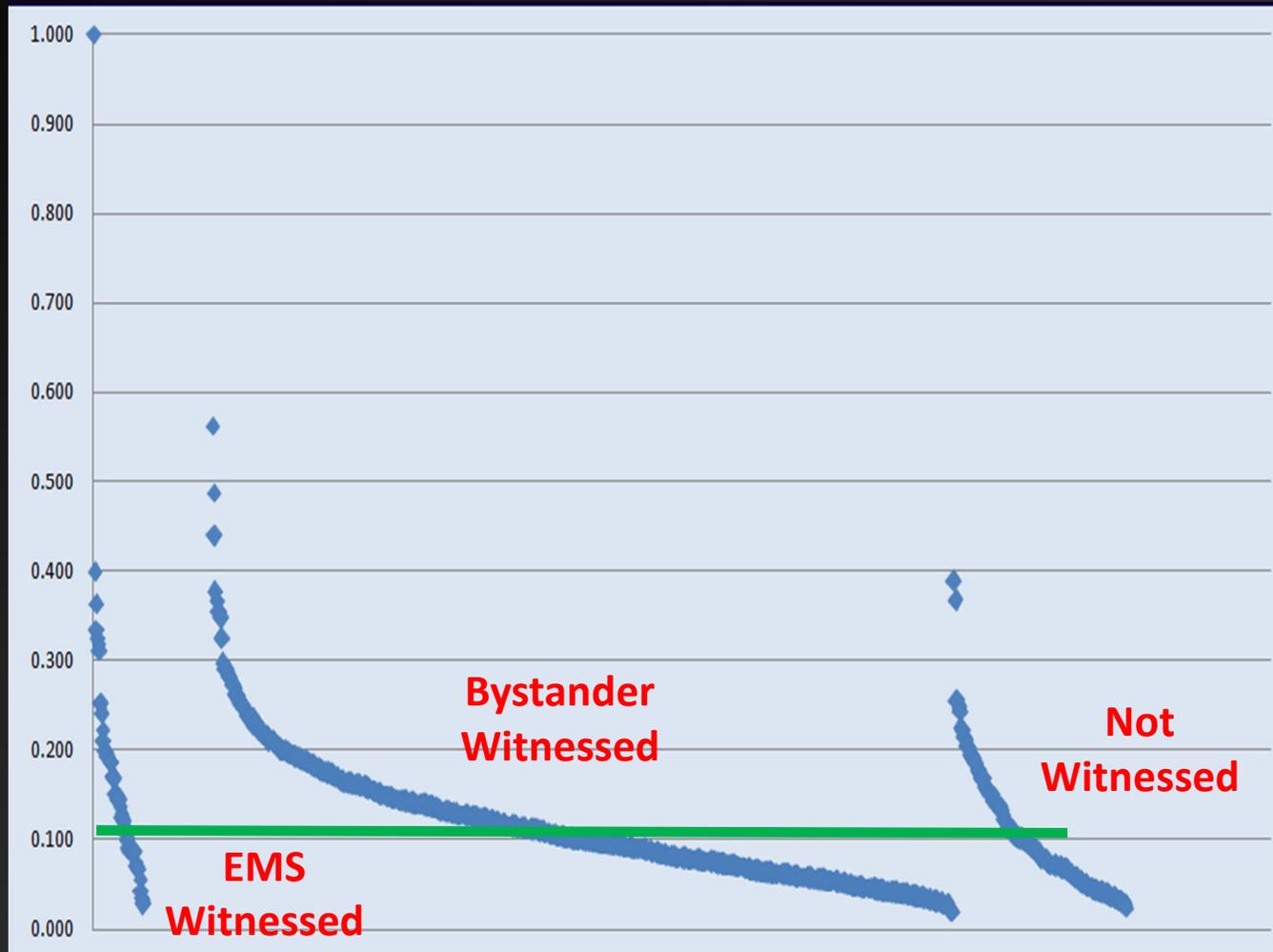
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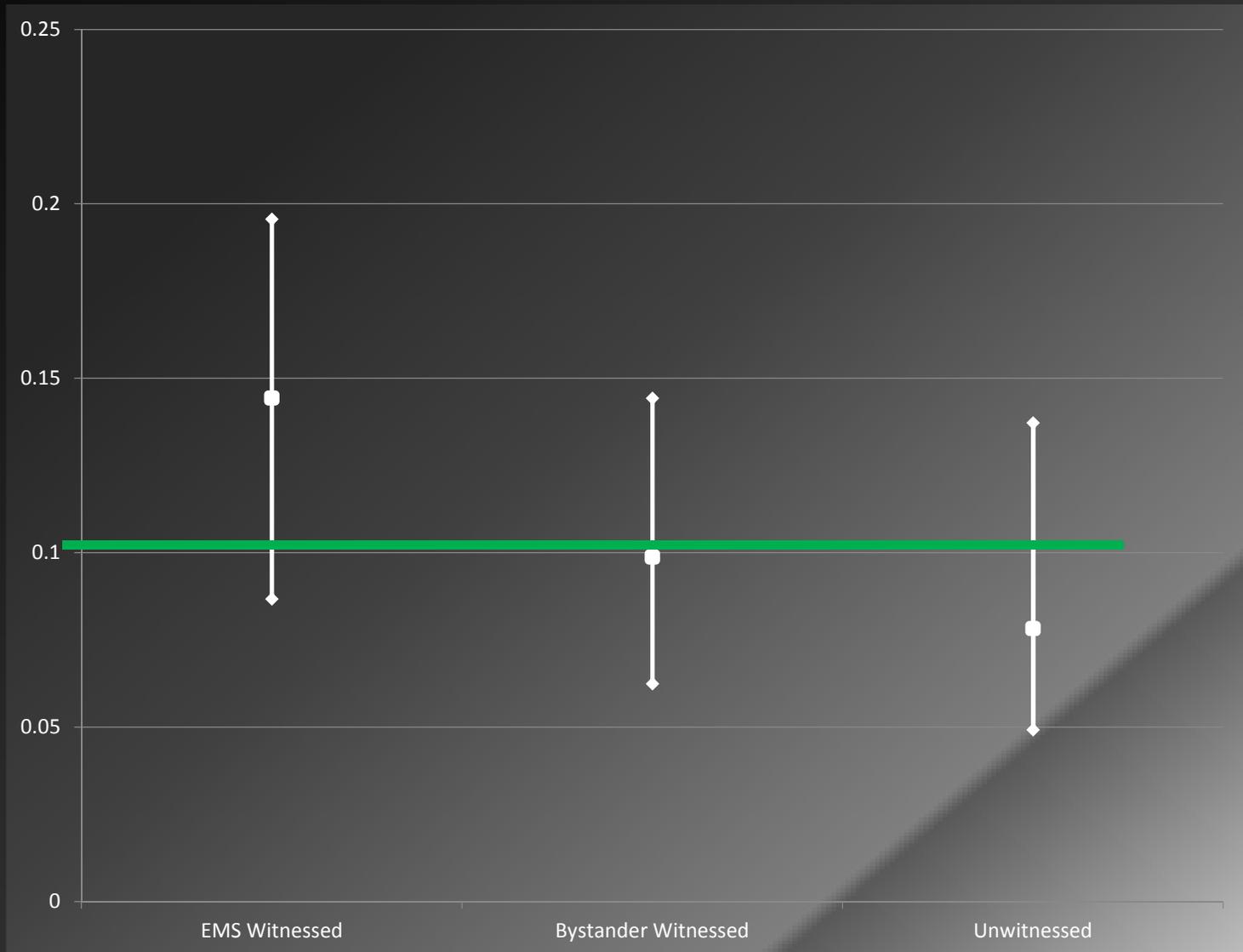
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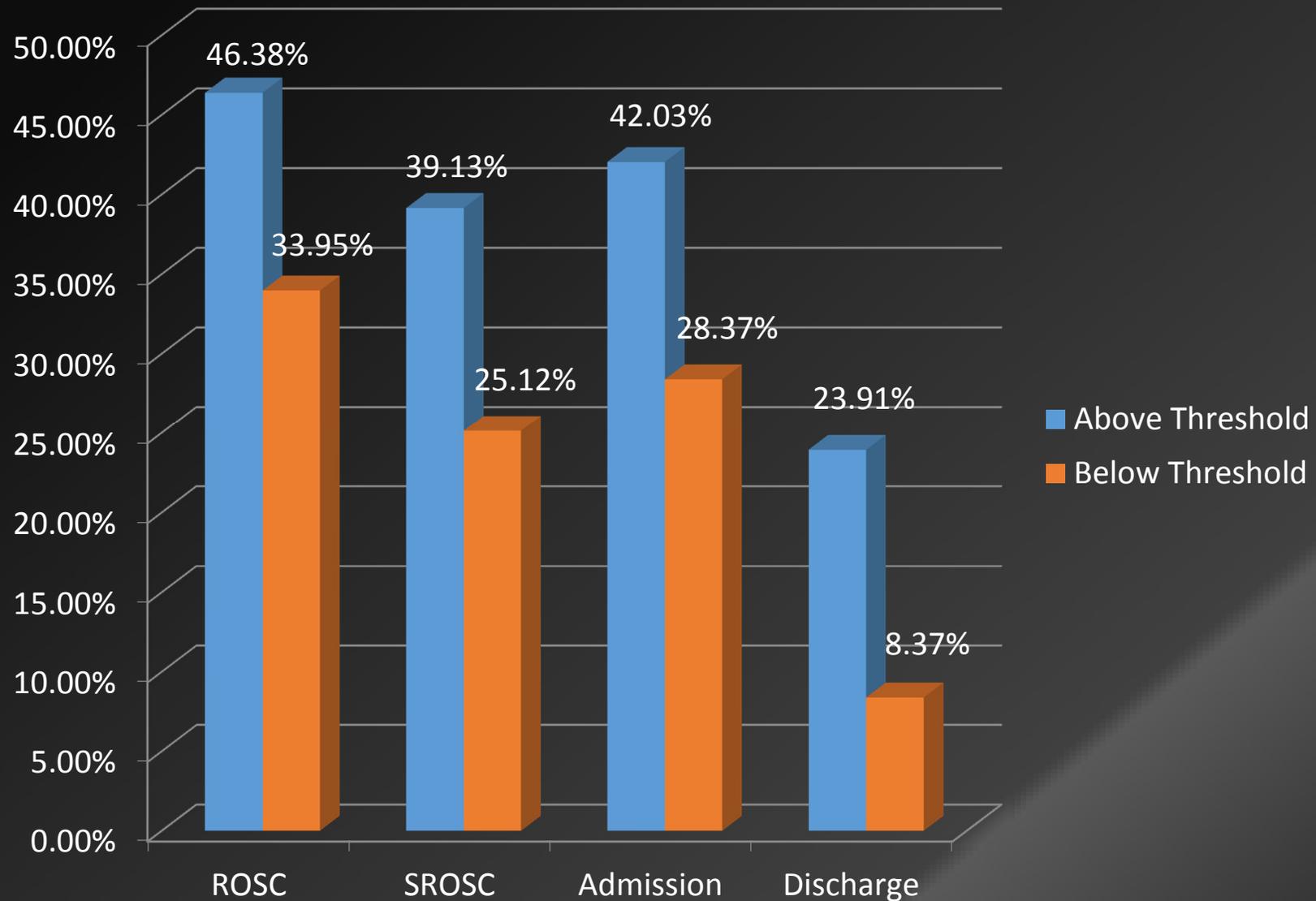
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THE REGIONAL EMERGENCY MEDICAL SERVICES COUNCIL OF NEW YORK CITY

BASIC EMERGENCY MEDICAL TECHNICIAN PROTOCOLS

403

NON-TRAUMATIC CARDIAC ARREST

1. Begin Basic Cardiac Life Support procedures.
 2. Request Advanced Life Support assistance.
 3. Apply an automated external defibrillator:
 - a. In EMS witnessed arrests, perform CPR until defibrillator is attached.
 - b. In arrests not witnessed by EMS, perform two (2) minutes of CPR prior to defibrillator use.
- NOTE:** If an AED utilizing VF waveform analysis is available, perform CPR until the defibrillator is attached for all arrests.
- c. If pediatric patient, under 9 years of age, see Protocol #455
 4. Analyze (do not perform CPR while the machine is analyzing).
 - Whenever the "NO SHOCK INDICATED" message appears, CPR should be performed for 2 minutes followed by the next analysis.
 5. After a total of three (3) cycles of CPR and analysis, continue CPR.
 6. Transport. During transport, or if transport is delayed, continue CPR, re-analyze every 2 minutes, and shock as indicated.

Special Considerations When Using an AED

- If present, remove Nitroglycerin patch and wipe off remaining paste; avoid contact with your skin.
- Prior to pad placement, the chest should be dry and, if needed, shave chest hair
- Attach automated external defibrillator pads
- If the patient has a pacemaker, position the pads at least one (1) inch away from the pacemaker device.

The Machines of Today / Tomorrow

The future of resuscitation...

... requires technology.

... cannot rely on arbitrary human decisions.

... will individualize therapy based upon each patient's physiology, not just their presenting rhythm.

... will utilize machines, not humans, in ways that we are just beginning to develop.

The Future of EMS Looks Amazing





Thank you!
freesej@fdny.nyc.gov

Break



Indiana University Health

ESKENAZI
HEALTH



@INDTrauma #EMSMDConf2015

#recess

378



Tactical EMS

Dr. Michael Smith, Reid Hospital & Health Care Services

@INDTrauma #EMSMDConf2015 #Smith

Tactical EMS and Active Shooters

AUGUST 2015

MICHAEL SMITH, MD, EMT-P



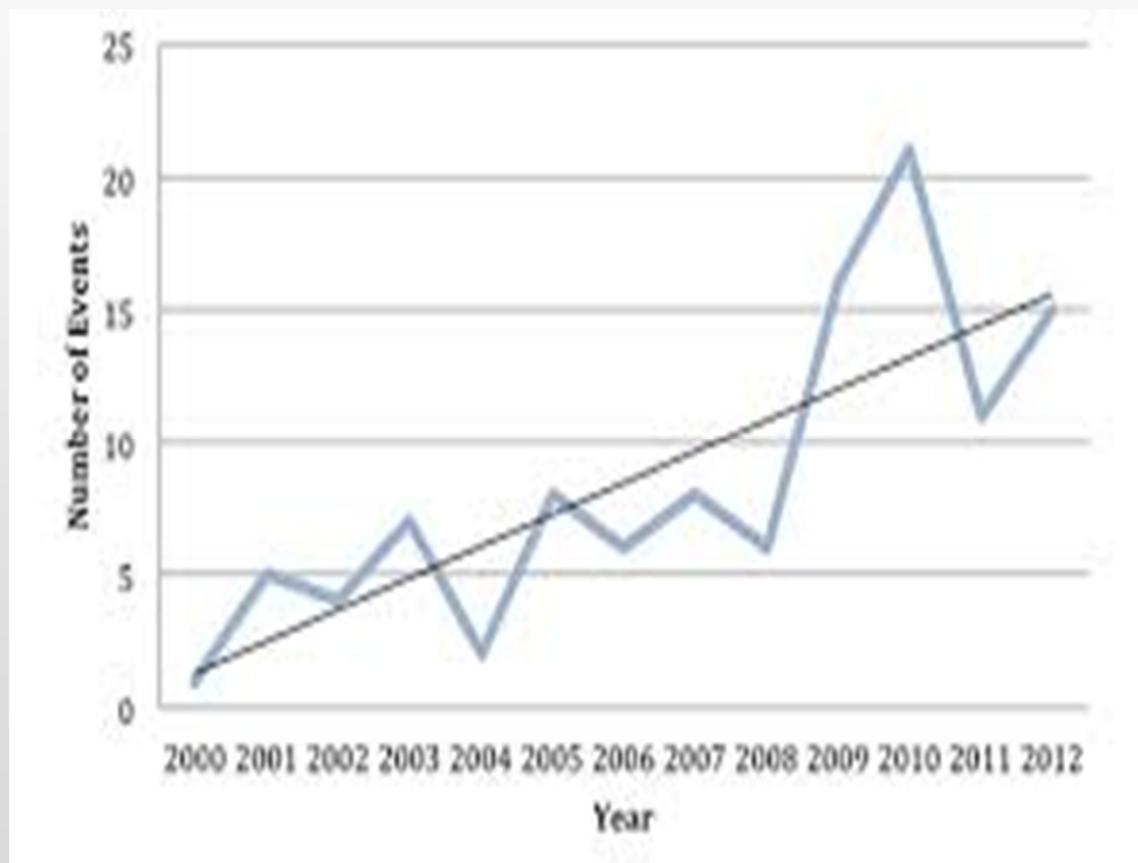
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Frequency Increasing



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What's happened more recently?

 POLITICS

→ *Crime and Justice, Guns, Media, Top Stories*

Rate of Mass Shootings Has Tripled Since 2011, Harvard Research Shows

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STEPHEN S. HORTON/AP

And, not every attack is a shooting...





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Key focus- for both EMS and LEO communities.

- **Equipment**
- **Personnel**
- **Follow-Up Resources Post Incident**

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US Fire Administration White Paper

- **Maximize Survival**
- **Train Together**
- **Take Specialty Courses and Integrate Teams.**

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The Hartford Consensus

“THREAT”

- Threat suppression
- Hemorrhage control
- Rapidly Extricate to safety
- Assessment and focused treatment
- Transport to definitive care

“Active Shooter Kits”





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Role as medical directors

- Education
- Political Advocacy
- Equipment and Protocols
- For Some: Active Field Participation

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SUMMARY

- EM/EMS has a role in tactical team preparedness.
- Committed individuals are almost impossible to stop before acting, and it is safe to assume these incidents will continue.
- A team approach that incorporates LEO, EMS, and ED response is the best way to train, and the most effective way to save lives.

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Traumatic Exposure: The Importance of Trauma-Informed Care

Michelle Hoersch, The Office of Women's Health

@INDTrauma #EMSMDConf2015

#Hoersch #OWH

406

Trauma and Trauma-Informed Care in the Context of an Emergency

Emergency EMS Medical Directors'
Annual Conference
August 19, 2015
Indianapolis

Michelle Hoersch, MS

Office on Women's Health – Region V
U.S. Department of Health and Human Services

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Functional Definition of Trauma

Trauma occurs whenever an external threat overwhelms a person's coping resources.

- Non-consensual
- Victim is in discomfort, fear, feels intimidated
- Bodily integrity (or that of someone else) is threatened





SAMHSA's Definition of Trauma

The 3 E's

- Event
- Experience
- Effect





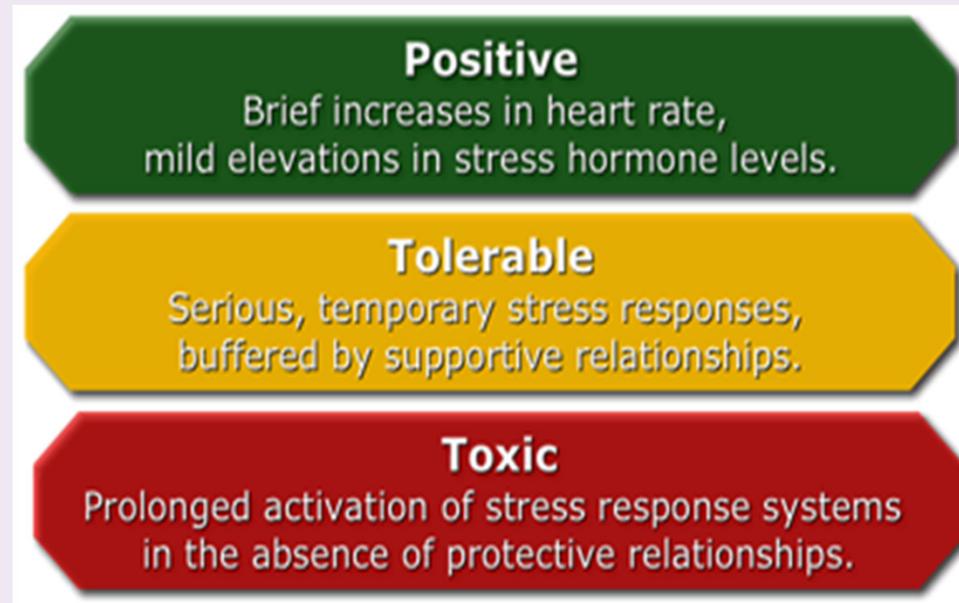
Common traumatic exposures

- ▶ Rape – 1 in 6 women
- ▶ Intimate Partner Violence - 1 in 3 women
- ▶ Childhood Sexual Abuse – 1 in 5 girls
- ▶ Military Sexual Trauma – 1 in 3 women
- ▶ Combat Exposure 2- 10% of women
- ▶ Historical Trauma
- ▶ Exposure to street violence
- ▶ Toxic Stress
- ▶ **Emergencies, Natural Disasters and Terrorism**





Toxic stress and Trauma



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Prevalence and Impact of Trauma in the U.S.

- **Likely that an individual will have exposure to multiple traumatic events during their lifetime**
- **The impact of trauma is dramatically underestimated**





The Adverse Childhood Experience (ACE) Study

- Over 17,000 Kaiser patients participating in routine health screenings volunteered to participate in the study.
- Data continues to be analyzed
- Staggering proof of the health, social, and economic risks that result from childhood trauma

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What is an ACE?

10 types of childhood trauma measured in the ACE Study

Five are personal:

- Physical abuse
- Verbal abuse
- Sexual abuse
- Physical neglect
- Emotional neglect

Five are related to other family members:

- A parent who's an alcoholic
- A mother who's a victim of domestic violence
- A family member in jail or prison
- A family member diagnosed with a mental illness
- The disappearance of a parent through divorce, death or abandonment





ACE Scores

- Number of categories (not events) is summed
- 2 out of 3 experienced at least one *category* of ACE
- If any one ACE is present, there is an 87% chance *at least* one other category of ACE is present

ACE Score	Prevalence
0	33%
1	25%
2	15%
3	10%
4	6%
5 or more	11%*

***Women are 50% more likely to have a score >5.**

Anda, Robert F. M.D., & Felitti, Vincent J. M.D. (July 2011). *Adverse Childhood Experiences and their Relationship to Adult Well-being and Disease: Turning Gold into Lead.* [PowerPoint slides]





Adverse Childhood Experiences ACEs have a strong influence on:

- Adolescent health
- Teen pregnancy
- Smoking
- Alcohol abuse
- Illicit drug abuse
- Sexual behavior
- Mental health
- Risk of revictimization
- Stability of relationships
- Performance in the workforce

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The Philadelphia Urban ACE Study

- The Institute for Safe Families examined the prevalence and impact of ACEs in Philadelphia, an urban city with a socially and racially diverse population.
- 1,784 adults completed the Philadelphia Urban ACE Survey
- Found a higher prevalence of ACEs than found in previous studies
 - 33.2% of Philadelphia adults experienced **emotional abuse**
 - 35% experienced **physical abuse** during their childhood
 - 35% of adults grew up in a household with a **substance-abusing** member
 - 24.1% lived in a household with someone who was **mentally ill**
 - 12.9% lived in a household with someone who served time or was sentenced to **serve time in prison**

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The Philadelphia Urban ACE Study

Survey also examined the **stressors that exist in the communities** where people live. The study found:

- 40.5% of Philadelphia adults **witnessed violence** while growing up, which includes seeing or hearing someone being **beaten, stabbed or shot**.
- 34.5% reported experiencing **discrimination** based on their race or ethnicity
- 27.3% reported having felt **unsafe in their neighborhoods** or not trusting their neighbors during childhood
- Over 37% of Philadelphia respondents reported **four or more ACEs**

The findings suggest the **need for services that address the unique environmental stressors experienced in urban neighborhoods** to mitigate their impact on individuals and prevent ACEs.

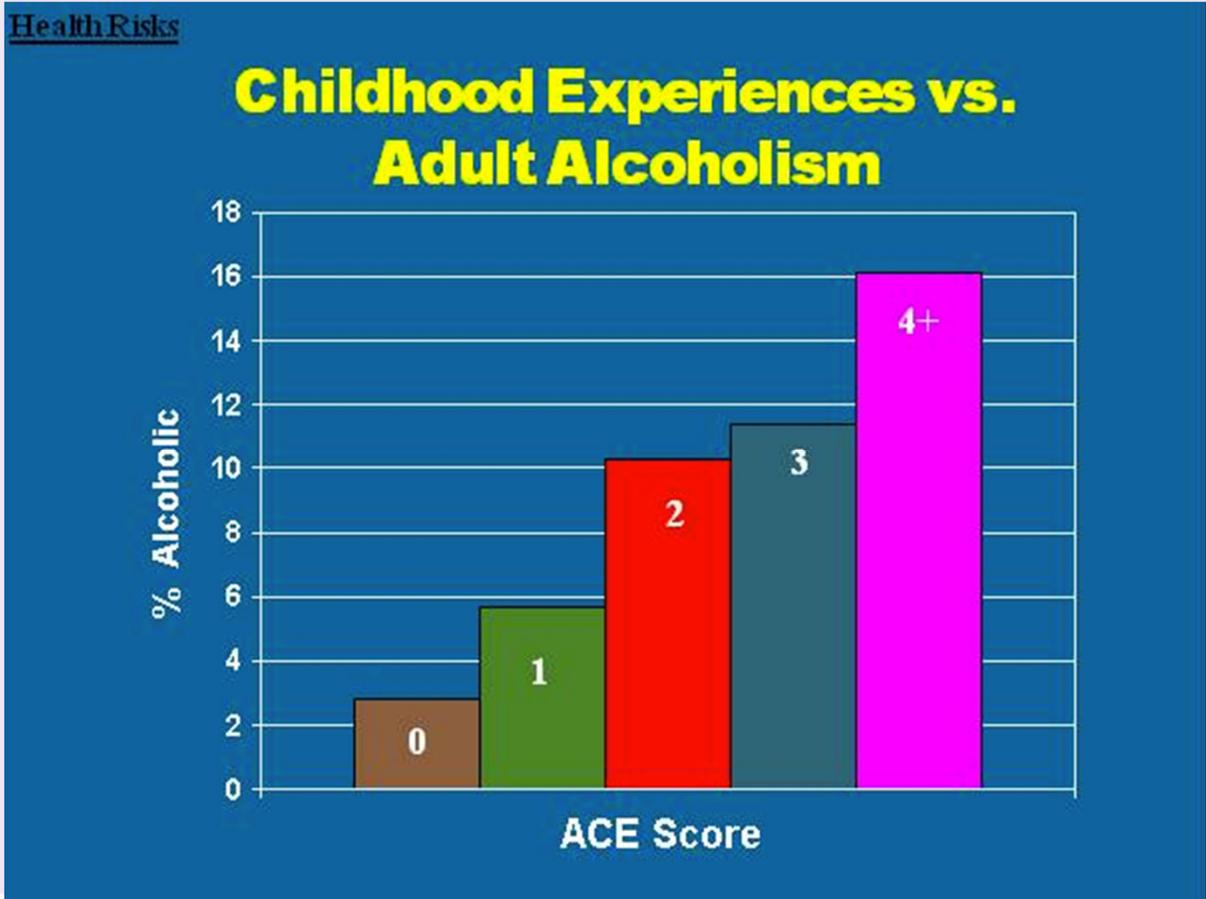
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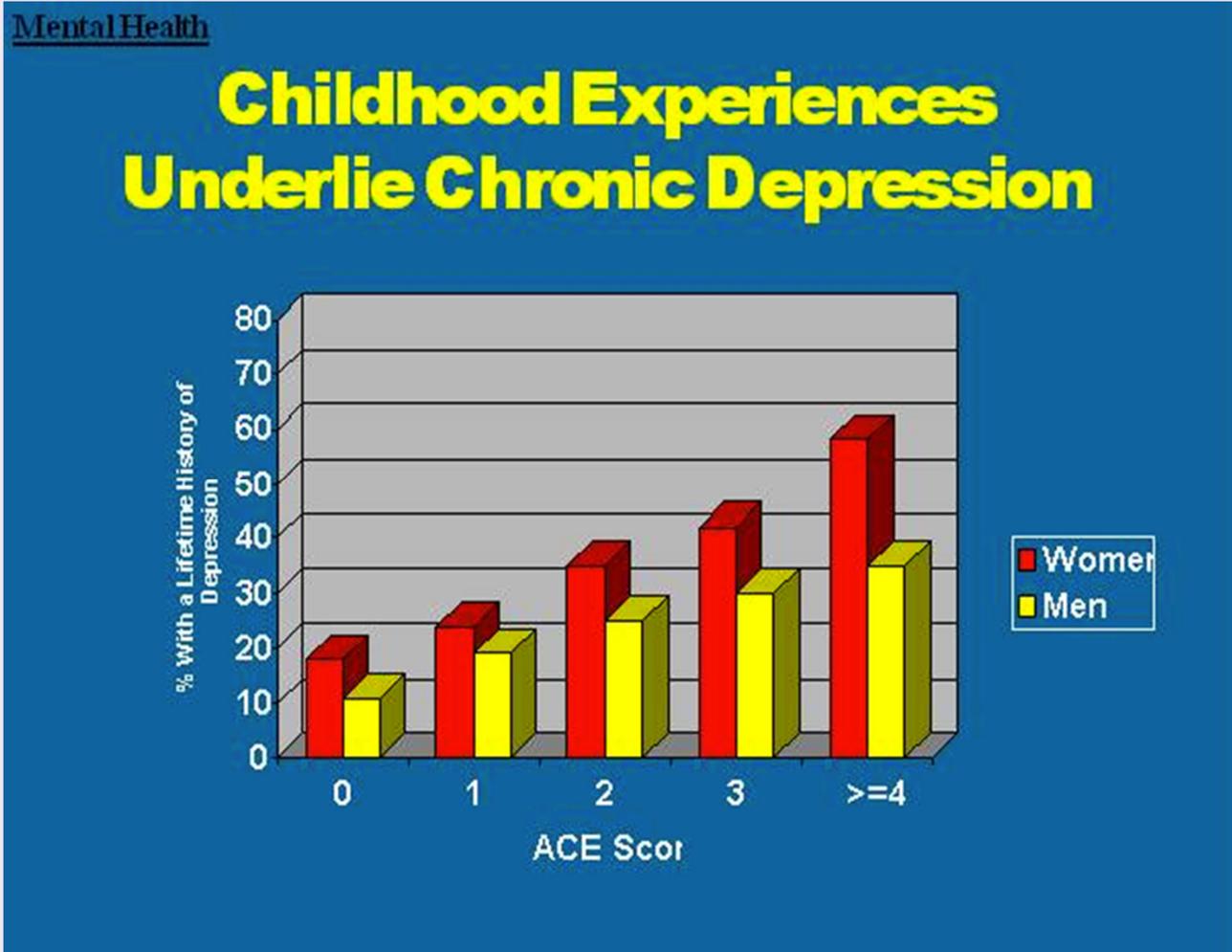
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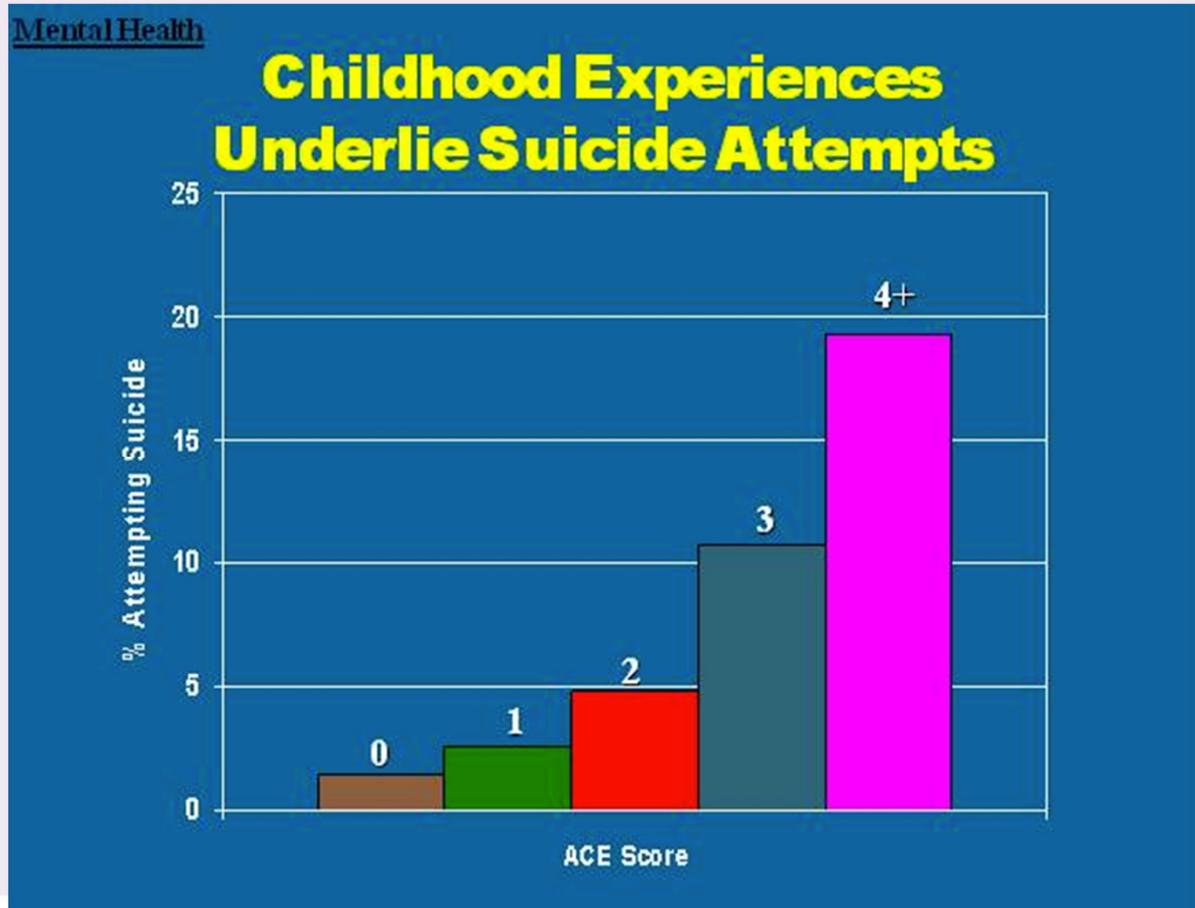
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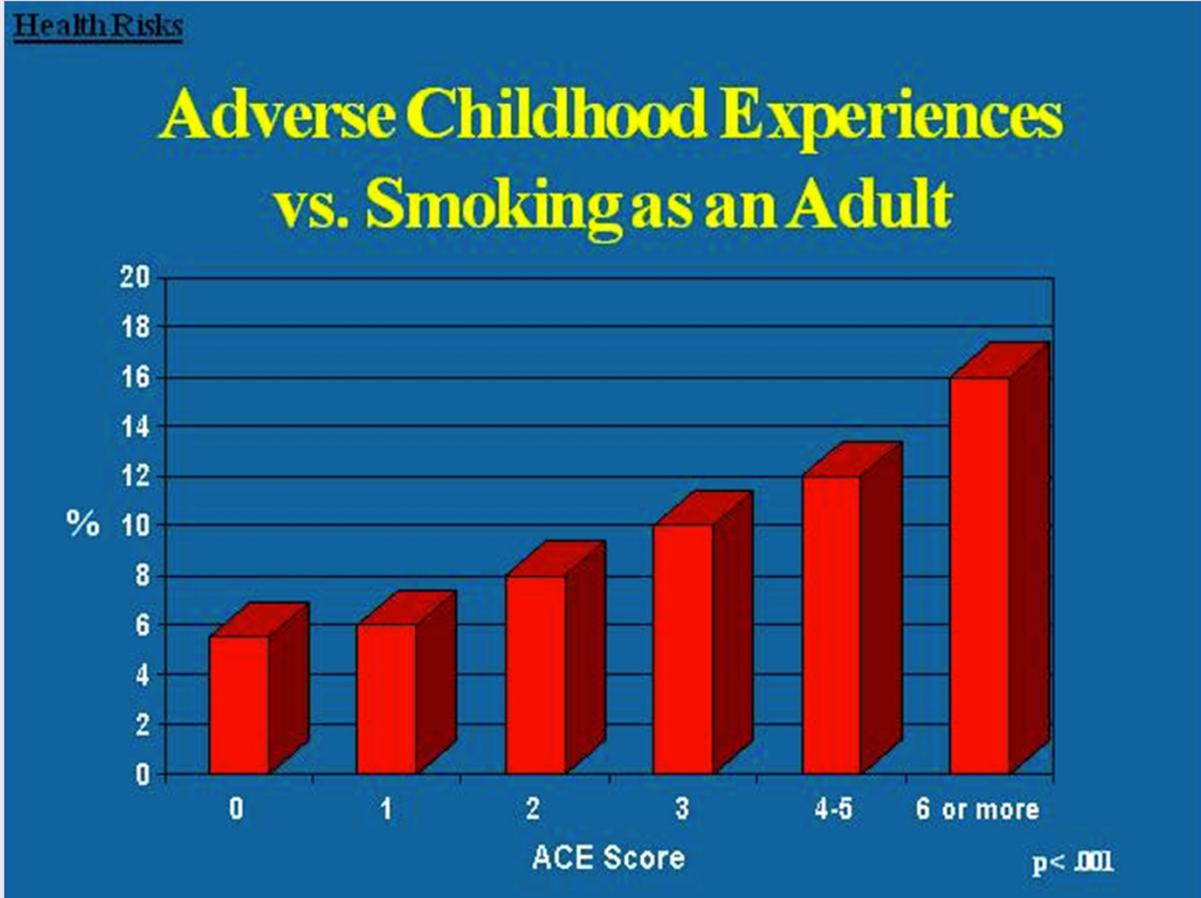
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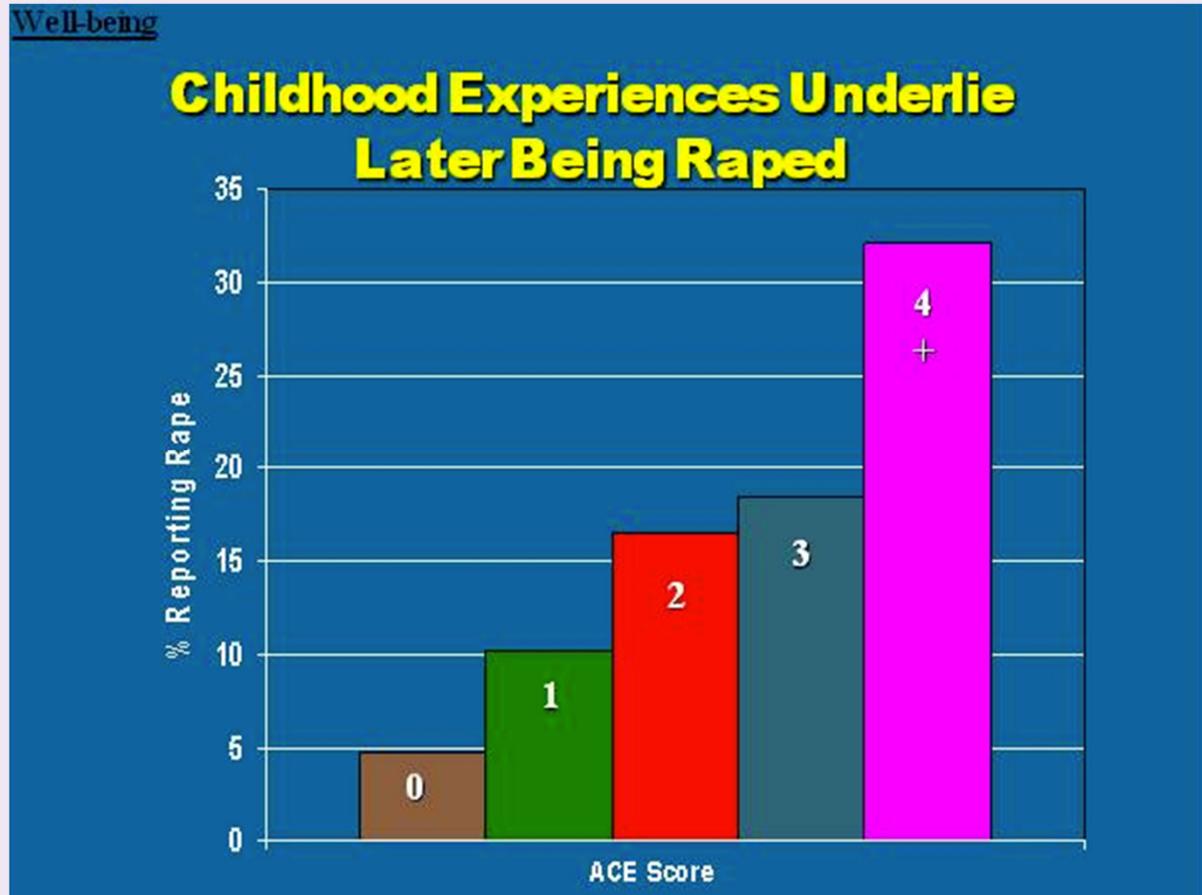
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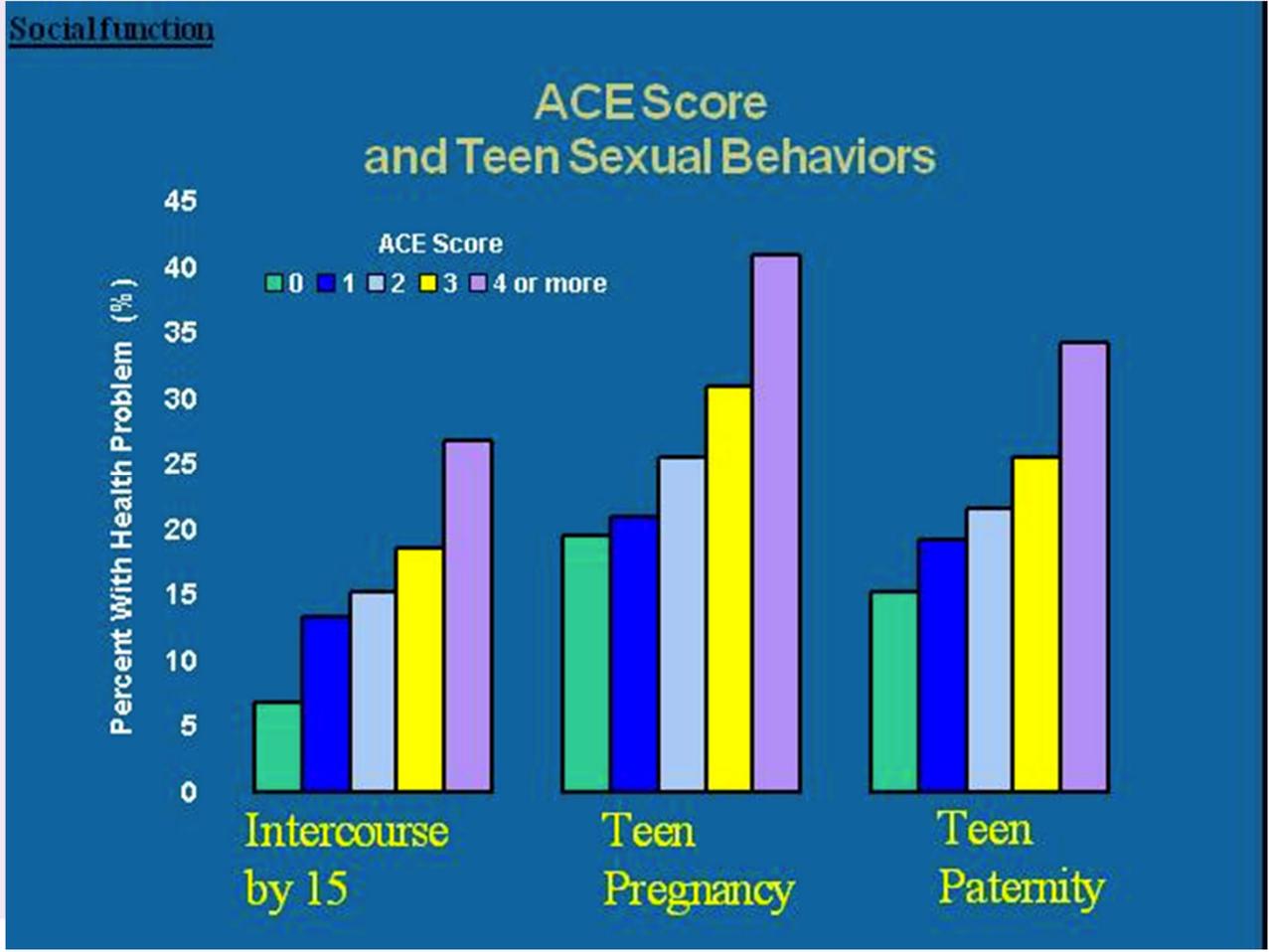


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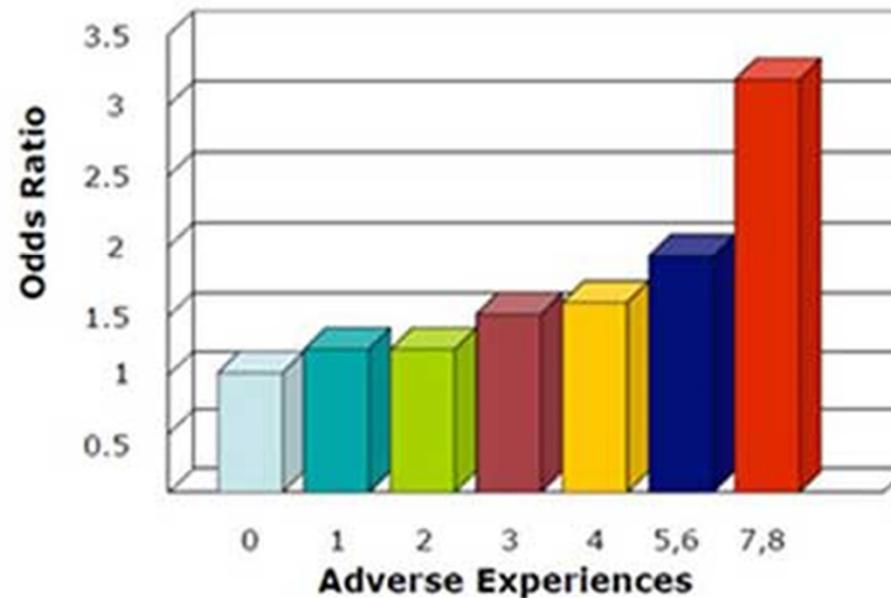
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Risk of Adult Heart Disease Increases with more Adverse Childhood Experiences



Source: Dong et al., 2004

The ACE Pyramid



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High Risk Behavior or Coping?

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A quote from Dr. Felitti:

**“It’s hard to give something up
that almost works.”**

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In Summary, the ACE Study indicates...

Adverse childhood experiences are the most basic and long lasting determinants of health risk behaviors, mental illness, social malfunction, disease, disability, death, and healthcare costs.

Anda, Robert F. M.D., & Felitti, Vincent J. M.D. (July 2011). *Adverse Childhood Experiences and their Relationship to Adult Well-being and Disease: Turning Gold into Lead.*

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Allostatic Load

- ▶ The “wear and tear on the body” which grows over time when the individual is exposed to repeated or chronic stress
- ▶ Physiological consequences of chronic exposure to fluctuating or heightened neural or neuroendocrine response that results from repeated or chronic stress
- ▶ Explains how frequent activation of the body's stress response, essential for managing acute threats, can in fact damage the body in the long run.

McEwen and Stellar, 1993



Stressor activates the Amygdala



HPA Axis

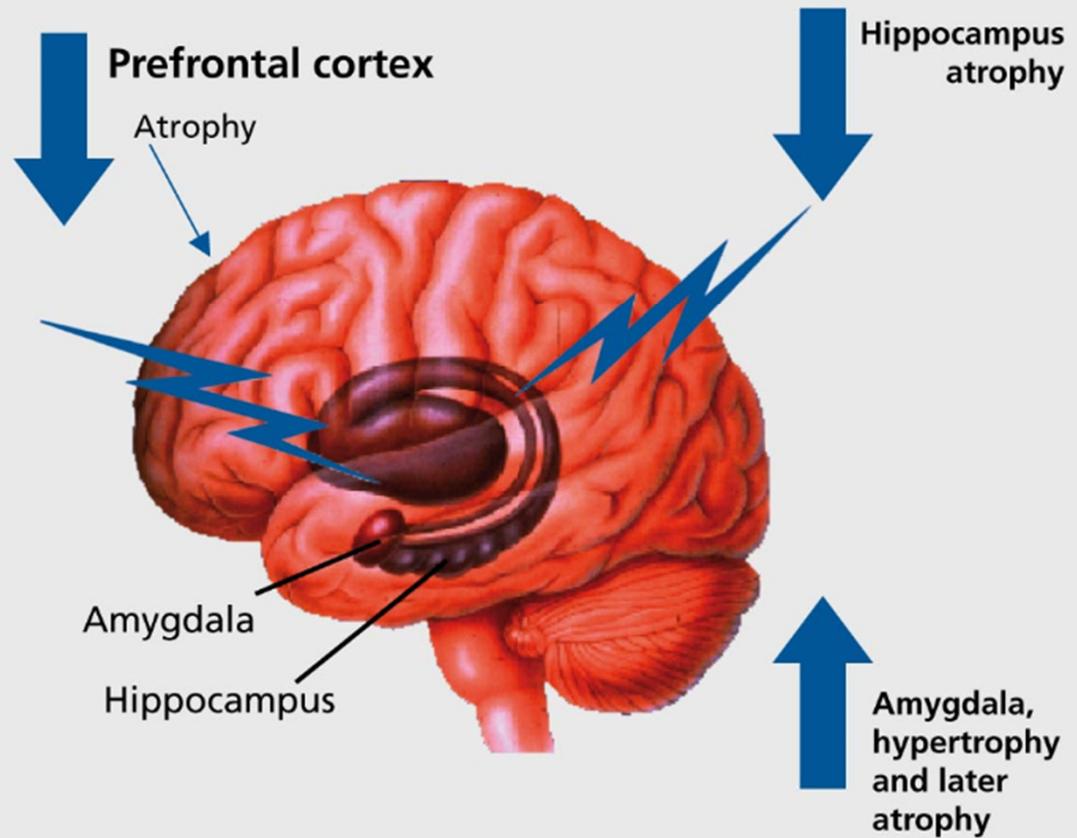


Release of Cortisol



Heart races
Blood goes to muscles
Digestion shuts down
Memory impacted

The brain under stress: structural remodeling





Impact of Trauma on the Brain and Behavior

Amygdala

- Triggers release of cortisol
- Involved in many emotions and motivations, particularly those related to survival
- Involved in the processing of emotions such as fear, anger, and pleasure
- Responsible for determining what memories are stored and where they are stored in the brain

Hippocampus

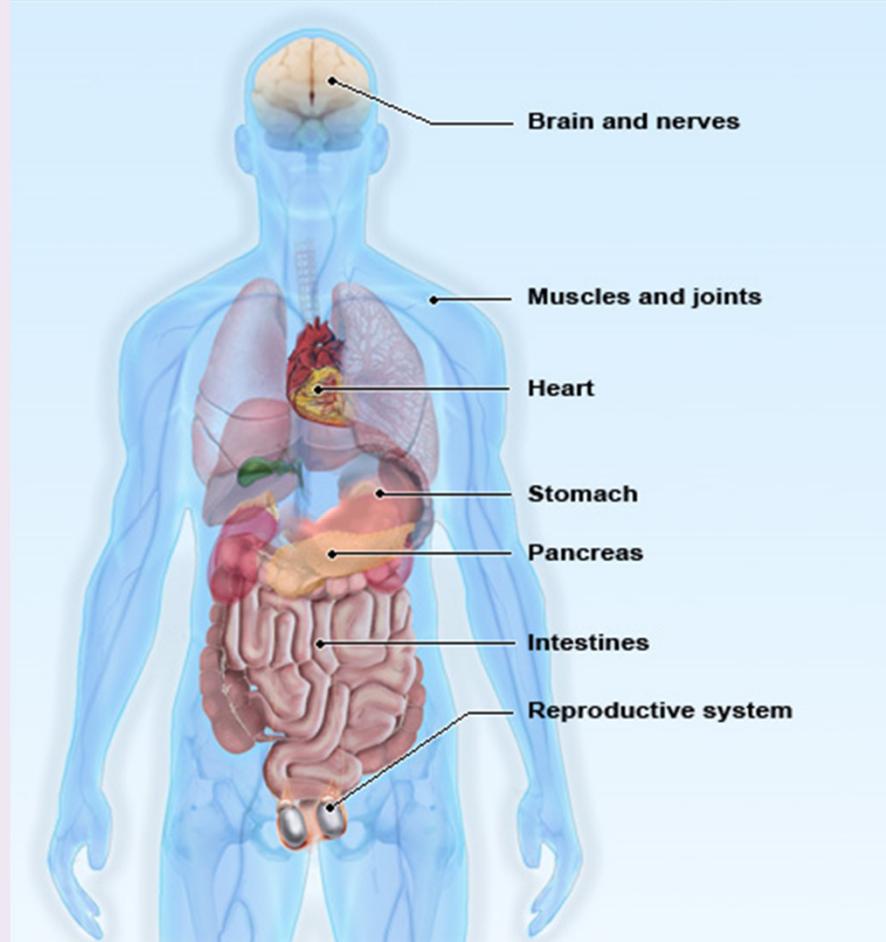
- Involved in the storage of long-term memory

Prefrontal Cortex

- Involved in planning complex cognitive behavior, personality expression, decision making, and moderating social behavior



Areas of the body affected by stress



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Trauma-informed Services

- Take trauma into account
- Avoid triggering trauma reactions and/or traumatizing the individual
- Adjust the behavior of providers, other staff and the organization to support the individual
- Allow survivors to manage their trauma symptoms successfully so that they are able to access, retain and benefit from the services.

(Harris & Fallot)





“Universal Precautions”

- ▶ Exposure to trauma is pervasive
- ▶ The impact of trauma is dramatically underestimated

Therefore, assume EVERYONE has a trauma history.





Trauma-Informed Care

Paradigm shift from...

What's wrong with you?

What happened to you?

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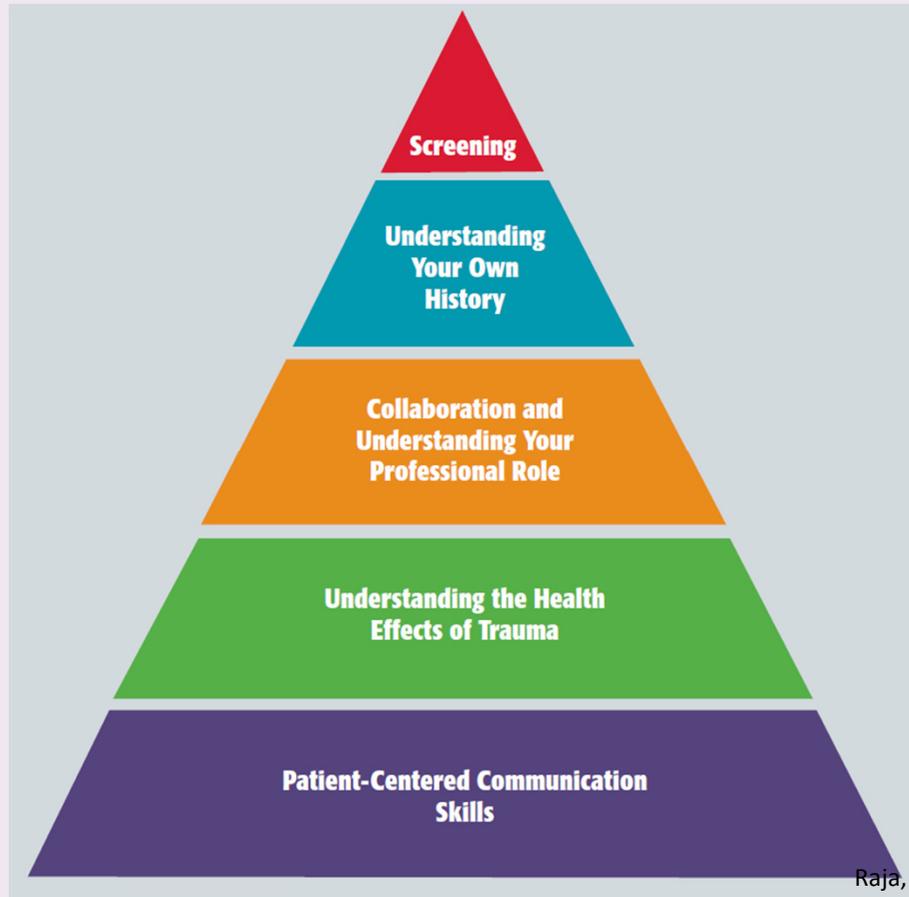
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The Trauma-Informed Care Pyramid



Raja, S., Hoersch, M., et al. (2014). *JADA*

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Trauma-Informed Approaches in Emergencies

- ▶ A trauma-informed approach to emergency /disaster response acknowledges past trauma and the current impact it may have on the lives of anyone receiving services or support.
- ▶ Recognizing likelihood of prior traumatic exposure can improve communication between responders and those being served and facilitate compliance with public health directives.

Office of the Assistant Secretary for Preparedness and Response, US DHHS

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Trauma and Retriggering in the Context of an Emergency

- ▶ Loud noises
- ▶ Pain
- ▶ Fear
- ▶ Uncertainty
- ▶ Death and Injury
- ▶ People in uniforms
- ▶ Lack of Control
- ▶ Separation from Family or Caregivers
- ▶ Bodily exposure during decontamination procedures

These stimuli may be very similar to and trigger past traumatic experiences.





Trauma-Informed Approaches in the Context of an Emergency

Things to consider:

- ▶ Most people have a trauma history
- ▶ This event is likely traumatic
- ▶ The stimuli of this event are likely retriggering old traumatic experiences
- ▶ Those impacted may not have access to their normal support systems or coping tools
- ▶ Do everything you can to minimize further unintentional retraumatization

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Trauma-Informed Approaches in the Context of an Emergency

Things to consider

- ▶ Ask consent before touching someone
- ▶ Protect privacy
- ▶ Explain what is going on and what you are doing
- ▶ Try to use calm voices
- ▶ Answer questions, even if asked multiple times
- ▶ What can we do to make you more comfortable or help you cope?
- ▶ Do not walk up from behind a person
- ▶ Ask before getting them alone or closing a door, curtain, etc.





Training Health Care Providers

Trauma-Informed Care for Health Care Providers: On-line Clinical Cases

- Interactive case-based learning
- Free-standing cases allows providers to self-tailor CMEs
- Evidenced-based
- To increase knowledge and skills in trauma-informed care

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Trauma-Informed Care for Health Care Providers: On-line Clinical Cases

Introductory Cases

- ▶ Preventive care visit
- ▶ Acute care visit
- ▶ Chronic disease management

Subsequent Cases

- ▶ Prenatal
- ▶ Obstetric
- ▶ Post-partum
- ▶ Pelvic exams with STI testing
- ▶ ER
- ▶ Hospitalization
- ▶ Ophthalmologic care
- ▶ Pain clinic
- ▶ Sleep clinic
- ▶ Office Procedures – biopsies cardiac imaging
- ▶ Surgical care
- ▶ Women Veterans
- ▶ Incarcerated and recently released
- ▶ Elderly
- ▶ LGBTQ
- ▶ Pediatric

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Resources

- ▶ National Center for Trauma-Informed Care
<http://beta.samhsa.gov/nctic>
- ▶ ACEStudy.org
- ▶ ACEStoohigh.com
- ▶ Wisconsin Department of Health Services –Trauma-informed Care Website
www.dhs.wisconsin.gov/tic/principles.htm





Trauma-Informed Approaches and Emergency Response Resources

- ▶ **Disaster Response for Homeless Individuals and Families: A Trauma-Informed Approach -**
<http://www.phe.gov/Preparedness/planning/abc/Pages/homeless-trauma-informed.aspx>
- ▶ **Trauma-Informed Care for Displaced Populations: A Guide for Community-based Providers**
www.familyhomelessness.org/media/405.pdf

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445





Women and Trauma Federal Partners Committee

Building a Trauma Informed Nation: Moving from Conversation to Action

Webcast Event and local stakeholder convenings
September 29-30, 2015

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446





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447



Questions?

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