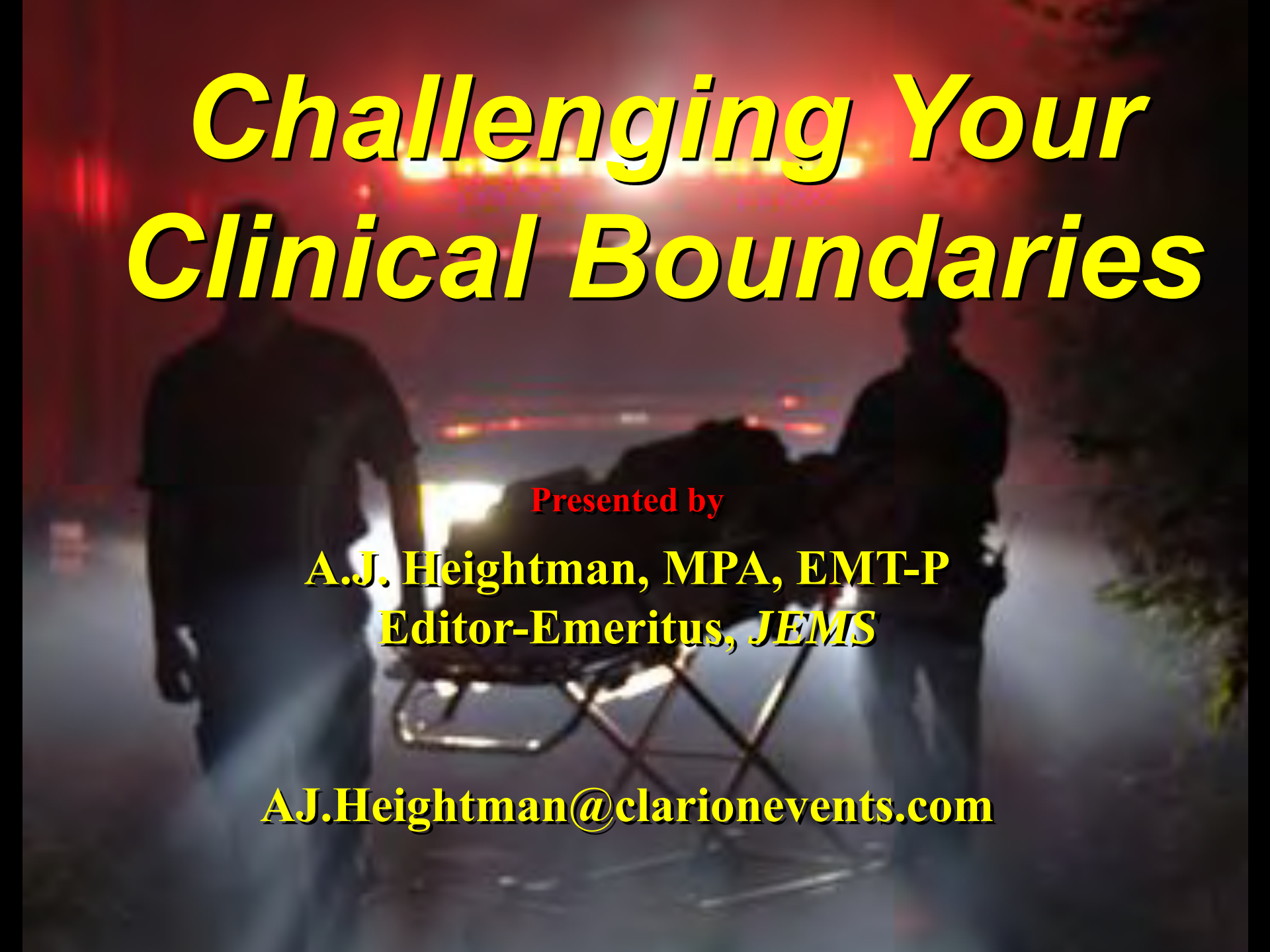


Challenging Your Clinical Boundaries

Presented by

A.J. Heightman, MPA, EMT-P
Editor-Emeritus, *JEMS*

AJ.Heightman@clarionevents.com

As society, technology, science, generations, and finances change, we too have to change

Our industry is now on the right track to redesigning safer ambulances, as well as safer, more flexible/adjustable seats that keep providers securely in place - but able to easily reach equipment and patients

ALL Personnel & Equipment Must Be Secured While Their Vehicle is in Motion

The OLD Days

We sat next to, and could see & touch our patients

The OLD Days

The monitor/defibrillator was secured on a shelf

Revolutionary New Ambulance Design

Parkview Whitley Hospital in Fort Wayne, IN

Parkview Whitley Hospital, Fort Wayne, IN

Parkview Whitley Hospital in Fort Wayne, IN

“Reverse-positioned” **Patient Compartment**

“Cockpit area”
for the
Primary
Attendant

Medvault for controlled medications - and IV supplies accessible to attendant

Sharps and trash easily accessible from a seated & secure position

Street-side compartments


NO SMOK
OXYGEN EQUI
FASTEN S
OXYG
OFF
KENWOOD
KENWOOD
HAZARD
EMESIS
SACA VO
BOLSA PA

No Wasted Space

We must focused attention on

Pediatric Care

(Handtevy Method &

Polk County Fla. approaches)

and Transportation

Secure all our “peds”


Neonate
AMBULANCE USE ONLY
FERNO
When It's Critical

NEW Response Modes & Vehicles

Tulsa Fire Dept.
Rapid-Response Vehicles (RRVs)

February 2014 JEMS

Alternative (2 person) ALS Response Units vs (4 person) ALS Engines

Alternative Use of “peak-hour” fire engines to reduce response times

Fixing EMS response time gaps has typically involved peak-time deployment of ambulances.

San Diego Fire-Rescue will now use roving “peak-hour” paramedic engines not connected to a station and deploy to reduce emergency response times during busy times in hard-to-serve areas of the sprawling, increasingly-congested city.


REGION


DK

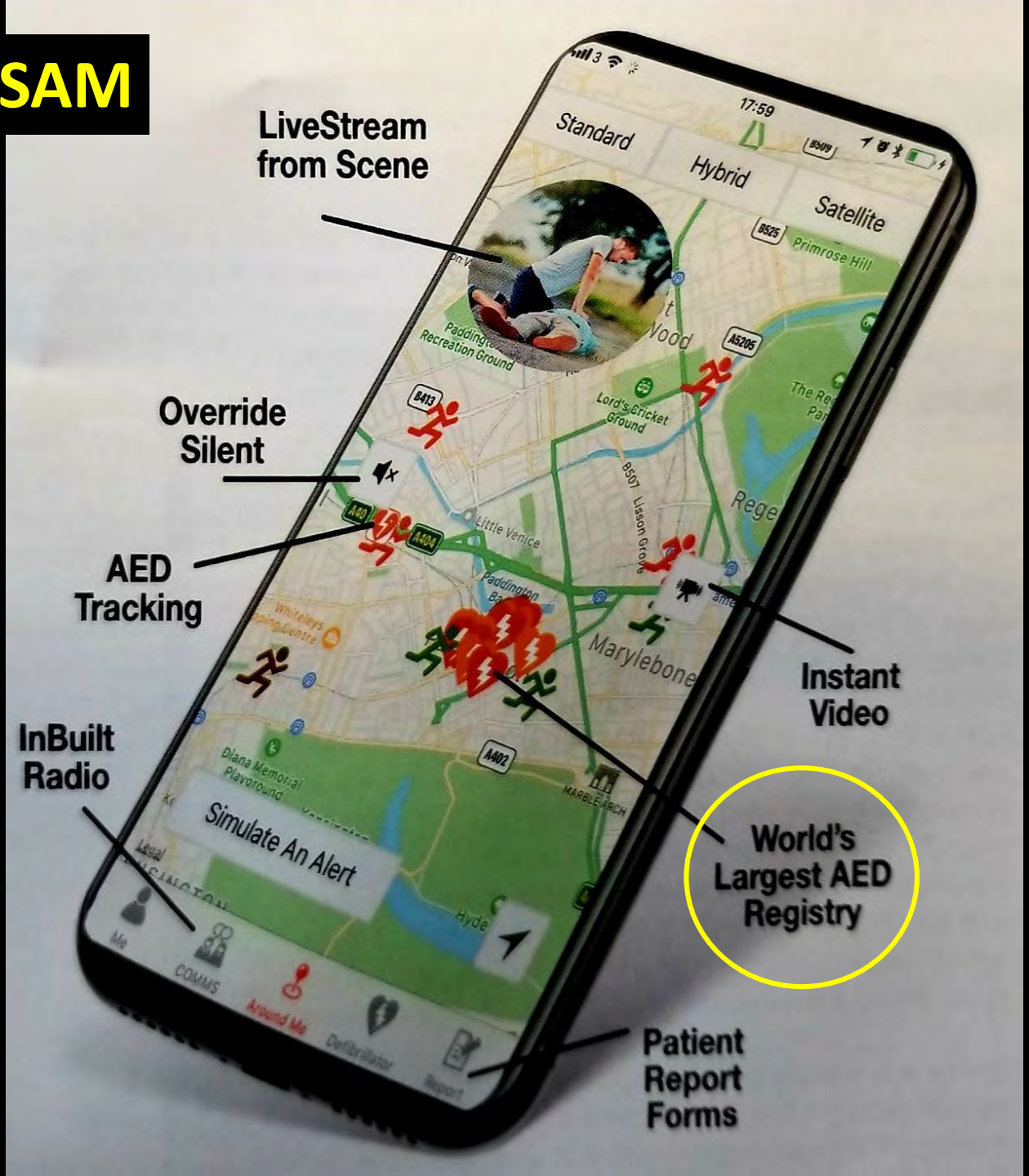
Israel

Israel & Jersey City

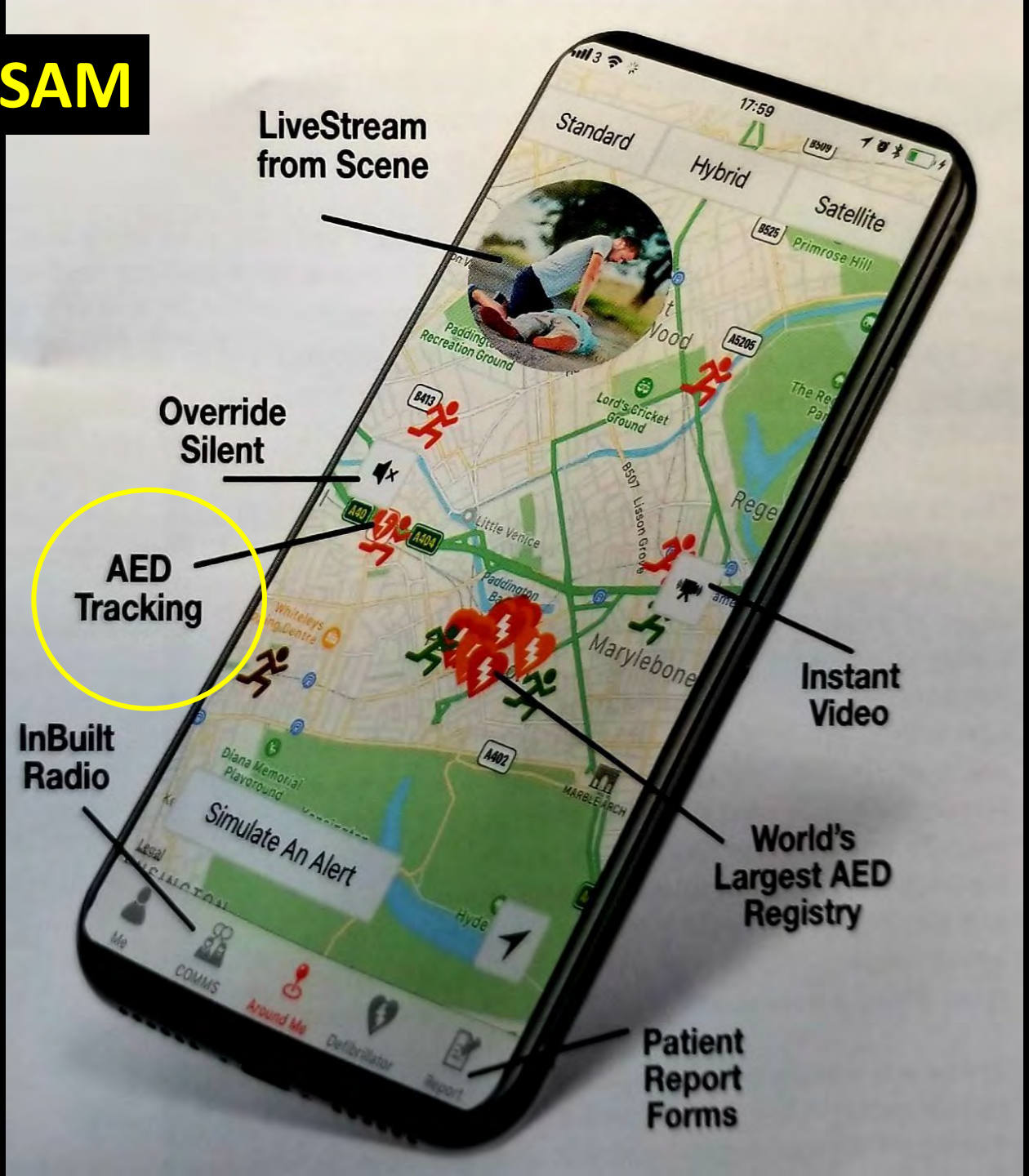
Trained & Alerted Citizen Responders


GoodSAM
instant.help
instant help
9:00
Standard
Hybrid
Satellite
Responder now
GoodSAM needs your help. Can
you assist?
Simulate An Alert
Saving Lives
through Technology
www.goodsamapp.org

GoodSAM


LiveStream from Scene
Override Silent
AED Tracking
InBuilt Radio
Instant Video
World's Largest AED Registry
Patient Report Forms
Standard
Hybrid
Satellite
Simulate An Alert
Me
COMMS
Around Me
Defibrillator
Report

GoodSAM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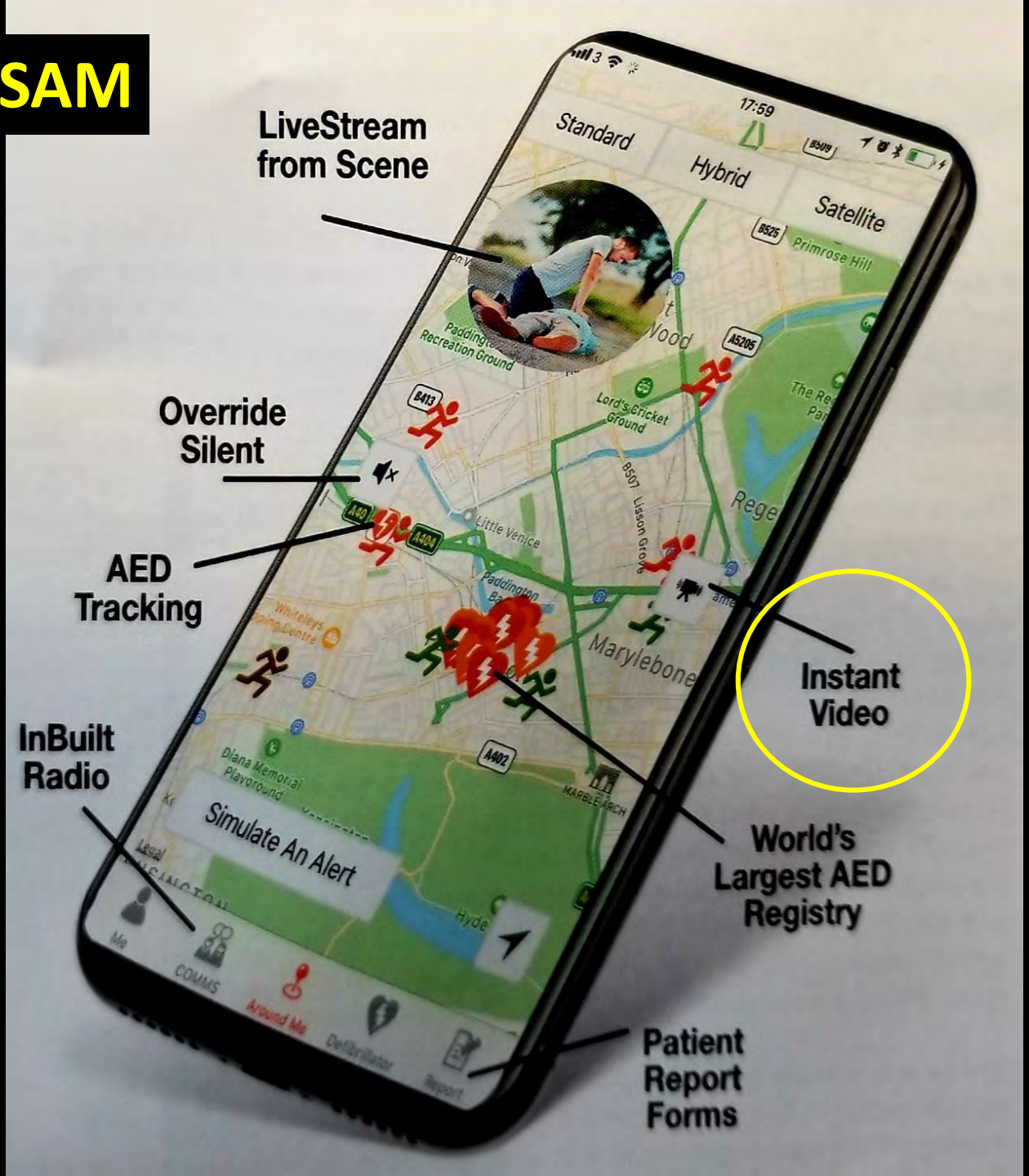
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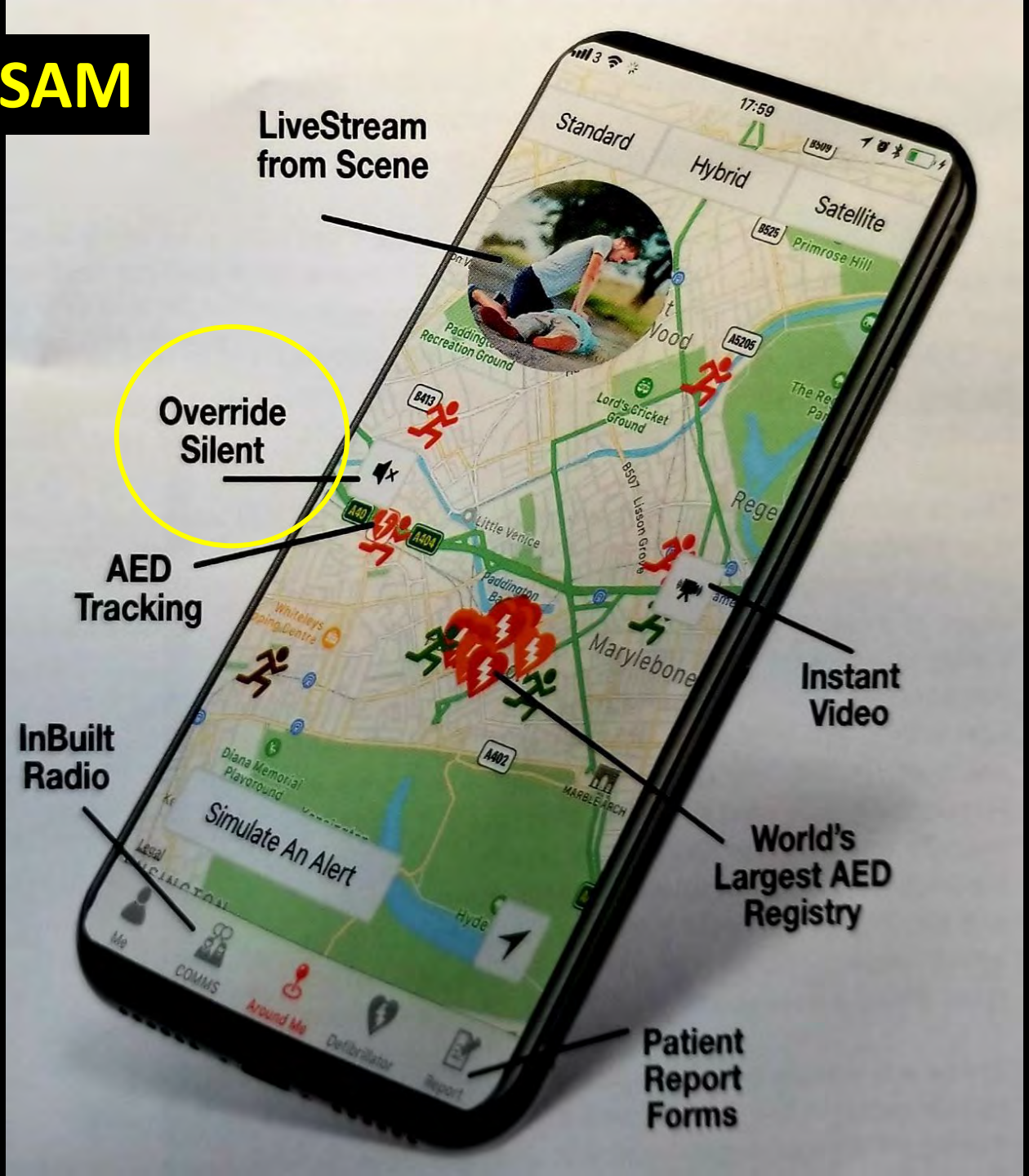
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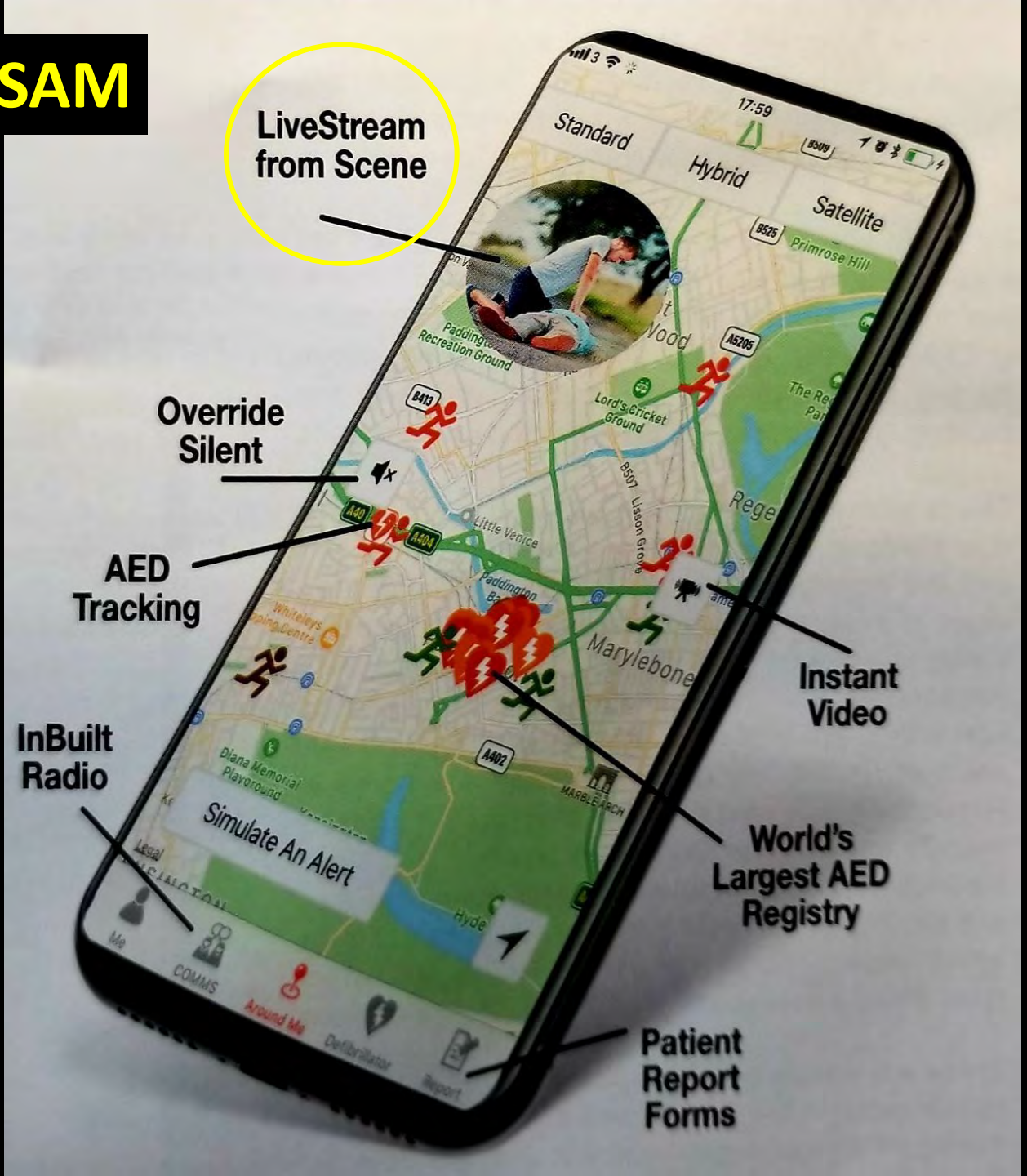
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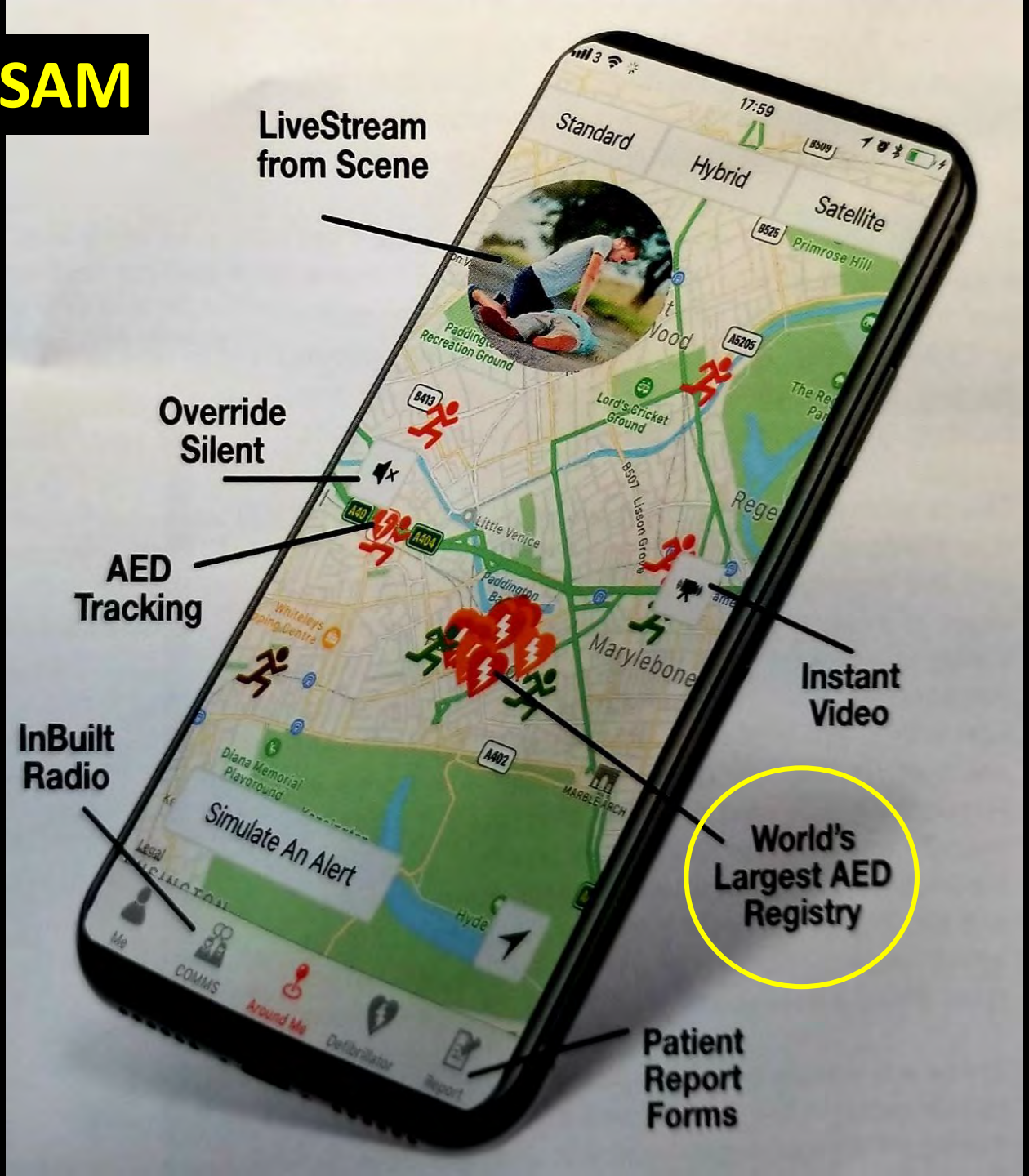
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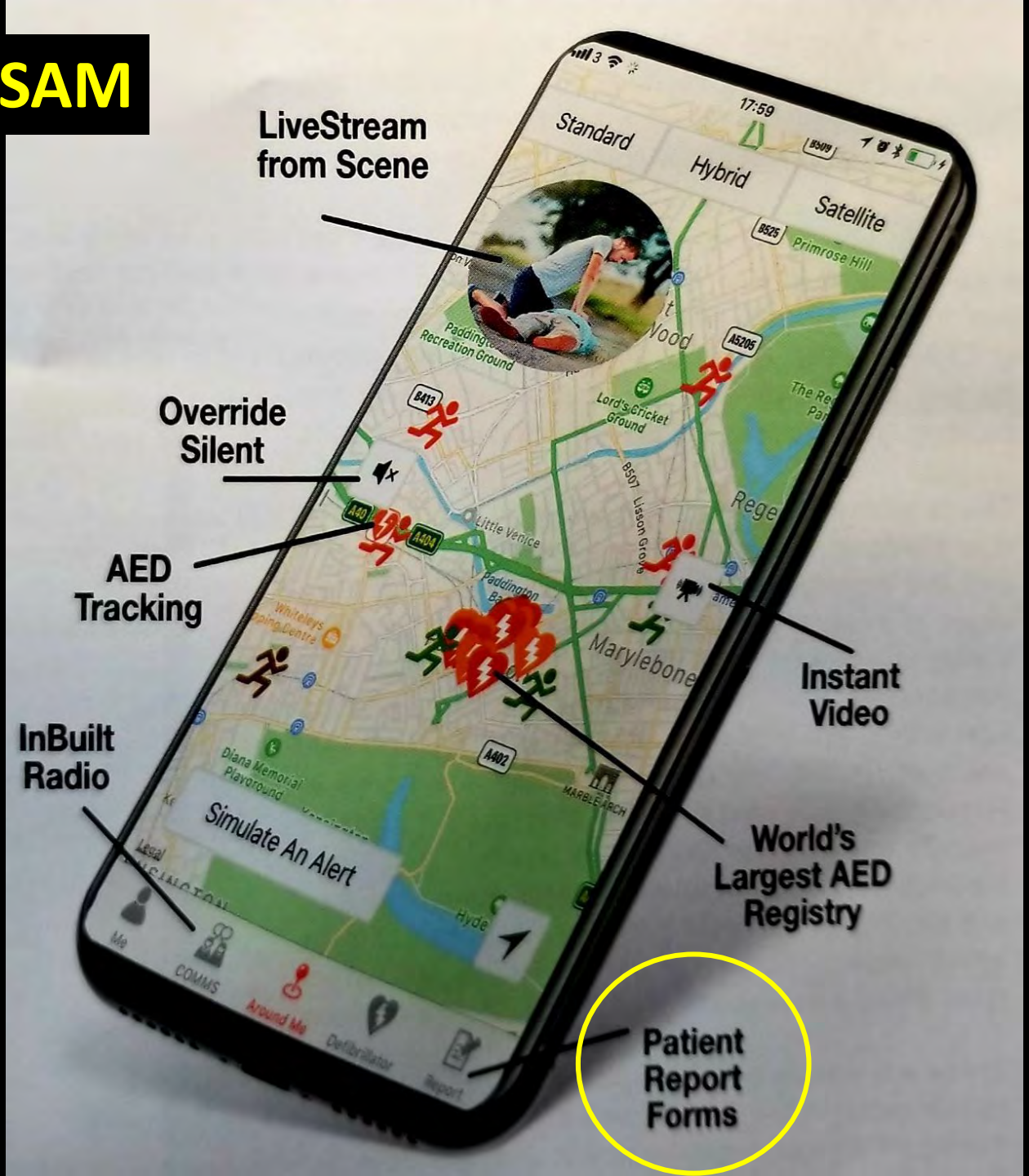
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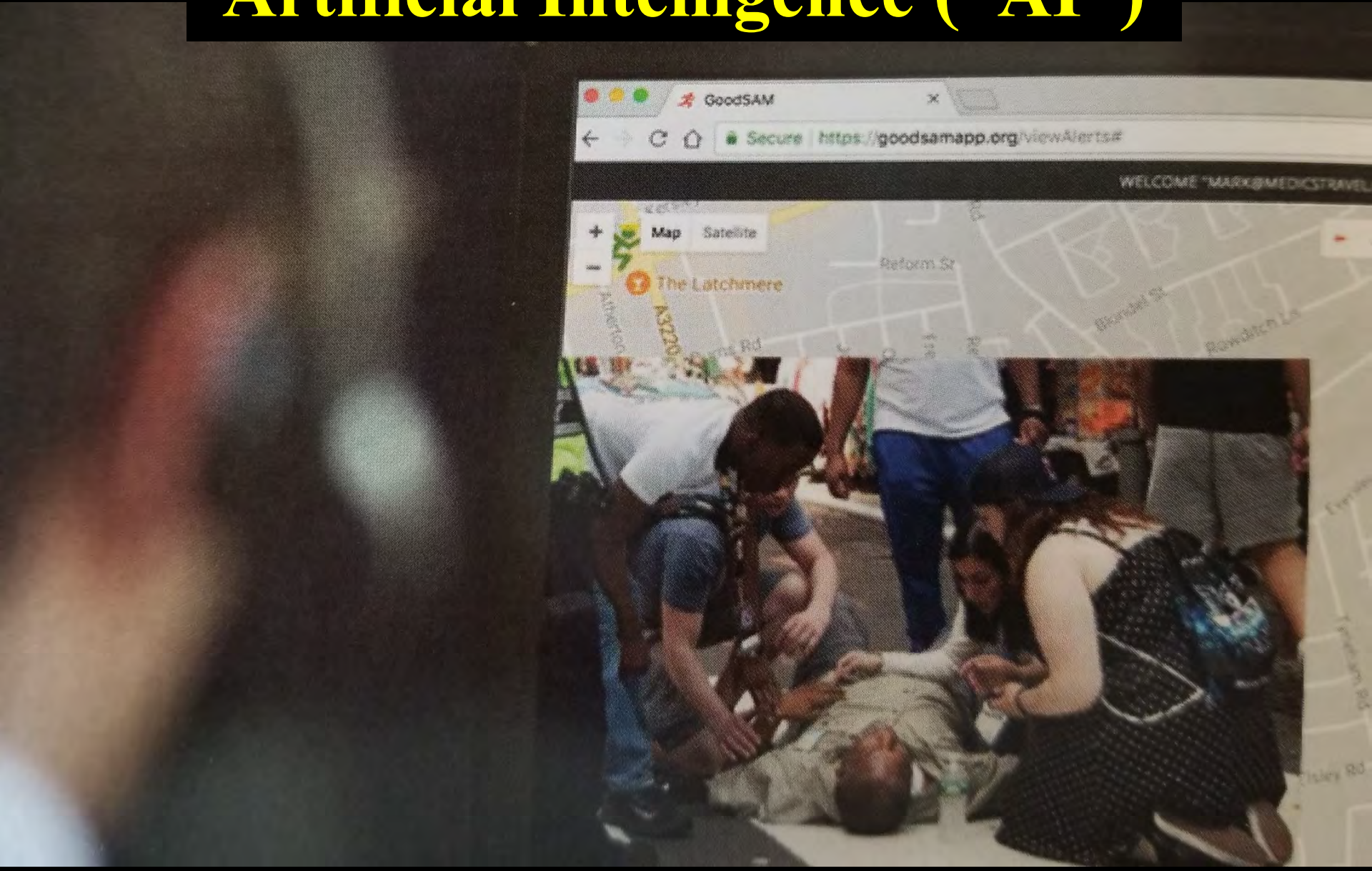
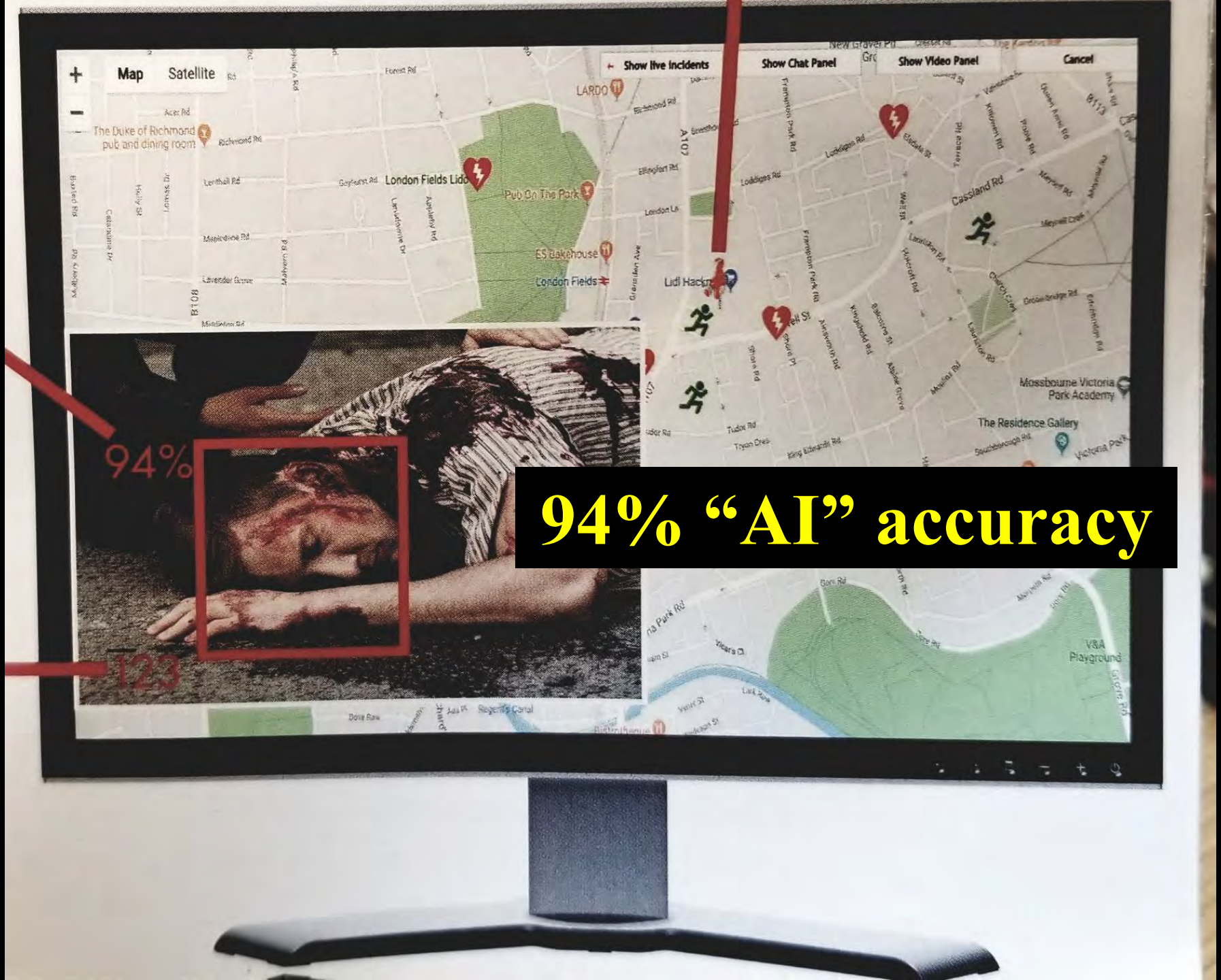
Artificial Intelligence ("AI")

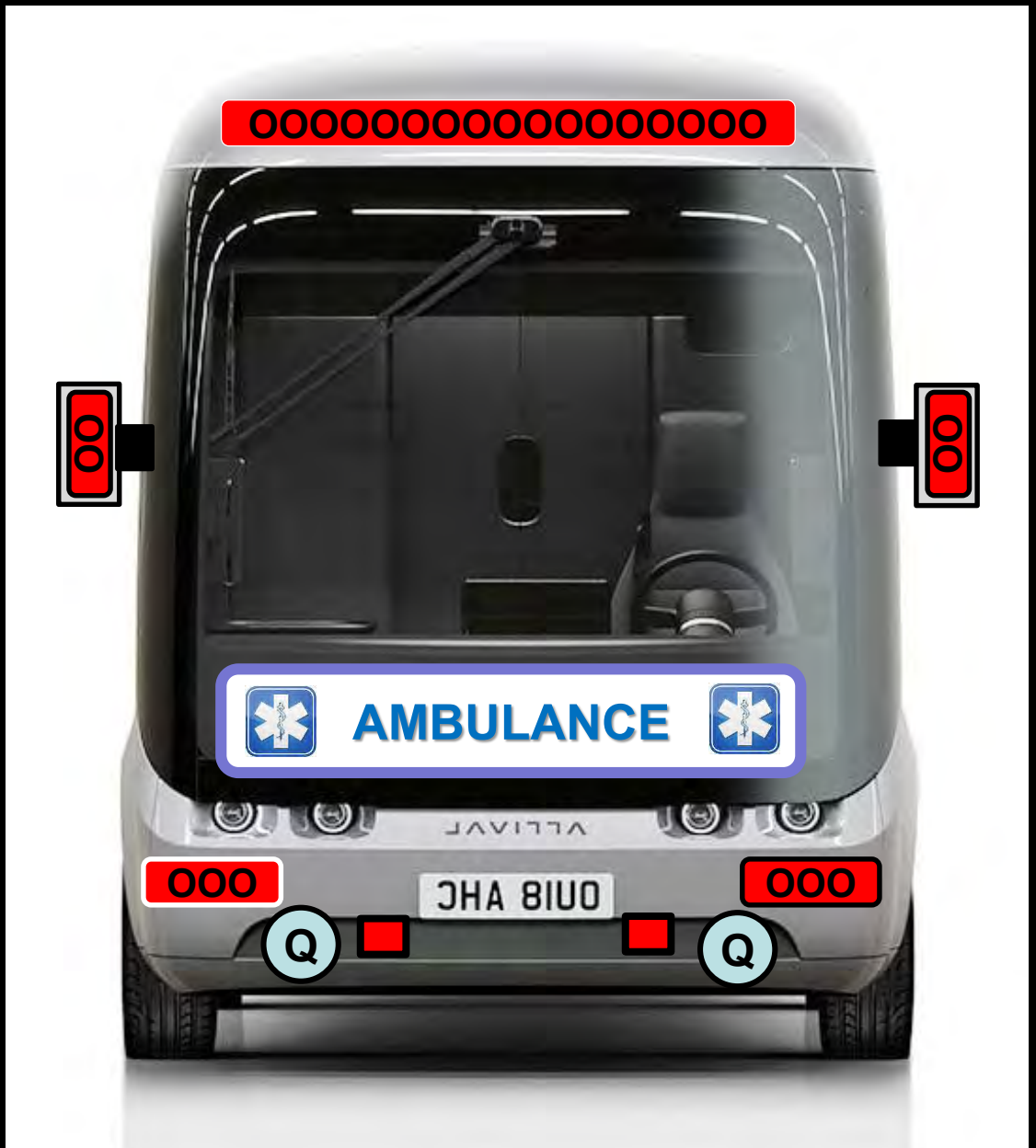



Messages
goodsamapp.org
On a phone or tablet rotate for better experience
2018 © GoodSAM - Saving Lives Through Technology


Map
Satellite
Show live incidents
Show Chat Panel
Show Video Panel
Cancel
The Duke of Richmond pub and dining room
London Fields Lido
Pub On The Park
ES Bakehouse
London Fields
Lidl Hackney
Cassland Rd
Mossbourne Victoria Park Academy
The Residence Gallery
V&A Playground
94%
123
94% “AI” accuracy

Electric Ambulances – 150 Miles on one charge

(Massive fuel cost savings would pay for the vehicle in 5-7 years)




AMBULANCE

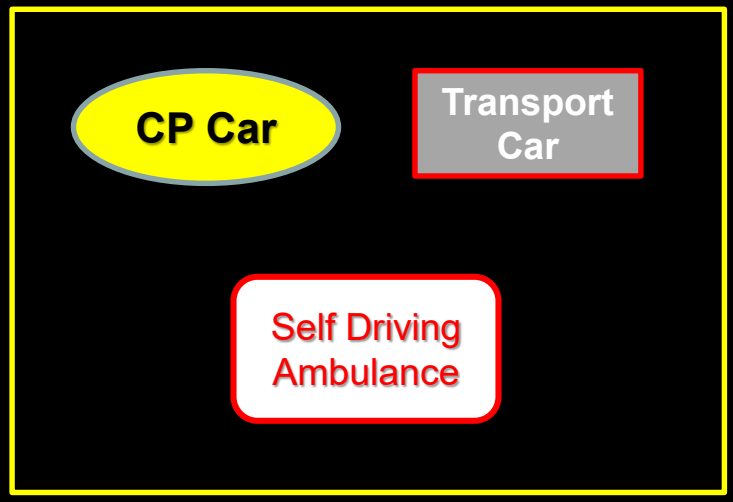
Electric Ambulances – 150 Miles on one charge

(Massive fuel cost savings will pay for the vehicle in 5-7 years)

https://arrival.com/


Self-Driving
AMBULANCE

Hospital



Home via CP

Skilled Nursing Facility

Hospital

CP Car

Transport Car

Self Driving Ambulance

1. Solo EMT drives to the Hospital

Home via CP

Skilled Nursing Facility

Hospital

CP Car

Transport Car

Self Driving Ambulance

1. Solo EMT drives to the Hospital
2. Patient placed on board

Home via CP

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Hospital

CP Car

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Self Driving Ambulance

1. Solo EMT drives to the Hospital
2. Patient placed on board
3. Solo EMT gets in the patient compartment

Home via CP

Skilled Nursing Facility

Hospital

CP Car

Transport Car

Self Driving Ambulance

1. Solo EMT drives to the Hospital
2. Patient placed on board
3. Solo EMT gets in the patient compartment
4. Vehicle drives to GEO-programmed location

Home via CP

Skilled Nursing Facility

Hospital

CP Car

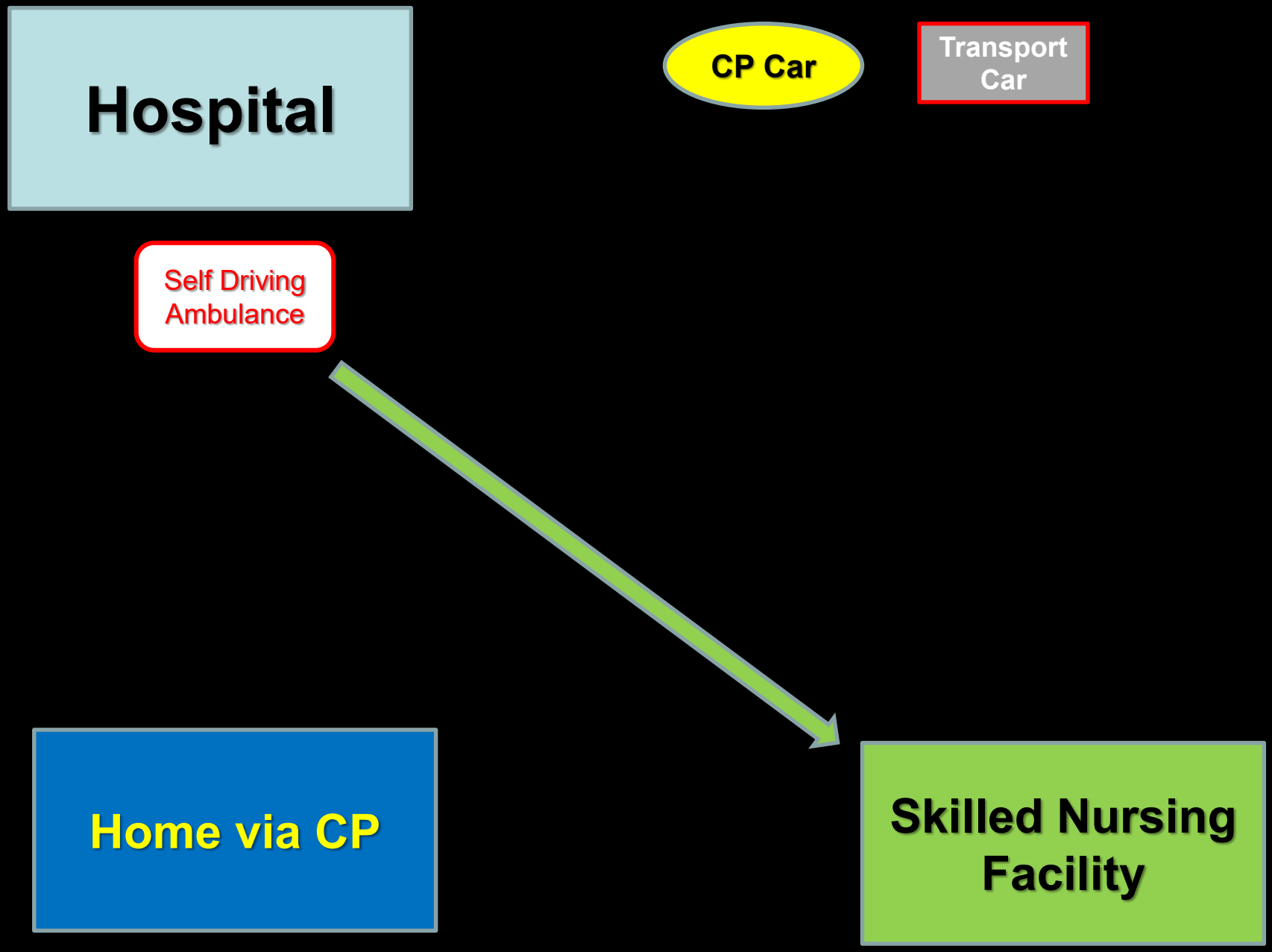
Transport Car

Self Driving Ambulance

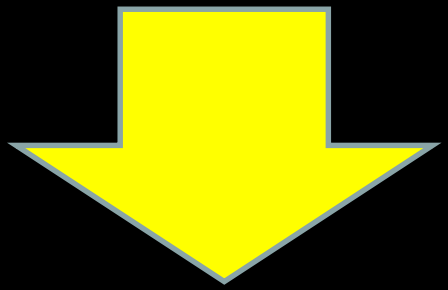
1. Solo EMT drives to the Hospital
2. Patient placed on board
3. Solo EMT gets in the patient compartment
4. Vehicle drives to GEO-programmed location
5. CP or Transport car meets at the destination

Home via CP

Skilled Nursing Facility


Hospital
CP Car
Transport Car
Self Driving Ambulance
Home via CP
Skilled Nursing Facility

Hospital

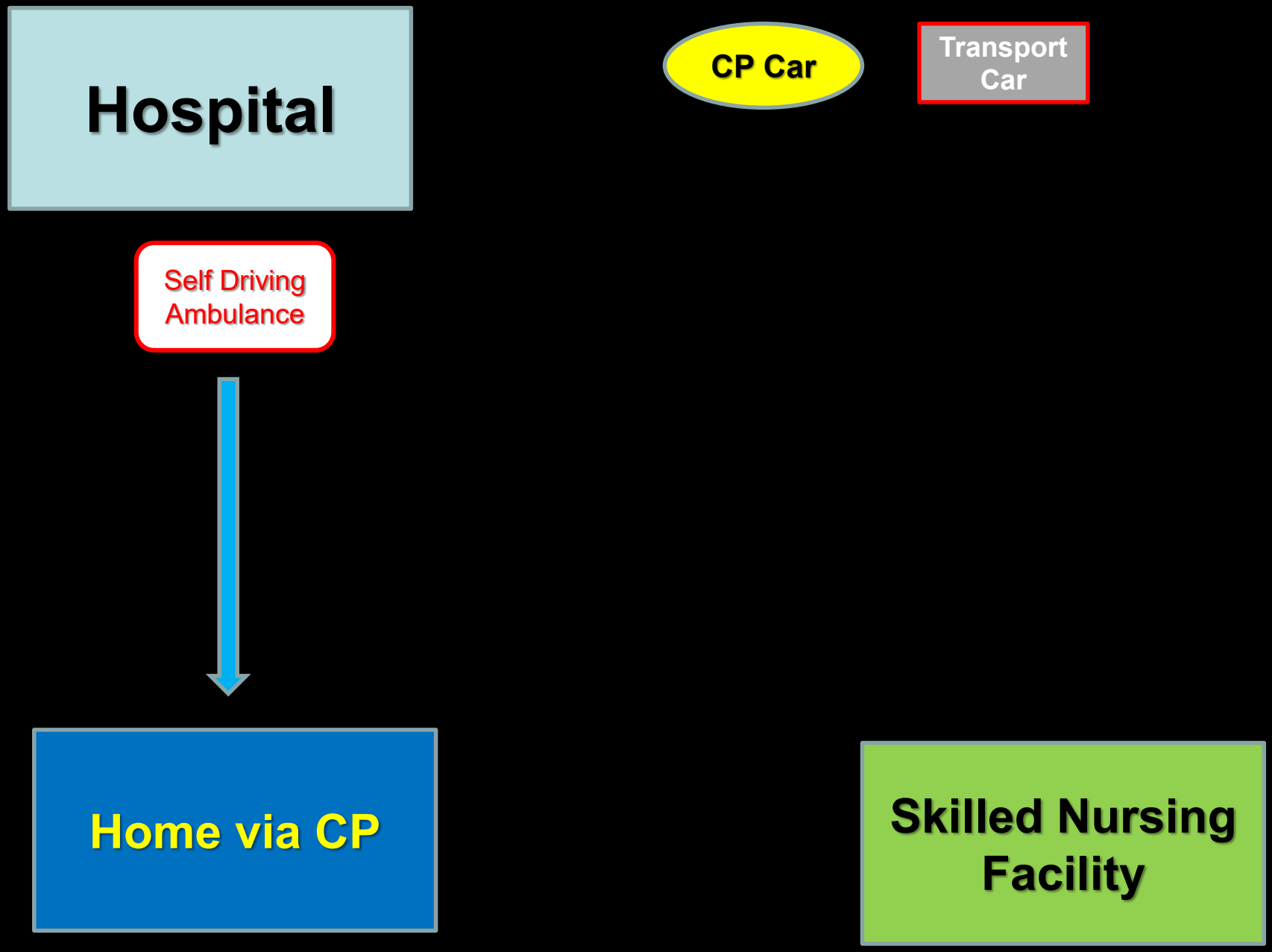


Self Driving Ambulance

Transport Car

Skilled Nursing Facility

Home via CP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Transport Car
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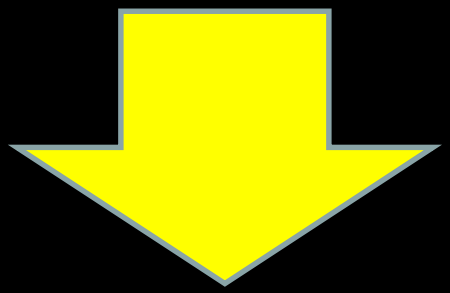
Hospital

Transport Car



Self Driving Ambulance

CP Car

Home via CP

Skilled Nursing Facility

The single-staff saving of a self-driving Routine Transfer Fleet of 8 Vehicles

$20/hour x 40 hrs x 52 weeks = $41,600 x 33% Benefits ($13,728) = $55,000

$55,000 x 3 people = $165,000 x 8 self-driving ambulances = *1.3 Million*

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$1.3 Million

Dispatch AEDS in rural areas on drones currently capable of carrying 25-50 lb. payloads

(Current REMSA Pilot Project)

Sweden – Roof of 6 FD Stations – Dispatched in 3 seconds

Sweden – Roof of 6 FD Stations – Dispatched in 2 seconds

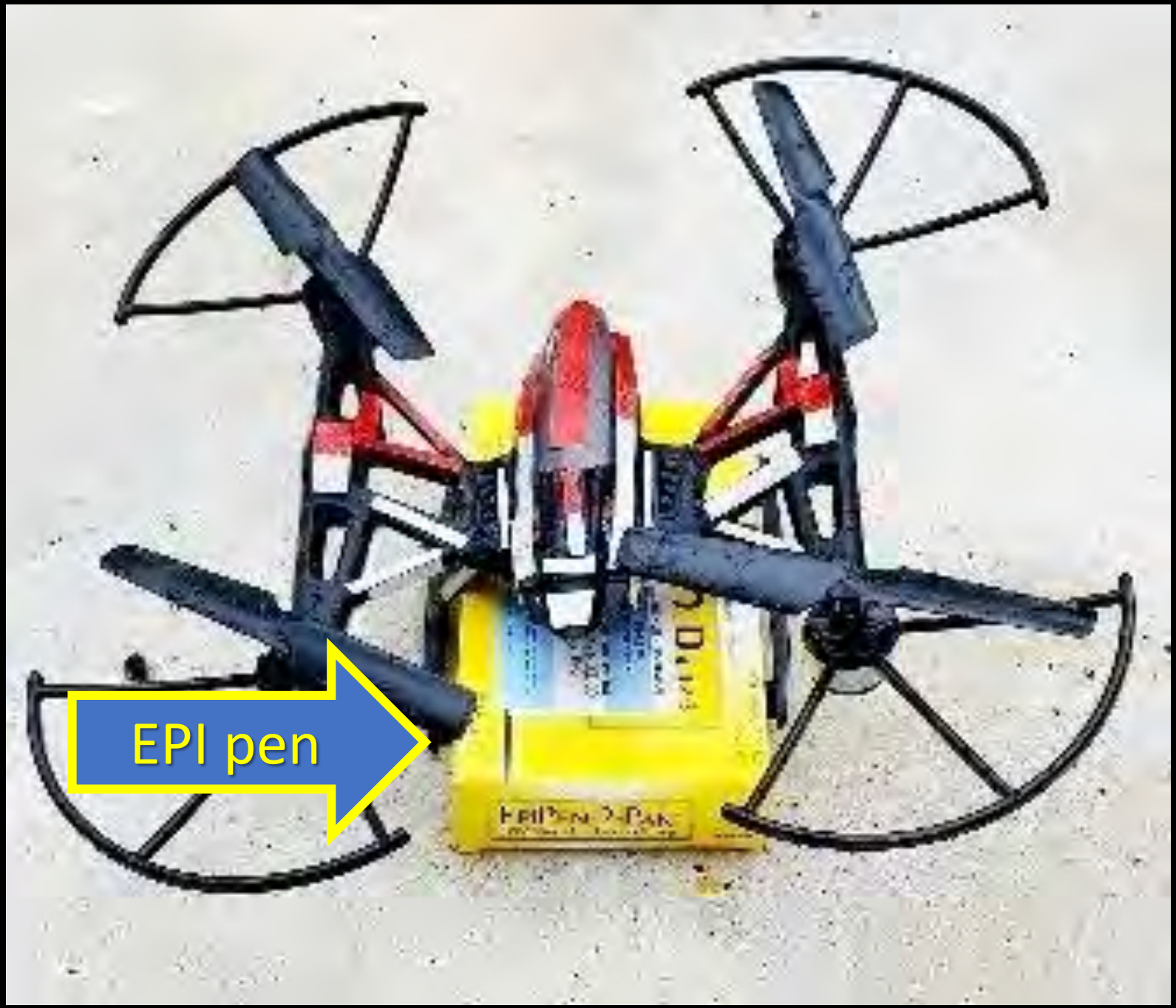
Sweden – Roof of 6 FD Stations – Dispatched in 2 seconds


Beats first responders by
15-20 minutes in rural areas
AED - HJÄRTSTARTARE

Copenhagen DRONE UNIT


Falck
Sortimo


Falck

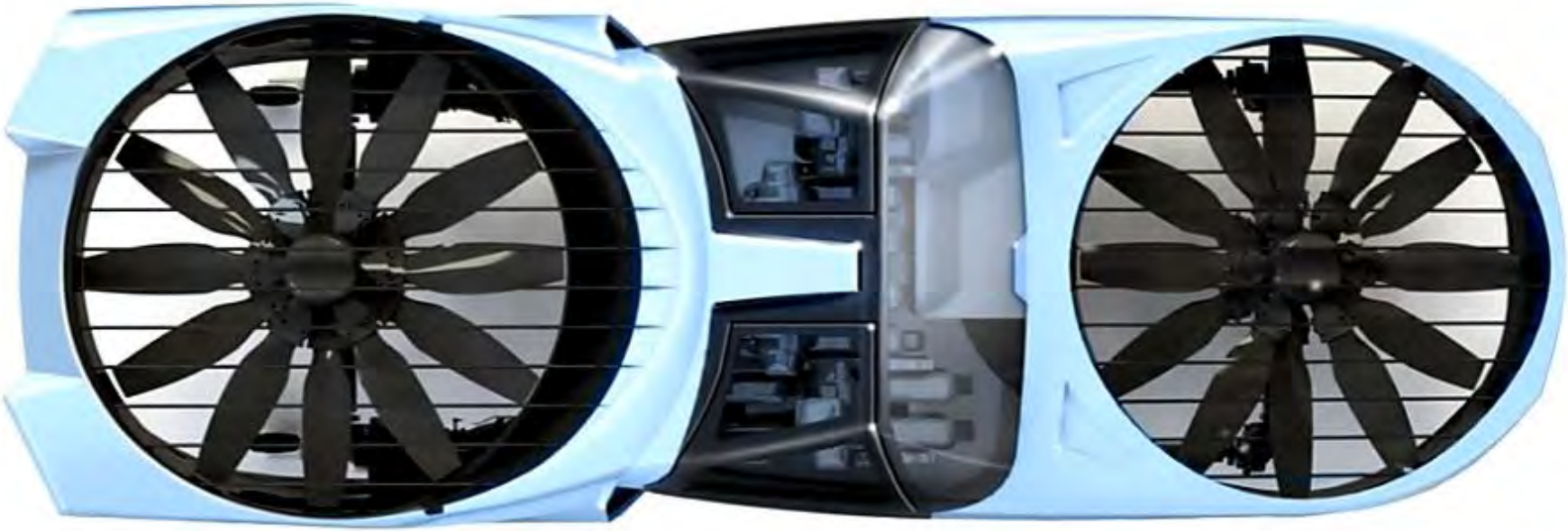

EPI pen


EPI pen
EPIPEN 2 PAK


nazon
CNBC
amazon
PrimeAir
amazon
PrimeAir


EMERGENCY


HYATT




Meet the CityHawk eVTOL
(Vertical Take-Off and Landing)

The CityHawk eVTOL has no external wings or rotors, resulting in “unparalleled” flying and landing access under any weather conditions, the company says. It features Urban Aeronautics’ internal rotor Fancraft technology, which utilizes powerful ducted fans in combination with advanced aerodynamic technologies that result in superior control, stability, speed, safety, noise reduction, and sustainability.

CityHawk eVTOL

Hatzolah is interested in Urban Aeronautics' CityHawk, a six-passenger vertical takeoff and landing (VTOL) flying ambulance which holds a pilot, patient, another companion, two EMT personnel, and life support equipment. It is meant to be used in search and rescue operations as a flying ambulance where a helicopter would be dangerous or useless, such as evacuating people from burning buildings or collecting civilians from bomb-riddled areas.

“Live 911” is here!

Chula Vista, CA now can automatically include the closest or responding units to a 9-1-1 call. The person can hear the exact words and emotion of the caller.

With “Live 911”, all Chula Vista police vehicles are now equipped with special laptops that not only allow officers to hear the conversation, but also pinpoint the exact location of the person making the call. It immediately pops up on their screen. In its first six months, the new system is shaving seconds, sometimes minutes, off response times.
https://live911.com/

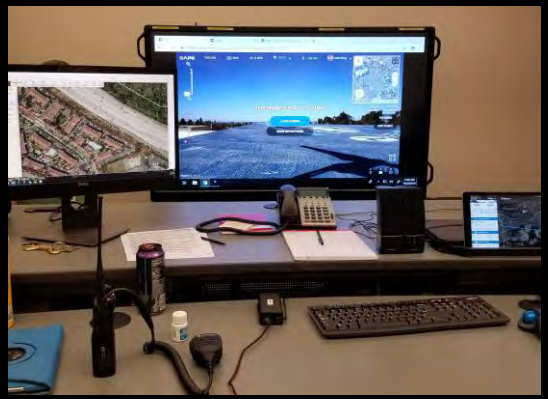
https://www.kpbs.org/news/2020/jul/20/new-911-system-chula-vista-faster-response/

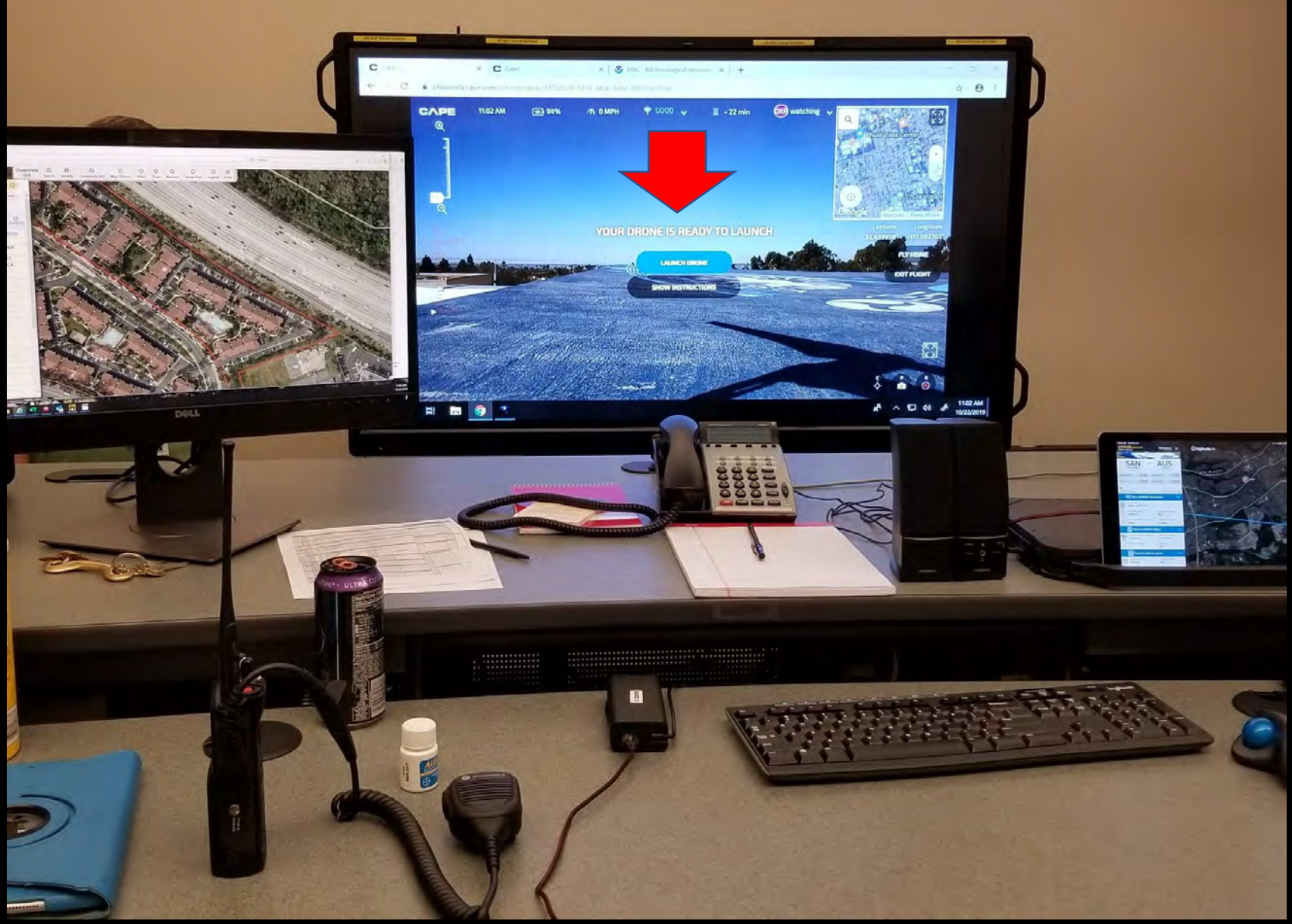
They also automatically dispatch a drone on emergency calls. All of their work and progress is online for others to see. https://www.chulavistaca.gov/departments/police-department/programs/uas-drone-program

Chula Vista (CA) PD also automatically dispatches a drone on emergency calls.

All of their work and progress is online for others to see:

https://www.chulavistaca.gov/departments/police-department/programs/uas-drone-program





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Chula Vista PD is also the first drone program in the USA Approved for Broader Use of Drones in Law Enforcement

https://www.chulavistaca.gov/departments/police-department/programs/uas-drone-program

https://www.kpbs.org/news/2020/jul/08/chula-vista-pd-approved-broader-use-drones-law-enf/

The drones arrive and send live video to the comm center and responding personnel long before field unit arrival:

Priority 1 calls:

Unmanned Aerial Support Unit = **2.46 Mins**

Police Patrol Unit = 3.56 Mins

Priority 2 calls:

Unmanned Aerial Support Unit = **1.44 Mins**

Police Patrol Unit = 4.23 Mins

DASHBOARD DATA

1. Total Calls Responded to = 2,930
2. Drone First Response Assisted Arrests = 381 (13%)
3. DFR avoided Dispatching a Patrol Unit = 693
4. DFR First on Scene = 1,221
5. Average response time (First on Scene) = 1.8 mins

We must find & groom the next generation of EMS managers and leaders

Top 5 Strengths by Generation

Gallop-Healthways Well Being Index Survey of 76,141 working adults

Age	8-27	28-43	44-62	63-86
TOP 5	Millenials	GEN X	Boomers	Traditionalists
1	Adaptability	Input	Responsibility	Responsibility
2	Input	Achiever	Achiever	Harmony
3	Responsibility	Responsibility	Adaptability	Empathy
4	Achiever	Learner	Developer	Consistency
5	Context	Relator	Empathy	Achiever

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5				Achiever

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4	Achiever			
5				Achiever

Gallop-Healthways Well Being Index Survey of 76,141 working adults

ET3

Emergency

Triage

Treatment &

Transport

ET3

Em[illegible]

Treatment &

Transport

It's about time!!!!

Phone Triage:

Always a good idea

Treatment In Place: "TIP" =

- A long time coming
- Physician or Telehealth

Alternative Destination Facility:

A long time coming

Progressive States & EMS Systems will not (and should not) wait for the "test systems" to be evaluated over the next 3 years

1. We *know* it can be effective. **(REMSA)**
2. We *have to prove* that it is effective!

After 3 years, Medicare will look at test system outcomes and *then* will put *"rewards"* (5%) in place.

“ALIGNED REGIONAL MARKETS”

We need cooperative agreements to be established - and multiple payers to support overall success and sustainability

VAPING!
The new health issue

The CDC is finding that Vitamin E Acetate mixed with THC and "other" items and flavors can become deadly when enhaled

VAPING!

The new health issue

The CDC is finding that Vitamin E Acetate mixed with THC and "other" items and flavors can become deadly when enhaled

5 X more likely to die from COVID19!


All bleeding will
eventually stop!

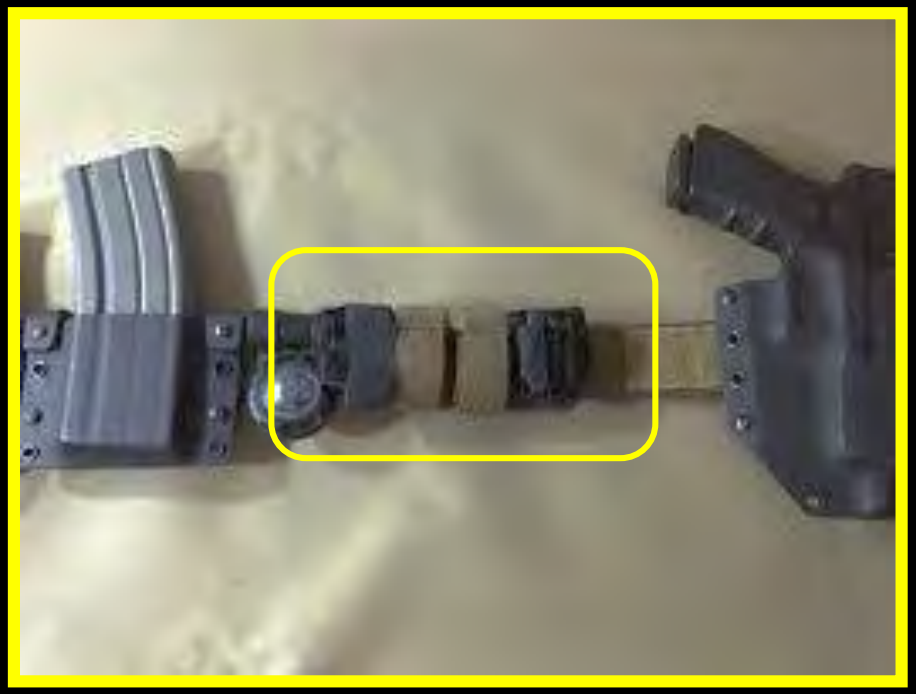
We must move on
("in")
from tourniquets

Tourniquets
(*4 per vehicle*)

1 person impacted by an IED can lose 4 limbs

Law Enforcement, "Packing" and splinting need more focus

LAW ENFORCEMENT Involvement



Wound Packing

(2015 – USA Hartford Consensus, post - Sandy Hook School Massacre)

and the

"Stop the Bleed" Initiative


Wound Packing

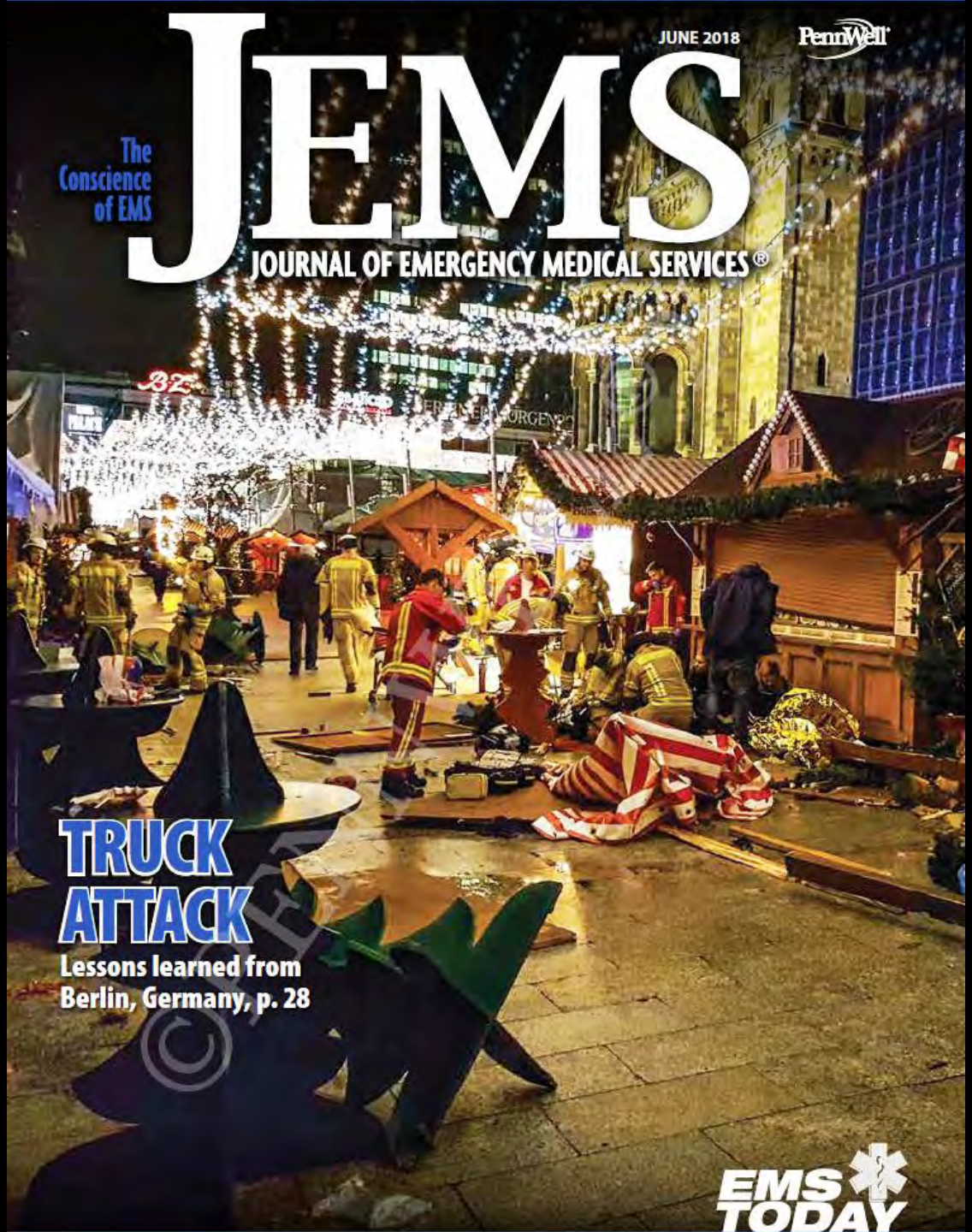

Quik Clot
Z-Folded
External Use


NAR
Compressed Gauze
NAR
Compressed Gauze

April 2, 2018

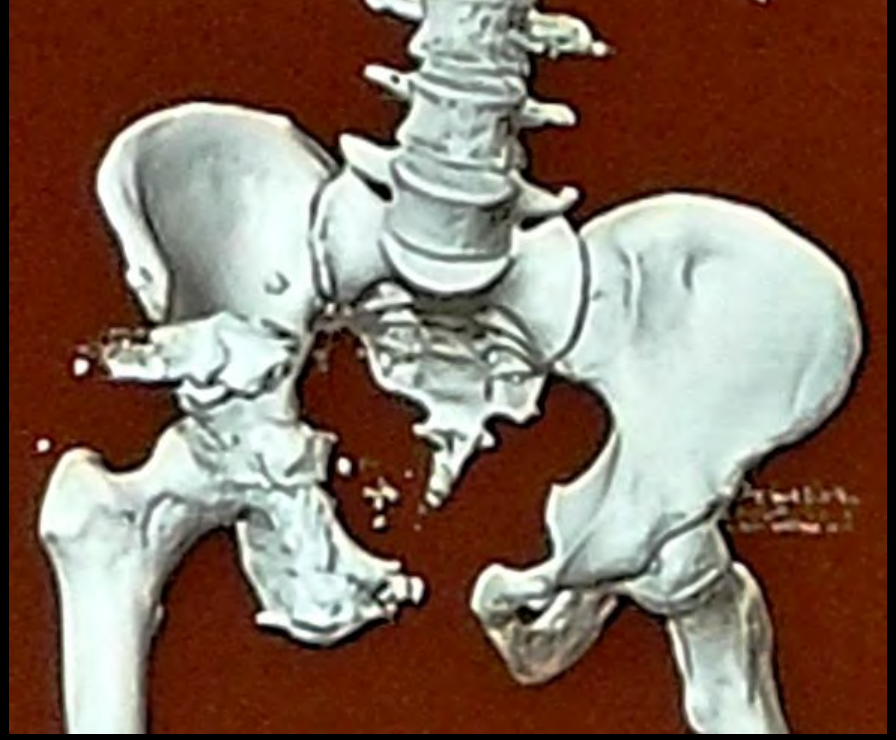
Berlin
Truck Attack

Pelvic Injuries



Berlin Truck Attack

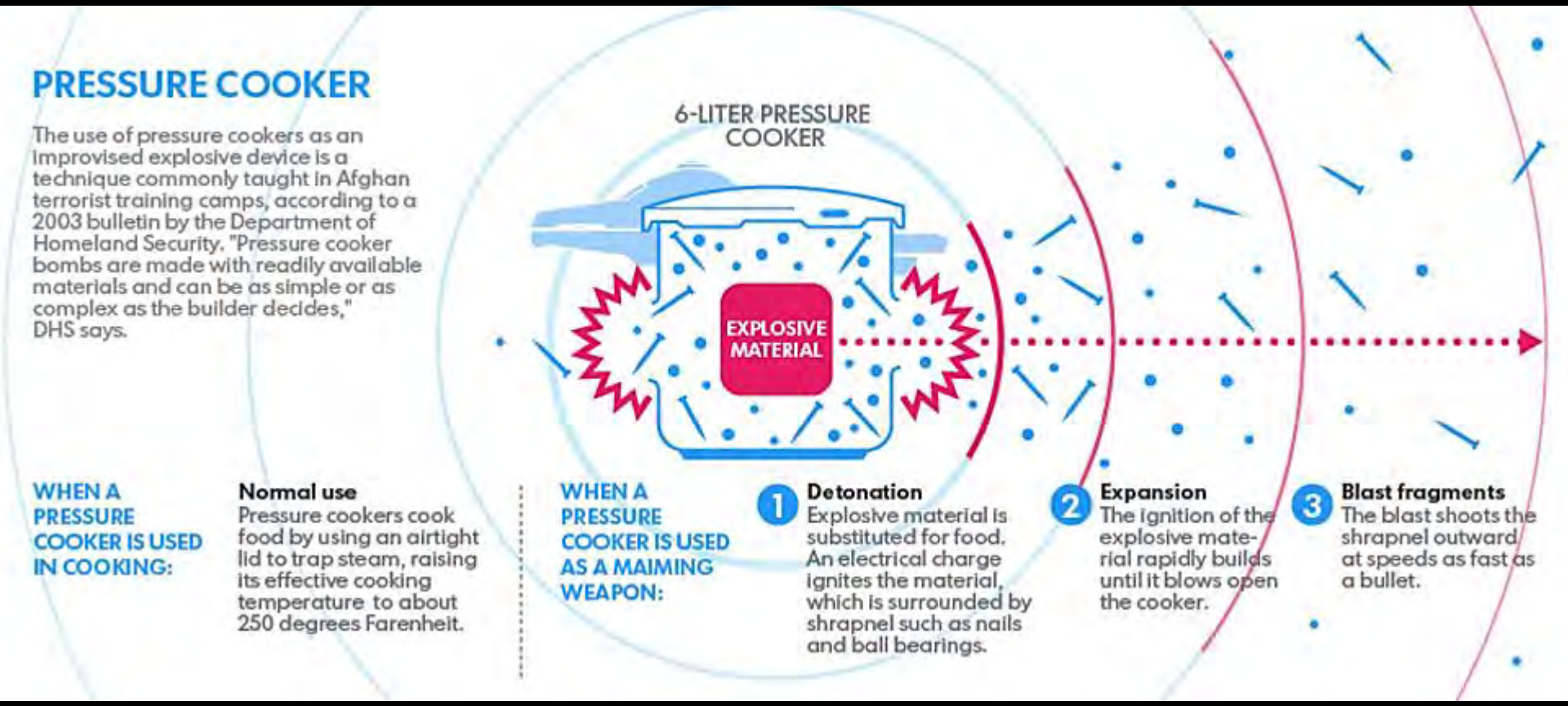
Pelvic Injuries




Pelvic Splints


FAGOR VERSA
5-in-1 MULTI-COOKER
PRESSURE COOKING
SLOW COOKING
RICE COOKER
YOGURT MAKER
FAGOR
HIGH
LOW
START STOP
KEEP WARM
TIME DELAY
STEAM
PRESSURE COOK
SLOW COOK
YOGURT
BROWN
SAUTÉ
SIMMER
WHITE RICE
BROWN RICE
RISOTTO
FAGOR
5-in-1 MULTI-COOKER
HEALTHY COOKING
CONVENIENT
MULTIFUNCTIONAL
EASY TO USE
INCLUDES RECIPE BOOK


SPAX
SPAX



Pressure cookers heat food with steam, using increased internal atmospheric pressure to heat and trap steam beyond its normal limit of 212 degrees Fahrenheit. This same increase in temperature is exploited by a pressure cooker bomb to amplify the power of an explosion set off within.

Source:
Popular Science – Technology Section
"How a Pressure Cooker Bomb Work"
It's an older recipe than you'd think.
By: Kelsey D. Atherton September 19, 2016

BLAST Injuries

as a result of

Improvised Explosive Devices (IEDS)

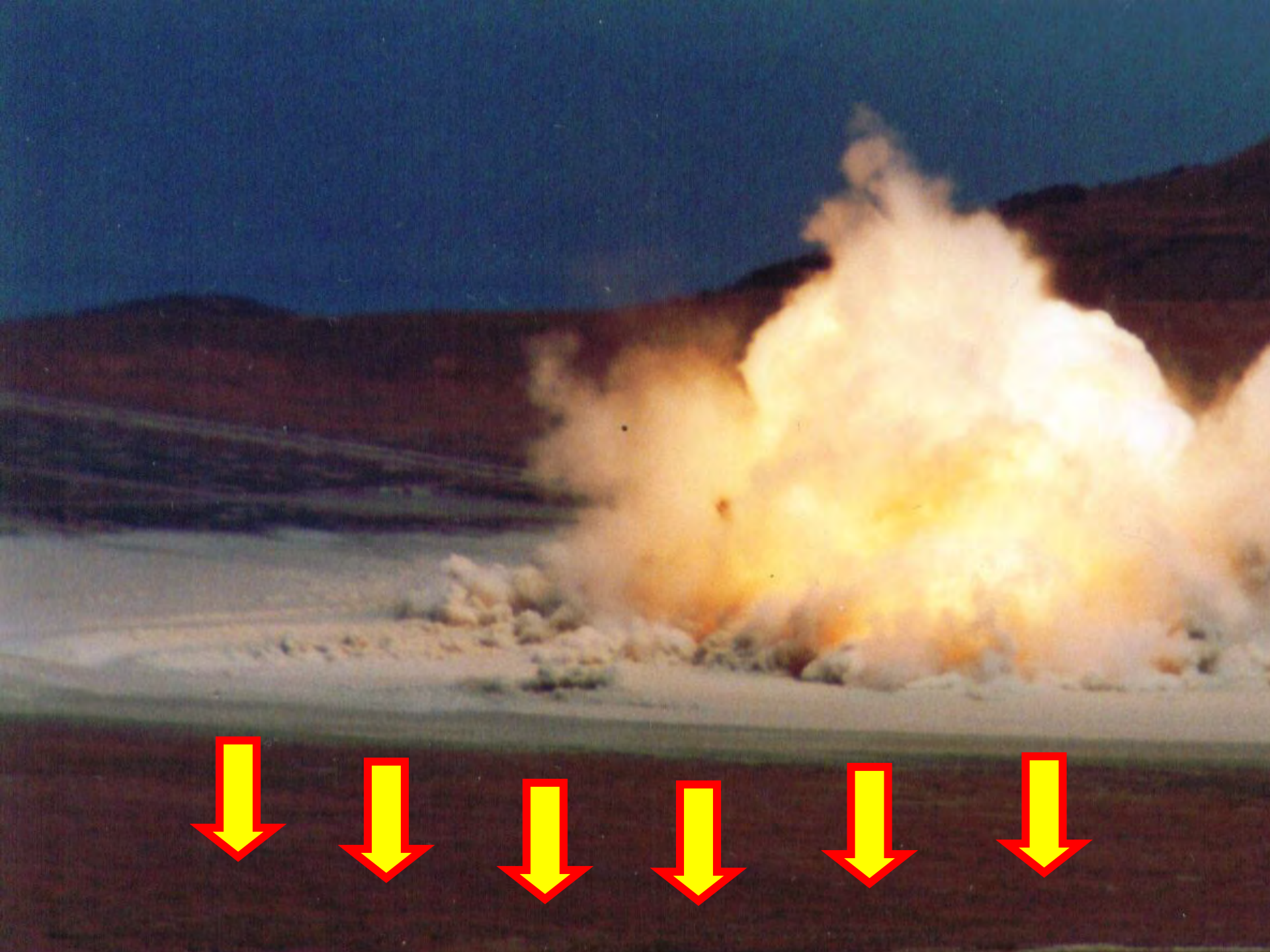
Being "Fast-Tracked"
by JEMS Editorial

BLAST Injuries

as a result of Improvised Explosive Devices

(IEDS)

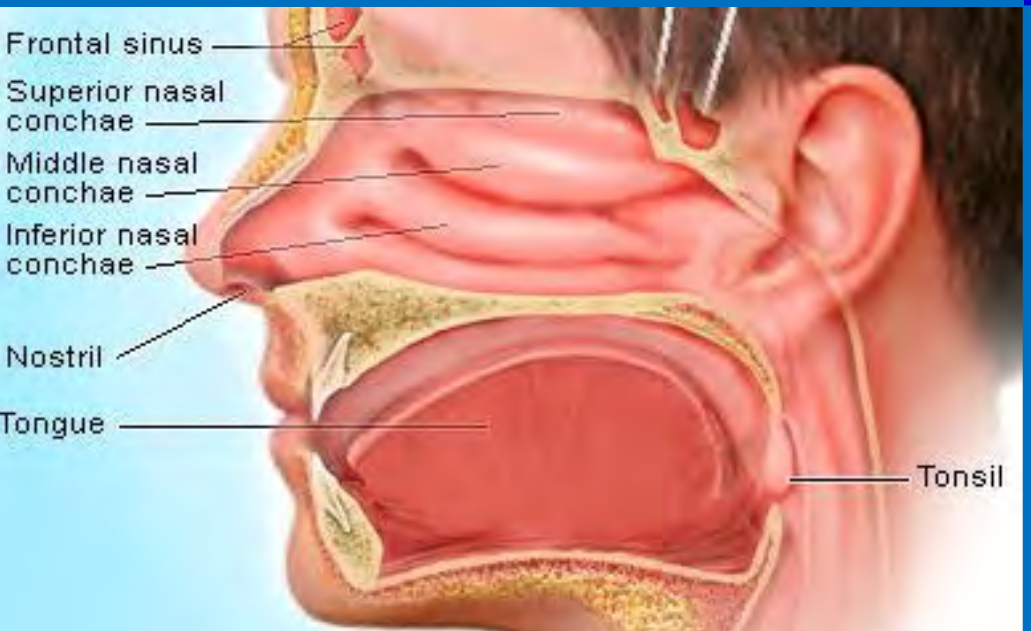
BLAST Injuries as a result of Improvised Explosive Devices (IEDS)

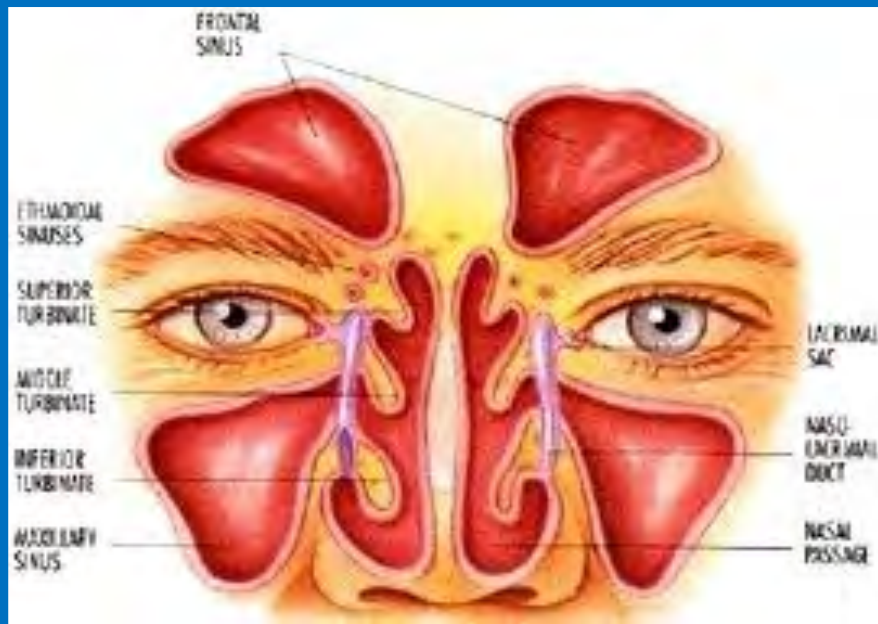


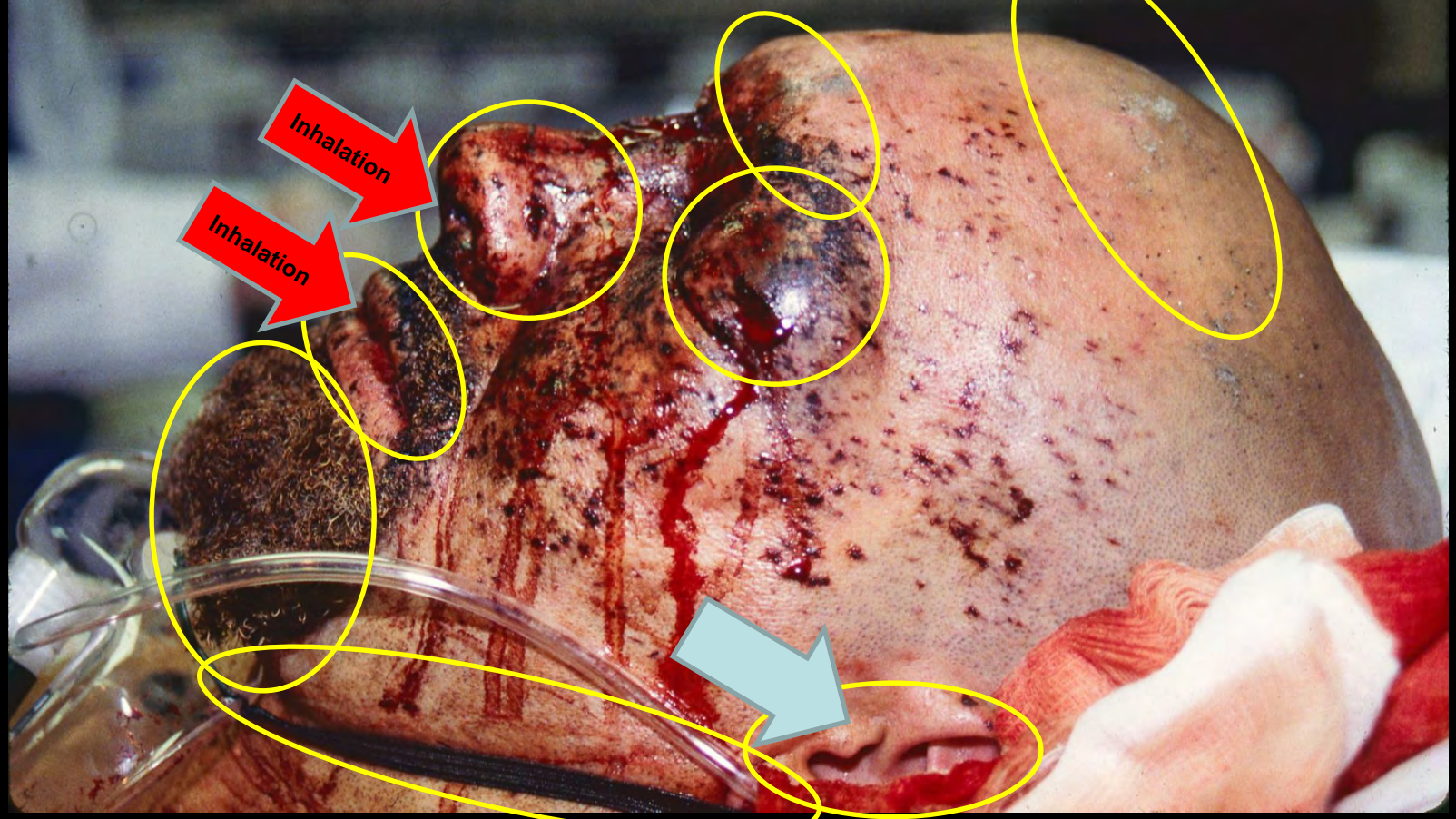
Thoracic Injuries

BLAST INJURY

Head & Face areas





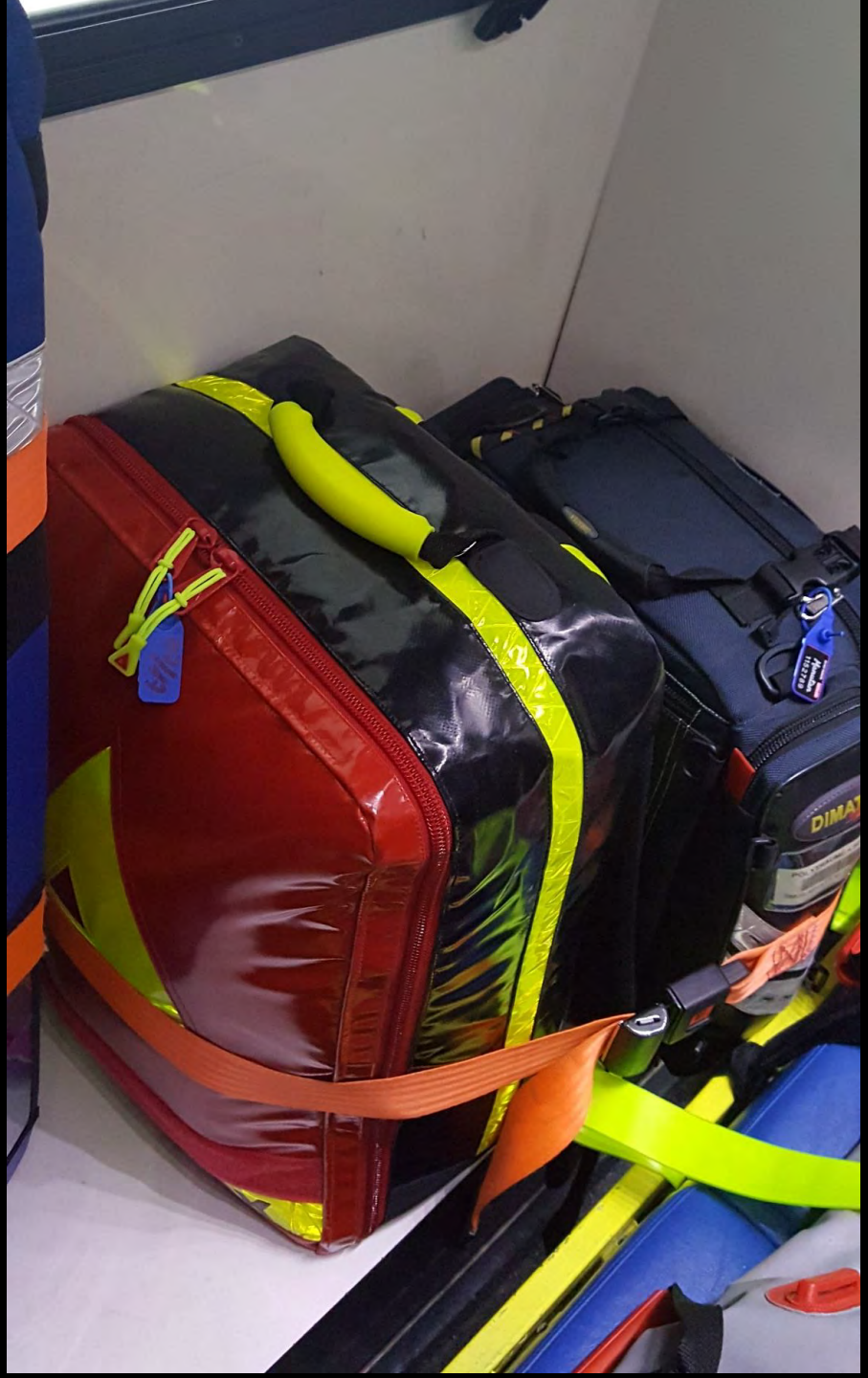


Primary, secondary and quaternary blast/thermal injuries to the face caused by a pipe bomb detonation to the face.

This patient sustained burns to his beard (quaternary /thermal blast injury), a ruptured left globe with eyeball collapse with vitreous fluid leaking down the cheek (from the primary blast wave), and (secondary blast/ shrapnel injury) shown on his forehead as comet-like streak wounds.

He also sustained frontal sinus fractures as part of his primary blast injuries.


LIFEPAK



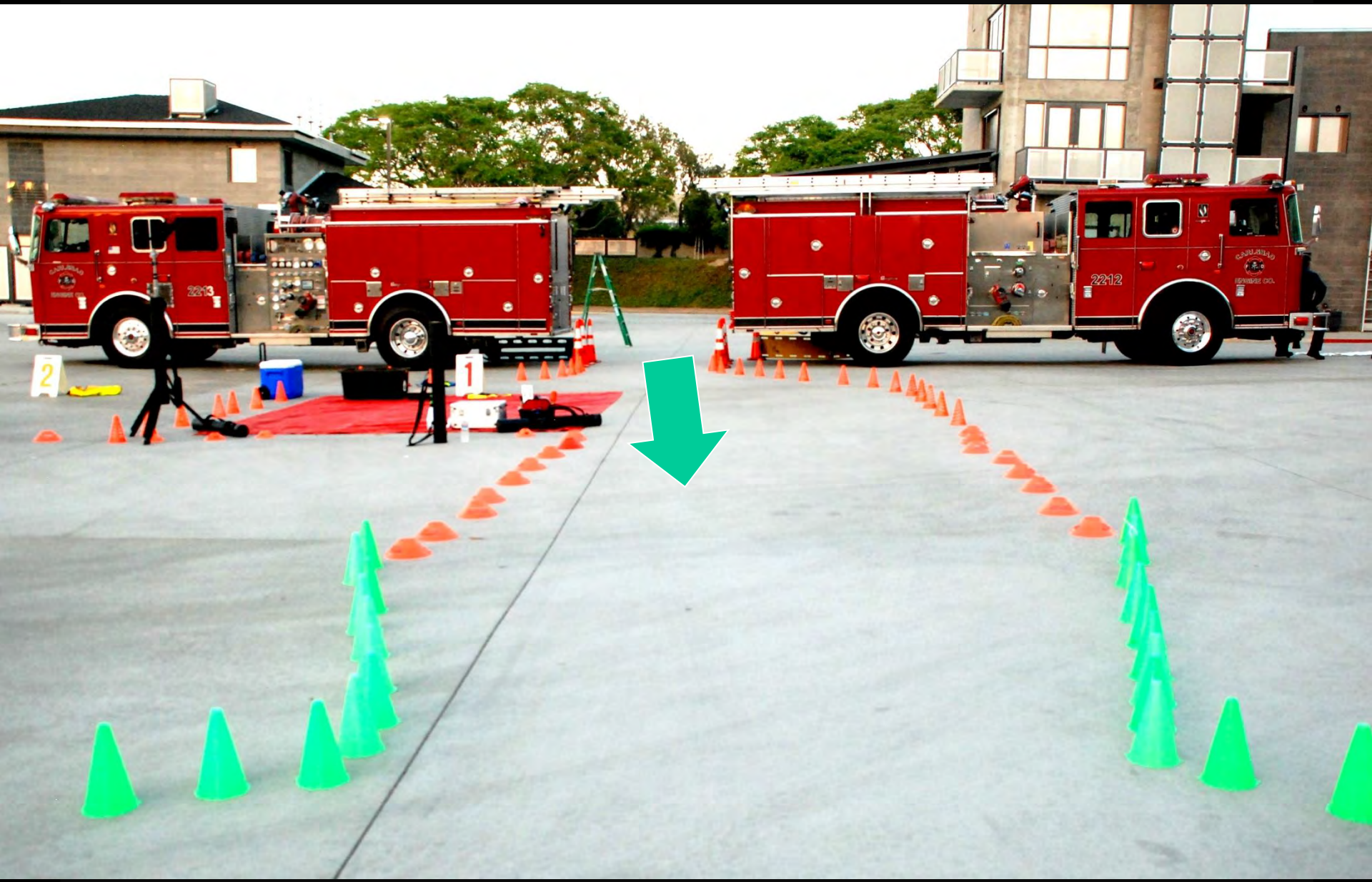
EMS & Fire Crews
are no longer safe from
Active Shooters and
Terrorists


FOR COMMERCIAL
AMMUNITION


223 caliber round


BULLET RECOVERY TANK


2212
F995
2212


2213
2212
2
1


1


CARLSBAD
2213
3
2
1

Need for RAPIDLY DEPLOYED LIGHTING

FoxFury.com


CBD
F995


CARLSBAD
ENGINE CO.
2213
BD
2213


213


2213
1


CARLSBAD
FIRE DEPARTMENT
PARAMEDICS
2275

We must keep up with the science

& convince our Medical “Elders” to do so *also!*

XStat Gunshot Wound Dressing

- The XStat Rapid Hemostasis System by RevMedX, is a delivery syringe device that contains tablet-sized sponges that are injected deep into a wound.

- The tablets absorb blood and rapidly expand to fill the cavity that they find themselves in.

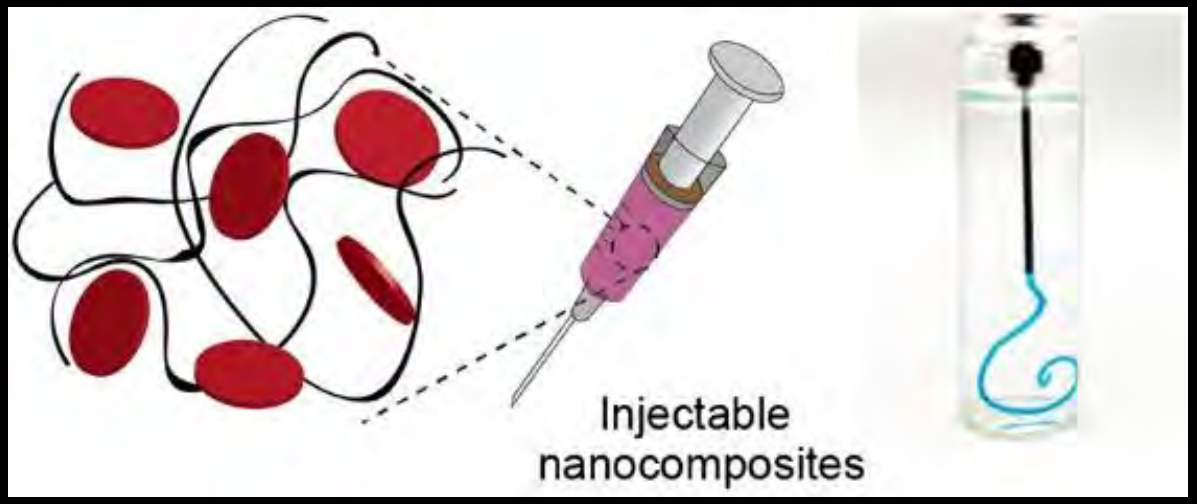

Nanoparticles –
Used to Control Internal
Bleeding After Explosive Blasts

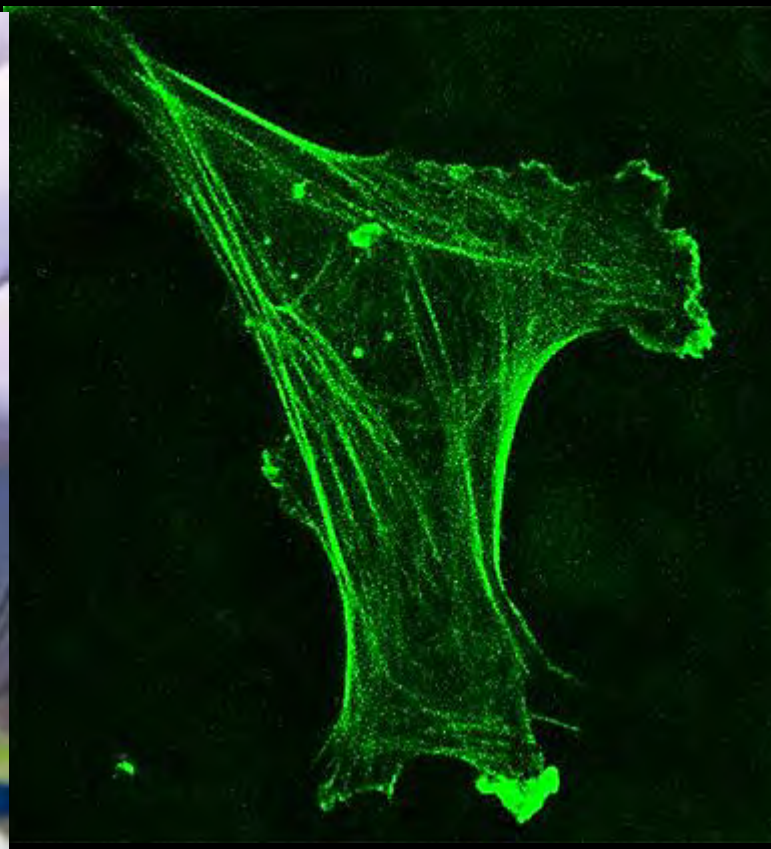
Therapeutic Hydrogel

Texas A&M University researchers developed a therapeutic hydrogel for injecting into bleeding wounds that can significantly speed up the hemostasis.

- **The material consists of nanosilicates, nanoparticles made from common minerals, and a *thickening agent* used in food preparation called kappa carrageenan.**

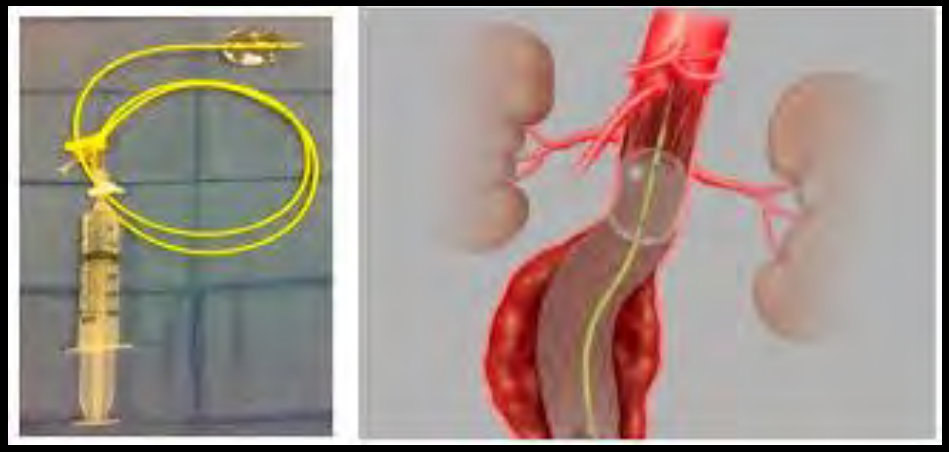
- **It can be produced for pennies per dose and doesn't require special handling procedures.**


Injectable
nanocomposites



REBOA:

Resuscitative Endovascular Balloon Occlusion of the Aorta

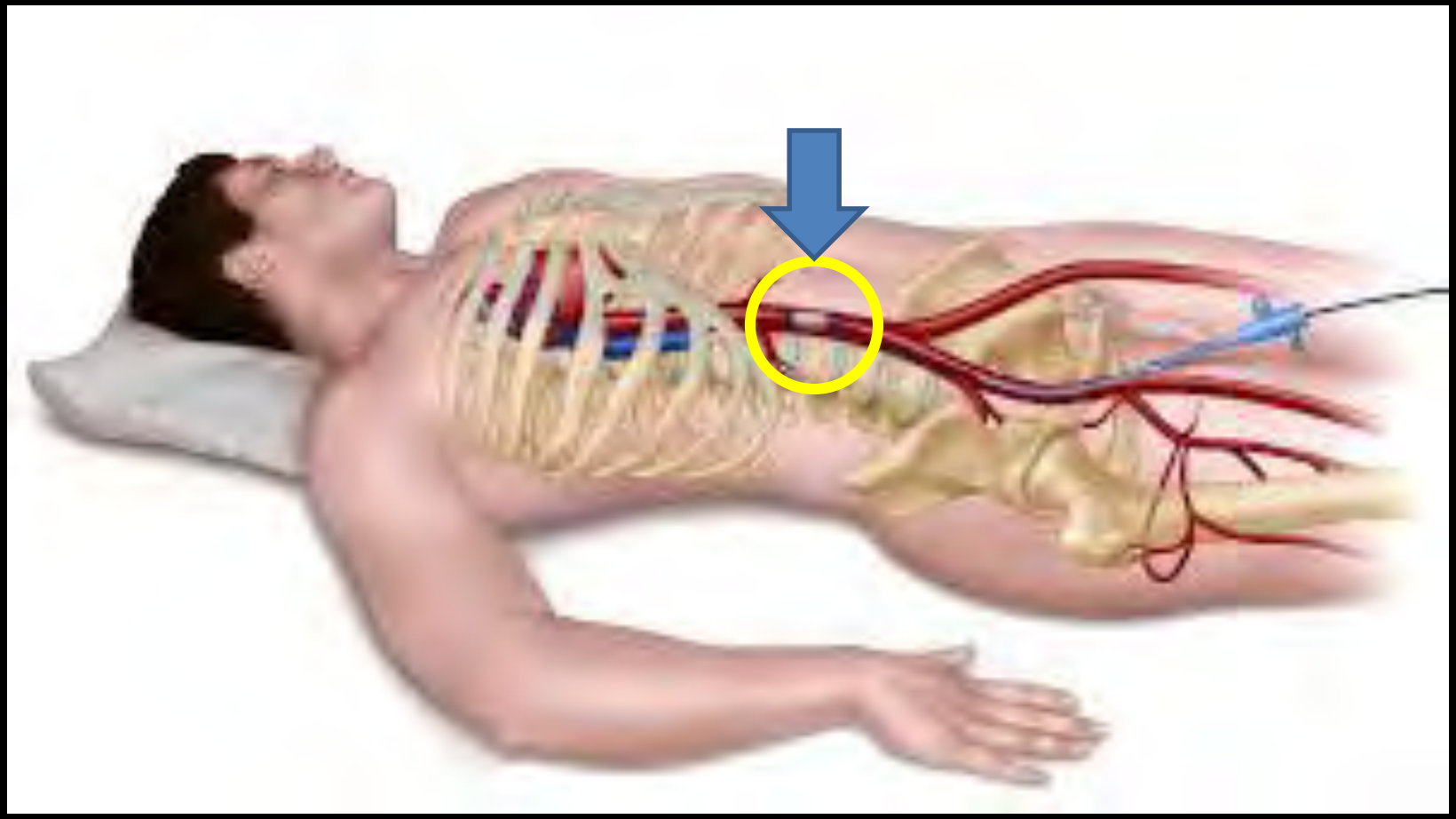


Occludes the aorta with a balloon to stop internal bleeding and give the patient enough time to reach the hospital and get surgery.

- **If used correctly, this procedure can save many lives, but can be fatal if the aorta is occluded for too long.**
- **Making the REBOA procedure more approachable and less complex could raise the number of surviving patients significantly.**


PSP Sgt. Seth Kelley
AJ Heighman

REBOA: Resuscitative Endovascular Balloon Occlusion of the Aorta

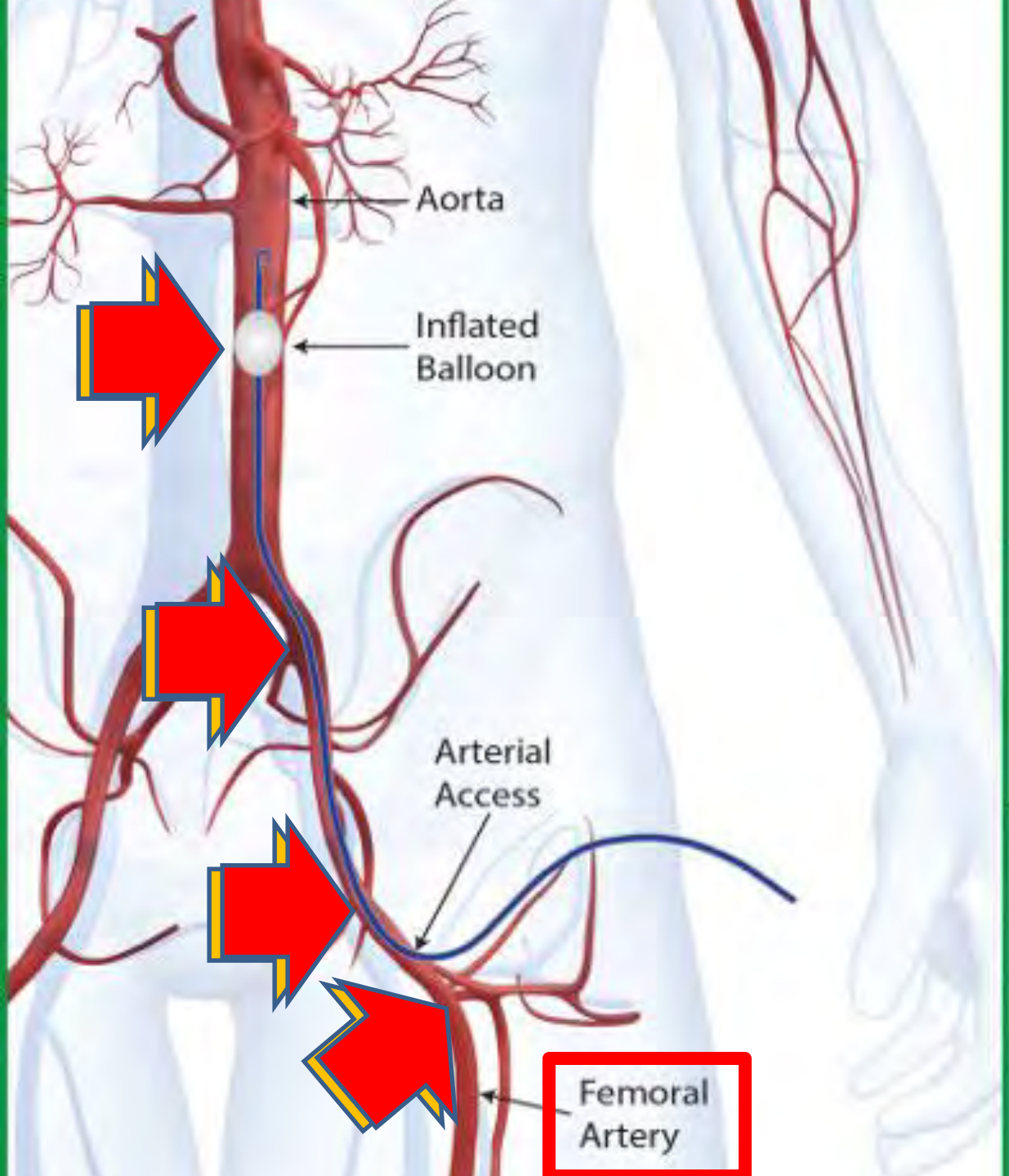


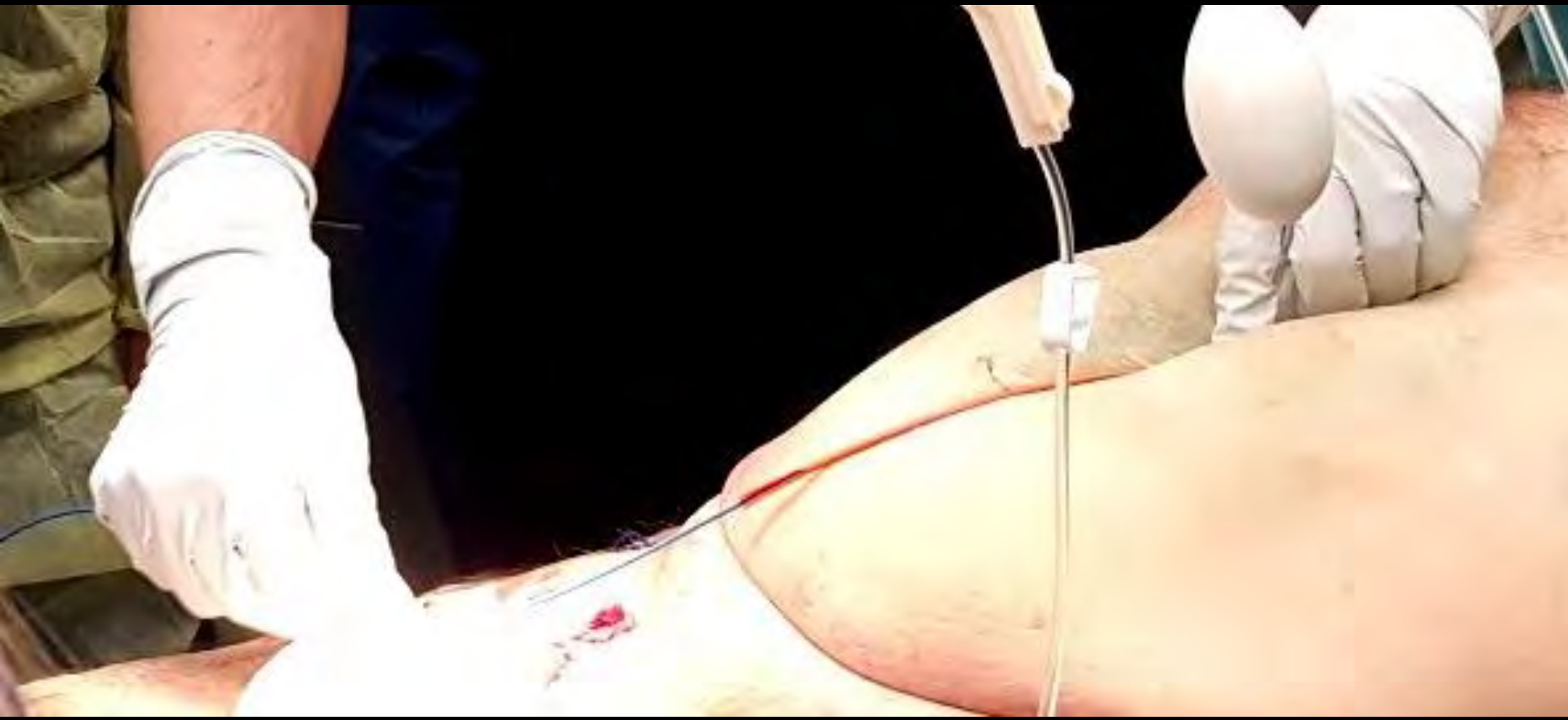
REBOA is used in trauma for patients that are rapidly bleeding to death from injuries to their chest, abdomen or pelvis.

This technique involves rapidly placing a flexible catheter into the femoral artery, maneuvering it into the aorta and inflating a balloon at its tip.

This stops blood flow beyond the balloon, essentially halting any bleeding, while also stopping all blood flow distal to the balloon.

It is a very temporary maneuver and is merely a bridge to get the severely injured patient to the Operating Room or Angiographic Suite.


Aorta
Inflated Balloon
Arterial Access
Femoral Artery




ART

Research like in the special December 2017 JEMS Resuscitation issue and its accompanying 36-page supplement, present undeniable proof that we can do better in the area of resuscitation if we change our mindset and approaches to resuscitation

EMS

STATE of the SCIENCE

Advances in cardiac arrest resuscitation

PHYSIO CONTROL

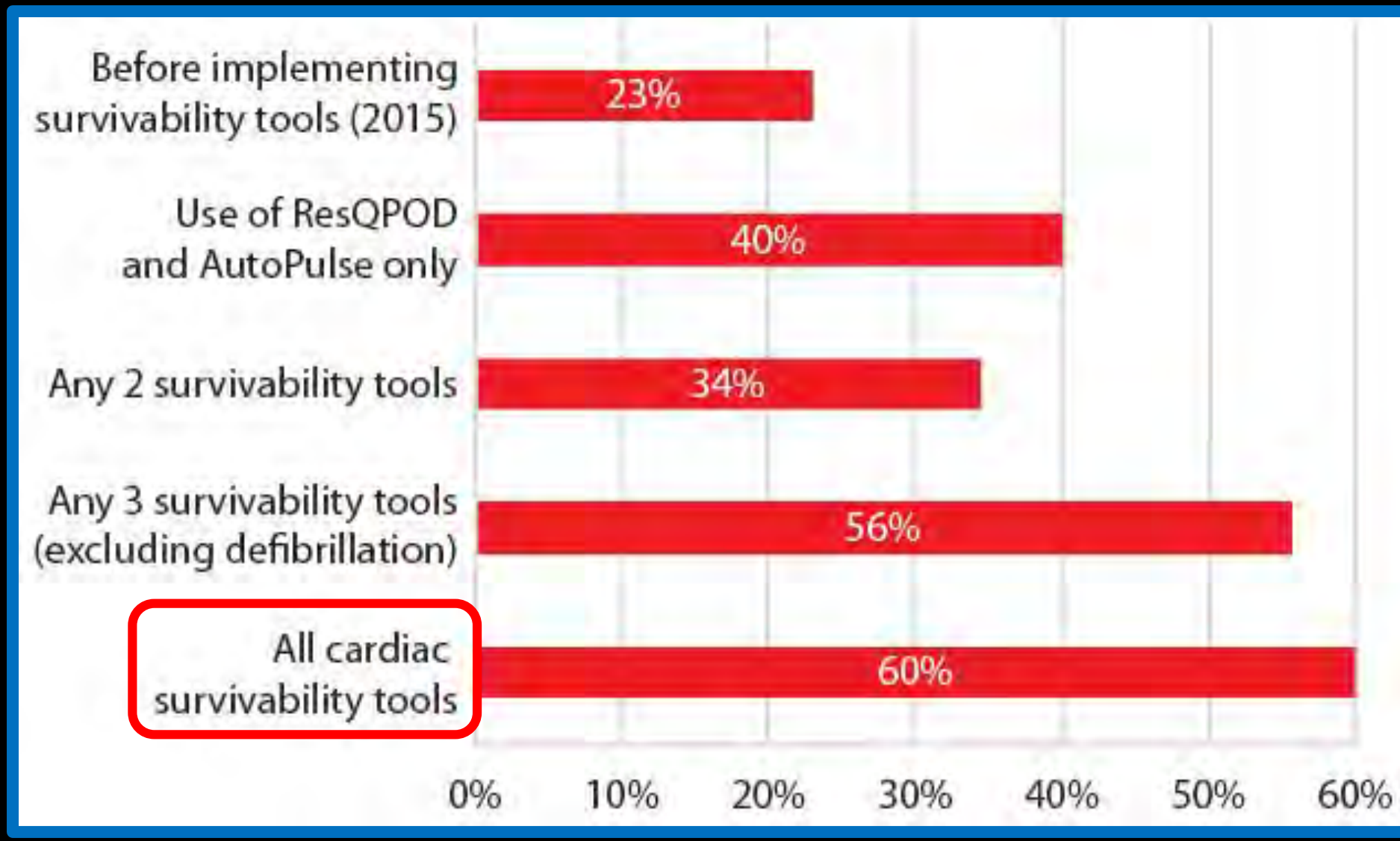
An exclusive editorial supplement to JEMS, spon[illegible] by Physio-Control, now part of Sc[illegible]

The Rialto (CA) and Lincoln (NE) fire departments, and EMS systems like Alameda County, Wake County, Minneapolis and King County (WA) EMS, closely aligned and interlinked with their hospital clinicians, exhibit what can be done if you rethink your approach to resuscitation, implement changes outside the norm and convince hospitals that there's a better way to continue the care we start out in the field.

These systems use “Bundle of Care” technology and citizen alerting system; mechanical compression devices; direct-to-cath lab care; Head-Up CPR; extracorpeal membrane oxygenation (ECMO)-capable EDs and know that patients can be resuscitated long after what many systems falsely believe is a 20-minute limit to resuscitations.


RIALTO FIRE
PARAMEDIC RESCUE

Percentage of patients where ROSC was achieved



The real elephant in the room is that, despite proven research and practices, outdated hospital and staff thinking, and stale, outdated protocols, are not offering the same aggressive care once we deliver patients through their doors, or are calling resuscitative efforts after the unsubstantiated "20 minute max resuscitative effort"

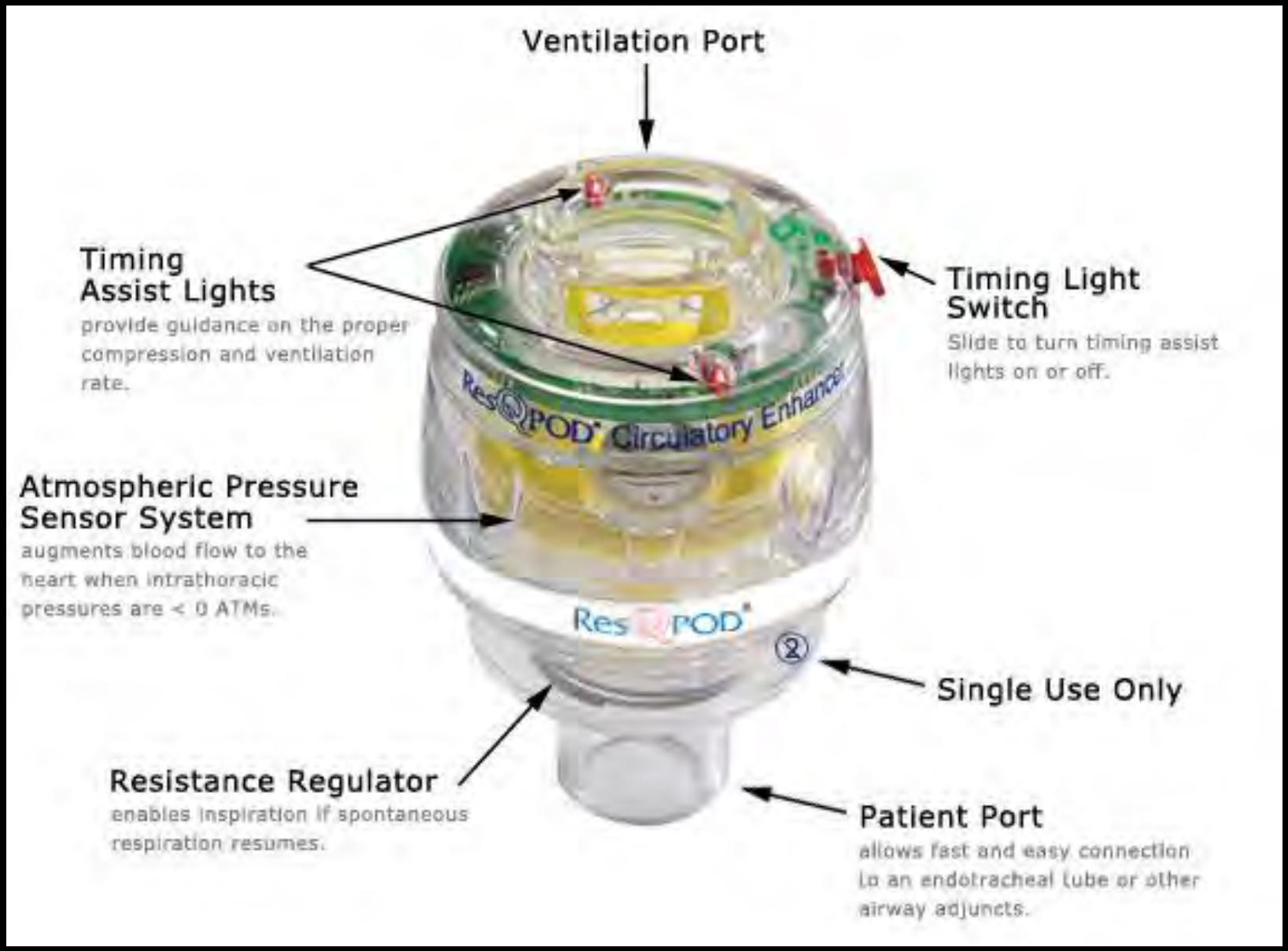

Proper & consistent, uninterrupted CPR,
- particularly compressions

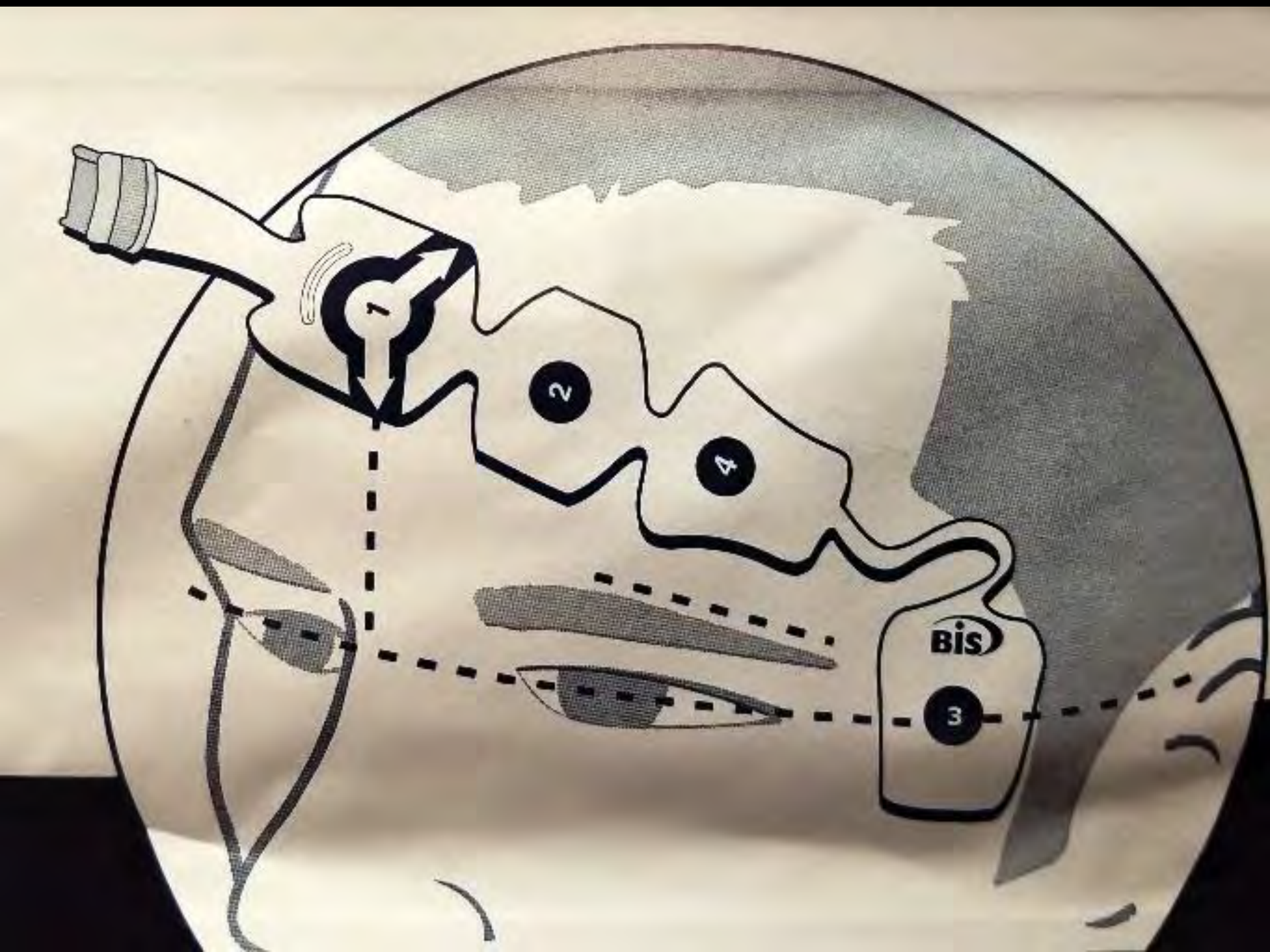

Proper & consistent, uninterrupted CPR,
- particularly compressions

MECHANICAL CPR
will continue to
make the difference
in resuscitation
success !

Use of
BODY
PRESSURE
to Regulate &
Resuscitate
patients

Impedence Threshold Device




1
2
4
BIS
3

FirstPass; Quality Enhancement Module

An advanced automated, cloud-based (software) system created by FirstWatch that alerts when a patient care report doesn't match an agency's protocols and also scan all patient records to identify key parameters that are selected by the agency.

It is virtually a 100% QI system that can identify high performers and low performers and areas that you can and should appreciate or improve.

This module has now processed more than 12 million ePCR records, from many different ePCR vendors, and has performed more than 360 million tests for deviations from protocol.

What used to take days or weeks can now be accomplished in minutes from when the ePCR record is complete, allowing agencies to take immediate action to correct documentation errors or to provide positive feedback and training.

The FirstPass "Bundle of Care" includes protocols such as: ACS/STEMI, Stroke, Trauma, Airway Management, and Cardiac Arrest.

Additional metrics a service might consider include: Pain Management, Patient Care Aspect, High Risk/Low Frequency Event or Non-Transports/Refusals.

Artificial Intelligence (AI)

Artificial ("Assisted") Intelligence

A GAME CHANGER!

Corti software / "AI" listens in on calls to dispatch and ("smart" with millions of bits of information) identifies a cardiac arrest or other serious, difficult-to-identify problem (even "hearing" agonal breathing in the background).

It actually "alerts" the dispatcher on their screen that it is:

- **Probable cardiac arrest;**
- **Septic shock;**
- **Epiglottis;**
- **Congestive heart failure;**
- **Anaphylaxis;**
- **Ruptured esophageal varices; etc.**

Pay attention to it because it is coming to EMS Dispatch Centers soon, starting in the Seattle MEDIC ONE system! ...

https://www.youtube.com/watch?v=PXf8Nq_zx0A

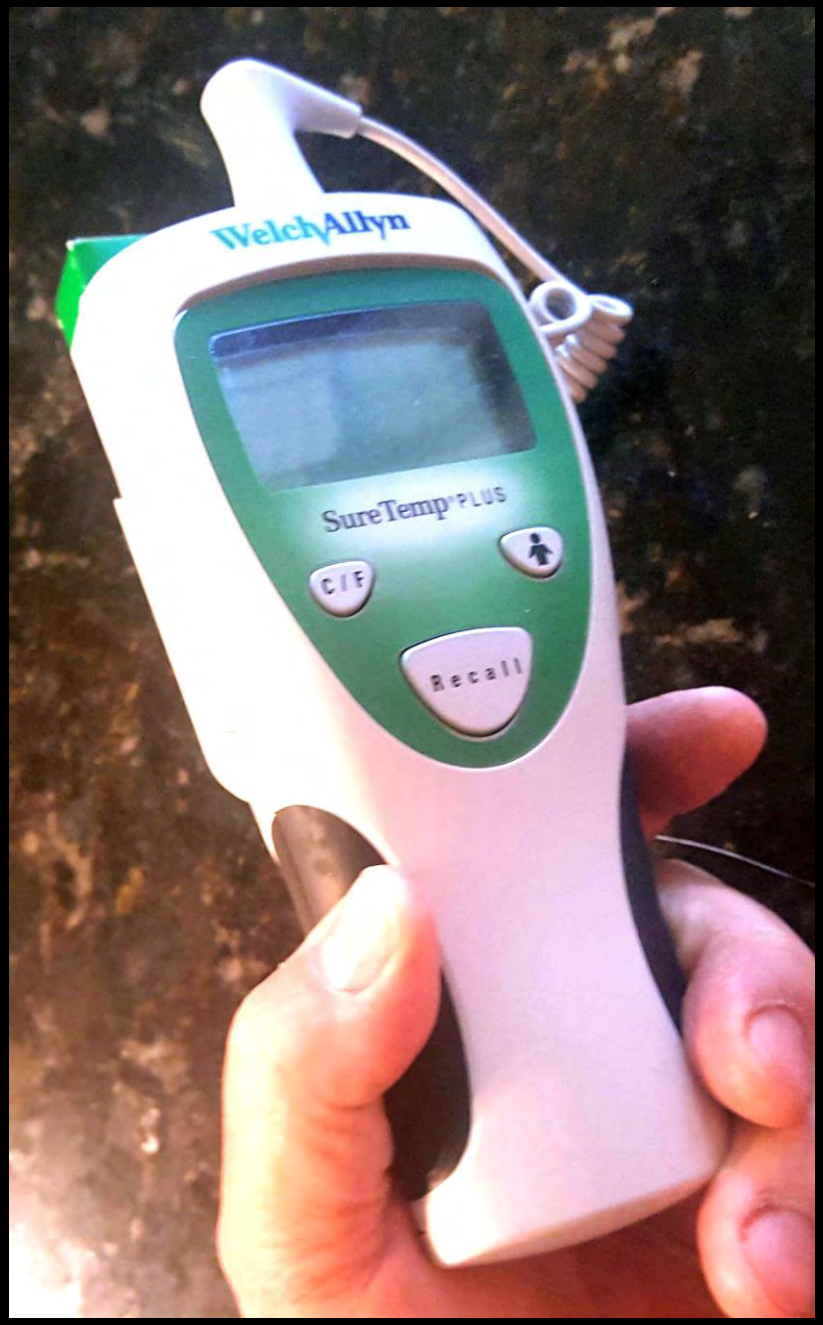
Sepsis Alert!

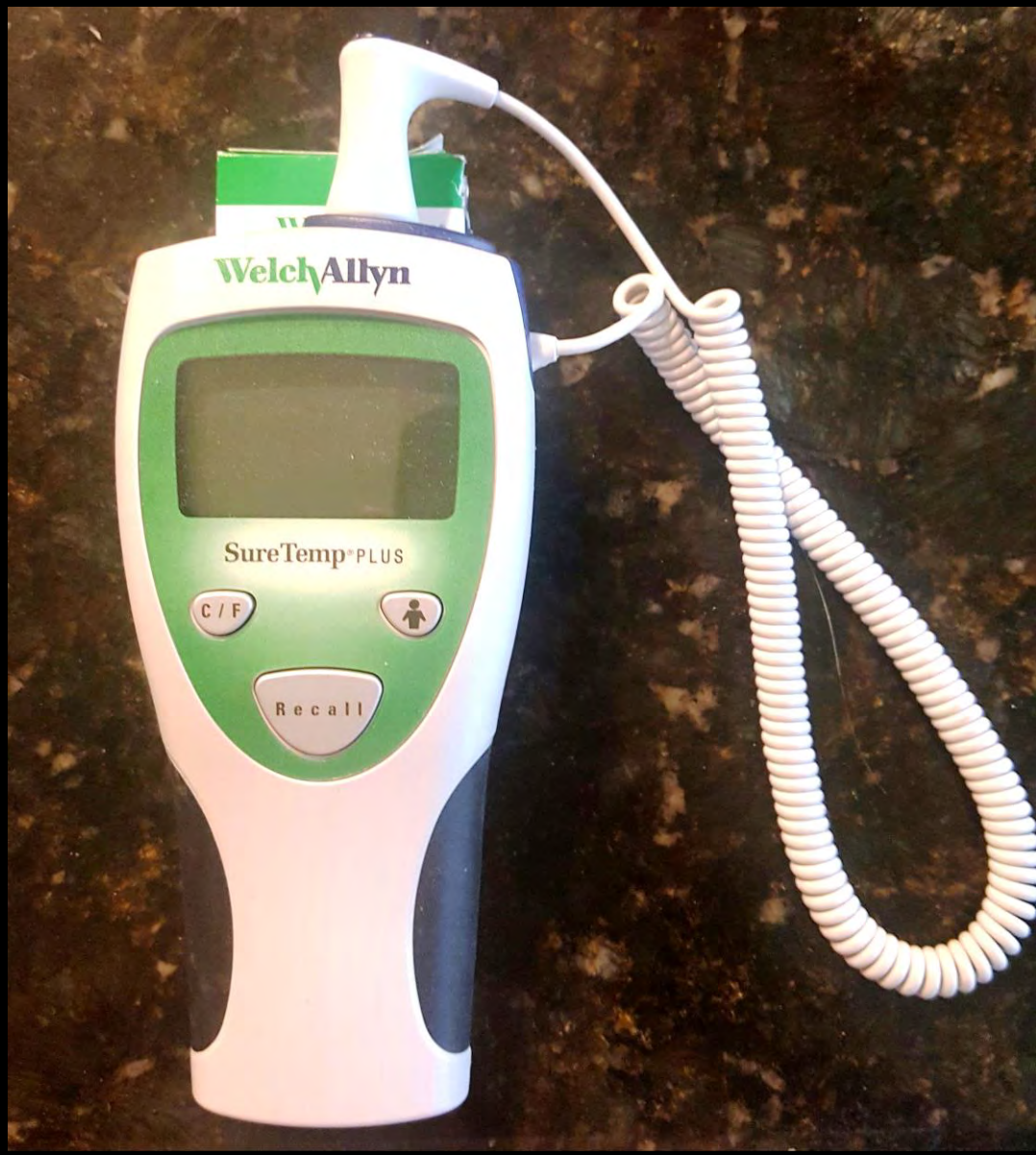
SEPTIC SHOCK

SIRS - Systemic Inflammatory Response Syndrome

***Some key* SIRS *criteria*:**

- **Fever > 100.4 degree Fahrenheit**
- **Tachycardia > 90 beats/minute,**
- **Tachypnea >20 breaths/minute**


WelchAllyn
SureTemp PLUS
C/F
Recall


WelchAllyn
SureTemp PLUS
C/F
Recall

CAPNOGRAPHY & Septic Shock

In patients with a ≥ 2 SIRS criteria, an $EtCO_2$ measurement of ≤ 25 mmHg is strongly correlated with lactate levels > 4 mM/L and increased mortality.


I'd Like to
Help, but...
You Need
ECMO,
Not Elmo.

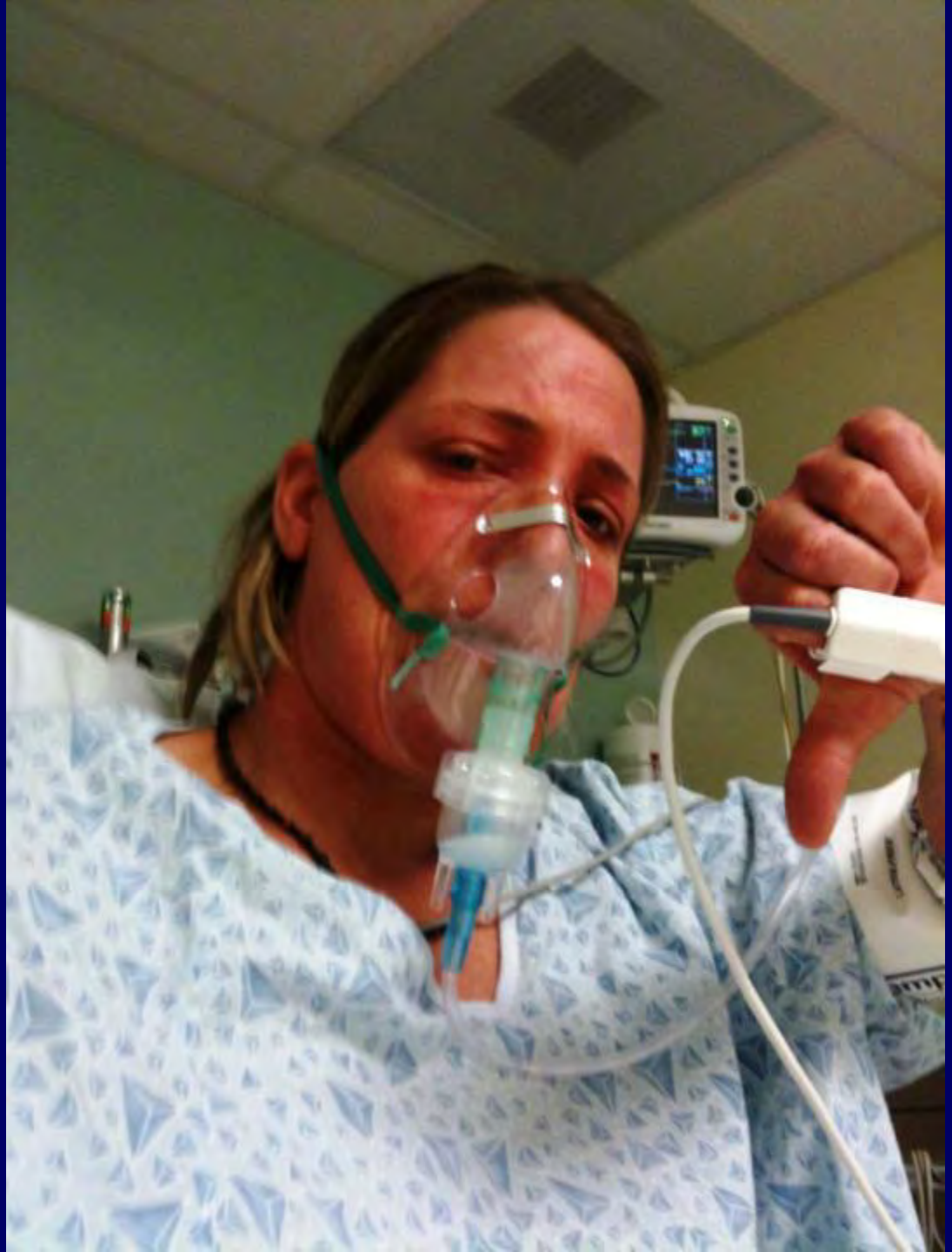

ECMO ALERT
- ETA 15 minutes

Andrea “Dre” Domingez

Paramedic/firefighter
San Diego
Fire Rescue

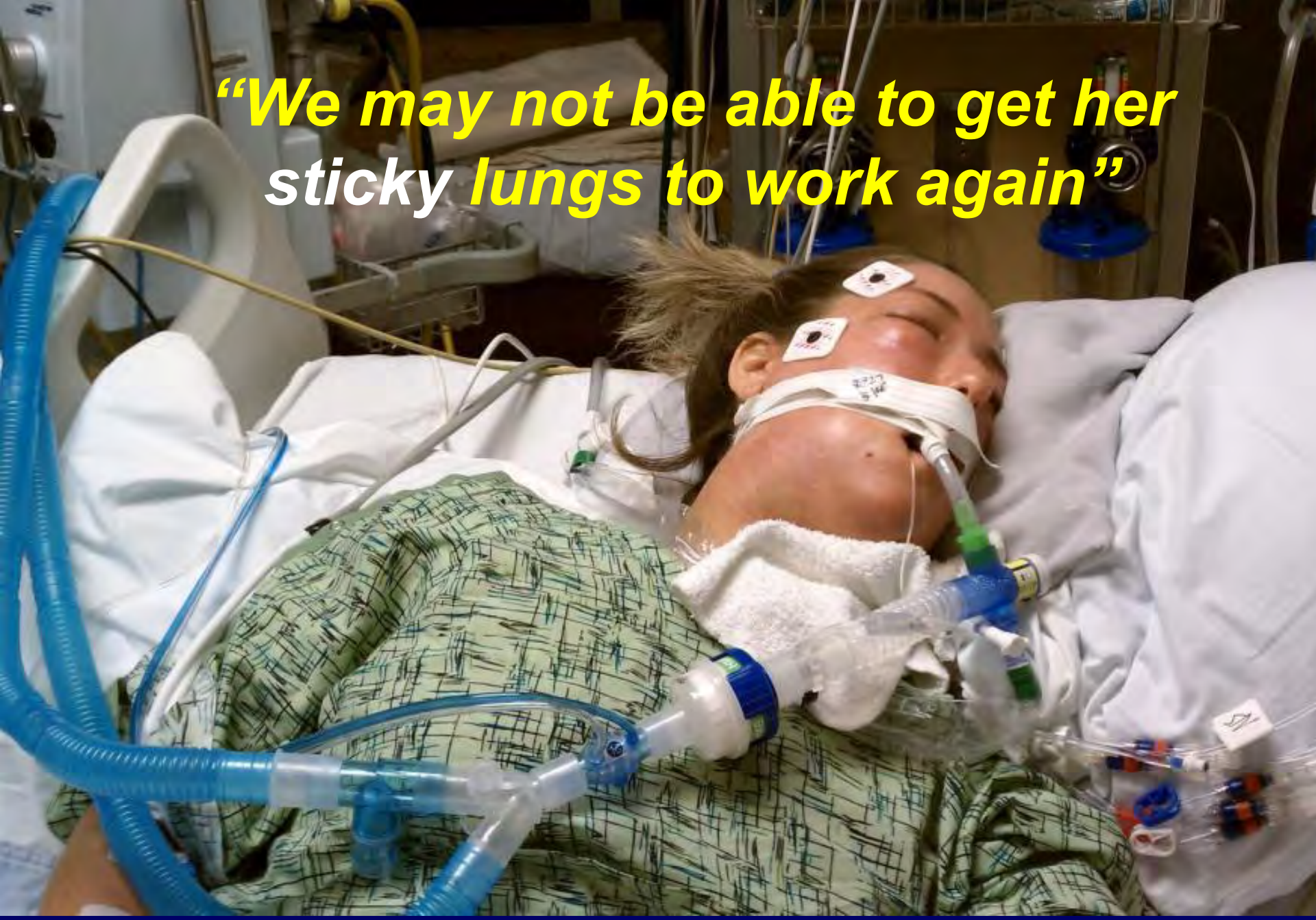
Featured in
March 2012 *JEMS*

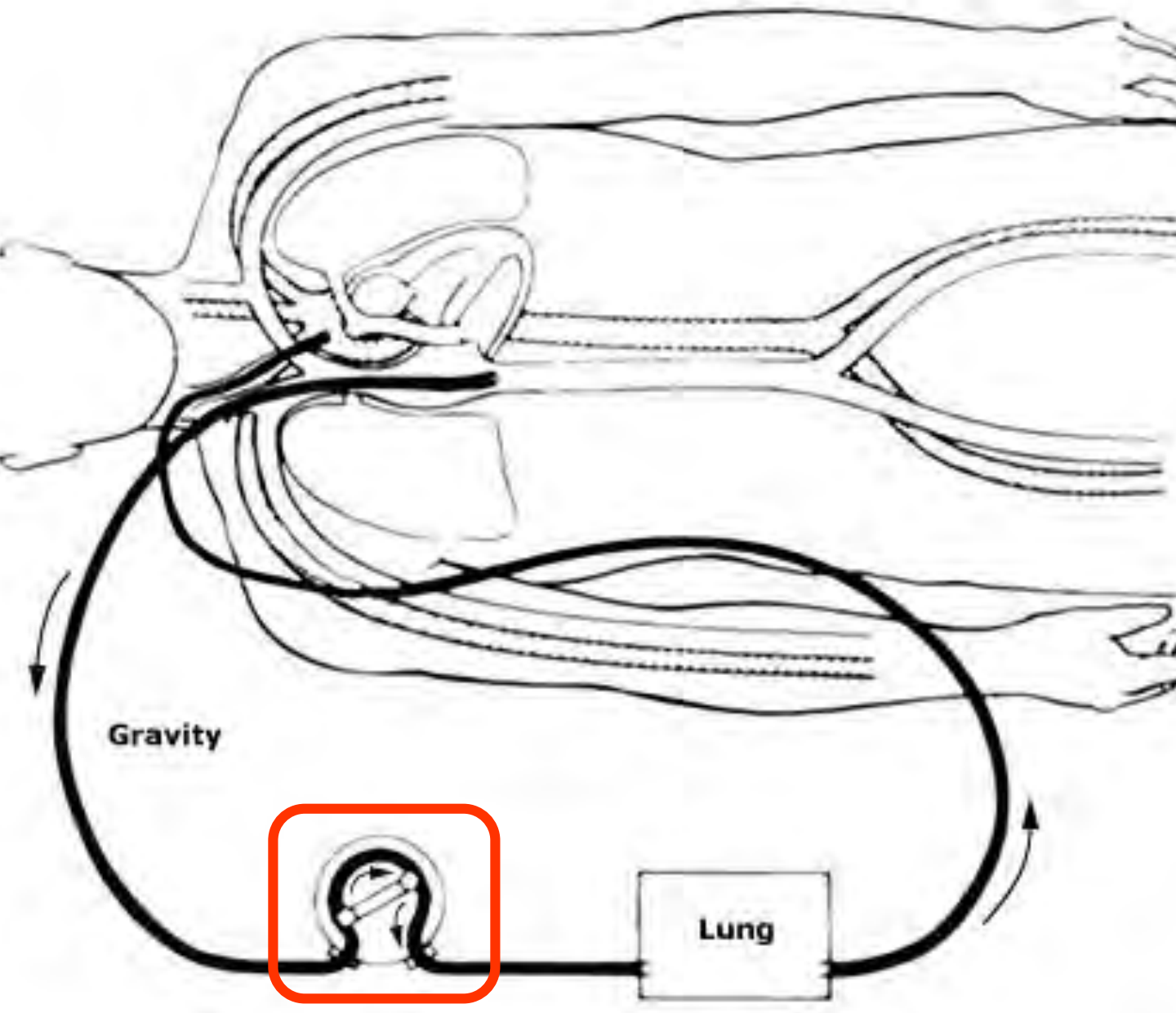
Go to www.jems.com



ExtraCorporeal Membrane Oxygenation

Extracorporeal membrane oxygenation (ECMO) an extracoporeal technique of **providing both cardiac & respiratory support oxygen** to patients whose heart and lungs are so severely diseased or damaged that they can no longer serve their function.


"We may not be able to get her sticky lungs to work again"


Gravity
Lung

Extracorporeal membrane oxygenation (ECMO) an extracoporeal technique of **providing both cardiac & respiratory support oxygen** to patients whose heart and lungs are so severely diseased or damaged that they can no longer serve their function.

AHA Guidelines)

gs where it can be rapidly implemented, ECPR may be
red for select patients for whom the suspected etiology of
iac arrest is potentially reversible during a limited period of
ical cardiorespiratory support (Class IIb, LOE C-LD).

eries have used rigorous inclusion and exclusion criteria to select patients for ECPR.
ese inclusion criteria are highly variable, most included only patients aged 18 to 75 years,
of cardiac origin, after conventional CPR for more than 10 minutes without ROSC. Such
iteria should be considered in a provider's selection of potential candidates for ECPR.


RIGHT


MAQUET
5 04


Intensive Care Unit

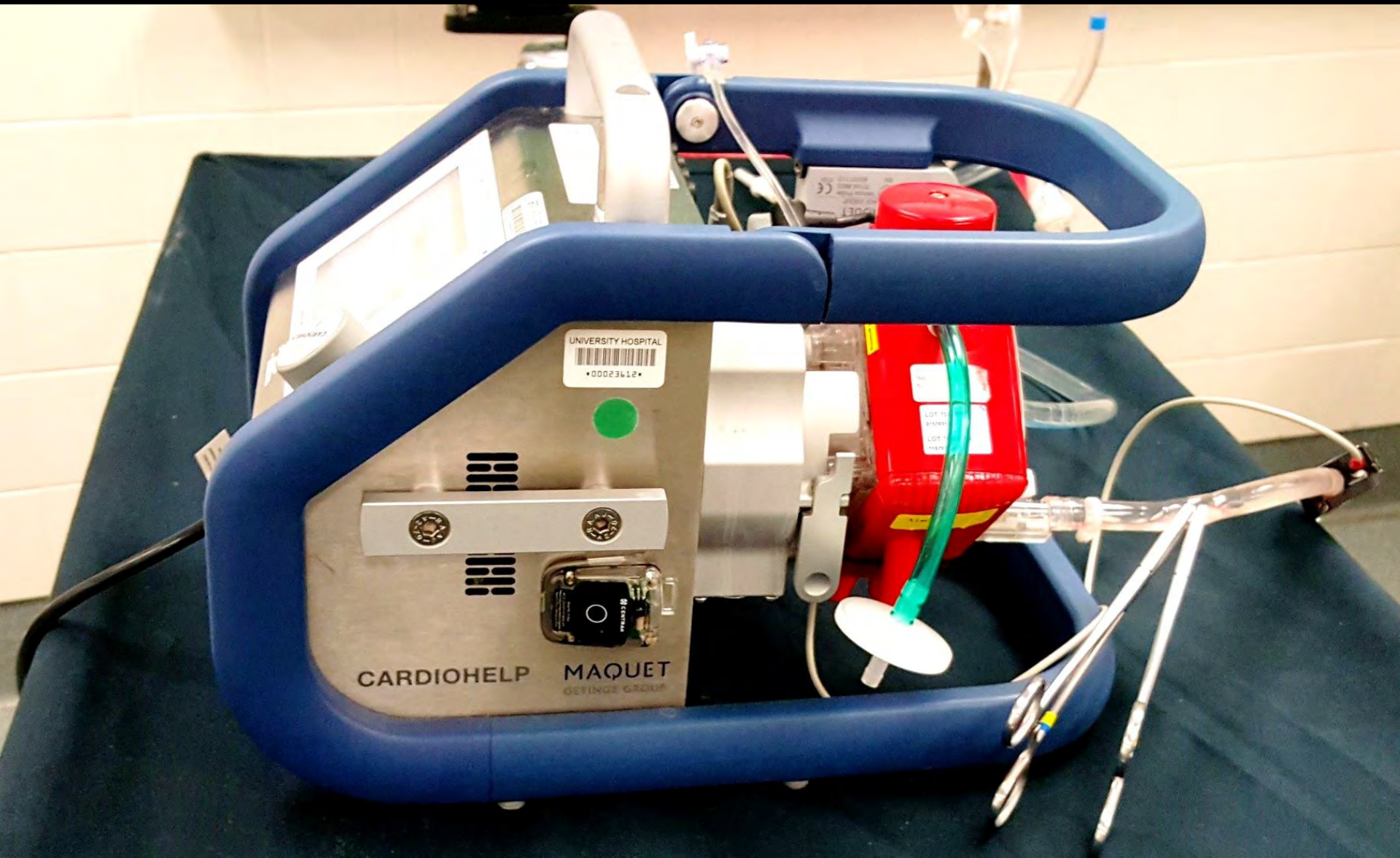
“Emily” with EMS Pioneer, Dr. Vince Mossesso, at the University of Pittsburgh

Paris – SAMU Mobile *"ECMO on the Streets Unit"*

56% survival

of nearly dead patients via ECMO in the field

Portable ECMO Unit –
The size of a Honda Generator



Greg Eubanks

60-years-old

Cardiac Arrest

August 10, 2019

Minneapolis/ St. Paul Airport

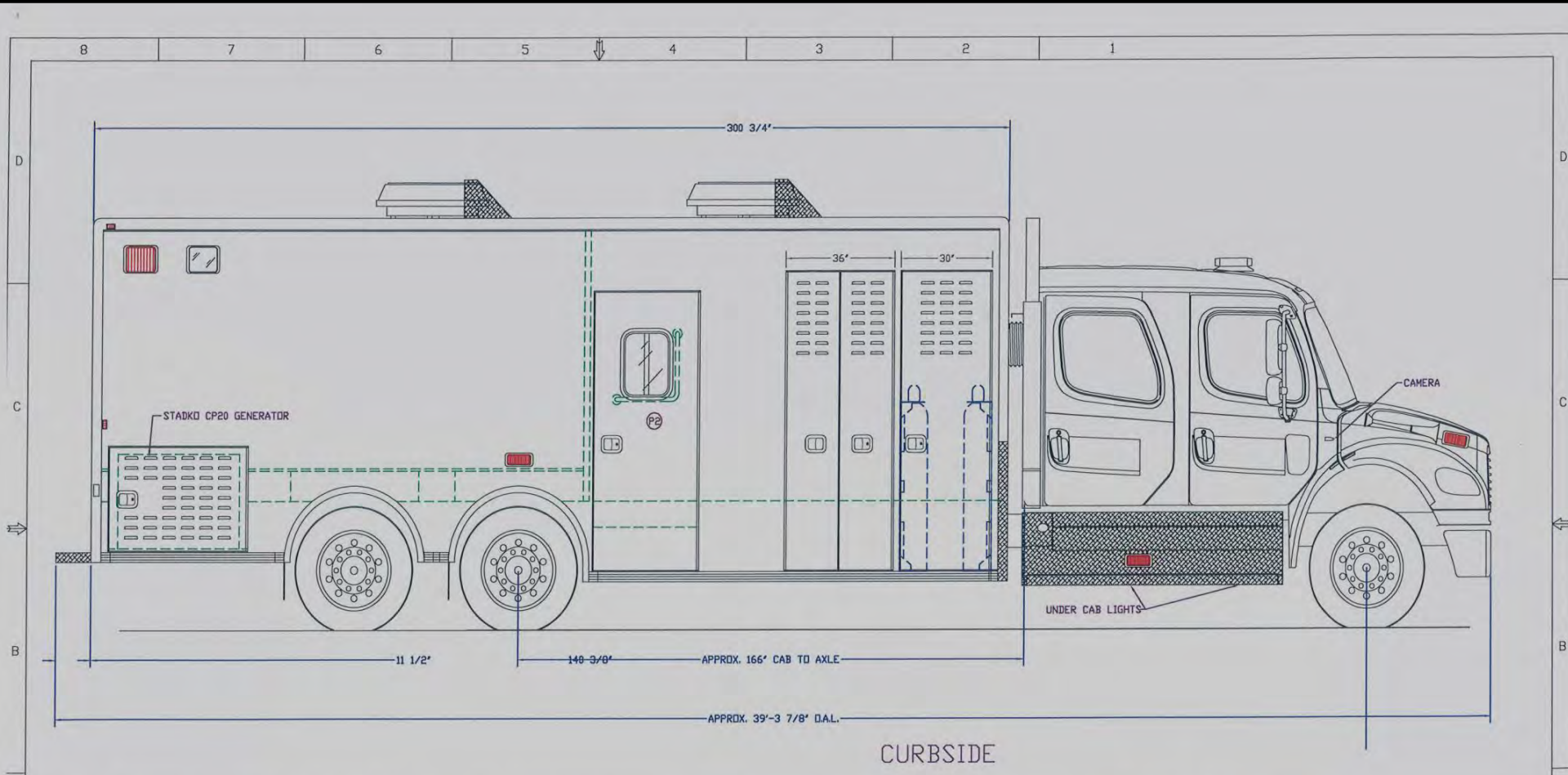
Refractory V-Fib

CPR and AED application in less than 60 seconds by two TSA Agents at the Minneapolis/St. Paul Airport on August 10, 2019

1st use of Elegard Head-Up CPR in conjunction with AC/DC CPR System and LUCAS II at an airport


AJ Hightree

Coming soon = Mobile ER



COMPT.	INTERIOR HEIGHT	PASS-THRU HEIGHT	INTERIOR WIDTH	PASS-THRU WIDTHS	DEPTH	DESCRIPTION
P1	---	---	--	--	--	--
P2	-	--	--	--	--	--
P3	--	--	--	--	--	-

*UPPER SECTION IS ONLY 13 1/2" DEEP

DRAWING NO: UOFM-FHE
DRAWN BY: L.M.
DATE: 5/3/16
SCALE: 1"=32"
REVISION(S): ***

Life Line EMERGENCY VEHICLES
30 Years

1 Life Line Dr.
Sumner, IA 50674

P.O. Box 299
Sumner, IA 50674

DIMENSIONS SHOWN ARE APPROXIMATE AND MAY CHANGE DURING THE CONSTRUCTION PROCESS. Tolerances:


ECMO ALERT
- ETA 15 minutes

Presented by

A.J. Heightman
IEMS Editor-Emeritus
AJ.Heightman@clarionevents.com