

# EPIC eNews

Excellence in Prehospital Injury Care– Traumatic Brain Injuries

Welcome to the EPIC eNewsletter! Keeping you up to date!

## Upcoming Events

**Early 2015: Updated, live video refresher**

**February 13: Resuscitation Academy with EPIC Training**

Registration [here](#)

## In this issue:

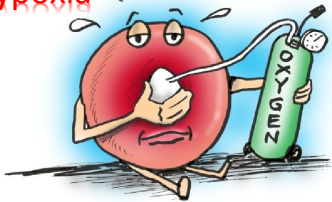
- EPIC TBI Guidelines Review
- Announcements and Updates
- Significance of fluids in TBI
- November Webinar Q&As
- Findings in the EPIC project Resuscitation Science Symposium, American Heart Association Conference



**EPIC-TBI**  
Excellence in Prehospital Injury Care  
Traumatic Brain Injury Project

[epic.arizona.edu](http://epic.arizona.edu)

Hypoxia



Hypotension



Hyperventilation



Hypoglycemia



## EPIC TBI Guideline Review

**Remember: No H-bombs!**

**Hypoxia: Apply high-flow oxygen IMMEDIATELY!**

**Hypotension: Give fluids if SBP is <90 mmHg**

**Hyperventilation: Keep ETCO<sub>2</sub> at 40 mmHg (range: 35-45)**

**Hypoglycemia: Check glucose, treat if below 70 mg/dL**

*When you treat the H-bombs, you treat the injured brain!*

## Test Your EPIC Knowledge

- Are you an EPIC Expert? Answer our Facebook and Twitter EPIC Scenarios each Monday and stay up to date on EPIC care. Be sure to “like” and “follow” us!

facebook.com/epic.tbi  
twitter.com/epic\_tbi

- Our Pocket TBI app is available in the [Google Play Store](#) and [iPhone Apple Store](#). Download the app to have adult and pediatric TBI guidelines on your smartphone for your next TBI patient.

- Stay current with EPIC. Early 2015, refresh with our updated video refresher online. Get CE Credit and learn more about TBI management.

# Hypoxia, Hypotension are deadly companions in TBI

Arizona's work in EPIC was presented November 15 in Chicago at the AHA ReSS Conference. "Although it's well known that hypoxia and hypotension occurring during pre-hospital emergency management of TBI reduce survival in these patients, little is known about

**While hypoxia and hypotension increase mortality by four- and three-fold respectively, when combined, mortality is increased 14 times.**

less than 90 mmHg) are both included in EPIC TBI guidelines because prevention of these

the effect of the combination of these factors," Dr. Spaite noted.

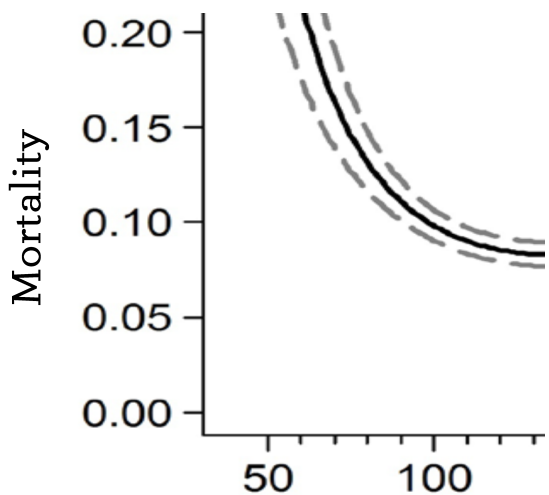
Prehospital treatment of hypoxia (defined as oxygen saturation less than 90%) and hypotension (defined as systolic blood pressure

effects increase likelihood of survival. Aggressive treatment should be implemented immediately, including high flow oxygen via non-rebreather mask or intubation and bag-valve mask as necessary, providing fluids, and prevention of hyperventilation. All healthcare providers automatically ventilate too fast—up to 30/min or more! Hyperventilation reduces blood flow to the injured brain through vasoconstriction. The proper rate of ventilation is 10/min.

## EPIC Finding

Q. EPIC guidelines state systolic blood pressure should always be greater than 90 mmHg. Early findings indicate that the SBP with the lowest mortality rate is 144 mmHg.\* Should we change guidelines higher?

A. NOT YET, but stay tuned. As we collect more data, we will be closer to the answers on this and other questions.



\*graph taken from November 2014 Webinar

## **Arizona EMS is the Best of the Best!**

Your implementation of EPIC guidelines won the Best of the Best Abstract award in Trauma Resuscitation Science at the American Heart Association. **Thank you for being the best EMS!**

## After you transfer care, give your fluids a stare

Did you give your TBI patient fluids because their SBP was <90 mmHg or falling?

**GREAT!**

Now, after you get your transfer of care signature, check the bag of fluids to see how much fluid your patient received by the time of hospital transfer. **DOCUMENT** this amount in your report. **Treat fluids like drug dosages in your documentation.**

The amount of fluids the patient receives is significant to document in order to see how the amount of fluid affects patient outcome.

## Q&As

Answers to Questions Asked at November  
Webinar

Page 1 of 2

***Q: Is there data on patients that are historically hypotensive prior to their TBI accident having adverse reactions to the fluid bolus?***

One study (Haut et al, 2011) showed worse outcomes from fluid administration in trauma patients, but their data was significantly flawed and limited. The most important limitation was that they could not identify which patients actually received fluids or just had an IV catheter placed. This means that they were unable to determine how much (if any) fluid was administered. Also, the patients who received IVs were more seriously injured than those that didn't receive an IV, and there were other significant limitations that make this study far from conclusive in any way.

A different (and admittedly ridiculous) conclusion might be that the mere act of inserting an IV catheter could cause death. A more likely conclusion might be that paramedics are skilled at identifying more seriously injured patients and start IVs more frequently in those patients (who would be more likely to die from their injuries).

We just presented a review of more than 10,000 patients at the Chicago AHA Resuscitation conference that showed that if a patient is hypotensive (even one SBP reading below 90), their likelihood of death triples. We feel confident that following the brain trauma guidelines to treat TBI patients and prevent hypotension (as we are using with EPIC) is good practice.

You may be able to help answer this ongoing controversy.

Please document the volume of fluids were infused in ALL of your patients. This is another example of important prehospital questions that we are working to answer.

***Q: Any updates for the next Master Trainer course?***

We don't have another Master Trainer course scheduled at present. If you need one, please let Kirstin Lathrop know ([kcfullme@email.arizona.edu](mailto:kcfullme@email.arizona.edu)) and we'll make one happen. We want to do all we can to keep the training fresh and current in the field. If you want to know more about what EPIC data is showing, please watch our online courses and presentations ([www.epic.arizona.edu/training](http://www.epic.arizona.edu/training)). We are sharing everything we can as we are learning new information.

***Q: When might you consider and training outside of Arizona?***

EPIC was funded ONLY for Arizona, so we can't train other states or countries. However, we want EPIC implemented everywhere! We want evidence based, excellent care provided to all possible TBI patients. The training is simple, and can be implemented in your agency, wherever that is. You can make a difference!

Resources are available at [www.epic.arizona.edu/training](http://www.epic.arizona.edu/training).

## Q&As

Answers to Questions Asked at November  
Webinar

Page 2 of 2

**Q: *The 90 systolic thing originally came about because the "research" upon which it was based, made the mistake of dichotomizing the SBP data into <90 and >90, losing much information.***

This is an important point. Previously, data was collected from whatever sources were available, and it was not possible to consistently get every blood pressure on prehospital patients.

Various trauma registries may collect data differently—they might collect the highest, lowest, average, first, last, or some other blood pressure.

Since they didn't have large amounts of data, the early work split (or dichotomized) data between "low normal or better" (90mmHg and up) and "low" (less than 90mmHg). Every study afterwards built on that work. They started with pails or wheelbarrows of data and did what they could.

We are collecting dumptrucks full of data, and are able to find out far more.

In EPIC, we collect EVERY blood pressure you record, so we have far more data to analyze and look for trends. We have been able to determine that although a systolic blood pressure of 95 has lower mortality than one of 85, the same is true for every 10mmHg change all the way up to 144 systolic!

**Q: *What strides have been made at the National level as far as data reporting, etc.? Projections for nationwide acceptance?***

No national databank that we are aware of involves the level of detail that we have been compiling in EPIC. The scope and complexity of this project on the data end is tremendous, and could not be done without significant funding such as the National Institutes of Health has provided for this project (and it absolutely could not be done without the effort YOU have put in!).

We gather the data from over 200 agencies in the state and carefully enter all pertinent details into a custom-created, encrypted database. We then use highly skilled data managers and statisticians to check the data for accuracy and then to find out answers from that mass of data.

The work we have done trying to implement the project at agencies across the state has been monumental and couldn't have been done without the involvement of all of the many different EMS agencies.

If we are successful at EPIC (meaning that every EMT or paramedic caring for a possible TBI provides and documents excellent EPIC care), we will show that a project of this magnitude can change patient outcome. If we are successful at this, EPIC will be a model for future efforts to change the outcome from prehospital illness and injuries.

Your participation and full implementation of EPIC guidelines--individually, at the agency level, and at the state level are crucial to making this happen. Thank you for all you do!

# EPIC Certified Agencies

A huge THANK YOU to the following agencies for their commitment to improving both the survival and neurological outcome of TBI patients in Arizona!

|                                   |                                  |                          |                                |
|-----------------------------------|----------------------------------|--------------------------|--------------------------------|
| AeroCare                          | Eloy FD                          | Mesa Fire/Medical Dept   | Scottsdale FD                  |
| AirEvac                           | Flagstaff FD                     | Montezuma-Rimrock FD     | Sedona FD                      |
| American ComTrans                 | Florence FD                      | Mount Lemmon FD          | Sierra Vista FD                |
| American Ambulance                | Fort McDowell FD                 | Mountain Vista FD        | Sonoita Elgin FD               |
| Apache Junction FD                | Fountain Hills/Rural Metro FD    | Native Air               | Southwest Ambulance            |
| Arivaca FD                        | Gilbert FD                       | Navajo Nation EMS        | St. David Volunteer FD         |
| Arizona City FD                   | Glendale FD                      | Nogales FD               | Summit FD                      |
| Arizona Lifeline                  | Globe FD                         | Nogales Suburban Fire    | Sun City FD                    |
| Avondale FD                       | Golden Valley FD                 | Northwest FD             | Sun City West FD               |
| Avra Valley FD                    | Golder Ranch FD                  | Page FD                  | Sun Lakes FD                   |
| Black Canyon FD                   | Goodyear FD                      | Patagonia Fire & Rescue  | Sunnyside FD                   |
| Blue Ridge FD                     | Green Valley FD                  | Payson FD                | Sunsites-Pearce FD             |
| Bouse Volunteer FD                | Greenlee County Ambulance        | Peoria FD                | Surprise FD                    |
| Buckeye FD                        | Guardian Air Transport           | Phoenix FD               | Tanque Verde Valley FD         |
| Buckeye Valley FD                 | Guardian Medical Transport       | Picture Rocks FD         | Taylor Ambulance Service & EMS |
| Bullhead City FD                  | Heber-Overgaard FD               | Pine-Strawberry FD       | Tempe FD                       |
| Camp Navajo FD                    | Highlands FD                     | Pinewood FD              | Tolleson FD                    |
| Camp Verde FD                     | Holbrook EMS                     | PMT Ambulance            | Tombstone Volunteer FD         |
| Canyon State Ambulance Inc. (PMT) | Huachuca City FD                 | Ponderosa FD             | Tonopah Valley FD              |
| Carefree FD (Rural Metro)         | Jerome FD                        | Portal Fire and Rescue   | Tri-Valley Ambulance           |
| Casa Grande FD                    | Joseph City FD                   | Prescott FD              | Tubac FD                       |
| Central Yavapai FD                | Kayenta FD                       | Queen Creek FD           | Tucson FD                      |
| Chandler FD                       | Kearny Fire & EMS                | Regional Fire and Rescue | Tusayan FD                     |
| Christopher Kohl's FD             | LifeLine Ambulance               | Rincon Valley FD         | Verde Valley Ambulance         |
| Clarkdale FD                      | LifeNet – Southern Arizona       | Rio Rico FD              | Verde Valley FD                |
| Cottonwood FD                     | Lifestar Ambulance               | Rio Verde FD             | Whispering Pines FD            |
| Daisy Mountain FD                 | Maricopa County Sheriff's Office | River Medical Inc.       | Wilderness Medics              |
| Department of Public Safety       | Maricopa FD                      | Rural/Metro Corporation  | Yuma FD                        |
| Douglas FD                        | Mayer FD                         | San Luis FD              |                                |
| El Mirage FD                      |                                  | San Simon FD             |                                |

**\*\*If your agency is not listed, please email us: [kcfullme@email.arizona.edu](mailto:kcfullme@email.arizona.edu)**

**Thank you to the Ramsey Social Justice Foundation & Rural/Metro Corporation, for Supplying Arizona's EPIC-Certified Agencies with free Pressure/Flow-Controlled Bags & Ventilation Rate Timers.**

