

# Undocumented Immigration, Drug Problems, and Driving Under the Influence in the United States, 1990–2014

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**Objectives.** To examine the influence of undocumented immigration in the United States on 4 different metrics of drug and alcohol problems: drug arrests, drug overdose fatalities, driving under the influence (DUI) arrests, and DUI deaths.

**Methods.** We combined newly developed state-level estimates of the undocumented population between 1990 and 2014 from the Center for Migration Studies with arrest data from the Federal Bureau of Investigation Uniform Crime Reports and fatality information from the Fatality Analysis Reporting System and the Centers for Disease Control and Prevention Underlying Cause of Death database. We used fixed-effects regression models to examine the longitudinal association between increased undocumented immigration and drug problems and drunk driving.

**Results.** Increased undocumented immigration was significantly associated with reductions in drug arrests, drug overdose deaths, and DUI arrests, net of other factors. There was no significant relationship between increased undocumented immigration and DUI deaths.

**Conclusions.** This study provides evidence that undocumented immigration has not increased the prevalence of drug or alcohol problems, but may be associated with reductions in these public health concerns. (*Am J Public Health*. 2017;107:1448–1454. doi: 10.2105/AJPH.2017.303884)

 See also Vaughan and Galea, p. 1367.

**D**riving under the influence (DUI) and drug problems remain pressing public health issues and foci for prevention and intervention efforts. Since 1990, nearly 1 million persons in the United States have died of drug overdoses and alcohol-related crashes.<sup>1,2</sup> Each year, alcohol-impaired driving fatalities account for more than one third of driving-related deaths in the United States.<sup>3</sup> The economic costs of drug use and drunk driving total more than \$240 billion annually.<sup>4,5</sup> In addition, the rate of drug overdose fatalities increased 137% between 2000 and 2014 and more people died of drug overdoses in 2014 than in any previous year on record.<sup>6</sup> These public health trends have coincided with a substantial influx of undocumented immigrants, from a population of 3.5 million in 1990 to an estimated 10.9 million in 2014,<sup>7</sup> sparking controversy as to whether undocumented immigration is related to the prevalence of drug problems and DUI.<sup>8,9</sup>

Indeed, within political discourse on undocumented immigration, public health and safety concerns regarding drug problems and drunk driving have received considerable attention from public officials. In defending Arizona's controversial SB 1070 law, which required law enforcement officers to determine an individual's immigration status during a stop, in 2010, then-Governor Jan Brewer stated "... the majority of the illegal trespassers that are coming in the state of Arizona are under the direction and control of organized drug cartels, and they are bringing drugs in."<sup>10</sup> Similarly, in 2006, an Iowa congressman claimed that 13 US persons died

every day as a result of undocumented drunk drivers.<sup>8</sup> Such controversies have achieved national headlines as presidential candidates have also made claims that undocumented immigrants increase drug activity.<sup>11,12</sup>

However, despite public comments and debate on these issues, empirical research on the public health consequences of undocumented immigration is lacking because of the scarcity of reliable data on the undocumented population.<sup>7</sup> We fill this gap by utilizing newly developed state-level estimates of the undocumented population between 1990 and 2014 to provide the first investigation into the relationship (if any) between undocumented immigration, DUI, and drug problems.

The literature on undocumented immigration and health primarily focuses on health care access and utilization.<sup>13,14</sup> As a result, evidence associating undocumented immigration to trends in DUI and drug problems is indirect and often mixed. On the basis of current debates and the existing literature, there are 2 plausible paths relating undocumented immigration to DUI and drug problems, one that considers a facilitating relationship, and the other that considers an inhibiting association.

Regarding the first pathway, several factors are important to consider. First, theories of addiction suggest that chronic stress plays an important role in substance abuse,<sup>15</sup> and research demonstrates a relationship among undocumented status, higher stress, and decreased mental health.<sup>16</sup> Thus, because undocumented immigrants often experience

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stress from fear of exploitation and deportation, they may use substances to reduce negative affect, in line with the stress-coping model of addiction.<sup>17</sup> Second, undocumented immigrants display risk factors for alcohol and drug dependence, including poverty and low educational attainment, at higher rates than native-born groups.<sup>18,19</sup> In line with economic theories of criminal behavior and Goldstein's tripartite model of the drug-crime nexus,<sup>20,21</sup> undocumented immigrants may turn to illegal economic pursuits, such as drug trafficking, because of formal exclusion from the labor market combined with their lack of economic assets. Moreover, a sizable proportion of illegal drugs in the United States, particularly cocaine and heroin, is smuggled across the US-Mexico border,<sup>22</sup> potentially relating undocumented immigration flows to drug trafficking, as has been argued within the political sphere.<sup>10-12</sup> Taken together, these considerations support a hypothesis that undocumented immigration may increase the frequency of DUI and drug problems.

In contrast with this hypothesis, it is also plausible that undocumented immigration may reduce the prevalence of DUI and drug problems. Undocumented immigrants are often motivated by economic opportunities for themselves and their families, and thus may be selected on attributes (e.g., ambition) that predispose them to less criminal involvement and healthier behaviors.<sup>23</sup> In line with this view, research indicates that immigrants in general are less likely to abuse drugs and alcohol than are their US-born counterparts<sup>24,25</sup> and these protective effects extend to the children of immigrants.<sup>26</sup> Research suggests that protective influences may stem from living in immigrant enclaves, which, because of processes of chain migration, are often characterized by dense networks of immigrant families and neighbors who reinforce social cohesion and provide social control to monitor criminal and risky behaviors.<sup>23</sup>

For example, research suggests that living among higher concentrations of recent immigrants is protective against substance use for Mexican youths,<sup>27</sup> notable findings given that the majority of undocumented immigrants are from Mexico.<sup>28</sup> In addition, awareness of police surveillance and the related threat of criminal deportation

may reduce the likelihood of consumption of illegal drugs and drunk driving by undocumented immigrants, especially in public locales such as bars and nightclubs, or reduce the likelihood of driving at all. Taken together, this body of literature supports a hypothesis that undocumented immigration may decrease the frequency of DUI and drug problems.

Within our evaluation of contrasting hypotheses regarding the influence of undocumented immigration on drug and alcohol problems, we considered 2 behavioral processes through the outcomes under consideration. The first outcome, DUI, allows us to consider the health behaviors of undocumented immigrants on wider community health and safety. As a focal concern regarding undocumented immigration and DUI has centered on the potential for drunk driving on the part of undocumented immigrants themselves, we consider this direct behavioral impact on public health. By contrast, the focal concern on drugs is that undocumented immigrants affect the behaviors of others in the community by providing opportunities for illegal drug use. For this reason, the drug outcomes permit us to consider the influence of undocumented immigration on the behaviors of others and wider public health.

## METHODS

We tested the contrasting hypotheses with data from multiple sources at the state level from 1990 to 2014. Data for DUI and drug arrest came from the Federal Bureau of Investigation Uniform Crime Reports, which compiles data from more than 18 000 law enforcement agencies representing 98% of the population in 2014.<sup>29</sup> Data on alcohol-related crash fatalities came from the National Highway Traffic Safety Administration's Fatality Analysis Reporting System, and drug overdose data are from the Centers for Disease Control and Prevention (CDC) Underlying Cause of Death database. The Fatality Analysis Reporting System and CDC data sets are nationwide censuses. Information on undocumented immigration comes from 2 of the most reliable sources of data on the unauthorized population: the Center for Migration Studies and the Pew Research Center.

In addition, we collected data on an array of socioeconomic, demographic, and criminal justice characteristics from the US Census, the National Prisoner Statistics, and the Federal Bureau of Investigation Police Employment data. Census measures came from 1 of 3 sources: the 5% Public Use Microdata, the American Community Survey (ACS), or the Current Population Survey. The ACS is an annual nationally representative survey of approximately 3 million US households, generating estimates of social and economic characteristics of the US population. Response to the ACS is required by law, ensuring high response rates (approximately 96%).<sup>30</sup> The Current Population Survey, like the ACS, is a nationally representative survey of approximately 60 000 households, used to calculate employment and labor market statistics. Table 1 displays the sources, properties, and descriptive statistics for all variables.

## Dependent Variables

We used 4 dependent variables. We measured problems related to drugs by using the rate of arrests for drug violations (per 100 000) and the rate of unintentional drug overdose deaths (per 100 000). We used 2 measures because arrests reflect a mixture of use and policing behavior. Overdose fatalities, by contrast, are unlikely to track changes in policing, and thus more accurately reflect the prevalence of heavy drug use.<sup>31</sup> Using the same logic, we measured alcohol-impaired driving by using the DUI arrest rate (per 100 000) and the rate of fatalities involving drunk driving (per 100 000), defined by the National Highway Traffic Safety Administration as a fatality (driver, passenger, or pedestrian) involving a crash in which a driver's blood alcohol content is 0.08 or greater. We calculated rates for each dependent variable by using the total population; however, results were unchanged when we calculated rates with the adult population (aged  $\geq 18$  years), driving population (aged  $\geq 16$  years), or population of legal drinking age (aged  $\geq 21$  years). We logged all outcome measures to reduce positive skewness (analyses using unlogged outcomes available in Table A, available as a supplement to the online version of this article at <http://www.ajph.org>).

As shown in Table 1, because of a small amount of missing data in Uniform Crime

**TABLE 1—Summary Statistics for State-Level Dependent and Independent Measures, in an Examination of Undocumented Immigration and Drug Arrests, Driving Under the Influence Arrests, Drug Overdose Mortality, and Driving Under the Influence Mortality: United States, 1990–2014**

Measures	Drug Arrest, Mean (SD)	Drug Mortality, Mean (SD)	DUI Arrest, Mean (SD)	DUI Fatality, Mean (SD)
<b>Dependent variables</b>				
Drug offense arrest rate per 100 000 population (logged) <sup>a</sup>	5.8 (0.7)			
Unintentional drug overdose mortality rate per 100 000 population (logged) <sup>b</sup>		2.0 (0.7)		
DUI offense arrest rate per 100 000 population (logged) <sup>a</sup>			5.8 (0.8)	
DUI fatality rate per 100 000 population (logged) <sup>c</sup>				1.5 (0.5)
<b>Focal measures, estimated proportion of population</b>				
Undocumented immigrants—Center for Migration Studies	1.9 (1.8)	1.9 (1.7)	1.9 (1.8)	1.9 (1.7)
Undocumented immigrants—Pew Research Center	2.1 (1.8)	2.1 (1.7)	2.1 (1.8)	2.1 (1.7)
<b>Covariates</b>				
Legal immigrants, proportion of the population <sup>d</sup>	6.4 (4.8)	6.5 (4.8)	6.4 (4.8)	6.5 (4.8)
Poverty, proportion of the population <sup>e</sup>	13.2 (3.7)	13.2 (3.7)	13.2 (3.7)	13.2 (3.7)
Low educational attainment (aged > 25 y without high-school degree), proportion of the population <sup>e</sup>	15.4 (5.2)	15.4 (5.2)	15.4 (5.2)	15.4 (5.2)
Racial composition: non-Hispanic Black, proportion of the population <sup>e</sup>	10.6 (10.2)	10.7 (10.7)	10.6 (10.2)	10.7 (10.7)
Unemployment, proportion of the population <sup>f</sup>	5.8 (1.9)	5.7 (1.9)	5.8 (1.9)	5.7 (1.9)
Employed in manufacturing industry, <sup>f</sup> %	12.7 (5.3)	12.6 (5.4)	12.6 (5.3)	12.6 (5.4)
Employed in managerial or professional occupations, <sup>f</sup> %	31.9 (5.7)	31.9 (5.7)	32.0 (5.7)	31.9 (5.7)
Age structure: 18–24 y, <sup>e</sup> %	9.9 (0.9)	9.9 (0.9)	9.9 (0.9)	9.9 (0.9)
Population density per square mile, <sup>g</sup> no.	235.9 (718.3)	274.3 (944.2)	235.7 (719.5)	274.3 (944.2)
Incarceration rate <sup>h,i</sup> per 100 000 population	385.0 (182.5)	386.5 (191.1)	384.6 (182.5)	386.5 (191.1)
Police officers per 100 000 population <sup>a</sup>	213.9 (60.0)	216.0 (67.3)	213.7 (60.0)	216.0 (67.3)
Number of state-years	1210	1259	1206	1259

Note. DUI = driving under the influence. Number of observations varies because of differences in missing information across dependent variables.

<sup>a</sup>According to Uniform Crime Reports.

<sup>b</sup>According to Centers for Disease Control and Prevention Underlying Cause of Death database.

<sup>c</sup>According to Fatality Analysis Reporting System.

<sup>d</sup>According to US Census Bureau/Public Use Microdata.

<sup>e</sup>According to US Census Bureau/American Community Survey.

<sup>f</sup>According to US Bureau of Labor Statistics.

<sup>g</sup>According to US Census Bureau.

<sup>h</sup>According to Bureau of Justice Statistics National Prisoner Statistics.

<sup>i</sup>Incarceration information is missing for Washington, DC, after 2001, when the city abandoned its prison system, and for 1 year in Arizona (2013).

Reports statistics, the number of state-years varies between the mortality and arrest variables. For both DUI and drug arrests, 4% of state-years are missing. To ensure comparability across samples, we show descriptive statistics of all covariates separately for each outcome. With 1 exception (population density), sample means do not vary by more than 1%, providing little evidence that the samples are biased by missing cases. We also reran the analysis without the population density measure as a robustness check, and the results were substantively identical.

## Undocumented Immigration

The focal measure in the analysis is the proportion of the total population that is undocumented. Although state-level undocumented estimates are available from the Center for Migration Studies for the full study period, Pew estimates are only available intermittently up until 2005. For this reason, our main analysis utilized Center for Migration Studies data and we replicated the results with Pew data. The use of data from 2 independent sources, which used disparate methodologies, serves as a robustness check.

*Pew Research Center estimates.* The Pew counts are perhaps the most widely utilized estimates of the unauthorized population. In calculating the undocumented estimates, Pew uses a residual methodology based on Census data. The residual method and its variants are widely used and accepted as the best estimates of the undocumented population.<sup>18</sup> Stated briefly, this method involves first subtracting the number of authorized immigrants from the total foreign-born population, and then uses probabilistic methods based on demographic, social, economic, and geographic characteristics to classify the residual as either

lawful or undocumented. For example, those in the residual with occupations that require legal status or receive public benefits restricted to legal residents are classified as lawful. Independent research using various triangulation methods, including death and birth records, substantiates the general accuracy of the Pew estimates.<sup>32</sup> Pew reports state-level unauthorized estimates for 1990, 1995, and 2000, then 2005 to 2014. We used linear interpolation to account for missing estimates in the intervening years.

**Center for Migration Studies estimates.** Like Pew, the Center for Migration Studies uses the residual method based on Census data but improves upon this technique by accounting for components of population change (e.g., emigration rates, undercount rates, removals, adjustments to lawful status, and mortality rates) and calculating independent population controls by country of origin for undocumented residents.<sup>7</sup> This methodology has been empirically vetted in peer-reviewed research and shown to produce smaller ranges of sampling error than alternative sources.<sup>7,33</sup>

## Covariates

We included a host of state-level socio-demographic characteristics that may confound associations between undocumented immigration, DUI, and drug problems. Of particular importance, we included a measure of the legal immigrant population (proportion of the population that are lawful immigrants) to separate the effects of undocumented immigration from general immigration trends. Drawing on previous research, we adjusted for known correlates that capture the entanglement of poverty, racial composition, and public health problems. These include the poverty rate,<sup>34</sup> the percentage non-Hispanic Black, and the proportion of the population older than 25 years without a high-school degree (i.e., low educational attainment). We include measures of the labor market and macro-economic climate: unemployment rate,<sup>35</sup> percentage of people in the manufacturing industry, and the percentage of people employed in managerial or professional occupations. Given the comparatively younger age structure of the unauthorized population,<sup>18</sup> we included a measure for the proportion of the population aged between 18 and 24 years—a life

course period when substance use peaks.<sup>36</sup> Lastly, we accounted for differences in population density and 2 salient measures of law enforcement, the incarceration rate and the police per capita.

## Analytical Method

We leveraged the longitudinal nature of our data by employing fixed-effects regression methods to estimate the effect of undocumented immigration on DUI and drug problems. The principal strength of this approach is that we can treat each state as its own statistical control.<sup>37</sup> As such, we accounted for between-state differences and examined only within-state variation over time, thus eliminating the effects of time-stable measured and unmeasured confounding variables, including cross-state dissimilarities in arrest and fatality reporting.

We also included year fixed effects to account for unmeasured trends that influenced DUI and drug problems nationally. A strength of fixed effects models is the ability to address issues of measurement error in the undocumented estimates. For example, to the extent that there is a national pattern of systematic under- or overcounting of the undocumented population, the model parameters are adjusted for this by the year fixed effects. Moreover, the state fixed effects account for unique challenges to estimating the unauthorized population within each state. In all models, we reported standard errors clustered by state and lagged the independent variables by 1 year to ensure that changes in undocumented immigration precede any fluctuations in DUI and drug problems.

## RESULTS

Table 2 reports associations between undocumented immigration and drug arrests, drug overdose fatalities, DUI arrests, and DUI deaths. For each outcome, we report the full analytical specification, inclusive of all covariates and state and year fixed effects. To gauge both statistical and substantive significance, we report standardized (B) and unstandardized (b) regression coefficients.

Beginning with the pattern in the findings, the direction of the coefficient for

undocumented immigration was negative for all outcomes. For drug arrests, drug overdose deaths, and DUI arrests, these associations were statistically significant. Moreover, an examination of the standardized coefficients, which account for differences in metrics across independent variables, suggests that unauthorized immigration is a comparatively meaningful measure in these models. To offer a substantive interpretation, the results with unlogged outcomes showed that a 1-unit increase in the proportion of the population that is undocumented is associated with 22 fewer drug arrests (per 100 000), 0.64 fewer drug overdose deaths (per 100 000), and 42 fewer DUI arrests (per 100 000). For DUI fatalities, the coefficient was small and not significant, suggesting that the frequency of drunk driving deaths is generally unaffected by unauthorized immigration.

To aid interpretation, we provide a graphic display of the effects of undocumented immigration on drug and alcohol outcomes in Figure 1, based on the results from Table 2. Taken together, the findings offer no evidence that unauthorized immigration increases the rate of DUI or drug problems. Rather, the pattern in the data suggests that undocumented immigration reduced the prevalence of DUI and drug problems over the past 25 years or had no effect.

We ran additional analyses to test for confounding by other measures in our analysis. Specifically, we ran models in which we only included the unauthorized measure with the state and year fixed effects. For drug arrests, overdose deaths, and DUI arrests, increased undocumented immigration was significantly associated with reductions in drug and alcohol problems. For DUI deaths, the relationship was negative but not significant, in line with results reported in Table 2. We also investigated the impact of outliers by replicating our analysis with robust regression models, which omit observations with Cook's distance greater than 1 and weights the data so that observations with smaller residuals are given greater weight in the analysis (reported in Table B, available as a supplement to the online version of this article at <http://www.ajph.org>). The results showed the same patterns, suggesting that the findings were not driven by outliers in the data.

**TABLE 2—Fixed Effects Models Examining the Relationship Between Undocumented Immigration, Drug Problems, and Driving Under the Influence at the State Level: United States, 1990–2014**

Variable	(ln) Drug Arrest Rate (n = 1164)		(ln) Drug Fatality Rate (n = 1210)		(ln) DUI Arrest Rate (n = 1160)		(ln) DUI Fatalities (n = 1210)	
	b (95% CI)	B	b (95% CI)	B	b (95% CI)	B	b (95% CI)	B
Focal variable: undocumented immigration—Center for Migration Studies	–0.20 (–0.35, –0.05)	–0.55	–0.13 (–0.19, –0.06)	–0.32	–0.17 (–0.30, –0.04)	–0.36	–0.0001 (–0.05, 0.05)	–0.0003
Covariates								
Legal immigration	–0.06 (–0.17, 0.05)	–0.46	–0.07 (–0.12, –0.02)	–0.48	–0.01 (–0.09, 0.07)	–0.06	–0.01 (–0.04, 0.03)	–0.06
Poverty	0.00 (–0.03, 0.03)	0.00	0.01 (–0.01, 0.02)	0.04	0.01 (–0.02, 0.04)	0.03	–0.01 (–0.01, 0.00)	–0.04
Low educational attainment	–0.01 (–0.05, 0.03)	–0.07	–0.02 (–0.03, 0.00)	–0.12	0.02 (–0.01, 0.06)	0.14	–0.02 (–0.03, –0.01)	–0.21
Percentage Black	0.05 (–0.10, 0.21)	0.87	0.03 (–0.03, 0.10)	0.50	0.17 (–0.01, 0.34)	2.08	–0.01 (–0.06, 0.04)	–0.20
Unemployment	0.00 (–0.05, 0.05)	0.00	0.03 (0.00, 0.05)	0.07	–0.01 (–0.05, 0.04)	–0.02	–0.03 (–0.05, –0.01)	–0.13
Manufacturing	0.04 (0.00, 0.08)	0.32	–0.01 (–0.03, 0.01)	–0.11	0.00 (–0.05, 0.05)	–0.01	–0.01 (–0.03, 0.00)	–0.16
Managerial or professional	0.00 (–0.04, 0.03)	–0.02	0.00 (–0.02, 0.01)	–0.01	0.00 (–0.03, 0.02)	–0.03	0.00 (–0.01, 0.01)	–0.01
Aged 18–24 y	0.05 (–0.03, 0.13)	0.07	–0.05 (–0.10, 0.01)	–0.06	0.04 (–0.04, 0.12)	0.04	0.04 (0.00, 0.07)	0.07
Population density	0.006 (0.002, 0.010)	6.51	–0.002 (–0.003, –0.001)	–2.65	0.005 (0.002, 0.008)	4.53	0.000 (–0.001, 0.001)	–0.24
Incarceration rate	0.000 (0.000, 0.001)	0.14	0.0004 (0.0003, 0.0009)	0.12	0.000 (–0.001, 0.001)	0.10	0.000 (0.000, 0.000)	–0.06
Police per capita	0.002 (–0.001, 0.004)	0.17	0.000 (–0.001, 0.001)	0.05	0.001 (–0.003, 0.004)	0.04	0.000 (–0.001, 0.000)	–0.07
Constant	1.00 (–2.57, 4.56)		0.90 (–0.73, 2.54)		–0.47 (–4.22, 3.28)		3.57 (1.99, 5.15)	
Specification and summary information								
State fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
R <sup>2</sup>	0.57		0.91		0.69		0.90	

Note. CI = confidence interval; DUI = driving under the influence; ln = natural log. All independent variables are lagged by 1 year. Standard errors are corrected for clustering. Number of observations varies because of differences in missing information across dependent variables.

Given the inherent difficulties in estimating the undocumented population, we provide a robustness check by replicating our main findings with Pew estimates of the unauthorized population (Table C, available as a supplement to the online version of this article at <http://www.ajph.org>) by using the same analytical specification shown in Table 2. Despite the use of a somewhat dissimilar methodology as the Center for Migration Studies, the pattern of results from this alternative analysis with Pew data was substantively identical to our main findings: increased undocumented immigration was associated with statistically significant decreases in drug arrests, drug overdose deaths, and DUI arrests. For DUI fatalities, the coefficient was negative but not significant.

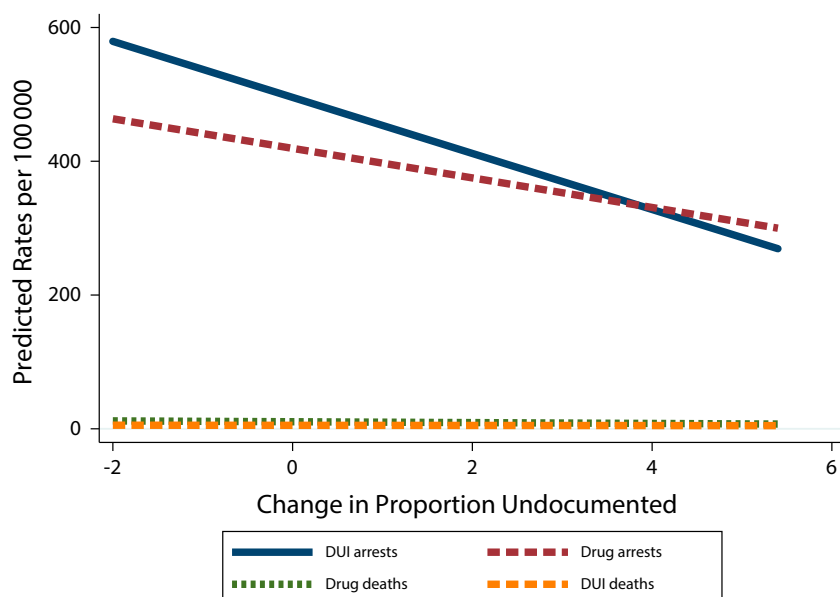
## DISCUSSION

Political rhetoric on the public health consequences of undocumented immigration

has far outpaced empirical research. This study takes a step toward filling this gap by providing the first longitudinal assessment of the relationship between increased undocumented immigration, DUI, and drug problems. We tested 2 competing hypotheses. The first hypothesis drew from the stress–coping model of substance use and economic theories of crime, which suggested that undocumented immigration may increase public health problems such as DUI and illicit drug use.<sup>19–21</sup> We found no evidence to support this hypothesis. The second hypothesis tested an alternative contention emerging from the existing literature on selective migration and the healthy immigrant hypothesis, which suggested that undocumented immigration may lead to decreases in these public health problems.<sup>23–27</sup> We found stronger evidence to support this hypothesis, with unauthorized immigration associated with significant reductions in drug arrests, DUI arrests, and drug overdoses.

Importantly, we considered 2 behavioral mechanisms by which these outcomes may emerge; on one hand, undocumented immigrants may have a direct impact on public health via their own health behaviors (DUI), whereas on the other hand, they may potentially have an impact on public health by influencing the behaviors of others in the community (drugs). We found evidence for both mechanisms. Regarding illicit drug use, our findings challenge claims that increased prevalence of drug problems results from unauthorized immigration. We also found evidence that undocumented immigration may be associated directly with public health via behaviors of immigrants, given the results for reduced DUI arrests. Undocumented persons may be less likely to drive after drinking, or drive at all, because of fear of police surveillance and deportation. For similar reasons, they may socialize and drink primarily within immigrant enclaves, obviating the need to drive.





Note. DUI = driving under the influence.

**FIGURE 1—Predicted Relationship Between Undocumented Immigration and Drug Arrests, Driving Under the Influence Arrests, Drug Overdose Mortality, and Driving Under the Influence Mortality: United States, 1990–2014**

## Strengths and Limitations

Our analysis had several strengths that bolster these conclusions. First, we triangulated the findings by using different measures of DUI and drugs. The chief advantage was to ensure that the pattern of results was robust from multiple approaches and across data sources with distinct aims and reporting procedures. Second, we utilized state fixed effects, which afford considerable analytical leverage to understand the associations between undocumented immigration and rates of DUI and drug problems by focusing on within-state changes. This method removes the effects of time-invariant causes of drug and alcohol problems (measured or not) that potentially confound the undocumented immigration–DUI or –drug relationship. We provided an additional analytical advantage by lagging the independent variables to ensure the time ordering of the relationship. However, we also tested this decision by rerunning the analysis without lagged predictors (Table D, available as a supplement to the online version of this article at <http://www.ajph.org>). It is possible that unauthorized immigrants have a contemporaneous effect on drug and alcohol problems,

particularly if unauthorized immigration is associated with drug smuggling. However, we found no evidence for this view. Rather, the findings align with those reported in the main analysis: unauthorized immigration is negatively associated with drug arrests, overdose deaths, and DUI arrests, and is not associated with DUI fatalities.

Despite the analyses' strengths, there are limitations. Notably, like all macrolevel health research,<sup>38</sup> the ecological fallacy is important to consider. When we use state-level data, we are unable to discern whose behavior accounts for these patterns. For example, undocumented immigration may be associated with decreased DUI and drug arrests if law enforcement directed attention toward other matters as the unauthorized population increased. Alternatively, unauthorized immigrants may be less likely to abuse drugs and alcohol, as the literature indicates occurs for immigrants more generally.<sup>25,26</sup> In short, future research is needed to elucidate these mechanisms, a task beyond the scope of the data currently available. A second consideration is that, although fixed effects help ameliorate some concerns about

causal inference, we cannot fully attribute causal relationships within this design.

A final limitation concerns measurement error in the unauthorized estimates. We minimized this concern in several ways. First, the use of state and year fixed effects accounts for any national miscounting, as well as unique challenges to estimating the unauthorized population in each state, as long as measurement error is stable over time. Second, we leveraged 2 of the most widely used sources of the undocumented population. Indeed, these are sources referenced by those who claim the size of the undocumented population is too large.<sup>39</sup> The fact that our results align with use of either set of estimates buttresses our findings.

## Public Health Implications

Whether undocumented immigration jeopardizes public health is an important question at the center of contemporary debates on unauthorized immigration. These debates are certain to continue, but they should do so informed by the available evidence, and our study speaks directly to this controversy. Our study does not contradict assertions that drugs are smuggled across the US border (they are) or that individual undocumented immigrants have been arrested for drunk driving (they have). Our findings do, however, significantly undermine arguments that the public is at greater risk for DUI or drug problems as a result of undocumented immigration. If anything, they suggest the opposite. Thus, public resources should be directed toward effective prevention and intervention efforts to reduce drug and alcohol problems, such as those supported by the CDC, rather than channeled to concerns unsupported by empirical evidence. **AJPH**

## CONTRIBUTORS

M. T. Light originated the study, conducted the analysis, and wrote the first draft of the article. T. Miller was responsible for data collection and data management. B. C. Kelly helped develop the theoretical framing and contributed to drafting the article. All authors interpreted the findings together and edited multiple drafts of the article.

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## HUMAN PARTICIPANT PROTECTION

This study used administrative records and not human participants.

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