Defending Non-Firearm Arrest-Related Death Incidents

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Mark W. Kroll, PhD
Adjunct Professor, Biomedical Engineering
UNIVERSITY OF MINNESOTA

Michael A. Brave, JD, MS
LAAW International LLC

Disclosures

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Introduction

- **Significant differences between the scientific and causal issues with a firearm and a *non-firearm* arrest-related death (ARD).**
- **In a firearm ARD there is generally no question of causation**
- **In *non-firearm* ARD cases, there is usually no officer action that can be scientifically linked to the subject's death**
- **Yet many defense attorneys believe that their officers actually contributed to the death.**



Non-Firearm ARD Junk-Science Causation Theories



Electrocution and asphyxia



Unspoken and unsupported hypothesis



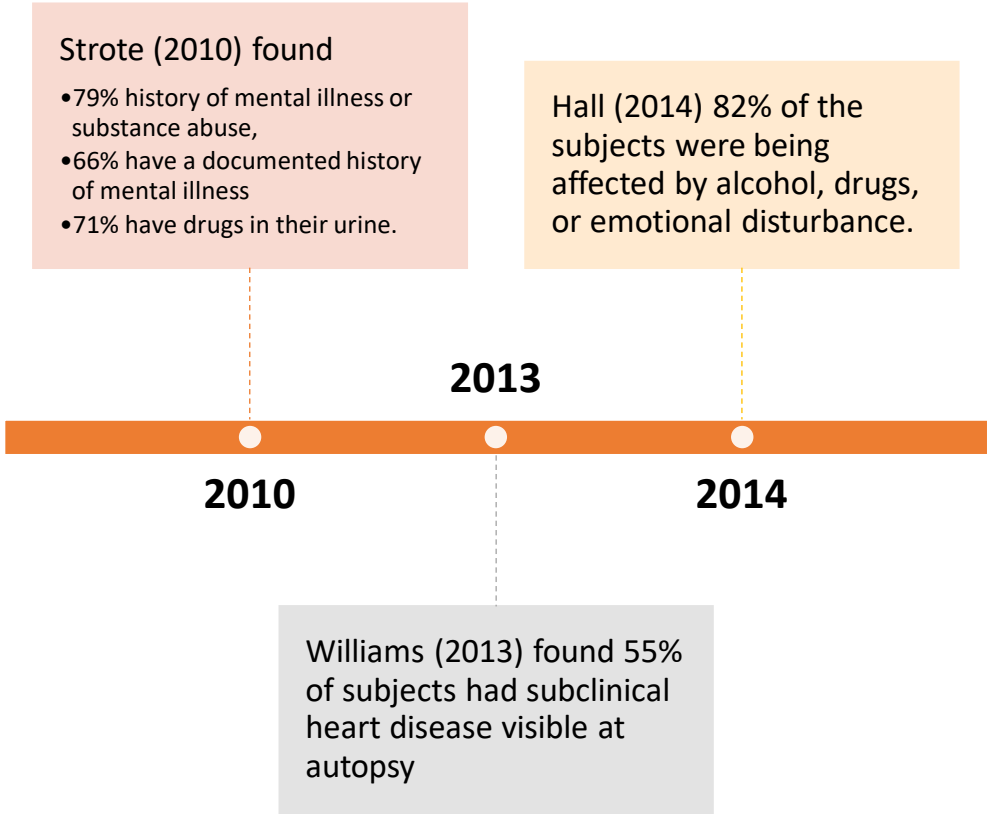
An ARD *must* be caused by officers' mistakes

Since ARD subjects are presumed clinically "normal"



Would not have died absent the actions of law enforcement.

Healthy & Sober People Rarely Resist Arrest



Risks of emotional disturbance.



Krexi (2016) studied unexpected cardiac deaths, after extreme physical or psychological stress



53% had a "negative" autopsy and normal heart (appearing normal to the pathologist's naked eye).



Only 10% had any law enforcement contact

Police Arrest vs. Anesthesia

The non-firearm ARD rate

- **1 death in 1000 force incidents**

Comparable to risks of general anesthesia.

Remarkable considering the co-morbidities found

- **in about 90% of law enforcement seizure (arrest) subjects.**

Conducted Electrical Weapon (CEW), rate falls by 2/3

- **to about 1/3000 uses of force.**

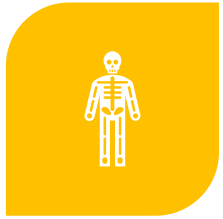
Non-Firearm ARD: What Is Known and Unknown



WHY DO SOME PEOPLE DIE RESISTING LEOS?



IN MANY INCIDENTS WE MAY NEVER KNOW.



MAJORITY (55%) HAVE VISIBLE (STRUCTURAL) HEART DISEASE AT AUTOPSY.



MANY ALSO HAVE INVISIBLE GENETIC ABNORMALITIES

Unexplained Sudden Cardiac Death Not Rare in Young People

- **30-50% of cases unexplained by a conventional autopsy (Doolan 2008)**
- **Of these, 27% have genetic abnormality (Bagnall 2016)**
- **Eckart (2004): 35% military training non-traumatic deaths unexplained.**
  - young, drug and alcohol free
  - same exercise routines as colleagues who did not die.

Killer Knees: Flavors of Asphyxia



- **Compression asphyxia is real.**
- **Soda machine can weigh 1100 lbs.**
  - most of the mass in the top
- **crowd collapse**
- **trench cave-ins.**
- **Falling automobile**



Man killed after vending machine falls

SAFETY HARBOR, Fla. (AP) — A man was killed when a soft-drink vending machine toppled over and crushed him, apparently because he was rocking it after the coin-return jammed, police said.

The vending machine had been filled earlier Monday, said Pinellas County Sheriff's deputy Charles Degenhardt. The machine, which has since been removed, is 6 feet 7 inches high. Erickson was 5 feet 9 and weighed 175 pounds, he said.

"I can't tell you how much (the machine) weighed, but it took four grown men to move it," said Degenhardt.

Not Possible with Officer Knee Force

- ***Legal* debate about officers causing compression asphyxia**
- **There is no *scientific* debate.**
- **Opinion differences between scientific researchers and**
  - a minority of Medical Examiners
- **About 600 lbs. is required to cause death. (Kroll 2017)**
- **highly unlikely as impossible for 2 or 3 officers**
  - to stand on the back.
- **Do not confuse this *chest-weight* issue with *abdominal weight* which might be more dangerous.**



Prone and Positional Asphyxia

- **Positional asphyxia can be fatal in people trapped upside down in a car. This concept also has been carried over and misapplied in an attempt to blame the prone position for ARDs.**
- **Large studies show no increased risk with prone restraint. (Hall 2015, Ross 2016)**
- **Prone position is *preferred* as it increases control**
- **Volunteers restrained prone position with no clinically significant reduction in breathing.**

Dangerous Position *Not* Used in Restraint

- **Clinically significant ventilatory reduction (Parkes 2011)**
  - Obese individuals,
  - Seated, and
  - Forced to lean forward.
- **Abdominal mass interfered with diaphragmatic breathing.**



Junk Science Under Different Names

- **Often accepted false asphyxia theories for ARDs:**
  - compression asphyxia
  - restraint asphyxia
  - positional (prone) asphyxia
- **Basically 3 flavors of the same theory.**
- **All soundly refuted by the peer-reviewed literature.**
- **Experts that raise this issue, cannot cite to scientific literature as none support this outdated hypothesis.**

Clinical Studies Refuting Prone Asphyxia

- **UCSD did several studies refute the notion of positional asphyxia.(Chan 1997, 1998)**
- **UCSD continued to study and refute various flavors of ARD "asphyxia" theories.**
- **Michalwicz (2007) hogtied prone volunteers with 225 lbs. of weight.**
  - **maintained a 24:1 safety margin**





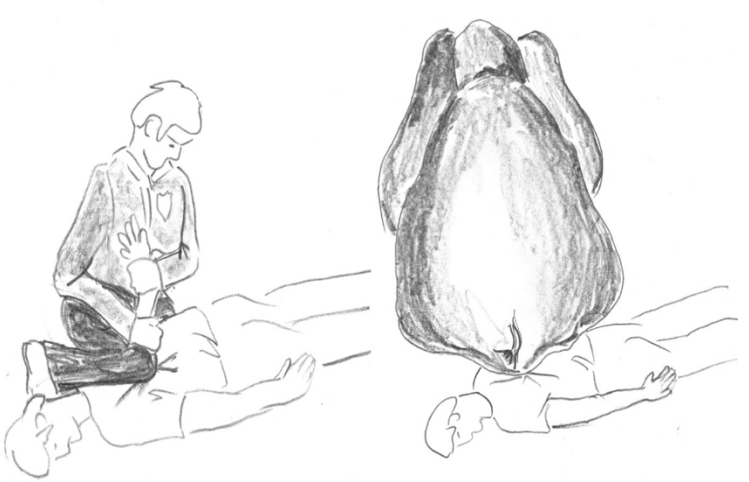
How About Obese Subjects?

- **Sloane (2014) intensely exercised**
  - *obese* volunteers
  - then hog-tied for 15 minutes
  - no evidence of hypoxia or hypoventilation
- **Takes about 600 lbs of chest weight to kill someone**
  - 400 lbs. with very-long durations,
- **Typical force of an officer's knee is 72 lbs. (Kroll 2019)**



Field Studies Show Proning is Safe

Hall (2012) n = 1269	• Position evenly split • There was 1 death; subject *not* proned.
Hall (2015) n = 4828	• No problems with proning
Ross & Hazlett (2016) n = 1085	• Prone position: 71% • Handcuffs in 96% • Hobble restraints in ¼ • No deaths
Lasoff (2017) n = 2431	• 63% proned • No fatalities



Reality vs Plaintiffs' Picture

Suits vs Science

- **Positional asphyxia is a scientifically invalid hypothesis**
- **All peer-reviewed studies refute it**
- **Also refuted by 50 million Americans who sleep prone**
- **Proning best for patients in respiratory arrest**
  - demonstrated in numerous clinical studies
- ***Disconnect between the law and science***





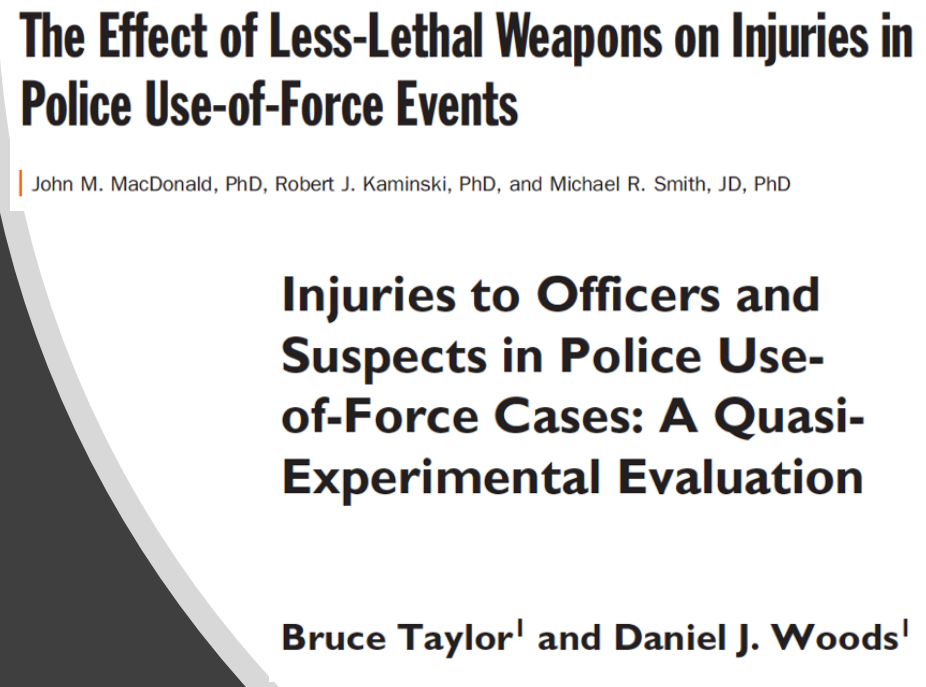
Left Lateral Decubitus (LLD) Position and the “Recovery” Myth

- **Common allegation that so-called “recovery” position would have saved a life.**
- **Taught in BLS for unconscious but breathing patient**
  - little to do with the ARD.
  - position reduces risk from vomiting.
- **Pulmonary function is compromised in LLD (Lohser 2008, Dunn 2000)**
- **Contrary to the myth, the best thing for patients in respiratory trouble is the prone position. (Alsaghir 2008)**


The
Electrocution
Myth

Benefits: Subject Injuries Greatly Reduced

- MacDonald Study: sponsored by US DOJ
  - N = 24 380
  - 12 law enforcement agencies
  - Subject injuries reduced by 65%
- Taylor Study: sponsored by US DOJ
  - N = 11 797
  - 13 law enforcement agencies
  - Any subject injuries reduced by 56%
  - Subject injuries requiring medical attention reduced by 79%



The Effect of Less-Lethal Weapons on Injuries in Police Use-of-Force Events

John M. MacDonald, PhD, Robert J. Kaminski, PhD, and Michael R. Smith, JD, PhD

Injuries to Officers and Suspects in Police Use-of-Force Cases: A Quasi-Experimental Evaluation

Bruce Taylor[1] and Daniel J. Woods[1]

Fatalities Reduced by 2/3

- Ferdik study
  - Fatal shootings down by 2/3
  - When CEW usage not overly restricted
- All-cause mortality
  - 1/1000 death rate with resisting arrest
  - 1/3500 death rate with CEW usage

The Influence of Agency Policies on Conducted Energy Device Use and Police Use of Lethal Force

Frank V. Ferdik[1], Robert J. Kaminski[2], Mikaela D. Cooney[2], and Eric L. Sevigny[2]







Media Imagery

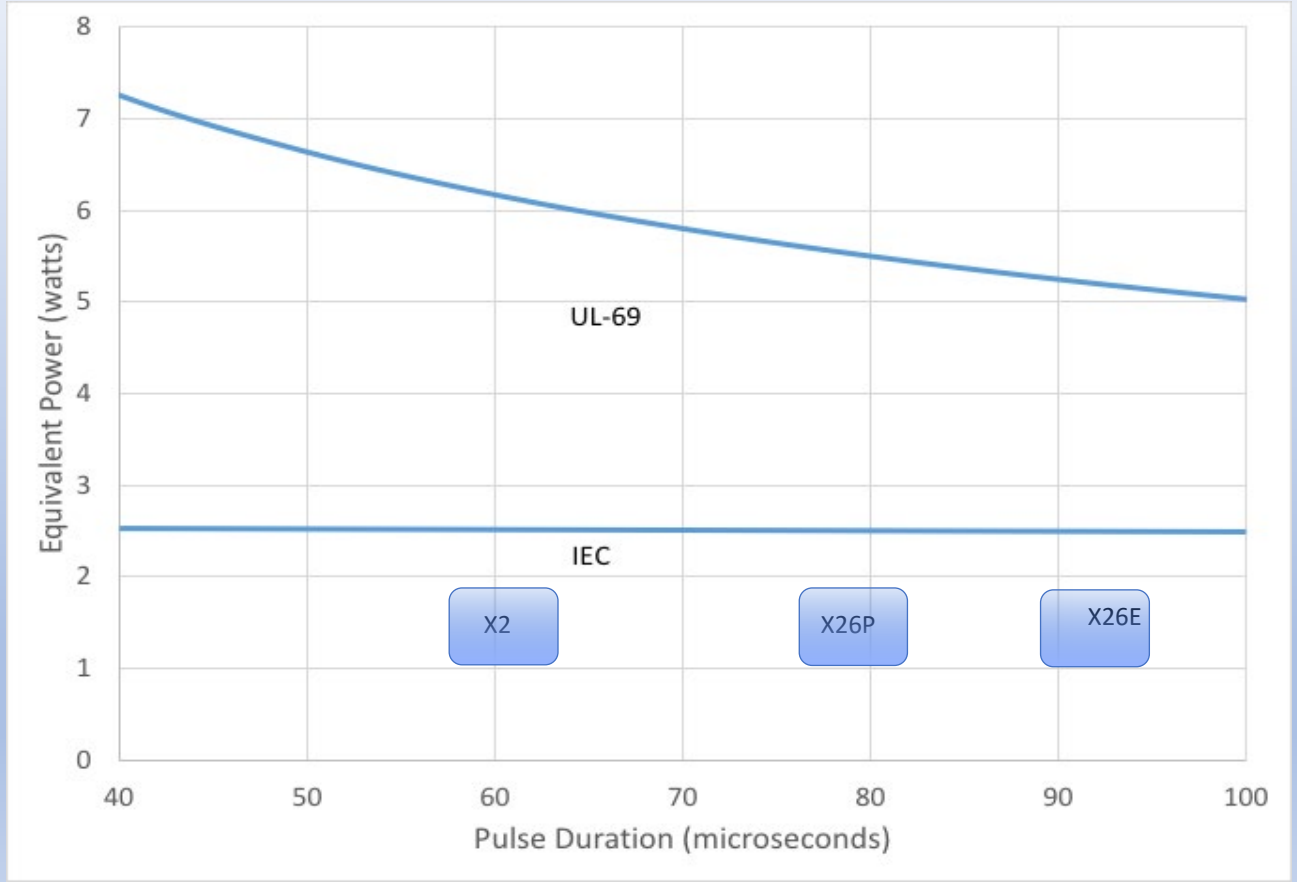


AC Current (mA)	Effect
1500	Nerve Damage
1000	
500	Cardiac Arrest Probable
200	
100	Cardiac Arrest Possible
50	Interference w Breathing
20	
16	Modern CEW (AC Equivalent)
15	Male No-let-go threshold
10	Muscle Contractions Begin
5	Pain Sensation
1	Hand Perception



Electricity Effects Studied for 140 Years

Electric Fence Safety Standards



All Electrical Weapons Sold in North America Satisfy the ANSI Safety and Effectiveness Standard

ANSI/CPLSO-17:2017

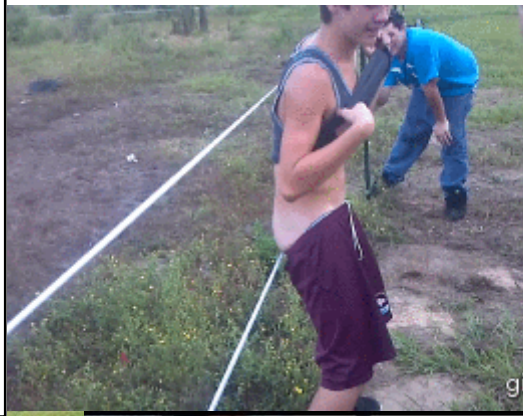
CPLSO Standards Publication

Electrical Characteristics of ECDs and CEWs

Conducted/Electronic; Restraint/Control/Energy; Device/Weapon
















MakeAGIF

Mortality Risks

Falls:

- Brain Injury: 17
- Cervical Fracture: 2

Fires: 7

Weapons Confusion: 3

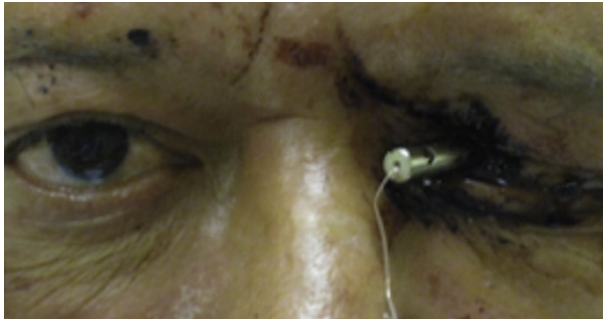
Total: 29

Fatal Complication Rate:

- 29 / 4 million
- 1 in 140 000 field uses





True Risks: Eye Injuries

Non-Fatal Major Complications



Major Burns: 4

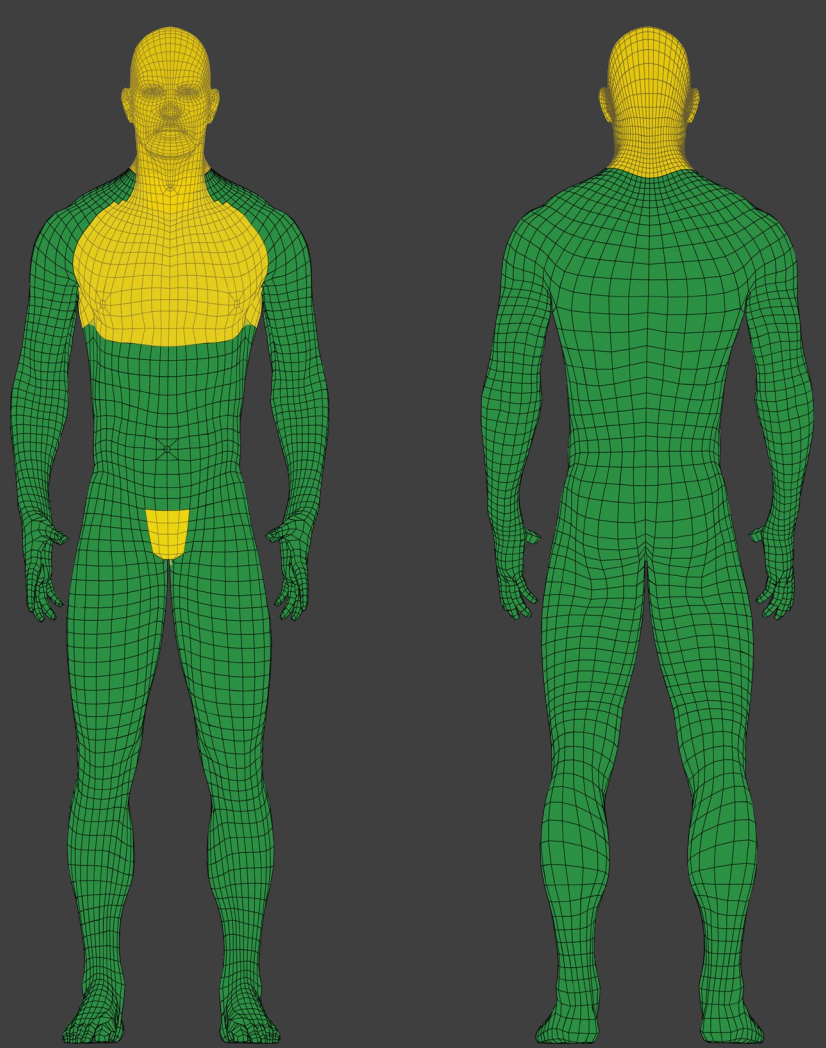


Blindness From Probe in Eye: 20

Axon Preferred Targeting

(Back always preferred)

1. Eye injuries
2. Incapacitation Effectiveness
3. Eliminate electrocution risk in very thin subjects



Conclusions from Swine Data

- Risk in 17 kg (37 lb) humans
- Risk if DTH (dart-to-heart) ≤ 3 mm
- Estimated human electrocution risk: 1: 2.9 million uses
  - 0.3 PPM





Kroll MW, Lakkireddy D, Rahko PS, Panescu D. Ventricular fibrillation risk estimation for conducted electrical weapons: critical convolutions. *Conf Proc IEEE EMBC.* 2011;33:271-277.

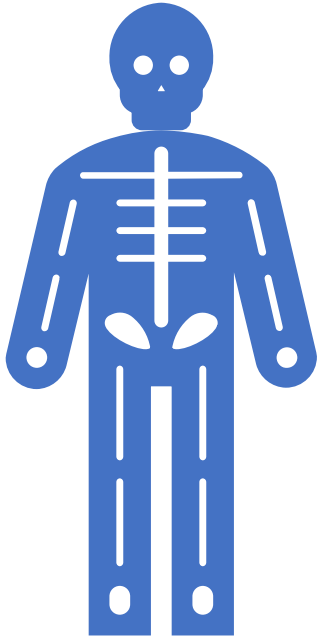
Panescu D, Kroll MW, and Brave MA, "Cardiac fibrillation risks with TASER conducted electrical weapons," Conf Proc IEEE Eng Med Biol Soc, vol. 2015, pp. 323-9, Aug 2015.

Short Inclusion Checklist for CEW Electrocution

- Pulse is instantly lost
- DTH (dart-to-heart) distance ≤ 3 mm
  - Alternatively, body mass < 17 kg
  - Sternum or bone not shielding heart
- Presenting rhythm of VF (within 30 minutes)
  - Not asystole or PEA
- Defibrillation attempted within 14 minutes expected to be successful
- Normal breathing ≤ 60 seconds
  - Agonal breathing ≤ 6 minutes

The 5 Interesting Cases

AGE/ RACE	DTH (MM)	BREATHING (MIN)	FAILED DEFIB.	CARDIAC PATHOLOGY	MEDICAL EXAMINER OPINION
25 B	>20	UNK	Y	Hypertrophy, fibrosis	physiologic stress of a physical altercation including the use of ECD and underlying heart disease.
48 C	No pene-tration	UNK	Y	LQT	Resuscitated
17 B	Right side	4	Y	Hypertrophic cardiomyopathy	Agitation & Stress.
17 B	50	4	Y	none on autopsy	Uncertain COD with acute alcohol toxicity contributing
16 B	55	8	Y	Arrhythmogenic right-ventricular cardiomyopathy	ARVC with CEW contributory



Analysis of These 5 Cases

- Elimination of Electrocution by:
  - Dart-to-heart ≥ 20 mm (vs. 3 mm): 5/5
  - Failure of prompt defibrillation: 5/5
  - Breathing > 1 minute: 3/5 (2 Unknown)
- Important Factors:
  - Significant cardiac pathology: 4/5
  - Electrocution blamed by medical examiner: 0/5

Myth: AHA did a study proving electrocution
Fact: AHA sponsored a written debate on this

CONTROVERSIES IN CARDIOVASCULAR MEDICINE

Can TASER Electronic Control Devices Cause Cardiac Arrest?

TASER Electronic Control Devices and Cardiac Arrests: Coincidental or Causal?

Mark W. Kroll, PhD; Dhanunjaya R. Lakkireddy, MD; James R. Stone, MD, PhD; Richard M. Luceri, MD

TASER Electronic Control Devices Can Cause Cardiac Arrest in Humans

Douglas P. Zipes, MD

The Baseball Rule

- Limit of 3 trigger pulls
  - Or 15 seconds
- Zero scientific basis
  - 14 seconds is safe but 16 is not?
- Supposed to transition after 3 trigger pulls.
  - To what? Firearm?
  - Really, another cartridge.
- Why not limit firearms?
  - To 3 rounds







Sudden Death Under Stress

Sudden cardiac death with stress and restraint: The association with sudden adult death syndrome, cardiomyopathy and coronary artery disease

Lydia Krexi[1], Roxani Georgiou[2], Dimitra Krexi[1] and Mary N Sheppard[2]

Altercation	50
Police restraint	16
Police custody	11
Psychiatric staff restraint	9
Exams or job stress	8
Security staff restraint	5
Bad news	4
Minor car accident	3
Friends	3
Kidnapper	1

Your Medical Examiner

Medical Examiners

- Good
  - Training is excellent in general
    - Cause of death
  - Limited re ARDs
- Bad
  - Mediocre pay, many vacancies
  - Manner of death is obsolete and arbitrary
- Ugly
  - Zero accountability
  - MEs forget or “forget” their training

Good: Training in Cause of Death



Medical School

2 years of relevant training in anatomy, physiology, and disease



Anatomical and Clinical Pathology

3 or 4 year residency



Forensic Pathology (45%)

1 year fellowship

The Bad: Manner of Death

1. Homicide
2. Suicide
3. Accidental
4. Natural
5. Undetermined



Manner of death began with the first estate tax

Custos placitorum coronae
“Keepers of the pleas of the crown”

Formalized in 1194 AD Richard the Lionhearted
“Articles of Eyre”



Homicide



Suicide



Accident
or Natural



Ft. Worth ARD Example (Darden)

- Struggle during drug-house raid
- Electronic control (TASER CEW) x 2 probe-mode
- Prone restraint during cuffing
  - 340 lbs
- Hospital records stated:
  - Nonresponsive after 2nd CEW trigger pull
- Autopsy found
- XLR-11 (synthetic cannabinoid)
- 90% stenosis of LAD coronary artery



Most MOD opinions can be rationalized:

1. **Natural:** The guy had a bad heart from years of drug abuse and it finally gave out with the excitement of being seized. This could just as well have happened during sex or while climbing the stairs.

2. **Accidental:** The guy did not realize that this “recreational” dosage of cocaine or meth would kill him therefore it is an accident.

3. **Homicide:** Officers touched him, or were present, therefore it was death “at the hands of another.” (Weird how the paramedics, or medical doctors, are never criminally charged under similar circumstances.)

4. **Undetermined:** There are so many pathological insults going on that we cannot pick out a single MOD. (This is often the honest answer.)

5. **Suicide:** Rarely ruled in ARDs.

- Homicide?
- Accidental?
- Suicide?
- Undetermined?

1306402
Jermaine N. Darden

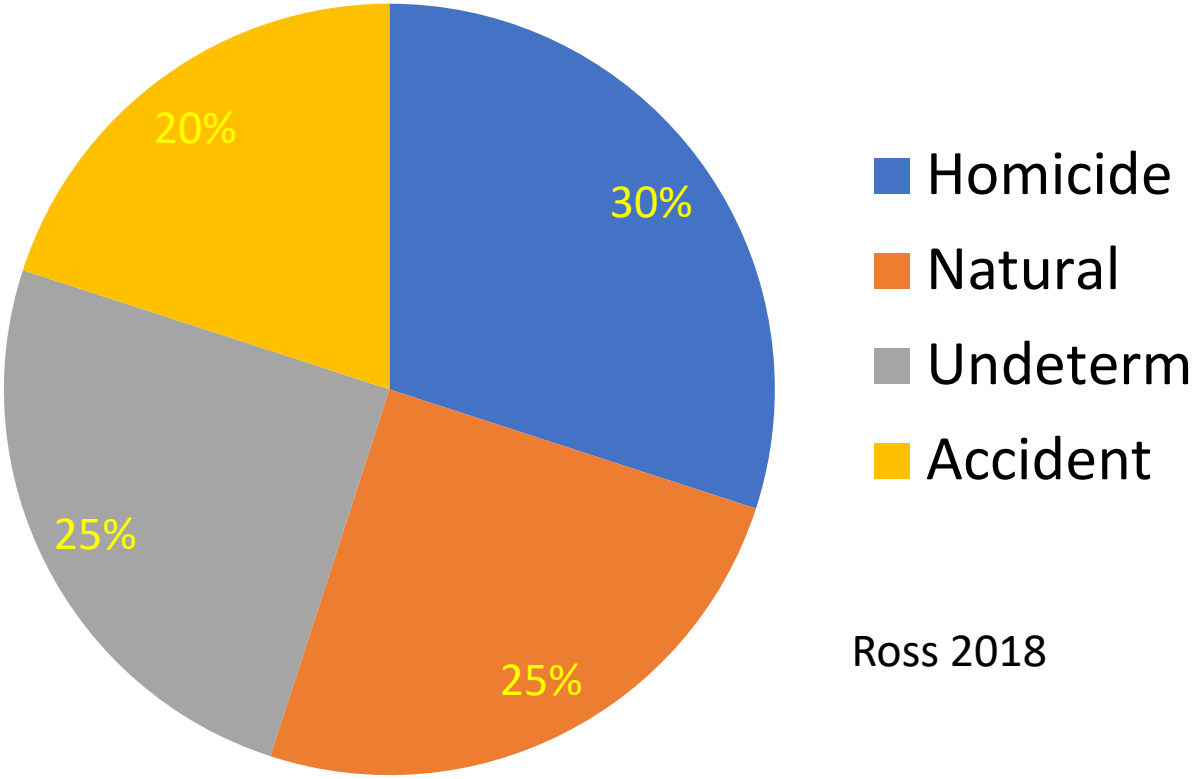
CAUSE OF DEATH:

I) SUDDEN CARDIAC DEATH ASSOCIATED WITH HYPERTENSIVE ATHEROSCLEROTIC CARDIOVASCULAR DISEASE AND APPLICATION OF RESTRAINT

II) OBESITY, HEPATIC STEATOSIS; CHRONIC THYROIDITIS

MANNER OF DEATH: NATURAL

Non-firearm ARD “Rulings”



Ross 2018

Anesthesia vs Arrest

- Mortality rate for minor surgery with general anesthesia about 1:1000
  - Apportion blame between surgeon and anesthesiologist?
- What happens when someone dies in surgery?
  - No medical examiner
  - No criminal charges
- Death at the hands of another
  - Why is this not homicide?
  - We assume that the staff did their best
  - Why not give officers that benefit of doubt?

Rules Written by MDs & Stacked Against Officers

- Law Enforcement:
  - Deaths due to positional restraint ….
  - or other measures to subdue may be classified as Homicide.
  - there may not be intent to kill….
  - there is some value to the homicide classification toward reducing the public perception [of] a “cover up”
- Our Physician Colleagues:
  - Deaths resulting from grossly negligent medical care …
  - may be classified as Accident ….
  - The criminalization of medical malpractice is of great concern ….
  - whether or not medical acts of commission or omission meet a legal definition of …. homicide is better left to others more familiar with the legal issues involved.

https://netforum.avectra.com/public/temp/ClientImages/NAME/4bd6187f-d6329-4948-6184dd-6183d6186fe6186b6148f6184d.pdf.

Police vs. Paramedics

- EMS and police show up simultaneously
- Police use trained techniques to control
- Subject placed in ambulance
- EMS monitors and treats
  - Subject continues to thrash around
- Subject dies in ambulance
- Homicide? (Death at the hands of another)
- By whom??

History of ARD Junk Science

- 1970s: Lateral Vascular Neck Restraint
- 1980s: OC spray
- 1990s: Restraint/Positional Asphyxia
- 2000s: TASER® CEW
- 2010s: Mixed
- 2014↑: (post Ferguson) “Police Violence”
- Future: Arrest-Related-Death Syndrome

The Ugly: Zero Accountability

- Police Officer Error
  - Administrative Discipline
  - Criminal Charges
  - Lawsuit
- Judge Error
  - Appeals
- Medical Examiner Error
  - Zero review
  - Except for Ohio



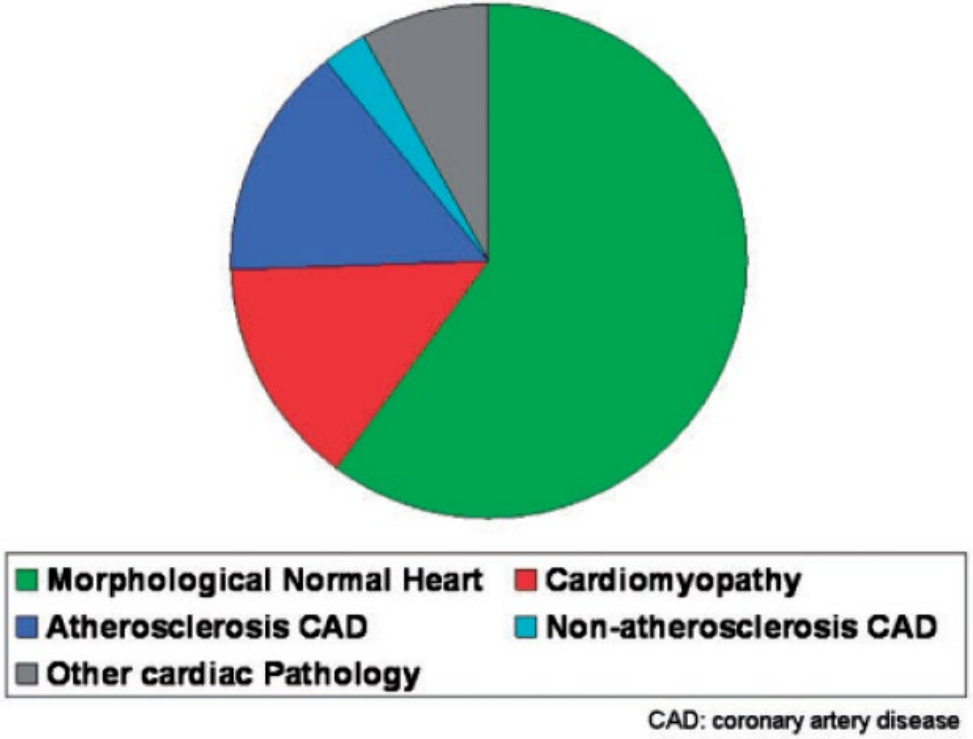
Silly Syllogisms of Sophistry

- If someone was *meant* to die the autopsy would find disease
- The autopsy of Mr. Johnson was negative
- Ergo, there was nothing wrong with him
- Ergo, your officers must have killed him

- A competant autopsy will always find a cause of death
- Some medical examiners do not want to appear incompetent
- Ergo, they opine with a mythical invisible cause of death

Sudden Cardiac Deaths in United Kingdom

Krexi 2015



Medical Examiner Sudden Cardiac Death (SCD) Undetermined

Date	% of Deaths Undetermined or Sudden Unexplained Death ("SUD")	Paper
Jan. 2015	53 % undetermined	Krexi, Sudden cardiac death with stress and restraint (n=110)
Apr. 2014	31 % undetermined	Risgaard, Sudden cardiac death in persons aged 1-49 years
Apr. 2014	28 % undetermined	Winkel, Sudden cardiac death in children (1-18 years)
Mar. 2014	20 % undetermined	Harmon, Etiologies of SCD in NCAA Athletes
Feb. 2014	9 % unresolved	Maron, U.S. college athletes
Sep. 2011	20.7 % unexplained	Eckart, young athletes
Dec. 2004	35 % undetermined	Eckart, military 25 year study

Inconsistent Case Law on Prone Restraint



1st & 10th Circuits

1st Circuit

- Exerting significant, continued force on a person's back 'while that [person] is in a face-down prone position after being subdued and/or incapacitated constitutes excessive force.'"
- *McCue v. City of Bangor*, 838 F.3d 55, 64 (1st Cir. 2016)
- Since the peer-reviewed literature now shows that the force of 1 or 2 knees is *not clinically significant*, will they have a problem with such prone restraint?

10th Circuit

- Accepts so-called positional asphyxia
- *Cruz v. City of Laramie*, 239 F.3d 1183 (10th Cir. 2001)
- Aff in *Weigel v. Broad*, 544 F.3d 1143 (10th Cir. 2008)

5th Circuit

- merely restraining a person in a prone position . . . cannot be characterized, in itself, as deadly force.
- *Gutierrez v. City of San Antonio*, 139 F.3d 441, 451 (5th Cir. 1998).

6th & 7th Circuits

6th Circuit

- Creating asphyxiating conditions by putting substantial or significant pressure, such as body weight, on the back of an incapacitated and bound suspect constitutes objectively unreasonable excessive force.
- *Champion v. Outlook Nashville*, Inc., 380 F.3d 893, 903 (6th Cir. 2004)
- If a knee can be considered "body weight" then the 6th Circuit has bought into an unscientific myth.

7th Circuit

- Enough force to crush the chest cavity, collapse his left lung and inflict severe trauma on the neck, there was a genuine issue of material fact concerning how much force the officer used. MSJ denied
- *Abdullahi v. City of Madison*, 423 F.3d 763 (7th Cir. 2005)
- Extreme case



Case Law Does Not Support the Electrocution Myth

8th & 11th Circuits

8th Circuit

- Although a CEW has a unique capability to cause high levels of pain without long-term injury, we have not categorized the [CEW] as an implement of force whose use establishes, as a matter of law, more than de minimis injury.
- *Hollingsworth v. City of St. Ann*, 800 F.3d 985, 990-91 (8th Cir. 2015).

11th Circuit

- …use of a CEW is moderate, non-lethal force.
- *Buckley v. Haddock*, 292 Fed. Appx. 791, 795 (11th Cir. 2008).

11th Circuit

- described the use of a CEW as "nonlethal" force
- *Smith v. LePage*, 834 F.3d 1285, 1295 (11th Cir. 2016).

9th Circuit

- The [CEW] is a safe alternative: …. officers can use it without engaging in personal combat. And a study by six university departments of emergency medicine found that 99.7% of those "Tased" by police suffer no injuries or, at most, mild ones. …. carries a significantly lower risk of injury than physical force.

Mattos v. Agarano, 661 F.3d 433 (9th Cir. 2011) (Kosinski, C.J., concurring in part, dissenting in part).

- non-deadly force

Sandberg v. City of Torrance, 456 Fed.Appx. 711, 713 (9th Cir. 2011)

- We are not convinced that the use of an X26 [CEW] involves deadly force.").

Marquez v. City of Phoenix, 693 F.3d 1167, 1176 (9th Cir. 2012), *as amended on denial of reh'g* (Oct. 4, 2012), *cert. denied*, 133 S. Ct. 1468 (U.S. 2013).

Conclusions re a Non-Firearm ARD

- Your officers are rarely at fault scientifically — Plaintiff's' theories are not scientifically supportable
- Medical Examiner cause-of-death opinion is often incorrect — Can be scientifically refuted
- Medical Examiner manner-of-death opinion is arbitrary
- Case law often supports restraint asphyxia myth — Science overwhelmingly refutes it
- Case law does not support electrocution myth

Scientific Details are Numerous & Complex



For checklists and study guides:

http://www.ecdlaw.info/ref.pdf

For scientific papers:

mark@kroll.name

brave@laaw.com

Monthly update on use-of-force research:

mark@kroll.name