

# Family Medicine Science Update 2019



Institute for Digital  
Health & Innovation

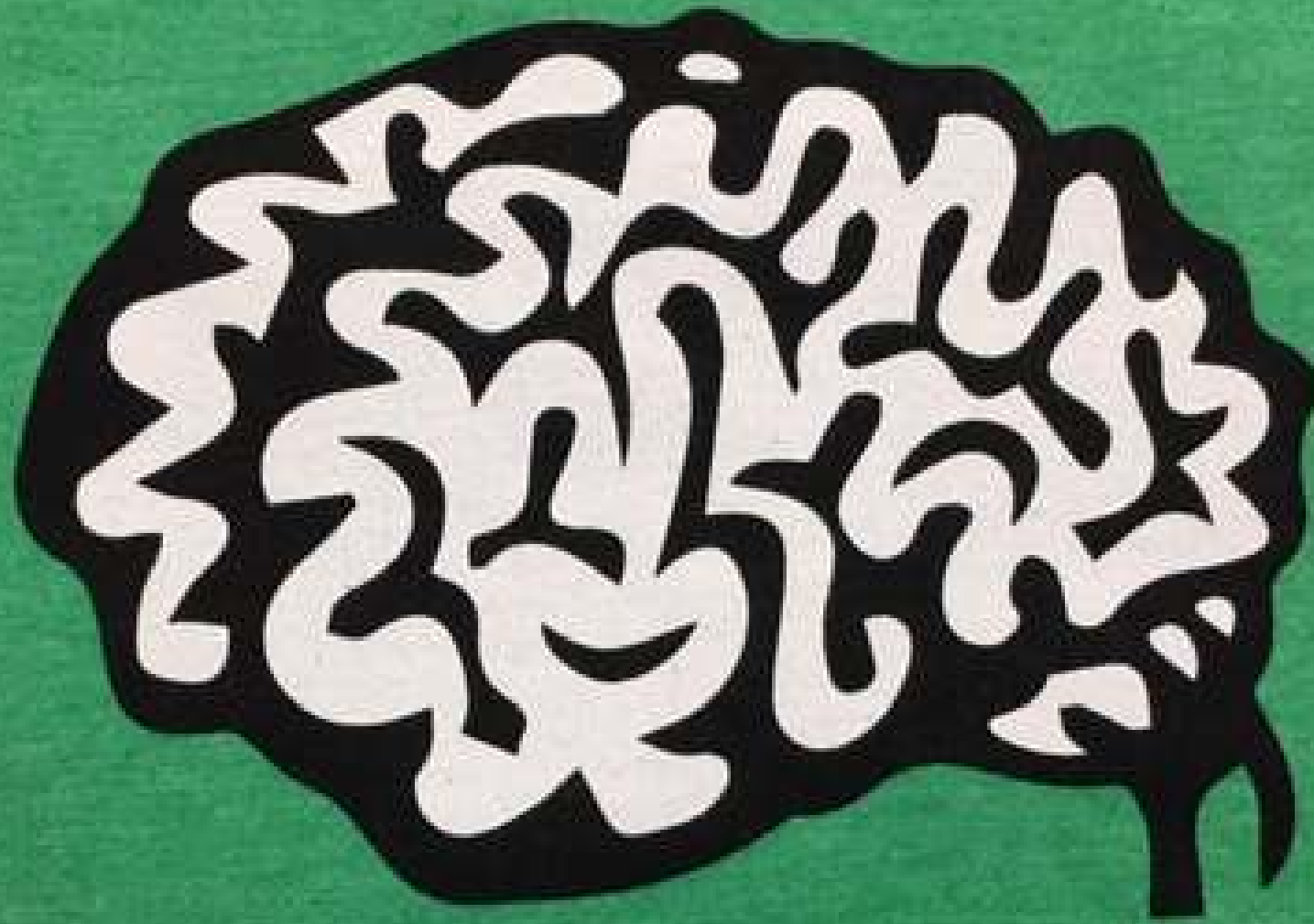
Trauma Rehabilitation  
Resources Program



## Trauma Rehabilitation

October 23, 2019

Rani Lindberg, MD  
Daniel Bercher, PhD



Not all injuries are visible.

# Vision and Mission

- Enable every Arkansan who has sustained a disabling traumatic injury
  - Access to the comprehensive rehabilitation care
  - Reintegration into the community
- Increase awareness of the rehabilitation and lifelong care needs of survivors of traumatic injuries
- Evaluate existing programs
- Educate healthcare professionals
- Identify vital resources for trauma survivors

# Purpose



Institute for Digital  
Health & Innovation

Trauma Rehabilitation  
Resources Program

- Call Center access for instant triage and consultation
  - Trauma rehabilitation survivors and families
  - Healthcare providers
- Enhance quality of life and increase access to resources
  - Patients & Families
  - Rural providers
  - Telemedicine
- Promote health care cost savings through
  - Efficient emergency services utilization
  - Evidence-based health care delivery



Institute for Digital  
Health & Innovation

Trauma Rehabilitation  
Resources Program

# Our Mantra:

- Increase access to medical information
- Improved care for traumatically injured Arkansans
- Decrease ED visits
- Improve Quality of Life through Community Integration

# Mentor State Grant



- TBI Advisory Board/Survivor Engagement
- Underserved Populations
- Waiver and Trust Funds

# Why we care



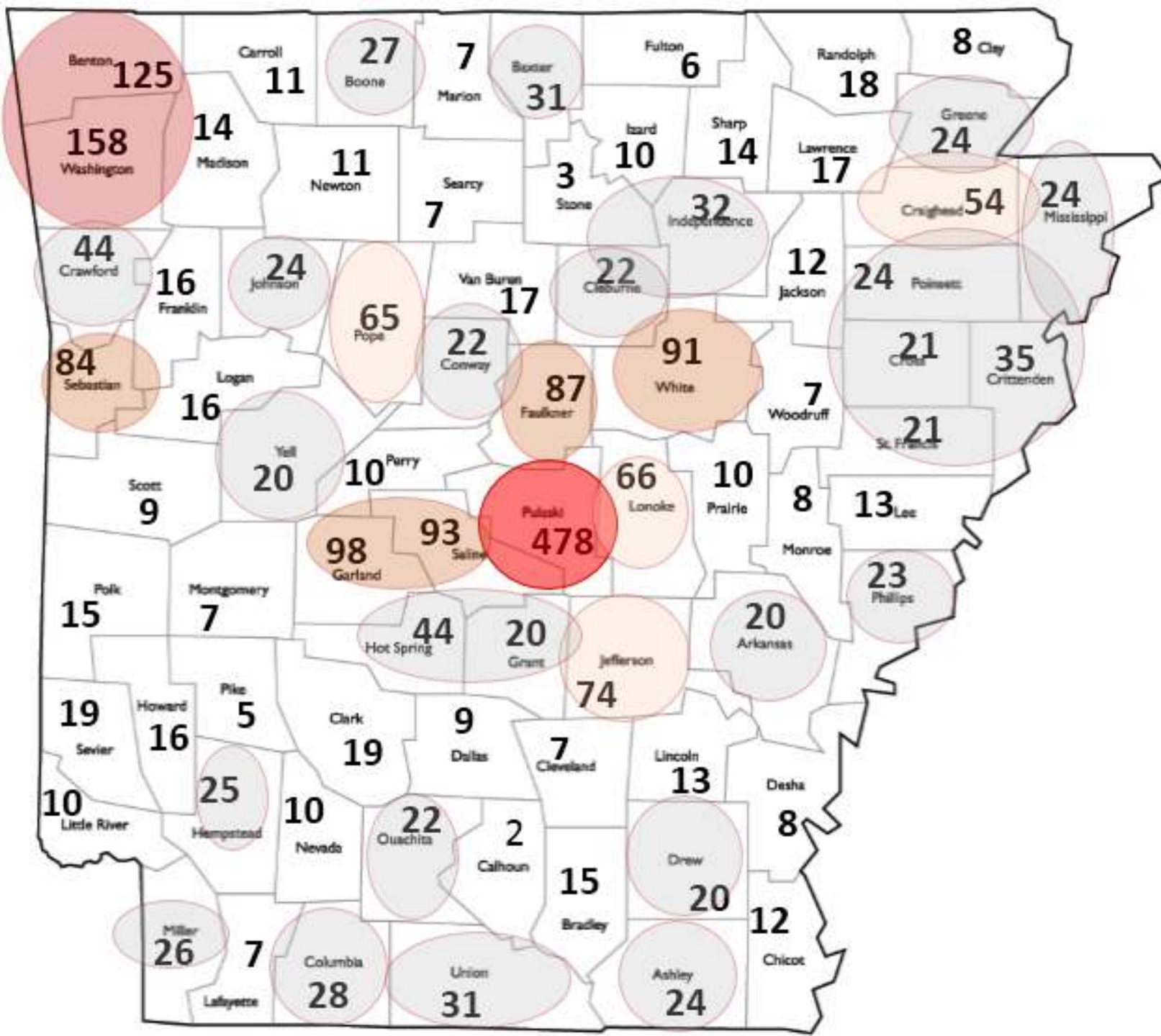
## **TRAUMATIC BRAIN INJURY (TBI)**

- #1 Cause of Disability in U.S.
- Nationwide 1.7 million
- Approximately 300 new survivors each year in Arkansas\*
- Over 8,000 survivors in Arkansas\*

\*Moderate to Severe TBIs

## **SPINAL CORD INJURY (SCI)**

- Nationwide 12,000 New Survivors of SCI yearly
- Approximately 200 new injuries every year
- Approximately 2,520 SCI Survivors in Arkansas

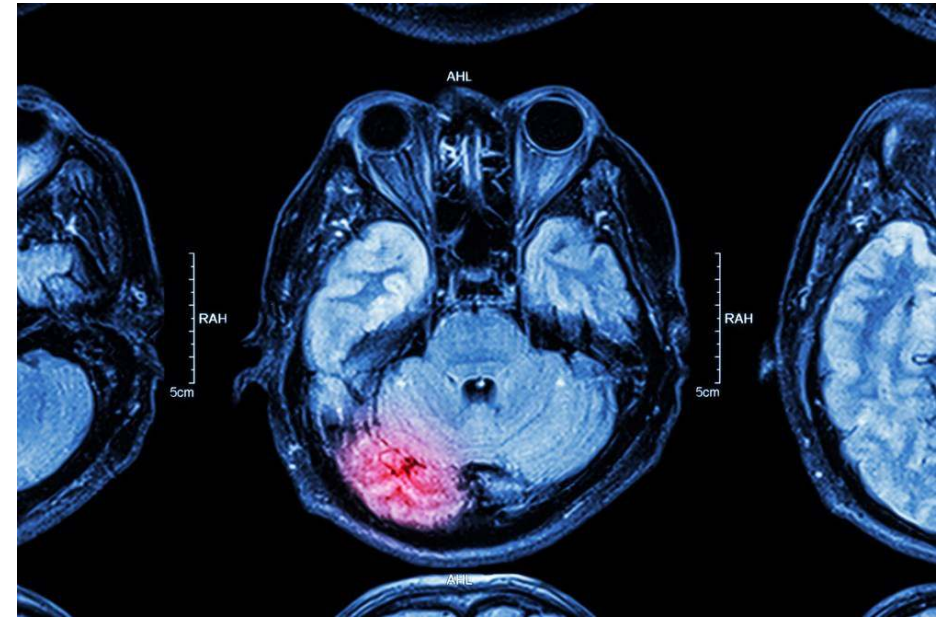


ASCC 2017

2545



# Traumatic Brain Injuries



- 113.4 million TBIs in Emergency Departments – 2013
- 33.4 million Hospitalizations - 2013
- 2.6 million Deaths – 2013

[https://www.cdc.gov/mmwr/volumes/66/ss/ss6609a1.htm?s\\_cid=ss6609a1\\_w](https://www.cdc.gov/mmwr/volumes/66/ss/ss6609a1.htm?s_cid=ss6609a1_w) (accessed on 10/23/2018)

- 556,000 TBIs in Emergency Departments - 2015

Rui P, Kang K. National Hospital Ambulatory Medical Care Survey: 2015 Emergency Department Summary Tables. Available from: [http://www.cdc.gov/nchs/data/ahcd/nhamcs\\_emergency/2015\\_ed\\_web\\_tables.pdf](http://www.cdc.gov/nchs/data/ahcd/nhamcs_emergency/2015_ed_web_tables.pdf) (accessed 10/23/2018)

# Annual TBI Mortality Costs (2010)

## U.S.

- 61,354 Deaths
- Medical
  - Average \$9,008
  - Total \$552.7 million
- Work Loss
  - Average \$576,645
  - Total \$35.4 billion
- Combined
  - Average \$585,654
  - Total \$35.9 billion

## Arkansas

- 719 Deaths
- Medical
  - Average \$7,465
  - Total \$5.4 million
- Work Loss
  - Average \$696,202
  - Total \$500.6 million
- Combined
  - Average \$703,667
  - Total \$505.9 million



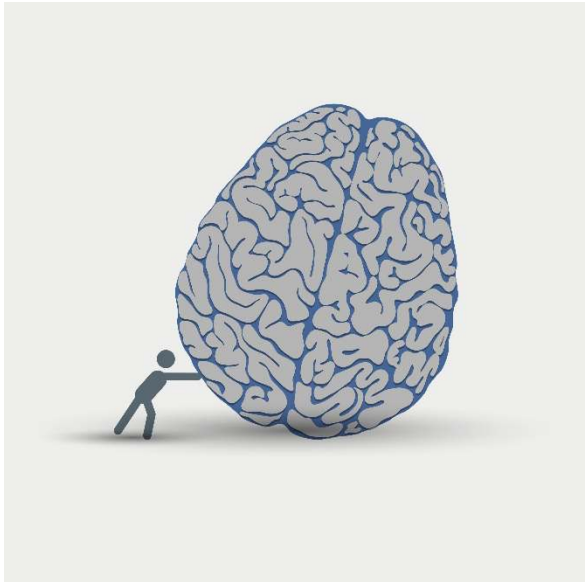
# US Annual TBI Cost of Nonfatal Injuries (2010)

- 340,293 Hospitalizations
- Medical
  - Average \$79,190
  - Total \$26.9 billion
- Work Loss
  - Average \$179,137
  - Total \$61.0 billion
- Combined
  - Average \$258,326
  - Total \$87.9 billion

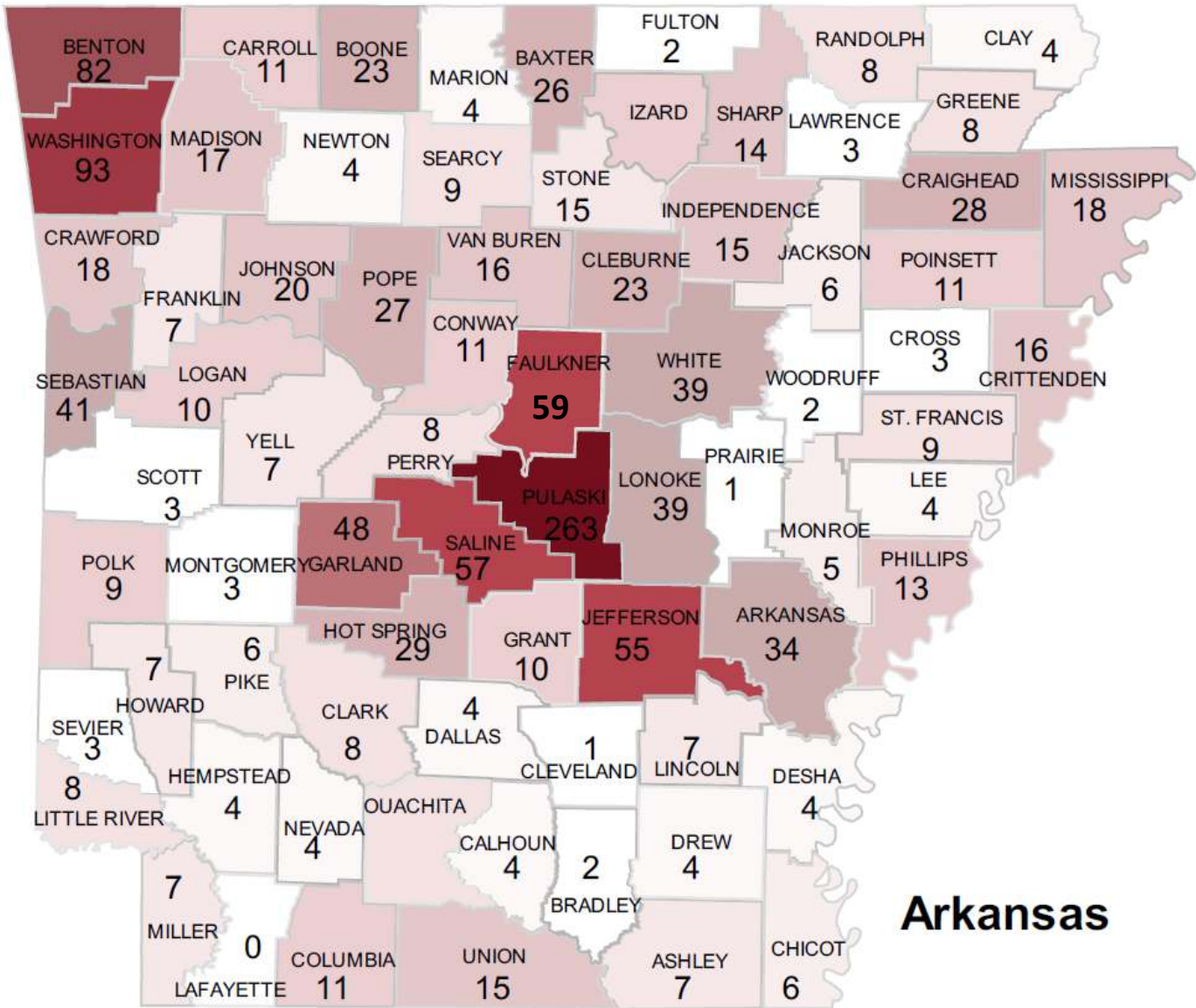


[www.cdc.gov/injury/wisqars](http://www.cdc.gov/injury/wisqars) accessed 10/23/2018

# TBIs per county (n = 1415)

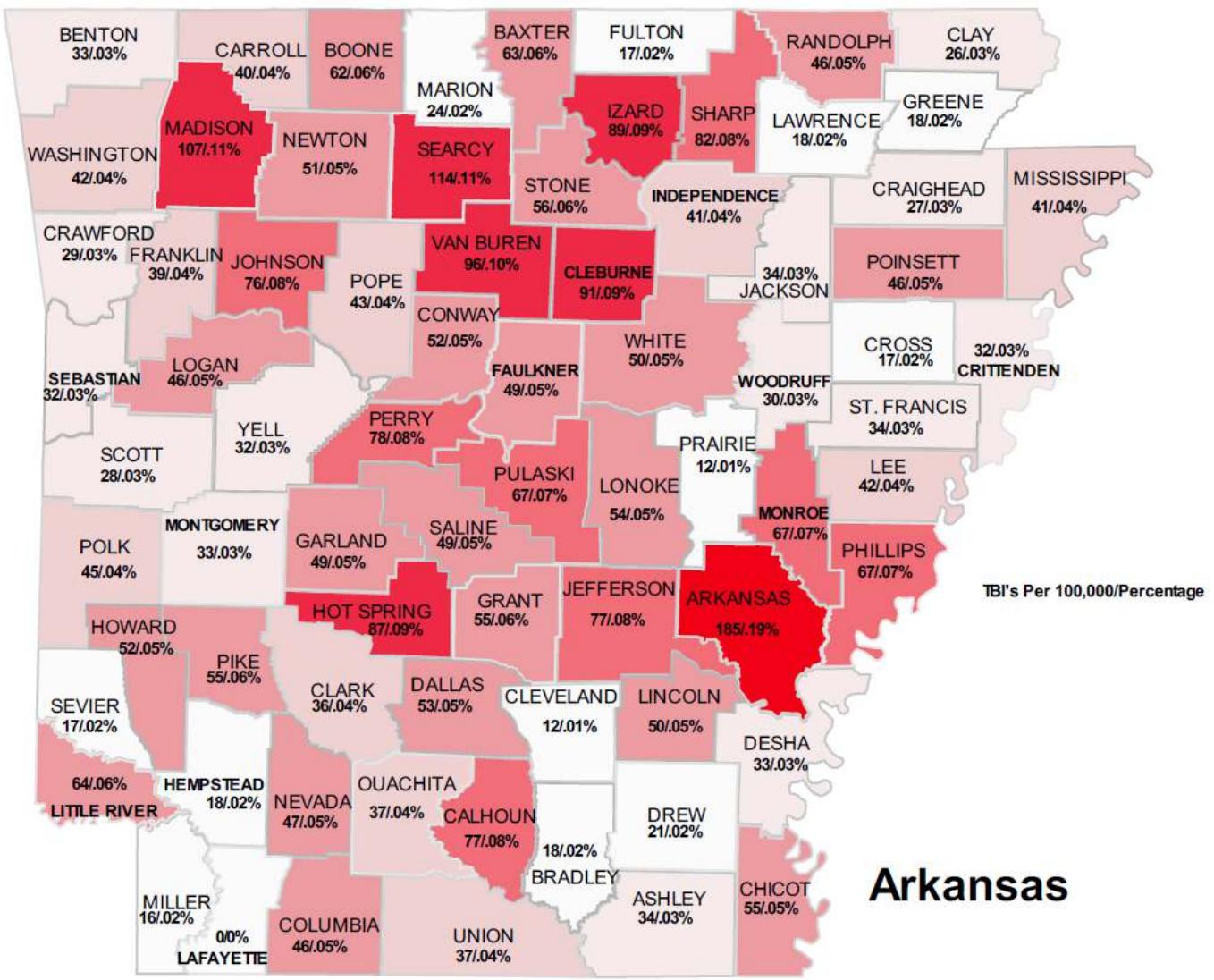


Moderate to Severe TBI  
Survivors  
2018





# TBIs per 100,000



# Traumatic Brain Injury Registry - Annual Referrals by Discharge Disposition/Destination\*

## for Year: 2018

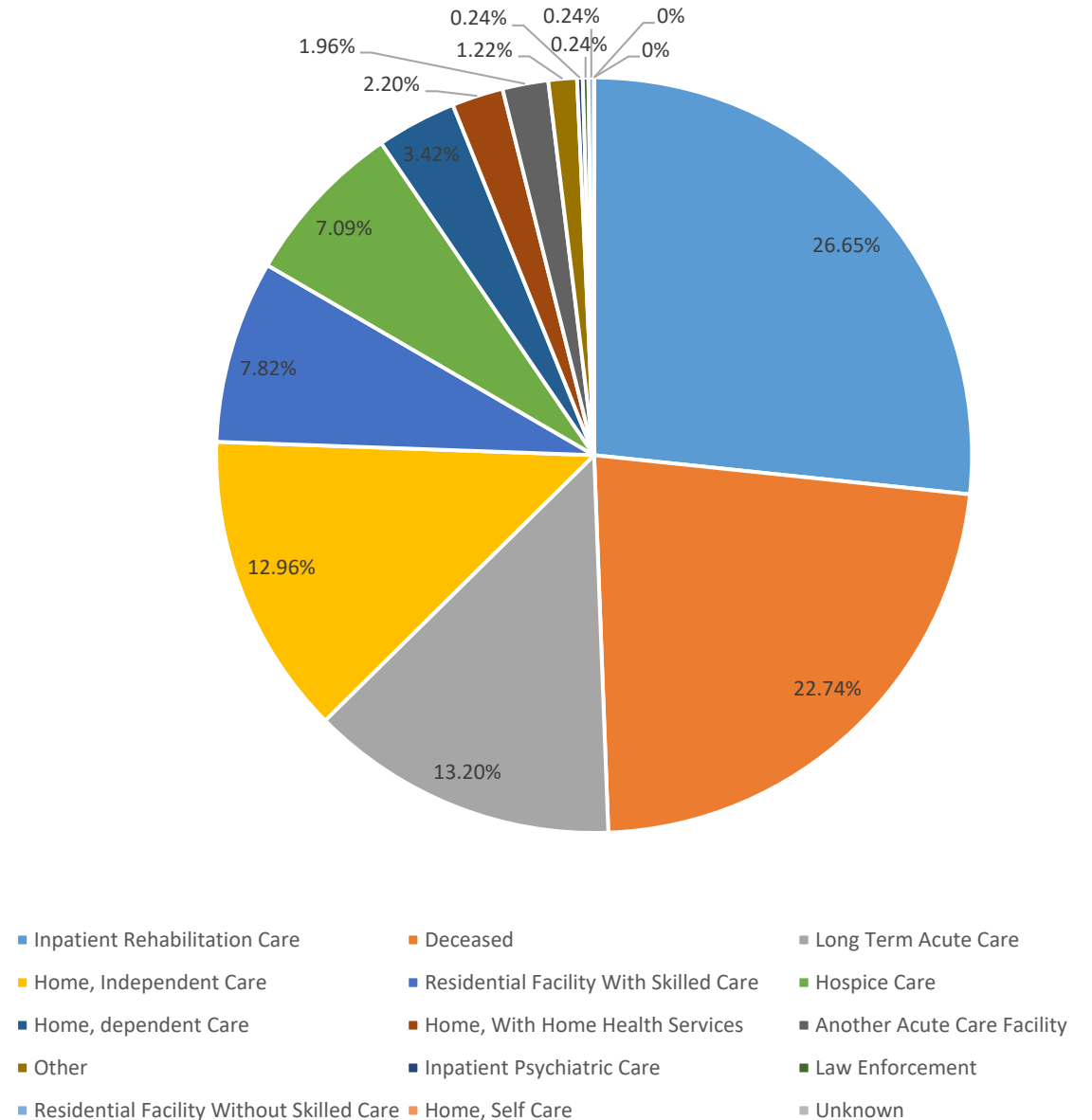
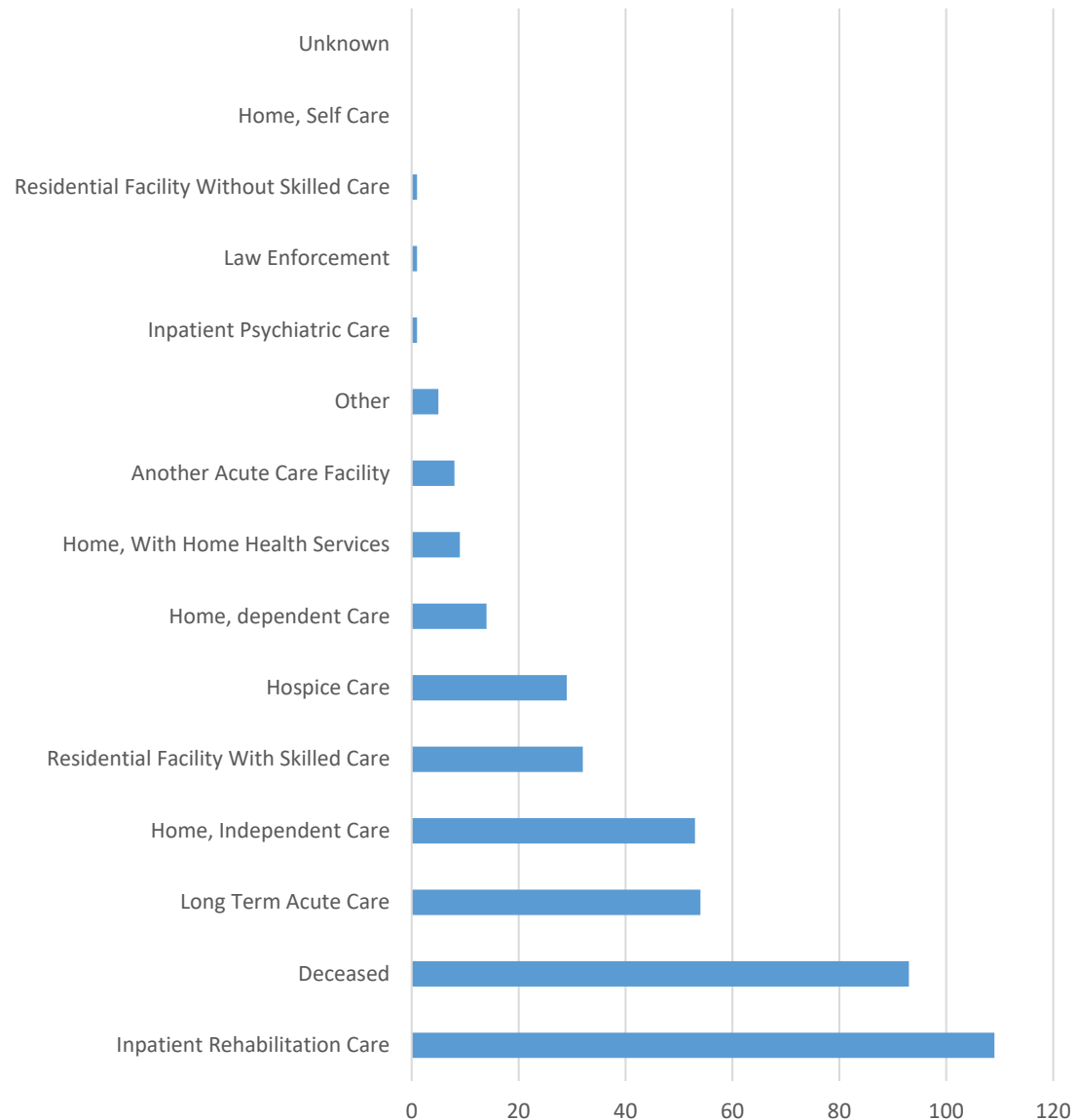
**Total # of Referrals: 409**

Disposition/Destination	# of Referrals	% of Total	% Change from prior year	Vent at intake	Vent at discharge**
Another Acute Care Facility	8	1.96%	-1.47%	6	1
Deceased	93	22.74%	5.62%	78	NR
Home, dependent Care	14	3.42%	2.69%	13	NR
Home, Independent Care	53	12.96%	8.07%	31	2
Home, Self Care	0	0%	0%	NR	NR
Home, With Home Health Services	9	2.2%	0.73%	6	NR
Hospice Care	29	7.09%	1.22%	11	2
Inpatient Psychiatric Care	1	0.24%	0%	1	NR
Inpatient Rehabilitation Care	109	26.65%	-1.47%	87	3
Law Enforcement	1	0.24%	-0.49%	1	NR
Long Term Acute Care	54	13.2%	1.47%	45	18
Other	5	1.22%	0.24%	2	2
Residential Facility With Skilled Care	32	7.82%	-0.98%	13	2
Residential Facility Without Skilled Care	1	0.24%	0.24%	NR	NR
Unknown	0	0%	0%	NR	NR
<b>Total Vent Status</b>				294	30

\* Vent status on registry is presented as a single checkbox rather than yes/no, which may affect accuracy.

\*\* In many cases, the patients recorded with vents at intake vs. those at discharge are not the same patient.

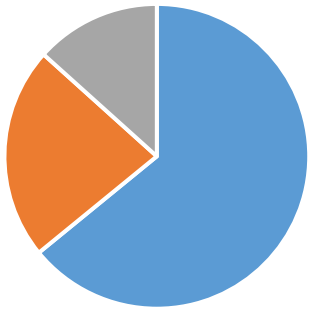
# Arkansas TBI Disposition/Destination 2018



# Moderate/Severe TBI Discharge Disposition

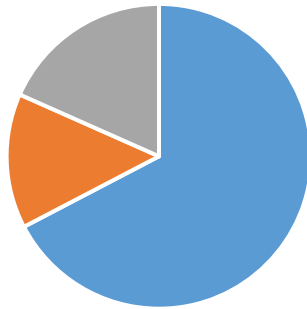
- In rank order, most go home, rehabilitation, then subacute care

CDC CNIS (n=15,646)



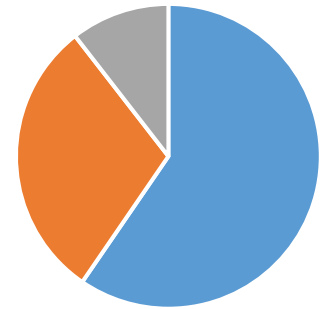
■ Home ■ Rehabilitation ■ Subacute ■

NTDS (n=52,012)



■ Home ■ Rehabilitation ■ Subacute ■

NSCOT (n=1286)



■ Home ■ Rehabilitation ■ Subacute ■

Arch Phys Med Rehab 2011; 92; 721-729

- 48.7% of Moderate to Severe TBI Coloradoans had significant disability 1 year post-injury

Arch Phys Med Rehab 2004; 85 (4 Suppl 2) S73-81



**TABLE 6.** Patient Readmission Status and Post-Acute Care Costs by Diagnosis, 2007-2012

	<b>READMITTED</b>			<b>NOT READMITTED</b>			
<b>DIAGNOSIS</b>	<b>N</b>	<b>TOTAL POST- ACUTE CARE COSTS</b>	<b>MEAN POST- ACUTE CARE COSTS</b>	<b>N</b>	<b>TOTAL POST- ACUTE CARE COSTS</b>	<b>MEAN POST- ACUTE CARE COSTS</b>	<b>READMISSION PERCENT</b>
<b>TBI</b>	97	\$3,608,992	\$37,206	121	\$1,295,940	\$10,890	44.5%
<b>SCI</b>	79	\$3,759,357	\$47,587	68	\$538,225	\$8,410	53.7%
<b>TAL</b>	5	\$289,709	\$57,942	9	\$55,129	\$6,126	35.7%
<b>TOTALS</b>	<b>181</b>	<b>\$7,658,059</b>	<b>\$42,310</b>	<b>198</b>	<b>\$1,889,295</b>	<b>\$9,840</b>	<b>47.8%</b>
<i>Patients &lt;65 years of age.</i>							

Tilford, J.M., Porter, A., Scheel, J., Boyd, M., Pullman, M. (2013). Hospitalizations and Medical Care Costs of Serious Traumatic Brain Injuries, Spinal Cord Injuries and Traumatic Amputations.

# Re-hospitalization

- High Probability of readmission rates to acute care within 1 year
- First year average re-hospitalizations 1.37 times (N=951)
- Most common health conditions
  - Urinary system
  - Respiratory system
  - Skin
- Average stay 15.5 day



DeJong, G., Tian, W., Hsieh, C., Junn, C., Karam, C., Ballard, P., Smout, R., Horn, S. D., Zanca, J. M., Heinemann, A. W., Hammond, F. M., Backus, D. (2013). Rehospitalization in the First year of Traumatic Spinal Cord Injury After Discharge from Medical Rehabilitation. *Archives of Physical Medicine and Rehabilitation*. 94(2) pp. 87-97 Retrieved from <http://dx.doi.org/10.1016/j.apmr.2012.10.037>

Tilford, J.M., Porter, A., Scheel, J., Boyd, M., Pullman, M. (2013). Hospitalizations and Medical Care Costs of Serious Traumatic Brain Injuries, Spinal Cord Injuries and Traumatic Amputations.

\*Medicaid numbers

# Mild Traumatic Brain Injuries

(the other silent epidemic)

- Represent 75% of all TBIs (16-25% not seen!!!)
- Incidence of approximately 1,200 TBIs annually in Arkansas
- Not tracked by Trauma System or TBI Registry

Mild	Moderate	Severe
Normal Structural Imaging	Normal or Abnormal Imaging	Normal or abnormal Imaging
LOC = 0-30 min	LOC > 30 min<24 hr	LOC > 24 hr
AOC = from moment to 24 hr	AOC > 24 hr severity (other)	
PTA = 0-1 day	PTA > 1 and < 7 days	PTA > 7 days
GCS = 13-15	GCS = 9-12	GCS = 3-8

AOC = Alteration of Consciousness

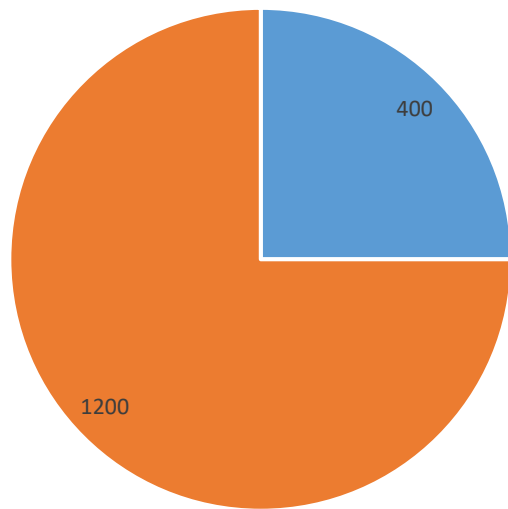
PTA = Posttraumatic Amnesia

# TBI Survivor Return to Work

- 10-40% Employment Post Injury
- 1600 TBIs
- 160 to 640 employed

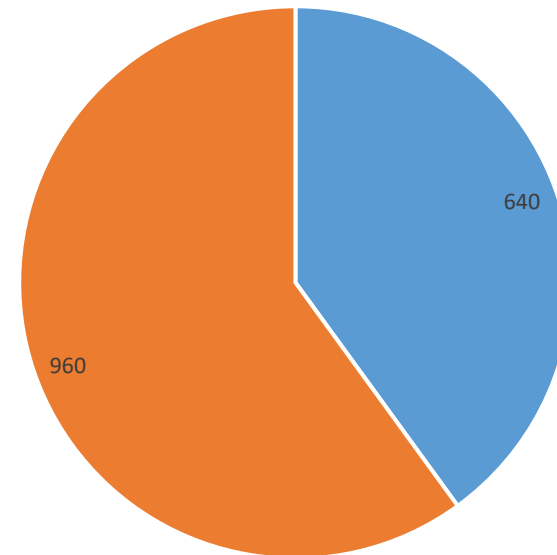


Estimate of all Ark. TBIs



■ Moderate to Severe ■ Mild

TBI Employment (Best Case)



■ Employed ■ Unemployed

# Why TBIs vs SCIs?

	TBIs	SCIs
Registry	Yes	Any spinal cord disability
Supportive Agency	IDHI-Trauma Rehab.	Arkansas Spinal Cord Commission (ASCC) & IDHI-Trauma Rehab
Case Management	None	15 managers in 10 field offices
Mandatory Reporting	Yes	Yes
24 hour Call Center	TRIUMPH	TRIUMPH
Resource Assistance	IDHI-Trauma Rehab. & ASCC Websites	IDHI-Trauma Rehab. & ASCC Websites
Advisory Board	Not officially sanctioned	Ark. Spinal Cord Commission

# TBI Rural & Mental Health Issues

- Readmission rate of 43.9% in Arkansas
- Mental disorders including psychosis, depression, dementia, and organic nervous system
- Chronic diseases

Gardner, et al. Trauma Surgery & Acute Care (2018)





# TBI Mental Health & Substance Abuse

- High Prevalence
  - Substance abuse 34%
  - Depression 11.1%



Silver, et al. Brain Injury (2001)

# TBI Older Adults & Unintentional Falls

- Adults 75 years +
    - 361,738
    - Highest rate of all TBI age groups (2,232/100,000) except 15-24 & 25-34 years
- [https://www.cdc.gov/mmwr/volumes/66/ss/ss6609a1.htm?s\\_cid=ss6609a1\\_e#T3\\_down](https://www.cdc.gov/mmwr/volumes/66/ss/ss6609a1.htm?s_cid=ss6609a1_e#T3_down)  
accessed 10/23/2018





# Incarcerated or Formerly Incarcerated TBIs

- Increased risk of suicide
- Unintentional injuries
- Unintentional falls

Steffens, et al. American Journal of Psychiatry (2018)



# TBI Intimate Partner Violence

- Under-reported intimate partner violence
- Domestic violence shelters
- 60% had TBIs

Monahan, K. Journal of Neurology Neuromedicine (2018)

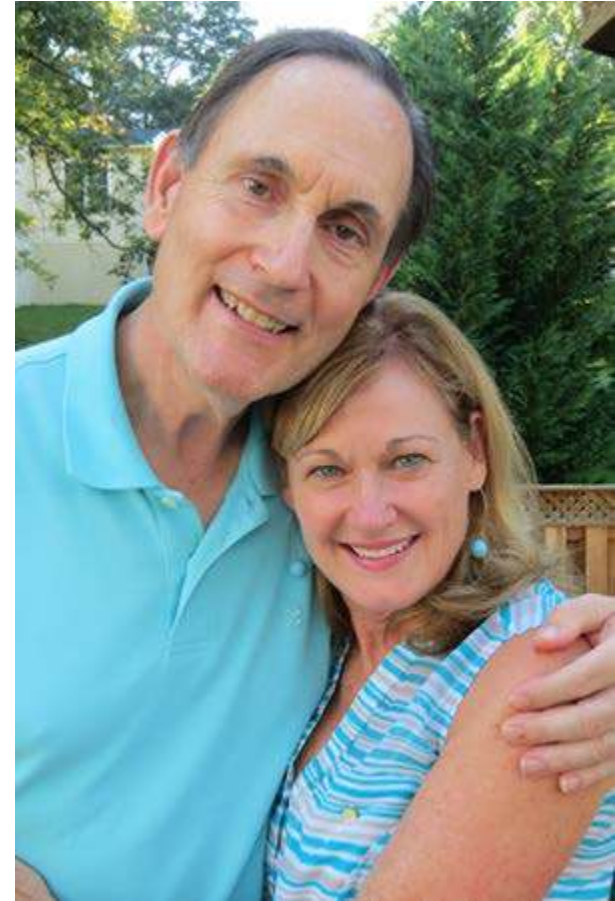


# TBI Caregivers

- Literature Review

- Caregiver life changes and appraisal
- Depressive symptoms, Coping, Well-being, Caregiver burden
- Social problem-solving abilities, Community integration
- Family assessment, Health-related quality of life, Alcohol use, Advocacy
- Skill application, intentions, knowledge about TBI
- Level of informed, Anxiety and other common psychiatric problems
- Functional status after TBI, Balance, Composite outcome
- Conversational skills, Self-esteem

Kreitzer, Kurowski & Bakas. Archives of Physical Medicine & Rehabilitation  
(2018)



# What Can We Do

- Education

- Patient
  - Professional

- Easy 24 hr Access

- TRIUMPH CALL CENTER
    - Patient
    - Professional



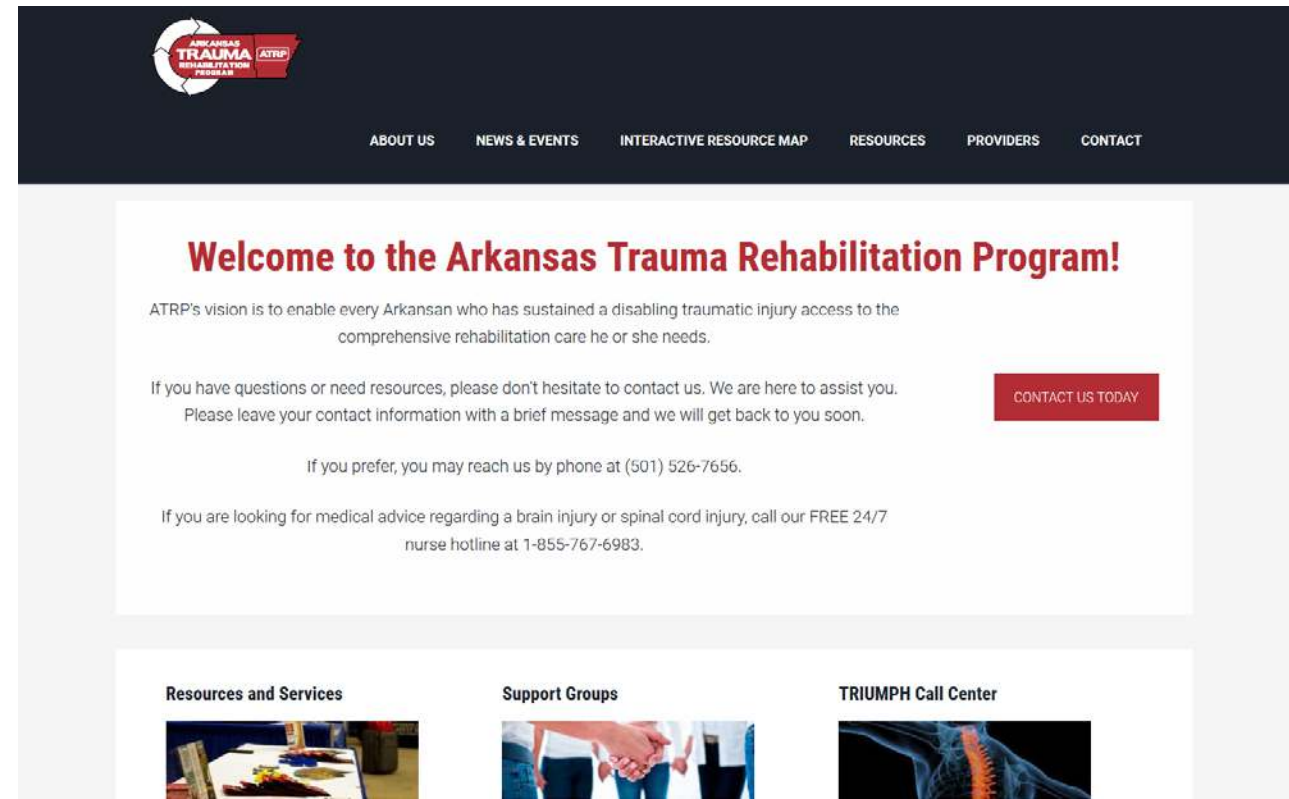
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Trauma Rehabilitation  
Resources Program

# Trauma Rehab Disability Resource Website

<https://atrp.arkansas.gov/>

- Initial Program began in February, 2014.
- Ultimate goal to become the “go to” website for
  - Healthcare Professionals
  - Survivors
  - Families/Support network
- Upon hospital discharge
  - Planners can locate appropriate resources for patients based upon
    - Location
    - Changing Conditions





# Education for Healthcare Professionals

- Clinical Management Guidelines
- Educational Webinars
- Continuing Education



# Education for Healthcare Professionals

<http://pmr.uams.edu/clinics-physicians/telemedicine/>

**UAMS**  
University of Arkansas for Medical Sciences

Physical Medicine and Rehabilitation

Search for:

[Home](#) [What is PMR?](#) [Residency](#) [Med Student Curriculum](#) [Chairman's Message](#) [Clinics & Physicians](#) [General Info](#)

TRIUMPH CALL CENTER PROGRAM

**TRIUMPH Guidelines**

TRIUMPH Patient Education

TRIUMPH VIDEOS

Home > Clinics & Physicians > TRIUMPH CALL CENTER PROGRAM > TRIUMPH Guidelines

## TRIUMPH Guidelines

### TBI

[Management of Altered Mental Status in the Patient with Post Traumatic Brain Injury](#)

[Management of Post Traumatic Brain Injury Headache](#)

[Management of Post Traumatic Brain Injury Agitation](#)

[Management of Seizures in the Patient with Post Traumatic Brain Injury](#)

### SCI


[TRIUMPH Medical Management Spasticity](#)

[Guidelines for Autonomic Dysreflexia](#)

[Guidelines for Neurogenic Bladder](#)

[Guidelines for Neurogenic Bowel](#)

[Guidelines for Pressure Ulcers](#)



# More HCP Education

<https://learnondemand.org>



**Dr. Thomas Kiser**



**Dr. Rani Lindberg**

The screenshot shows the UAMS LearnOnDemand CME/CE Portal. At the top, there is a red header with the UAMS logo and the text "UNIVERSITY OF ARKANSAS FOR MEDICAL SCIENCES". To the right of the header, there are links for "Colleges Institutes Research Hospitals & Clinics Employment Giving Newsroom", "Login | Help", and "Learn on Demand". Below the header is a navigation bar with links: "LOD Home", "Dashboard", "Departments", "Educational Events", "CE Requests", "My Profile", and "About this Site". The main content area has a welcome message: "Welcome to the LearnOnDemand UAMS CME/CE Portal". Below this is a large blue logo with the letters "LOD" and a play button icon, with the text "learnondemand.org" underneath. There are two columns of content. The left column is titled "Online Professional Education" and contains a list of programs: "TRIUMPH - Autonomic Dysreflexia" and "TRIUMPH - Neurogenic Bladder Management in Adults". The right column is titled "Weekly LIVE Teleconferences" and contains a list of programs: "ONE Team - A Preeclampsia Primer". Each program entry includes a small icon, the program title, a brief description, and accreditation information.

UAMS.EDU Colleges Institutes Research Hospitals & Clinics Employment Giving Newsroom

**UAMS**  
UNIVERSITY OF ARKANSAS  
FOR MEDICAL SCIENCES

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Learn on Demand

Search for activities Search

LOD Home Dashboard Departments Educational Events CE Requests My Profile About this Site

Welcome to the LearnOnDemand UAMS CME/CE Portal

**LOD**  
learnondemand.org

Online Professional Education

Click **View Details** to see the program information.  
Click the program title to begin the activity

**TRIUMPH** - Autonomic Dysreflexia  
Dr. Kiser discusses AD and reviews the current treatment guideline.  
Accreditation: AMA PRA Category 1 Credit™ 1.0 Credits, ANCC 1.0 Contact Hours

**TRIUMPH** - Neurogenic Bladder Management in Adults

Weekly LIVE Teleconferences

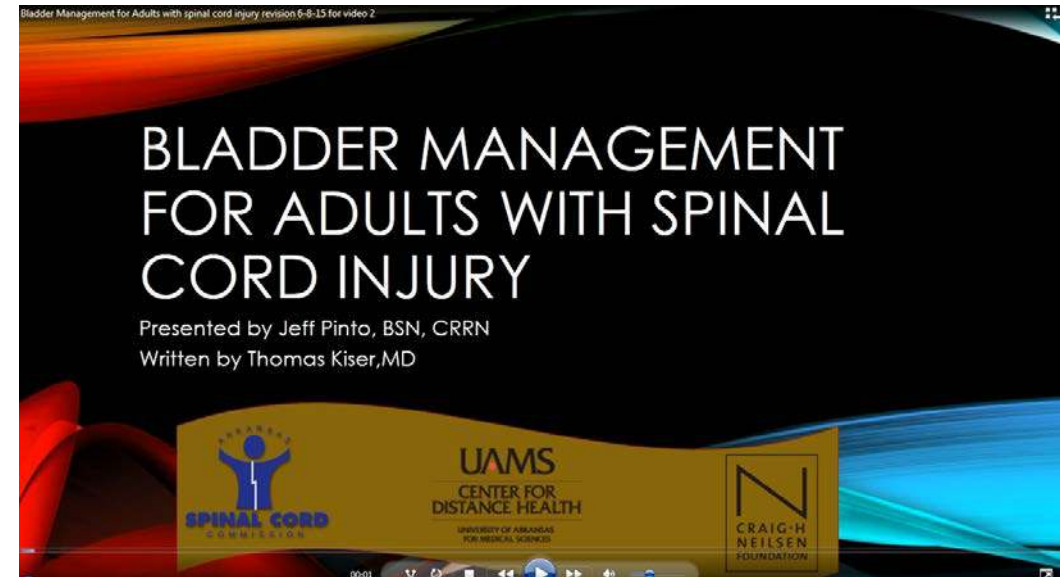
Click **View Details** to see the program information.  
Click the program title to begin the activity.

**ANGELS** ONE Team - A Preeclampsia Primer  
Speaker: Erin Bush, MA, RNC-MNN  
Accreditation: ANCC 1.0 Contact Hours



[PMR.uams.edu/clinics-physicians/telemedicine/](http://PMR.uams.edu/clinics-physicians/telemedicine/)

- FREE CEUs
- Interactive content
- Videos



# BRAIN INJURY

Brain Injury

Anatomy of the Brain

Tests

Coping with an Injury



# UNDERSTANDING SPINAL CORD INJURY

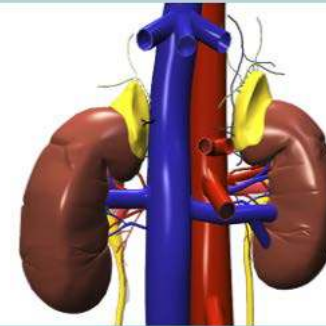
## Neurogenic Bowel Management



Bladder Mgmt. for Adults with Spinal Cord Injury


[Resources](#) | [Glossary](#)

## Bladder Management for Adults with Spinal Cord Injury



# TBI Survivor Outreach

- Newsletter
- Regional Events
- Follow-up
  - Calls
  - Home Visits
- Telemedicine
- TRIUMPH Call Center



# BRAIN Waves

Good Vibes for the Arkansas Brain Injury Community


VOL. 1, Issue 2, Spring 2019

## HOME ACTIVITIES WITH THERAPEUTIC BENEFITS


Many brain injury survivors report having a "loss of self" or purpose once they return home. It is important to practice home management skills to continue the benefits of therapy. Aside from exercise routines, therapists may prescribe daily activities for survivors to complete in the home environment. Because they require "dual-tasking" (where a physical task is coupled with a cognitive task), those daily chores or to-do's can be therapeutic.

For example, unloading the dishwasher not only works on cleaning the kitchen, but also on memory, sequencing, planning, processing; all higher executive skills required in the "outside world." From a mobility standpoint, that very task is working on negotiating around obstacles, gait, balance, reaching, and strength.

It would be a good idea to think of each room in the home as a therapeutic area. For instance, think about all the physical and mental steps doing laundry requires— carrying the clothes basket, sorting clothes, deciding the water amount and temperature, loading and unloading the machine, folding, and putting the clothes away. It may be a somewhat boring chore, and it may take all day. However, at the end of this task the survivor has not only helped around the home, but they have worked on making improvements in their balance, coordination, walking, memory, safety and judgement.



## ASK the Specialist



Maritza Dominguez, PT, CBIS  
NeuroRestorative Timber Ridge

There are many other ways to incorporate therapy outside of the home as well. Playing outdoor games such as bocce ball and baggio improve grasp/release, hand-eye coordination, dynamic balance and from a social perspective— time with friends and family, turn-taking, and sportsmanship.

So, the next time extended hours on the couch seem all too routine, get off the couch and begin your therapy session right in the comfort of your home! Not only do completing household chores assist in filling the survivors' schedule, but more importantly, finishing meaningful tasks instills a sense of purpose.



Suggest a topic! Email us at [atrp@uams.edu](mailto:atrp@uams.edu)

Brain Waves Spring 2019



# TRIUMPH Call Center: What Can We Do

- Education

- Patient
- Professional

- Easy 24 hr Access

- TRIUMPH CALL CENTER
  - Patient
  - Professional



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Trauma Rehabilitation  
Resources Program

# TRIUMPH Call Center

- 24 hour Assistance
- Individuals living with SCI or TBI
- Health care Professionals
- Families



# TRIUMPH Call Center

- Health Care Professionals

- Home Health Care givers
- Family Practice Offices
- Emergency Rooms
- Care Management
- General Questions
- Referrals

- Patients & Families

- Medical information
- Medication refills
- Appointments
- Resources
  - Transportation
  - Medical Equipment
  - Clinics



# TRIUMPH Call Center

- Common Medical Calls

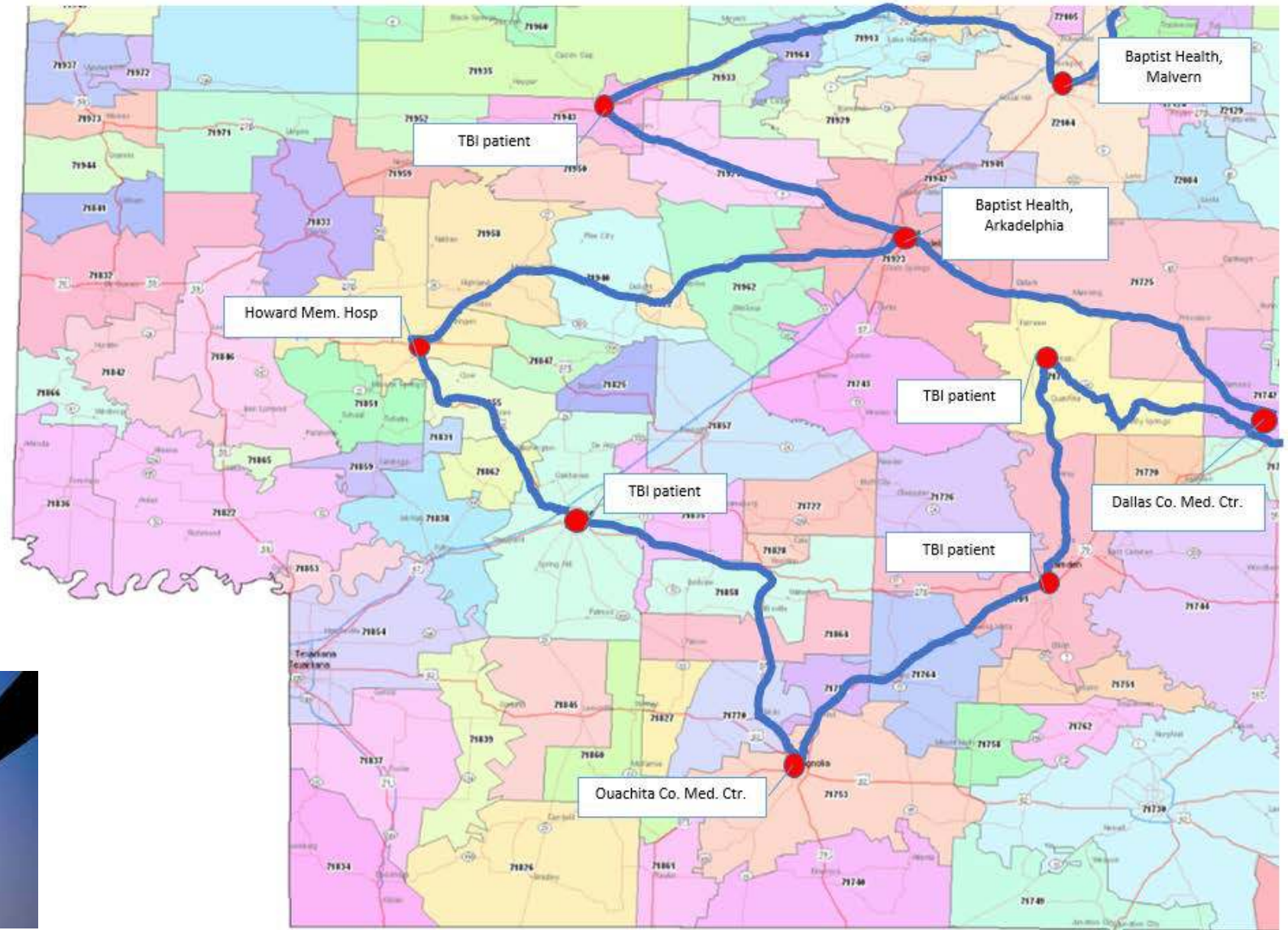
- Bladder
- Bowel
- Abdominal
- Spasticity
- Autonomic Dysreflexia
- Medication questions





# Outreach

- TBI & SCI patients/follow-ups
- Level 1-4 Trauma Centers
- PCPs
- Rehab facilities





# Telehealth and Telemedicine Technology Components



Clinical/  
Non-Clinical  
Carts



Desktop Unit

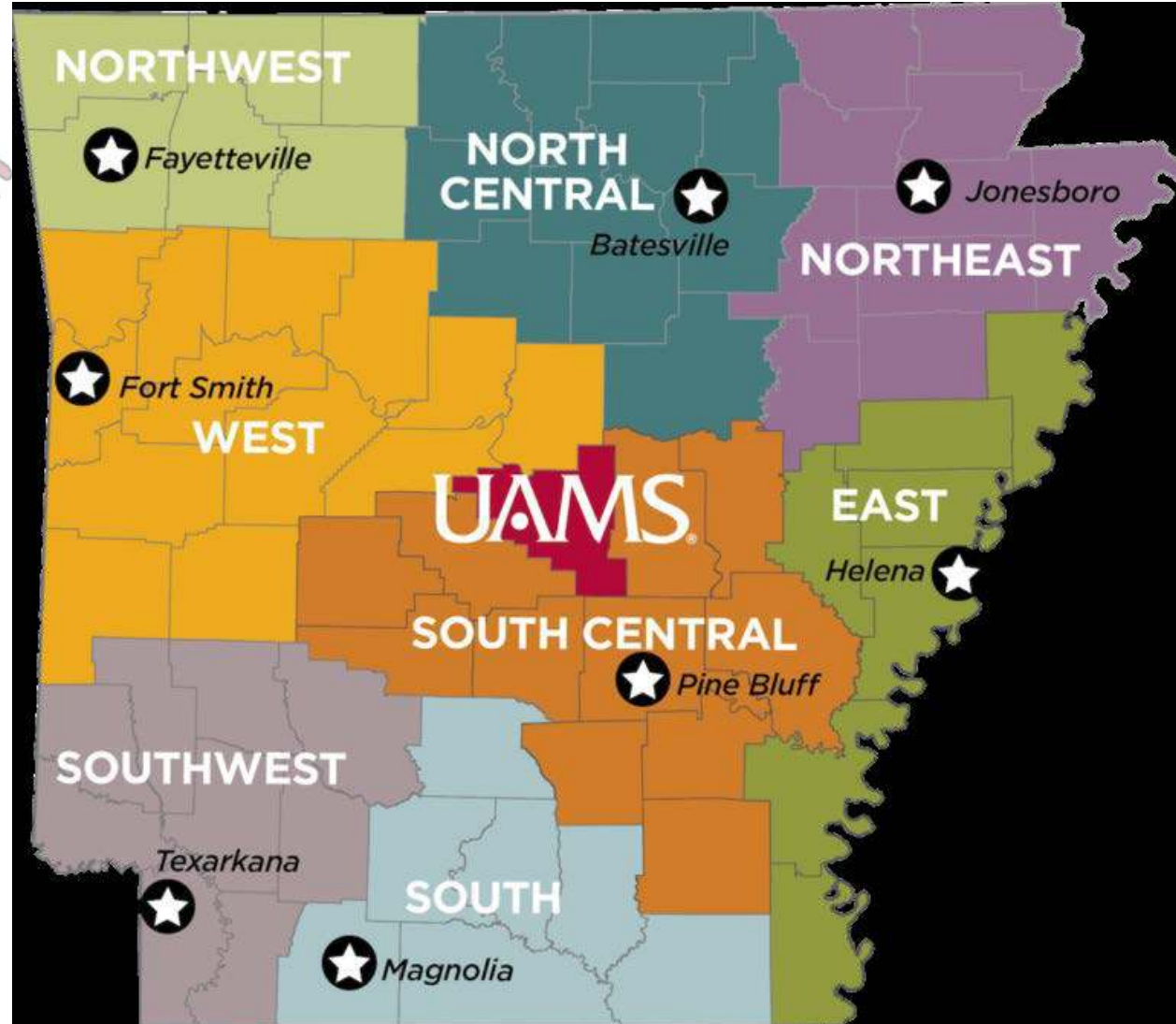
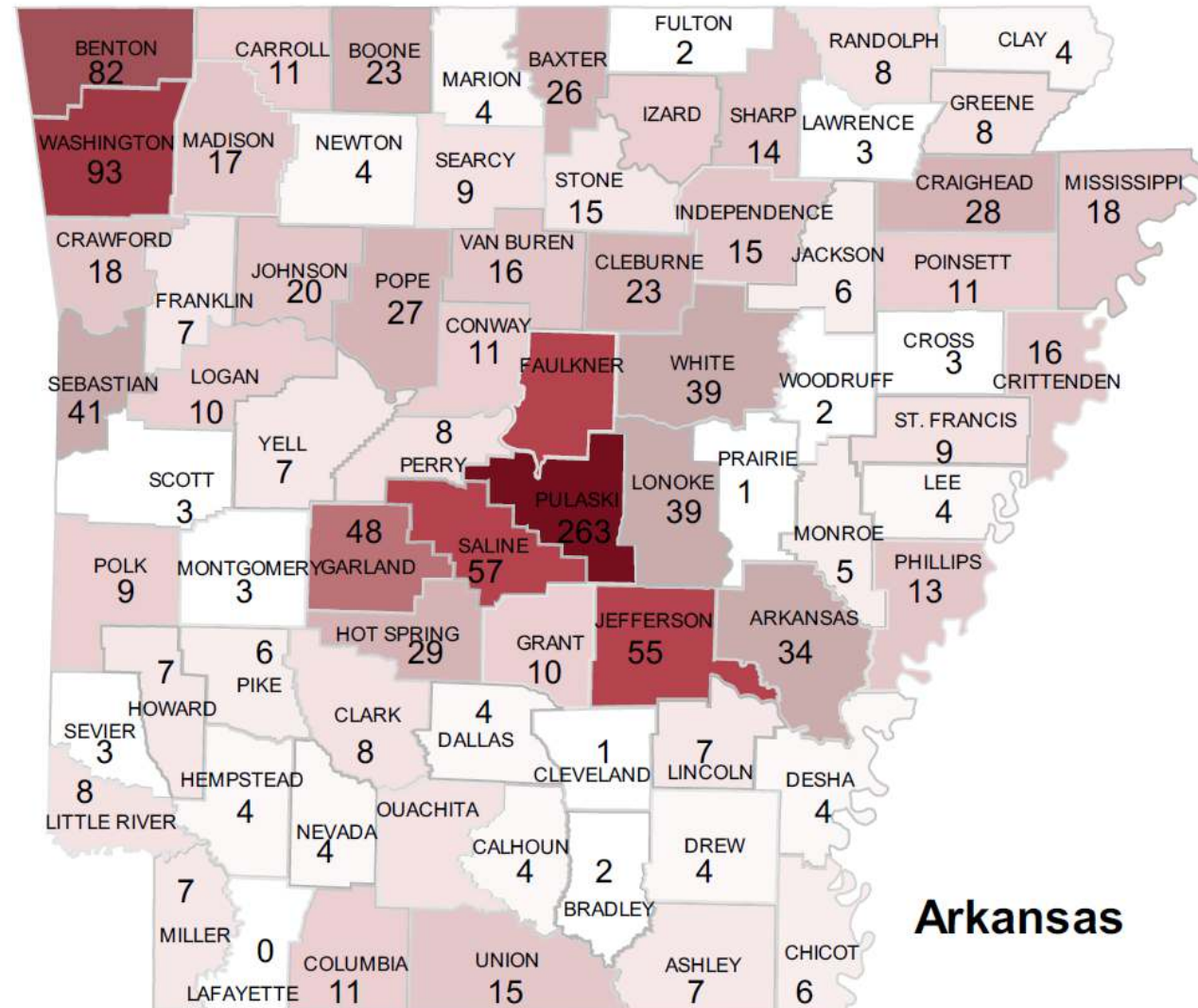


Room System



mHealth  
(Mobile Health)

# TBI Patients and Teleclinic Locations



# Summary

## ○Education

- Patient
- Professional

## ○Easy 24 hr Access

- TRIUMPH CALL CENTER
  - Patient
  - Professional

## TRIUMPH CALL CENTER

1-855-767-6983

HERE TO HELP 24 HOURS A DAY- 7 DAYS A WEEK.

**We are a 24/7 resource to serve patients with Brain injury and Spinal cord injury and providers.**

- Provide call center access for on-the-spot triage and consultation
- Enhance quality of life and increase available resources
- Promote health care cost savings





# True Story

- July 1, 2017
  - 2:00 am
- Pedestrian hit by a car



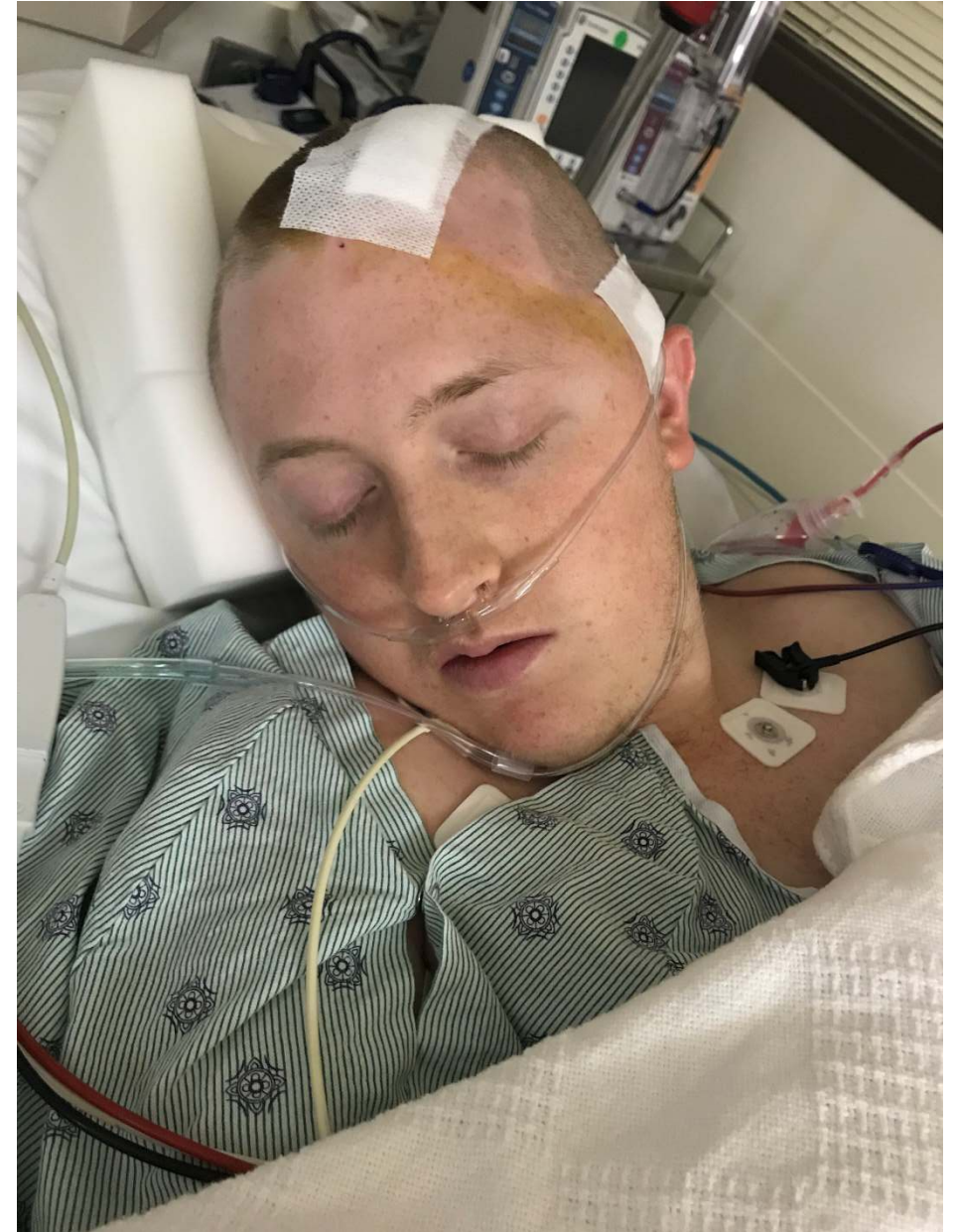
# The Injuries

- Bilateral pneumothoraces
- Near amputation right arm
- Laceration
- Skull fracture
- Serious blood loss



# The Trauma System

- 9-1-1
- Central EMS
- Fayetteville Fire Dept
- Washington Regional
- Baptist Health  
Rehabilitation Institute





18 month later...



# What does this have to do with you?

- Rani Lindberg, MD
  - Associate Professor
  - Board Certified in Physical Medicine
  - Board Certified in Rehabilitation & Brain Injury Medicine
  - Physical Medicine and Rehabilitation Residency Director

# Spinal Cord Injury Patient in the ED:

- Spastic paraplegic Spinal cord injury patient presents to the emergency room with fever, GI disturbance, tachycardia, and fever
- Differential diagnosis: Infection, autonomic dysreflexia, medication effect
- Work up included:
  - Abdominal Xray: Constipation. Symptoms unresolved after disimpaction
  - UTI: negative UA and Ucx
  - CT head: Negative

# Baclofen withdrawal

- PM&R consultation via TRIUMPH
  - Work up reviewed
  - Medications reviewed; notable for baclofen which the patient had not refilled
  - Recommendations for treatment of baclofen withdrawal instituted

Baclofen Withdrawal	Autonomic Dysreflexia	Sepsis
Fever Confusion Disorientation Tachycardia Lightheadedness Nausea Myalgia	Headache Lightheadedness Flushing of skin Sweating Tachycardia Profuse sweating	Confusion Disorientation Shortness of breath Tachycardia Fever/Chills Nausea/Vomiting Pain/discomfort

# Facility patients: Anoxic Brain Injury

- 33 yo gentleman who was found unconscious in hotel room while on vacation in the Philippines. Transferred to UAMS once medically stable for flight.
- Due to low functional level and disorder of consciousness, discharged to long term care and did not receive PM&R consultation or rehabilitation efforts



# Anoxic Brain Injury continued

- Location: Springdale, AR
- Mom contacted TRIUMPH for brain injury resources
- Telemedicine appointment arranged with facility and patient seen at bedside over teleconference.
- Medication management for disorder of consciousness
- Spasticity management recommends to help with ROM, pain control, skin management

# TBI follow up

- 77yo RHD man with a TBI following assault in October 2018. He has a R hemi and aphasia as a result of the trauma.
- Location: White Hall, AR
- Active problems:
  - Headache management
  - Neuropathic pain and spasticity management
  - Mood management
  - Therapy/Mobility management

# TRIUMPH Call Center: Why use it?

- Rehab: Resources for support groups, educational information, disability law, rehabilitation programs, etc
- Medical issues specific to the SCI and TBI patients:
  - Neurogenic bowel and bladder
  - Autonomic dysreflexia
  - Wounds
  - Restless/agitation
  - Disorder of Consciousness/Neurostimulation
  - Spasticity management
  - Headache management after trauma
  - PM&R follow up or new patient evaluation

# Contact Information

- **855-767-6983**
- [dlbercher@uams.edu](mailto:dlbercher@uams.edu)
- Web sites:
  - [atrp.arkansas.gov/](http://atrp.arkansas.gov/)
  - [pmr.uams.edu/telemedicine](http://pmr.uams.edu/telemedicine)

-  \_\_\_\_\_@Triumphuams

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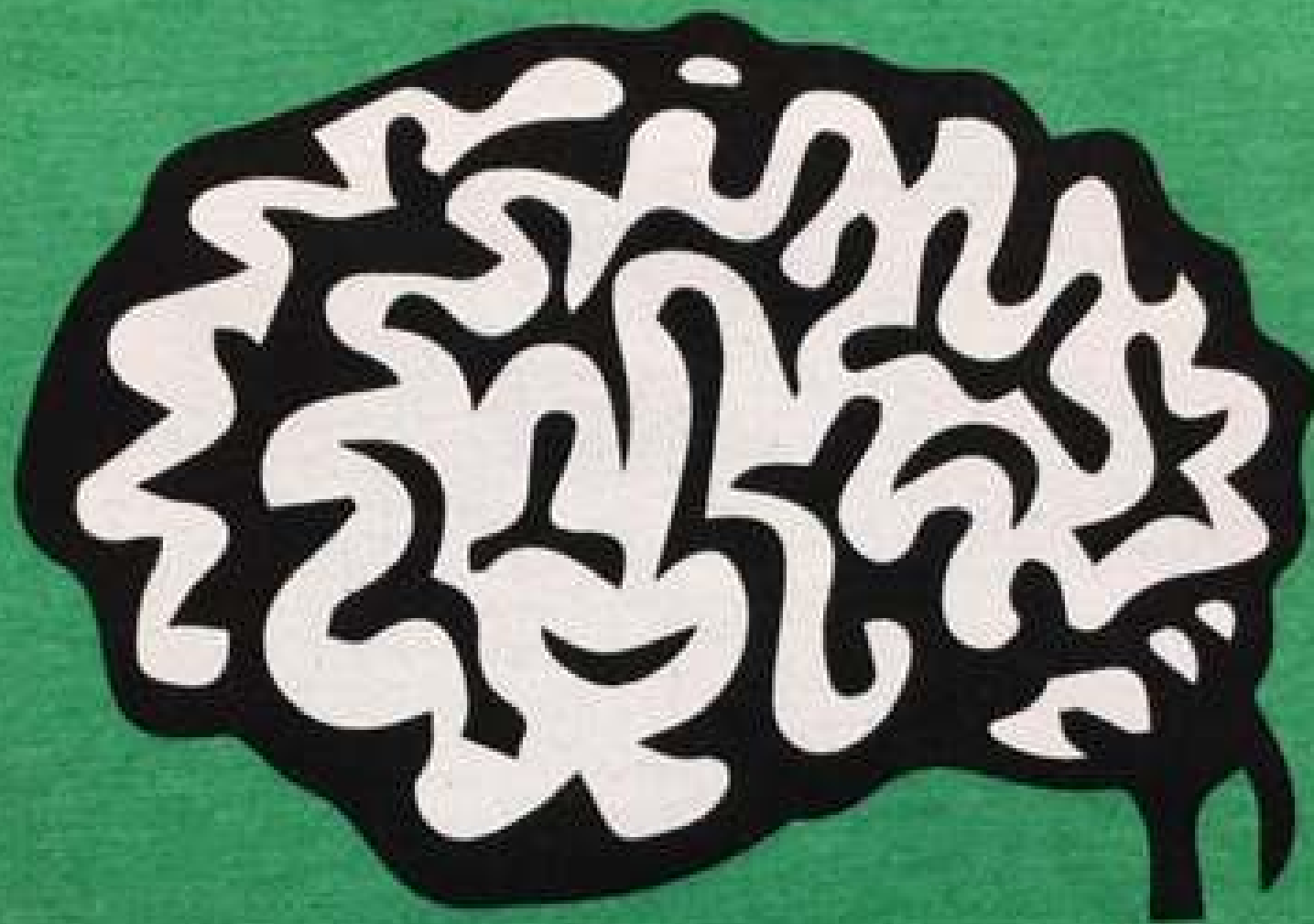
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- [https://www.cdc.gov/mmwr/volumes/66/ss/ss6609a1.htm?s\\_cid=ss6609a1\\_w](https://www.cdc.gov/mmwr/volumes/66/ss/ss6609a1.htm?s_cid=ss6609a1_w)  
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Not all injuries are visible.