Published in final edited form as:

J Trauma Acute Care Surg. 2015 May ; 78(5): 1026–1033. doi:10.1097/TA.0000000000000593.

Trauma Care Doesn't Discriminate: The Association of Race and Health Insurance with Mortality Following Traumatic Injury

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Abstract

Background—Previous studies have reported that black race and lack of health insurance coverage are associated with increased mortality following traumatic injury. However the association of race and insurance status with trauma outcomes has not been examined using contemporary, national, population-based data.

Methods—We used data from the National Inpatient Sample on 215,615 patients admitted to one of 836 hospitals following traumatic injury in 2010. We examined the effects of race and insurance coverage on mortality using two logistic regression models, one for patients aged <65 years and the other for older patients.

Results—Unadjusted mortality was low for white (2.71%), black (2.54%) and Hispanic (2.03%) patients. We found no difference in adjusted survival for non-elderly black patients compared to white patients (adjusted odds ratio [AOR] 1.04; 95% confidence interval [CI]: 0.90-1.19, $P=0.550$). Elderly black patients had a 25% lower odds of mortality compared to elderly white patients (AOR 0.75; 95% CI 0.63-0.90; $P=0.002$). After accounting for survivor bias insurance coverage was not associated with improved survival in younger patients (AOR 0.91; 95% CI: 0.77-1.07; $P=0.233$).

Conclusions—Black race is not associated with higher mortality following injury. Health insurance coverage is associated with lower mortality but this may be the result of hospitals' inability to quickly obtain insurance coverage for uninsured patients who die early in their hospital stay. Increasing insurance coverage may not improve survival for patients hospitalized following injury.

Level of Evidence—III, Prognostic.

Keywords

Race; Health Insurance; Mortality; Survivor Treatment Assignment Bias

Introduction

Racial disparities in health care outcomes in the United States have been extensively reported for many conditions, including lung cancer¹, head and neck cancer² and following cardiac arrest³. A recent meta-analysis⁴ concluded that black patients had substantially worse adjusted survival than whites following traumatic injury. Overall blacks have a life expectancy that is 6 years shorter than whites, and trauma accounts for nearly as much of this disparity as ischemic heart disease, stroke, and cancer combined⁵. The relationship between race and survival following trauma is complex, however, because white patients are much more likely to have health insurance than black or Hispanic patients⁶, and health insurance has been associated with improved survival for trauma patients⁴.

Previous studies examining black-white disparities in trauma mortality are nearly all based on a single convenience sample of trauma centers, the National Trauma Databank. No studies are based on contemporary national population-based data. Further, none of these studies accounts for the possibility that the association between insurance coverage and apparently improved outcomes is due to the inability of hospitals to obtain insurance coverage for uninsured trauma patients who die early in their hospital course. Our goal is to examine the association between race, insurance coverage and mortality in injured patients using a national population-based sample. Our findings may help policy makers better understand the potential impact on outcomes of expanding health care coverage to uninsured injured patients.

Methods

Data

The study is based on the Healthcare Cost and Utilization Project (HCUP) Nationwide Inpatient Sample (NIS), a 20% stratified sample of patients from nonfederal hospitals. The NIS includes information on patient demographics, race, insurance, admission source, ICD-9-CM diagnostic and injury codes, AHRQ comorbidity measures, in-hospital mortality, hospital characteristics, and hospital identifiers.

The study population consists of patients admitted with a principal ICD-9-CM diagnosis of trauma (800 -959.9), excluding patients with late effects of injury, foreign bodies, burns or complications of trauma. ICD-9 Ecodes were used to create 7 clinically relevant injury

mechanisms (gunshot wound, self-inflicted gunshot wound, low fall, motor vehicle crash, pedestrian injury, other blunt injuries, and stab wound). We excluded 53,955 patients with missing information on race as well as 6,776 patients whose survival status could not be determined because they were transferred to another hospital. The final study cohort consisted of 108,178 non-elderly (15 < age < 65) and 107,437 elderly patients (age ≥ 65) admitted to 836 hospitals.

Statistical Analysis

The outcome variable of interest was in-hospital mortality. Because elderly (age ≥ 64) and non-elderly (age < 65) trauma patients have very different risk and injury profiles we fit separate logistic regression models for each age group. We controlled for age, sex, traumatic shock (ICD-9 958.4), extent of anatomical injury (expressed as the logit of the probability of death computed using the Trauma Mortality Prediction Model⁷), mechanism of injury, 12 comorbidities, as well as the predictor of interest, race (white, black, Hispanic). Although we explored the role of insurance status in the non-elderly cohort, for reasons outlined below we excluded insurance status from our final models. We did not control for insurance status in the elderly patients since over 99% of the elderly patients were insured. Because four states provided no information on race and were excluded from our analysis we estimated all models without sample weighting. However, including sample weights changed our results minimally. We used clustered sandwich estimators⁸ to adjust for the correlation of outcomes within individual hospitals.

Our initial model for the young patient cohort indicated an improbably large effect of health insurance coverage on survival. We therefore explored the possibility of survivor treatment assignment bias (STAB)⁹, a well-recognized but often overlooked¹⁰ problem that can arise when a time dependent treatment is specified as if it is fixed at baseline. Considering insurance coverage as a treatment, time dependency is introduced by the efforts of hospital administrators to obtain insurance coverage for uninsured patients following hospital admission. As a result of such efforts, patients who die without insurance may die uninsured simply because early death prevented them from becoming insured. The risk for STAB for young trauma patients is substantial because both death and change in insurance status usually occur very early in patients' hospital stays: in our sample, two thirds of deaths occurred by the third hospital day and almost all patients who would ultimately be insured had been insured. (Figure 1)

In order to minimize survivor bias inherent to insurance status we imputed the insurance status of uninsured patients with hospital stays less than one day. Our imputation model predicted the probability of having health insurance at any time after the first hospital day using only predictors fixed prior to hospital admission (Supplementary Appendix). We used this model to impute insurance status for the 4,409 (4%) of patients with LOS less than one day, the group with the highest risk of STAB. We then included this imputed insurance status in our final mortality model to account for hospitals' frequent failure to find insurance coverage for initially uninsured patients within the first hospital day. In effect this procedure assigned these patients the insurance status they would have had if they had stayed in hospital longer than a single day, thus controlling for STAB. All statistical analysis was

performed using Stata/MP, version 13.1. The Institutional Review Board of the University of Vermont judged this research not to require review because it did not constitute human subject research.

Results

Non-elderly black patients had a higher mortality (2.39%) than non-elderly white patients (1.73%); this relationship was reversed in the elderly where that black race had a lower mortality (3.07%) than the white race (3.46%) (Tables 1 and 2). Non-elderly black patients were more likely to be uninsured than whites (29% vs. 16%). Less than one percent of elderly were uninsured. White patients were more likely to be admitted to small and to rural hospitals while black patients were more commonly admitted to urban hospitals and to teaching hospitals. (Table 3)

Among non-elderly patients, after adjusting for covariates black patients (adjusted odds ratio [AOR] 1.105; 95% confidence interval [CI]: 0.90-1.22, $P = 0.56$) and Hispanic patients (AOR 0.93; 95% CI: 0.73-1.19; $P = 0.55$) had similar risk of mortality compared to white patients. In patients age 65 or older, black patients had a 25% lower odds of mortality compared to white patients (AOR 0.75; 95% CI 0.63-0.90; $P = 0.002$), whereas Hispanic patients had similar risk of mortality compared to white patients. (Table 3).

We found that insurance status had no effect survival when we imputed insurance status for the 4,409 patients died or were discharged during the first 24 hours of their hospital stay (AOR 0.91; 95% CI: 0.77-1.07; $P = 0.233$). By contrast, insurance status was associated with better survival in our initial baseline model which did not account for survivor bias: (AOR 0.81; 95% CI: 0.68-0.93; $P = 0.005$).

Because our use of multiple imputation to control for STAB is novel we performed two confirmatory analyses. In the first we excluded the 4% of patients with length of stay < 1 day from our analysis because these patients were the most likely to be affected by STAB. A second confirmatory analysis examined the effect of insurance status at the time of admission rather than on discharge, thus allowing us to treat the time varying nature of insurance status as a measurement error problem. The results of both of these confirmatory analyses support our imputation analysis finding that the apparent effect of insurance on survival is largely or entirely due to STAB. (Supplementary Appendix)

Discussion

In this nationally representative sample of US hospitals we did not find evidence that either black race or Hispanic ethnicity was associated with worse outcomes in patients hospitalized with traumatic injuries. We also found no evidence that patients with health insurance were more likely to survive after accounting for the effects of survivor bias.

Our study is the first population-based national study with comprehensive risk adjustment to examine the association between race and mortality in injured patients. This result contradicts a number of previous studies reporting that blacks are more likely than whites to die following traumatic injuries^{11,12,13,14,15,16,17}. However since most of these studies are

based on a single dataset, the National Trauma Data Bank (NTDB), and rely on a single technique, logistic regression, their findings might be better thought of as replications of a single study. One study based on the NIS reported a black-white disparity in trauma outcomes, but this study¹² was based on data two decades old and had limited risk adjustment. More recently Glance¹⁸ used regional data limited to 28 trauma centers in Pennsylvania to examine the association of race and mortality, but their findings may not be generalizable outside of Pennsylvania or to non-trauma centers.

Our finding that elderly black trauma patients were more likely to survive compared to white patients was unexpected. Although this observation is based on only 5,024 black patients only 147 of whom died, the effect is highly significant and possibly large enough to be clinically important. This finding persisted after controlling for hospital effects, suggesting that this surprising finding is not the result of elderly black patients receiving care at hospitals with better outcomes. A recent study of the NIS using a different model reported a similar survival advantage of elderly black trauma patients over white patients¹⁹ and proposed a number of possible explanations, among them a reduction in treatment biases in older patients, or possibly a health survivor bias.

The association between health insurance coverage and improved survival following injury has been widely reported. In our baseline analysis we also found that health insurance was associated with improved survival. However we believe that this finding is an epiphenomenon, the result of an overlooked quirk of our health care system: Patients' insurance status is actually not fixed on admission but is instead recorded at discharge. To improve reimbursement most hospitals help uninsured patients become insured²⁰, a process that can take several days. As a result, patients who die early in their hospital course are more likely to die uninsured than are patients who survive longer simply because it takes time to insure the initially uninsured. This effect is particularly important in young patients hospitalized following injury who, if they are to die at all, usually die early in their hospital course. Thus it is early mortality that increases a patient's likelihood of being uninsured rather than the usual narrative that being uninsured increases mortality through some unspecified mechanism. The effect of this survivor treatment assignment bias is most appropriately addressed by including a time varying covariate in the prediction model²¹. However the hospital day on which insurance is obtained is not available in the NIS; only the patient's insurance status at the time of discharge or death is provided. It is not straightforward to compute the importance of survivor treatment assignment bias, but our novel use of imputation suggests that the efforts of hospitals to find insurance for initially uninsured patients may entirely account for the apparent survival advantage conferred by insurance reported by other investigators.

It may surprise some readers that our analysis of the NIS concludes that neither race nor insurance coverage affect survival following injury, a conclusion diametrically opposed to several previous analyses of the same questions in the NTDB. To such readers we offer two observations: First, the NIS is a stratified random sample of hospitals which allows inferences to be made to trauma care in the United States overall. The NTDB, by contrast, is a convenience sample that allows inferences only to be made to care at hospitals which contribute data to the NTDB. Because our interest centers on the effect of race and insurance

coverage on trauma outcomes in the United States as a whole we believe the NIS is the appropriate dataset for our analysis. A second observation we would offer is that we believe our conclusion that neither race nor insurance is associated with survival is actually not the result of using a different *dataset* (the NIS rather than of the NTDB), but rather the result of using a different statistical *model*. While the details of statistical models are often not reported by researchers, the many seemingly small decisions that statisticians make in the course of analyzing a dataset can profoundly affect, and even reverse, the ultimate conclusions offered. Our analysis of the NIS is a case in point. Our model differs in several important respects from those used in previous studies, but perhaps most importantly our models explicitly controlled for gunshot wound as a mechanism of injury and for shock on admission as a physiologic predictor of outcome. In a paper analyzing the NTDB, Millham and coworkers¹⁸ modeled the NTDB controlling explicitly for shock as a physiologic predictor and gunshot wound as a mechanism of injury and using this model conclude, as we do, that race is not a predictor of subsequent mortality in the NTDB. This suggests that it is the model, not the dataset, which is driving the difference in results. A second paper by Hicks and coworkers²⁰ models survival following injury in the *NIS without* explicitly controlling for gunshot wound or shock as predictors and concludes that black race *is* associated with higher mortality in patients under the age of 65. Again, this finding points to a difference in models rather than a difference in dataset causing disparate results. Taken together, these two papers make the case that it is a difference in statistical modeling rather than datasets that leads us to conclude that neither race nor insurance coverage are associated with survival following injury in the United States today.

Our study has several strengths. Because our analysis is based on a random sample of hospitals from almost all states our results are more likely to be representative of the country as a whole than the convenience samples used in earlier work, and because we used contemporary data we believe our results reflect the current relationship between race, insurance status, and survival. In addition, the models which we developed for this study had outstanding discrimination and very good calibration. (Supplemental Appendix)

Our study also has several potential limitations. Administrative datasets are subject to miscoding as well as under coding, errors that may result in incorrect estimates of injury severity. Additionally, administrative datasets lack important clinical predictors of mortality (e.g. admission systolic blood pressure). Although we were able to approximate this particular clinical predictor using an ICD-9 code (traumatic shock, 958.4), actual clinical data would have been preferable. Additionally, four states (MN, OH, WA, WV) did not provide information about race to the NIS, so our conclusions may not apply to these states. Finally, the NIS dataset did not allow us to address insurance status as the time varying covariate that it is. While we believe our use of imputed insurance status is a better solution to this problem than the more usual approach of treating insurance status as though it were fixed on admission, we acknowledge that an analysis based upon the actual date of insurance coverage might reach a different conclusion than ours.

In summary, we did not find evidence that black race is associated with higher mortality in a large nationally representative sample of patients hospitalized following injury. We also found no evidence that uninsured patients are more likely to die compared to insured

patients after adjusting for the effects of survivor bias. This latter result suggests that efforts to increase insurance coverage in young injured patients will not lead to improved survival. While there are many compelling reasons to provide health insurance for our citizens, improved survival following injury is not among them.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

The National Inpatient Sample dataset was provided by the Healthcare Cost and Utilization Project.

Research reported in this publication was supported by the National Institute On Minority Health And Health Disparities of the National Institutes of Health under Award Number R01MD006231.

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Figure 1. Proportion of patients who are uninsured (solid line) and proportion of total deaths (dashed line) as functions of length of hospital stay, until death or discharge.

Table 1

Characteristics of patients aged 16-65

	White	Black	Hispanic	Total
N	73,975 (68.4%)	18,277 (16.9%)	15,926 (14.7%)	108,178
Female	27,553 (37.3%)	4,908 (26.9%)	3,779 (23.7%)	36,240 (33.5%)
Age (Mean)	43.2	37.2	36.3	41.2
Length of stay	4.94	5.88	5.19	5.14
Uninsured	11,584 (15.6%)	5,208 (28.5%)	4,835 (30.4%)	21,591 (20.0%)
Payer				
Medicare	7,287 (9.9%)	1,458 (8.0%)	643 (4.0%)	9,398 (8.7%)
Medicaid	8,738 (11.8%)	4,416 (24.2%)	3,217 (20.2%)	16,371 (15.1%)
Private	38,149 (51.6%)	5,404 (29.6%)	4,031 (25.3%)	47,584 (44.0%)
Self-pay	10,858 (14.3%)	4,872 (26.7%)	4,461 (28.0%)	19,918 (18.4%)
No charge	936 (1.3%)	336 (1.8%)	374 (2.4%)	1,673 (1.6%)
Other	8,253 (11.2%)	1,781 (9.7%)	3,200 (20.1%)	13,234 (12.2%)
Comorbidity				
AIDS	121 (0.16%)	119 (0.65%)	50 (0.13%)	290 (0.27%)
Congestive heart failure	1,129 (1.53%)	309 (1.69%)	93 (0.58%)	1,531 (1.42%)
Chronic lung disease	7,460 (10.08%)	1,644 (8.99%)	733 (4.60%)	9,837 (9.09%)
Coagulopathy	2,193 (2.96%)	466 (2.55%)	375 (2.35%)	3,034 (2.80%)
Liver disease	1,707 (2.31%)	249 (1.36%)	283 (1.78%)	2,239 (2.07%)
Electrolyte disorder	8,545 (11.55%)	2,032 (11.12%)	1,468 (9.22%)	12,045 (11.13%)
Metastatic cancer	242 (0.33%)	32 (0.18%)	21 (0.13%)	295 (0.27%)
Perivascular disease	1,064 (1.44%)	209 (1.14%)	125 (0.78%)	1,398 (1.29%)
Pulmonary circulatory disease	564 (0.76%)	142 (0.78%)	86 (0.54%)	792 (0.73%)
Renal failure	1,439 (1.95%)	519 (2.84%)	247 (1.55%)	2,205 (2.04%)
Tumor without metastasis	281 (0.38%)	43 (0.24%)	19 (0.12%)	343 (0.32%)
Weight loss	1,747 (2.36%)	492 (2.69%)	237 (1.49%)	2,487 (2.29%)
Mechanism				
Blunt	38,574 (52.1%)	8,373 (45.8%)	8,406 (52.8%)	55,353 (51.2%)
Gunshot wound	1,095 (1.5%)	2,909 (15.9%)	944 (5.9%)	4,948 (4.6%)
Gunshot wound (self-inflicted)	394 (0.5%)	182 (1.0%)	49 (0.3%)	625 (0.6%)
Low fall	10,643 (14.4%)	1,602 (8.8%)	1,447 (9.1%)	13,692 (12.7%)
Motor vehicle crash	14,367 (19.4%)	3,214 (17.6%)	3,037 (19.1%)	20,618 (19.1%)
Pedestrian trauma	7,836 (10.6%)	1,654 (9.1%)	1,542 (9.7%)	1,910 (1.8%)
Stab wound	1,066 (1.4%)	343 (1.9%)	501 (3.2%)	1,910 (1.8%)

Table 2

Characteristics of patients aged >64

	White	Black	Hispanic	Total
N	96,750 (90.1%)	5,180 (4.8%)	5,507 (5.1%)	107,437
Female	67,130 (69.4%)	3,327 (64.2%)	3,596 (65.3%)	74,053 (68.9%)
Age (Mean)	81.39	79.06	79.37	81.18
Length of stay	5.27	6.28	5.75	5.35
Uninsured	485 (0.5%)	85 (1.6%)	185 (2.9%)	728 (0.68%)
Payer				
Medicare	85,422 (88.3%)	4,285 (82.7%)	4,253 (77.2%)	93,960 (87.5%)
Medicaid	707 (0.7%)	112 (2.2%)	372 (6.8%)	1,191 (1.1%)
Private	8,883 (9.2%)	635 (12.3%)	613 (11.1%)	10,131 (9.4%)
Self-pay	437 (0.5%)	79 (1.5%)	147 (2.7%)	663 (0.6%)
No charge	48 (0.05%)	6 (0.12%)	11 (0.20)	65 (0.06%)
Other	1,253 (1.3%)	63 (1.22%)	111 (2.02%)	1,427 (1.33%)
Comorbidity				
AIDS	18 (0.02%)	6 (0.12%)	2 (0.04%)	26 (0.02%)
Congestive heart failure	13,883 (14.3%)	720 (13.9%)	621 (11.3%)	15,224 (14.2%)
Chronic lung disease	18,776 (19.4%)	795 (15.4)	836 (15.2%)	20,407 (19.0%)
Coagulopathy	5,230 (5.4%)	285 (5.5%)	308 (5.6%)	5,823 (5.4%)
Liver disease	932 (1.0%)	72 (1.4%)	124 (2.3%)	1,128 (1.1%)
Electrolyte disorder	24,127 (25.0%)	1,282 (24.8)	1,314 (23.9)	26,723 (24.9)
Metastatic cancer	985 (1.0%)	51 (1.0%)	54 (1.0%)	1,090 (1.0%)
Perivascular disease	6,122 (6.33%)	359 (6.9%)	299 (5.4%)	6,780 (6.3)
Pulmonary circulatory disease	3,553 (3.7%)	191 (3.7%)	140 (2.5%)	3,884 (3.6%)
Renal failure	11,701 (12.0%)	1,072 (20.7%)	746 (13.6%)	13,519 (12.6%)
Tumor without metastasis	1,575 (1.6%)	112 (2.2%)	70 (1.3%)	1,757 (1.6%)
Weight loss	4,101 (4.2%)	285 (5.5%)	195 (3.5%)	4,581 (4.3%)
Mechanism				
Blunt	50,680 (52.4)	2,781 (53.7)	2,787 (50.3)	55,353 (51.2%)
Gunshot wound	75 (0.08%)	26 (0.50)	5 90.09%)	106 (0.10)
Gunshot wound (self-inflicted)	74 (0.08%)	8 (0.15%)	3 (0.05%)	85 (0.08%)
Low fall	40,618 (42.0%)	1,912 (36.9%)	2,262 (41.1%)	44,792 (41.7%)
Motor vehicle crash	4,144 (4.3%)	321 (6.2%)	305 (5.5%)	4,770 (4.4%)
Pedestrian trauma	996 (1.0%)	118 (2.3%)	150 (2.7%)	1,264 (1.2%)
Stab wound	163 (0.2%)	14 (0.3%)	14 (0.3%)	191 (0.2%)

Table 3**Hospital Characteristics**

	White	Black	Hispanic	Total
Location				
Rural	21,597 (12.7)	970 (4.1)	1,099 (5.1)	23,666 (11.0)
Urban	145,027 (85.0)	21,776 (92.8)	19,999(93.3)	186,802 (86.6)
Unknown	4,101 (2.4)	711 (3.0%)	335 1.6%)	5,147 (2.4)
Hospital size				
Small	17,563 (10.3)	1,088 (4.6)	1,389 (6.5)	20,040 (9.3)
Medium	37,017 (21.7)	4,346 (18.5)	3,906(18.2)	45,269 (21.0)
Large	112,044 (65.6)	17,312 (73.8)	15,803(73.7)	145,159 (67.3)
Unknown	4,101 (2.4)	711 (3.0)	335 (1.6)	5,147 (2.4)
Teaching status				
Teaching	82,592 (48.4)	17,659 (75.3)	12,781(59.6)	113,032 (52.4)
Nonteaching	84,032 (49.2)	5,087 (21.7)	8,317(38.8)	97,436 (45.2)
Geographic region				
Northeast	36,509 (21.4)	6,653 (28.4)	3,664(17.1)	46,826 (21.7)
South	70,268 (41.2)	11,324 (48.3)	7,551(35.2)	89,161 (41.4)
Mid-West	31,143 (18.2)	3,546 (15.1)	1,365 (6.4)	36,054 (16.7)
West	32,787 (19.2%)	1,934 (8.2)	8,853(41.3)	43,574 (20.2)

Table 4

Logistic Mortality Model for Young Patients (Aged 15 to 64).

Died	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Race						
black	0.044215	0.078467	0.56	0.573	−0.10958	0.198006
Hispanic	−0.07135	0.127728	−0.56	0.576	−0.32169	0.178994
tmpm	1.093017	0.023319	46.87	0	1.047313	1.138721
age_cubed	0.003405	0.000388	8.78	0	0.002645	0.004165
female	−0.1701	0.052703	−3.23	0.001	−0.27339	−0.0668
shock	1.267253	0.119979	10.56	0	1.032099	1.502406
Mechanism						
gsw	1.00004	0.109899	9.1	0	0.784642	1.215439
gsw_suicide	2.301176	0.131011	17.56	0	2.0444	2.557953
low_fall	−0.25369	0.130667	−1.94	0.052	−0.50979	0.002414
mvc	0.033061	0.078994	0.42	0.676	−0.12177	0.187886
ped	0.330151	0.081035	4.07	0	0.171326	0.488976
stab	−1.50146	1.023311	−1.47	0.142	−3.50711	0.504195
Comorbidity						
CM_AIDS	1.143439	0.282672	4.05	0	0.589411	1.697466
CM_CHF	0.883181	0.176471	5	0	0.537305	1.229058
CM_CHRNLUNG	−0.34719	0.130588	−2.66	0.008	−0.60313	−0.09124
CM_COAG	1.084424	0.099851	10.86	0	0.888719	1.280128
CM_LIVER	0.897533	0.128884	6.96	0	0.644925	1.150141
CM_LYTES	0.428118	0.077048	5.56	0	0.277107	0.579129
CM_METS	1.815436	0.251919	7.21	0	1.321684	2.309189
CM_PERIVASC	0.393444	0.169066	2.33	0.02	0.062081	0.724807
CM_PULMCIRC	0.467698	0.227137	2.06	0.039	0.022518	0.912878
CM_RENLFAIL	0.861067	0.147915	5.82	0	0.57116	1.150974
CM_TUMOR	0.948488	0.369524	2.57	0.01	0.224235	1.672742
CM_WGHTLOSS	−0.76369	0.148471	−5.14	0	−1.05468	−0.47269
_cons	−1.31034	0.078589	−16.67	0	−1.46438	−1.15631

Note that neither black nor Hispanic race is significantly associated with mortality (p-values > >0.05) compared to the reference group, white patients.

Table 5

Logistic Mortality Model for Patients Aged 65 and over.

	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Race						
black	-0.28991	0.089722	-3.23	0.001	-0.46577	-0.11406
Hispanic	-0.08506	0.084584	-1.01	0.315	-0.25085	0.080718
tmpm	0.964038	0.016399	58.78	0	0.931896	0.996181
age_ln	3.462618	0.191101	18.12	0	3.088067	3.837169
female	-0.59761	0.037164	-16.08	0	-0.67045	-0.52477
shock	1.863622	0.133345	13.98	0	1.60227	2.124973
Mechanism						
gsw	0.828997	0.353678	2.34	0.019	0.135801	1.522192
gsw_suicide	1.773806	0.282302	6.28	0	1.220504	2.327108
low_fall	-0.24002	0.039483	-6.08	0	-0.31741	-0.16264
mvc	0.008207	0.076642	0.11	0.915	-0.14201	0.158422
ped	0.174122	0.129817	1.34	0.18	-0.08032	0.428559
Comorbidity						
CM_AIDS	0.363656	1.047107	0.35	0.728	-1.68864	2.415947
CM_CHF	0.617823	0.043758	14.12	0	0.532059	0.703586
CM_CHRNLUNG	0.297296	0.04385	6.78	0	0.211353	0.38324
CM_COAG	0.36039	0.061155	5.89	0	0.240527	0.480252
CM_LIVER	0.776638	0.131465	5.91	0	0.518971	1.034305
CM_LYTES	0.369904	0.038397	9.63	0	0.294648	0.44516
CM_METS	0.965557	0.117581	8.21	0	0.735103	1.196011
CM_PERIVASC	0.116318	0.066314	1.75	0.079	-0.01365	0.246291
CM_PULMCIRC	0.642636	0.070194	9.16	0	0.505057	0.780214
CM_RENLFAIL	0.292098	0.048183	6.06	0	0.197661	0.386534
CM_TUMOR	0.262524	0.119354	2.2	0.028	0.028594	0.496453
CM_WGHTLOSS	0.457513	0.063302	7.23	0	0.333443	0.581583
_cons	0.164293	0.061206	2.68	0.007	0.044331	0.284254

Note that black race is significantly (p-value <0.001) associated with lower mortality (negative coefficient) compared to white patients, the reference group.