



Introduction

EMS demand is ever-present, but significant variations exist when observed at the local level. The market for ambulance services is far from homogeneous. This unclear, and largely unspecified, heterogeneity leads us to investigate potential social factors contributing to EMS demand. Although individual community needs are of great import for designers and managers of EMS systems, there may exist factors that transcend geopolitical boundaries and can be bookmarked as universal predictors of demand.

Methods

Data for this study were collected from publicly available reports from Florida and Oklahoma. Each state reported total annual requests for service per county from 2009 through 2015. County-level health and social data were gathered by the Robert Wood Johnson Foundation (RWJF). For analysis, call volume (per 10,000 persons) was log-transformed to derive a semi-elasticity function. Pooled ordinary least squares model with time-fixed effects were utilized for tests of inference.

Social Determinants of Health Framework



Semi-Elasticity of Health Behavior and Socioeconomic Measures on EMS Demand Rate

Variable	Coef	95% CI	P-Value
% Poor/Fair Health	0.0225	0.0063 – 0.0386	0.006
Poor Mental Health Days	0.0278	-0.0118 – 0.0674	0.169
% Smoker	-0.0017	-0.0121 – 0.0086	0.742
% Obese	-0.0115	-0.0215 – -0.0015	0.024
% Binge Drink	0.0253	0.0162 – 0.0345	<0.000
Teen Birth Rate	0.0032	0.0011 – 0.0052	0.002
% Uninsured Adults	-0.0056	-0.0149 – 0.0034	0.217
High School Grad Rate	0.0028	0.0001 – 0.0055	0.044
% Unemployed	0.0222	0.0053 – 0.0392	0.010
% Child Poverty	-0.0107	-0.0196 – -0.0019	0.017
Violent Crime Rate	0.0002	0.0001 – 0.0003	0.006

Results

A total of 874 county-year observations were analyzed. A one percentage-point increase in those in poor or fair health increased EMS call volume by 3% ($B=0.03$, $p<0.000$). For each additional day of poor mental health, EMS call volume increased by 6.5% ($B=0.065$, $p=0.001$). A one percentage-point increase in binge drinking increased EMS call volume by 1.6% ($B=0.016$, $p<0.000$). A one percentage-point increase in uninsured adults decreased EMS call volume by 1.1% ($B=0.011$, $p=0.004$). A one percentage-point increase in the unemployment rate increased EMS call volume by 3.6% ($B=0.036$, $p<0.000$). A one percentage-point increase in child poverty increased EMS call volume by 0.6% ($B=0.0059$, $p=0.036$). An additional 100 violent crimes (per 100,000 population) increased EMS call volume by 2.8% ($B=0.00028$, $p<0.000$).

Conclusion

After examination, the data support the notion that some community measures and behaviors have a significant effect on local EMS demand. These factors may have been treated as spurious or completely overlooked by policy makers and EMS leadership.