Health Affairs Scholar, 2025, **3**(1), qxaf005
https://doi.org/10.1093/haschl/qxaf005
Advance access publication: January 15, 2025
Research Article

Health Affairs Scholar
EMERGING & GLOBAL HEALTH POLICY
OXFORD

State-level LGBTQ+ policies and health: the role of political determinants in shaping health equity

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Abstract

Lesbian, gay, bisexual, transgender, and queer/questioning (LGBTQ+) individuals in the United States experience higher rates of discrimination and stressors that negatively impact health compared with their straight, cisgender counterparts. Using 2022 Behavioral Risk Factor Surveillance Survey (BRFSS) data, estimating multilevel mixed-effects logistic regressions, we examined the relationship between state LGBTQ+ policies and health among LGBT people. Findings reveal a statistically significant inverse link between protective (high) state policy scores and poor self-rated health, poor mental health days, and poor physical health days. Specifically, with each 1-point increase in policy score, the odds of poor self-rated health are reduced by 0.03%, high mental health burden by 0.02%, and high physical health burden by 0.02%. Inequalities in self-rated health, high mental health burden, and high physical health burden are greater in policy environments with fewer state-level protections, with LGBT individuals reporting better health where there are more protections. These results indicate that discriminatory state policies are linked to poorer health for LGBT individuals and suggest that protective policies could improve health. Further research with comprehensive data is needed to deepen understanding.

Key words: LGBTQ+; political determinants of health; health disparities/inequalities.

Introduction

The health and health care utilization of individuals who identify their sexual orientation and gender identity as lesbian, gay, bisexual, transgender, or queer/questioning (LGBTQ+) have been a topic of political conversation for decades. In recent history, the HIV/AIDS epidemic of the 1980s brought significant attention to the health issues faced by LGBTQ+ communities. While the earlier years of the HIV/AIDS epidemic villainized and pathologized LGBTQ+ communities, persistent advocacy brought about increased visibility, research funding, and policy changes to address the crisis.[1] In the 1990s, organizations like the Gay and Lesbian Medical Association began advocating for better health care for LGBTQ+ people. They raised awareness around mental health and substance abuse, as well as the need for culturally competent care.[1] In 2010, Section 1557 of the Patient Protection and Affordable Care Act (ACA) included provisions that prohibited discrimination on the "basis of sex" and the Obama administration clarified this to include discrimination prohibitions based on gender identity and sex stereotyping. This action temporarily increased access to health care for LGBTQ+ individuals by prohibiting discrimination by insurers, but current court cases (*Tennessee v Becerra*) threaten those protections.[2,3] In 2015, the legalization of same-sex marriage allowed same-sex couples to enjoy the same legal rights and health benefits as different-sex couples, such as spousal health insurance and health care decision-making.[4] Studies demonstrate that these provisions have far-reaching impacts on improving LGBTQ+ health outcomes.[5-7] There have been several advancements on the national level over the past few decades; at the state level, numerous policies, laws, and regulations have impacted the freedoms and rights of LGBTQ+ people.[8]

In 1993, the federal Religious Freedom Restoration Act (RFRA) passed. Since then, 28 states have passed similar legislation. The federal law was intended to protect individuals' religious freedoms, but these policies have been used to justify discrimination against LGBTQ+ people, particularly in business and service settings.[9-11] In 2016, North Carolina was the first state to enact "Bathroom Bills," state laws requiring individuals to use public bathrooms that correspond to their sex assigned at birth rather than their gender identity.[12] Such laws limit the rights of transgender and gender-diverse individuals by attempting to prevent them from accessing public resources in a manner that is appropriate and safe for them. Evidence demonstrates that these laws have negative consequences on the health and safety of gender-diverse individuals.[13,14] Over the past few years, states like Florida have

Received: October 9, 2024; Revised: December 3, 2024; Accepted: January 9, 2025

enacted "Don't Say Gay" bills that prohibit the discussion of sexual orientation and gender identity in certain grade levels, limiting the representation of LGBTQ+ individuals in education and education resources.[15] Last, several states have enacted policies that attempt to restrict or ban access to gender-affirming care for transgender minors.[16] Some states have gone as far as attempting to criminalize gender-affirming care providers.[17] These types of policies are opposed by all major medical organizations.[18] These examples demonstrate an ongoing political struggle over LGBTQ+ rights. According to Daniel E. Dawes' Political Determinants of Health (PDOH) conceptual framework, political actions and policies significantly influence the health outcomes of individuals from diverse backgrounds.[19]

The PDOH conceptual framework demonstrates how political decisions impact people's health. It posits that policy decisions can either improve or harm public health; that the power and influence of actors like politicians, corporations, and interest groups shape health policies and, ultimately, health outcomes; and that historical events and policies have long-lasting effects on health.[19] The PDOH affect access to health care, social determinants of health (SDOH), and environmental and contextual factors that can impact the conditions in which people live and access health care. Policies and laws can impact health directly or indirectly by influencing social standing and resource access. Research shows that LGBTQ+ individuals face higher rates of mental health challenges, such as depression, anxiety, and suicidality, compared with cisgender, straight counterparts.[20]

LGBTQ+ people also have less access to preventive health care services, are more likely to delay health care due to cost, are less likely to have a consistent care provider, and are more likely to have state-sponsored health insurance, and for some LGBTQ+ groups, no health insurance at all.[20] Previous research linked health inequalities in LGBTQ+ communities to limited access to SDOH as well as minority stress,[20-22] the unique stress experienced by individuals who are vulnerable to stigmatization, marginalization, and systemic discrimination. Introduced by Virginia Brooks[21] in 1980 as it relates to lesbian women and extended to gay men by Meyer[22] (1995), the minority stress model was developed to explain the effect that external and internal stressors have on health outcomes to repudiate beliefs that health inequalities in LGBTQ+ communities were results of biological and behavioral defects innate to this group.

In this study, we leveraged multilevel, mixed-effects logistic regression, and a comprehensive report of state law and policies designed to help LGBTQ+ people understand the impacts of policies on LGBTQ+ individuals' health. We focused on several categories of health that potentially impact SDOH to answer the following research questions:

1. What is the relationship between state-level policies specific to LGBTQ+ individuals and their health outcomes?
2. Does living in a state with more protective LGBTQ+ policy environments have a positive impact on LGBTQ+ individuals' health?

Based on the PDOH conceptual framework, we hypothesized that higher levels of protective policies for LGBTQ+ persons in states, operationalized as more favorable state policies, would be associated with better health among lesbian, gay, bisexual and transgender (LGBT) survey respondents included in the Behavioral Risk Factor Surveillance Survey (BRFSS).

Data and methods

Study design

We performed a secondary data analysis of 2022 BRFSS data.

Study population and data source

This study used 2022 BRFSS data, a national telephone survey that captures health-related risk behaviors, chronic conditions, and preventive services use among the US population.[23] In 2014, the BRFSS began collecting information on the sexual orientation and gender identity (SOGI) of respondents through an optional SOGI questionnaire module. To determine sexual orientation identity, respondents are asked the following questions: "Which of the following best represent how you think about yourself?" with the following response options: gay/lesbian; straight, that is, not gay; bisexual; something else; I don't know the answer; and refused. To determine gender identity, respondents are asked the following: "Do you consider yourself to be transgender?" with the following options: Yes, transgender, male-to-female; Yes, transgender, female-to-male; Yes, transgender, gender nonconforming; and no. Our analysis was limited to the 33 states that used the SOGI modules in the 2022 BRFSS year (Figure 1).

Our analytic sample included 19 634 LGBT adults. We used a cross-classification approach[24] to determine LGBT status. We first identified respondents as cisgender men or women (those who reported they were not transgender and reported their sex as male and female, respectively), transgender men or women (those who reported they were transgender regardless of their reported sex), and nonbinary (those who reported they were gender nonconforming regardless of their reported sex). Reported sex was not considered for respondents identifying as transgender to honor their self-reported gender identity. Further, previous investigations of the BRFSS sex and gender identity questions suggest that many transgender respondents will report their sex as their affirmed gender identity rather than the sex assigned to them at birth.[25] We next identified respondents' sexual orientation based on the response options listed above, removing those who reported "I don't know the answer" or those who refused to answer. We then took a cross-classification of these 2 variables to distinguish between cisgender gay men ($n = 3134$), cisgender lesbian women ($n = 2405$), cisgender bisexual men ($n = 2455$), cisgender bisexual women ($n = 5726$), cisgender other sexual minority ($n = 4258$), transgender straight men ($n = 306$), transgender straight women ($n = 126$), transgender sexual minority men ($n = 238$), transgender sexual minority women ($n = 390$), gender nonbinary straight individuals ($n = 120$), and gender nonbinary sexual minority individuals ($n = 476$). We used cisgender gay men as the reference group in analytic models as they have the lowest prevalence of poor/fair self-rated health.

Outcomes

We examined 3 binary outcomes: (1) poor or fair self-rated health, (2) high mental health burden, and (3) high physical health burden. Self-rated health is a global appraisal of one's own health and has 5 attributes: poor, fair, good, very good, and excellent. For analytic purposes, we dichotomized self-

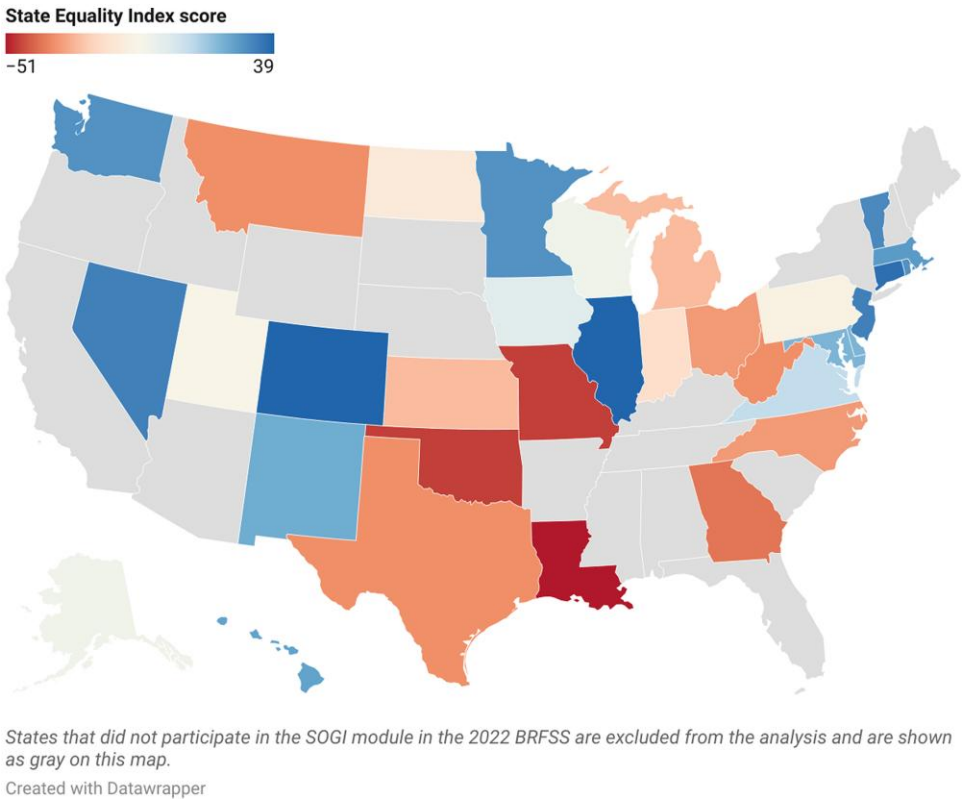

Figure 1. Map of the United States and State Equality Index score using Human Rights Campaign data for states that participated in the 2022 Behavioral Risk Factor Surveillance Survey (BRFSS) sexual orientation and gender identity module. Abbreviation: SOGI, sexual orientation and gender identity.

rated health as poor or fair vs good, very good, and excellent. High mental health burden uses the question, "Now, thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 was your mental health not good?" To identify respondents with the highest mental health burden, we applied the Centers for Disease Control and Prevention (CDC) threshold of 14+ days compared with those who reported 13 or fewer poor mental health days.[26,27] High physical health burden asks, "Now, thinking about your physical health, which includes physical illness and injury, how many days during the past 30 was your physical health not good?" To identify respondents with the highest physical health burden, we used the CDC threshold of 14+ days compared with those who reported 13 or fewer poor physical health days.

Exposures: state LGBTQ+ policy environment

To measure state LGBTQ+ policy environment, we used the 2022 State Equality Index (SEI) developed by the Human Rights Campaign (HRC) to operationalize inclusive and restrictive state policy climates.[28] The SEI is an annual comprehensive report produced by the HRC that tracks, evaluates, and compares state laws and policies affecting LGBTQ+ individuals across the United States. The SEI assesses a broad range of criteria to determine the legal equality and protection level for LGBTQ+ people in each state. The SEI evaluates the absence or presence of a wide range of policies and laws, including, but not limited to, non-discrimination, health and safety, parenting, religious exemption, and gender marker update laws. The HRC categorizes the SEI into 4 groups: high priority to achieve basic equality, building equality, solidifying equality, and working toward innovative equality. However, for this study, we created a continuous score for each state with a unique scoring schematic operationalized by the study team. The SEI assessed 72 state laws and policies.

Our scoring schematic gave 1 point for the presence of a protective policy (ie, increased rights of LGBTQ+ individuals). If the policy was separated by sexual orientation or gender identity, a point (1) was awarded for each. If the state did not have a protective policy, it received −1 points. This was because we posited that the absence of a protective policy is not benign, and harm can occur without policy protections. Conversely, if a state had a restrictive or punitive policy (ie, a policy that restricted or limited the rights of LGBTQ+ individuals), 2 points were removed (−2).

In the case of a restrictive or punitive policy that addressed sexual orientation and gender identity separately, a point was removed (−1) for each. If a state did not have a restrictive policy, 0 points were removed. This was because we posited that the absence of a restrictive policy was benign. Scores ranged between −57 and 55.

Higher policy environment scores indicated more protective policy environments based on SEI score. Additional information on the data collection and methodology for the SEI score can be found on the HRC website.[28] Alpha testing of state laws and policies indicates a good fit for combining all policy items into 1 scale as we did for this analysis (72 items; $\alpha = .9677$).

Covariates

Our covariate selection is guided by the Aday-Anderson behavioral model for health services utilization.[29] This model

ensures that a broad range of social, economic, and clinical factors that interact to share health outcomes are considered. Predisposing factors, individual characteristics that influence health care use, include sociodemographic covariates including age (18–24 years, 25–44 years, 45–64 years, 65+ years), race/ethnicity (Non-Hispanic American or Alaska Native, Non-Hispanic Asian or Native Hawaiian or Other Pacific Islander, Non-Hispanic Black or African American, Latinx/Hispanic, and Other/Multiracial); non-English speaker; and urban residence; and socioeconomic covariates including educational attainment (high school or less, some college, and college graduate). Enabling factors, resources and conditions that influence health care use, include marital status (married, divorced/widowed/separated, never married, and unmarried couple), employment status (employed, unemployed, not in the labor force), and insurance status. Need factors, an individual's perceived and objectively evaluated health status, were not include in the model due to endogeneity that would bias the models.

Statistical analysis

All analyses were conducted using Stata 18 (StataCorp LLC, College Station, TX). Descriptive statistics were calculated and presented for variables included in all models. Due to the dichotomous nature of our 3 outcome variables and to test the relationship between state-level LGBTQ+ policy environment and health outcomes, we utilized multilevel, mixed-effects logistic regression, expressed in adjusted odds ratios (aORs). To account for data clustering by state, we included the US state where the respondent resided at the time of the survey as a random intercept. We present the most parsimonious models by re-specifying models after assessing multicollinearity by dropping income and other covariates that were too closely associated with each other. Adjusted ORs with 95% CIs and 2-sided P values are reported with a $P < .05$ threshold for significance.

There are likely a host of other state-level variables that may confound the association between LGBTQ+ policy environment and health. Thus, as a test of robustness, we present several models where we controlled for additional state-level covariates. These include 2022 indicators of whether the state had expanded Medicaid, state gross domestic product (GDP), state-level uninsured rates, and partisanship of the state governor.[30,31]

Limitations

There are limitations to every study. First, the BRFSS is a national cross-sectional survey with an optional SOGI module. Only 33 out of the 50 states participated in the SOGI module, meaning that the population of LGBT respondents was underrepresented. Also, the states not participating in the SOGI module (AL, AZ, AR, CA, DE, FL, ID, KY, ME, MS, NE, NH, NY, OR, SC, SD, TN, WY) were overly represented in the US South, where a majority of Black LGBTQ+ adults reside (11 out of 18 without the SOGI module are in the US South Census region). Additionally, it is likely that the BRFSS not only underestimates LGBTQ+ respondents but underestimates LGBTQ+ respondents of color. Recent private polling estimates that 7.6% of the US population identifies as LGBTQ+. While the BRFSS has weighted estimates of 11% and 15% of LGBT respondents identifying as Black and Hispanic, respectively, other estimates show 12% and 21% of the LGBT population identifying as Black and Hispanic, respectively.[32,33] Similar incongruences were found in educational and income measures. We believe that the BRFSS may not fully capture the behaviors of and risk factors for LGBTQ+ adults of color. Importantly, as the BRFSS contains cross-sectional data and the analytic models we selected cannot ascertain causality, our analysis is not a rigorous assessment of the impact of the policies and laws included in our composite measure of LGBTQ+ policy environment.

Several measurement decisions warrant mentioning. Our measure of LGBTQ+ policy environment cannot capture the duration of the observed policy environment. For example, we have no way to ascertain how long individuals have lived in each state, nor does our measure capture how long the policy environment of each state has been in place. Our scoring schematic for our policy measure also assumes each of our 72 indicators are of equal importance when it is possible that some indicators may be more salient than others. Additionally, we elected to dichotomize our outcome variables, which provides the best analytic approach but erases potential variation across each measure.

Last, this study did not look at differences across race and ethnicity despite evidence demonstrating different health outcomes for LGBTQ+ people of color. Due to the sampling issues previously mentioned, BRFSS sample sizes for subgroups of LGBTQ+ respondents of color are extremely small, with limited statistical power. The findings would be spurious, and we would have been unable to make meaningful inferences. The lack of available data on LGBTQ+ adults of color in national health surveys is a public health issue that should be addressed as researchers and policymakers work to eliminate health disparities within this population.

Results

Table 1 presents descriptive characteristics for the full study sample by LGBT status. Overall, over 1 in 5 LGBT respondents reported poor/fair self-rated health (21.19%), nearly 30% reported a high mental health burden, and over 16% reported a high physical health burden. The prevalence of these poor health outcomes varied by LGBT status. Among cisgender LGBT adults, gay men had the lowest prevalence of poor/fair self-rated health (15.56%) and high mental health burden (18.44%), and bisexual men had the lowest prevalence of high physical health burden (11.82%). Bisexual women had the highest prevalence of all 3 poor health outcomes. Transgender and nonbinary respondents generally reported a higher prevalence of poor health outcomes compared with cisgender respondents.

State policy environment scores averaged 3.68 (SD: 26.35). Although policy scores ranged from a low of 1.45 for transgender straight men to 7.24 for transgender sexual minority men, scores did not significantly differ across LGBT status.

Tables 2–4 present results from multilevel, mixed-effects logistic regression analysis with respondent state set as a random intercept. Model fit for all models indicated that multilevel models with random intercepts provided a substantially better fit than a standard logistic regression model or a standard logistic regression model with random or fixed effects. In baseline models, as LGBTQ+ policy environment scores increased, indicating more protective policy environments, the odds of reporting poor/fair self-rated health, high mental health

Table 1. Study sample characteristics (percentages) by sexual orientation and gender identity, 2022 Behavioral Risk Factor Surveillance Survey.

		Cisgender					Transgender				Nonbinary		
	Total	Gay man	Lesbian	Bisexual man	Bisexual woman	Other sexual minority	Straight man	Straight woman	Sexual minority man	Sexual minority woman	Straight adult	Sexual minority adult	*P*-value
Poor/fair self-rated health	21.19	15.56	16.84	19.33	21.02	21.19	21.97	31.75	31.09	26.80	19.49	30.79	***
High mental health burden	29.42	18.44	22.67	26.24	37.64	27.91	22.67	30.65	53.22	39.74	16.24	54.19	***
High physical health burden	16.11	12.12	14.09	11.82	17.39	19.40	17.85	23.97	20.87	15.36	17.50	25.43	***
Policy environment [SEI range: −51, 39]	3.68 (26.35)	4.68 (26.13)	4.38 (26.37)	3.51 (26.36)	3.26 (26.53)	2.76 (26.42)	1.45 (24.96)	5.06 (24.71)	7.24 (25.59)	6.19 (25.13)	4.34 (24.71)	4.60 (26.42)	
Age													***
18–24 y	16.93	8.84	10.44	21.71	21.66	13.95	7.84	7.14	47.48	21.54	10.00	39.50	
25–44 y	41.00	34.97	31.10	42.08	53.74	34.19	25.49	15.87	39.50	51.54	25.00	45.59	
45–64 y	23.97	33.79	35.72	20.12	16.91	23.56	38.24	36.51	7.14	15.90	27.50	10.29	
65+ y	18.09	22.40	22.74	16.09	7.70	28.30	28.43	40.48	5.88	11.03	37.50	4.62	
Race/ethnicity													***
NH White	69.93	74.44	74.18	71.73	70.40	62.28	69.93	76.98	71.01	69.74	70.83	69.96	
NH Black	7.18	6.19	8.57	6.35	7.33	8.36	8.50	3.17	5.04	2.05	5.00	4.62	
Hispanic	11.23	9.86	8.98	10.02	10.78	14.16	11.76	9.52	14.29	13.08	19.17	11.97	
NH American Indian or Alaska Native	1.53	0.99	0.87	1.71	1.69	1.90	0.33	1.59	1.26	2.82	2.50	1.68	
NH Asian/NHOPI	6.22	5.58	4.16	6.80	4.82	9.61	5.88	7.94	3.36	6.92	2.50	5.88	
Other/multiracial	3.91	2.94	3.24	3.38	4.98	3.69	3.59	0.79	5.04	5.38	0.00	5.88	
Marital status													***
Married	32.29	28.08	39.00	30.71	32.31	34.97	44.77	42.06	12.18	17.44	42.50	18.91	
Divorced/widowed/ separated	18.26	11.33	17.75	16.01	17.94	25.13	25.82	30.16	10.50	18.21	51.03	13.33	
Never married	38.49	48.31	32.18	42.93	37.44	38.49	21.90	23.02	61.76	51.03	20.00	53.57	
Unmarried couple	10.97	12.28	11.06	10.35	12.31	8.20	7.52	4.76	15.55	13.33	6.67	14.29	
Non-English speaker	2.37	1.31	1.04	1.47	0.77	6.58	2.94	5.56	0.42	1.79	10.83	0.42	***
Urban residence	92.62	94.42	93.80	92.14	93.05	90.09	90.52	88.10	96.22	95.13	94.17	93.07	***
Educational attainment													***
High school or less	29.59	20.64	19.75	34.75	28.19	38.37	36.93	38.89	39.50	33.85	37.50	32.14	
Some college	27.35	26.52	24.66	27.21	29.17	26.47	24.18	30.16	30.67	31.54	16.67	31.93	
College graduate	43.07	52.84	55.59	38.04	42.65	35.16	38.89	30.95	29.83	34.62	45.83	35.92	
Employment status													***
Employed	60.86	63.05	61.50	67.37	65.70	50.40	51.31	46.03	59.66	55.90	47.50	63.03	
Unemployed	6.26	5.42	3.91	6.48	6.48	6.76	3.59	5.56	9.66	13.08	5.00	10.29	
Not in labor force	32.88	31.53	34.59	26.15	27.82	42.84	45.40	48.41	30.67	31.03	47.50	26.68	
Uninsured	6.78	5.11	4.49	7.98	5.97	9.78	5.56	7.14	7.56	9.49	2.50	6.09	***

$n = 19\,634$. ***$P < .001$.
Abbreviations: NH, Non-Hispanic; NHOPI, Native Hawaiian or Other Pacific Islander.

Table 2. Multilevel mixed-effects logistic regressions for fair/poor self-rated health, 2022 Behavioral Risk Factor Surveillance Survey.

Variables	Baseline	Demographics	Socioeconomic status
Policy environment	0.996***	0.996***	0.997***
	(0.994-0.998)	(0.994-0.998)	(0.995-0.998)
LGBT status (ref: cisgender gay man)			
Cisgender lesbian	1.102	1.128	1.136
	(0.954-1.274)	(0.974-1.306)	(0.978-1.320)
Cisgender bisexual man	1.292***	1.425***	1.340***
	(1.124-1.486)	(1.235-1.643)	(1.158-1.552)
Cisgender bisexual woman	1.433***	1.669***	1.527***
	(1.276-1.610)	(1.477-1.885)	(1.347-1.730)
Cisgender other sexual minority	1.952***	1.903***	1.610***
	(1.734-2.198)	(1.683-2.153)	(1.418-1.827)
Transgender straight man	1.509**	1.463*	1.229
	(1.130-2.014)	(1.091-1.961)	(0.910-1.659)
Transgender straight woman	2.546***	2.331***	1.952**
	(1.726-3.755)	(1.571-3.458)	(1.302-2.927)
Transgender sexual minority man	2.486***	3.002***	2.646***
	(1.857-3.330)	(2.223-4.044)	(1.947-3.595)
Transgender sexual minority woman	2.010***	2.174***	1.815***
	(1.572-2.568)	(1.634-2.790)	(1.404-2.346)
Nonbinary straight adult	1.368	1.230	1.093
	(0.857-2.184)	(0.764-1.981)	(0.671-1.781)
Nonbinary sexual minority adult	2.433***	2.933***	2.741***
	(1.955-3.030)	(2.342-3.674)	(2.175-3.454)
Age (ref: 18–24 y)			
25–44 y	—	1.161**	1.666***
		(1.040-1.296)	(1.484-1.870)
45–64 y	—	1.735***	2.231***
		(1.527-1.972)	(1.953-2.548)
65+ y	—	1.790***	1.518***
		(1.558-2.055)	(1.307-1.762)
Race/ethnicity (ref: NH White)			
NH Black	—	1.161*	1.039
		(1.013-1.331)	(0.904-1.196)
Hispanic	—	1.168*	1.057
		(1.031-1.323)	(0.930-1.202)
NH American Indian or Alaska Native	—	1.346*	1.148
		(1.033-1.755)	(0.875-1.508)
NH Asian/NHOPI	—	0.904	0.888
		(0.774-1.055)	(0.758-1.041)
Other/multiracial	—	1.354***	1.213*
		(1.138-1.610)	(1.015-1.448)
Marital status (ref: married)			
Divorced/widowed/separated	—	1.734***	1.507***
		(1.569-1.917)	(1.359-1.670)
Never married	—	1.498***	1.364***
		(1.361-1.649)	(1.236-1.506)
Unmarried couple	—	1.275***	1.238**
		(1.118-1.453)	(1.082-1.417)
Non-English speaker	—	2.046***	1.497***
		(1.634-2.562)	(1.180-1.899)
Urban residence	—	0.955	1.018
		(0.835-1.091)	(0.888-1.167)
Educational attainment (ref: HS or less)			
Some college	—	—	0.806***
			(0.738-0.881)
College graduate	—	—	0.438***
			(0.399-0.480)
Employment status (ref: employed)			
Unemployed	—	—	1.935***
			(1.686-2.221)
Not in labor force	—	—	2.462***
			(2.258-2.684)
Uninsured	—	—	1.163*
			(1.011-1.338)
Constant	0.189***	0.0951***	0.0876***
	(0.170-0.209)	(0.0768-0.118)	(0.0700-0.110)

All models include level 1 individual($n = 19\,588$) and level 2 state (groups = 33). All models include respondent state of residence as random intercept. Coefficient represents odds ratio; 95% CI in parentheses. ***$P < .001$, **$P < .01$, *$P < .05$.
Abbreviations: HS, high school; LGBT, lesbian, gay, bisexual, transgender; NH, Non-Hispanic; NHOPI, Native Hawaiian or Other Pacific Islander; ref, reference.

Table 3. Multilevel mixed-effects logistic regressions for high mental burden, 2022 Behavioral Risk Factor Surveillance Survey.

Variables	Baseline	Demographics	Socioeconomic status
Policy environment	0.997**	0.997**	0.998*
	(0.995-0.999)	(0.996-0.999)	(0.997-1.000)
LGBT status (ref: cisgender gay man)			
Cisgender lesbian	1.296***	1.369***	1.392***
	(1.135-1.479)	(1.194-1.570)	(1.212-1.599)
Cisgender bisexual man	1.564***	1.315***	1.244**
	(1.375-1.778)	(1.151-1.503)	(1.086-1.424)
Cisgender bisexual woman	2.654***	2.054***	1.964***
	(2.387-2.951)	(1.837-2.296)	(1.754-2.199)
Cisgender other sexual minority	1.714***	1.865***	1.696***
	(1.530-1.921)	(1.655-2.102)	(1.502-1.914)
Transgender straight man	1.937***	1.521**	1.386*
	(1.307-2.872)	(1.131-2.046)	(1.028-1.870)
Transgender straight woman	5.012***	2.845***	2.506***
	(3.811-6.592)	(1.884-4.295)	(1.652-3.802)
Transgender sexual minority man	2.886***	3.138***	2.899***
	(2.306-3.611)	(2.364-4.165)	(2.176-3.862)
Transgender sexual minority woman	0.848	2.217***	1.942***
	(0.514-1.400)	(1.758-2.794)	(1.535-2.458)
Nonbinary straight adult	5.197***	1.052	1.021
	(4.235-6.378)	(0.626-1.768)	(0.605-1.723)
Nonbinary sexual minority adult	1.937***	3.453***	3.279***
	(1.307-2.872)	(2.796-4.266)	(2.647-4.063)
Age (ref: 18–24 y)			
25–44 y	—	0.704***	0.869**
		(0.643-0.771)	(0.790-0.955)
45–64 y	—	0.417***	0.479***
		(0.372-0.468)	(0.426-0.538)
65+ y	—	0.194***	0.181***
		(0.169-0.224)	(0.155-0.210)
Race/ethnicity (ref: NH White)			
NH Black	—	0.885	0.825**
		(0.777-1.009)	(0.723-0.941)
Hispanic	—	1.001	0.929
		(0.896-1.119)	(0.829-1.040)
NH American Indian or Alaska Native	—	0.878	0.768
		(0.671-1.147)	(0.585-1.009)
NH Asian/NHOPI	—	0.789**	0.784**
		(0.683-0.911)	(0.678-0.907)
Other/multiracial	—	1.296**	1.193*
		(1.107-1.517)	(1.017-1.400)
Marital status (ref: married)			
Divorced/widowed/separated	—	1.884***	1.695***
		(1.701-2.086)	(1.528-1.880)
Never married	—	1.518***	1.413***
		(1.389-1.658)	(1.291-1.546)
Unmarried couple	—	1.595***	1.547***
		(1.420-1.790)	(1.376-1.740)
Non-English speaker	—	0.278***	0.208***
		(0.203-0.380)	(0.151-0.288)
Urban residence	—	1.065	1.116
		(0.932-1.216)	(0.976-1.277)
Educational attainment (ref: HS or less)			
Some college	—	—	0.945
			(0.868-1.028)
College graduate	—	—	0.589***
			(0.541-0.641)
Employment status (ref: employed)			
Unemployed	—	—	1.778***
			(1.563-2.022)
Not in labor force	—	—	1.595***
			(1.469-1.732)
Uninsured	—	—	1.211**
			(1.063-1.381)
Constant	0.226***	0.309***	0.306***
	(0.203-0.251)	(0.254-0.377)	(0.249-0.376)

All models include level 1 individual ($n = 19\,333$) and level 2 state (groups = 33). All models include respondent state of residence as random intercept. Coefficient represents odds ratio; 95% CI in parentheses. ***$P < .001$, **$P < .01$, *$P < .05$.
Abbreviations: HS, high school; LGBT, lesbian, gay, bisexual, transgender; NH, Non-Hispanic; NHOPI, Native Hawaiian or Other Pacific Islander; ref, reference.

Table 4. Multilevel mixed-effects logistic regressions for high physical burden, 2022 Behavioral Risk Factor Surveillance Survey.

Variables	Baseline	Demographics	Socioeconomic status
Policy environment	0.997***	0.997***	0.998**
	(0.995-0.9)	(0.995-0.999)	(0.996-0.999)
LGBT status (ref: cisgender gay man)			
Cisgender lesbian	1.192*	1.194*	1.201*
	(1.017-1.397)	(1.017-1.402)	(1.020-1.414)
Cisgender bisexual man	0.966	1.077	1.040
	(0.819-1.138)	(0.911-1.273)	(0.877-1.233)
Cisgender bisexual woman	1.512***	1.764***	1.624***
	(1.330-1.719)	(1.541-2.019)	(1.415-1.864)
Cisgender other sexual minority	1.734***	1.751***	1.525***
	(1.518-1.981)	(1.526-2.010)	(1.325-1.756)
Transgender straight man	1.573**	1.514*	1.330
	(1.146-2.160)	(1.098-2.086)	(0.959-1.845)
Transgender straight woman	2.294***	2.052**	1.788*
	(1.489-3.534)	(1.325-3.178)	(1.143-2.798)
Transgender sexual minority man	1.945***	2.529***	2.238***
	(1.389-2.723)	(1.794-3.566)	(1.575-3.180)
Transgender sexual minority woman	1.320	1.448*	1.199
	(0.980-1.778)	(1.070-1.959)	(0.881-1.632)
Nonbinary straight adult	1.591	1.483	1.331
	(0.979-2.584)	(0.908-2.423)	(0.808-2.195)
Nonbinary sexual minority adult	2.470***	3.122***	2.916***
	(1.950-3.130)	(2.447-3.984)	(2.274-3.741)
Age (ref: 18–24 y)			
25–44 y	—	1.370***	1.885***
		(1.202-1.562)	(1.645-2.160)
25–44 y	—	2.135***	2.573***
		(1.842-2.476)	(2.209-2.997)
65+ y	—	2.003***	1.509***
		(1.706-2.351)	(1.272-1.789)
Race/ethnicity (ref: NH White)			
NH Black	—	0.812*	0.741***
		(0.690-0.956)	(0.628-0.875)
Hispanic	—	0.980	0.911
		(0.849-1.132)	(0.786-1.056)
NH American Indian or Alaska Native	—	1.246	1.109
		(0.927-1.674)	(0.820-1.500)
NH Asian/NHOPI	—	0.824*	0.814*
		(0.690-0.984)	(0.679-0.975)
Other/multiracial	—	1.559***	1.411***
		(1.298-1.872)	(1.171-1.702)
Marital status (ref: married)			
Divorced/widowed/separated	—	1.689***	1.514***
		(1.516-1.882)	(1.355-1.692)
Never married	—	1.275***	1.164**
		(1.146-1.419)	(1.044-1.299)
Unmarried couple	—	1.218**	1.196*
		(1.053-1.408)	(1.031-1.386)
Non-English speaker	—	1.193	1.015
		(0.905-1.574)	(0.759-1.357)
Urban residence	—	0.960	0.988
		(0.829-1.112)	(0.851-1.147)
Educational attainment (ref: HS or less)			
Some college	—	—	0.969
			(0.876-1.071)
College graduate	—	—	0.602***
			(0.543-0.667)
Employment status (ref: employed)			
Unemployed	—	—	2.138***
			(1.835-2.492)
Not in labor force	—	—	2.687***
			(2.441-2.956)
Uninsured	—	—	0.929
			(0.785-1.098)
Constant	0.140***	0.0688***	0.0549***
	(0.125-0.157)	(0.0542-0.0873)	(0.0427-0.0706)

All models include level 1 individual($n = 19\,249$) and level 2 state (groups = 33). All models include respondent state of residence as random intercept. Coefficient represents odds ratio; 95% CI in parentheses. ***$P < .001$, **$P < .01$, *$P < .05$.
Abbreviations: HS, high school; LGBT, lesbian, gay, bisexual, transgender; NH, Non-Hispanic; NHOPI, Native Hawaiian or Other Pacific Islander; ref, reference.

Table 5. Multilevel mixed-effects logistic regressions for robustness checks across models, 2022 Behavioral Risk Factor Surveillance Survey.

	Medicaid	GDP	Uninsured	Governor	Combined
a. Fair/poor self-rated health					
Policy environment	0.996*** (0.995-0.998)	0.997*** (0.995-0.999)	0.997** (0.996-0.999)	0.997*** (0.995-0.999)	0.997*** (0.995-0.998)
Medicaid expanded	1.052 (0.925-1.196)	—	—	—	1.121 (0.786-1.599)
GDP	—	1.000 (1.000-1.000)	—	—	1.000 (1.000-1.000)
Uninsurance rate	—	—	1.013 (0.997-1.030)	—	1.014 (0.994-1.034)
Democrat governor	—	—	—	1.010 (0.881-1.158)	1.031 (0.728-1.460)
Constant	0.138*** (0.109-0.175)	0.142*** (0.116-0.174)	0.133*** (0.106-0.166)	0.143*** (0.114-0.180)	0.114*** (0.0844-0.154)
b. High mental health burden					
Policy environment	0.998* (0.996-1.000)	0.998 (0.997-1.000)	0.998* (0.996-1.000)	0.998* (0.996-1.000)	0.997* (0.995-0.999)
Medicaid expanded	1.030 (0.879-1.206)	—	—	—	0.892 (0.608-1.309)
GDP	—	1.000 (1.000-1.000)	—	—	1.000 (1.000-1.000)
Uninsurance rate	—	—	0.995 (0.977-1.014)	—	0.988 (0.965-1.012)
Democrat governor	—	—	—	1.030 (0.889-1.194)	1.169 (0.805-1.699)
Constant	0.256*** (0.201-0.326)	0.258*** (0.212-0.313)	0.270*** (0.216-0.338)	0.255*** (0.204-0.320)	0.265*** (0.192-0.366)
c. High physical health burden					
Policy environment	0.997*** (0.995-0.999)	0.998** (0.996-0.999)	0.998* (0.996-1.000)	0.997** (0.995-0.999)	0.997** (0.996-0.999)
Medicaid expanded	1.176* (1.021-1.354)	—	—	—	1.292 (0.875-1.908)
GDP	—	1.000 (1.000-1.000)	—	—	1.000 (1.000-1.000)
Uninsurance rate	—	—	1.003 (0.985-1.020)	—	1.018 (0.996-1.041)
Democrat governor	—	—	—	1.126 (0.982-1.290)	0.968 (0.662-1.415)
Constant	0.0879*** (0.0676-0.114)	0.106*** (0.0849-0.132)	0.103*** (0.0802-0.131)	0.0945*** (0.0739-0.121)	0.0746*** (0.0533-0.104)

All models fully adjusted for individual-level covariates (LGBT status, age, race/ethnicity, marital status, English proficiency, educational attainment, employment status, and insurance status). All models include level 1 individual ($n = 19\,249$ for 5a; $n = 19\,333$ for 5b; $n = 19\,249$ for 5c) and level 2 state (groups = 33). All models include respondent state of residence as random intercept. Coefficient represents adjusted odds ratio; 95% CI in parentheses. ***$P < .001$, **$P < .01$, *$P < .05$.
Abbreviations: GDP, gross domestic product; LGBT, lesbian, gay, bisexual, transgender.

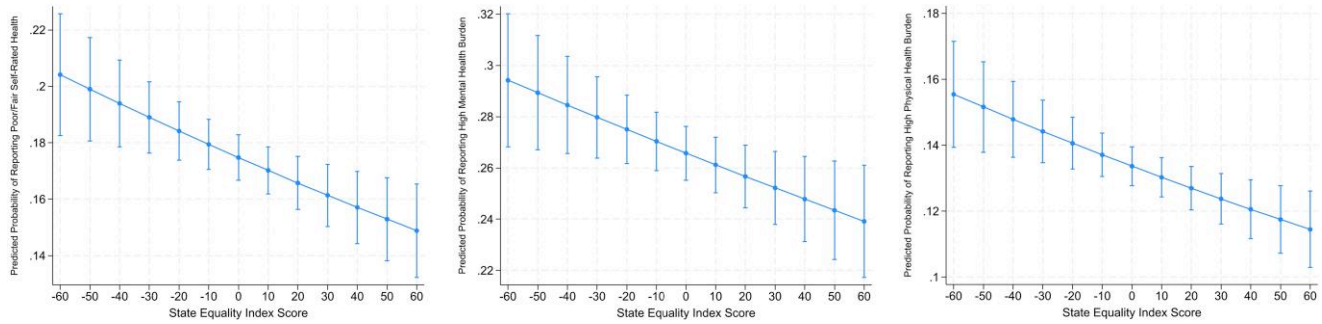

Figure 2. Predicted probabilities of reporting poor/fair self-rated health, high mental health burden, and high physical health burden by state policy score. Abbreviation: LGBTQ+, lesbian, gay, bisexual, transgender, and queer/questioning.

burden, and high physical health burden significantly decreased (aOR: 0.996; 95% CI: 0.994–0.998; $P < .001$ for self-rated health; aOR: 0.997; 95% CI: 0.995–0.999; $P < .007$ for high mental health burden; aOR: 0.997; 95% CI: 0.995–0.999; $P < .001$ for high physical health burden). These associations remained significant after adjusting for a host of demographic and socioeconomic status covariates (aOR: 0.997; 95% CI: 0.995–0.998; $P < .001$ for self-rated health; aOR: 0.998; 95% CI: 0.997–1.00; $P < .05$ for high mental health burden; aOR: 0.998; 95% CI: 0.996–0.999; $P < .01$ for high physical health burden.

Table 5 presents results from robustness checks controlling for 4 state-level covariates. All models are fully adjusted for individual-level covariates (LGBT status, age, race/ethnicity, marital status, english proficiency, educational attainment, employment status, and insurance status). For each outcome, we first present aORs for each state-level covariate and then present a final model including all 4 state-level covariates. Final models demonstrate that state-level policy is robustly associated with fair/poor self-rated health, high mental health burden, and high physical health burden. Similar to models fully adjusted for individual-level covariates discussed above and presented in Tables 2–4, the significant association between state-level policy and each health outcome holds with the introduction of additional state-level covariates.

Figure 2 presents the predicted probabilities of reporting poor/fair self-rated health, high mental health burden, and high physical health burden, each by state LGBTQ+ policy score. Across all 3 outcomes, increasing policy scores, indicating a more protective LGBTQ+ policy environment, were associated with significantly lower predicted probabilities for poor reported health outcomes. For poor/fair self-rated health, the predicted probability of reporting poor/fair self-rated health in the most restrictive policy environment was 0.225 (95% CI: 0.205–0.245), holding all other covariates constant. In contrast, in the most protective policy environment, the predicted probability of reporting poor/fair self-rated health dropped to 0.164 (95% CI: 0.148–0.180). In the most restrictive policy environment, the predicted probability of reporting a high mental health burden was 0.287 (95% CI: 0.263–0.311), compared with 0.245 (95% CI: 0.224–0.267) in the most protective policy environment. Finally, in the most restrictive policy environment, the predicted probability of reporting a high physical health burden was 0.163 (95% CI: 0.147–0.179) vs 0.126 (95% CI: 0.114–0.139) in the most protective policy environment.

Discussion

The purpose of this study was to leverage the PDOH conceptual framework to examine if and to what extent state LGBTQ+ policies predicted health among LGBTQ+ individuals. Our findings demonstrated that LGBT respondents in states with more protective policy environments were less likely to report poor/fair self-rated health, high mental health burden, and high physical health burden than other LGBT respondents. Additionally, as state policy environments became more restrictive, poor self-rated health and high mental and physical health burden increased. That is, the inequalities in health outcomes were larger in states with less protective LGBTQ+ policy environments.

We took a novel approach to examine the relationship between state-level PDOH and health among LGBT populations. Where other research on policy determinants of LGBTQ+ health has found PDOH to be significantly associated with the mental, behavioral, and physical health of LGBTQ+ populations,[34] our measure of state policy as a PDOH was more encompassing and posited that the absence of protective policy was not benign. Much of the literature examining these questions captures state-level policy environments with a single policy item, or fewer than 10 policies or laws, and generally focuses on protective policies only.[34] In contrast, we captured the state policy environment with 72 indicators and used a scoring system encompassing protective and restrictive policies and laws.

This study's findings were consistent with previous studies demonstrating that state policies affect LGBT people's health.[34,35] In addition to providing evidence of the mental health burden associated with restrictive policy environments, our findings demonstrate the physical implications of non-protective policy climates. Since the SEI includes 72 indicators of state-level equality, future studies should disaggregate the indicators to understand which aspect of the policies has the greatest impact on health.

Our findings, building on previous research, highlight the critical need for policymakers to consider the broader policy environment rather than treating individual laws as isolated measures. While the introduction of a single protective policy can yield meaningful health improvements for LGBTQ+ individuals, it is only 1 piece of the puzzle. Lasting, systemic change requires a comprehensive policy framework that addresses the interconnected factors contributing to inequities. By fostering a more cohesive and inclusive policy environment, policymakers can more effectively tackle the deep-

rooted disparities faced by LGBTQ+ communities and ensure sustainable progress. More work is needed to understand the pathways by which the PDOH affect access to health care, SDOH, and environmental and contextual factors impacting LGBTQ+ individuals' health in states with restrictive policy environments. Studies examining the impact of policy environment on health care access, employment, housing, and public safety would improve our understanding of how policy decisions impact SDOH and, in turn, health outcomes.

Results from our study demonstrate that state LGTBQ+ policy environment is related to physical health burden in LGBT respondents. Minority stress theory posits that stigma, prejudice, and discrimination create a hostile and stressful social environment, which causes health problems.[36] Stress has also been documented to negatively impact memory and the cardiovascular, immune, and gastrointestinal systems.[37] This study demonstrates the critical role of state-level LGBTQ+ policies in shaping health outcomes, with findings showing that protective policy environments are associated with lower rates of poor self-rated health, mental health burden, and physical health burden among LGBTQ+ individuals. The results reveal that states with fewer protections have greater health disparities, while those with stronger protections have significantly better health outcomes. By linking higher policy scores to reduced odds of poor health, this research adds to the growing evidence that inclusive, non-discriminatory policies are essential for mitigating the adverse health effects of discrimination and stress experienced by LGBTQ+ populations.

Conclusion

This study highlights the impact of state-level LGBTQ+ policies on the health of LGBT individuals. Using the PDOH framework, our analysis shows that states with higher SEI scores are linked to better self-rated health and lower mental and physical health burdens, while restrictive policies exacerbate health disparities. The stress from hostile policy environments likely affects health through stress-related pathways, underscoring the need for further research to identify harmful policy components and their impact on care access and well-being. Improved data collection is also essential to ensure better representation of LGBTQ+ individuals, particularly LGBTQ+ people of color, in national health surveys. In conclusion, protective state-level policies are crucial for LGBTQ + health, and policymakers should consider the broader health implications of their decisions.

Acknowledgments

The authors thank Saniya Sahasrabudhe, Rose Pophal, and Mayher Sachdeva for their support in coding the State Equality Index. They also thank the team at the Human Rights Campaign for publishing the State Equality Index. Oral presentation delivered at the Interdisciplinary Association for Population Health Science (IAPHS) annual research conference in St. Louis, MO.

Supplementary material

Supplementary material is available at *Health Affairs Scholar* online.

Funding

None declared.

Conflicts of interest

Please see ICMJE form(s) for author conflicts of interest. These have been provided as supplementary materials.

Notes

1. Bietsch B. Second time overlooked in crisis: examining how HIV/AID health policies in the USA connect with policy implications today for aging LGBTQ adults during the COVID-19 pandemic. *J Hum Rights Soc Work*. 2022;7(3):246-255. https://doi.org/10.1007/s41134-021-00208-7
2. Obama B. United States health care reform: progress to date and next steps. *JAMA*. 2016;316(5):525-532. https://doi.org/10.1001/jama.2016.9797
3. US Department of Health and Human Services. Section 1557 of the Patient Protection and Affordable Care Act. Accessed November 14, 2024. https://www.hhs.gov/civil-rights/for-individuals/section-1557/index.html
4. Perone AK. Health implications of the Supreme Court's Obergefell vs. Hodges marriage equality decision. *LGBT Health*. 2015;2(3):196-199. https://doi.org/10.1089/lgbt.2015.0083
5. Raifman J, Moscoe E, Austin SB, McConnell M. Difference-in-differences analysis of the association between state same-sex marriage policies and adolescent suicide attempts. *JAMA Pediatr*. 2017;171(4):350-356.
6. Carpenter C, Eppink ST, Gonzales G Jr, McKay T. *Effects of Access to Legal Same-Sex Marriage on Marriage and Health: evidence From BRFSS*. No. w24651. National Bureau of Economic Research; 2018.
7. Hatzenbuehler ML, O'cleirigh C, Grasso C, Mayer K, Safren S, Bradford J. Effect of same-sex marriage laws on health care use and expenditures in sexual minority men: a quasi-natural experiment. *Am J Public Health*. 2012;102(2):285-291.
8. Peele C. Roundup of Anti-LGBTQ+ legislation advancing in states across the country. 2023. Accessed February 22, 2024. https://www.hrc.org/press-releases/roundup-of-anti-lgbtq-legislation-advancing-in-states-across-the-country
9. Drinan RF, Huffman JI. The religious freedom restoration act: a legislative history. *J Law Relig*. 1993;10(2):531-541. https://doi.org/10.2307/1051146
10. Johnson Hammersmith R. Equality trumps religion: why Indiana's religious freedom restoration act is inherently promoting discrimination based on sexual orientation comments. *Univ Toledo Law Rev*. 2016–2017 2016;48(1):109-136.
11. Bomboy S. Explaining the Indiana RFRA controversy in five minutes. 2015. Accessed May 23, 2024. https://constitutioncenter.org/blog/explaining-the-indiana-rfra-controversy-in-five-minutes
12. Baier E. HB2: how did we get here? WUNC. Accessed July 3, 2024. https://www.wunc.org/politics/2017-03-23/hb2-how-did-we-get-here
13. White Hughto JM, Murchison GR, Clark K, Pachankis JE, Reisner SL. Geographic and individual differences in healthcare access for US transgender adults: a multilevel analysis. *LGBT Health*. 2016;3(6):424-433.
14. Hasenbush A, Flores AR, Herman JL. Gender identity nondiscrimination laws in public accommodations: a review of evidence regarding safety and privacy in public restrooms, locker rooms, and changing rooms. *Sex Res Soc Policy*. 2024;16(1):70–83. https://doi.org/10.1007/s13178-018-0335-z
15. Johnson M. The dangerous consequences of Florida's "Don't Say Gay" Bill on LGBTQ+ youth in Florida. Accessed May 16, 2024. https://www.law.georgetown.edu/gender-journal/online/volume-xxiii-online/the-dangerous-consequences-of-floridas-dont-say-gay-bill-on-lgbtq-youth-in-florida/

16. Dawson L, Kates J. Policy tracker: youth access to gender affirming care and state policy restrictions. KFF. Accessed May 28, 2024. https://www.kff.org/other/dashboard/gender-affirming-care-policy-tracker/
17. Choi A, Mullery W. 19 states have laws restricting gender-affirming care, some with the possibility of a felony charge. 3 Charts show the state of gender-affirming care in the US. CNN; 2023. Accessed January 18, 2024. https://www.cnn.com/2023/06/06/politics/states-banned-medical-transitioning-for-transgender-youth-dg/index.html
18. Turban JL, Kraschel KL, Cohen IG. Legislation to criminalize gender-affirming medical care for transgender youth. *JAMA*. 2021; 325(22):2251-2252. https://doi.org/10.1001/jama.2021.7764
19. Dawes DE, Williams DR. *The Political Determinants of Health*. Hopkins Press; 2020.
20. Mongelli F, Perrone D, Balducci J, et al. Minority stress and mental health among LGBT populations: an update on the evidence. *Minerva Psichiatr*. 2019;60(1):27-50. https://doi.org/10.23736/s0391-1772.18.01995-7
21. Brooks VR. *Minority Stress and Lesbian Women*. Lexington Books; 1981.
22. Meyer IH. Minority stress and mental health in gay men. *J Health Soc Behav*. 1995;36(1):38-56. https://doi.org/10.2307/2137286
23. Centers for Disease Control and Prevention (CDC). Behavioral risk factor surveillance system survey data and documentation. 2022. Accessed June 23, 2023. https://www.cdc.gov/brfss/annual_data/annual_2022.html
24. Mahendran M, Lizotte D, Bauer GR. Quantitative methods for descriptive intersectional analysis with binary health outcomes. *SSM Popul Health*. 2022;17:101032. https://doi.org/10.1016/j.ssmph.2022.101032
25. Harris JK, Hernandez O. Measurement of sex and gender identity in the Behavioral Risk Factor Surveillance System Survey, 2014 to 2020. *J Health Care Poor Underserved*. 2023;34(2):585-597. https://doi.org/10.1353/hpu.2023.0051
26. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. *Psychiatr Ann*. 2002;32(9):509-515. doi: doi:10.3928/0048-5713-20020901-06
27. Kroenke K, Strine TW, Spitzer RL, Williams JB, Berry JT, Mokdad AH. The PHQ-8 as a measure of current depression in the general population. *J Affect Disord*. 2009;114(1-3):163-173. https://doi.org/10.1016/j.jad.2008.06.026
28. The HRC Foundation. 2022 State Equality Index. Accessed February 12, 2024. https://reports.hrc.org/2022-state-equality-index
29. Aday LA, Andersen R. A framework for the study of access to medical care. *Health Serv Res*. 1974;9(3):208-220.
30. US Bureau of Economic Analysis. SASUMMARY State annual summary statistics: personal income, GDP, consumer spending, price indexes, and employment. Updated 10/02/2024. Accessed November 13, 2024. https://apps.bea.gov/itable/?ReqID=70&step=1&_gl=1*2bcyh9*_ga*MTQ2MzI2ODI4OC4xNzMyNTg5ODg1*_ga_J4698JNNFT*MTczMjU4OTg4NS4xLjEuMTczMjU4OTkyNS4yMC4wLjA.#eyJhcHBpZCI6NzAsInN0ZXBzIjpbMSwyOSwyNSwzMSwyNiwyNywzMF0sImRhdGEiOltbIlRhYmxlSWQiLCI2MDAiXSxbIk1ham9yX0FyZWEiLCIwIl0sWyJTdGF0ZSIsWyIwIl1dLFsiQXJlYSIsWyJYWCJdXSxbIlN0YXRpc3RpYyIsWyI0Il1dLFsiVW5pdF9vZl9tZWFzdXJlIiwiTGV2ZWxzIl0sWyJZZWFyIixbIjIwMjIiXV0sWyJZZWFyQmVnaW4iLCItMSJdLFsiWWVhcl9FbmQiLCItMSJdXX0=
31. Kaiser Family Foundation. Health insurance coverage of the total population. KFF. Accessed November 13, 2024. https://www.kff.org/other/state-indicator/total-population/?currentTimeframe=1&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D
32. Jones JM. LGBTQ+ identification in U.S. now at 7.6%. Accessed June 5, 2024. https://news.gallup.com/poll/611864/lgbtq-identification.aspx
33. The Williams Institute. *LGBT Demographic Data Interactive*. Los Angeles, CA: The Williams Institute, UCLA School of Law; 2019.
34. Hatzenbuehler ML, Lattanner MR, McKetta S, Pachankis JE. Structural stigma and LGBTQ+ health: a narrative review of quantitative studies. *Lancet Public Health*. 2024;9(2):e109-e127. https://doi.org/10.1016/s2468-2667(23)00312-2
35. White BP, Abuelezam NN, Fontenot HB, Jurgens CY. Exploring relationships between state-level LGBTQ inclusivity and BRFSS indicators of mental health and risk behaviors: a secondary analysis. *J Am Psychiatr Nurses Assoc*. 2023;29(3):224-231. https://doi.org/10.1177/10783903211007900
36. Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. *Psychol Bull*. 2003;129(5):674-697. https://doi.org/10.1037/0033-2909.129.5.674
37. Yaribeygi H, Panahi Y, Sahraei H, Johnston TP, Sahebkar A. The impact of stress on body function: a review. *Excli J*. 2017;16:1057-1072. https://doi.org/10.17179/excli2017-480