UC Davis
UC Davis Previously Published Works

Title

Racial And Socioeconomic Differences Affect Outcomes in Elderly Burn Patients

Permalink

Journal

ISSN

Authors

Romanowski, Kathleen S
Zhou, Yunshu
Ten Eyck, Patrick
et al.

Publication Date

DOI

Peer reviewed

Racial And Socioeconomic Differences Affect Outcomes in Elderly Burn Patients

Kathleen S. Romanowski[a,*], **Yunshu Zhou**[b], **Patrick Ten Eyck**[b], **Anthony Baldea**[c], **James J. Gallagher**[d], **Colette Galet**[a], **Yuk Ming Liu**[a,1]

[a]Acute Care Surgery Division, Department of Surgery, University of Iowa, Iowa City, Iowa, United States

[b]Institute for Clinical and Translational Science, University of Iowa, Iowa City, Iowa, United States

[c]Loyola University Chicago, Department of Surgery, Maywood, Illinois, United States

[d]Weill Cornell Medicine, Department of Surgery, New York, New York, United States

Abstract

Background: Race and socioeconomic status influence outcomes for adult and pediatric burn patients, yet the impact of these factors on elderly patients (Medicare eligible, 65 years of age) remains unknown.

Methods: Data pooled from three verified burn centers from 2004 to 2014 were reviewed retrospectively. Age, race, gender, percent total body surface area (%TBSA) burn, mortality, length of stay (LOS), LOS per %TBSA burn, and zip code which provided Census data on race, poverty, and education levels within a community were collected. Data were analyzed using logistic and generalized linear models in SAS version 9.4 (SAS Institute, Cary, NC, USA).

Results: Our population was mainly Caucasian (63%), African American (18%), Hispanic (7.6%), and Asian (3.5%). Mean age was 76.3 ± 8.3 years, 52.5% were male. Mean %TBSA was $9 \pm 13.8\%$; 15% of the patients sustained an inhalation injury. The mortality rate was 14.4%. Inhalation injury was significantly associated with mortality and discharge to a skilled nursing facility (SNF) ($p < 0.05$). Race was significantly associated with socioeconomic disparities and affected LOS/TBSA, but not discharge to SNF or mortality on univariate analysis. Poverty level,

*Corresponding author. Present address: Shriners Hospitals for Children Northern California, 2425 Stockton Blvd. Suite 718, Sacramento, CA 95817, United States. ksromanowski@ucavis.edu (K.S. Romanowski).
[1]Present address: Loyola University Chicago, Department of Surgery, Chicago, Illinois.

education level, and insurance status (others vs. public) independently predicted SNF discharge, while median income and insurance type independently predicted LOS/TBSA.

Conclusion: In this elderly cohort, race did not predict standard markers of burn outcome (mortality and discharge to SNF). Socioeconomic status independently predicted LOS and discharge to SNF, suggesting a relationship between socioeconomic status and recovery from a burn injury. Better understanding of racial and socioeconomic disparities is necessary to provide equitable treatment of all patients.

Keywords

Burn; older adults; socioeconomic status; race

1. INTRODUCTION

The publication of Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care in 2003 led medical providers to become increasingly aware of outcome discrepancies for minority groups when compared to Caucasian patients [1]. Though greater attention has been paid to the healthcare experiences of minority patients, the surgical world continues to fail to fully recognize the specific ways in which socioeconomic and racial differences truly impact patients [1–6]. The National Burn Repository (NBR) has allowed for an analysis of outcomes in patients of different racial backgrounds and has allowed us to begin to recognize some patterns of racial and socioeconomic differences [7,8]. Despite interest in the effect of race and social determinants of health in general, the impact of these effects on an older adult population has not been studied. The lack of research on race and social determinants of health in older adult patients may be in part due to the assumption that they are able to obtain insurance through Medicare, mitigating the effects of race and social status. However, research suggests that disparities persist despite insurance coverage [9].

While studies utilizing the NBR highlighted issues surrounding race, there are some limitations imposed by this pooled data, which may be overcome by center-specific data analysis [9–11]. Specifically, data obtained from the NBR de-identifies a patient's zip code. This piece of information can act as a surrogate marker for the general socioeconomic climate in which our patients live, but not necessarily for each patient's individual circumstance [12–15]. Factors related to education and poverty can be reflected by zip code and, though the United States as a whole is racially diverse, historical echoes of racial segregation, immigration patterns, and wealth gaps can be observed by analyzing different neighborhoods within a larger community [16]. Though always dynamic and impacted by phenomena like gentrification and urban sprawl, zip code can provide a wealth of information about the financial and education status of a particular area [12,16]. These factors may play a role in the recovery of an older patient with burn injury.

Based on this hypothesis, we sought to assess the impact of socioeconomic and racial disparities on burn injury outcomes in older adults from three American Burn Association (ABA) verified burn centers. We hypothesized that, despite access to insurance through Medicare, race and socioeconomic status contribute to outcomes following burn injury in the older population.

2. MATERIALS AND METHODS

2.1. Study design

This retrospective multi-institutional study was approved by the University of Iowa Institutional Review Board (IRB # 201602841). Data from three American Burn Association (ABA) verified centers, namely University of Iowa hospital and clinics (UIHC), Loyola University Medical Center (LUMC), and Weill Cornell Medicine (WUMC) were pulled. Data were collected on all burn patients admitted between January 2004 and December 2014 at each burn center. De-identified data on patients 65 and older were compiled and analyzed in this study. This study follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines for cross-sectional studies.

2.2. Data Collection

The following variables were collected from the electronic medical record and/or the burn registry at each institution: Age, race, gender, percentage of total burned surface area (% TBSA), length of hospital stay (LOS), LOS per %TBSA burn (LOS/TBSA), %3rd degree, %2nd degree, inhalation injury, ventilator days, intensive care unit LOS, number of operations, discharge disposition (specifically discharge to a skilled nursing facility (SNF)), comorbidities, in-hospital mortality, insurance status, and zip code which provided Census data on race, poverty, and education levels within a community.

2.3. Statistical analysis

Descriptive statistics were obtained. Differences between centers were assessed using Chi-square and ANOVA tests using SPSS 25.0 (IBM, Chicago, IL). Additional statistical analysis was performed using SAS 9.4 (SAS Institute, Cary, NC, USA).We employed the generalized linear modeling (GLM) framework for our analyses, which allowed us to examine the relationship between our fixed effect predictor variables and the outcomes (mortality, LOS, LOS/TBSA, and discharge to a SNF). These predictors are patient-level variables, including age, gender, race, primary payor, having an ED visit as well as census tract level data: % individuals below poverty level, % High school grade or higher (5 y average), and median household income. Each predictor-outcome combination was initially evaluated using univariate comparisons. Multivariate models were then fit with interactions between race and the predictor of interest to assess if the relationship varied by race. p-Values <0.05 were considered significant.

3. RESULTS

3.1. Patient characteristics

Our population characteristics are presented in Table 1. Our population was mainly Caucasian (63%), African American (18%), Hispanic (7.6%), and Asian (3.5%). Mean age was 76.3 ± 8.3 years, 52.5% were male. Mean %TBSA was 9 ± 13.8%; 15% of the patients sustained an inhalation injury. The mortality rate was 14.4%. Of those who died, 69 patients died within the first 72 hours of admission (6.5% of the total population and 45.1% of those who died) suggesting possible withdrawal or withholding of care. On univariate analysis,

inhalation injury was significantly associated with mortality (OR = 5.86 [3.78–9.10]; p < 0.001) and discharge to a skilled nursing facility (SNF) (OR = 2.22 [1.31–3.76]; p = 0.003).

As shown in Table 1, significant differences were observed between the three ABA verified burn centers. Patients admitted to UIHC burn center were more likely to be male and Caucasian compared to those admitted at LUMC and WCMC. Although not significant, the average age of the UIHC population was the lowest of the three centers. While mean % TBSA was lower at WCMC than that at UIHC and LUMC, hospital length of stay was longer. Fewer patients at LUMC underwent surgery when compared with UIHC and WCMC. The number of patients with inhalation injury was higher at LUMC than at UIHC or WCMC.

Socio-economic information is presented in Table 2. Based on ZIP codes, the mean value for median income of the community in which our patients lived was $61,100. However, the mean value for median income of patients admitted at UIHC was significantly lower than that of patients admitted at LUMC or WCMC. The average percentage of individuals living under the poverty level was 15%, with that of WCMC being higher than that of UIHC and LUMC. The percentage of individuals with a high school degree or higher education was 86.2%, with that of UIHC being significantly higher than that of LUMC or WCMC. Medicare was the primary payer for 76.9% of our population. However, a significant difference was observed between centers with only 56.3% of UIHC patients on Medicare compared to 83% at LUMC and WCMC.

3.2. Race and ethnicity affect socio-economics and burn outcomes

In our population, race was significantly associated with socioeconomic disparities based on zip code where the patient resided. The median income of African Americans and Hispanics was significantly less than that of Caucasians ($14,316 and $5540 less; p < 0.001 and p = 0.03, respectively). African Americans, Asians, and Hispanics were 6.7, 7.1, and 9.25 times less likely to obtain a high school degree or higher education, respectively, (p < 0.001) and 9.3, 3.9, and 6.9 times more likely to live below the poverty level, respectively (p < 0.001, p = 0.017, and p < 0.001, respectively). Additionally, race and ethnicity affected, LOS, TBSA, and the resulting LOS/TBSA. LOS of African American and Hispanic patients was 34% and 18% higher than that of Caucasian patients, respectively (p = 0.0016). Inversely, TBSA was 29% and 38% less than that of Caucasian patients, respectively (p < 0.001). As a result, the corrected LOS/TBSA of African American and Hispanic patients was 0.66 times higher than that of Caucasian patients (p < 0.001). Race and ethnicity did not affect discharge to SNF and mortality on univariate analysis (data not shown).

3.3. Socio-economic status independently predicts burn outcomes

Poverty level independently predicted LOS and SNF discharge, but not mortality. A 1% increase in poverty level was associated with a 2% increase in hospital length of stay (p = 0.004) and a 4% increased risk/chance of being discharge to SNF (OR = 1.04 [1.01–1.07]; p = 0.003). Education level also independently predicted LOS and SNF discharge, but not mortality. A 1% increase in the proportion of individual with a high school degree or higher education was associated with a 1.45% reduction in LOS and a 2% decreased

risk/chance of being discharged to SNF (OR = 0.98 [0.96–1.0]; p = 0.045). Insurance status (others vs. public) independently predicted LOS/TBSA and SNF discharge. As expected, younger elderly patients were 5.5 times more likely than older elderly patients to have other insurance than public insurance (p < 0.001). LOS/TBSA is 48% higher for those with public insurance compared to other (p < 0.01). Patients on other insurance were less likely to be discharged to SNF (OR = 0.47 [0.23–0.97]; p = 0.04).

Median income independently predicted LOS/TBSA (p = 0.0019). An interaction between median income and race was observed. As median income increases by $10,000, the mean LOS/TBSA of Caucasian patients increased by 5.5% (p = 0.0079), while it would decrease by 5.75% for African Americans (p = 0.0113).

4.   DISCUSSION

In this study, we show that, for older burn patients, race and ethnicity are associated with socioeconomic disparities and with LOS, TBSA, and the resulting LOS/TBSA, but not with discharge disposition or mortality. Socioeconomic status was an independent predictor of burn outcomes. In fact, poverty and education levels predicted LOS and discharge disposition to SNF, while median income was associated with LOS/TBSA and insurance status predicted LOS/TBSA and discharge to SNF.

To examine the effects of racial and socioeconomic make up on burn outcomes, we chose three ABA verified Burn Centers, which represent different geographic areas to examine the effects of racial and socioeconomic factors on burn outcomes in the older burn population. UIHC is a tertiary referral center that serves a small city as well as a significant rural population. The racial make-up of the area is approximately 78.5% Caucasian, which differs vastly from the populations of the other two burn centers (49.4% in Chicago and 42.6% in New York City) [17]. Our data show a similar distribution (Table 1). While unclear, the reason for the increased proportion of men in the UIHC population could be related to patient age or gender-related activities. Data from the National Burn Repository shows that the proportion of men with burn injuries decreases consistently from 70% at age 50–59.9 to 43% in patients over 89 years old [18].

In addition to the racial and sex difference between the centers, burn size (TBSA) was significantly different between centers with smaller burns at WCMC than at the two other centers. Despite smaller burns, WCMC patients remained in the hospital longer (Table 1). Difference in burn size and LOS could be due to a combination of factors, including differences in burn depth (as indicated by the fact that more patients underwent surgery), patient socioeconomic characteristics, or physician practice patterns that lead to admitting smaller burns, and discharge practices that are different from the other two burn centers. The socioeconomic status of the patients also differed by burn center. The average percentage of individuals living under the poverty level was higher at WCMC than that at UIHC and LUMC (Table 1), which could also potentially influence multiple factors related to patient care, including need for admission to the hospital, length of stay, and discharge disposition.

Despite these differences between centers and between the characteristics of the patients treated at each center, there was no difference in mortality rate at each hospital. In fact, race and socioeconomic status did not affect mortality in our population either; inhalation injury and TBSA were the only factors associated with in-hospital mortality. This finding differs from that of other studies. Others observed a 37–57% increase in mortality in African American patients [7,19,20]. These studies, however, did not specifically examine a population of older adults nor did they perform a subgroup analysis for this population. The lack of effect on mortality in our study may be secondary to the elderly population we examined or linked to the use of data from three centers rather than that of a nationwide dataset. Our results suggest that the NBR should be examined to determine if the racial disparities noted in the full data set are present in older adults.

In our population, race/ethnicity was associated with income and education levels. We found that being African American and/or Hispanic was significantly associated with living in an area with lower median income, and being African American, Hispanic, and/or Asian was associated with living in area with decreased education attainment and increased poverty when compared to Caucasian patients. Yet, no differences in mortality or SNF discharge were observed based on race. This distinction is important as, traditionally, this is how the impact of race on burn recovery has been examined [7,19,20]. Regardless, our data support the impact of race/ethnicity on burn recovery as we showed that African American and Hispanic patients stayed in the hospital longer per percent body surface area burned.

The interactions observed in our study between race, socioeconomic status, and healthcare are similar to those described in other studies examining race, socioeconomic status, and health, highlighting the complex interaction between these three entities [21]. In the older burn population, race seems to play a lesser role in outcomes than what was described in other studies looking at the overall population; yet, they still experience disparities [7,19,20,22]. Prior studies using the NBR could not truly evaluate socioeconomic status as the only socioeconomic marker included in the database is insurance status [7,19]. In examining insurance status, Bedri et al. demonstrated that the uninsured had higher mortality, longer LOS, higher hospital charges, and increased infections [7]. However, Murphy et al. showed that the racial disparities in outcomes persisted even in those who had private insurance [9]. In this study, patients with public insurance as their primary payor (Medicare or Medicaid) had longer LOS/TBSA and were less likely to be discharged to a SNF compared to patients who had other types of insurance or no insurance.

One of the novel aspect of our study was its ability to examine the effects of socioeconomic disparities on outcomes in older adults following burn injury. Increased poverty level and decreased educational level of the older adults were independently associated with increased LOS and increased chance of being discharged to a SNF. In a single center study, Doctor et al. also found that socioeconomic status was a predictor of burn outcomes, graft take, and readmissions, but they did not examine outcome measures such as mortality, length of stay, and discharge disposition [22]. These observations raises the need to address issues related to socioeconomic status at a granular level in terms of access to ancillary services and supportive care contributing to the increased LOS and increased discharge to SNF.

This study presents a number of limitations. First and foremost, it is retrospective in nature and spans ten years, during which practice patterns may have changed, impacting burn injury management and outcomes such as LOS, LOS/TBSA, and mortality. Additionally, these factors made us unable to determine the circumstances that led to patient deaths (withdrawal or withholding of care vs. nature of burn injury) which could have affect outcomes and could be influenced by race or socioeconomic factors. The retrospective nature also means that we depended on zip code data to examine socioeconomic differences. The socioeconomic data is reflective of the area where the patient lives, but may not reflect each individual situation. Correlations between outcomes and socioeconomic status might have been different if we had gathered the information directly from the patient. For this study, we utilized aggregate zip code data, not age specific data which may be different, especially in the elderly. Some data suggest that zip code data, especially with respect to poverty, under-estimates the problem in elderly patients [23]. Unfortunately, not all zip codes had data for patient's 65 and older. Given that age specific data was not available for all zip codes and the fact that we are not aware of our patients actual socioeconomic situation, we elected to use what is likely the most conservative estimate and use the aggregate zip code data for poverty, median income and level of education. Additionally, though focusing on data from three burn centers carries the advantage of zip code analysis, the populations of these centers are predominantly urban or suburban with a subset of patients hailing from more rural areas. While data from the catchment areas of these three burn centers helps to ensure increased racial and socioeconomic diversity, it may not be completely generalizable across the United States. Several existing studies have demonstrated outcome discrepancies between rural and urban trauma patients [24,25]. Specifically, mortality is worse for rural trauma patients [25]. There are also outcome differences for rural versus urban burn patients with regard to longer length of stay [24]. Regional differences do exist and it is important to consider this prior to clinical application.

Despite these limitations, this is an important study as it is the first to examine the socioeconomic disparities of older adult burn patients. In this study, mortality of older adults was associated with burn characteristics rather than with race or socioeconomic status. However, expanding our analysis beyond survival showed that race and socioeconomic status influence older adults' hospital length of stay and socioeconomic status influences discharge to SNF. In fact, our data shows that poor socioeconomic factors were associated with worse outcomes. As we care for these older patients, a better understanding of social determinants of health may be useful in making informed medical decisions. Future studies should include data on socioeconomic status and social determinants of health in this age group. Knowing that these patients are at risk for long hospital stays and unable to be discharged home would allow us to better communicate and engage with our social service colleagues to plan for their aftercare.

5. CONCLUSIONS

The interaction between race, socioeconomic status, and health in an older adult burn population is complex. In our examination of these factors, it appears that mortality in older burn patients is largely governed by factors related to the burn, while outcomes measures such as LOS and discharge disposition are significantly influenced by socioeconomic

factors. In this study, socioeconomic disparities, rather than race, are independent drivers of outcomes in older adults. Going forward, we must work to mitigate the effects of socioeconomic disparities in older adults through the use of social work and discharge planning to make sure that patients are receiving all of the support that can be offered. Additionally, we should focus our prevention efforts to reduce rates of burn injuries in our most vulnerable patients: the elderly and the poor.

Funding

REFERENCES

[1]. Smedley BD, Stith AY, Nelson AR, editors. Institute of medicine (US) committee on understanding and eliminating racial and ethnic disparities in health care. Unequal treatment: Confronting racial and ethnic disparities in health care. Washington (DC): National Academies Press (US); 2003.

[2]. Britton BV, Nagarajan N, Zogg CK, Selvarajah S, Schupper AJ, Kironji AG, et al.Awareness of racial/ethnic disparities in surgical outcomes and care: factors affecting acknowledgment and action. Am J Surg2016;212(1)102–8 e2. [PubMed: 26522774]

[3]. Haider AH, Chang DC, Efron DT, Haut ER, Crandall M, Cornwell EE 3rd. Race and insurance status as risk factors for trauma mortality. Arch Surg2008;143(10):945–9. [PubMed: 18936372]

[4]. Haider AH, Scott VK, Rehman KA, Velopulos C, Bentley JM, Cornwell EE 3rd, et al.Racial disparities in surgical care and outcomes in the United States: a comprehensive review of patient, provider, and systemic factors. J Am Coll Surg2013;216 (3)482–92 e12. [PubMed: 23318117]

[5]. Hernandez RA, Hevelone ND, Lopez L, Finlayson SR, Chittenden E, Cooper Z. Racial variation in the use of life-sustaining treatments among patients who die after major elective surgery. Am J Surg2015;210(1):52–8. [PubMed: 25465749]

[6]. Hicks CW, Hashmi ZG, Velopulos C, Efron DT, Schneider EB, Haut ER, et al.Association between race and age in survival after trauma. JAMA Surg2014;149(7):642–7. [PubMed: 24871941]

[7]. Bedri H, Romanowski KS, Liao J, Al-Ramahi G, Heard J, Granchi T, et al.A national study of the effect of race, socioeconomic status, and gender on burn outcomes. J Burn Care Res2017;38 (3):161–8. [PubMed: 28423388]

[8]. Chen Jh, Nosanov Lb, Carney Bc, Vigiola Cruz M, Moffatt LT, Shupp JW. Patient and social characteristics contributing to disparities in outcomes after burn injury: application of database research to minority health in the burn population. Am J Surg2018;216(5):863–8. [PubMed: 29366485]

[9]. Murphy S, Clark DE, Carter DW. Racial disparities exist among burn patients despite insurance coverage. Am J Surg2019;218 (1):47–50. [PubMed: 30195836]

[10]. Kahn SA, Bernal N, Mosier MJ. Pearls from the national burn repository. J Burn Care Res2018;39(4):626–7. [PubMed: 29901808]

[11]. Taylor SL, Lee D, Nagler T, Lawless MB, Curri T, Palmieri TL. A validity review of the national burn repository. J Burn Care Res2013;34(2):274–80. [PubMed: 23128133]

[12]. Berkowitz SA, Traore CY, Singer DE, Atlas SJ. Evaluating area-based socioeconomic status indicators for monitoring disparities within health care systems: results from a primary care network. Health Serv Res2015;50(2):398–417. [PubMed: 25219917]

[13]. Chang VW. Racial residential segregation and weight status among US adults. Soc Sci Med2006;63(5):1289–303. [PubMed: 16707199]

[14]. Subramanian SV, Acevedo-Garcia D, Osypuk TL. Racial residential segregation and geographic heterogeneity in black/white disparity in poor self-rated health in the US: a multilevel statistical analysis. Soc Sci Med2005;60(8):1667–79. [PubMed: 15686800]

[15]. Williams DR, Collins C. Racial residential segregation: a fundamental cause of racial disparities in health. Public Health Rep2001;116(5):404–16. [PubMed: 12042604]

[16]. Tienda MPoor people and poor places: deciphering neighborhood effects on poverty outcomes. Chicago: Population Research Center; 1991.

[17]. The 200 Largest Cities in the United States by Population. 2020.. (Accessed27 April 2020) worldpopulationreview.com/us-cities/.

[18]. American Burn Association. National Burn Repository 2010–2018 Report. 2018.

[19]. Assimacopoulos EM, Liao J, Heard JP, Kluesner KM, Wilson J, Wibbenmeyer LA. The national incidence and resource utilization of burn injuries sustained while smoking on home oxygen therapy. J Burn Care Res2016;37(1):25–31. [PubMed: 26284642]

[20]. Veeravagu A, Yoon BC, Jiang B, Carvalho CM, Rincon F, Maltenfort M, et al.National trends in burn and inhalation injury in burn patients: results of analysis of the nationwide inpatient sample database. J Burn Care Res2015;36(2):258–65. [PubMed: 24918946]

[21]. National Research Council. In: Anderson NB, Bulatao RA, Cohen B, editors. Critical perspectives on racial and ethnic differences in health in late life. Washington, DC: The National Academies Press; 2004. p. 752.

[22]. Doctor N, Yang S, Maerzacker S, Watkins P, Dissanaike S. Socioeconomic status and outcomes after burn injury. J Burn Care Res2016;37(1):e56–62. [PubMed: 26594862]

[23]. Cubanski J, Koma W, Damico A, Neuman T. How Many Seniors Live in Poverty? . https://www.kff.org/report-section/how-many-seniors-live-in-poverty-issue-brief/.

[24]. Mitchell RJ, Chong S. Comparison of injury-related hospitalised morbidity and mortality in urban and rural areas in Australia. Rural Remote Health2010;10(1):1326. [PubMed: 20230166]

[25]. Peek-Asa C, Zwerling C, Stallones L. Acute traumatic injuries in rural populations. Am J Public Health2004;94(10):1689–93. [PubMed: 15451733]

Table 1 –

Patient characteristics.

		Overall population n = 1061	LUMC n = 433	UIHC n = 245	WCMC n = 383	p-Value
Male (%)		557 (52.5)	208 (48)	174 (71)	175 (45.7)	<0.001
Age (mean ± SD)		76.3 ± 8.3	76.3 ± 8.3	75.4 ± 8.2	76.9 ± 8.4	0.082
Race/ethnicity (%)	Caucasian	667 (62.9)	290 (67)	222 (90.6)	155 (40.5)	<0.001
	African American	188 (17.7)	95 (21.9)	10 (4.1)	83 (21.7)	
	Asian	37 (3.5)	6 (1.4)	2 (0.8)	29 (7.6)	
	Hispanic	81 (7.6)	23 (5.3)	0	58 (15.1)	
	Other	88 (8.3)	19 (4.4)	11 (4.5)	58 (15.1)	
%TBSA (mean ± SD)		9 ± 13.8	9.9 ± 15.1	10.7 ± 15.1	6.8 ± 11.8	0.001
Inhalation injury (%)		159 (15)	84 (19.4)	33 (13.5)	42 (11)	0.003
OR Treatment Received(%)		481 (45.3)	155 (35.8)	123 (50.2)	203 (53.0)	<0.001
LOS (mean ± SD)		13.4 ± 20.6	12.4 ± 17.1	7.7 ± 7.7	18.3 ± 27.8	<0.001
LOS/TBSA (mean ± SD)		4 ± 8.6	3.2 ± 8.6	1.7 ± 3.5	6.3 ± 10.2	<0.001
Discharge (%)	Home	304 (28.7)	97 (19.1)	74 (28.8)	133 (30.9)	<0.001
	Home with healthcare	266 (25.1)	113 (22.2)	39 (15.2)	114 (26.5)	
	Skilled nursing	183 (17.2)	80 (15.7)	43 (16.7)	60 (13.9)	
	Rehabilitation	110 (10.4)	58 (11.4)	36 (14)	16 (3.7)	
	Other	180 (17)	85 (16.7)	35 (13.6)	60 (13.9)	
In-hospital mortality		153 (14.4)	75 (17.4)	30 (12.2)	48 (12.5)	0.08
Primary payor = Medicare, n (%)		816 (76.9)	360 (83.5)	138 (56.3)	318 (83)	<0.001

Table 2 –

Socio-economic statistics from aggregate zip code data.

	Overall population	LUMC	UIHC	WCMC	p-Value
	n = 1061	n = 433	n = 245	n = 383	
% individual under the poverty level (mean ± SD)	15.5 ± 9	15.3 ± 9.9	13.5 ± 7	17 ± 8.9	<0.001
Median income (5 year average ± SD)	$61100 ± 25600	$59387 ± 23073	$51425 ± 13753	$69448 ± 31170	<0.001
Education (% High school or higher) (mean ± SD)	86.2 ± 9.3	85.3 ± 9.6	90.4 ± 5.1	84.5 ± 10.2	<0.001