Association between race and insurance status with postoperative mortality following major trauma in children

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Introduction

❑ Both minority race and uninsured status are known risks for poorer surgical outcomes
❑ With respect to trauma outcomes, many studies have been performed, finding varied results for racial disparities
❑ There are few studies specifically evaluating the relationship of race on *operative* trauma outcomes

Objective: to determine the relationship of race and insurance status with operative trauma mortality

Methods

❑ Retrospective analysis of the Healthcare Cost and Utilization Project (HCUP) Kids' Inpatient Database (KID), 2006, 2009, and 2012
❑ Patients <18 having major traumatic injury and subsequent therapeutic surgery
❑ Primary outcome was 30-day in-hospital mortality, comparing race and insurance statuses

Results

❑ We found that children whose family was **uninsured were 2x as likely to die** during their hospital course **following operative intervention for traumatic injury** as compared to children whose family had private insurance
❑ We did not find an association of race and mortality

Discussion

❑ As trauma care is emergent, it would be expected to be the most equitable of specialties, being blinded to race and payer status (EMTALA 1986)
❑ Uninsured may have worse outcomes because of delay in care (higher transfer rate, fewer diagnostic tests ordered), worse baseline health, lack of preventative health measures, increased environmental exposures and risk-taking behaviors inherent to poverty, and poor health literacy

Conclusion

❑ Insurance status rather than race was a critical determinant of mortality in pediatric operative trauma.

Insurance status is associated with postoperative mortality for major trauma in pediatrics

Characteristics	Overall No.(%)	White No.(%)	Black No.(%)	Hispanic No.(%)	Other No.(%)
Study population	**11882(100.0)**	**6375(53.7)**	**2414(20.3)**	**2182(18.4)**	**911(7.7)**
Age (in years), median[IQR]	15[12,16]	15[11-16]	16[13-17]	15[11-16]	15[10-16]
Female sex	3258(27.4)	2062(32.4)	446(18.5)	514(23.6)	236(25.9)
Selected comorbidities					
Preoperative anemia	858(7.2)	467(7.3)	155(6.4)	175(8)	61(6.7)
Chronic pulmonary disease	832(7.0)	409(6.4)	250(10.4)	116(5.3)	57(6.3)
Coagulopathy	725(6.1)	357(5.6)	159(6.6)	133(6.1)	76(8.3)
Fluid and electrolyte disorders	1811(15.2)	970(15.2)	383(15.9)	311(14.3)	147(16.1)
Other neurological disorders	432(3.6)	245(3.8)	76(3.1)	77(3.5)	34(3.7)
Obesity	139(1.2)	65(1.0)	36(1.5)	29(1.3)	9(1)
Weight loss	388(3.3)	217(3.4)	90(3.7)	53(2.4)	28(3.1)
Median household income for ZIP Code					
< $39000	3826(33.2)	1402(22.6)	1298(55.4)	881(41.7)	245(28.5)
$39,000–$62,999	5596(48.6)	3335(53.7)	847(36.1)	999(47.3)	415(48.3)
> $63,000	2103(18.2)	1473(23.7)	199(8.5)	231(10.9)	200(23.3)
Insurance status					
Medicaid	4507(37.9)	1612(25.3)	1399(58)	1153(52.8)	343(37.7)
Private	5925(49.9)	4132(64.8)	739(30.6)	633(29)	421(46.2)
No insurance	657(5.5)	269(4.2)	156(6.5)	166(7.6)	66(7.2)
Other	793(6.7)	362(5.7)	120(5)	230(10.5)	81(8.9)

Table 1: Individual Level Characteristics of the Study Population

Characteristics	Overall No.(%)	White No.(%)	Black No.(%)	Hispanic No.(%)	Other No.(%)
Region of hospital					
Northeast	1980(16.7)	1004(15.7)	513(21.3)	241(11)	222(24.4)
Midwest	2119(17.8)	1399(21.9)	489(20.3)	120(5.5)	111(12.2)
South	4451(37.5)	2413(37.9)	1113(46.1)	695(31.9)	230(25.2)
West	3332(28)	1559(24.5)	299(12.4)	1126(51.6)	348(38.2)
Patient location					
Central metropolitan (>= 1 million population)	4008(34.2)	1189(18.9)	1299(54.2)	1171(54.4)	349(38.8)
Fringe metropolitan (>= 1 million population)	2382(20.3)	1494(23.8)	435(18.1)	258(12)	195(21.7)
Metropolitan (250,000-999,999 population)	2268(19.3)	1314(20.9)	385(16.1)	427(19.8)	142(15.8)
Metropolitan (50,000-249,999 population)	1053(9)	701(11.2)	145(6)	138(6.4)	69(7.7)
Micropolitan or rural	2023(17.2)	1587(25.3)	134(5.6)	158(7.3)	144(16)
Location/teaching status of hospital					
Rural	333(2.9)	276(4.5)	24(1)	12(0.6)	21(2.4)
Urban non-teaching	1835(15.9)	1097(17.8)	238(10.2)	389(18.2)	111(12.7)
Urban teaching	9354(81.2)	4799(77.8)	2075(88.8)	1736(81.2)	744(84.9)
Year of operation					
2006	4104(34.5)	2219(34.8)	821(34)	734(33.6)	330(36.2)
2009	4078(34.3)	2209(34.7)	822(34.1)	737(33.8)	310(34)
2012	3700(31.1)	1947(30.5)	771(31.9)	711(32.6)	271(29.7)

Table 2: Hospital Level Characteristics

Willer et al. Anesth Analg. 2020
Nafiu et al. Pediatrics. 2020
Haider et al. J Am Col Surg. 2012
Stone et al. J Pediatr Surg. 2013
CDC. WISQARS. 2020
Smith JM. J Natl Med Assoc. 2002
Sabharwal et al. J Pediatr Orthop. 2007
Haider AH. Arch Surg. 2008
Hollis et al. J Trauma Inj Infect Crit Care. 2006

Characteristics	No. of children	Mortality cases (n)	Mortality rates (%)	Unadjusted analysis OR(95%CI)	P	Adjusted analysis OR(95%CI)	P
Race							
White	6375	349	5.5	Reference		Reference	
Black	2414	134	5.6	1.03(0.84,1.28)	0.751	1.05(0.81,1.35)	0.712
Hispanic	2182	141	6.5	1.19(0.97,1.47)	0.101	1.12(0.87,1.44)	0.388
Other	911	63	6.9	1.30(0.98,1.73)	0.066	1.08(0.78,1.50)	0.630
Insurance status							
Private insurance	5925	307	5.2	Reference		Reference	
Medicaid	4507	252	5.6	1.08(0.90,1.29)	0.402	0.92(0.75,1.13)	0.431
No insurance	657	66	10.0	2.06(1.55, 2.73)	<0.001	2.20(1.60,3.03)	<0.001
other	793	62	7.8	1.56(1.17,2.09)	0.003	1.45(1.05,1.99)	0.024

Table 3: Unadjusted and adjusted odds ratio of in-hospital mortality