

NEBRASKA TRAUMA SYSTEM CHALLENGES RURAL TRAUMA CARE

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NO DISCLOSURES







Trauma Statistics

Trauma leading cause death individuals below the age of 45.

Trauma 4th leading cause death all ages.

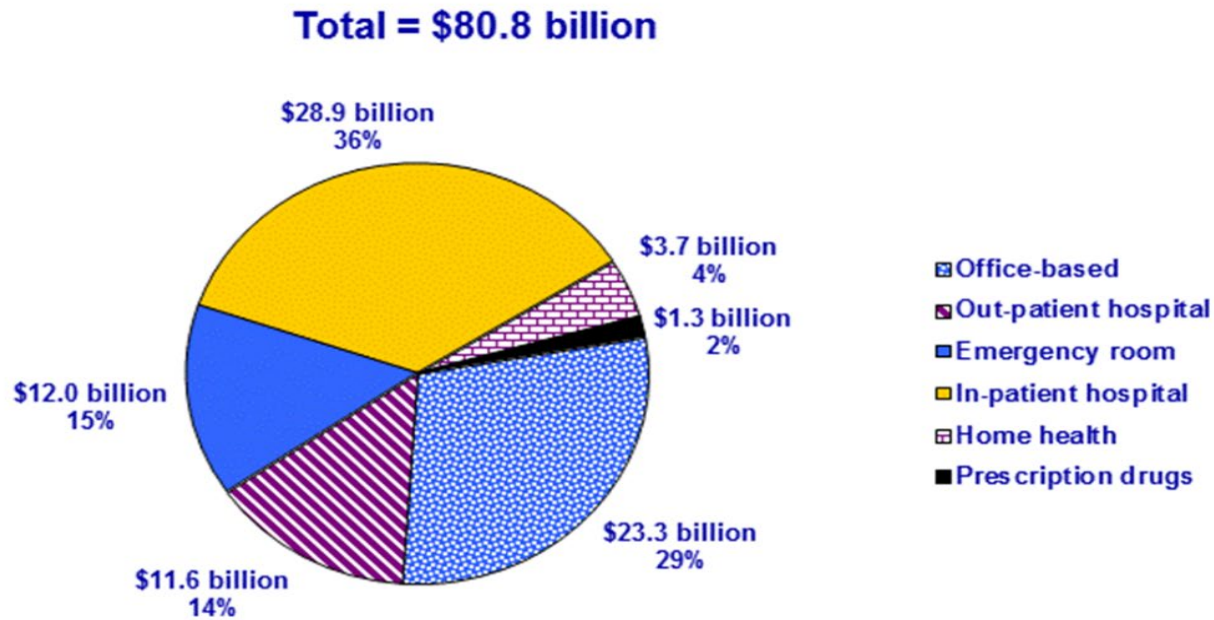
Approximately 40,000 homicide and suicide deaths per year.

Injury accounts for over 150,000 deaths and 3 million non-fatal injuries per year.

Trauma Costs



Figure 4. Total medical expenditures for trauma-related disorders, by type of service



Source: Center for Financing, Access, and Cost Trends, AHRQ, Household Component of the Medical Expenditure Panel Survey, 2009

What is Rural Trauma ?

When optimal care of the injured patient is delayed or limited by geography, weather, distance or resources.

Low volume experience that demands continuous evaluation and education to maintain skills.

ACS Committee on Trauma, 2006.

Rural Trauma

Large rural 15,000-50,000.

Small rural 2,500 – 15,000.

Frontier/ Pioneer < 2500.

Rural Trauma

20% of population live in rural areas, however 60% of all trauma deaths occur in rural areas.

Death rate in rural areas is inversely related to population density.

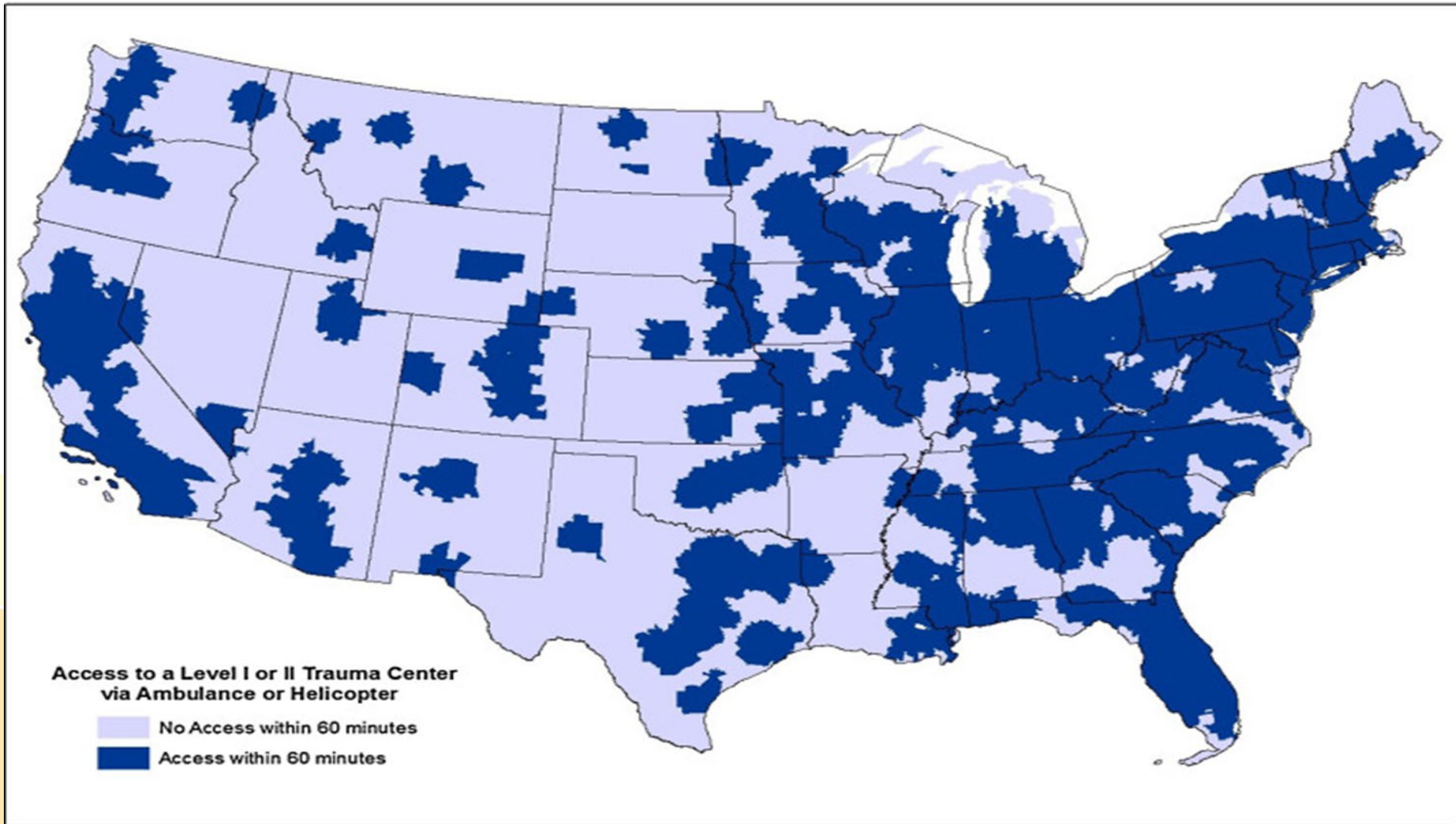
In the pediatric population death from injury may be 8x higher in rural areas compared to urban areas.

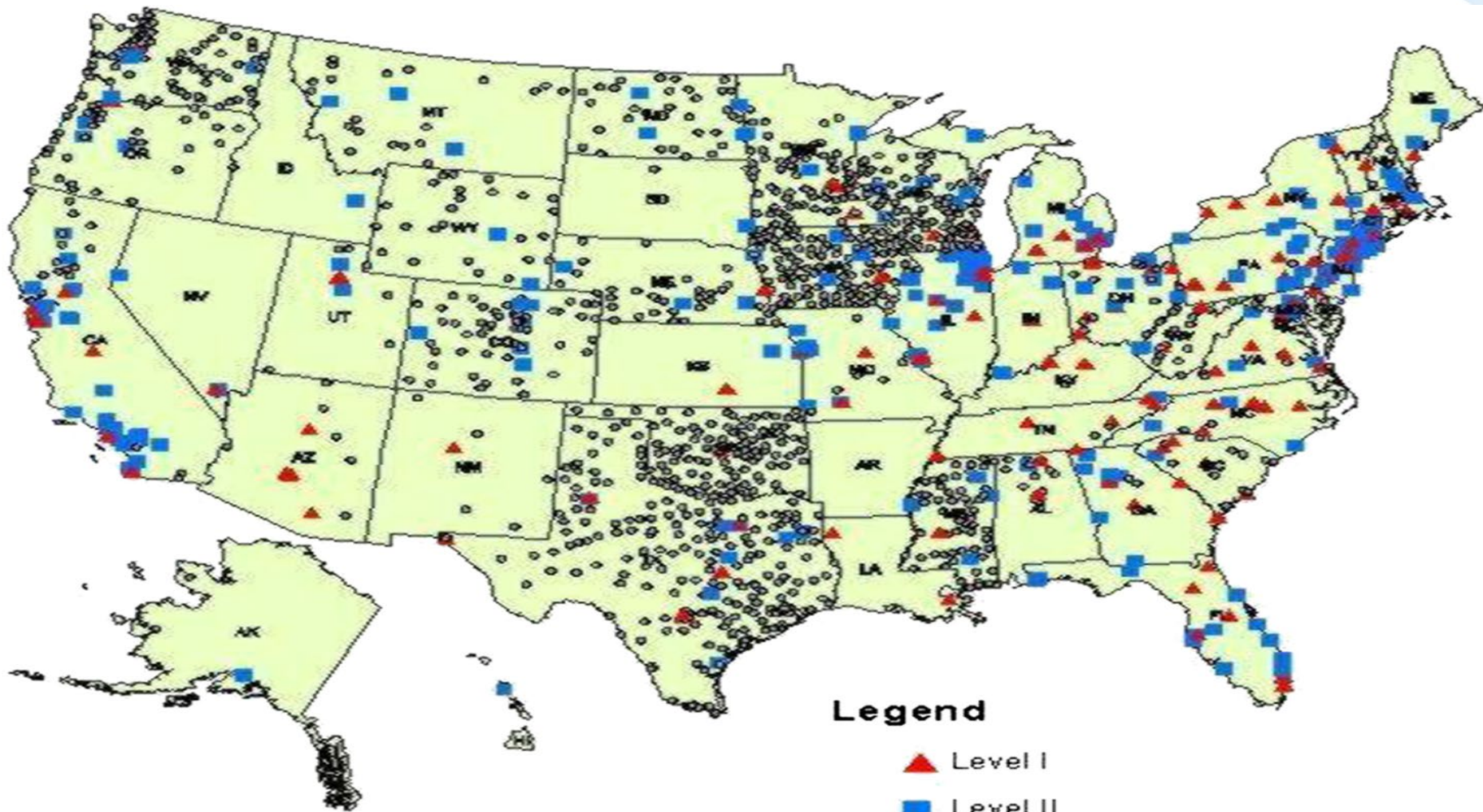
Rural Trauma

85% U.S. residents in urban areas live within an hour of a level I or II trauma center.

In rural area only 25% of residents have access within an hour to level I or II trauma center.

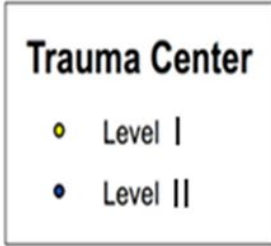
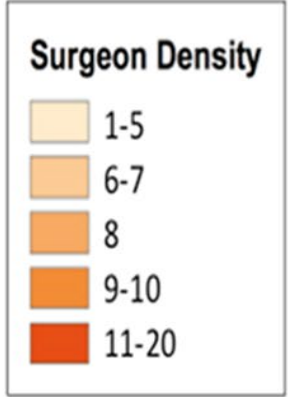
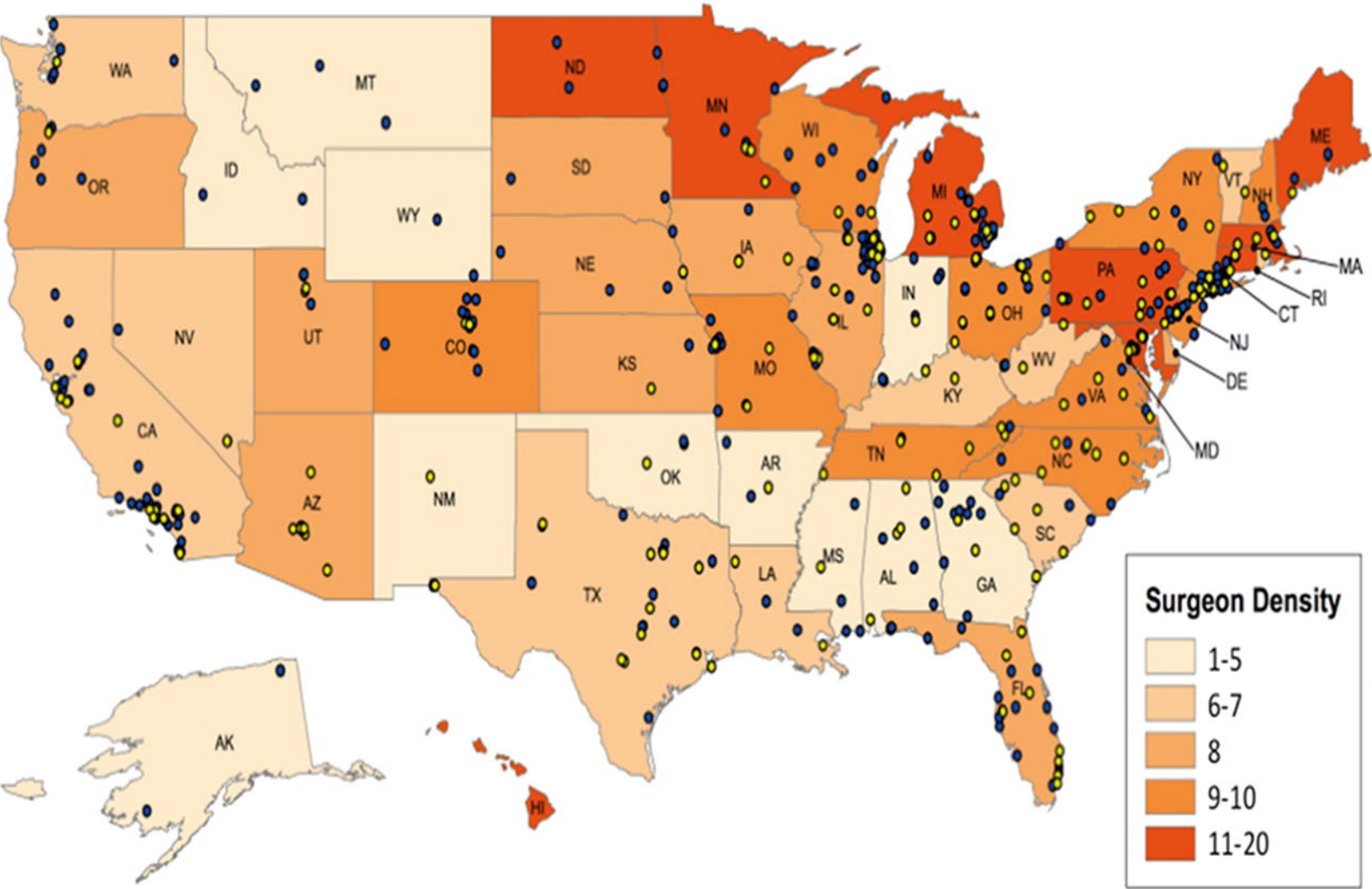
Branas, et al. Health Services Research 2000.



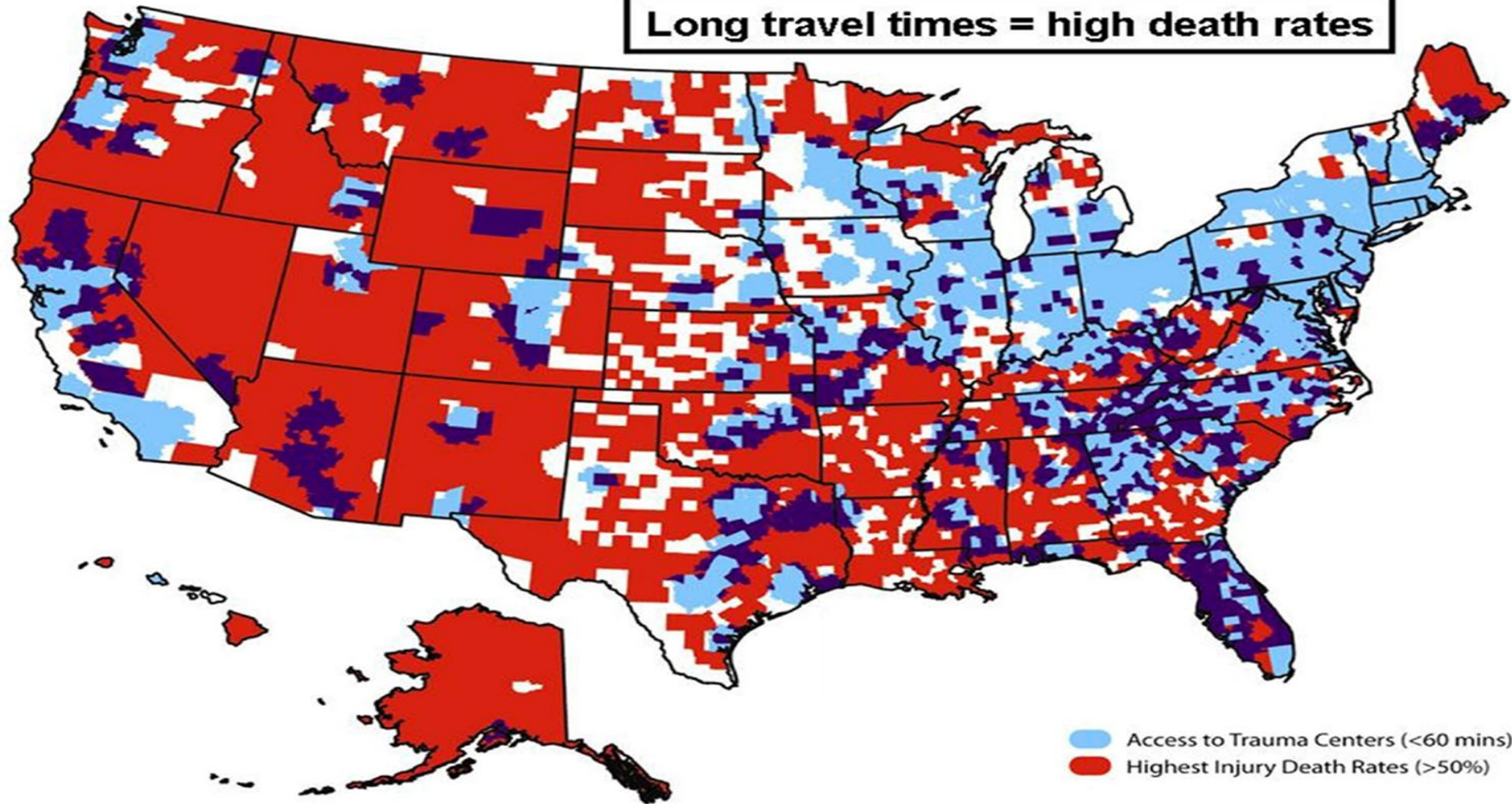


Legend

- ▲ Level I
- Level II
- Level III-V



Long travel times = high death rates



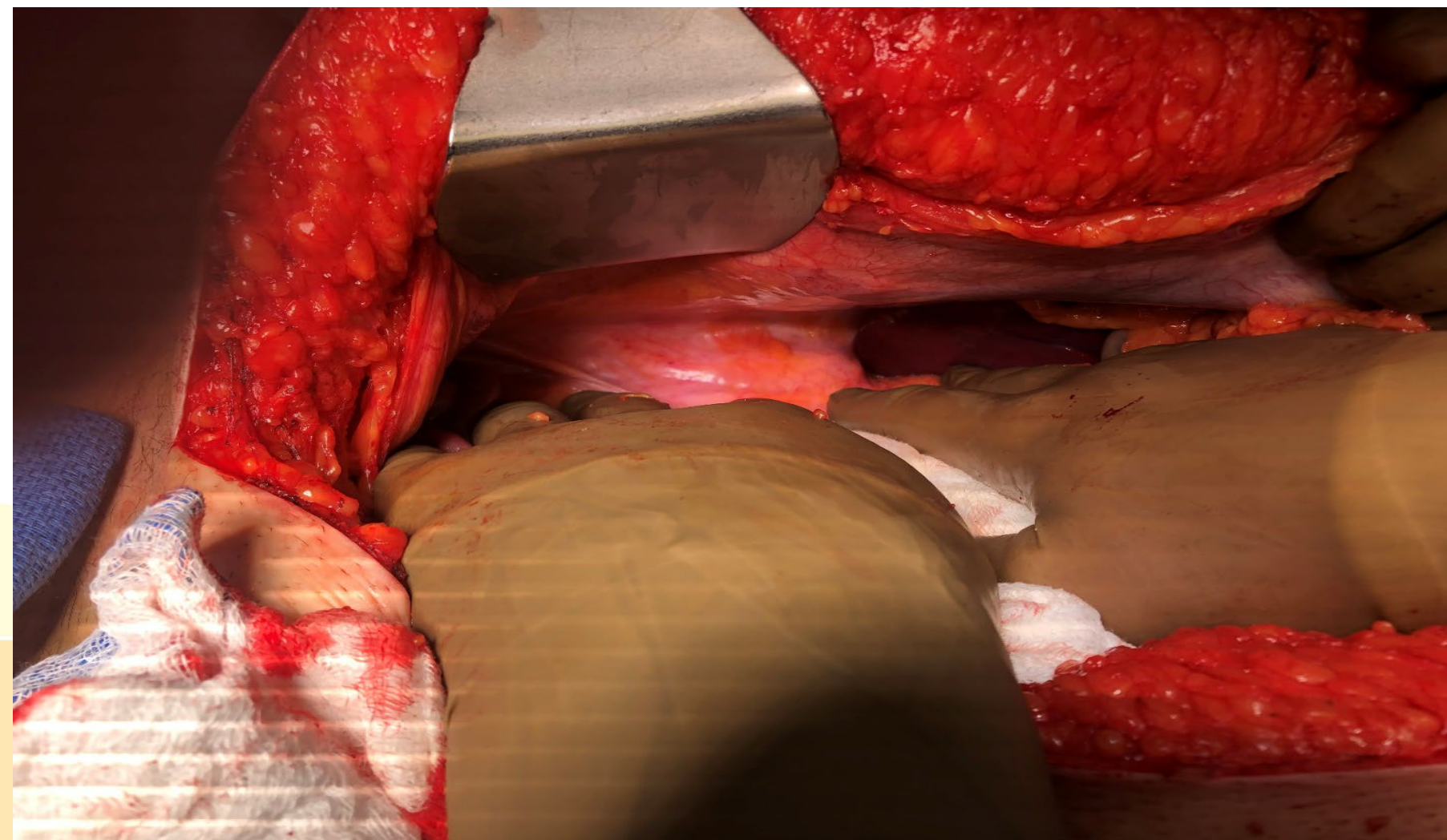
RURAL TRAUMA

Unique injury patterns



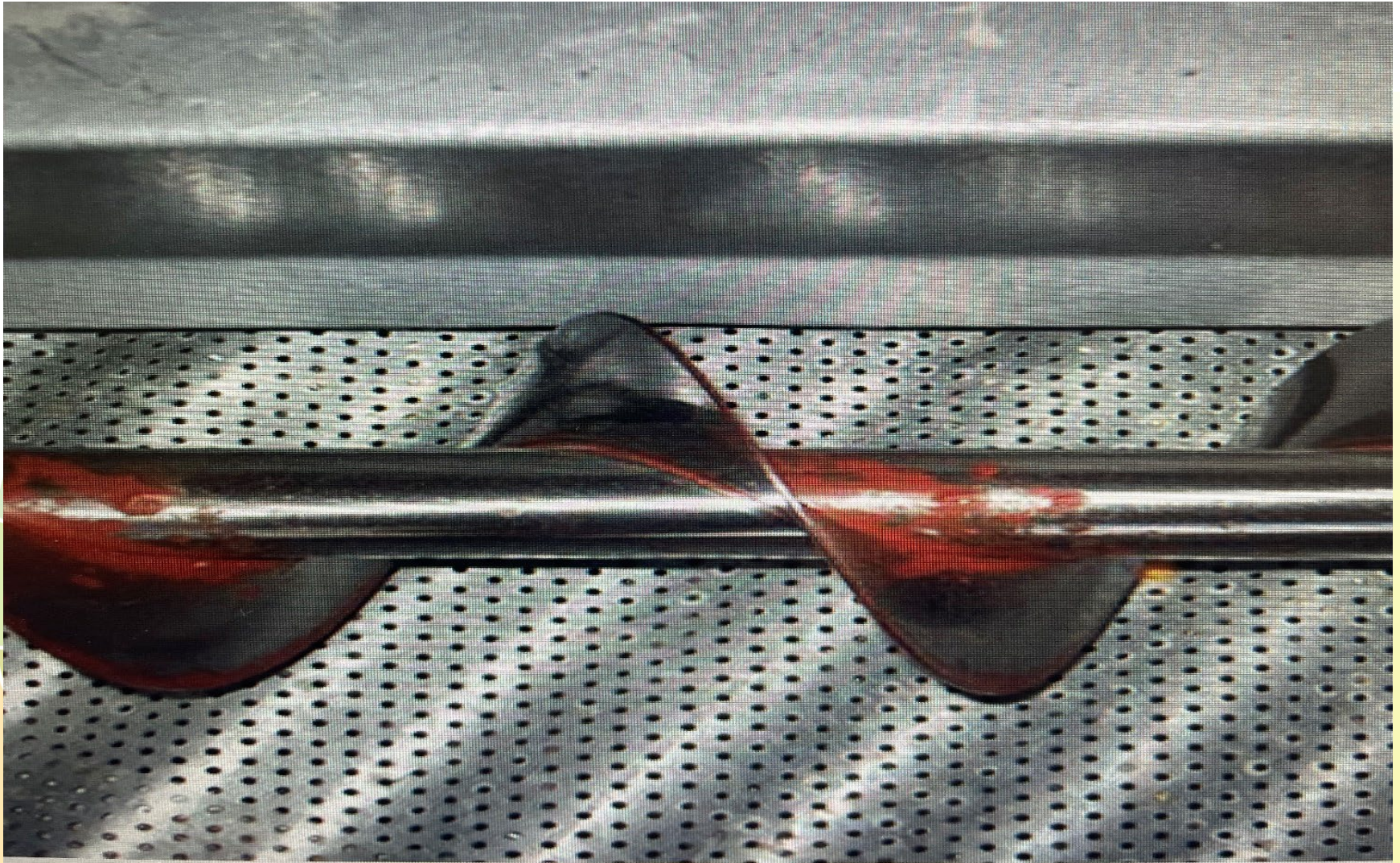






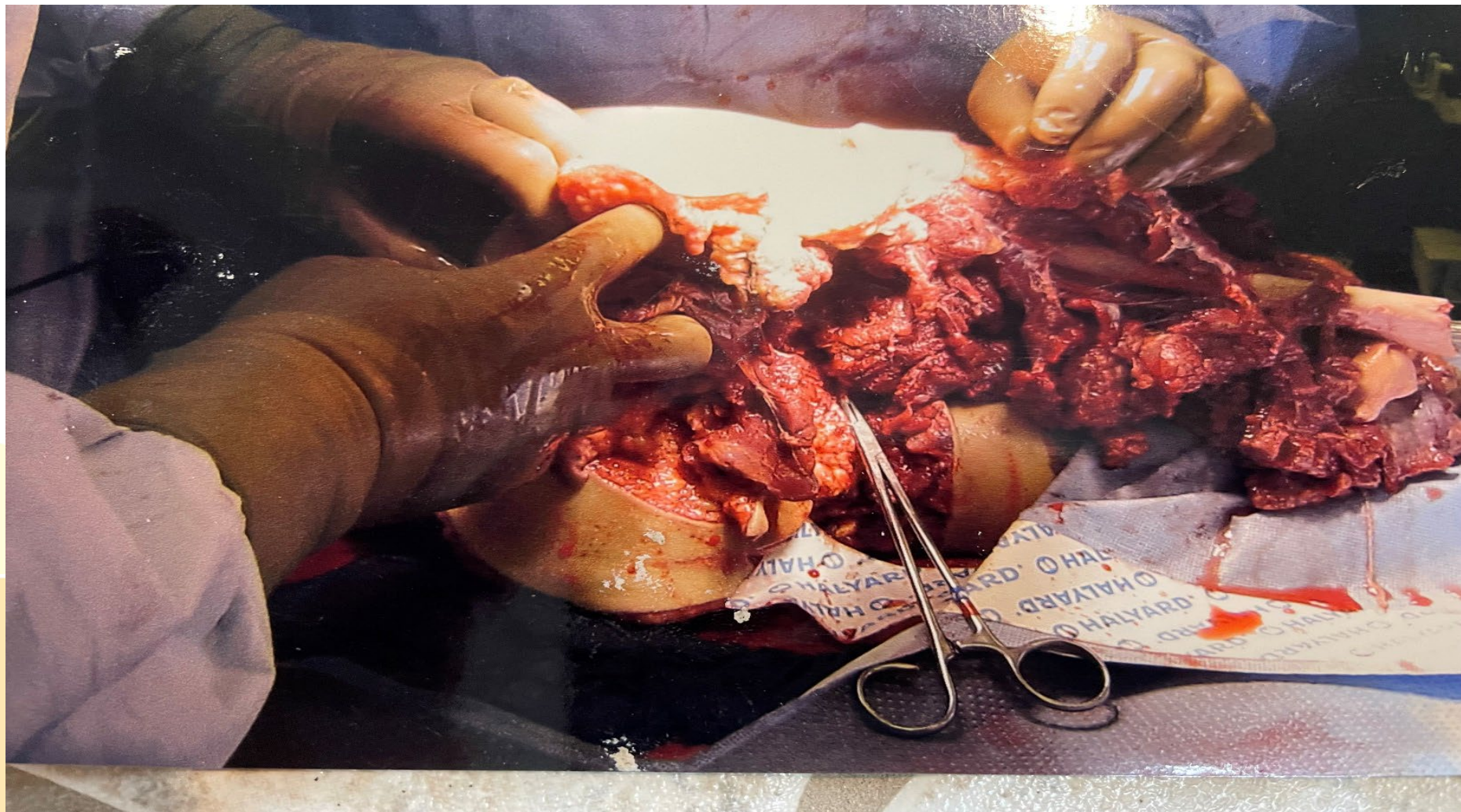


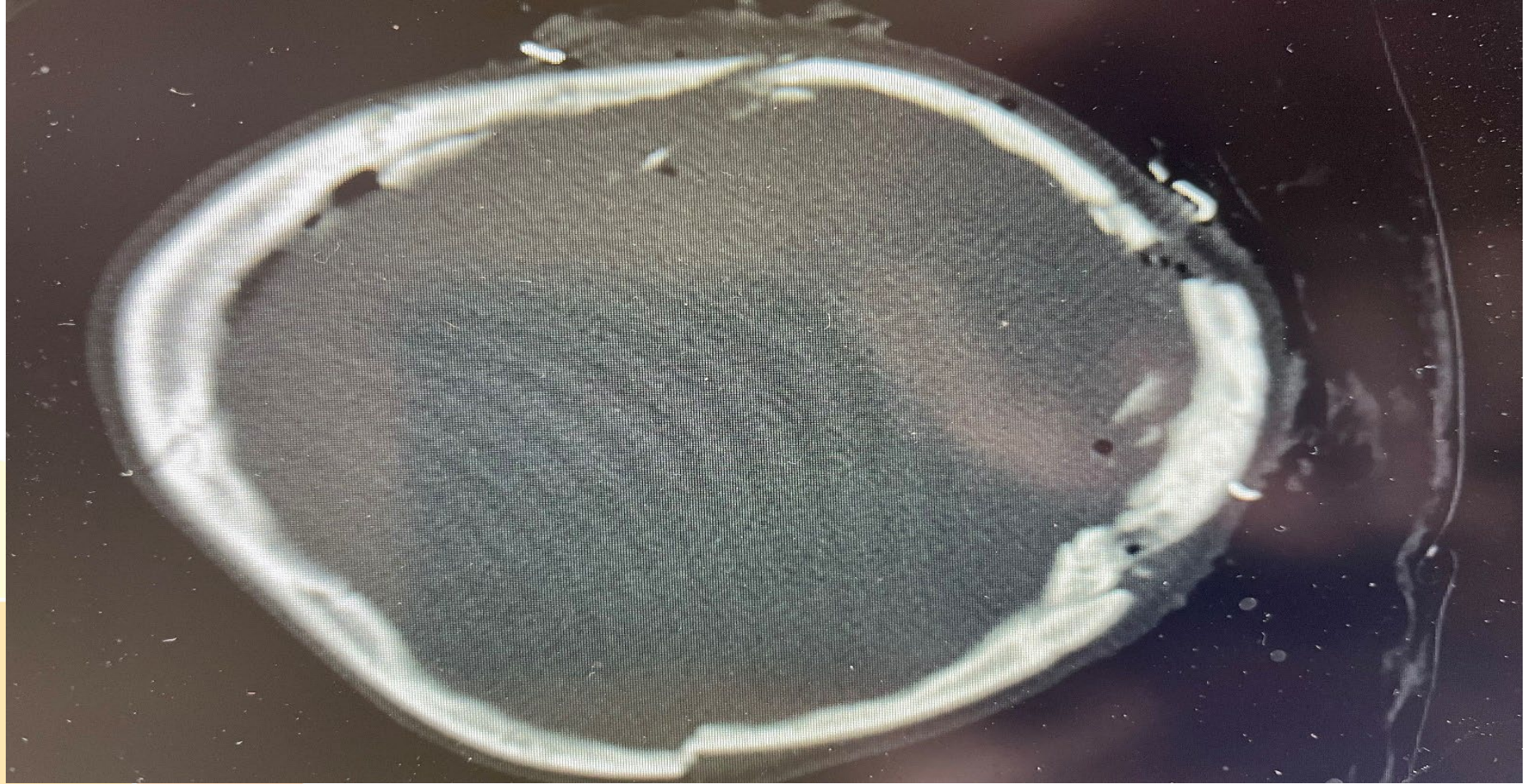










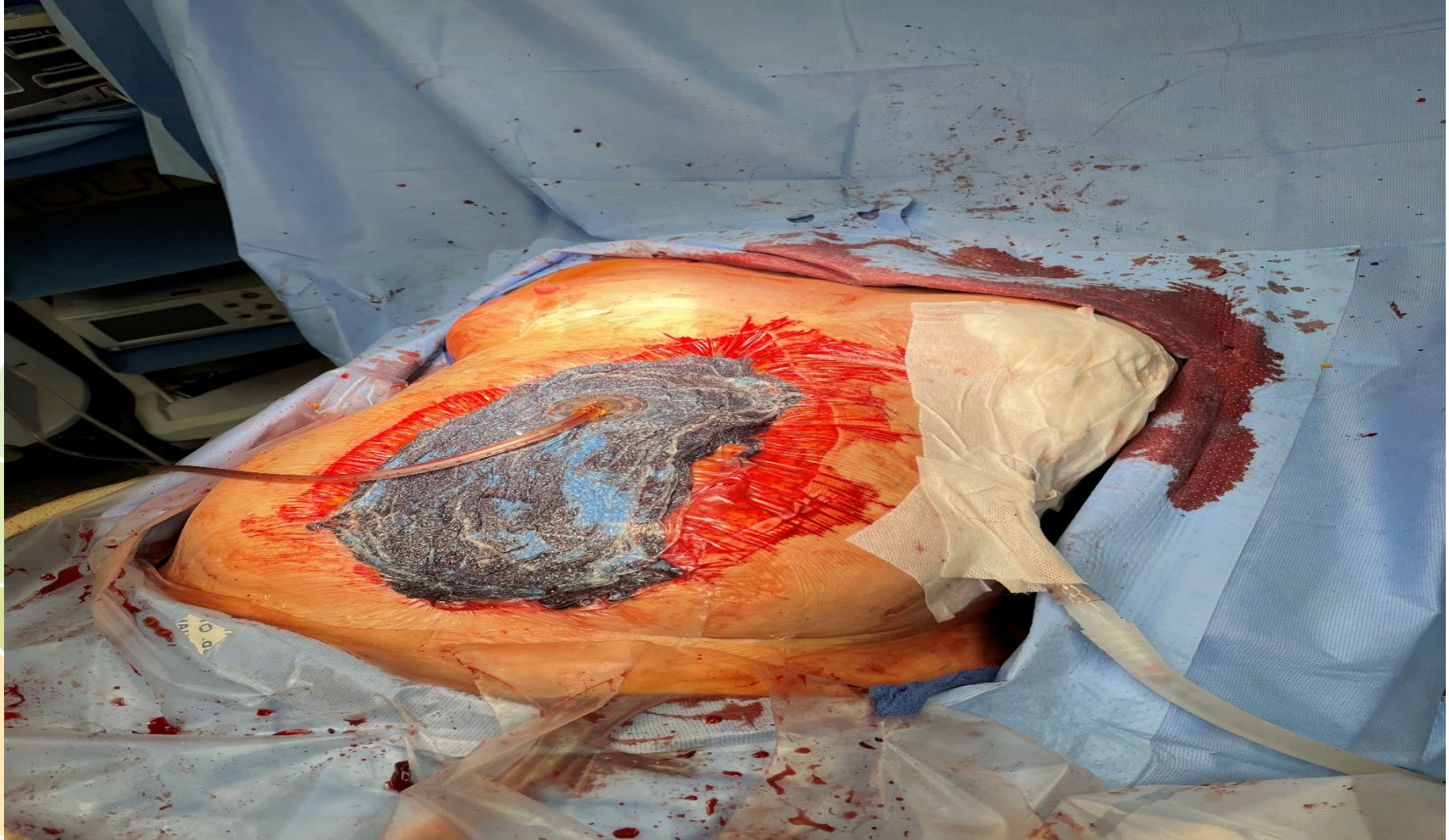












Considerations: Rural Trauma

15 y/o male unrestrained passenger, ejected.

Found outside the vehicle at the scene GCS = 9
(E2,V3,M4) Hr 120, SBP 80.

Exam – abrasions head, face, decreased breath sounds right side, abdomen distended with abrasions, right thigh swelling, right foot externally rotated and foreshortened.

Considerations: Rural Trauma

Volunteer BLS squad arrives – places oxygen, c-collar transports to local hospital.

Local hospital 20 bed critical access. No surgical capabilities. ED staffed by nurse practitioner (no ATLS), one RN (no TNCC), lab tech, CT scanner, Blood bank consist of 2 units PRBC.

The hospital has chosen not to be redesignated by the state trauma designation program (basic level) secondary to costs.

Considerations: Rural Trauma

At the local hospital - GCS = 9 (E2,V3,M4), SBP 80, HR 120,
Sats 90% on 15L mask.

Exam unchanged from the field.

Start IV give 2liters LR , fluids 150 cc/hr, CXR done, send pt to
CT with nurse.

CT- head – rt epidural. CT trauma body- rib fx, small
hemo/pneumothorax, liver lac, spleen lac, hemoperitoneum,
pelvic fx, femur fx.

Back to the ED.

Considerations: Rural Trauma

After CT results (90 min post injury) arrangements are made for air transport to the nearest trauma center (level II – 100 miles away).

While awaiting arrival of air transport pt becomes more hypotensive codes.

Unable to be resuscitated.

Improving Rural Trauma Care: Trauma Systems

Organized trauma systems started in 1960's 1970s.

National Highway Safety Act 1966.

Emergency Medical Service Act 1973.

Improving Rural Trauma Care: Trauma Systems

American College of Surgeons Committee on Trauma in 1976 published 'Optimal Care for the Injured Patient'.

1978 ATLS course unveiled - "Golden Hour".

Right Pt, Right Place, Right Time – Dr. Trunkey.

Trauma systems regulated at the state level.

Improving Rural Trauma Care: Trauma Systems

Elements of the Trauma System

**Bystander
Care**
to provide
early first aid

**Prehospital
EMS Care**
to stabilize
vital functions

**Hospital
Definitive
Care**
to repair
injuries

**Early
Rehabilitation**
to minimize
disability

**Recovery and
Re-Entry**
into society
and workforce

Source: Adapted from National Academies of Science, Engineering and Medicine (NASEM). "A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths," 2016. <http://www.nationalacademies.org/hmd/Reports/2016/A-National-Trauma-Care-System-Integrating-Military-and-Civilian-Trauma-Systems.aspx>

Improving Rural Trauma Care: Trauma Systems

Network of hospitals with the commitment and the resources to care for trauma patients.

A way to monitor the resources of each trauma hospital on a moment to moment basis.

Organized plan to route critical patients to the right hospital with the resources to care for them.

Constant monitoring of the system to correct problems, improve the system and validate the quality of care provided.

NEBRASKA STATE TRAUMA SYSTEM

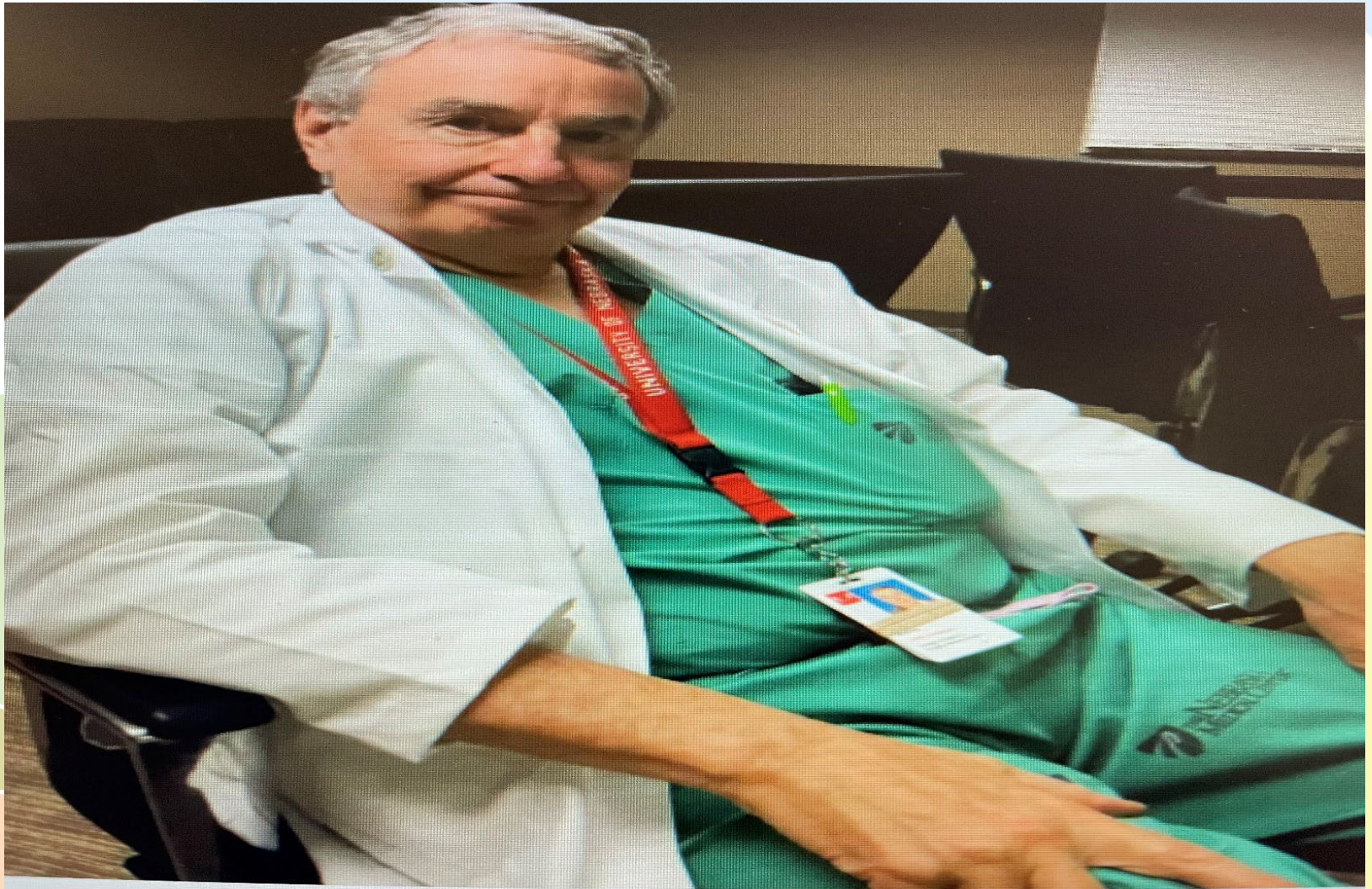
1993 – Dr Stothert, Dr. Harry (Lexington) Dr. Westerbuhr (Scottsbluff), Dr. Gaines, Dr. Paul and others started meeting with state legislators, mainly Senator Wesley, proposing formation of the Nebraska State Trauma system.

NEBRASKA STATE TRAUMA SYSTEM

Senator Wesley introduced (LB 1223) which called for the development of a state trauma plan.

July 1994 – The Trauma System Development Board was formed.

The board developed Statewide Trauma System plan LB626 - passed 1997.











NEBRASKA STATE TRAUMA SYSTEM

4 Regions with lead hospital each region

Region 1 – UNMC - Omaha

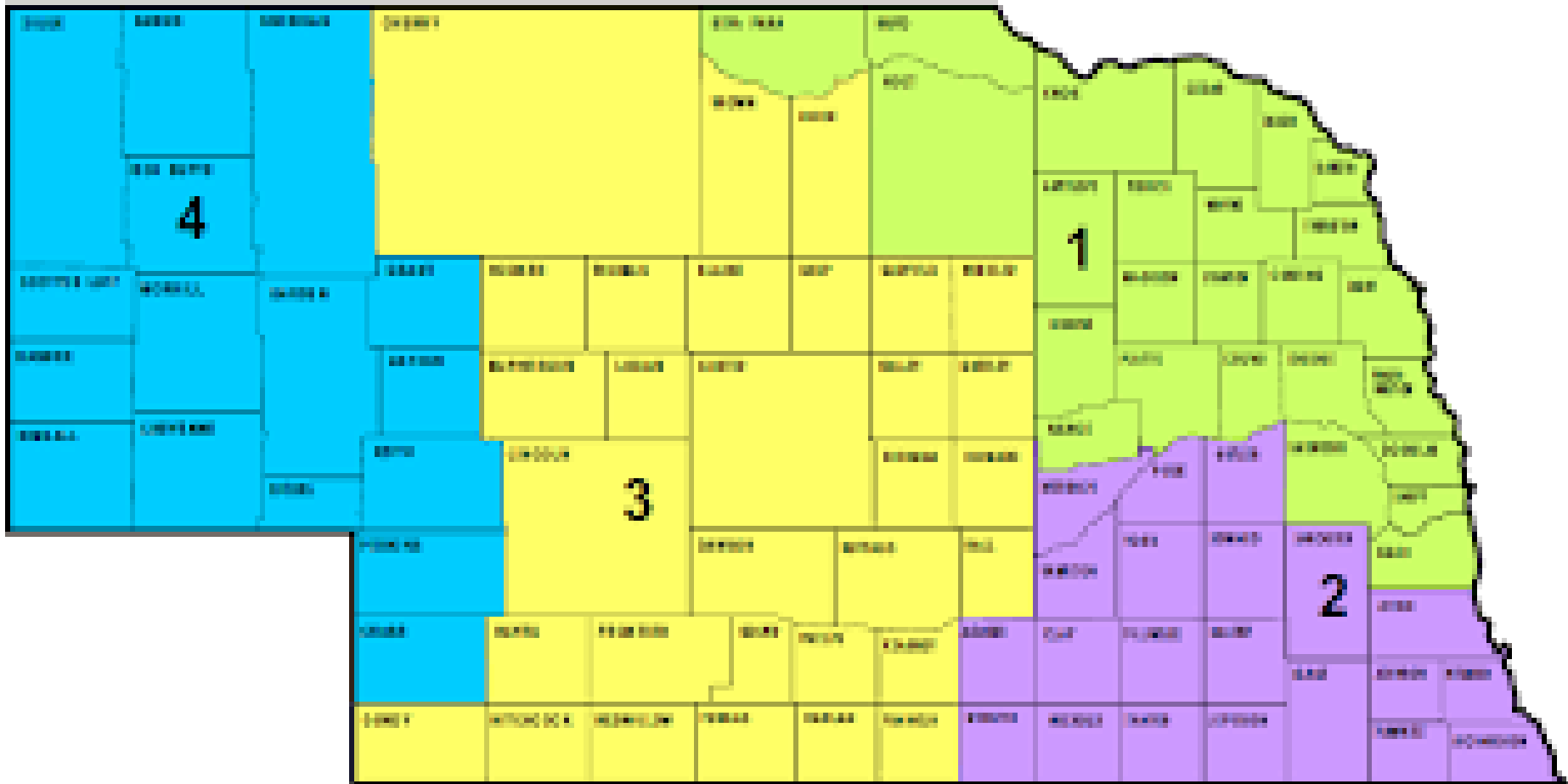
Region 2 – Bryan Hospital - Lincoln

Region 3 – Good Samaritan Hospital - Kearney

Region 4 – Regional West - Scottsbluff

**Comprehensive (Level 1), Advanced (Level 2),
General (Level 3), Basic (Level 4)**

NEBRASKA STATE TRAUMA SYSTEM



STATE OF NEBRASKA TRAUMA SYSTEM DESIGNATED HOSPITALS

Comprehensive (level 1) - 2

Advanced (level 2) - 3

Pediatric Advanced (level 2) - 1

General (level 3) - 5

Basic (level 4) - 38

Total number hospitals Nebraska - 104

27 acute care

64 critical access

3 peds

4 long term care

4 psych

2 rehab

NEBRASKA STATE TRAUMA SYSTEM

Designation process parallels American College Surgeons.

Hospitals redesignated every 3-4 years.

State Trauma Board – Rules and Regs.

Representation all stakeholders.

Funding State Trauma System

***2000 – Senator Byars LB 191 to the transportation Committee
\$1/ vehicle - reduced to \$.50***

***Approx. \$900,000 per year – has not been an increase in
funding or attempts to get more funding.***

STATE TRAUMA BOARD CHALLENGES

Financial support.

Increase state office department staff.

Legislation outreach.

Need legislators that are trauma advocates.

Statewide education.

Utilizing state TQIP data in effective manner to impact state trauma care.

GAPS THAT NEED FILLED STATE LEVEL

Buy in

Governing partner/leader (HRSA)

Trauma board at other tables

More guests at the trauma board meetings

BIGGEST GAP

Physician Leadership

TRAUMA CARE: RURAL CHALLENGES

Rural practitioners isolated

- Staffed with PA's, NP's limited backup
- Undertrained, little support
- Lack of experience with trauma care

Geographic distances

Shortage of support staff

Delay of transport to definitive care

Double transfers

TRAUMA CARE: RURAL CHALLENGES

Providers

- Lack of education.
- Lack of experience.
- Lack of comfort.
- Unfamiliar with treatment protocols.

Lack of institutional support.

Lack of regional support.

RURAL TRAUMA CHALLENGES -- TRANSPORT

Variability of services and level of training.

“Return to home hospital” mentality.

Long transport may leave community uncovered.

Delay in transfer waiting for higher level of skill.

Rely heavily air transport

- **overutilization ? / underutilization ?**
- **cost effectiveness ?**
- **better outcomes ?**
- **risk to crew**

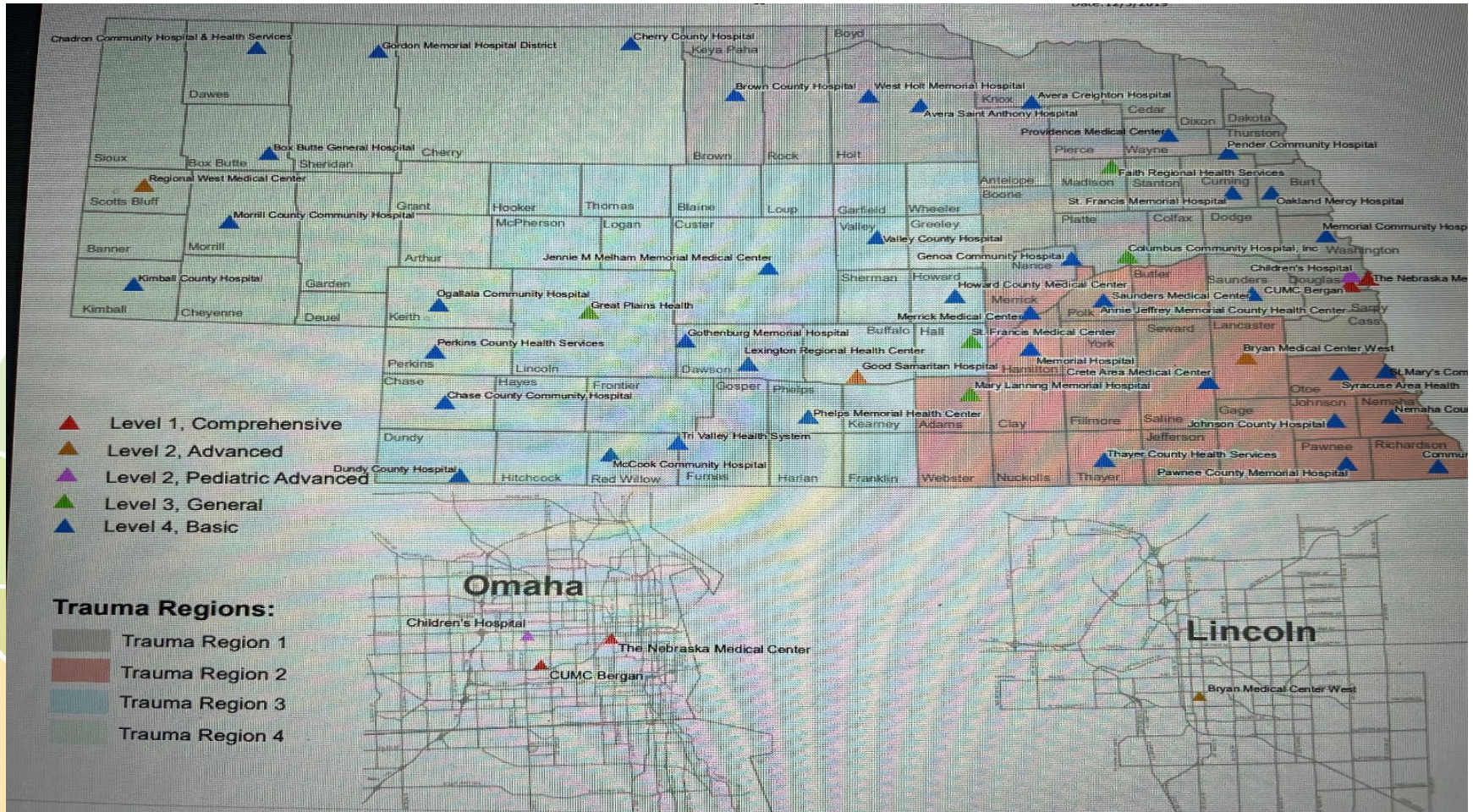
RURAL TRAUMA CHALLENGES -- TRANSPORT

Regionalization of EMS crews.

Place staffed squads, ambulances in surrounding towns to transport pts, help in the local hospitals.

Bring higher level of care/ trauma experience to the local communities.

RURAL TRAUMA CHALLENGES -- TRANSPORT



CHALLENGES RURAL TRAUMA CARE

Air Transport – The link between the critical access hospital and regional trauma centers.

Bring higher level of care to the patients.

Able to bring blood, blood products.

In air standby

- **Able to be deployed to the scene by local EMS based on mechanism, injury patterns.**
- **Able to tier with local squads.**
- **Significantly reduces time to definitive treatment.**

No charges if not needed not turned away.

IMPROVING RURAL TRAUMA CARE: EDUCATION

Trauma specific educational opportunities

- ATLS
- TNCC
- PHTLS
- RTTDC

Need to be supported by local and facilitated by regional centers.

IMPROVING RURAL PEDIATRIC TRAUMA CARE: EDUCATION

Rural Trauma Team Development Course (RTTDC).

Purpose – to train rural hospital providers and support staff in team approach to initial assessment and resuscitation.

IMPROVING RURAL TRAUMA CARE: EDUCATION

RTTDC

- Establishes a trauma team using the personnel and resources available at the local facility.
- Develops team approach to resuscitation, stabilization, prompt transfer.
- Identifies key factors in the organization for successful resuscitation, adequate equipment.
- Develops institutional confidence.

IMPROVING RURAL TRAUMA CARE: EDUCATION

RTTDC

- Taught by personnel from areas level I, II, or III trauma centers.
- Builds working relationships between trauma centers and referring facilities.
- Allows trauma center personnel to see first hand resources available at the referring facility.

IMPROVING RURAL CARE: INCREASED SUPPORT FROM ACCEPTING HOSPITALS

Transfer Center – help arrange transport, if unable to accept pt help find another accepting institution.

Try truly make it “one call”

“User Friendly” – “Be Nice”

May not be the time for “20 questions”

Limit the number of people referring providers need to talk to

IMPROVING RURAL TRAUMA CARE PERFORMANCE IMPROVEMENT

Done at all levels, data collected on local regional state level.

Care issues.

System issues.

Appropriate audit filters.

Lead by the region hospitals with the support from state.

**Accurate clean TQIP data use to make changes locally,
regionally, state.**

Involve all stakeholders.

RURAL TRAUMA SUPPORT: PERFORMANCE IMPROVEMENT

Attend referring facilities trauma conferences.

Non punitive approach.

Use it as a time to educate.

Regional PI meetings - Educational offering, group case reviews.

Always be willing to share your centers issues first.

Celebrate the successes.

IMPROVING RURAL TRAUMA CARE

Teletrauma

PACS

Simulation

IMPROVING RURAL TRAUMA CARE

Funding

- State
- National
- ACS initiative

Achieving Zero Preventable Deaths; Building a National Trauma Care System and Research Action Plan.

IMPROVING RURAL TRAUMA CARE: CASE REVISITED

15 y/o male unrestrained passenger, ejected

Found outside the vehicle.

GCS = 9 (E2,V3,M4), Hr 120, SBP 70s

Exam – abrasions head, face, decreased breath sounds right side, abdomen distended/tender, pelvis tender, right thigh swelling, right foot external rotated, foreshortened.

**Volunteer squad – oxygen, c-collar to local hospital.
Notify hospital pts condition and time to arrival.**

IMPROVING RURAL TRAUMA CARE: CASE REVISITED

Local Hospital – 20 bed critical access, designated as state basic level trauma center.

Has recently participated in RTTDC course.

Staffed by NP (has completed ATLS), backed up by primary care provider (ATLS trained), two nurses (have completed TNCC), CRNA.

IMPROVING RURAL TRAUMA CARE: CASE REVISITED

On getting report of trauma pt – contact is made with regional trauma center.

Level II.- Helicopter dispatched flight crew takes blood.

On pt arrival – rapid assessment, intubated by CRNA, IVs started. Blood initiated OG. CXR/pelvic film Pelvic binder, warming

Uses teletrauma for resuscitation help and placement of right chest tube.

After initial resuscitation blood- Hr 110, SBP 90s.

Flight team still 20 minutes away

IMPROVING RURAL TRAUMA CARE: CASE REVISITED

Pt to CT accompanied by providers/nurses

Ct Findings – Head epidural

- Body – rib fxs, liver/spleen
- pelvic fx
- rt femur fx

Images downloaded via PACS to regional trauma center.

Flight crew arrives pt packaged.

Continue blood give TXA. SBP 80s Hr 115.

Trauma Center Updated

IMPROVING RURAL TRAUMA CARE: CASE REVISITED

Regional Trauma Center Level II –No PICU.

Prior to Pt arrival films images reviewed/pt status known.

Contact made with Level 1 pediatric trauma center.

**Direct admit from helipad to OR where neurosurgery/
general surgery combined procedure craniotomy/Ex lap
spleen removed/ liver packed / abdomen packed.**

Ortho ex fix femur.

IMPROVING RURAL TRAUMA CARE: CASE REVISITED

Pt taken from PACU - helicopter transferred to Level 1 Pediatric trauma center.

Pt cared for at level 1- definitive surgery, PICU care to rehab 7 days post injury.

Pt goes on to have excellent recovery.

IMPROVING RURAL TRAUMA CARE: CASE REVISITED

Case reviewed by local hospital, flight medical director, regional trauma center (taken to local trauma peer review).

Feedback from the level I center to the level II center back to referring level IV center.

Case presented at regional performance improvement meeting.

Any issues tracked by local, regional trauma nurse manager.

Changes in protocols made as needed.

RURAL TRAUMA PERSONAL OBSERVATIONS

Level IV facilities do a GREAT job with limited resources.

It is driven usually by the facility nurses and trauma nurse coordinators.

They take great pride in their local institutions.

They are committed to improving trauma care in their facilities.

As the trauma care improves so does care in all areas of the hospital.

DECLINE RURAL GENERAL / TRAUMA SURGEONS

Aging surgeon population.

Declining surgeon to population ratio.

Most trainees enter fellowships – 80%.

Most trainees after fellowship migrate to urban areas.

Earlier physician retirement.

More physician emphasis on work life balance.

DECLINE RURAL GENERAL / TRAUMA SURGEONS

Without general surgeon, many rural facilities will close.

Large impact on financial well being of rural communities.

Financial impact of general surgeon is approx. 2.5 million/yr.

Rural pts delayed or no care due to long travel distances.

DECLINE RURAL GENERAL / TRAUMA SURGEONS

Delayed resuscitation/ stabilization rural trauma pts.

Less effective triage.

Overburdening of regional higher level trauma centers with less injured pts.

CONS OF RURAL GENERAL / TRAUMA SURGEONS

Call coverage.

Reimbursement.

Isolation.

Inability to acquire new skills.

Increased administrative duties.

“Not comfortable”

TRAINING RURAL GENERAL / TRAUMA SURGEONS

Majority of rural surgeons or their spouses are from rural area.

Identify those trainees earlier

Expose students / residents to rural surgical experience.

Resident rural rotations.

Develop rural mentors.

Increased professional respect general surgeons.

RURAL vs URBAN SURGEON CASE LOAD

Urban – 466/yr.

Large Rural – 644/yr.

Small Rural – 681/yr.

Valentine et al, 2011

Rural surgeon – more endoscopy, “smaller cases”

PROS RURAL GENERAL / TRAUMA SURGERY

Lack of competition

Collegiality

Independence

Continuity of care

Rural lifestyle

Lack of commute / multiple hospitals

Family time

PROS RURAL GENERAL / TRAUMA SURGERY

*Broad case load – ability to make it what you want –
Laparoscopy, advanced laparoscopy, robotics, vascular,
trauma, thoracic, wound care, endoscopy.*

*Not for everyone – “Be comfortable being
uncomfortable.”*

TRAINING RURAL GENERAL / TRAUMA SURGEONS

Fellowship trained surgeons who enjoy the challenges of general surgery will be ideally suited to staff rural regional centers and smaller hospitals.

They will be highly sought after.

They will be rewarded professionally and financially.

The Art of Medicine is.....

**Amusing the patient while
nature cures the disease
process.**



