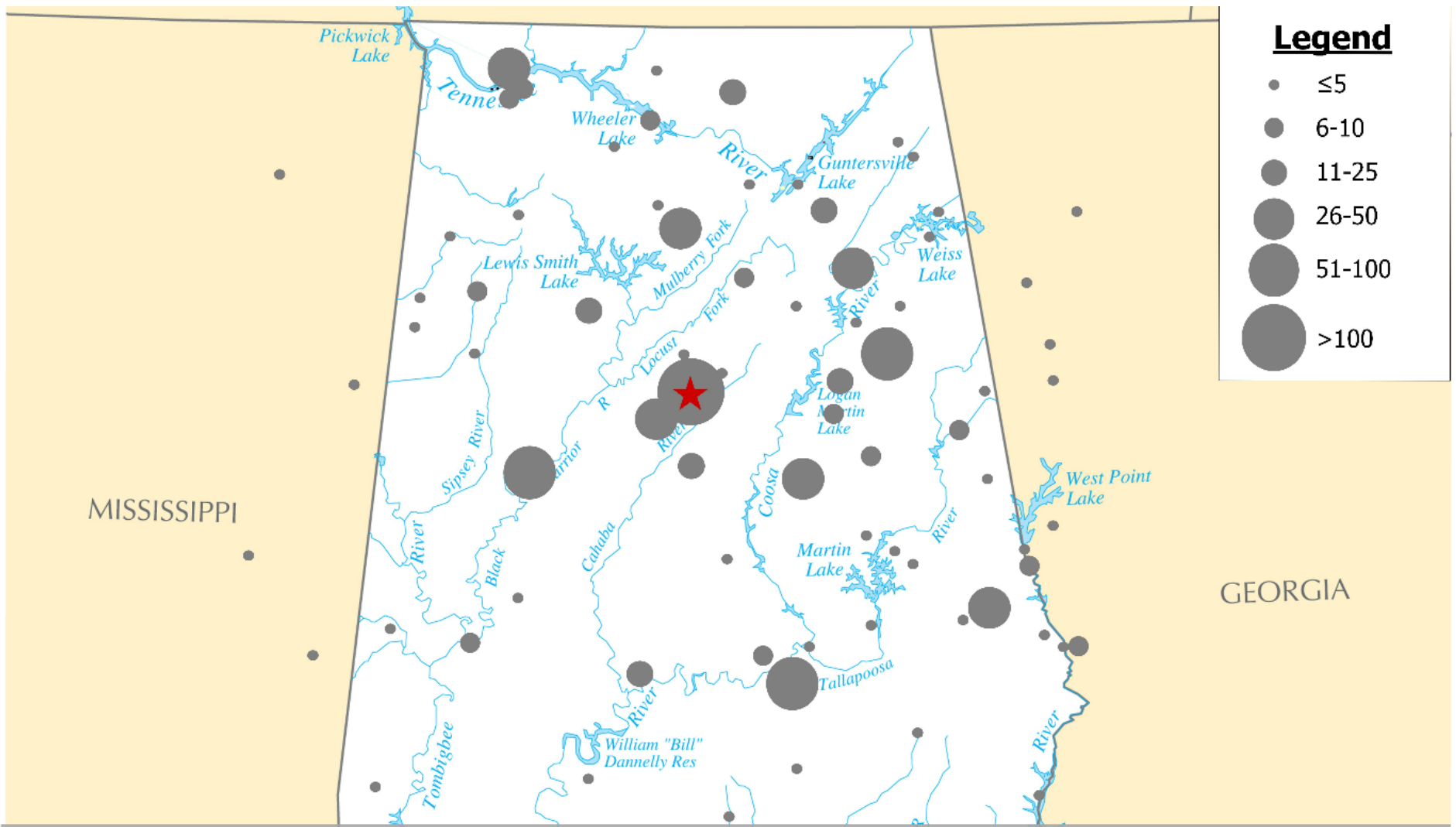


Transfers to tertiary neurosurgical care

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Case 1

77 yo M

AAA repair 3 weeks ago

On coumadin and plavix

PLTs 97K, INR 2.0

GCS 15, at neuro baseline



Case 2

86 yo male

Fall with back pain

Afib on coumadin

Neuro intact

Ambulatory w cane



Aims

- describe patterns
- identify potentially avoidable transfers
- assess costs

Billing record query 2012-14



5531 pts admitted to neurosurgery



943 coded as transfer



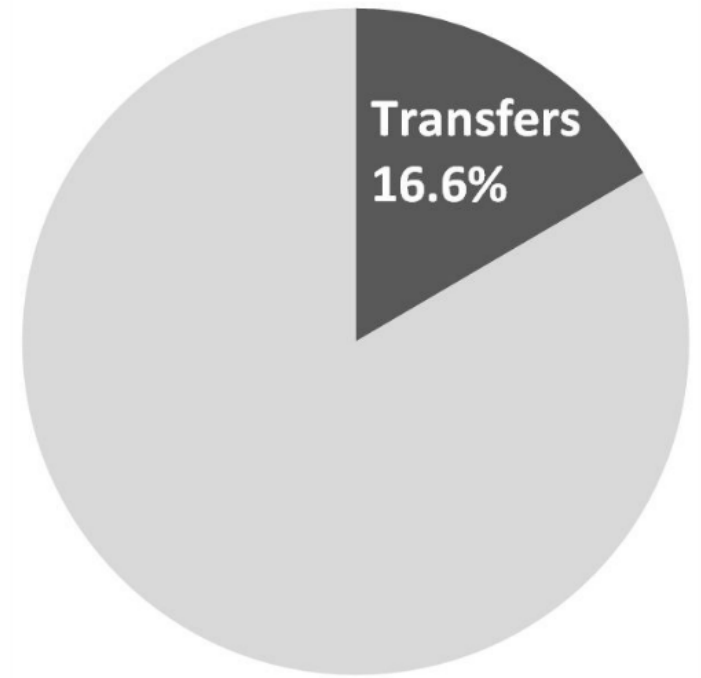
EMR reviewed

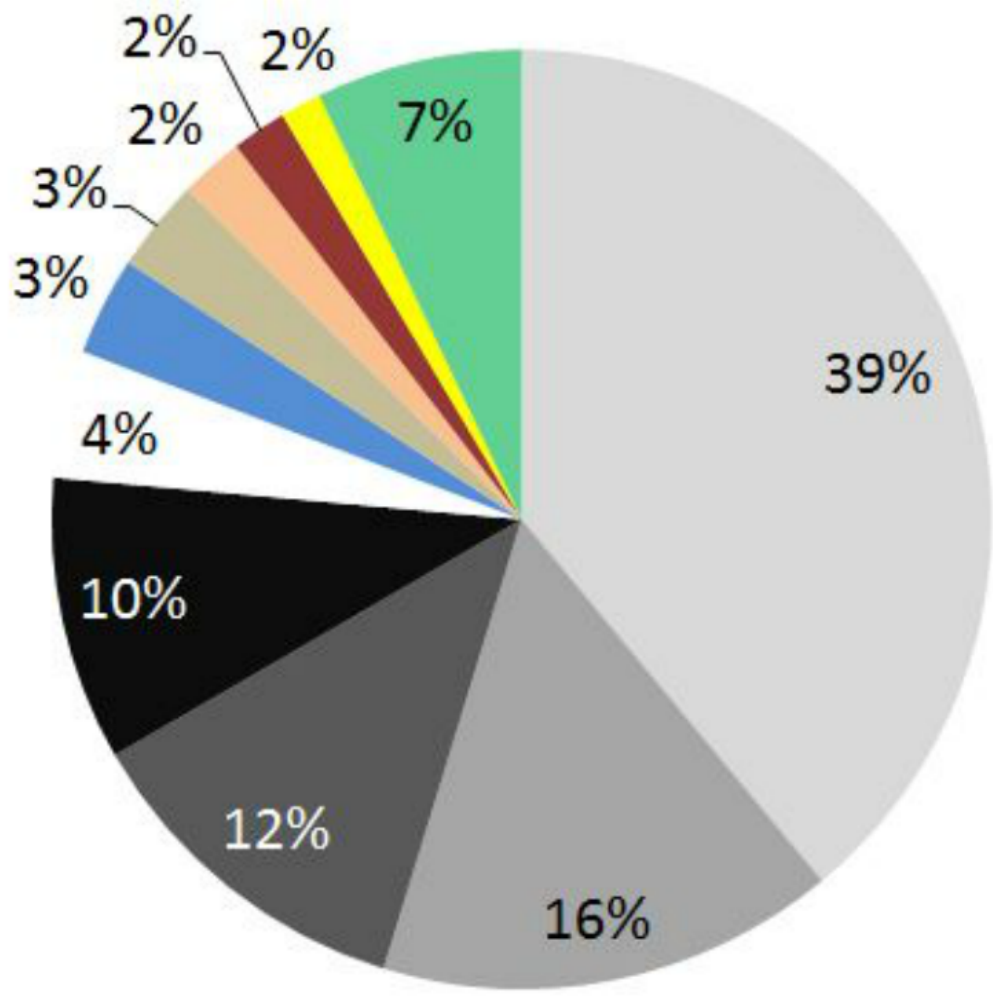


916 transfers



No exclusions





- Intracranial hemorrhage
- Neoplasm
- Trauma
- Spine (non-trauma) Infection
- Ischemic stroke
- Unruptured aneurysm
- Shunt-related
- Hydrocephalus
- Headache
- Other

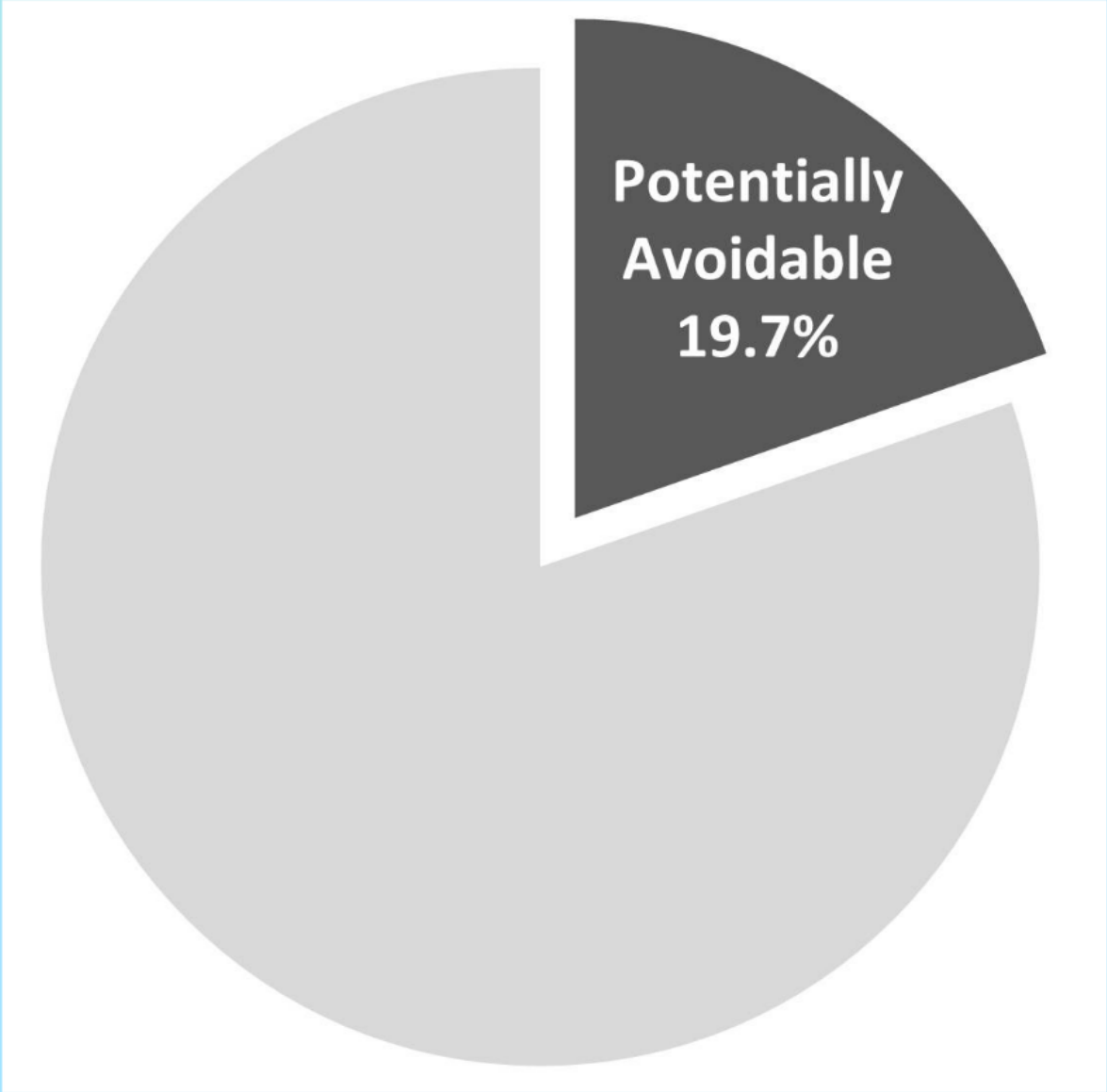
Potentially Avoidable

- Dead
- Immediate palliative/comfort care
- Discharge without diagnostic/therapeutic intervention

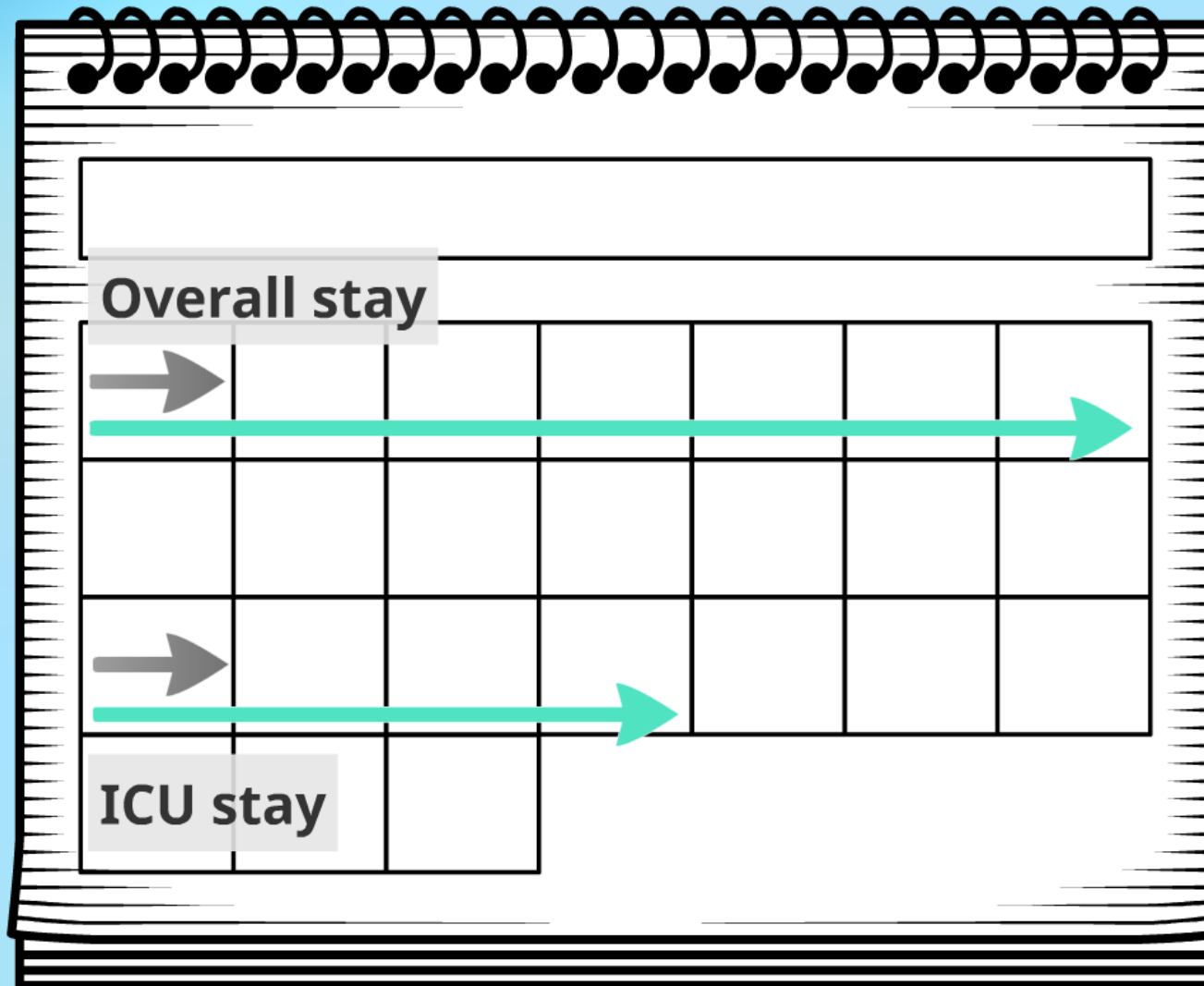
Justifiable

- Any neurosurgical or invasive procedure
- Diagnostic testing not widely available (eg. LTEEG, CT myelogram)
- At significant risk of neurologic decline

Outcomes: length of stay, mortality, discharge disposition, cost



Length of Hospital and ICU Stay

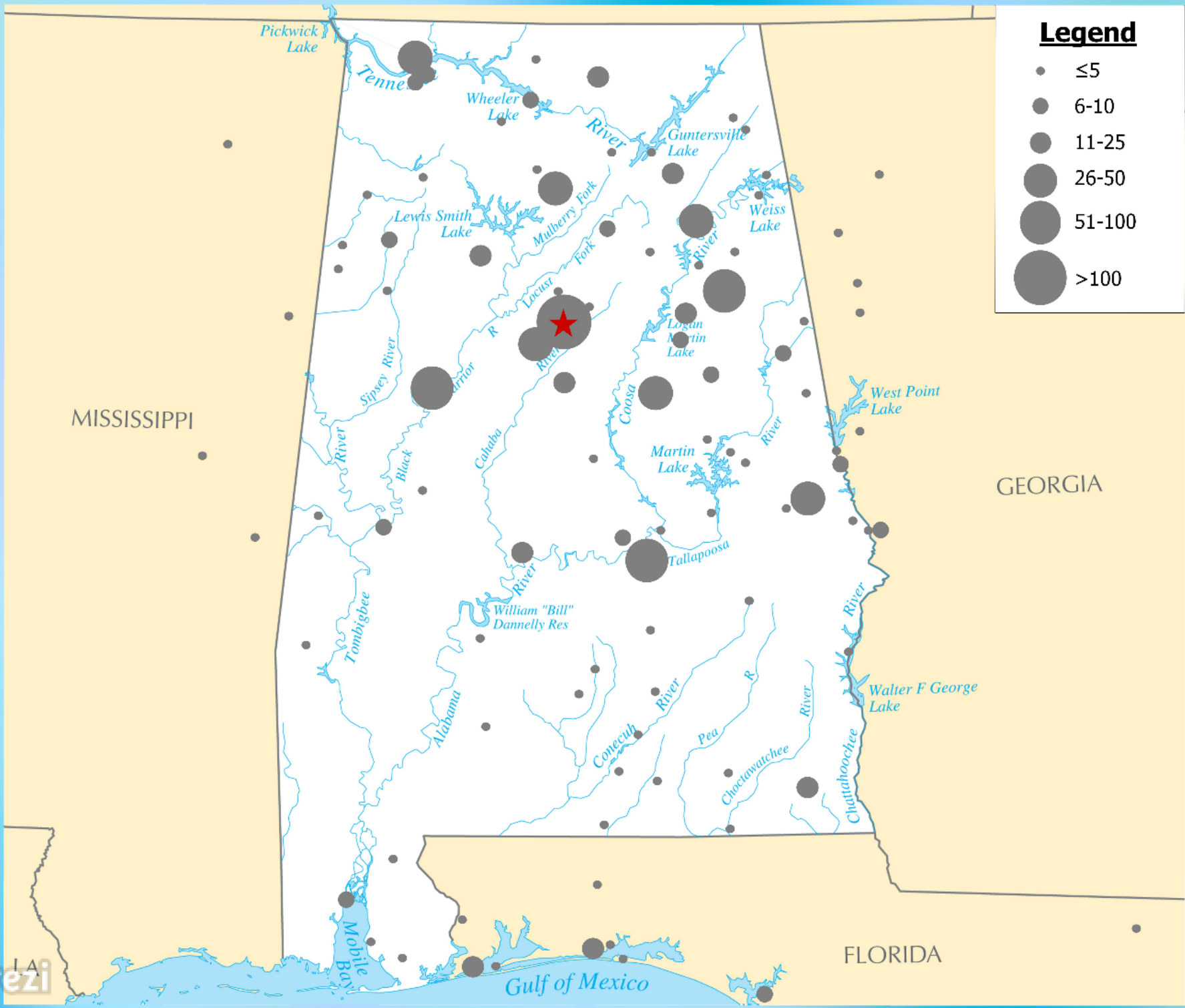


	Justifiable Transfers	Potentially Avoidable	P-value
No.	736	180	
Age in years	55.5 ± 16.5	61.3 ± 19.1	< 0.0001
Males, %	46.7	46.1	0.93
Mortality, %	6.5 (N=48)	21.1 (N=38)	< 0.0001
Insurance types, %			0.045
Uninsured/Charity care	11.8 (N=87)	10.6 (N=19)	0.70
Private	29.6 (N=218)	22.2 (N=40)	0.052
Medicare	42.0 (N=309)	55.6 (N=100)	0.001
Medicaid	11.1 (N=82)	8.3 (N=15)	0.34
VA	2.6 (N=19)	1.7 (N=3)	0.60
Other	2.9 (N=21)	1.7 (N=3)	0.60
Hospital LOS, days (IQR)	7 (4–14)	1 (1–3)	< 0.0001
Admitted to ICU, %	73.7	70.0	0.35
ICU LOS, days (IQR)	4 (2–9)	1 (0–1)	< 0.0001
Transfer distance, miles (IQR)	70 (46–110)	66 (46–108.8)	0.56

ICU = intensive care unit; LOS = length of stay; IQR = interquartile range

Legend

- ≤5
- 6-10
- 11-25
- 26-50
- 51-100
- >100



Requiring Tertiary Care

Neoplasm:

OR 0.53 (0.32-0.90)

Non-traumatic hemorrhage

OR 0.67 (0.48-0.95)

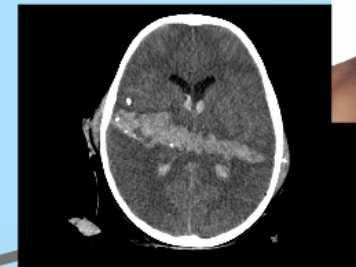
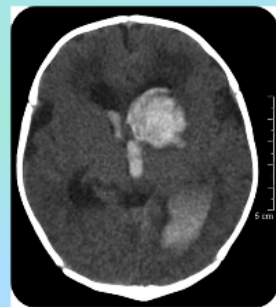
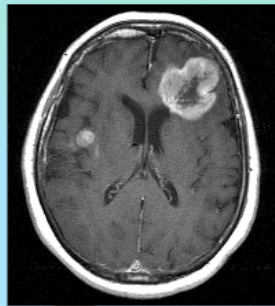
Potentially Avoidable

Trauma:

OR 5.82 (3.82-8.87)

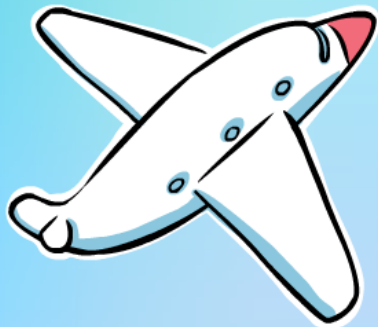
Headache:

OR 3.59 (1.19-10.82)





$\$6160 + 24.64/\text{mile}$



$\$11,760 + 122.08/\text{mile}$



\$1.46 million

Discussion



20% of transfers
potentially avoidable

Elderly, trauma, headache

\$1.5 million
transport cost

Implications

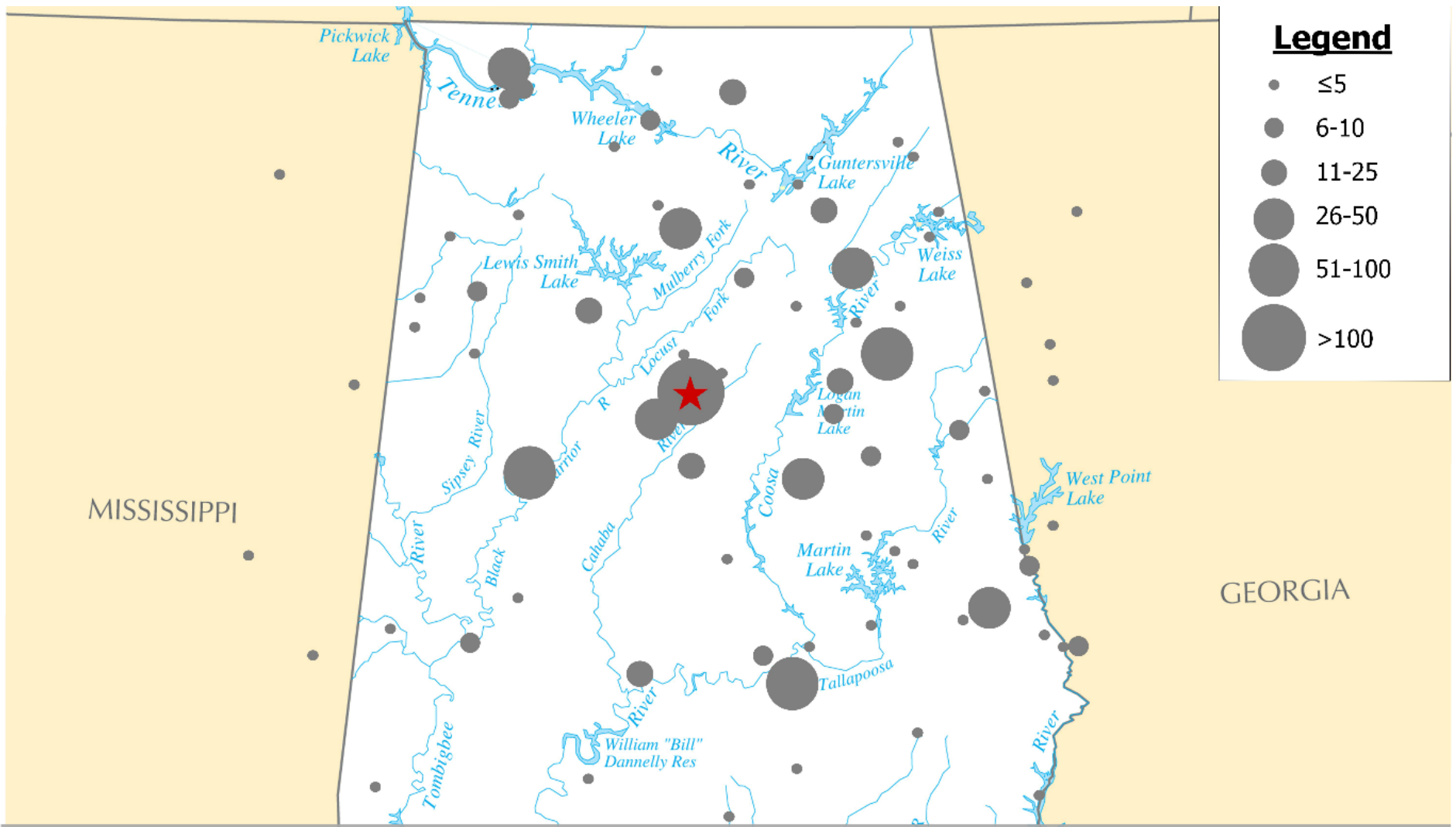
- Lost opportunity cost
- Unnecessary duplication of labs/imaging
- Increased cost to insurers, patients
- Patient/family inconvenience
- Potential for patient harm

Assessment of Cost

- Air transport
- Cost of duplicate labs/imaging
- Cost of perhaps unnecessary ancillary tests
- Opportunity costs
- Cost of family travel

Limitations/Next Steps

- Local resources
- Underlying dynamics
- Cross-community policy, existing relationships
- Communication



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