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Associations Between State and Local Government Spending and Pregnancy-Related Mortality in the U.S.

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Abstract

Introduction: There is limited evidence on how government spending is associated with maternal death. This study investigates associations between state and local government spending on social and healthcare services and pregnancy-related mortality (PRM) among the total, non-Hispanic (NH) Black, Hispanic, and NH White populations.

Methods: State-specific total population and race/ethnicity-specific 5-year (2015–2019) PRM ratios were estimated from annual natality and mortality files provided by the National Center for Health Statistics (NCHS). Data on state and local government spending and population-level characteristics were obtained from U.S. Census Bureau surveys. Generalized linear Poisson regression models with robust SEs were fitted to estimate adjusted rate ratios (ARR) and 95% CIs associated with proportions of total spending allocated to social services and healthcare domains, adjusting for state-level covariates. All analyses were completed in 2021–2022.

Results: State and local government spending on transportation was associated with 11% lower overall PRM (ARR=0.89, 95% CI=0.83, 0.96) and 9%–12% lower PRM among the racial/ethnic groups. Among spending sub-domains, expenditures on higher education, highways and roads, and parks and recreation were associated with lower PRM rates in the total population (ARR=0.90, 95% CI=0.86, 0.94; ARR=0.87, 95% CI=0.81, 0.94; and ARR=0.68, 95% CI=0.49,

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0.95, respectively). These results were consistent among the racial/ethnic groups, but patterns of associations with PRM and other spending sub-domains differed notably between racial/ethnic groups.

Conclusions: Investing more of local and state targeted spending in social services may decrease the risk for PRM, particularly among Black women.

INTRODUCTION

Over the past 2 decades, the U.S. has experienced an increase in maternal mortality (MM)—defined as deaths of women while pregnant or within 42 days of being pregnant from causes related to or aggravated by the pregnancy or its management— that remains considerably higher compared to other high-income countries.^{1,2} The most recent national maternal mortality ratio (MMR) reported by the Centers for Disease Control and Prevention (CDC) is 23.8 deaths per 100,000 live births for 2020,³ which is substantially higher than 12.7 deaths per 100,000 live births reported in 2007.⁴ Similarly, the pregnancy-related mortality ratio (PRM), defined as maternal death during pregnancy or within 1 year from any cause related to or aggravated by the pregnancy or its management, remains elevated at 27.5 deaths per 100,000 live births in 2019.⁵ Furthermore, wide racial disparities in maternal deaths persist, with non-Hispanic (NH) Black women being 3 to 4 times more likely to die from pregnancy-related complications than NH White women (Black and White, hereafter).^{4,6,7} Research indicates that more than 60% of these deaths are preventable,⁶ and the proportion of preventable deaths is higher among Black women compared with White women.⁸

Within the U.S., MM and PRM ratios vary significantly by states, and emerging evidence implicates the role of societal and policy factors in contributing to risk for maternal death and perpetuating racial inequity in PRM.^{9–12} Growing evidence has recognized the impact of public health spending on maternal health outcomes, including adverse birth outcomes and maternal mortality.^{13–15} A retrospective study on maternal mortality in 24 European Union countries demonstrated that, over the period of 1981–2010, every annual 1% decrease in government healthcare spending was associated with 10.6% annual increase in maternal mortality (or 89 excess maternal deaths).¹⁶ More recent evidence from the U.S. has shown that increases in public health spending on maternal and child health-related programs subsequently lead to reduced infant and maternal mortality.^{13,17} For instance, using 2001–2014 data across 67 Florida counties, Bernet et al. found that each 10% increase in pregnancy-related public health expenditures was associated with a 13.5% decline in Black MMR and a 20% decrease in Black-White disparities in MMR.¹³

While research has shown that improving population health requires consideration of government spending beyond health care,^{18,19} there is limited evidence on how public investments in social and structural determinants of health (i.e., social, economic, and physical conditions of the daily environments that affect individual health and well-being) may influence reproductive health. Previous studies found that higher investment in social services at the state and county levels was associated with a range of improved population health outcomes including decreased overall and infant mortality, increased life expectancy, and decreased incidence of low birthweight.^{18,20–22}

Moreover, greater investment in social, behavioral, and environmental determinants of health (including housing, education, income, transportation, and environmental factors) may help to address the vast and persistent racial inequities in reproductive health. Historically entrenched systemic racism, discrimination, a lack of institutional and political power, and limited access to resources imposed on communities of color, particularly Black and Hispanic women, result in their disproportionate exposure to harmful physical environments, greater socioeconomic constraints, and restricted access to educational and employment opportunities, high-quality housing, and transportation.^{23–25} Targeted investment in social services and physical environment in historically disadvantaged communities may meaningfully modify adverse living conditions and subsequently contribute to improved health outcomes and advancements toward health equity, including reduced rates of maternal death.

To address the dearth of evidence on government non-healthcare spending and maternal health, this study examined the associations between local and state government spending on social and health-related services in 2014–2018 and PRM in 2015–2019. The primary hypothesis is that higher government investments in health and non-health related services, including education, social services, public welfare, transportation, public safety, and environment and housing, will be associated with lower PRM. Given the importance of upstream investment in historically disadvantaged communities, the secondary hypothesis anticipated stronger associations between government spending in social services and PRM among Black and Hispanic populations.

METHODS

Study Sample

This study is a retrospective ecological analysis of the 2015–2019 recoded maternal mortality file released by the NCHS. These data apply a rigorous new coding method for identifying maternal deaths to mitigate misclassification errors previously arising from the adoption of the standardized pregnancy-status checkbox on revised death certificates (i.e., indicating whether the descendant was pregnant within a year of death). Given the potential risk of misclassification of maternal deaths at more advanced maternal ages,⁴ analyses were limited to the population aged 10 to 44 years. For mortality rate denominators, the 2015–2019 natality files (live birth records) were used to identify the number of live births among persons age 10–44 years occurring by state over the study time frame (n=19,272,649). Both mortality and natality files contain geographic identifiers for maternal state of residence (Federal Information Processing System (FIPS) codes) for all 50 states and the District of Columbia (DC).

Measures

The outcome of interest was pregnancy-related mortality, defined as a death while pregnant or within 1 year following the end of a pregnancy, from any cause related to or aggravated by the pregnancy or its management. Pregnancy-related deaths were identified based on underlying cause of death from ICD-10 as codes O00-O95, O98-O99, and A34. To maximize rate stability, the 5-year (2015–2019) PRM ratios (deaths per 100,000 live births)

for the total population and by race/ethnicity (non-Hispanic Black, Hispanic, non-Hispanic White) were computed for each state and DC where there was a minimum of 5 deaths within the 5-year period.¹²

The independent variables of interest were the proportions of the total local and state government spending allocated to social and health related services (2014–2018 5-year estimates). Data on these variables were obtained from the U.S. Census Bureau's Annual Survey of State and Local Government Finances.²⁶ This survey was used to select data on the 5 mutually exclusive categories of spending that have been shown to be linked to adverse maternal and infant health outcomes^{21,27} and thus hypothesized to be associated with PRM: (1) education services, including elementary and secondary education and higher education; (2) social services and income maintenance, including public welfare, hospitals, and health; (3) transportation services, including highways and roads; (4) public safety, including police protection, fire protection, and correction; and (5) environment and housing, including natural resources, parks and recreation, housing and community development, and sewerage and solid waste management. To investigate which sub-categories of spending might be driving the main associations, each spending category was further separated into 13 sub-categories listed above.

Adjusted models included 2014–2018 5-year estimates of the total local and state government spending per capita, state-level poverty rate (proportion of the state population living below the federal poverty level), total state population, percentage of the population with college degree, percentage of the population that is White, percentage of the population living in urban counties, percentage of the foreign-born population, state-level violent crime rate (per 100,00 population), Medicaid expenditure per capita, and number of wildfires per state. These measures were retrieved from the U.S. Census Bureau's American Community Survey (ACS), the Federal Bureau of Investigation (FBI) Uniform Crime Reports,²⁸ and National Interagency Fire Center. To account for state legislature composition, data on the state legislature party majority (Democrat, Republican, or split) was retrieved from the National Conference of State Legislatures.²⁹ Additional state-level covariates included Medicaid expansion status (retrieved from the Kaiser Family foundation),³⁰ pregnancy checkbox status, percentage of births covered by Medicaid, and percentage of births to women over 35 years old, aggregated from the NCHS natality files.

Statistical Analysis

Descriptive statistics characterized the variation of state-level total and race/ethnicity-specific PRM and the percentage of local and state spending allocated to social and health services. Then, separate models examining the associations between spending categories and the total PRM, Black PRM, Hispanic PRM, and White PRM were fitted. Modified Poisson regression with robust SEs were used to account for clustering within states in estimating the adjusted rate ratios (ARR) and 95% CIs for all outcomes. Models examining the associations between the outcomes and expenditure allocated to social services (i.e., education, transportation, public safety, environment and housing) additionally adjusted for Medicaid spending per capita, whereas models with expenditure measures on public safety (i.e., police and fire protection, correction) were adjusted for state-level crime rates and

numbers of wildfires. Models were weighted by the total number of live births by state (2015–2019) for the total PRM, and by race/ethnicity in stratified models. In sensitivity analyses, lagged associations between government spending in 2010–2014 and PRM in 2015–2019 were examined, and additional robustness check performed with per capita measures. All statistical analyses were performed with SAS 9.4 in 2021–2022. Statistical significance was set at $p < 0.05$ and all tests were 2-sided.

RESULTS

From 2015 to 2019, the authors identified 4,851 pregnancy-related deaths among women aged 10 to 44 years, including 2,198 pregnancy-related deaths among White, 1,562 deaths among Black, and 784 among Hispanic populations. State-level 5-year PRM ratios averaged 25.2 deaths per 100,000 live births. State Black PRM ratios averaged 56.6 deaths per 100,000 live births and exceeded White and Hispanic PRM ratios (22.5 and 17.8 deaths per 100,000 live births, respectively) across states by 2.5–3 times, on average (Table 1).

During 2014–2018, the largest percentages of expenditure from the total local and state government budget were allocated to education services (Mean=28.7, SD=3.6) and social services and income maintenance (Mean=25.7, SD=4.5). The remaining categories of spending, including transportation, public safety, and environment and housing, received 6.0% to 6.9% of the total expenditure, on average (Table 1). Among the sub-categories of expenditure, the most funded across the states were elementary and secondary education (Mean=18.0, SD=2.5) and public welfare (Mean=18.2, SD=4.1) categories.

Among the main spending categories, 1-percentage point increase in state and local government spending on transportation was associated with 11% lower overall PRM (ARR=0.89, 95% CI=0.83, 0.95) and 9%–12% lower PRM among the racial/ethnic groups (for Black, ARR=0.88, 95% CI=0.84, 0.93; for Hispanic ARR=0.89, 95% CI=0.81, 0.98; and for White ARR=0.91, 95% CI=0.86, 0.97). Each additional percentage point of the total spending allocated to educational services was associated with 10% higher Black PRM (ARR=1.10, 95% CI=1.06, 1.14) (Table 2).

Among expenditure sub-categories, greater spending on higher education, highways and roads, and parks and recreation were associated with lower total PRM and separate PRM rates among Black, Hispanic, and White populations (Table 3). For instance, 1 percentage point increase in spending on parks and recreation was associated with 32% lower total PRM (ARR=0.68, 95% CI=0.49, 0.95), 55% lower Black PRM (ARR=0.45, 95% CI=0.31, 0.67), 41% lower Hispanic PRM (ARR=0.59, 95% CI=0.50, 0.69), and 29% lower White PRM (ARR=0.71, 95% CI=0.55, 0.90). One percentage point higher spending on higher education was associated with 10% lower total PRM (ARR=0.90, 95% CI=0.86, 0.94) and 7%–9% lower PRM across all racial/ethnic groups (for Black, ARR=0.93, 95% CI=0.89, 0.97; for Hispanic ARR=0.91, 95% CI=0.87, 0.95; and for White ARR=0.92, 95% CI=0.88, 0.96). In addition, 1 percentage point increase in expenditures on hospitals was associated with 4% lower Black PRM (ARR=0.96, 95% CI=0.93, 0.99) whereas 1 percentage point in increased spending in preserving natural resources was associated with 18% lower

Black PRM (ARR=0.82, 95% CI=0.70, 0.95). Increased spending on police protection was associated with 20% lower White PRM (ARR=0.80, 95% CI=0.69, 0.94).

Spending on elementary and secondary education was associated with higher total, Black, and White PRM rates (Table 3). For instance, each additional percentage point of the total local and state budget spend on elementary and secondary education was associated with 7% higher total PRM (ARR=1.07, 95% CI=1.04, 1.11), 9% higher Black PRM (ARR=1.09, 95% CI=1.06, 1.11) and 5% increased White PRM (ARR=1.05, 95% CI=1.01, 1.10). One percentage point increase in spending on fire protection was associated with 37% higher White PRM (ARR=1.37, 95% CI=1.13, 1.66), whereas 1 percentage point increase in expenditure on sewerage and solid waste management was associated with 29% higher Hispanic PRM (ARR=1.29, 95% CI=1.18, 1.42). Results from the sensitivity analyses of lagged associations and alternative spending measures such as per capita spending were mostly consistent with the primary analysis (Appendix Tables 1–5).

DISCUSSION

This study examined whether local and state government spending on social and health-related services are associated with pregnancy-related mortality in the U.S. for the total population and across racial/ethnic groups. The findings indicate that higher investments in social services and physical and environmental conditions in which people live, particularly systems of transportation, higher education, and parks and recreation were associated with lower PRM across all populations. Additionally, investing in targeted social determinants of health may be particularly beneficial to historically and systematically oppressed and disenfranchised populations. That is, each additional percentage point larger expenditure in higher education, highways and roads, hospitals, natural resources, and parks and recreation was associated with 4%–55% lower PRM ratios among the Black population, after controlling for state-level covariates. These findings have implications for local and state policy decisions indicating that targeted upstream investments beyond the healthcare sector into environmental, transportation, educational, and social services may be a potential avenue to address the root causes of maternal health inequities and eliminate the disproportionate burden of preventable loss within Black communities.

Increasing evidence highlights how the conditions in which women live are crucial in shaping their reproductive health, emphasizing the critical need to further examine social and structural determinants of maternal health.^{9,10,12,31} Findings of this study emphasize the importance of investing in environmental and physical conditions, including systems of transportation, access to natural resources and green areas, in order to eradicate systemic barriers that affect women's lives, health and well-being over their life course. In addition, these findings support recent studies showing that higher spending on parks and recreation services at the county and state levels is associated with decreased incidence of low birth weight³² and infant mortality.²¹ Such evidence is broadly consistent with ample research on the detectable impact of residential greenness and green spaces on maternal health and birth outcomes.^{33,34} Similarly, higher investment in transportation services has been shown to be associated with lower severe maternal morbidity (i.e., health-impacting and life-threatening events that occur during hospitalization for childbirth).²⁷ In addition, higher expenditure

on police protection was associated with lower PRM rates among White population but not other racial/ethnic groups. This warrants further examination as emerging studies have documented the disproportionate burden of police violence on communities of color and its detrimental impact in perpetuating racial inequities in maternal and infant health.^{35–37}

These findings are highly relevant as local, state and federal governments are simultaneously faced with severe budget cuts on education and infrastructure because of the COVID-19 pandemic and continuous efforts to align state budgets with priorities to advance health equity and racial justice. With the COVID-19 pandemic, local, state, and federal budgets are likely to be strained for the foreseeable future,^{38,39} thus limiting spending on public health programming, social services and infrastructure aimed to reduce adverse maternal health outcomes. However, recent developments in passing the Black Maternal Health Momnibus Act, which includes transformative policies for maternal health, may be the critical step in investing in social determinants of health and eliminating systemic barriers to optimal maternal health for women of color. In the past year, several states have introduced bills that mirror the federal Momnibus, each of which have the potential to address structural racism through legislation that targets the social determinants of health. To solve maternal health issues at the national, state, and local levels, broad federal policies must be accompanied by more targeted local public health interventions that have a potential of reducing maternal and infant mortality.^{13,17}

Limitations

This analysis has several limitations. First, given insufficient within-state variation in spending patterns, an ecological, cross-sectional study design was used which prohibits inferring causation or exploring the impact of government spending on trends in PRM over time. Second, the PRM estimates presented in this study should not be compared with those officially reported by the CDC. Official reports are based on data from the Pregnancy Mortality Surveillance System (PMSS) in which every case undergoes additional validation to confirm its pregnancy-related status. In addition, this analysis focuses on PRM, which by definition does not include external causes of death during pregnancy and up to 1 year postpartum, including overdose, suicide, and homicide. Third, the possibility of residual confounding by state-level factors remains. Fourth, some of the findings were unexpected, which itself is not a limitation but challenges interpretation. For instance, higher spending on elementary and secondary education was associated with higher PRM ratios among the total, Black, and White populations, whereas spending on sewerage and solid waste management services was associated with increased Hispanic PRM. In addition, the findings on fire protection are opposite to the recent evidence of Muchomba et al. study in which they reported negative associations between municipal expenditure on fire and ambulance services and severe maternal morbidity.²⁷ Even when controlling for a number of potentially relevant confounders, it remains unclear as to whether spending in some of these domains reflects investments (e.g., in which the expenditure might improve outcomes) or instead reflects the severity of public challenges (e.g., in which the expenditure proxies for the poorer outcomes that necessitated the spending). Fifth, to better understand the role of public fiscal allocation, this study utilized proportions-based measures for spending which yielded estimates based on relative but not absolute spending. However, the results largely hold

when using per capita measures instead. Finally, this is a state-level analysis of aggregated government spending and thus the next step for future research is to investigate to what extent, and which targeted programming and disaggregated spending at the state, county, and municipality levels are associated with PRM and other maternal health outcomes.

CONCLUSIONS

Reproductive health adversities, including maternal death, are inseparable from the broader social, economic, and environmental context in which women live. The findings suggest that increased local and state spending allocated to non-health related sectors is associated with decreased PRM, particularly among Black population. Addressing social determinants of maternal health through targeted investment strategies for systematically disadvantaged populations may have the potential to reduce racial inequity in PRM.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Pregnancy-Related Mortality by Race/Ethnicity,^a State and Local Government Expenditure, and State-Level Covariates

Variable	Mean (SD)	Range	IQR	75th percentile
PRM per 100,000 live births (N=51)	25.2 (8.9)	11.3–48.3	10.1	27.7
NH Black PRM per 100,000 live births (N=34)	56.6 (19.1)	17.7–82.1	29.0	74.1
Hispanic PRM per 100,000 live births (N=29)	17.8 (6.7)	7.6–33.5	3.9	18.6
NH White PRM per 100,000 live births (N=47)	22.5 (7.4)	13.3–39.9	10.9	27.6
State and local expenditure in health and non-health domains (% of the total spending)				
Education services	28.7 (3.6)	16.8–34.9	4.7	31.4
Elementary and secondary education	18.0 (2.5)	12.8–24.6	3.3	19.5
Higher education	8.7 (2.4)	0.9–14.9	3.4	10.4
Social services and income maintenance	25.7 (4.5)	16.5–35.3	5.7	28.7
Public welfare	18.2 (4.1)	8.5–25.7	6.9	21.2
Hospitals	4.9 (3.4)	0.3–13.4	4.6	6.6
Health	2.5 (1.0)	1.1–4.6	1.5	3.1
Transportation	6.9 (2.4)	2.8–17.1	2.9	8.0
Highways and roads	6.0 (2.3)	2.7–16.2	2.4	6.9
Public safety	6.7 (1.3)	4.6–10.8	1.4	7.2
Police protection	2.9 (0.6)	1.8–4.9	0.7	3.3
Fire protection	1.3 (0.4)	0.3–2.6	0.6	1.6
Corrections	2.1 (0.5)	1.0–3.4	0.8	2.5
Environment and housing	6.0 (1.3)	4.0–10.9	1.6	6.7
Natural resources	1.1 (0.7)	0.2–2.9	0.8	1.3
Parks and recreation	1.3 (0.5)	0.5–3.0	0.6	1.5
Housing and community development	1.4 (0.7)	0.2–4.6	0.6	1.6
Sewerage and solid waste management	2.2 (0.6)	1.4–4.3	0.5	2.4
State level covariates (2014–2018 5-year average)				
State and local expenditure per capita (USD)	11.1 (32.2)	7.7–25.0	2.8	11.9
Poverty (% of state population with income below Federal Poverty Level)	13.7 (2.9)	7.9–20.8	4.9	16.0
Income inequality (Gini coefficient)	46.5 (2.0)	42.3–52.8	2.8	47.9
Total state population	6,335,415.5 (7,239,790.7)	582,488–39,207,820.2	560,928.2	7,293,082.6
College graduates (% of state population age 25 years and older)	30.9 (6.3)	20.2–57.2	6.9	33.8
NH White (% of state population)	68.5 (16.2)	22.1–93.4	23.5	16.2
Residence in urban county (% of state population)	74.1 (14.9)	38.7–100.0	23.1	8.8
Foreign-born population (% of state population)	9.3 (6.1)	1.6–26.9	9.4	14.00
Violent crime rate (per 100,000 population)	381.9 (187.1)	119.3–1273.6	204.9	462.5
Wildfires	1,297.1 (1,835.5)	1.6–9723.0	1,360.0	1,495.4
Medicaid expenditure per capita (USD)	3,174.8 (1,140.9)	1,441.8–7,312.4	1,523.3	3,818.4

Variable	Mean (SD)	Range	IQR	75th percentile
Births covered by Medicaid (% of all births in 2015–2019)	16.3 (4.2)	9.9–27.8	6.3	19.3
Births covered by Medicaid (% of all births in 2015–2019)	41.1 (8.8)	24.0–62.3	10.5	46.8
Medicaid expansion status in 2015, n (%)				
Yes	32 (62.8)			
No	19 (37.2)			
Region, n (%)				
Midwest	12 (23.5)			
Northeast	9 (17.7)			
South	17 (33.3)			
West	13 (25.5)			
Legislature, n (%)				
Democrat	11 (22.0)			
Republican	31 (62.0)			
Split	8 (16.0)			
Pregnancy checkbox, n (%)				
Yes	49 (96.1)			
No	2 (3.9)			

^aNH Black PRM ratios, Hispanic PRM, and NH White PRM ratios were calculated only in states with a minimum of 5 Black, Hispanic, and White maternal deaths within the 5-year period, respectively. PRM, NH Black PRM, Hispanic PRM, and NH White PRM ratios were weighted by the number of live births in each population.

PRM, pregnancy-related mortality; NH, non-Hispanic, USD, U.S. Dollar

Table 2.

Associations Between Pregnancy-Related Mortality, Including Stratified by Race/Ethnicity, and State and Local Government Expenditures

Variable	Overall PRM ARR (95% CI)	Black PRM ARR (95% CI)	Hispanic PRM ARR (95% CI)	White PRM ARR (95% CI)
Education services	1.04 (0.99, 1.10)	1.10** (1.06, 1.14)	0.97 (0.93, 1.01)	1.03 (0.98, 1.08)
Social services and income maintenance	1.00 (0.96, 1.05)	0.99 (0.94, 1.04)	1.03 (1.00, 1.07)	1.01 (0.98, 1.05)
Transportation	0.89* (0.83, 0.95)	0.88** (0.84, 0.93)	0.89* (0.81, 0.98)	0.91** (0.86, 0.97)
Public safety	0.92 (0.81, 1.03)	0.98 (0.84, 1.14)	0.99 (0.88, 1.10)	0.88 (0.78, 1.01)
Environment and housing	1.01 (0.95, 1.07)	0.92 (0.83, 1.02)	1.07 (0.99, 1.15)	0.99 (0.93, 1.05)

^aRace/ethnicity categories are mutually exclusive (i.e., non-Hispanic Black, non-Hispanic White, and Hispanic any race).

^bAll models adjusted for local and state total spending per capita, state population size, state-level poverty, income inequality (Gini coefficient), % population with BA degree or higher, % non-Hispanic White population, % urban population, % foreign-born population, Medicaid expansion status, average % of births covered by Medicaid, average % of births to women over 35 years old, and regional differences. Models predicting the study's outcomes by the proportion of the overall spending on public safety domain also included state level violent crime rate as a covariate. Boldface indicates statistical significance (* $p < 0.05$; ** $p < 0.01$).

PRM, pregnancy-related mortality; ARR, adjusted rate ratios.

Table 3.

Associations Between PRM, Including Stratified by Race/Ethnicity, and State and Local Government Spending Allocated to Specific Sub-Domains

Spending domains	Overall PRM ARR (95% CI)	Black PRM ARR (95% CI)	Hispanic PRM ARR (95% CI)	White PRM ARR (95% CI)
Education services				
Elementary and secondary education	1.07** (1.04, 1.11)	1.09** (1.06, 1.11)	1.00 (0.95, 1.05)	1.05* (1.01, 1.10)
Higher education	0.90* (0.86, 0.94)	0.93** (0.89, 0.97)	0.91** (0.87, 0.95)	0.92** (0.88, 0.96)
Social services and income maintenance				
Public welfare	1.00 (0.98, 1.03)	1.04 (0.98, 1.10)	1.03 (0.99, 1.08)	1.01 (0.99, 1.04)
Hospitals	1.00 (0.96, 1.05)	0.96* (0.93, 0.99)	0.99 (0.95, 1.03)	1.01 (0.97, 1.06)
Health	1.01 (0.91, 1.11)	1.02 (0.88, 1.17)	1.05 (0.94, 1.18)	0.95 (0.86, 1.03)
Transportation				
Highways and roads	0.87** (0.81, 0.94)	0.86** (0.81, 0.91)	0.86** (0.79, 0.94)	0.90** (0.84, 0.96)
Public safety				
Police protection	0.82 (0.67, 1.00)	0.87 (0.71, 1.06)	0.82 (0.66, 1.03)	0.80** (0.69, 0.94)
Fire protection	1.08 (0.76, 1.55)	1.08 (0.77, 1.51)	1.33 (0.93, 1.92)	1.37** (1.13, 1.66)
Corrections	0.97 (0.80, 1.16)	1.08 (0.82, 1.42)	1.04 (0.87, 1.25)	0.95 (0.80, 1.14)
Environment and housing				
Natural resources	0.95 (0.86, 1.04)	0.82* (0.70, 0.95)	1.11 (0.96, 1.29)	0.92 (0.84, 1.01)
Parks and recreation	0.68* (0.49, 0.95)	0.45** (0.31, 0.67)	0.59** (0.50, 0.69)	0.71** (0.55, 0.90)
Housing and community development	1.26 (0.97, 1.64)	1.05 (0.72, 1.54)	1.19 (0.93, 1.53)	1.26 (0.99, 1.59)
Sewerage and solid waste management	1.10 (0.88, 1.38)	1.29 (0.95, 1.75)	1.29** (1.18, 1.42)	1.00 (0.78, 1.27)

^aRace/ethnicity categories are mutually exclusive (i.e., non-Hispanic Black, non-Hispanic White, and Hispanic any race).

^bAll models adjusted for local and state total spending per capita, state population size, state-level poverty, income inequality (Gini coefficient), % population with BA degree or higher, % non-Hispanic White population, % urban population, % foreign-born population, Medicaid expansion status, average % of births covered by Medicaid, average % of births to women over 35 years old, and regional differences. Models predicting the study's outcomes by the proportion of the overall spending on public safety domain also included state level violent crime rate as a covariate. Boldface indicates statistical significance (* $p < 0.05$; ** $p < 0.01$).

PRM, pregnancy-related mortality; ARR, adjusted rate ratios.