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CONNECTICUT STATE MEDICAL SOCIETY

2023 Legislative Priorities

In 2023, the Connecticut State Medical Society (CSMS) has continued to advocate for its physicians and physician-in-training members, and the patients they serve. We have promoted efforts to strengthen the healthcare system, protect the interests of physicians and the patients they serve, and ensure that the highest quality of care is available and able to be delivered. CSMS' legislative priorities were developed within the realities facing our state in 2023. In 2023, CSMS' primary focus were:

- **Reducing unnecessary prior authorization requirements and other burdens,** including step therapy, placed on physicians and our patients by health insurers
- **Increasing Medicaid reimbursement rates** for all physicians
- **Removing barriers** to attracting and retaining the best graduates of medical schools and post-graduate training programs
- **Continuing efforts** to mitigate the detrimental impact high-deductible health plans have on our patients
- **Opposing changes** to Connecticut's landmark out of network/surprise billing statute
- **Ensuring continued and expanded access** to telehealth services for Connecticut physicians and their patients
- **Addressing the mental health crisis,** including pediatric patients boarding in emergency departments
- **Reducing and preventing burnout,** supporting physician well-being, and raising awareness regarding healthcare professional suicide

Want to be involved? **Our advocacy team is on the ground in Hartford every day during legislative sessions, and we're always looking for physicians who can lend their expertise in public hearings. If you have an issue you're passionate about and are willing to testify, contact Layne Gakos at the CSMS Offices at 203-865-0587, ext 129; email lgakos@csms.org.**

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CSMS: An Advocate for You and Your Career

Connecticut MEDICINE

The Journal of the Connecticut State Medical Society

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Evaluating Mortality Among Racial and Ethnic Minorities in COVID-19: the Influence of Social Determinants of Health

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ABSTRACT – Minorities are disproportionally affected by COVID-19. Methods: retrospective analysis of COVID-19 infection rates within a seven-hospital healthcare system from March 2020 to October 2020. Results: 1432 identified with COVID-19: 24.8% non-survivors, 770 (54%) non-Hispanic whites (NHW); 214 (15%) Black/African American (AA); 364 (25.4%) Latino/Hispanic (H). On univariate analysis, among the H and NHW subgroup, uninsured status, long term care facility, disability, current tobacco use, chronic kidney disease, atrial fibrillation, and presence of religious beliefs were significantly associated with in-hospital mortality. Employment status, illicit drug use, and H ethnicity were protective of mortality. For AA vs NHW, uninsured status, long term care facility, disability, religious beliefs, tobacco use, chronic kidney disease, and atrial fibrillation were associated with in-hospital mortality. On multivariate analysis, age, chronic kidney disease, and uninsured status were significant predictors of mortality. Conclusion: Hispanics have improved mortality rates compared to their non-Hispanic white counterparts; social determinants of health may yield clues to these observations.

INTRODUCTION

The severe acute respiratory syndrome coronavirus 2 disease, also known as Coronavirus disease 2019 (COVID-19), was first recognized in December 2019 in Wuhan, China, soon becoming a pandemic.[1] The COVID-19 pandemic has had a devastating effect on international healthcare systems, the economy, and virtually every aspect of daily life.[2] COVID-19 has unveiled some of the faults and inequalities of America's healthcare system.[3,4] Early reports suggest Black/African American (AA) and Latino/Hispanic (H) patients have higher infection and mortality rates resulting from COVID-19.[5–9] In addition, these minority communities are affected by social determinates of health (SDH) to a greater extent,[10,11] which is further highlighted in the COVID-19 pandemic. Minorities suffer from lower socioeconomic status, reside in densely populated areas, and lack access to healthcare systems, making them more susceptible to infectious agents.[5,6] These factors have been suggested to contribute to a lower rate of social distancing, the higher rate of infection, and decreased availability of testing.[6,7]

Not only are minorities disproportionally affected by COVID-19, they also suffer a higher disease burden compared to Caucasians.[7] The socioeconomic disadvantage is highlighted among US Hispanics;[12] however, they tend to have overall improved mortality rates compared to non-Hispanic whites (NHW). This paradox is termed the Hispanic paradox.[12,13]

The aim of this study was to evaluate rates of in-hospital mortality of ethnic and racial minorities following COVID-19 hospital admission among the largest healthcare system within Connecticut (CT). We hypothesized that H are more likely to leave the hospital alive, despite their disadvantaged profile compared to NHW. We also examined the rates of in-hospital mortality among AA and NHW and explored the relationship of social and clinical covariates with in-hospital mortality.

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METHODS

We performed a retrospective analysis of COVID-19 infection rates within the seven-hospital Hartford Healthcare (HHC) system from March 1, 2020 to October 31, 2020. This study was approved by the HHC Institutional Review Board (HHC-2021-0018). Consent was waived as this was a retrospective study. We included patients over the age of 18, who were admitted with a diagnosis of COVID-19 within one of the HHC hospitals. Our primary outcome was in hospital mortality. Our covariates were: race/ethnicity, clinical factors, and social variables. The cohort was subdivided into H and AA vs NHW.

Sociodemographic factors including race and ethnicity (self-reported), age (dichotomized ≤ 70 y or > 70 y), gender, and health insurance categories (private, Medicaid/Medicare, uninsured) were analyzed. We also extracted information on the presence of comorbidities including hypertension, diabetes mellitus (DM), coronary artery disease (CAD), congestive heart failure (CHF), chronic obstructive lung disease (COPD), chronic kidney disease (CKD), cancer, atrial fibrillation, obesity, asthma, body mass index (BMI), and autoimmune disorders. To better understand the SDH, social variables were recorded from chart review when available. The following variables were collected: household size (≥ 1), home (apartment, home, or long term care facility), alcohol use (yes or no), tobacco use (never, former user, or current user), illicit drug use (yes or no), marital status (divorced/single/widowed or married), established primary care physician (yes or no), religious beliefs (yes or no), employed (yes or no), education, language (English vs other), and disability (any assistance with activities of daily living (yes or no).

To determine the service area covered by HHC, heatmaps were created of the cities of Connecticut based on the published US Census Bureau data on income, population density (defined as number of people per square mile), and households numbers using Mathematica (Mathematica, Inc., Princeton, NJ)[12] and Wolfram's Knowledgebase (Wolfram Research, Inc., Champaign, IL).[14]

STATISTICAL ANALYSIS

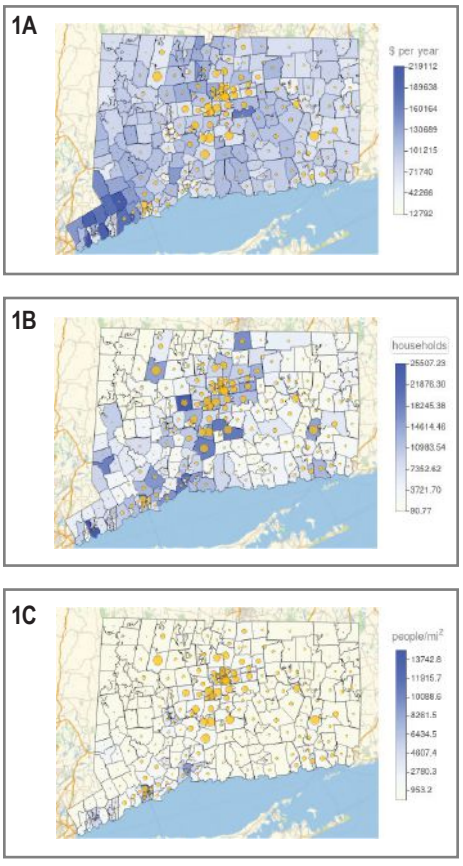
Clinical and demographic data were reported with mean and standard deviation for normally distributed parametric data and medians and min-max were reported for non-parametric data. Categorical data were reported as frequencies. Continuous variables were compared using student's *t* test or Mann-Whitney U test for two groups based on the distribution. Categorical data was compared using the Pearson chi-square test. Univariate logistic regression analyses were performed to analyze factors independently associated with in-hospital mortality and odds ratios (OR) with a 95% confidence interval (CI) were presented. Factors that were independently associated with in-hospital mortality significantly were further included in a multivariate logistic regression model. A p value < .05 was deemed statically significant. SPSS v. 26 (IBM, Armonk, NY) was used for the analyses.

For the purpose of power analysis, we powered the study for 16 covariates with an expected mortality rate of 20%. The minimum number of cases needed was: n = 10k/p = (10*16)/0.20 = 800 (k = number of covariates and p = expected positive rate of the outcome or expected rate of mortality in the case of this study). Our sample was greater than 800 in the multivariate models, giving ample power for the analyses in this manuscript.

RESULTS

Between March 1st 2020 and October 31st 2020, 1432 patients tested positive for COVID-19 within HHC; 355 (24.8%) were non-survivors. Within the HHC system, a large number of COVID-19 cases were from areas with a lower household income (Figure 1A), with a larger

Figure 1. Within the HHC system, a large number of COVID-19 cases were from areas of with a lower household income (Figure 1A), with a larger household unit size (Figure 1B), and residing in densely populated areas (Figure 1C).



household unit size (Figure 1B), and residing in densely populated areas (Figure 2C).

Our cohort was comprised of 727 (51%) males with an average age of 66 years. The race distribution of our cohort was: 770 (54%) Caucasian, 214 (15%) AA, and 448 (31.2%) Other; 364 (25.4%) were Hispanics (two identified Black Hispanics, 29 as White Hispanics).

In comparing demographics/social variables between NHW and H, median age (NHW 73.0, H 59.0), BMI (NHW 28.8, H 30.9), uninsured (NHW 1.1, H 6.9, $p < .001$), disability (NHW 47.6, H 23.8, $p < .001$), drug use (NHW 3%, H 7.5%, $p = .001$), religious beliefs (NHW 73.4%, H 86.7%, $p = .012$), long term care facility (NHW 42.8%, H 13.5%, $p < .001$), and family support > 1 (NHW 89.1%, H 94.2%, $p = .005$) differed between the groups. For NHW and AA, differences between age (NHW 73, AA 62), BMI (NHW 28.8, AA 31.5), tobacco use (NHW 7.9%, AA 17.9%, $p < .001$), drug use (NHW 3%, AA 11.7%, $p < .001$), religion (NHW 73.4%, AA 93.8%, $p = .002$), long-term care facility (NHW 42.8%, AA 27.4%, $p < .001$) were observed.

The baseline demographics of the patient population in survivors and non-survivors are demonstrated in Table 1. Compared with survivors, non-survivors were more likely to be of older age (76 vs 63, $p < .001$), non-Hispanic ethnicity (28% vs 15%, $p < .001$), male sex (28% vs 22%, $p = .008$), Medicare/Medicaid insurance (31% vs 8% in commercial, $p < .001$), and to have a history of CHF (17% vs 7%, $p < .001$), COPD (11% vs 6%, $p = .001$), CKD (34% vs 18%), $p < .001$), cancer (14% vs 7%, $p = .001$), and atrial fibrillation (18% vs 6%, $p < .001$).

We compared social variables between survivors and non-survivors (Table 2). Compared with survivors, non-survivors were more likely to have disability (64.6% vs 30.1%, $p < .000$), identify as single (67.1% vs 57.5%, $p = .001$), have religious beliefs (82.9% vs 73.0%, p = .001), be former tobacco users (48.2% vs 32.0%, $p < .000$), reside in a long-term care facility (50.0% vs 23.7%, $p < .000$), and

Table 1. Baseline Demographic, Clinical and Treatment Characteristics of Patient Population

Variable	*Overall (n = 1432)*	*Survivors (n = 1077 (75.2%))*	*Non-survivors (n = 355 (24.8%))*	*P value*
Age (years) (median, IQR)	66 (18-103)	63 (18-100)	76 (31-103)	< .000
Age dichotomized (≤ 70 yr) > 70 yr		505 (62.5) [a] 303 (37.5) [a]	86 (29.5) [b] 206 (70.5) [b]	< .000
Gender (Male) (%) Gender (Female)	727 (51) 704 (49)	525 (72) [a] 551 (78) [b]	202 (28) [a] 153 (22) [b]	.008
Race: African America Non-African American	214 (15) 1218 (85)	161 (75) 916 (75)	53 (25) 302 (25)	> .99
Ethnicity: Hispanic / Latino Non-Hispanic	364 (25) 1068 (75)	310 (85) [a] 767 (72) [b]	54 (15) [a] 301 (28) [b]	< .001
BMI (mean, SD)		31.36 (8.16) [a]	30.16 (9.42) [b]	< .044
Insurance: Commercial Medicare/Medicaid	298 (22) 1071 (78)	275 (92) [a] 742 (70) [b]	23 (8) [a] 329 (31) [b]	< .001
Hypertension	486 (34)	364 (34)	122 (34)	.84
Diabetes Mellitus	300 (21)	219 (20)	81 (23)	.32
Coronary Artery Disease	127 (9)	92 (9)	35 (10)	.45
Congestive Heart Failure	134 (9)	74 (7) [a]	60 (17) [b]	< .001
Chronic Obstructive Pulmonary Disease	103 (7)	63 (6) [a]	40 (11) [b]	.001
Chronic Kidney Disease	313 (22)	193 (18) [a]	120 (34) [b]	< .001
Cancer	131 (9)	80 (7) [a]	51 (14) [b]	< .001
Atrial Fibrillation	131 (9)	69 (6) [a]	62 (18) [b]	< .001
Obesity	69 (5)	51 (5)	18 (5)	.80
Asthma	64 (5)	57 (5) [a]	7 (2) [b]	.009
Autoimmune Disorder	18 (1)	10 (1)	8 (2)	.052

M, Median; IQR, Interquartile range; SD, standard deviation; BMI, body mass index
a,b – cells with different superscripts are significantly different from each other. Cells with same superscript are not significantly different from each other

Table 2. Social Determinants of Health Variables in Survivors and Non-survivors

Variable	*Overall (n = 1432)*	*Survivors (n = 1077 (75.2%))*	*Non-survivors (n = 355 (24.8%))*	*P value*
Household size greater than one person	236 (29.0)	197 (29.6) [a]	39 (26.5) [a]	0.461
Apartment/house				
Apartment/Condo	348 (24.7)	292 (27.6) [a]	56 (16.0) [b]	< .000
House	631 (44.8)	515 (48.6) [a]	116 (33.0) [b]	
Long term care facility	431 (30.6)	252 (23.8) [b]	179 (51.0) [a]	
Occupation				
Employed	286 (43.3)	267 (52.5) [a]	19 (12.6) [b]	< .000
Education				
High school	5 (13.9)	5 (17.2) [a]	0 (0.0) [a]	0292
College	4 (11.1)	2 (6.9) [a]	2 (28.6) [a]	
Graduate	23 (63.9)	19 (65.5) [a]	4 (57.1) [a]	
Alcohol use	56 (4.5)	43 (4.5) [a]	13 (4.2) [a]	.472
Tobacco use				
Current	116 (9.2)	87 (9.1) [a]	29 (9.3) [a]	< .000
Former	454 (36.0)	304 (32.0) [b]	150 (48.2) [a]	
Drug use	68 (5.5)	63 (6.7) [b]	5 (1.7) [a]	.002
Religious beliefs	615 (76.1)	402 (73.0) [a]	213 (82.9) [b]	.001
Marital status				
Single	848 (59.9)	613 (57.5) [b]	235 (67.1) [a]	.001
Married	568 (40.1)	453 (42.5) [b]	115 (32.9) [a]	
Disability	495 (38.0)	303 (30.1) [b]	192 (64.6) [a]	< .000
Primary care physician	1272 (89.7)	954 (89.5) [a]	318 (90.3) [a]	.367
Language-English	1139 (80.2)	849 (79.5) [a]	290 (82.4) [a]	.134
Family Support				
Direct	996 (70.4)	744 (69.9) [a]	252 (72.0) [a]	.392
Extended	281 (19.9)	220 (20.7) [a]	61 (17.4) [a]	

a,b – Cells with different superscripts are significantly different from each other. Cells with same superscript are not significantly different from each other

less likely to use illicit drugs (1.7% vs 6.7%, $p = .002$) or maintain a professional job (3.3% vs 18.3%, $p < .000$).

We further examined predictors of mortality among our largest minority cohorts (H and AA) compared to NHW. Univariate and multivariate logistic regression analyses were performed to examine the factors associated with in-hospital mortality among mutually exclusive groups of H and AA subgroups and primarily NHW. On univariate analysis (Table 3), NHW were twice as likely to experience in-hospital mortality compared to H (OR = 2.07 [95% CI, 1.43, 3]); $p < .001$). In-hospital morality did not significantly differ between AA and NHW (OR = 1.41 [95% CI, 0.93, 2.13]; $p = .10$). Among the Hispanics and NHW subgroup, uninsured status (OR = 1.92 [95% CI, 1.31, 2.82]; $p \leq .001$), long term care facility (OR = 2.11 [95% CI, 1.54, 2.90]; $p < .001$), disability (OR = 2.44 [95% CI, 1.72, 3.47]; $p \leq .000$), current tobacco use (OR = 1.35 [95% CI, 1.06, 1.73]; $p = .02$), and presence of religious beliefs (OR = 1.87 [95% CI, 1.16, 3.00]; $p \leq .010$) were associated with in-hospital mortality. Employment status (OR = 0.21 [95% CI, 0.11, 0.4]; $p < .001$) and illicit drug use (OR =0.11 [95% CI, 0.2, 0.77]; $p = .003$) were protective of mortality. For nonsocial variables, age > 70 (OR = 2.40 [95% CI, 1.74 to 3.31]; $p < .000$), atrial fibrillation (OR = 1.91 [95% CI, 1.23, 2.96]; $p = .004$), and CKD (OR = 2.28 [95% CI, 1.63, 3.21]; $p < .001$) were also independent predictors of in-hospital mortality. Similar results were observed for AA and NHW. Health insurance (OR = 2.99 [95% CI, 1.89, 4.73]; $p < .001$), residing in a long-term care facility (OR = 1.79 [95% CI, 1.30, 2.48]; $p < .001$), having a disability (OR = 2.09 [95% CI, 1.45, 3.01]; $p < .001$), religious beliefs (OR = 1.65 [95% CI, 1.04, 2.62]; $p = .03$), active tobacco use (OR = 1.30 [95% CI, 1.02, 1.67]; $p = .04$), atrial fibrillation (OR = 2.0 [95% CI, 1.26, 3.12]; $p = .003$), and CKD (OR = 2.03 [95% CI, 1.44, 2.89]; $p < .001$) were all positively related; while drug use (OR = 0.21 [95% CI, 0.49, 0.86]; $p = .03$), employment (OR = 0.2 [95% CI, 0.11, 0.42]; $p < .001$), and

Table 3. Univariate Logistic Regression Analysis of Factors Associated with In-Hospital Mortality Among Ethnic/Racial Subgroups

Hispanic/Latinos (n = 364 (33%) and Caucasian (n = 736 (70%))			*African Americans (n = 214 (22%)) and Caucasians (n = 736 (78%))*		
Variable	*OR (95% CI)*	*P value*	*Variable*	*OR (95% CI)*	*P value*
Hispanic/Latino (= 0) vs Caucasian (= 1)	2.07 (1.43, 3.00)	< .001	Caucasian vs African Americans	1.41 (0.93, 2.13)	.10
Age Dichotomized (≤ 70 or > 70y)	2.40 (1.74, 3.31)	< .000	Age Dichotomized (≤ 70 or > 70y)	2.11 (1.51, 2.94)	< .000
Sex (Male vs Female)	1.23 (0.90, 1.68)	.19	Sex (Male vs Female)	1.19 (0.91, 1.55)	.20
BMI	1.01 (0.99, 1.03)	.25	BMI	1.00 (0.98, 1.02)	.73
Health Insurance Groups 1 = Private 2 = Medicaid/Medicare 3 = Uninsured/Self-Pay	1.92 (1.31, 2.82)	.001	Health Insurance Groups 1 = Private 2 = Medicaid/Medicare 3 = Uninsured/Self-Pay	2.99 (1.89, 4.73)	< .001
Hypertension	1.17 (0.85, 1.61)	.34	Hypertension	0.99 (0.71, 1.38)	.97
Coronary Artery Disease	0.96 (0.57, 1.64)	.89	Coronary Artery Disease	1.23 (0.71, 2.13)	.47
Atrial Fibrillation	1.91 (1.23, 2.96)	.004	Atrial Fibrillation	2.00 (1.26, 3.12)	.003
Diabetes Mellitus	1.20 (0.83, 1.74)	.34	Diabetes Mellitus	1.16 (0.79, 1.71)	.46
Obesity	1.45 (0.73, 2.91)	.29	Obesity	1.71 (0.88, 3.33)	.11
Cancer	1.25 (0.77, 2.02)	.36	Cancer	1.01 (0.61, 1.68)	.97
Chronic Obstructive Pulmonary Disease	1.24 (0.73, 2.11)	.43	Chronic Obstructive Pulmonary Disease	0.91 (0.52, 1.62)	.75
Asthma	0.60 (0.25, 1.42)	.24	Asthma	0.50 (0.18, 1.43)	.20
Congestive Heart Failure	1.36 (0.82, 2.24)	.23	Congestive Heart Failure	1.36 (0.84, 2.20)	.21
Autoimmune Disorder	2.97 (0.96, 9.18)	.06	Autoimmune Disorder	2.27 (0.83, 6.22)	.11
Chronic Kidney Disease	2.28 (1.63, 3.21)	< .001	Chronic Kidney Disease	2.03 (1.44, 2.89)	< .001
Household > 1	0.75 (0.48,1.27)	.75	Household > 1	1.13(0.60,2.12)	.70
Long term care facility	2.11 (1.54, 2.90)	< .001	Long term care facility	1.79 (1.30, 2.48)	< .001
Employed	0.21 (0.11, 0.41)	< .001	Employed	0.20 (0.11, 0.42)	< .001
Alcohol	0.84 (0.37, 1.9)	.68	Alcohol	0.74 (0.33, 1.70)	.48
Tobacco Use	1.35 (1.06, 1.73)	.02	Tobacco Use	1.30 (1.02, 1.67)	.04
Drug Use	0.11 (0.2, 0.77)	.03	Drug Use	0.21 (0.49, 0.86)	.03
Disability	2.44 (1.72, 3.47)	< .001	Disability	2.09 (1.45, 3.01)	< .001
Education	1.05 (0.42, 2.6)	.92	Education*		
Married	0.85 (0.62, 1.16)	.30	Married	0.87 (0.62, 1.21)	.40
Primary Care Physician	1.12 (0.67, 2.0)	.55	Primary Care Physician	0.87 (0.49, 1.52)	.62
Language: English	1.07 (0.74,1 .56)	.72	Language: English	0.45 (0.24, 0.85)	.01
Family Support	1.10 (0.81, 1.49)	.54	Family Support	1.08 (0.77, 1.51)	.65
Religion	1.87 (1.16, 3.00)	.01	Religion	1.65 (1.04, 2.62)	.03

OR, odds ratio; CI, confidence interval; BMI, body mass index. *insufficient data

English language (OR = 0.45 [95% CI, 0.24, 0.85]; $p = .01$) were negatively related to in-hospital mortality. Similar findings were found when comparing AA and H (not reported here).

For the multivariate analyses, only independent significant variables were included for statistical power. Among the H vs NHW subgroup (Table 4), age > 70 (OR = 1.80 [95% CI, 1.15, 2.81]; $p < .010$) and CKD (OR = 1.87 [95% CI, 1.24, 2.84]; $p < .003$) were the only significant predictors of in-hospital mortality. Further, among the AA vs NHW subgroup age > 70 (OR = 1.71 [95% CI, 1.09, 2.68]; $p < .019$), lack of health insurance (OR = 2.52 [95% CI, 1.36, 4.66]; $p = .003$), smoking (OR = 1.35 [95% CI,

Table 4. Multivariate Logistic Regression Analysis of Factors Associated with In-Hospital Mortality Among Ethnic/Racial Subgroups vs Caucasian

Hispanic or Latinos (n = 364 (33%) vs. Caucasian (n = 736 (70%))			*African Americans (n = 214 (22%)) vs Caucasians (n = 736 (78%))*		
Variable	*OR (95% CI)*	*P value*	*Variable*	*OR (95% CI)*	*P value*
Hispanic/Latino (= 0) vs Caucasian (= 1)	1.32 (0.85, 2.05)	.210			
Age Dichotomized (≤ 70 or > 70y)	1.80 (1.15,2.81)	.010	Age Dichotomized (≤ 70 or > 70y)	1.71 (1.09, 2.68)	.019
Health Insurance Groups 1 = Private 2 = Medicaid/Medicare 3 = Uninsured/Self-Pay	1.46 (0.85, 2.81)	.173	Health Insurance Groups 1 = Private 2 = Medicaid/Medicare 3 = Uninsured/Self-Pay	2.52 (1.36, 4.66)	.003
Atrial Fibrillation	0.96 (0.55, 1.66)	.878	Atrial Fibrillation	1.09 (0.62, 1.91)	.763
Chronic Kidney Disease	1.87 (1.24, 2.84)	.003	Chronic Kidney Disease	1.74 (1.13, 2.67)	.012
Tobacco Use	1.32 (0.98, 1.76)	.072	Tobacco Use	1.35 (1.01, 1.82)	.045
Drug Use	0.147 (0.02, 1.11)	.063	Drug Use	0.21 (0.5, 0.93)	.04
Disability	1.51 (0.99, 2.29)	.054	Disability	1.35 (0.88 ,2.05)	.167

OR, odds ratio; CI, confidence interval

1.01, 1.82]; $p < .045$), and CKD (OR = 1.74 [95% CI, 1.13, 2.67]; $p = .012$) were significant predictors of in-hospital mortality, while drug use (OR = 0.21 [95% CI, 0.05, 0.93]; $p < .040$) was protective.

DISCUSSION

The COVID-19 pandemic has revitalized interest in racial and ethnic healthcare disparities. Multiple reports have demonstrated higher mortality and infection rates from COVID-19 among ethnic minorities.[5,7–9,] For instance, Okoh et al demonstrated a 38.6% increase in hospital mortality among AA and H within a quaternary care hospital in New Jersey.[9] This increased mortality rate has been attributed to later disease presentation and higher incidence of comorbidities compared to NHW.[7,9,15] In fact, shortly after the COVID-19 public health crisis unfolded in the US, members of Congress requested that government health agencies research and analyze factors contributing to and strategies to mitigate racial and ethnic disparities.[16] While other studies corroborate a pronounced mortality disadvantage amongst AA,[6,7] interestingly some have observed that compared to NHW, H odds of mortality was lower.[17]

Herein, we present a retrospective analysis of patients hospitalized with COVID-19 within the largest healthcare system in Connecticut looking at mortality in ethnic/racial groups. This study is unique in that we looked at the association of SDH variables with mortality among these subgroups. In our cohort, we did not see a difference in mortality rates among NHW vs AA. More interestingly, however, we demonstrate a favorable correlation between H ethnicity and being discharged alive from hospital. Additionally, the following social variables were found to be associated independently with in-hospital mortality: uninsured status, long-term care facility, disability, tobacco use, unemployment, and religion. Due to the high collinearity between variables, many independently significant variables were not significant in the multivariate logistic regression model; however, this does not necessarily negate the importance of various social variables being significant predictors of in-hospital mortality.

Our data presents interesting findings. Racial and ethnic minorities have been disproportionately affected by COVID-19.[2,8,9,18] Both H and AA have been shown to be more likely to test positive for COVID-19 compared to NHW.[5,8] In addition, minorities tend to live in densely populated areas, multigeneration households, with lower income status, and less access to health care.[7,9] It is thought that these factors and increased genetic susceptibility may play a role in the increased vulnerability seen in these susceptible populations.[2,5–7] Our study population was predominantly lower income, living in densely populated households. Not surprisingly, we found higher rates of COVID-19 in these areas.

Minorities of lower socioeconomic status also experience disparities in health and are more likely to be affected by chronic diseases.[10,19] Not only is this affected by medical care, but also SDH, including economic stability, health, community, education, social support, and environment.[11,20] These individuals may be more prone to risky behavior, environmental exposures, and family conflict which negatively impact health.[11] We similarly demonstrated risky behaviors and religious beliefs to be

more common among minorities; however, NHW were more likely to have disability or reside in a long-term care facility. The correlation between tobacco use and mortality in our cohort supports the negative impact of these behaviors on health. Interestingly, drug use was protective in both subgroups. This could be a surrogate for younger age rather than the risky behavior (in our sample median age of drug users was 52 vs 69 in non-user). The uninsured status and unemployment corresponding to increased risk of mortality may be indicative that these patients have less access to healthcare and may experience more economic instability contributing to their increased risk.

Hispanics demonstrated improved survival benefit in COVID-19 despite their social disadvantages. This phenomenon has been observed among Hispanics for other diseases and has been coined the "Hispanic Paradox,"[13,19,21,22] begging the question: Does the Hispanic Paradox extend to COVID-19 infection? Some of the theories that speculate on the veracity of these findings suggest a lower socioeconomic health gradient.[23] Multiple explanations have been offered for the Hispanic Paradox. The "healthy migrant" theory postulates that only the healthiest individuals immigrate to a new country, thereby increasing the average life expectancy of the population.[12,13,21,24] The "Salmon bias" theory suggests that, if a person is ill, they will travel back to their country of origin to be with their family, friends, and community in their time of need.[25] However, this theory would not be possible as an explanation during the COVID-19 pandemic. Finally, the increased level of socio-cultural support in the lives of Hispanic communities affects survivability, which is critical in treatment of a chronic disease.[12,13,21,25] Hispanic households often comprise several generations living under one roof, larger immediate and extended families, and highly developed community support networks through shared cultural values.[26,27] In this cohort, while family support was not protective of mortality, Hispanics were less likely to reside in a long-term care facility and more likely to have extended family support system, which could explain the improved survival rate. Though the etiology is unknown, Hispanics confer a survival advantage over NHW for COVID-19 infection in this study.

This study has a number of limitations. First, this is a retrospective study with the inherent selection biases. Due to the duration of this study and its analysis during the initial COVID-19 pandemic, total number of captured patients could be underestimated. In addition, geographic limitations play a role as our enactment area may result in a higher proportion of minorities examined than observed in other areas. Due to our healthcare system's service area, the number may not be representative of statewide statistics. In addition, SDH were analyzed in this study and due to the retrospective nature, the capture was small affecting analysis, and only social variables reported were captured. This could lead to underrepresentation of these categories. Interpretation of our data should be used with caution due to the limited knowledge of this disease process and the continued changing management.

CONCLUSION

Despite the social disadvantages observed among Hispanics, Hispanic ethnicity was associated with improved survival rates, suggesting that the Hispanic Paradox may play a role in COVID-19 infection. In this study of hospitalized patients with confirmed COVID-19, we demonstrated an association between SDH and mortality along with ethnicity.

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Blood Donation from MSM: A Timeline of Anachronistic Policies and Crisis Decision Making

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ABSTRACT – In response to the HIV/AIDS epidemic in the 1980s, the US Food and Drug Administration (FDA) issued a lifetime ban on blood donation from men who have sex with men (MSM). At that time, there was no accurate testing or effective treatment, and this measure was deemed critical to protect the blood supply. With advancements of HIV testing and treatment, the FDA shifted the blood donor guidelines to permit MSM to donate 12 months after sex. In 2020, COVID-19 catalyzed a severe blood shortage. The FDA then shortened the deferral period for MSM to three months to support the supply. Crisis decision making encouraged reevaluation of antiquated policies to protect the health of the nation. On May 12, 2023, the FDA issued a statement supporting the assessment of potential donors based on individual risk-based questions. The FDA's developing recommendations raise ethical and practical questions regarding the right to donate and receive safe blood, and the impact of extending donor eligibility on the current blood shortage.

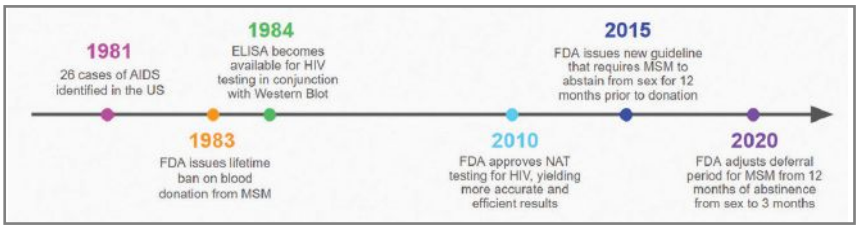
BACKGROUND

From the start of the AIDS epidemic in 1981 to the COVID-19 pandemic, public health emergencies have shed light on complex social and healthcare-related inequities.[1] Examples of such include the increased mortality of COVID-19 among marginalized and underrepresented communities related to disparities in testing, prevention, and treatment.[2] Furthermore, decreased access to HIV testing, pre-exposure prophylaxis (PrEP), and antiretroviral therapy (ART), as a result of COVID-19 restrictions, were estimated to increase HIV infections among MSM by 10.5%.[3] The national blood shortage in the US reached a critical new level in 2020, which promoted important conversation and legislation regarding the blood donation restrictions among MSM.

The AIDS epidemic emerged in the US in 1981, with the first 26 cases being identified among homosexual men. As a result, the disease quickly became associated with this marginalized population. Initially, there was no effective treatment or accurate testing for HIV. On March 24, 1983, in an act to protect the safety of blood donations, the FDA issued a lifetime deferral on blood and plasma donation from MSM (Figure 1). In 1984, the enzyme linked immunosorbent assay (ELISA) test became available and was able to detect 96% – 98% of infections.[1] Although ELISA had a high sensitivity rate, the specificity was considerably lower and false seropositive results occurred. Therefore, a more expensive test was used to confirm or deny positive test results from the ELISA; this secondary test was the western blot. However, neither test could detect HIV in a patient in the six-to-eight week window period (time between active infection and antibody formation in the blood). In 1985, the risk of HIV transmission through blood transfusions was 1 in 153,123 units.[4] In the early years of the AIDS epidemic, the FDA lifetime deferral was considered necessary to ensure the safety of the nation's blood supply and the health of donors and recipients.

In 2010, the FDA announced its approval of a new method to detect HIV: nucleic acid testing (NAT). This new technology was capable of detecting viruses within 10 days of exposure, a dramatic improvement in window time since the 1980s. Furthermore, this test was considered to be extremely accurate, with sensitivity and specificity rates

Figure 1. Timeline of HIV testing advancements and blood donor deferrals for MSM.



ELISA, enzyme linked immunosorbent assay; FDA, US Food and Drug Administration; MSM, men who have sex with men; NAT, nucleic acid testing

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of virtually 100%. In the years that followed, advocacy for an amendment to the lifetime deferral on blood donation from MSM skyrocketed. Members of the scientific community, legal arena, and public sphere joined to fight for MSM to have the ability to donate blood and plasma. In 2015, the FDA adjusted the deferral policy on MSM to require potential donors to abstain from MSM contact for 12 months before donating blood or plasma.[5] In 2023, the FDA issued updated guidelines on mitigating the risk of HIV transmission through donor blood products. This statement included the recommendation of evaluating donor eligibility on an individual basis using risk-based questions.[6] The American Red Cross, and other national blood and plasma donation banks, are currently working to safely and effectively implement the FDA's proposed screening criteria.[7]

IMPACT OF COVID-19 ON THE NATION'S BLOOD SUPPLY

On March 17, 2020, days after the president declared a state of national emergency regarding the novel coronavirus, the American Red Cross announced that 2700 blood drives had been canceled nationally, and as a result, there were at least 86,000 fewer donations. The first blood drives canceled were community-based blood drives – those held at office buildings, shopping malls, public schools, and places of worship – which account for over 80% of the typical blood supply. The American Association of Blood Banks noted that in 2019, a minimum of 33,000 units of blood were required daily to meet patient demand (Figure 2). Considering the majority of blood centers are operating with less than two days of supply, and a single trauma patient can require over 100 units of blood, it remains absolutely critical to the health of patients that the donor eligibility criteria is extended.[8]

With the blood supply dwindling and the demand for blood products rising nationally, several hospitals issued increasingly stringent criteria for patients to qualify for a blood transfusion. This criteria often required multiple lab tests showing deteriorating status before patients were eligible to receive blood; blood products were effectively limited to the sickest patients in the hospital. Some hospitals also divided each platelet unit into two doses and many canceled all elective and non-urgent procedures.[9] Within the first weeks of the COVID-19 crisis, the severity of the blood shortage became clear and efforts to protect the adequacy and integrity of the blood supply became paramount. In April of 2020, the FDA issued updated guidelines for the eligibility of donors, in an effort to increase the overall eligible population of donors. Among several adjustments to travel limitations, vital signs, and donation intervals, the FDA decreased the deferral period for MSM from 12 months to three months of abstinence. Since 2010, every single unit of donated blood has been tested, per CDC guidelines, for HIV with an advanced NAT and an antibody test. When analyzed together, the sensitivity and specificity of these HIV tests are virtually 100% and the window from infection to a positive test result is under three days. With these measures in place, it is estimated that the current risk of HIV transmission is 1 in 1.5 million units of blood, a significant decrease from the risk in 1985 of 1 in 153,123 units.[9]

Changing the deferral period for MSM raises the question of how policy change could tangibly affect the blood supply in the US. In a 2017 cross-sectional study, Liszewski and colleagues surveyed 764 self-identified MSM in the US. Of this population, only 8.9% of participants met the 12-month deferral period but 90.6% of all participants were interested in donating.[10] In 2020, MSM were

Figure 2A. Estimated total blood supply at blood centers in the Northeast region in 2022 (ME, NH, VT, MA, CT, RI, NY, PA, DE, MD, DC) Data collected by America's Blood Centers.[6]

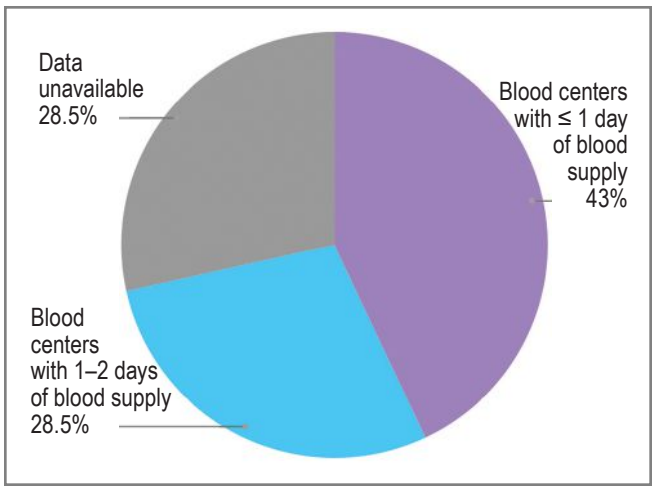
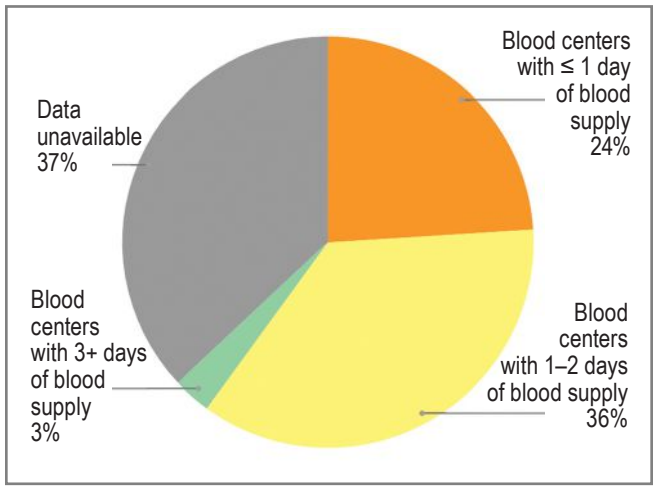


Figure 2B. Estimated total blood supply at all blood centers in the United States in 2022. Data collected by America's Blood Centers[6]



estimated to account for 2% of the US population and 10% of eligible donors annually. Park and colleagues estimate that revising the donor eligibility criteria to screen for high-risk behaviors on an individual basis could add up to 600,000 annual donors to the blood supply.[4] This crucial contingent of blood donors will no longer be excluded based on the FDA's most recent recommendation. To match the unprecedented demand for blood donations, we must optimize the safety of the blood supply with the need for more donors based on the most advanced testing measures. Current testing protocols (that can detect HIV in less than three days) in conjunction with individual risk-based eligibility questionnaires will allow hundreds of thousands of additional units to be donated each year.

ETHICS OF BLOOD DONATION

In addition to protecting the safety of the blood supply, the inclusivity of the blood donor criteria raises several ethical challenges. The deferral for MSM first began when HIV was considered to affect a higher portion of MSM as compared to the general population. In 2020, the prevalence of HIV in MSM was 11% which represents a disproportionate contingent of HIV cases in the US. However, the rate of HIV in MSM who sought out blood donation opportunities in the latter half of 2020 was 0.25%.[4] Dr. Arora argues that it is unfair and inaccurate to consider the population of MSM as a whole when concerned with the HIV status of potential donors. It is furthermore an act of inequity to place blanket restrictions on a heterogeneous subpopulation. The safety of the blood supply must be at the core of all donor guidelines. However, excluding donors based on antiquated science and preventing potential contributions to the dwindling blood supply could be a detriment to public health today. As science advances, policy must advance.[5]

The categorization of individuals becomes complex when the classification system is fluid. Park and colleagues analyze the impact of gender self-identification on the blood donor guidelines. Specifically, if a transgender female (who was identified as male at birth) has sex with a cis-gender male, she would be eligible to donate blood without a deferral period under the current FDA guidelines. However, if two cis-gender males engage in sexual activity, they would be deferred from donating blood for three months.[4] This complexity further shines light on the importance of an individual-based risk assessment and supports the current FDA recommendation.

Professor of Law Doron Dorfman examined the ethical basis of the FDA's stringent guidelines on MSM through the lens of travel bans issued during the height of the coronavirus pandemic.[11] In March 2020, conversations ensued regarding the constitutionality of restricting travel between states. Several states imposed guidelines for travelers coming from states with higher COVID-19 rates; these guidelines typically included a COVID-19 test and/or self-isolation for 10 – 14 days. These guidelines effectively assume that every resident of a state with high COVID-19 rates is infected with the virus and can transmit the virus to others. Both the interstate travel guidelines and the blood donor criteria were issued to prevent an outbreak from spreading. Further, both policies classify populations based on a specific behavior (residing in a specific state, MSM) and make a sweeping generalization about these heterogeneous populations. Finally, neither policy uses testing to confirm the validity of the generalization. Dorfman articulates one fundamental difference that shapes this debate: the travel regulations would not remain effective after the novel coronavirus was no longer an active threat in a specific region. However, the blood donation ban on MSM persisted for decades despite extraordinary advances in testing methods and widely available, effective treatment options. Dorfman notes that interstate travel is a constitutional right – as ruled by the Supreme Court in the case Edwards vs California of 1941 – whereas donating blood is not a constitutional right.[11] The question of who should be eligible to donate blood is rooted in the preservation of human rights and the protection of public health.

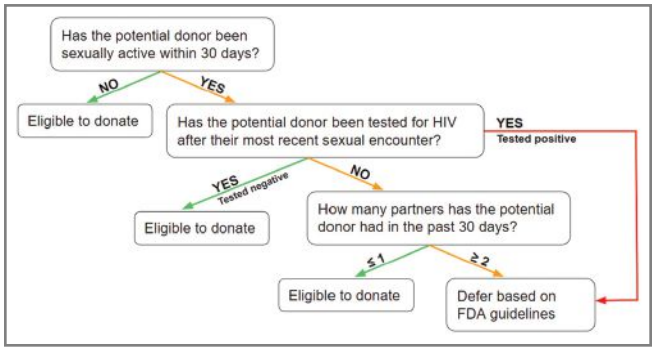
When considering the ethical dilemma of blood donation, it is important to consider how each at-risk subpopulation is treated. For example, the FDA requires that all donated units of blood are tested for *Trypanosoma cruzi*, a pathogen native to Latin America that causes Chagas disease. Chagas disease affects an estimated 288,000 people in the US, often leading to a fever, splenomegaly, and eyelid swelling. Despite the testing measures to protect blood recipients from *T. cruzi*, donors are not screened for Chagas disease or travel history to Latin America.[12] Dr. Kavita Shah Arora argues that there are several inconsistencies in the way that the FDA approaches each at-risk subpopulation. It is central to the fairness of blood donation that each at-risk population is subject to appropriate screening and testing procedures. To be selectively precautionary towards one at-risk population is an act of discrimination.[5]

POTENTIAL SOLUTIONS

Prior to the FDA's 2023 statement, several scholars suggested using a gender-blind, individual-based inclusion criteria method that screens each potential donor for high-risk behaviors and travel.[4,5,13] The algorithm would issue each potential donor a stamp of approval or an appropriate deferral period. This method would seek to eliminate, at least partially, the bias against MSM in blood donation and crack the foundation of population-based blanket policies. The adequacy of a safe blood supply

hinges on the act of considering each donor as a unique individual, who cannot be wholly represented by their self-identification with a specific population. The eligibility questionnaire proposed by the FDA addresses this gap. Park and colleagues suggest a branched question format that screens for specific high-risk behaviors including the number of sexual partners and the donor's knowledge of their partners' HIV status[4] (Figure 3). Furthermore, the questionnaire would have the same format for travel to high-risk regions, behaviors including intravenous drug use, and other activities that could pose a risk to blood recipients. As national blood banks work to implement the new FDA recommendations, the aforementioned scholars' research may serve as a blueprint.

Figure 3. Based on the study by Park et al, here we propose a branched tree survey as an individual-based screening format for potential donors.[4]



CONCLUSION

One of the many health crises that the COVID-19 pandemic brought to light was the historically unfair treatment of marginalized and underrepresented individuals in our nation's healthcare systems. The current FDA recommendation represents significant progress in fairly assessing the risk of potential blood donors, especially given the thorough infectious disease testing requirements that govern blood donation.

Crisis decision making resulted in a lifetime ban on blood and plasma donation from MSM, protecting the public health of a nation in a state of emergency in the 1980s. In our recent blood shortage, this anachronistic policy jeopardized the adequacy of the nation's blood supply. The individual risk-based question criteria offered by the FDA supports the goal of protecting the safety of the blood supply and maximizing the donor population, in addition to striving for fair and equitable policies across public health.

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Poisoning-Related Emergency Department Visits in Children Aged 0 to 9 Years, 2016 to 2018

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ABSTRACT – Poisonings are a leading cause of morbidity, mortality, and emergency department (ED) visits in US children. This study describes the frequency, exposure type, and geographic location of unintentional and unknown-intent poisonings within a representative sample of 472,014 ED discharges among Connecticut (CT) children aged 0–9 years from 2016–2018. Using ICD-10-CM codes, we identified that 1995 (< 1%) were poisoning-related. Poisonings occurred most frequently in children who were 1–2 years old (58.4%) and were most frequently documented as unknown/other exposure (25.6%), followed by nonopioid analgesics (11.4%). Geospatial analysis showed clustering around cities, most distinctly with detergent and soap poisonings. County poisoning rates ranged from 2.5–5.9 per 1000 population ≤ 9 years. Results suggest that informatics-led efforts may be required to understand and mitigate the large prevalence of unspecified/other poisoning codes; interventions focused on non-opioid analgesic safety may be warranted in larger CT cities.

Key words: Poisonings, emergency department, ICD-10-CM, overdose, GIS/geospatial analysis

BACKGROUND

The US Centers for Disease Control and Prevention (CDC) defines poisoning as "any substance, including medications, that is harmful to your body if too much is eaten, inhaled, injected, or absorbed through the skin."[1] Poisoning is a leading cause of morbidity[2–4] and mortality[5–7] among children in the US, as well as a driver of emergency department (ED)-related healthcare costs and resource utilization.[8] In 2010 alone, US children aged under 10 years made 43,452 nonfatal poisoning-attributed ED visits, resulting in costs totaling $67.5 million.[9] Presently, there is a paucity of publicly-available data examining more recent poisoning-related pediatric ED utilization. Notably, the Healthcare Cost and Utilization Project provides open-source injury data, but poisonings are not distinguishable from other injuries.

INTENT

Poisoning intent differs across age groups. Children aged 1–3 years are at greatest risk of unintentional poisoning and associated ED visits.[2,6,10,11] Since hand-to-mouth behavior is common in this age group,[3,10–12] these individuals are particularly at risk of poisoning due to exploratory ingestion.[13] In contrast, the risk of intentional self-harm via poisoning increases among older children;[12–15] this behavior can occur in patients as young as 10 years.[13,15] Malicious administration of poisoning by others is rare across all age groups.[3,16,17]

POISONING EXPOSURE

Child poisoning exposures are diverse, including numerous drugs and household items. Children treated in EDs from 2001–2011 were most frequently exposed to drugs (both medicinal and recreational), household products, and unknown substances.[15] In 2017, US poison control centers (PCCs) reported that the most frequent childhood poisoning exposures were cosmetics/personal care products, household cleaning products, and analgesics.[3] Over 400,000 PCC calls involved children aged 5 years and under who were exposed to pharmaceuticals of all types; of these, 91,741 were related to analgesics.[3] Previous studies have shown that adult medication use, particularly opioids, has a significant association with poisonings in children.[4,18]

OUTCOMES

Most child poisonings result in minor adverse health outcomes, but severe poisonings and fatalities do occur.[19] Though death is rare,[3,8] analgesics were the primary cause

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of poisoning death among US children aged under 6 years in 2017.[3] Fatalities were most common in children under 6 years of age exposed to highly toxic substances such as opioids,[4,20] which can be fatal to young children with a single adult dose.[20] Additionally, poisoned children may experience moderate/severe symptoms continuing past the initial poisoning event, including pain, digestive effects, disability, and disfigurement.[4]

STUDY OBJECTIVES

In CT from 2010–2017, there was a 9.4% increase in all drug-related deaths among all ages and a 496.6% increase in deaths from opioids among children 18 years and under.[6] As drug use increases among adults in CT, more children may be exposed to theses prescription or illicit substances. Children may also have varying exposure to poison types based on geographical location. A previous study demonstrated that the number of opioid prescriptions filled in a geographic area was correlated with the number of PCC calls for children exposed to that specific drug.[4]

A significant knowledge gap exists around poisoned children, particularly regarding poisoning types, clinical documentation, and geographic characteristics. To address this gap in the literature, the objectives of this study are to describe patient characteristics, poisoning exposures, and cost for ED visits involving unintentional and unknown-intent poisonings among CT children aged 0–9 years from 2016–2018; and identify patterns of child poisonings by geographic location. We hypothesize that analgesics will be the most common poisoning exposure, and that large cities (> 75,000 population) will have the highest incidence of poisonings.

METHODS

STUDY POPULATION AND SETTING

Our study employed a retrospective cohort design to examine ED visits for poisonings of unintentional and undetermined intent among CT residents aged 0–9 years from 2016–2018. This period was selected for coding consistency, as the *International Classification of Diseases, Tenth Revision, Clinical Modification* (ICD-10-CM) (World Health Organization, Geneva, Switzerland) was introduced in October 2015. The ages of 0–9 years were selected to capture a wider range of unintentional child poisonings than studied in the existing literature, which has focused on children aged ≤ 5 years.[4,21–23] Children ≥ 10 years old were excluded given that prior studies have demonstrated increased risk of intentional ingestions beginning at this age.[12–15] This study was approved by Institutional Review Board at CT Children's Medical Center.

DATA SOURCES

Emergency department discharge data were obtained from the CT Hospital Association. These data included 27 of 29 CT hospitals, and captured demographic characteristics, visit cost, zip code, and ICD-10-CM codes (maximum 10) for each discharge.

VARIABLES

The primary outcome of interest was unintentional poisoning, defined by ICD-10-CM codes for poisonings of unintentional or undetermined intent (X40–X49, Y10–Y19, T36–T55, T57, T60, T65.2, T65.9).[24] We excluded ICD-10-CM codes for poisonings related to the environment, assault, self-harm, and adverse effects of properly administered substances.[25]

The outcome of interest was evaluated by child age (years), race-ethnicity (non-Hispanic Black, Hispanic, non-Hispanic White, Hispanic, other), sex (male, female), insurance status (public, private, self, other), patient discharge status (death, left against medical advice/discontinued care, discharge to: home/self-care, inpatient care, home health service), total cost of ED visit, and home address location (zip code).

STATISTICAL ANALYSIS

Demographic characteristics of the study population were calculated using univariate analysis, and stratified by poisoning exposure type (eg, opioid, non-opioid analgesic, detergent). Comparisons between poisoning and nonpoisoning ED records were made using *t* tests and chi-square tests, as appropriate. SAS 9.4 (SAS Institute, Inc., Cary, NC) was used for all quantitative analysis; the level of significance was set at 0.05.

Geographic information system (GIS) analysis was used to create maps using data from the quantitative analysis. The base map for geospatial analysis was obtained from Esri (Environmental Systems Research Institute, Inc., Redlands, CA).[26] Population data were obtained from the US Census Bureau[27] and the CT Data Collaborative.[28] County rates were calculated using the number of poisonings in our study population as the numerator and county population ≤ 9 years old as the denominator, then mapped with graduated colors. ArcGIS Pro 2.4.1[26] was used for all geospatial analysis.

RESULTS

QUANTITATIVE

Between 2016–2018, there were 472,014 ED discharges for children aged 0–9 years. A total of 1995 unique ED discharges involved poisonings, representing < 1% of all ED visits, a rate of 4.23 poisonings per 1000 ED visits. Mean total cost per poisoning visit was $1,441.33, with a total cost of $2,875,452.00 over the study period (Table 1).

When compared to ED visits that did not involve poisonings, poisoning diagnoses occurred more often among children who were younger (2.0 vs 3.0 years), of non-Hispanic white race (48.8% vs 39.9%), and with private insurance (28.4% vs 22.8%) (all *p* values < .0001). Most poisonings (92.8%) were discharged to home/self-care, and approximately 6.5% were transferred to inpatient care (Table 1). No poisoning cases resulted in death while in the ED. Due to anonymization of data, patients' outcomes after leaving the ED could not be tracked.

Twenty-six percent (n = 533) of all poisonings were documented with codes indicating unspecified/other drugs/substances (T50, T65; Table 2).

Poisonings involving nonopioid analgesics (T39) were the single largest identifiable category of identified poisonings (11.8%; n = 236). Of these, the most frequently documented were aminophenol derivatives (eg, acetaminophen), propionic acid derivatives (eg, ibuprofen), and aspirin. Other common exposures included systemic and hematological agents (9.6%; n = 192), psychotropic drugs (6.8%; n = 135), and drugs primarily affecting the autonomic nervous system (6.4%; n = 128). Cannabis poisonings were rare (0.6%; n = 12).

Seventy-one ED discharge records involved multiple poisonings, representing 3.6% of all poisoning-related visits, a rate of 1.50 visits per 10,000 ED visits (data not displayed). This resulted in a total of 2082 poisoning diagnosis codes assigned to the 1995 unique discharge records.

GEOSPATIAL

County rates of poisoning per 1000 population under 10 years were highest in New Haven County (5.9), followed by Hartford (5.8), New London (5.4), Litchfield

Table 1. Prevalence of poisonings in EDs among CT hospitals, CT residents aged 0–9 years: 2016–2018 (N = 472,014)

Characteristics	*Total ED n(%)*	*Total ED Poisoning-Related n(%)*	*ED Non-Poisoning-Related n(%)*	*P value*
Median age (years)	3.0	2.0	3.0	< .0001
Sex				
Male	255,258(54.1%)	1,090(54.6%)	254,168(54.1%)	0.88
Female	216,753(45.9%)	905(45.4%)	215,848(45.9%)	
Race/ethnicity				
Non-Hispanic White	188,394(39.9%)	973(48.8%)	187,421(39.9%)	< .0001
Non-Hispanic Black	91,736(19.4%)	371(18.6%)	91,365(19.4%)	
Hispanic	57,773(12.2%)	206(10.3%)	57,567(12.3%)	
Other	134,111(28.4%)	445(22.3%)	133,666(28.4%)	
Insurance status				
Public	342,173(72.5%)	1,324(66.4%)	340,849(72.5%)	< .0001
Private	107,698(22.8%)	567(28.4%)	107,131(22.8%)	
Self	21,385(4.5%)	103(5.2%)	21,282(4.5%)	
Other	758(0.2%)	*	757(0.2%)	
Discharge status				
Routine discharge (home/self care)	460,908(97.6%)	1,851(92.8%)	459,057(97.7%)	< .0001
Discharged to inpatient care	7,877(1.7%)	129(6.5%)	7,748(1.6%)	
Discharged to home health service	849(0.2%)	7(0.4%)	842(0.2%)	
Left against medical advice or discontinued care	2,150(0.5%)	8(0.4%)	2,142(0.5%)	
Expired	117(0.0%)	0(0.0%)	117(0.0%)	
Other discharge status	119(0.0%)	0(0.0%)	119(0.0%)	
Costs				
Mean cost per visit	$1,438.04	$1,441.33	$1,438.04	0.90
Total cost over study period	$678,780,939.93	$2,875,451.92	$675,905,488.00	

Note: poisonings are determined by discharge records including IDC-10-CM codes X40–X49, Y10–Y19, T36–T55, T57, T60, T65.2, and/or T65.9. Some percentages may add up to over 100% due to rounding. All values < 5 have been suppressed.

Table 2. Prevalence of poisoning by diagnosis code in emergency department discharges for CT hospitals, CT residents aged 0–9 years: 2016–2018 (N = 472,014)

ICD-10-CM Code	*Description*	*N*	*% of ED Poisoning Records With Code*
T50	Unspecified and other drugs	281	14.1%
T65	Unspecified and other substances	252	12.6%
T39	Non-opioid analgesics	236	11.8%
T39.0	Salicylates, eg, aspirin	27	1.4%
T39.1	4-aminophenol derivatives, eg, acetaminophen	108	5.4%
T39.3	Other NSAIDS, eg, ibuprofen, naproxen	97	4.9%
T45	Primarily systemic and hematological agents	192	9.6%
T43	Psychotropic drugs	135	6.8%
T44	Drugs primarily affecting the autonomic nervous system	128	6.4%
T54	Corrosive substances	108	5.4%
T49	Topical agents primarily affecting skin and mucous membrane and ophthalmological, otorhinolaryngological and dental drugs	100	5.0%
T42	Antiepileptic, sedative-hypnotic and antiparkinsonism drugs	96	4.8%
T55	Soaps and detergents	93	4.7%
T46	Agents primarily affecting the cardiovascular system	82	4.1%
T48	Agents primarily acting on smooth and skeletal muscles and the respiratory system	63	3.2%
T40	Poisoning by and underdosing of narcotics and psychodysleptics [hallucinogens]	56	2.8%
T38	Poisoning by and underdosing of hormones and their synthetic substitutes and antagonists, not elsewhere classified	51	2.6%
T60	Toxic effect of pesticides	44	2.2%
T47	Poisoning by and underdosing of agents primarily affecting the gastrointestinal system	42	2.1%
	Other	123	6.2%

Note: The percentages in this table add up to over 100% because the denominator is percentage of records (1,995), not percentage of diagnoses (2,082).

(5.0), Windham (4.9), Tolland (4.4), Fairfield (4.1), and Middlesex (2.5) counties (Figure 1). Poisoning rates were generally highest per capita in counties containing larger cities such as New Haven and Hartford. Fairfield County was a notable exception to this, having the second-lowest per capita county rate of poisoning despite encompassing Bridgeport, the most populous city in the state. The cities of Bridgeport and Hartford each had the highest number of poisonings (n = 151 per city).

There was geographic variation in poisoning distribution by substance type. Nonopioid analgesic poisonings were distributed widely across the state (Figure 2) while hot spot analysis showed distinct clustering of detergent/soap and opioid poisonings around urban areas (Figure 3 and 4).

DISCUSSION

Our study provides recent data regarding poisonings among children ≤ 9 years in CT. Consistent with prior studies, we found the majority of poisonings occurred among children aged 1–2 years, and children of white non-Hispanic race-ethnicity.[8,10,12–15]

This study found only one discharge involving poisoning with a co-occurring maltreatment code. Though codes exist to document maltreatment, neglect is seldom a medically diagnosed condition.[11] Previous studies have identified poisoning diagnoses as potentially suggestive of neglect, and it is possible that some cases of neglect were misclassified in our study.[10,11]

In contrast to the 2017 American Association of PCCs annual report, our study found nonopioid analgesics to be the most prevalent identifiable poisoning exposure (11.8%). The PCC report found that the leading reported exposure among children ≤ 5 years was cosmetics/personal care products (12.6%), followed by household cleaning substances (11.0%), and analgesics (9.2%).[3] There are several possible reasons for this discrepancy. PCC data are based on PCC calls rather than ED visits, and many PCC cases (65.5%) are resolved via phone without

Figure 1. Rate of poisonings in CT residents aged 0–9 years treated in CT emergency departments, 2016–2018, county level.

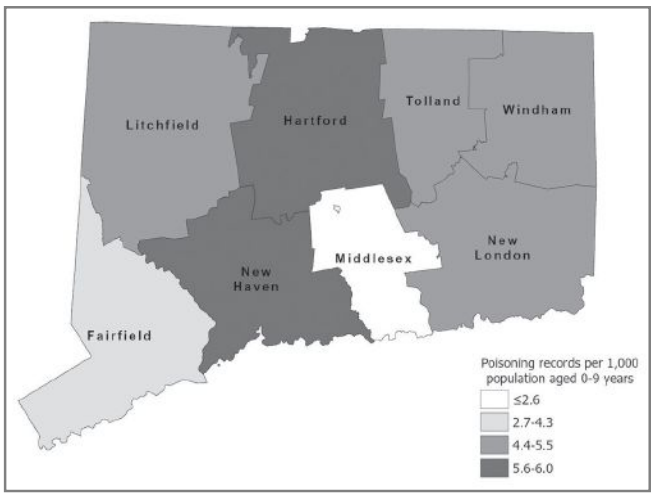


Figure 2. Frequency of nonopioid analgesic poisonings in CT residents aged 0–9 years treated in CT emergency departments, 2016–2018, county level.

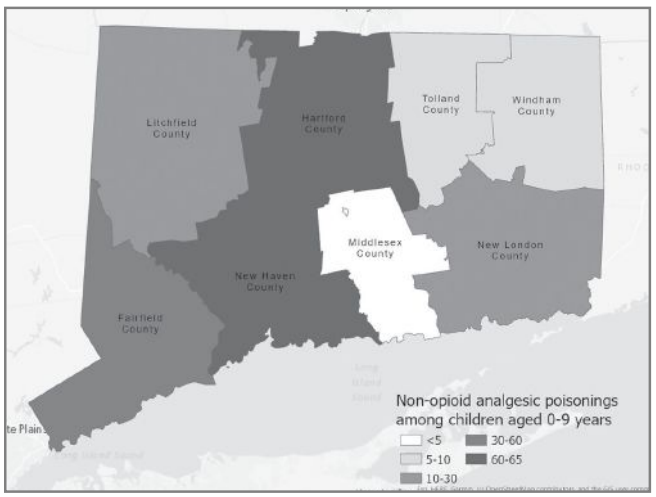


Figure 3. Frequency of detergent and soap poisonings in CT residents aged 0–9 years treated in CT emergency departments, 2016–2018, county level.

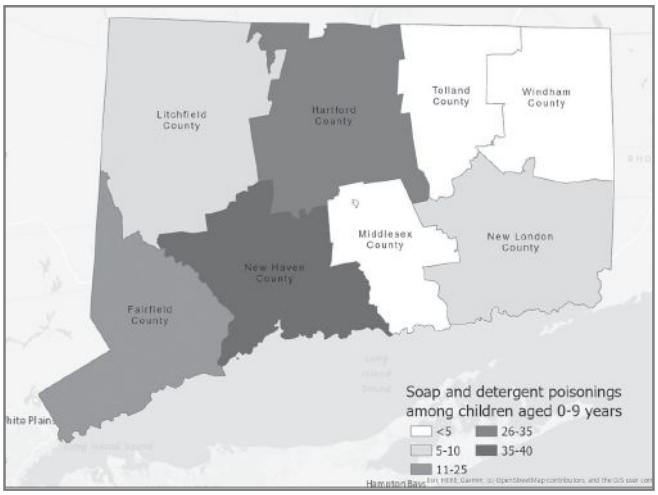
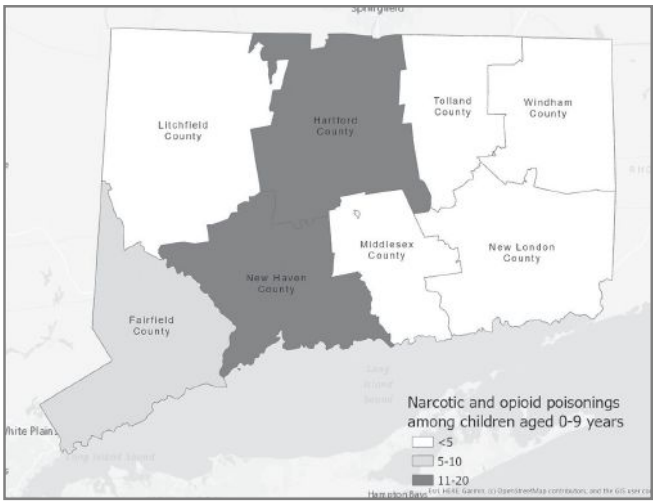


Figure 4. Frequency of opioid and narcotic poisonings in CT residents aged 0–9 years treated in CT emergency departments, 2016–2018, county level.



further healthcare intervention.[3] This suggests that EDs may interface with different/more severe cases than PCCs. Furthermore, though ICD-10-CM codes capture some of the PCC poisoning exposure categories, not all PCC categories are represented in the ICD system. For example, "cosmetics/personal care items" is the most granular level of this PCC category of exposure resulting in calls about children.

Our study found approximately 10% of poisoning discharges involved nonopioid analgesics, which generally have less severe outcomes compared to opioid poisonings.[4] Though most cases of nonopioid analgesic poisoning resolve with mild/no symptoms and few/no complications, treatment still requires healthcare resources and expenditures.[9] Still, critical outcomes may occur. For example, acetaminophen poisoning can result in hepatotoxicity potentially leading to liver failure.[29] Since these severe outcomes are relatively rare in young children,[29] it is likely that caregivers perceive nonopioid analgesics as reasonably safe, especially since these drugs are frequently available over the counter and in children's dosages. However, these poisonings utilize ED resources and create stress, minor injury, and cost for children and caregivers. A previous study showed that 42,623 children aged 0–11 years visited US EDs from 2006–2010 for acetaminophen poisoning alone, creating a cost of $11.45 million.[30] Community intervention is recommended in areas exhibiting high incidence of nonopioid analgesic poisoning.

A quarter of poisoning exposures in our study were diagnosed as unspecified/other drugs/substances with no further specification (T50.9, T65.9, and T65.89 ICD codes). These unspecified/other codes may be attributed to caregivers' unawareness of the substance ingested, or unwillingness to divulge that children in their care consumed a known hazardous, controlled, and/or illicit substance. Additionally, the high prevalence of unspecified/other codes may be a consequence of clinical barriers, eg, inability to test for substances before normal biological processes eliminate the substances. Future research is needed to quantify the capacity of clinicians to select more specific ICD-10-CM categories in relation to child poisoning; particularly, qualitative analysis of clinical notes may elucidate the circumstances around these poisonings. It is also possible that some common types of poisoning may not be captured in the ICD-10-CM coding system (eg, cosmetics/personal care items), causing potential misclassification of known substances into unspecified/other categories.

Despite the high rate of opioid poisonings among adults in the US and CT, few opioid poisonings were observed among children in this study. This finding is consistent with other studies reporting a low incidence of opioid poisonings among preadolescent children.[31,32] It is possible that caregivers who use opioids may be more cautious with these drugs than they are with substances that may be perceived as less dangerous, eg, nonopioid analgesics; alternatively, caregivers may be unwilling to report children's exposure to opioids.

Poisoning frequencies were highest in larger cities, including Bridgeport, Hartford, Waterbury, and New Haven. This was expected due to higher population density in these areas. Poisoning rates were also generally highest per capita in counties with large cities. It is yet to be determined whether poisoning rates are truly higher per person in these counties, or if ED utilization for poisonings is higher in these areas. Greater availability of prescription drugs due to easier access to pharmacies in urban areas may contribute to increased poisoning rates in larger cities.[33] Alternatively, it is possible that hospitals are simply more accessible to urban residents, resulting in higher ED utilization and therefore higher representation in our data. If those in rural areas cannot readily access a hospital, they may be more likely to use non-hospital resources such as urgent care, primary care providers, or PCC calls. Since many PCC calls are resolved at home with no further healthcare intervention,[3] higher utilization of PCCs could result in significantly lower ED utilization.[34,35]

Although the city of Bridgeport had the highest count of poisonings in CT, it lies within Fairfield County which had the second-lowest per capita county rate of poisoning. This difference may be explained by income differences between the city of Bridgeport, Fairfield County, and the state of CT. Fairfield County has a higher median household income ($92,969) than CT overall ($76,106).[36] However, Bridgeport has a lower median household income ($45,441)[37] than both the county and state,[36] suggesting that Bridgeport is an economically depressed city in an otherwise wealthy county. Children from areas with a low median household income are more likely to experience poisoning than children from higher-income areas.[8,38] Additionally, neighborhood disadvantage and individual low income are associated with drug use in adults,[39] which creates greater risk of poisoning for children. Thus, it is conceivable that factors associated with Bridgeport's lower average socioeconomic status may contribute to the notably high number of poisonings. Additional research is needed to investigate this potential association further. Furthermore, those with lower income status are less likely to call PCCs when a child has been exposed to a potential poison.[40] Therefore, caregivers in low-income areas (ie, Bridgeport) may bring children to the ED when home treatment solicited from a PCC may suffice. Additional investigation is needed to determine if PCCs receive calls from Bridgeport; if not, a community intervention to improve PCC usage is suggested.

Frequencies of specific poisoning exposures showed varying degrees of density around large cities. Nonopioid analgesic poisonings (Figure 2) were widespread across the state, showing higher density around large cities in proportion with the larger population in these areas; whereas laundry detergent poisonings (Figure 3) were more distinctly clustered around cities, with far less activity in rural areas. These findings might indicate a varied approach to intervention based on population density and poisoning exposure.

LIMITATIONS AND STRENGTHS

Our study was not without limitations. First, our data only examined ED visits in CT, and thus may not be generalizable to other states and areas. Second, our analysis excludes inpatient, urgent care, poison control center, or other health clinic data. Further investigation into urgent care utilization for poisonings in children is recommended, as urgent care may be utilized as a resource for poisonings. Individuals living near hospitals may be more likely to take children to EDs rather than to other healthcare providers, which could potentially bias our sample. Third, ED data may not capture some variables effectively. For example, race is poorly captured due to human error in the ED setting (misclassification, assuming a patient's race), and due to individuals within the same ethnic group identifying their race differently (such as those from Hispanic backgrounds identifying as Hispanic White or Hispanic Black).[10] Fourth, our ED

data did not have a unique identifier for each patient, therefore we had no knowledge of any potential repeat visits to the ED by the same patient. It is possible that some individuals may appear in the data multiple times if they visited the ED on multiple occasions. Finally, given the complexities involved in medical diagnosis, human error is possible in diagnosis codes as well. Though the ICD-10-CM was developed to allow consistent morbidity coding internationally, it is primarily used for billing purposes in the US; this potentially affects reliability of US ICD data for epidemiological analysis. Diagnosis coding is completed by different individuals (clinicians, coders, etc.) at different facilities, which may contribute to variability in certain codes.[11]

This study also had several strengths. Our data was pulled from 27 of 29 hospitals in CT, providing a representative statewide sample inclusive of all pediatric ED facilities. Our data also included visits for residents in all major cities in CT, capturing a large portion of the CT population. The use of ICD-10-CM codes for billing is predefined by the World Health Organization and used globally. Therefore, the categories used in this study are generalizable.

CONCLUSION

The high prevalence of unspecified ICD-10-CM codes indicates a potential need to expand the current coding system. Our study found the majority of poisonings occurred among children younger than 3 years of age, most frequently from exposure to unknown/other substances or nonopioid analgesics, which suggests that interventions may be framed to promote the protection of young children from substances perceived as safe (eg, nonopioid analgesics). GIS analysis demonstrated clustering around cities consistent with higher population in these areas. Stakeholders involved in poisoning-related health campaigns may also consider targeting interventions to parents of children in larger cities, especially those containing populations with low income status.

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The Epidemiology of Pediatric Suicide Deaths in Connecticut, a Ten-Year Review

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ABSTRACT – Suicide is the second leading cause of death in American children. Screening is one strategy to identify children at risk for suicide. We analyzed pediatric suicide deaths in Connecticut (CT) over a 10-year period using data from the Office of the Chief Medical Examiner (OCME) and the Department of Public Health (DPH). We also reviewed the outcomes of a suicide screening questionnaire implemented in the emergency department of our institution's affiliated children's hospital. From 2008 to 2018, there were 541 deaths among children aged 10 to 18 years, of which 16.2% were suicides. The majority of suicide deaths (77.9%) were by hanging, and 13.9% were by firearm. Since implementation of the suicide screening questionnaire, 89% of children registered in the ED were screened, of which 16% screened positive. Suicide is the third leading cause of death for children in CT. Further research should inform strategies to lower the risk of pediatric suicide by hanging and firearm.

INTRODUCTION

Suicide remains a major public health problem, and disproportionately affects the pediatric population. It is the second leading cause of death among children and young adults aged 10–34.[1–3] Common means of pediatric suicide in the US in decreasing order of frequency are: firearms, suffocation (including asphyxiation and hangings) and poisoning.[4] From 2000 to 2017, the suicide rate in children increased to 11.8 per 100,000 representing a 10% increase in suicide rates.[5] In CT, 6.7% of high school-aged adolescents report having attempted suicide, and the state suicide rates have increased since 2007 alongside national trends.[3]

Lethal means is associated with death on the first suicide attempt by an individual, meaning the patient has had no prior attempt and they are successful on their first attempt.[6] The use of firearms is lethal 95.3% of the time and is 2.6 times more lethal than the next most common suicide method.[1,2] There are a number of studies that corroborate these findings.[1,2,6–9]

Lethal means safety interventions are intentional actions to decrease one's suicide risk by limiting access to lethal means. There is significant variation in firearms laws at the state level. Studies show that suicide attempts with a firearm are higher in states with comparably lenient firearm laws, though these studies generally include children and adults. Firearm legislation strength has been shown to be inversely associated with state-wide overall suicide rates. Accordingly, areas with strong firearms legislation, despite high gun ownership rates, have lower rates of suicide by firearms.[2,7,17,18,9–16] Following the Sandy Hook elementary school shooting, CT enacted a host of gun safety laws and the state is considered to have some of the most stringent policies in the nation. In CT, a person must be at least 21 years of age to obtain an eligibility certificate for a handgun, and the law prohibits any person from selling or exchanging a firearm to a person under age 21. However, in other states, the minimum age is 18 years. Moreover, CT ranks highly on the Brady scorecard, a scoring system designed by the Brady campaign to compare the strength of states' laws to prevent gun violence. For example, the scorecard examines states' laws regarding background checks, permit-to-purchase requirements, handgun purchasing limits, and retention of sales records. In 2020, CT ranked third out of 50, after California and New Jersey, and has the third-lowest gun death rate among states.[19]

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In addition to strengthening policies, another prevention strategy is screening children to identify those at-risk for suicide. The pediatric population tends to have frequent contact with a healthcare provider. About one-half of suicidal adolescents have seen a physician for a medical complaint within a month of their suicide death and 80% have seen a physician within six months.[20] Regular contact with healthcare providers presents a potential opportunity to screen children and identify those who are at-risk for suicide in order to facilitate lethal means counseling.

We retrospectively examined the pediatric suicide deaths in CT from 2008 to 2018 by reviewing data from the CT OCME and DPH. In 2019, CT Children's Medical Center (CCMC), the state's only free-standing children's hospital, implemented a suicide screening questionnaire in the emergency department (ED). We hypothesized that CT would have lower rates of pediatric suicide by firearm in comparison to national rates based on the state's relatively stringent firearms laws that would work to limit children's access to firearms. Importantly, however, the national data on pediatric suicide remains sparse and incomplete. We designed this epidemiologic study to demonstrate that it was feasible to acquire pediatric suicide data at the state-level and thereby broadly evaluate childrens' lethal access to firearms. Simultaneously, we analyzed the outcomes of a suicide screening questionnaire recently implemented in the ED of CCMC. We hypothesized that the survey would be universally administered to children in the ED and that children/families who are identified as at-risk would receive appropriate lethal means counseling.

Here we report the incidence of pediatric suicide, modality of suicide, and the outcomes of the screening tool. We compared the CT data with national data and firearm legislation with the objective to evaluate prevention opportunities and strategies.

MATERIALS AND METHODS

This is a retrospective review of data from the CT OCME and the CT DPH from 2008 to 2018. All deaths among children ages 10 to 18 were identified from public health data and suicide data were further reviewed from the medical examiner data. Age, manner of death, modality of injury, and year of death were reviewed and compared. All deaths in this age group with suicide as the manner of death were included in the study. From the suicide cohort, the modality of injury was classified into different categories – shooting, hanging, ingestion, jumping, train, stabbing, asphyxiation with bag, carbon monoxide poisoning, drowning, fire, automobile related, neck compression, and other. The types of injuries were compared, along with age at death and year of death.

CCMC adopted a universal approach to suicide screening, beginning at age 10 years. This screening initiative commenced in 2019. Data from all respondents aged 10 to 18 years was reviewed. The Ask Suicide Screening Questions (ASQ) tool is a validated tool for use in emergency departments. Qualitative and quantitative data from the suicide screening questionnaire was reviewed and compared from August 2019 to March 2021.

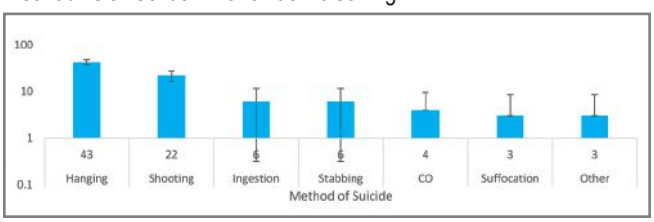
For the statistical analysis, continuous data are presented as mean ± standard error or deviation if normally distributed, or as a median and interquartile range (25th, 75th) if non-normally distributed. The Kruskal-Wallis test was used to assess rank sums of data not normally distributed. Significant differences are denoted by a P value of ≤ .05 in all statistical analyses with a 95% confidence interval. A descriptive analysis was performed focusing on method of suicide death. Statistical analysis was carried out with IBM™ SPSS Statistics for Windows/Mac version 26 (IBM™ Corporation, Armonk, NY 2019) and Graphpad Prism for Windows/Mac, version 8.41 (GraphPad Software, La Jolla, California USA). Suicide deaths are summarized with descriptive statistics.

RESULTS

From 2008 to 2018, there were a total of 541 deaths among ages 10–18 years in CT, of which 48.9% were from illness, 26.1% were from accidents, 16.2% were from suicides, and 7.9% were from assaults. Among suicide deaths, 77.9% were by hanging and 13.9% were by firearm. Suicide deaths were found to be significantly different by method ($p < .001$) (Figure 1). There were six medication ingestions, six incidences of stabbing, four incidences of carbon monoxide (CO) poisoning, three incidences of suffocation with a bag, and three deaths categorized as other. Other methods include jumping off a cliff, decapitation, and train; these accounted for one death each.

Secondary analysis of suicide deaths was significantly different by age ($p < .05$). 88% of suicide deaths were between 14–18 with a mean age of 15.19 years (Figure 2). Thirty-two percent of suicide deaths occurred in 16-year-olds. Across all suicide methods, the distribution for both year and age did not significantly differ ($p > .05$), meaning there was no difference in method of death determined by

Figure 1: Pediatric Suicide in Connecticut Distributed by Method. CO: Carbon Monoxide Poisoning



year or age. For example, there was no statistical difference in older children committing suicide by firearm at a higher rate nor was there a statistical difference in any specific year and any means of suicide occurring at a higher rate (Figure 3).

Since the implementation of the suicide screening questionnaire, 19,262 children ages 10 and older utilized the ED at CCMC. The ASQ was performed 17,254 times (89%). ASQ was not administered for varied reasons, including the medical condition of the patient (227) and patient or parental refusal (18). Data from 45 incomplete surveys was excluded from this study. Of the completed surveys, 2,777 out of 17,254 children (16%) screened positive. However, 400 of 17,254 (14%) children screened "acutely" positive. A total of 364 social work evaluations were made for an acute positive screen (91%).

DISCUSSION

Suicide is the third leading pediatric cause of death in CT (86), after illness (265) and accident (144). The majority of pediatric suicide deaths were from hanging. Older children are more likely to commit suicide with the median age being 15 years, and were more likely to be male (57%). Use of firearm was the second leading cause of suicide deaths in CT youth, which is significantly lower than the data reported from other states in the US. Approximately 17,000 children have been screened at CCMC since the implementation of a suicide screening questionnaire, with an overall screening rate of 89%. Sixteen percent of children screened positive and appropriate referrals and resources were provided. Acute positive screens (14%) received the full version of the Columbia Suicide Severity Rating Score questions, received a full social work consult, and a psychiatric consultation. Resources provided are dependent on patient's needs. Children with acute screening can be connected to an inpatient psychiatric facility, intensive outpatient treatment, or other programs according to needs.

Figure 2. Pediatric Suicide in Connecticut Distributed by Age

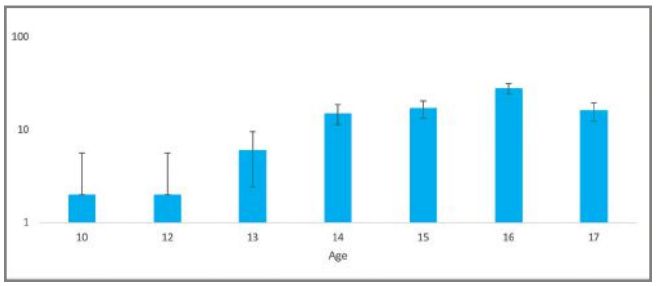
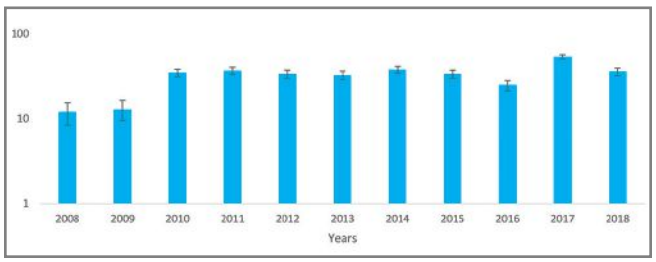


Figure 3. Pediatric Suicide in Connecticut Distributed by Year



There are limited studies analyzing pediatric suicide deaths. Studies cite firearm use in pediatric suicide anywhere between 37%–43%.[1,2,7,10] In CT, the suicide by firearm rate is much lower, likely due to strict firearms legislation that limit children's access, however this remains unproven (13.9%). Hangings and firearms combined for 91% of deaths in our group as compared to 75.3% of deaths in other studies.[21] Mcloughlin et al reviewed the epidemiology of children under 21 hospitalized with self-inflicted injuries. Six-hundred-thirteen hospitalizations for self-inflicted injury were identified, in-hospital mortality was 39.1%, mean age of study population was 17.2 years, and 87.5% were male.[2] Compared to this data, our patients were younger and fewer (57%) were male.

There are even less data on effective screening methods for the prevention of suicide. Most of the literature discusses how to identify individuals at risk of suicide as opposed to effectiveness of screening strategies.[2,7,22–25] Morken et al performed a systematic review that demonstrated a school-based screening program decreased suicide ideation in the short term and suicide attempts in the long term. In those children who screened positive, both developmental didactic therapy and group therapy were successful.[26] Over more time the screening interventions in our hospital will be able to be analyzed to determine the impact of the prevention strategies.

This study has several limitations. Although CT has lower rates of pediatric suicide deaths than the national rates and relatively stringent firearms laws, correlation does not prove causality. We reviewed descriptive statistics only, limited to a specific age range and cannot generalize this to the population. In addition, the screening questionnaire is newly implemented. More time is needed to determine if universal screening has led to an overall decrease in suicide deaths. The time period over which pediatric deaths were reviewed did not overlap with the time period the screening questionnaire was implemented. Future studies will monitor suicide rates as suicide screening continues to become more widespread.

Pediatric suicide is preventable. Many children's hospitals are facing behavioral health crises and increased suicide screening may help alleviate this burden. Overall, CT has a significantly lower rate of firearm suicide in the pediatric population compared to the national rate.[1,10]

We attribute this to CT's lethal means safety laws which limit childrens' access to firearms given that suicide rates in CT continue to increase and yet children in the state are choosing alternative methods of suicide. In other states, this may not be the case. Although the national data remain incomplete, individual states are capable of analyzing pediatric suicide rates and suicide means as one measure of childrens' access to lethal weapons.

Suicide is the third leading cause of death for children in CT, and hanging is the most common means. The authors are aware of no current prevention strategies in CT to specifically reduce the risk of suicide by hanging; however, our data reveals this to be an important area for future research and intervention. Further work is needed to develop strategies toward incorporating policies that lower the risk of suicide by hanging into lethal means safety counseling and identifying which mental health resources are most effective at lowering suicide risk.

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The Secret Ingredient to Caring for our Trainees: Community Connection

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ABSTRACT – In the spring of 2020, when many Yale-New Haven Hospital trainees were home recovering from COVID-19 and restaurants were closed, Meals4Healers was born in New Haven, Connecticut. The initial goals of Meals4Healers were multi-pronged: 1) provide nutritious meals to physicians-in-training quarantining or isolating due to COVID-19; 2) deliver empathy-focused messages with meals by community members for an extra layer of compassion; 3) support local New Haven restaurants who have been impacted by the pandemic; and 4) provide a safe way for community members to show their gratitude and make an immediate impact. The purpose of this perspective is to highlight the greatest lesson learned from our experience: the key to resident well-being is community connection.

Como Agua Para Chocolate by Laura Esquivel (and later the film *Like Water for Chocolate*) illustrates a deep connection between food and emotions. The lead character, Tita, quickly learns that how she feels when she whips up a meal in the kitchen evokes the same emotions in those who consume her meals. Whether it be sadness or passion, her meals are a means of communicating her emotions. With the spirit of this concept in mind and as we endured the unknown of the first surge of the COVID-19 pandemic, Meals4Healers (M4H) was born to communicate, through the delivery of meals and encouraging messages, a sense of connection among our community by nourishing healthcare workers on the frontline and supporting local restaurants.

In a matter of days in early 2020, COVID-19 transformed our healthcare system into an environment of uncertainty and worry – a recipe for negatively impacting the well-being of those on the frontline. Residents and other trainees were exposed and displaced because they were ill or, potentially, infectious. Not only did they feel ill, but they also felt isolated from their support systems, including their families, friends, and communities. At that time, the Centers for Disease Control and Prevention recommended a minimum of 14 days of isolating or quarantining. Therefore, a major challenge was how to ensure that those frontline workers who ended up in isolation retained a sense of connectedness. M4H aimed to enhance this sense of connection among trainees and their community.

In late March 2020, the M4H team delivered the first meals prepared by a local restaurant to trainees who were displaced due to exposure to or illness from COVID-19, offering connection in the form of nourishment along with messages of support. The health system and the neighboring community came together, offering generous monetary donations which had the positive side effect of not only taking care of the frontline workers, but also bolstering the neighborhood restaurants that were, like all across the world, suffering an economic crisis during this time. The community collectively rallied to coordinate services including volunteers delivering meals with thoughtful text messages, drafting notes of inspiration and one-pagers on relaxation techniques to include in a delivery bag, and organizations sponsoring virtual dance classes. In conjunction with M4H's efforts, resources were provided for how to access peer and professional support for mental health. The overarching message to the residents and trainees was: You are not alone, we are all in this together, and we are so grateful for your efforts.

Immediately, the outpouring of gratitude from trainees highlighted the value of what MH4 was providing. One trainee wrote: *"Dear Meals4Healers, during these difficult times, after a whole day of taking care of sick patients, I can't come back home to my family, some days are unbearable. Receiving meals from you is the best thing that happened to me since the beginning of this pandemic. I found a touch of beautiful kindness in the midst of disastrous circumstance. I want*

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you to know that what you do is greatly appreciated and much, much needed. You are fueling fighters; therefore, you are fighting with us. Thank you very much, each and every one of you."

To date, M4H has provided over 1500 meals and raised nearly $40,000 in charitable donations. During various surges of the pandemic, M4H has also assisted in coordinating large meal drops to hospital floors, meals for a virtual graduation celebration for outgoing Internal Medicine residents, gift baskets for chief residents, and more. The initiative recognized early the importance of simple and genuine expressions of gratitude for our trainees' commitment to put themselves in harm's way as a means to feeling connected and improving well-being – a critical aspect that has been highlighted in navigating the pandemic.[1]

Although there have been brief breaks in the need for M4H services when COVID-19 cases have declined, the need fluctuates mirroring rates of infection. In August 2021, M4H relaunched the delivery program in response to breakthrough cases due to the surge in the Delta variant and, more recently, cases due to the Omicron variant, with hospital numbers surpassing the figures from April 2020. While vaccinated frontline workers who become infected are generally experiencing mild symptoms, they still are required to isolate and they have limited reserves after an already challenging two years. This places an enormous toll on the well-being of our trainees as hospitals numbers are at capacity and there are shortages of frontline workers. It is no surprise that there is a devastating impact from COVID-19 on our frontline healthcare workers, including on their well-being. In a recently published study of healthcare workers in New York City, 48% screened positive for depressive symptoms, 57% for acute stress, and 33% for anxiety.[2] With frontline workers vulnerable to the detrimental effects of the pandemic on their mental health, there is a dire need to prioritize the well-being of those caring for our community and to protect our frontline workers.[3] Recognizing causes of distress can help organizations provide a targeted approach to care for trainees. Notably, trainees express the following requests from their organizations: hear me, protect me, prepare me, support me, and care for me.[4] To respond to trainees, M4H focuses on caring for frontline healthcare workers by creating a supportive safety net to help them to feel connected to and cared for by their community.

The pandemic has enhanced our commitment to centering the well-being of our trainees and the critical need to integrate resident well-being with a targeted focus in fostering connection into our educational training model. As another resident shared: *"Thank you to the Meal4Healers and the wonderful community members for providing me with love-filled meals as I was recovering. My heart is full from the kindness and the generosity you have shown. As I recover and prepare to go back to work, knowing that I am supported by the community, will keep me going."*

If there is a silver lining of the global COVID-19 pandemic, perhaps it is the opportunity to rethink our approaches to medical education with regard to intentionally fostering well-being among our trainees. Currently, the M4H initiative is supported by the Graduate Medical Education office at Yale New Haven Hospital with coordination from leadership. To launch this initiative, leadership understood and prioritized the value of this initiative, and their support was instrumental to maintain the spirit over the last two years. M4H has not been successful solely because it brings meals to those on the frontline; it is successful because, as the term "comfort food" implies, it uniquely targets what is most desired in times of isolation and stress – a sense of emotional connectedness.

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Emotional Intelligence – An Impactful and Often Overlooked Leadership Skill

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It is March 2020. It's 6:30 pm on Thursday evening and you are sitting in the middle of a department meeting being held on Zoom. You watch as colleagues become more and more impatient discussing who will be covering extra teaching attending and overnight call responsibilities due to concerns about attempts to minimize COVID exposure to those colleagues with risk factors that may portend a poor prognosis. The conversation becomes somewhat heated and you feel your impatience beginning to surface as there are other things that you feel could be more productive and efficient for you to be focusing on. Suddenly, you unmute yourself and blurt out, "I've got to go, this conversation is truly a waste of time." You press the "leave meeting" button.

Initially, you feel empowered and satisfied. You showed "them" how inefficient they are. My time is too valuable to waste on aimless conversations, you think to yourself. However, after a minute, you begin to reflect. What might the conversation on the call be focusing on now? Me? My actions? What is the emotional wake that I have just left behind? Did my frustration lead me to behave in a way that did not reflect the best version of myself? Maybe if I had paused, taken a deep breath, analyzed how I was feeling and why I was feeling that way, I could have moderated and expressed my response more effectively. Gosh, now I may have to do some damage control, you think. As you reflect, you realize that these types of actions or more accurately "reactions" will not help you accomplish your goals of making your colleagues function more efficiently and having your input viewed as collaborative and effective.

The concept of "feelings" is one that we don't address often in medicine. Emotions play an integral role in what makes all of us human. However, emotions often cloud our judgment, expose our vulnerabilities in ways we may not want them to, and ultimately lead us to express ourselves or act in ways we wish we hadn't.

The field of Emotional Intelligence (EI) has blossomed in recent years and is applicable to everyone and every industry. Originally defined by psychologists Peter Salovey and John Mayer in 1990, EI is "the ability to monitor one's own and others' feelings and emotions to discriminate among them and to use this information to guide one's thinking and actions."[1]

WHY EI?

Often suppressing or ignoring our emotions or feelings leads to unwanted outcomes and situations. A recent Gallup poll revealed that over 50% of employees are unengaged at work, and 13% report they are "miserable."[2] From 2016–2017, one in three students at US college campuses surveyed reported diagnosed mental health conditions.[3] The goal of EI is to allow us to accept our emotions, understand and regulate them so as to live healthier, more productive lives, and to make smarter choices and more impactful and constructive decisions.

Professor Marc Brackett, Director of the Yale University Center for Emotional Intelligence, is a pioneer in this field. The Center for Emotional Intelligence has a distinct goal: "To use the power of emotions to create a healthier and more equitable, innovative and compassionate society," states Dr. Brackett in his new thought provoking book *Permission to Feel*.

Imagine if all of us were able to give ourselves permission to feel any way we did, but then used that information in constructive ways to create better solutions to problems and become more effective resources for our patients, our colleagues, and ourselves. Data supports that this will lead to more personal and professional satisfaction, less job stress, less fatigue and burnout, and better quality care delivered.

It is difficult to accurately and specifically describe how one "feels" at any given moment. Often we respond when asked with words like "fine" or "good" or "OK." EI challenges individuals to dive deeper and try to recognize, understand, and label more specifically how one feels in response to any given stimulus or situation. By doing this, we learn to express ourselves more clearly to others while regulating our responses. This will ultimately lead to better professional and personal relationships and better collaboration, teamwork, and quality in our home lives and professional settings.

THE RULER METHODOLOGY

The tenets of the "RULER" Method, developed by Dr. Brackett, aim to help individuals recognize, understand, and label his/her emotions. By incorporating these reflective practices, one will hopefully be able to better express and regulate one's response. This RULER methodology has been validated in many settings, and is currently being implemented in school systems nationwide as part of a core curricular endeavor. The hope and goal of this implementation is that students, educators, and administrators will all subscribe to this methodology to create an environment that optimizes learning while recognizing individual challenges faced by teachers and students alike.

There is one simple question that many of us ask each other in passing every day. "How are you? How are you doing?" Paradoxically, we inquire with one another, but most times don't ever expect or desire an honest answer. We expect the reflexive, "Fine, how are you?" or "Great, thanks and you?" This is normal as we have an instinct not to show our vulnerability and admit that all might NOT be OK or great, as if it would reflect weakness or ineptitude. EI turns this notion on its head. Though it might be risky or inconvenient to share how we are truly feeling when asked, suppression of those feelings only makes them stronger and build up and affect all of our interactions and relationships. If we don't express our emotions, "They pile up like a debt that will eventually come due," states Dr. Brackett.

WHY FEELINGS MATTER

Our feelings matter most in the following ways. Our emotional state determines what we remember and how we learn. Emotions affect our decision making, as we perceive the world differently depending on the mood that we are in. A study evaluating teachers asked to recall a positive memory and then grade an exam, compared with teachers asked to recall a negative memory and asked to then grade the same exam, revealed that those who recalled negative memories graded the same test a full grade level lower. When these same educators were asked if they felt that their mood affected their evaluation of the papers, 87% said no.[4] This suggests that emotions subjectively affect our decision making and analytical skills.

Emotions affect our social relations and our mood, words, and nonverbal cues signal others to approach or avoid. Those with robust social networks enjoy better physical and mental health and data also suggests that those with more enhanced networks live longer. Emotions modulate our health through endorphin release and neurotransmitter release. Finally, emotions impact our creativity and performance levels. Positive emotions help to promote divergent thinking and creative problem solving which yields a positive feedback loop to promote happiness and feeling good.

EI IN YOUR LEADERSHIP TOOLBOX

Emotional intelligence enables individuals to think more honestly, creatively, and critically self-reflect in order to get better results from themselves and their colleagues. It doesn't allow feelings to impair that process, in fact, it restores balance to our thought processes and prevents emotions from having excessive influence over our actions.

Thus, if EI were part of one's leadership toolbox, the vignette at the beginning of this piece may have had a very different outcome. The physician described could have recognized and understood how s/he was feeling, labeled those emotions so as to disempower them and their ability to impair proper communication, and in turn allow for productive expression of one's opinion in a more tactful way. If medicine were to implement EI as part of a medical school or post-graduate training curricular pillar, this very well could help all colleagues enjoy more personal and professional satisfaction and assist with combatting the other pandemic we are presently facing, professional burnout.

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Time to Reform Blood Donation Policy

David S. Shapiro, MD, MHCM

In 2016, a shooting at the Pulse Nightclub in Orlando, Florida, resulted in 49 people dead and 58 injured. A massive shooting like this results in a variety of needs, and nearly always requires blood transfusions to save lives. I vividly recall queues around city blocks in Orlando with the willing ready to donate their precious blood to the local blood banks and assure the blood supply was there for those who needed it. Many were turned away – they were turned away from donating their valued commodity at a time when the need was highest.

Blood donation is a critical aspect of modern medicine that saves lives, but it's not without controversy. Among the most prominent and persistent controversies is the practice of excluding men who have sex with men (MSM) and gay men from donating blood. This practice, discussed by authors Mitali Vedula and Jane Keating in this issue, began in the early 1980s as a response to the HIV/AIDS epidemic and remains in place in many countries worldwide. Recent work from multiple authors, however, suggests that justification for this policy is weak, and it may actually be harmful to public health by reducing the overall blood supply and driving altruistic donors from the practice. Scientific evidence supporting a nondiscriminatory approach to blood donation supports the social and ethical implications of such a change.

It is crucial to consider the social implications the ban has imbued upon MSM and gay men. This practice is a form of institutionalized stigmatization that affects not only the individual donor but the broader LGBTQ+ community. LGBTQ+ individuals already express hesitation in seeking medical care because of a fear of discrimination, stigma, or violence. The current policy on MSM and gay men donating blood sends the message that the LGBTQ+ community is not valued, contributing to an already stigmatized and marginalized population.

The policy of excluding MSM and gay men from donating blood is based in trepidation, not truly evidence. In recent years, many countries have moved to reduce or eliminate this ban based on the latest scientific research. A 2020 systematic review of the literature, published in *The Lancet Haematology*, found that the risk of transfusion-transmissible infections, including HIV, Hepatitis B, and Hepatitis C, was not significantly different between MSM and heterosexual donors. The review also found that countries that had lifted or relaxed their MSM blood donation ban had not experienced an increase in blood-borne infections. Another study published in the same journal in 2021 analyzed the blood donation policy in the United Kingdom concluding that the risk of transmitting HIV through transfusions from MSM donors who had sex within the last three months was lower than previously estimated. These studies suggest that the current policy on MSM and gay men donating blood is based on outdated assumptions and that there is no scientific basis for excluding this population from donating blood.

The exclusion of MSM and gay men from donating blood has negative implications for the blood supply. As you already know, I'm a trauma surgeon – blood shortages dramatically affect our ability to conduct lifesaving elective surgery, but certainly cloud important decisions in the process of lifesaving emergent procedures in trauma, obstetrics, orthopedics, cardiac, and other systems-based surgery. Blood products are a precious and life-saving resource that must be available when needed. The exclusion of MSM and gay men from donating blood limits the pool of potential donors, leading to shortages in the blood supply. It is essential to ensure that blood donation policies are inclusive and that all individuals who are healthy and willing to donate blood can do so.

Finally, it is important to consider the ethical implications of blood donation restrictions. The World Health Organization states that all blood donations should be voluntary, non-remunerated, and anonymous.

The current policy on blood donation is not only discriminatory but also harmful to public health and the blood supply. It is essential to adopt a nondiscriminatory approach to blood donation that is based on evidence and reflects the principles of fairness and justice. This would not only improve the blood supply but also promote a more inclusive and equitable society. It is time for policymakers and the medical community to re-examine their assumptions and adopt a more inclusive approach to blood donation. Only then can we ensure that all patients have access to the life-saving blood products they need.

Readers, what you've just read is the product of an online artificial intelligence platform, asked to create a brief manuscript on the topic of blood donation from restricted populations. Though it pains me to say it, I did check the data with online and primary literature-based resources, and it is accurate, however the machine-like tone. The tambor of an AI-generated work notwithstanding, it's imperative that we, as the scientific and medical community, have a bit of scrutiny on what is truly an evidence based report and what is a collection of facts placed into a cadence that seems familiar by an algorithmic code. Recent events including an attorney citing cases – as precedent in court (sampled by an AI platform found to be nonexistent and therefore not precedent) – are frightening. AI may be the next big thing, but I'm concerned about its role in the human decision-making process that must somehow combine the logical and the factual with the emotional piece no machine has made to date.

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