**Race, place, and police involved deaths**

**Abstract**

**Objective.** To estimate mortality for police-involved deaths by race and geography in the United States.

**Methods.** We estimate mortality rates for deaths involving police by race and by census region using data on all police-involved deaths between 2013 and 2017. We estimate multilevel Bayesian Poisson models that adjust for unobserved geographic characteristics and allow for more predictive precision for rare events, such as law enforcement deaths.

**Results.** Summarize mortality estimates. Summarize fit on observed. Summarize variation across places, races, metros.

**Conclusions.** Abrupt statement

**Policy Implications.** Efforts to address should take race, place seriously. Clear mort risk for PoC, treat as pub health problem

**Introduction**

Violent and fatal interactions between law enforcement and people of color are a persistent feature of American social life. 1,2 In response to the shortcomings of federal efforts to systematically document deaths involving police,3 newspapers and journalists have undertaken a series of systematic efforts to provide comprehensive data on fatalities resulting from interactions between police and the public.4 This analysis utilizes these new data to provide estimates of mortality risk from interactions with police by race and place.

Race, place, and policing are important social determinants of health.5–7 Prior research has clearly established that African Americans are at higher risk of death in interactions with law enforcement 8,9 and has demonstrated clear links between race, place and mortality.10 The legal, cultural, and institutional environments that structure relationships between police and communities of color are tightly coupled with geography,11,12 suggesting that the relationship between policing, race, and mortality may be heterogenous across places. In this paper, we show how geography and race interact to produce variable risks for mortality in encounters with law enforcement for people of color.

**Background**

Police violence has been a historically constant grievance of African American led social movements.13,14 Recently, Black Lives Matter organizers have argued that the deaths of Michael Brown, Sandra Bland, Philando Castille, Tamir Rice, Laquan McDonald, Eric Garner, Charleena Lyles, and many others illustrate a systematic disregard for the safety and basic humanity of African Americans among law enforcement officials and the broader polity. An increasing volume of social scientific research indicates that Black people far more likely to die in interaction with law enforcement than are whites,8,15,16 including when those killed are unarmed.17 Because policing and criminal justice regimes vary across places,11,12,18 it is likely that the risk of mortality from interactions with law enforcement are, in part, a function of geography.

Past work has been limited by the absence of systematic national data on deaths involving law enforcement.3 Law enforcement data on police-involved deaths, primarily collected through the Bureau of Justice Statistics’ Arrest Related Deaths program or the Federal Bureau of Investigation’s Uniform Crime Report’s Supplementary Homicide Report are widely acknowledged to undercount the true number of deaths involving police.3,19,20 Public health scholars have exploited data from National Center for Health Statistics mortality files, the National Violent Death Reporting System, US Centers for Disease Control and Prevention’s mortality files and various emergency department surveys.3,21–23 Researchers have found that these methods yield substantially higher counts than those reported by law enforcement agencies, but still suffer from under-reporting or limited geographic coverage.3

Journalists, activists and researchers have stepped in to fill this information gap by constructing a series of public datasets that count police-involved deaths using a combination of public records and media accounts. In response to the limits of official data, BJS has undertaken a redesign of the Arrest-Related Deaths Program that more closely matches the methodology of public data collection projects. BJS analysts noted that *Fatal Encounters*,4 a journalist-led project that seeks to document all episodes of fatal police-civilian interactions in the United States, closely matched the proposed inclusion criteria for this BJS redesign of the Arrest-Related Deaths Program.24

**Data and Methods**

We join data on all police-involved deaths obtained from *Fatal Encounters* with population estimates from the American Community Survey to produce model based estimates of mortality risk by race, region, and metro type. We pool all reported police-involved deaths between January 1, 2013 and May 8, 2017 to produce counts of police involved deaths by race / ethnicity at the county-level. These criteria yield a total of 7,118 reported deaths involving police.

Data on police-involved deaths come from *Fatal Encounters*, a journalist-led project that seeks to document all episodes of fatal police-civilian interactions in the United States for those dates with complete national data, January 1, 2013 through the date of access, May 8, 2017.4 The project relies on contributions of professional and volunteer researchers, compiled from media reports and public records. The universe of cases in *Fatal Encounters* is broader than similar projects, such as *The Washington Post's* compilation of data on police shootings, and has a greater temporal coverage than *The Guardian's* dataset on police-involved deaths. Race data are not reported for all cases in *Fatal Encounters*, because they are often excluded from news reports or public records. We use victim names and county of residence to predict victim race,26 only assigning race in cases with a 75 percent or higher posterior probability of membership, and leaving those cases with less than a 75 percent posterior probability of membership in any category unidentified.

We rely on data from the American Community Survey 5-year 2009 - 2014 population estimates for rate denominators of population by race, ethnicity and county.25 For geographic classification, we rely on the U.S. Census Bureau's 2010 state division classification (see Appendix Table1), and use the National Center for Health Statistics' six category urban-rural county classification scheme for all US counties (see Appendix Table 2).

Because deaths involving police are a relatively rare event (nationally, we estimate 0.52 deaths per 100,000 population per year), and zero police deaths were recorded in more than half of US counties, we construct regression models to pool power across data to provide predictions of mortality rates by race, by metropolitan status, and by region. These figures provide more reliable estimates of police mortality risk by adjusting for the rarity of this event in places with small populations, smoothing extreme estimates from the observed data driven by outliers or no observed cases.

We estimate Bayesian multilevel Poisson regressions of police-involved deaths as a function of the race of the victim, metropolitan status, and region. We then estimate posterior predictive mortality rates for each subset of race by metropolitan status by region. While frequentist inferences may be appropriate for counties with large populations, they greatly distort estimates from places with small populations, where any incident can dramatically effect estimates of per capita rates, or reduce observed rates to zero, though the risk of mortality is almost certainly greater than zero. Bayesian predictive intervals provide more realistic estimates of population mortality rates, because they average over the instabilities that may occur due to idiosyncratic local or annual trends through repeated simulation.

**Findings**

Table on cause of death by region

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 1.** Police related fatalities in the U.S. by metro type and Census division, January 1, 2013 through May 8, 2017, annual rate per 100,000 population in parenthesis | | | | | | | |
| Census Division | Large Central Metro | Large Fringe Metro | Medium Metro | Small Metro | Micro-politan | Noncore | *Total* |
| East North Central | 323  (0.58) | 139  (0.26) | 127  (0.39) | 75  (0.33) | 81  (0.32) | 39  (0.31) | 784  (0.39) |
| East South Central | 84  (0.64) | 39  (0.35) | 120  (0.60) | 83  (0.80) | 82  (0.59) | 97  (0.76) | 505  (0.62) |
| Middle Atlantic | 166  (0.26) | 111  (0.17) | 110  (0.41) | 23  (0.23) | 23  (0.25) | 10  (0.28) | 443  (0.25) |
| Mountain | 240  (0.71) | 57  (0.52) | 188  (0.75) | 110  (0.85) | 76  (0.68) | 39  (0.67) | 710  (0.71) |
| New England | 23  (0.23) | 41  (0.18) | 54  (0.27) | 16  (0.45) | 13  (0.27) | 13  (0.46) | 160  (0.25) |
| Pacific | 685  (0.58) | 179  (0.51) | 309  (0.68) | 98  (0.75) | 58  (0.67) | 21  (0.68) | 1350  (0.60) |
| South Atlantic | 309  (0.57) | 394  (0.42) | 392  (0.61) | 115  (0.45) | 108  (0.62) | 75  (0.51) | 1393  (0.52) |
| West North Central | 107  (0.90) | 91  (0.44) | 123  (0.79) | 64  (0.45) | 59  (0.43) | 63  (0.43) | 507  (0.56) |
| West South Central | 476  (0.80) | 181  (0.66) | 283  (0.76) | 93  (0.69) | 120  (0.81) | 113  (0.90) | 1266  (0.77) |
| *Total* | 2413  (0.57) | 1232  (0.36) | 1706  (0.59) | 677  (0.54) | 620  (0.52) | 470  (0.57) | 7118  (0.52) |
| *Note:* Data from *Fatal Encounters*, accessed 5/9/17 | | | | | | | |

Big takeaway: the posterior predictive estimates smooth out the extremes in estimates from small population counties. They also provide more reasonably estimates for the counties with zero observed estimates. For reasonable estimates of population risk, these posterior estimates are superior to the frequentist alternative.

African Americans at much higher risk of mortality than are whites, risk is generally highest in medium metros, Pacific states. Latino risk also generally higher than white risk, sensitive to division, highest in non-large metro counties, highest in non-core.

Place matters. Clear regional and metro differences. Pacific states have exceptionally high inequalities. Suggests that local culture, institutions, politics, and systems of structural inequality shape risk.

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**Appendix**

Models:

alpha (intercept prior) calculated from Krieger et al. 2015

$$log(E(y|X)) = \beta\_0 + \beta\_1x + \gamma + \varepsilon + log(offset)$$

$$\beta\_0 \sim Normal(log(\alpha) - log(offset), 10) $$

$$ \beta\_1 \sim Normal (0, 2.5) $$

$$ \gamma, \varepsilon \sim MVN(0, \Sigma) $$

$$ \Sigma \sim decov(1, 1, 1, 1) $$

|  |  |
| --- | --- |
| Appendix Table 1. States in Census Divisions | |
| Division Name | States Included |
| East North Central | IL, IN, OH, MI, WI |
| East South Central | AL, KY, MS, TN |
| Middle Atlantic | NJ, NY, PA |
| Mountain | AZ, CO, ID, MT, NM, NV, UT, WY |
| New England | CT, MA, ME, NH, VT |
| Pacific | AK, CA, HI, OR, WA |
| South Atlantic | DE, FL, GA, MD, NC, SC, VA, WV |
| West North Central | IA, KS, MN, MO, ND, NE, SD |
| West South Central | AR, LA, OK, TX |
| ADD CITATION | |

|  |  |  |
| --- | --- | --- |
| Appendix Table 2. Description of NCHS Urban-Rural County Classification | | |
| County Type | Description | Number of Counties |
| Large Central Metro | counties in MSA of 1 million population that: 1) contain the entire population of the largest principal city of the MSA, or 2) are completely contained within the largest principal city of the MSA, or 3) contain at least 250,000 residents of any principal city in the MSA. | 68 |
| Large Fringe Metro | counties in MSA of 1 million or more population that do not qualify as large central | 368 |
| Medium Metro | Medium metro counties in MSA of 250,000-999,999 population. | 372 |
| Small Metro | Small metro counties are counties in MSAs of less than 250,000 population. | 358 |
| Micropolitan | Nonmetropolitan counties: Micropolitan counties in micropolitan statistical area | 641 |
| Noncore | Noncore counties not in micropolitan statistical areas | 1333 |
| Citation: https://www.cdc.gov/nchs/data/series/sr\_02/sr02\_166.pdf | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Posterior police related mortality by race/ethnicity, census region, and metro type, 95 percent credible intervals | | | |
| **County Name** | **Black** | **Latinx** | **White** |
| East North Central |  |  |  |
| - Large Central Metro | 1.1 (0.4, 2.4) | 0.3 (0, 0.8) | 0.2 (0.1, 0.5) |
| - Large Fringe Metro | 0.7 (0.2, 1.6) | 0.2 (0, 0.7) | 0.2 (0.1, 0.4) |
| - Medium Metro | 1.2 (0.4, 2.7) | 0.3 (0.1, 1) | 0.3 (0.1, 0.6) |
| - Small Metro | 0.8 (0.3, 1.8) | 0.3 (0, 0.8) | 0.3 (0.1, 0.6) |
| - Micropolitan | 0.9 (0.3, 2) | 0.3 (0.1, 0.9) | 0.3 (0.1, 0.6) |
| - Noncore | 0.8 (0.3, 1.8) | 0.3 (0.1, 1) | 0.3 (0.1, 0.6) |
| East South Central |  |  |  |
| - Large Central Metro | 0.9 (0.3, 2.1) | 0.2 (0, 0.8) | 0.4 (0.1, 0.9) |
| - Large Fringe Metro | 0.6 (0.2, 1.4) | 0.2 (0, 0.7) | 0.4 (0.1, 0.8) |
| - Medium Metro | 1.1 (0.4, 2.3) | 0.3 (0.1, 1) | 0.5 (0.2, 1.1) |
| - Small Metro | 0.7 (0.2, 1.6) | 0.2 (0, 0.8) | 0.5 (0.2, 1.1) |
| - Micropolitan | 0.8 (0.3, 1.7) | 0.2 (0, 0.8) | 0.5 (0.2, 1.2) |
| - Noncore | 0.7 (0.2, 1.6) | 0.3 (0.1, 1) | 0.5 (0.2, 1.2) |
| Middle Atlantic |  |  |  |
| - Large Central Metro | 0.8 (0.3, 1.8) | 0.2 (0, 0.5) | 0.1 (0.1, 0.3) |
| - Large Fringe Metro | 0.5 (0.2, 1.2) | 0.1 (0, 0.4) | 0.1 (0.1, 0.3) |
| - Medium Metro | 0.9 (0.3, 2) | 0.2 (0, 0.6) | 0.2 (0.1, 0.4) |
| - Small Metro | 0.6 (0.2, 1.3) | 0.2 (0, 0.5) | 0.2 (0.1, 0.5) |
| - Micropolitan | 0.6 (0.2, 1.5) | 0.2 (0, 0.5) | 0.2 (0.1, 0.5) |
| - Noncore | 0.6 (0.2, 1.4) | 0.2 (0, 0.6) | 0.2 (0.1, 0.5) |
| Mountain |  |  |  |
| - Large Central Metro | 1.1 (0.4, 2.6) | 0.6 (0.1, 1.7) | 0.4 (0.2, 1) |
| - Large Fringe Metro | 0.7 (0.2, 1.7) | 0.5 (0.1, 1.5) | 0.4 (0.1, 1) |
| - Medium Metro | 1.2 (0.4, 2.8) | 0.8 (0.2, 2.2) | 0.6 (0.2, 1.3) |
| - Small Metro | 0.8 (0.3, 1.9) | 0.6 (0.1, 1.8) | 0.6 (0.2, 1.3) |
| - Micropolitan | 0.9 (0.3, 2.1) | 0.6 (0.1, 1.8) | 0.6 (0.2, 1.4) |
| - Noncore | 0.8 (0.3, 2) | 0.7 (0.1, 2.2) | 0.6 (0.2, 1.4) |
| New England |  |  |  |
| - Large Central Metro | 0.9 (0.3, 2) | 0.3 (0.1, 1.1) | 0.2 (0.1, 0.4) |
| - Large Fringe Metro | 0.6 (0.2, 1.4) | 0.3 (0.1, 0.9) | 0.2 (0.1, 0.4) |
| - Medium Metro | 1 (0.3, 2.3) | 0.4 (0.1, 1.3) | 0.2 (0.1, 0.5) |
| - Small Metro | 0.6 (0.2, 1.5) | 0.3 (0.1, 1.1) | 0.2 (0.1, 0.5) |
| - Micropolitan | 0.7 (0.2, 1.6) | 0.3 (0.1, 1.1) | 0.2 (0.1, 0.6) |
| - Noncore | 0.6 (0.2, 1.5) | 0.4 (0.1, 1.4) | 0.2 (0.1, 0.6) |
| Pacific |  |  |  |
| - Large Central Metro | 1.5 (0.5, 3.2) | 0.4 (0.1, 1.3) | 0.4 (0.1, 1) |
| - Large Fringe Metro | 1 (0.3, 2.1) | 0.4 (0.1, 1) | 0.4 (0.1, 1) |
| - Medium Metro | 1.6 (0.5, 3.6) | 0.5 (0.1, 1.6) | 0.6 (0.2, 1.3) |
| - Small Metro | 1 (0.4, 2.4) | 0.4 (0.1, 1.2) | 0.6 (0.2, 1.3) |
| - Micropolitan | 1.2 (0.4, 2.7) | 0.4 (0.1, 1.3) | 0.6 (0.2, 1.4) |
| - Noncore | 1.1 (0.4, 2.5) | 0.5 (0.1, 1.6) | 0.6 (0.2, 1.4) |
| South Atlantic |  |  |  |
| - Large Central Metro | 0.9 (0.3, 2) | 0.2 (0, 0.6) | 0.3 (0.1, 0.7) |
| - Large Fringe Metro | 0.6 (0.2, 1.3) | 0.2 (0, 0.5) | 0.3 (0.1, 0.7) |
| - Medium Metro | 1 (0.3, 2.2) | 0.2 (0.1, 0.8) | 0.4 (0.1, 0.9) |
| - Small Metro | 0.7 (0.2, 1.5) | 0.2 (0, 0.6) | 0.4 (0.1, 0.9) |
| - Micropolitan | 0.7 (0.2, 1.6) | 0.2 (0, 0.6) | 0.4 (0.2, 1) |
| - Noncore | 0.7 (0.2, 1.5) | 0.3 (0, 0.7) | 0.4 (0.2, 1) |
| West North Central |  |  |  |
| - Large Central Metro | 1.4 (0.5, 3.3) | 0.4 (0.1, 1.2) | 0.3 (0.1, 0.6) |
| - Large Fringe Metro | 1 (0.3, 2.2) | 0.3 (0.1, 1) | 0.3 (0.1, 0.6) |
| - Medium Metro | 1.6 (0.5, 3.8) | 0.5 (0.1, 1.4) | 0.4 (0.1, 0.8) |
| - Small Metro | 1.1 (0.4, 2.4) | 0.4 (0.1, 1.1) | 0.4 (0.1, 0.8) |
| - Micropolitan | 1.2 (0.4, 2.6) | 0.4 (0.1, 1.2) | 0.4 (0.1, 0.9) |
| - Noncore | 1.1 (0.3, 2.5) | 0.5 (0.1, 1.4) | 0.4 (0.1, 0.9) |
| West South Central |  |  |  |
| - Large Central Metro | 1.2 (0.4, 2.7) | 0.7 (0.1, 1.9) | 0.5 (0.2, 1.1) |
| - Large Fringe Metro | 0.8 (0.3, 1.8) | 0.6 (0.1, 1.6) | 0.5 (0.2, 1.1) |
| - Medium Metro | 1.4 (0.5, 3.1) | 0.8 (0.2, 2.3) | 0.7 (0.2, 1.4) |
| - Small Metro | 0.9 (0.3, 2) | 0.7 (0.1, 2) | 0.7 (0.2, 1.5) |
| - Micropolitan | 1 (0.3, 2.2) | 0.7 (0.1, 1.9) | 0.7 (0.2, 1.6) |
| - Noncore | 0.9 (0.3, 2.1) | 0.8 (0.2, 2.4) | 0.7 (0.2, 1.6) |