On the Feasibility of Using All Payer Claims Data to Monitor Regional Trauma Care Transitions

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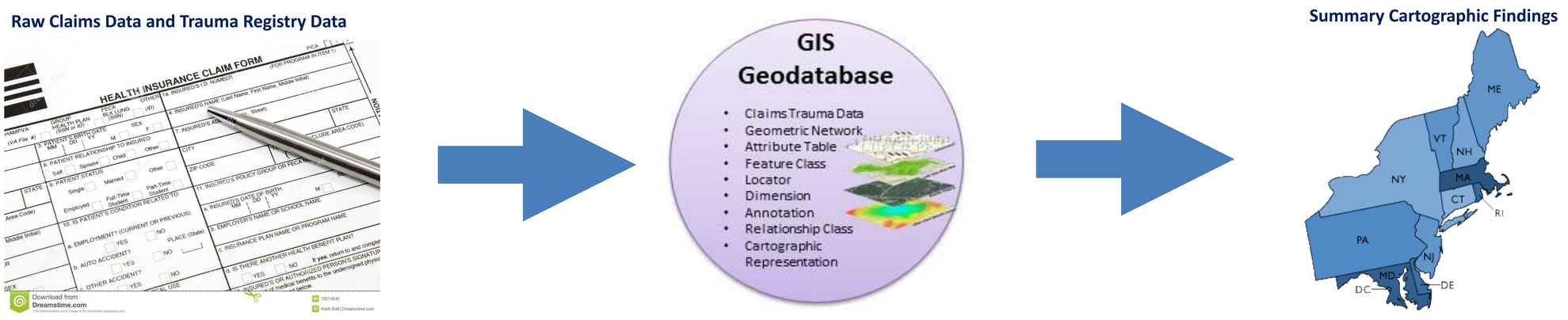
Background

American College of Surgeons trauma verification includes pre-review of service and referral geographic catchment areas around trauma centers from data collected in hospital and state-level trauma registries. Service area data from such registries based on farthest Euclidean pre-hospital transport distance of ZIP code clusters lacks health exchange information that could quantify out migration of service area patients to surrounding states. Out migration information would facilitate state-level gauging of care fragmentation, assessing regional gaps in specialty taxonomies, and determining to what extent drops in trauma center requisite patient volume are attributable to catchment drift. We sought to determine the feasibility of using Massachusetts (MA) All Payer Claims Database (APCD) to fill this critical gap in state-level and hospital-level information on trauma care navigation by MA residents outside of state boundaries, specifically in bordering New England Region States, and profile referral and transfer patterns in 'in state' and 'out of state' trauma care seekers.

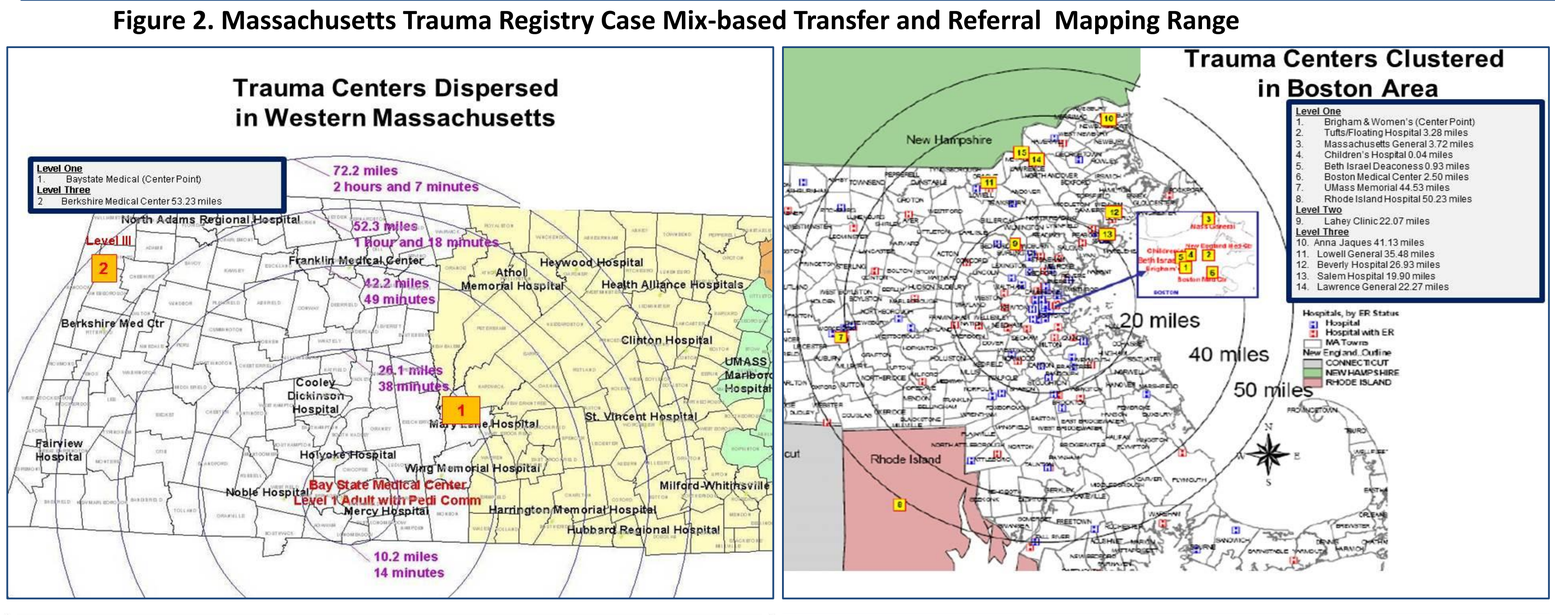
Methods and Materials

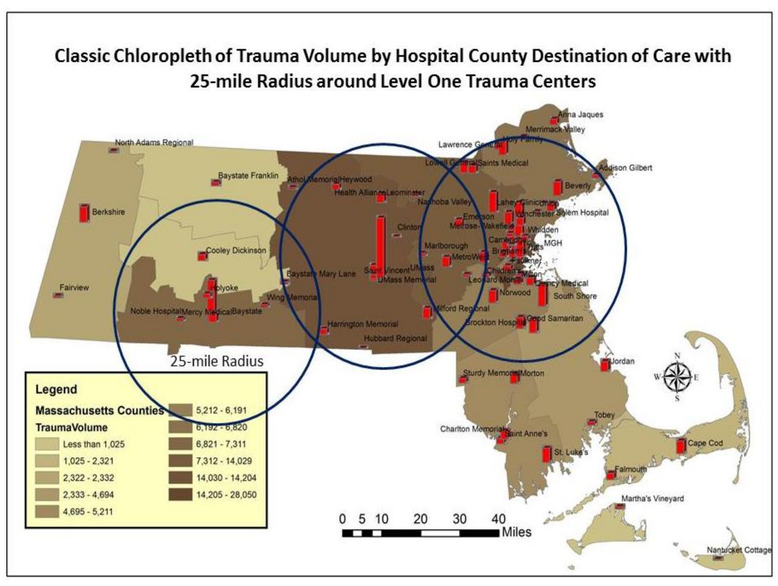
FIGURE 1. All Payer Claims Extraction and ArcGIS Geodatabase Analytic Process

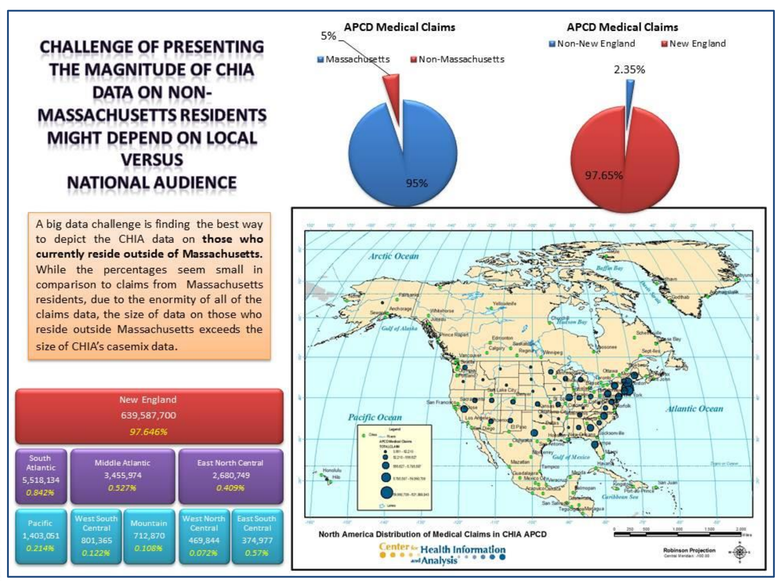


An extraction of 1.74 million **private-sector health plan (non-Medicare, non-Medicaid)** beneficiary trauma care (CY 2009-2011) medical claims for 229,557 episodes of care needed by 91,477 MA residents from APCD for MA Level I, II, and III trauma center primary service area ZIP codes were analyzed for out of state inpatient trauma care seeking patterns by service provider specialty taxonomy, referral indicators, covered days, patient outcomes, patient age, and in network payment flags. Statistical tests and patient-level roll up of claims by patient, payer claim control numbers, demographic and diagnoses information, service payment window dates and provider information were performed using SAS (version 9.2). Geographic data visualization[1] of maximum Massachusetts[2] resident out of state linear trauma care seeking distance using de-identified aggregated ZIP codes and census[3] attributes were performed using ESRI's ArcMap (version 9.3.1). Trauma registry private payer care seeking geography for Massachusetts residents was compared to APCD using chloropleths maps.

Figure 2. Massachusetts Trauma Registry Case Mix-based Transfer and Referral Mapping Range







Results

Private health plan beneficiary MA residents receiving inpatient trauma care out of state constituted 9% of the patient sample with 50% of care provided in New England (NE) states bordering MA in order of the following MA patient volume ranking: RI, NH, CT, NY, ME, and VT. Comparing in-state care seekers (mean age 53) to NE-care seekers (mean age 44), NE patients had increased odds of care destination through referral (OR 1.34, 95% CI 1.28-1.4, $p < 0.0001$ and a 42% higher risk of charges not paid in comparison to MA ($p<0.0001$). Florida and Texas rank as the highest volume non-NE region sites of care. Clinically, NE patients had a higher rate of care sought for open fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with loss of consciousness of unspecified duration than non-MA care seekers outside of the NE region. SAS method for patient rollout of claims data was successfully validated against trauma registry volumes for single eligibility beneficiaries. Trauma Registry had higher quality external cause of injury than claims.

Discussion

MA Trauma Registry is built in part through linkage with hospital casemix data submitted only from MA hospitals. As a small state, 30% of transfer patients fall off the geographic radar due to care provided in surrounding NE states.

Conclusions

APCD systems in combination with existing clinical registries and pre-hospital data can fill gaps in information needed for care coordination and monitoring disparities in access to care and provide new information on in state and out of state post discharge care settings.

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References

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