

AIDS

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## CONCISE COMMUNICATION

Association of HIV Diagnosis Rates and Laws Criminalizing HIV Exposure in the United States

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### Disclaimer

The findings and conclusions in this study are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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## Abstract

**Objective:** To assess whether state criminal exposure laws are associated with HIV and stage 3 (AIDS) diagnosis rates in the United States.

**Design:** We assessed the relationship between HIV and stage 3 (AIDS) diagnosis data from the National HIV Surveillance System and the presence of a state criminal exposure law as identified through WestlawNext by using generalized estimating equations.

**Methods:** We limited analysis to persons aged  $\geq 13$  years with diagnosed HIV infection or AIDS reported to the National HIV Surveillance System of the Centers for Disease Control and Prevention. The primary outcome measures were rates of diagnosis of HIV (2001–2010 in 33 states) and AIDS (1994–2010 in 50 states) per 100,000 individuals per year. In addition to criminal exposure laws, state-level factors evaluated for inclusion in models included income, unemployment, poverty, education, urbanicity, and race/ethnicity.

**Results:** At the end of the study period, 30 states had laws criminalizing HIV exposure. In bivariate models ( $P < .05$ ), unemployment, poverty, education, urbanicity, and race/ethnicity were associated with HIV and AIDS diagnoses. In final models, proportion of adults with less than a high school education and percentage of the population living in urban areas were significantly associated with HIV and AIDS diagnoses over time; criminal exposure laws were not associated with diagnosis rates.

**Conclusions:** We found no association between HIV or AIDS diagnosis rates and criminal exposure laws across states over time, suggesting that these laws have had no detectable HIV prevention effect.

**Key Words:** HIV criminal exposure laws, HIV exposure laws, HIV-specific criminal laws, HIV policy, HIV prevention

## Introduction

Preventing HIV infection continues to present a substantial public health challenge in the United States. Since 2010, HIV infection has been diagnosed for approximately 40,000 persons each year.<sup>1</sup> Large disparities persist with blacks or African Americans (hereafter referred to as blacks), Hispanic/Latinos, men who have sex with men and persons who inject drugs most severely affected.<sup>2</sup> The National HIV/AIDS Strategy (NHAS), released in 2010 and updated in 2015, calls for renewed and coordinated efforts to reduce the number of new HIV infections and decrease HIV-related health disparities.<sup>3,4</sup> The NHAS also calls for reexamination of HIV-specific laws and policies, including review of the broad range of criminal statutes to ensure their consistency with current science and public health approaches to HIV prevention and treatment.

Although several studies have investigated the relationship between specific public policies and sexually transmitted diseases,<sup>5,6,7</sup> few studies have explored the relationship between legislated policies and HIV or focused on criminal exposure laws and HIV diagnosis rates.<sup>8,9</sup> In general, criminal exposure laws impose criminal penalties on persons who know they have HIV and subsequently engage in certain behaviors, such as sexual activity without disclosing their infection status. States have implemented these laws at various times and key characteristics of the laws, such as the extent they require documentation of transmission and whether the behaviors pose high or very minimal risk of transmission, vary.<sup>10</sup> Few take into account whether measures such as condom use or

use of antiretroviral medications were taken to reduce the risk of transmission.<sup>10</sup>

Whether these laws may influence risk behaviors that could lead to transmission and whether they ultimately serve to advance or undermine prevention goals has been debated.<sup>11-14</sup> We assessed whether criminal exposure laws, were associated with HIV and AIDS diagnoses rates by state.

## **Methods**

We conducted a longitudinal analysis, using annual state-level data on criminal exposure laws, HIV and AIDS diagnoses, and social and economic data from the U.S. Census Bureau.

### **Law Database**

We used WestlawNext to identify states with criminal exposure laws. Applying primary legal research methods,<sup>15,16,17</sup> we used broad search terms (“HIV,” “human immunodeficiency virus,” “AIDS,” “acquired immunodeficiency syndrome,” “sexual! transmit! disease!,” “sexual! transmit! infection!” “communicable disease!”, and “venereal disease!”) to locate applicable laws. We collected information about laws that criminalize behaviors that could expose another person to HIV (e.g., through oral, anal, or vaginal sex; donation of blood or tissue; biting or spitting). For each year from 1994-2010, each state was coded as having a criminal exposure law or not; states with such laws were also coded for the year the law was enacted. Key characteristics of the laws have been described previously.<sup>10</sup> Categorization of laws for this analysis included

information updated in August 2014. (See website for additional information

<https://www.cdc.gov/hiv/policies/law/states/exposure.html>)

### **HIV Surveillance Data**

The main outcome variables, HIV infection and AIDS diagnosis rates were obtained from the Centers for Disease Control and Prevention's (CDC's) National HIV Surveillance System. For analysis of HIV diagnosis rates, we included persons with diagnosed HIV (regardless of stage of diagnosis) during 2001-2010, reported to CDC through June 2012, in 33 states that had confidential HIV infection reporting from 2001-2010: Alabama, Alaska, Arizona, Arkansas, Colorado, Florida, Idaho, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, West Virginia, Wisconsin, and Wyoming. For analysis of diagnosis rates of HIV infection classified as AIDS, we included persons whose infections were classified as AIDS during 1994-2010 in all 50 states.

We restricted this analysis to the population aged  $\geq 13$  years reported to CDC through June 2012. Rates per 100,000 population were calculated in each state per year by using population denominators from the U.S. Census Bureau. Data were statistically adjusted for reporting delays.<sup>1,18</sup>

## Social and Economic Data

We obtained state-level data for each year from 1994-2010:

- Poverty: percentage of state population with income in the past 12 months below poverty level.<sup>19</sup>
- Median income: household median income.<sup>20</sup>
- Unemployment: state unemployment rates.<sup>21</sup>
- Education: percentage of persons aged  $\geq 25$  years, with less than high school education 1994–2006<sup>22</sup> and 2007–2010.<sup>23</sup>
- Race/ethnicity: percentage of non-Hispanic blacks, Hispanics, and non-Hispanic whites.<sup>24,25</sup>
- Urban residence: percentage of the state population residing in urban areas. Because annual state-specific estimates were not available, we used the 1990 state estimates for each year during 1994–1995,<sup>26</sup> the 2000 state estimates for each year during 1996–2005,<sup>27</sup> and the 2010 state estimates for each year during 2006–2010.<sup>28</sup>

## Data Analysis

We use generalized estimating equations to evaluate the association of HIV criminalization laws with HIV and AIDS diagnosis rates over time. We treated log-transformed HIV and AIDS rates as separate outcomes<sup>29</sup> and evaluated the association of each state-level factor as well as having a criminal exposure law against each outcome. A multivariable linear regression model examined the association between criminal exposure laws and each outcome. We associated diagnosis data (time =  $t$ ) with law data

from the previous year (time =  $t-1$ ) to evaluate whether a law (in effect for at least 1 year). The best subset selection method was used to determine the variables included in the final adjusted model with criteria based on the smallest Akaike's Information Criteria (AIC). Analyses were performed using SAS, version 9.3 (SAS Institute).

## Results

By the end of 2010, 30 states had criminal exposure laws. During the study period, the distribution of AIDS diagnosis rates and HIV diagnoses varied across states. Income and unemployment increased between 2000 and 2010 for all states; trends in summary statistics for state-level factors at three time periods were similar for both states with and without criminalization laws (**Table 1**). There was little change in the number of states with laws over the whole study period. Urbanicity, unemployment, low education, poverty and minority populations were positive and significantly associated with HIV and AIDS diagnoses rates ( $p < .05$ ; Table 2). In both adjusted bivariable models, low education and urbanicity were significantly associated with HIV and AIDS diagnoses rates; having a criminal exposure law was not (**Table 2**). Models incorporating a 5-year lag for implementation showed similar results (not shown).

## Discussion

In this ecologic analysis, we found no association between diagnosis rates and state criminal exposure laws. Although other analyses have examined the relationship of



structural interventions and HIV, none have focused on laws that criminalize behaviors that could expose others to HIV infection and HIV diagnoses. Since the 1980s and early 1990s, when most states implemented these laws, there has been an ongoing discussion about whether these laws affect behavior or transmission.<sup>10-14,30-33</sup> Criminal exposure laws could potentially reduce transmission by encouraging disclosure of HIV status to comply with the law or by deterring HIV-positive persons from engaging in behaviors that could expose others. On the other hand, these laws could increase transmission by discouraging testing or disclosure because of perceived stigma or by discouraging HIV-positive persons from learning their HIV status (to avoid satisfying the “knowing” element of the crime).<sup>11,12,14,30</sup> In the end, these laws may have no effect on transmission because limited knowledge of such laws results in no impact on behaviors.<sup>12</sup> Finding no association between HIV or AIDS diagnoses rates and laws that criminalize HIV exposure supports the hypothesis that these laws have not affected HIV behaviors or transmission.

Our findings that low education and urbanicity were associated with HIV diagnosis rates are consistent with other analyses of national surveillance data in which high rates of HIV diagnoses in areas (census tracts) were associated with higher percentage of residents with less than high school education<sup>34</sup> and high rates of HIV diagnoses occurring in large metropolitan area.<sup>35,36</sup> These results complement other work underscoring the benefits of multifactorial HIV prevention approaches that include considerations of social determinants and the communities most affected by HIV.<sup>2,3</sup> Finally, while HIV diagnosis data do not directly represent incidence because persons may not be diagnosed and

reported for several years after infection, long-term temporal trends in HIV diagnoses, like those in this analysis, likely reflect changes in incidence over time, especially with stable or increasing rates of HIV testing over the same time period, and evidence that 87% of persons with HIV have been diagnosed in recent years.<sup>37,38,39</sup> Although the period between infection and diagnosis with AIDS may be many years, AIDS diagnoses data were available for all states and provided more years of data. In addition, HIV criminal exposure laws could influence care seeking behavior, therefore demonstrating association with AIDS diagnoses. The finding that results were consistent for analyses of HIV in 33 states and AIDS diagnoses in all states is a strength of this study.

Our analysis has several limitations. First, ecologic analyses such as this one are intended to reveal associations between policies and health outcomes not causation. Additionally, we only classified states as either having HIV-specific criminal exposure law during each year of the analysis period or not and we did not include more detailed categorization of laws. State laws vary (e.g., which acts are criminalized, whether the crime is a misdemeanor or a felony, which defenses are available) which could affect their impact on diagnoses.<sup>13</sup> Also, because states can use (and have used) general criminal laws—such as assault and battery or attempted murder—or communicable disease laws to prosecute persons accused of exposing others to HIV, the absence of a criminal exposure law does not mean that exposure incidents were not prosecuted in that state. Prosecution data or other factors to measure enforcement of these laws were unavailable. Additionally, HIV prevalence in a jurisdiction may also influence new diagnoses and we did not adjust for HIV prevalence in our analysis. Finally, because this was a national analysis of state-

level data, local factors were not considered. Other factors related to the implementation of these types of laws may also affect this type of ecologic analysis.

Reducing misperceptions, stigma and discrimination to break down barriers to HIV prevention is an explicit goal of the NHAS. To that end, state governments have been encouraged to review criminal laws to ensure they reflect current science on transmission risk as well as further public interest and public health.<sup>4,40</sup> Because at least some of the rationale for implementing criminal exposure laws was to reduce HIV transmission, our findings may provide useful scientific information for policy discussions. Our finding of no association between HIV diagnosis rates and state criminal exposure laws, suggests these laws have had no detectable HIV prevention effect in the United States.

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## References

1. Centers for Disease Control and Prevention. HIV Surveillance Report, 2014; vol 26. <https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2014-vol-26.pdf> Published November 2015. Accessed December 15, 2016.
2. Centers for Disease Control and Prevention. HIV infection—United States, 2008 and 2010. In: CDC Health Disparities and Inequalities Report—United States, 2013. MMWR Supplements. 2013; 62(suppl 03);112-119.
3. National HIV/AIDS strategy for the United States. <http://www.whitehouse.gov/sites/default/files/uploads/NHAS.pdf>. Published July 2010. Accessed February 19, 2014.
4. National HIV/AIDS strategy for the United States: Updated to 2020. <https://www.aids.gov/federal-resources/national-hiv-aids-strategy/nhas-update.pdf>. Published July 2015.
5. Sen A, Luong M. Estimating the impact of beer prices on the incidence of sexually transmitted diseases: cross-providence and time series evidence from Canada. *Contemp Econ Policy*. 2008;26(4):505-517.
6. Chesson H, Harrison P, Kassler WJ. Sex under the influence: the effect of alcohol policy on sexually transmitted disease rates in the United States. *J Law Econ*. 2000; 43(1):215-238.
7. Caprara K. The effect of strict alcohol policies on America's sexually transmitted disease rates. In: *Proceedings of the New York State Economics Association*. Vol 3, September 2010, pp 19-27. <http://nysea.bizland.com>. Accessed February 19, 2015.
8. Cohen DA, Wu SY, Farley TA. Structural interventions to prevent HIV/ sexually transmitted disease: are they cost-effective for women in the southern United States? *Sex Transm Dis*. 2006; 33 (7 Suppl):S46-S49.

9. Forsyth, AD, Valdiserri RO. A state-level analysis of social and structural factors and HIV outcomes among men who have sex with men in the United States. *AIDS Educ Prev* 2015;27(6):493-504.

10. Lehman JS, Carr MH, Nichol AJ, et al. Prevalence and public health implications of state laws that criminalize potential HIV exposure in the United States. *AIDS Behav*. 2014;18:997-1006. doi:10.1007/s10461-014-0724-015.1.

11. Burris S, Cameron E. The case against criminalization of HIV transmission. *JAMA*. 2008;300(5):578-581.

12. Burris S, Beletsky L, Bureson J, et al. Do criminal laws influence HIV risk behavior? An empirical trial. *Arizona State Law J*. 2007;39:467-517.

13. Lazzarini Z, Bray S, Burris S. Evaluating the impact of criminal laws on HIV risk behavior. *J Law Med Ethics*. 2002;30(2):239-253.

14. Wolf LE, Vezina R. Crime and punishment: is there a role for criminal law in HIV prevention policy? *Whittier Law Review*. 2004;25:821-886.

15. Burris S, Wagenaar AC, Swanson J, et al. Making the case for laws that improve health: a framework for public health law research. *Milbank Q*. 2010;88(2):169-210.

16. Burris S, Anderson E. The challenges of quantitative public health law research. *Am J Prev Med*. 2010;39(1):99-901.

12. Tremper C, Thomas S, Wagenaar AC. Measuring law for evaluation research. *Eval Rev*. 2010;34(3):242-266.

18. Song R, Green TA. An improved approach to accounting for reporting delay in case surveillance systems. *JP J Biostat*. 2012;7(1):1-14.

19. US Census Bureau. Historical Poverty Tables—People, Table 21: Number of poor and poverty rate, by state, 1980 to 2013. <http://www.census.gov/hhes/www/poverty/data/historical/people.html> (or <http://www.census.gov/hhes/www/poverty/data/historical/hstpov21.xls> to open the table in Excel). Accessed February 20, 2013.

20. US Census Bureau. State Median Income, Annual Social and Economic Supplement: Median household income by state, single-year estimates (1984 to 2013).

<http://www.census.gov/hhes/www/income/data/statemedian/> (or <http://www.census.gov/hhes/www/income/data/historical/household/2013/h08.xls> to open the supplement in Excel). Accessed July 15, 201

21. Bureau of Labor Statistics, US Department of Labor. Annual state unemployment rates retrieved from <http://www.bls.gov/lau/> Accessed February 27, 2013.

22. US Census Bureau. Current Population Survey on Educational Attainment; data for 1990 to 2006 retrieved from <http://www.census.gov/hhes/socdemo/education/data/cps/>. Accessed March 3, 2013.

23. US Census Bureau. American FactFinder; American Community Survey data for 2007 to 2010 on educational attainment retrieved from <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>. Accessed March 3, 2013.

24. National Center for Health Statistics. Bridged-race intercensal estimates of the resident population of the United States for July 1, 1990–July 1, 1999, by year, county, single-year of age (0, 1, 2, ..., 85 years and over), bridged race, Hispanic origin, and sex. Prepared under a collaborative arrangement with the U.S. Census Bureau. Retrieved from [/nchs/nvss/bridged\\_race.htm](/nchs/nvss/bridged_race.htm) March 3, 2013, following release by the US Census Bureau of the revised unbridged intercensal estimates by 5-year age group on July 26, 2004.

25. National Center for Health Statistics. Bridged-race intercensal estimates of the resident population of the United States for July 1, 2000–July 1, 2010, by year, county, single-year of age (0, 1, 2, ..., 85 years and over), bridged race, Hispanic origin, and sex. Prepared under a collaborative arrangement with the U.S. Census Bureau. Retrieved from [/nchs/nvss/bridged\\_race.htm](/nchs/nvss/bridged_race.htm) March 3, 2013, following release by the U.S. Census Bureau of the revised unbridged intercensal estimates by 5-year age group on May 31, 2012.

26. US Census Bureau. The 2012 Statistical Abstract—Population, Table 29: Urban and rural population by state. 1990 Data retrieved from <http://www.census.gov/compendia/statab/2012/tables/12s0029.pdf>. Accessed November 19, 2014.

27. US Census Bureau. American FactFinder; Table H002: Urban and rural housing units, 2000 Census Summary File 1. Data retrieved from [http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC\\_00\\_SF1\\_H002&prodType=table](http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_00_SF1_H002&prodType=table). Accessed November 19, 2014.

28. US Census Bureau. American FactFinder; Table H2: Urban and rural housing units, 2010 Census Summary File 1. Data retrieved from [http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC10\\_SF1\\_H2&prodType=table](http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC10_SF1_H2&prodType=table). Accessed November 19, 2014.

29. French, B and Heagerty, P.J. Analysis of longitudinal data to evaluate a policy change. *Statist Med*. 2008;27:5005-5025.

30. O'Toole EM. HIV-specific crime legislation: targeting an epidemic for criminal prosecution. *J Law Health*. 1995-1996;10(1):183-208.

31. Galletly CL, Pinkerton, SD. Preventing HIV Transmission via HIV exposure laws: Applying logic and mathematical modeling to compare statutory approaches to penalizing undisclosed exposure to HIV. *J Law, Med Ethics*. 2008;36(3); 577-584.. doi:10.1111/j.1748-720X.2008.306.x.

32. Galletly CL, Glasman LR, Pinkerton SD, DiFranceisco W. New Jersey's HIV exposure law and HIV-related attitudes, beliefs, and sexual and seropositive status disclosure behaviors of persons living with HIV. *Am J Public Health*. 2012;102(11):2135-2140.

33. Horvath KJ, Weinmeyer R, Rosser S. Should it be illegal for HIV-positive persons to have unprotected sex without disclosure? an examination of attitudes among US men who have sex with men and the impact of state law. *AIDS Care*. 2010;22(10):1221-1228.

34. Centers for Disease Control and Prevention. Social determinants of health among adults with diagnosed HIV infection in 20 states, the District of Columbia, and Puerto Rico, 2010. *HIV Surveillance Supplemental Report* 2014;19(No. 2). Revised edition. <http://www.cdc.gov/hiv/library/reports/surveillance/>. Published July 2014. Accessed February 19, 2015.

35. Centers for Disease Control and Prevention. Diagnosed HIV infection among adults and adolescents in metropolitan statistical areas—United States and Puerto Rico, 2011. *HIV Surveillance Supplemental Report* 2013;18(No. 8). Revised edition. <http://www.cdc.gov/hiv/library/reports/surveillance/>. Published March 2014. Accessed February 19, 2015.

36. Hall HI, Espinoza L, Benbow N, Hu YW; for Urban Areas HIV Surveillance Workgroup. Epidemiology of HIV infection in large urban areas in the

United States. *PLoS One*. 2010;5(9):e12756. doi:10.1371/journal.pone.0012756.

37. Satcher Johnson, A, Hall, HI, Hu X, Lansky A, Holtgrave DR, Mermin J. Trends in Diagnoses of HIV Infection in the United States, 2002-2011. *JAMA*. 2014; 312(4):432-434. doi: 10.1001/jama.2014.8534.

38. Centers for Disease Control and Prevention. *HIV Testing Trends in the United States, 2000-2011*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; January 2013:1-35.

[http://www.cdc.gov/hiv/pdf/testing\\_trends.pdf](http://www.cdc.gov/hiv/pdf/testing_trends.pdf) Accessed September 30, 2015.

39. Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data—United States and 6 dependent areas—2013. *HIV Surveillance Supplemental Report* 2015;20(No. 2).

<http://www.cdc.gov/hiv/library/reports/surveillance/>. Published July 2015. Accessed September 30, 2015.

40. U.S Department of Justice, Civil Rights Division. Best Practices Guide to Reform HIV-Specific Criminal Laws to Align with Scientifically Supported

Factors. <http://hivlawandpolicy.org/sites/www.hivlawandpolicy.org/files/DOj-HIV-Criminal-Law-Best-Practices-Guide.pdf>. Accessed September 30, 2015.



**Table 1.** Description of State-level Factors at Three Time Periods for States With or Without Criminal Exposure Laws

	2000		2005		2010	
	States with Laws (n=27)	States without Laws (n=23)	States with Laws (n=29)	States without Laws (n=21)	States with Laws (n=30)	States without Laws (n=20)
Median Household Income (mean in dollars)	41355.30	42264.43	45321.14	47495.19	48748.54	51577.40
Unemployment rate (mean %)	3.7	4.0	5.1	4.6	9.2	8.1
Percent of Population						
Below Poverty Level (mean %)	10.8	10.7	12.3	11.8	14.7	13.4
Less than HS Education (mean %)	14.8	14.2	13.9	12.6	13.3	12.2
Residing in Urban Areas (mean %)	72.6	68.2	71.5	69.3	72.8	70.6
Hispanic (mean %)	7.1	8.7	8.2	10.5	9.4	12.0
Non-Hispanic white (mean %)	76.4	77.0	74.3	75.5	72.3	74.2
Non-Hispanic black (mean %)	12.5	7.3	13.2	6.4	13.2	6.8

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**Table 2.** Crude and Adjusted Model Results with 1-year lag for HIV Diagnoses and AIDS Diagnoses by HIV Criminal Exposure Law and Selected Demographic State-level Characteristics, United States

	Models			
	Crude		Adjusted	
	$\beta$ (95% CI)	P value	$\beta$ (95% CI)	P value
	<b>HIV diagnoses, states, 2001–2010 (n=33)</b>			
HIV criminal exposure law	0.09 (-0.34, 0.52)	0.69	0.08 (-0.18, 0.34)	0.55
Median household income	0	0.63		
Unemployment rate	0.08 (0.03, 0.14)	0.005		
Percent of Population				
Hispanic	0.02 (0.0004, 0.04)	0.05		
Non-Hispanic black	0.06 (0.04, 0.07)	<.0001		
Non-Hispanic white	- 0.04 (-0.05, -0.02)	<.0001		
Below poverty level	0.08 (0.03, 0.12)	0.001		
Less than high school education	0.11 (0.08, 0.15)	<.0001	0.12 (0.09, 0.15)	<.0001
Residing in urban areas	0.03 (0.01, 0.04)	<.0001	0.03 (0.02, 0.04)	<.0001
	<b>AIDS diagnoses, states, 1994–2010 (n=50)</b>			
HIV criminal exposure law	-0.15 (-0.57, 0.28)	0.30	-0.01 (-0.27, 0.26)	0.95
Median household income	0	0.39		
Unemployment rate	0.08 (0.004, 0.15)	0.04		
Percent of Population				
Hispanic	0.02 (0.003, 0.04)	0.03		
Non-Hispanic black	0.06 (0.04, 0.07)	<.0001		
Non-Hispanic white	-0.03 (-0.05, -0.02)	0.0001		
Below poverty level	0.05 (-0.002, 0.09)	0.06		
Less than high school education	0.10 (0.06, 0.13)	<.0001	0.10 (0.08, 0.12)	<.0001
Residing in urban areas	0.03 (0.02, 0.04)	<.0001	0.03 (0.02, 0.04)	<.0001