Report Information from ProQuest

02 October 2023 08:49

TABLE OF CONTENTS

Search Strategy........ iv

1. Severity of Inpatient Hospitalizations Among Undocumented Immigrants and Medi-Cal Patients in a Los Angeles, California, Hospital: 2019........ 1

2. The Hemp Loophole: A Need to Clarify the Legality of Delta-8-THC and Other Hemp-Derived Tetrahydrocannabinol Compounds........ 10

3. COVID-19 Era Recessional Mortality Continues the Impact of Prepandemic Recessions on Mortality....... 15

4. The High Cost and Unequal Cancer Burden of Poor Diet in the United States........ 19

5. Credits........ 24

6. Countermarketing About Fruit Drinks, Alone or With Water Promotion: A 2019 Randomized Controlled Trial in Latinx Parents........ 25

7. The Economy as a Determinant of Pandemic Deaths........ 36

8. The Social Survey, the Metropolitan Life Insurance Company, and the Beginnings of the US Public Health Service's Sickness Surveys........ 39

9. "American Indian" as a Racial Category in Public Health: Implications for Communities and Practice....... 52

10. Trends in Ketamine Use, Exposures, and Seizures in the United States up to 2019........ 62

11. Unemployment, Bankruptcies, and Deaths From Multiple Causes in the COVID-19 Recession Compared With the 2000–2018 Great Recession Impact........ 67

12. Community Action for People With HIV and Sex Workers During the COVID-19 Pandemic in India........ 77

13. Impact of COVID-19 on Primary Health Care Services........ 78

14. Excess Deaths During the COVID-19 Economic Downturn........ 80

15. Vaccine Coverage Across the Life Course in Michigan During the COVID-19 Pandemic: January–September 2020........ 84

16. Workplace Leave and Breastfeeding Duration Among Postpartum Women, 2016–2018........ 93

17. An Unnecessary Gift for COVID-19 Vaccines and Therapeutics: The Medical Countermeasure Priority Review Voucher........ 103

18. Table of Contents........ 109

19. Disparities in Health and Economic Burdens of Cancer Attributable to Suboptimal Diet in the United States, 2015–2018........ 110

20. Racial Disparities of E-Cigarette Use Among US Youths: 2014–2019........ 120

21. New Evidence on Sweetened Beverage Taxes Points the Way for Future Policy and Research............ 129

22. High-Risk Outreach for COVID-19 Mortality Reduction in an Indigenous Community........ 133

23. Caregiving Across Cultures: Priority Areas for Research, Policy, and Practice to Support Family Caregivers of Older Asian Immigrants........ 138

24. Childhood Asthma and Air Pollution........ 143

25. Capitalizing on Missed Opportunities for Sexual Health Workforce Development by Adoption of a Sexual Health Paradigm........ 145

26. Is the Probation Population's Health and Health Care Utilization Gendered?........ 151

27. Warning: Don't Let the Beverage Industry Harm Your Kids........ 153

28. Philadelphia's Excise Tax on Sugar- Sweetened and Artificially Sweetened Beverages and Supplemental Nutrition Assistance Program Benefit Redemption........ 157

29. Heavily Polluted Regions May Experience Higher COVID-19 Mortality........ 167

30. Accounting for the Full Scope of Health Consequences of Policy Decisions Across the Life Course....... 168

31. New Directions for Public Health Research on the Health and Health Care of Undocumented Immigrants 172

32. 10 Years Ago/50 Years Ago........ 177

33. Choosing to Be Both: Perspectives From a Researcher About Early Motherhood........ 179

34. Trends in Cannabis Involvement and Risk of Alcohol Involvement in Motor Vehicle Crash Fatalities in the United States, 2000–2018........ 181

35. Self-Reported Health Indicators in the US Army: Longitudinal Analysis From a Population Surveillance System, 2014–2018........ 191

36. Establishment and Evaluation of a Large Contact-Tracing and Case Investigation Virtual Training Academy........ 201

37. Sexual Orientation and Gender Identity Data Collection at US Health Centers: Impact of City-Level Structural Stigma in 2018........ 205

Bibliography........ 212

SEARCH STRATEGY

Set No.	Searched for	Databases	Results
S1	american journal of public health	Ebook Central, Public Health Database, Publicly Available Content Database	595109*

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Severity of Inpatient Hospitalizations Among Undocumented Immigrants and Medi-Cal Patients in a Los Angeles, California, Hospital: 2019

Ro, Annie, PhD, MPH; Yang, Helen W, MD; Du, Senxi, BA; Hanlon, Courtney L, MD, MS; Young, Andrew Shane, DO

ABSTRACT (ENGLISH)

Objectives. To compare the severity of inpatient hospitalizations between undocumented immigrants and Medi-Cal patients in a large safety-net hospital in Los Angeles, California. Methods. We conducted a retrospective analysis of all 2019 inpatient stays at a Los Angeles hospital (n 5 22480), including patients of all races/ethnicities. We examined 3 measures by using insurance status to approximate immigration status: illness severity, length of hospital stay, and repeat hospitalizations. We calculated group differences between undocumented and Medi-Cal patients by using inverse probability weighted regression adjustment separately for patients aged 18 to 64 years and those aged 65 years and older. Results. Younger undocumented patients had less severe illness and shorter lengths of stay than their Medi-Cal counterparts. Older undocumented immigrants also had less severe illness, but had similar lengths of stay and were more likely to have repeated hospitalizations. Conclusions. While existing work suggests that undocumented immigrants could have more severe health care needs on account of their poorer access to medical care, we did not see clear health disadvantages among hospitalized undocumented immigrants, especially younger patients. There were fewer differences between undocumented and Medi-Cal patients who were older. (Am J Public Health. 2021 ;111(11):2019-2026. https://doi.org/10.2105/AJPH.2021.306485)

FULL TEXT

Headnote

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Methods. We conducted a retrospective analysis of all 2019 inpatient stays at a Los Angeles hospital (n 5 22480), including patients of all races/ethnicities. We examined 3 measures by using insurance status to approximate immigration status: illness severity, length of hospital stay, and repeat hospitalizations. We calculated group differences between undocumented and Medi-Cal patients by using inverse probability weighted regression adjustment separately for patients aged 18 to 64 years and those aged 65 years and older.

Results. Younger undocumented patients had less severe illness and shorter lengths of stay than their Medi-Cal counterparts. Older undocumented immigrants also had less severe illness, but had similar lengths of stay and were more likely to have repeated hospitalizations.

Conclusions. While existing work suggests that undocumented immigrants could have more severe health care needs on account of their poorer access to medical care, we did not see clear health disadvantages among hospitalized undocumented immigrants, especially younger patients. There were fewer differences between undocumented and Medi-Cal patients who were older. (Am J Public Health. 2021 ;111(11):2019-2026. https://doi.org/10.2105/AJPH.2021.306485)

There is growing interest in how immigration status affects the health care access and utilization for 10.5 million undocumented immigrants1 in the United States. Undocumented immigrants have significantly lower levels of insurance coverage and lower use of the emergency department, and are less likely to have a usual source of care compared with both their documented counterparts and the US-born.2,3 These disparities are attributable to lower household incomes and ineligibility for Medicaid and Medicare, as well as lack of private insurance from employers. Even when health care is available, undocumented immigrants may be reluctant to access it because of the fear of deportation for themselves or their families.4,5 Undocumented immigrants also face challenges accessing the limited care that is available to them because of economic barriers and unfamiliarity with the health care system.6 Despite worse access to and lower utilization of health care, undocumented immigrants do not seem to have widespread negative physical health. In a review of 45 studies, Hamilton et al.7 found that the large majority did not observe undocumented immigrants to have significantly worse health than their documented counterparts. In some studies, undocumented immigrants seemed to have better health outcomes for conditions such as hypertension, asthma, and other selfreported chronic conditions. A nationally representative sample confirmed the diverging trends between health =insurance coverage and health status: Ro and Van Hook8 found that undocumented immigrants had lower odds of being currently insured but also had lower odds of disability and poor or fair self-rated health compared with those born in the United States.

While undocumented immigrants' limited health care access and robust physical health patterns may appear contradictory, these findings rely on self-reported health status in surveys and may capture their health care utilization when individuals are relatively healthy. Undocumented immigrants tend to be younger than their documented counterparts,8 suggesting that some chronic health conditions may not have yet emerged or may have not reached the point of requiring serious medical intervention. Undocumented immigrants are also more likely to be positively selected on health, given the costs and risks inherent in unauthorized migration.9 Undocumented immigrants' younger age and positive health selection may buoy their general health status, and, as a result, they may not seek regular medical care.

What is unknown, however, is the health status of undocumented immigrants when they reach the point of needing intensive medical care and their health needs when they are in close contact with the health care system. As immigrants stay longer in the United States, their positive health advantage erodes.10 In the case of undocumented immigrants, initial health advantages can obscure longerterm care needs as their health deteriorates over time. In the general population, those who are uninsured or do not have regular medical care are more likely to enter the health care system in poorer health and have worse outcomes for both overall health and specific diseases.11 Given their overall lack of medical care access, it is possible that undocumented immigrants will display poorer health outcomes than other groups when they are at the point of needing higher-level care. Moreover, consistent underutilization of preventive services may leave them with more advanced stages of disease when they eventually need medical attention.

The extant literature has provided only limited or dated information on this topic. One study found uninsured undocumented immigrants hospitalized in Florida to have higher case mix indexes (a measure of disease severity) but shorter hospital stays than immigrants with legal status.12 Among patients in select cites in California and Texas, undocumented immigrants had the same levels of hospitalizations as documented immigrants, with the exception of childbirth.13 Treatment of end-stage renal disease among undocumented immigrants has been widely studied as an example of a lifethreatening condition that requires intensive medical treatment but is highly mediated by access to health care. Undocumented immigrants with end-stage renal disease are more likely to receive emergency-only hemodialysis than standard hemodialysis,14 which is associated with increased mortality, health care utilization, and costs.15,16

In this study, we explored the severity of hospitalizations among undocumented immigrants of all races/ethnicities who have required inpatient stays at the largest safety net hospital in Los Angeles County, California. Los Angeles County has the largest population of undocumented immigrants in the country; there are nearly 880 000 undocumented immigrants, representing a wide number of countries of origin.17 We used insurance status to approximate immigration status, leveraging the county's unique health plans for undocumented immigrants to accurately estimate the likely undocumented population. Addressing this knowledge gap will reveal potential unmet needs of undocumented immigrants in the hospital setting during critical periods of illness as well as possible disparities in inpatient health care.

METHODS

The study was a retrospective analysis of all inpatient stays at Los Angeles County and University of Southern California (LAC+USC) Medical Center from January 1,2019, to December 31,2019. We merged 2 data sources: (1) the LAC+USC internal electronic medical records system using Cerner PowerInsight and (2) Vizient Health System Data, a hospital billing and administrative claims database. All data were de-identified to conform to Health Insurance Portability and Accountability Act requirements.

We examined the data at both the encounter and patient level. For encounter data, there were 29 765 total inpatient hospitalizations at LAC+USC in 2019. We limited the sample to hospitalizations with patients aged 18 years and older and who were fullscope Medi-Cal patients (California's Medicaid program) or undocumented (coding detailed in the "Variables" section). Our final analytic sample consisted of 22 480 inpatient encounters. In our analyses, we separated the sample by age (18-64 years and $ 65 years) because of differences in health status at older ages and public insurance coverage (18-64 years = 18 244; $ 65 years 5 4236). For the older adults, we limited the sample to those who only had Medi-Cal ora combination of Medi-Cal and Medicare to better isolate a low-income comparison group. For outcomes that used patient-level data (e.g., unique number of patients who were admitted to LAC+USC in 2019), there were 15 876 patients (18-64 years 5 12 910; $ 65 years = 2966).

Variables

Outcomes. We examined 3 outcomes indicating the severity of the hospitalization: illness severity, length of hospital stay, and repeat hospitalization. We measured illness severity by the relative risk of mortality, which we calculated with a proprietary algorithm that predicts the risk for mortality based on patient demographics, clinical characteristics, procedures, and comorbidities for each Medicare Severity-Diagnosis Related Group. For example, the risk prediction for a liver transplant (Medicare Severity-Diagnosis Related Group 5 or 6) was a function of hemodialysis, cachexia, complication of transplanted organ ortissue, ventilator on admission day, and type 2 diabetes. The risk for mortality was averaged over all encounters in the hospital for each diagnosis group in 2019. Encounters that were 75% of the mean were coded "lower risk" relative to the mean. Encounters that were within 75% and 125% of the mean were coded "similar risk," and encounters more than 125% of the mean were considered "higher risk." We dichotomized the outcome to hospitalizations lower or similar to the mean versus those with higher risk of mortality.

Length of hospital stay was the total number of days of the inpatient admission, with longer encounters indicating sicker patients. This was an encounterlevel variable, meaning that each hospitalization had its own length of stay. To account for outliers, we conducted additional analyses with encounters longer than 21 days removed.

Repeat hospitalization was a patientlevel variable and was dichotomized to patients who had 1 inpatient admission in 2019 versus those who had more than 1 admission. We assumed that those with more than 1 admission were sicker and needed more comprehensive care. Though it is possible that repeated hospitalizations might be attributable to unrelated or isolated events (e.g., injuries), it is more likely that repeated hospitalizations result from unresolved or ongoing illness.

Immigration status. We compared undocumented immigrants to fullscope Medi-Cal patients by using insurance status as a proxy to determine immigration status. We coded a patient as having undocumented status ifthe primary insurance for the encounter was restricted-scope Medi-Cal, which provides health services to low-income Los Angeles County residents who meet the income threshold for MediCal but do not meet immigration status requirements as either US nationals, citizens, or lawful permanent residents. These services include access to county facilities that provide preventive, emergency, diagnostic, specialty, inpatient, and pharmacy services, as well as a local health care program (My Health LA) that offers primary and preventive health care services through community clinic partners.18

Given the income requirement for restricted-scope Medi-Cal eligibility, we chose full-scope Medi-Cal (hereafter referred to as Medi-Cal) patients as a comparison group of low-income patients who are either US-born or foreign-born with authorized status. Because ofthe citizenship requirements for federal health insurance, nearly all ofthe

Medi-Cal patients are either US-born or documented. The other option for a comparison group is individuals on other forms of insurance (e.g., private insurance), but we do not know either the poverty level or the immigration status of these patients.

Covariates. We included age as a continuous variable, race/ethnicity (Hispanic [reference], non-Hispanic White, non-Hispanic Black, non-Hispanic Asian, non-Hispanic other), language (English [reference], Spanish, other), gender (male [reference], female), and homeless status (housed [reference], nonhoused). We included language preference to account for reduced English proficiency, which can have an impact on treatment utilization and quality.19 As the primary safety net hospital in the county, LAC+USC has a substantial homeless patient population. We included homeless status to account for the substantial barriers to regular medical care that unhoused individuals face, as well as their complex health conditions.20 For encounter-level outcomes, we included an indicator of whetherthe encounter was the only admission for the patient in 2019 (reference) or if it was a repeat hospitalization. For instance, ifan encounter was 1 of 2 or more hospitalizations from a patient in 2019, all encounters from that patient were coded "1." If an encounter was the only hospitalization from a patient in 2019, it was coded "0."

Analysis

Because ofthe inherent compositional differences between undocumented and Medi-Cal patients, we estimated group differences in our outcomes of interest by using inverse probability weighted regression adjustment (IPWRA). This approach weights observations based on the inverse of their conditional probability of "treatment" exposure (i.e., being undocumented). The "treatment" model is estimated first, and the predicted probability of being "treated" (i.e., undocumented) is used to compute the inverseprobability weights. These weights are then applied to the outcome models (i.e., illness severity, length of stay, repeat admission), creating a pseudomatched sample, such that undocumented and Medi-Cal patients are balanced in their covariates. In conventional multivariate regression analysis, covariates are included in the model to account for compositional differences but each observation is weighted equally. In IPWRA models, observations that have a higher likelihood of being "treated" (i.e., undocumented) are up-weighted while those that have lower likelihood are down-weighted. IPWRA is also known as the doubly robust method because it models both the outcome and propensity for "treatment" within the same framework, and only one needs to be correctly specified to produce unbiased results.21

We ran each weighted outcome model on the undocumented group first and then the comparison group. We calculated average treatment effects (ATEs), a common postestimation approach for treatment effects models such as the IPWRA,22 for each of our outcomes. The ATEs take a counterfactual approach and assume that each subject has a pair of potential outcomes: the outcome if they were undocumented or the outcome if they were on Medi-Cal. We calculated the predicted means for the outcome for each observation assuming they were undocumented (using their own covariate values) and then again for each observation assuming they were on Medi-Cal. For each observation, the difference between the undocumented predicted mean and Medi-Cal predicted mean is called the effect of "treatment." We averaged this difference across the entire population to calculate the ATE.

For the "treatment" model (i.e., undocumented vs Medi-Cal), we included age, race, language, gender, and homeless status as predictors of undocumented status. For the outcome models (i.e., illness severity, length of stay, repeat admission), we included the same covariates as the "treatment" model as well as whether the encounter was a repeat hospitalization for the illness severity and lengthof-stay outcomes. For illness severity and repeat admissions, we conducted logistic regressions, whereas for length of stay, we conducted a linear regression model. We calculated robust standard errors to correct for potential for heteroskedasticity. We did this separately for patients aged 18 to 64 years versus those aged 65 years or older. We conducted our analyses by using Stata version 16 (StataCorp LP, College Station, TX). We provide the coefficients for the IPWRA models in the Tables C, D, and E (available as supplements to the online version of this article at http://www.ajph.org).

RESULTS

Table 1 provides descriptive information for our sample at the encounter level. The same descriptive statistics at the patient level are provided in Table A (available as a supplement to the online version of this article at http://www.

ajph.org). Nearly one third of encounters were for undocumented patients (31.6%). The mean age for younger patients (18-64 years) was 45.8 years for undocumented patients and 41.6 years for Medi-Cal patients. Among older patients ($ 65 years), the mean age was 73.1 years for undocumented and 73.8 years for Medi-Cal. Undocumented patients in both age groups were predominantly Hispanic (18-64 years: 91.8% vs $ 65 years: 86.5%). Medi-Cal patients in both age groups were also predominantly Hispanic, but comprised a lower proportion (18-64 years: 62.5% vs $ 65 years: 57.2%).

Undocumented patients primarily spoke Spanish (18-64 years: 82.5%; $ 65 years: 84.8%), whereas Medi-Cal patients had differences in language preference according to age group. Notably, homelessness was nearly 3-fold greater among Medi-Cal patients compared with undocumented patients across age groups (18-64 years: 18.8% vs 6.6%; $ 65 years: 13.3% vs 4.8%).

Compared with Medi-Cal patients, undocumented patients had lower illness severity and average length of stay. Among younger patients, 8.6% of undocumented patients had higherthan-average relative mortality risks compared with 11.2% of Medi-Cal patients. Among older patients, 15.8% of undocumented patients had higherthan-average mortality risk compared with 23.1% of Medi-Cal patients. The average length of stay in the hospital was 4.6 days for undocumented and 6.1 days for Medi-Cal among younger patients and 5.2 days and 6.8 days, respectively, among older patients. Among younger patients, inpatient encounters over the study period were comparable between undocumented and Medi-Cal patients, in which approximately 70.7% were first encounters and 29.1% were repeat hospitalizations. However, among older patients, undocumented patients had more repeat hospitalizations compared with Medi-Cal patients (34.8% vs 24.8%).

Group Differences in Inpatient Measures

The results ofthe IPWRA are presented in Table 2. Among patients aged 18 to 64 years, encounters with undocumented patients had lower illness severity and shorter lengths of stay than encounters with Medi-Cal patients. The probability of having an encounter with a higher-than-average risk for mortality was 8.4% for undocumented patients and 11.6% for Medi-Cal patients. Encounters for undocumented patients therefore had 3.2% lower probability of a higher-thanaverage mortality risk compared with encounters for Med-Cal patients. The average length of stay for undocumented patients' encounters was 1.1 days shorter than for Medi-Cal patients (5 days vs 6.1 days). Among younger patients, the probability of having a repeat hospitalization in 2019 did not significantly differ between undocumented and Medi-Cal patients. Both groups had a probability of repeat hospitalization that was around 22%.

Among patients aged 65 years and older, encounters for undocumented patients had similarly lower illness severity. Undocumented patients' encounters therefore had 6.5% lower probability for a higher-than-average risk encounter (15.7% vs 22.2%). There was no significant difference in predicted length of stay. However, the probability of having a repeated hospitalization was higher for undocumented patients compared with Medi-Cal patients. Undocumented patients had a 26.5% probability of having a repeat hospitalization in 2019 while Medi-Cal patients had a 22.0% probability, with a statistically significant difference in probabilities of 4.5%.

Sensitivity Checks

We conducted several sensitivity checks to confirm the robustness of our findings. We also limited the sample to those who identified as Hispanic/ Latino, which was 72% of the sample aged 18 to 64 years and older and 62% of sample aged 65 years and older. For encounter-level outcomes (relative risk of mortality and length of stay), we kept only 1 encounter per patient. The results were qualitatively similar for all of these checks (Table B, available as a supplement to the online version of this article at http://www.ajph.org).

For the length-of-stay outcome, we removed outliers whose inpatient stays were 21 days or longer. For encounters with patients aged 18 to 64 years, the difference in predicted length of stay dropped to 0.5 days but remained significantly different from zero. For patients aged 65 years and older, the difference dropped to 0.1 and remained nonsignificant.

DISCUSSION

We compared the severity of inpatient stays between undocumented and fullscope Medi-Cal patients at the largest safety-net hospital in Los Angeles County. Our results provide insight into the health status of undocumented immigrants at the point of needing inpatient medical care, by using measures of illness severity, length of hospital stay, and repeat hospitalizations. In our study, younger undocumented patients who were hospitalized had less severe illness and spent less time in the hospital compared with Medi-Cal patients. While existing work suggests that undocumented immigrants could have higher risk for poorer inpatient outcomes on account of their limited access to medical care,23 the younger undocumented patients in this study did not present with more severe health problems upon hospital admission. Our findings add to those of others that have found positive health trends among undocumented immigrants compared with documented immigrants or US-born counterparts.7,8

These trends were consistent among older undocumented immigrants as well, but older undocumented patients were more likely to have repeat hospitalizations than their Medi-Cal counterparts. Lower illness severity among older undocumented patients, however, suggests that their higher likelihood of repeat hospitalizations may represent a higher willingness to access care rather than comparatively poorer health. While qualitative work has suggested that barriers to receiving regular care can exacerbate older undocumented immigrants' existing chronic conditions,24 we did not find this to be the case from our data.

There are several caveats to our interpretations. First, the Medi-Cal patients at LAC+USC may be a unique, low-income sample. The high proportion of homelessness, for example, indicates that this population has complex health care needs. The longer length of stay among Medi-Cal patients may also be attributable to discharge planning issues, such as a long wait for other health facilities or a lack of a discharge destination. Thus, the relatively positive outcomes among undocumented patients may not be attributable to any inherent health advantages perse, but rather that the comparison group suffers from serious health conditions. Conversely, our sample of undocumented immigrants included those who had access to county and community facilities via local health plans that provide preventive care. Los Angeles County has actively addressed the health care needs of the undocumented population, which suggests that this undocumented patient population may be receiving regular care that contributes to their better health at the point of hospitalization.

Limitations

We do not have direct information on the immigration status of patients. However, we believe restricted-scope Medi-Cal is a valid approximation of undocumented status. Patients who are not insured at the time of admission but are Medi-Cal eligible are coded under a separate payment source that provides qualified individuals immediate access to temporary Medi-Cal while applying for permanent Medi-Cal or other health coverage (e.g., hospital presumptive eligibility). There may also be immigrants who use restrictedscope Medi-Cal who are not undocumented, such as those on student and work visas, and certain permanent legal residents who have not met the 5-year residency requirement for public insurance. Alternatively, there may be undocumented immigrants who do not qualify for restricted Medi-Cal because of their high incomes. We believe these comprise a very small number in our sample, however.

We also acknowledge that we lack important variables, such as nativity, country of origin, or ethnic subgroups (e.g., Mexican, Salvadoran, Chinese) and did not control for them in our analysis. We did include language use in our IPWRA models, however, which up-weights individuals in the full-scope Medi-Cal comparison who may be foreign-born and prefer Spanish. We also found similar results when we limited the analyses to Hispanics/Latinos, confirming that these trends are consistent for Hispanic/Latino undocumented immigrants. In addition, we did not have information on baseline health status. While this was indirectly incorporated in our illness severity measures, this is a limitation for length of stay and repeat encounters. Finally, our illness severity outcome might be biased by undiagnosed disease. Yet comprehensive evaluation upon admission often leads to diagnosis ofvarious chronic conditions, which are then captured in the illness severity score. Nevertheless, we acknowledge the limitations of unknown chronicity of medical conditions and adequacy of treatment in the outpatient setting. Future research, including qualitative interviews, would enrich research with respect to nativity status, length of time in the United States, and perceptions around health and health care utilization among undocumented immigrants.

Conclusions and Future Directions

We found that undocumented immigrants in Los Angeles County do not have poorer health outcomes at the point of hospitalization. Contrary to some popular narratives, undocumented immigrants do not appear to overburden the health care system. We note, however, that the county provides public or subsidized access to health care services for its undocumented residents. While we do not have information on primary care utilization or outpatient care, future research could examine whether local policies contribute to positive hospitalization characteristics among undocumented immigrants or whether our findings hold in other locales with weaker safety-net programs.

ABOUT THE AUTHORS

Annie Ro is with the Department of Health, Society, and Behavior at the University of California, Irvine. At the time the study was conducted, Helen W. Yang was a chief resident in Internal Medicine at the Keck Schoolof Medicine of University of Southern California (USC), Los Angeles. Senxi Du is a medicalstudent at the Keck School of Medicine of Medicine. Courtney L. Hanlon is with the Los Angeles County and USC Medical Center, Los Angeles. Andrew Shane Young is with the Division of Geriatric, Hospital, Palliative, and GeneralInternalMedicine, Department of Medicine, Keck Schoolof Medicine.

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CONTRIBUTORS

A. Ro conceptualized the study, conducted the analysis, and wrote the article. H. W. Yang and A. S. Young conceptualized the study, interpreted results, and assisted with article writing. S. Du and C. L. Hanlon interpreted results and assisted with article writing. All authors reviewed the final draft of the article.

CONFLICTS OF INTEREST

The authors have no conflicts of interests to disclose.

HUMAN PARTICIPANT PROTECTION

All project activities were reviewed and approved bythe USC institutional review board (HS-1900890), which served as a reliance for the University of California Irvine institutional review board. The project did not require informed consent.

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Document 2 of 37

The Hemp Loophole: A Need to Clarify the Legality of Delta-8-THC and Other Hemp-Derived Tetrahydrocannabinol Compounds

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ABSTRACT (ENGLISH)

On June 22, 2021, Connecticut became the newest state to legalize recreational cannabis, raising the total number of US states allowing recreational cannabis to 18. One of the promissory notes of state-led legalization is that it will bring cannabis out of an illicit market and into a more transparent one with better safety standards. Meeting this challenge will require properly defining a group of compounds that fall into the category of tetrahydrocannabinol (THC) but can have different structures and origins. Here I discuss loopholes that allow for legal hemp production to yield a THC compound that has escaped state and federal regulation because of its hemp, rather than cannabis, origins. I make the case that the loopholes that allow THC compounds to be sold as hemp ought to be closed and provide a brief case study of one state that has done an exceptional job in closing such loopholes.

FULL TEXT

On June 22, 2021, Connecticut became the newest state to legalize recreational cannabis, raising the total number of US states allowing recreational cannabis to 18. One of the promissory notes of state-led legalization is that it will bring cannabis out of an illicit market and into a more transparent one with better safety standards. Meeting this challenge will require properly defining a group of compounds that fall into the category of tetrahydrocannabinol (THC) but can have different structures and origins. Here I discuss loopholes that allow for legal hemp production to yield a THC compound that has escaped state and federal regulation because of its hemp, rather than cannabis, origins. I make the case that the loopholes that allow THC compounds to be sold as hemp ought to be closed and provide a brief case study of one state that has done an exceptional job in closing such loopholes.

WHERE DO THC COMPOUNDS COME FROM?

The label THC refers to a group of compounds that in chemistry are called isomers. THC isomers have the same formula and structure but a different arrangement of atoms and potentially different pharmacological properties. The most abundant naturally occurring THC isomer is D9-tetrahydrocannabinol (delta-9-THC). Delta-9-THC is the main cannabis-specific compound (called a cannabinoid) responsible for mediating the psychotropic effects of cannabis. Because of delta-9-THC's ubiquity in most cannabis strains, it is often referred to universally as "THC," but other THC isomers can also naturally occur, just usually in smaller amounts.

One other THC isomer that naturally occurs in cannabis plants is Д8tetrahydrocannabinol (delta-8-THC). Delta-8-THC is nearly identical in chemical structure to delta-9-THC, differing only by the location of a carbon-carbon double bond.1 Because the structure of delta-8-THC is slightly different from that of delta-9-THC, it interacts with the human body in ways that can differ from delta-9-THC. For example, at the same dose, delta-8-THC produces a psychotropic effect that is similar to but slightly reduced from delta-9-THC. The pharmacological profile of delta-8-THC also suggests it has antiemetic, anxiolytic, appetite-stimulating, analgesic, and neuroprotective properties, indicating that it may have therapeutic applications and that some of these applications may differ from delta-9THC.

Both delta-8-THC and delta-9-THC naturally occur in cannabis, but they can also be synthesized. One means of synthesis is conversion from another group of naturally occurring cannabis isomers called cannabidiol (CBD). Because CBD isomers are similar in structure to THC isomers, they can be converted to THC isomers through a relatively simple series of chemical reactions. The main method of converting CBD to delta-8-THC yields a solution containing delta-8-THC and delta-9THC as well as other byproducts from the associated reactions. This solution can be further processed to remove delta-9-THC and then added to various consumer goods for consumption or application.

LOOPHOLES ALLOW SOME THC COMPOUNDS TO BE SOLD NATIONWIDE

Many manufacturers in the United States have made the argument that delta-8-THC products are "hemp products" and not "cannabis products," which, if true, affords them legal rights and privileges. Hemp is a variety of the cannabis plant species in which 0.3% or less of its mass contains delta-9-THC when measured after it is dried. In the past three years, hemp and derivatives extracted from hemp have become widely available in the United States after a US congressional law called the 2018 Farm Bill removed hemp from the definition of marijuana in the Controlled Substances Act.2 This has allowed hemp to be legally cultivated for its commercial and industrial purposes (e.g., to make paper, rope, and clothing) while retaining the schedule I classification of cannabis strains containing concentrations of delta-9-THC above 0.3%.

Because hemp contains very little delta-9-THC, it is not generally considered psychotropic; however, because it contains an abundance of CBD, it is possible to synthesize THC isomers from hemp. The processes used to convert CBD or other cannabinoids found in hemp to THC isomers were not explicitly prohibited in the 2018 Farm Bill or in most state laws governing hemp. One interpretation ofthe omissions of a broader definition of THC and the processes of synthesizing THC isomers from hemp laws is that this implies that THC isomers can be produced and sold legally under hemp laws so long as hemp and hemp derivatives are legally obtained and the final products contain 0.3% or less delta-9-THC.

These "hemp loopholes" have created a new marketplace for delta-8THC products that uses sophisticated sourcing and distribution strategies designed to evade cannabis and hemp laws and appeal to consumers but also resemble a legitimate business. For example, one ofthe largest delta-8-THC manufacturers is based in Indiana, where both medicinal and recreational cannabis products containing delta-9THC remain prohibited.3 The manufacturer claims to obtain hemp and hemp extracts that are legally sourced from California, Colorado, and Oregon and then convert the extracts to other cannabinoids including delta-8-THC. The manufacturer sells bulk quantities of delta-8-THC solutions and an array of premixed delta-8-THC products that resemble traditional cannabis products (e.g., brownies, cookies, dabbing concentrates, gummies, vape cartridges) through its Web site and claims to have had these products featured in major news outlets such as ESPN, ABC News, and Rolling Stone.

The manufacturer also has a program to ship its products wholesale to retailers that resell them, as well as individually to consumers across the United States. To help guide purchasing decisions, the manufacturer provides a tool on its Web site to educate retailers and consumers on how it interprets federal cannabis and hemp laws and comparable laws in the 50 US states (Table 1). Nowhere on this manufacturer's Web site does it suggest that it restricts shipments to specific places; on its "shipping" page, however, the manufacturer claims that "if, after ordering, we discover an item is illegal in your state we reserve the right to cancel and refund the order."

CANNABIS CONTROL SYSTEMS PROMISE A SAFER MARKETPLACE

Hemp loopholes have created a marketplace in which delta-8-THC products are being widely sold outside of most ofthe cannabis control systems developed by states that have legalized recreational cannabis products. Although the marketplaces regulated by staterun cannabis control systems remain unambiguously illegal at the federal level and have faced many challenges from the still-thriving illicit cannabis market, in theory they are designed to bring cannabis out of an illicit marketplace and into ones with more effective means for oversight and better safeguards that ensure consumer safety. Examples of some ofthe requirements in these systems provide a perspective on how they are intended to protect the public's health in ways that the current marketplace for delta-8-THC does not.

First, most cannabis control systems have established a minimum purchasing age and require age verification to purchase cannabis products. Age requirements are designed to limit youth access to cannabis given that developing brains are more susceptible to addiction, exposure among youths potentially results in a greater number of heavy users, and heavy cannabis use among young people may have distinct health effects (e.g., cognitive impairments).4 For now, delta-8-THC retailers are setting their own minimum purchasing age (if any) and creating their own method of verifying the ages of their consumers.

Second, most cannabis control systems require cannabis products to be submitted to a certifying agency that tests them for potency, consistency, and a wide range of potential contaminants that are known to be used in illicit cannabis cultivation and processing. Without such requirements, adulterated products can enter the supply chain and harm consumers. For example, illicit cannabis vaping products containing the cutting agent vitamin E acetate were determined to be the primary cause ofthe 2019 outbreak of lung injury known as EVALI that led to 2668 hospitalizations and 68 deaths.5 Delta-8-THC products have not been linked to EVALI, but such events expose the potential dangers of certain manufacturing processes that, if left unchecked, could harm consumers. Although some delta-8-THC manufacturers claim to test their products, the methods used to convert CBD to delta8-THC have not been well studied with respect to quality assurance, and there are currently no established standards fortesting delta-8-THC products for potentially toxic or otherwise harmful substances that could be byproducts of these processes.

Finally, most cannabis control systems have established detailed packaging and labeling standards including requirements for legible supplement information, warnings regarding the presence of psychotropic compounds, and restrictions on design features that could be attractive to youths (e.g., cartoons and names such as "kandyz"). Delta-8-THC products do not have such packaging and labeling requirements, and this could increase the risk of unintended use or overdose. The West Virginia Poison Center has already issued a warning after adults mistakenly consumed delta-8-THC products believing them to be CBD products and youths were hospitalized after consuming delta-8-THC gummies believing them to be candy.6

CLOSING HEMP LOOPHOLES

Precedent exists to incorporate delta8-THC into federal regulations governing cannabis. According to the 1986 amendment to the Controlled Substances Act,7 a controlled substance analogue is a substance where "the chemical structure of which is substantially similar to the chemical structure of a controlled substance in schedule I or II." The act also states that "a controlled substance analogue shall, to the extent intended for human consumption, be treated, for the purposes of any Federal law, as a controlled substance in schedule I." Given that the chemical structure of delta-8-THC is nearly identical to that of delta-9-THC, it could certainly be considered a controlled substance analogue of delta-9-THC and enforced as such. The Drug Enforcement Agency has also promulgated that the use of any process that creates delta-9-THC as a byproduct at any point-as is the case during the conversion of CBD to delta-8-THC-is in violation of federal law.8 Although these rulings have been made, it is unclear whether the Drug Enforcement Agency has acted or will act on them.

In the current political landscape, federal enforcement of cannabis laws rarely occurs and will likely be inadequate to have any meaningful public health impact. Thus, state-by-state amendments to cannabis control laws are probably the best course of action to close hemp loopholes in a meaningful manner. Few states have anticipated the potential for psychotropic compounds to be produced under hemp laws, butsome have already taken actions to close their hemp loopholes in ways that put the public's health first and serve as an example for other states.

The actions taken by Colorado represent an excellent model for closing a hemp loophole. First, Colorado's controlled substance laws9 provide a clear definition of THC that broadly applies to isomers other than delta-9-THC, eliminating any ambiguity about whether delta-8-THC is considered an analogue to delta-9-THC. Second, the Colorado Department of Public Health10 and the Marijuana Enforcement Division11 have made it clear to their stakeholders that the state considers the process of chemically modifying or converting naturally occurring cannabinoids from industrial hemp as noncompliant with the statutory definition of an "industrial hemp product," clarifying that industrial hemp and hemp derivatives should not be used as precursors.

Third, the Marijuana Enforcement Division has also clarified the specific solvent and extract methods it allows and specified that the current methods of converting cannabinoids do not fall in this category.11 Finally, the Colorado Department of Public Health has explained that it is disallowing THC isomers produced by methods of converting cannabidiol or other cannabinoids from being added to food, dietary supplements, or cosmetics because there is insufficient evidence to determine whether any toxic or otherwise harmful substances are produced during the process of creating or converting THC isomers and may remain in the products ingested, applied, or used by consumers.

At present, these actions essentially ban manufacturers from producing or selling delta-8-THC or other THC isomers if they are converted from other cannabinoids in hemp or cannabis. However, Colorado's Marijuana Enforcement Division has left open the possibility for stakeholders to work with regulators to examine potentially compliant methods to produce THCs by converting cannabis-derived cannabinoids.11 Colorado's policies also do not appear to prohibit strains of cannabis that contain THCs other than delta-9THC or any compliant methods of extracting those compounds. This suggests that compliant delta-8-THC products could be sold within Colorado's cannabis control system and that methods of converting cannabinoids could be used once their safety can be assured.

The actions taken by Colorado are commendable because they prioritize the public's health while also acknowledging a potentially legitimate consumer demand for delta-8-THC and the potential value of safe methods of converting naturally occurring cannabinoids. For this reason, I believe that more states should follow in Colorado's footsteps and close their own hemp loopholes. >4JPU

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COVID-19 Era Recessional Mortality Continues the Impact of Prepandemic Recessions on Mortality

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ABSTRACT (ENGLISH)

C OVID-19 has had profound health, social, and economic effects globally. Its impact and our understanding of it will continue to evolve as issues- related, for example, to delayed diagnoses, social isolation, increased public sector borrowing, and health care worker burnout-emerge. Short-term effects, such as COVID-19-related deaths, are significant; in the United States these are estimated to have exceeded 630 000.1 The longer-term effects will take time to evolve but are already sources of concern to decision makers and their consultants, including those in academia. In April 2020, the US unemployment rate reached 14.8%-the highest rate observed since data collection began in 1948.2 In this issue of AJPH, Brenner (p. 1950) examines how this and other economic indicators of the effects of COVID-19 on the economy affect health. Brenner examines the relationship of unemployment and bankruptcy rates with excess deaths during the COVID-19 recession, contextualizing these with reference to the Great Recession of 2000 to 2018 in the United States.

FULL TEXT

C OVID-19 has had profound health, social, and economic effects globally. Its impact and our understanding of it will continue to evolve as issues- related, for example, to delayed diagnoses, social isolation, increased public sector borrowing, and health care worker burnout-emerge. Short-term effects, such as COVID-19-related deaths, are significant; in the United States these are estimated to have exceeded 630 000.1 The longer-term effects will take time to evolve but are already sources of concern to decision makers and their consultants, including those in academia. In April 2020, the US unemployment rate reached 14.8%-the highest rate observed since data collection began in 1948.2 In this issue of AJPH, Brenner (p. 1950) examines how this and other economic indicators of the effects of COVID-19 on the economy affect health. Brenner examines the relationship of unemployment and bankruptcy rates with excess deaths during the COVID-19 recession, contextualizing these with reference to the Great Recession of 2000 to 2018 in the United States.

CONTINUING RECESSIONAL EFFECTS

Unemployment rates and gross domestic product (GDP) per capita have been long considered two major indicators of recession. Studies have shown rising unemployment and falling GDP per capita to be associated with higher mortality.3,4 Brenner used separate pooled cross-sectional time series analysis of state-aggregated mortality, per capita GDP, unemployment, and bankruptcy data for the Great Recession period (2000-2018) and the COVID-19 recession period (February-November 2020). The author found a strong positive relationship of unemployment, bankruptcy, and GDP per capita with excess deaths, controlling for COVID-19 cases, age, and race/ethnicity. Unemployment was also strongly correlated with major causespecific mortality from 2000 to 2018. With these findings, it seems that the recessional effect persists over the studied periods; that is, the COVID-19 era recessional mortality continues the consequences of prepandemic recessions (2000-2018) on multiple causes of mortality. Brenner also examined the relationship between the recession and mental health disturbances. At the beginning of the COVID-19 pandemic, there were calls to focus on mental health services, as high rates of unemployment were predicted, potentially leading to increased suicide rates.5 Nevertheless, a recently published article has reported unchanged or decreased numbers of suicides across developed countries in the early months ofthe pandemic.6 These interesting findings could be because of early warnings of mental health issues during the pandemic, timely health care programs focusing on potentially susceptible people with both physical and mental illnesses, and fiscal policies enacted to support national economies.6 Equally, it could be that a rise in suicide is yet to emerge, mental health operating as a mediator.7 Indeed the relationship with mental health is complex. In a recent meta-analysis, Fond et al. reported a significant association between mental health disorders (e.g., major depression, anxiety, schizophrenia) and COVID-19related mortality.7 Patients with mental health disorders may be prone to engage in behaviors (e.g., smoking, substance abuse) that made them more susceptible to COVID-19 compared with otherwise healthy people.

THE LONG-STANDING DISPARITY ISSUES

Communities left vulnerable by socioeconomic status, including Black and Hispanic communities as noted by Brenner, could suffer disproportionately from both the Great Recession and the COVID-19 pandemic. This may be exacerbated in the case of COVID19 because of these communities' greater representation as employees in personal services and hard-hit industries.8 A combination of psychological distress, inadequate access to health care insurance (arising from loss of employment), and social support during social distancing as well as insecurities in housing could place these communities in a relatively disadvantaged position for obtaining a job following the pandemic recession.

Systemic and mutually reinforcing sources of disadvantage were accentuated during both examined recessions and contributed to a widening gap between vulnerable communities and those who are better off in terms of their mortality experience. Brenner's study provides further evidence of this in the pandemic's impact on these communities. It also, though, highlights the positive contribution of health care in attenuating the mortality impact of both COVID-19 and broader economic shocks, offering hope and a warning.

WHERE DO WE GO FROM HERE?

As we noted, the effects of COVID-19 on health, health care, the economy, and society will take time to evolve. The effects may well be greater than those Brenner estimated, depending on how measurements are made, for example, whether we examine potential years of life lost rather than mortality and whether we include stillbirths in our analyses. Moreover, overall mortality picks up violence-related deaths, which may be an outcome of COVID-19related recession and act as a mediator in the relationship between unemployment and suicide. These are an important future area of research.

The moderating effect of the size of the health care workforce observed in Brenner's study and previous literature needs to be better understood as potentially related to countercyclical spending and the service actually delivered. This is in line with the perception that the health care system in the United States is "recession proof based on economic evidence during the Great Recession.9 The fundamental principle for the inelasticity of health care demand in part is related to comprehensive insurance coverage with affordable deductible health plans.10 However, COVID-19 changed the situation and may lead to a shift from more generous private to public insurance as well as increased cost-averse behaviors by the privately insured.10 The COVID19 crisis also led to a peak of 10.3% unemployment among those previously employed in the health care sector in April 2020.11 Additionally, the increased stress level accentuated by fear of virus transmission and overwhelming workload because of COVID-19 also led to an estimated 49% of US health care workers experiencing burnout.12 Therefore, timely investment to enlarge the health care workforce could be a priority to offset the adverse effects of COVID-19 on the health care system, which consequently contributes to save lives.

It is estimated that 10% unemployment is associated with approximately 48 149 excess deaths (35 700 excess deaths while being jointly analyzed with bankruptcies). Equipped with evidence such as that presented by Brenner, decision makers can plan to mitigate the effects. Importantly, Brenner highlights the importance of economists, labor market specialists, and public health researchers working more closely to better understand causal relationships, the impact on inequalities, and how these inequalities might be mitigated. As Brenner says, these are potentially avoidable deaths requiring urgent action that prioritizes populations of low socioeconomic status and communities of color. >4JPH

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DETAILS

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Document 4 of 37

The High Cost and Unequal Cancer Burden of Poor Diet in the United States

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ABSTRACT (ENGLISH)

Poor diet is known to increase cancer risk and mortality, both directly and mediated by excess body fatness.1,2 Characterized by higher intakes of red and processed meat and sugar sweetened beverages (SSBs) and a lower intake of whole grains, vegetables, and fruit, poor diet is associated with the risk of multiple cancers, especially colorectal cancer.1,2 The most recent estimates of the proportion of new cancer cases attributable to suboptimal diet range from 4.2%3 to 5.2%,4 equating to approximately 67 000 to 80 000 total cases per year in the United States. Disparities in cancer outcomes among racial and ethnic groups and by socioeconomic status are well documented.5,6 For example, colorectal cancer death rates among Black males is more than 44% higher than among White males.5 Few studies, however, have quantified the impact of poor diet on cancer outcomes in these subgroups. In this issue of AJPH, Wang et al. (p. 2008) estimate the lifetime health and economic costs of cancer attributable to poor diet among US subpopulations defined by age, sex, race/ethnicity, education, income, and Supplemental Nutrition Assistance Program (SNAP) participation. The authors projected both direct and indirect effects of poor diet, the latter derived from a pooled analysis of three prospective cohorts, to obtain diet-body mass index associations. Additionally, using publicly available data and modelingtechniques, the authors estimated that the impact of suboptimal intakes of seven dietary factors (whole grains, dairy products, fruits, vegetables, red meat, processed meat, and SSBs) accounted for 3.04 million new cancer cases (7.4%) and 1.74 million cancer deaths (7.7%) among US adults over a lifetime. These percentages are higher than previous estimates, likely because of the authors' use of lifetime modeling, whereas estimates from previous studies were for a specific year (i.e., 20143 or 20154). The authors also estimated $254 billion in medical costs attributable to poor diet (7.8% of direct medical costs of 1 5 dietrelated cancers in the United States).

FULL TEXT

Poor diet is known to increase cancer risk and mortality, both directly and mediated by excess body fatness.1,2 Characterized by higher intakes of red and processed meat and sugar sweetened beverages (SSBs) and a lower intake of whole grains, vegetables, and fruit, poor diet is associated with the risk of multiple cancers, especially colorectal cancer.1,2 The most recent estimates of the proportion of new cancer cases attributable to suboptimal diet range from 4.2%3 to 5.2%,4 equating to approximately 67 000 to 80 000 total cases per year in the United States. Disparities in cancer outcomes among racial and ethnic groups and by socioeconomic status are well documented.5,6 For example, colorectal cancer death rates among Black males is more than 44% higher than among White males.5 Few studies, however, have quantified the impact of poor diet on cancer outcomes in these subgroups.

In this issue of AJPH, Wang et al. (p. 2008) estimate the lifetime health and economic costs of cancer attributable to poor diet among US subpopulations defined by age, sex, race/ethnicity, education, income, and Supplemental Nutrition Assistance Program (SNAP) participation. The authors projected both direct and indirect effects of poor diet, the latter derived from a pooled analysis of three prospective cohorts, to obtain diet-body mass index associations. Additionally, using publicly available data and modelingtechniques, the authors estimated that the impact of suboptimal intakes of seven dietary factors (whole grains, dairy products, fruits, vegetables, red meat, processed meat, and SSBs) accounted for 3.04 million new cancer cases (7.4%) and 1.74 million cancer deaths (7.7%) among US adults over a lifetime. These percentages are higher than previous estimates, likely because of the authors' use of lifetime modeling, whereas estimates from previous studies were for a specific year (i.e., 20143 or 20154). The authors also estimated $254 billion in medical costs attributable to poor diet (7.8% of direct medical costs of 1 5 dietrelated cancers in the United States).

A valuable contribution by Wang et al. is the quantification of disparities in the diet-attributable burden of cancer in subpopulations by cancer type and by dietary factor. For example, the authors estimated that non-Hispanic Black persons would experience more dietattributed incident cancers and cancer deaths than would non-Hispanic White persons, with a difference of 110 cases and 214 deaths per 100 000. With the exception of diet-attributed oral, pharyngeal, and laryngeal cancers, which was highest among White persons, this disparity applied to all cancers studied, but particularly colorectal cancer. This higher burden was greatest for low consumption of dairy and whole grains and for excess consumption of processed meats and SSBs.

Having attained less than a college education was also associated with a higher number of diet-attributable cancer cases and deaths compared with adults with a college degree (excess cases and deaths of 180 and 132 per 100 000, respectively). The largest differences were seen for colorectal cancer and applied to all dietary factors, most notably SSBs. Low family income and SNAP participation were associated with higher diet-attributable cancer cases and deaths, with the largest disparities related to consumption of SSBs and low consumption of whole grains. Approximately 72% of the cases associated with poor diet were attributed to direct diet-cancer etiologic effects, with the remainder mediated by body mass index.

ORIGINS OF DISPARITIES

The reasons for disparities in dietrelated health outcomes are multifactorial and complex, with major aspects rooted in structural and social marginalization and discrimination, which result in poorer living environments, limited educational and occupational opportunities, and lower incomes among people of color and other historically marginalized populations.7 Consequently, these populations often experience higher levels of unhealthy food marketing and lower access to healthy foods because of a lack of financial and other resources, including transportation insecurity. This is compounded by limited access to supermarkets with healthy, affordable, highquality choices but high availability of low-cost, poor quality "fast foods" and less healthy foods from convenience stores.1 Even when supermarkets are available, healthier foods are often more expensive.8 Disconcerting trends of widening gaps in diet quality have been documented by education and income.9

PUBLIC HEALTH IMPLICATIONS

Eliminating health inequities through addressing structural racism and improving social determinants of health, which influence factors such as education, wages, housing security, and access to medical care, will need greater societal efforts to address these fundamental causes of poor health. However, some nutrition interventions may help reduce disparities in ensuring food and nutrition security so that individuals have a fair chance at a healthy diet pattern. Several policy implications and approaches are enumerated by Wang et al. For example, the authors suggest priority targets for behavior change and policy strategies to reduce these disparities, including incentives and disincentives to steer SNAP food purchases and improving access to whole grains, fruits, and vegetables, as well as disincentives, such as taxation or labeling, to discourage SSB and processed meat consumption. SSB consumption emerged as a key target in this work; various policy approaches- including taxation-have proven successful in several countries, regions, and cities,10 although few places in the United States have made progress in adopting these policies in the past few years.

Improving availability of drinking water and affordable, healthy, culturally appropriate foods in low-income and racial/ethnic minority communities are other approaches to addressing these gaps. Produce prescription programs and financial incentives for purchasing fruits and vegetables among SNAP participants are showing promise in US-based studies.11 In these programs, when a person purchases produce with SNAP funds, they receive additional funds to spend on fruits and vegetables. Medically tailored meals are emerging as a way to support risk reduction and disease selfmanagement. Reducing the marketing of unhealthy foods and beverages has also shown promise as a strategy. Finally, to inform policy and program efforts, there is a need for more implementation research on interventions that aim to reduce disparities.

STUDY STRENGTHS AND WEAKNESSES

The study by Wang et al. provides important evidence on diet-related cancer and economic disparities that can be used to inform future efforts to improve health equity. Despite its many strengths, this study also has limitations, some of which are acknowledged by the authors. For example, they used data on diet in people aged 20 years and older from surveys conducted in 2015 to 2018 to estimate diet across the life course, not taking into account any potential changes in diet over different periods or the effects of early life diet on cancer outcomes, although the latter has not been extensively investigated in other similar studies either. In addition, more research is needed on indirect effects of diet on cancer through body mass index and on any differences in associations between diet and cancer risk by race/ethnicity; in this study, the authors used the same estimates for all racial/ethnic groups.

STUDY TAKEAWAYS

Food insecurity, at high levels in the United States because of the COVID-19 pandemic, is likely to exacerbate already existing racial and economic health inequalities. If left unaddressed, the disparities in diet quality, the disparities in the proportion of diet-preventable cancers, and the high economic costs identified by Wang et al. will continue or worsen. Innovative and societal solutions are required at national, state, territorial, tribal, and local levels to make it possible for all individuals to have the ability to follow dietary recommendations and cancer-prevention guidelines for optimal health and quality of life. x4jPU

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

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DETAILS

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Document 6 of 37

Countermarketing About Fruit Drinks, Alone or With Water Promotion: A 2019 Randomized Controlled Trial in Latinx Parents

Krieger, James, MD MPH; Kwon, Taehoon, PhD; Run, Rudy, MPP; Walkinshaw, Lina Pinero, MPH; Yan, Jiali, MS; Roberto, Christina A, PhD

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ABSTRACT (ENGLISH)

Objectives. To test whether fruit drink countermarketing messages alone or combined with water promotion messages reduce Latinx parents' purchases of fruit drinks for children aged 0 to 5 years. Methods. We performed a 3-arm randomized controlled online trial enrolling 1628 Latinx parents in the United States during October and November 2019. We assessed the effect of culturally tailored fruit drink countermarketing messages (fruit drink-only group), countermarketing and water promotion messages combined (combination group), or car-seat safety messages (control) delivered via Facebook groups for 6 weeks on parental beverage choices from a simulated online store. Results. The proportion of parents choosing fruit drinks decreased by 13.7 percentage points in the fruit drink-only group (95% confidence interval [CI] = -20.0, -7.4; P <.001) and by 19.2 percentage points in the combination group (95% CI = -25.0, -13.4; P <.001) relative to control. Water selection increased in both groups. Conclusions. Fruit drink countermarketing messages, alone or combined with water promotion messages, significantly decreased parental selection of fruit drinks and increased water selection for their children. Public Health Implications. Countermarketing social media messages may be an effective and low-cost intervention for reducing parents' fruit drink purchases for their children. (Am J Public Health. 2021;111(11):1997-2007. https://doi.org/10.2105/AJPH.2021.306488)

FULL TEXT

Headnote

Objectives. To test whether fruit drink countermarketing messages alone or combined with water promotion messages reduce Latinx parents' purchases of fruit drinks for children aged 0 to 5 years.

Methods. We performed a 3-arm randomized controlled online trial enrolling 1628 Latinx parents in the United States during October and November 2019. We assessed the effect of culturally tailored fruit drink countermarketing messages (fruit drink-only group), countermarketing and water promotion messages combined (combination group), or car-seat safety messages (control) delivered via Facebook groups for 6 weeks on parental beverage choices from a simulated online store.

Results. The proportion of parents choosing fruit drinks decreased by 13.7 percentage points in the fruit drink-only group (95% confidence interval [CI] = -20.0, -7.4; P <.001) and by 19.2 percentage points in the combination group (95% CI = -25.0, -13.4; P <.001) relative to control. Water selection increased in both groups.

Conclusions. Fruit drink countermarketing messages, alone or combined with water promotion messages, significantly decreased parental selection of fruit drinks and increased water selection for their children.

Public Health Implications. Countermarketing social media messages may be an effective and low-cost intervention for reducing parents' fruit drink purchases for their children. (Am J Public Health. 2021;111(11):1997-2007. https://doi.org/10.2105/AJPH.2021.306488)

Consumption of sugar-sweetened beverages (SSBs) is associated with adverse health outcomes among children that are inequitably distributed by race and income.1-3 In the United States, nearly half of children aged 2 to 4years consume an SSB on a given day,4 and SSB intake is highest among Latinx and Black children.5,6 Latinx children are the largest racial/ethnic group among children of color in the United States.7 Fruit drinks (fruit-flavored beverages containing added sugar) are the most-consumed SSB among young children, including Latinx children.4,5,8

Most ofthe many public health awareness campaigns aimed at decreasing SSB consumption have used messages about the sugar content and health effects of these beverages.9-15 However, misleading marketing may lead parents to believe fruit drinks are healthy beverages, contributing to high consumption.16,17 Countermarketing campaigns highlighting industry's misleading messages may encourage healthier beverage choices and could complement the more traditional messages.18 Tobacco countermarketing has increased antitobacco attitudes and lowered smoking rates and may serve as a model for applying this approach to unhealthy foods and beverages.19,20

Public health SSB campaigns have primarily used mass media channels for message delivery (Lina Pinero Walkinshaw, e-mail communication, July 15, 2019). Using social media to target messages may be a more cost-effective and scalable approach.21 Consumers, including Latinx people, are increasingly using social media as a source of health information.22,23

Despite the promise of countermarketing campaigns and social media as public health communication tools, few studies have evaluated their effects on parents' beverage choices for their children and children's SSB consumption. To address this gap and the need to reduce SSB consumption among Latinx children, we conducted a randomized controlled trial to test the hypothesis that fruit drink countermarketing messages delivered via Facebook groups would reduce the proportion of parents choosing fruit drinks for their children and reduce child fruit drink intake. We also assessed whether adding positive messages promoting the health benefits of water would enhance the effects of the negative countermarketing messages.

METHODS

The study was a parallel group, prospective, 3-arm, randomized controlled trial conducted in the United States between October 11 and November 22, 2019. We used Facebook groups to deliver fruit drink countermarketing messages to one intervention arm (fruit drink-only group), a combination of fruit drink countermarketing and water promotion messages to a second (combination intervention group), and car seat safety messages to an attention control arm.24 The complete Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) protocol is available upon request.

Participants

A survey research firm (Galloway Research) recruited study participants using its nationwide proprietary database (populated with respondents to randomized phone survey invitations and former research project participants) and targeted social media messages. Potential participants were asked to enroll in a research study and share opinions about beverages. Eligibility criteria were self-identifying as Latinx, age 18 years or older, caretaker of a child aged 0 to 5 years, daily social media use, and preferring either English or Spanish when speaking. We stratified recruitment so that 80% of participants preferred English when using social media and 20% preferred Spanish, and educational status and household income were representative ofthe US Latinx population.25

Study Procedures and Randomization

After online eligibility screening, eligible respondents were directed to an online baseline survey and offered $15 for completing it. Before starting the survey, participants received information about study procedures and indicated that they understood and agreed to participate. We informed them that they would be asked to join a Facebook group for 6 weeks focused on kids' drinks and would receive information about these drinks. Those completing the survey were enrolled in the study and randomized to a study arm using a computer-generated random number and blocking procedure with randomly varied block size (Voxco RAN[0.01,0.99] command26). All research team members were blinded to assignments until data collection was complete.

Within study arms, participants were assigned to an English- or Spanishlanguage Facebook group based on their language preference.

Each of 9 campaign messages was posted twice to the Facebook groups, so participants received 3 messages per week over a 6-week study period. Messages consisted of a short text header and image (Figure A, available as a supplement to the online version of this article at http://www.ajph.org). Participants were asked to set Facebook notifications to display messages in their News Feeds and to view the group page at least weekly and received weekly e-mail reminders to view messages. They could "like" and comment on the messages. Interlex, a Latinx-led bilingual communications team, monitored posts for compliance with group rules, but otherwise study team members did not interact with the participants in the Facebook groups.

After 6 weeks, all randomized participants received a link to an online exit survey, along with multiple e-mails and Facebook reminders to complete it. Participants received $20 for completing the exit survey.

Intervention Development

We developed preliminary messages informed by a Centers for Disease Control and Prevention compilation of existing SSB message campaigns,9 a literature review, an Internet search, and an expert advisory group. Interlex created initial messages modeled on branding of fruit drinks popular in Latinx communities. Messages were developed simultaneously in English and Spanish to ensure consistency and relevance across languages and cultures. Findings from 5 focus groups across the United States with 45 Latinx parents of children aged 0 to 5 years informed the final content of the messages (Figure B, available as a supplement to the online version of the article at http://www.ajph.org). For example, one message consists of an image of a child with tooth decay along with a fruit drink pouch displaying an "all-natural" claim and the text, "Just because a label states 'all-natural' doesn't make a fruit drink healthy. Don't let the beverage industry harm your kids."

Measures

Full measures and surveys are in Appendices A and B (available as supplements to the online version of this article at http://www.ajph.org). The baseline survey included the following:

* Supermarket shopping task: We asked participants to imagine a typical trip to the supermarket or grocery store and buying a beverage for their oldest child between age 0 and 5 years. They were asked to select 1 beverage from an image of shelves containing 2 waters (both with no added sweeteners, vitamins, or additives, and 1 with and 1 without flavor), 1 soda, two 100% juices, 6 fruit drinks, and 1 milk (2% fat, unflavored; Figure C, available as a supplement to the online version of this article at http://www. ajph.org). To incentivize real-world shopping behavior, participants were told that once they completed the study, they would receive two $2 coupons for the drinks they selected in the study store that could be redeemed at a real-world store (in reality they received a $4 cash payment in lieu of the 2 promised $2 beverage coupons). We assessed the proportion of parents choosing a fruit drink (primary outcome), water, soda, 100% juice, and milk.

* Beverage perceptions: Participants viewed 4 beverage images (2 fruit drinks, 1 water, 1 soda) and answered questions about each one: "How much do you think your child would enjoy this drink?" and "How likely are you to serve or buy this drink for your child in the next four weeks?" from not at all to extremely. They then rated how strongly they agreed or disagreed with the following: "Drinking this product often would ... (1) lead my child to gain weight; (2) increase my child's risk of diabetes; (3) increase my child's risk of cavities and tooth problems; (4) help my child live a healthier life." All responses were on 1 -to-7 Likert scales. We computed a health risk index by averaging responses to these last 4 items (reverse-coding the last statement); lower scores indicated healthier beverage perceptions. Fruit drink scores were averaged across the 2 drinks.

* Beverage intake: We assessed children's beverage consumption (ounces per day, main secondary outcome) with the Children's BevQ beverage frequency questionnaire27 and adult consumption (frequency per day) with 2 questions from the Family Life, Activity, Sun, Health, and Eating (FLASHE) Study.28

* Sociodemographic information: Participants provided their age, gender, race, country of origin, educational attainment, child's age and gender, and household composition and income (from which we calculated percentage of the 2020 federal poverty level).29

The exit survey included the following additional measures:

* Message recall: Participants viewed each of the 9 messages they received and indicated how often they saw each in the past 6 weeks: never, once, or more than once. Recall was averaged across the 9 messages.

* Message perceptions: Participants viewed 3 randomly selected messages from their study arm and provided Likert scale ratings on 10 dimensions including likeability, believability, and providing new information.30,31

* Perceptions of beverage brands: Participants viewed images of 2 fruit drink brands and completed a Net Promoter Score rating and an adaptation of the Brand Trust Scale.32 The Net Promoter Score assesses the likelihood of recommending a brand to a friend or colleague.33 Based on response to a Likert scale ranging from 0 (not at all likely to recommend) to 10 (extremely likely to recommend), the respondent was classified as a promoter (9 or 10), passive (7 or 8), or detractor (0-6). The net score is the difference in the percentage of respondents who are promoters and detractors. We averaged the 5 items from the Brand Trust Scale to create an overall score from 1 to 5, with higher scores indicating greater trust.

* Facebook engagement metrics: We collected data on the counts of "views," "likes," and comments for each

message 1 week after posting.

Sample Size

A sample size of 385 per group was needed to detect a reduction of 10 percentage points in choice of fruit drink relative to control (conservatively assuming baseline prevalence of 50%), with 2-sided a of .05 and power of .8. We sought to enroll 514 people per group to allow for 25% attrition.

Statistical Methods

The primary analysis was intention to treat and included all randomized participants regardless of whether they joined a Facebook group or completed the exit survey. We used multiple imputation with predictive mean matching using 20 imputation data sets, 84 variables, and a set of 5 candidate donors from complete cases for the missing entry to estimate missing exit survey outcome data for those not completing the study and for missing baseline data for parental beverage consumption (22% of latter missing because of a survey programming error).34,35 A secondary perprotocol analysis included only those participants who both joined a Facebook group and completed the exit survey.

We used linear regression models with robust standard errors to model the effect size of the intervention as the adjusted absolute difference in proportions (percentage point difference) or means between groups. The dependent variable was the postintervention value of the outcome. Independent variables were the baseline value of the outcome (except when outcome was measured at exit only) and a dummy variable for each intervention group (control was the reference).

We corrected model-generated P values for multiple comparisons.36 We considered a corrected P value of less than .05 significant.

We conducted exploratory analyses to assess whether a set of demographic and baseline consumption variables modified intervention effects on the primary outcome with separate regression models for each variable. Models included the primary model variables and terms that interacted the modifier with the group assignment variable. Because these were exploratory analyses, we deemed P <.05 without correction for multiple comparisons as significant. All analyses were 2-tailed and performed using R version 3.6.337 (including the {mice} package for multiple imputation and {miceadd} for linear model cluster robust standard error) and STATA/SE version 15.1 38 We preregistered the trial before recruitment at AsPredicted #29421.39

RESULTS

We assessed 5297 individuals for eligibility and enrolled 1628 into the study, of whom 90% joined a Facebook group, and 79% completed both the intervention and the exit survey (Figure 1). Nine participants left the groups. Study arms were well-balanced demographically at baseline (Table 1). Participants were predominantly female and of Mexican descent, used social media frequently, lived in lower-income households, and had not completed college.

The proportions completing the study were similar across the groups (77%-82%). Participant characteristics associated with not joining a Facebook group included Spanish as preferred language, non-White race, less than college educational attainment, and low household income (Table A, available as a supplement to the online version of this article at http://www.ajph.org).

Primary Outcome

The proportion of parents choosing a fruit drink for their child decreased absolutely by 13.7 percentage points in the fruit drink-only group (95% confidence interval [CI] = -20.0, -7.4; P <.001) and by 19.2 percentage points in the combination group (95% CI 5 -25.0, -13.4; P <.001) relative to the control group (Table 2). The decreases in the intervention groups did not differ significantly. The relative percent decrease compared with the control group was 30.9% (95% CI = 16.7%, 45.1%) for the fruit drink-only group and 42.6% (95% CI = 29.7%, 55.4%) for the combination group. The per-protocol analysis showed larger effect sizes and a significantly larger decrease in the combination arm tive to fruit drink-only arm (Table B, available as a supplement to the online version of this article at http://www. ajph.org).

Secondary Outcomes and Additional Analyses

Choice of other beverages. The proportion of parents choosing water for their child (Table 2) increased by 17.6 percentage points in the fruit drink-only group relative to the control group (95% CI 5 11.9, 23.4; P <.001) and by 29.7 percentage points in the combination group (95% CI 5 24.0, 35.5; P <.001). The increase was larger in the combination group compared with the fruit drink-only group (12.1 percentage points; 95% CI 5 5.7,18.5; P 5 .002). The proportion choosing 100% fruit juice declined significantly in the combination group relative to control, although the difference between intervention groups was not significant. There were no significant differences in changes in choice of soda or milk across groups. Per-protocol analysis (Table B) showed a similar pattern but with larger effect sizes on choice of water and 100% juice.

Beverage intake. Children's fruit drink consumption decreased 0.6 ounces per day in the fruit drink-only group (95% CI 5-1.1, -0.2; P 5 .02) and 0.8 ounces per day in the combined group (95% CI 5 -1.4, -0.3; P 5 .01) compared with the control group (Table 2). A decrease of 0.8 ounces per day is equivalent to approximately 2 grams of added sugars, given the added sugars content of commonly consumed fruit drinks. This represents a 22% decrease in added sugars from sweetened beverages consumed by children aged 2 to 5 years.40 Consumption of milk and 100% fruitjuice decreased significantly more in both intervention groups relative to the control group. We observed no significant differences in changes in water consumption. Parents in both intervention groups reported drinking sugary drinks less frequently compared with the control group. The per-protocol analysis revealed similar patterns for parents' and children's beverage consumption, although children's reductions for all types of SSB intake were significant for both arms (data not shown).

Beverage perceptions. Parental perceptions of fruit drinks as healthy or enjoyable and their intentions to buy or serve them for their children decreased significantly in both intervention groups relative to the control group (Table 3). Parents' intention to serve or buy soda for their children decreased significantly in both groups while perceptions of soda as healthy and enjoyable declined only in the combined group.

Brand perceptions and trust. Parents in both intervention groups were significantly less likely to be promotors of fruit drink brands and to trust fruit drink brands at the time of the exit survey relative to the control group (Table 3).

Tests for effect modification. We did not detect significant modification of the intervention effect on the primary outcome by caretaker age, income, education, race, and preferred language, nor child's or caretaker's baseline fruit drink consumption (Table C, available as a supplement to the online version of this article at http://www. ajph.org).

Facebook Engagement, Messages, and Cost

The proportion of participants joining their assigned Facebook group ranged from 88.5% to 92.0% across groups. Averaged across all 6 weeks, 80.0% to 83.5% of group members viewed the Facebook posts. The proportion of participants "liking" messages from each group, averaged across all messages received during the 6 weeks, ranged from 36.4% to 40.5%. The average proportion posting comments ranged from 0% to 10.7%. One third (33.7%) of intervention-group participants reported seeing the messages at least once, while 47.1% reported seeing them more than once, and 19.2% reported never seeing them or did not know. Participants found the messages convincing and informative (Table D, available as a supplement to the onlineversion of this article at http://www.ajph.org). The cost of delivering the messages and moderating the Facebook group was $20 000, or $12.29 per person.

DISCUSSION

The deliveryofculturallytailored countermarketing messages about fruit drinks via a Facebook group to Latinx parents ofyoungchildren, alone orcombined with water promotion messages, led to large and significant reductions in the proportion of parents choosingfruit drinksfortheirchildren in an online simulated store. There was no effect modification by race, income, education level, age, or language preference. The fruit drink messages also increased parents' selection of water, with a larger effect from the combined messages. Both messages led to significant decreases in parents' reports oftheir children's fruit drink consumption and increased parents' negative perceptions of fruit drinks and beverage company brands. To our knowledge, this is the first study to demonstrate the efficacy of countermessages delivered solely via social media as well as the first to specifically target sweetened beverage consumption amongyoungchildren.

Unexpectedly, we observed a decrease in parental report oftheir children's consumption of both 100% juice and milk. Juice consumption may have declined because parents may not always clearly differentiate between 100% juice and fruit drinks containing some juice and may perceive the large total sugar content of 100% juice to be unhealthy. Milk consumption may have declined if parental concerns about artificial flavors in flavored milks increased and they therefore chose milk less often fortheir children.

Although SSB or added sugars countermarketing campaigns have been described, none have been rigorously evaluated.41,42 There are numerous reports of mass media campaigns using traditional health education messages-not countermessages- focused on the amount of added sugars in SSBs and their health effects.9-15 These campaigns have used multiple communication channels, including social media digital advertisements, but not social media groups. Evaluations have yielded mixed findings, and most have been limited to a single site or used an uncontrolled study design (only 3 were controlled10,11,15). The positive studies found 3% to 10% relative reductions in SSB sales or self-reported consumption. Costs ranged from $300 000 to $1.6 million in the 3 studies reporting them, which may be prohibitive for public and nonprofit agencies.10..

Many public health organizations use social media to disseminate health messages, but few rigorous studies have evaluated their impact. Most social media-based nutrition interventions have been tested in small pilot or feasibility studies and have focused primarily on White youths and adults.43 Our study suggests that organic social media may be an effective, low-cost method for organizations with existing social media followings to launch SSB communication campaigns. As costs were fixed, the cost per person would decrease proportionate to the number of participants.

Our study had several limitations. First, our primary outcome was beverage choice in a simulated online store rather than a real store, but participants believed that they would receive a coupon for their beverage selection, incentivizing a real-world choice. Selfreported beverage consumption may be biased by social desirability, although we used a well-validated questionnaire and did not reveal study hypotheses to participants. Future research should assess additional outcomes like retail sales or 24-hour dietary recalls.

Second, we do not know whether effects persisted after the interventions ended. Third, participants were recruited in part from a marketing database and may not be representative of the population of Latinx parents of young children, although they do reflect the educational status and household income ofthe US Latinx population. Fourth, people with lower incomes, with less education, who were nonWhite, and who preferred communicating in Spanish were less likely to join a Facebook group or complete the study. Barriers to engaging these populations in social media interventions and approaches for additional tailoring of interventions should be explored. Fifth, participants were recruited and offered incentives to join oursocial media groups, which might be prohibitively expensive in the real world. It will be useful to learn whether social media advertising alone, which is less costly than implementing social media groups, has effects comparable to those produced by joining a group. Finally, although effect modification analyses were not significant, our sample size was insufficient to detect modest effects.

Study strengths included its longitudinal, randomized controlled design; large sample size; high degree of participant engagement; and good participant retention.

Conclusions

In summary, this first, to our knowledge, rigorous assessment of fruit drink countermarketing messages tailored to Latinx parents of young children and delivered via a Facebook social media group, alone and in combination with water promotion messages, demonstrated reductions in parental choice of these beverages in an online simulated store and children's reported intake. Purchases of water increased. These results suggest that countermarketing messages delivered through social media groups may be a useful addition to existing sugary drink-reduction strategies.

Public Health Implications

Our findings highlight the promise of social media countermarketing messages as either a low-cost stand-alone tool or one integrated into broader mass media campaigns, deployed during SSB policy adoption campaigns, or combined with other SSB reduction strategies.44 It would be useful to understand the added benefits of combining social media countermarketing messages with traditional mass media campaigns and to test our approach with different beverage types and populations. j4]PU

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CONTRIBUTORS

J. Krieger originated the study. J. Krieger and C. A. Roberto designed the study and provided oversight of all aspects of study implementation and analysis. L. P. Walkinshaw performed project management and focus group implementation analysis. J. Krieger, L. P. Walkinshaw, and R. Ruiz designed the messages. J. Krieger, C.A. Roberto, L. P. Walkinshaw, and T. Kwon designed the survey and measures. J. Yan and T. Kwon analyzed the data.J. Krieger prepared drafts ofthe article with input from co-authors. All authors contributed to refinement ofthe study design and protocoland reviewed the finalarticle.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

HUMAN PARTICIPANT PROTECTION

Because the research team had no participant contact or access to identifiable data, the University of Washington institutionalreview board (IRB) determined the study did not require IRB review. The survey firm adhered to its established privacy policy (https://www.gallowayresearch.com/privacypolicy).

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DETAILS

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Document 7 of 37

The Economy as a Determinant of Pandemic Deaths

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ABSTRACT (ENGLISH)

The strong relationship between socioeconomic contexts and the health of individuals and populations has long been settled science and a core tenet of public health.1 Measuring effects and examining possible causal pathways, however, is an ongoing challenge for researchers and policymakers alike.2,3

FULL TEXT

The strong relationship between socioeconomic contexts and the health of individuals and populations has long been settled science and a core tenet of public health.1 Measuring effects and examining possible causal pathways, however, is an ongoing challenge for researchers and policymakers alike.2,3

Brenner's article (p. 1950) discusses, based on innovative methods, possible effects of the COVID-19-related economic downturn on economic and health indicators in the United States, focusing on excess deaths as a result of economic strife. Putting those effects into perspective, he also analyzes the health repercussions of the long recession that has afflicted the United States through much of the past decades, which also helps to demonstrate that some of the bad repercussions can happen in the shortterm.

The two accompanying editorials, by Pagan (p. 1947) and Nguyen et al. (p. 1944), both stress key issues raised by Brenner: (1) The pandemic had a clear negative effect on the economy that was responsible for an important amount of excess deaths. (2) The recession disproportionately affected communities of color and was independent ofthe implementation of social distancing measures. (3) Increases in the health care workforce can attenuate some ofthe repercussions ofthe debilitated economy on the population's health.

The role of health care and prevention in softening the blow of economic hazards has been observed elsewhere; for instance, during one ofthe worst periods ofthe Brazilian economy throughout the 1980s, infant mortality, which has always been closely associated with general living conditions, kept steadily declining.4This has been interpreted as a result ofthe expansion ofthe country's immunization program combined with specific measures addressing low-weight infants in the poorer regions. Community health workers tracked children's development to detect early signs of malnutrition, and oral rehydration therapy was implemented at the onset of cases of diarrhea.

The articles by Brenner, Pagén, and Nguyen et al. correctly point to the need to expand the public health workforce and provide wider access to health care as urgent measures to counterthe broad negative repercussions ofthe pandemic, including its economic consequences. Nguyen et al. further emphasizes the need to incorporate research from other disciplinary fields, such as economics and labor markets, to better understand causal relationships in the economic system as well as its intersections with people's health and possible pathways to alleviate the impact of economic downturns in socioeconomic inequalities and their repercussions on health.

There is, however, a limit to what public health interventions can achieve without addressing what many social epidemiologists have dubbed "the causes of causes," that is, the overall structural social and economic issues that push entire populations into heightened vulnerability to poor health.

Economic programs that reduce wages and public spending to restore balanced state budgets5 have been shown to slow down economic recovery and further penalize the already fragile segments ofthe population.6 Discrimination based on race, gender, and sexual orientation further compounds the problem.

To achieve the long-sought aim of "health for all," overarching political, economic, and social change is necessary to address the fundamental drivers of poor health and inequality.7 Without ensuring that everyone has adequate housing, good jobs, proper education, food security, and protection against all forms of discrimination-in summary, the bare minimum for a decent life-public health personnel will still be compensating for the damage and not building on fair foundations. ÂfPH

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The Social Survey, the Metropolitan Life Insurance Company, and the Beginnings of the US Public Health Service's Sickness Surveys

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ABSTRACT (ENGLISH)

The earliest sickness survey of the US Public Health Service, which started in 1915, was the Service's first socioeconomic study of an industrial community. It was also the first to define illness as a person's inability to work. The survey incorporated the Metropolitan Life Insurance Company's definition of illness, which, instead of sickness rates, focused on duration of illness as a proxy of time lost from work. This kind of survey took place in the broader context ofthe reform movements ofthe Progressive Era and the social surveys conducted in the United States, which led to the creation ofthe Federal Commission on Industrial Relations, where the Service's sickness survey originated. The Service's focus on the socioeconomic classification of families and definition of illness as the inability to work enabled it to show the strong link between poverty and illness among industrial workers. The leader ofthe survey, Edgar Sydenstricker, and the Metropolitan Life Insurance Company came up with new ways to measure the health ofthe population, which also influenced the Service's studies ofthe effects ofthe Great Depression on public health and the National Health Survey of 1935-1936. (AmJ Public Health. 2021; 11 1(1 1):1960-1968. https://doi.org/10.2105/AJPH.2021.306454)

FULL TEXT

Headnote

The earliest sickness survey of the US Public Health Service, which started in 1915, was the Service's first socioeconomic study of an industrial community. It was also the first to define illness as a person's inability to work. The survey incorporated the Metropolitan Life Insurance Company's definition of illness, which, instead of sickness rates, focused on duration of illness as a proxy of time lost from work. This kind of survey took place in the broader context ofthe reform movements ofthe Progressive Era and the social surveys conducted in the United States, which led to the creation ofthe Federal Commission on Industrial Relations, where the Service's sickness survey originated. The Service's focus on the socioeconomic classification of families and definition of illness as the inability to work enabled it to show the strong link between poverty and illness among industrial workers. The leader ofthe survey, Edgar Sydenstricker, and the Metropolitan Life Insurance Company came up with new ways to measure the health ofthe population, which also influenced the Service's studies ofthe effects ofthe Great Depression on public health and the National Health Survey of 1935-1936. (AmJ Public Health. 2021; 11 1(1 1):1960-1968. https://doi.org/10.2105/AJPH.2021.306454)

This is a study ofthe pioneering socioeconomic sickness survey in the United States, undertaken by the US Public Health Service (hereafter referred to as "Service") in the 1910s. The Service was created in 1912 to assist the public health work ofthe states. Between 1912 and World War II, the Service carried out socioeconomic investigations, which had an enormous influence on the scientific and public understanding of inequalities in health.1 These investigations also provided the basis for innovative epidemiological designs.2 The Service's early socioeconomic studies were also an adaptation ofthe social surveys that expanded after Charles Booth's work on poverty, Life and Labor ofthe People in London (1899 and 1903), and Benjamin Seebohm Rowntree's study of poverty in York, England, A Study of Town Life (1901).3 The social survey in England studied the urban working classes to formulate programs to ameliorate the harsh conditions of their lives.4 The term refers to a number of investigations that, contrary to previous ones, entailed the first-hand collection of data about individuals, families, and households on a local rather than a national level and developed in tandem with the evolution of public policy and social reform.5 Among the most notable were those undertaken by the settlement house movement in England and the United States (i.e., the Hull House Maps and Papers about Chicago, Illinois, 1890), the work of W. E. B. Du Bois (1889), and the surveys sponsored by the Russell Sage Foundation (the Pittsburgh Survey, 1907-1908).6 However, historians have largely ignored the social surveys devoted to public health. The bibliography of social surveys by Allan Eaton and Shelby M. Harrison ofthe Russell Sage Foundation (1930) shows that public health was indeed at the core ofthe social survey.7 By focusing on the work ofthe first economiststatistician ofthe Service, Edgar Sydenstricker,8 I will show how the Service's investigations were a continuance ofthe Victorian and Progressive tradition.

One aim ofthe social surveys in the United States was to be objective and scientific, which, in the period in question, was synonymous with quantitative methods. Indeed, the Progressive reformers increasingly relied on statistics, economics, and the emerging social sciences: the Service's early surveys adopted the quantitative analyses typical of the social survey.9 Of course, neither quantification nor the effort to measure the relation between social conditions and health was a novelty at that time. In the 19th century, public health advanced in close connection with the development of statistics and the rationalization of government administration. Starting in 1830, a French doctor, Louis René Villermé, pioneered quantitative investigations that established links between poverty and the poor health of the working classes in Paris, France,10 while in England, the General Register Office, created in 1837, developed an institutional structure for the study of the relationship between mortality, causes of death, and occupation that became the basis of the British public health movement.11 In the United States, during roughly the same period, the decentralization of its government and the lack of a comprehensive compilation of vital statistics meant that there were no systematic studies of mortality patterns in the whole population before the 1930s. However, as Krieger and Fee have pointed out, investigations of the links between socioeconomic conditions and health by federal agencies and nongovernmental bodies were crucial in revealing the socioeconomic factors responsible for inequalities in health in the first half of the 20th century.12

One novel feature ofthe Service's surveys, led by Sydenstricker, which quantified the relation between socioeconomic conditions and health, was the employment ofthe methods pioneered by the Metropolitan Life Insurance Company. As some historians have noted, the insurance companies were responsible for some ofthe most thorough mortality studies in that period.13 In Britain, the statistician William Farr ofthe General Register Office used the life tables technique of actuaries to calculate life expectancy, agespecific mortality rates, and standardized mortality rates to determine which districts ofthe country were healthy or not and improve the conditions of public health, which became the basis of the 20th century British classification of health conditions in terms of occupation.14^ throw further light on the links between US life insurance companies and public health surveys, this article shows how the Service's investigations implemented the measurements the Metropolitan Life Insurance Company used to investigate the health of its policyholders. The company's approach not only influenced the

Service's earliest survey but also continued to be used up to the 1930s.

SOCIAL SURVEY AND THE SERVICE

Soon after its creation, the Service came up with a research agenda that would eventually make poverty the main focus of its analyses ofthe effect of socioeconomic differences on health.15 Sydenstricker was a graduate ofWashington and Lee University (1902) and Fellow of Political Economy at the University of Chicago (1907-1908).16 His previous work in labor economics for the Immigration Commission (1907-1909)17 but, most importantly, for the Commission on Industrial Relations (1912-1915), connects Sydenstricker's work in the Service with the social survey movement initiated in Britain.

The term social survey was derived from Booth's work. Alarmed by the situation ofthe poor, certain sectors of the middle and upper classes drafted policies for social reform based on a systematic accumulation of data.18 Quantification was a significant aspect ofthe approach of Booth and his followers. Rowntree's work on poverty in York (1901), for example, sought "the true measure ofthe poverty in the city... how much of it was due to insufficiency of income and how much to improvidence."19 Booth specifically set out to show "the numerical relation which poverty, misery, and depravity bear to regular earnings and comparative comfort" and measure the number of people above and below the poverty line.20 Instead of relying on official statistics, Booth innovatively compiled first-hand data about the household circumstances of poor families gathered by school board visitors. His findings not only had a direct impact on public policies and led to movements for social reform in England, but they also inspired pioneering social researchers in the United States, including Jane Addams and W. E. B. Du Bois.21

The social survey flourished in the United States in the early decades of the 20th century, thanks to the work of the philanthropist Margaret Olivia Sage and the magazine Charities and the Commons (renamed Survey in 1909), a leading national outlet for the reform movement.22 The magazine's editors, Edward T. Devine and Paul U. Kellogg, with financial support from the Russell Sage Foundation, undertook the Pittsburgh Survey in 1907-1908, which studied how industrial capitalism (the steel industry) shaped urban development.23 After the bombing ofthe Los Angeles Times building in 1910 and the subsequent conviction and imprisonment of those held responsible for it-John J. McNamara (the secretary of the International Association of Bridge and Structural Iron Workers) and his brother, James McNamara- these editors called on President Taft to create a commission for the investigation of social unrest. The bombing was the culmination of two decades of conflict between capital and labor caused by demands for better working conditions and the right to form trade unions. Along with leaders of the social survey movement, like Addams, the editors argued that the growing power of capitalism in American life was creating unrest in the working class, and because this problem was beyond the capacity of the country's legal system, a thorough investigation oftrade unions and the cost of strikes would be needed to deal with it.24

Thus, pressured by the Progressive reformers and leaders of the US social survey movement, the US Congress created the Commission on Industrial Relations in 1912 to ascertain the causes of industrial strife and ensure decent working and living conditions.25 William Jett Lauck,26 who had studied industrial communities for the Immigration Commission of 1907-1909,27 was appointed director of research. Sydenstricker assisted the sanitary adviser ofthe Commission on Industrial Relations, the Surgeon General ofthe Service, Benjamin S. Warren, in the investigation of health insurance for wage earners and the living conditions of industrial workers and communities.28

A staff of more than 50 persons was assembled for the Commission, most of them young economists.29 Chiefly concerned with the strikes and violent protests that took place between 1910 and 1915, they interviewed more than 700 persons all over the country, from businessmen to miners, farmers, garment workers, lumberjacks, silk weavers, and mechanics.30 The Commission served as a training ground for a new generation of labor economists and social investigators who came into prominence duringthe 1920s and the New Deal.31

Sydenstricker also surveyed community welfare for the Commission and studied the public hearings on the building trades of New York City, collective bargaining in the anthracite coal industry in Pennsylvania, and the conditions of industrial workers.32 In his study of Pennsylvania coal miners, he argued that the causes of industrial unrest were the irregularity of employment, the fall ofthe real income ofthe miners, and "the manner of living, standard of home, the real value ofthe worker's wages as expressed in commodities and enjoyment"; the wage earner lacked incentives to become a "stable citizen."33 The unrestrained growth of industrial centers had brought about poverty, physical degeneration, and moral deterioration, he argued.34 Municipal governments, not social workers-with their "taint of charity"-should be responsible for community welfare, in his view.35 His findings supported the Progressive reformers, who wanted the authorities to guarantee the rights ofthe poor to employment and insurance.36

The Commission believed that the responsibility for the worsening conditions of workers and industrial violence lay with the big corporations: their enormous profits were not fairly shared with their workers or consumers. Instead of tracking real earnings over time, Sydenstrickefe report, Conditions of Labor in the Principal Industries, analyzed the extent to which a worker's income would support a decent standard of life: the average wageearner's family spent from three fourths to four fifths of its income on subsistence, leaving little or nothing for unemployment or old age.37 According to Sydenstricker's report, "Fully one-half ofthe wage-earners' families in the United States do not have any income sufficient for adequate subsistence and health."38

While the Commission had not been formed to investigate the health of workers, in 1915, Warren asked Lauck to help the Service to determine the causes of sickness and mortality among wage earners in a typical industrial community. It rested on Warren's idea that such problems had complementary "hygienic and economic" causes and, thus, the "economic and hygienic facts should be obtained at the same time and for the same conditions."39

A one-year study of "a fair type ofthe American industrial town" of 20 000 to 30 000 inhabitants, with 4000 workers in a single predominant industry and a complete range of wages, would be ideal, argued Warren: the community should be as average as possible,40 and the study should focus on a crosssection of national conditions (although African Americans were excluded).41 The main value ofthat study, never made before, would be to show "the real" relation of economic and hygienic conditions in a typical industrial community.42

Lauck fully agreed with the "determination in a scientific manner of the relation of sickness and mortality to poverty and all that the term poverty means." In his opinion, although Rowntree's study of poverty in York was groundbreaking, it was out of date and only applied to England; because "there is nothing in America of its kind," it would be "the first survey in the field."43 Warren claimed that Sydenstricker's study for the Commission on the cost of living would have a direct bearing on the question of health, a study that "has never been made before;" because the whole subject "so closely involves economic facts and questions," Sydenstricker was hired by the Service.44

THE SERVICE'S EARLIEST SICKNESS SURVEY

With Sydenstricker on board, Warren carried out his investigation of the causes of sickness and mortality among the wage earners of a typical industrial community. This plan drew on the Service's studies of pellagra in South Carolina, starting in 1914, under physician Joseph Goldberger. Goldberger sought to determine whether there was a causal relationship between diet and the disease with the use of clinical and experimental methods.45 Warren and Sydenstricker planned to complement Goldberger's investigations with a study of the economic and sanitary factors responsible for pellagra, not just the dietary ones. For the 1915-1916 study, they chose seven cotton mill villages in northwestern South Carolina, with 500 to 800 inhabitants each, where pellagra was prevalent. A house-to-house canvass was supervised by physician George A. Wheeler, and the assembling of data on the families' diet and income by Sydenstricker. This field work (which continued until 1919 at least) also investigated the links between income and illness in general, not just with pellagra.

It was the first study of the close correlation of "hygienic" and "economic" conditions in an industrial community46 and drew on the methods of Booth and Rowntree: the first-hand collection, by a trained investigator, of data about individuals, families, and households on a local level, and an attempt to quantify the phenomena and pressure public policy to make social reforms.47 Lauck believed that the Service's sickness survey would provide a "solid foundation for more intelligent and constructive remedial measures,"48 while Warren and Sydenstricker urged the federal government to implement a system of sickness insurance, arguing that a study of the causes of sickness among wage earners would throw light on the responsibilities of employers, employees, and the public for these conditions.49

Instead of the "indefinite terms" like "poor," "fair," and "well-to-do" commonly used to classify the population's living conditions, Sydenstricker and his associates used quantitative methods and, "for the purpose of accuracy and convenience," an index of living conditions was expressed in a numerical form.50 They took into account the income and food requirements of the family when classifying the sample population, about 4160 people in about 750 households.51 The resulting groups- half-month income of less than $6.00, $6.00 to $7.99, $8.00 to $9.99, $10.00 to $13.99, and $14.00 or more- showed a crude case rate of pellagra per 1000 of 42.7, 26.0,12.8, 4.1, and 3.4 for the year 1916, respectively. According to the authors, "It is the first reported study in which the degree of the long-recognized association between poverty and pellagra incidence is measured in a definite, purely objective manner."52

Similarly, for the analysis of the possible association between family income and sickness in general, the same investigators used the term "disabling illness" as a proxy for sickness to make their results as comparable as possible with the contemporary sickness surveys by insurance companies.53 "Sick" persons were those who were "unable to work" on account of sickness or accident, including those "up and about but unable to work" and those confined to bed.54 The community sickness surveys in question had been made by the Metropolitan Life Insurance Company in 1915. The definition of sickness as disability and the instructions to the field agents of the Service's survey were exactly those of the insurance company.55 The unemployment surveys the insurance company made in conjunction with the US Bureau of Labor Statistics paved the way for the company's sickness surveys.56

METROPOLITAN LIFE INSURANCE COMPANY

Unemployment had been one of the major concerns of the investigations of social unrest, not only of the Commission on Industrial Relations but also the Bureau of Labor Statistics and local organizations. The Bureau regarded unemployment as the greatest evil of the capitalist system. The Commission presented a novel official view of unemployment as a collective tragedy that society was responsible for, instead of voluntary organizations or the private sector.57 Meanwhile, the Bureau, the government of New York City, and the Metropolitan Life Insurance Company set out to measure unemployment, first in New York City, then nationwide.58

In January 1915, the agents of the Metropolitan, in conjunction with the Mayoralty of New York, visited the families of the policyholders, 155 960 in all, and concluded that 18% of all potential wage earners were unemployed. Having found the same percentages based on the 1910 census, the Bureau enlisted the insurance company to make studies in other cities. All persons who had any employment, regular or irregular, full or part time, were recorded as employed.59 The Bureau, in cooperation with the insurance company, surveyed 16 cities in the East and Midwest and 12 cities in the Rocky Mountains and the Pacific Coast to find out whether unemployment was because of "no work to be found," "sickness or disability," "strikes or lockouts," or "other causes."60

Having found that 11% of unemployment was associated with sickness or workplace accidents, the Metropolitan set out to measure the "amount of illness prevailing in American communities."61 It chose the city of Rochester, New York, for its initial "sickness census" in September 1915. In all, 7638 families, made up of 34490 persons, were surveyed, almost 10 times the number of families canvassed in the Service's earliest sickness survey in South Carolina. The census divided sickness into cases in which the illness did or did not result in incapacity (to work). The instructions to the agents specify, for those who were found to be sick, that-

The sick should include: (a) Those persons who are up and about, but are unable to work because of sickness or accident; (b) Those who are confined to bed at home because of disease or accident; (c) Those who are receiving treatment in hospitals or similar institutions.

The question "how long sick to date" should be answered in days, weeks or months62

-the same method ofthe Service's earliest community survey.

Disease understood as an inability to work surpassed disease understood as a specific medical diagnosis. Using the former, the company calculated the effects of sickness in the general population of Rochester, in terms of days lost from work and, thus, wages lost in a year. Illness in a community-or the prevalence of sickness-could thus be translated into economic losses-and perhaps into calculating premiums.63

The company noted that "a sick benefit society experiencing a light sickness rate may come to grief if the sicknesses involve protracted payments of benefit out of all relation to the premiums charge." So, classifying sickness rates by sex, age, and other measures was perhaps less important than to know that, of those cases of sickness, 56% will probably last more than one month, 39% more than 3 months, 25% more than one year and 14% more than 3 years . . . persons interested in the social consequences of sickness are more likely to inquire into the durations of sicknesses than, primarily, into the sickness rate.64

This definition of sickness dates back to the company's free Visiting Nurse Service created in 1909. Lee K. Frankel, then head ofthe company's welfare and health program, believed that the nurse service benefitted both the policyholder, usually a worker, and the company: the policyholders who were taught the importance of personal hygiene would be less likely to suffer from illness and premature death, and the company would likewise profit from a lower mortality rate.65 But the company's need to show that spending a policyholder's money on health work would reduce the cost of insurance, with findings backed by data,66 led it to compile information about the policyholders, in the form of a "new case and history slip" the nurses had to fill in at the bedside, which included such questions as "how long was the patient ill at the time ofthe first visit? Up and about? In bed?"67 This information was grouped into the general category of "inability to work" in the sickness surveys done in Rochester in 1915, which in turn were taken up by the Public Health Service's sickness survey in the cotton mill villages in South Carolina. With this definition and metrics, the Service found in 1915 to 1916 that the rates of disabling illness (inability to work) per 1000 persons in the families ofthe cotton mill villages with an income of less than $6.00, $6.00 to $7.99, $8.00 to $9.99, and $10.00 and more were 70.1, 48.2, 34.4, and 18.5, respectively.68

THE LATER SICKNESS SURVEYS

The socioeconomic classification ofthe families used by Sydenstricker in the South Carolina sickness survey, and the definition of illness proposed by Metropolitan Life Insurance Company, were at the core of several sickness surveys ofthe following decades. In the Service's investigation ofthe mortality rates from influenza during the pandemic of 1918 and the sickness survey of Hagerstown, Maryland (1921 -1924), ofthe incidence of several diseases among 1600 families (7200 persons), information on the economic status of the respondents was recorded but it was left to the enumerators to classify the families with the use of "indefinite"-not quantitative-categories: "well-to-do, comfortable, moderate, poor, very poor."69 The 1928 and 1931 surveys of 8758 families in 17 states by the Committee on the Cost of Medical Care, with the participation of Sydenstricker and the insurance company, used the company's definition of illness: "any disorder which wholly or partially disables an individual for one or more days... ."70; and the number of days in bed, days lost from school or work, and total duration of each illness were also recorded.71

In the studies done during the Depression by the Milbank Memorial Fund and the Service with the Metropolitan Life Insurance Company under the auspices of the Health Organization of the League of Nations, quantitative data of 12 000 families in 10 localities, including eight large cities, were compiled. The households were classified according to their economic status as comfortable, moderate, or poor to determine and quantify whether a fall in income had affected their health.72 A "disabling illness" was defined as a situation in which "the person was unable to work, attend school or undertake other activities for 1 or more days during the 3 months period of the study."73 This methodology was based on the assumption that mortality statistics were an insufficient way to measure a nation's health. The conservative members of the League of Nations Health Organization, who eventually won the upper hand, had claimed that the decline in mortality rates during the 1930s meant that the economic crisis had not affected public health, while Sydenstricker, now working for the Milbank Memorial Fund, and George St John Perrott, from the Service, showed the opposite: that morbidity (disabling illness) was directly linked with socioeconomic status (income).74

Historian George Weisz has shown that defining disabling illness as inability to work and perform other activities was crucial for the focus on chronic disease of the biggest morbidity survey up to then: the National Health Survey (1935-1936), whose aim was to support health care reform.75 Sydenstricker was the driving force of this survey as well. Weisz argued that its focus revealed the pervasiveness of chronic disease and how the poor, who had less access to health care, suffered more from diseases than other classes.76

CONCLUSIONS

The earliest socioeconomic sickness survey in an industrial community undertaken by the US Public Health Service in 1915, a result of the US social survey movement, marked the beginning of a methodology of research that stretched to the National Health Survey of the 1930s. Other agencies, like the US Children's Bureau and the National Tuberculosis Association, also used information on a family's economic status or occupation in their mortality investigations. With the decline of the Progressive movement, institutional and methodological changes, and the outbreak of World War II, the socioeconomic measurements used for vital statistics were virtually abandoned.77 However, the 1935-1936 National Health Survey's definition of illness in terms of days of disability played a significant role in the United States' epidemiological and political approach to chronic diseases, while the National Health Survey became a major source of information for the arguments that eventually led to the establishment of Medicaid.78 This definition originated with the Metropolitan Life Insurance Company's sickness surveys and was adopted by the surveys that the Public Health Service began in the 1910s. Both organizations participated in the Committee on the Cost of Medical Care and in the studies made during the Depression. The extent to which the Service's concerns about the health of the wage earners coincided with the interests the company is a subject that requires further research. >4jPH

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CONFLICTS OF INTEREST

The author reports no conflict of interest.

Footnote

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8. The primary sources upon which this research was based are documents available at the National Archives at College Park, MD, and Harvard Libraries. At the National Archives, I checked the papers ofthe Commission on Industrial Relations where Sydenstricker worked before going to the US Public Health Service. They are located in the Microfilm Publications, T4, A2. These documents have been used by economic historians such as Mary O. Furner but never in relation to the Service's surveys. I also checked the papers and correspondence of the pellagra studies directed by the Service, where surgeon Benjamin S. Warren (advisor ofthe Service to the Commission on Industrial Relations) and Edgar Sydenstricker started their socioeconomic surveys. They are available at RG Central File 1897-1923, Pellagra, NC-34-10, File 1648, Boxes 148-153. I also checked the correspondence ofthe Service in RG 90 Insurance-Health, which refers to the initiative to make community sickness surveys and how it was related to the social survey. Finally, I also checked the National Institute Health Survey Forms, Hagerstown, in RG 90 Entry: A1 21, Boxes 1-20. As for the social survey and the Metropolitan Life Insurance Company, I relied on the historiography about the company as well as on published primary sources located at the Countway Library of Medicine and the Widener Library, both at Harvard University.

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15. Krieger and Fee, "Measuring Social Inequalities in Health," 394-399.

16. Sydenstricker is listed as one of the graduate students of the University of Chicago in James Lawrence Laughlin, Twenty-Five Years of the Department of Political Economy (University of Chicago, Priv. Print., 1916), 16. See also Wilford I. King, "Edgar Sydenstricker," Journal of the American Statistical Association 31, no. 94, 1936: 411-415; Washington and Lee University, The Calix 1902. Yearbook, Vol VII (Louisville, KY: The Prentice Press, 1902), 25.

What we know about Edgar Sydenstricker derives from his work for several institutions. For his work for the Commission on Industrial Relations, see Mary O. Furner, "Knowing Capitalism: Public Investigation and the Labor Question in the Long Progressive Era," in The State and Economic Knowledge. The American and British Experiences, eds. Mary O. Furner and Barry Supple (Cambridge, England: Cambridge University Press, 1990), 275. About his work for the US Public Health Service, see Krieger and Fee, "Measuring Social Inequalities in Health," and HarryMarks, "Epidemiologists Explain Pellagra: Gender, Race and Political Economy in the Work of Edgar Sydenstricker," Journal of the History of Medicine 58, no. 1 (2003): 34-55, https:// doi.org/10.1093/jhmas/58.1.34. We also know that he assisted the League of Nations Health Organization as a statistical adviser: see Weindling, "Interwar Morbidity Surveys," 77. He also helped in the design ofthe National Health Survey of 1935-1936: see George Weisz, "Epidemiology and Health Care Reform. The National Health Survey of 1935-1936," American Journal of Public Health 101, no. 3 (2011): 438-447, https://doi.org/10.2105/AJPH.2010. 196519. Finally, we also know that while working for the Milbank Memorial Fund, he advocated for national health insurance before the Committee on the Cost of Medical Care and the Committee on Economic Security of the Roosevelt administration: see Jaap Kooijman, . . . And the Pursuit of National Health. The Incremental Strategy Toward National Health Insurance in the United States of America (Amsterdam, Netherlands: Rodopi, 1999).

17. Sydenstricker's work for the Immigration Commission was most likely his first experience of fieldwork on the condition of industrial workers and the use of quantitative methods and descriptive accounts in industrial surveys. The purpose ofthe Immigration Commission was to study the origins of the immigration of the 1880s, motivated by the higher wages paid for industrial labor and its effects upon the institutions and industries of the country-see Reports of the Immigration Commission. Abstracts of Reports of the Immigration Commission: With Conclusions and Recommendations and Views ofthe Minority, V1 (Washington, DC: Government Printing Office, 1911), 13. The Commission reflected the spirit of Progressivism, a movement to improve the country's socioeconomic conditions, relying on what their adherents considered to be scientific objectivity and a commitment to government intervention. The Progressives believed that investigations carried out by properly trained experts, not by well-meaning amateurs or charities, would equip policymakers with the means to solve social problems-see Robert F. Zeidel, Immigrants, Progressives, and Exclusion Politics. The Dillingham Commission, 1900-1927 (DeKalb, IL: Northern Illinois University Press, 2004), 3. Two of the nine-member Commission were professors of political economy, and the support staff included the political economist William Jett Lauck, who was trained by James Laurence Laughlin and Thorstein Veblen at the Department of Political Economy of the University of Chicago-see Laughlin, Twenty-Five Years of the Department ofPolitical Economy, 9. One of Lauck's assistants was Edgar Sydenstricker, then a graduate student of political economy at the University of Chicago-see Laughlin, Twenty-Five Years of the Department of Political Economy, 16; see also King, "Edgar Sydenstricker." The Commission obtained original information on about 3.2 million people. Their fieldwork was done in 24 states with 17 141 households and studied several industries, from sugar refining to coal mining. The investigations combined data "which were susceptible oftabulation and statistical presentation" about the individual employee, his household, and industrial plant, along with descriptive and historical information about 200 industrial plants and communities: see Reports of the Immigration Commission, 293-295.

18. These sectors were the "professional classes," that is, women ofa privileged social position, professionals in the field of medicine, members of voluntary welfare associations, some journalists, and, at the end ofthe century, a few academics responsible for "social surveys." See Bulmer et al., "The Social Survey in Historical Perspective," 2.

19. Benjamin Seebohm Rowntree, Poverty. A Study of Town Life (London, England: Macmillan and Co Limited, 1901), vi.

20. Charles Booth, Life and Labour of the People in London. Volume I. East, Central and South London (London, England: Macmillan and Co, 1892), 6.

21. Bulmer et al., "The Social Survey in Historical Perspective," 20-21.

22. Jean M. Converse, Survey Research in the United States. Roots and Emergence, 1890-1960 (New Brunswick, NJ: Transactions Publishers, 2009), 22-23; Martin Bulmer, "The Decline of the Social Survey Movement and the

Rise ofAmerican Empirical Sociology," in Bulmer et al., The Social Survey in Historical Perspective, 991 -315, 293.

23. Steven R. Cohen, "The Pittsburgh Survey and the Social Survey Movement: A Sociological Road Not Taken," in Bulmer et al., The Social Survey in Historical Perspective, 245-268, 247-249.

24. Adams, Age of Industrial Violence, 25-30.

25. First Annual Report of the Commission on Industrial Relations (Chicago, IL: Barnard &Mills Print, 1914), 6.

26. Lauck graduated from Washington and Lee University and obtained a degree in political economy at the University of Chicago. See Laughlin, Twenty-Five Years of the Department of Political Economy, 9; Washington and Lee University, "University, Washington, D.C.," The Ring-Tum Phi 11, no. 17 (1908): 2; Washington and Lee University, "Hart, Schaffner &Marx Prizes," The RingTum Phi 12, no. 11 (1909): 4.

27. Washington and Lee University, "Dr G. Campbell Tells ofIndustrial Commission. Vitally Important Work Being Done by W. &L. Men," The Ring-Tum Phi 17, no. 18(1914): 3.

28. Benjamin S. Warren, "Outline of Plan for the Study of Sickness Insurance," April 23,1915, in National Archives, RG 90 Insurance-Health, 6. Elizabeth Fee's and Theodore M. Brown's assertion that the available biographical information about Benjamin Warren is very meager still holds true: see Elizabeth Fee and Theodore Brown, "Edgar Sydenstricker and Benjamin Warren," American Journal of Public Health 89, no. 11 (1999): 1643-1644, 1643. Warren's participation in some ofthe Service's projects, such as the pellagra studies, is mentioned in Ralph Chester Williams, The United States Public Health Service, 1789-1950 (Washington, DC: US Public Health Service, 1951), 152, 423. To my knowledge, this article is the first to discuss his work as the sanitary adviser ofthe Commission on Industrial Relations and his role in implementing the sickness survey among wage earners.

29. First Annual Report of the Commission, 8.

30. Adams, Age of Industrial Violence, 206; Reports of the Immigration Commission, 2.

31. Mary O. Furner, "Knowing Capitalism: Public Investigation and the Labor Question in the Long Progressive Era," in The State and Economic Knowledge. The American and British Experiences, eds. Mary O. Furner and Barry Supple (Cambridge, England: Cambridge University Press, 1990), 241-286, 275.

32. Edgar Sydenstricker, "Topical Analysis ofTestimony at Public Hearings on the Building Trades of New York City, N.Y. May 25-29, 1914," in Microfilm publications, T4, Reel 14, A2 Cab 41/4, 50 pages; Edgar Sydenstricker, "Report on the System of Collective Bargaining in the Anthracite Coal Industry," in National Archives, Microfilm Publications, T4, A2 Cab 41/4, Reel 8. See also Edgar Sydenstricker, "Condition of Labor in the Principal Industries," s/f, in National Archives, Microfilm Publications, T4, A2 Cab 41/4, Reel 9. This served as the basis for W. Jett Lauck and Edgar Sydenstricker, Conditions ofLabor in American Industries (New York, NY, and London, England: Funk &Wagnalls Company, 1917).

33. Edgar Sydenstricker, "Appendix M. Industrial Communities," in National Archives, Microfilm Publications, T4, A2 Cab 41/4, Reel 11,1-11,2.

34. Edgar Sydenstricker, "Welfare Activities of Communities. Report to Sept. 1,1914," in National Archives, Microfilm Publications, T4, A2 Cab 41/4, Reel 1, 1.

35. Sydenstricker, "Welfare Activities," 2-3; H. G. Lee, "Digest of Mr. Sydenstricker's Preliminary Report on Welfare Activities of Communities," February 18, 1915, in National Archives, Microfilm Publications, T4, A2 Cab 41/4, Reel 11.

36. Social progressives, under the American Association for Labor Legislation, played an important role in establishing workmen's compensation and the campaign for health insurance. See Paul Star, The Social Transformation ofAmerican Medicine (New York, NY: Basic Books, 1982), 243-249; Kooijman, . . . And the Pursuit ofNational Health, 25-30.

37. Furner, "Knowing Capitalism," 278.

38. Sydenstricker, "Condition of Labor in the Principal Industries," 1.

39. Benjamin S. Warren, "Industrial Hygiene. Preliminary Outline of Plan for the Study of a Typical Industrial Community,"January 19, 1915, in National Archives RG 90 Insurance-Health, 1.

40. To ensure a fair sampling-or the "representative method" as it was called-the American social surveys based

their selection of communities on the idea of a "typical" village or "average" community, as Charles Booth did when he used the School Board Visitors' data on the poor in London, England, and the Service when it surveyed the cotton-mill villages in South Carolina. On the representative method in US social survey, see Alain Desrosieres, "The Part in Relation to the Whole: How to Generalize? The Prehistory of Representative Sampling," in Bulmer et al., eds., The Social Survey in Historical Perspective, 217-244, 220.

41. Warren excluded African Americans because he wished to model his survey on an "average" community; he argued that too great a diversity of races among the wage earners should be avoided because of variations in standards of living caused by "racial customs." He was also concerned about the impact of his conclusions: he wanted to avoid any "appearance of muckraking," on the one hand, or present better-than-ordinary conditions, on the other. For him, "complicating" factors should be avoided; hence, as far as possible, the study had to be based on typical conditions. See Warren, "Industrial Hygiene," 2, 8. Nevertheless, historian Harry M. Marks has shown that Sydenstricker's focus on economic underdevelopment in the Service's pellagra studies led him to ignore that African Americans were the main victims ofthe disease. This indifference, he argues, also reflected a broader concept of race at that time. For Northerners, race meant "immigrants." When settlement workers and the social economists of Sydenstricker's cohort spoke of "races," they were generally referring to recent immigrants. See Marks, "Epidemiologists Explain Pellagra," 53-55.

42. Warren, "Industrial Hygiene," 2, 8.

43. Letter by Jett Lauck to Benjamin S. Warren, Chicago IL, February 17, 1915, National Archives RG 90 Insurance, Health, 1-2.

44. Benjamin S. Warren, "Outline of Plan for the Study of Sickness Insurance," April 23, 1915, in National Archives, RG 90 Insurance-Health, 6 pages, quotations in pages 1, 2, and 6 respectively. Sydenstricker was the first statistician of the service. See letter from Rupert Blue to the Secretary of the Treasury, July 19, 1915, in National Archives, RG 90 Entry NC 34-10 Box 292 File Number 3339 to 3343.

45. Mooney et al., "The Thompson-McFadden Commission"; Marks, "Epidemiologists Explain Pellagra," 34-35.

46. Letter by GA Wheeler, P.A. Surgeon, Medical Officer, in Immediate Charge, to Surgeon General, USPH Service, Field Investigations of Pellagra, Spartanburg, SC, December 10, 1919, National Archives, RG 90 Central File 18971923, Pellagra, NC-34 10, File 1648, Box 148 to 153, Box 151; Letter by Joseph Goldberger, Surgeon in Charge of Pellagra Investigations, to Surgeon General, USPH Service, Washington, July 2, 1920, National Archives, RG 90 Central File 1897-1923, Pellagra, NC-34 10, File 1648, Box 148 to 153, Box 151.

47. Sydenstricker and his collaborators referred to Seebohm Rowntree's work on poverty in York, England, as a "classic" when discussing the measurement of the economic status of families: Edgar Sydenstricker and Wilford I. King, "A Method of Classifying Families According to Incomes in Studies of Disease Prevalence," Public Health Reports 35 no. 48 (1929): 2829-2846, 2833; and Edgar Sydenstricker and Wilford I. King, "The Measurement of the Relative Economic Status of Families," Quarterly Publications of the American Statistical Association 17, no. 135 (1921): 842-857, 844. They even used the information gathered by the Service's earliest sickness survey in South Carolina cotton-mill villages to ascertain the variations in economic status at different stages of family life, as Rowntree had done in his book and as a direct application of Rowntree's idea: Edgar Sydenstricker, Willford I. King, and Dorothy Wiehl, "The Income Cycle in the Life of the Wage-Earner," Public Health Reports 39, no. 34 (1924): 2133-2140.

48. Letter by Jett Lauck to Benjamin S. Warren, Chicago IL, February 17, 1915, National Archives, RG 90 Insurance, Health, 1.

49. Benjamin S. Warren and Edgar Sydenstricker, "Health Insurance. Its Relation to the Public Health," Public Health Bulletin 76, 2nd ed (Washington, DC: Government Printing Office, 1916), 38.

50. Edgar Sydenstricker and Wilford I. King, "A Method of Classifying Families According to Incomes in Studies of Disease Prevalence," Public Health Reports 35, no. 48 (1920): 2829-2846, 2830.

51. The size, ages, and genders of the families were taken into account by employing a common denominator for individuals, derived from the Atwater scale of food requirements. Thus, Sydenstricker and his colleagues set 1 as

the requirement of a male adult, while the requirements of children and females were set at between 0.2 and 0.8. The 747 households were then classified according to a half-month family income per adult male unit with data canvassed between April and June, 1916. Joseph Goldberger, G.A. Wheeler, and Edgar Sydenstricker, "A Study of the Relation of Family Income and Other Economic Factors to Pellagra Incidence in Seven Cotton-Mill Villages of South Carolina in 1916," Public Health Reports 35, no. 46 (1920): 2673-2714, 2678-2684.

52. Goldberger et al., "A Study of the Relation of Family Income," 2687. Quote on 2711.

53. Edgar Sydenstricker, G.A. Wheeler, and Joseph Goldberger, "Disabling Sickness Among the Population of Seven Cotton Mill Villages of South Carolina in Relation to Family Income," Public Health Reports 33, no. 47 (1918): 2038-2051.

54. Sydenstricker et al., "Disabling Sickness," 2038-2039, 2043-2046.

55. John Eyler also mentions this connection in his chapter "Health Statistics in Historical Perspective," 39-40.

56. Lee E. Frankel and Louis I. Dublin, "Community Sickness Survey. Rochester, N.Y., September 1915," Public Health Reports 31, no. 8 (1916): 423-438, 423.

57. Furner, "Knowing Capitalism," 279. On the changing views on unemployment since the 19th century, see Ingrid Liebeskind Sauthier, "Modern Unemployment: From the Creation ofthe Concept to the International Labour Office's First Standards," in Globalizing Social Rights. The International Labour Organization and Beyond, eds. Sandrine Kott and Joelle Droux (Basingstoke, England, and New York, NY: Palgrave Macmillan, 2013), 67-84; Noel Whiteside, "Constructing Unemployment: Britain and France in Historical Perspective," Social Policy &Administration 48, no. 1 (2014): 67-85, https://doi.org/ 10.1111/spol. 12032.

58. US Bureau of Labor Statistics, "Unemployment in New York City, N.Y./ Bulletin of the US Bureau of Labor Statistics 172 (1915): 6.

59. US Bureau of Labor Statistics, "Unemployment in New York," 6-8.

60. US Bureau of Labor Statistics, "Unemployment in the United States," Bulletin of the US Bureau of Labor Statistics 195(1916): 92.

61. Frankel and Dublin. "Community Sickness Survey," 423. According to John Eyler, between 1915 and 1917, the Metropolitan Life Insurance Company undertook similar surveys in seven communities in total: five large cities and two smaller villages, where study groups were asked to fill out a simple form about illness for each family they visited. The surveys gathered information on 637 000 individuals. See Eyler, "Health Statistics in Historical Perspective," 39-40. See also Louis I. Dublin, A Family of Thirty Million: The Story of the Metropolitan Life Insurance Company (New York, NY: Metropolitan Life Insurance Company, 1943), 438.

62. Frankel and Dublin, "Community Sickness Survey," 423-425.

63. Ibid., 438.

64. Lee K. Frankel and Louis I. Dublin, Sickness Survey of Principal Cities in Pennsylvania and West Virginia. Sixth Community Sickness Survey (New York, NY: Metropolitan Life Insurance Company, 1917), 34.

65. Louis I. Dublin, After Eighty Years: The Impact of Life Insurance on the Public Health (Gainesville, FL: University of Florida Press, 1966), 38-41.

66. Call of the Life Extension Committee of the Association of Life Insurance Presidents, in 1912. F. W. Jenkins, "Report of Health Committee of Association of Life Insurance President," Proceedings of the Annual Meeting of the Association of Life Insurance Presidents 6 (1912): 78-85, 83, quoted in Dan Bouk, How Our Days Became Numbered, Risk and the Rise of the Statistical Individual (Chicago, IL: The University of Chicago Press, 2015), 130-131, footnote 61.

67. Bouk, How Our Days Became Numbered, 131-132. Bouk's book includes reproductions of the slips on pages 132 and 133.

68. Income per adult male unit: see Sydenstricker et al., "Disabling Sickness," 2038-2039; 2043-2046.

69. Alfredo Morabia, "The US Public Health Service House-to-House Canvass Survey of the Morbidity and Mortality of the 1918 Influenza Pandemic," American Journal of Public Health 111, no. 3 (2021): 438-445, https://doi.org/10.2105/AJPH. 2020.306025. Hagerstown schedules are found in the National Archives, RG 90 Entry

A1 21, National Institute for Health Survey Forms, Hagerstown, Box 5, File 550-574.

70. Isidore S. Falk, Margaret C. Klem, and Natham Sinai, The Incidence ofIllness and the Receipt and Costs ofMedical Care Among Representative Families. Experiences in Twelve Consecutive Months During 1928-1931 (Chicago, IL: The University of Chicago Press, 1933), 8.

71. Here, the notion of "time lost from work," although recorded, was considered misleading as measurement of disability attributable to sickness because the interruption ofthe normal routine depended on whether or not the individual was employed or unemployed at the time. Thus, this factor was eliminated by restricting the index to days in bed and to those who were employed at some time during the survey year. See Falk et al., "The Incidence of Illness," 81.

72. George St. John Perrott, Selwyn D. Collins, and Edgar Sydenstricker, "Sickness and the Economic Depression. Preliminary Report on Illness in Families of Wage Earners in Birmingham, Detroit, and Pittsburgh," Public Health Reports 48, no. 41 (1933): 1251-1264, 1255-1259; George St.John Perrott and Selwyn Collins, "Relation of Sickness to Income and Income Change in 10 Surveyed Communities," Public Health Reports, 50 (1935): 595-622, 607.

73. Perrott et al., "Sickness and the Economic Depression," 1259; Perrott and Collins, "Relation of Sickness to Income," 603-604.

74. For an analysis ofthis controversy see Weindling, "Interwar Morbidity Surveys," 75-84; Iris Borowy, "Crisis as Opportunity: International Health Work During the Economic Depression," Dynamis, 28 (2008): 29-51, https://doi.org/ 10.4321/s0211953620080001000002; Mónica García, "Mortality Rates or Sociomedical Indicators? The Work of the League of Nations on Standardizing the Effects ofthe Great Depression on Health," Health Policy and Planning 29, no. 1 (2014), 1-11, https://doi.org/10.1093/heapol/czs111.

75. Weisz, "Epidemiology and Health Care Reform."

76. Ibid., 445.

77. Krieger and Fee, "Measuring Social Inequalities in Health," 406-413.

78. Weisz, "Epidemiology and Health Care Reform," 446.

DETAILS

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Document 9 of 37

"American Indian" as a Racial Category in Public Health: Implications for Communities and Practice

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ABSTRACT (ENGLISH)

When public health considers the health and disease status of Indigenous people, It often does so using a racial lens. In recent decades, public health researchers have begun to acknowledge that commonly employed racial categories represent history, power dynamics, embodiment, and legacies of discrimination and racism, rather than innate biology. Even so, public health has not yet fully embraced an understanding of other components of identity formation for Indigenous people, including political status within Native nations. In this article, we discuss why the continued racial conceptualization of Indigeneity in US public health is inadequate. We begin by providing a brief account of racialization as a tool of colonization, of failure to recognize and acknowledge Indigenous sovereignty, and of common public health practices of Indigenous data collection and interpretation. We then articulate the stakes of racialized health data for Native communities. We end by offering alternative approaches, many drawn from scholarship from Indigenous researchers.

FULL TEXT

Headnote

When public health considers the health and disease status of Indigenous people, It often does so using a racial lens. In recent decades, public health researchers have begun to acknowledge that commonly employed racial categories represent history, power dynamics, embodiment, and legacies of discrimination and racism, rather than innate biology. Even so, public health has not yet fully embraced an understanding of other components of identity formation for Indigenous people, including political status within Native nations.

In this article, we discuss why the continued racial conceptualization of Indigeneity in US public health is inadequate. We begin by providing a brief account of racialization as a tool of colonization, of failure to recognize and acknowledge Indigenous sovereignty, and of common public health practices of Indigenous data collection and interpretation.

We then articulate the stakes of racialized health data for Native communities. We end by offering alternative approaches, many drawn from scholarship from Indigenous researchers. (Am J Public Health. 2021;111(11):1969-1975. https://doi.org/10.2105/AJPH.2021.306465)

In what is currently the United States, it is common to encounter statements like "American Indian/Alaska Native adults are nearly three times more likely than non-Hispanic white adults to be diagnosed with diabetes,"1 and "the incidence of laboratoryconfirmed COVID-19 cases among AI/ AN persons was 3.5 times that among white persons."2(p1169) In addition to communicating the disproportionate disease burden borne by American Indians, Alaska Natives, Native Hawaiians, and Pacific Islanders in the United States, these aggregated, racially bound statistics are difficult to accurately interpret and carry four significant implications, which we outline in the following paragraphs. We primarily focus this article on the experiences of American Indian people whose traditional homelands are located in what is currently understood as the lower 48 states of the United States. Although many of these experiences will also resonate with Native Hawaiians, Pacific Islanders, and Alaska Natives, there are also critically distinct contexts that shape issues of citizenship and governance differently for their communities.

In this article, we suggest that without careful contextualization and consideration ofthe historical background of racialization in the United States, common practices that categorize Indigenous people by race imply a biological or genetic origin, rather than a structural cause, for health differences between Native and non-Native communities. Second, by ignoring the unique and complex sociopolitical and historical contributors to health within each tribal community, such approaches mistakenly represent diverse Native communities as a monolith. Third, when researchers perceive Native peoples as a homogenized group, they often fail to assess the importance of tribal sovereignty and locally specific metrics of belonging within Native nations. Lastly, such approaches obscure how colonial policies have disproportionately and negatively affected health and well-being, placingthe blame on individuals instead ofthe compounded impacts of a systematic lack of access to care, environmental racism, economic deprivation, educational violence, and discriminatory policies.

We begin with background information about identity, racialization, and common practices for collecting and using data about Native people from public health research. After detailing what is at stake for Native communities when collection and interpretation of Native-specific health data rely solely on a racial lens, we end by offering alternative approaches.

Throughout this article, we use "Native" and "Indigenous" interchangeably, a practice based on our experiences as Indigenous women and as researchers. The term "American Indian" is inscribed in federal law, and we use American Indian or the category "American Indian/Alaska Native" (orAI/ AN) where such categorization aligns with large existing data sets or with federal law.

BACKGROUND

Before the onset of colonization, there were no "Indians" or "Natives"; rather, there were Anishinaabeg, Dee-ni', Chahta, Diné, Samoans, and hundreds of other distinct societies. Our shared experiences of colonization link us together, even as our distinctiveness as individual nations persists. Our identities today continue to be intimately shaped by our relationships to each other, to our homelands and waters, to our plant and animal relatives, to our languages, and to our teachings. We do not, and have never, needed external governments or researchers to tell us who we are. Rather than biology, our identities reflect our shared obligations to one another and these ongoing connections.

For many Native people, our status as citizens or descendants of specific Native nations plays a key part in how we perceive our identities. This forms the basis for our political status, as citizens of both the United States and our respective Native nations. Native nations are sovereign governments with the inherent right to determine criteria for their citizenry, a right that the Supreme Court ofthe United States (in Santa Clara Pueblo v Martinez) and the United Nations (in its Declaration on the Rights of Indigenous People) have each recognized as among the core obligations and rights of any sovereign government. Each Native nation makes decisions about its citizenry based on its unique historical, sociopolitical, and environmental contexts.3

Today, Native people live in urban, suburban, and rural settings across all states and territories. As researchers, it is imperative that we listen to, honor, and abide by the ways in which people identify themselves, including attending to the vast diversity within and between Native communities. Doing so must take priority over convenience in how we think about, organize, analyze, and present our data. Doing otherwise is not only unethical, but can also result in poor, inaccurate results that collapse critical differences between communities.4

FEDERAL ATTEMPTS TO RACIALIZE AND HOMOGENIZE

The United States, a nation with a long history of differentially defining racial groups using biologically based notions of race to the direct benefit of White Americans, has insisted on a false homogenized and racialized narrative about Indigeneity.3 Blood, for example, has been used as a structuring category to both categorize and erase Native people. This has been most visible in the policy of blood quantum, a government-created metric under which agents ofthe government would identify and record Native people by their perceived percentage of "Indian blood," often based on phenotypic characteristics. Use of blood quantum was the beginning of a system of administrative genocide whose purpose was to eliminate Indigenous peoples and, by extension, open Indigenous lands for settler use.

This homogenization has long been a tool for settler acquisition of Indigenous lands; during the treaty-making period, policymakers used blood as a metaphor for identity as they defined legal and social concepts of race.5 The United States used this racialization in its attempts to render Native peoples interchangeable for the purposes of control, as federal Indian Affairs Commissioner J. D.C. Atkins wrote in 1888: "The object of greatest solicitude should be . . . to blot out the boundary lines which divide [Native people] into distinct nations, and fuse them into one homogeneous mass."6(p9) Rather than shared biological traits, it is this shared experience of colonial harm, as well as shared strategies for resistance to it, that connect Native people.

PUBLIC HEALTH METRICS AND INDIGENEITY

The social and historical context of each Native nation shapes the distribution of health and disease within its population today, because of centuries of colonial policies aimed at Indigenous elimination.7'8 Examples of these include, among others, removing Native people from their homelands, which disrupted medicinal, nutritional, and ethnobotanical practices; crowding Native students into federal boarding schools, deeply unhygienic spaces where Native youths faced both assimilation and abuse as well as disconnection from their families, communities, and traditional knowledge; sterilizing Native women in Indian Health Service facilities to reduce the size of subsequent generations; mining, nuclear testing, and nuclear waste disposal on the homelands of American Indians, Alaska Natives, Native Hawaiians, and Pacific Islanders, resulting in high rates of environmental exposures and disease; and superimposing governmentdelivered commodity food rations while restricting access to traditional Native foodways, contributing to epidemics of diabetes and metabolic disease in Indian Country.

Existing health disparities stem from these and other forms of structural harm rather than biological deficiency. And yet, the persistent rhetoric of race within public health research obscures the impact of colonial violence on health outcomes. To make matters more complicated, there is no consensus for how to collect, organize, and analyze data from Indigenous research participants. Large data sets often use either self-reported survey questions, which may allow respondents to include their tribal nation in addition to the more generic "American Indian/ Alaska Native," or close-ended questions that ask respondents to identify themselves within a given racial schema (e.g., White, Black, other). Both options are vulnerable to overcounting (when people who are not recognized by a Native community mark themselves as Native) and undercounting (when multiracial people are not given the option to select multiple racial identities). As an example, the 2020 US Census, which helps determine resource allocation based in part on race, used the following close-ended self-reported categories for race: White, Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian and Pacific Islander, and some other race, with the additional option to write in tribal affiliation. Other studies or surveys measure race as determined by an outsider, often a researcher or medical professional, with or without the input of the survey participant. This can result in discrepancies between an individual's self-identification and their official record, as stereotypes of what Native people are "supposed to look like" dominate the national imagination.

WHAT IS AT STAKE

As the categories "American Indian/ Alaska Native" and "Native Hawaiian/ Pacific Islander" have become codified in many areas of social inquiry in the United States, so too have they passed into usage in public health research, leading many researchers to erroneously see racial articulations of Native peoples as legitimate. To better express the problems associated with applying these racial categorizations, we name what is at stake for Native people and communities in the United States with this continued use.

Public health's use of racial categorization ignores the treaty-based nation-tonation relationship between the United States and Native nations. Doing so also ignores the legal implications of sovereignty and self-governance, particularly around defining citizenship.5 Any attention to Indigenous health outcomes must therefore reflect the ways in which Native nations define their citizenry, rather than masking each under a ubiquitous, homogenizing category.

The continued application ofthis categorization also ignores individuals' articulations ofthemselves. Use of the racialized category is a values-based decision, one that sends the message that the racial designation of Indigenous people matters more than other ways of defining Indigeneity.9'10 Privileging race means that other articulations of belonging, based on ceremony, citizenship, or kinship, are not seen as legitimate or are seen as less legitimate than racial criteria.9 Continued use of the racial Indigenous categorization lends credibility to the colonizer's view of who qualifies as "Indian" and clearly articulates who has the power to decide.10'11 Any attention to Indigenous health outcomes must therefore also reflect the ways in which Indigenous peoples define themselves.

Public health's use ofthe racial categorization system also supports the dispossession of Native communities of their land and resources,10'11 as it furthers the logic embedded in colonial policies that have long been "rooted in imperialism, White supremacy, and a desire for material gain."12(p92) Indigenous populations, when viewed as a racial category, are seen as small and shrinking in size because of inaccurate assumptions about the inevitability of Indigenous extinction, assumptions that emerge from both historical narratives steeped in Manifest Destiny and racist beliefs that multiracial Indigenous people are not "Indigenous enough." Research practices that lump or altogether drop Indigenous peoples from data sets through practical considerations regarding sample size perpetuate discourses of Indigenous disappearance and death by reflecting a false perception of a country without Native peoples where Native lands and resources are up for grabs by others. Additionally, non-White racial categories are often conflated with innate biological or genetic deficiency, and thus any connection to disease is highlighted.13 As such, racialized communities are seen as bearing a disproportionate burden of morbidity and mortality, whereas Whiteness is rarely connected with health risks.14 One result of incorrectly placing causation for the burdens of disease on racial groups instead of structural factors is that it blames Native people (rather than settler colonialism) for health disparities.

Finally, condensing all Native people into a single category erases the unique experiences of each tribal community-experiences that have a significant impact on health. Conclusions and health interventions based on research conducted using such broad strokes are unlikely to be effective at either identifying the root causes of health disparities unique to each tribal community or identifying effective intervention strategies. In light of the immense diversity within Indian Country, Native people should not be consolidated under a single category for health research. Such statistical categories obscure the distinctions between Native nations (each with its own histories, political and environmental contexts, and systems for governance, education, and health) and reify notions of Indigenous essentialism.

TOWARD SOLUTIONS

In this article, we have offered a brief window into identity and the ramifications of public health's "colonial blindness" on the collection and analysis of health data for Indigenous peoples.15 Moving ahead, we urge a pivot in public health scholarship to an approach that identifies the true factors responsible for poor health outcomes in Native communities. These shifts may lead to more targeted, systems-focused interventions and promote increased tribal self-determination in health research processes. Forthose interested in pursuing public health research with Indigenous communities, we offer a set of recommendations, which join our own suggestions with those previously published by colleagues.16,17 Indeed, 20 years ago, Burhansstipanov and Satter raised several ofthese issues and offered solutions in this veryjournal.17 We lament that many ofthese suggestions have gone unheeded. Boxes 1-4synthesize previously proposed solutions as well as our : own suggestions. Note that the boxes do not provide an exhaustive list of all activities that researchers might do to be good stewards of the research process, nor do they reflect every recommendation from previous studies.

However, we believe the included recommendations offer a good place to start in supporting Indigenous public health in a way that upholds tribal nations' sovereignty with regard to their people, lands, and data. Such recommendations are in alignment with Articles 4 and 7 of the declaration of the Indigenous and Tribal Peoples Convention ofthe International Labor Organization, which hold that Indigenous peoples have the right to set priorities and parameters for projects that affect their lives, and that all initiatives must protect against harm to Indigenous bodies, lands, properties, cultures, and institutions.

CONCLUSION

Public health researchers and practitioners must listen to and honor the ways in which Indigenous peoples identify themselves. Doing so must take priority over convenience in how we think about, organize, analyze, and present our data. Given the history of unethical and inappropriate health research in Indian Country and the long-standing practice of non-Native researchers imposing their own definitions for and expectations about Native communities, it is essential to listen to and follow the research priorities and guidelines of Native nations and Native-run organizations. Native-run organizations have issued guidance for these processes, including the National Congress of American Indians' Walk Softly report,27 several briefs by the Urban Indian Health Institute,30 and the United States Indigenous Data Sovereignty Network.31 Relatedly, a recent National Institutes of Health-commissioned document, American Indian and Alaska Native Research in the Health Sciences: Critical Considerations for the Review of Research Applications, assists reviewers in understanding the unique context of funding applications that propose research with Indigenous communities.32 Failing to follow these guidelines may produce inaccurate or difficult-tointerpret results and is also unethical. We hope the recommendations we have outlined here provide an introduction to alternative practices as public health researchers endeavor to represent data about Native communities with the dignity and nuance that all people deserve. ,4jPU

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CONFLICTS OF INTEREST

The authors have no disclosures of potentialor actualconflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

This article did not involve human participant research and was therefore exempt from institutional (including tribal) review board review.

Sidebar

BOX 1- Potential Solutions for Commonly Encountered Issues in Indigenous Health Research: Data Aggregation

1. Data aggregation severely limits the local applicability of research results but is unavoidable if no effort is made to obtain tribal affiliation of participants.

* Research that is conducted by or in collaboration with Native nations, on health concerns directly identified by those nations, is more likely to focus on specific tribal communities instead of a homogenized "Native America."

* When feasible, data collection should allow for statements of tribal affiliation, including descendancy.17 In these cases, use of "tribally affiliated" rather than "tribal citizenship" is preferred to account for unenrolled people who maintain tribal affiliation.18

* Tribe-specific data collection greatly assists in the development of local programs and policies and aids in the disaggregation of aggregated estimates.19 However, when performing secondary data analyses, it may prove impossible to differentiate between tribal communities if the original survey failed to collect such data. In these cases, the inability to specify findings by tribal group should be listed as a limitation.

* The inability to differentiate between tribal nations is a common limitation of secondary data analyses. Recognition of data limitations should motivate researchers to "do better" in the future, improving the quality of tribal data in public health over time by oversampling in populationwide studies or by conducting tribe-specific studies.16

2. Data aggregation may raise ethical concerns if appropriate tribal approvals are not sought during the research process.

* Tribal IRBs (institutional review boards) and RRBs (research review boards) exist to protect the interest of tribes, particularly given previous, egregious research-based mistreatment of Indigenous peoples. Therefore, it is essential to engage with tribal research boards and Tribal Councils from the tribal nation of each participant when conducting research with Native peoples.16,18,20

* Do not publicly report on tribe-specific information without consulting Tribal Councils21 and having data use agreements in place.18

3. Data aggregation across tribes obscures important health disparities within and between tribes.22

* Each Native nation has unique community values, history, religion, language, epistemology, political affiliations, presence of economic drivers, age structure, health insurance coverage and access, disease prevalence, distributions of risk, and protective factors. Each of these affects the distribution of health and disease; policies and programs aimed at eliminating health disparities should be tailored to local contexts to achieve greatest effectiveness.

* There are instances, however, in which studying the aggregate Native experience is called for: specifically, when assessing the impacts ofstructural, environmental, and interpersonal racism on Native nations collectively. In these cases, it is the racism ofasystem and the outcomesofthat racism that are beingevaluated, notthe "race" ofthe people thatsystem affects.Approval from tribeswhose data are being aggregated is still required.20

* Other instances in which data aggregation may be appropriate include the following20:

* Similarities in community locality and characteristics, including population density (urban/rural) and availability of natural resources (coastal, inland).

* Similarities in environmental contaminant exposure that may affect local food, water, and soil.

* Similarities in ability to access health-related resources and services, including travel distances to resources and services, cultural sensitivity of care provision, spaces for physical activity, healthy food availability, and educational opportunities.

* Overall affluence and economic development, including presence of local economic drivers and unemployment levels.

BOX 2- Potential Solutions for Commonly Encountered Issues in Indigenous Health Research: Avoiding the "Other" Category

Adequate data regarding disease burden is critical when justifying the need for prevention or intervention programs and health policies. Indigenous peoples may make up a small proportion ofthe overall participants in health studies, but altogether removing Indigenous peoples from results or collapsing Indigenous populations into an "other" category obscures important and needed health data.

* Studies should report and publish results for numerically small groups, regardless of statistical significance of estimates.17 For a discussion of similar dynamics in higher education research, see Shotton et al.23

* When sample sizes do not allow for statistical significance to be achieved, studies should avoid the urge to group numerically small groups, including Indigenous communities, into an "other" category. Instead, report results by group, regardless of sample size.17 Indeed, when practitioners attempt to use existing data to justify the need for programs or to develop prevention or intervention projects, estimates that categorize Indigenous communities as part of an "other" group are of little utility.17

* Limited data, when limitations are clearly specified, are better than no data. Withholding Indigenous-specific estimates makes it impossible for future meta-analyses or pooling projects to make use of existing study results. Further, Indigenous communities have noted that although they participate in studies, they often do not see results that are relevant to them. This weakens relationships necessary for the research enterprise to be sustained. Additional useful information includes sample size (raw numbers), percentage of total population, and confidence intervals (with explanations of their meanings). Include issues that stem from sample size in the limitations section.

* Small sample size should not be considered an obstacle to high-quality research, particularly since findings can

yield useful information for local practitioners. Include the results of qualitative techniques, such as focus groups or talking circles, to provide important information otherwise obscured by small sample sizes.18

BOX 3- Potential Solutions for Commonly Encountered Issues in Indigenous Health Research: Indigenous Identification and Classification

1. Providing an opportunity to mark "all that apply" rather than a single racial or ethnic identity allows individuals free choice in self-identification.

* Several governmental data collection efforts (e.g., the US Census) include options to self-identify and select multiple racial and ethnic identities.

* Carefully consider when it is best to have participants identify as multiracial and how those individuals will be considered in analyses and reporting.17 Make your intentions clear and include your rationale in research communications.16

* Some community advocates have suggested that Indigenous peoples check only 1 race to ensure that they are tabulated as Indigenous and that associated resource distributions would be more equitable.17 Always consult and seek guidance from Indigenous communities to better understand how they define themselves.24

* "Select all that apply" instructions may lead to highly specific results or groupings that are difficult to interpret (i.e., "American Indian and Black" vs "American Indian, Black, and Asian"); it is still important, however, to offer the opportunity to self-identify. Aggregation into broader categories can be done, with documentation.18

2. Racial misclassification, specifically undercounting of Indigenous populations, is a well-described issue in health research. Administrative data frequently misreport Native people as belonging to other racial or ethnic groups.

* Under no circumstances should phenotypic or cultural characteristics (hair, skin color, clothing, language) be used to assign racial identity or tribal affiliation.21

* Racial classification by others (i.e., not self-identified) is affected by social processes and stereotypes and is therefore not accurate.4,21

BOX 4- Potential Solutions for Commonly Encountered Issues in Indigenous Health Research: Avoiding Exploitative and Extractive Research Practices

There is a long history of researchers enacting exploitative and extractive practices in Indigenous communities, and studies have too often presented Indigenous peoples as deficient.

* The foundation of Indigenous data sovereignty is that Indigenous peoples have the right to determine how, when, where, and for what purposes data about them are collected, accessed, analyzed, interpreted, managed, and disseminated. Because of this, researchers must pay attention to local data sovereignty practices and consult data sovereignty networks.25-28

* Data needs vary across Indigenous peoples. Data are needed that meet the needs and desires of specific communities. When Indigenous data needs are met, and data reflect the priorities, values, and diversity of Indigenous peoples, then these data can disrupt deficit narratives, present the realities of Indigenous people's lives, and support Native nation (re)building.26,29

* Research findings must benefit the participating community.27 Findings should be shared with the participating community before being disseminated to the broader scientific community.20,25

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DETAILS

Subject:	Pacific Islander people; Diabetes; Public health; Data collection; Ethnic identity; Alternative approaches; Indigenous peoples; Racism; Sociopolitical factors; Discrimination; Researchers; Sovereignty; Concept formation; Colonization; Race relations; Native North Americans; Medical research; Citizens; Biology; Identity formation; American Indians; Embodiment; Power structure; Classification; Racialization
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Document 10 of 37

Trends in Ketamine Use, Exposures, and Seizures in the United States up to 2019

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ProQuest document link

ABSTRACT (ENGLISH)

Objectives. To determine whether there have been shifts in nonmedical ketamine use, poisonings ("exposures"), and seizures. Methods. We used generalized additive models to detect trends in past-year use (2006-2019), exposures (1991 -2019), and seizures (2000-2019) involving ketamine in the United States. Results. There was a quarterly increase in self-reported past-year nonmedical ketamine use in 2006 to 2014 (B 5 0.21; P = .030) and an increase in 2015 to 2019 (B = 0.29; P = .036), reaching a peak of 0.9% in late 2019. The rate of exposures increased from 1991 through 2019 (B = 0.87; P = .006), and there was an increase to 1.1 exposures per 1 000 000 population in 2014, with rates remaining stable through 2019. The rate of ketamine seizures increased from 2000 through 2019 (B = 2.27; P <.001), with seizures reaching a peak in 2019 at 3.2 per 1000 seizures. Conclusions.

Indicators suggest that ketamine use and availability has increased, including before increased medical indications, but nonmedical use is still currently uncommon despite increased acceptance and media coverage.

FULL TEXT

Headnote

Objectives. To determine whether there have been shifts in nonmedical ketamine use, poisonings ("exposures"), and seizures. Methods. We used generalized additive models to detect trends in past-year use (2006-2019), exposures (1991 -2019), and seizures (2000-2019) involving ketamine in the United States. Results. There was a quarterly increase in self-reported past-year nonmedical ketamine use in 2006 to 2014 (B 5 0.21; P = .030) and an increase in 2015 to 2019 (B = 0.29; P = .036), reaching a peak of 0.9% in late 2019. The rate of exposures increased from 1991 through 2019 (B = 0.87; P = .006), and there was an increase to 1.1 exposures per 1 000 000 population in 2014, with rates remaining stable through 2019. The rate of ketamine seizures increased from 2000 through 2019 (B = 2.27; P <.001), with seizures reaching a peak in 2019 at 3.2 per 1000 seizures. Conclusions. Indicators suggest that ketamine use and availability has increased, including before increased medical indications, but nonmedical use is still currently uncommon despite increased acceptance and media coverage.

Ketamine is a dissociative anesthetic that has been prevalent as a recreational drug in nightclubs for decades.1,2 However, ketamine has been used as an anesthetic in both animals and humans for a half century.3 Evidence indicates that ketamine produces analgesia without substantial respiratory depression in both children and adults, and thus its use is particularly common in prehospital settings (e.g., among emergency medical technicians) and in field conditions (e.g., in low-income countries).3 Ketamine has not been widely used in psychiatry until recently. Randomized double-blind controlled-placebo trials have recently determined that intranasal nonanesthetic doses of esketamine, an enantiomer of ketamine, can have an ultrarapid antidepressant effect among those with major depression.4 In response to studies demonstrating the drug's efficacy in treating treatmentresistant depression, on March 5, 2019, the US Food and Drug Administration approved the use of esketamine nasal spray to treat this condition.

Findings on the drug's efficacy and Food and DrugAdministration approval led to increased availability of ketamine in psychiatric treatment settings. Such coverage, however, also led to extensive media coverage ofthe drug. Since ketamine's approval for use in psychiatric settings, the drug has been covered in many major US news sources, including USA Today and the New York Times,5'6 and many articles referto ketamine as a "club drug" or referto it by its street name: "Special K." Given that media coverage can affect drug use patterns in the general population,7 it is unknown whether such coverage about the benefits of use of a club drug may have created mixed messages regarding the drug's safety or acceptability to use recreationally. Estimated past-year use of ketamine-which is assumed to be nonmedical use-was found to have significantly increased among nightclub and dance festival attendees in New York City between 2016 and 2019 (from 5.9% to 15.3%),2 but trends in use in the general population have remained largely unknown. We examined trends in ketamine use and availability using multiple forms of national indicator data.

METHODS

We analyzed data from 3 national data sources. First, we estimated trends in quarterly prevalence of ketamine use based on past-year report among participants aged 12 to 34 years in the 2006 to 2019 National Survey on Drug Use and Health (NSDUH), a nationally representative survey of noninstitutionalized individuals in the United States.8 Ketamine use was asked about in a section querying hallucinogen or psychedelic use in which participants were asked about use of "ketamine, also called 'Special K' or 'Super K,'" so we assumed reported use to be mainly nonmedical use.

We examined quarterly trends in past-year use separately (using weighted data) before and after 2015 because of a change in survey design.8 Then, we estimated trends in poisonings ("exposures") reported to poison control centers (PCCs) involving ketamine and its analogs from 1991 to 2019. There are 55 PCCs that cover the United States and its territories, and, since 2003, data have been stored in the National Poison Data System, which replaced the previous Toxic Exposure Surveillance System.9 We converted counts to rates per 1 000 000 persons based on the US Census. Finally, we estimated trends in seizures tracked by the Drug Enforcement Administration's National Forensic Laboratory Information System (NFLIS) from 2000 to 2019 based on counts converted into rates per 1000 annual total drug seizures.

The NFLIS systematically collects seizure results from federal, state, and local forensic laboratories throughout all 50 states.10 We chose years for inclusion for all data sources based on data availability. We analyzed case-level data for NSDUH and extracted count data from PCCs and the NFLIS from annual reports.9,10 We used generalized additive models with cubic basis functions to fit regression splines with automated selection of knots to visually capture nonlineartrends. We plotted trends with 95% confidence intervals for model predictions. We then modeled trends with orthogonal polynomial terms. Data and code can be found at https://
github.com/caroruth/ketaminetrends.

RESULTS

There was a linear quarterly increase in self-reported past-year ketamine use (via the NSDUH) in 2006 to 2014 (B 5 0.21; SE 5 0.01; P = .030) with a nadir in late 2008 of 0.1% and then a cubic increase in 2015 to 2019 (B 5 0.29; SE 5 0.13; P 5 .036), reaching a peak of 0.9% in late 2019 (Figure 1). The rate of exposures reported to PCCs increased in a cubic manner from 1991 through 2019 (B 5 0.87; SE 5 0.29; P 5 .006; Figure A, available as a supplement to the online version of this article at https://www.ajph.org). Reported exposures began in 1991 at 0.1 exposures per 1 000 000 population and increased to a peak of 1.4 exposures per 1 000 000 in 2000. Rates then decreased to 0.4 exposures per 1 000 000 in 2008 and increased to 1.1 exposures per 1 000000 in 2014 and remained somewhat stable through 2019. The rate of seizures increased in a quadratic manner from 2000 through 2019 (B 5 2.27; SE 5 0.33; P <.001), with seizures reaching a nadir in 2004 to 2005 at 0.27 per 1000 and increasing from 2011 through a peak in 2019 at 3. 2 per 1000 (Figure B, available as a supplement to the online version of this article at https://www.ajph.org).

DISCUSSION

Our results suggest increased nonmedical use and availability of ketamine in recent years-particularly in the past year. However, despite a recent increase in prevalence of nonmedical ketamine use, prevalence remained relatively rare, below 1%. Exposures as reported to PCCs were highest in 2000 to 2001, which was also the peak in use of other club drugs such as MDMA (3,4methylenedioxymethamphetamine), also known as ecstasy,11 possibly suggesting ketamine's close link to recreational use in nightlife scenes. After a decline in exposures, there was an increase again through 2014, but exposures have remained relatively consistent thereafter. Rates of ketamine seizures, however, have increased exponentially since 2012, suggesting increasing availability, although seizures are still uncommon relative to other drugs. Overall, results suggest that use and availability are indeed increasing, but ketamine remains an uncommon recreational drug.

Detected increases in ketamine use corroborate recent detected increases in recreational use among nightclub and dance festival attendees in New York City,2 so use appears to be increasing both in this high-risk population and in the general population. However, to better inform prevention and harm reduction efforts, future research is needed to determine use and exposure trends according to demographic and other drug use characteristics to obtain a clearer picture regarding which subpopulations are increasing use. Further, studies are needed to directly determine whether findings on the efficacy of ketamine and associated media coverage are directly linked to increasing use.

Limitations

This study is not without limitations. Data on ketamine use and exposure are likely underreported because data rely on self-report. We assumed NSDUH data on ketamine use to refer to nonmedical use, but it is possible that some use was medical use. Count data from PCCs was limited, as we were not able to deduce with confidence the extent of "abuse" or intentional misuse among cases. Finally, people who use synthetic drugs such as ecstasy can be unknowingly exposed to ketamine as an adulterant, and this also leads to underreporting of use.12

Public Health Implications

National indicator data suggest that nonmedical ketamine use and availability are increasing in the United States, but use is still uncommon-even despite increased acceptance and media coverage. Ketamine is used medically throughout much of the world, and access to appropriate medical use is warranted; however, it is important for surveillance efforts focusing on nonmedical use to also continue to inform prevention and harm reduction. AJPH

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CONTRIBUTORS

J. J. Palamar conceptualized and designed the study. C. Rutherford conducted the statistical analyses under the mentorship of K. M. Keyes. All authors drafted the initialarticle, interpreted results, and critically reviewed and revised the article. All authors are responsible for this reported research and approved the finalarticle as submitted.

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CONFLICTS OF INTEREST

J.J. Palamar has consulted for the biopharmaceuticalcompany Alkermes plc. The authors have no other potentialconflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

This study was exempt from institutionalreview board review because it was a secondary data analysis and therefore did not include human participants.

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DETAILS

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Document 11 of 37

Unemployment, Bankruptcies, and Deaths From Multiple Causes in the COVID-19 Recession Compared With the 2000–2018 Great Recession Impact

Brenner, M Harvey, PhD

ProQuest document link

ABSTRACT (ENGLISH)

Objectives. To determine whether unemployment and bankruptcy rates are related to increased excess deaths during the COVID-19 recession and to examine whether the current recession-based mortality rate not only is dependent on COVID-19 but also continues the pattern of recessions, especially the Great Recession, in relation to chronic disease mortality rates and mental health disturbances (e.g., including suicide) from 2000 to 2018. Methods. This study used pooled cross-sectional time series analysis to determine the impact of unemployment and bankruptcy rates on excess deaths from February to November 2020 for US states. The study used a second pooled cross-sectional time series analysis to determine whetherthe COVID-19-era recessional mortality continues the impact of prepandemic recessions (2000-2018) on multiple causes of mortality. Results. Ten percent unemployment was associated with approximately 48[thin space]149 excess deaths, while, jointly with bankruptcies, their combined effect produced 35 700 and 144483 excess deaths, for unemployment and bankruptcies, respectively. These health-damaging COVID-19-recessional findings suggest a reiteration of the significantly increased major cause-specific mortality during 2000 to 2018, mitigated by the size of the health care workforce. Conclusions. Minimization of deaths attributable to the COVID-19 recession requires ample funding for the unemployed and underemployed, especially Black and Hispanic communities, along with significant investments in the health workforce. (AmJ Public Health. 2021 ;111(11):1950-1959. https://doi.org/10.2105/AJPH.2021.306490)

FULL TEXT

Headnote

Objectives. To determine whether unemployment and bankruptcy rates are related to increased excess deaths during the COVID-19 recession and to examine whether the current recession-based mortality rate not only is dependent on COVID-19 but also continues the pattern of recessions, especially the Great Recession, in relation to chronic disease mortality rates and mental health disturbances (e.g., including suicide) from 2000 to 2018.

Methods. This study used pooled cross-sectional time series analysis to determine the impact of unemployment and bankruptcy rates on excess deaths from February to November 2020 for US states. The study used a second pooled cross-sectional time series analysis to determine whetherthe COVID-19-era recessional mortality continues the impact of prepandemic recessions (2000-2018) on multiple causes of mortality.

Results. Ten percent unemployment was associated with approximately 48[thin space]149 excess deaths, while, jointly with bankruptcies, their combined effect produced 35 700 and 144483 excess deaths, for unemployment and bankruptcies, respectively. These health-damaging COVID-19-recessional findings suggest a reiteration of the significantly increased major cause-specific mortality during 2000 to 2018, mitigated by the size of the health care workforce.

Conclusions. Minimization of deaths attributable to the COVID-19 recession requires ample funding for the unemployed and underemployed, especially Black and Hispanic communities, along with significant investments in the health workforce. (AmJ Public Health. 2021 ;111(11):1950-1959. https://doi.org/10.2105/AJPH.2021.306490)

The United States continues to experience an unpredictable COVID-19 pandemic, during which deaths have been accelerating since November 2020, and the national toll has reached 4000 persons per day. Overall, deaths have exceeded 595 000 as ofJune 9, 2021. The Centers for Disease Control and Prevention has estimated a reduction, in the first half of 2020, in years of life expectancy-with 2.7 years lost by African Americans, 1.9years lost by Hispanic populations, and 0.8 years lost by Whites.1 The current COVID-19 pandemic is exacerbated by the appearance of newer variants originating in the United Kingdom, South Africa, and Brazil, which bring further uncertainty to the death rate. The loss of life expectancy raises the question whether-orto what degree-the estimated deaths are partly the result of the abrupt national recession, which caused extraordinarily high unemployment rates and business closures in the onset of the COVID-19 pandemic. Is the accompanying recession a source of additionally increased excess deaths?2 If the COVID-19-based recession has, in itself, produced higher-than-expected mortality, is this a unique feature ofthe COVID-19 pandemic-increased mortality would thus be the result of a natural disaster-or is it a continuing effect of heightened unemployment and loss of income that, as evidenced during the Great Recession, may have increased national and state mortality during the first 2 decades of the 21 st century?

The impact of COVID-19 on recession, especially unemployment, is clear from reports by economists.3,4 But does COVID-19-based unemployment by itself produce additional mortality beyond that initiated directly through the COVID-19 infection? Literature over 40 years, consistent with epidemiology at the individual level,5-9 shows, using a variety of methods, medium- to longterm (5- to 10-year) effects of recessions on elevated mortality (especially cardiovascular causes).10-15

But are there short-term effects within the same year of increased unemployment and bankruptcies on excess deaths during the COVID-19 period of February to November 2020? And, if so, are these effects predictable resumptions of the impact of prepandemic recessions on mortality during the first 2 decades of the 21st century, which includes the Great Recession and its aftermath? The evidence so far shows conflicting findings.16 The present single-year analysis of the health damage of unemployment supports the relationship between recessional factors and mortality rates; it approximates the types of calculations typical of business cycle analysis (although unemployment is understood to be a "lagging" business cycle indicator).17

To answer these questions, I explored the potential impact of unemployment and bankruptcies on total excess deaths over the COVID-19 pandemic period of February to November 2020. I furthermore examined the relationship between employment status and gross domestic product (GDP) declines duringthe prepandemic 2000-2018 period as potentially linked to mortality. Proximate causes of mortality include heart disease, cancer, stroke, diabetes, chronic lower respiratory disease, and suicide.

METHODS

In many observational studies, observations are available over a sequence of points in time (e.g., states and years as in our case). Examination of only 1 dimension (i.e., space ortime) would limit us to perform classical crosssectional or time-series regression analysis. Drawing on more advanced techniques18,19 (i.e., pooled crosssectional time series analysis [PCSTS]), allows us to model simultaneously both space and time components as discussed by Reibling.20

Pooled Cross-Sectional Time Series Analysis

The PCSTS method combines 2 approaches. First, the more familiar one is cross-sectional analysis, where, in this case, US states were the units of analysis. I examined multiple crosssectional analyses corresponding to the 19-year period of 2000 to 2018 for which all of the data representing the individual variables were available with respect to all 50 US states. Second, the same is true for the PCSTS analysis of the monthly period of February to November 2020, which I analyzed by state. I based all variables used in these PCSTS analyses on aggregated data (i.e., population rates rather than individual-level data).21 In addition to the cross-sectionality of this procedure in both periods (2000-2018 and February-November 2020), the technique simultaneously entails time-series analysis, involving variations overtime in the individual predicted variables and the outcome variables-age-adjusted rates of overall mortality and those for major chronic diseases (apart from dementia) and suicide.22

A more detailed discussion ofthe PCSTS approach is provided in Appendix A (available as a supplement to the online version of this article at http:// www.ajph.org). References to the data sources for each ofthe variables are provided in Appendix B (available as a supplement to the online version of this article at http://www.ajph.org).

Major Variables in the Predictive Models

Three central variables, acting together, hypothetically promoted or harmed (in the case ofthe unemployment rate) overall population health during 2000 to 2018. These variables were the unemployment rate, GDP per capita with 5-year lag, and the size ofthe health care workforce. The lagged measure of GDP per capita was, hypothetically, the principal source of medium- and long-term national economic and population health gain.

Following GDP per capita with a 5-year lag, a key predictive variable was the very short-term impact ofthe unemployment rate, representing the immediacy of economic recession, during a single year (i.e., without lag). The third variable was the availability of health care represented by the size of the US health care workforce per 1000 of total employment. This variable is a potential central moderator ofthe effects of unemployment and GDP per capita with a 5-year lag. In this 3-variable overall hypothesis, all 3 variables act jointly to influence the overall mortality rate. The study's argument required the modeling of all 3 variables simultaneously. Additional control variables (including severe poverty, tobacco, opioid and extensive alcohol consumption, and environmental pollution) are listed in detail in the section on control variables, including rationales, operationalization, and references for each control variable.

Components of the National Economy

Journalistically, the unemployment rate has been the principally used indicator measuring the presence of recessions. Despite alternative measures for which there are plausible arguments, this rate is nevertheless the metric that is most commonly used in policy discussions of the implications of recession, both short- and long-term. While past researchers have typically either concentrated on the mediumterm or lengthy effects of unemployment on damaged health, recent literature at the macroeconomic level has tended to focus on the nearsimultaneous relation between unemployment and mortality. Such refocusing assumed that both unemployment and mortality could potentially behave like typical business cycle indicators, the effects of which are often seen within a single year. However, in the case of unemployment, it is understood by the National Bureau of Economic Research to be a lagging indicator, the maximum effect of which can remain high at least a year or 2 following the end of economic recessions.23 Thus, to capture the health implications of unemployment within the same year that unemployment comes to its peak, it was necessary to treat the unemployment without any lag (i.e., contemporaneously) from February to November 2020, thus capturing only very short-term effects. At the same time, I used estimates of GDP per capita with a 5-year lag to capture medium-term effects of recession and growth on mortality from 2000 to 2018.

Log Gross Domestic Product per Capita

The most comprehensive hypothesized variable benefiting population health is log GDP per capita with a 5-year lag for the period 2000 to 2018. This variable is as yet unavailable for February to November 2020. The GDP measure, with a 5-year lag, expresses the standard of living for the general society over the medium term within a full 5to 6-year business cycle.23 In the present study, I expressed GDP per capita in terms of a 5-year lag to take account of the cyclical implications of investments that require several years to result in health improvements (especially in health care technology and pharmaceuticals), in occupationalenvironmental health, and poverty minimization via social welfare expenditures affecting many categories of living conditions and elevated consumption of necessary goods and services (e.g., nutrition, clothing, shelter, electricity, transportation, rent).

Long-term GDP per capita has predominant importance for improved public health even though it includes elements of substantial economic inequality,24 especially by US region, income group, educational status, and race/ethnicity. The economic inequality issue, in conjunction with long-term economic growth (for the general population and especially high-income groups) should not be underestimated. In the United States, rural, Midwestern, and Rust-Belt areas have fallen behind in economic growth and life span. It has been argued that these aspects of lagging development have been at least partly responsible for the emergent trends ofthe opioid crisis amongyounger populations and long-term loss in life expectancy (i.e., "deaths of despair").25

Health care workforce (2000-2018). The size ofthe health care workforce over long periods in US history reflects a sustained upward trend. At the same time, the short-term and long-term effects of recessions have decreased the size ofthe health care workforce because of a loss of health insurance related to unemployment during recessions and a recessional loss of income to the population more generally, thus inhibiting investment in an expanded workforce. Thus, I separately investigated the trend in the size ofthe health care system, highly contingent on scientific and technological advances and long-term health policy, as to its longterm implications for societal health.

Total bankruptcies (February-November2020). In the February to November 2020 analysis, in addition to unemployment, I also used bankruptcies (private and commercial) as a COVID19 recessional predictor of excess deaths. In the 2020 monthly analyses of the impact of recession, it was important to take into account a somewhat broader set of measures-especially those that influence business as a whole. A prominent and traditional business cycle indicator is total bankruptcies,26 which provides a more widespread sense ofthe extensiveness and depth ofthe COVID-19- initiated recession. The total bankruptcy rate provides an indication of losses to small and large businesses.

Control variables. I introduced behavioral risk factors as variables into the predictive models to distinguish them from the more direct effects of income change or unemployment.

The behavioral risk factors from 2000 to 2018 were as follows:

1. Major depressive episodes: The intention was to discriminate between depressive episodes that were clearly linked to recession and those that were not necessarily associated with recession, but rather emanated from major life events27 and daily hassles,28 including those that occurred at the workplace, in family life, and especially resulting from the loss and grief related to damaged health and mortality. Nevertheless, depression is a significant risk factor for poor health, low life satisfaction, and early mortality.
2. Smoking: Smoking, a basic behavioral risk factor, was measured at a 3-year lag because the long-term trend in

industrialized societies (especially the United States) has involved major declines in smoking prevalence, greatly curtailing mortality from cardiovascular illnesses, malignancies, and chronic obstructive pulmonary disease. The 3-year lag was hypothesized because there is evidence that several years are often required after smoking cessation for the former smokers' health to improve to a point that it returns to previous nonsmoker cardiopulmonary functioning.

3. Participation in physical activities: It is now widely accepted that participation in physical activities is a major source of health maintenance and improvement.

4. Alcohol-induced death rate: The literature is complicated regarding the health impact of the overall population consumption of alcohol. Especially for the cardiovascular illnesses, very high as well as virtually zero consumption are associated with elevated mortality, whereas moderate consumption appears to enhance longevity.29 To specifically indicate chronically higher alcohol consumption, which elevates mortality for many chronic and mental health causes, I used age-adjusted alcohol-related deaths as a behavioral risk factor for mortality.

5. Tuberculosis: Tuberculosis incidence is especially high in low-income developing countries, but modest in industrialized countries. I used it as a predictive behavioral risk factor because of its intense association with chronic poverty, but not necessarily with trends in GDP or recession.

For references and further discussion of control variables, see Appendix C (available as a supplement to the online version of this article at http://www. ajph.org).

RESULTS

In the COVID-19 period of February to November 2020, unemployment was a significant predictor of excess deaths controlling for the number of COVID-19 cases, age, and Black and Hispanic racial/ethnic groups (Table 1). Using the same model, with identical controls, the combination of both recessional factors of unemployment and bankruptcies yielded an impact of further increased excess deaths (Table 2). In the analysis presented in Table 2, which combines unemployment and bankruptcies, the numerical effect on excess deaths related to unemployment slightly decreased because ofthe relationship between unemployment and bankruptcies that typically would occur in a recession. In the model that presents 10% unemployment (as currently estimated by the Federal Reserve and Department of the Treasury30) as the only recessional variable, an additional 48149 deaths were estimated (Table 1). In the recessional model that included both unemployment and bankruptcies, the estimates of 10% additional unemployment led to 35 700 excess deaths, and a 120-unit increase per 100 000 in bankruptcies led to approximately 144483 deaths.

Is this finding a unique, natural consequence of a recession related to a world pandemic or a partial reinstantiation ofthe effects of recessions during the 21st century, specifically 2000 to 2018? Like total mortality, all major chronic disease causes of death showed significant beneficial effects of log GDP per capita with a 5-year lag and mortality increases related to unemployment without lag (Table 3).

The principal recessional variable, unemployment, showed evidence of elevated mortality during 2000 to 2018 (total mortality) and major chronic causes of death and suicide and continued to do so in the period February to November 2020 for total excess death. This indicates a continuous relationship of recession (especially indicated by unemployment rates) through the 2 research sample periods elevating mortality. The principal control variables showed strong positive relations to total mortality and mortality by major cause. However, the health care workforce with inverse relations to mortality featured as the strongest coefficient among predictive variables except GDP per capita with a 5-year lag (Table 3).

The impact of recessions during 2000 to 2018 on suicide was clear, while the predictive model and, therefore, the findings, were somewhat different from those of total mortality and that for major chronic diseases. For suicide, the unemployment rate proved to be a robust and significant related predictive factor. GDP per capita, the major indicator of national economic change, was not predictive for suicide, while, when instead median household income for GDP with 5-year lag (which de-emphasizes income inequality) was included, the model showed the hypothesized relationship. However, the control variables, expressing stress relationships and coping mechanisms, were positively related to and constituted significant risk factors in the occurrence of suicide (Table 4).

DISCUSSION

In the COVID-19 recession, both unemployment and bankruptcies exerted a substantial damaging impact on excess deaths. COVID-19 incidence, age, and race/ethnicity were controlled. This means that the ethnic/racial factors, which have been widely reported as being especially important,31 were adjusted for in these 2 models covering the COVID-19 recession era. In these models, the potential importance of race/ethnicity in the COVID-19 recession was further highlighted by the fact that unemployment rates in 2020 were considerably higher for Hispanic and Black populations than for the White population32 and, for the same period, bankruptcies were especially high for the African American population, especially Black women.33

However, the Federal Reserve and Department of the Treasury announced on February 22, 2021, that the official unemployment rate of 3.6% should really be taken as close to 10.0% because of many unemployed persons completely leaving the labor force.30 If that is correct, then our estimates of the impact of unemployment could be underestimated.

Comorbidities of COVID-19 Mortality

In addition, the recessional effects of COVID-19 could also extend to the chronic disease comorbidities of COVID-19 mortality, as was the case for elevated chronic disease mortality in the 2000-2018 period. Main contributing factors in the COVID-19 pandemic could include the influence of psychological stress, loss of access to health care because of pressure on the health care system, and loss of financial resources. In such cases, because the Black population has been more susceptible to many chronic diseases, their relatively low economic and occupational status may well put them at greater risk for recessional losses. The important implication is that far more extensive work is required to understand how key elements of economic recession intersect with race/ ethnicity to produce much higher-thanexpected mortality rates.

Support for the long-term relationship between unemployment and increased mortality has been found at the national level9,12-15 and extensively tested for at the individual level in epidemiological studies over 40 years.5-8,10,11 A principal contribution of this article is the demonstration that short-term, intense, and abrupt increases in unemployment have led to elevated excess deaths during the COVID-19 recession as well as expanded total and chronic disease mortality during the 2000-2018 period. Despite the fact that the unemployment-to-mortality relationship has been established for mediumand long-term relationships,5,6,14 it is only recently that economists have begun to study this relationship at the macro level within a single year (i.e., the same year) in the attempt to use temporally coincident (i.e., contemporaneous) indicators in the technical business cycle terminology.

At first sight, it would seem that examining only the very-short-term mortality impact of unemployment would be counterintuitive with respect to the epidemiological tradition of research, which stipulates that the development of chronic diseases occurs over much of the life span. Previous research using this short-term approach has produced contradictory findings.16 Nevertheless, in keeping with the style of research that is specific to short-term business cycle analysis, I analyzed the measures of the effects of recession, unemployment over 2020 and 2000 to 2018, and bankruptcy rates during 2020 (over a single year) in this article. At the same time, longerterm analysis by economists have emphasized the effects, after a first year of peak unemployment, of hysteresis, or scarring.34 Hysteresis refers to the multiple effects lagging high recessional unemployment during which employment and income losses persist.

Nevertheless, the mortality-inducing effects of long-term and severe economic loss are supported by the most prominent and ubiquitous findings in epidemiology, in industrialized countries and globally. This finding has become known as the "social gradient" or "health gradient."35 It specifies that the higher the level of socioeconomic status of a person or population, the lower will be the mortality rate. The direct inference is that elevation of socioeconomic status decreases population and individual mortality, while declines in socioeconomic status produce increases in mortality. This study is apparently one of the first that deals with the importance of GDP per capita, on both an annual and long-term basis, in the reduction of mortality for major causes during 2000 to 2018. In this article, the value added is that statistical tests were used to examine this hypothesis on a US state basis. The analysis over 2000 to 2018 provides the extensive statistical degrees of freedom necessary to examine the impact of the size of the health care work force on multiple causes of mortality, holding constant overall GDP per capita. The resulting significant impact of the health care workforce is one ofthe major sources of mortality reduction during 2000 to 2018. It is clear that investment in the health workforce, including public health, has been a major factor leading to improvement in the public's health. Indeed, it is possible that, absent the mortality-reducing effects ofthe health care workforce during 2000 to 2018, the impacts of recession on increased mortality may have been greatly enlarged.

Public Health Implications

The COVID-19-induced unemployment and bankruptcy rates are robustly related to increased excess mortality from February to November 2020. Economists and labor market specialists should therefore join public health researchers to formulate policies that reduce mortality. Rapid policy intervention is especially required for populations of low socioeconomic status and communities of color who have suffered inordinately from COVID-19 in terms of morbidity and mortality. The vulnerability of these groups is attributable not only to occupations that more frequently involve interpersonal contact but also to low socioeconomic position, with considerably higher unemployment, income loss, and bankruptcy occurring to these populations in recession. We need to reconsider the epidemiology-public health disciplines involving natural disasters-epidemics, heatwaves, floods, hurricanes, etc. The typical approach in public health disaster relief has been to concentrate on mitigating the immediate disaster. But the corollary economic and social implications of natural disasters could have medium- and long-term implications for substantially expanded illness and mortality if these corollary effects are not attended to.

Although the COVID-19 recession is unique in being caused by a natural disaster, it follows a pattern of recessions during the 21st century, including the Great Recession, of increasing the total mortality rate and mortality specifically attributable to major chronic diseases, such as heart disease, cancer, stroke, diabetes, and chronic lower respiratory disease, as well as mental health consequences, such as suicide.36 It is clearly important for Congress to provide sufficient funds to aid in vaccine distribution and COVID-19 treatment ofthe full population. At the same time, the minimization of deaths attributable to the COVID-19 recession requires ample funding for the unemployed and underemployed, and to individuals and businesses who have experienced and are experiencing major economic losses. Also, it is especially important for funding to mitigate the maximum effect of recession to communities of color, rural populations, and those "left behind" in previous governmental support efforts during the Great Recession era. Given the vulnerabilities of communities of colorto the pandemic and its economic consequences, it would be important to investigate more precisely how different racial/ethnic groups' health vulnerabilities interact with economic losses imposed by recessions ofthe 21st century. Furthermore, the prepandemic 2000-2018 analysis makes clear that the absolute size ofthe health workforce is a highly significant factor in mitigating the results of economic recession, low socioeconomic status, and poverty. Investments into enlarging the size ofthe health workforce, and more generally into public health, is an important priority for reducing overall health inequalities in American society, in both the short and long term.

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DETAILS

Subject:	Population; Mental health; Chronic illnesses; Public health; COVID-19; Bankruptcy; Disease; Mortality; Economic conditions; Business cycles; Unemployment; Mortality rates; Time series; Health care; States; Great Recession; Life expectancy; Suicide; Pandemics; Per capita; Workforce; Variables; Investments; Gross Domestic Product--GDP; Coronaviruses; Fatalities; Recessions
Business indexing term:	Subject: Economic conditions Business cycles Great Recession Bankruptcy Per capita Workforce Gross Domestic Product--GDP Unemployment Recessions
Location:	United States--US
Publication title:	American Journal of Public Health; Washington
Volume:	111
Issue:	11
Pages:	1950-1959
Publication year:	2021
Publication date:	Nov 2021
Section:	UNEMPLOYMENT, BANKRUPTCIES, AND EXCESS DEATHS DURING THE COVID-19 PANDEMIC
Publisher:	American Public Health Association
Place of publication:	Washington
Country of publication:	United States, Washington
Publication subject:	Public Health And Safety, Medical Sciences
ISSN:	00900036
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Language of publication:	English
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Document URL:	https://www.proquest.com/scholarly-journals/unemployment-bankruptcies-deaths-multiple-causes/docview/2602731725/se-2?accountid=211160

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Document 12 of 37

Community Action for People With HIV and Sex Workers During the COVID-19 Pandemic in India

Lewandowski, Stephen A; Hughes, Rebekah C; Marziali, Megan E; Segura, Luis E

ProQuest document link

FULL TEXT

The COVID-19 lockdowns in India devastated the daily lives and functions of those labeled as being the most vulnerable, including the sex worker population. Before the COVID-19 pandemic, sex workers diagnosed with HIV were able to get care through the hospital systems. However, multiple hospital systems shifted to treating solely COVID-19 patients during the pandemic and forced a halt on the treatment of other medical conditions. Ashodaya, a well-established sex worker organization in India, set out to determine the social protections allowed by the government and how they could be provided in a timely manner. Through their work, Ashodaya partnered with the community to ensure that sex workers diagnosed with HIV had access to antiretroviral therapy and to spread awareness about social protections being offered by the government and how they could be accessed. Ashodaya's activities provide a framework for how marginalized populations can be reached and protected during public health crises.

Citation. Reza-Paul S, Lazarus L, Haldar P, et al. Community action for people with HIV and sex workers during the COVID-19 pandemic in India. WHO South East Asia J Public Health. 2020;9(2):104-106. https://doi.org/10.4103/2224-3151.294302

DETAILS

Subject:	Pandemics; Community action; Prostitution; Workers; COVID-19; Human immunodeficiency virus--HIV; Public health; Sexually transmitted diseases--STD; Coronaviruses; Sex industry; Hospital systems
Business indexing term:	Subject: Workers
Location:	India
Publication title:	American Journal of Public Health; Washington
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Publication year:	2021
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Document 13 of 37

Impact of COVID-19 on Primary Health Care Services

Lewandowski, Stephen A; Hughes, Rebekah C; Marziali, Megan E; Segura, Luis E

ProQuest document link

FULL TEXT

The onset of COVID-19 has potentially created barriers to health care access through the implementation of nationwide lockdowns. Pillay et al. analyzed data from the District Health Information System from March to December 2020 and from March to December 2019 to gain insight into access to health services during the COVID-19 period in comparison to the pre-COVID-19 period. The authors found that 3.44 million fewer HIV tests were conducted in the COVID-19 period, which is a 22.3% decline from the pre-COVID-19 period. Differences exist across provinces, with one province (North West) reporting a 1.7% increase in the number of HIV tests conducted and another (Western Cape) reporting a 36.1% decrease in testing. Pillay et al. hypothesize that the decrease in HIV testing resulted from limitations to accessing health services because of lockdowns, creating a barrier for HIV treatment. They conclude that health care services need to be prioritized to prevent morbidity and mortality.
Citation. Pillay Y, Pienaar S, Barron P, Zondi T. Impact of COVID-19 on routine primary healthcare services in South Africa. S Afr Med J. 2021;111(8):714-719. https:// doi.org/10.7196/SAMJ.2021. v111i8.15786

DETAILS

Subject:	Health care access; Primary care; Human immunodeficiency virus--HIV; COVID-19; Coronaviruses; Health services; Health care; Medical tests
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Publication year:	2021
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Place of publication:	Washington
Country of publication:	United States, Washington
Publication subject:	Public Health And Safety, Medical Sciences
ISSN:	00900036
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Language of publication:	English
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Last updated:	2023-03-01
Database:	Public Health Database

Document 14 of 37

Excess Deaths During the COVID-19 Economic Downturn

Pagan, José A, PhD [1] [1] Department of Public Health Policy and Management, School of Global Public Health, New York University, New York, NY

ProQuest document link

ABSTRACT (ENGLISH)

More than 700 000 people have died from COVID-19 in the United States over the last year and a half since the pandemic began.1 Measures to stop the spread of COVID-19, such as stay-at-home orders and business closures, together with severe disruptions in overall economic activity brought about a short but deep economic recession. The Bureau of Economic Analysis of the US Department of Commerce estimates that real gross domestic product in the United States decreased at an annual rate of 19.2% from the fourth quarter of 2019 through the second quarter of 2020.2

In this issue of AJPH, Brenner (p. 1950) investigates excess deaths associated with unemployment and bankruptcies during the COVID-19 recession. The sharp economic downturn experienced by the United States last year is likely to lead to higher mortality over the next five to 10 years.3 The key question Brenner answers is whether higher unemployment and business closures due to the pandemic have a more immediate, same-year effect on excess deaths.

FULL TEXT

More than 700 000 people have died from COVID-19 in the United States over the last year and a half since the pandemic began.1 Measures to stop the spread of COVID-19, such as stay-at-home orders and business closures, together with severe disruptions in overall economic activity brought about a short but deep economic recession. The Bureau of Economic Analysis of the US Department of Commerce estimates that real gross domestic product in the United States decreased at an annual rate of 19.2% from the fourth quarter of 2019 through the second quarter of 2020.2

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EXCESS DEATHS BEYOND COVID-19

Brenner uses data for the 50 US states from prepandemic years (2000-2018) and pandemic months (February 2020-November 2020), together with regression analysis, to study how the unemployment rate, GDP per capita with a 5-year lag, health care workforce size per 1000 total employment, and bankruptcies are related to excess deaths. His statistical approach controls for the number of COVID-19 cases and other key demographic and behavioral risk variables. The results of his study show that unemployment and bankruptcies during COVID-19 are significantly related to excess deaths. For example, 10% additional unemployment (i.e., unemployment rate as a proportion of the total labor force) is associated with 35 700 excess deaths, and a rate of 120 total bankruptcies per 100 000 people is associated with 144483 excess deaths (Brenner,
Table 2). Interestingly, his study finds that the size of the health care workforce also has a strong inverse relationship to excess deaths. This may have implications on the role of public health and health care delivery system investments in mitigating the negative population health consequences of economic downturns.

There is no question that the COVID-19 pandemic has had a disproportionate impact on communities of color, particularly Blacks and Hispanics/Latinos. Survey data from April 2020 to March 2021 from the Understanding Coronavirus in America Tracking Study show that 89% of Latinos and 86% of Blacks experienced at least one serious economic, psychological, or health-related hardship compared with 76% of Whites.4 Brenner's study suggests that the impact of the pandemic will be even larger than expected for these two racial/ethnic groups given their high unemployment rates and their high presence in business sectors highly affected by the pandemic, such as the hospitality industry and retail and food services. In other words, not only are Blacks and Hispanics/Latinos at relatively high risk for COVID-19 because of where they live and work, but the population health and equity consequences ofthe pandemic are likely to be dramatic for them given the independent impact of unemployment and bankruptcies on excess deaths. What we are seeing now is just the tip ofthe iceberg in the sense that these economic effects take a few years to fully manifest themselves (i.e., they occur with a lag).

THE TIME TO ACT IS NOW

Brenner's study highlights the need to implement measures to address issues directly related to a specific event, such as a pandemic or a natural disaster. In addition, it points out that it is essential to immediately and swiftly confront related challenges such as job loss and disruptions in economic activity in economic sectors and communities affected by a catastrophic event. Policy conversations often tend to focus on dealing with what may seem like the most critical, immediate needs (e.g., vaccine distribution in a pandemic, food distribution after a hurricane), but it is never too early to start the conversation and, more importantly, to act to meet other needs that become evident much later, when it could be too late (e.g., avoiding business closures or providing adequate unemployment assistance). The main consequence of not doing something in the face of a sharp economic downturn is a more pronounced impact on the most vulnerable. The experience from the COVID-19 recession and other economic downturns and natural disasters suggests that this will certainly be the case.

INVESTMENTS IN PUBLIC HEALTH INFRASTRUCTURE

An interesting finding of Brenner's study is that the size of the health care workforce seems to have partially suppressed the harmful effects of economic downturns during the 2000-2018 period. Although this finding may be difficult to interpret, it is consistent with the idea that a strong public health and health care infrastructure can help everyone to weather the negative effects of economic downturns on population health. The Affordable Care Act led to substantial investments in the health care infrastructure of the United States and expanded health insurance coverage.5 Perhaps these types of investments have had the unintended benefit of making it easier to address COVID-19 challenges for public health and health care delivery systems. For example, the largest municipal health care system in the United States (New York City Health 1 Hospitals) reports that its ability to effectively serve COVID-19 patients, and all other patients, resulted from investments in an integrated electronic health system for its multiple safety net clinics and hospitals shortly before the pandemic began.6

THE FUTURE IS SOMEWHAT PREDICTABLE

Highly transmissible variants of the SARS-CoV-2 virus (the virus that causes COVID-19) have surfaced already and are likely to continue emerging without the adoption of strong mitigation measures.7 A more transmissible virus threatens to partially reverse the progress made to contain COVID-19 through vaccination and other preventive efforts. A virus resurgence and a subsequent economic slowdown will certainly have a disproportionate impact on the same populations that have experienced the worse effects of what feels like a never-ending pandemic.

Brenner's study provides important insights on what to expect in the immediate and near future in terms of mortality. The most recent life expectancy estimates from the National Vital Statistics System show that between 2019 and 2020, life expectancy at birth in the United States declined by 3.0 years for the Hispanic population, 2.9 years for the non-Hispanic Black population, and 1.2 years for the non-Hispanic White population.8 These sharp declines in life expectancy and the differences across racial/ethnic groups highlight the need to continue to delve deeper into how recessions, pandemics, and natural disasters are related to population health and health disparities. ÂfPH

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CONFLICTS OF INTEREST

The author has no conflicts of interest to disclose.

Sidebar

STg See also Brenner, p. 1950.

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DETAILS

Subject:	Health care policy; Mortality; Economic conditions; Coronaviruses; Pandemics; Gross Domestic Product--GDP; Economic analysis; COVID-19; Bankruptcy; Commerce departments; Unemployment; Fatalities; Recessions; Hispanic Americans
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Vaccine Coverage Across the Life Course in Michigan During the COVID-19 Pandemic: January–September 2020

Shen, Angela K, ScD, MPH; Bramer, Cristi A, MPH; Kimmins, Lynsey M, MPH; Swanson, Robert, MPH; Vranesich, Patricia, BSN; Orenstein, Walter, MD

ProQuest document link

ABSTRACT (ENGLISH)

Objectives. To assess the impact of the COVID-19 pandemic on immunization services across the life course. Methods. In this retrospective study, we used Michigan immunization registry data from 2018 through September 2020 to assess the number of vaccine doses administered, number of sites providing immunization services to the Vaccines for Children population, provider location types that administer adult vaccines, and vaccination coverage for children. Results. Of 12 004384 individual vaccine doses assessed, 48.6%, 15.6%, and 35.8% were administered to children (aged 0-8 years), adolescents (aged 9-18 years), and adults (aged 19-105 years), respectively. Doses administered overall decreased beginning in February 2020, with peak declines observed in April 2020 (63.3%). Overall decreases in adult doses were observed in all settings except obstetrics and gynecology provider offices and pharmacies. Local health departments reported a 66.4% decrease in doses reported. For children, the total number of sites administering pediatric vaccines decreased while childhood vaccination coverage decreased 4.4% overall and 5.8% in Medicaid-enrolled children. Conclusions. The critical challenge is to return to prepandemic levels of vaccine doses administered as well as to catch up individuals for vaccinations missed. (Am J Public Health. 2021 ;111(11):2027-2035. https://doi.org/10.2105/AJPH.2021.306474)

FULL TEXT

Headnote

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Methods. In this retrospective study, we used Michigan immunization registry data from 2018 through September 2020 to assess the number of vaccine doses administered, number of sites providing immunization services to the Vaccines for Children population, provider location types that administer adult vaccines, and vaccination coverage for children.

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overall decreased beginning in February 2020, with peak declines observed in April 2020 (63.3%). Overall decreases in adult doses were observed in all settings except obstetrics and gynecology provider offices and pharmacies. Local health departments reported a 66.4% decrease in doses reported. For children, the total number of sites administering pediatric vaccines decreased while childhood vaccination coverage decreased 4.4% overall and 5.8% in Medicaid-enrolled children.

Conclusions. The critical challenge is to return to prepandemic levels of vaccine doses administered as well as to catch up individuals for vaccinations missed. (Am J Public Health. 2021 ;111(11):2027-2035. https://doi.org/10.2105/AJPH.2021.306474)

The pandemic spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes COVID-19, exploded onto the global stage in early December 2019 in Wuhan, China.1 The first confirmed case of COVID-19 in the United States was reported on January 20, 2020,2 and community transmission was detected in February 2020. By midMarch, all 50 states, the District of Columbia, and all 4 US territories had reported cases of COVID-19.3 Michigan reported its first case on March 10, 2020, and, soon thereafter, on March 13, 2020, the United States declared a national state of emergency to control the pandemic spread of the virus.4 As of April 27, 2021, more than 918 000 cases and 17 400 deaths have been recorded in Michigan, and more than 31.9 million cases and more than 569 700 deaths have been reported across the United States.3

Public health response measures were implemented across the nation to mitigate the pandemic, centering on social distancing and quarantine policies, including shelter-in-place and stayat-home orders. Michigan declared a state of emergency5 and implemented executive orders to suspend in-person operations that were not critical to sustain or maintain life, disrupting access to routine health services.6,7 Michigan reopened using a tiered approach on June 22, 2021. Public schools, kindergarten through grade 12, also opened for the 2020-2021 academic year through a combination of in-person, online, and hybrid learning.

Core preventive services, including immunizations, were dramatically interrupted resulting in declines in vaccination coverage leaving communities at risk for vaccine-preventable diseases (VPDs) and associated complications.8,9 With interruptions of immunization services, concerns about outbreaks of disease, particularly measles, which requires an estimated immunity level of at least 92% to 94% to reach the herd immunity threshold and prevent outbreaks, were of primary concern.10 Reductions in measles coverage and coverage of other routinely recommended vaccines (e.g., diphtheria, mumps, pertussis, polio, varicella, and rubella) threaten herd immunity, particularly in areas where unvaccinated persons are in close proximity and introductions of cases through travel are more likely. The critical challenge for Michigan and other states across the nation is to ensure a return to prepandemic levels of doses administered while ensuring catch-up doses are administered to individuals who have fallen behind on complying with the Advisory Committee on Immunization Practices (ACIP) routine immunization schedules.11

To do this, states rely on programs like the Vaccines for Children (VFC) program, a federal safety net that seeks to ensure that all children have access to vaccines without financial barriers. Children eligible for the VFC program include those who are Medicaideligible, uninsured, and American Indian or Alaska Native. In addition, children with health insurance that does not cover vaccination (underinsured) can get free vaccines at federally qualified health centers.12 Furthermore, all states including Michigan utilize pharmacists and pharmacies as vaccinators and sites of service. Pharmacies offer the convenience of extended hours outside ofthose for a traditional medical clinic, including holidays, expanding access points for routine vaccination services, particularly for adults who value the convenience pharmacies offer.13 In this retrospective study, we used the Michigan Care Improvement Registry (MCIR; the state's immunization information system [IIS]) and assessed vaccine doses administered across the life course during the COVID-19 pandemic. We also assessed routine vaccination coverage for children aged 19 to 35 months.14

METHODS

The study period for this retrospective analysis of doses reported to MCIR for individuals aged 0 through 105 years was from January 1,2018, through September 30, 2020. We compared monthly dose administrations from January through September 2020 with January through September 2018-2019 averages. We chose a 2-year average as a representative baseline to account for data fluctuations that may occur in a given year, beginning in 2018, because administration ofthe 2-dose herpes zoster vaccine began in earnest in 2018, after the November 2017 ACIP recommendation, as supply constraints limited initial vaccinations.15-17 The analysis of vaccination coverage for children aged 19 to 35 months included coverage in September 30, 2020, compared with coverage in September 30,2019, as point estimates.

Data Source

As of September 2020, MCIR contained more than 153 million provider-verified immunization records for more than 11 million individuals, including 2 693 310 children and adolescents aged younger than 19 years and 8 772125 adults. Duplicate doses, doses from individuals who opted out ofthe registry, nonvaccine products (e.g., tuberculin skin tests and immunoglobulins), and other doses (e.g., historical doses, not administered by the reporting MCIR provider-rather, reported based on vaccine documentation) were excluded. Doses were limited to 1 vaccine type (based on vaccine administration code) per day per person (e.g., only 1 hepatitis B included per person per day). Influenza vaccinations were excluded because ofthe seasonality of vaccine administration and because the study period ended before the start of the 2020-2021 influenza season. Travel and counterbioterrorism vaccines were included; however, they accounted for less than 1% of vaccine doses. Immunization providers are required to report vaccinations administered to persons less than 20 years of age to the MCIR within 72 hours, unless the parent, guardian, or person in loco parentis of the child who received the vaccine objects by written notice.18 According to annual data reported to the Centers for Disease Control and Prevention, a majority of doses are reported electronically within 24 hours.

Study Population

The following study cohorts were created to assess doses administered in 2020 compared with the monthly average ofthe 2 previous years (2018-2019) for the months of January to September: young children (aged 0 to <2 years), children (aged 2 to 8 years), adolescents (aged 9 to 18 years), and adults (aged 19 to 105 years). First, pediatric and adolescent doses administered were reported by programmatic variables: by VFC Program status and whether the doses were administered at a VFC site. Second, doses administered were reported by ACIP-recommended age groups, for adolescents and adults respectively: human papillomavirus; tetanus, diphtheria, and acellular pertussis (Tdap) or tetanus-diphtheria (Td); and meningococcal serogroup A, C, W, Y (MenACWY) vaccines for adolescents aged 11 through 18 years; and Tdap or Td (adults aged 19 years and older), herpes zoster (for adults aged 50 years and older), and pneumococcal polysaccharide vaccine-23 valent (PPSV23, for adults aged 65 years and older) for adults. Lastly, doses administered for adults were reported by 10 MCIR facility types (i.e., site of service) that most frequently report administering adult vaccinations.

Vaccination coverage (up-to-date status) for children aged 19 to 35 months was also reported. This includes the percentage of children (19-35 months) fully immunized with 4 or more doses of diphtheria, tetanus, and acellular pertussis (DTaP); 3 or more doses of polio; 1 or more dose of measles, mumps, and rubella; 3 or more doses of Haemophilus influenzae type b (3 or 4 doses depending on vaccine product), 3 or more doses of hepatitis B, 1 or more dose of varicella, and 4 or more doses of pneumococcal conjugate.14 We also assessed the change in vaccination coverage in Medicaid-enrolled children and the number of children enrolled in Medicaid during the same 1-yeartime period.

We analyzed data by using SAS version 9.4 (SAS Institute Inc, Cary, NC).

RESULTS

Of the 12 004384 provider-verified doses in the study sample, 48.6% were administered to children aged 0 to 8 years, 15.6% to adolescents aged 9 to 18 years, and 35.8% to adults aged 19 years and older. Total doses administered in each age group increased in January 2020 compared with the average during the same time period in 2018 and 2019, with the largest increase in adults aged 19 through 105 years (32.3%), primarily driven by increased administrations of a newly licensed15 and ACIP-recommended16 2-dose herpes zoster vaccine (Figure 1). The greatest decreases across all age groups were observed in April 2020, with the largest percentage decrease of 85.6% observed among adolescents (2018-2019 average = 46 295; 2020 5 6678), followed by a 82.7% decrease in children aged 2 through 8 years (2018-2019 average = 37 890; 2020 5 6571), a 82.2% decrease in adults (2018-2019 average 5 128 383; 2020 5 22 865), and a 34.9% decrease in children aged younger than 2 years (2018-2019 average 5 147 456; 2020 5 95 998).

Only 1 age group and time point showed a percentage increase during the pandemic. Specifically, inJune 2020, children aged younger than 2 years received 5.7% more vaccines compared with the average inJune 2018 and 2019. However, the increase was not sustained, as doses administered in July through September declined, compared with July through September 2018-2019 averages, by 3.5%, 8.6%, and 2.8%, respectively (Figure 1).

Vaccination Sites of Services for Children

The total number of sites reporting vaccines to the MCIR for children aged 0 through 18 years declined 36.2% from March to April 2020; the number of sites reporting VFC and non-VFC doses declined from 1123 and 1634 sites to 718 and 1040 sites, respectively, between March and April 2020. The number of sites reporting doses has somewhat recovered; however, the total number of sites reporting doses remain below 2018-2019 averages (9384 in 2020 relative to 10 738 in 2018-201 9 for VFC sites and 14899 in 2020 relative to 17 825 in 201 8-2019 for non-VFC sites). In addition, the number of VFC doses reported (775 736) was lower than non-VFC doses (1 041 055) reported during the study period.

Doses Administered to Adolescents

Total doses of routinely recommended adolescent vaccines administered declined, with the greatest decrease occurring in 11 through 18-year-old adolescents in April 2020 (Figure 2). Decreases were observed in all routinely recommended adolescent vaccines relative to the same month average during 2018 and 2019 with the peak decline in April: 85.8% decrease in human papillomavirus (from 14388 to 2043), 86.2% decrease in MenACWY (from 121 156 to 1675), and an 82.6% decrease in Tdap (from 7337 to 1273). Only MenACWY is required for school entry at this age.19

Doses Administered to Adults

Dramatic decreases were also observed in the routinely recommended adult vaccines evaluated in April: 89.6% decrease in PPSV23 (from 6905 to 716), 85.5% decrease in herpes zoster (from 22 262 to 3229), and 67.5% decrease in Tdap orTd (from 38 802 to 12 616; Figure 3). Doses of herpes zoster and PPSV23 administered duringJune through September 2020 exceeded doses administered in the same time period (June through September) 2018-2019 averaged.

The sites of service where adults received vaccines did not change during the pandemic relative to before the pandemic (Table 1). The largest proportion of doses administered to adults aged 50 through 64years and adults aged 65 years and older were reported by family practice and pharmacy locations (44.0% and 55.8%, respectively); doses administered to adults aged 19 through 49 years (37.8%) were most often reported by family practice sites and hospitals (37.8%). The greatest decreases were observed in doses reported by local health departments for adults aged 19 through 49 years (70.3%) and adults aged 50 through 64 years (66.1 %). Obstetrics and gynecology provider sites and pharmacies were the only locations that reported percentage increases in doses administered to adults during 2020 (11.1% and 0.4%, respectively). Any remaining types were defined as "other" (Table 1).

Childhood Vaccination Coverage

Recommended vaccination coverage for children aged 19 through 35 months for the complete doses of the combined 7-vaccine series to prevent 13 diseases was 70.3% as of September 30, 2020, a decrease of 4.4% from September 30, 2019. Coverage for completion of individual vaccines also declined; specifically, coverage with DTaP was 72.9% (a 4.4% decrease from 2019). Vaccination coverage and respective declines for the completion of individual vaccines was 79.3% for pneumococcal conjugate (3.9%); 82.4% for measles, mumps, and rubella (3.6%); 81.4% for varicella (3.4%); 83.9% for Haemophilus influenzae type b (3.1 %); 85.2% for hepatitis B (2.2%); and 84.7% for polio (1.6%). From September 30, 2019, to September 30, 2020, the number of Medicaid-enrolled children aged 19 through 35 months in MCIR increased 4.3%, from 71 798 to 74837, while vaccination coverage for the complete series of the combined 7-vaccine series of Medicaid-eligible children decreased 5.8%, from 73.1% in 2019 to 67.3% in 2020. Vaccination coverage for the individual vaccines also decreased in Medicaid-eligible children with the largest decrease in DTaP vaccination of 5.6% (69.6% in 2020 vs 75.2% in 2019).

DISCUSSION

As Michigan and the entire country emerged from stringent lock-down measures imposed in spring 2020, adults have resumed work in congregate settings; students, to varying degrees, have physically returned to schools and universities; and individuals have returned to popular community settings, like the gym, bars, and restaurants. In our study, we found dramatic decreases in (1) doses administered across the life course; (2) adult dose administration across the majority of provider settings, particularly in local health departments; and (3) vaccination coverage for the complete doses ofthe combined 7-vaccine series in children aged 19 to 35 months in 2020 compared with previous data.

As we strive to achieve pre-COVID19 levels of doses administered for routinely recommended vaccines, it is vital to ensure catch-up vaccination of doses missed throughout the pandemic to stem outbreaks of VPDs (e.g., measles). Decreasing coverage can lead to resurgences of all VPDs. Because measles is the most contagious ofthe VPDs, measles may be the first such disease to increase.10 This study also showed a decrease in pediatric immunization provider sites, particularly those dedicated to caring for more vulnerable populations, like Medicaid-insured children; this will complicate the ability to reach prepandemic rates quickly with fewer access points for vaccination and, in some cases, fewer appointment options.

To reach prepandemic levels of vaccination coverage and to ensure catch-up vaccination on doses missed since the onset ofthe pandemic, it is critical to take steps to ensure both adult and pediatric providers identify and target their patients for catch-up doses.20-22 The IIS can help with this effort, as a supplement to provider electronic health records for doses that are not captured by a provider's electronic health records to identify those indicated for vaccination and to contact them to schedule appointments. Additional clinic hours and appointment times can also be a useful strategy to support efforts. At every encounter, providers can ensure that the immunization status of every individual is assessed, vaccines are strongly recommended, and individuals are vaccinated or referred for vaccination.23 While the rate of decrease in doses administered has slowed since April 2020 (Figure 1), decreases in preventive care during the pandemic are cause for concern. This concern stems from the potential for missed diagnoses that may increase infectious disease susceptibility coupled with health care practices, particularly small, private practices, which continue to struggle to survive in the wake of the COVID-19 pandemic, changing health care patterns of access and utilization.24-26

August is often associated with backto-school vaccinations, and this study confirmed increased doses administered in August 2020 (Figure 2); however, up-to-date vaccination coverage is a more accurate reflection of protection against VPDs, and this will take longer to rebound. While providers and some families appear to be seeking catch-up vaccinations, lower coverage among Medicaid-covered children is concerning.8 Increases in Medicaid enrollment from the previous year, most likely attributable to COVID-19induced economic-related insurance coverage shifts, means more children are shifting from other insurance types onto Medicaid coverage and eligibility for the VFC program, shifting the costs of vaccination onto public programs. The marginal increase already observed in this study may signal an ongoing potential for increases in Medicaid enrollment, particularly as the long-term economic impact of the pandemic is yet to be fully realized; therefore, monitoring changes in VFC immunization provider sites will be important for ensuring access to vulnerable populations and at-risk communities. Changes in practice patterns may be a result of pay cuts, staff layoffs because of low patient volume, and the consequences of adheringto public health guidelines related to social distancing (e.g., fewer appointments, fewer people in the office).

Dramatic declines in doses administered have yet to translate to dramatic declines in vaccination coverage as the full impact on coverage levels at specific ages (i.e., 19-35 months), as young children aged 2 years and younger who missed doses have yet to age into the 19- through 35-month age cohort assessed by the National Immunization Survey.14 For example, a child aged 6 months who missed multiple vaccinations throughout the pandemic would not be included in the coverage assessment. The decreases in this study reflect preliminary decreases in coverage, which can be alarming if children are not caught up on recommended vaccines.

We observed age-related differences in adult vaccines as doses administered of PPSV23 and herpes zoster have rebounded to pre-COVID-19 levels. The rebound in doses administered for PPSV23 may reflect a concern for other respiratory pathogens amid SARS-CoV-2 cocirculation. Undoubtedly, resolution of persistent supply issues for herpes zoster and an ACIPpreferential recommendation for a 2-dose zoster vaccine16 have contributed to increased doses administered, as the previous zoster vaccine was only a single dose.17 By contrast, younger adults may not feel as much of a need to seek health care, or they may have difficulties related to appointment availability, causing them to change where they get immunizations, particularly as providers may have decreased appointment "slots." Some special populations such as pregnant women were prioritized as a priority population for appointments (Table 1). Even as providers consider different adult populations and pandemic-associated changes in vaccination-seeking behaviors, it is important that even those not offering, or no longer offering, vaccinations continue to promote the importance of vaccination.23

Pharmacies have increasingly become a vital vaccination resource in communities. Michigan has observed an increase in the number of pharmacy sites and the number of doses reported to the MCIR. There has been an increase in electronic reporting by pharmacies, which play a critical role in administering vaccinations, particularly to older adults (Table 1).23,27'28 Ensuring individuals are vaccinated, particularly as other respiratory pathogens (e.g., influenza, Streptococcus pneumoniae), are circulating during the COVID-19 pandemic, has been a priority.29 While this study period ended before influenza vaccinations began in earnest, efforts to vaccinate for routinely recommended vaccines are important, particularly in adults aged 65 years and older, as this cohort is a vulnerable population accounting for a disproportionate number of seasonal influenza-related deaths, an estimated 70% to 85%, and a high proportion of influenza-related hospitalizations.30 This same population accounts for 8 of every 10 confirmed COVID-19-reported deaths in the United States.31,32

Limitations

Vaccination coverage is the traditional metric and gold standard used to assess vaccine utilization, a population's level of protection from disease, and immunization program performance; however, doses administered and reported to an IIS represent timely and available proxy measures. One well-established limitation in the use of IIS data, particularly in the adolescent and adult population, is denominator inflation.33,34 Denominator inflation occurs when IIS client totals exceed population estimates, which can skew population coverage estimates, for example, because of multiple records for 1 individual. This inflation may underestimate coverage rates. Overestimates of coverage estimates occur when a population estimate is used for the denominator. We attempted to account for this by conducting manual checks to deduplicate data and limiting coverage calculations to childhood vaccinations.

Another limitation is that adult immunization reporting is not required in Michigan; therefore, completeness of reporting for adults is lower than for children. It is possible that some of the changes noted in the number of reported adult immunizations in 2020 were attributable to reductions in reporting rather than changes in administration. In responding to the pandemic, we suspect that providers may have had less time because of competing priorities to report all administered doses to the registry.

A third limitation is that the classification of MCIR facility types is performed by MCIR regional staff, who are best positioned to know the populations served by the facilities in their regions; however, these classifications are not routinely verified and updated after enrollment.

Lastly, at the time of this analysis, race and ethnicity data, which can be useful in understanding the health disparities and health care utilization patterns of care in vulnerable communities, were incomplete across the life course.

Public Health Implications

After a 2020 summer lull in daily COVID-19 case counts, cases began to rise exponentially, with unprecedented record metrics (e.g., hospitalizations) associated with the pandemic in November 2020.3 Diligence in monitoring vaccination rates and provider site availability will be critical to returning to prepandemic levels of coverage as well as catching up cohorts of individuals for vaccinations. It will also be critical for all providers to be astute in considering VPD diagnoses in their diagnostic assessments moving forward. As vaccination coverage has dropped, susceptible populations are accumulating, which could lead to outbreaks ofVPDs not seen in recent times. Given that measles is the most contagious of the VPDs, outbreaks of measles may be the first evidence of resurgences in VPDs. The susceptibility gap for all of the VPDs needs to be closed as soon as possible.

Since May 2021, COVID-19 vaccination programs are now widely available across all jurisdictions in the United States. As a result of increased capability to report race and ethnicity data for adults, as required for COVID-19 vaccine, Michigan and other jurisdictions now have enhanced tools to address under- and unvaccinated populations. As society shifts to a new normal, recalibrating to a world where SARS-CoV-2 is endemic, COVID-19 vaccines will certainly transition onto the routine immunization schedule in some form. It is critical to ensure the immunization delivery system supports timely, accessible, and reliable access to routinely recommended vaccines across the nation, sustaining historical high coverage in children and strengthening increasing coverage for adolescents and adults.

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Note. The views here do not represent the officialviews of the Michigan Department of Health and Human Services.

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CONTRIBUTORS

A. K. Shen, C. A. Bramer, and L. M. Kimmins conceptualized and designed the study, and analyzed and interpreted the data for the study. A. K. Shen wrote the first draft. All authors were equally responsible for criticalreview and approvalof the finalarticle.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to disclose.

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This study was considered exempt as a program evaluation of a public health activity bythe Michigan Department of Health and Human Services institutional review board.

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DETAILS

Subject:	Adolescents; Medicaid; Mumps; Severe acute respiratory syndrome coronavirus 2; Rubella; Immunization; Drug stores; Children; COVID-19; Pediatrics; Pandemics; Diphtheria; Public health; Obstetrics; Coronaviruses; Childhood; Teenagers; Disease transmission; COVID-19 vaccines; Vaccines; Gynecology; Influenza; Government programs; Herd immunity; Chicken pox; Tetanus; Pharmacy; Adults; Measles; Age groups; Whooping cough; Poliomyelitis; Hepatitis
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Document 16 of 37

Workplace Leave and Breastfeeding Duration Among Postpartum Women, 2016–2018

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ABSTRACT (ENGLISH)

Objectives. To examine associations of workplace leave length with breastfeeding initiation and continuation at 1,2, and 3 months. Methods. We analyzed 2016 to 2018 data for 10 sites in the United States from the Pregnancy Risk Assessment Monitoring System, a site-specific, population-based surveillance system that samples women with a recent live birth 2 to 6 months after birth. Using multivariable logistic regression, we examined associations of leave length (< 3 vs $ 3 months) with breastfeeding outcomes. Results. Among 12 301 postpartum women who planned to or had returned to the job they had during pregnancy, 42.1% reported taking unpaid leave, 37.5% reported paid leave, 18.2% reported both unpaid and paid leave, and 2.2% reported no leave. Approximately two thirds (66.2%) of women reported taking less than 3 months of leave. Although 91.2% of women initiated breastfeeding, 81.2%, 72.1%, and 65.3% of women continued breastfeeding at 1,2, and 3 months, respectively. Shorter leave length (< 3 months), whether paid or unpaid, was associated with lower prevalence of breastfeeding at 2 and 3 months compared with 3 or more months of leave. Conclusions. Women with less than 3 months of leave reported shorter breastfeeding duration than did women with 3 or more months of leave. (Am J Public Health. 2021;111(11):2036-2045. https://doi.org/ 10.2105/AJPH.2021.306484)

FULL TEXT

Headnote

Objectives. To examine associations of workplace leave length with breastfeeding initiation and continuation at 1,2, and 3 months.

Methods. We analyzed 2016 to 2018 data for 10 sites in the United States from the Pregnancy Risk Assessment Monitoring System, a site-specific, population-based surveillance system that samples women with a recent live birth 2 to 6 months after birth. Using multivariable logistic regression, we examined associations of leave length (< 3 vs $ 3 months) with breastfeeding outcomes.

Results. Among 12 301 postpartum women who planned to or had returned to the job they had during pregnancy, 42.1% reported taking unpaid leave, 37.5% reported paid leave, 18.2% reported both unpaid and paid leave, and 2.2% reported no leave. Approximately two thirds (66.2%) of women reported taking less than 3 months of leave. Although 91.2% of women initiated breastfeeding, 81.2%, 72.1%, and 65.3% of women continued breastfeeding at 1,2, and 3 months, respectively. Shorter leave length (< 3 months), whether paid or unpaid, was associated with lower prevalence of breastfeeding at 2 and 3 months compared with 3 or more months of leave.

Conclusions. Women with less than 3 months of leave reported shorter breastfeeding duration than did women with 3 or more months of leave. (Am J Public Health. 2021;111(11):2036-2045. https://doi.org/ 10.2105/AJPH.2021.306484)

Breast milk is recognized globally as the ideal form of nutrition for most infants for optimal growth and development.1,2 Improving US breastfeeding rates is a public health priority.3,4 In the United States, the American Academy of Pediatrics recommends that mothers exclusively breastfeed for about 6 months and continue breastfeeding as complementary foods are introduced through the infant's first birthday.1 Although most mothers initiate breastfeeding,5 many face multiple barriers to continuing.4,6,7 Specifically, mothers employed outside the home face unique challenges, including separation from their infants when returning to work and inadequate time or space to express milk at work, which can lead to early cessation of breastfeeding.6,7 Over the past half century, the number of first-time mothers participating in the workforce has increased, with the percentage who worked during pregnancy increasing from 44% in 1961 to 1965 to 66% in 2006 to 2008.8 In 2018, nearly two thirds of women who had a live birth in the past year were in the workforce in the United States.9

The US Surgeon General's 2011 Call to Action to Support Breastfeeding outlined actions employers could take to support employees who breastfeed, including establishing paid maternity leave and lactation support programs.4 Policies that support maternal leave and breastfeeding for women in the workplace include the Family Medical Leave Act(FMLA),10the Patient Protection and Affordable Care Act,11 paid family leave policies enacted or passed in 8 states and the District of Columbia,12 and, for federal employees, the Federal Employee Paid Leave Act (effective October 2020).13 In addition to leave policies at the state and federal levels, several large organizations offer their employees paid family leave.14 Although the FMLA(upto 12 weeks of unpaid leave)10 and paid family leave policies12-14 provide opportunities for mothers re rate leave after delivery, many vannet afford to take unpaid lea ve are not co.-orod by the policies, or do not miV'V't the .eligibility criteria (e.g., length of time employed, number of hours worked) to participate.4 Limited access to leave means many women are als-o returning to the workforce' soon after giving birth.8

Research .e·amining data before the Surgeon General's Call to Action15-19 and, more recently, state-specific examinations on the effects of paid leave20,21 and small-scale studies on specific populations (e.g., military)22 have demonstrated that women who are able to remain on leave longer are also more likely to contini io bröastfc.'C.'ding. Population-based analyses that consider both ļnaid and unpaid lea.-:" are lacking. Wo compared the prevalence of breastfeeding initiation and any breastfeeding at 1,2, and 3 months by length of leave taken, both paid and unpaid, among a large representative sample of recently postpartum women who gave birth duringJanuary 2016 to December 2018.

METHODS

We derived data from the Pregnancy Risk .Asso-esiment ídeniteпng System (PRAMS), a multisite, population-based sur/oillanco system. During tho years examined, PRAMS collected data on maternal attitudes, behaviors, and experiences before, during, and shortly after pregnancy using a standardized questionnaire and protocol from 47 states, tho District of Coli imbia, i few York City (NYC), and Puerto Rico (hereafter described as "sites"). PRAMS sites selected a stratified random sample of women with a recent live birth from site birth 'OeiTificam filos 2 to 6 months after birth. Sampl·ed women wore mail·ed a self-administered survey. Following nonresponse to 3 mailed surveys, PRAMS sites initiated telephone follow-up (up to 15 calls). Each site's PRAMS survey included a mandatory "core" questionnaire, and each site had the option to include additional "standard" questions from a library of optional question modl I that repandod on or addressorl different topics not captured by coro qi rations. We analyzed PRAMS 2016 to 2018 data from 10 sites (Massachusetts, Maryland, Minnesota, Missouri, North Carolina, New Hampshire, New York State, Vermont, Wisconsin, and NYC) that included standard workplace loavorelated questions on their site-specific surveyand achiovod a weighted re'spo·nso rato of 55% or greater for at least 1 year during the study period. The Centers for Disease' Control and Prevente t3 for sampling design, noncoverage, and nonresponse to be representative of each site's live birth population. PRAMS sitos mailed sampled women a written informed consent with the survey. Forthose who compkotod tho survey during telephone follow-up, informed consent was compfeted letore starting tho survey. Further detail on PRAf/S moth 1 i been described elsewhere.23

Measures

Type of leave and leave length. Women who were employed during pregnancy and had roti irnod (or planned to roti irn) to tho samo job they had during prognane; after giving birth referted on the type of leave they took and the length of leave they had taken or planned to take. Respondents were asked, "Did you take leave from work after your now baby was born? ¡cCecR all that apply)" and asked to respond from the following options: "I took paid loavo from my job," "I took i inpaid loavo from my job," and "I did not take any leave." NYC and Missouri included sitosiereifl'c responsos on typ·e of kee.eo Wo coded the NYC response option "I took leave and used temporary disability insurance" as paid leave. In NYC, 29.7% of women who took loavo repcrteei recei ving mmiporary disability insurance. We coded the Missouri response option "Family Medical Leave (paid or unpaid)" as unpaid leave based on Missouri Family Medical Leave laws.24

We codod typo of loavo into g camgories: (1) "paid leave only," (2) "unpaid only," (3) "both paid and unpaid leave," and (4) "no leave." Women who ro|oorted taking any leave wore als-ē asked, "How many weeks or months of leave, in total, did you take or will you take?" We categorized leave length as less than 3 months (# 12 weeks; this induced women reporting no kw.ivo) and 3 or more months ($ 13 weeks) of leave. We selected this categorization, as women might havo qualifiod for up to 12 weeks of leave under the FMLA,10 and this categorization has been used prod'oiisl.,' in research assoesing breastfeeding outcomes.25 We also examined tho folkowing 3-lovol eetogeriZetien of leave length-0 to 5 weeks, 6 to 12 weeks, and 13 or more weeks of leave-as this categorization has also been used in previous research on breastfeeding outcomes.25 We did not find difforonæs in breastfeeding 'outcomes between women with 0 to 5 and 6 to 12 weeks of leave (Table A [available as a supplement to the online version of this article at http://www. ajph.org]); therefore, we report on leave categorized as less than 3 versus 3 or more months of leave. To describe whether any leave was paid, we also created a dichotomous indicator distinguishing "no paid leave" (this included women reporting no leave and unpaid leave only) and "any paid leave" (this included women reporting paid leave only or both paid and unpaid leave).

Breastfeeding initiation and any breastfeeding at 1, 2, and 3 months. To measure breastfeeding initiation, respondents were asked, "Did you ever breastfeed or pump breast milkto feed your new baby, even for a short period of time?" We used 2 questions to measure breastfeeding duration: (1) women who ever breastfed were asked, "Are you currently breastfeeding or feeding pumped milkto your new baby?" and (2) women who had stopped breastfeeding when they completed the PRAMS survey were asked, "How many weeks or months did you breastfeed or pump milkto feed your baby?" Women whose infant was deceased or not living with them when they completed the survey were instructed to skip breastfeeding-related questions.

We created the following 4 dichotomous yes-no indicators for breastfeeding: (1) breastfeeding initiation, (2) any breastfeeding at 1 month (4 weeks), (3) any breastfeeding at 2 months (9 weeks), and (4) any breastfeeding at 3 months (13 weeks).

Statistical Analyses

Our analytic sample excluded women whose infants were deceased or not living with them at time of survey completion, women who did not work for pay during pregnancy, those who were not returning to the same job they had during pregnancy, those who were aged 17 years or younger at time of delivery (because of federal and state-level age restrictions on work hours),26 and those who were missing data on covariates or leave type and length. We also excluded women who reported inconsistent information between leave type and duration from the analysis. After excluding those with missing or discordant data between leave type and length (3.2% and 4.3%, respectively), missing data on breastfeeding initiation and duration (0.2% and 1.2%, respectively) and covariates (5.5%), our final analytic sample included 12301 (weighted n = 718139) women who had worked during pregnancy and had returned or planned to return to the same job after giving birth and for whom leave length and breastfeeding were known.

We performed descriptive statistics (the x2 test and 95% confidence intervals [CIs]) to assess leave length (< 3 and $ 3 months) overall and separately for selected characteristics and by PRAMS site. We identified selected characteristics a priori based on measures that have been associated with leave or breastfeeding outcomes.15,19 Data for these characteristics came from birth certificate data available in the PRAMS data set and from PRAMS survey data. Selected characteristics from birth certificate data included maternal race and Hispanic origin (Hispanic, non-Hispanic White, nonHispanic Black, and non-Hispanic other), age (18 - 24, 25 - 34, and $ 35 years), education (# high school diploma orgeneral equivalency diploma, some college or associate's degree, and bachelor's degree or higher), marital status (married and unmarried), parity (primiparous and multiparous), and infant gestational age (preterm: <37 weeks; term: $ 37 weeks). Federal poverty level (# 100%, >100%-200%, and >200%) was available from PRAMS survey data. We also examined leave length by type of leave (no paid leave and any paid leave).

We constructed 4 separate models to describe the associations of each breastfeeding outcome (breastfeeding initiation and breastfeeding at 1,2, and 3 months) with leave length (< 3 and $ 3 months of leave). We calculated the model-based prevalence estimate for each breastfeeding outcome with predicted marginal means and then estimated both unadjusted prevalence ratios (PRs) and adjusted prevalence ratios (APRs) and their associated 95%

CIs for leave length. Each model adjusted for all previously mentioned characteristics, timing of survey completion (< 6 vs $ 6 months after giving birth), and PRAMS site.

Because previous research has shown that the association of leave length with breastfeeding outcomes varies by select characteristics,21 we also examined interactions. For each of the selected characteristics previously mentioned, we constructed a separate model, which included an interaction term between the respective characteristic being examined and leave length. If there was a significant interaction (P <.01 based on the F-test for 2-way interaction), we stratified results by the respective characteristic. We also constructed a model to examine the interaction term between leave length and paid leave, and we report these stratum-specific results. Each model contained only 1 interaction term and adjusted for all other selected characteristics.

For all analyses examining breastfeeding feeding at 3 months, we restricted the sample to those who completed the PRAMS survey 3 or more months after delivery (n = 10 031). We performed sensitivity analyses on other breastfeeding outcomes among this restricted sample to assess the robustness of our results. We conducted all analyses with SAS version 9.4 (SAS Institute, Cary, NC) and SAS-callable SUDAAN version 11.0.1 (RTI International, Research Triangle Park, NC) using weighted data to account for the complex sampling design of PRAMS.

RESULTS

In our study, there were 12 301 women with a recent live birth who had returned or planned to return to the same job they had during pregnancy after giving birth. Among these women, 97.8% reported taking leave (42.1% reported taking only unpaid leave, 37.5% reported only paid leave, and 18.2% reported both unpaid and paid leave). Women who reported taking or planning to take leave had a mean of 12 weeks of leave (median = 11 weeks), with 66.2% of women reporting less than 3 months of leave and 33.8% reporting 3 or more months of leave (Table 1). By site, the prevalence of 3 or more months of leave ranged from 17.0% in Missouri to 55.7% in NYC. Prevalence of taking or planning to take 3 or more months of leave after delivery was highest among women who had any paid leave (37.2%), who were aged 35 years or older (42.2%), who had a bachelor's or higher degree (38.8%), who were married (35.5%), who had a household income level higher than 200% the federal poverty level (37.4%), who were primiparous (36.1%), and whose infant was born preterm (44.5%). Prevalence oftaking 3 or more months of leave was also higher amongthose who were Hispanic (43.2%), non-Hispanic Black (38.8%), or non-Hispanic other (38.5%) than among those who were non-Hispanic White (30.8%). Overall, most (91.2%) women reported initiating breastfeeding; however, the prevalence of any breastfeeding was lower at both 1 (81.2%) and 2 (72.1%) months. Amongthose who had completed the PRAMS survey at 3 or more months after birth (n = 10 031), 65.3% reported any breastfeeding at 3 months.

In both unadjusted and adjusted analyses (Table 2), a smaller proportion of women who reported taking or planning to take less than 3 months of leave than those reporting 3 or more months of leave reported ever breastfeeding (90.4% vs 93.2%; APR = 0.97; 95% CI 5 0.95, 0.98), breastfeeding at 1 month (79.7% vs 84.5%; APR 5 0.94; 95% CI 5 0.92,0.97), and breastfeeding at 2 months (70.1 % vs 76.2%; APR 5 0.92; 95% CI 5 0.89, 0.95). Among those who had completed the PRAMS survey at 3 or more months, a smaller proportion of women who reported taking or planning to take less than 3 months of leave reported any breastfeeding at 3 months than those with 3 or more months of leave (63.2% vs 69.8%; APR 5 0.90; 95% CI 5 0.87, 0.94). In sensitivity analyses, when restricting to those who had completed the PRAMS survey at 3 or more months, findings for all breastfeeding outcomes at different periods were consistent with that reported for the full sample (Table B [available as a supplement to the online version of this article at http://www.ajph.org]).

For breastfeeding initiation and breastfeeding at 1 month after birth, we observed no interactions between any of the maternal and infant characteristics examined and leave length. For breastfeeding at 2 and 3 months, there was only a significant interaction between leave length and maternal race and Hispanic origin (Table C [available as a supplement to the online version of this article at http://www.ajph.org]). Breastfeeding at 2 months was lower among women who reported less than 3 months compared with 3 or more months of leave for women who were non-Hispanic Black (64.8% vs 78.5%; APR 5 0.83; 95% CI = 0.77,0.89), nonHispanic other (72.4% vs 82.3%; APR 5

0.88; 95% CI 5 0.81,0.95), and non-Hispanic White (69.7% vs 74.6%; APR 5 0.93; 95% CI 5 0.90, 0.97), respectively. Breastfeeding at 3 months was lower among women who reported taking or planning to take less than 3 months compared with 3 or more months of leave for women who were non-Hispanic Black (55.9% vs 73.5%; APR 5 0.76; 95% CI 5 0.69,0.83), nonHispanic other (63.8% vs 73.5%; APR 5 0.87; 95% CI 5 0.78, 0.96), and non-Hispanic White (63.6% vs 68.8%; APR 5 0.92; 95% CI 5 0.88, 0.97), respectively. No differences in prevalence of breastfeeding at 2 and 3 months by leave length were observed among Hispanic women (76.4% vs 76.8% at 2 months; 68.6% vs 66.9% at 3 months).

No significant interactions between leave length and type of leave were observed for breastfeeding outcomes (Table 3). Shorter leave length was associated with lower rates of breastfeeding at 2 and 3 months, independent of whether any leave was paid.

DISCUSSION

Despite efforts to increase breastfeeding support in the workplace,11 differences in breastfeeding duration were evident by length of leave. In this analysis of PRAMS data, we found that approximately two thirds of women took or planned to take less than 3 months of leave after delivery. Breastfeeding initiation was high (> 90%); however, fewer women continued to breastfeed at 1,2, and 3 months, which is consistent with national estimates.5 Women who reported taking or planning to take less than 3 months of leave were less likely to initiate and continue breastfeeding than were women with 3 or more months of leave, with estimates suggesting that this difference increased for each additional month of breastfeeding duration measured. The absolute differences in breastfeeding duration were modest (ranging from 4.8% at 1 month to 6.6% at 3 months). By 3 months, fewer than two thirds of women who had less than 3 months of leave reported any breastfeeding. Although this finding suggests a low likelihood that women in our sample would meet the American Academy of Pediatrics breastfeeding recommendation to exclusively breastfeed to about 6 months and continue breastfeeding until 1 year or more,1 we were unable to measure breastfeeding exclusivity or breastfeeding duration beyond 3 months.

Previous studies have yielded mixed results on the relationship between paid leave and breastfeeding duration, with studies finding a positive or null effect on breastfeeding duration.15,19 We found no significant interaction between leave length and whether leave was paid for breastfeeding outcomes. Women with shorter leave length, independent of whether it was paid or unpaid, were less likely than were those with longer leave to continue breastfeeding at 2 or 3 months. However, a higher proportion of women with any paid leave reported taking or planning to take 3 or more months of leave compared with those with no paid leave. These findings suggest that any amount of paid leave might indirectly affect breastfeeding rates by influencing the total length of leave women take. However, we were unable to examine the proportion of usual pay received while on leave, which might also influence decisions on leave length. Previous research has shown that women with paid leave are more likely to take longer leave.8 Some evidence suggests state-based paid leave policies might be a mechanism for enabling women who might not otherwise be able to afford to take leave to be able to take longer postpartum leave.20 Of note, women in NYC, where a statewide paid leave policy was implemented in 2018,12 reported the highest prevalence of 3 or more months of leave among PRAMS sites.

In our sample, the sociodemographic differences (e.g., age, race and Hispanic origin, education) related to the length of leave taken are similar to differences in census data findings on women who received any paid leave and longer periods of leave.8 Previous studies have also found differences in breastfeeding outcomes by many sociodemographic characteristics, including race and Hispanic origin.27,28 The significant interaction between leave length and race and Hispanic origin that we found suggests that longer leave minimizes differences in breastfeeding prevalence by race. This finding suggests that access to longer leave may be a strategy to reduce racial/ethnic disparities in breastfeeding rates. Overall, longer leave length was associated with improved breastfeeding rates among all racial/ethnic groups, except for women who were Hispanic. It is unclear why this relationship was null; however, previous research has demonstrated that Hispanic women have higher breastfeeding rates, independent of other factors typically associated with breastfeeding rates.29 In addition, it is possible that our analysis might not have been powered to detect differences among Hispanic women.

The proportion of women who take any maternity leave has remained stagnant since 1994,30 despite efforts to expand access through the FMLA and state-level leave programs.12,20,30 Although some recent evidence suggests that uptake of the Affordable Care Act provision to cover access to lactation services and breast pumps is associated with increased breastfeeding duration,31 breastfeeding rates remain suboptimal.1,5 Despite efforts to increase support of breastfeeding in the workplace, we found that leave length was associated with breastfeeding outcomes. This association contributes to existing evidence about the role that leave plays on the ability of women with a recent live birth to meet American Academy of Pediatrics breastfeeding recommendations.

Limitations

This analysis is subject to several limitations. We did not have data on the type, location, size of the respondents' employer, work schedule (e.g., parttime, full-time, flexible schedule), or specific type of leave (vacation time, sick time, FMLA, etc.), which might also influence breastfeeding duration. Women who return to work fulltime are more likely to cease breastfeeding than are women who return to work part-time.32 The type of work schedule has also been shown to play an important role in whether women meet their breastfeeding intentions.33

Also, data were unavailable on workplace leave taken or plans for leave for women who returned to a different job than the one they had during pregnancy and for women who were unemployed during pregnancy and actively seeking employment. Therefore, our findings might underrepresent women who had returned or were planning to return to work. In addition, PRAMS did not have data on the proportion of usual pay women received while on leave or the proportion of leave that was paid or unpaid for respondents who reported both.

We also could not examine breastfeeding-related measures that might have confounded our findings, such as breastfeeding intentions and reasons for not starting or stopping breastfeeding. We were also unable to examine breastfeeding exclusivity and any breastfeeding beyond 3 months. PRAMS data are self-reported and subject to social desirability and recall bias. Recall bias might be unlikely, as PRAMS data are collected 2 to 6 months after giving birth and most respondents in this study sample (87%) completed and returned the PRAMS survey between 2 to 4 months after giving birth.34

Finally, our findings are also limited to PRAMS sites that included workrelated questions on their site-specific survey, potentially limiting the generalizability of our findings to other sites. Despite these limitations, PRAMS provides a rich source of data from women with a recent live birth, which allowed us to examine associations of leave length with breastfeeding outcomes and consider important interactions.

Public Health Implications

Among women who were employed during pregnancy and returning to work after delivery, nearly all reported taking some leave, with approximately two thirds reporting less than 3 months of leave. Women reporting less than 3 months of leave were less likely to initiate breastfeeding and continue breastfeeding at 1,2, and 3 months than were women with 3 or more months of leave. A higher proportion of women reporting any paid leave reported taking 3 or more months of leave than women reporting no paid leave. However, the association of length of leave with breastfeeding rates, in general, was independent of whether any leave was paid. Women with less than 3 months of leave reported shorter breastfeeding duration than did women with 3 or more months of leave. >4jPH

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K. Kortsmit conceptualized the study, conducted the data analyses, and drafted the article. R. Li, S.Cox, C. K. Shapiro-Mendoza, C. G. Perrine, D. V. D'Angelo, W. D. Barfield, H. B. Shulman, C. F. Garfield, and L. Warner provided significant input on interpretation of the data and review and editing of the article.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to disclose.

HUMAN PARTICIPANT PROTECTION

This was a secondary data analysis and was exempt from institutionalreview board review. The Centers for Disease Controland Prevention and each site's institutionalreview boards reviewed and approved the Pregnancy Risk Assessment Monitoring System study protocol.

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Document 17 of 37

An Unnecessary Gift for COVID-19 Vaccines and Therapeutics: The Medical Countermeasure Priority Review Voucher

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ABSTRACT (ENGLISH)

When the US Food and Drug Administration (FDA) approved remdesivir in October 2020 for the treatment of COVID-19, it awarded the manufacturer, Gilead Sciences, an additional prize: a medical countermeasure priority review voucher. Upon full FDA approval, COVID-19 vaccine manufacturers may also be awarded this regulatory incentive. These vouchers are meant to motivate manufacturers to develop medical countermeasures (MCMs), which are defined as medical products that treat or prevent harm owing to a biological, chemical, radiological, or nuclear agent identified as a material threat, or a condition caused by administering a drug against such an agent.1

However, given the significant public funding already invested in these products before approval for both their development and procurement, we believe these vouchers offer little additional incentive and are unnecessary. As manufacturers of COVID-19 vaccines and other therapeutics seek full approval and become eligible for MCM priority review vouchers, their use should be reconsidered.

FULL TEXT

When the US Food and Drug Administration (FDA) approved remdesivir in October 2020 for the treatment of COVID-19, it awarded the manufacturer, Gilead Sciences, an additional prize: a medical countermeasure priority review voucher. Upon full FDA approval, COVID-19 vaccine manufacturers may also be awarded this regulatory incentive. These vouchers are meant to motivate manufacturers to develop medical countermeasures (MCMs), which are defined as medical products that treat or prevent harm owing to a biological, chemical, radiological, or nuclear agent identified as a material threat, or a condition caused by administering a drug against such an agent.1 However, given the significant public funding already invested in these products before approval for both their development and procurement, we believe these vouchers offer little additional incentive and are unnecessary. As manufacturers of COVID-19 vaccines and other therapeutics seek full approval and become eligible for MCM priority review vouchers, their use should be reconsidered.

WHAT ARE THEY?

Priority review vouchers were originally introduced through the FDA Amendments Act of 2007 (Pub L No. 110-85) to incentivize pharmaceutical manufacturers to develop drugs or biologics for tropical diseases, which are largely concentrated in developing nations and offer limited profit potential, in exchange for expedited review of a future new drug application.2 In 2012, priority review vouchers were extended to sponsors of FDA-approved drugs treating rare pediatric diseases. When a priority review voucher is redeemed by a manufacturer, it allows a product that would have otherwise received a "standard review" of 10 months to instead receive a "priority review" of six months, allowing earlier market entry. This designation directs the FDA to ensure sufficient attention and resources to the product's application so that the hastened regulatory review deadline of six months is met. Companies awarded this voucher can use it for a product in their portfolio or sell it to another company. Recent vouchers have sold for about $80 to $130 million.3

In 2016, the 21st Century Cures Act (Pub L No. 1 14-255) broadened priority review vouchers to sponsors of MCMs.1 To be eligible for an MCM priority review voucher, the Department of Homeland Security (DHS) together with the Department of Health and Human Services (HHS) must issue a determination that a potential public health emergency, such as the COVID-19 pandemic, is a material threat.1,4 Although a list of material threats that informs the issuance of MCM priority review vouchers must be updated annually, no such list has been made publicly available since 2017.5 Remdesivir was the fourth medical product for which an MCM priority review voucher was awarded since the program's inception in 2016 (Table 1). Although COVID-19 has not been publicly listed as a material threat, congressional committees and manufacturers have been notified of this designation, allowing manufacturers to apply for this additional incentive when seeking FDA approval for treatments and vaccines.

ARE THEY NECESSARY?

An examination of the existing limited literature by the Government Accountability Office reviewing each of the three available priority review vouchers (tropical diseases, rare pediatric diseases, and MCMs) generally did not find any effect of priority review vouchers on innovation, although several sponsors claimed the program affected their development decisions.3 Moreover, one analysis found that 25 of the 26 MCMs in clinical trials received public funding for their development, prompting the study's authors to suggest that alternatives to the priority review voucher program might better motivate the development of these products.

It is difficult to determine whether a voucher is cost-effective, as development cost data are not publicly available. However, the fact that MCMs already receive significant public investment, regulatory incentives, and federal procurement contracts (Table 1) suggests that a voucher may be unnecessary. For current devastating threats like COVID19 for which there is a high demand and therefore a viable market, granting a priority review voucher as an additional incentive may not be needed at all.

The original discovery of all five MCM products was publicly funded-the innovation of four products was underwritten by the US government and one by the German government. The US government also sponsored the latestage clinical trials supporting FDA approval of all five products. For three products, US federal agencies designed and ran these trials.

Ahead of approval, the FDA also granted these MCM products additional regulatory incentives, including designations that allowed these drugs and vaccines to receive expedited review. Additionally, these MCM products received further intellectual property protections through issuance of exclusivity periods upon FDA approval, barring generic competition for 5 (for new chemical entities), 7 (for orphan drugs), or 12 (for newly approved biologics) years.

Besides funding their development, the federal government ensured manufacturers a market for these MCMs through the purchase of large volumes of each product. Each advance purchasing agreement for these MCM products, valued at several hundreds of millions of dollars, was often secured before their approval. Effectively, the federal government paid twice for these products: first through direct funds for their development and then again for their procurement.

When applied, priority review vouchers also create an undue burden for patients by forcing the FDA to rapidly assess the safety and efficacy of future therapies that would not have received an expedited review designation otherwise. Moreover, an analysis of FDA approvals for drugs that have received such an expedited review designation found they involved fewer pivotal trials, enrolled fewer patients in their trials, and, more often, used surrogate endpoints in lieu of more clinically relevant ones.21 For example, in March 2018, Novartis redeemed a priority review voucher to expedite approval ofsiponimod for relapsing forms of multiple sclerosis.3 Although FDA reviewers questioned whether the pivotal clinical trial had "sufficient evidence to support the approval of siponimod with an indication for relapsing forms of MS"(p13) and although the drug had a "relatively modest"(p12) treatment effect, the drug was approved in less than six months.22

POLICY RECOMMENDATIONS

Of course, addressing pandemics like COVID-19 requires rapid development of medical products. But at the onset of this pandemic, manufacturers quickly shifted focus to COVID-19 to develop novel drugs and vaccines, catalyzed by both immense research and financial investments from the federal government and by extraordinary public health need, which ensured a viable market for these technologies. Additional regulatory incentives were created for these products, including expedited review through the Coronavirus Treatment Acceleration Program, a newly created special emergency FDA program.

Congress could allow the MCM priority review voucher program to expire on its scheduled date of October 1, 2023. However, ahead of this, the FDA will likely award full approval to COVID19 vaccines and therapeutics eligible for an MCM priority review voucher despite having already received significant federal funding for the development, manufacturing, and procurement ofthese products.

Before the MCM priority review voucher program expiration, the DHS and the HHS should remove the "material threat" determination for COVID-19, preventing indicated vaccines and therapeutics such as those for COVID-19 from receiving the voucher upon approval. Pfizer and BioNTech, manufacturers of the only fully approved COVID-19 vaccine to date (Comirnaty),23 did not receive an MCM priority review voucher, perhaps in acknowledgment that the voucher was unnecessary given significant public funding support for the vaccine's development and procurement,24,25 as well as record profit due to high demand.26 More broadly, Congress should amend the current statute to further narrow the eligibility criteria for medical countermeasures to ensure more judicious granting of the MCM priority review voucher. This could include the product having already received substantial public investment or other regulatory incentives for its development or procurement or, if the product is indicated for an ongoing threat with high demand, making such a voucher unnecessary. Additionally, as with the five MCM products that received priority review vouchers, the federal government should instead ensure sustained funding for the development of other MCMs in exchange for adequate supply and reasonable pricing in lieu ofvouchers.

Moving forward, Congress should reconsider the MCM priority review voucher program altogether, acknowledging that there is no evidence that it promotes the development of such products. For example, in the next iteration of the 21st Century Cures Act (Cures 2.0) or upcoming reauthorization of the Prescription Drug User Fee Act (Pub L No. 102-571) in 2022, legislators should sunset the MCM priority review voucher ahead of its expiration. Although intended to spur necessary innovation, there is no clear evidence of any added value from these vouchers in the face of substantial government investment for research, development, and procurement of treatments and vaccines to combat these serious threats./íjpn

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R. Ramachandran abstracted the data and drafted the editorial. All authors contributed to editorial concept and design, data Interpretation, and critical revision of the editorial.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

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Document 18 of 37

Table of Contents

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Document 19 of 37

Disparities in Health and Economic Burdens of Cancer Attributable to Suboptimal Diet in the United States, 2015–2018

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ABSTRACT (ENGLISH)

Objectives. To quantify disparities in health and economic burdens of cancer attributable to suboptimal diet among US adults. Methods. Using a probabilistic cohort state-transition model, we estimated the number of new cancer cases and cancer deaths, and economic costs of 15 diet-related cancers attributable to suboptimal intake of 7 dietary factors (a low intake of fruits, vegetables, dairy, and whole grains and a high intake of red and processed meats and sugar-sweetened beverages) among a closed cohort of US adults starting in 2017. Results. Suboptimal diet was estimated to contribute to 3.04 (95% uncertainty interval [UI] = 2.88, 3.20) million new cancer cases, 1.74 (95% UI = 1.65,1.84) million cancer deaths, and $254 (95% UI = $242, $267) billion economic costs among US adults aged 20 years or older over a lifetime. Diet-attributable cancer burdens were higher among younger adults, men, non-Hispanic Blacks, and individuals with lower education and income attainments than other population subgroups. The largest disparities were for cancers attributable to high consumption of sugar-sweetened beverages and low consumption of whole grains. Conclusions. Suboptimal diet contributes to substantial disparities in health and economic burdens of cancer among young adults, men, racial/ethnic minorities, and socioeconomically disadvantaged groups.

FULL TEXT

Headnote

Objectives. To quantify disparities in health and economic burdens of cancer attributable to suboptimal diet among US adults. Methods. Using a probabilistic cohort state-transition model, we estimated the number of new cancer

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Cancer is a major public health burden and the second leading cause of death in the United States, with approximately 1.8 million new cancer cases and 0.6 million cancer deaths estimated in 2018.1 The annual numbers of new cancer cases and deaths are expected to increase, reaching 2.3 million and 1.0 million, respectively, in 2040.2 The direct medical cost associated with cancer care was estimated to increase from $124 billion in 2010 to $173 billion in 2020, a 17% increase over 10 years.3 Reducing cancer burdens through effective prevention strategies has long been an overarching goal for public health policies in the United States.

Suboptimal diet is well known to be associated with the risk of cancer. Strong evidence from systematic reviews suggests that a high consumption of processed and red meats and a low consumption of whole grains and dairy products are associated with an increased risk of colorectal cancer, and a low consumption of fruits and vegetables is associated with an increased risk of cancer in the oral cavity, pharynx, and larynx.4,5 Importantly, obesity has been recognized as a risk factor for 13 types of cancers.6 Sugar-sweetened beverage (SSB) consumption can increase the risk of obesity-associated cancers by contributing to weight gain and obesity.7,8 We have previously estimated that more than 80 000 new cancer cases among US adults each year are attributable to suboptimal intake of these dietary factors.9 Diet-associated cancers are likely to contribute to a substantial economic burden given the high costs of cancer care. Optimizing dietary intake could be a cost-effective strategy for cancer prevention, yet the economic burden of diet-attributable cancers has not been quantified.

In addition, cancer disproportionally affects individuals of low socioeconomic status and non-Hispanic Blacks in the United States, who bear a higher rate of cancer incidence and death for many cancers than other population subgroups.10 Meanwhile, dietary disparities have persisted or worsened for most dietary components among US adults despite an overall modest improvement in Americans' diet in the past 10 to 15 years.11-13 For example, when low-income adults who participated in the Supplemental Nutrition Assistance Program (SNAP) were compared with higher-income individuals, SNAP participants experienced no improvements in diet quality from 2003 to 2013, whereas diet quality significantly improved among higher-income individuals.12 Non-Hispanic Blacks had a worse diet quality and smaller improvement in diet quality over time compared with non-Hispanic Whites.11,13 Interestingly, the racial/ethnic disparities in colorectal cancer incidence and mortality parallel the racial/ ethnic disparities in diet quality among US adults.10,14,15 Dietary disparities could contribute to substantial cancer disparities in the United States. In the present study, we aimed to quantify disparities in the health and economic burdens of cancer attributable to suboptimal diet among US adults. Such findings can inform priority areas in public health strategies to improve diet and reduce diet-attributable cancer disparities in the United States.

METHODS

We used a cohort state-transition model, the Dietary and Cancer Outcome Model,16 to estimate the health and economic burdens of cancer attributable to suboptimal diet among US adults over a lifetime in a closed cohort (Figure A and Method A, available as supplements to the online version of this article at http://www.ajph.org). Starting from a cancer-free representative population of US adults in 2017, the model simulated the development and progression of cancer over a lifetime by transitions of health states and tracked numbers of cancer cases and cancer deaths, and associated direct medical and indirect societal costs that occurred annually in the cohort. To estimate diet-associated cancer burdens, the model compared the incremental difference in cancer burdens between the current and optimal dietary intake scenarios. Diet-associated cancer burdens were estimated in population subgroups stratified by age, gender, race/ethnicity, education, income, and SNAP participation, and combined for estimates among US adults. Health outcomes and economic costs were discounted at 3% annually as recommended by the Second Panel on CostEffectiveness in Health and Medicine.17

Study Population

Demographics were obtained on noninstitutionalized US adults aged 20 years or older based on the 2 most recent cycles of the National Health and Nutrition Examination Survey (NHANES) (2015-2016 and 2017-2018; Table A, available as a supplement to the online version of this article at http://www.ajph.org). Population subgroups were jointly stratified by age (20-44,45-54, 55-64, and 65 years or older), gender (men and women), race/ ethnicity (non-Hispanic Whites, nonHispanic Blacks, Hispanics, and others), education (< high school, high school, some college, and college graduate or above), income (family income to poverty ratio [FIPR], calculated by using the poverty guideline by the Department of Health and Human Services, of <1.3,1. 3-2.9, and $ 3), and SNAP participation status (SNAP participants, SNAP-eligible nonparticipants, and SNAP ineligible individuals). Information on race/ethnicity was self-reported according to fixed categories; Asian and other racial/ ethnic groups were combined into 1 group because of their small sample sizes.18

Current and Optimal Dietary Intakes

Seven dietary factors representing the suboptimal diet (a low consumption of whole grains, dairy products, fruits, and vegetables, and a high consumption of red meats, processed meats, and SSBs) were selected on the basis of evidence from systematic reviews performed by the World Cancer Research Fund/ American Institute for Cancer Research (WCRF/AICR) and others showing "convincing" or "probable" evidence of association with cancer risk.8 We estimated current intakes of these dietary factors by using two 24-hour dietary recalls per person from NHANES cycle 2015-2016 and 2017-2018, which provided the most recent dietary intake data of nationally representative US adults. The NHANES used the US Department of Agriculture Automated Multiple-Pass Method to enhance complete and accurate recall of all foods and beverages consumed in the previous day and reduce respondent burden across all cycles.19 We performed energy adjustment to reduce measurement errors associated with self-reported dietary intake estimates.20 The estimated mean consumption incorporated sampling weights to account for the complex sampling design and ensure national representativeness (Table B, available as a supplement to the online version of this article at http://www.ajph.org). We characterized the optimal intake of each dietary factor based on the consumption level associated with lowest disease risk in meta-analyses of clinical end points, assessed by the Global Burden of Disease 2010.21

Diet-Cancer Associations

To estimate cancer risks attributable to suboptimal diet, we incorporated both direct diet-cancer etiologic effects and the body mass index (BMI; defined as weight in kilograms divided by the square of height in meters)-mediated associations between diet and cancer. We obtained the relative risk estimates for direct diet-cancer etiologic effects from meta-analysis performed by WCRF/AICR,4,5 which included prospective cohort studies with limited evidence of bias from confounders, where the associations were multivariable adjusted and independent of BMI (Table C and Method B, available as supplements to the online version of this article at http://www.ajph.org). The long-term etiologic effects of dietary factors on BMI were estimated based on multivariable-adjusted pooled analysis from 120 977 US men and women from 3 prospective cohort studies (Table D, available as a supplement to the online version of this article at http://www.ajph.org).7,9 We obtained effects of elevated BMI on cancer from meta-analyses of prospective cohort studies conducted by the International Agency for Research on Cancer6 and WCRF/AICR (Table E, available as supplement to the online version of this article at http://www.ajph.org).8

Cancer Incidence and Survival

We obtained cancer incidence rates for the 15 diet-related cancer types (i.e., colorectal, oral cavity or pharynx, larynx, corpus uteri, kidney, breast, liver, stomach, esophagus, pancreas, prostate, thyroid, gallbladder, ovary, and multiple myeloma) in 2017 from the Centers for Disease Control and Prevention's National Program of Cancer

Registries and the Surveillance, Epidemiology, and End Results program (SEER; Method C and Table F, available as supplements to the online version of this article at http://www.ajph.org).22 To account for underlying trends in cancer incidence for each cancer type, we estimated the average annual percent change in age-adjusted incidence rates from 2008 to 2017, and then applied that to the baseline incidence rates to project future trends in cancer incidence in 2018 and beyond.3 We estimated the annual probability of dying from cancer based on the 5-year relative survival in 2016 obtained from SEER (Method C and Table G, available as supplements to the online version of this article at http://www.ajph.org).

Economic Costs

We obtained direct medical costs for cancer care by age (< 65 and $ 65 years),
gender, and phase of cancer care (initial, continuing, and end year of life) from National Cancer Institute's Cancer Prevalence and Cost of Care Projections.3 Indirect societal costs including productivity loss costs and patient time costs associated with cancer care were obtained from published estimates based on the Medical Expenditure Panel Survey data.23,24 All costs were inflated to 2017 US dollars using the Personal Health Care index (Method D and Table H, available as supplements to the online version of this article at http://www.ajph.org).

Uncertainty Analysis

We incorporated uncertainties in each model input parameter using probabilistic sensitivity analyses with 1000 simulations. We derived corresponding 95% uncertainty intervals (UIs) from the 2.5th and 97.5th percentiles of 1000 estimates. We conducted statistical analyses in R, version 3.6.1 (R Foundation, Vienna, Austria).

RESULTS

Among US adults over a lifetime, suboptimal intakes of 7 dietary factors were estimated to cause 3.04 (95% UI 5 2.88, 3.20) million new cancer cases, 1.74 (95% UI = 1.65, 1.84) million cancer deaths (Table 1), and $253.69 (95% UI 5 $241.54, $266.54) billion direct medical costs associated with cancer care (Table 2), accounting for 7.4% of new cancer cases, 7.7% of cancer deaths, and 7.8% of direct medical costs of these 15 cancers in the United States. These diet-attributable cancers also cost $113.89 (95% UI 5 $108.21, $119.86) billion in productivity losses and $16.10 (95% Disparities by Age and Gender

Per 100 000 population, young adults (aged 20-44 years) had a higher number of diet-attributable cancer cases (difference = 803; 95% UI = 656, 952) and cancer deaths (difference = 582; 95% UI 5 500,668) than older adults ($ 65 years; Table 1). Similar age patterns were observed for all cancer types (Figure 1 and Table M, available as a supplement to the online version of this article at http://www.ajph.org) and all dietary factors (Figure 2 and Table N, available as a supplement to the online version of this article at http://www.ajph.org). Men had a higher number of diet-attributable cancer cases (difference = 300; 95% UI = 169, 434) and cancer deaths (difference 5 234; 95% UI = 157, 315) per 100 000 population than women, overall and across cancer types except for female cancers (e.g., female breast, endometrial, and ovary cancers). Men also had a higher diet-attributable cancer burden than women for nearly all dietary factors except for high SSB consumption, which contributed to a higher number of cancer cases in women than in men (11; 95% UI 5-10,43).

Disparities by Race/Ethnicity

Non-Hispanic Blacks had more diet-attributable cancer cases (difference 5 110; 95% UI 5-21,265) and cancer deaths (214; 95% UI 5 126, 309) per 100 000 population than nonHispanic Whites. Non-Hispanic Blacks also had a higher number of diet-attributable cancer burden for most cancer types, with the largest differences seen for colorectal cancers. However, non-Hispanic Whites had a higher number of diet-attributable cases and deaths for oral cavity, pharynx, or larynx cancers than non-Hispanic Blacks. By dietary factors, non-Hispanic Blacks had a higher number of diet-attributable cancer burden than non-Hispanic Whites for most of the dietary factors, with greater differences attributable to low consumption of dairy and whole grains and high consumption of processed meats and SSBs.

Disparities by Education, Income, and SNAP Status

Compared with those with a college graduate or above level of education, individuals with a lower than college graduate level of education had a higher number of diet-attributable cancer cases (e.g., difference for less than high school vs college graduate 5 180; 95% UI 5 33,301) and cancer deaths (132; 95% UI 5 46, 219) per 100 000 population. Similar disparities by education were observed for nearly all cancer types, with largest differences seen for colorectal cancer and for nearly all dietary factors with the largest differences attributable to high consumption of SSBs.

Individuals with a low level of family income (FIPR <1.3) had a higher number of diet-attributable cancer cases (difference 5 170; 95% UI 5 24, 322) and cancer deaths (difference 5 142; 95% UI 5 49, 238) per 100 000 population than higher-income individuals (FIPR $ 3). Similar disparities were observed across cancer types and dietary factors, with only a few exceptions. Similarly, we observed a higher number of diet-attributable cancer cases and cancer deaths among SNAP participants than eligible nonparticipants (difference 5 100; 95% UI 5 15,330) and SNAP-ineligible individuals (difference 5 250,95% UI 5 106,402) for nearly all cancer types and each dietary factor. The largest disparities by family income and SNAP participation status were attributable to high consumption of SSBs and low consumption of whole grains.

Obesity vs Direct Diet-Cancer Associations

The diet-attributable cancer cases and deaths mediated through obesity were higher among young versus older adults per 100 000 population (difference of cases 5 292; 95% UI 5 236, 350), women versus men (difference of cases 5 128; 95% UI 5 78, 182), non-Hispanic Blacks versus nonHispanic Whites (difference of cases s 95; 95% UI 5 21, 160), individuals with low versus higher levels of education (difference of cases 5 91; 95% UI 5 29, 154) or income (difference of cases 5 140; 95% UI 5 69, 207), and SNAP participants versus SNAPineligible individuals (difference of cases 5 162; 95% UI 5 87, 242; Table I and Table J). We observed similar disparities for cancer burdens attributable to direct diet-cancer associations, except that men had a higher direct diet-attributable cancer burden than women (Table K and Table L).

Disparities in Economic Costs

We observed similar disparities for diet-attributable cancer costs for direct medical costs, productivity loss costs, and patient time costs. For example, the direct medical costs of diet-attributable cancers (million per 100 000 population) were higher in young (aged 20-44 years) versus older adults (aged $ 65 years; differ-ence 5 46.91; 95% UI 5 35.69, 59.03), men versus women (difference 5 39.90; Public Health Implications

The higher diet-attributable cancer burdens among non-Hispanic Blacks, individuals with lower education and income attainments, and SNAP participants reflects both a higher cancer risk and a worse diet quality among these population subgroups.10-12 These findings suggest that targeted nutrition interventions among these population subgroups can potentially reduce diet-attributable cancer disparities.

In addition, our study revealed that the highest diet-cancer disparities were attributable to high consumption of SSBs and processed meats and low consumption of whole grains and dairy. These could be priority dietary targets for behavior change and policy strategies to reduce cancer disparities in the United States. Policy options may include expanding SNAP to include financial incentives for purchasing whole grains, fruits, and vegetables and disincentives to discourage the consumption of SSBs and processed meats.25,26 Other relevant policy actions may include improving the availability, affordability, and accessibility of healthy foods in low-income and racial/ethnic minority communities, schools, and workplaces.27

The gender difference in diet-attributable cancer burdens is also worth attention. The overall higher diet-attributable cancer burdens in men than women may reflect a worse diet quality in men than women.11,13 For example, the Healthy Eating Index 2015, a diet quality index that measures adherence to the 2015-2020 Dietary Guidelines for Americans, was 5% (3 percentage points) lower in men than women.13 However, women had a higher diet-attributable cancer burden mediated through obesity than men. It is possible that excessive body weight has a larger impact on female cancers. In accordance with this finding, our results also revealed that high SSB consumption contributed to more cancer cases in women than in men. The higher diet-related cancer burdens estimated among younger than older adults were primarily attributable to the longer length of follow-up ofyounger adults in a closed cohort.

Consumption of SSBs contributed to the largest diet-attributable cancer disparities in the United States, by age, race, and socioeconomic status. Although SSB consumption had declined by 28% since 1999 among US adults, level of consumption remains high, especially among young adults, racial/ethnic minorities, and socioeconomically disadvantaged groups.12 Reducing SSB consumption through relevant policy actions, including taxes, warning labels, or Nutrition Facts Panel labeling of added sugars28,29 could be effective strategies for reducing diet-attributable cancer disparities.

Although restricting SSB purchases for SNAP participants has been debated,30 a combination of financial disincentives for SSBs and other less healthful foods plus incentives for a range of healthful foods may help reduce disparities while still preserving choice.31

Low whole grain consumption also contributed to substantial diet-cancer disparities in the United States. Despite modest recent increase in whole grain consumption, current levels of 1 serving a day remain far below the recommended intake of 3 servings per day.11 In 2015 to 2016, US adults consumed only 2.7% of calories from whole grains, compared with 15.9% of calories from refined grains.13 Potential barriers for increasing whole grain consumption include the lack of public awareness on health benefits of whole grains, lack of knowledge to identify whole grain products, and absence of standardized definitions and labeling to increase awareness and healthier choices.32 Efforts are needed to address these challenges,9,32 including incorporating additional financial incentives for healthy whole grain products (rather than only fruits and vegetables) in SNAP.31

By cancer type, optimizing dietary intake could be particularly important for reducing disparities related to colorectal cancer. Colorectal cancer is the third most diagnosed cancer among US men and women1 and is associated with the largest number of diet-attributable cases.9 Colorectal cancer disproportionally affects men, nonHispanic Blacks, and socioeconomically disadvantaged groups,14,15 which runs parallel with the higher colorectal cancer burden attributable to diet observed in this study.

Strengths and Limitations

Our study had several strengths. We used a probabilistic cohort statetransition model, which simulates the transitions among various cancer-related health states along with aging, allowing us to project the health and economic burdens of cancer attributable to diet over a lifetime. Our model incorporated national representative estimates for recent dietary intakes of US adults, national data for cancer incidence and survival, and multivariate-adjusted etiology effects for diet-cancer associations from meta-analysis of cohort studies. In addition to estimating direct diet-cancer associations independent of obesity, our model further incorporated obesity-mediated cancer risks, allowing us to estimate diet-attributable cancer burdens attributable to obesity-mediated pathways. Our model also accounted for the uncertainty of dietary intake and cancer incidence, allowing estimation of the lower and upper bounds of the plausible effects.

Potential limitations should also be considered. First, self-reported dietary assessment is subject to measurement error. Yet the NHANES is the only nationally representative survey of Americans' diet; dietary intake data collected in NHANES are often used to evaluate dietary intake patterns of US adults and children.11 In addition, the use of multiple-pass method19 and energy adjustments reduce measurement error.20

Second, we did not incorporate secular trends in diet over time or changes in diet across the life course. If disparities in dietary intake patterns persist or worsen in future years or as people age, the estimated disparities in diet-associated cancer burdens are likely to sustain to later years or become more profound. In addition, the current estimates did not consider the impact of early life diet on cancer outcomes and could have underestimated cancer burdens attributable to suboptimal diet.

Third, the projected rates of cancer incidence and mortality in the current model may not fully capture the influence of Affordable Care Act and other changing policies and factors on cancer outcomes. Disparities in diet-associated health and economic burdens of cancer may decline in future years if the insurance expansion under the Affordable Care Act is likely to reduce cancer disparities in the United States.33

Fourth, cancer could lead to substantial psychological burdens for the patients and their families. Our model did not include the psychological burden of cancer because of the lack of well-accepted methods to quantify it;34 the diet-associated cancer burdens could be underestimated.

Fifth, we assumed a 5-year induction period between changes in current dietary intakes to optimal intakes and cancer risks, based on limited empiric evidence of the induction time between diet and various cancers.35 Longer or shorter induction periods could partly alter our findings.

Conclusions

Suboptimal diet contributes to a substantial cancer burden in racial/ethnic minorities, socioeconomically disadvantaged groups, SNAP participants, men, and young adults. High consumption of SSBs and low consumption of whole grains are 2 leading dietary targets for prevention policies to reduce diet-attributable cancer disparities in the United States. These findings underscore the importance of developing and implementing targeted food and nutrition strategies among key population subgroups to reduce cancer disparities in the United States. AJPH

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CONTRIBUTORS

L. Wang and F.F. Zhang conceptualized the study. L. Wang performed formal data analysis and drafted the article. M. Du and C. Griecci provided key input data used in the simulation model. F. Cudhea contributed to the development of the simulation model. D. Mozaffarian and F. F. Zhang supervised the study. F. F. Zhang acquired funding for conducting the study. M. Du, F. Cudhea, D. S. Michaud, and D. Mozaffarian and F. F. Zhang critically reviewed the article and provided important intellectualcontent. All authors read and approved the finalarticle.

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CONFLICTS OF INTEREST

The authors declare no competing interests.

HUMAN PARTICIPANT PROTECTION

The study is exempt for ethicalreview and waived for consent because it used publicly available data with no personalidentifiable information.

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DETAILS

Subject:	Beverages; Minority &ethnic groups; Food stamps; Estimates; Nutrition research; Cancer; Young adults; Diet; Health; Economics; Vegetables; Dietary intake; Disadvantaged; Consumption; Obesity; Medical research; Adults; Public health; Fruits; Race; Education; Fatalities; Population; Body mass index; Grain; Disease prevention; Disadvantaged groups; Ethnicity; Colorectal cancer; Economic impact; Larynx; Costs; Subgroups; Cultural differences; Minority groups; Dairy products; Hispanic people; Cohort analysis
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Document 20 of 37

Racial Disparities of E-Cigarette Use Among US Youths: 2014–2019

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ProQuest document link

ABSTRACT (ENGLISH)

Objectives. To evaluate disparities in youth e-cigarette use patterns and flavor use by race/ethnicity overtime. Methods. We used data from the US 2014-2019 National Youth Tobacco Survey (NYTS) to examine trends in dual use (co-use of e-cigarettes and cigarettes or other tobacco products), occasional (≤ 5 days) versus frequent use (≥ 20 days) in the past 30 days, and flavor use among current (past-30-day) e-cigarette users (n = 13178) across racial/ethnic groups (non-Hispanic Whites, non-Hispanic Blacks, Hispanics/Latinos, and non-Hispanic others). Results. Among current e-cigarette users, dual use and occasional use decreased significantly from 2014 to 2019 across racial and ethnic groups except for non-Hispanic Blacks; frequent use and flavored e-cigarette use increased among non-Hispanic Whites, Hispanics/Latinos, and non-Hispanic others but not among non-Hispanic Blacks. In 2019, non-Hispanic Black e-cigarette users were more likely to report dual use (adjusted odds ratio [AOR] = 2.2; 95% confidence interval [CI] = 1.5, 3.2; P< .001) and occasional use of e-cigarettes (AOR = 3.7; 95% CI = 2.3, 5.9; P <.001) but less likely to report frequent use (AOR 5 0.2; 95% CI = 0.1,0.4; P <.001) and flavored e-cigarette use (AOR = 0.4; 95% CI = 0.3, 0.5; P <.001) than their White peers. Conclusions. Youth e-cigarette use patterns differed considerably across racial/ethnic groups, and tailored strategies to address disparities in e-cigarette use are needed. (Am J Public Health. 2021;111(11): 2050-2058. https://doi.org/10.2105/AJPH.2021.306448)

FULL TEXT

Headnote

Objectives. To evaluate disparities in youth e-cigarette use patterns and flavor use by race/ethnicity overtime. Methods. We used data from the US 2014-2019 National Youth Tobacco Survey (NYTS) to examine trends in dual use (co-use of e-cigarettes and cigarettes or other tobacco products), occasional (≤ 5 days) versus frequent use (≥ 20 days) in the past 30 days, and flavor use among current (past-30-day) e-cigarette users (n = 13178) across racial/ethnic groups (non-Hispanic Whites, non-Hispanic Blacks, Hispanics/Latinos, and non-Hispanic others). Results. Among current e-cigarette users, dual use and occasional use decreased significantly from 2014 to 2019 across racial and ethnic groups except for non-Hispanic Blacks; frequent use and flavored e-cigarette use increased among non-Hispanic Whites, Hispanics/Latinos, and non-Hispanic others but not among non-Hispanic Blacks. In

2019, non-Hispanic Black e-cigarette users were more likely to report dual use (adjusted odds ratio [AOR] = 2.2; 95% confidence interval [CI] = 1.5, 3.2; P< .001) and occasional use of e-cigarettes (AOR = 3.7; 95% CI = 2.3, 5.9; P <.001) but less likely to report frequent use (AOR 5 0.2; 95% CI = 0.1,0.4; P <.001) and flavored e-cigarette use (AOR = 0.4; 95% CI = 0.3, 0.5; P <.001) than their White peers.

Conclusions. Youth e-cigarette use patterns differed considerably across racial/ethnic groups, and tailored strategies to address disparities in e-cigarette use are needed. (Am J Public Health. 2021;111(11): 2050-2058. https://doi.org/10.2105/AJPH.2021.306448)

While the cigarette smoking rate among youths has been declining over the past several decades,1,2 the prevalence of current (past-30-day) e-cigarette use (or vaping) among adolescents increased dramatically during 2017 to 2019.2,3 Although e-cigarettes deliver a substantially lower level of toxins than do combustible cigarettes,4 e-cigarette aerosol is not harmless, as studies have identified harmful and potentially harmful constituents in e-cigarettes.5 Vaping at a young age could cause nicotine addiction, harm brain development, and increase risks of respiratory and cardiovascular diseases.5-7

Race/ethnicity may differentiate youth tobacco use, and non-Hispanic Black and Hispanic/Latino tobacco users experience significant health disparities in tobacco-related diseases, including cancer, stroke, and heart disease.8,9 Studies have documented that non-Hispanic Black adolescents report a significantly lower prevalence of cigarette smoking but a higher prevalence of cigar use than their Hispanic/Latino and White peers.10 Hispanic/Latino youths reported a higher prevalence of hookah use.10 Recent studies also indicate that e-cigarettes are not uniformly used across racial and ethnic groups,5 and non-Hispanic White and Hispanic/ Latino youths are more likely to use e-cigarettes than are non-Hispanic Black youths.10,11 Longitudinal studies also show distinct transition patterns by racial and ethnic group,12,13 and White and Hispanic adolescent e-cigarette users are more likely to transition to cigarette smoking than their Black counterparts.13 Another national study found that non-Hispanic Black students and Hispanic students significantly initiate e-cigarettes at an earlier age than White peers.14 Alarmingly, early initiation (age 13 years and younger vs older than 13 years) of e-cigarettes could increase the risk of nicotine dependence and sustained e-cigarette use.14 A socioecological model posits that multifaceted factors at the individual, interpersonal, community, and policy levels could lead to distinct patterns of exposure to secondhand tobacco, tobacco initiation, use patterns, and cessation behaviors by race and ethnicity.15 These existential disparities in e-cigarette and tobacco use may be attributable to social determinants related to race/ ethnicity (e.g., education, income, geography), neuropsychological factors, the long history of the tobacco industry's aggressive marketing toward racial and ethnic minority communities, and biological aspects.5,8,9

A growing body of literature has extended current youth e-cigarette research to better understand the frequency of e-cigarette use, co-use of e-cigarettes and other tobacco products, and flavored e-cigarette use. For instance, Glasser et al.16 reported that about half of current e-cigarette users vaped occasionally (# 5 days in the past 30 days) and roughly a quarter vaped frequently ($ 20 days in the past 30 days) in 2018.16 E-cigarette use is strongly associated with cigarette smoking and other tobacco use; a majority of young current e-cigarette users have been found to report concurrently using 1 or more other tobacco products.5,17 A previous study17 identified that, across racial and ethnic groups, most current tobacco users were dual or poly tobacco users in 2014. But it is unclear whether poly tobacco use behaviors have changed since then.

Meanwhile, flavored e-cigarette products are widely available in the United States, and flavors have become one of the leading reasons for current e-cigarette use among youths.18 Flavored e-cigarette use has been increasing among youths since 2015, with 65.2% of current e-cigarette users reporting use of flavored products in the past 30 days in 201 8.19,20 However, little is known about differential patterns of e-cigarette use and flavor use across racial/ethnic groups overtime. Understanding how adolescents use e-cigarettes (e.g., use patterns, flavors) is critical to inform regulatory actions and develop effective intervention strategies to prevent and reduce youth vaping behaviors, especially among vulnerable subpopulations such as racial and ethnic minority adolescents.

To address these gaps in knowledge, we analyzed data from the 2014-2019 National Youth Tobacco Survey (NYTS) by examining the changes in temporal trends of e-cigarette use patterns and flavor use among current youth e-cigarette users across racial and ethnic groups. We further tested disparities in e-cigarette use patterns and flavor use across racial/ethnic groups.

METHODS

The NYTS is a nationally representative, cross-sectional, and school-based annual survey of middle- and highschool students between the ages of 9 and 19 years in the United States. The survey was conducted using a probabilistic sampling procedure without replacement at 3 stages: (1) primary sampling units such as a county, a group of small counties, or part of a very large county; (2) secondary sampling units including schools within each selected primary sampling unit; and (3) students within each selected school. The 2014-2019 NYTS data included 117472 respondents, with the annual survey sample size ranging from 17 711 in 2015 to 22 007 in 2014. The median response rate for participating schools and students ranged from 63.4% to 73.3% during the study period. A detailed description of the NYTS survey can be found on the NYTS Web site.21

Measures

Race/ethnicity. Participants were classified into 4 groups: non-Hispanic White, non-Hispanic Black, Hispanic/Latino, or non-Hispanic other.

E-cigarette use. Current e-cigarette users were determined by those who reported using e-cigarettes 1 or more days in the past 30 days. We further categorized current e-cigarette users as occasional users (# 5 days) and frequent users ($ 20 days) based on the frequency of e-cigarette use in the past 30 days.

Current cigarette smokers were defined as those who reported smoking 1 or more days in the past 30 days, and current other tobacco users were defined as those who reported using 1 or more other tobacco products on 1 or more days of the past 30 days. Other tobacco products included cigars (cigars, little cigars, and cigarillos), smokeless tobacco (chewing tobacco, snuff, dip, snus, and dissolvable tobacco), hookahs, pipe tobacco, and bidis.10 Those who reported current co-use of e-cigarettes and cigarettes or other tobacco products were defined as dual users. Current e-cigarette users who reported using e-cigarettes that tasted like menthol (mint), alcohol (wine, cognac), candy, fruit, chocolate, or any other flavors were classified as flavored e-cigarette users. The NYTS did not have separate questions for each flavor, and a single composite flavor question was utilized. Those who reported not using flavored e-cigarettes were likely to be users of tobacco-flavored or flavorless e-cigarettes or those who did not recall the flavor in e-cigarettes.

Covariates. Demographic variables include gender (male or female), age (continuous variable), school level (middle or high school), and tobacco use by other household members ("none," "other tobacco product use" [i.e., non-e-cigarette use], and "e-cigarettes").

Statistical Analyses

We weighted data to provide national estimates by accounting for the complex survey design and nonresponse. First, weighted percentages and 95% confidence intervals (CIs) of sample characteristics (e.g., demographic characteristics, smoking prevalence) among current e-cigarette users were reported from 2014 to 2019.

Second, temporal trends of e-cigarette use patterns (dual use, occasional use, and frequent use) and flavored e-cigarette use from 2014 to 2019 were reported, overall and by racial/ethnic groups. We examined the interaction of year x race/ethnicity in the multivariable model adjusted for covariates, current cigarette smoking, and other tobacco use status. We also reported linear and quadratic trends based on multivariable logistic regression analyses, where survey years served as a continuous variable. We performed stratified analyses by racial/ ethnic group. The sample sizes for other races, such as Asians, American Indians/Alaska Natives, Native Hawaiians, and other Pacific Islanders, were too small to model the temporal trends. Therefore, we combined these minority subpopulations into 1 category (i.e., non-Hispanic others).

Third, we performed separate multivariable logistic regression models to examine the association between race/ ethnicity and e-cigarette use patterns and flavor use among current e-cigarette users by using the 2019 NYTS data. The temporal trends in associations between race/ethnicity and e-cigarette use patterns from 2014 to 2019 are reported in Figure A (available as a supplement to the online version of this article at http://www.ajph. org). Adjusted odds ratios (AORs) are reported in the multivariable analysis. We analyzed data by using SAS version 9.4 (SAS

Institute, Cary, NC) survey procedures, and we considered a P level of less than .05 to be statistically significant.

RESULTS

The analytical sample included 13178 current e-cigarette users from the combined 2014-2019 NYTS (female, 44.6%; high school, 79.8%; non-Hispanic White, 65.0%; non-Hispanic Black, 7.6%; Hispanic/Latino, 23.6%; current cigarette smokers, 28.6%; current other tobacco use, 43.0%). Table A (available as a supplement to the online version of this article at http://www.ajph.org) presents the sample characteristics of current e-cigarette users from 2014 to 2019. Overall, the distribution of e-cigarette users by age and grade was relatively stable, while more female students were current e-cigarette users in 2019 (47.8%) than in 2014 (44.1%). Among current e-cigarette users, the prevalence of current cigarette smoking dropped dramatically from 37.6% in 2014 to 17.9% in 2019. We also observed a decreasing trend in the prevalence of current other tobacco use (56.5% in 2014 to 30.8% in 2019). Table B reports the unweighted sample sizes for each outcome variable by racial/ethnic group.

Figure 1 presents the temporal trends of dual use among current e-cigarette users from 2014 to 2019. The overall dual use decreased significantly from 65.2% in 2014 to 36.0% in 2019 (difference = -29.2%; 95% CI 5 -34.4%, -24.0%) and fit a significant quadratic trend over 2014 to 2019 (P 5 .009). Changes in dual use among current e-cigarette users from 2014 to 2019 differed significantly by racial and ethnic group (year x race/ethnicity; P <.001). The decreases were significant for non-Hispanic Whites (AOR 5 0.76; 95% CI 5 0.72, 0.80; P< .001) and non-Hispanic others (AOR 5 0.83; 95% CI 5 0.71,1.00; P 5 .046). The changes fit a quadratic trend for Hispanics/Latinos (P< .001). For non-Hispanic Blacks, there was no significant change in dual use from 48.3% in 2014 to 49.9% in 2019 (AOR 5 0.97; 95% CI 5 0.88,1.06; P5 .46).

Among current e-cigarette users, there was a significant decrease in occasional use (Figure 2a; 63.5% in 2014 vs 50.8% in 2019; quadratic trend, P <.001) and a significant increase of frequent use (Figure 2b; 14.8% in 2014 vs 30.4% in 2019; quadratic trend, P< .001). Changes in use patterns among current e-cigarette users differed by racial and ethnic group (year x race/ethnicity; P< .001). The drops in occasional use were significant across all racial/ethnic groups except for nonHispanic Blacks, for whom the proportion was stable at 72.2% in 2014 versus 71.2% in 2019 (AOR 5 1.01; 95% CI 5 0.90,1.13; P 5 .87). Similarly, the increases in frequent use were significant across all racial/ethnic groups except for non-Hispanic Blacks with a stable trend at 11.8% in 2014 versus 13.5% in 2019 (AOR 5 1.10; 95% CI 5 0.95, 1.27; P 5 .19).

Changes in flavor use among current e-cigarette users fit a quadratic trend from 2014 to 2019 (P <.001) with a significant decrease from 2014 to 2015 and then a significant increase from 2015 to 2019 (Figure 3). The interaction term between the year and race/ethnicity was not significant (P 5 .23). Table 1 presents univariate and multivariable analyses of e-cigarette use patterns and race/ethnicity among current e-cigarette users in 2019 (n 5 3628). Non-Hispanic Black e-cigarette users had higher odds of reporting dual use compared with their White peers (AOR 5 2.2; 95% CI 5 1.5, 3.2; P <.001). Non-Hispanic White e-cigarette users were less likely than their racial/ethnic minority peers to report occasional use but more likely to report frequent use. For instance, 44.7% (95% CI 5 41.6%, 47.8%) of non-Hispanic White e-cigarette users reported occasional use in 2019, compared with 71.2% (95% CI 5 64.0%, 78.4%) of nonHispanic Blacks (AOR 5 3.7; 95% CI 5 2.3, 5.9; P <.001) and 59.0% (95% CI 5 54.9%, 63.1%) of Hispanics/Latinos (AOR 5 1.6; 95% CI 5 1.3, 2.0; P <.001). Conversely, 36.3% (95% CI 5 32.9%, 39.7%) of non-Hispanic White e-cigarette users reported frequent use in 2019, in comparison with 13.5% (95% CI 5 8.4%, 18.6%) of non-Hispanic Blacks (AOR 5 0.2; 95% CI 5 0.1,0.4; P <.001) and 21.2% (95% CI 5 17.3%, 25.1%) of Hispanics/Latinos (AOR 5 0.5; 95% CI 5 0.4, 0.7; P <.001).

Flavored e-cigarette use differed significantly by racial and ethnic group, with non-Hispanic White e-cigarette users reporting the highest proportion (75.0%; 95% CI 5 72.5%, 77.6%) and non-Hispanic Blacks reportingthe lowest proportion (43.9%; 95% CI 5 37.1%, 50.7%; AOR 5 0.4; 95% CI 5 0.3, 0.5; P <.001).

Temporal trends of associations between e-cigarette use behaviors and race/ethnicity are presented in Figure A. The sensitivity analysis shows wide gaps in dual use, occasional use, and frequent use between nonHispanic Blacks and non-Hispanic Whites.

DISCUSSION

Although enormous progress has been made in reducing tobacco use in the United States, this progress has not been equally distributed across the population, with a large disparity in tobacco use persisting across groups defined by race/ethnicity, education level, income level, region, and other factors.15 The tobacco use landscape has substantially changed in recent years with more adolescents using e-cigarettes, and the prevalence of youth e-cigarette use has surpassed the use of cigarettes since 2015.22 However, there is a dearth of research in assessing disparities of e-cigarette use with little work comparing trajectory and etiology in e-cigarette use patterns by racial and ethnic subpopulation. Surveillance of current e-cigarette use is important for public health, but attention to past-30-day e-cigarette use prevalence may obscure important use behavioral differences such as occasional use versus frequent use and co-use of e-cigarettes and other tobacco products across racial and ethnic groups.16

This study identified sharply different trends in the dual use between non-Hispanic Blacks and other racial/ ethnic groups from 2014 to 2019. For instance, the proportion of current e-cigarette users reporting dual use dropped by nearly half from 65.2% in 2014 to 36.0% in 2019 for nonHispanic Whites, but the proportion was stable for non-Hispanic Blacks (48.3% vs 49.9%). The multivariable analysis further showed a considerable disparity, with non-Hispanic Black e-cigarette users being 1.8 times more likely to report dual use than their White peers in 2019. Sensitivity analyses also showed a growing gap between non-Hispanic Blacks and non-Hispanic Whites in dual use over time. One may speculate that the relative preference for combustible products among non-Hispanic Blacks, possibly facilitated by the tobacco industry's targeted advertising,23 including the promotion of menthol cigarettes and flavored little cigars, drives these results. Another factor to consider is relatively easy access to single cigarettes and cigarillos such as Phillies, Black &Mild, and Swisher Sweets sold individually in segregated Black neighborhoods.24 Dual use may further increase disparities in health outcomes given that multiple tobacco product use is associated with increased symptoms of nicotine dependence and addiction in comparison with single product use.25

Our study showed that e-cigarette use patterns differed considerably by race/ethnicity. From 2014 to 2019, frequent use of e-cigarettes showed a 2.5fold increase for non-Hispanic White e-cigarette users (14.8% to 36.3%), but the proportion was relatively flat for non-Hispanic Blacks (11.8% to 13.5%; P 5 .15). Furthermore, non-Hispanic White e-cigarette users were more likely to report frequent e-cigarette use and flavored e-cigarette use than nonHispanic Blacks and Hispanics/Latinos in 2019. Studies have shown that vaping more frequently among adolescents was associated with a higher risk of frequent and heavy smoking in the future26 and that flavored e-cigarette use was associated with an increased risk of cigarette smoking and future vaping.27 Even occasional e-cigarette use is associated with significantly higher risks of binge drinking, marijuana use, and other illicit drug use than nonuse.28 These remarkable disparities in e-cigarette use behaviors underscore the importance of developing and implementing tailored strategies to address the e-cigarette use epidemic across race/ethnicity. Our results suggest that non-Hispanic Black adolescents are more likely to be dual users of e-cigarette and other tobacco products, which may lead to less frequent use of e-cigarettes. For non-Hispanic Black youths, tailored interventions are needed to promote prevention and cessation of tobacco use and raise the harm perception of light tobacco use, including the occasional use of e-cigarettes. On the other hand, non-Hispanic White youths seem to be moving toward more exclusive and frequent e-cigarette use. Therefore, evidence-based youth vaping cessation programming may be suitable for this subpopulation. Certainly, while possibly acknowledging differential preferences for various tobacco products, a uniform message might be provided-that any nicotine-containing product is dangerous for youths and may lead to cardiovascular and carcinogenic consequences later on.5

Enactment and implementation of tobacco control policies need to account for differential effects on racial/ethnic subpopulations to ensure that policies can uniformly prevent the initiation and reduce the prevalence of youth tobacco use, which could further lead to a reduction of health disparities in tobacco use and tobacco-related morbidity and mortality. There are large variations in tobacco-free and smokefree public policies, tobacco taxes, tobacco retail and vape shop density, tobacco product point-of-sale advertising restrictions, and other tobacco control legislation across states and localities. In addition, the contents and coverage of e-cigarette regulations vary by jurisdiction, which could exacerbate inequities in e-cigarette use and tobacco-related disease burden by geography, race, and ethnicity. The nationwide Tobacco 21 policy that was passed in December 2019 to raise the minimum legal age of tobacco sales to 21 years29 could increase tobacco control coverage in minority populations and reduce youth access to tobacco products through commercial and social sources.

The US Food and Drug Administration issued an enforcement policy on unauthorized cartridge-based e-cigarette flavors other than tobacco and menthol, which went into effect on February 6, 20 20,30 and further sent warning letters to notify e-cigarette companies including Puff Barto remove flavored disposable e-cigarette products from the market in July 2020.31 As menthol-flavored tobacco products are particularly appealing to African American tobacco users, continued surveillance of current e-cigarette use by racial and ethnic groups is critically needed.

Limitations

This study had several limitations. First, the NYTS is a survey of middle- and high-school students, and our findings might not be generalizable to the broader youth population. However, 97% of adolescents aged between 10 and 17 years were enrolled in school.32

Second, e-cigarette use behaviors were self-reported, and they are subject to recall bias, especially for younger respondents. However, the test and retest reliability of self-reported behaviors related to tobacco use among adolescents is high.33

Third, self-reported race/ethnicity was grouped into 4 categories to ensure sufficient sample sizes in assessing temporal trends of e-cigarette use. However, a deeper understanding of differences within these groups is needed.

Fourth, these nationally representative data were of repeated crosssections, and changes in cohort composition overtime could affect results (e.g., trends between e-cigarette use and dual use). However, the sample sizes at each time point were large, and sampling strategies for data collection minimize that possibility.34

Fifth, the NYTS only asked a single composite question about flavor use. It is possible that if separate flavors were recorded, the results might differ. In addition, occasional e-cigarette users may be less likely to know if the e-cigarette products they used were flavored, potentially leading to misclassified responses.

Finally, there were small changes in the wording and placement of survey questions for certain tobacco products during 2014 to 2019. Prevalence estimates with similar definitions have been reported in other surveillance reports.2 Furthermore, some confounders that may affect the outcomes, such as peer use, household income, parental education, and socioeconomic status, were not asked in the NYTS.

Public Health Implications

The latest statistics from the 2020 NYTS data showed a drop in e-cigarette use among US youths, but the prevalence is still at an unacceptably high level, with about 1 in 5 high-school students (~3 million) and 1 in 20 middle-school students (~550 000) reporting current e-cigarette use.35 This study identified significant disparities in youth e-cigarette use across racial/ethnic groups. Non-Hispanic White youths were more likely to report frequent e-cigarette use and use of flavored products, while non-Hispanic Black adolescents were more likely to report occasional use of e-cigarettes and dual use of e-cigarettes and cigarettes or other tobacco products than their peers. Tailored, culturally relevant messaging and interventions may help address the racial/ethnic disparities in e-cigarette use. ÂfPU

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CONTRIBUTORS

H. Dai and S.Y. Sussman conceptualized and designed the study and drafted the article. All authors acquired, analyzed, or interpreted the data and critically revised the article for important intellectual content. H. Dai performed statistical analysis and obtained funding.

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CONFLICTS OF INTEREST

The authors report no potential conflicts of interest.

HUMAN PARTICIPANT PROTECTION

Institutional board review was not required for this study, as it was a secondary analysis of de-identified data.

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DETAILS

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New Evidence on Sweetened Beverage Taxes Points the Way for Future Policy and Research

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ABSTRACT (ENGLISH)

In the six years since Berkeley, California, enacted its sugar-sweetened beverage (SSB) tax, seven other US cities have followed suit, recognizing these taxes as feasible policy both for addressing public health challenges related to excess sugar consumption and for increasing revenues to invest in food access and other social determinants of health. The proposed mechanism behind the taxes is simple: as excise taxes, they lead to increased prices for taxed beverages, and higher prices cause consumers to reduce their SSB purchases in favor of healthier beverages. Ultimately, it is hoped, taxes will reduce added sugar intake, thus reducing obesity and improving health, while revenues from remaining sweetened beverage sales are invested back into community health efforts. Although there is consistent evidence that the prices of taxed beverages increase after SSB taxes are imposed, tax effects on household SSB purchases and intake are less clear.1-3 Studies using retail scanner data consistently find that purchases of taxed beverages fall at retailers located in taxed cities.4,5 But some of these studies have found contemporaneous increases in purchases of SSBs at retailers located outside the city's borders,5 suggesting that residents may simply be avoiding taxes without changing their intake.

FULL TEXT

In the six years since Berkeley, California, enacted its sugar-sweetened beverage (SSB) tax, seven other US cities have followed suit, recognizing these taxes as feasible policy both for addressing public health challenges related to excess sugar consumption and for increasing revenues to invest in food access and other social determinants of health. The proposed mechanism behind the taxes is simple: as excise taxes, they lead to increased prices for taxed beverages, and higher prices cause consumers to reduce their SSB purchases in favor of healthier beverages. Ultimately, it is hoped, taxes will reduce added sugar intake, thus reducing obesity and improving health, while revenues from remaining sweetened beverage sales are invested back into community health efforts.

Although there is consistent evidence that the prices of taxed beverages increase after SSB taxes are imposed, tax effects on household SSB purchases and intake are less clear.1-3 Studies using retail scanner data consistently find that purchases of taxed beverages fall at retailers located in taxed cities.4,5 But some of these studies have found contemporaneous increases in purchases of SSBs at retailers located outside the city's borders,5 suggesting that residents may simply be avoiding taxes without changing their intake.

Along with doubts about householdlevel responses to SSB taxes come questions about tax equity. As with sales taxes, SSB taxes may impose higher burdens on low-income households than they do on higher-income households.6 Unlike a sales tax, however, low-income households can reduce their SSB tax burden by reducing purchases of taxed products or by traveling outside the jurisdiction to purchase SSBs. Because SSB taxes in the United States are city-level taxes, avoiding taxes by crossing borders to shop is relatively easy, but evidence of cross-border shopping by income group is thin.

Given the policy implications of inequitable tax burdens, and the tendency of the beverage industry to use equity arguments to speak out against SSB taxes, it is important to fully understand household responses to these taxes, both overall and by income.7 There is little evidence on this topic so far, mainly because of the need for researchers to collect primary survey data to investigate household-level behavior in a single city.8,9

NEW DATASHINES A NEW LIGHT ON THE ISSUE

In this issue of AJPH, Chrisinger (p. 1986) uses a unique data source to improve our knowledge about lowincome household responses to SSB taxes. Using administrative data on county-level redemptions of Supplemental Nutrition Assistance Program (SNAP) benefits, Chrisinger investigated SNAP redemption patterns in Philadelphia, Pennsylvania, and its neighbor counties before and after the enactment of Philadelphia's 2017 sweetened beverage tax. Chrisinger found that total SNAP redemption and SNAP redemption per participant increased in several of Philadelphia's neighbor counties after Philadelphia implemented its tax, even though SNAP redemptions fell across the United States during the same period.

Chrisinger used the method of synthetic controls to estimate the proportion of these post-tax increases that can be attributed to the tax. He found that the tax was associated with up to $6 million in increased redemptions in Montgomery, Bucks, and Delaware counties, the three Pennsylvania counties bordering Philadelphia. He was not able to estimate the decline in total redemptions in Philadelphia because of the tax but found that per participant SNAP redemption fell there by about $10 per month. At the same time, per participant SNAP redemptions increased by about $35 and $20 per month in Montgomery and Delaware counties, respectively.

These findings provide new and valuable evidence regarding the crossborder shopping habits of low-income Philadelphia residents. However, the study had some limitations. Chrisinger's inability to estimate the post-tax decline in SNAP redemptions in Philadelphia makes it difficult to assess the importance ofthe cross-border increases he measured. He did find that per participant SNAP redemptions increased more in Philadelphia's neighbors than they declined in Philadelphia. However, with different numbers of participants in each county, it is again difficult to determine the relevance of the relative quantities.

It is also possible that Chrisinger's findings are not generalizable to other US sweetened beverage taxes. Philadelphia is unique in taxing beverages sweetened with noncaloric sweeteners along with SSBs. Nearly twice as many ounces of taxed beverages were purchased per capita in Philadelphia in 2020 than in Seattle, Washington, or San Francisco, California, two other large cities with SSB taxes, suggesting a much larger tax burden in

Philadelphia.10

Finally, although the synthetic control method is the standard for conducting policy evaluation with a small number of treated units, it suffers from the usual limitations of causal inference with observational data.11 So although Chrisinger was able to conclude that the patterns associated with Philadelphia's sweetened beverage tax are not attributable to random chance, it is impossible to say that the changes were caused by the tax and not by cooccurring but unobserved economic or behavioral factors.

Despite these concerns, Chrisinger's results offer important new insights into behavioral responses to SSB taxes. Future researchers can and should use these data to replicate the work for the other seven SSB taxed cities in the United States. Doing so will produce more robust and more generalizable estimates ofthe impact of SSB taxes on food purchasing behavior ofthe cities' low-income residents.

IMPLICATIONS FOR FUTURE POLICIES

Chrisinger's findings supply the first evidence, to my knowledge, that post-SSB tax cross-border shopping trends can be driven by low-income as well as high-income consumers, although it is difficult to determine the extent to which low-income families are moving their shopping trips outside the city. Leaving the city to purchase groceries imposes time, transportation, and convenience costs on consumers, though, and these costs are likely to be significant for low-income purchasers. That cross-border shopping is costly can be seen in previous estimates that sweetened beverage purchases outside Philadelphia only account for about 25% of the sweetened beverage sales lost by Philadelphia retailers.5 Still, greater geographic spread of SSB taxes, particularly the introduction of statewide SSB taxes, is likely to make tax avoidance more costly and further reduce household SSB purchases.

These results also raise new questions about the broader impacts of sweetened beverage tax policy and whether cities should act to reduce these effects. Chrisinger suggests that some SNAP beneficiaries are moving entire shoppingtrips outside Philadelphia city limits because ofthe tax. This claim is worthy of further investigation into whether SSB taxes cause negative spillovers to the revenues of food retailers. Ifthese effects are found, Philadelphia could consider using sweetened beverage tax revenues to subsidize healthy food purchases made with SNAP dollars to promote healthy diets while reducing incentives to leave the city to purchase groceries. Seattle has implemented a similar policy, using part of its sweetened beverage revenues to fund the Fresh Bucks Match program, which is available at supermarkets and neighborhood grocers. Another way for Philadelphia to increase the effectiveness of its tax and discourage cross-border shopping is to invest in public health information campaigns to reduce demand for SSBs.10 In the end, pairing price increases with these types of mitigation strategies may do more than a price increase alone to permanently change dietary patterns and promote both equity and public health in the long run.

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CONFLICTS OF INTEREST

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Note. The City of Seattle did not influence the writing of this editorial.

Sidebar

See also Chrisinger, p. 1986.

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Document 22 of 37

High-Risk Outreach for COVID-19 Mortality Reduction in an Indigenous Community

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ProQuest document link

ABSTRACT (ENGLISH)

Indigenous populations have been disproportionally affected by COVID-19, particularly those in rural and remote locations. Their unique environments and risk factors demand an equally unique public health response. Our rural Native American community experienced one of the highest prevalence outbreaks in the world, and we developed an aggressive management strategy that appears to have had a considerable effect on mortality reduction. The results have implications far beyond pandemic response, and have reframed how our community addresses several complicated health challenges.

FULL TEXT

Headnote

Indigenous populations have been disproportionally affected by COVID-19, particularly those in rural and remote locations. Their unique environments and risk factors demand an equally unique public health response. Our rural Native American community experienced one of the highest prevalence outbreaks in the world, and we developed an aggressive management strategy that appears to have had a considerable effect on mortality reduction. The results have implications far beyond pandemic response, and have reframed how our community addresses several complicated health challenges. (AmJ Public Health. 2021; 111(11):1939-1941. https://doi.org/10.2105/AJPH.2021.306472)

More than 22% of our rural Native American community was diagnosed with COVID-19 between April 1, 2020 and February 15, 2021, an incidence nearly three times higher than that reported for the rest of the United States.1 Medical care is provided by a single 22-bed hospital covering an area approximately the size of Delaware. The unique environment and scale of the outbreak necessitated an efficient and creative response to the pandemic.

INTERVENTION

We developed an early outreach and field medicine program to augment contact tracing and act as a bridge between community surveillance and hospital care.

PLACE AND TIME

Our program is based out of Whiteriver, Arizona, and serves approximately 18 000 people living on and around the White Mountain Apache Reservation. Outreach began in March 2020, and remains ongoing.

PERSON

Community members infected with or exposed to SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2, the causative agent of COVID-19).

PURPOSE

The high transmissibility and evasive clinical presentation of SARS-CoV-2 often leads to patients being infected for days before they are traced and tested. Many people then enter medical care late in the disease process, when medical therapeutics are far less effective. Our goal was to quickly identify, monitor, and support those at highest risk of death.

IMPLEMENTATION

COVID-19 was first diagnosed in our community on April 1,2020. Within weeks, our Indian Health Service facility was identifying more than 250 new cases per 100 000 persons daily. Quickly outpaced, we focused our efforts on finding the highest-risk contacts of each person and testing them immediately.

Our community's low phone ownership necessitated that most tracing activities be performed in the field. Testing was performed in contacts' homes at the time of tracing, which often meant that newly discovered cases were still in the asymptomatic period. As tracers returned to deliver test results or drop off isolation supplies, they noticed a concerning pattern among patients in the earliest stages of COVID-19. It was clearthatthe window oftime between asymptomatic infection and critical illness was small for many, and particularly so for elders.

Short-interval follow-up was needed, but the usual methods of health care delivery would have overwhelmed local resources. Our facility was already operating near capacity, seeing about 1000 primary care encounters, 500 emergency department visits, and 50 admissions or transfers each week. We therefore partnered with tribal government to integrate public health outreach and direct medical care.

We builta High-RiskCOVIDOutreach Program to conduct repeated home visits for every person olderthan 60 years (and most older than 40 years) with known or suspected to have COVID-19. Hospital staffwere paired with community health workers, and each team typically saw about 10 to 20 patients a day. Depending on the case volume, we would dispatch upto fourteams each morning. The field physician would provide remote medical supervision for each team while also directly visiting patients with more complicated health needs. Visits for all patients continued until symptoms improved or the patient met criteria for hospital admission (most often ambulatory hypoxia).

Hospitalized patients would also receive a visit from the field team within 24 hours of discharge. This was critically important for patients who had been hospitalized at lower-elevation facilities. Blood oxygen levels often dropped considerably when patients returned home to our mountainous region. Patients could then be rehospitalized locally or set up with home oxygen and close follow-up depending on their risk of further decompensation. The latter option not only allowed patients to remain in a more comfortable environment, but also freed up scarce hospital beds for sicker patients.

EVALUATION

Integrating public health outreach and direct medical care appears to have had a considerable impact on our communitywide case fatality rate (CFR). It was 1.3% as of February 15, 2021, lower than Arizona's general population CFR of 1.9%, and just over a third of that for all other Native Americans statewide (3.2%).2

Our community had 3904 cases of COVID-19 by February 15, 2021. Of these, 1348 (34.5%) with a test date of January 15, 2021 or earlier were identified through contact tracing and followed in our program. The median age was 55 years (interquartile range = 41 -64). This group is among those at highest risk of death from COVID-19,3 yet the CFR for all 1348 patients was 1.3%. This is lower than some reported general-population estimates.4

We wondered if we had simply identified more mild cases relative to other communities, but this does not seem to be the case. The COVID-19 hospitalization rate in our community was 24.7% (n 5 966), markedly higher than that reported for the rest of the country (6.2%).1 The CFR for patients in our program aged older than 60 years who were eventually hospitalized was 5.2% (n 5 10). A major study reported a CFR of 25.7% in a general hospitalized population with similar age distribution.5 Within our own community, the CFR for hospitalized individuals aged olderthan 60 years who self-presented for medical care outside of the high-risk program was 14.3% (n 5 18). The relative risk of death forthose in the program was 0.36 (95% confidence interval 5 0.17, 0.76; P <.01) despite having the same geographic distribution and similar average age (70 vs 72 years for program participants and those selfpresenting, respectively), average body mass index (31.1 vs 29.6 kg/m2), diabetes rate (58.1% vs 58.8%), and hypertension rate (70.1% vs 76.5%).

ADVERSE EFFECTS

No patients reported adverse effects. Staff members encountered impassable roads, wild animals, and the occasional patient who declined home visits (< 1%). By traveling during daylight hours in teams of at least two, the effects of these hazards were minimal.

SUSTAINABILITY

The partnership between our hospital, tribal leaders, and community members created a strong sense of unity and purpose that has strengthened other multidisciplinary partnerships addressing mental health and noncommunicable diseases unrelated to COVID-19. In fact, it led to the formation of a new Preventive Medicine Department that aims to apply the lessons learned from this program to other health conditions that have been challenging to address through usual care delivery models.

Staff members were initially recruited from departments that became less active during the pandemic. The fulltime equivalents of one physician and one physician assistant were assigned to the program (of a total medical staff of about 30), along with one nurse and three medical assistants. Partial salary reimbursement came from billing for home visits and telehealth services, with additional investment from our hospital's operating budget to offset the difference. The benefits from improved survival rates, reduced admissions, and enhanced community partnerships are difficult to quantify in purely financial terms, but we feel they are worth the modest cost of our program.

PUBLIC HEALTH SIGNIFICANCE

COVID-19 remains disproportionately hazardous to rural Indigenous communities. Our experience has shown that brief, frequent evaluations of people at risk for severe COVID-19 can extend the capacity of limited health care resources and have considerable impact on communitywide mortality. As a stand-alone intervention, this program had a better mortality risk reduction than commonly used medical treatments.5-7 But early outreach alone does not save lives, it simply allows therapeutics and health professionals to work more effectively when there is a scarcity of both.

The dichotomy between public health and medicine has always been artificial. Integrating the two saves lives, and our experience has been a striking reminder of this. As we rebuild our postpandemic health systems, the populations we serve will benefit from expanded coordination between public health agencies and traditional health care facilities. The shared goals have never been more apparent or more necessary. AJPH

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CONTRIBUTORS

M.J. Stone was the director of the High-Risk Program and wrote the initial and revised manuscripts. R. M. Close oversaw the hospital-wide COVID-19 response, conceptualized the High-Risk Program, performed the statisticalanalysis, and contributed to subsequent iterations of the manuscript. C. K. Jentoft also served as a director of the High-Risk Program and, along with K. Pocock, performed chart reviews for the comparative analysis. G. Lee-Gatewood is the chairwoman of the White Mountain Apache Tribe and coordinated tribalsupport of this program and report. B. I. Grow performed the initial chart reviews for outcome analysis of program participants. K. H. Parker and A. Twarkins were field team leads and helped develop the described intervention approach. J.T. Nashio was the lead community health representative overseeing much of the field work by tribal staff. J. B. McAuley is the hospitalclinicaldirector and provided the staff and institutionalsupport for the program. All authors contributed revision edits and approved the final draft.

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Note. The findings and conclusions of the article are those of the authors. They do not necessarily reflect those of the US Public Health Service Commissioned Corps, the Indian Health Service, or the US Department of Health and Human Services.

CONFLICTS OF INTEREST

No authors have any potentialor actualconflicts of interest to disclose.

HUMAN PARTICIPANT PROTECTION

This project was approved by the White Mountain Apache Tribal Council and Health Board and was part of ongoing public health and clinical activities in response to the COVID-19 pandemic.

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Caregiving Across Cultures: Priority Areas for Research, Policy, and Practice to Support Family Caregivers of Older Asian Immigrants

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ABSTRACT (ENGLISH)

About 4.6 million older adults (aged 60 years and older) in the United States are foreign born, and Asian Americans are projected to become the largest immigrant group in the United States by 2055.1 Older Asian immigrants have to navigate new sociocultural contexts, including relationships with health care providers, dietary recommendations and adjustments, and care-seeking norms.2 They may also experience structural challenges, such as discrimination in the health care system because of race, ancestry, and language.3 These adults often require assistance from unpaid family caregivers (e.g., adult children)-with whom they are also likely to reside-to navigate these sociocultural complexities and barriers in the health care system.4 Yet, our understanding of the experiences and challenges of family caregivers of older Asian immigrants remains limited despite their unique circumstances as children of immigrants who are simultaneously balancing and navigating multiple cultural identities of their own while often being viewed as perpetual foreigners or outsiders to US culture.

Immigration history and experiences likely also influence the use of formal services. Minority family caregivers are less likely than White caregivers to use formal support services (e.g., mental health treatment), suggesting that they may face additional burdens and barriers in the process of supporting their older relative in the health care system.6 Identifying ways to better support family caregivers as they care for their immigrant older relatives is critical for promoting inclusion in the health care system. This requires concerted research on Asian American caregivers and their experiences and challenges in their role supporting older relatives with household, daily functioning, and health care activities as well as navigating sociocultural aspects of care.7 It also requires recognition and consideration of the diversity of experiences and challenges faced by Asian American families, including heterogenous Asian ethnic subgroups with distinct cultures, languages, needs, and preferences.

FULL TEXT

About 4.6 million older adults (aged 60 years and older) in the United States are foreign born, and Asian Americans are projected to become the largest immigrant group in the United States by 2055.1 Older Asian immigrants have to navigate new sociocultural contexts, including relationships with health care providers, dietary recommendations and adjustments, and care-seeking norms.2 They may also experience structural challenges, such as discrimination in the health care system because of race, ancestry, and language.3 These adults often require assistance from unpaid family caregivers (e.g., adult children)-with whom they are also likely to reside-to navigate these sociocultural complexities and barriers in the health care system.4 Yet, our understanding of the experiences and challenges of family caregivers of older Asian immigrants remains limited despite their unique circumstances as children of immigrants who are simultaneously balancing and navigating multiple cultural identities of their own while often being viewed as perpetual foreigners or outsiders to US culture.5

Immigration history and experiences likely also influence the use of formal services. Minority family caregivers are less likely than White caregivers to use formal support services (e.g., mental health treatment), suggesting that they may face additional burdens and barriers in the process of supporting their older relative in the health care system.6 Identifying ways to better support family caregivers as they care for their immigrant older relatives is critical for promoting inclusion in the health care system. This requires concerted research on Asian American caregivers and their experiences and challenges in their role supporting older relatives with household, daily functioning, and health care activities as well as navigating sociocultural aspects of care.7 It also requires recognition and consideration of the diversity of experiences and challenges faced by Asian American families, including heterogenous Asian ethnic subgroups with distinct cultures, languages, needs, and preferences.

We have identified four priority areas to advance research, practice, and policy on the role of family caregivers of older Asian immigrants as informed by our ongoing qualitative research with 30 caregivers of older immigrants from Asian subgroups, including those identifying as South Asian, Chinese, Korean, and Vietnamese: (1) caregivers as sociocultural navigators in the health care system, (2) caregivers' role in detecting and protecting against discrimination, (3) addressing the mental health needs of caregivers and their relatives, and (4) recognizing the heterogeneity of experiences by cultural background.

SOCIOCULTURAL CONTEXT OF CARE DELIVERY

Family caregivers of older immigrants playa critical role in navigating the social and cultural context of health care delivery in the United States on behalf of, or with, their older relatives. This role may be mediated by the caregiver's own identity as an immigrant; for instance, caregivers who are themselves first- or 1.5-generation (i.e., immigrated in childhood) immigrants may have responsibilities with linguistic translation or interpretation of medical terminology, procedures, and paperwork in the absence of professional interpreters in the health care setting.8 However, second-generation (i.e., USborn) immigrants may struggle with translating cultural phrases or Idioms In the health care context. For example, one participant explained that the closest translation for herbal medicine in Hmong is the word for wood chips, which resulted in confusion during a health care visit. Caregivers also discussed their role in navigating the link between dietary practices in health care settings and culture and tradition (e.g., the impact of the Vietnam War on concerns about food security in long-term care). Caregivers may be tasked with interpreting their older relative's customs and practices to their relative's health care provider or helping their relatives reconcile US health care and health care-seeking norms (e.g., use of primary care services rather than emergency departments).

PROTECTING AGAINST DISCRIMINATION

In our study, family caregivers reported detecting discrimination or unfair practices experienced by their older relative, even if their relative normalized or did not recognize those incidents as being discriminatory. They are also attuned to the possibility of discrimination occurring at the intersection of race and ancestry, language proficiency, and gender. For instance, multiple caregivers recalled experiences in which their relative was ignored for hours despite going in with an urgent care need while other patients received care. In instances of observing discrimination, caregivers in our study felt responsible for finding their relative a new provider, and although only a few caregivers felt comfortable speaking up about an incident, many expressed subsequent discouragement and distrust of the health care system.

MENTAL HEALTH NEEDS

Family caregivers in our study discussed challenges with loneliness and isolation as they became increasingly responsible for serving the daily functioning, social, and mental health needs of their older relatives. Several did not recognize that they were a caregiver as a result of complex cultural circumstances, such as norms around filial piety, consequently limiting their use of support services.9 They also discussed observing and supporting their relative through mental health challenges that were undiagnosed because of a lack of culturally and linguistically appropriate screening tools. Asian Americans, for example, exhibit cultural variations in the way distress is expressed-called "idioms of distress" in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. These idioms of distress affect the likelihood and type of service utilization and the way mental health symptoms are reported in research. For example, an extensive line of research has found that East and Southeast Asians are more likely to experience mental health symptoms in somatic rather than psychological terms.10 However, somatic symptoms, which include headache and fatigue, are not included in most depression and anxiety screenings.

DISAGGREGATING DATA

Improving the quality of research and subsequent implications for health care and supports for family caregivers and their older Asian immigrant relatives requires disaggregation of data on Asian Americans from research conceptualization to analysis and interpretation.11-13 For example, many South Asian family caregivers of Indian origin in our study discussed how they and their older relative follow a strict vegetarian diet, limiting dietary options in health care facilities. A Hmong caregiver explained that in Hmong culture meat is a symbol of wealth, and modifying her relative's diet at home to meet clinical recommendations to manage cardiometabolic health conflicts with this cultural norm. Policies and practices-such as dietary guidelines-that assume that needs and preferences of all Asian immigrants and their caregivers are uniform ultimately reinforce a lack of inclusion in the system.

RECOMMENDATIONS

Our ongoing work informs several recommendations. First, diversifying the health care workforce (e.g., social workers, community health workers, medical interpreters, and dietitians) and building cultural literacy across care teams is critical to supporting family caregivers in their responsibilities as a sociocultural navigator. Further, health systems should facilitate early relationships and rapport building between patients, family caregivers, and these health professionals to promote trust.

And yet, although representation in the workforce is a promising avenue for promoting cultural sensitivity, health care institutions must also recognize and address the fact that seeking care from the health care system does not necessarily mean that patients are truly included in the system.14 Maintaining these cultural barriers will only perpetuate a health system that lacks inclusion, thereby exacerbating health disparities. For instance, health care facilities could offer foods that cater to multicultural dietary preferences, and clinicians could recommend dietary modifications that are culturally relevant. Consistently, there is a need to include multiple Asian American communities in research and to disaggregate their data to compare across communities. Further, racial and ethnic differences in outcomes should not be attributed merely to cultural identity but, again, to the sociocultural context in which older adults and family caregivers live as well.

Future research should also consider diverse methodologies (i.e., quantitative and qualitative), approaches (e.g., individual and dyadic interviews; longitudinal surveys), and tools (i.e., translation of surveys, interviews, and clinical trials-e.g., for dementia-in multiple languages). These considerations are crucial for enhancing the quality of research and the applicability of findings to practice and policy so that the distinct needs of different Asian American communities are considered rather than a having a "one size fits all" approach to policy. For instance, intake forms for adding prospective participants to registries should be available in multiple languages to ensure the availability of research opportunities for Asian immigrants and their family caregivers and the accessibility of study components. Scales used in clinical settings to assess psychological distress should be translated not only in a breadth of languages but also in a reliable and valid way that is considerate ofthe cultural context in which language operates.15 Support groups and interventions for older adults and family caregivers should recognize that cultural and associated social barriers may limit the inferences drawn from previous literature. These limitations should be acknowledged and considered when developing subsequent interventions.

CONCLUSIONS

Supporting Asian immigrants and their family caregivers is a health system imperative and requires further insight into the caregiving role, caregiver and immigrant mental health needs, cultural sensitivity and relevance of programs and research, and disaggregation of data to illuminate the varied experiences and associated challenges and needs of distinct Asian American communities. "4JPH

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CONTRIBUTORS

M.Raj conducted the research study.M.Raj and S.Zhou conceptualized the study. All authors wrote and reviewed the editorial.

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CONFLICTS OF INTEREST

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Childhood Asthma and Air Pollution

Anonymous

ProQuest document link

FULL TEXT

Childhood asthma prevalence in Australia is high, affecting 12% of boys and 8% of girls. Ewald et al. calculated the impact of a hypothetical reduction of nitrogen dioxide (NO2) air pollution on childhood asthma in New South Wales. They based their estimates on the existing asthma prevalence and average annual NO2 concentrations across 128 local government areas. They derived population-weighted NO2 values from a satellite-based land use regression model and applied dose-response coefficients from two meta-analyses and an Australian cross-sectional survey. They determined that a 25% reduction in NO2 would lead to between 2597 and 12 286 fewer children with asthma in New South Wales. NO2 reductions may be pursued through more stringent ambient air quality standards and lower emission transportation strategies.

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Capitalizing on Missed Opportunities for Sexual Health Workforce Development by Adoption of a Sexual Health Paradigm

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ABSTRACT (ENGLISH)

Sexually transmitted infections (STIs), a longstanding problem for Americans, were characterized as a hidden epidemic in a 1997 Institute of Medicine report.1 More than two decades later, the National Academies of Sciences, Engineering, and Medicine (National Academies) have revisited the topic and released Sexually Transmitted Infections: Adopting a Sexual Health Paradigm,2 a consensus study report with recommendations for responding to persistently high, increasing, and now record-level rates of reported STIs.3 Despite more than two decades of separation, the two reports discuss surprisingly similar key problems. STIs remain a major cause of morbidity, disproportionately affecting younger persons and having lifelong consequences.1,2 Reportable STI rates have increased since 1997, and the latest data reflect an all-time high.3 Estimates suggest that approximately one in five people in the United States had an STI on any given day in 20184 Although the STI burden is increasing across all population groups, adolescents and young adults, women, men who have sex with men, and other groups underserved by mainstream health and public health systems remain disproportionately affected. Therefore, the dire need for increased public health attention and resources for addressing the "hidden epidemic" of STIs persists today. The lack of progress in STI prevention and control is owing to longstanding underinvestment in the broader public health system and its workforce, as highlighted during the COVID-19 pandemic. For example, the Centers for Disease Control and Prevention's (CDC's) inflation-adjusted budget for STI prevention decreased by 40% since 2003.5 This underinvestment has contributed to the deterioration of the STI-focused public health infrastructure, programming, and workforce, including unmet staffing needs in state and local STI programs and declining availability of public health STI specialty clinics, an important safety net for individuals without health insurance. We draw on the National Academies' new report to outline a roadmap for rebuilding and expanding a workforce that is equipped for effective STI prevention and control, thereby addressing a missed opportunity from more than two decades ago: investing in STIs and sexual health as a public health priority.

FULL TEXT

Sexually transmitted infections (STIs), a longstanding problem for Americans, were characterized as a hidden epidemic in a 1997 Institute of Medicine report.1 More than two decades later, the National Academies of Sciences, Engineering, and Medicine (National Academies) have revisited the topic and released Sexually Transmitted Infections: Adopting a Sexual Health Paradigm,2 a consensus study report with recommendations for responding to persistently high, increasing, and now record-level rates of reported STIs.3 Despite more than two decades of separation, the two reports discuss surprisingly similar key problems. STIs remain a major cause of morbidity, disproportionately affecting younger persons and having lifelong consequences.1,2 Reportable STI rates have increased since 1997, and the latest data reflectan all-time high.3 Estimates suggest that approximately one in five people in the United States had an STI on any given day in 20184 Although the STI burden is increasing across all population groups, adolescents and young adults, women, men who have sex with men, and other groups underserved by mainstream health and public health systems remain disproportionately affected. Therefore, the dire need for increased public health attention and resources for addressing the "hidden epidemic" of STIs persists today.1,2

The lack of progress in STI prevention and control is owing to longstanding underinvestment in the broader public health system and its workforce, as highlighted during the COVID-19 pandemic. For example, the Centers for Disease Control and Prevention's (CDC's) inflation-adjusted budget for STI prevention decreased by 40% since 2003.5 This underinvestment has contributed to the deterioration of the STIfocused public health infrastructure, programming, and workforce, including unmet staffing needs in state and local STI programs and declining availability of public health STI specialty clinics, an important safety net for individuals without health insurance.2,5

We draw on the National Academies' new report to outline a roadmap for rebuilding and expanding a workforce that is equipped for effective STI prevention and control, thereby addressing a missed opportunity from more than two decades ago: investing in STIs and sexual health as a public health priority.

ADOPTING A SEXUAL HEALTH PARADIGM

As a guiding paradigm for STI prevention and control, the National Academies committee that wrote the report recommends adopting a holistic perspective on sexual health as a key dimension of healthy living.2 Wider recognition of this concept is reflected in calls from Congress to establish a Federal Office of Sexual and Reproductive Health and Wellbeing.6 Importantly, this new paradigm requires consideration of the sociostructural determinants of sexual health and STI risk beyond individual behavior. A holistic sexual health paradigm is supported by empirical evidence, which suggests that sociostructural factors are central in determining individual STI risk and in producing STI disparities, rendering health inequity a driving force in STI epidemiology.2

The proposed sexual health paradigm for STI prevention and control is more than a change in terminology and is a twofold opportunity for moving beyond enduring stigma and chronic underresourcing. First, adoption of a health-centered perspective moves toward the abandonment of the disease-focused, stigma-loaded framing of STIs that had persisted across previous nomenclature changes (i.e., "venereal disease" to "sexually transmitted disease" to "sexually transmitted infection"). Second, recognition of sexual health as an integral component of broader health and well-being creates opportunities for using additional resources and partnerships (e.g., in education, family services, community health) to supplement STI-specific funding and infrastructure and a STIspecific workforce. Notably, the COVID19 response demonstrated the benefits of braiding and blending funds to facilitate cross-agency collaboration in improving health-related services.7

In relation to the workforce, the adoption of a sexual health paradigm has implications for (1) broadening ownership and accountability for STI prevention and control, (2) redefining STI specialists from a public health perspective, and (3) creating new sexual health-focused workforce opportunities across the public health system.

BROADENING OWNERSHIP AND ACCOUNTABILITY

There is a longstanding misperception by too many primary care practitioners that addressing sexual health and STIs is nottheirjob, narrowly vesting responsibility for sexual health promotion and STI services in STI clinics or among a relatively small number of STI and sexual and reproductive health specialists. However, additional practitioners across clinical health care and public health, most notably primary care providers, can be used if a well-being-focused sexual health paradigm is adopted and applied to workforce development. Therefore, the committee identifies a wide range of professionals and stakeholders as part of the sexual health workforce.

Although primary care providers (i.e., primary care physicians, nurse practitioners, and physician assistants), nurses, and many clinical behavioral health professionals are well positioned to deliver or facilitate sexual histories, STI vaccination, routine testing, and treatment, clinical health care generalists often do not sufficiently prioritize sexual health services.2 Recognition of the important role of general practitioners in sexual health and STI services is required. The committee therefore recommends that clinical practice guidelines and training curricula for health care generalists define a minimum set of sexual health competencies, more heavily emphasizing the importance of the consistent delivery of recommended sexual health services, such as sexual histories, STI screening, and vaccination.2

As first-line providers trained to deliver most aspects of sexual health promotion, STI prevention, and STI management and as the largest segment of the health care workforce, nurses are particularly well positioned to increase the reach of sexual health services.2 The committee encourages a broader scope of nursing practice in sexual health services as meaningful for strengthening the sexual health workforce and reducing STI disparities-guidance aligned with the vision outlined in the National Academy of Medicine's The Future of Nursing 2020-2030 report to use nurses for addressing social determinants of health and population health in the United States.8

Given that about 90% of the US population lives within two miles of a community pharmacy, pharmacists can serve as convenient entry points into the health care system, including for sexual health services.2 The committee therefore highlights the utility of incorporating pharmacists into the sexual health workforce, particularly for STI testing using point-of-care tests.

Research to develop and improve biomedical tools, behavioral interventions, and sexual health service delivery models and implementation strategies to adopt existing evidence-based programs are essential for improving the response to STIs.2 The report emphasizes the need for increased investments in sexual health research, includingtraining programs and incentives for researchers to take up sexual health-focused work.

Research demonstrates that parents, health educators, community health workers, and civic and religious leaders can be influential in family- and community-based sexual health education and promotion.2 It is essential to recognize these stakeholders as an important segment of the sexual health workforce and to mobilize the public health system to provide them with resources, training, and support.

Disease intervention specialists reduce the transmission of STIs by providing ground-level STI education and partner services, including counseling, testing, and referrals.2 The committee reaffirms the importance of disease intervention specialists in promoting sexual health and addressing STIs, especially syphilis, and highlights their utility for responding to outbreaks of other communicable diseases, for example through contact tracing for COVID-19.2 The recently announced governmental investment of $1.13 billion from the American Rescue Plan Act to strengthen the disease intervention specialist workforce to address COVID-19 and other infectious diseases is an important step in the right direction.9

REDEFINING SPECIALISTS

Beyond broadening ownership and accountability for sexual health, the development of sexual health and STI specialty expertise in all sectors of the public health system is integral. Traditionally, professionals considered as STI specialists have been mainly limited to clinical STI specialty providers and disease intervention specialists. Yet expertise across clinical, epidemiological, sociobehavioral, pharmaceutical, diagnostic, programmatic, and policy domains of public health is necessary to develop and implement a comprehensive strategy for sexual health promotion and STI control.2

For example, clinical sexual health specialty providers are needed to manage complicated STI cases and to provide technical assistance for health care generalists. Epidemiologists with sexual health specialty expertise are required to design and improve sexual health surveillance systems and to identify risk and protective factors to be used for behavioral, biomedical, diagnostic, and structural interventions. Practitioners and researchers with sexual health specialty expertise can implement existing and develop new interventions and advance the accuracy, timeliness, and practical utility of diagnostics. Public health administrators and public officials with sexual health specialty expertise are crucial for designing and implementing public health programs and federal, state, and local regulations that facilitate, rather than obstruct, sexual health promotion and STI prevention and control. The group of professionals considered sexual health specialists should therefore be redefined by considering each relevant sector of the public health system.

CREATING OPPORTUNITIES

Given that professionals with sexual health specialty expertise remain scarce in many sectors of the public health system, efforts to attract and sustain such a workforce are needed, for example, through investments in sexual health-focused training opportunities and subsequent career paths. Various partners can be engaged to improve sexual health-focused training and career opportunities, including the CDC, state and local health departments, federally qualified health centers, the National Coalition of STD Directors, the National Network of STD Clinical Prevention Training Centers, disease intervention specialiststraining centers, universities (e.g., schools and departments of medicine, nursing, the biomedical sciences, public health, and social work), and commercial pharmaceutical businesses through publicprivate partnerships.2,10

Both the existing workforce and the next generation of professionals require opportunities for the development of sexual health and STI specialty expertise. For this workforce, sexual health and STI-focused continuing education is scarce, and additional opportunities should be offered by the CDC, state and local health departments, STI and HIV expert providers, and STI prevention training centers.2 For future professionals, sexual health-focused electives offered as part of professional education for physicians, nurses, physician assistants, and other health and social service professionals (e.g., pharmacists, behavioral health practitioners, social workers, public health professionals) are important (e.g., as sexual health certificate programs as extensions to professional degrees).2 In addition, the expansion of fellowship-based sexual health specialty training programs could strengthen the pipeline for future clinical, epidemiological, programmatic, and policy leaders.2

The committee emphasizes that the Department of Health and Human Services, especially through the CDC Division of STD Prevention, has particular responsibility for leadership in elevating STIs on the national public health agenda by promoting sexual health-focused training and career opportunities. To this end, the involvement of and support for local stakeholders in planning and coordinating sexual health promotion and the responses to STIs at the jurisdiction level is crucial. To develop effective local sexual health workforces around the country, the report envisions a formal infrastructure for training and technical assistance that draws on existing sexual health and STI expertise from STI and HIV expert providers; for example, through local or regional STI resource centers.

CONCLUSIONS

The 1997 Hidden Epidemic report was a missed opportunity to invest in STIs as a national public health priority. The new National Academies' report on STIs provides another opportunity to address this continuing challenge, particularly given that the release of the first National STI Strategic Plan for the years 2021 through 2025 indicated renewed interest in STIs at the federal level.11 The National Academies' report defines sexual health as an integral component of healthy living and as a guiding paradigm for future STI prevention and control efforts. This new sexual health paradigm necessitates broadening ownership and accountability for STI prevention and management to include practitioners and stakeholders not traditionally considered part of the sexual health workforce, redefining STI specialists from a public health perspective, and creating opportunities for sexual health specialty training and careers across the public health system.

Decades of underinvestment in the broader US public health system have contributed to record levels of reportable STIs. The COVID-19 pandemic has increased momentum for greater prioritization ofthe public health infrastructure and workforce.2,12 Too often, however, past calls to strengthen infrastructure and the workforce in response to contemporary public health priorities have yielded only inadequate and short-lived action, such as the response to the 1997 Hidden Epidemic report. Using the renewed focus on public health to address one of the leading cause of morbidity in the United States-namely STIs-through targeted workforce development is an opportunity that should not be wasted. AJPH

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DETAILS

Subject:	Health care policy; Training; Intervention; Reproductive health; Drug stores; Health promotion; Immunization; Pharmacists; Medicine; Medical research; Workforce; Public health; Nursing; Coronaviruses; Disease transmission; Infectious diseases; Sexually transmitted diseases--STD; Epidemiology; Disease prevention; Nurses; Accountability; Epidemics; Primary care; Committees; Health services; Adolescents; Morbidity; Young adults; COVID-19; Pandemics; Men; Health care industry; Infections; Clinics; Inflation; Health insurance; Disease control; Prevention; Public works; Men who have sex with men; Gays &lesbians; Mens health; Sexual health
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Document 26 of 37

Is the Probation Population's Health and Health Care Utilization Gendered?

Dillavou, Julia, MA [1] ; Zhang, Yiwen, MA MPP [1] [1] PhD candidate in the Department of Sociology and Criminology, Pennsylvania State University, University Park.

ProQuest document link

FULL TEXT

We read with great interest the article by Hawks et al.1 comparing the health and care use of adults under probation with that of adults not under supervision. The authors used data from the National Survey on Drug Use and Health to draw comparisons between individuals 18 to 49 years of age who either were or were not on probation. We commend the authors for focusing on the characteristics and unmet needs of this population; however, we have some concerns. Most importantly, given the evidence of gender differences in populations with psychiatric and substance use disorders2,3 as well as justice involvement,4,5 we wonder why the authors chose notto further split their analyses by gender or include interactions in their modeling strategy.

Figure 1 of the article displays the proportions of respondents on probation with physical and mental health conditions broken down by racial categories. Although salient in understanding the prevalence of such conditions and access to care, race is inextricably connected to gender within the power structures that affect social determinants of health and access to resources, including treatment. This figure shows little variation across race, but it does not address the evidence that justiceinvolved women have high rates of mental health diagnoses, substance use disorders, and histories of material hardship and trauma. These rates are often found to be higher than the rates among both justice-involved men and the general population of women.

It is imperative to consider gender when comparing justice-involved populations with the general population. Women entering the criminal justice system are likely to have a gendered set of risk factors, including a high prevalence of mental health problems, substance use disorder, and material hardship. Women also face unique barriers to entry for substance use disorder treatment and experience gender-based stigma for such disorders.6,7 These risk factors and barriers may be further exacerbated by racialized systems of disadvantage. We believe that by not accounting for gendered differences in condition prevalence and care use as well as potential interactions with race, Hawks et al. may have left significant associations out of their explanations for the distinctions between individuals on parole and those not under supervision. AJPH

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CONTRIBUTORS
J. Dillavou conceptualized and contributed to the writing of the letter. Y. Zhang contributed to the writing and editing of the letter.

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The authors declare no potential conflicts of interest.

Sidebar

Letters to the editor referring to a recent AJPH article are encouraged up to 3 months after the article's appearance. By submitting a letter to the editor, the author gives permission for its publication in AJPH. Letters should not duplicate material being published or submitted elsewhere. The editors reserve the rightto editand abridge letters and to publish responses. Text is limited to 400 words and 7 references. Submit online at www.editorialmanager.com/ajph. Queries should be addressed to the Editor-in-Chief, Alfredo Morabia, MD, PhD, at editorajph@apha.org

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DETAILS

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Document 27 of 37

Warning: Don't Let the Beverage Industry Harm Your Kids

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ABSTRACT (ENGLISH)

This issue of AJPH brings some good news for everyone concerned about childhood nutrition: in a rigorous, randomized controlled trial-the first study of its kind to my knowledge- Krieger et al. (p. 1997) found that countermarketing on social media could reduce purchases and consumption of sugary fruit drinks and increase consumption of water among Latino/a/x1 parents and their children. The key to understanding the significance of this study is in the definition of "countermarketing," a technical term that directs audiences' attention to the behavior of industry.

FULL TEXT

This issue of AJPH brings some good news for everyone concerned about childhood nutrition: in a rigorous, randomized controlled trial-the first study of its kind to my knowledge- Krieger et al. (p. 1997) found that countermarketing on social media could reduce purchases and consumption of sugary fruit drinks and increase consumption of water among Latino/a/x1 parents and their children. The key to understanding the significance of this study is in the definition of "countermarketing," a technical term that directs audiences' attention to the behavior of industry.

DENORMALIZING INDUSTRY PRACTICES

Unlike general social marketing or other communications campaigns, countermarketing is designed "to reduce the demand for unhealthy products by exposing the motives of their producers and portraying their marketing activities as outside the boundaries of civilized corporate behavior."2(p120) The spectrum of health communications can stretch from inspiring individual behavior change on one end to campaigns that influence policy, systems, and environmental change on the other; countermarketing sits at the systems end of the spectrum, with the intention of shiningthe light on institutions with the power to change environments.3 At scale, countermarketing improves health by denormalizingthe marketing practices-the normal business practices-of companies producing products that harm health.2

The messages Krieger et al. tested put the beverage industry's manipulative marketing front and center. For example, one of their messages shows a girl with severe tooth decay holding a fruit drink pouch bearing an "allnatural" claim and the text "Just because a label states 'all-natural' doesn't make a fruit drink healthy. Don't let the beverage industry harm your kids." (I encourage AJPH readers to view the images in the supplemental material to feel their, well, punch.) The study demonstrated the strength of the messages with statistically significant reductions in parents selecting fruit drinks in the virtual store and in their reported consumption in real life later.

As Krieger et al. note, tobacco control has had celebrated success with countermarketing. Indeed, the study's message is reminiscent of a countermarketing message from California's storied campaign Warning: The Tobacco Industry Is Not Your Friend, a campaign credited with tripling the decline in smoking in California.4 But such campaigns are expensive. California's multimillion dollartobacco education campaign was funded by a statewide tobacco tax, and a similarly robust early effort, the original "truth" campaign in Florida, was funded with $200 million from Florida's $11.3 billion settlement with the tobacco industry.5 Krieger et al. suggest that their findings will help local organizations without such deep pockets reach parents with successful countermarketing because the messages were tested on social media, in this case, Facebook.

QUESTIONS OF HEALTH AND RACIAL EQUITY

Herein lies an irony: is Facebookthe solution or the problem? Krieger et al. point out the affordability of social media campaigns, but reach is still an issue. Posts from alcohol, tobacco, and food companies often generate millions of views, whereas communityorganized grassroots health-focused social media might generate views that number in the hundreds.6 Getting to scale, even on social media, can be expensive.

The social media platforms themselves, including Facebook, are now the largest junk food marketers. Google and Facebook alone account for the majority (nearly 60%) of digital ad spending worldwide,7 and social media is where food and beverage companies go to reach children.8 Facebook has worked with Coca-Cola, PepsiCo, Unilever, Nestlé, and many other companies to enable sophisticated marketing across its platform.8 Consider just one example: in 2019, Pepsi partnered with Facebook's Instagram to produce 230 million bottles of soda imprinted with mobile phone codes that triggered "full-screen immersion" augmented reality effects to stimulate purchases of 20-ounce bottles of Pepsi.8 Even with the low entry fees to social media, it will be hard for public health to compete with immersive, enticing, and everpresent digital campaigns.

Sugary beverage marketing is a health equity issue because the food, beverage, and digital marketing industries hold the power over what children see. It is also a racial equity issue because children of color are heavily targeted with marketing for sugary beverages and other junk food.9 Although parents control the products they serve their children, it is not fair to hold parents solely responsible for the effects of marketing they do not control. These power imbalances force us to turn our attention not just to the decisions individual parents make about what they and their families consume but also to the policies that shape the environment in which those decisions are made.

Countermarketing can help when the messages are part of policy campaigns to rein in industry behavior. Recent research has demonstrated, for example, that messages emphasizing the intersections among industry behavior, parental decisions, and community efforts may be particularly effective in moving diverse constituents to support policy such as marketing restrictions, and communities of color in particular may be more attuned, perhaps through lived experience with aggressive target marketing, to the value of policy in shaping industry behavior.10 Current legislative and legal antitrust actions against tech giants, including Facebook, are an opportunity to restrict marketing practices across digital platforms, including marketing for sugary drinks.8

CONCLUSIONS

In the early 1990s, the task of the tobacco control movement was "to publicly identify the tobacco cartel as the enemy, and to fight to dislodge it from its positions of power."11(p35) Countermarketing was an important tool in tobacco control. Krieger et al. have shown that we can wield the same tool to improve childhood nutrition by making visible the actions of food and beverage marketers targeting children. Let's put this good news to use by placing responsibility at the feet of the platforms and companies profiting from directly and incessantly targeting children with marketing the food and drink they should avoid. "4JPH

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CONFLICTS OF INTEREST

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DETAILS

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Document 28 of 37

Philadelphia's Excise Tax on Sugar- Sweetened and Artificially Sweetened Beverages and Supplemental Nutrition Assistance Program Benefit Redemption

Chrisinger, Benjamin W, PhD, MUEP

ProQuest document link

ABSTRACT (ENGLISH)

Objectives. To assess the effect of a 2017 excise tax on sugar and artificially sweetened beverages in Philadelphia, Pennsylvania, on the shopping patterns of low-income populations using Supplemental Nutrition Assistance Program (SNAP) data. Methods. I used a synthetic controls approach to estimate the effect of the tax on Philadelphia and neighboring Pennsylvania counties (Bucks, Delaware, and Montgomery) as measured by total SNAP sales ("SNAP redemption") and SNAP redemption per SNAP participant. I assembled biannual data (2005-2019) from all US counties for SNAP redemption and relevant predictors. I performed placebo tests to estimate statistically significant effects and conducted robustness checks. Results. Detectable increases in SNAP spending occurred in all 3 Philadelphia neighboring counties. Per-participant SNAP spending increased in 2 of the neighboring counties and decreased in Philadelphia. These effects were robust across multiple specifications and placebo tests. Conclusions. The tax contributed to increased SNAP shopping in Philadelphia's neighboring counties across both outcome measures, and decreased spending in Philadelphia (at least by 1 measure). This raises questions about retailer behavior, the effectiveness of the tax's public health aim of reducing sugar-sweetened beverage consumption, and policy aims of investing in low-income communities.

FULL TEXT

Headnote

Objectives. To assess the effect of a 2017 excise tax on sugar and artificially sweetened beverages in Philadelphia, Pennsylvania, on the shopping patterns of low-income populations using Supplemental Nutrition Assistance Program (SNAP) data.

Methods. I used a synthetic controls approach to estimate the effect of the tax on Philadelphia and neighboring Pennsylvania counties (Bucks, Delaware, and Montgomery) as measured by total SNAP sales ("SNAP redemption") and SNAP redemption per SNAP participant. I assembled biannual data (2005-2019) from all US counties for SNAP redemption and relevant predictors. I performed placebo tests to estimate statistically significant effects and conducted robustness checks.

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Conclusions. The tax contributed to increased SNAP shopping in Philadelphia's neighboring counties across both outcome measures, and decreased spending in Philadelphia (at least by 1 measure). This raises questions about retailer behavior, the effectiveness of the tax's public health aim of reducing sugar-sweetened beverage consumption, and policy aims of investing in low-income communities.

(Am J Public Health. 2021 ;111(11):1986-1996. https://doi.org/10.2105/AJPH.2021.306464)

Policies aimed at reducing population-level intake of sugarsweetened beverages (SSBs) via excise taxes have now been adopted by several cities in the United States (e.g., Berkeley, Oakland, and San Francisco, California).1 Recent evaluations of a $.015-per-ounce excise tax in Philadelphia, Pennsylvania, a broader tax on both sugar-sweetened and artificially sweetened beverages, have documented significantly higher prices and lower sales of taxed items following the policy's implementation on January 2017.2 Though other research has not found any significant changes in unemployment claims across potentially affected industries, retailers and industry groups contend that recent store closures are directly related to the Philadelphia tax.3 Tax opponents often cite the regressive nature of the tax (i.e., on average, lower-income individuals spend a higher proportion oftheir incomes on SSBs than higher-income individuals), and supporters highlight the tax's progressivity via its revenueraising utility for antipoverty initiatives (e.g., universal prekindergarten schooling), a deliberate political feature ofthe Philadelphia tax identified by qualitative researchers.45 Still, to my knowledge, no research has investigated how low-income shoppers responded to the beverage tax.

The socioeconomic context of food shopping is critical in Philadelphia. While the city's unemployment rate has declined from a 2012 peak of 10.9% to 6.2% in 2017 (vs national rates of 9.0% and 4.4%, respectively), food insecurity has risen over recent years, and the poverty rate has remained relatively flat at about 26%, the highest among the nation's largest 10 cities.6,7 In 2017, 22.1% of Philadelphia households participated in the federal government's largest and most widespread effort to reduce food insecurity, the Supplemental Nutrition Assistance Program (SNAP), nearly double the national rate of participation (11.2%).8 However, the average monthly amount of SNAP benefits redeemed at eligible retailers in Philadelphia also declined by $5.4 million between 2016 and 2017, mirroring, at least partially, national declines in SNAP participation after a period of expansion following the 2008 economic crisis as part of the American Recovery and Reinvestment Act. During the same time, however, SNAP spending increased in the counties immediately neighboring Philadelphia, contrary to state and national trends. A key aim of this study was to identify approximately how much of these changes in SNAP spending, if any, is attributable to the tax.

Generally, SNAP is allocated monthly to participating households via electronic benefit transfers in amounts based on characteristics such as income, age, and the presence of children; nationwide, the average SNAP participant received about $127 per month in 2018. The program is "cashlike," in that participants can redeem benefits on any food item (excluding prepared foods, alcohol, medicines, or vitamins) at approved retailers. For many low-income households, SNAP benefits comprise a significant portion of monthly food budgets and are fully exhausted by the end of the month, though unused benefits are carried forward.9,10 While the program helps guard against experiences of deep poverty, food insecurity, and hospitalization,11,12the nutritional content of SNAP purchases has also been the subject of scrutiny. Proposals from the political left and right call for restricting or excluding certain food items from SNAP,13,14 responding in partto studies that identify socioeconomic gradients in diet quality, with poorer households purchasing and consuming less healthy, often lower-cost foods.15,16 Cyclical patterns are commonly observed in analyses of benefit use, with end-of-month periods characterized by decreased food intake and lower nutritional quality of foods consumed.9,17 The program's relationship with neighborhood food environment is also notable: previous research has shown associations between SNAP retailer availability and participant enrollment,18,19 a multiplier effect of SNAP spending that stimulates broader economic activities,20 and the monthly cycle in SNAP spending cited by retailers as a barrier to operating stores in lowerincome communities.21 Thus, SNAP spending is key to our understanding of how policies might affect the health and everyday lives of socioeconomically disadvantaged groups.

METHODS

Monthly totals (2005-2019) for the dollar value of all SNAP benefits spent at eligible retailers in a given county (subsequently called "SNAP redemption") were obtained from the US Department of Agriculture (USDA) for all counties in the United States from 2005 to 2019. Monthly counts (2005-2019) of stores where SNAP could be redeemed were also included. Redemption amounts from counties with 4 or fewer SNAP-eligible retailers are redacted by the USDA to protect retailer identities, though this typically only applies to very small counties.

The count of SNAP participants and amounts of SNAP benefits distributed were also obtained for every county from USDA; these data are released biannually, with month estimates provided for every January and July. Statelevel agencies that administer SNAP locally collect this information and provide it to USDA. Monthly county-level unemployment rate estimates were obtained from the US Bureau of Labor Statistics. County-level population estimates from the 2012-2016 5-year American Community Survey were also included as covariates. Table A (available as a supplement to the online version of this article at http://www.ajph. org) provides a summary of data sources.

Study Dates

To allow this analysis to incorporate government stimulus-related SNAP spending patterns, the starting month was selected as January 2005, several years before the onset of the American Recovery and Reinvestment Act. To temporally match data sets, only observations from January and July were included in this analysis, as this was the frequency of USDA reporting for county-level SNAP-participating individuals and SNAP benefits distributed. January 2019 observations were omitted from this analysis, as an anomalous spike appears in SNAP redemption across all counties. July 2019 was selected as the end month, and the resulting monthly data set included 24 pretax observations and 5 posttax observations for each county.

Outcome Variables

The primary outcome variable was total county-level monthly SNAP redemption. As a secondary outcome, I calculated the value of SNAP redemption in a county per SNAP participant (hereafter called "SNAP per participant") by dividing SNAP redemption by the count of SNAP participants in a county for a given month. I repeated the analyses subsequently described separately for each outcome.

Statistical Analyses

I employed a synthetic control approach to model the effect of the excise tax. I fit 4 separate synthetic control models (Philadelphia and its immediate neighbors, Bucks, Delaware, and Montgomery counties) for each outcome. Philadelphia is a consolidated city-county, so references to "Philadelphia," "Philadelphia County," or "city of Philadelphia" are interchangeable. I did not assess neighboring counties in NewJersey, given the additional physical and economic obstacles to travel (e.g., Delaware River with only toll-bridge crossings; see Figure A, available as a supplement to the online version of this article at http://www.ajph. org). This synthetic control method, pioneered by the work of Abadie, Gardeazabal, Diamond, and Hainmueller,22-24 has been used in previous social science research and is built upon interactive fixed-effect models, which generate hypothetical or "synthetic" controls for each treated unit, rather than a more traditional matching approaches often used in evaluation research.24-26 The synthetic control approach leverages time-series outcomes across many potential donor units to identify optimal weights for estimating a counterfactual unit and can also integrate and weight the influence of covariates. Synthetic control studies typically employ a test statistic proposed by Abadie etal.- ratio of the root mean squared prediction errors (RMSPEs)-to compare models and calculate a treatment P value from a placebo test, which refits a synthetic control for each of the donor units.24

Selection of donor counties. As described by Bouttell et al., synthetic control methods rest on several assumptions: (1) the similarity of treated and potential control units, (2)no spillover effects of intervention to potential controls, and (3) no external shocks.27(p676) To satisfy the first assumption, following the guidance of McClelland and Gault,28 the pretreatment trends for SNAP redemption were also used to narrow the pool of potential donor counties. I calculated simple linear regressions for each potential donor county for 2 periods, 2008-2013 and 2014-2016, and extracted a slope to approximate the trend in SNAP redemption for the county. I chose these periods to reflect the expansion in SNAP underthe American Recovery and Reinvestment Act, with peak SNAP enrollments occurring in 2013. Nationally, SNAP enrollment was declining in the second pretreatment period (2014-2016). At least 20 possible donor counties were selected based on their pretreatment predictor values and slopes.

This analysis directly addressed the second assumption, as it attempts to measure the spillover of the Philadelphia policy into its most geographically accessible neighbors by fitting separate models for each neighboring county. These neighboring counties were excluded from each other's potential donor pools (e.g., Montgomery County was excluded as a potential donor for synthetic Bucks and Delaware counties). Furthermore, any counties with similar local beverage taxes duringthe study period (San Francisco County and Alameda County in California)29 and their immediate neighbors were also excluded from the data set. I used visual inspection of time-series outcome variable plotsto identify potential external shocks (assumption 3).261 included only counties with complete data duringthe study period in the final data set.

Synthetic control estimation and specification searching. Recent methodological literature provides further guidance for systematic application of synthetic controls, especially as to the use of pretreatment lagged outcome observations in developing the synthetic unit.30 The guidance provided by Ferman et al. is meant to offer a systematic way of specifying, choosing among, and testing different synthetic control specifications (Table B, available as a supplementto the online version ofthis article at http://www.ajph.org) for significant treatment effects, as a means of guarding against specification searching for statistical significance, and over- and underrejection ofthe null hypothesis.30 In short, I used the following steps to identify synthetic control specifications and assess importance ofthe results: (1) visual inspection of pre-treatment gaps, which should be relatively small for well-fitting synthetic controls; (2) a P value less than .10 from the placebo test described by Abadie et al.;24

(3) consistency of treatment effect observed across 95% confidence set calculations that combine specifications not rejected by steps 1 and 2; and (4) for the specification selected by a MSPE criterion proposed by Dube and Zipperer,31 consistency of the treatment effect observed in different covariate configurations, and "leave-one-out" and "in-time" placebo tests. These steps are described in greater detail in the Appendix (available as a supplement to the online version of this article). The assembled data set and code used for conducting the analyses are available on the Oxford University Research Archive (https://doi.org/10.5287/ bodleian:0oqGkDBdy).

RESULTS

The average monthly SNAP benefits redeemed in Philadelphia County in 2016 was $61.78 million (SD = $.8 million), and $7.85 million across the 3 bordering counties in Pennsylvania, all higher than the monthly average for Pennsylvania counties ($2.22 million) or the national average ($1.8 million). In 2017, SNAP redemption fell by 6.5% in Philadelphia (to $57.75 million), 1.9% in other Pennsylvania counties (to $2.18 million), and 2.1 % nationwide (to

$1.76 million). All of Philadelphia's neighboring Pennsylvania counties saw a rise in SNAP redemption: 3.1 % in Bucks (to $5.25 million), 6.0% in Montgomery (to $9.77 million), and 8.9% in Delaware County (to $10.06 million). Figure 1 illustrates the trend for SNAP outcomes in Philadelphia and its immediate neighbors.

Over the same period, SNAP participation decreased nationally (-2.8%), with a smaller decrease in Pennsylvania counties (-0.7%). Philadelphia saw a decrease in SNAP participation of 1.4%, while 2 of its neighbors saw steeper decreases (-3.9% in Montgomery and -2.2% in Bucks), and there was an increase of less than halfa percent (.2%) in Delaware County. From 2016 to 2017, SNAP benefit distributions decreased by 4.4% nationwide, 1.4% in Pennsylvania counties, and 2.1% in Philadelphia. Among neighboring counties, decreases were also observed: -2.7% in Bucks, -0.5% in Delaware, and -5.3% in Montgomery.

SNAP Redemption Outcome

For SNAP redemption in Philadelphia, no specifications appeared to have a good fit, indicating that a synthetic control estimation may not be appropriate. Visual inspection of gap plots illustrated that the differences observed after treatment were not much larger than gaps seen between the treated and synthetic Philadelphia data in pretreatment periods. This may be reflective of the need to relax selection criteria to achieve a donor pool size larger than 20, indicating the difficulty in establishing a reasonable synthetic unit given the predictors used.

For SNAP redemption in Bucks County, all specifications indicated a positive long-run trend; of these, specification 5 (all odd pretreatment periods) had the lowest RMSPE (Table 1) and was also the selected specification perthe criterion outlined by Dube and Zipperer.31 Figure C (available as a supplement to the online version ofthis article at http://www.ajph.org) illustrates relatively minor differences between specifications. Two covariates, total population and the number of authorized retailers, had marginal weights in the selected model (.022 and .001, respectively) (Table 2). Placebo testing yielded a P value of .087 (Figure D, available as a supplementto the online version ofthis article at http://www.ajph.org). Confidence sets for the effect functions of all specifications indicated a positive effect in the posttreatment period, with the earliest posttreatment periods crossing zero (Figure E, available as a supplementto the online version ofthis article at http://www.ajph.org). Donor county weights are reported for all specifications in Table C (available as a supplementto the online version ofthis article at http://www.ajph.org). Figure 2 summarizes the estimated gaps between treated and synthetic counties across the study period.

For Delaware County, all specifications also indicated a positive long-run effect, with specification 2 (first three quarters of pretreatment periods) selected based on the lowest RMSPE, though all specifications had similar RMSPE values; specification 5 was selected by the Dube and Zipperer criterion,31 though its outcomes and weightings were comparable to specification 2. Three covariates-the number of authorized stores, total SNAP benefits distributed, and number of SNAP participants-were marginally weighted in the model. Placebo testing produced a P value of .04, and confidence set plots also illustrated positive effects in all posttreatment periods.

For Montgomery County, all specifications also indicated a positive effect, and specification 3 (first half of pretreatment periods) was selected for the lowest RMSPE; specification 5 was selected by the Dube and Zipperer criterion,31 and produced similar though slightly larger gaps in posttreatment periods than specification 3. All covariates contributed at least marginal weights to the synthetic unit.

Placebo testing produced a P value of .045, and confidence set plots showed a positive effect in all posttreatment periods.

Redemption Per Participant Outcome

For SNAP redemption amount per participant in Philadelphia, all specifications showed a negative long-run trend (Figure F, available as a supplement to the online version of this article at http://www.ajph.org), and 4 of 5 produced P values less than .05 via placebo testing (Figure G, available as a supplement to the online version of this article at http://www.ajph.org). Specification 5 had the smallest RMSPE (Table 1), with only the population covariate receiving a small weighting, reflected in the similarities of synthetic controls estimations among all 5 specifications (Table D, available as a supplementto the online version ofthis article at http://www.ajph.org). Specification 4 (odd pretreatment periods) was indicated by the selection criteria of Dube and Zipperer,31 though outcomes were similar to specification 5 (Figure F). Confidence sets for significant specifications illustrated a negative effect for most posttreatment periods (Figure H, available as a supplement to the online version ofthis article at http://www.ajph.org). Donor county weightings are reported in Table E (available as a supplement to the online version ofthis article at http://www.ajph.org).

All specifications for neighboring counties demonstrated a positive posttreatment trend. Specifications for Delaware County were deemed significant via placebo testing (P = .029 for all specifications in Delaware County). Specifications in Montgomery and Bucks counties did not yield significant P values through placebo testing (P = .054 for all specifications in Montgomery; specifications ranged from P = .13 to .28 in Bucks). In Delaware County, specification 3 had the lowest RMSPE, with SNAP benefit allocations, participant counts, and retailer counts included as covariates. In Montgomery County, specification 5 had the lowest RMSPE, with all covariates receiving at least a marginal weighting. Dube and Zipperer criteria31 indicated specification 5 for both counties. Confidence sets calculated for both Delaware and Montgomery counties illustrated a consistently positive trend across posttreatment periods.

DISCUSSION

Even amid broader macroeconomic changes, such as rates of SNAP participation, unemployment, and benefit allocations, implementation ofthe Philadelphia excise tax appears to have resulted in a geographical shift in SNAP spending. Though benefits cannot be directly traced from one county to another, synthetic control analyses for the 3 neighboring counties provides a high-level perspective on where these funds may have moved. Each neighbor saw detectable increases in SNAP redemption, with the largest increases observed in Montgomery County, which shares the longest border with Philadelphia ofthe 3 adjacent Pennsylvania counties. Similarly, per-participant SNAP redemption was shown to decrease in Philadelphia and increase in both Delaware and Montgomery counties. Here, it is reasonable to surmise that the observed changes in SNAP spending in Philadelphia's neighboring counties is attributable to the implementation of the SSB tax. The mechanisms explaining these changes must be carefully considered.

Probably More Than SugarSweetened Beverages

Earlier research has shown that decreases in Philadelphia SSB sales following the beverage tax were partially offset by increased sales in bordering counties, tempering expectations of broader public health benefits that would result from reduced SSB consumption.2 This is consistent with other research from Oakland, California, which finds similar cross-border shopping in response to a SSB tax.32 The present study places these findings in a larger context. While media reports following the tax's implementation have sensationalized cross-boundary "soda trips," the magnitude of changes observed in this analysis suggest that SNAP participants may have migrated entire grocery shopping trips (rather than purchases of taxed goods alone) outside city boundaries. Furthermore, USDA estimates that, on average, SNAP households make 9.4 transactions per month, with an average transaction amount of $27.36.10 Existing research on food shopping among low-income Philadelphians adds to the plausibility of entire trips being migrated by suggesting that retailer proximity, while important, is far from the only factor that influences where to shop, which can include broader economic, logistical, and social considerations.33,34

With an excise tax, applied at the distributor level, important questions exist about how much of the tax is passed through to customers via product prices, if any, and on which products. One could imagine an excise tax directly passed through via proportionately higher prices on taxed goods, or more indirectly spread among taxed and untaxed products. A recent study of tax implementation in Philadelphia supermarkets found the mean price per ounce oftaxed beverages increased by .83 cents from 2016 to 2017, and sales oftaxed beverages decreased in Philadelphia and increased in neighboring areas, suggesting that price passthrough did occur.2 These higher prices, in turn, could have motivated price-sensitive shoppers to shop outside Philadelphia, especially in neighborhoods near the county border. SNAP is predominantly spent at supermarket retailers, typically with the largest shopping trip occurring at the beginning of the month as benefits are renewed, and involving some form of private vehicle use, even by those who are not vehicle owners, but who might share rides with friends or family.15,33,34 Thus, if the price differences resulting from the tax were enough to motivate SNAP shoppers to shift these larger, vehicle-oriented trips across city borders, a sizeable effect might be expected.

Looking More Closely at Retailer Behavior

While higher prices on SSBs may have motivated shopping outside the city among low-income individuals, more explanation is needed. For instance, what role did retailer pricing and promotion strategies (on both taxed and untaxed items) play? Evidence from New York State reveals significant increases in in-store marketing of SSBs during periods of SNAP benefit issuance compared with other times of the month, with no attendant increases in marketing of low-calorie or unsweetened beverages,35 illustrating how retailers can target SNAP shopping. Although additional research is needed to unpack the pricing and promotion dynamics that may have motivated SNAP shoppers to move entire shopping trips across city boundaries, it is likely that retailers signaled to consumers beyond pricing alone.

Public Health Implications

In light of these and other findings that suggestshoppers may have moved rather than reduced purchases of taxed beverages, alternative strategies for achieving public health benefits should be considered. At the consumer level, a direct consumer tax, such as sales taxes more commonly associated with alcohol or tobacco, could be set uniformly across city retailers, rather than the general increase in prices that result from distributor and retailer pass-through of an excise tax. Still, this does little to solve the problem of cross-border shopping to avoid the tax, and other research suggests that sales taxes are less salient to consumers than excise taxes.36 Notably, purchases made with SNAP are exempt from sales taxes, so these efforts may do little to reduce SSB consumption among SNAP shoppers.

In terms of retailer-level alternatives, policies intended to reduce consumption of certain goods are unlikely to win allies from the business community. Complementary policies or programs that encourage substitution of goods (e.g., water or unsweetened beverages) or additional purchasing (e.g., "doubleup" bonuses for fruit and vegetable purchases) are perhaps more palatable to retailers, and also create both push and pull dynamics to help encourage

Strengths and Limitations

The synthetic control approach offers a data-driven method that, when carefully applied, helps rule out alternative explanations by matching and weighting donor units based on underlying relationships between variables in a data set. This study merges several discrete county-level, time-series data sets related to the allocation and spending of SNAP benefits. Thus, we can more accurately consider the supply-anddemand dynamics related to SNAP spending.

This study also had several limitations. Here, it was assumed that households did not choose to stop participating in SNAP on the basis of the implementation of the beverage tax. It is also critical to note that this study did not examine items purchased by SNAP shoppers. While we can make comparisons to existing literature on purchasing patterns among SNAP participants, we cannot conclude that the price of SSBs specifically was the cause of the observed shift in SNAP spending, nor do we estimate individual-level changes in spending. More detailed consumer panel data may reveal if particular items motivated the broader shifts in spending.

Conclusions

The 2017 implementation of an SSB excise tax in Philadelphia coincided with nationwide decreases in SNAP enrollment. I used a synthetic control approach to estimate the average treatment effect of the tax on Philadelphia as well as its immediate neighbors and observed significant treatment healthy behavior changes at the population level. effects on SNAP shopping in Philadelphia's neighboring Pennsylvania counties, potentially indicating a shift in SNAP purchasing away from Philadelphia. However, the magnitude of these effects suggests that they are not likely to reflect SSB sales alone. More research is needed to understand the mechanisms involving both retailer and consumer behavior that might explain these responses to the excise tax. >4JPH

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CONFLICTS OF INTEREST

The author has no conflicts of interest to declare.

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No human participants were involved in this analysis.

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DETAILS

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Document 29 of 37

Heavily Polluted Regions May Experience Higher COVID-19 Mortality

Anonymous

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FULL TEXT

Pollution is a well-known risk factor of asthma and other diseases. However, little is known about how environmental pollutants affect COVID-19 mortality. Cabrera-Cano et al. explored the ecological association between air pollutant data and mortality rates of 25 cities in Mexico. After considering the average concentration of each environmental pollutant in the past year, the authors found a significant increase of 3.5% (2.3-4.7) in COVID-19 mortality rates for each microgram per cubic meter in annual concentration of NO2. Although not statistically significant, COVID-19 mortality rates increased 1.8% for each microgram per cubic meter of particulate matter 2.5. These results highlight the potential impact of environmental pollutants on the burden of deaths from COVID-19 and underscore the importance of environmental interventions for reducing COVID-19 death rates.

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Document 30 of 37

Accounting for the Full Scope of Health Consequences of Policy Decisions Across the Life Course

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ABSTRACT (ENGLISH)

Our health is of immediate concern to all of us. Indeed, it is difficult to think of much that is of more immediate concern. Our health makes it possible for us to make choices about how we wish to live our lives. Clearly this statement is complicated by the many and varied expressions of health, and we recognize that many of us can live rich, fulfilled lives, even if in imperfect health. But fundamentally good health affords us the means to live however we wish, serving as a key element of our individual dreams and aspirations. It is, then, not at all surprising that we tend to focus on health in the present. If we are unhealthy in the moment, it inhibits our capacity to do what we wish in the moment and compels us to seek a cure. This is when there is a synergy between our individual perception of health and the aspirations of medicine. Medicine is fundamentally concerned with restoring us to health, overcoming sickness in the short-term so that we can return to living our lives as we choose to. That is a powerful and compelling aspiration and explains, in no small part, why we as a country spend more on health care, by far, than any other comparable high-income country.2 A health concern is an urgent concern, and we, as a country, have long judged it worth it to spend as much money as we can to ameliorate that concern, resulting in extraordinary spending on our health care. And yet, as readers of this series of commentaries well realize, despite our spending on health care, our health as a country lags substantially behind our peer nations. Central to the reason for this mismatch between health spending and health outcomes is our underspending on preventing illness and, commensurately, on lessening the structural forces that contribute to illness throughout the life course.3 We underspend on lessening these structural forces for many reasons, but perhaps first among those is that it is often difficult to see the direct link between those forces and our health. Although we may be able to recognize logically that, for example, spending on parks and recreation facilities will lead to opportunities for exercise and healthier populations in decades to come, that concern is readily drowned out by concerns with individual cardiac disease in the present, even if that cardiac disease could have been prevented with investment in structural forces in previous decades.

This, then, makes work that highlights the full scope of the life course a consequence of societal decisions that much more important. By documenting the health impacts of decisions in the present throughout our lives, such work builds on the scholarship of life course thinking4,5 and bears witness to the forces that generate the sum of health over many decades and may help us focus on structural causes of health.

FULL TEXT

Our health is of immediate concern to all of us. Indeed, it is difficult to think of much that is of more immediate concern. Our health makes it possible for us to make choices about how we wish to live our lives. Clearly this statement is complicated by the many and varied expressions of health, and we recognize that many of us can live rich, fulfilled lives, even if in imperfect health. But fundamentally good health affords us the means to live however we wish, serving as a key element of our individual dreams and aspirations.1

It is, then, not at all surprising that we tend to focus on health in the present. If we are unhealthy in the moment, it inhibits our capacity to do what we wish in the moment and compels us to seek a cure. This is when there is a synergy between our individual perception of health and the aspirations of medicine. Medicine is fundamentally concerned with restoring usto health, overcoming sickness in the shortterm so that we can return to living our lives as we choose to. That is a powerful and compelling aspiration and explains, in no small part, why we as a country spend more on health care, by far, than any other comparable high-income country.2 A health concern is an urgent concern, and we, as a country, have long judged it worth it to spend as much money as we can to ameliorate that concern, resulting in extraordinary spending on our health care.

And yet, as readers of this series of commentaries well realize, despite our spending on health care, our health as a country lags substantially behind our peer nations. Central to the reason for this mismatch between health spending and health outcomes is our underspending on preventing illness and, commensurately, on lessening the structural forces that contribute to illness throughout the life course.3 We underspend on lessening these structural forces for many reasons, but perhaps first among those is that it is often difficult to see the direct link between those forces and our health. Although we may be able to recognize logically that, for example, spending on parks and recreation facilities will lead to opportunities for exercise and healthier populations in decades to come, that concern is readily drowned out by concerns with individual cardiac disease in the present, even if that cardiac disease could have been prevented with investment in structural forces in previous decades.

This, then, makes work that highlights the full scope of the life course a consequence of societal decisions that much more important. By documenting the health impacts of decisions in the present throughout our lives, such work builds on the scholarship of life course thinking4,5 and bears witness to the forces that generate the sum of health over many decades and may help us focus on structural causes of health.

HEALTH CONSEQUENCES

Three articles in this issue of AJPH do just that. The first article, by Wang et al. (p. 2008), documents the long-term health burden of suboptimal diets, focusing on cancer. Starting in 2017, they studied a closed cohort of US adults aged 20 years or older, modeling events across the lifespan. They found that suboptimal diets contribute to 3.0 million new cancer cases, 1.7 million cancer deaths, and more than $250 billion in economic costs. The sheer scope ofthe consequences of suboptimal diets this study suggests is staggering, even more so when noting that many of the cancers studied were attributable to high consumption of sugar-sweetened beverages and low consumption of whole grains. Importantly, both sugarsweetened beverages and diet composition are linked, relatively directly, to policy decisions that we make as a society.6 This means, in essence, that we are choosing foods available to us and thus choosing to incur the long-term burden of cancer over the life course. When stated in such stark terms, these choices may seem inexplicable but perhaps are less so in the broader understanding of our focus on the immediate in health and our challenge, as discussed here, with thinking ofthe longterm consequences of actions today for our health tomorrow.

Our challenge with thinking about, and working to prevent, untoward health consequences in future decades is illustrated well in the current COVID19 moment and is shown in two other articles. COVID-19 gripped the country and the world starting in 2019. Efforts to mitigate the spread of COVID-19 have included a wholesale limitation of population mobility, limiting employment for many, and limiting access to routine health care services for many more. An analysis by Brenner (p. 1950) shows how the economic consequences brought about by mobility restrictions related to slowing the spread of COVID-19 in the United States are associated with nearly 200 000 combined deaths in the long term as a result of unemployment and bankruptcies.

An article by Shen et al. (p. 2027) considers the interruption to regular health care services brought about by COVID-19. Using data from the Michigan immunization registry, this article shows overall declines in non-COVID19 vaccination across the life course, including both pediatric and adult vaccinations. It will of course require substantial effort to catch up on vaccinations for all age groups to mitigate the health harms that can come from persons not being vaccinated. The potential long-term health challenges that have emerged from our dealing with COVID-19 do not suggest, of course, that we should not have implemented the efforts needed to limit the spread of a novel, highly contagious pathogen, but they reinforce, with forceful clarity, the costs of such inaction over the life course. That should give us both pause and perspective and should inspire usto balance our actions in the immediate present with an awareness of their health costs in the coming decades.

ATTENDING TO FUTURE HEALTH

It is our job to focus on how we may improve population health over the life course. This requires an unyielding focus on what is difficult to keep in mind-the future-and a near constant reminder to those who are in a position to make policy decisions that will influence the long-term health consequences of our actions today. Articles such as the ones in this issue of AJPH do an invaluable job of buildingthe evidence base that can help to this end.

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CONTRIBUTORS

The authors contributed equally to this editorial.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

Sidebar

¾See also Wang et al., p. 2008, Brenner, p. 1950, and Shen et al., p. 2027.

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DETAILS

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Document 31 of 37

New Directions for Public Health Research on the Health and Health Care of Undocumented Immigrants

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ABSTRACT (ENGLISH)

In 2017, approximately 10.5 million undocumented immigrants lived in the United States. Although the number of undocumented immigrants has declined over the past decade, this estimate is triple that of the population size in 1990, when there were 3.5 million undocumented immigrants.1 According to a recent population-based study of California residents, undocumented immigrants exhibit worse patterns of health care access and use than US-born residents or immigrants who are naturalized or hold green cards.2 This is not necessarily surprising given that undocumented immigrants have largely been left out of policies aimed at improving insurance coverage and access to care. Some states, including California, have used state Medicaid programs or organized county indigent care programs to care for undocumented youths and young adults. However, most states have excluded undocumented immigrants from public insurance programs, and they are explicitly excluded from the marketplace exchanges and the federally funded Medicaid expansions provided by the Patient Protection and Affordable Care Act.

FULL TEXT

¾See also Ro et al., p. 2019.

In 2017, approximately 10.5 million undocumented immigrants lived in the United States. Although the number of undocumented immigrants has declined over the past decade, this estimate is triple that of the population size in 1990, when there were 3.5 million undocumented immigrants.1 According to a recent population-based study of California residents, undocumented immigrants exhibit worse patterns of health care access and use than US-born residents or immigrants who are naturalized or hold green cards.2 This is not necessarily surprising given that undocumented immigrants have largely been left out of policies aimed at improving insurance coverage and access to care.

Some states, including California, have used state Medicaid programs or organized county indigent care programs to care for undocumented youths and young adults. However, most states have excluded undocumented immigrants from public insurance programs, and they are explicitly excluded from the marketplace exchanges and the federally funded Medicaid expansions provided by the Patient Protection and Affordable Care Act.3,4

In their article in this issue, Ro et al. (p. 2019) used administrative data from the Los Angeles County 1 University of Southern California Medical Center to describe differences in illness severity, length of hospital stays, and repeat hospitalizations between undocumented immigrant patients and fullscope Medi-Cal (California's Medicaid program) patients. To classify undocumented immigrants, they used as a proxy restricted-scope Medi-Cal, which is limited to emergency and pregnancy care for low-income Los Angeles residents who meet the Medi-Cal income threshold but do not meet immigration status requirements (e.g., US national, lawful permanent resident).

Their main findings were that younger (18-64 years) undocumented immigrant patients had less severe illness and spent less time in the hospital than younger Medi-Cal patients, whereas older ($ 65 years) undocumented patients also had less severe illness but had lengths of stay that were similar to those of older Medi-Cal patients. These findings generally confirm previous reports indicating that undocumented immigrants are unlikely to burden the safety net because of their healthy profiles and underuse of health services.2,5

This study is an important contribution to the growing literature on the health and health care needs of undocumented immigrants. It is also one of the first studies in which administrative data have been used to understand patterns of hospital care use and illness severity among undocumented immigrants requiring hospitalization. The study, however, must be put into the context of the broader empirical literature on the topic.

For example, the authors used data from patients needing hospitalization from a safety net hospital in Los Angeles that serves a very vulnerable population with complex health needs, including many low-income patients on Medicaid or without insurance and a large homeless population. Thus, the observations are not necessarily representative ofthe undocumented population in Los Angeles County, the state of California, or nationally. Also, the strategy to identify undocumented immigrant patients through restrictedscope Medi-Cal creates potential selection bias among patients who are poor and have high medical needs. The authors attempted to account for this problem by controlling for homeless status and using an inverse probability weighted regression adjustment;

however, tine unobserved differences between the undocumented immigrant and Medi-Cal populations are still likely to mispresent the health advantages of i indocumented immigrants.

Public health researchers have long observed a health advantage for recent immigrants, an advantage ccmmcnly referred to as the "healthy immigrant effect."6 This phenomenon is the notion that recent immigrants are in better health, on average, than US-born residents or immigrants who have been in the country for a long period of time. Because access to and use of health care tend to be poor among undocumented immigrants, it has been assumed that in general they are at high risk for poor health outcomes; however, others have posited that they are protected as a result of the healthy immigrant effect.

Indeed, Ro et al. concluded that despite poor access to care, undocumented immigrants had less severe illness than their Medi-Cal counterparts. It should be noted, however, that their measure of health trends was based on illness severity' as rmsasi mod bythe relative risl- of mortalit; among hospitalized patients. Most researchers assessing the health ad vantages of immigrants ha ve i used measi ures su mb as setif-rated health status, physician-diagnosed chronic diseases, and health behaviors.2,8,9

In 2017, it was estimated that 66% of undocumented immigrant adults in the United States had been in the country for more than 10 years, as compared with 41% in 2007. With acculturation and more time spent in the United States, it has been observed that the advantages of the healthy immigrant effect decline.10 Undocumented immigrants, particularly those who have been in the country for many years, would in theory benefit less from the healthy immigrant effect. A necent California study showed that the immigrant health advantage with respect to cardio.vascular behavioral health risk did not apply to undocumented immigrant Latino men whose health behaviors were similar to those of US-born Latino men; however, health patterns were better among undocumented immigrant Latinas.8 Similarly, a study of Latinos in Los Angeles County revealed that undocumented immigrants who had been in the United States for short durations had worse self-reported health than the US-born individuals.9

In 2018, it was estimated that 880 000 undocumented immigrants lived in Los Angeles County and that 680 000 (78%) of them were Latino.11 In a study of California Latino immigrants, only 25% of undoci miented immigrants reported being in excellent or very good health, as compared with i9% of US-born Latinos and 36% of naturalized Latino immigrants, e ven though undocumented immigrants were less likely to report physical health problems such as obesity, high blood pressure, asthma, and diabetes.2 The lower odds of i undocumented immigrants ever having been told by a prouder that they had a physical health condition were a function of their having significantly worse access to care than other groups.3 Furthermore, some of the discrepancy, at least with respect to self-rated health, might be attributed to the measure's response categories and the Spanish translation of "fair."12

Immigrants have long been underserved in the US health care system, particularly гЬс-по who are i ininsi ired or do not have legal authorization status. The recent expansion of Medicaid coverage to undocumented immigrants up to the age of 26 years in California and new indigent care programs vuch as f/yHealthLA are examples of initiati ves at the state and local levels that can partly address health care inequities among immigrants. Policy efforts to expand health insurance coverage to the growing aging i indcc imented immigrant population should include assessments of tine siti lation in California, where the state legislature recently decided tc expand Medi-Cal coverage tc lowincome undocumented immigrants 50 years or elder. Undocumented immigrants 26 tc 49 years eld without insurance will continue tc have seme level cf accevv tc primary, specialty, and inpatient care thrcugh California's indigent care programs, although these programs dc net offer the same financial protection as private insurance er Medi-Cal. Public health research cn the health and health care of undocumented immigrants in the United States p. qui'!lv e - mins The Ro et al. article augments what has been observed in population-based studies, and it raises seme interesting areas cf inquiry for the field. The extent tc which the healthy immigrant effect applies tc undocumented immigrants, especially as them live in the country fer lcnger durations and a growing prcpcrticn cf them are aging, is still epen fer debate and discovery.7 We alse need a better understanding cf the health care needs cf undocumented immigrants tc inform policies and programs aimed at addressing health inequities. As the demcgraphy cf the immigrant pcpulation ccntini ies tc shift, it is imperative that public health research, practice, and advocacy focus cn ways tc engage all immigrants, especially those whc are undocumented. /4JPU

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10 Years Ago/50 Years Ago

Anonymous

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FULL TEXT

Impact of Business Cycles on US Suicide Rates

Our findingssuggestthe importance of population-level suicide-prevention strategies, particularly during recessions. For example, during recessions importance must be placed on providing social support and counseling services to those who lose jobs or home; promoting individual, family, and communityconnectedness; and providing adequate resources to crisis call centers and other community services.... We found that people in prime working ages (25-64years) were more vulnerable to recession than were others. This may be partly explained bythe factthat many ofthose people were breadwinners in their homes, and theirjobs supported mortgage payments, health insurance, children's education, and other expenses.... The multifaceted nature ofsuicide indicates the need to develop prevention efforts that use multiple settings where vulnerable people and individuals may be found.

From AJPH, June 2011, pp. 1143-1145 passim

50 Years Ago

Economic Changes and Heart Disease Mortality

Among the major social stresses that may be involved in heart disease incidence or mortality are those which originate in adverse changes in the economic status ofindividuals. . .. Periods ofinstability, particularly periods of economic recession, force a sizable portion of the population either out ofthe economy... or into a situation of decreased income. ...It is ...a reasonable speculation that heart disease mortality might increase during an economic downturn as a result ofthe decreased availability, in economic terms, of medical care services. ... The findings ofthe present study clearly indicate that economic downturns are associated with increased mortalityfrom heart disease and that, conversely, heart disease mortality decreases during economic upturns.

From AJPH, March 1971, pp. 606, 609 passim

DETAILS

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Choosing to Be Both: Perspectives From a Researcher About Early Motherhood

Allen, Caitlin G, PhD, MPH [1] [1] Postdoctoral Fellow Medical University of South Carolina, Charleston

ProQuest document link

FULL TEXT

Over the past year, I have had the privilege of adding a number of professional achievements to my curriculum vitae, including becomingthe student editor for AJPH. There is no place on my curriculum vitae, however, for the most important and life-changing new role I have taken on this year: mother.

I approached the process of becoming a mother in the same way that I would approach any new "project" I conjured up as a doctoral student-I naturally fell into the researcher mentality whereby I began analyzing, studying, asking questions, and preparing for everything I could possibly think of regarding babies and becoming a new mother. I conducted informal interviews with friends and family members, created excel files to assess daycare centers, reviewed the pros and cons of different strollers, attended classes on breast feeding, read scientific literature about infant sleep, and made an infographic of my birth plan for hospital staff. Even after my son arrived, I continued to use this scientific process-convinced that I could "research" my way through anything that arose as part of new motherhood. Phone apps made it possible to collect data about my son's feedings, bowel movements, nap times, and growth, just to name a few. With these data I developed hypotheses about almost everything. Most notably, I focused on what might be causing baby to be colicky at night and worked to ensure that all possible confounding variables were controlled for to guarantee that the baby would sleep through the night.

Turns out, approaching motherhood from a purely scientific mindset was unsustainable. The approach I had chosen (one in which I was in complete control) had failed me. The rigid expectations of what my motherhood experience should be like-from labor and delivery to how quickly my body and mind would "bounce back"-were dismantled.

I sought to maintain control of the "researched' mentality whereby I was able to identify causal pathways and test interventions to manipulate the predictors related to my "participant's" (son's) outcomes of interest. Slowly, I realized that it was unachievable and downright miserable to try to hold onto control in this way. The reality was that motherhood, especially during a pandemic, required adaptation or would lead very quickly to burnout. And so, I gradually shifted from the comfortable role I had always held as an outside observer and inquisitive problem solver to an active participant of a live and ever-changing experiment. The reality was that in this motherhood role, I had to be "both ... and": both the prepared and thoughtful investigator and the present and active participant.

So, how has this new role, which is completely unaccounted for as part of my professional identity but simultaneously the most life-changing and long-term position I will ever hold, changed my approach to public health and research? At the core, I think it has provided an important gateway for me to be open, honest, and vulnerable, even in professional settings, which in turn gives others permission to do the same. It also encourages me to advocate institutionalized systems that support and nurture the balance between the two roles successfully. The messy nature of early motherhood has helped me appreciate the complex aspects of research, challenging meto maintain high standards in my research while also becoming more accepting of the uncertainty that comes with studying human behaviors. I have learned to ask new and better questions, to think about things from both the scientific and the practical side. I now understand that it is possible to be ambitious and flexible, determined and gentle, dedicated to my career and my family. In short, a mother and a researcher.

DETAILS

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Trends in Cannabis Involvement and Risk of Alcohol Involvement in Motor Vehicle Crash Fatalities in the United States, 2000–2018

Lira, Marlene C, MPH; Heeren, Timothy C, PhD; Buczek, Magdalena, MS; Blanchette, Jason G, JD, MPH; Smart, Rosanna, PhD; Pacula, Rosalie Liccardo, PhD; Naimi, Timothy S, MD, MPH

ProQuest document link

ABSTRACT (ENGLISH)

Objectives. To assess cannabis and alcohol involvement among motor vehicle crash (MVC) fatalities in the United States. Methods. In this repeated cross-sectional analysis, we used data from the Fatality Analysis Reporting System from 2000 to 2018. Fatalities were cannabis-involved if an involved driver tested positive for a cannabinoid and alcohol-involved based on the highest blood alcohol concentration (BAC) of an involved driver. Multinomial mixed-effects logistic regression models assessed cannabis as a risk factor for alcohol by BAC level. Results. While trends in fatalities involving alcohol have remained stable, the percentage of fatalities involving cannabis and cannabis and alcohol increased from 9.0% in 2000 to 21.5% in 2018, and 4.8% in 2000 to 10.3% in 2018, respectively. In adjusted analyses, fatalities involving cannabis had 1.56 (95% confidence interval [CI] = 1.48,1.65), 1.62 (95% CI = 1.52,1.72), and 1.46 (95% CI = 1.42,1.50) times the odds of involving BACs of 0.01% to 0.049%, 0.05% to 0.079%, and 0.08% or higher, respectively. Conclusions. The percentage of fatalities involving cannabis and coinvolving cannabis and alcohol doubled from 2000 to 2018, and cannabis was associated with alcohol coinvolvement. Further research is warranted to understand cannabis- and alcohol-involved MVC fatalities. (AmJ Public Health. 2021;1 11(1 1):1976-1985. https://doi.org/10.2105/AJPH.2021.306466)

FULL TEXT

Headnote

Objectives. To assess cannabis and alcohol involvement among motor vehicle crash (MVC) fatalities in the United States.

Methods. In this repeated cross-sectional analysis, we used data from the Fatality Analysis Reporting System from 2000 to 2018. Fatalities were cannabis-involved if an involved driver tested positive for a cannabinoid and alcohol-involved based on the highest blood alcohol concentration (BAC) of an involved driver. Multinomial mixed-effects logistic regression models assessed cannabis as a risk factor for alcohol by BAC level.

Results. While trends in fatalities involving alcohol have remained stable, the percentage of fatalities involving cannabis and cannabis and alcohol increased from 9.0% in 2000 to 21.5% in 2018, and 4.8% in 2000 to 10.3% in 2018, respectively. In adjusted analyses, fatalities involving cannabis had 1.56 (95% confidence interval [CI] = 1.48,1.65), 1.62 (95% CI = 1.52,1.72), and 1.46 (95% CI = 1.42,1.50) times the odds of involving BACs of 0.01% to 0.049%, 0.05% to 0.079%, and 0.08% or higher, respectively.

Conclusions. The percentage of fatalities involving cannabis and coinvolving cannabis and alcohol doubled from 2000 to 2018, and cannabis was associated with alcohol coinvolvement. Further research is warranted to understand cannabis- and alcohol-involved MVC fatalities. (AmJ Public Health. 2021;1 11(1 1):1976-1985. https://doi.org/10.2105/AJPH.2021.306466)

Motor vehicle crashes (MVCs) are a leading cause of injury death in the United States, and more than 35% of MVC fatalities result from crashes in which at least 1 driver has a positive blood alcohol concentration (BAC).1,2 Cannabis use is a risk factor for driving impairment and the secondmost-common substance involved in fatal MVCs after alcohol.3,4 The impairing effects of A9-tetrahydrocannabinol (THC) in cannabis on driving ability include lane weaving, delayed reaction time, decreased coordination, and distorted perception.4-9 Laboratory tests show that low-dose cannabis (< 10% THC) used in combination with alcohol may increase impairment more than either substance alone, particularly for skills relevant to driving.10-13

Throughout the past 2 decades, cannabis policy in the United States has dramatically shifted as states have legalized medical cannabis, decriminalized possession of cannabis, and legalized recreational cannabis; correspondingly, rates of cannabis use in the United States have increased among adults.14 Between 2002 and 2017, past-month cannabis use assessed through the National Survey on Drug Use and Health (NSDUH) increased among adults aged 26 years and older from 4.0% to 7.9%, and among adults aged 18 to 25 years from 17.3% to 22.1%.15 Among nighttime drivers, rates of cannabis prevalence in oral fluid also increased, from 8.6% in the 2007 National Roadside Survey to 12.6% in the 2013-2014 National Roadside Survey.16,17 More recently, a study utilizing NSDUH data from 2016 to 2018 found that 29.5% of cannabis users reported driving under the influence of cannabis.18 While the proportion of US crash deaths that involve alcohol has remained constant over time despite significant safety improvements in cars and car driving services,2,19 positive toxicology results for substances other than alcohol in fatally injured drivers has increased to approximately 30%.20

Little consideration has been given to trends in co-use of alcohol and cannabis, in particular cannabis involvement at various alcohol levels in MVC deaths. Alcohol coinvolvement may be 1 explanation for the inconsistent findings of cannabis policy changes on cannabisinvolved MVC fatalities, in addition to the difficulties in disentangling whether cannabis and alcohol are used as substitutes or complements, and whether changes in actual cannabis involvement stem from changes in testing for cannabis, given suboptimal testing.21-27 Thus, there is still a need to describe cannabis involvement in MVC fatalities at various levels of alcohol involvement and to assess whether cannabis is a contributing risk factor for alcohol-involved crashes.

To fill this gap in the literature, the objectives of this study were 3-fold. First, we sought to describe drug testing rates in MVC fatalities overall and by BAC level. Second, we sought to describe patterns of alcohol and cannabis coinvolvement in MVC fatalities overall and by BAC level, and evaluated differences in decedent characteristics across crashes with varying substance involvement and coinvolvement. Finally, we assessed the cannabis involvement as a risk factor for alcohol coinvolvement by BAC level in MVC fatalities. Given the conflicting evidence regarding cannabis and alcohol as potential substitutes or complements, we did not have prespecified hypotheses regarding the direction or magnitude of potential associations between cannabis and alcohol.

METHODS

The methods of this study were similar to those conducted by our study team in past analyses.2,19,28 This was a repeated cross-sectional analysis of MVC fatalities from the Fatality Analysis Reporting System (FARS), a census of MVC fatalities in US states and Washington, DC, from 2000 to 2018.29

Participants

In this study, we utilized distinct participant groups for each stage of the analysis. For the first objective, describing drug testing rates in MVC fatalities overall and by BAC level, participants included FARS decedents from 2000 to 2018 who died in MVCs in which at least 1 driver was identified. For the second objective, describing patterns of alcohol and cannabis coinvolvement, participants were restricted to those with crash-level drug testing, defined as at least 1 driver having valid drug test results. For the third objective of the study, assessing cannabis involvement as a risk factor for alcohol coinvolvement, the group was further restricted to those with individual- and crash-level characteristics.

Variables

The main predictor, crash-level cannabis involvement, was defined as at least 1 driver with valid drug test results indicating the presence of a cannabinoid (FARS drug test results from 600 to 695). Before 2018, FARS reported up to 3 substances in drug test results based on a hierarchy, such that narcotics would be given top priority, followed by depressants, stimulants, hallucinogens, and then cannabinoids.30 In 2018, FARS began reporting all positive substances. To use more recent data and maintain a uniform definition, the hierarchy used through 2017 was applied to data from 2018. The outcome, alcohol involvement by BAC level, was similarly calculated at the crash level such that the highest BAC from all drivers was assigned to all decedents from the crash. BAC levels were 0.00%, 0.01% to 0.049%, 0.05% to 0.079%, and 0.08% or higher. Because it is unlikely that alcohol test results are missing completely at random or missing completely not at random, missing results are an important threat to validity. Therefore, we utilized validated, imputed data sets from FARS to estimate missing BAC levels.31

Potential confounders were year (continuous); decedent-level characteristics: sex (male [reference] vs female), age category (< 21 years [reference], 21 -34 years, 35-54 years, $ 55 years), race/ethnicity (White [reference], nonHispanic Black, Hispanic, other, unknown); crash-level characteristics: opioid involvement (no [reference] vs yes), other substance involvement (i.e., $ 1 driver positive for substance other than alcohol, cannabis, or opioids; no [reference] vs yes), urbanicity (rural [reference] vs urban); and continuous state-level characteristics: percentage male, percentage non-Hispanic White, percentage Hispanic, percentage aged 21 years or older, percentage with college degree or higher, percentage Catholic population, median household income, law enforcement officers per 1000 residents, annual vehicle miles traveled, and state-year drug testing rate.32-35 Decedents with missing individual- or crash-level characteristics were excluded from analyses provided that missingness was not substantial (< 1%). Approximately 9% of decedents had missing information on race/ethnicity, so an "unknown" category was created.

Statistical Methods

We calculated crash-level drug testing rates and cannabis involvement rates overall and by BAC level over the study period. Because testing rates changed over time, we also calculated rates of cannabis involvement after restricting the data to state-years with testing rates of at least 50%, restricting to states with testing rates of at least 50% for all years, and restricting to states with testing rates of at least 33.3% for all years. We calculated prevalence rates of cannabis involvement by demographic and crash-level characteristics in all MVC fatalities, as well as among various BAC strata.

We calculated the prevalence of cannabis by BAC level and demographic and crash characteristics. Because alcohol values were imputed for some decedents, it was possible that the level of alcohol involvement could change across imputations. The data set was therefore transformed from a wide format to a long format, such that there were 10 observations for each decedent. Cannabis involvement was tabulated overall and for each BAC level by the variable rows in Table 1. Values were then divided by 10 and rounded to the nearest whole number to return the data set to its original size.

We used mixed-effects multinomial logistic regression models with the multiply imputed alcohol data using Rubin's rules36 to assess crude and adjusted relationships between crash-level cannabis involvement and alcohol levels (BACs of 0.01%-0.049%, 0.05%0.079%, and $ 0.08% vs 0.00%). Given that there may be similarities within states, we accounted for potential clustering by state random effects. Covariates in adjusted analyses included those listed in the "Variables" section.

Sensitivity Analyses

Given suboptimal drug testing rates and the variation in approaches utilized by similar analyses in the wider literature, we performed a number of sensitivity analyses to assess the robustness of findings. These included further adjusting for the alcohol policy environment,37 restricting the sample to only include decedents who were drivers, restricting the sample to only include decedents who were drivers and using individual-level toxicology results rather than crash-level toxicology results, conducting a crash-level analysis, utilizing nonimputed data, and restricting the sample to include decedents from state-years with testing rates of at least 50% and 66.67%. We conducted analyses by using Stata version 15.1 (StataCorp LP, College Station, TX).

Effect Modification

Given that age and sex are strong risk factors for cannabis and alcohol use, we conducted posthoc analyses stratified on the basis of decedent sex (male vs female) and age (< 21 years, 21 -34 years, 35-54 years, and $ 55 years).

RESULTS

Between 2000 and 2018, there were 721 825 MVC fatalities in the United States with at least 1 identified driver. Of these, 327 073 (45.3%) had crash-level drug testing results, constituting the sample for Figures 1 and 2. Of these, 322 773 (98.7%) had complete demographic and crash information, constituting the final sample for analyses (Tables 1 and 2). The 322 773 decedents comprised 254002 drivers, 52 053 passengers, and 16 718 other victims (i.e., pedestrians, cyclists). Of the 254002 deceased drivers, 243 926 or 96.0% were actually tested for alcohol. When alcohol results were applied to nondriver decedents at the crash level, 270 31 1 of the 322 773, or 83.8%, had at least 1 driver with valid alcohol test results.

Drug testing overall increased from 32.9% in 2000 to 47.9% in 2018 (data not shown). Overall and when stratified by crash-level BAC, testing increased for all BAC levels overtime (Figure A, available as a supplement to the online version of this article at http://www. ajph.org); however, MVC fatalities not involving alcohol had the lowest rates of drug testing.

The percentage of fatalities involving cannabis increased from 9.0% in 2000 to 21.5% in 2018 (Figure 1). Given that testing and cannabis both increased during the study period, we also assessed cannabis involvement restricting the data to state-years with higher testing rates, and results were consistent (Figure B, available as a supplement to the online version of this article at http://www.ajph.org). After restricting state-years to those with testing rates of at least 50%, restricting the sample to states with testing rates of at least 50% for all years (n = 7: Hawaii, Illinois, New Hampshire, NewJersey, Rhode Island, Washington, and West Virginia), and restricting the sample to states with testing rates of at least 33.3% for all years (n = 16: the aforementioned states as well as California, Connecticut, Georgia, Kentucky, Nevada, New Mexico, North Dakota, Ohio, and Wyoming), the rates of cannabis involvement were similar, indicating that changes in testing have not substantially affected observed levels of cannabis involvement in fatal crashes.

We examined the percentage of decedents from crashes with any alcohol, any cannabis, cannabis and alcohol, and neither alcohol nor cannabis over the study period (Figure 1). Alcohol was consistently involved in approximately 40% of MVC fatalities from 2000 to 2018. However, the percentage of crashes involving any cannabis more than doubled from 9.0% in 2000 to 21.5% in 2018, and the percentage of fatalities involving both cannabis and alcohol more than doubled from 4.8% to 10.3%. When we examined cannabis involvement by BAC level (Figure 2), cannabis involvement increased over time for all groups. Cannabis involvement was more prevalent among fatalities that involved alcohol at all 3 BAC-level categories compared with fatalities that were not alcohol-involved.

We examined cannabis involvement by decedent and crash characteristics overall (Table 1). Crash-level cannabis involvement was more prevalent among decedents who were younger than 35 years and who were nonHispanic Black, and in crashes that involved other drugs, occurred at night, and occurred on weekends. Decedents who were passengers were also more likely to have died in accidents involving cannabis, suggesting that these crashes are more likely to involve deaths of individuals otherthan the driver. Cannabis involvement by decedent and crash characteristics were also examined and stratified by level of alcohol involvement. Cannabis involvement was more prevalent among decedents with alcohol involvement among all BAC strata than decedents without alcohol involvement. Specifically, cannabis was involved in 11.5% of alcohol-uninvolved fatalities, versus 18.9% of fatalities involving BACs of 0.01% to 0.049%, 20.2% of fatalities involving BACs from 0.05% to 0.079%, and 17.7% of fatalities with BACs of 0.08% or higher. Among decedents who were younger than 21 years, 17.3% of deaths from alcohol-uninvolved crashes involved cannabis, whereas approximately 25% of deaths from alcohol-involved crashes involved cannabis. Similarly, among decedents who died in evening crashes, 13.2% of alcohol-uninvolved deaths involved cannabis, but approximately 20% of alcohol-involved deaths also involved cannabis.

Regression Analyses

In unadjusted, multinomial, multiple imputation analyses, fatalities involving cannabis had 1.77 (95% confidence interval [CI] = 1.68,1.86) times the odds of involving a BAC from 0.01% to 0.049%, 1.95 (95% CI = 1.84, 2.06) times the odds of involving a BAC from 0.05% to 0.079%, and 1.67 (95% CI 5 1.63,1.71) times the odds of involving a BAC of 0.08% or higher compared with fatalities not involving cannabis (Table 2). In models adjusted for year, decedent-level characteristics, crash-level characteristics, and statelevel characteristics, fatalities involving cannabis had 1.56 (95% CI = 1.48,1.65) times the odds of involving a BAC from 0.01% to 0.049%, 1.62 (95% CI = 1.52, 1.72) times the odds of involving a BAC from 0.05% to 0.079%, and 1.46 (95% CI 5 1.42,1.50) times the odds of involving a BAC of 0.08% or higher compared with fatalities not involving cannabis. The full adjusted model can be found in Table B (available as a supplement to the onlineversion of this article at http://www.ajph.org).

Additional Analyses

Results were similar across the aforementioned sensitivity analyses further adjusted for alcohol policies, restricted to drivers, at the crash-level, using nonimputed data, and restricted to fatalities from state-years with various thresholds for testing. Given that decedent sex and age were associated with alcohol involvement, we conducted posthoc analyses stratified by age and sexto assess whether the relationship between cannabis and alcohol coinvolvement differed on the basis of these factors (Table 2). Although females, individuals younger than 21 years, and individuals aged 55 years or older had lower odds of alcohol involvement in the main analysis (Table B), the relationship between cannabis and alcohol coinvolvement appeared stronger for these groups.

DISCUSSION

In this study, we assessed trends in cannabis and alcohol involvement in MVC decedents in the United States from 2000 to 2018 and examined how cannabis involvement relates to alcohol coinvolvement. To our knowledge, this is the first study to examine recent trends overtime of cannabis involvement in relation to alcohol involvement in the United States, and the first to examine these relationships among all crash decedents rather than only drivers. We found that cannabis involvement and cannabis and alcohol coinvolvement in fatal MVCs are increasing nationally. While rates of alcohol involvement have remained steady overtime, the rates of cannabis coinvolvement have increased. This does not offer support for the idea of cannabis and alcohol being substitutes, at least in terms of MVC fatalities. In adjusted regression analyses, cannabis was associated with alcohol involvement, even at BAC levels below 0.08%, indicating that cannabis use is a risk factor for alcohol-involved MVC fatalities even at levels of alcohol below the legally permissible level for driving.

The proportion of MVC fatalities that were cannabis-involved more than doubled during the study period. This could be attributable to shifting cannabis policies enabling expansion of medical and recreational cannabis markets, changing societal attitudes toward cannabis, and other factors such as increased cannabis potency. Although low drug testing rates are a known limitation of FARS, they increased from 32.9% to 47.9% over the study period. However, trends in increased cannabis involvement over time were consistent when we looked at subsets of states and state-years with higher testing rates, as has been done in past studies.39 Drug testing procedures and rates are heterogeneous across states, and some states may conduct drug testing selectively, either opting for crashes in which alcohol use is already suspected, or the opposite, not conducting drug testing when alcohol is already known to be involved as a costsaving measure, potentially resulting in biases in either direction.39-41

Cannabis involvement was more prevalent among fatalities that involved alcohol than fatalities that did not involve alcohol (Table 1). These findings were remarkably consistent by demographic and crash-level characteristics, with the highest prevalence of cannabis and alcohol coinvolvement in crashes involving younger decedents (aged <35 years) and passenger deaths. Although most alcohol-involved fatalities occur at BACs of 0.08% or higher, the legal limit in all states but Utah (which in 2019 implemented a limit of 0.05%), cannabis coinvolvement was similar across BAC levels in crashes involving any alcohol. In regression analyses, cannabis involvement was associated with increased odds of also involving alcohol, regardless of BAC level. This finding was consistent across multiple sensitivity analyses and suggests that cannabis is a risk factor for alcohol-involved MVCs.

This study builds on past epidemiological studies of alcohol- and cannabisinvolved MVC fatalities. While laboratory studies have shown driving impairment from cannabis and synergistic effects with alcohol, only a handful of recent epidemiological studies have examined the combined effects of alcohol and cannabis on the risk of crashes. Two case-control studies found a dose-effect of alcohol and cannabis on unsafe driving actions,42,43 and another study found that culpable drivers in fatal MVCs were more likely to test positive for alcohol, cannabis, or both.44 A meta-analysis conducted by the same authors found a pooled effect of marijuana on crash risk to be 2.66 (95% CI = 2.07, 3.41).45 Contrasting results were seen in 2 studies that compared fatally injured drivers from FARS with matched drivers from the National Roadside Survey: one reported marijuana being associated with 83% increased odds of being a fatally injured driver rather than a control,46 and the other reported statistically nonsignificant findings regardless of alcohol involvement.47 These diverging results were later attributed to methodological differences, such as inclusion factors for states based on testing rates, and the authors recommended future research should "account for as many factors as possible when assessing crash risk," which we have tried to do in this analysis.39(p324) More precise estimates of the degree of cannabis involvement, and the nature of alcohol-cannabis coinvolved crash fatalities, would require testing levels of cannabinoids in drivers.

Given that the percentage of MVC fatalities involving alcohol has remained relatively stable at approximately 40% over the past 2 decades, it could be that increases in coinvolvement of cannabis are undercutting attempts at reducing alcohol-involved crash fatalities. There is a known relationship between alcohol policies and alcohol involvement in MVCs among adults and children, and within crashes involving alcohol at levels below the legal limit of 0.08%.2'19'28 However, future research is warranted to understand whether cannabis changes the protective associations between alcohol policies and alcohol-involved crashes.

A number of studies have analyzed the effect of various forms of cannabis legalization on cannabis-involved MVC fatalities; however, results have been conflicting, and these studies have not consistently examined interactions with alcohol or alcohol policies.21-27 Adopting a lower permissible BAC threshold for those with cannabis in their system may be a policy strategy to reduce MVC harms from concurrent and simultaneous use of alcohol and cannabis. Indeed, even without consideration for cannabis, the National Highway Traffic Safety Administration and the National Academies of Sciences, Engineering, and Medicine have recommended decreasing the legal alcohol limit to 0.05% to reduce alcohol-involved MVC fatalities.48

Limitations

This study is subject to a number of limitations. Most importantly, these data cannot provide information on whether cannabis caused the crash. The mere presence of cannabis without a level is not alone indicative of impairment as, depending on frequency and amount of use, individuals can test positive for days or even weeks after use. Cannabinoid test results were collapsed such that individual cannabinoids were not analyzed. Previous research has suggested a blood THC limit of 5 nanograms per milliliter as a cutoff for impairment; however, FARS reports binary results.7,8 There has been variation in drug testing practices between states and over time, and some states may systematically not test for cannabis. This would, however, likely lead to an underestimation ofthe prevalence and bias toward the null in regression results. In addition, there is some evidence to suggest that simultaneous alcohol use increases THC levels and that there are lingering impairment effects once THC levels have declined, further complicating this.10

Although we conducted sensitivity analyses to understand the effect of limited testing on the prevalence of cannabis, it is possible that cannabis positivity was nevertheless subject to testing bias. In addition, because only 1 valid drug test from drivers in a crash was required for the definition of cannabis involvement, it is possible that cannabis involvement was undercounted if one driver tested negative and another was not tested. However, this would have likely resulted in a bias toward the null, and the sensitivity analysis restricted to drivers and involving their individual-level test results mitigates this concern. Alcohol testing was similarly not uniform, and we used imputed data from FARS to account for suboptimal testing.31 Our regression analyses assessed the odds of alcohol involvement, to which the counterfactual is a fatality without alcohol involvement. This is distinct from incidence rate ratios but allows for adjusting for individual-level characteristics in models. However, our figures assessing rates over time support similar conclusions (Figure B).

Public Health Implications

Between 2000 and 2018, the percentage of MVC fatalities involving cannabis and coinvolving cannabis and alcohol more than doubled. Fatalities involving cannabis had increased odds of also involving alcohol, regardless of BAC level, suggesting that cannabis use is a risk factor for alcohol-involved MVC fatalities in the United States. Future research is needed to understand how cannabis and alcohol relate to cannabis and alcohol policies, both separately and together.

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CONTRIBUTORS

M. C. Lira, M. Buczek, and T. S. Naimi conceptualized the study. M. C. Lira conducted the analyses with statistical expertise provided byT. C. Heeren. All authors contributed to interpretation of the analysis. M. C. Lira drafted the article, and all authors provided critical feedback.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

HUMAN PARTICIPANT PROTECTION

This study was determined to be not human participant research by the institutional review board at Boston University Medical Campus (protocol H37378).

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Document 35 of 37

Self-Reported Health Indicators in the US Army: Longitudinal Analysis From a Population Surveillance System, 2014–2018

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ProQuest document link

ABSTRACT (ENGLISH)

Objectives. To describe health-related behaviors or indicators associated with overall health and well-being using the Global Assessment Tool (GAT), a health behavior and psychosocial questionnaire completed annually by US Army personnel. Methods. We analyzed GAT responses from 2014 to 2018, consisting of 367 000 to 449 000 respondents per year. We used generalized estimating equations to predict the presence of each health behavior or indicator, aggregated by year and stratified on various demographics. Results. Key findings included decreases from 2014 to 2018 in risky health behaviors such as hazardous drinking (7.5% decrease) and tobacco use (7.9% decrease), dietary supplement use (5.0% to 10.6% decrease, depending on type), self-reported musculoskeletal injury (5.1 % decrease), and pain interference (3.6% decrease). Physical activity, sleep, and nutritional habits largely remained consistent overtime. Conclusions. In the Army, tobacco, alcohol, and risky dietary supplement usage appears to be declining, whereas lifestyle health behaviors have been stable. Whether these trends reflect responses to health education is unknown. The GAT provides useful insights into the health of the Army, which can be leveraged when developing health-related educational programs and policies. Public Health Implications. Health behaviors that have changed less over time (e.g., nutrition, sleep) may require novel approaches compared with those that changed more (e.g., dietary supplement use, drinking). (Am J Public Health. 2021;111(11):2064-2074. https://doi.org/10.2105/AJPH.2021.306456)

FULL TEXT

Headnote

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Army personnel.

Methods. We analyzed GAT responses from 2014 to 2018, consisting of 367 000 to 449 000 respondents per year. We used generalized estimating equations to predict the presence of each health behavior or indicator, aggregated by year and stratified on various demographics.

Results. Key findings included decreases from 2014 to 2018 in risky health behaviors such as hazardous drinking (7.5% decrease) and tobacco use (7.9% decrease), dietary supplement use (5.0% to 10.6% decrease, depending on type), self-reported musculoskeletal injury (5.1 % decrease), and pain interference (3.6% decrease). Physical activity, sleep, and nutritional habits largely remained consistent overtime.

Conclusions. In the Army, tobacco, alcohol, and risky dietary supplement usage appears to be declining, whereas lifestyle health behaviors have been stable. Whether these trends reflect responses to health education is unknown. The GAT provides useful insights into the health of the Army, which can be leveraged when developing health-related educational programs and policies.

Public Health Implications. Health behaviors that have changed less over time (e.g., nutrition, sleep) may require novel approaches compared with those that changed more (e.g., dietary supplement use, drinking). (Am J Public Health. 2021;111(11):2064-2074. https://doi.org/10.2105/AJPH.2021.306456)

Data repositories of self-reported health-related behaviors and traits, such as the National Health and Nutrition Examination Survey (NHANES),1 track secular health trends and determine risk for mobility2 and musculoskeletal (MSK) disability.3 These efforts provide a road map for evaluating population-level health-related behaviors and indicators. The US Army is particularly concerned about soldier health and deployability and has multiple surveillance systems to track the health status of the force. In 2017, approximately 60 000 US Army soldiers were unfit for combat, with up to 80% of those unable to deploy because of injuries and illness.4 With the 2018 Army directive on deployability and fitness, Army soldiers who do not meet deployment standards, or who become permanently nondeployable, are unqualified to serve.5Thus, it is important to understand factors that affect health and well-being and contribute to deployability.

One of the largest health behavior surveillance systems for the Army is the Global Assessment Tool (GAT), a self-report survey that assesses emotional, social, family, spiritual, and physical health (on October 2019, the GAT was renamed Azimuth Check [Army Regulation 350-53]).6 Soldier health behaviors and related indicators assessed with the GAT provide insights into population-level trends. The GAT provides similar data as NHANES and select other military studies (a regular cross-sectional population-stratified survey of health behaviors7 and a large longitudinal cohort study of mental health8) covering multiple healthrelated behaviors and well-being indicators plausibly associated with military deployability. Specifically, the GAT focuses on sleep, physical activity, and nutrition, which have recently been the focus of Army readiness-related programs.9 Alcohol consumption (also addressed in the GAT) may also affect job performance, and excessive use can lead to disciplinary actions and associated occupational terminations.10 Further factors of interest included in the GAT are dietary supplement use,11 tobacco use,12 and MSK injury.13

Describing Army health behaviors provides valuable information to assist in focusing public health efforts within the military community. We employed longitudinal modelingto examine population-level trends for GAT health indicators during 2014 to 2018. We summarize findings in healthpromoting and risky health behaviors or indicators across the Army as a whole, stratified by gender, service component (i.e., active duty, National Guard, Army Reserve), rank, years of service, and military occupational specialty.

METHODS

All Army personnel are required to annually complete the GAT and are subsequently given the option to allow their responses to be used for research purposes. For this study, data consisted of GAT and demographic records from 2014 to 2018 of US Army soldiers who consented to have their responses used for research, resulting in a dynamic cohort that varies by study year (total n = 952 371; see Table 1 for breakdown by year). On average, each individual in the cohort recorded 2.1 ±1.2 observations over the period from 2014 to 2018. Most respondents were White, male, enlisted, and activeduty soldiers aged 34 years or younger across all 5 years (Table 1).

GAT data are stored in the PersonEvent Data Environment, a secure data enclave maintained by the Army Analytics Group Research Facilitation Laboratory (Monterey, CA), combining large data sets de-identified for research. In this study, demographic and careerrelated variables were culled from administrative data sets from the Defense Manpower Data Center and merged with a data set of GAT respondents.

GAT data from about 60% of the Army flows to the Person-Event Data Environment; within those data, about 70% of participants consent for their GAT responses to be used for research and were thus accessed for our analyses. We compared this analytic GAT sample with total Army reports14 and estimate that our sample represents about 40% of the Army. Demographically, oursample is very similar to the total Army (see Table A, available as a supplement to the online version of this article at http://www.ajph.org, for comparisons stratified by year and component).

Measures

Key variables are summarized here; more extensive details regarding survey item wording are provided in the Appendix (available as a supplement to the online version of this article at http://www.ajph.org; see Section 1 - Item Wording). To concisely present the results, all health behavior or indicator items were dichotomized or categorized by using public health guidelines where applicable (e.g., fruit and vegetable consumption,15 activity,16 and sleep17), or expert opinion where guidelines were lacking.

Demographic information, including gender, age, race, career path, and service component were accessed through the personnel records provided by the Defense Manpower Data Center.

Regarding physical activity, soldiers were asked about the duration and frequency of vigorous aerobic activity, which was then coded into activity minutes per week and dichotomized based on 150 or more minutes per week. For days per week of resistance training, responses were classified as low (0-1 days/week), moderate (2-4 days/week), or high ($ 5 days/week). A final question asked about highintensity interval training(HIIT, defined in the survey as "sets of high intensity exercises with brief rest periods in between") and was dichotomized based on soldiers reporting any HIIT activity in the past 30 days.

To assess dietary habits, frequency of fruit and vegetable intake, breakfast consumption, and postexercise recovery snacks were analyzed. For fruit and vegetable intake, respondents were dichotomized based on whether they ate 2 or more servings per day or less. For breakfast, soldiers were dichotomized as regularly eating breakfast (6 to 7 times per week) and as not regularly eating breakfast (fewer than 6 times per week). Postexercise recovery fueling responses were categorized as frequently engaging in recovery fueling ("often" or "most of the time") and as never or infrequently engaging in recovery fueling ("only sometimes" or less).

Dietary supplement use was dichotomized based on whether soldiers reported using products at least once a month in the previous year. Respondents who affirmatively responded to taking dietary supplements were then asked about dietary supplement use in the following categories: healthpromoting, vitamin D, fish oil, sport protein powders, weight loss, and performance-enhancing or bodybuilding dietary supplements.

Sleep duration was assessed with 2 items that asked weekday and weekend sleep hours. Responses were combined and dichotomized at 6 hours or less per average day versus more than 6 hours. Sleep quality was assessed using the 2-item Pittsburgh Insomnia Rating Scale, which evaluates sleep satisfaction and difficulties relating to lack of energy because of poor sleep within the last week.18 A score greater than 2 was used to classify soldiers as at risk for insomnia.

Frequency of tobacco use was categorized as regular tobacco users (using tobacco for the past 3 months or more) and nontobacco users (not using tobacco within the past 3 months).

The Alcohol Use Disorders Identification Test (AUDIT), a 2-item screen (assessing frequency and quantity of alcohol consumption), was used.19 Soldiers categorized as hazardous drinkers had AUDIT scores greater than or equal to 4, and soldiers categorized as non-hazardous drinkers had AUDIT scores less than 4.

Self-reported limited duty within the past year because of a MSK injury was assessed to indicate whether soldiers were deemed medically nonready (MSK-MNR). Responses were dichotomized as "yes" or "no" based on whether they responded affirmativ m having sustained a duty-limiting MiSK injury within 12 months. Pain interference m i usual actidtiös was assessed along a scale of 1 ("hardly notice") to 10 ("as bad as it could be, nothing else matters").

Responses were dichotomized as a rating of 5 ("interrupts some activities") or higher and 4 ("distracts me, can do usual activities") or below.

Analyses

For döscnptbe analyses, responses were aggregated by calendar year to examine overall percentage changes in prevalence over the 5-year period from 2014 to 2018. Absolute and average rates of change were calculated from 2014 to 2018. Group differences were then assessed based upon demographics (i.e., gender, age) and occupational variables (i.e., years of service, rank, component, military occupational specialty). Military occupational specialty was categorized as combat support, cyber and military intelligence, engineering and maintenance, frontline, or service support (breakdown provided in the online Appendix, Section 2 - MOS Categories) to obtain an analysis of different career fields. Overall prevalence percentages are described i using frequ rsncies of respondents who reported engaging in a certain behavior in each survey year.

For statistical analyses, longitudinal trends and person covariates were modeled at the individual level using generalized estimating equations to predict the presence of each health behavior or indicator, with logit link and binomial distributien and an autoregrossi ve covariance stri ururo accounting for responses from the same respondent in different years (SAS Enterprise Guide version 7.1, PROC GENMOD; FAS Institute, Cary, i !C). Only resistance, training was modol·cd differ*ently to retain its 3 categories and capture' 'overtraining; it was modólód as an ordinal variable by using the cumulative probability of engaging in higher levels of training and with an independence covariance structures Because there wörö only 5 time points and no a priori reason to suspect linear changes, "year" was modeled as a categorical variable indicating odds ratios (ORs) for the prösonco of behaviors or indicators 1"o1cΓ1co to the basolinô year (2014).

We executed 2 types of models for each outcome: a time-only longitudinal model, which just used survey year as a prodictēr, and a co/ariato-adjustod longitudinal model, which used sur.·cp· year and demographic and occupatronalpr.cdiet.ors ¡OR roforrod to as adjusted OR [AOR]). Results from the majority of time-only models closely mincncd those of the covariatoadjustod models, and findings from both models can be found in the tables. Most results presented here focus on health behaviors in 2018 compared with 2014 in covariate-adjusted models. Finally, time-only models were also conducted within stratified samples, with strata consisting of various demographic and occupational variables. fv'osi ults from those stratified models are presented as ORs and our interpretation focuses on effect sizes. Notable results from the stratified analyses are highlighted here.

RESULTS

With regard to physical activity, respondents had greater odds of engaging in at least 150 minutes of vigorous activity in 2018 compared with 2014 (Table 2: 53% vs 52% of respondents; Table 3: AOR = 1.11). Resistance training more than 5 days per work increased overall by 2% in 2018 compared with 2014 (Table 3: AOR 5 1.18). Respondents had lower odds of participating in HIIT programs at least once per week in 2018 compared with 2014 (Table 2: 34% vs 38%; Table B [available as a supplement to the online version of this article at http://www.ajph.org] AOR = 0.83).

In stratified analyses comparing prevalence rates in 2014 to 2018, the largest exceptions to these trends were based on service duration: soldiers with 6 to 10 years of service had a greater increase in reported vigorous activity (Table C [available as a supplement to the online version of thus article at htt[ajph.org]: 7% increase; OR = 1.28) and resistance, training (6% increase; OR 5 1.39) from 2014 to 2018. However, there was a smaller change in HIIT participation among soldiers with 6 to 10 (Table C: 0% change; OR 5 0.94) and 11 to 30 years of service (2% increase; OR = 1.02). There were no differences for those who had served 0 to 5 years.

With regard to dietary habite, o vor the 5-year period, fruit consumption of 2 or more servings per day ranged from 36% in 2014 and 2018 to a high of 39% in 2016 (Table 3: 2018 vs 2014 AOR 5 0.89), and vegetable consumption of 2 or more servings per day ranged from 45% in 2014 to a high of 48% in 2016 (Table 3: 2018 vs 2014 AOR 5 0.98). Regular breakfast consumption (6-7 days/week) was higher in 2016 (55%) but decreased to 53% in 2018 compared with 2014 (Table B: 2018 vs 2014 AOR 5 1.04).

Approximately 53% of respondents frequently consumed postexercise recovery fueling in 2018 compared with 52%

in 2014 (Table B: AOR = 1.07).

Stratified unadjusted analyses suggested some differences in these trends by gender and service duration. Women (Table C: 3% decrease; OR 5 0.85) and soldiers with 6 to 10 years of service (5% decrease; OR 5 0.80) reported a greater decrease in fruit consumption compared with the increase in the full sample. Soldiers holding a cyber and military intelligence military occupational specialty reported a decrease in regular fruit (Table C: 4% decrease; OR 5 0.79) and breakfast (2% decrease; OR 5 0.87) consumption compared with the full sample.

A 5% to 11% decrease was reported in all categories of dietary supplement use (health-promoting, vitamin D, fish oil, protein, weight-loss, and performance-enhancing) in 2018 compared with 2014 (Table B: AOR ranging from 0.52 to 0.61). Similar trends were seen among the stratified groups compared with the full sample.

A decrease was reported in poor sleep quality (Table 2: 4%; Table 4: AOR 5 0.86) and short sleep duration (i.e., 6 hours or less; Table 2: 3%; Table 4: AOR 5 0.88) in 2018 compared with 2014. Similartrends were seen among the stratified groups compared with the full sample.

Reports of hazardous drinking were lower in 2018 (19%) compared with 2014 (Table 2: 27%; Table 4: AOR = 0.72). Tobacco use decreased by 8% during this 5-year period (Table 4: AOR 5 0.73).

In stratified analyses, soldiers with 11 to 30 years of service (Table B: 4%; OR 5 0.90) reported a smaller decrease in tobacco use than the full sample.

Overall, reported MSK-MNR was 30% in 2018 compared with 35% in 2014 (Table 4: AOR = 0.88). Respondents had lower odds of reporting pain interference in usual activities in 2018 (17%) than in 2014 (21 %; AOR = 0.85).

In stratified analyses, reserve soldiers reported a smaller decrease in MSKMNR (Table C: 0% change; OR = 1.01) and pain interference (1 % decrease; OR 5 0.97) compared with the full sample. Soldiers with 0 to 5 years of service reported a greater decrease in MSKMNR (Table C: 6% change; OR = 0.75) and pain interference (5%; OR = 0.72), while soldiers with 6 to 10 years reported a smaller decrease in MSKMNR (1% change; OR = 1.03) and pain interference (0% change; OR = 0.99) over time compared with the full sample.

DISCUSSION

From 2014 to 2018, we observed decreasing prevalence in some risky health behaviors (i.e., hazardous drinking, tobacco use, weight-loss and performance-enhancing dietary supplements) and medical outcomes (MSK injury, pain interference), along with relatively stable levels of healthy behaviors (dietary habits, regular physical activity, consumption of breakfast and postexercise recovery snacks) within the Army. Sleep quality and duration appeared to improve from 2014 to 2018, although more than one third of respondents reported poor sleep quality or an average duration of 6 hours or less. Differences were also observed among some demographic groups. Women reported better dietary habits and lower levels of risky health behaviors relative to the full sample. Men reported higher levels of physical activity relative to the full sample. Some of these trends (e.g., medical outcomes, alcohol and tobacco use) appeared to be driven by soldiers who were earlier in their career and were more subtle among those with longer service durations. Soldiers who are early in their career may be more subject to structured routines and healthy lifestyle campaigns aimed at new enlistees than more-experienced soldiers.

Important similarities and differences in health behavior trends exist between civilian and Army populations. Dietary habits remained stable from 2014 to 2018, a finding similar to the general population in which dietary trends have been stable for a few decades20 despite numerous well-publicized campaigns. Many soldiers, particularly junior enlisted personnel, live and work in controlled environments, where environmental and occupational interventions intended to improve health behaviors continue to be tested.21 Their diets remain poor overall, which, coupled with short sleep, can compromise readiness and deployability.

Dietary supplement use, including weight-loss and performanceenhancing dietary supplements, decreased over this time period. This trend is similar to those seen in previous surveys, namely the Health-Related Behavior Survey (HRBS)7'22 and is encouraging because some dietary supplements marketed for weight loss or body building have been identified in postmarket US Food and Drug Administration warnings as containing potentially dangerous substances23 that pose a risk to both the general population24 and service members.25 Furthermore, trends in dietary supplement use had previously been higher for military populations compared with civilians, and may be attributable to service members seeking a performance boost to assist with increased occupational demands.26 Results from the National Sleep Foundation's Sleep Health Index questionnaire, administered quarterly to nationally representative samples, showed that 32% of the US population rated their sleep quality as "excellent" or "very good" and 34% rated their sleep quality as "fair" or "poor."27 Since 2016, these levels have remained fairly consistent. The Centers for Disease Control and Prevention reported that approximately 35% of all adults had a short sleep duration on average (less than 7 hours of sleep), with males (35.4%) and adults aged 35 to 44 years (38.3%) having the highest prevalence in 201 4.28 Similar to civilians, male soldiers reported slightly lower levels of short sleep duration than female soldiers, though female soldiers reported higher levels of poor sleep quality than male soldiers. Overall, a greater proportion of the Army population reported short sleep duration and poor sleep quality compared with their civilian counterparts,28 although demographic differences complicate these comparisons.

The National Institute on Alcohol Abuse and Alcoholism's National Epidemiologic Survey on Alcohol and Related Conditions shows an increase in highrisk drinking (defined as 4 or more drinks for women and 5 or more drinks for men in a day at least once monthly during the previous year) from 2001-2002 (9.7%) to 2012-2013 (12.6%).29 Historically in the United States, men have consumed alcohol more frequently and in greater quantity than women.30 However, the National Survey on Drug Use and Health, which was completed between 2002 and 2012, reported a narrowing of the gap, including increases in the prevalence of any alcohol consumption in the previous month, the number of drinking days, and binge drinking among women.30 A greater decrease in hazardous drinking was observed in men than women, which indicates a similar convergence in drinking habits based upon gender.30 These decreases in alcohol use are parallel to decreases observed over the 2011 and 20157 waves of the HRBS, which indicate that our findings may be a continuation of earlier large-scale declines in hazardous drinking.

Our general findings that prevalence of risky health behaviors and selfreported medical outcomes were lower in 2018 than 2014 are important because of their potential impact on Army readiness and deployability. Reductions in risky health behaviors, such as hazardous drinking, may improve overall Army readiness by reducing the number of soldiers deemed nondeployable or being discharged from service because of disciplinary actions.10 Reductions in self-reported MSK injuries and pain interference may signify some improvements in Army readiness; MSK injuries accounted for 65% of medically nondeployable combat arms soldiers and 70% of medical discharges from 2011 through 2016.31 Differences between demographic groups in how the prevalence of health behaviors changed from 2014 to 2018 indicate that changes overtime are complex. Future efforts should consider demographicspecific drivers and barriers to positive health-promoting behaviors.

Limitations

All of the measures were self-reported, and, therefore, respondents may be biased toward representing themselves in a positive manner. Even though the data are collected confidentially and not made available to a soldiers' chain of command, there could still be some inherent distrust about effects their responses would have on one's career. Also, we cannot directly compare respondents who did and did not allow their records to be used for research. The sample, although large, still represents a convenience sample, unlike the HRBS,7,22 which is a sample-stratified survey of active-duty personnel across all branches. Therefore, it is likely that the point estimates from our data may be less accurate than those from HRBS, although, compared with the HRBS, GAT data likely depict a superior view of annual trends and their directions because it was from 1 continuous behavioral surveillance system with minimal changes (at least, with regard to "sampling") over the time span.

Lastly, sample sizes for the 2 models (time-only and covariate-adjusted) differed substantially because 37.9% of respondents were missing administrative data. Respondents with missing administrative data were nearly identical along health behaviors or indicators (percentage differences were within 2%-3%), although they were different along career-related factors: compared with respondents with complete data, those with missing data had more respondents who served for longer than 11 years (21% vs 8%) and fewer who were active duty (42% vs 61%). Nonetheless, only trivial differences were noted in the coefficients for the time-only and fully adjusted models, which indicates that sample sets and person covariates had minimal impacts on estimated changes (i.e., OR associated with year).

Public Health Implications

Health behaviors are a major contributing factor to the health, well-being, and readiness of the US military. Currently, the US military employs various educational programs and policies to address health behaviors, including (but not limited to) the Army Substance Abuse Program to educate and provide resources for treatment of drug and alcohol abuse, Operation Supplement Safety to provide information on the use of dietary supplements, and the Performance Triad Soldier Challenge, which promotes the importance of sleep, activity, and nutrition. The results of the present study show an overall decline in reported levels of risky health behaviors and steady reported rates of health-promoting behaviors. Despite declines in risky health behaviors, Soldiers still report higher levels of some of these behaviors, such as hazardous drinking and poor sleep quality, than the civilian population. These differences highlight the importance of assessing military-specific health needs. Future research efforts may focus on understanding the direct associations between health behaviors and measures of health and well-being (e.g., physical fitness scores, body composition standards, limited duty rates) as well as the effectiveness of ongoing educational programs and interventions to improve overall health status. In addition, future efforts should assess the impact of new policies and programs (e.g., Army Combat Fitness Test, Army Holistic Health and Fitness program) on improving the health, wellbeing, and readiness ofthe US military. /4JPH

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CONTRIBUTORS

J.L. Kegel executed original analyses ofthe data and drafted the article. J. B. Kazman executed additional data analyses and assisted with the write-up. D. R. Clifton, P.A. Deuster, and S.J. de la Motte provided iterative input into the analytic approach and article revisions.

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CONFLICTS OF INTEREST

The authors have no financial interests or relationships to disclose.

HUMAN PARTICIPANT PROTECTION

The project was reviewed and classified as "research - not human subjects" by the Uniformed Services University Human Research Protection Program Office.

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DETAILS

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Establishment and Evaluation of a Large Contact-Tracing and Case Investigation Virtual Training Academy

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ABSTRACT (ENGLISH)

During the COVID-19 pandemic, the Virtual Training Academy (VTA) was established to rapidly develop a contact-tracing workforce for California. Through June 2021, more than 10 000 trainees enrolled in a contact-tracing or case investigation course at the VTA. To evaluate program effectiveness, we analyzed trainee pre- and postassessment results using the Wilcoxon signed-rank test. There was a statistically significant ($P< .001$) improvement in knowledge and self-perceived skills after course completion, indicating success in training a competent contact-tracing workforce. (Am J Public Health. 2021;111(11): 1934-1938. https://doi.org/10.2105/AJPH.2021.306468)

FULL TEXT

Headnote

During the COVID-19 pandemic, the Virtual Training Academy (VTA) was established to rapidly develop a contact-tracing workforce for California. Through June 2021, more than 10 000 trainees enrolled in a contact-tracing or case investigation course at the VTA. To evaluate program effectiveness, we analyzed trainee pre- and postassessment results using the Wilcoxon signed-rank test. There was a statistically significant ($P< .001$) improvement in knowledge and self-perceived skills after course completion, indicating success in training a competent contact-tracing workforce. (Am J Public Health. 2021;111(11): 1934-1938. https://doi.org/10.2105/AJPH.2021.306468)

Early in the COVID-19 pandemic, contact tracing and case investigation were identified as key strategies to help decrease the spread of disease. To support this public health need, it was necessary to rapidly build a workforce of contact tracers (CTs) and case investigators (CIs).

INTERVENTION

The goal of the Virtual Training Academy (VTA) is to train a skilled workforce of CTs and CIs to effectively combat the spread of COVID-19 in the state of California.

PLACE AND TIME

The VTA offered its first course in May 2020 and has held 35 weeks of introductory CT and CI training as ofJune 2021. Because the VTA is a virtual training program, trainees and staff participate remotely.

PERSON

VTA trainees are prospective CTs and CIs. Although some are public health professionals, many are local or state government staff who have been redirected to support California's contacttracing efforts during the pandemic. Most trainees have a non-health career background (Table A, available as a supplement to the online version of this article at http://www.ajph.org). VTA participants came from 56 of California's 61 local health jurisdictions and more than 100 different state departments.

PURPOSE

After he issued the March 19, 2020, stayat-home order in California,1 Governor Gavin Newsom required statewide expansion of contact-tracing capacity to proceed with staged reopening.2 The workforce is composed oftwo complementary roles. CIs contact individuals who have tested positive for COVID-19, provide instructions and resources for isolation, and elicit a list of contacts who may have been exposed to the virus.3 CTs then reach out to the identified contacts and instruct them to quarantine to prevent further disease transmission.3 With a population of nearly 40 million,4 California requires a large workforce of CTs and CIs to help contain outbreaks early at a local level. This need for rapid workforce development led to the estab lishment of the VTA.

IMPLEMENTATION

The VTA is implemented by subject matter experts from the University of California, San Francisco and the University of California, Los Angeles in partnership with the California Department of Public Health. The flagship program of the VTA is a week-long introductory CT and CI training course, which the California Department of Public Health promotes to California's local health jurisdictions. Originally, trainees could enroll in either a 14-hour CT track or an 18-hour CI track, depending on their anticipated job assignment. Both tracks covered the same core information, with the CI track including additional information critical for the case investigation role. Given the demand for CIs throughout the state, the CT-only course was discontinued in December 2020.

During the course, trainees attend live didactic webinars covering topics that include the epidemiology of COVID-19, interviewing techniques, determining quarantine and isolation dates, and socioeconomic and racial disparities in COVID-19 cases and deaths (Figure 1)5 Case reporting is covered briefly, although more in-depth training is provided outside the VTA through other trainings.

The VTA places a strong emphasis on active learning and skill building. Thus, to complement the webinars, all trainees participate in three hours (CT course) or six hours (CI course) of "skills lab" sessions. The skills labs are held in virtual breakout rooms and allow trainees to role-play interviews and discuss challenging scenarios with a small group of peers under the guidance of trained course facilitators. The sessions are designed to develop skills and to raise trainee confidence. Optional skills labs are also offered, including a session to practice conducting interviews in Spanish.

To supplement synchronous course components, the course Web page offers resources to support trainees. Webinar recordings, presentation slides, and handouts are posted for trainees to review. Additionally, demonstration videos for the state's main case investigation and contact-tracing data management platform are provided.

EVALUATION

It is vital to California's COVID-19 response that the VTA successfully prepare trainees for the job. To evaluate this, pre- and postcourse assessments are administered.

The "knowledge check" contains true/ false and multiple-choice questions that measure understanding of key course concepts (Figure 1; Table B, available as a supplement to the online version of this article at http://www.ajph.org). Those passing the postcourse knowledge check within two tries are eligible to begin work as a CT or CI.

The skills "self-assessment" measures self-perceived ability to perform key job skills (Figure 1; Table D, available as a supplement to the online version of this article at http://www.ajph.org). Selfperceived ability to perform each skill is rated on a scale from 1 (not at all) to 5 (very well). The ratings on all items are averaged to obtain a composite score of self-perceived skills for each trainee before and after the course.

We analyzed assessment results from the weeks of June 29, 2020 to March 22, 2021, during which time 1445 unique trainees completed the CT course and 3352 unique trainees completed the CI course. We did not include previous cohorts, as assessment instruments were not yet finalized. We included only trainees who completed all questions on both the pre- and postassessment in the analysis for that assessment so that the individual-level change in performance could be measured. We used a onetailed Wilcoxon signed-rank test and found that the improvement in performance on the knowledge check was statistically significant (P <.001) for the CT and CI tracks, as well as for the subset of trainees with non-health career backgrounds in each track. A majority of trainees (76.9% in the CT track and 72.6% in the CI track) received a perfect score or missed only one question on the postcourse knowledge check, compared with 25.8% and 18.5% on the respective preassessments. The improvement in performance on the self-assessment was also statistically significant (P <.001) for both tracks and for the trainees who reported non-health career backgrounds. Overall results are shown in Table 1, and question-level results are shown in Tables C and D (available as supplements to the online version of this article at http://www.ajph.org). These results indicate that VTA trainees left the VTA with a strong foundation in the knowledge required to be a CT orCI. Furthermore, they greatly improved their self-perceived ability to perform keyjob skills. The significant improvements extended to trainees without a health-related career background, who had lower mean precourse scores than the other trainees but showed a larger percentage improvement. These results point to the effectiveness of the VTA at training participants, regardless of career background.

ADVERSE EFFECTS

No adverse effects of the training program are known.

SUSTAINABILITY

Once an online training platform is established, courses can be deployed to fill gaps in the public health workforce and respond to emerging challenges. At the VTA, course offerings have evolved in response to the changing needs of health departments, with newer programs including specialized training courses for staff who are designated to assist schools with reopening orto manage outbreaks in congregate settings. The VTA has also recently launched a vaccine communication course intended to provide CTs and CIs with the skills necessary to address vaccine hesitancy. Although the frequency of program delivery may decline after the pandemic eases, virtual programs such as the VTA can be a centralized and sustainable way to train an effective public health workforce.

PUBLIC HEALTH SIGNIFICANCE

Based on these results, the VTA has succeeded in its goal of quickly and effectively training CTs and CIs who have a strong foundation in the knowledge and skills required for the job and will help to protect public health by reducing the spread of COVID-19.

Even once in-person trainings can safely resume, there are benefits to virtual training programs, including the ability to simultaneously train workforces in multiple geographic locations without requiring travel and to share lessons learned across local health jurisdictions. The success of the VTA should encourage the further development and use of online training programs, both during the COVID-19 pandemic and for future public health needs that arise. Â1PU

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O. Golston conducted the statistical analysis and drafted the article. O. Golston, M. Prelip, A. Cass, A. Dorian, R. Myrick, M. Reid, K. White, and S. Shafir conceptualized the analysis. M. Prelip, A. Cass, C. Keh, M. Reid, and S. Shafir reviewed and revised the article. D. B. Brickley, L. Chen, A. Gandelman, A. Maher, and R. Willard-Grace designed the Virtual Training Academy training program. All authors approved the final version of the article.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to disclose.

HUMAN PARTICIPANT PROTECTION

The University of California, Los Angeles, Office of Human Research Protection Program determined that this project did not meet the definition of human participants research, so did not require institutionalreview board approval.

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DETAILS

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Document 37 of 37

Sexual Orientation and Gender Identity Data Collection at US Health Centers: Impact of City-Level Structural Stigma in 2018

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ABSTRACT (ENGLISH)

Objectives. To examine the relationship between city-level structural stigma pertaining to sexual orientation and gender identity (SOGI) and completeness of patient SOGI data collection at US federally qualified health centers (FQHCs). Methods. We used the Human Rights Campaign's Municipal Equality Index to quantify city-level structural stigma against sexual and gender minority people in 506 US cities across 49 states. We ascertained the completeness of SOGI data collection at FQHCs from the 2018 Uniform Data System, which describes FQHC patient demographics and service utilization. We included FQHCs in cities captured by the structural stigma index in multinomial generalized linear mixed models to examine the relationship between city-level structural stigma and SOGI data completeness. Results. FQHCs in cities with more protective sexual orientation nondiscrimination policies reported more complete patient sexual orientation data (adjusted odds ratio [AOR] = 1.6; 95% confidence interval [CI] 5 1.2, 2.1). This association was also found for gender identity nondiscrimination policies and gender identity data collection (AOR = 1.7; 95% CI = 1.3, 2.2). Conclusions. Municipal sexual and gender minority nondiscrimination laws are associated with social and municipal environments that facilitate patient SOGI data collection. (AmJ Public Health. 2021 ;111(11): 2059-2063. https://doi.org/10.2105/AJPH.2021.306414)

FULL TEXT

Headnote

Objectives. To examine the relationship between city-level structural stigma pertaining to sexual orientation and gender identity (SOGI) and completeness of patient SOGI data collection at US federally qualified health centers (FQHCs). Methods. We used the Human Rights Campaign's Municipal Equality Index to quantify city-level structural stigma against sexual and gender minority people in 506 US cities across 49 states. We ascertained the completeness of SOGI data collection at FQHCs from the 2018 Uniform Data System, which describes FQHC patient demographics and service utilization. We included FQHCs in cities captured by the structural stigma index in multinomial generalized linear mixed models to examine the relationship between city-level structural stigma and SOGI data completeness. Results. FQHCs in cities with more protective sexual orientation nondiscrimination policies reported more complete patient sexual orientation data (adjusted odds ratio [AOR] = 1.6; 95% confidence interval [CI] 5 1.2, 2.1). This association was also found for gender identity nondiscrimination policies and gender identity data collection (AOR = 1.7; 95% CI = 1.3, 2.2). Conclusions. Municipal sexual and gender minority nondiscrimination laws are associated with social and municipal environments that facilitate patient SOGI data collection. (AmJ Public Health. 2021 ;111(11): 2059-2063. https://doi.org/10.2105/AJPH.2021.306414)

Collection of patient sexual orientation and gender identity (SOGI) data is essential for improving health care access, quality, and outcomes for sexual and gender minority (SGM) populations.1,2 Given these potential benefits, the US Health Resources and Services Administration Bureau of Primary Health Care requires SOGI data reporting from Health Center Program grantees.3 Federally qualified health centers (FQHCs) provide comprehensive primary care for more than 28 million patients in medically underserved areas.4 Optimizing SOGI data collection at FQHCs is therefore critical for addressing the health needs ofthe most vulnerable SGM communities.5

SOGI data collection approaches across FQHCs are highly variable. These include self-report at intake or registration, report by caregivers, and collection by frontline staff or providers. Although each FQHC is required to report SOGI data annually in aggregate, the lack of consistent mechanisms to ensure SOGI data collection remains a barrier to data completeness.5,6 In an examination of first-year SOGI data reporting by FQHCs, sexual orientation (SO) data were missing for 77% of patients, and gender identity (GI) data were missing for 62%.6 Anti-SGM stigma has been hypothesized to be a key driver of limited SOGI data collection. Although the mechanisms underlying this relationship are not fully understood, it may be mediated in part by a lack of training on SOGI data collection, health care staff discomfort, patient nondisclosure, and other confounders.6,7

Studies on the public health implications of stigma have increasingly focused on structural stigma, defined as societal conditions, cultural norms, and institutional policies that adversely affect stigmatized populations.8 This research has demonstrated that structural stigma is associated with identity concealment, self-stigma, perceptions of discrimination, poor health behaviors, psychological distress, and psychiatric morbidity across numerous stigmatized populations, including SGM people.9 Little is known, however, about the empirical relationship between structural stigma and SOGI data collection.

We conducted the first, to our knowledge, investigation of associations between structural stigma and patient SOGI data collection. We used an existing structural stigma index to examine the relationship between completeness of SOGI data collection at FQHCs and structural stigma related to SOGI.

METHODS

The primary predictors were structural stigma scores. We obtained our structural stigma index from the Human Rights Campaign's 2018 Municipal Equality Index(HRC-MEI),10 which scores SGM inclusivity for 506 US cities, including the 50 state capitals, the 200 most populated cities, the 5 most populated cities in each state, cities that are home to each state's 2 largest public universities, 75 cities with the highest proportions of same-sex couples, and 98 additional cities selected for inclusion by the HRC and affiliates.

The HRC-MEI measures SGM inclusivity across 5 domains in US cities: nondiscrimination laws (SGM protections in employment and housing), municipality as employer (policies on SGM city employees), municipal services (inclusiveness of city services), law enforcement (SGM police task forces), and leadership on SGM equality (SGMaffirming public statements and legislation introduced by city leadership). When possible, the HRC-MEI provides separate scores for performance on each item as it relates to SO and GI. Scoring criteria are available.10

For each city, we generated 5 structural stigma scores (1 for each HRC-MEI domain) by calculatingz scores for each city's performance relative to all cities in the index. We calculated separate domain scores for SO and GI. Higher scores represent greater SGM inclusiveness and thus less anti-SGM structural stigma.

The primary outcome was SOGI data completeness, operationalized as the percentage of patients without missing SOGI data at each FQHC. Incomplete data included patients who either declined to answer SOGI questions or were not asked these questions. We obtained FQHC data from the Bureau of Primary Health Care's 2018 Uniform Data System (UDS), an annual data set on FQHC patient demographics and service utilization. The 2018 UDS included data from 1362 FQHCs.

We restricted our analysis of the 2018 UDS data to the 447 FQHCs that could be matched by address to 1 of the cities represented in our structural stigma index. FQHCs in 49 states were represented. City-level structural stigma scores for Hawaii and the District of Columbia were not included in the HRC-MEI.

We conducted our analysis in SAS version 9.4 (SAS Institute, Cary, NC). Two multinomial generalized linear mixed models, 1 each for SO and GI data completeness, tested associations between structural stigma scores and percentages of patients with SO and GI data (grouped by quartile because of nonnormal distributions and to increase statistical efficiency), with cities as a random intercept. Each model included all 5 structural stigma domain scores and was adjusted for FQHC patient population size (< 10 000, 10 000-19 999, 20 000-29 999, 30 000-49 999, $ 50 000), percentages of patients who were younger than 18 years, were racial/ethnic minorities, were uninsured, or had income at or below the federal poverty level (based on the US Department of Health and Human Services 2018 federal poverty guidelines). We performed Bonferroni correction for 10 tests, with a significance threshold of P of less than .005.

RESULTS

We present the results in Table 1.

The median percentage of patients with complete GI data was 90.0% (interquartile range [IQR] = 44.9%) compared with 67.3% (IQR 5 55.3%) for complete SO data. In the final multivariable models, nondiscrimination laws were significantly associated with SO and GI data completeness. The odds of an FQHC being in a higher quartile of data completeness increased with each 1-point increase in structural stigma z score for nondiscrimination laws. This was true for both SO nondiscrimination laws (adjusted odds ratio [AOR] = 1.6; 95% confidence interval [CI] = 1.2,2.1)and

GI nondiscrimination laws (AOR = 1.7; 95% CI 5 1.3, 2.2).

Most sociodemographic covariates were not significantly associated with SOGI data completeness, including FQHC size, percentage of racial/ethnic minority patients, percentage below the federal poverty level, and percentage uninsured. The percentage of patients younger than 18 years was significantly associated with SO data completeness (AOR = 16.8; 95% CI 5 3.5,80.7) and GI data completeness (AOR 5 10.6; 95% CI 5 2.5, 45.1), but these estimates were unstable and should be interpreted with caution.

DISCUSSION

This is the first study, to our knowledge, to demonstrate an empirical relationship between structural stigma and patient data collection. FQHCs in cities with more protective SGM nondiscrimination laws reported more complete SOGI patient data than did FQHCs in cities with less protective nondiscrimination laws. These findings support the hypothesis that anti-SGM stigma is associated with limited SOGI data collection.6 Our focus on city-level structural stigma adds to the existing stigma literature, as scholars have hypothesized that proximal (e.g., city-level) forms of structural stigma may have greater influences on health than distal (e.g., state-level) forms.9

Notably, the only structural stigma domain significantly associated with SOGI data collection was nondiscrimination laws. There were no statistically significant associations between SOGI data completeness and the 4 other structural stigma domains. These findings suggest that enforceable SGM-inclusive laws are more strongly associated with stigma alleviation and SOGI data collection than are the other structural stigma domains, which were largely composed of voluntary practices and symbolic representations of SGM inclusivity.

The completeness of GI data may be substantially higher than the completeness of SO data in this sample for several reasons. First, sex-related data, which may be conflated with GI data, are collected more consistently for billing purposes. Second, it is possible that frontline staff do not explicitly ask GI questions; they might assume GI based on their own perception of each patient's gender expression. Third, it is possible that health care staff may view GI as more actionably relevant to medical care than SO.

Our study has several limitations. Our structural stigma index is based on the HRC-MEI; therefore, our findings are specific to FQHCs in the HRC-MEI's 506 listed cities and may not be generalizable across all health care systems. The UDS does not distinguish between SOGI data being incomplete because patients were not asked by staff versus patients chose not to disclose, which precluded assessment of mechanisms underlying this study's findings. Furthermore, the UDS only reports aggregate data at the FQHC level, precluding patient-level statistical analysis. The study's crosssectional design does not allow us to determine causation or directionality of our main finding, which may be bidirectional: SGM nondiscrimination laws may promote SOGI data collection,11 and SOGI data collection may facilitate the implementation of SGM-inclusive policies.12 Finally, as this is an observational study, it may be subject to unmeasured confounding.

Future investigations on structural stigma and SOGI data collection would benefit from the expansion of structural stigma indices to measure stigma in a more diverse selection of regions, including more rural settings. Furthermore, future studies should thoroughly examine how predictors of differential access to affirming health care may influence SOGI data collection. In this study, percentage of racial and ethnic minority patients was not a significant predictor of SOGI data completeness. However, our access to only aggregate FQHC-level data mayhave precluded our identification of significant associations. This limitation reinforces the importance of future patient-level analyses for assessing associations between structural stigma and patient data collection.

PUBLIC HEALTH IMPLICATIONS

In this cross-sectional study, we found that structural stigma scores quantifying the protectiveness of city-level SGM nondiscrimination laws were associated with SOGI data collection completeness at FQHCs. Our findings suggest potential value in enhanced federal oversight to improve mandated collection of SOGI data, particularly in cities with higher levels of anti-SGM structural stigma. These findings also underscore the importance of municipal SGM nondiscrimination laws and affirming social environments, which may mutually reinforce one another, foster robust SOGI data collection, and promote SGM health equity. ÂfPU

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CONTRIBUTORS

A. N. Almazan led the drafting of the article. A. N. Almazan and D. King contributed to analysis design. A. N. Almazan and A. S. Keuroghlian conceptualized and designed the study. D. King conducted the analyses. M. Lattanner and M. L. Hatzenbuehler contributed to the development of the structuralstigma index. A. S. Keuroghlian supervised the implementation and reporting of the study. All authors edited the finalarticle.

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CONFLICTS OF INTEREST

A. S. Keuroghlian willreceive royalties as editor of an upcoming McGraw-HillEducation textbook on transgender and gender diverse care. The authors report no other relevant conflicts of interest.

HUMAN PARTICIPANT PROTECTION

This study was reviewed by the Fenway Institute institutionalreview board and did not constitute human participants research.

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DETAILS

Subject:	Indexes; Sexual orientation; Public health; Data collection; Gender identity; Cities; Uninsured people; Equality; Stigma; Sexual behavior; Health facilities; Confidence intervals; Human rights; Policies; Gender aspects; Patients; Poverty; Gender; Minority &ethnic groups; Completeness; Health care; Primary care; Demography; Urban planning; Minority groups; Statistical models
Business indexing term:	Subject: Uninsured people
Location:	United States--US
Company / organization:	Name: Bureau of Primary Health Care; NAICS: 923120; Name: Human Rights Campaign; NAICS: 813311
Publication title:	American Journal of Public Health; Washington
Volume:	111
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Ro, Annie,PhD., M.P.H., Yang, H. W., M.D., Du, S., B.A., Hanlon, Courtney L,M.D., M.S., & Young, A. S., D.O. (2021). Severity of inpatient hospitalizations among undocumented immigrants and medi-cal patients in a los angeles, california, hospital: 2019. American Journal of Public Health, 111(11), 2019-2026. doi:https://doi.org/10.2105/AJPH.2021.306485

Objectives. To compare the severity of inpatient hospitalizations between undocumented immigrants and Medi-Cal patients in a large safety-net hospital in Los Angeles, California. Methods. We conducted a retrospective analysis of all 2019 inpatient stays at a Los Angeles hospital (n 5 22480), including patients of all races/ethnicities. We examined 3 measures by using insurance status to approximate immigration status: illness severity, length of hospital stay, and repeat hospitalizations. We calculated group differences between undocumented and Medi-Cal patients by using inverse probability weighted regression adjustment separately for patients aged 18 to 64 years and those aged 65 years and older. Results. Younger undocumented patients had less severe illness and shorter lengths of stay than their Medi-Cal counterparts. Older undocumented immigrants also had less severe illness, but had similar lengths of stay and were more likely to have repeated hospitalizations. Conclusions. While existing work suggests that undocumented immigrants could have more severe health care needs on account of their poorer access to medical care, we did not see clear health disadvantages among hospitalized undocumented immigrants, especially younger patients. There were fewer differences between undocumented and Medi-Cal patients who were older. (Am J Public Health. 2021 ;111(11):2019-2026. https://doi.org/10.2105/AJPH.2021.306485)

Leas, E. C.,PhD.M.P.H. (2021). The hemp loophole: A need to clarify the legality of delta-8-THC and other hemp-derived tetrahydrocannabinol compounds. American Journal of Public Health, 111(11), 1927-1931. Retrieved from https://www.proquest.com/scholarly-journals/hemp-loophole-need-clarify-legality-delta-8-thc/docview/2602732223/se-2?accountid=211160

On June 22, 2021, Connecticut became the newest state to legalize recreational cannabis, raising the total number of US states allowing recreational cannabis to 18. One of the promissory notes of state-led legalization is that it will bring cannabis out of an illicit market and into a more transparent one with better safety standards. Meeting this challenge will require properly defining a group of compounds that fall into the category of tetrahydrocannabinol (THC) but can have different structures and origins. Here I discuss loopholes that allow for legal hemp production to yield a THC compound that has escaped state and federal regulation because of its hemp, rather than cannabis, origins. I make the case that the loopholes that allow THC compounds to be sold as hemp ought to be closed and provide a brief case study of one state that has done an exceptional job in closing such loopholes.

Nguyen, Nga TQ,B.Pharm, PhD., Nguyen, Hoa Q,B.Pharm, PhD., & O'Neill, C., PhD. (2021). COVID-19 era recessional mortality continues the impact of prepandemic recessions on mortality. American Journal of Public Health, 111(11), 1944-1946. Retrieved from https://www.proquest.com/scholarly-journals/covid-19-era-recessional-mortality-continues/docview/2602732155/se-2?accountid=211160

C OVID-19 has had profound health, social, and economic effects globally. Its impact and our understanding of it will continue to evolve as issues- related, for example, to delayed diagnoses, social isolation, increased public sector borrowing, and health care worker burnout-emerge. Short-term effects, such as COVID-19-related deaths, are significant; in the United States these are estimated to have exceeded 630 000.1 The longer-term effects will take time to evolve but are already sources of concern to decision makers and their consultants, including those in academia. In April 2020, the US unemployment rate reached 14.8%-the highest rate observed since data collection began in 1948.2 In this issue of AJPH, Brenner (p. 1950) examines how this and other economic indicators of the effects of COVID-19 on the economy affect health. Brenner examines the relationship of unemployment and bankruptcy rates with excess deaths during the COVID-19 recession, contextualizing these with reference to the Great Recession of 2000 to 2018 in the United States.

McCullough, Marjorie L,ScD., R.D., & Islami, Farhad,M.D., PhD. (2021). The high cost and unequal cancer burden of poor diet in the united states. American Journal of Public Health, 111(11), 1913-1915. Retrieved from https://www.proquest.com/scholarly-journals/high-cost-unequal-cancer-burden-poor-diet-united/docview/2602732136/se-2?accountid=211160

Poor diet is known to increase cancer risk and mortality, both directly and mediated by excess body fatness.1,2 Characterized by higher intakes of red and processed meat and sugar sweetened beverages (SSBs) and a lower intake of whole grains, vegetables, and fruit, poor diet is associated with the risk of multiple cancers, especially colorectal cancer.1,2 The most recent estimates of the proportion of new cancer cases attributable to suboptimal diet range from 4.2%3 to 5.2%,4 equating to approximately 67 000 to 80 000 total cases per year in the United States. Disparities in cancer outcomes among racial and ethnic groups and by socioeconomic status are well documented.5,6 For example, colorectal cancer death rates among Black males is more than 44% higher than among White males.5 Few studies, however, have quantified the impact of poor diet on cancer outcomes in these subgroups. In this issue of AJPH, Wang et al. (p. 2008) estimate the lifetime health and economic costs of cancer attributable to poor diet among US subpopulations defined by age, sex, race/ethnicity, education, income, and Supplemental Nutrition Assistance Program (SNAP) participation. The authors projected both direct and indirect effects of poor diet, the latter derived from a pooled analysis of three prospective cohorts, to obtain diet-body mass index associations. Additionally, using publicly available data and modelingtechniques, the authors estimated that the impact of suboptimal intakes of seven dietary factors (whole grains, dairy products, fruits, vegetables, red meat, processed meat, and SSBs) accounted for 3.04 million new cancer cases (7.4%) and 1.74 million cancer deaths (7.7%) among US adults over a lifetime. These percentages are higher than previous estimates, likely because of the authors' use of lifetime modeling, whereas estimates from previous studies were for a specific year (i.e., 20143 or 20154). The authors also estimated $254 billion in medical costs attributable to poor diet (7.8% of direct medical costs of 1 5 dietrelated cancers in the United States).

Credits. (2021). American Journal of Public Health, 111(11), 1898. Retrieved from https://www.proquest.com/scholarly-journals/credits/docview/2602732092/se-2?accountid=211160

Krieger, J.,M.D.M.P.H., Kwon, T., PhD., Run, R., M.P.P., Walkinshaw, L. P., M.P.H., Yan, J., M.S., & Roberto, C. A., PhD. (2021). Countermarketing about fruit drinks, alone or with water promotion: A 2019 randomized controlled trial in latinx parents. American Journal of Public Health, 111(11), 1997-2007. Retrieved from https://www.proquest.com/scholarly-journals/countermarketing-about-fruit-drinks-alone-with/docview/2602732091/se-2?accountid=211160

Objectives. To test whether fruit drink countermarketing messages alone or combined with water promotion messages reduce Latinx parents' purchases of fruit drinks for children aged 0 to 5 years. Methods. We performed a 3-arm randomized controlled online trial enrolling 1628 Latinx parents in the United States during October and November 2019. We assessed the effect of culturally tailored fruit drink countermarketing messages (fruit drink-only group), countermarketing and water promotion messages combined (combination group), or car-seat safety messages (control) delivered via Facebook groups for 6 weeks on parental beverage choices from a simulated online store. Results. The proportion of parents choosing fruit drinks decreased by 13.7 percentage points in the fruit drink-only group (95% confidence interval CI] = -20.0, -7.4; P < .001) and by 19.2 percentage points in the combination group (95% CI = -25.0, -13.4; P < .001) relative to control. Water selection increased in both groups. Conclusions. Fruit drink countermarketing messages, alone or combined with water promotion messages, significantly decreased parental selection of fruit drinks and increased water selection for their children. Public Health Implications. Countermarketing social media messages may be an effective and low-cost intervention for reducing parents' fruit drink purchases for their children. (Am J Public Health. 2021;111(11):1997-2007. https://doi.org/10.2105/AJPH.2021.306488)

de Camargo, Kenneth Rochel, MD, PhD. (2021). The economy as a determinant of pandemic deaths. American Journal of Public Health, 111(11), 1942-1943. Retrieved from https://www.proquest.com/scholarly-journals/economy-as-determinant-pandemic-deaths/docview/2602732067/se-2?accountid=211160

The strong relationship between socioeconomic contexts and the health of individuals and populations has long been settled science and a core tenet of public health.1 Measuring effects and examining possible causal pathways, however, is an ongoing challenge for researchers and policymakers alike.2,3

García, M., MD PhD. (2021). The social survey, the metropolitan life insurance company, and the beginnings of the US public health service's sickness surveys. American Journal of Public Health, 111(11), 1960-1968. Retrieved from https://www.proquest.com/scholarly-journals/social-survey-metropolitan-life-insurance-company/docview/2602731837/se-2?accountid=211160

The earliest sickness survey of the US Public Health Service, which started in 1915, was the Service's first socioeconomic study of an industrial community. It was also the first to define illness as a person's inability to work. The survey incorporated the Metropolitan Life Insurance Company's definition of illness, which, instead of sickness rates, focused on duration of illness as a proxy of time lost from work. This kind of survey took place in the broader context ofthe reform movements ofthe Progressive Era and the social surveys conducted in the United States, which led to the creation ofthe Federal Commission on Industrial Relations, where the Service's sickness survey originated. The Service's focus on the socioeconomic classification of families and definition of illness as the inability to work enabled it to show the strong link between poverty and illness among industrial workers. The leader ofthe survey, Edgar Sydenstricker, and the Metropolitan Life Insurance Company came up with new ways to measure the health ofthe population, which also influenced the Service's studies ofthe effects ofthe Great Depression on public health and the National Health Survey of 1935-1936. (AmJ Public Health. 2021; 11 1(1 1):1960-1968. https://doi.org/10.2105/AJPH.2021.306454)

Gartner, D. R., PhD., Wilbur, R. E., M.P.H., & McCoy, Meredith L,PhD., M.Ed. (2021). "American indian" as a racial category in public health: Implications for communities and practice. American Journal of Public Health, 111(11), 1969-1975. doi:https://doi.org/10.2105/AJPH.2021.306465

When public health considers the health and disease status of Indigenous people, It often does so using a racial lens. In recent decades, public health researchers have begun to acknowledge that commonly employed racial categories represent history, power dynamics, embodiment, and legacies of discrimination and racism, rather than innate biology. Even so, public health has not yet fully embraced an understanding of other components of identity formation for Indigenous people, including political status within Native nations. In this article, we discuss why the continued racial conceptualization of Indigeneity in US public health is inadequate. We begin by providing a brief account of racialization as a tool of colonization, of failure to recognize and acknowledge Indigenous sovereignty, and of common public health practices of Indigenous data collection and interpretation. We then articulate the stakes of racialized health data for Native communities. We end by offering alternative approaches, many drawn from scholarship from Indigenous researchers.

Palamar, J. J.,PhD.M.P.H., Rutherford, C., M.S., & Keyes, K. M., PhD. (2021). Trends in ketamine use, exposures, and seizures in the united states up to 2019. American Journal of Public Health, 111(11), 2046-2049. doi:https://doi.org/10.2105/AJPH.2021.306486)

Objectives. To determine whether there have been shifts in nonmedical ketamine use, poisonings ("exposures"), and seizures. Methods. We used generalized additive models to detect trends in past-year use (2006-2019), exposures (1991 -2019), and seizures (2000-2019) involving ketamine in the United States. Results. There was a quarterly increase in self-reported past-year nonmedical ketamine use in 2006 to 2014 (B 5 0.21; P = .030) and an increase in 2015 to 2019 (B = 0.29; P = .036), reaching a peak of 0.9% in late 2019. The rate of exposures increased from 1991 through 2019 (B = 0.87; P = .006), and there was an increase to 1.1 exposures per 1 000 000 population in 2014, with rates remaining stable through 2019. The rate of ketamine seizures increased from 2000 through 2019 (B = 2.27; P < .001), with seizures reaching a peak in 2019 at 3.2 per 1000 seizures. Conclusions. Indicators suggest that ketamine use and availability has increased, including before increased medical indications, but nonmedical use is still currently uncommon despite increased acceptance and media coverage.

Brenner, M. H. (2021). Unemployment, bankruptcies, and deaths from multiple causes in the COVID-19 recession compared with the 2000–2018 great recession impact. American Journal of Public Health, 111(11), 1950-1959. doi:https://doi.org/10.2105/AJPH.2021.306490

Objectives. To determine whether unemployment and bankruptcy rates are related to increased excess deaths during the COVID-19 recession and to examine whether the current recession-based mortality rate not only is dependent on COVID-19 but also continues the pattern of recessions, especially the Great Recession, in relation to chronic disease mortality rates and mental health disturbances (e.g., including suicide) from 2000 to 2018. Methods. This study used pooled cross-sectional time series analysis to determine the impact of unemployment and bankruptcy rates on excess deaths from February to November 2020 for US states. The study used a second pooled cross-sectional time series analysis to determine whetherthe COVID-19-era recessional mortality continues the impact of prepandemic recessions (2000-2018) on multiple causes of mortality. Results. Ten percent unemployment was associated with approximately 48thin space]149 excess deaths, while, jointly with bankruptcies, their combined effect produced 35 700 and 144483 excess deaths, for unemployment and bankruptcies, respectively. These health-damaging COVID-19-recessional findings suggest a reiteration of the significantly increased major cause-specific mortality during 2000 to 2018, mitigated by the size of the health care workforce. Conclusions. Minimization of deaths attributable to the COVID-19 recession requires ample funding for the unemployed and underemployed, especially Black and Hispanic communities, along with significant investments in the health workforce. (AmJ Public Health. 2021 ;111(11):1950-1959. https://doi.org/10.2105/AJPH.2021.306490)

Lewandowski, S. A., Hughes, R. C., Marziali, M. E., & Segura, L. E. (2021). Community action for people with HIV and sex workers during the COVID-19 pandemic in india. American Journal of Public Health, 111(11), 2. Retrieved from https://www.proquest.com/scholarly-journals/community-action-people-with-hiv-sex-workers/docview/2602731723/se-2?accountid=211160

Lewandowski, S. A., Hughes, R. C., Marziali, M. E., & Segura, L. E. (2021). Impact of COVID-19 on primary health care services. American Journal of Public Health, 111(11), 2. doi:https://doi.org/10.2105/AJPH.2021.306533

Pagan, J. A., PhD. (2021). Excess deaths during the COVID-19 economic downturn. American Journal of Public Health, 111(11), 1947-1949. Retrieved from https://www.proquest.com/scholarly-journals/excess-deaths-during-covid-19-economic-downturn/docview/2602731677/se-2?accountid=211160

More than 700 000 people have died from COVID-19 in the United States over the last year and a half since the pandemic began.1 Measures to stop the spread of COVID-19, such as stay-at-home orders and business closures, together with severe disruptions in overall economic activity brought about a short but deep economic recession. The Bureau of Economic Analysis of the US Department of Commerce estimates that real gross domestic product in the United States decreased at an annual rate of 19.2% from the fourth quarter of 2019 through the second quarter of 2020.2In this issue of AJPH, Brenner (p. 1950) investigates excess deaths associated with unemployment and bankruptcies during the COVID-19 recession. The sharp economic downturn experienced by the United States last year is likely to lead to higher mortality over the next five to 10 years.3 The key question Brenner answers is whether higher unemployment and business closures due to the pandemic have a more immediate, same-year effect on excess deaths.

Shen, Angela K,ScD., M.P.H., Bramer, C. A., M.P.H., Kimmins, L. M., M.P.H., Swanson, R., M.P.H., Vranesich, P., B.S.N., & Orenstein, W., M.D. (2021). Vaccine coverage across the life course in michigan during the COVID-19 pandemic: January–September 2020. American Journal of Public Health, 111(11), 2027-2035. doi:https://doi.org/10.2105/AJPH.2021.306474

Objectives. To assess the impact of the COVID-19 pandemic on immunization services across the life course. Methods. In this retrospective study, we used Michigan immunization registry data from 2018 through September 2020 to assess the number of vaccine doses administered, number of sites providing immunization services to the Vaccines for Children population, provider location types that administer adult vaccines, and vaccination coverage for children. Results. Of 12 004384 individual vaccine doses assessed, 48.6%, 15.6%, and 35.8% were administered to children (aged 0-8 years), adolescents (aged 9-18 years), and adults (aged 19-105 years), respectively. Doses administered overall decreased beginning in February 2020, with peak declines observed in April 2020 (63.3%). Overall decreases in adult doses were observed in all settings except obstetrics and gynecology provider offices and pharmacies. Local health departments reported a 66.4% decrease in doses reported. For children, the total number of sites administering pediatric vaccines decreased while childhood vaccination coverage decreased 4.4% overall and 5.8% in Medicaid-enrolled children. Conclusions. The critical challenge is to return to prepandemic levels of vaccine doses administered as well as to catch up individuals for vaccinations missed. (Am J Public Health. 2021 ;111(11):2027-2035. https://doi.org/10.2105/AJPH.2021.306474)

Kortsmit, K.,PhD.M.P.H., Li, R., PhD., Cox, S., M.S.P.H., Shapiro-Mendoza, C., Perrine, C. G., PhD., D'Angelo, D. V., MPH, . . . Warner, L.,PhD.M.P.H. (2021). Workplace leave and breastfeeding duration among postpartum women, 2016–2018. American Journal of Public Health, 111(11), 2036-2045. doi:https://doi.org/10.2105/AJPH.2021.306484

Objectives. To examine associations of workplace leave length with breastfeeding initiation and continuation at 1,2, and 3 months. Methods. We analyzed 2016 to 2018 data for 10 sites in the United States from the Pregnancy Risk Assessment Monitoring System, a site-specific, population-based surveillance system that samples women with a recent live birth 2 to 6 months after birth. Using multivariable logistic regression, we examined associations of leave length (< 3 vs $ 3 months) with breastfeeding outcomes. Results. Among 12 301 postpartum women who planned to or had returned to the job they had during pregnancy, 42.1% reported taking unpaid leave, 37.5% reported paid leave, 18.2% reported both unpaid and paid leave, and 2.2% reported no leave. Approximately two thirds (66.2%) of women reported taking less than 3 months of leave. Although 91.2% of women initiated breastfeeding, 81.2%, 72.1%, and 65.3% of women continued breastfeeding at 1,2, and 3 months, respectively. Shorter leave length (< 3 months), whether paid or unpaid, was associated with lower prevalence of breastfeeding at 2 and 3 months compared with 3 or more months of leave. Conclusions. Women with less than 3 months of leave reported shorter breastfeeding duration than did women with 3 or more months of leave. (Am J Public Health. 2021;111(11):2036-2045. https://doi.org/ 10.2105/AJPH.2021.306484)

Ramachandran, Reshma,M.D., M.P.P., Gupta, R., M.D., & Luo, Jing,M.D., M.P.H. (2021). An unnecessary gift for COVID-19 vaccines and therapeutics: The medical countermeasure priority review voucher. American Journal of Public Health, 111(11), 1923-1926. Retrieved from https://www.proquest.com/scholarly-journals/unnecessary-gift-covid-19-vaccines-therapeutics/docview/2602731291/se-2?accountid=211160

When the US Food and Drug Administration (FDA) approved remdesivir in October 2020 for the treatment of COVID-19, it awarded the manufacturer, Gilead Sciences, an additional prize: a medical countermeasure priority review voucher. Upon full FDA approval, COVID-19 vaccine manufacturers may also be awarded this regulatory incentive. These vouchers are meant to motivate manufacturers to develop medical countermeasures (MCMs), which are defined as medical products that treat or prevent harm owing to a biological, chemical, radiological, or nuclear agent identified as a material threat, or a condition caused by administering a drug against such an agent.1 However, given the significant public funding already invested in these products before approval for both their development and procurement, we believe these vouchers offer little additional incentive and are unnecessary. As manufacturers of COVID-19 vaccines and other therapeutics seek full approval and become eligible for MCM priority review vouchers, their use should be reconsidered.

Table of contents. (2021). American Journal of Public Health, 111(11), 1899-1900. Retrieved from https://www.proquest.com/scholarly-journals/table-contents/docview/2602731232/se-2?accountid=211160

Wang, L.,PhD.M.P.H., Du, M.,M.S.M.P.H.R.D., Cudhea, F., PhD., Griecci, C., PhD., Michaud, D. S., ScD., Mozaffarian, D.,M.D.DrP.H., & Zhang, F. F.,M.D.PhD. (2021). Disparities in health and economic burdens of cancer attributable to suboptimal diet in the united states, 2015–2018. American Journal of Public Health, 111(11), 2008-2018. doi:https://doi.org/10.2105/AJPH.2021.306475

Objectives. To quantify disparities in health and economic burdens of cancer attributable to suboptimal diet among US adults. Methods. Using a probabilistic cohort state-transition model, we estimated the number of new cancer cases and cancer deaths, and economic costs of 15 diet-related cancers attributable to suboptimal intake of 7 dietary factors (a low intake of fruits, vegetables, dairy, and whole grains and a high intake of red and processed meats and sugar-sweetened beverages) among a closed cohort of US adults starting in 2017. Results. Suboptimal diet was estimated to contribute to 3.04 (95% uncertainty interval UI] = 2.88, 3.20) million new cancer cases, 1.74 (95% UI = 1.65,1.84) million cancer deaths, and $254 (95% UI = $242, $267) billion economic costs among US adults aged 20 years or older over a lifetime. Diet-attributable cancer burdens were higher among younger adults, men, non-Hispanic Blacks, and individuals with lower education and income attainments than other population subgroups. The largest disparities were for cancers attributable to high consumption of sugar-sweetened beverages and low consumption of whole grains. Conclusions. Suboptimal diet contributes to substantial disparities in health and economic burdens of cancer among young adults, men, racial/ethnic minorities, and socioeconomically disadvantaged groups.

Dai, H., PhD., Ramos, A. K., PhD., Faseru, Babalola,M.D., M.P.H., Hill, J. L., PhD., & Sussman, S. Y., PhD. (2021). Racial disparities of E-cigarette use among US youths: 2014–2019. American Journal of Public Health, 111(11), 2050-2058. doi:https://doi.org/10.2105/AJPH.2021.306448

Objectives. To evaluate disparities in youth e-cigarette use patterns and flavor use by race/ethnicity overtime. Methods. We used data from the US 2014-2019 National Youth Tobacco Survey (NYTS) to examine trends in dual use (co-use of e-cigarettes and cigarettes or other tobacco products), occasional (≤ 5 days) versus frequent use (≥ 20 days) in the past 30 days, and flavor use among current (past-30-day) e-cigarette users (n = 13178) across racial/ethnic groups (non-Hispanic Whites, non-Hispanic Blacks, Hispanics/Latinos, and non-Hispanic others). Results. Among current e-cigarette users, dual use and occasional use decreased significantly from 2014 to 2019 across racial and ethnic groups except for non-Hispanic Blacks; frequent use and flavored e-cigarette use increased among non-Hispanic Whites, Hispanics/Latinos, and non-Hispanic others but not among non-Hispanic Blacks. In 2019, non-Hispanic Black e-cigarette users were more likely to report dual use (adjusted odds ratio AOR] = 2.2; 95% confidence interval CI] = 1.5, 3.2; P< .001) and occasional use of e-cigarettes (AOR = 3.7; 95% CI = 2.3, 5.9; P < .001) but less likely to report frequent use (AOR 5 0.2; 95% CI = 0.1,0.4; P < .001) and flavored e-cigarette use (AOR = 0.4; 95% CI = 0.3, 0.5; P < .001) than their White peers. Conclusions. Youth e-cigarette use patterns differed considerably across racial/ethnic groups, and tailored strategies to address disparities in e-cigarette use are needed. (Am J Public Health. 2021;111(11): 2050-2058. https://doi.org/10.2105/AJPH.2021.306448)

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