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Can universal coverage eliminate health disparities? Reversal of disparate injury outcomes in elderly insured minorities ☆

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ABSTRACT

Background: Health outcome disparities in racial minorities are well documented. However, it is unknown whether such disparities exist among elderly injured patients. We hypothesized that such disparities might be reduced in the elderly owing to insurance coverage under Medicare. We investigated this issue by comparing the trauma outcomes in young and elderly patients in California.

Methods: A retrospective analysis of the California Office of Statewide Health Planning and Development hospital discharge database was performed for all publicly available years from 1995 to 2008. Trauma admissions were identified by *International Classification of Disease, Ninth Revision,* primary diagnosis codes from 800 to 959, with certain exclusions. Multivariate analysis examined the adjusted risk of in-hospital mortality in young (<65 y) and elderly (≥65 y) patients, controlling for age, gender, injury severity as measured by the survival risk ratio, Charlson comorbidity index, insurance status, calendar year, and teaching hospital status.

Results: A total of 1,577,323 trauma patients were identified. Among the young patients, the adjusted odds ratio of death relative to non-Hispanic whites for blacks, Hispanics, Asians, and Native Americans/others was 1.2, 1.2, 0.90, and 0.78, respectively. The corresponding adjusted odds ratios of death for elderly patients were 0.78, 0.87, 0.92, and 0.61.

Conclusions: Young black and Hispanic trauma patients had greater mortality risks relative to non-Hispanic white patients. Interestingly, elderly black and Hispanic patients had lower mortality risks compared with non-Hispanic whites.

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1. Introduction

Disparities in health outcomes among racial minorities are well documented. However, it is unknown whether such disparities also exist among elderly minorities. There are reasons to believe that these disparities are reduced or eliminated in the elderly because of their insurance coverage under Medicare. We investigated this issue using trauma outcomes in young and elderly racial/ethnic minorities in California.

2. Materials and methods

We performed a retrospective analysis of the California Office of Statewide Health Planning and Development (OSHPD) hospital discharge database from 1999 to 2008. OSHPD is 1 of 13 departments within the California Health and Human Services Agency. It reports the healthcare outcomes for specific procedures and medical conditions from California-licensed hospitals and healthcare practitioners. Our study reflects publicly available data. We chose to include data beginning in 1999 to capture a more complete data set [1].

Trauma patients aged ≥18 y at admission were identified using *International Classification of Diseases, Ninth revision,* primary diagnosis codes of 800–959, excluding codes 905–909 (late effects of injury), 930–939 (foreign body), 940–949 (burn), and 958 (early complications of trauma). Early complications of trauma were excluded, because this diagnosis code indicates readmission for complications of trauma rather than the index or initial admission, and we sought to identify the initial admission only. We excluded children because pediatric trauma care differs from that of adults with regard to patterns of injury, the physiologic response to injury, and management and should therefore be analyzed separately. Moreover, the pattern of insurance for children also differs from that of adults (i.e., State Children's Health Insurance Program funding).

Our primary outcome variable for our multivariate analysis was in-hospital death. Our primary independent variable was race/ethnicity, defined as the broad categories of non-Hispanic whites, blacks, Hispanics, Asians, and Native American/others. Our covariates included age, gender, admission year, insurance status, injury severity adjusted using the survival risk ratio (SRR), comorbidities using the Charlson index, teaching hospital status, and mechanism of injury. Our reference age group included patients aged 18–29 y. The comparison groups were categorized by 5-year intervals starting at age ≥30 y. The effect of admission year (2000–2008) on in-hospital death was compared with the in-hospital deaths in 1999. Our reference group for insurance status included patients with insurance coverage (e.g., Medicare or private coverage) and compared them with patients with limited insurance coverage (Medi-Cal, Workers' Compensation, County Indigent Programs, other government programs, other indigent programs, self-pay, and other payer programs). Injury severity was adjusted using the SRR according to the *International Classification of Diseases, Ninth Revision* injury severity score (ISS) method according to the diagnosis code of the patients [2]. Traditional SRRs were calculated. Comorbidities were adjusted using the Charlson comorbidity index. The Charlson commodity index was calculated according to the Deyo adaptation for administrative data sets [3]. Teaching hospitals were defined as those having a surgical residency training program. In the present study, we categorized the mechanism of injury into motor vehicle crashes, handguns, falls, and other.

We performed multivariate analyses. The analyses were stratified by age group (18–64 y and ≥65 y). Statistical analysis was performed using Stata, Special Edition 11.2 (StataCorp, College Station, TX). Statistical significance was defined as $P < 0.05$. The present study and its publicly accessible database were deemed exempt from review by our institutional review board.

3. Results

For a total of 1,577,323 patients, the overall death rate was 2.18%. The demographic information for the entire study population is listed in Table 1. Of the patient population, 72.6% were non-Hispanic whites. Approximately two thirds of patients were >65 y, and two thirds of patients had full

Table 1 – Study population characteristics.	
Characteristic	Value
Death	34,460 (2.18)
Race	
Non-Hispanic white	718,130 (72.55)
Black	52,519 (5.31)
Hispanic	169,106 (17.09)
Asian	32,285 (3.26)
Native American/other	17,751 (1.79)
Age (y)	
18–29	51,451 (8.17)
30–34	18,594 (2.95)
35–39	21,441 (3.41)
40–44	24,666 (3.92)
45–49	26,697 (4.24)
50–54	26,365 (4.19)
55–59	24,706 (3.92)
60–64	23,647 (3.76)
65–69	28,193 (4.48)
70–74	41,522 (6.60)
75–79	67,410 (10.71)
80–84	90,011 (14.30)
85–89	184,864 (29.36)
Gender	
Male	561,101 (49.45)
Female	573,517 (50.55)
Admission year	
1999	157,669 (10.00)
2000	156,710 (9.94)
2001	157,720 (10.00)
2002	158,937 (10.08)
2003	159,368 (10.10)
2004	158,950 (10.08)
2005	158,307 (10.04)
2006	158,926 (10.08)
2007	158,564 (10.05)
2008	152,172 (9.65)
Insurance coverage	
Limited	507,794 (32.51)
Full	1,053,986 (67.49)
Traditional SRR	0.91 ± 0.12
Charlson comorbidity index	
0–2	1,497,497 (94.94)
≥3	79,826 (5.06)
Surgical residency program	
No	1,350,410 (85.61)
Yes	226,913 (14.39)
Mechanism of injury	
Motor vehicle crash	299,652 (19)
Handguns	10,324 (0.65)
Falls	770,623 (48.86)
Total (*n*)	1,577,323

SRR = survival risk ratio.
Data presented as mean ± standard deviation or number (%).