State Policies and Health Disparities between Transgender and Cisgender Adults: Considerations and Challenges Using Population-Based Survey Data

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Abstract

Context: The authors examined the association between state-level policy protections and self-rated health disparities between transgender and cisgender adults.

Methods: They used data on transgender (n = 4,982) and cisgender (n = 1,168,859) adults from the 2014–2019 Behavioral Risk Factor Surveillance System. The authors estimated state-specific health disparities between transgender and cisgender adults, and they used multivariable logistic regression models to compare adjusted odds ratios between transgender and cisgender adults by state-level policy environments.

Findings: Transgender adults were significantly more likely to report poor/fair health, frequent mental distress, and frequent poor physical health days compared to cisgender adults. Disparities between transgender and cisgender adults were found in states with strengthened protections and in states with limited protections. Compared to transgender adults in states with limited protections, transgender adults in states with strengthened protections were marginally less likely to report frequent mental distress.

Conclusions: Transgender adults in most states reported worse self-rated health than their cisgender peers. Much more research and robust data collection on gender identity are needed to study the associations between state policies and transgender health and to identify best practices for achieving health equity for transgender Americans.

Keywords LGBT health, state policy, health equity

In recent years, a growing body of research across the fields of psychology, public policy studies, and public health has demonstrated the importance of state-level and national policies to the health of lesbian, gay, bisexual, and transgender (LGBT) populations. For instance, marriage equality and

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nondiscrimination protections in employment, housing, education, and public accommodations have been associated with improved health outcomes (e.g., mental health, self-rated health, and access to care) for sexual minority people (Buchmueller and Carpenter 2012; Carpenter et al. 2018; Gonzales 2015; Hatzenbuehler, Keyes, and McLaughlin 2011; Hatzenbuehler et al. 2010, 2012; Wight, LeBlanc, and Badgett 2013). Much less research has focused on whether and how public policy environments affect health and access to care among transgender and gender-diverse (TGD) populations (defined as people whose gender identity or gender expression is incongruent with their sex assigned at birth), including those who identify as gender nonbinary, genderqueer, gender fluid, or other gender minority identities.

Numerous studies have shown that TGD populations have worse mental and physical health than cisgender populations (defined as people whose gender identity or gender expression is congruent with their sex assigned as birth), potentially the result of societal-based transphobia, violence victimization, and gender minority stress (Meyer et al. 2017; Progovac et al. 2020; Progovac et al. 2021; Reisner et al. 2015; Tan et al. 2020). More specifically, TGD populations have higher levels of depression and anxiety (Reisner et al. 2015), suicidality (Adams, Hitomi, and Moody 2017; Progovac et al. 2020), substance use (Johns et al. 2019), physical and cognitive disabilities (Downing and Przeworski 2018), and coronary heart disease (Downing and Przeworski 2018). Despite poorer mental and physical health ratings, TGD populations experience substantial and unique barriers to accessing health care, including the fear of being pathologized by their gender identity and a lack of trans competent providers in practically all fields of medicine (Snow et al. 2019). This fear of seeking health services is compounded by the fact that TGD people also experience elevated rates of interpersonal violence (Langenderfer-Magruder et al. 2016), physical and verbal abuse, and sexual assault (James et al. 2016), which are significant risk factors for worse physical and mental health. Additionally, TGD populations experience a higher burden of HIV (Baral et al. 2013) and almost all cardiovascular, neurological, metabolic, and mental health comorbidities (Hughes, Shireman, and Hughto 2021), presumably attributable to systemic barriers to care and structural transphobia.

In light of these barriers, state-level nondiscrimination policy interventions have the potential to address these disparities and to promote the health and well-being of TGD populations. Such nondiscrimination policies may include those sectors included in Title VII of the Civil Rights Act

(1964), including education, employment, and public accommodations as well as Title VIII of the Fair Housing Act (1968), which provides housing nondiscrimination protections. These policies would explicitly prohibit discrimination on the basis of gender identity, a key gap in current sex-based discrimination protections, throughout the social determinants of health—the places where we live, learn, work, play, and age (Gonzales and Gavulic 2020). Unfortunately, studying the associations—much less the causal impacts—between evolving public policies and transgender health is difficult given the absence of robust data collection that is inclusive of gender identity. To date, and to the best of our knowledge, only one population-based and nationally representative survey conducted by the Centers for Disease Control and Prevention (CDC) or the US Census Bureau has added questions about gender identity to the main demographic questionnaire: the Census Bureau's Household Pulse Survey added gender identity questions to the main questionnaire for all states beginning in June 2021 (File and Lee 2021). Other population-based surveys—such as the Youth Risk Behavior System (YRBS) and the Behavioral Risk Factor Surveillance Survey (BRFSS)—give states the option to add gender identity to their statewide surveys. This state-by-state patchwork leaves transgender participants in many states unaccounted for and absent from public health studies.

Thus, the limited body of transgender-specific health policy research relies on convenience samples or health insurance claims data to examine how public policies are associated with transgender health outcomes. For example, previous studies using a relatively small (n = 120) convenience sample found that gender-identity-specific nondiscrimination protections in housing and employment were associated with lower community stigma and lower levels of discrimination and victimization, better mental health, and lower risk for suicide attempts (Gleason et al. 2016). Another study among privately insured gender minorities found that health care nondiscrimination laws were associated with reductions in suicidality for gender minorities (McDowell et al. 2020); unfortunately, uninsured and publicly insured gender minorities were not included in that analysis. A previous study also found that for transgender adults, living in states with state-level policies that were more inclusive and protective of transgender people was associated with fewer recent poor mental health days, fewer average alcoholic drinks per day, and a shorter length of time since the last health care checkup than for transgender adults living in states without these protections (Du Bois et al. 2018). However, no cisgender comparison group was used, and state-policy environments were measured using 35 LGBT-related policies; data were also limited to a single year (Du Bois et al. 2018).

This study builds on previous research and examines the association between state-level nondiscrimination policies across multiple key social and health sectors and self-reported health among a sample of TGD adults. Our study design does not allow for causal inference, but we hypothesize that living in a state with strengthened legal protections for TGD individuals is associated with narrower disparities in self-reported health for TGD adults. We test this hypothesis by using the largest population-based health survey to collect gender identity to date to compare self-reported health status by state policy environment (limited versus strengthened protections for TGD people). Our analysis uses multiple years of data from the largest multistate and random sample of TGD participants currently available to researchers, focuses on actionable public policies currently debated for TGD populations, and analyzes health disparities between transgender and cisgender participants *and* within TGD samples by state policy environments.

Methods

Data and Study Sample

Data for this study came from the 2014–2019 BRFSS, which is a cross-sectional telephone survey of the civilian, noninstitutionalized adult population (CDC 2017). The CDC sponsors the BRFSS annually in conjunction with state health departments in all 50 states and the District of Columbia. Approximately 450,000 adults are randomly selected each year and are asked a core set of questions, including information about demographics and socioeconomic status, health care access, and health behaviors.

The BRFSS core questionnaire does not currently ascertain sexual orientation or gender identity, but a few states have independently added these questions to their BRFSS surveys in recent years (Conron et al. 2012; GenIUSS 2014). Starting in 2014, the BRFSS offered states an optional and unified module on sexual orientation and gender identity. The following 39 states added sexual orientation and gender identity questions to their statewide BRFSS surveys at least once between 2014 and 2019: Alaska, Arizona, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Minnesota, Mississippi, Missouri, Montana, Nevada, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

In these states, participants were asked whether they considered themselves to be transgender, and if so, which of the following response categories applied to them: (1) transgender, male-to-female; (2) transgender, female-to-male; and (3) transgender, gender nonconforming. A detailed definition of gender identity was provided to the participant if they expressed confusion about the gender identity question. While very little research has examined nonresponse bias and misreporting issues for this gender identity item, a similar question was previously tested in the Massachusetts BRFSS (Conron et al. 2012) and was recommended for measuring transgender status in health surveys (GenIUSS 2014). More recently, a growing body of research has questioned the internal and external validity of the sexual orientation and gender identity (SOGI) module in the BRFSS, especially when describing TGD populations. For instance, the BRFSS did not directly ask participants about their "sex" until 2016. Previously, biological sex was assigned by the surveyor based on the participant's vocal timbre (Riley et al. 2017). Previous research (Riley et al. 2017; Tordoff, Andrasik, and Hajat 2019) has noted that this leads to substantial misclassification when examining sex-specific questions. Other researchers (Lett and Everhart 2022) have raised issues with using survey weights provided by the CDC, because sex is a key component of creating survey weights (via raking methodologies) and introduces misclassification into the calculation of survey weights for transgender participants. Lett and Everhart (2022: 68) recommend "excluding the raked weights and adjusting for stratified and clustered sampling only. . . . This approach essentially treats the BRFSS as an unweighted cluster stratified random sample of the United States." Finally, Jesdale (2021) finds that 12.5% of cellphone participants completing the SOGI module were not living in the state of interest and were residing outside the state administering the survey. To address these data concerns, we have restricted the analysis to participants (both landline and cellphone respondents) living in the state administering the survey, excluded the survey weights, and adjusted all analyses for the stratified and clustered sample. All standard errors were also clustered at the state level. Our final analysis included 4,982 transgender participants and 1,168,859 cisgender participants.

Health Outcomes

We examined three binary health outcomes that represent different aspects of physical and mental health. We examined whether participants rated their general health as poor or fair (versus excellent, very good, or good),

exhibited frequent mental distress (i.e., their mental health—which includes stress, depression, and problems with emotions—was not good for 14 days or more in the previous 30 days) (Zahran et al. 2004), or indicated that they had frequent poor physical health days (i.e., their physical health—which includes physical illness and injury—was not good for 14 days or more in the previous 30 days). We chose to define and evaluate these specific health outcomes given their reliability, their routine use by the CDC and in national health reports, and the CDC's historical use of these outcomes for monitoring health-related quality of life over time (Moriarty, Zack, and Kobau 2003; Zhao et al. 2018). These indicators are also correlated with premature mortality (Brown et al. 2013). All outcomes used in this analysis were based on self-reported information in the BRFSS.

State Policy Definitions

Eleven of the 39 study states ascertaining transgender status in the 2014–2019 BRFSS were deemed to have strengthened protections: California, Colorado, Connecticut, Hawaii, Illinois, Massachusetts, Minnesota, Nevada, New York, Vermont, and Washington. We described these states as having "strengthened protections" because, according to the Human Rights Campaign, they enacted at least five of the following six protections at some point during the study period: (1) hate crime protections inclusive of gender minorities; (2) bans on health insurance exclusions inclusive of trans related procedures in private health insurance; and nondiscrimination protections inclusive of gender minorities in (3) employment, (4) housing, (5) education, and (6) public accommodations (Gill 2015; Warbelow and Diaz 2016; Warbelow and Diaz 2017; Warbelow, Oakley, and Kutney 2018; Warbelow and Persad 2016) (our review of state policies from the Human Rights Campaign is available upon request). These states were also considered by the Transgender Law Center to have a "high gender identity policy tally," which identifies "transgender friendly" states or the states ensuring the most possible protections for gender minorities to date (Transgender Law Center 2020). All other states included in this analysis were considered to have "limited protections," meaning they had fewer than five of the six dimensions listed above during the study period.

Statistical Analysis

We used descriptive statistics and Pearson chi-squared tests to characterize the study sample by transgender status and state-level protections. Next, we

estimated the prevalence of each health outcome by transgender status at the state level. To preserve data integrity and reliability, we only present state-specific estimates when there were 25 or more transgender adults participating in the statewide survey (sample sizes in figures 1–3 range from n = 28 transgender adults in Tennessee to n = 454 transgender adults in New York). Then, we estimated logistic regression models to compare the prevalence of each outcome between transgender adults and their cisgender peers; unadjusted models did not include covariates, and fully adjusted models controlled for demographic and socioeconomic characteristics. Our fully adjusted models controlled for age in years (18–24, 25–34, 35–44, 45–54, 55–64, ≥ 65, missing), race and ethnicity (non-Hispanic white, non-Hispanic Black, Hispanic, other/multiple races, missing), relationship status (married or living with a partner; divorced, separated, or widowed; never married; missing), the presence of children in the household, educational attainment (less than high school, high school graduate, some college, college graduate, missing), employment status (employed, unemployed, not in labor force, missing), household income in dollars (0–9,999; 10,000–19,999; 20,000–34,999; 35,000–49,999; 50,000–74,999; ≥ 75,000; missing), health insurance coverage status (insured, uninsured, missing), maintenance of a usual source of care (yes, no, missing), state of residence, and survey year. These covariates were selected as controls to account for individual and group-based characteristics that influence mental and physical health status. The associations between health, age, and socioeconomic status are well documented (House, Kessler, and Herzog 1990). Meanwhile, interpersonal and structural racism differentially affects the health of minoritized racial/ethnic groups (Williams et al. 2010). Thus, we included race/ethnicity as a proxy for exposure to discrimination in our adjusted regression models. We included indicators when data were missing for each variable. Unadjusted and adjusted odds ratios were reported first for adults in all 39 study states that collected gender identity in the BRFSS. Then, we repeated logistic regression models and estimated odds ratios for the 11 study states with strengthened protections and then the 28 study states with limited protections. Finally, we examined whether there were statistically significant ($p < 0.05$) or marginally significant ($p < 0.10$) differences in the odds of each adverse health outcome between transgender (cisgender) adults living in states with strengthened protections versus transgender (cisgender) adults living in states with limited protections. Results from all logistic regression models are presented as unadjusted odds ratios (OR) or fully adjusted odds ratios (aORs) with 95% confidence intervals (CIs). We conducted all analyses in Stata version 14 using the *svy*

command to adjust for the complex survey design of the BRFSS and to cluster standard errors at the state level. We did not use person-level survey weights as recommended by Lett and Everhart (2022).

Results

Demographic and Socioeconomic Status

Table 1 presents sociodemographic characteristics for transgender and cisgender adults by state-level protection environments. Compared to transgender adults living in states with limited protections, the sample of transgender adults living in states with strengthened protections were younger (14.2% versus 11.6% were 18–24 years old) and more likely to be racially/ethnically diverse and never married (31.9% versus 24.8%). Transgender adults in states with strengthened protections were more likely to have college degrees, employment, and health insurance compared to transgender adults in states with limited protections.

Table 1 also presents descriptive statistics for cisgender adults by state-level protection environments. Although chi-squared test results indicated statistical significance (likely owing to greater precision with larger samples of cisgender participants), cisgender adults across state protection environments shared similarities in distributions of age, relationships status, and children in the household. Cisgender adults in states with strengthened protections were more likely to be racially/ethnically diverse and to report higher levels of educational attainment, employment, and household incomes greater than $75,000 compared to cisgender adults in states with limited protections.

State-Specific Health Disparities

Figure 1 presents state-specific estimates of poor/fair health by transgender status. Compared to cisgender adults, transgender adults were more likely to report poor/fair health in every state except North Carolina, Mississippi, Arizona, and Idaho. The difference in reporting poor/fair health between transgender and cisgender adults was greater than 10 percentage points in Maryland, West Virginia, Connecticut, Washington, Pennsylvania, Nevada, Rhode Island, Iowa, and Tennessee.

Figure 2 presents state-specific estimates of frequent mental distress by transgender status. Compared to cisgender adults, transgender adults were more likely to exhibit frequent mental distress in every state except North Carolina. The difference in the prevalence of frequent mental distress

Table 1 Sociodemographic Characteristics of Transgender and Cisgender Adults by State-Level Protection Environments

	Transgender			Cisgender		
	Limited Protections	Strengthened Protections		Limited Protections	Strengthened Protections	
	n = 3,054	n = 1,928	*p*	n = 722,387	n = 446,472	*p*
Age						
18–24	11.6	14.2	<0.001	4.9	5.6	<0.001
25–34	11.7	15.5		8.8	10.1	
35–44	10.9	11.8		10.9	11.8	
45–54	14.2	15.0		15.1	15.9	
55–64	20.5	19.1		21.8	21.7	
>65	29.8	23.6		37.3	33.4	
Missing	1.3	0.9		1.2	1.5	
Race/Ethnicity						
White	68.9	61.2	<0.001	78.4	75.0	<0.001
Black	13.0	5.9		10.0	4.4	
Hispanic	9.2	12.9		5.5	8.2	
Other/Multiple Races	7.0	17.4		4.6	10.8	
Missing	1.9	2.7		1.5	1.7	
Relationship Status						
Married or living with an unmarried partner	45.7	43.0	<0.001	54.9	55.3	<0.001
Separated, divorced, or widowed	28.9	24.5		30.1	26.3	
Never married	24.8	31.9		14.5	17.8	
Missing	0.6	0.6		0.5	0.6	

(*continued*)

Table 1 Sociodemographic Characteristics of Transgender and Cisgender Adults by State-Level Protection Environments (*continued*)

	Transgender			Cisgender		
	Limited Protections	Strengthened Protections		Limited Protections	Strengthened Protections	
	n = 3,054	n = 1,928	*p*	n = 722,387	n = 446,472	*p*
Number of Children in the Household						
No children	76.4	74.4	0.29	74.5	73.5	<0.001
At least one child present	22.8	24.7		25.0	25.8	
Missing	0.8	0.8		0.6	0.7	
Educational Attainment						
Less than high school	15.3	12.7	<0.001	7.7	5.9	<0.001
High school graduate	36.2	33.0		29.2	24.3	
Some college	26.1	26.9		27.5	27.4	
College/technical school graduate	22.0	27.0		35.3	42.1	
Missing	0.5	0.4		0.3	0.3	
Employment Status						
Employed	44.0	49.5	<0.001	47.5	52.9	<0.001
Unemployed	6.1	8.5		3.8	4.3	
Not in labor force	49.1	40.6		48.1	42.1	
Missing	0.9	1.4		0.6	0.8	

Table 1 (*continued*)

	Transgender			Cisgender		
	Limited Protections	Strengthened Protections		Limited Protections	Strengthened Protections	
	n = 3,054	n = 1,928	*p*	n = 722,387	n = 446,472	*p*
Household Income						
0-10,000	7.8	8.7	0.13	3.9	3.4	<0.001
10,000-20,000	16.2	15.2		10.8	9.1	
20,000-35,000	21.6	19.7		17.5	15.0	
35,000-50,000	10.8	10.2		12.3	11.5	
50,000-75,000	10.7	11.3		13.6	13.9	
>75,000	16.6	19.2		26.4	32.4	
Missing	16.2	15.7		15.5	14.8	
Health Insurance Status						
Insured	86.1	88.3	0.06	91.6	93.6	<0.001
Uninsured	13.1	10.9		8.0	6.1	
Missing	0.8	0.8		0.4	0.4	
Has Usual Source of Care						
Yes	73.1	69.8	0.02	77.1	76.9	<0.001
No	26.3	29.1		22.4	22.7	
Missing	0.7	1.1		0.5	0.4	

Note: Data are from the 2014–2019 Behavioral Risk Factor Surveillance System, adults aged 18 years and older.

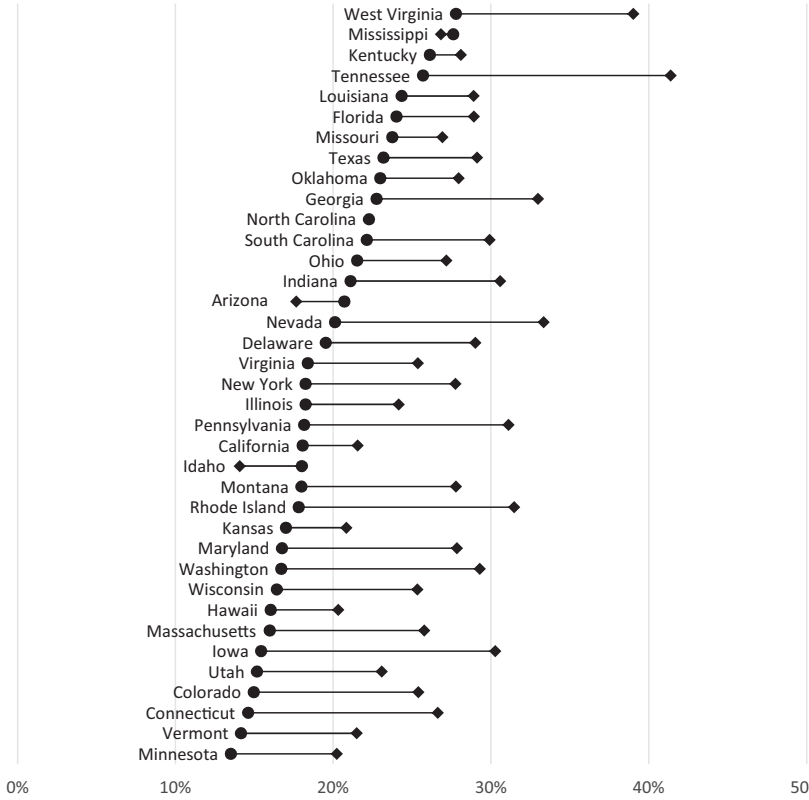

Figure 1 State-specific estimates of poor/fair health by transgender status.

Source: 2014–2019 Behavioral Risk Factor Surveillance Survey.

Notes: Estimates represent the percentage of adults aged 18 years and older who reported poor or fair health (instead of excellent, very good, or good health). Not all states in the figure ascertained transgender status every year, but comparisons between cisgender adults and transgender adults are state-year specific. Data for two states (Alaska and Wyoming) were suppressed because sample sizes for transgender adults were small (n <25) and were deemed less reliable for state-specific estimates.

● = cisgender adults; ◆ = transgender adults.

between transgender and cisgender adults was wider than 10 percentage points in 21 states and greater than 20 percentage points in three states: Oklahoma, Washington, and Colorado.

Figure 3 presents state-level estimates of frequent poor physical health days. Transgender adults were more likely to report frequent poor physical health days compared to cisgender adults in every state except the following: Indiana, Missouri, Oklahoma, West Virginia, Kentucky, and

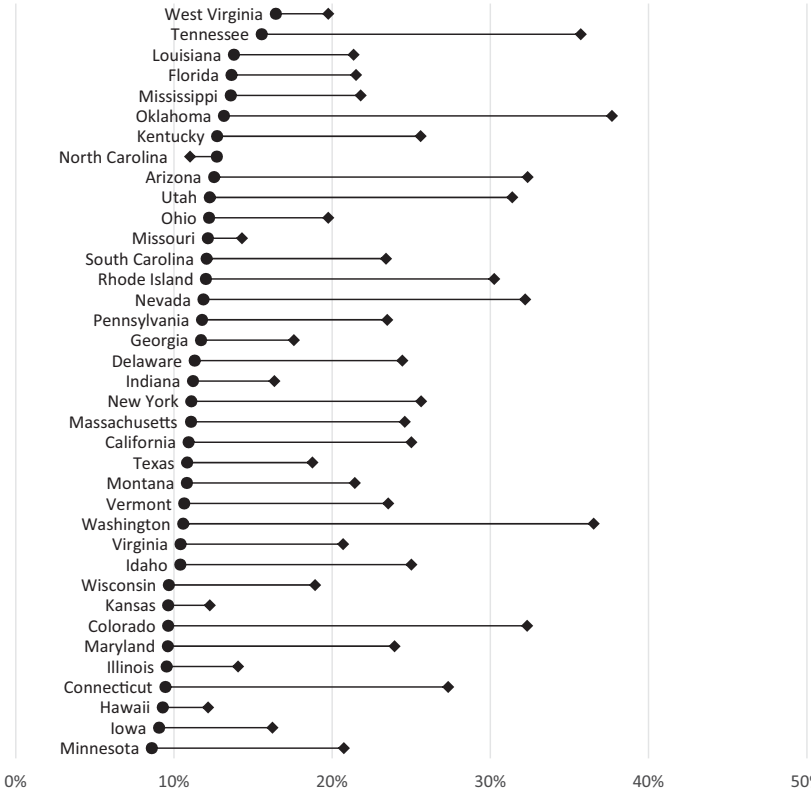

Figure 2 State-specific estimates of frequent mental distress by transgender status.

Source: 2014–2019 Behavioral Risk Factor Surveillance Survey.

Notes: Estimates represent the percentage of adults aged 18 years and older who reported frequent mental distress (defined as mental health—which includes stress, depression, and problems with emotions—was not good 14 days or more in the previous 30 days). Not all states in the figure ascertained transgender status every year, but comparisons between cisgender adults and transgender adults are state-year specific. Data for two states (Alaska and Wyoming) were suppressed because sample sizes for transgender adults were small (n <25) and were deemed less reliable for state-specific estimates.

● = cisgender adults; ◆ = transgender adults.

Illinois. Meanwhile, the prevalence of frequent poor physical health days was greater than 10 percentage points in Utah, Montana, and Tennessee.

Regression Results by State Protection Environments

Table 2 presents the prevalence and adjusted odds ratios comparing health outcomes among adults by transgender status and state-level policy

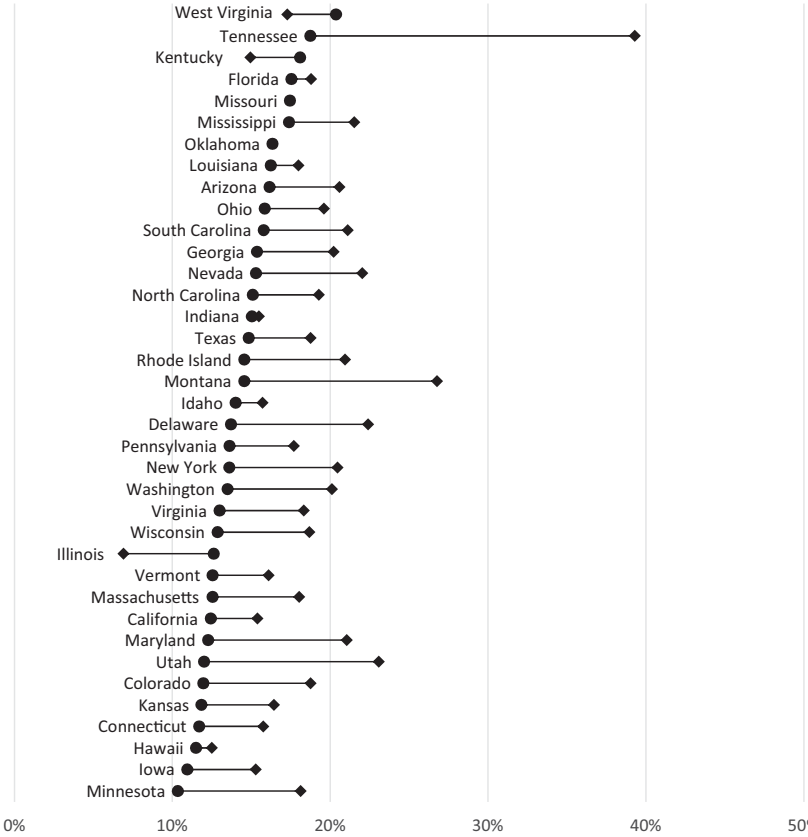

Figure 3 State-specific estimates of poor physical health days by transgender status.

Source: 2014–2019 Behavioral Risk Factor Surveillance Survey.

Notes: Estimates represent the percentage of adults aged 18 years and older who reported frequent poor physical health days (defined as physical health—which includes physical illness and injury—was not good 14 days or more in the previous 30 days). Not all states in the figure ascertained transgender status every year, but comparisons between cisgender adults and transgender adults are state-year specific. Data for two states (Alaska and Wyoming) were suppressed because sample sizes for transgender adults were small (n <25) and were deemed less reliable for state-specific estimates.

● = cisgender adults; ◆ = transgender adults.

protections. After controlling for sociodemographic characteristics, transgender adults in all 39 study states were more likely to report poor/fair health (aOR = 1.26; 95% CI = 1.18–1.36; $p < 0.001$), frequent mental distress (aOR = 1.79; 95% CI = 1.67–1.93; $p < 0.001$), and frequent poor physical health days (aOR = 1.26; 95% CI = 1.16–1.36; $p < 0.001$) compared to their cisgender peers. Among the 11 study states with strengthened

Table 2 Prevalence and Odds Ratios Comparing Health Disparities between Transgender and Cisgender Adults by State Level Policy Environments

	Poor/Fair Health					Frequent Mental Distress					Frequent Poor Physical Health Days				
	%	uOR (95% CI)		aOR (95% CI)†		%	uOR (95% CI)		aOR (95% CI)†		%	uOR (95% CI)		aOR (95% CI)†	
Adults in all 39 study states															
Cisgender	18.8	1.00	[Reference]	1.00	[Reference]	10.9	1.00	[Reference]	1.00	[Reference]	13.8	1.00	[Reference]	1.00	[Reference]
Transgender	26.4	1.55	(1.45-1.65)***	1.26	(1.18-1.36)***	22.1	2.32	(2.16-2.48)***	1.79	(1.67-1.93)***	18.5	1.42	(1.32-1.53)***	1.26	(1.16-1.36)***
Adults in 11 study states with strengthened protections															
Cisgender	16.1	1.00	[Reference]	1.00	[Reference]	10.1	1.00	[Reference]	1.00	[Reference]	12.3	1.00	[Reference]	1.00	[Reference]
Transgender	24.4	1.68	(1.51-1.86)***	1.34	(1.19-1.51)***	23.8	2.79	(2.50-3.10)***	2.11	(1.88-2.36)***	17.5	1.51	(1.34-1.70)***	1.33	(1.18-1.52)***
Adults in 28 study states with limited protections															
Cisgender	20.4	1.00	[Reference]	1.00	[Reference]	11.5	1.00	[Reference]	1.00	[Reference]	14.6	1.00	[Reference]	1.00	[Reference]
Transgender	27.6	1.49	(1.37-1.61)***	1.22	(1.12-1.34)***	21.1	2.06	(1.89-2.25)***	1.62	(1.48-1.78)***	19.1	1.38	(1.26-1.51)***	1.22	(1.11-1.35)***

Source: 2014–2019 Behavioral Risk Factor Surveillance System (BRFSS).

Notes: % = prevalence as percent; uOR = unadjusted odds ratio; aOR = adjusted odds ratio; CI = confidence interval. †Adjusted OR estimates are from logistic regression models adjusting for age, race/ethnicity, relationship status, children in the household, educational attainment, household income, employment status, health insurance status, usual source of care, state of residence, and survey year.

***$p < 0.001$; **$p < 0.05$; *$p < 0.10$

protections, transgender adults were more likely to report poor/fair health (aOR = 1.34; 95% CI = 1.19–1.51; $p < 0.001$), frequent mental distress (aOR = 2.11; 95% CI = 1.88–2.36; $p < 0.001$), and frequent poor physical health days (aOR = 1.33; 95% CI = 1.18–1.52; $p < 0.001$) compared to cisgender adults. Finally, among the 28 study states with limited protections, transgender adults were still more likely to report poor/fair health (aOR = 1.22; 95% CI = 1.12–1.34; $p < 0.001$), frequent mental distress (aOR = 1.62; 95% CI = 1.48–1.78; $p < 0.001$), and frequent poor physical health days (aOR = 1.22; 95% CI = 1.11–1.35; $p < 0.001$) compared to cisgender adults after controlling for sociodemographic characteristics.

Table 3 presents health disparities *within* cisgender and transgender adult populations by state-level policy environments. After controlling for sociodemographic characteristics in adjusted models, cisgender adults in states with strengthened protections were significantly ($p < 0.05$) more likely to report frequent mental distress (aOR = 1.18; 95% CI = 1.04–1.35; $p < 0.05$) and frequent poor physical health days (aOR = 1.20; 95% CI = 1.06–1.35; $p < 0.05$) compared to cisgender adults in states with limited transgender protections. Meanwhile, transgender adults in states with strengthened protections were marginally ($p < 0.10$) less likely to report frequent mental distress (aOR = 0.33; 95% CI = 0.11–1.05; $p < 0.10$) compared to transgender adults in states with limited protections after controlling for sociodemographic characteristics. There were no significant differences in poor/fair health and frequent poor physical health days between transgender adults in states with strengthened protections and transgender adults in states with limited protections.

Discussion

This study used a population-based and multistate sample of transgender and cisgender adults in the United States to characterize disparities in self-reported health by trans related state policy environments. We examined whether living in a state with strengthened protections versus limited legal protections for transgender individuals (*strengthened* is defined as enacting at least five of the following six protections: hate crime protections inclusive of gender minorities, bans on health insurance exclusions for trans related procedures, and nondiscrimination protections inclusive of gender minorities in employment, housing, education, and public accommodations) was associated with smaller disparities in self-rated health among transgender adults and the cisgender comparison group. We only examine *associations*—not causal relationships—between

Table 3 Health Disparities within Cisgender and Transgender Adult Populations by State-Level Policy Environment

	Poor/Fair Health					Frequent Mental Distress					Frequent Poor Physical Health Days				
	%	uOR (95% CI)		aOR (95% CI)†		%	uOR (95% CI)		aOR (95% CI)†		%	uOR (95% CI)		aOR (95% CI)†	
Cisgender Adults															
Residing in states with *limited protections*	20.4	1.00	[Reference]	1.00	[Reference]	11.5	1.00	[Reference]	1.00	[Reference]	14.6	1.00	[Reference]	1.00	[Reference]
Residing in states with *strengthened protections*	16.1	0.75	(0.74-0.76)***	0.98	(0.88-1.09)	10.1	0.87	(0.85-0.88)***	1.18	(1.04-1.35)**	12.3	0.82	(0.81-0.83)***	1.20	(1.06-1.35)**
Transgender Adults															
Residing in states with *limited protections*	27.6	1.00	[Reference]	1.00	[Reference]	21.1	1.00	[Reference]	1.00	[Reference]	19.1	1.00	[Reference]	1.00	[Reference]
Residing in states with *strengthened protections*	24.4	0.85	(0.74-0.96)**	1.07	(0.34-3.35)	23.8	1.17	(1.02-1.34)**	0.33	(0.11-1.05)*	17.5	0.90	0.77-1.04)	0.65	(0.21-2.00)

Source: 2014–2019 Behavioral Risk Factor Surveillance System (BRFSS).

Notes: uOR = unadjusted odds ratio; aOR = adjusted odds ratio; CI = confidence interval. †Adjusted OR estimates are from logistic regression models adjusting for age, race/ethnicity, relationship status, children in the household, educational attainment, household income, employment status, health insurance status, usual source of care, state of residence, and survey year.

***$p < 0.001$; **$p < 0.05$; *$p < 0.10$

state-level policy environments and transgender health disparities. Contrary to our hypothesis, health disparities between transgender and cisgender people were observed in states with limited protections *and* in states with strengthened protections. We did not find narrower disparities between transgender and cisgender adults in a subset of "transgender friendly" states. Perhaps this finding suggests that strengthened policy protections may not go far enough in creating an inclusive and healthy environment for transgender adults, or that strengthened policy protections may need more time to secure better health for transgender Americans. Meanwhile, the structural and interpersonal stigma (Hughto, Reisner, and Pachankis 2015) experienced by transgender Americans may place so much burden on transgender individuals that it translates to internalized transphobia, elevated stress, and wide health disparities across the country. Future research should continue to develop and test interventions to reduce public stigma against transgender people, especially since one study suggests that lower levels of structural stigma were associated with fewer suicide attempts among an online sample of transgender adults (Perez-Brumer et al. 2015). We only examined public policies, but structural stigma should be reviewed more broadly to include public attitudes on transgender rights, for instance.

We found some instances when transgender adults reported narrower disparities in states with limited protections (e.g., a lower prevalence of poor/fair health among transgender participants in Mississippi, Arizona, and Idaho, and a lower prevalence of frequent mental distress among transgender participants in North Carolina). One possible interpretation for these findings could be that some transgender adults may leave unfriendly geographies for states with stronger legal protections, which may lead to higher access to specialized medical care and more educational or professional opportunities. Meanwhile, transgender individuals remaining in states with limited protections may be more resilient or have social networks and familial supports that promote their health. More research is critically needed to understand migration patterns of TGD populations and whether this affects state-level health disparities.

Finally, after controlling for sociodemographic characteristics, we did find that transgender adults in states with strengthened protections were marginally ($p < 0.10$) less likely to report frequent mental distress compared to their transgender peers in states with limited protections. We did not find similar results for poor/fair self-rated health and frequent poor physical health days. This may suggest that protective policies, like those examined in this analysis, are associated with better mental health among the subset of transgender adults who live in "transgender friendly" states,

which has been reported in previous studies (Du Bois et al. 2018; Gleason et al. 2016; McDowell et al. 2020; Perez-Brumer et al. 2015). Geography remains an important driver of health outcomes (Crosby et al. 2012), and geopolitical environments may motivate transgender people to migrate to more gender-affirming and safer regions (Gamarel et al. 2021), including from rural areas to urban settings. Unfortunately, the BRFSS did not routinely provide urban/rural data in the public use files until very recently, so we were not able to consistently observe or control for rurality using 2014–2019 BRFSS data. Previous research suggests that rural residents experience less access to health care (Douthit et al. 2015), and rural transgender people in particular report more health needs (Horvath et al. 2014). Additional data resources and research are needed to understand health status by gender identity, policy environments, and rurality. Public health researchers should immediately collect representative data on transgender populations in the United States, especially as more states consider and enact varying policies affecting transgender individuals. Having more robust, longitudinal, and population-based data will enable researchers to study the associations between transgender-specific policies and trans health disparities.

Implications for Health Policy and Practice

Research on transgender health is limited because most federal health surveys and administrative data do not collect sexual orientation or gender identity. The Healthy People 2030 agenda for LGBT populations emphasizes the need for robust data collection (Healthy People 2030 n.d.). Still, only a few federal health surveys (e.g., the Census Bureau's Household Pulse Survey, the YRBS, and the BRFSS used in this study) include a gender identity item. In lieu of self-reported gender identity data, researchers have adopted novel methods to analyze health insurance claims (Progovac et al. 2018) and electronic health record data (Ehrenfeld et al. 2019) to approximate the health outcomes and health services utilization of TGD populations. These data are likely an undercount of transgender and gender-diverse individuals, as these approaches only capture those who already access and utilize health services. Furthermore, because population-based surveys interview noninstitutionalized adults living in housing units, most analyses may be missing a substantial portion of the transgender population. Previous research has documented that transgender Americans are more likely to be homeless, vulnerable to low socioeconomic status and poverty, and institutionalized in criminal justice facilities (James et al. 2016). Because most estimates suggest that the transgender population makes up less than 1% of

the US population (Meyer et al. 2017), missing a disproportionate number of transgender people in randomized health surveys may lead to inaccurate conclusions. Future research should examine the extent to which population-based data on transgender people truly represent the population. We recommend that transgender people should be oversampled and that gender identity should be incorporated into the calculation of survey weights in representative surveys, when possible. Additional surveys should employ validated methods for collecting gender identity information to inform data-driven strategies for addressing transgender health disparities (Daniel and Butkus 2015; Stroumsa 2014).Ongoing convenience samples of transgender populations should be routinely supported and used to monitor health disparities facing transgender populations in the United States.

Meanwhile, health care providers and public health policy makers will continue to play instrumental roles in promoting transgender health. Accrediting bodies for all clinicians—nurses, physicians, and allied health professionals—should include structural competencies in their licensure requirements, including but not limited to soliciting gender pronouns, using affirming language about gender identity and anatomy, and displaying appropriate knowledge of preventive care (e.g., Pap smears, cervical screenings, HPV vaccinations, and HIV preexposure prophylaxis). Requiring national licensure standards to include transgender-related structural competencies may ensure that more providers have the content knowledge and comfort level for providing care for TGD patients, especially those practicing in rural or less transgender-friendly settings. Meanwhile, federal and state policy makers should consider policies that would protect transgender Americans from discrimination in all policy contexts (e.g., employment, housing, education, public accommodations, and health care). Ensuring transgender safety in the social determinants of health is paramount for achieving transgender health equity.

Limitations

There were several limitations to using the BRFSS for this analysis. First, all data were self-reported by participants, so the data may suffer from recall and social desirability bias. Some transgender participants may not feel comfortable disclosing their gender minority status to telephone interviewers, for instance. Another limitation is that the definition of health-related nondiscrimination protections that we operationalized only considered protections against private health plans not being permitted to categorically ban gender-affirming care. Coverage for gender-affirming procedures by health insurance remains in limbo as employers, presidential

administrations, and courts reconcile what is protected and afforded under federal or state laws. For instance, the Affordable Care Act's Section 1557 nondiscrimination protections on the basis of sex may include gender identity protections, but final rules issued by the Department of Health and Human Services (HHS) in June 2020 under the Trump administration narrowed the definition of "sex" to biological sex. In May 2021, the Biden administration reissued these rules to include gender identity and sexual orientation. Given the possible impact of the HHS rule, additional research is needed to examine how different health care nondiscrimination policy levers impact the health of TGD populations (e.g., religious freedom laws and state Medicaid program categorical bans of gender-affirming care).

Our study also predates a rapid onset of antitransgender policies debated and passed by state legislatures after the 2014–2019 BRFSS data were collected. According to the Human Rights Campaign (Ronan 2021), state legislatures enacted more anti-LGBT laws in 2021 since the organization began monitoring and reporting state-level activity in 2004. Seven states banned transgender youth from participating in sports based on their gender identity, and the Arkansas state legislature passed and overturned Governor Asa Hutchinson's veto to enact a bill that would prohibit health care professionals from providing gender-affirming medical care to transgender youth (Ronan 2021).

Our results may not be generalizable to the entire US transgender population, as our study only included data from 39 states. In particular, some southern states (e.g., Arkansas and Alabama) and western states (e.g., New Mexico, Nebraska, and the Dakotas) were missing. This may be problematic in that it excludes transgender adults living in some of most hostile policy environments for transgender people. We recommend that the BRFSS add sexual orientation and gender identity to the main demographic questionnaire for all states. Having these data are critical for monitoring Healthy People 2030 goals for TGD populations.

Our study also would have benefited from additional data missing in the BRFSS. For instance, the BRFSS does not collect information on experiences of discrimination or victimization. Having confidential data on self-reported experiences of discrimination on the basis of race, ethnicity, sex, gender identity, sexual orientation, and disability status in national health surveys will facilitate ongoing health equity research and comparisons to federal statistics. These data could also be useful for examining the effects and mechanisms of nondiscrimination protections for transgender individuals, including intersectionality-focused research on transgender people of color.

Conclusion

We conducted one of the first studies to examine the association between state policy environments and health disparities between transgender and cisgender adults. Overall, transgender adults in almost all states reported worse self-rated health than their cisgender peers regardless of nondiscrimination protection environments. We found some evidence that transgender adults living in states with strengthened nondiscrimination policy protections reported better mental health than transgender adults in states with limited protections. Our study also discusses the ongoing data challenges and considerations for studying how state-level policies are associated with transgender health in the United States. Much more research is critically needed to identify best practices for achieving health equity for transgender Americans at the clinical, organizational, and policy levels. Meanwhile, other public health initiatives should continue to add gender identity questions to national health surveys to document the sociodemographic characteristics and health outcomes of TGD individuals. Only then will baseline health measures be documented and used to set targets for achieving health equity for TGD populations in the United States.

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