

How access, appropriateness, and quality of care affect patient outcomes for time-sensitive medical emergencies in British Columbia, Canada

Panagiotoglou, Dimitra^{1*}¹University of British Columbia

Objectives

Cox Proportional Hazards models tested the relationship between access to care for time sensitive medical events and 30-day survival while controlling for appropriateness and quality of care.

Approach

A population study of all acute myocardial infarction (AMI), trauma, and stroke events treated within British Columbia between April 1st 1999 and March 31st 2013. Data sources included: the Discharge Abstract Database (DAD); a registry file; the Vital Statistics Mortality data; and the Medical Services Plan (MSP) Payment Information.

Access to care was estimated with a de-identified residential postal code to hospital distance matrix developed using origin-destination network analysis in ArcGIS 10.2. Appropriateness of care compared national protocols with treatment received. Care that was contraindicated, outdated, or at an inexperienced facility was inappropriate. Quality of care was an outcome measure that used risk-standardized mortality ratios and funnel plots to identify hospitals that offered poor care.

Results

There were 106,409 AMI, 220,602 trauma, and 88,136 stroke events that occurred during the study period and used in condition specific hierarchical hazards models. Adjusted hazards ratios (aHR) found access to care were not associated with 30-day mortality after controlling for appropriateness and quality of care along with patient (i.e. age, sex, income, rurality, frailty) and system specific (i.e. method of transport, transfer patterns, facility volume, rurality, peer group) characteristics. Appropriate care reduced the hazard of mortality for all three conditions: AMI aHR=0.860 (95% CI=0.792-0.993, p-value=0.0003); stroke aHR=0.448 (95% CI=0.324-0.619,

p-value<0.0001) and trauma aHR=0.824 (95% CI=0.703-0.967, p-value=0.0176). Quality of care reduced hazards of mortality for trauma (aHR=0.689, 95% CI=0.586-0.808, p-value<0.0001) and stroke (aHR=0.762, 95% CI=0.689-0.842, p-value<0.0001). Inter-hospital transfers were protective for AMI (aHR=0.513, 95% CI=0.406-0.649, p-value<0.0001) and stroke (aHR=0.768, 95% CI=0.630-0.936, p-value=0.0089) but detrimental for trauma (aHR=1.583, 95% CI=1.310-1.913, p-value<0.0001). Method of transport was also significant. Self-transport was protective for trauma (aHR=0.462, 95% CI=0.417-0.513, p-value<0.0001) and stroke (aHR=0.330, 95% CI=0.301-0.363, p-value<0.0001). Older age was associated with higher mortality rates across all three conditions (p-value<0.0001) and being female increased the hazard of death for AMI (aHR=1.049, 95% CI=1.010-1.088, p-value=0.0125) but was protective for trauma (aHR=0.583, 95% CI=0.551-0.617, p-value<0.0001) events.

Conclusion

As health systems evolve to meet the needs of their patients and work to provide equitable care under economic pressure for efficiency, it is important to understand how access, appropriateness and quality of care affect patient outcomes and distribute services accordingly.

*Corresponding Author:

Email Address: d.panagiotoglou@gmail.com (D. Panagiotoglou)