

Racial and Ethnic Variations in Mortality Associated with Common Pediatric Gastrointestinal Disorders in Children's Hospitals in the US

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Background: The objective of this study is to determine the mortality, risk factors, and disease associations of eight common pediatric gastrointestinal (GI) disorders: cystic fibrosis (CF), cirrhosis, gastrointestinal bleeding (GIB), inflammatory bowel disease (IBD), liver failure (LF), liver transplant, acute pancreatitis, and short bowel syndrome (SBS).

Methods: Diagnoses were found using the *International Classification of Disease* (ICD) codes from 2004 through 2020. We performed a retrospective cohort study using the Pediatric Health Information System (PHIS) database from 50 children's hospitals in the US. We analyzed all encounters with ICD codes for these disorders, then determined the per-encounter mortality rate for each. We performed a mixed-effects logistic regression modeling hospital as a random effect, mortality as the dependent variable, and patient demographics and medical history as independent variables. We hypothesized that demographic factors such as Black race, Hispanic ethnicity, and markers of socioeconomic status would be associated with increased mortality.

Results: The per-encounter mortality for each diagnosis was: cirrhosis (2.19%), CF (0.66%), GIB (4.22%), IBD (0.21%), LF (7.03%), liver transplant (0.37%), acute pancreatitis (2.23%), and SBS (1.13%). There was a higher ($p < 0.05$) mortality for those of Asian race and mixed-race populations in GIB (OR 1.76 and 1.37, respectively) and acute pancreatitis (OR 1.94 and 1.34, respectively). For those of Black race, there was a higher mortality in liver transplant and liver failure (OR 1.31 and 1.65 respectively). Additionally, mortality was increased in Hispanic/Latino patients with CF, GIB, and SBS (OR 2.34, 1.39, and 1.41, respectively). Coincident cardiovascular, renal/urologic, and neurologic/neuromuscular abnormalities were also associated with a significant higher mortality.

Conclusion: The degree of variation associated with race and ethnicity is unlikely to be accounted for by variation in clinical features, thus the impact of social determinants of health should be the focus of future study.

	Cirrhosis	CF	GIB	IBD	LF	Liver Transplant	Acute Pancreatitis	SBS
Mortality Rate	2.19%	0.66%	4.22%	0.21%	7.03%	0.37%	2.23%	1.13%
Asian Race OR	1.10	3.77	1.76*	1.71	1.08	0.89	1.94*	1.35
Black Race OR	0.90	0.48	1.03	1.55	1.31*	1.65*	1.15	1.14
Mixed Race OR	1.16	1.12	1.37*	1.44	1.23	0.85	1.34*	1.16
Hispanic/Latino OR	1.13	2.34*	1.39*	1.53	1.16	1.65	1.13	1.41*

*Significant OR numbers with an associated $p < 0.05$