Indiana Department of Health

INDIANA STATE TRAUMA CARE COMMITTEE

10/16/20

Email questions to: indianatrauma@isdh.in.gov

OUR MISSION:

To promote, protect, and improve the health and safety of all Hoosiers.

OUR VISION:

Every Hoosier reaches optimal health regardless of where they live, learn, work, or play.

Housekeeping

- This meeting was public noticed – anyone can attend.
- Submit questions in the chat box or you can unmute your computer.
- Please make sure you are on mute if you are not speaking.

Introduction and approval of meeting minutes

Updates

Katie Hokanson, *Director of Trauma and Injury Prevention*

This meeting has been public noticed

National Trauma Data Standards (NTDS)

Change Da	Adm	Element Name	Change Location	Change Text
Jul-20	2021	EMS DISPATCH DATE	ELEMENT	RETIRED
Jul-20	2021	EMS DISPATCH TIME	ELEMENT	RETIRED
Jul-20	2021	EMS UNIT ARRIVAL DATE AT SCENE OR TRANSFERRING FACILITY	ELEMENT	RETIRED
Jul-20	2021	EMS UNIT ARRIVAL TIME AT SCENE OR TRANSFERRING FACILITY	ELEMENT	RETIRED
Jul-20	2021	EMS UNIT DEPARTURE DATE FROM SCENE OR TRANSFERRING FACILITY	ELEMENT	RETIRED
Jul-20	2021	EMS UNIT DEPARTURE TIME FROM SCENE OR TRANSFERRING FACILITY	ELEMENT	RETIRED
Jul-20	2021	INITIAL FIELD SYSTOLIC BLOOD PRESSURE	ELEMENT	RETIRED
Jul-20	2021	INITIAL FIELD PULSE RATE	ELEMENT	RETIRED
Jul-20	2021	INITIAL FIELD RESPIRATORY RATE	ELEMENT	RETIRED
Jul-20	2021	INITIAL FIELD OXYGEN SATURATION	ELEMENT	RETIRED
Jul-20	2021	INITIAL FIELD GCS EYE	ELEMENT	RETIRED
Jul-20	2021	INITIAL FIELD GCS VERBAL	ELEMENT	RETIRED
Jul-20	2021	INITIAL FIELD GCS MOTOR	ELEMENT	RETIRED
Jul-20	2021	INITIAL FIELD GCS TOTAL	ELEMENT	RETIRED
Jul-20	2021	INITIAL FIELD GCS 40 EYE	ELEMENT	RETIRED
Jul-20	2021	INTIIAL FIELD GCS 40 VERBAL	ELEMENT	RETIRED
Jul-20	2021	INITIAL FIELD GCS 40 MOTOR	ELEMENT	RETIRED
Jul-20	2021	TRAUMA TRIAGE CRITERIA (STEPS 1 AND 2)	ELEMENT	RETIRED

Annual trauma registry feedback meeting

- Annual meeting to receive feedback from facilities on the trauma registry.
- Wednesday, October 21, 10am, TEAMS

2021 meeting changes

- ISTCC will meet quarterly vs. bi-monthly in 2021.
- Plan for meetings to be virtual for the foreseeable future.

2021 meeting changes

- 2021 meeting dates:
  - February 19
  - May 21
  - August 20
  - November 19

2020 EMS Leadership Conference

- Previously known as “EMS Medical Directors’ Conference”.
- Two days – December 8 & 9.
  - Two-hour sessions.
- Covering:
  - Best practices in EMS treatment.
  - Actionable steps for quality improvement in your community.
  - Identifying resources to enhance existing healthcare systems in your community.
  - Having a better understanding of current EMS activities in Indiana.
- To receive notification when registration opens, email: isdhevents@isdh.in.gov.

Ramzi & the Indiana Commendation Medal

Division grant activities

- Applied but was not awarded U.S. Department of Transportation: State & Local Government Data Analysis Tools to Support Policy & Decision Making for Roadway Safety grant.
- Applied but was not awarded Administration for Community Living: 2020 Empowering Communities to Reduce Falls & Falls Risk grant.

Division grant activities

- STOP School Violence Grant Program
  - If awarded, starts October – still waiting to hear if awarded.
  - $749,656/year for 3 years.

SHIELD

- SHIELD – safety and health integration in the enforcement of laws on drugs.
- Evidence-based training for law enforcement officers:
  - Syringe and overdose scene safety.
  - COVID-19 safety.
  - Workplace wellness.
- Started in 2003 by Northeastern University School of Law.
  - Evidence-based.
- "Train the trainer" police officers lead the **virtual** sessions.
- Started program in September. Next session is in December. Including COVID-19 information.

Division staffing updates

- No updates.

- Fall division interns:
  - Emma Heltzel
  - Maggie Hatfield
    - Trauma & Injury Prevention Program
  - Aubrey Keiser
    - Naloxone program intern
  - Gwen Tingwald
    - Drug Overdose Prevention program
  - Olivia Krober
    - Indiana Violent Death Reporting System (INVDRS) program

Stroke center list

- IC 16-31-2-9.5
  - Compile & maintain a list of Indiana hospitals that are stroke certified.
  - https://www.in.gov/isdh/27849.htm
  - Transfer agreements – must be stroke specific.

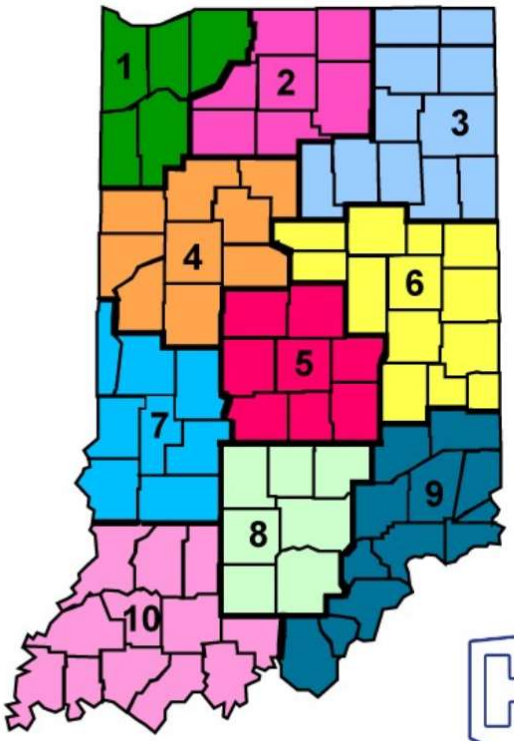
Injury Prevention Updates

- Creating and disseminating COVID-19 guidance for injury prevention programs.

Regional Updates

Regional updates

- District 1
- District 2
- District 3
- District 4 – No Update
- District 5 – No Update, next meeting Nov. 18th
- District 6
- District 7 – No Update, focus has been on COVID
- District 8 – No Update
- District 9 – No Update
- District 10



Indiana Department of Health

District 1

- Continued work on Stop the Bleed programming followed by scheduled skills evaluations to schools.
- No meeting scheduled so far.

District 2

- The 3rd quarter D2TRAC meeting was held virtually on September 15th with representation from six hospitals, five EMS agencies, and the IDH. We presented a few cases for educational purposes and discussed the management of tension pneumothorax in the pre-hospital setting. The next meeting will also be virtual and will take place on November 17th.
- There is a new interim Trauma Coordinator at Elkhart: Eric Parmley. Interviews were completed this week for the vacant Trauma Coordinator positions at Memorial (offers are pending). Education and outreach activities are steadily increasing. Elkhart will be hosting their local EMS agencies for a case review session on 10/22/20.

District 3

- District 3 held their meeting last week.
- The Stop the Bleed program was discussed on how to regionalize to make sure the school systems have what they need according to the Indiana Law.
- District 3 is planning a mass casualty drill to coincide with the airport air show drill in 2021.
- Penetrating injury is increasing in the district, they attempted to get data from the EMS database, but it was unusually high for penetrating versus blunt– will continue to determine the data.
- Discussion on the 2 of 13 hospitals in the district that were not reporting to the state – with follow-up plan in place.
- Community burn prevention education was requested and discussion on providing to the community.

District 6

- Hadn't met in almost a year.
- Discussed trauma care & COVID challenges.
- Delays in verification for all the centers.
- Discussed how to help some of the smaller facilities to move towards submitting data to the state and to submit the hospital characteristics survey.
- Most of the injury prevention activities have been put on hold, but some STB stuff still going on.
- Some EMS challenges, related to COVID impacts on transfers, but generally going well. Some bed availability issues at receiving centers.
- Planning to meet in January for our next D6 Trauma Meeting; Planning on having a D6 TQIP Data Review meeting in December for the Trauma Centers to compare data and talk about best practices.

District 7

- Our only update is just to recap that we are still ACS verified as a Level 2 trauma center, but we had voluntary decided to downgrade to a Level 3. The change occurred August 1, 2020 and things are going well. We will have our ACS visit June 2021.

District 10

- Dr. Jay Woodland providing the update.

Trauma System Planning Subcommittee

- Feedback to non-trauma centers post transfer.
- Trauma system assessment.
- Legislative initiatives
  - IHA planning to do something again in 2021.

2008 ACS Recommendations

1. Statutory authority and administrative rules
   - Amend PL 155-2006, the trauma system law, to include the establishment of a Governor-appointed, multi-disciplinary, state trauma advisory board to advise the Indiana State Department of Health in developing, implementing and sustaining a comprehensive statewide trauma system.
     - ACTION: Executive Order formed ISTCC in 2011.

2008 ACS Recommendations

2. System leadership

- Develop an Office of Emergency Care within the Indiana State Department of Health that includes both the trauma program and emergency medical services (EMS).
  - ACTION: Created the division of trauma and injury prevention at ISDH in 2011; EMS is located at IDHS.

2008 ACS Recommendations

3. Lead agency and human resources within the lead agency

- Hire sufficient staff based on the recommendations identified in the trauma system plan:
  - Trauma System Manager
    - Katie Hokanson
  - Trauma System Planning and Outreach coordinator
    - Ramzi Nimry – federally funded
  - Trauma System Medical Director - 0.3 FTE
    - Have access to Dr. Weaver, but not dedicated to trauma.
    - Have contract with Dr. Peter Jenkins, but not serving in this capacity.
  - Trauma Registrar
    - Chinazom Chukwuemeka – federally funded
  - Administrative Support
    - In process of hiring
  - Trauma Designation Coordinator
    - N/A – do not have a state designated process yet
  - Injury prevention coordinator
    - Pravy Nijjar – federally funded
  - PI coordinator
    - Trinh Dinh – federally funded

2008 ACS Recommendations

4. Trauma system plan

- Develop a plan for statewide trauma system implementation using the broad authority of the 2006 trauma system legislation.
  - Created a strategic plan that covered 2016-2018; 2019-2020.

2008 ACS Recommendations

5. Financing

- Develop a detailed budget proposal for support of the state trauma system infrastructure within the trauma system plan.
  - Have not created; need to determine what to fund, first.

2008 ACS Recommendations

6. Emergency Medical Services

- Recruit and hire a qualified State Trauma/EMS Medical Director who will provide clinical expertise, oversight, and leadership for the state's Trauma and EMS systems.
  - IDHS hired an EMS MD in 2015; IDOH has a dedicated CMO.

2008 ACS Recommendations

7. Definitive care

- Perform a needs assessment to determine the number and level of trauma hospitals needed within the state.
  - Have conducted both ACS NBATS tools, but identified areas of opportunity with the tool.

2008 ACS Recommendations

8. System coordination and patient flow

- Develop, approve, and implement prehospital trauma triage guidelines as well as inter-facility transfer criteria.
  - Developed the first trauma triage guidelines in 2012; sent IDHS recommendations for improvements in 2017.
  - Developed inter-facility transfer guidelines in 2018.

2008 ACS Recommendations

9. Disaster preparedness

- Involve the State Trauma/EMS Medical Director in statewide disaster planning initiatives.
  - Not sure of current state.

2008 ACS Recommendations

10. System-wide evaluation and quality assurance

- Create a performance improvement (PI) subcommittee of the Trauma System Advisory Task Force (TSATF) to develop a trauma system performance improvement plan
  - Created PI subcommittee and PI plan in 2013
    - Develop a PI process template as a resource tool for all trauma centers and participating hospitals
      - Have not done
    - Standardize a subset of trauma PI activities for each trauma center and participating hospital
      - Have not done
    - Implement regional PI processes that feed into the statewide trauma PI processes
      - D1 & D10 has started

2008 ACS Recommendations

11. Trauma management information systems

- Amend or create a statute with specific language to ensure the confidentiality of the trauma registry and of trauma system performance improvement activities and to protect both from discoverability.
  - Have proposed legislation since 2016 but has not been picked up.
- Create and implement a Trauma System Information Management Plan.
  - Created a strategic plan that includes data that covered 2016-2018; 2019-2020 plan.

Performance Improvement Subcommittee Update – October 2020

Peter M. Hammer

Trauma Medical Director

IU Health Methodist Hospital

2020 Goals Refresher

- Decrease ED LOS at non-trauma centers
- Increase trauma registry quiz participation
- Collect hospital level variables
- Continued EMS run sheet collection

These goals with be discussed at the next PI meeting, whether to add/subtract.

Number of Reporting Hospitals

Q3 2019	108
Q4 2019	108
Q1 2020	103

Transfer Delays

- **Q3 2019 (N=544)**
  - Null (N=144)
  - Receiving Facility Issue (N=73)
  - EMS Issue (N=67)
  - Referring Facility Issue (N=44)
  - Other (N=40)

Transfer Delays

- **Q4 2019 (N=439)**
  - Null (N=177)
  - Receiving Facility Issue (N=64)
  - EMS Issue (N=57)
  - Referring Facility Issue (N=53)
  - Other (N=23)

Increase Trauma Registry Quiz Participation

May – 38 individuals

June – 38 individuals

July – 39 individuals

August – 26 individuals

September – 22 individuals

- Continued promotion of quiz participation
  - If you have registrars/other staff interested in taking quizzes for CEUs, please contact Trinh Dinh at tdinh@isdh.in.gov or Chinazom Chukwuemeka at cchukwuemeka@isdh.in.gov

Hospital Level Variables

- Variables being collected:
  - Teaching status (Community, Non-Teaching (no residents), University
  - Profit (For or Non)
  - Number of beds
  - Number of ICU beds
  - Number of Trauma, Orthopedic and Neuro – surgeons

- Currently, 93 hospitals have responded to this request.
  - Be on the lookout for email reminders from Ramzi Nimry to complete this survey.

PI Subcommittee Schedule

- Next meeting is November 17th at 10a on Microsoft Teams.

- 2021 Dates TBD

PI Subcommittee

ACS-COT updates

- Dr. Thomas updates

State EMS Medical Director updates

Dr. Michael Kaufmann

Law

IC 16-19-3-28

State department designated as lead agency of a statewide trauma care system; rule making authority

Sec. 28. (a) The state department is the lead agency for the development, implementation, and oversight of a statewide comprehensive trauma care system to prevent injuries, save lives, and improve the care and outcome of individuals injured in Indiana.

(b) The state department may adopt rules under IC 4-22-2 concerning the development and implementation of the following:

(1) A state trauma registry.

(2) Standards and procedures for trauma care level designation of hospitals.

Trauma Registry Rule

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

Trauma Registry Rule

Rule that requires these providers to report data to the trauma registry:

- EMS providers
  - National EMS Information System (NEMSIS) Silver
  - 15th of the month
- All hospitals with EDs
  - National Trauma Data Standard (NTDS)
  - Quarterly
- Rehabilitation hospitals
  - CMS – Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI)
  - Quarterly

Rule also permits ISDH to grant any person involved in a legitimate research activity to request access to confidential information

HIPAA

IDOH is a “hybrid” entity

- Trauma program is not a HIPAA-covered entity
  - Can collect identifiable information securely, not required under trauma registry rule

Privacy Rule

General public health activities

- IDOH legally authorized to receive information for public health purposes

Data sharing agreements no longer needed

Data Requests

Two types in the Division
- Patient Identifiable
  - Data Release Committee
- Aggregate
  - Division

More information at:
http://www.in.gov/isdh/19537.htm

Data Requests - DRC

Identifiable data

Handled by the agency

Processed in ~2 weeks

<u>All requests tracked</u>

- Legal
- Tracking log (division)
- E-mail communication (division and/or legal)
- Weekly staff meetings

Must provide:

- Division data request form
- Agency data request form
- Document on letterhead describing study
- IRB approval (if applicable)

Data Requests - DRC - Process

1. Request to program
2. Program sends necessary paperwork to requestor
3. Upon receipt of paperwork and request, program contacts DRC
4. DRC reviews and discusses whether information can be released under Indiana law
5. Decision made and communicated to requestor

Data Requests - DRC - Committee Members

Office of legal affairs – 2 attorneys
HIPAA Privacy Officer (attorney)
Data Analysis Team member (epidemiologist)
State Epidemiologist
Trauma Registry representative
Cancer Registry representative
Vital Records representative (State Registrar)
Office of Public Affairs representative

Data Requests - Division

Division data request form

De-identified data

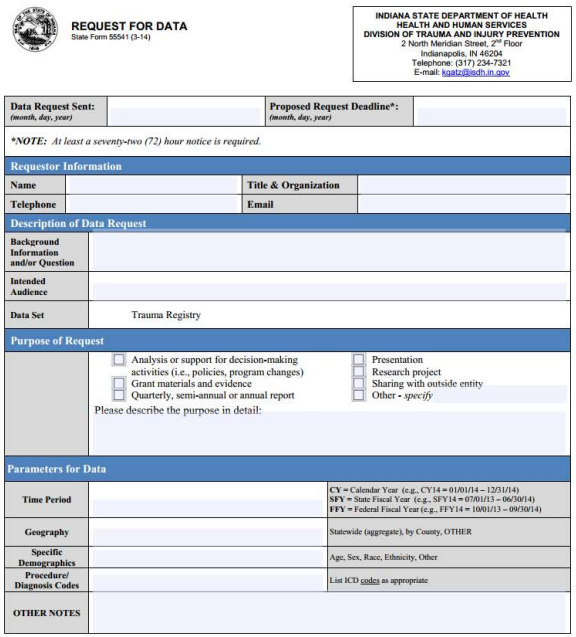
- **If in doubt, ask DRC**

Handled by the division

Processed in 3 business days

<u>All requests tracked</u>

- Tracking log
- E-mail communication
- Weekly staff meetings



REQUEST FOR DATA
State Form 55541 (3-14)

INDIANA STATE DEPARTMENT OF HEALTH
HEALTH AND HUMAN SERVICES
DIVISION OF TRAUMA AND INJURY PREVENTION
2 North Meridian Street, 2nd Floor
Indianapolis, IN 46204
Telephone: (317) 234-7321
E-mail: kgatz@isdh.in.gov

Data Request Sent: *(month, day, year)*		Proposed Request Deadline*: *(month, day, year)*	

**NOTE:* *At least a seventy-two (72) hour notice is required.*

Requestor Information

Name		Title & Organization	
Telephone		Email	

Description of Data Request

Background Information and/or Question	
Intended Audience	
Data Set	Trauma Registry

Purpose of Request

☐ Analysis or support for decision-making activities (i.e., policies, program changes)
☐ Grant materials and evidence
☐ Quarterly, semi-annual or annual report
☐ Presentation
☐ Research project
☐ Sharing with outside entity
☐ Other - *specify*

Please describe the purpose in detail:

Parameters for Data

Time Period		**CY** = Calendar Year (e.g., CY14 = 01/01/14 – 12/31/14) **SFY** = State Fiscal Year (e.g., SFY14 = 07/01/13 – 06/30/14) **FFY** = Federal Fiscal Year (e.g., FFY14 = 10/01/13 – 09/30/14)
Geography		Statewide (aggregate), by County, OTHER
Specific Demographics		Age, Sex, Race, Ethnicity, Other
Procedure/ Diagnosis Codes		List ICD codes as appropriate
OTHER NOTES		

How to Make Elements Less Identifiable:

- Calculate the time between two dates and times.
  - Ex. Emergency department length of stay (EDLOS) , EMS total time
- Give the month and year instead of a specific date
- Collapse categories with counts
  - Ex. Collapse categories with small counts into an 'Other' category
- Collapse categories geographically
  - Ex. Collapse counties into public health preparedness districts
- Collapse hospital name
  - Ex. Provide only trauma level

Demographic and Injury Information

Demographic Information

Injury Incident Date
Injury Incident Time
Date of Birth
Age
Age Units
Race
Ethnicity
Gender
Patient's Home Country
Patient's Home Zip Code
Patient's Home City
Patient's Home County
Patient's Home State
Alternate Home Residence
Primary Method of Payment
Work-Related
Patient's Occupational Industry
Patient's Occupation

Injury Information

Location E-Code
Incident Location Zip Code
Incident Country
Incident City
Incident County
Incident State
Primary E-Code
Additional E-Code
Report of Physical Abuse
Investigation of Physical Abuse
Caregiver at Discharge
Protective Devices
Child Specific Restraint
Airbag Deployment

Indiana Department of Health

Pre-hospital and ED/Acute Care Information

Pre-Hospital Information

Vehicular, Pedestrian, Other Risk Injury
EMS Dispatch Date
EMS Dispatch Time
EMS Unit arrival Date at Scene or Transferring Facility
EMS Unit arrival Time at Scene or Transferring Facility
EMS Unit Departure Date from Scene or Transferring Facility
EMS Unit Departure Time from Scene or Transferring Facility
Transport Mode
Other Transport Mode
Initial Field Systolic Blood Pressure
Initial Field Pulse Rate
Initial Field Respiratory Rate
Initial Field Oxygen Saturation
Initial Field GCS – Eye
Initial Field GCS – Verbal
Initial Field GCS – Motor
Initial Field GCS – Total
Inter-Facility Transfer
Trauma Center Criteria
Pre-Hospital Cardiac Arrest

ED/Acute Care Information

ED/Hospital Arrival Date
ED/Hospital Arrival Time
ED Discharge Date
ED Discharge Time
ED Discharge Disposition
Signs of Life

India Department of Health

Initial Assessment and Diagnosis Information

Initial Assessment Information

Height
Weight
Initial ED/Hospital Temperature
Initial ED/Hospital Systolic Blood Pressure
Initial ED/Hospital Pulse Rate
Initial ED/Hospital Respiratory Rate
Initial ED/Hospital Respiratory Assistance
Initial ED/Hospital Oxygen Saturation
Initial ED/Hospital GCS – Eye
Initial ED/Hospital GCS – Verbal
Initial ED/Hospital – Motor
Initial ED/Hospital – Total
Initial ED/Hospital GCS Initial ED/Hospital Supplemental Oxygen
Assessment Qualifiers
Initial ED/Hospital – Height
Initial ED/Hospital – Weight
Alcohol Use Indicator
Drug Use Indicator

Diagnosis Information

Injury Diagnoses
AIS Predot Code
AIS Severity
ISS Body Region
AIS Version
Locally Calculated ISS

Co-Morbidity, Procedures, Complications/PI and Outcome Information

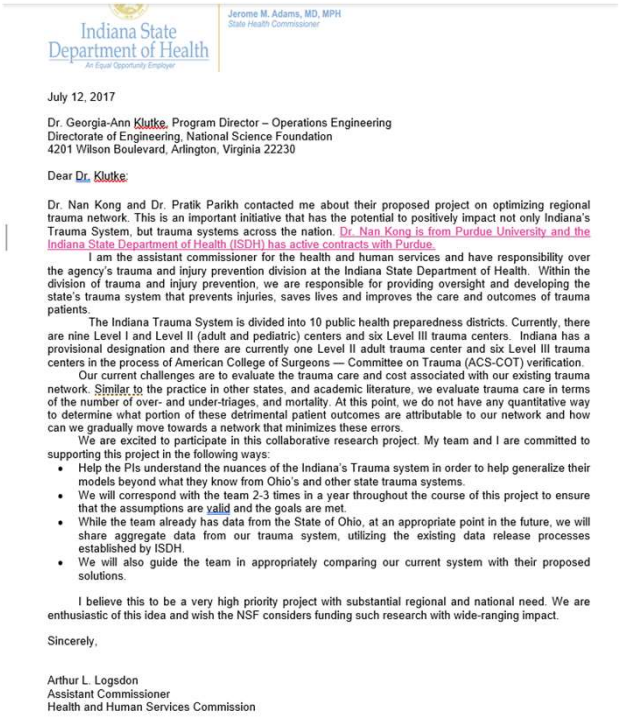
Co-Morbidity Information
Co-Morbid Conditions

Procedures Information
Hospital Procedures
Hospital Procedure Start Date
Hospital Procedure Start Time

Complications / PI Information
Hospital Complications

Outcome Information
Hospital Discharge Date
Hospital Discharge Time
Total ICU Length of Stay
Total Ventilator Days Hospital Discharge Disposition

Trauma Network Design



Indiana State Department of Health
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Jerome M. Adams, MD, MPH
State Health Commissioner

July 12, 2017

Dr. Georgia-Ann Klutke, Program Director – Operations Engineering
Directorate of Engineering, National Science Foundation
4201 Wilson Boulevard, Arlington, Virginia 22230

Dear Dr. Klutke:

Dr. Nan Kong and Dr. Pratik Parikh contacted me about their proposed project on optimizing regional trauma network. This is an important initiative that has the potential to positively impact not only Indiana's Trauma System, but trauma systems across the nation. Dr. Nan Kong is from Purdue University and the Indiana State Department of Health (ISDH) has active contracts with Purdue.

I am the assistant commissioner for the health and human services and have responsibility over the agency's trauma and injury prevention division at the Indiana State Department of Health. Within the division of trauma and injury prevention, we are responsible for providing oversight and developing the state's trauma system that prevents injuries, saves lives and improves the care and outcomes of trauma patients.

The Indiana Trauma System is divided into 10 public health preparedness districts. Currently, there are nine Level I and Level II (adult and pediatric) centers and six Level III trauma centers. Indiana has a provisional designation and there are currently one Level II adult trauma center and six Level III trauma centers in the process of American College of Surgeons — Committee on Trauma (ACS-COT) verification.

Our current challenges are to evaluate the trauma care and cost associated with our existing trauma network. Similar to the practice in other states, and academic literature, we evaluate trauma care in terms of the number of over- and under-triages, and mortality. At this point, we do not have any quantitative way to determine what portion of these detrimental patient outcomes are attributable to our network and how can we gradually move towards a network that minimizes these errors.

We are excited to participate in this collaborative research project. My team and I are committed to supporting this project in the following ways:

- Help the PIs understand the nuances of the Indiana's Trauma system in order to help generalize their models beyond what they know from Ohio's and other state trauma systems.
- We will correspond with the team 2-3 times in a year throughout the course of this project to ensure that the assumptions are valid and the goals are met.
- While the team already has data from the State of Ohio, at an appropriate point in the future, we will share aggregate data from our trauma system, utilizing the existing data release processes established by ISDH.
- We will also guide the team in appropriately comparing our current system with their proposed solutions.

I believe this to be a very high priority project with substantial regional and national need. We are enthusiastic of this idea and wish the NSF considers funding such research with wide-ranging impact.

Sincerely,

Arthur L. Logsdon
Assistant Commissioner
Health and Human Services Commission

Indiana Department of Health

Trauma network design (continued)

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J.B. SPEED SCHOOL OF ENGINEERING

Towards an Optimal Regional Network of Trauma Centers

Pratik J. Parikh, Ph.D.

Sagar Hirpara, Lin Lin, Devarsha Katragadda

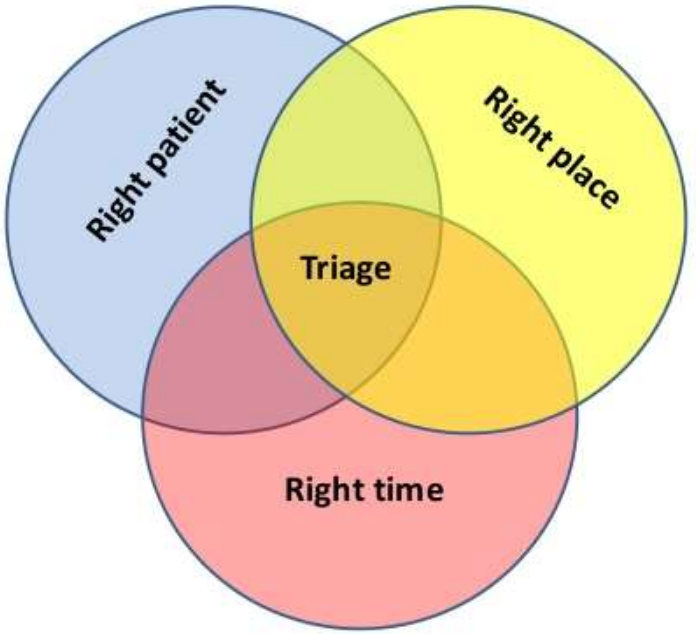
University of Louisville, KY

Nan Kong, Ph.D.

Purdue University


J.B. SPEED SCHOOL OF ENGINEERING
PURDUE UNIVERSITY
NSF
WRIGHT STATE UNIVERSITY
Indiana State Department of Health
JOHNS HOPKINS UNIVERSITY
Weill Cornell Medicine
OHIO DEPARTMENT OF PUBLIC SAFETY
SAFETY • SERVICE • PROTECTION
UAB
THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Study Objective



- Analyze an existing network of trauma centers
- Impact on patient safety (system-related under- and over-triage)
- Serve as a benchmark for other approaches (e.g., ACS NBATS)
- Conduct ‘what-if’ analysis and optimization

We call our approach …

Performance-Based Assessment of Trauma Systems (PBATS)

J.B. SPEED SCHOOL OF ENGINEERING

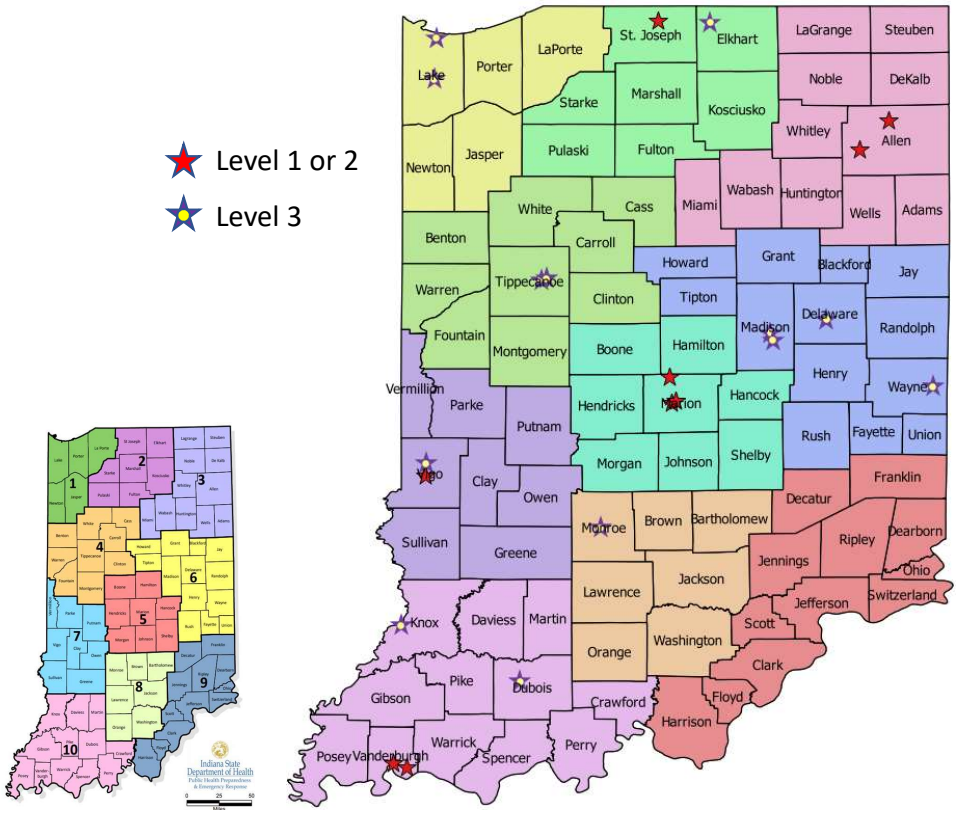
Video of PBATS Prototype using 2012 OH data

(L3 treated as NTC)

J.B. SPEED SCHOOL OF ENGINEERING

Data Analysis of
2018 Indiana Trauma Registry Data

Location of Level 1, 2 & 3 Trauma Centers in 2018



District	# Level 1 & 2 TC	# Level 3 TC	# Level 1, 2 & 3 TC
1	0	2	2
2	1	1	2
3	2	0	2
4	0	2	2
5	3	0	3
6	0	4	4
7	1	1	2
8	0	1	1
9	0	0	0
10	2	2	4
Overall	9	13	22

*Only adult trauma centers are considered here

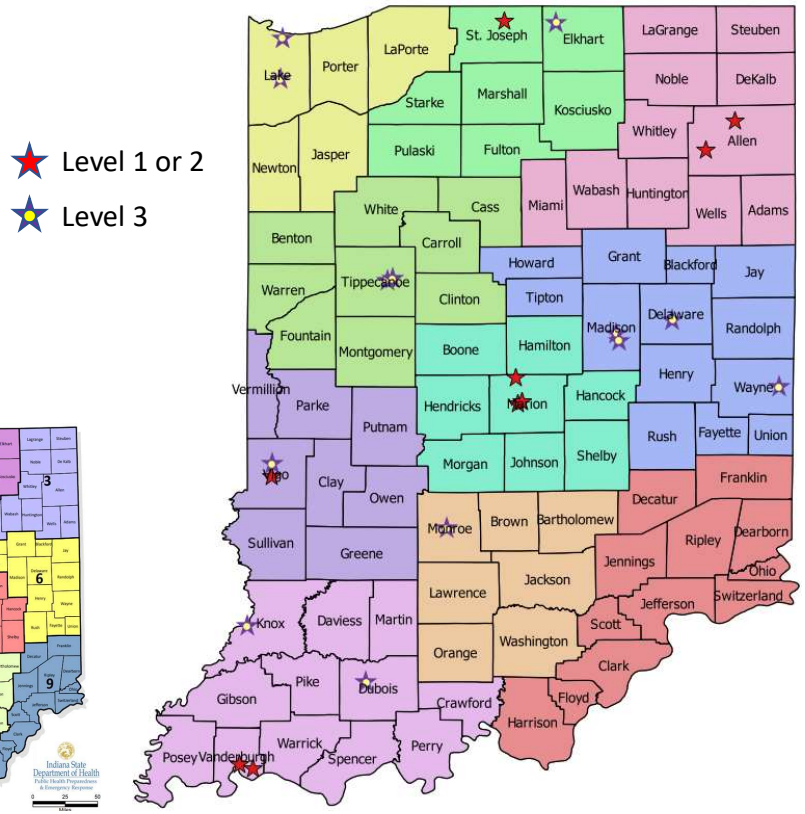
Summary

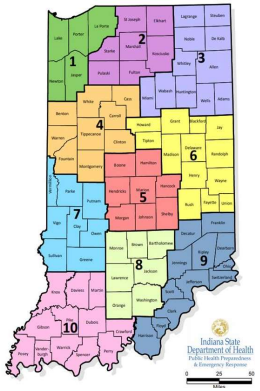
J.B. SPEED SCHOOL OF ENGINEERING

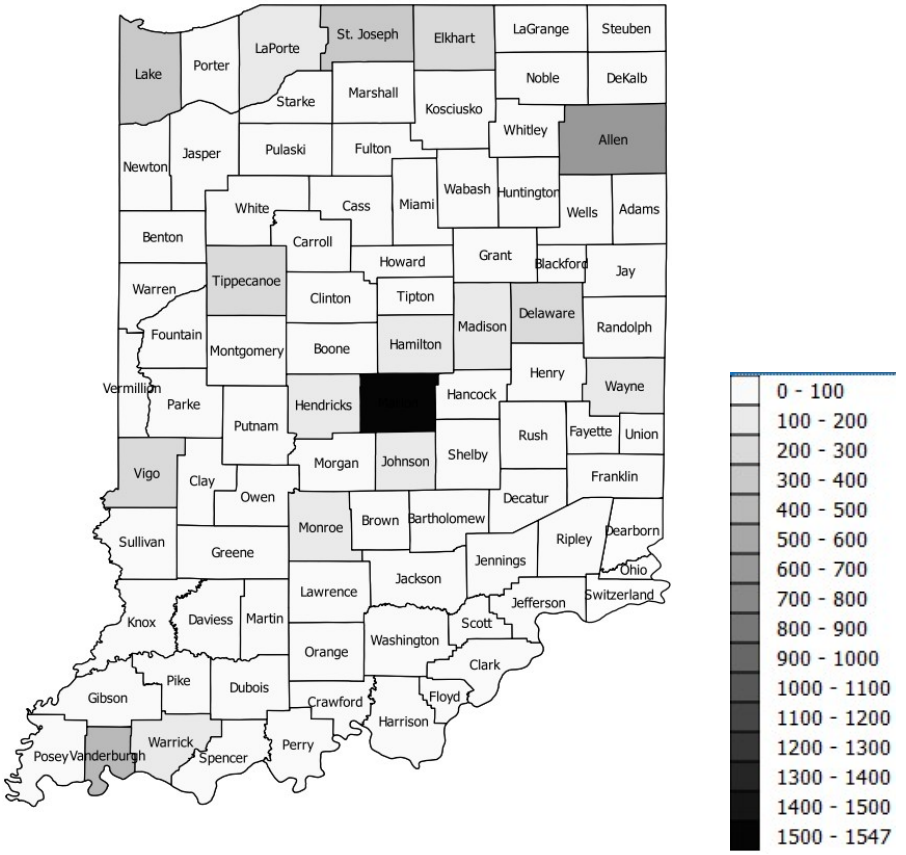
2018 Data			
Action	**Remaining cases**	**Removed cases**	**Total cases in each category**
Total cases	11857		
Removed interfacility transfers cases (H1 to H2)	8704	3153	3153
Removed cases with missing injury county information	8213	491	653
Removed patients younger than 18 years	7818	395	893
Removed patients injured outside of Indiana	**7774**	44	1456

Analysis based on “injured adult patients in IN admitted to hospitals in IN”

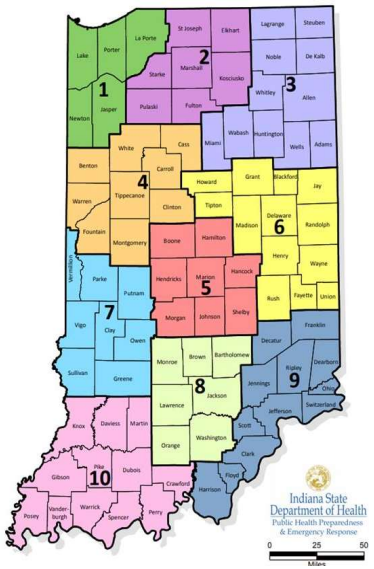
Incidence Map







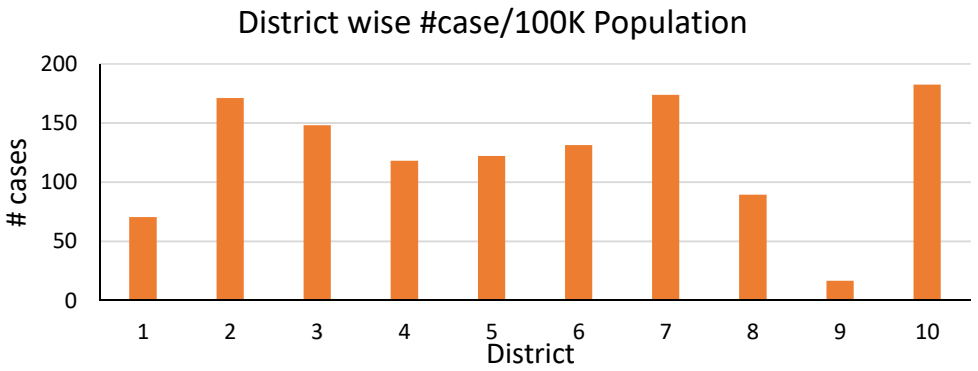
District-Wise Summary

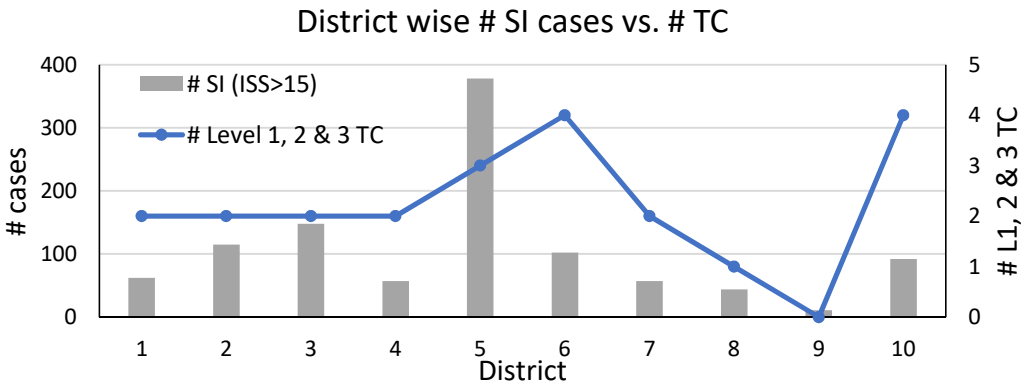


District	# Level 1 & 2 TC	# L1, 2 & 3 TC	Pop.	# Total cases	# Cases/ 100k pop	% of total cases	# SI (ISS>15)	% SI of total cases
1	0	2	811,393	573	71	7.4%	62	10.8%
2	1	2	406,975	697	171	9.0%	115	16.5%
3	2	2	741,028	1099	148	14.1%	148	13.5%
4	0	2	379,126	448	118	5.8%	57	12.7%
5	3	3	1,845,334	2257	122	29.0%	378	16.7%
6	0	4	626,342	823	131	10.6%	102	12.4%
7	1	2	277,282	482	174	6.2%	57	11.8%
8	0	1	382,115	342	90	4.4%	44	12.9%
9	0	0	710,263	118	17	1.5%	11	9.3%
10	2	4	512,020	935	183	12.0%	92	9.8%
Overall	9	22	6,691,878	7774	116	100%	1066	13.7%

Compare D2 and D10:

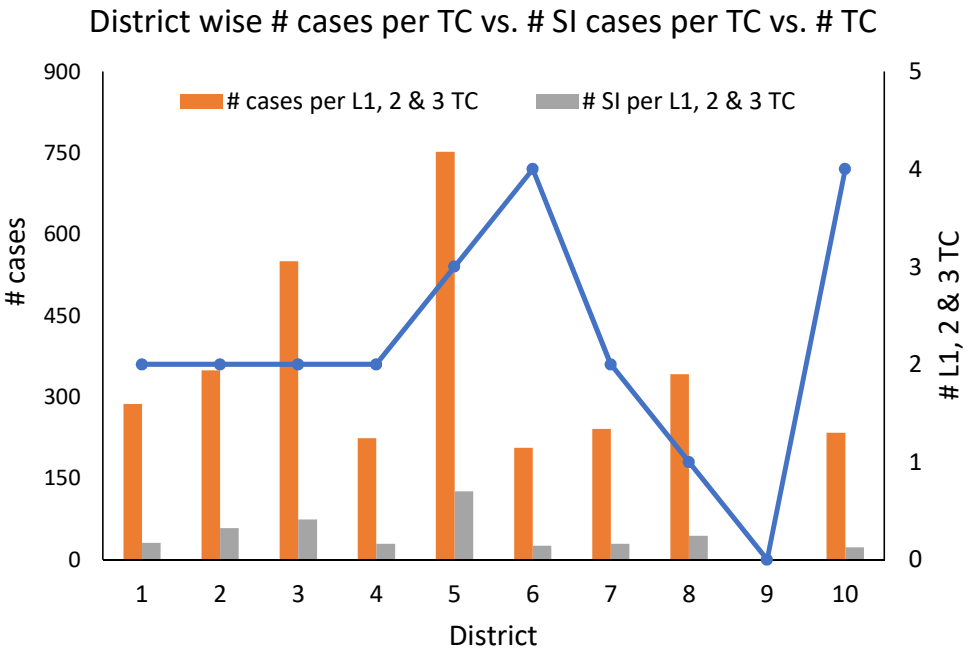
- Both have higher case incidence per 100k
- But D2 has high %SI in the state, while D10 has low (similar to D9)
- Still D2 has 2, while D10 has 4 TCs





Number of total and SI cases per district

District	# L1, 2 & 3	Pop.	# Total cases	# cases/L1, 2 & 3	# SI (ISS>15)	# SI/L1, 2 & 3
1	2	811,393	573	287	62	31
2	2	406,975	697	349	115	58
3	2	741,028	1099	550	148	74
4	2	379,126	448	224	57	29
5	3	1,845,334	2257	752	378	126
6	4	626,342	823	206	102	26
7	2	277,282	482	241	57	29
8	1	382,115	342	342	44	44
9	0	710,263	118	-	11	-
10	4	512,020	935	234	92	23
Overall	22	6,691,878	7774	353	1066	48



- **D6** and **D10** have low #cases and #SI/TC
- **D5**, with 3 TCs, has high # cases and #SI/TC

UT and OT rate calculation

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		Injury Severity Score (ISS)	
		ISS>15	*ISS≤15*
Destination	*To TC*	Appropriate-triage (AT^P)	Over-triage (OT)
	To NTC	Under-triage (UT)	Appropriate-triage (AT^N)

$$UT\ Rate = 1 - sensitivity = 1 - \frac{Appropriate{-}triage\ (ATP)}{Cases\ with\ ISS > 15} = \frac{UT\ cases}{Cases\ with\ ISS > 15}$$

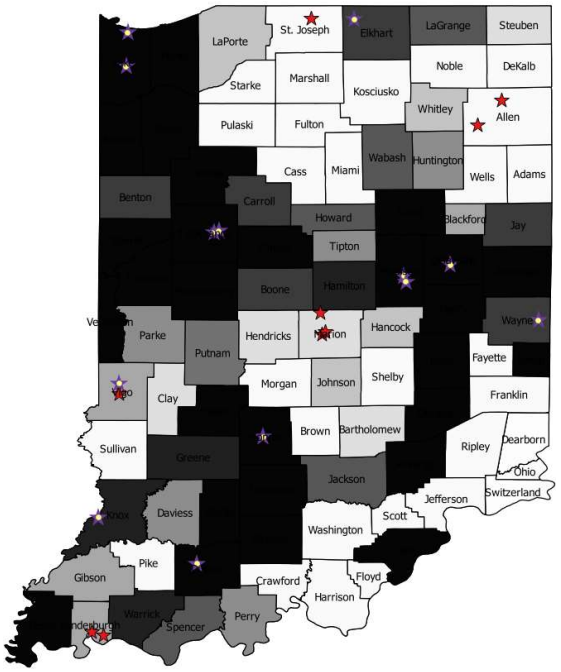
$$OT\ Rate = 1 - specificity = 1 - \frac{Appropriate{-}triage\ (ATN)}{Cases\ with\ ISS \leq 15} = \frac{OT\ cases}{Cases\ with\ ISS \leq 15}$$

UT rates

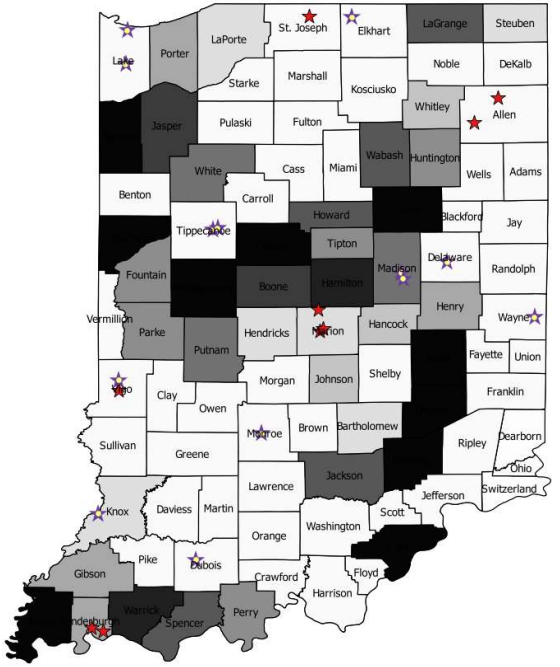
District	# L1 & 2 TC	UT Rate	# L1, 2 & 3 TC	UT Rate(include L3)
1	0	0.82	2	0.18
2	1	0.23	2	0.03
3	2	0.16	2	0.16
4	0	0.88	2	0.16
5	3	0.18	3	0.18
6	0	0.90	4	0.45
7	1	0.42	2	0.09
8	0	0.82	1	0.16
9	0	0.64	0	0.64
10	2	0.51	4	0.37
Overall	9	0.40	22	0.20

- **D2** and **D7** both have 2 TCs and UT rates are low as expected
- **D6** and **D10** both have 4 TCs, but still have high UT rates

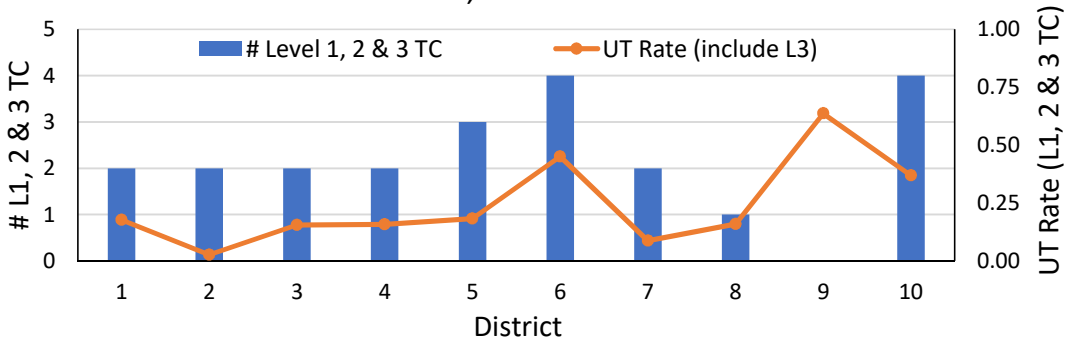
(L1 & L2 TC) vs. (L3 & NTC)



(L1, L2 & L3 TC) vs NTC



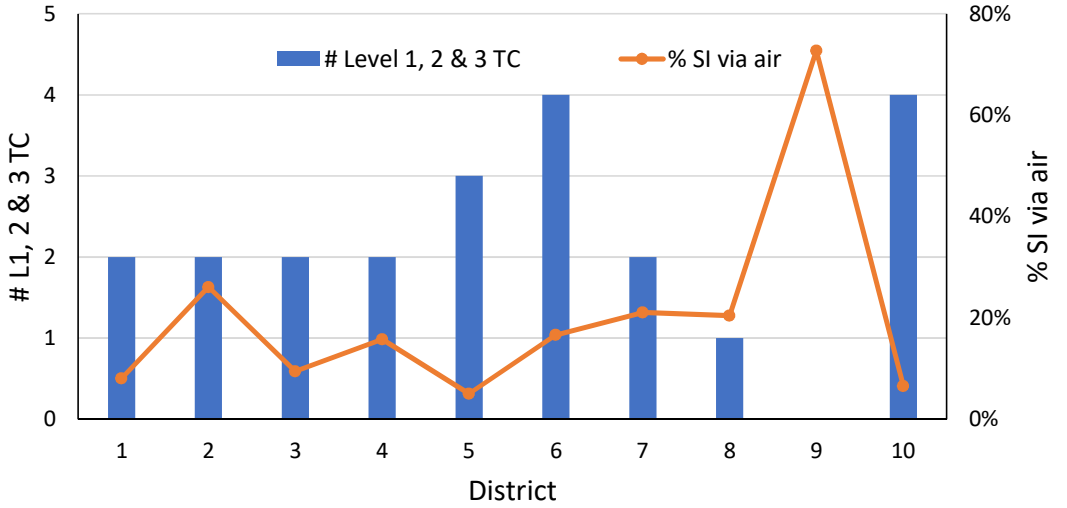
District wise L1, 2 &3 TC vs. UT Rate



Air ambulance usage (from incidence district to same or other districts)

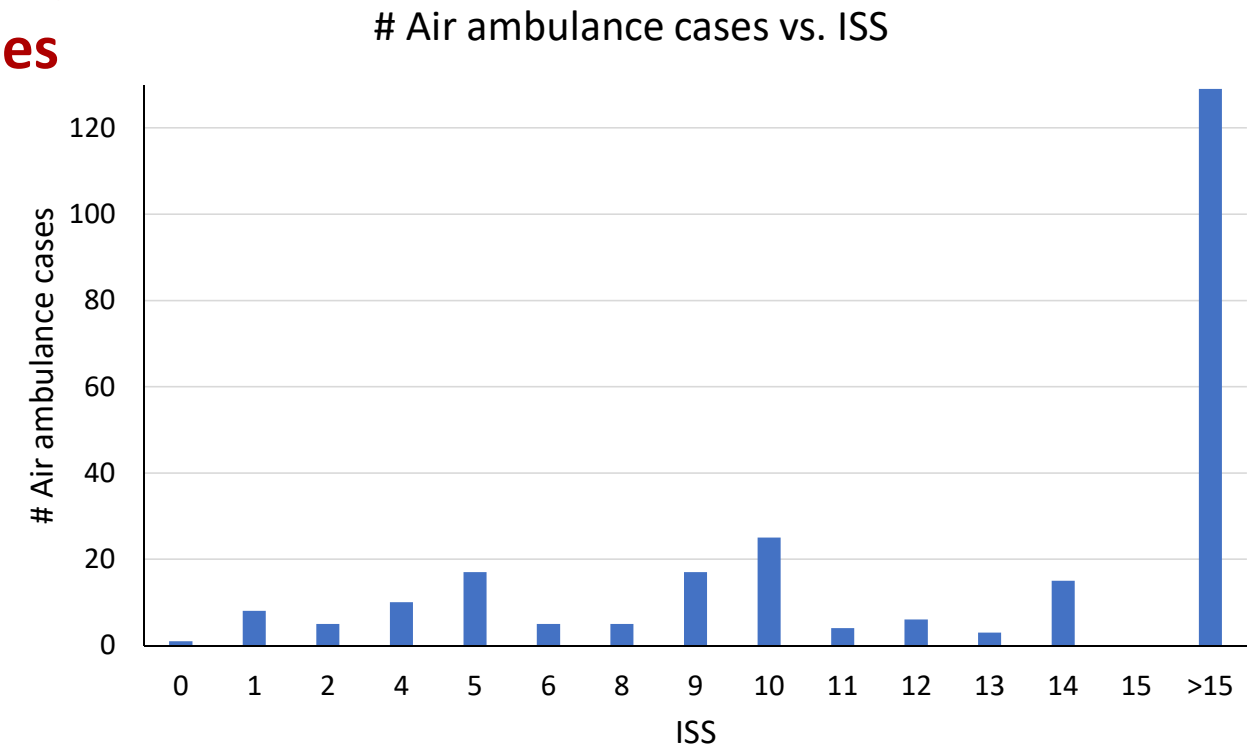
- **D5** and **D10**: higher number of TCs, so less % SI via air, as expected
- **D2**, **D6** and **D7**: not true

Incidence district	# Level 1 & 2	# L1, 2 & 3	# Total cases	# SI	Air Ambulance		
					# SI	% SI	# NSI
1	0	2	573	62	5	8.06%	4
2	1	2	697	115	30	26.09%	20
3	2	2	1099	148	14	9.46%	13
4	0	2	448	57	9	15.79%	12
5	3	3	2257	378	19	5.03%	10
6	0	4	823	102	17	16.67%	21
7	1	2	482	57	12	21.05%	15
8	0	1	342	44	9	20.45%	10
9	0	0	118	11	8	72.73%	7
10	2	4	935	92	6	6.52%	9
State Wise	9	22	7774	1066	129	12.10%	121



Air ambulance usage (from incidence district to same or other districts) for NSI cases

ISS	# Air ambulance cases
0	1
1	8
2	5
4	10
5	17
6	5
8	5
9	17
10	25
11	4
12	6
13	3
14	15
15	0
>15	129
Total	250



- ~50% of air ambulance usage is for NSI (ISS $\leq$ 15) cases
- ~37% of air ambulance usage is for ISS $\leq$ 10 cases

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Towards an Optimal Regional Network of Trauma Centers

Pratik J. Parikh, Ph.D.

Sagar Hirpara, Lin Lin, Devarsha Katragadda

University of Louisville, KY

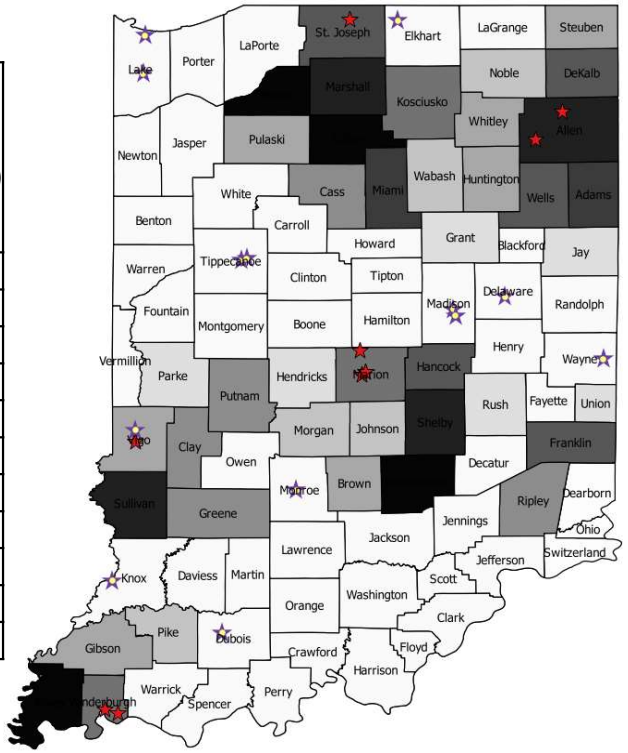
Nan Kong, Ph.D.

Purdue University

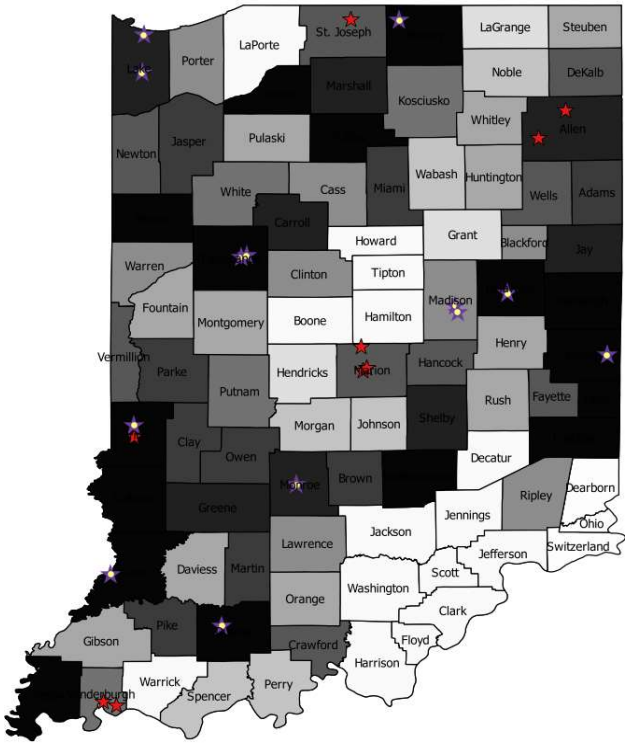
County-wide OT

District	# Level 1 and 2 adult trauma center (TC)	# Level 1, 2 and 3 adult trauma center (TC+ITC)	OT Rate (TC)	OT Rate (TC+ITC)
1	0	2	0.01	0.65
2	1	2	0.48	0.76
3	2	2	0.66	0.66
4	0	2	0.02	0.78
5	3	3	0.48	0.48
6	0	4	0.03	0.70
7	1	2	0.35	0.88
8	0	1	0.02	0.59
9	0	0	0.04	0.05
10	2	4	0.31	0.56
Overall	9	22	0.34	0.62

(L1 + L2) vs. (L3 + NTC)



(L1 + L2 + L3) vs NTC



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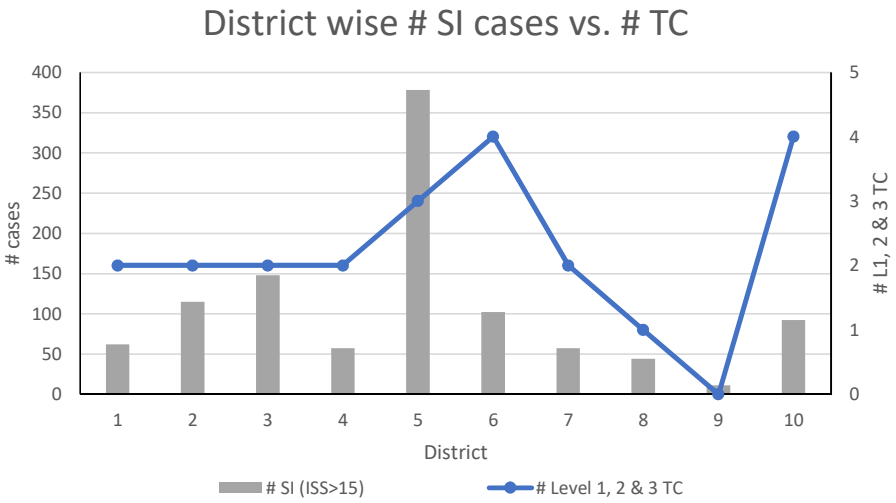
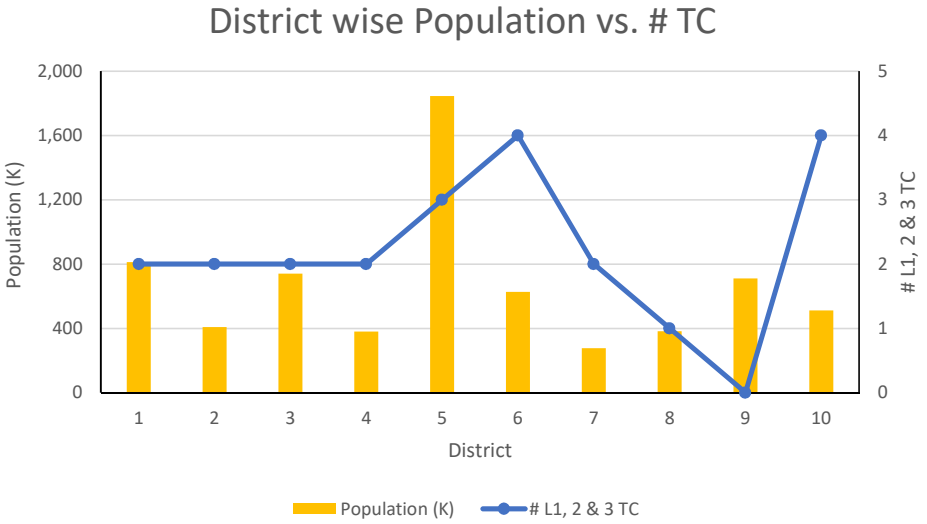
Relationship between population, trauma volume and number of TC by district





Next ISTCC Meeting

December 11