Spatial Variation in Very Preterm Birth to Hispanic Women Across the United States: The Role of Intensified Immigration Enforcement

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Introduction: Limited existing research suggests that immigration climate and enforcement practices represent a social determinant of health for immigrants, their families, and communities. However, national research on the impact of specific policies is limited. The goal of this article is to estimate the effect of county-level participation in a 287(g) immigration enforcement agreement on very preterm birth (VPTB, <32 weeks' gestation) rates between 2005-2016 among US-born and foreign-born Hispanic women across the United States.

Methods: We fit spatial Bayesian models to estimate the effect of local participation in a 287(g) program on county VPTB rates, accounting for variation by maternal nativity, county ethnic density, and controlling for individual specific Hispanic background and nativity and county-level confounders.

Results: While there was no global effect of county participation in a 287(g) program on county VPTB rates, rates were slightly increased in some counties, primarily in the Southeast (Virginia, North Carolina, South Carolina).

Future Directions: Future research should consider the mechanisms through which immigration policies and enforcement may impact health of both immigrants and wider communities.
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Background

Structural racism is defined as "the processes of racism that are embedded in laws (local, state, and federal), policies, and practices of society and its institutions that provide advantages to racial groups deemed as superior, while differentially oppressing, disadvantaging, or otherwise neglecting racial groups viewed as inferior."[1,p107] Due to the pervasive and embedded nature of structural racism, it may adversely affect health more than any other form of racism.[1] Restrictive immigration policies are a form of structural racism, acting to systematically limit access to needed resources (eg, health care, work, education) for specific immigrant groups[1–4] and define these groups as "other"

resulting in experienced racism and stress.[2,5,6] Immigration policies and enforcement activities disproportionately affect Hispanic individuals who comprise the majority of the undocumented and non-citizen immigrant population.[2,7] Due to racially targeted enforcement, someone who appears Hispanic is often perceived as an undocumented immigrant, regardless of citizenship or nativity status.[4,7]

Variation in how, when, and where policies were implemented in the United States over time allows for studying the effect of specific immigration policies.[8] Policies may be restrictive, limiting access to resources and privileges, or inclusive, expanding access to resources and privileges.[2,5] Immigration enforcement activities include detentions

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and deportations, workplace or home raids, and traffic stops.[8,9] A growing body of work demonstrates a relationship between restrictive immigration policies and negative health outcomes.[5] Specifically, aggressive enforcement practices have been linked to increased risk of low birthweight and preterm birth, food insecurity, mental distress, and poor self-rated health for Hispanic immigrants and, in some cases, all Hispanic individuals.[10–14]

We focus on one local-level policy, the partnership of local police and Immigration and Customs Enforcement (ICE) to detain undocumented immigrants. Since 2005, the number of deportations per year has steadily increased, with interior removals (non-border crossing) peaking in 2009.[9] In addition, the patterning of deportations has changed. Since 1996, different programs have allowed for partnerships between local police and ICE to carry out enforcement activities.[8,15,16] One such program, the 287(g) program, begun in 1996, allows police departments to apply for and receive funding and training to conduct immigration enforcement activities.[17,18] While the stated goal of the program is to leverage police resources to target undocumented immigrants who had committed crimes, many police departments have used the program to target all potentially undocumented immigrants.[19-21] Overall, the proportion of individuals removed from the interior with no criminal conviction or only a traffic-related violation increased between 2003-2015, particularly among women and Latinos.[9]

Evidence suggests the 287(g) program acts as a form of structural racism, by creating stress and fear in Hispanic communities through racial profiling and targeting of communities for enforcement activities.[14,19-21] In 2009, a Government Accountability Office report to Congress on the 287(g) program described a lack of oversight, disproportionate number of arrests for traffic-related violations, and

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use of racial profiling language in its implementation in 29 reviewed districts.[21] Police departments set up traffic stops in primarily Hispanic neighborhoods, conducted workplace raids, and, in many cases, used the law to harass entire communities.[19,20] Local evidence shows that, following implementation of 287(g) programs, police officers targeted individuals who 'looked like' possible undocumented immigrants – namely, Hispanic in-

dividuals. In an analysis of police driver's license-related arrest narratives before and following the implementation of 287(g) in Davidson County, Tennessee, Donato and Rodriguez found an increase in the use of terms like "foreignness" to describe the reasons for a traffic stop following implementation.[20] In a qualitative study in North Carolina, Hispanic participants described increased worry and mistrust of government following implementation of a 287(g) program.[14]

In this analysis, we focus on the potential health effects of increases in experienced stress due to structural and interpersonal racism following the implementation of 287(g) programs. Increased chronic stress prior to and during pregnancy, at individual, interpersonal, and environmental levels is associated with increased risk of very preterm birth.[22,23] Though biological mechanisms have not been completely described, this risk likely stems from weathering of physiologic systems, changes in neuroendocrine or immune system responses, or maladaptive behaviors (eg, smoking) in response to increased chronic stress.[24] Previous research has linked environmental stressors (segregation, immigration policy climate) to increased risk of very preterm birth.[25,26] Very preterm birth (VPTB, defined as live birth <32 weeks completed gestation) is a high risk, homogenous subset of preterm births (<37 weeks gestation) and critical indicator of population health.[27]

The 287(g) program can be considered as a spatially varying,

environmental stressor. Local jurisdictions choose to participate in 287(g) and administer much of the program, resulting in variations in where, when, and how adoption of 287(g) programs takes place. Generally, immigration enforcement intensity varies spatially, due to local and state policy context and differences in policy implementation.[15,18] The effects of enforcement may not be restricted to participating jurisdictions. For example, members of nearby communities may travel through, and thereby be affected by 287(g) programs without living within that jurisdiction. This produces spatial spillover because the impact of the policy is not geographically isolated. The health effects of immigration enforcement may also vary by characteristics of place. For instance, geographically diverse social and political climates, including varying levels of access to community, health, economic, and political resources, may either buffer or exacerbate the effects of local 287(g) participation. Because of the potential for spatial spillover and the heterogeneity in other place-based factors, we explored the effect of 287(g) on VPTB in an explicitly spatial framework. This allows us to explore both residual autocorrelation that could bias estimates and whether the effect of 287(g) participation may impact health in different ways in different places, depending on geographic characteristics.

The goal of this research was to estimate the effect of adoption of a 287(g) immigration enforcement agreement on county-level VPTB rates among US-born and foreign-born Hispanic women. Within this article, we report on our findings that answer these key research questions: 1) What is the overall effect of local adoption of a 287(g) immigration enforcement agreement on county-level VPTB rates among Hispanic women? 2) Does the effect of 287(g) participation on VPTB rates vary by maternal nativity (US-born vs foreign-born)? 3) Does the effect of 287(g) participation on VPTB rates vary spatially due to unmeasured factors?

Methods

Population

We used data from the 2005-2016 US live birth file, excluding records missing gestational age (120,111), missing ethnicity (358,584), to non-Hispanic women (36,870,436), non-singleton (274,361), or missing (36,223) or invalid (81,800) maternal place of residence at delivery. We created a dataset aggregated at the level of county-year and included all county-year combinations with non-zero numbers of births to Hispanic women (11,210,097 births). We used information on maternal residence to link birth certificate data to five-year estimates from the American Community Survey (ACS) on county-level percent Hispanic residents, percent of individuals living below the federal poverty level, and percent foreign-born.[28] We also used maternal residence to link birth data to information from the Department of Homeland Security on whether any police jurisdiction within the county had a 287(g) agreement with Immigrations Customs Enforcement in place for that year.[29,30] We did not consider statewide 287(g) agreements (eg, with the Massachusetts State Department of Corrections).

Key Constructs and Measures

We created county-year-specific counts of births by gestational age. We estimated VPTB rates as the proportion of VPTBs among live births. Though 287(g) agreements occur at a jurisdiction level, their effects may occur at multiple levels including community (through increased worry or fear), interpersonal (through the detention or deportation of family members or neighbors), and individual (through increased police contact). We considered community- and individual-level confounders and potential modifiers of the effect of 287(g) on VPTB risk. At an individual level, we controlled for maternal nativity (US-born vs foreign-born) and specific Hispanic background (Mexican, Puerto Rican, Cuban, Central/South American, or other Hispanic). At a county level, we controlled for percent Hispanic (as a proxy for ethnic density), percent of residents who were foreign-born, and percent of families below the federal poverty level. We controlled for year to account for secular trends. Our exposure was dichotomous, whether any jurisdiction in the county had a 287(g) agreement in place for that year.

Analysis

To address all research questions, we estimated multilevel

spatial Bayesian models with conditionally autoregressive priors described by Besag, York and Mollié (BYM).[31] The BYM models assume that county-specific rates of VPTB may vary from one another, and that those differences can be described by estimating random effects that explicitly account for spatial relatedness (eg, which counties are adjacent and which are distant), as well as random effects that are spatially-independent. We used integrated nested Laplace approximation (INLA) for estimating posterior distributions. Bayesian analysis is well-suited for the questions at hand because it accommodates investigation of complex processes such as spatial spillover and heterogeneity, while producing reliable estimates even in the presence of sparse data by borrowing statistical information through spatial and non-spatial priors.[32] We present median incidence density ratios (IDRs) as effect estimates and exceedance probabilities bounding 60% and 90% credible intervals, as, with Bayesian CAR models, a 95% credible interval may result in a high false positive rate.[33]

To first describe the baseline variation in VPTB, we fit an unconditional model with only county random effects (model 0), then a model with all predictors except 287(g) (model 1). We then fit models with different specifications for the effects of the county random effect and 287(g). Briefly, we considered effects for each accounting for spatial structure (assuming a BYM prior specification) and assuming no spatial structure (with a spatially independent prior). We conduct-

ed all analyses in R version 3.5.1 (R Core Team, Vienna, Austria).

For research question 1, we sought to determine whether there was an overall (global) effect of 287(g) adoption on county VPTB rates among Hispanic mothers, conditional on individual and area-level potential confounders. We estimated negative binomial models considering the effect of 287(g) adoption on county VPTB rates, conditional on individual maternal nativity and Hispanic background and county-level percent Hispanic, poverty, percent foreign-born, and year. We accounted for potential spatial structure by including a spatial random effect for county (model 2). For research question 2, we extended this model to include an interaction term between maternal nativity and 287(g) adoption (model 3).

While research question 2 concerns whether the effect of 287(g) on VPTB rates differs for US- vs foreign-born Hispanic women, it is possible that the effect varies for other reasons. For instance, 287(g) adoption may have a stronger impact in some counties due to variation in policy implementation or other unmeasured county factors. Most regression models assume "stationarity" or that the effect of an exposure is the same in across all units (places). For research question 3, we explored possible non-stationarity by including a spatial random effect for 287(g) adoption in our model (models 4-6) and by considering effect modification by county-level ethnic density (model 6). To describe the pattern of variation,

we mapped the combined global effect of 287(g) with each county's additional spatially varying effect.

We conducted two main sensitivity analyses. First, we considered whether control for state immigration policy climate changed effect estimates. Second, we restricted the sample to women with Mexican or Central/South American background only, as these groups may be more likely to be impacted by intensified enforcement.

RESULTS

County and Population-level Characteristics

The final analytic dataset contained 11,210,097 births to Hispanic mothers in 3,162 counties in 50 states (Table 1). From 2005-2016, 57 counties adopted a 287(g) agreement for at least one year. There were more counties who adopted 287(g) agreements in the Southeast and East compared with the West, and almost no counties adopting 287(g) agreements in the Northwest or Midwest. Overall, 1.5% of births were very preterm and 10% were preterm (<37 completed weeks' gestation) (Table 1). This did not differ among counties that did and did not adopt 287(g). Generally, maternal characteristics (age, parity, relationship status, nativity, and education) were similar in counties that ever adopted and never adopted 287(g) agreements. However, compared with mothers in the ever adopter counties, in counties that never adopted 287(g), mothers were more likely to be of

Table 1. Descriptive characteristics by counties that ever or never adopted 287(g), 2005-2016, for 11,210,097 births to Hispanic women in the United States

	287(g) ever adopters	287(g) never adopters	Total
	n= 2,557,973 births	n= 8,652,124 births	n= 11,210,097 births
	n= 57 counties	n= 3,105 counties	n= 3,162 counties
Individual characteristics	% (n) / mean (SD)	% (n) / mean (SD)	% (n) / mean (SD)
Very preterm birth, < 32 weeks	1.47 (37,553)	1.52 (131,189)	1.51 (168,742)
Preterm birth, <37 weeks	10.5 (269726)	10.6 (918,726)	10.6 (1,188,452)
Maternal age	26.8 (6.2)	26.8 (6.2)	26.8 (6.2)
Primiparous	30.1 (769,873)	30.3 (2,617,335)	30.2 (3,387,208)
Relationship status			
Married	48.4 (1,236,773)	47.6 (4,114,552)	47.7 (5,351,325)
Unmarried, father's information on birth certificate	40.4 (1,034,478)	41 (3,548,809)	40.9 (4,583,287)
Unmarried, no father's information on birth certificate	11.2 (286,722)	11.4 (988,763)	11.4 (1,275,485)
Hispanic origin group			
Mexican	73.7 (1,884,878)	61.1 (5,289,539)	64.0 (7,174,417)
Puerto Rican	2.6 (67,177)	8.2 (706,244)	6.9 (773,421)
Cuban	.9 (21,854)	2.2 (187,589)	1.9 (209,443)
Other Central/South American	13.6 (347,795)	15.5 (1,344,220)	15.1 (1,692,015)
Other Hispanic	9.2 (236,269)	13 (1,124,532)	12.1 (1,360,801)
Foreign-born	57.6 (1,473,174)	55 (4,759,502)	55.6 (6,232,676)
Maternal education[a]			
8th grade or less	14.5 (330,088)	14.9 (1,208,182)	14.8 (1,538,270)
Some high school	27.1 (618,216)	24.5 (1,987,601)	25 (2,605,817)
High school grad	30.9 (705,741)	29.5 (2,396,440)	2981 (3,102,181)
Some college/associates	18.9 (431,893)	21 (1,709,823)	20.6 (2,141,716)
College or more	8.6 (197,069)	10.1 (822,723)	9.8 (1,019,792)
Place-based characteristics			
County classified as rural	.4 (10,693)	9.8 (847,629)	7.7 (858,322)
Percent of families living below FPL	15.5 (4.3)	16.5 (6.4)	16.3 (6.0)
Percent Hispanic	35.5 (16.0)	31.5 (22.1)	32.4 (21.0)
Percent foreign-born	23.0 (7.0)	21.3 (12.8)	21.7 (11.7)

[a]7.2% (802,321) missing

FPL, federal poverty level; 287(g), formal agreements between police departments and Immigration Customs Enforcement under section 287(g) of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996.
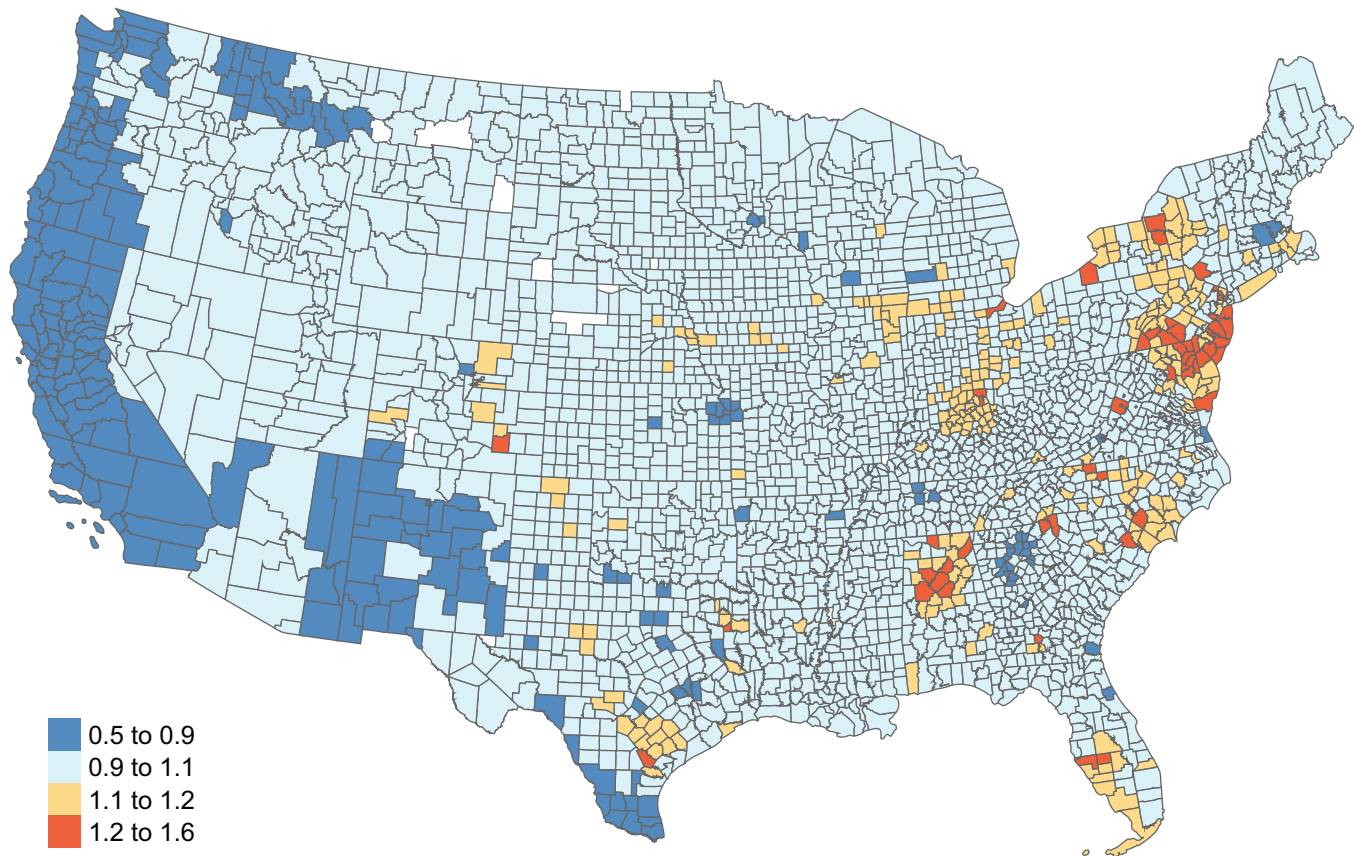
Figure 1. Standardized morbidity ratio
County Variation in Very Preterm Birth (< 32 weeks) to Hispanic Mothers, adjusting for nativity, year, percent poverty, Hispanic origin group, percent Hispanic, percent foreign born, 2005-2016, Model 1 Results, county Standardized Morbidity Ratios

Puerto Rican (8.2% vs 2.6%) or Cuban background (2.2% vs .9%). Counties that never, compared with ever, adopted 287(g) were more likely to be classified as rural (9.8% vs .4%) and had, on average, higher mean percent Hispanic (mean: 22.1[SD: 31.5] vs 16.0 [SD:35.5]) and higher mean percent foreign-born (mean: 12.8 [SD: 21.3] vs 7.0 [SD: 23.0]).

In order to describe baseline spatial variation in county VPTB rates, irrespective of 287(g) adoption, we mapped adjusted VPTB median standardized morbidity ratios (SMRs) and exceedance probabilities, conditional on maternal nativity, Hispanic background, year, county-level percent Hispanic, percent below federal poverty level, and percent foreign-born. The SMR (Figure 1) is interpreted as the relative deviation of each county from the national average VPTB rate for Hispanic women. For example, an SMR of 1.1 means that the county VPTB rate is 10% higher than the national average. The exceedance probability (Figure 2), is the posterior probability that the SMR is different from the null value of 1. We present exceedance probabilities bounding 90% (limits: .05, .95) and 60% (limits: .2, .8) credible intervals around the SMRs. For example, for a county with an exceedance probability of .1, only 10% of all estimated SMRs exceeded 1. Coun-

Table 2. Spatial and aspatial Bayesian models, model fit statistics and estimated median incidence density ratios for association of 287(g) adoption with very preterm birth, 11,210,097 births to Hispanic women in the United States, 2005-2016

Model (M)	Fixed effects	Aspatial random effects	Spatial random effects	DIC	IDR (95% CI)	
					US-born	Foreign-born
0	None	Intercept	Intercept	171652		
1	Year, nativity, percent below FPL, specific Hispanic origin, percent Hispanic, percent foreign-born	Intercept	Intercept	171653		
Research question 1						
2	M 1 + 287(g)	Intercept	Intercept	171645	1.02 (.99, 1.05)	
Research question 2						
3	M 2 + 287(g)*nativity	Intercept	Intercept	171645	.99 (.95, 1.02)	1.04 (1.01, 1.12)
Research question 3						
4	M 1 + 287(g)	Intercept, 287(g) slope	Intercept, 287(g) slope	171646	1.02 (.98, 1.06)	
5	M 4 + 287(g)*nativity	Intercept, 287(g) slope	Intercept, 287(g) slope	171645	.99 (.95, 1.03)	1.04 (.96, 1.13)
6	M 5 + 287(g)*percent Hispanic	Intercept, 287(g) slope	Intercept, 287(g) slope	171643	.99 (.87, 1.12)[a]	1.04 (.88, 1.23)[a]

DIC, deviance information criterion; IDR, incidence density ratio; FPL, federal poverty level.
a. At 25th percentile of percent Hispanic.

ties in the east generally had higher standardized morbidity ratios, with the lowest SMRs clustered along the California coast (Figure 1).

To answer the first research question regarding the overall effect of county 287(g) adoption, we estimated the association of 287(g) adoption with county VPTB rates accounting for spatial structure by including a county random intercept. The global effect of 287(g) adoption on county VPTB rates was null (incidence density ratio (IDR): 1.02 (.99, 1.05) (model 2,Table 2). To answer the second research question regarding differences in effect of 287(g) based

on individual women's nativity, we included an interaction term between 287(g) and nativity. There appeared to be slight heterogeneity by maternal nativity (model 3, Table 2). The IDR for US-born women was .99 [.95, 1.02]), whereas the IDR for foreign-born women was 1.04 [1.01, 1.12]).

Finally, we considered a spatial random slope for 287(g) adoption (representing unmeasured, county-level characteristics that may include program implementation or underlying climate) and an interaction term for percent of residents who were Hispanic (Table 2; models 4-6). Including the spatial random slope for

287(g) adoption and the interaction term for percent Hispanic improved model fit (DIC, model 6, Table 2). We mapped the exceedance probabilities for the spatially varying effect estimates from model 5 for 287(g) (Figure 3). For three counties in two states (Georgia [1], North Carolina [2]), the median IDR was above 1 and the 90% credible interval did not contain 1. There were an additional 161 counties for which the estimated IDR was above 1 and the 60% credible did not contain 1 (Arizona [1], Connecticut [1], Florida [1], North Carolina [82], South Carolina [28], Tennessee [2], Texas [1], Virginia
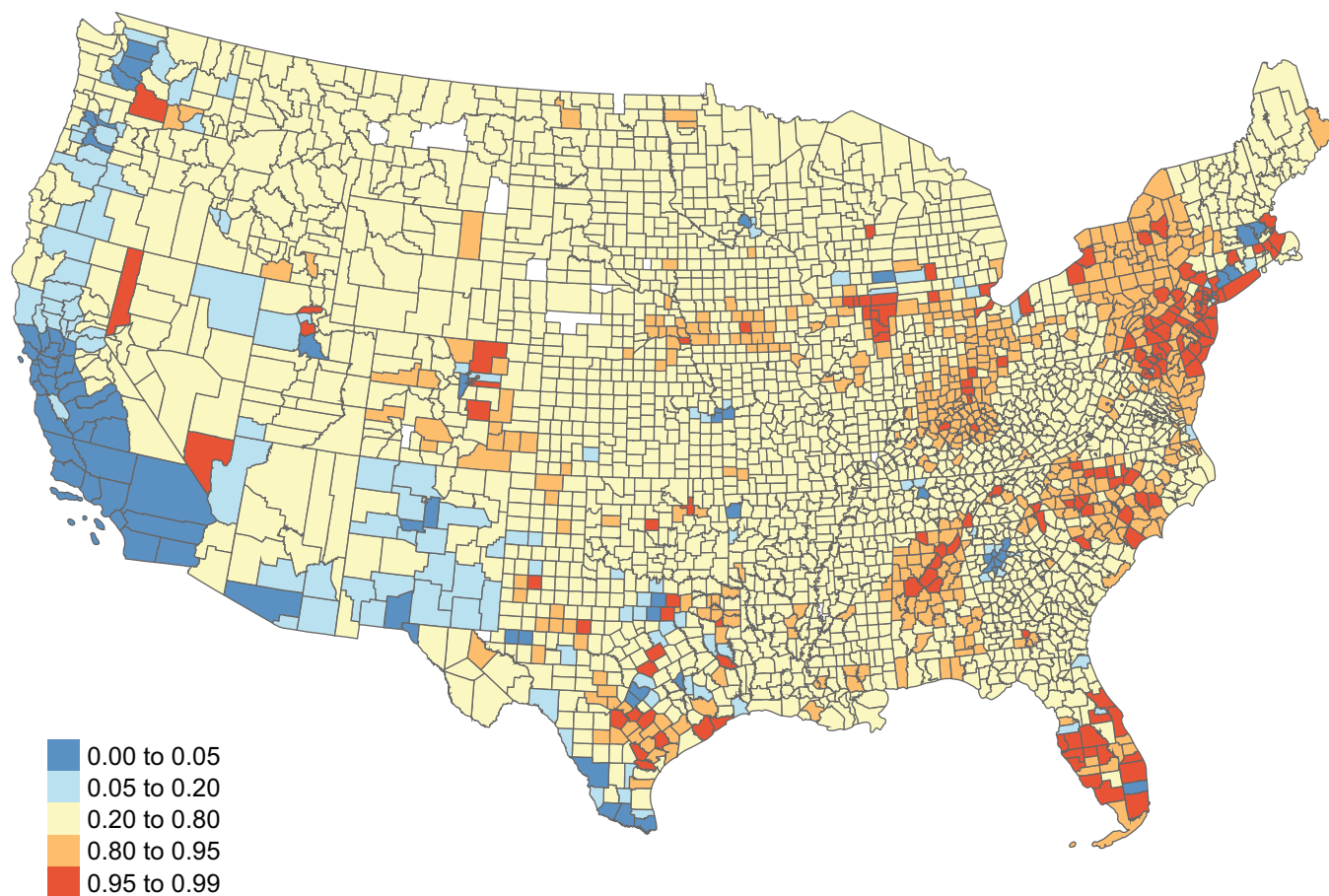
Figure 2. Exceedance probability
County Variation in Very Preterm Birth (< 32 weeks) to Hispanic Mothers, adjusting for nativity, year, percent poverty, Hispanic origin group, percent Hispanic, percent foreign born, 2005-2016, Model 1 Results, county Exceedance probabilities

[46]). There was no difference in the effect of 287(g) adoption on county VPTB rates across counties with differing percent of Hispanic residents (IDR for 287(g) adoption on VPTB rates for foreign-born women living in counties with 25% Hispanic residents: 1.04 (.88, 1.23); living in counties with 75% Hispanic residents: 1.05 (.80, 1.39), model 6, Table 2).

Controlling for state immigration policy climate did not change observed estimates. After restricting to only women of Mexican or Central/ South American background, observed effects were similar with overall IDR M2: 1.03 (1.0, 1.06); M3: USB: 1.0 (.96, 1.05), FB: 1.05 (.96 1.15).

DISCUSSION

A small but growing body of work links immigration policy and enforcement climate to health.[2,5] However, the field is limited by measurement challenges,[1] and many analyses have focused on only one state or local area. Simultaneously, immigration enforcement varies across the United States and is continuously changing. The 287(g) program is a form of structural racism as it increases hardships for immigrant communities, with documented racial profiling in its implementation, and results in increased material deprivation for Hispanic families.[12,19,20,34]
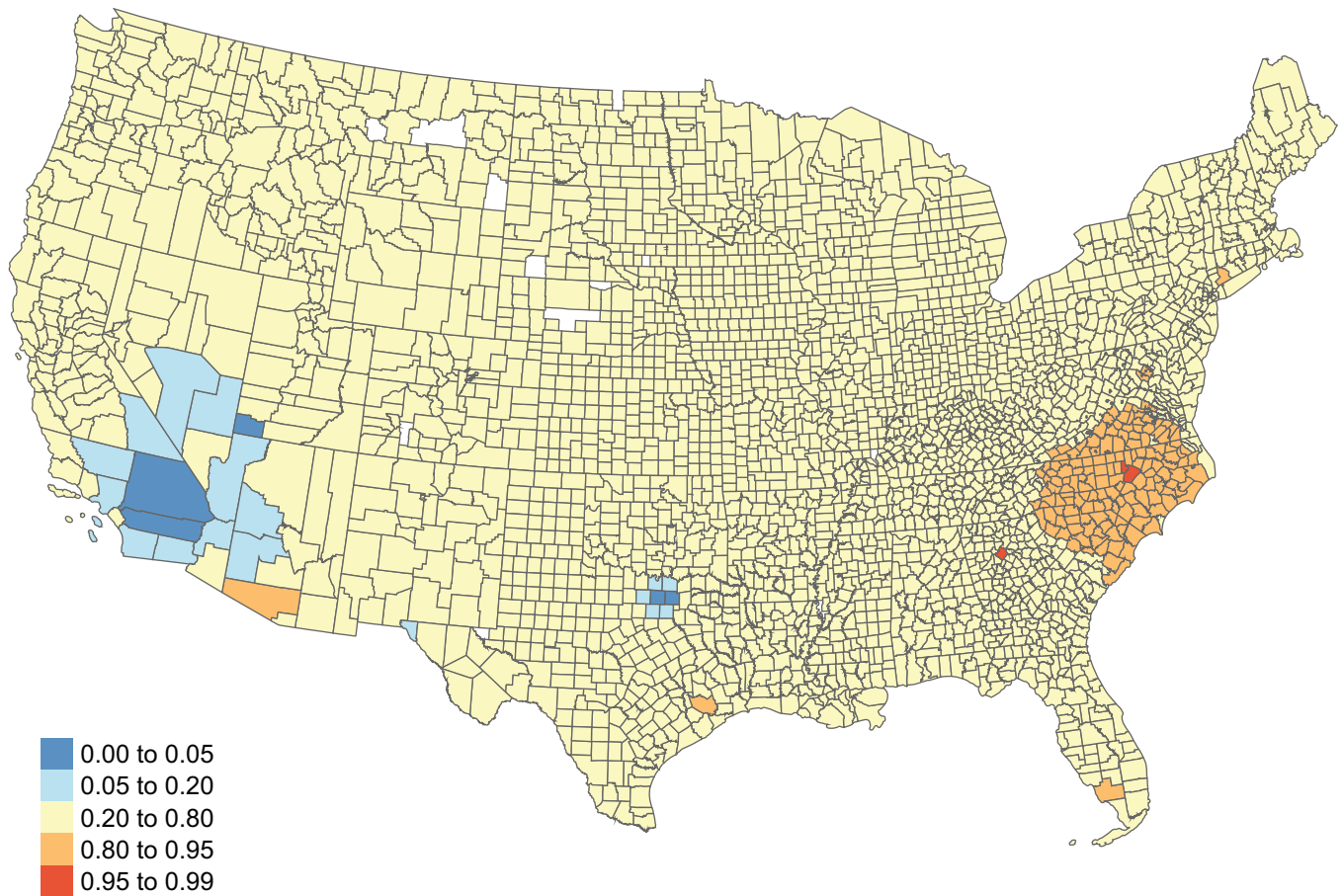
Figure 3. Exceedance probability 287(g)
County specific effects (probability of local effect estimate exceeding 1) of county adopting a 287(g) agreement on Very Preterm Birth rates, foreign-born Hispanic women, 2005-2016, Model 5 results

Contrary to our hypothesis, we did not observe a global effect of 287(g) adoption on county VPTB rates. However, in some counties, primarily in the Southeast, 287(g) adoption was associated with subsequent increased county VPTB rates among foreign-born Hispanic women (Figure 2). This is distinct from previous research on the effect of 287(g) adoption.[12,13,34] Previous researchers have observed effects of 287(g) adoption among foreign-born and US-born Hispanics on risk of food insecurity and foreclosures.[12,34] This may reflect the fact that 287(g) adoption may impact access to material resources among US-born families (increasing risk of food insecurity or foreclosure) but not create stress. It may also be that the effects of changes in material resources are immediate whereas the impact of stress might be lagged. Finally, it could be that there is not enough variation in VPTB among Hispanic women to observe an effect (Figure 1), suggesting that other stress-sensitive outcomes should be investigated as well.

While an accepted example of racial profiling,[15,19] 287(g) adoption is at best an imperfect proxy for racially targeted immigration enforcement and interpersonal discrimination, both of which could occur in the absence of the program through variations in state and local law or police culture. It

is likely a non-specific measure of anti-immigrant sentiment, as many counties with high anti-immigrant sentiment may never adopt 287(g) either through lack of opportunity or through applying and being rejected from the program. However, it is a testable policy with local and temporal variation that has been expanded under the Trump administration and through state mandates.[8] This analysis suggests that, if 287(g) increases stress and stress-related health outcomes, im-

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While an accepted example of racial profiling,[15,19] 287(g) adoption is at best an imperfect proxy for racially targeted immigration enforcement and interpersonal discrimination…

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plementation is either varied across localities in unmeasured ways, insufficient to increase risk of VPTB, or may affect long-term health rather than immediate risk of VPTB.

This analysis has at least three limitations. First, it may not be appropriate to compare counties that implemented 287(g) to all other counties, as implementing counties may have underlying anti-immigrant sentiment that may increase risk of VPTB and their likelihood of implementing the program. Previous authors have used jurisdictions that applied for and were rejected from the 287(g) program as a comparison group instead of all counties without the program.[13,34] However, we chose not to do this as it would have limited the temporal and geographic scope of our analysis. Second, we did not control for other policies that may have affected immigration enforcement at the county, state, or federal level. However, in a sensitivity analysis we included an index of sub-federal immigration-related policies as a control variable and estimates did not change. Finally, we do not have data on all potential confounders or effect modifiers, such as undocumented population size at the county level. Inclusion of this variable would have limited our analysis to large counties (with available estimates of the undocumented population), so we chose not to control for it.

This analysis offers several strengths. Vital records data include virtually all births in the United States, including those of vulnerable women who are rarely captured in population-based surveys. Second, adoption of a Bayesian modeling strategy provided a robust statistical framework for modeling complex spatial variation and incorporation of information from even sparsely populated counties across the United States. Finally, VPTB has an established relationship with cumulative stress and is unlikely to vary geographically for other temporally changing reasons. This outcome helps us focus on the proximal stress effects of the policy.

CONCLUSIONS

Researchers should continue to explore and test the effects of immigration policies, carefully considering timing, mechanism, and population at risk. Though we did not observe clear associations between adoption of a 287(g) agreement and county VPTB rates, this does not indicate that immigration enforcement activities do not impact health. Researchers should consider testing the effects of intensified enforcement on outcomes known to be sensitive to acute changes in stress (eg, blood pressure) or to changes in access to health care or material resources (eg, flu vaccination). Additionally, while 287(g) represents a testable, locally implemented policy, it may not capture immigration enforcement context fully. Researchers should consider alternate ways to study enforcement intensity (eg, detention rates[35]), potentially comparing different definitions. Finally, qualitative work on the specific elements of immigration enforcement that increase stress may help elucidate why the program is harmful in some places and not others. Research critically exploring and testing the specific mechanisms through which specific immigration policies may result in poor health is part of improving health equity and combating racism.

References

1. Williams DR, Lawrence JA, Davis BA. Racism and health: evidence and needed research. *Annu Rev Public Health*. 2019;40(1):105-125. https://doi.org/10.1146/annurev-publhealth-040218-043750 PMID:30601726
2. Philbin MM, Flake M, Hatzenbuehler ML, Hirsch JS. State-level immigration and immigrant-focused policies as drivers of Latino health disparities in the United States. *Soc Sci Med*. 2018;199:29-38. https://doi.org/10.1016/j.socscimed.2017.04.007 PMID:28410759
3. Jones CP. Levels of racism: a theoretic framework and a gardener's tale. *Am J Public Health*. 2000;90(8):1212-1215. https://doi.org/10.2105/AJPH.90.8.1212 PMID:10936998
4. Viruell-Fuentes EA, Miranda PY, Abdulrahim S. More than culture: structural racism, intersectionality theory, and immigrant health. *Soc Sci Med*. 2012;75(12):2099-2106. https://doi.org/10.1016/j.socscimed.2011.12.037 PMID:22386617
5. Perreira KM, Pedroza JM. Policies of Exclusion: Implications for the Health of Immigrants and Their Children. *Annu Rev Public Health*. 2019;40(1):147-166. https://doi.org/10.1146/annurev-publhealth-040218-044115 PMID:30601722
6. Almeida J, Biello KB, Pedraza F, Wintner S, Viruell-Fuentes E. The association between anti-immigrant policies and perceived discrimination among Latinos in the US: A multilevel analysis. *SSM Popul Health*. 2016;2:897-903. https://doi.org/10.1016/j.ssmph.2016.11.003 PMID:29349196
7. Budiman A. Key findings about U.S. immigrants. Pew Research Center. August 20, 2020. Last accessed September 1, 2020 from https://www.pewresearch.org/fact-tank/2020/08/20/key-findings-about-u-s-immigrants/
8. Wong K, , Shklyan K, Silva A, Espino J. *Fractured Federalism: How Dissonant Immigration Enforcement Policies Affect Undocumented Immigrants*. U.S. Immigration Policy Center; 2019. Last accessed November 5, 2020 from https://usipc.ucsd.edu/publications/Fractured-Immigration-Federalism-.pdf
9. Moinester M. A look to the interior: trends in US immigration removals by criminal conviction type, gender, and region of origin, fiscal years 2003. *Am Behav Sci*. 2019;63(9); 1276-1298. https://doi.org/10.1177/0002764219835276
10. Novak NL, Geronimus AT, Martinez-Cardoso AM. Change in birth outcomes among infants born to Latina mothers after a major immigration raid. *Int J Epidemiol*. 2017;46(3):839-849. https://doi.org/10.1093/ije/dyw346 PMID:28115577
11. Lopez WD, Kruger DJ, Delva J, et al. Health implications of an immigration raid: findings from a Latino community in the midwestern United States. *J Immigr Minor Health*. 2017;19(3):702-708. https://doi.org/10.1007/s10903-016-0390-6 PMID:27041120
12. Potochnick S, Chen JH, Perreira K. Local-level immigration enforcement and food insecurity risk among hispanic immigrant families with children: national-level evidence. *J Immigr Minor Health*. 2017;19(5):1042-1049. https://doi.org/10.1007/s10903-016-0464-5 PMID:27435475
13. Wang JS-H, Kaushal N. Health and Mental Health Effects of Local Immigration Enforcement. *International Migration Review*. Published online October 5, 2018. Last accessed November 5, 2020 from https://doi.org/10.3386/w24487
14. Rhodes SD, Mann L, Simán FM, et al. The impact of local immigration enforcement policies on the health of immigrant Hispanics/Latinos in the United States. *Am J Public Health*. 2015;105(2):329-337. https://doi.org/10.2105/AJPH.2014.302218 PMID:25521886
15. Coleman M. The "local" migration state: the site-specific devolution of immigration enforcement in the U.S. South. *Law Policy*. 2012;34(2):159-190. https://doi.org/10.1111/j.1467-9930.2011.00358.x
16. Walker KE, Leitner H. The variegated landscape of local immigration policies in the United States. *Urban Geogr*. 2011;32(2):156-178. https://doi.org/10.2747/0272-3638.32.2.156
17. American Immigration Council. The 287(g) Program: An Overview. Last accessed November 5, 2020 from https://www.americanimmigrationcouncil.org/research/287g-program-immigration
18. Capps R, Rosenblum MR, Rodríguez C, Chishti M. *Delegation and Divergence: A Study of 287(g) State and Local Immigration Enforcement*. Washington, DC: Migration Policy Institute. 2011.
19. Coleman M, Kocher A. Rethinking the "gold standard" of racial profiling: §287(g), secure communities and racially discrepant police power. *Am Behav Scientist*. 2019; 63(9):1185-1220. doi:10.1177/0002764219835275
20. Donato KM, Rodríguez LA. police arrests in a time of uncertainty: the impact of 287(g) on arrests in a new immigrant gateway. *Am Behav Sci*. 2014;58(13):1696-1722. https://doi.org/10.1177/0002764214537265
21. GAO 2019. *Immigration Enforcement: Better Controls Needed over Program Authorizing State and Local Enforcement of Federal Immigration Laws Highlights State and Local Enforcement of Federal Immigration Laws*. 2009. Last accessed November 5, 2020 from https://www.gao.gov/products/GAO-09-109
22. Kramer MR, Hogue CJ, Dunlop AL, Menon R. Preconceptional stress and racial disparities in preterm birth: an overview. *Acta Obstet Gynecol Scand*. 2011;90(12):1307-1316. https://doi.org/10.1111/j.1600-0412.2011.01136.x PMID:21446927
23. Kramer MR, Hogue CR. What causes racial disparities in very preterm birth? A biosocial perspective. *Epidemiol Rev*. 2009;31(1):84-98. https://doi.org/10.1093/ajerev/mxp003 PMID:19477907
24. Shapiro GD, Fraser WD, Frasch MG, Séguin JR. Psychosocial stress in pregnancy and preterm birth: associations and mechanisms. *J Perinat Med*. 2013;41(6):631-645. https://doi.org/10.1515/jpm-2012-0295 PMID:24216160
25. Kramer MR, Cooper HL, Drews-Botsch CD, Waller LA, Hogue CR. Metropolitan isolation segregation and Black-White disparities in very preterm birth: a test of mediating pathways and variance explained. *Soc Sci Med*. 2010;71(12):2108-2116. https://doi.org/10.1016/j.socscimed.2010.09.011 PMID:20947234
26. Stanhope KK, Hogue CR, Suglia SF, Leon JS, Kramer MR. Restrictive subfederal immigration policy climates and very preterm birth risk among US-born and foreign-born Hispanic mothers in the United States, 2005-2016. *Health Place*. 2019;60:102209. https://doi.org/10.1016/j.healthplace.2019.102209 PMID:31550633
27. Barfield WD. Public health implications of very preterm birth. *Clin Perinatol*. 2018;45(3):565-577. https://doi.org/10.1016/j.clp.2018.05.007 PMID:30144856
28. United States Census Bureau. Summary File. 2005-2016 American Community Survey. January 1, 2018. http://ftp2.census.gov/
29. US Immigration and Customs Enforcement (ICE). FOIA Library. Immigration Customs Enforcement. 2019. Last accessed November 5, 2020 from https://www.ice.gov/foia/library
30. Office of Inspector General, Department of Homeland Security. *The Performance of*

287(g) Agreements Homeland Security. 2010. Last accessed November 5, 2020 from www. oig.dhs.gov/assets/mgmt/OIG_10_63_ Mar10.pdf

31. Besag J, York J, Mollié A. Bayesian image restoration, with two applications in spatial statistics. *Ann Inst Stat Math.* 1991;43(1):1-20. https://doi.org/10.1007/BF00116466

32. Blangiardo M, Cameletti M. *Spatial and Spatio-Temporal Bayesian Models with R-INLA.* 2015. John Wiley & Sons. Last accessed November 5, 2020 from https:// bit.ly/3lcLN15

33. Richardson S, Thomson A, Best N, El- liott P. Interpreting posterior relative risk estimates in disease-mapping studies. *Environ Health Perspect.* 2004;112(9):1016- 1025. https://doi.org/10.1289/ehp.6740 PMID:15198922

34. Rugh JS, Hall M. Deporting the American dream: immigration enforcement and latino foreclosures. *Sociol Sci.* 2016;3:1077-1102. https://doi.org/10.15195/v3.a46

35. Moinester M. Beyond the border and into the heartland: spatial patterning of u.s. immigration detention. *Demog- raphy.* 2018;55(3):1147-1193. https:// doi.org/10.1007/s13524-018-0679-2 PMID:29785525