

Research advisor Jennifer Freeman writes: “Ryker’s research is investigating whether a developmental exposure to herbicides used in the midwestern United States may alter behavioral patterns. His research is important because his findings provide new toxicity information for the new herbicide mixture products containing glyphosate and dicamba.”

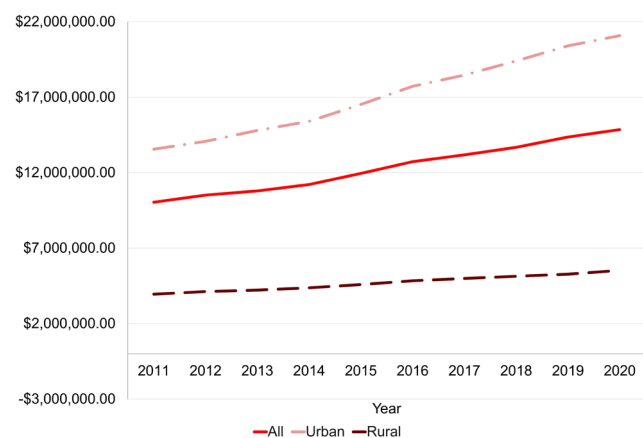
Analyzing Health Care Delivery Costs from 2011 to 2020 in the Emergency Departments and Overall Hospital Costs

Student researcher: Jacob A. Corey, Senior

The goal of this research was to analyze how COVID-19 affected the cost of health care within hospitals, specifically within the emergency department (ED) and overall hospital expenditures. It was hypothesized that both urban and rural hospitals would see a sharp increase in the costs for 2020, especially in emergency departments, due to the pandemic.

Hospital cost data for the years 2011–2020 from form CMS-2252-10 shared by the Centers for Medicare and Medicaid Services was utilized for this project. Inclusion criteria were based on whether hospitals had submitted cost results for EDs and total hospital cost results in at least 8 years of the 10-year time span. The total number of hospitals included in this study was $n = 3,141$, with 958 of these hospitals being rural and 2,183 being urban.

The average overall hospital cost increase from 2011 to 2019 was 4.48% per year, but it was 6.18% from 2019



Average emergency department costs from 2011 to 2020 for all, rural, and urban hospitals.

to 2020. The average urban total hospital cost increase from 2011 to 2019 was 4.76% per year, but it was 6.70% from 2019 to 2020. The average rural total hospital cost increase from 2011 to 2019 was 3.84% per year, but it was 6.12% from 2019 to 2020.

The average overall ED cost increase from 2011 to 2019 was 4.46% per year, but it was 3.43% from 2019 to 2020. The average urban ED cost increase from 2011 to 2019 was 5.03% per year, but it was 3.32% from 2019 to 2020. The average rural ED cost increase from 2011 to 2019 was 3.81% per year, but it was 4.72% from 2019 to 2020.

A major limitation of this study involves the inclusion criteria requiring 8 years of reports out of the 10 years of data. This caused around half of the hospitals in the CMS-2252-10 form to be excluded from this analysis.

Research advisor Cody Mullen writes: “When the COVID-19 pandemic started in 2020 our health care system quickly and effectively responded to the needs of the communities they serve. It is important to understand how hospital operations changed. This study starts to document the changes in hospital operations during the pandemic for both urban and rural facilities.”

Formulation of Preservation Solutions for Model Generation with In Vivo Tissue Morphology

Student researcher: Holly Pickett, Junior

Historically, standard tissue fixation methods present an unrealistic representation of in vivo tissue morphology. These resultant alterations, such as tissue hardening, not only hamper development of key connections between form and function in the anatomy classroom, but also the critical diagnostic skills necessary to attain clinical gains. The aim of this project is to develop a new tissue preservation method to bridge such gaps. This involves assessing the effects of a modified-release fixation component in solution containing physiological electrolytes. Porcine lungs were dissected into lobes and placed in two solutions with different concentrations of the fixation component. The lungs were observed using tactile manipulation for in vivo tissue resilience over the course of four months, also being attentive to bacterial growth that could lead to decay. Investigative results