Demographic Characteristics and Health Status of Transgender Adults in Select US Regions: Behavioral Risk Factor Surveillance System, 2014

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Objectives. To describe the health status of the transgender population in the United States.

Methods. We used 2014 Behavioral Risk Factor Surveillance System data that comprised a probability sample from 19 US states and Guam (n = 151 456).

Results. Bivariate analyses showed that, in comparison with cisgender individuals, transgender individuals had a higher prevalence of poor general health (odds ratio [OR] = 1.7; 95% confidence interval [CI] = 1.2, 2.4), more days per month of poor physical (b = 2.43; 95% CI = 0.61, 4.24; *P* < .01) and mental (b = 1.74; 95% CI = 0.28, 3.19; *P* = .02) health, and a higher prevalence of myocardial infarction (OR = 1.7; 95% CI = 1.1, 2.5). In addition, more transgender than cisgender people lacked health care coverage (OR = 1.8; 95% CI = 1.2, 2.7) and a health care provider (OR = 1.5; 95% CI = 1.0, 2.1), and they were less likely to have visited a dentist in the preceding year (OR = 0.7; 95% CI = 0.5, 1.0). However, transgender individuals did not differ from cisgender individuals with respect to prevalence of chronic diseases, cancers, or depressive disorders or in terms of health behaviors such as smoking, binge drinking, and always wearing a seatbelt.

Conclusions. Our findings highlight areas of unmet needs in the transgender population. (*Am J Public Health.* 2017;107:582–589. doi:10.2105/AJPH.2016.303648)

Transgender people have a gender identity that differs from the sex assigned to them at birth. Studies have shown that transgender people experience pervasive social and economic marginalization and exclusion, including prejudice and stigma, discrimination, unemployment, and violence, that adversely affect their health and well-being.[1–4] Research has documented high prevalence of psychological distress, HIV and other sexually transmitted infections (particularly among transwomen), mental health problems, suicide, and substance use and abuse among transgender populations.[5–8] Transgender people also face barriers to accessing quality health care, which may, in part, explain these adverse health outcomes.[9,10]

With the exception of a report from the Massachusetts Behavioral Risk Factor Surveillance System (BRFSS),[11] data on the demographic and health characteristics of the transgender population come from nonprobability samples, including clinical and community-based samples. Such studies have provided important information alerting researchers and public health policymakers to the health concerns of transgender people.[12] However, because data on the transgender population are derived from nonprobability samples, they remain subject to unknown sampling bias. Obtaining data on the US transgender population is critical in guiding public health and policy efforts.

Here we aim to provide a partial—yet, to date, the most comprehensive—view of the population of transgender individuals in the United States by means of a probability sample from 19 states and 1 territory. We describe the basic demographic characteristics and health status of transgender individuals and describe health disparities between transgender and cisgender individuals. The general hypothesis guiding our research was based on minority stress theory, which suggests that social disadvantage causes adverse health outcomes that, in turn, lead to health disparities between transgender and cisgender populations.[1,13,14]

METHODS

The collaborative BRFSS survey is overseen by the Centers for Disease Control and Prevention (CDC) and administered by the departments of health of individual states. In 2014, all 50 states as well as the District of Columbia, Puerto Rico, and Guam used the BRFSS to collect data. Eligible individuals included noninstitutionalized adults (aged 18 years or older).

In 2014, the BRFSS made available, for the first time, an optional module that assessed gender identity. Only 19 US states—Delaware, Hawaii, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland,

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Minnesota, Montana, Nevada, New York, Ohio, Pennsylvania, Vermont, Virginia, Wisconsin, and Wyoming—and the territory of Guam provided data on the gender identity of their respondents (see the appendix, available as a supplement to the online version of this article at http://www.ajph.org).

Data were collected through landline and cellular telephone interviews. The CDC provided states with lists of telephone numbers. In the landline sample, numbers were stratified according to the density of landline numbers in a specific geographic location and randomly sampled within each stratum. Interviewers then collected information on eligible individuals in each household and randomly selected participants from these individuals. In the cellular sample, telephone numbers were randomly selected and respondents were treated as single adult households. In the 2014 BRFSS survey, national response rates were 48.7% for landline telephones and 40.5% for cellular telephones. Data from states were compiled by the CDC in a combined landline and cellular data set that is publically available. More information about the methodology of the survey is available on the BRFSS Web site.[15]

Measures

The full 2014 BRFSS questionnaire is available online.[16] Here we describe briefly the main variables we used in our analysis.

Gender identity. Respondents were asked "Do you consider yourself to be transgender?" Individuals who responded affirmatively were asked "Do you consider yourself to be male to female, female to male, or gender nonconforming?" Respondents who were uncertain about the definitions of the terms *transgender* and *gender nonconforming* were provided additional information (e.g., "some people describe themselves as transgender when they experience a different gender identity from their sex assigned at birth"). In most of our analyses, we used a dichotomous variable categorizing respondents as either transgender (including those who self-identified as male to female, female to male, and gender nonconforming) or cisgender.

Demographic characteristics. Respondents reported their age in years (18–24, 25–34,

35–44, 45–54, 55–64, ≥65), race/ethnicity (White, Black, American Indian or Alaska Native, Asian, Native Hawaiian or other Pacific Islander, Hispanic, multiracial, other), educational attainment (did not graduate from high school, graduated from high school, attended college or technical school, graduated from college or technical school), and income (< $15 000, $15 000–$24 999, $25 000–$34 999, $35 000–49 999, ≥ $50 000).

Respondents also provided information on their employment status (employed for wages or self-employed, unemployed, homemaker, student, retired, unable to work; recoded from the BRFSS employment variable), marital status (married, divorced, widowed, separated, never married, member of an unmarried couple), veteran status (yes or no), and sexual orientation (straight, lesbian or gay, bisexual, other). Finally, they reported their home ownership status (own, rent, other arrangement) and whether they were raising children in the household (dichotomous variable created from the BRFSS variable specifying the number of children younger than 18 years living in the household).

Health status and limitations in activity. The health status variable comprised general health (whether the respondent was in generally fair or poor health), the number of days in the preceding 30 days the respondent's physical health was "not good," the number of days in the preceding 30 days the respondent's mental health was "not good," and lifetime history of diagnosed chronic conditions (the respondent having ever been told by a "doctor, nurse, or other health professional" that he or she had diabetes, kidney disease, arthritis, asthma, chronic obstructive pulmonary disease, skin cancer, any other type of cancer, coronary heart disease, or depressive disorder or that he or she had suffered a stroke or myocardial infarction).

Limitations in activity comprised the number of days respondents were limited in engaging in their "usual activities" as a result of their physical or mental health; whether respondents had ever been limited because of physical, mental, or emotional problems; whether they had used special equipment because of health problems; whether they had difficulty seeing (even with glasses) or were

blind; whether they had trouble making decisions because of a physical, mental, or emotional condition; whether they had serious difficulty walking; whether they had difficulty dressing; and whether they had difficulty doing errands alone because of a physical, mental, or emotional condition.

Health behaviors. Health behaviors included smoking, coded as current smoker, former smoker, or never smoked; binge drinking, defined as consuming 4 or more drinks (for female respondents) or 5 or more drinks (for male respondents) on a single occasion in the preceding 30 days (the BRFSS-recorded sex of male or female was used for this variable because there are no accepted standards for transgender individuals); weight, coded according to body mass index (BMI) as underweight (BMI < 18.5 kg/m^2), normal weight (BMI between 18.5 and 24.9 kg/m^2), overweight (BMI between 25.0 and 29.9 kg/m^2), or obese (BMI ≥ 30.0 kg/m^2); and respondents' reports of whether they always used a seatbelt while in a car (yes or no).

Health care access and use. Variables related to health care access and use were all dichotomized (yes or no) and included the following: whether respondents had health care coverage (including health insurance, prepaid plans, government plans such as Medicare, or Indian Health Service coverage), whether respondents had a personal health care provider, whether respondents aged 18 to 64 years (who would not qualify for Medicare had health care coverage), and whether respondents were unable to see a doctor in the preceding year because of cost. On the basis of a BRFSS categorical variable denoting the most recent time respondents had received a checkup, we created an additional variable assessing whether respondents had received their most recent medical checkup in the preceding year.

Other variables included whether respondents had ever undergone a colonoscopy or sigmoidoscopy (among those older than 50 years), had ever had an HIV test, had received a flu vaccine in the preceding year, and had visited a dentist in the preceding year.

Data Analysis

The BRFSS data included 154 062 respondents who were asked the transgender

Characteristic	Transgender Group (n = 691)		Cisgender Group (n = 150 765)		Transgender vs Cisgender, OR (95% CI)
	No.	% (SE)	No.	% (SE)	
Age, y					
18–24	44	13.95 (0.03)	7 358	12.39 (< 0.01)	1 (Ref)
25–34	63	8.92 (0.02)	13 264	16.02 (< 0.01)	0.49 (0.27, 0.90)
35–44	100	21.44 (0.03)	17 539	15.94 (< 0.01)	1.19 (0.67, 2.14)
45–54	129	17.87 (0.02)	26 038	18.17 (< 0.01)	0.87 (0.51, 1.49)
55–64	167	21.43 (0.03)	35 653	17.41 (< 0.01)	1.09 (0.61, 1.96)
> 65	188	16.39 (0.02)	50 913	20.06 (< 0.01)	0.73 (0.43, 1.24)
Race/ethnicity					
White	489	62.26 (0.04)	121 470	73.76 (< 0.01)	1 (Ref)
Black or African American	71	15.88 (0.03)	10 630	11.97 (< 0.01)	1.57 (1.08, 2.30)
American Indian/Alaska Native	15	2.6 (0.01)	1 736	0.74 (< 0.01)	4.13 (1.34, 12.38)
Asian	27	2.4 (0.02)	4 117	3.90 (< 0.01)	0.72 (0.40, 1.32)
Native Hawaiian/Pacific Islander	14	0.44 (< 0.01)	1 115	0.30 (< 0.01)	1.75 (0.69, 4.45)
Other	3	0.06 (< 0.01)	549	0.27 (< 0.01)	0.24 (0.07, 0.81)
Multiracial	25	2.18 (0.01)	4 003	1.33 (< 0.01)	1.94 (0.88, 4.25)
Hispanic/Latino	34	14.23 (0.04)	5 241	7.73 (< 0.01)	2.18 (1.19, 4.00)
Education					
Did not graduate from high school	88	22.52 (0.04)	10 020	12.38 (< 0.01)	1 (Ref)
Graduated high school	275	41.93 (0.04)	44 933	31.02 (< 0.01)	0.74 (0.47, 1.17)
Attended college or technical school	193	22.54 (0.03)	41 396	30.33 (< 0.01)	0.41 (0.26, 0.64)
Graduated from college or technical school	132	13.00 (0.02)	54 101	26.27 (< 0.01)	0.27 (0.16, 0.46)
Income, $					
< 15 000	119	16.13 (0.03)	12 944	10.41 (< 0.01)	1 (Ref)
15 000–24 999	143	24.54 (0.04)	22 048	16.84 (< 0.01)	0.94 (0.58, 1.50)
25 000–34 999	75	13.51 (0.03)	15 104	10.76 (< 0.01)	0.81 (0.45, 1.47)
35 000–49 999	79	13.14 (0.03)	19 770	14.45 (< 0.01)	0.59 (0.35, 1.00)
≥ 50 000	192	32.68 (0.04)	61 381	47.54 (< 0.01)	0.44 (0.29, 0.68)
Employment status					
Employed (for wages or self-employed)	323	54.26 (0.04)	76 997	57.71 (< 0.01)	1 (Ref)
Unemployed	45	7.60 (0.02)	6 284	6.04 (< 0.01)	1.34 (0.70, 2.57)
Homemaker	37	6.85 (0.02)	8 537	5.79 (< 0.01)	1.26 (0.70, 2.27)
Student	13	3.07 (0.01)	3 300	5.40 (< 0.01)	0.60 (0.29, 1.27)
Retired	175	16.16 (0.03)	44 784	18.26 (< 0.01)	0.94 (0.63, 1.41)
Unable to work	94	12.07 (0.02)	10 307	6.79 (< 0.01)	1.89 (1.18, 3.02)
Home ownership status					
Own	422	65.33 (0.03)	113 580	70.44 (< 0.01)	1 (Ref)
Rent	227	30.07 (0.03)	30 448	25.02 (< 0.01)	1.30 (0.96, 1.75)
Other arrangement	37	4.60 (0.01)	5 697	4.54 (< 0.01)	1.09 (0.64, 1.88)

Continued

identity question. We dropped from our analyses respondents who answered "don't know/not sure" (n = 1138; 0.74% of the sample) or refused to answer (n = 1468; 0.95% of the sample) the question. Respondents who were not included differed from those who were included in that they were older, were more likely to self-identify as Asian or Hispanic, had less education and lower incomes, and were less likely to be fully employed. They were also more likely to be widows, to be separated from their partners, and to have no children. The final sample included 151 456 respondents who answered the gender identity question.

To account for nonresponse and selection bias, we weighted the data on the basis of a final weight developed for and provided with the BRFSS data set. This weight, calculated according to a raking methodology, accounts for age group by gender, race or ethnicity, education, marital status, gender by race or ethnicity, tenure (property ownership), age group by race or ethnicity, and telephone ownership. Data are representative of the population of each state individually. The combined data set does not represent the general US population; rather, it represents the population across the 19 states and Guam in which the optional module with the question about transgender identity was administered.

Following the minority stress theory, the overarching framework guiding our analyses was that social disadvantage leads to social stress, in turn resulting in adverse health outcomes and observed disparities between transgender and cisgender populations.[12] Because probability samples have offered little information on transgender people to date, we describe demographic data in addition to health status measures.

With respect to demographic characteristics and health status, we present bivariate percentages and standard errors for transgender respondents in comparison with cisgender respondents. In the case of some variables, measured on a continuous scale (e.g., number of days a respondent's physical health was not good), we present means and standard errors. We also present the results of bivariate and multiple regression analyses in the form of odds ratios (ORs) for dichotomous variables and linear regression coefficients (b values) for continuous variables. Because the transgender population tends to be younger overall, we also include results adjusted for age.

RESULTS

Of the 151 456 respondents, 99.5% reported that they were not transgender, 363 (0.3%) reported that they were transgender

TABLE 1—Continued

Characteristic	Transgender Group (n = 691)		Cisgender Group (n = 150 765)		Transgender vs Cisgender, OR (95% CI)
	No.	% (SE)	No.	% (SE)	
Marital status					
Married	335	49.58 (0.04)	82 245	52.28 (< 0.01)	1 (Ref)
Divorced	97	10.68 (0.02)	20 911	10.77 (< 0.01)	1.04 (0.71, 1.54)
Widowed	75	5.35 (0.01)	19 616	6.96 (< 0.01)	0.81 (0.53, 1.24)
Separated	16	3.98 (0.02)	2 632	2.29 (< 0.01)	1.83 (0.80, 4.21)
Never married	147	27.00 (0.04)	21 734	23.78 (< 0.01)	1.20 (0.82, 1.74)
Coupled, unmarried	21	3.41 (0.01)	3 627	3.92 (< 0.01)	0.92 (0.43, 1.97)
Children younger than 18 y in household	179	31.86 (0.03)	39 238	36.52 (< 0.01)	0.81 (0.60, 1.10)
Veteran	92	9.46 (0.02)	20 088	11.08 (< 0.01)	0.84 (0.58, 1.22)
Sexual orientation					
Straight	571	85.13 (0.03)	143 332	96.33 (< 0.01)	1 (Ref)
Lesbian or gay	22	3.95 (0.01)	1 859	1.50 (< 0.01)	2.98 (1.63, 5.45)
Bisexual	45	9.00 (0.02)	1 901	1.81 (< 0.01)	5.62 (3.18, 9.93)
Other	17	1.92 (0.01)	422	0.35 (< 0.01)	6.06 (2.59, 14.15)

Note. CI = confidence interval; OR = odds ratio. The sample size was n = 151 456.

male to female, 212 (0.2%) reported that they were transgender female to male, and 116 (0.1%) reported that they were transgender gender nonconforming (data not shown; all percentages were weighted for sampling bias). Thus, for our analyses, a total of 691 individuals were classified as transgender, leading us to estimate the transgender population as representing 0.53% (95% confidence interval [CI] = 0.46%, 0.61%) of the US population.

Demographic Characteristics and Sexual Orientation

Overall, there were slight differences between transgender and cisgender individuals in terms of the variables we tested (Table 1). Most significantly, transgender respondents were more likely than cisgender respondents to be Black, American Indian/Alaska Native, or Hispanic; less likely to have attended or graduated from college; more likely to be unable to work; and less likely to be in a higher income bracket. Interestingly, transgender people did not differ from cisgender people with respect to several important characteristics, including home ownership, marital status, whether or not they had children younger than 18 years living in their household, and whether they were veterans.

Among cisgender people, 3.7% (95% CI = 3.5%, 3.9%) self-identified as lesbian, gay, bisexual (LGB), or "other" but not "straight," which we grouped with the LGB category. Among those who identified as transgender, 15.0% (95% CI = 9.0%, 23.9%) of transgender male-to-female respondents, 9.6% (95% CI = 3.6%, 22.9%) of transgender female-to-male respondents, and 25.0% (95% CI = 13.8%, 41.1%) of transgender gender-nonconforming respondents were LGB.

Health Status and Activity Limitations

Table 2 shows results regarding health status and limitations in activity. In comparison with cisgender individuals, transgender individuals had a higher prevalence of fair or poor general health (OR = 1.7; 95% CI = 1.2, 2.4), more days per month of poor physical (b = 2.4; 95% CI = 0.6, 4.2; $P < .01$) and mental (b = 1.7; 95% CI = 0.3, 3.2; $P = .02$) health, and a higher prevalence of history of myocardial infarction (OR = 1.7; 95% CI = 1.1, 2.5). Transgender individuals did not differ from cisgender individuals with respect to a number of other health status variables, including diabetes, kidney disease, arthritis, asthma, chronic obstructive pulmonary disease, cancers,

stroke, angina or coronary heart disease, and depressive disorders.

In terms of activity limitations, transgender people had more days (per month) than cisgender individuals when physical or mental health issues kept them from their usual activities (b = 1.9; 95% CI = 0.3, 3.5; $P = .02$), as well as a higher prevalence of serious vision problems (OR = 2.1; 95% CI = 1.2, 3.8), difficulty concentrating or remembering (OR = 2.2; 95% CI = 1.5, 3.3), and difficulty walking (OR = 1.5; 95% CI = 1.0, 2.1). However, they were not more likely to experience difficulties related to use of special equipment such as a wheelchair; difficulties doing errands alone because of a physical, mental, or emotional condition; or other limitations caused by physical, mental, or emotional problems (Table 2).

Health Behaviors

With respect to health behaviors, transgender people did not differ from cisgender people in terms of smoking, binge drinking, BMI distribution, or always wearing a seatbelt (Table 3).

Health Care Access and Use

Table 4 shows that transgender individuals were more likely than cisgender individuals to not have health care coverage (OR = 1.8; 95% CI = 1.2, 2.7) or a personal health care provider (OR = 1.5; 95% CI = 1.0, 2.1); also, they were more likely to have been unable to afford a doctor visit when they needed it (OR = 1.7; 95% CI = 1.1, 2.5). To control for Medicare eligibility, we conducted separate analyses among people aged 18 to 64 years and found that in this group, consistent with the trend among all respondents, a greater proportion of transgender than cisgender individuals lacked health care coverage (OR = 1.8; 95% CI = 1.2, 2.7); specifically, about 1 in 5 transgender people aged 18 to 64 years lacked coverage.

Nevertheless, transgender individuals did not differ significantly from cisgender individuals in whether they had undergone a routine medical checkup in the preceding year, had ever been tested for HIV, or had ever had a colonoscopy or sigmoidoscopy (among those older than 50 years). However, fewer transgender than cisgender individuals

TABLE 2—Health Status and Activity Limitations of Transgender and Cisgender Adults: Pooled Behavioral Risk Factor Surveillance System Sample, United States, 2014

Variable	Transgender Group (n = 691)		Cisgender Group (n = 150 765)		Transgender vs Cisgender, OR (95% CI)	Transgender vs Cisgender, Adjusted OR[a] (95% CI)
	No.	% (SE)	No.	% (SE)		
General health fair or poor	183	26.17 (0.03)	27 002	17.02 (< 0.01)	1.73 (1.24, 2.40)	1.75 (1.27, 2.42)
Physical health not good (days per month)[b]	664	6.28 (0.93)	147 604	3.85 (0.04)	2.43 (0.61, 4.24)[c]	2.37 (0.64, 4.11)[d]
Mental health not good (days per month)[b]	671	5.41 (0.74)	148 307	3.67 (0.04)	1.74 (0.28, 3.19)[e]	1.70 (0.22, 3.17)[f]
Lifetime history of diagnosed chronic conditions						
Diabetes	116	13.88 (0.02)	19 788	10.69 (< 0.01)	1.35 (0.95, 1.90)	1.37 (0.96, 1.95)
Kidney disease	40	4.29 (0.01)	5 284	2.65 (< 0.01)	1.65 (0.96, 2.84)	1.70 (0.98, 2.95)
Arthritis	235	29.84 (0.03)	53 481	27.85 (< 0.01)	1.10 (0.81, 1.50)	1.16 (0.86, 1.57)
Asthma	99	13.50 (0.02)	19 859	14.15 (< 0.01)	0.95 (0.65, 1.37)	0.94 (0.65, 1.37)
Chronic obstructive pulmonary disease	66	7.87 (0.02)	12 693	6.91 (< 0.01)	1.15 (0.75, 1.78)	1.18 (0.76, 1.83)
Skin cancer	55	5.68 (0.01)	13 419	5.71 (< 0.01)	0.99 (0.63, 1.58)	1.04 (0.65, 1.68)
Cancer (other than skin)	55	4.32 (0.01)	14 387	6.64 (< 0.01)	0.63 (0.42, 0.95)	0.65 (0.43, 0.99)
Stroke	46	4.74 (0.02)	6 134	3.01 (< 0.01)	1.60 (0.83, 3.09)	1.75 (0.93, 3.29)
Angina or coronary heart disease	49	5.71 (0.01)	9 195	4.54 (< 0.01)	1.27 (0.78, 2.07)	1.37 (0.83, 2.25)
Myocardial infarction	68	7.29 (0.01)	9 029	4.46 (< 0.01)	1.69 (1.13, 2.51)	1.82 (1.22, 2.72)
Depressive disorder	142	19.72 (0.03)	28 886	18.76 (< 0.01)	1.06 (0.74, 1.54)	1.06 (0.73. 1.53)
Unable to do usual activities because of physical or mental health issues (days per month)[b]	680	4.47 (0.81)	149 246	2.52 (0.03)	1.95 (0.35, 3.55)[g]	1.90 (0.33, 3.48)[h]
Limited because of physical, mental, or emotional problems	198	24.43 (0.03)	36 885	20.99 (< 0.01)	1.22 (0.88, 1.69)	1.22 (0.89, 1.68)
Health problems that require use of special equipment	94	8.70 (0.02)	17 308	8.79 (< 0.01)	0.99 (0.68, 1.44)	1.00 (0.67, 1.48)
Blind or have serious difficulty seeing	58	8.80 (0.02)	7 296	4.30 (< 0.01)	2.15 (1.23, 3.76)	2.16 (1.22, 3.83)
Difficulty concentrating, remembering, or making decisions because of physical, mental, or emotional problems	124	20.14 (0.03)	14 700	10.28 (< 0.01)	2.20 (1.47, 3.29)	2.18 (1.46, 3.28)
Serious difficulty walking	168	19.19 (0.03)	25 899	13.85 (< 0.01)	1.48 (1.04, 2.10)	1.52 (1.06, 2.18)
Difficulty dressing or bathing	38	3.94 (0.01)	6 013	3.56 (< 0.01)	1.11 (0.69, 1.79)	1.09 (0.68, 1.76)
Difficulty doing errands alone because of a physical, mental, or emotional condition	72	6.59 (0.01)	10 838	6.49 (< 0.01)	1.02 (0.69, 1.49)	1.02 (0.69, 1.51)

Note. CI = confidence interval; OR = odds ratio. Percentages are weighted. The sample size was n = 151 456.
[a]Adjusted for age group.
[b]Linear regression coefficient.
[c]*t* = 2.62; *P* < .01.
[d]*t* = 2.68; *P* < .01.
[e]*t* = 2.34; *P* = .02.
[f]*t* = 2.25; *P* = .02.
[g]*t* = 2.39; *P* = .02.
[h]*t* = 2.38; *P* = .02.

had visited a dentist in the preceding year (OR = 0.7; 95% CI = 0.5, 1.0).

DISCUSSION

To date, very little research relying on probability samples is available to describe the transgender population and compare it with the cisgender population. In this study,

we used 2014 BRFSS aggregate data from 19 US states and 1 territory that provided information about the transgender population. Our finding, that 0.53% (95% CI = 0.46%, 0.61%) of the US population is transgender, is consistent with earlier results regarding the Massachusetts transgender population.[11] Using the same data used here, researchers at the Williams Institute estimated that transgender individuals represent

0.58% (95% CI = 0.36%, 0.95%) of the US population.[17]

Consistent with the minority stress perspective and knowledge regarding disparities in the health outcomes of transgender versus cisgender populations,[12] we found that transgender people disproportionately rate their general health as fair or poor relative to cisgender adults. We also found that transgender individuals were more disadvantaged

TABLE 3—Health Behaviors of Transgender and Cisgender Adults: Pooled Behavioral Risk Factor Surveillance System Sample, United States, 2014

Variable	Transgender Group (n = 691) No.	Transgender Group (n = 691) % (SE)	Cisgender Group (n = 150 765) No.	Cisgender Group (n = 150 765) % (SE)	Transgender vs Cisgender OR (95% CI)	Transgender vs Cisgender Adjusted OR[a] (95% CI)
Smoking status						
Never smoked	375	58.03 (0.04)	82 611	56.53 (< 0.01)	1 (Ref)	1 (Ref)
Former smoker	166	19.29 (0.02)	43 620	24.79 (< 0.01)	0.76 (0.55, 1.04)	0.76 (0.55, 1.05)
Current smoker	147	22.69 (0.03)	23 777	18.68 (< 0.01)	1.18 (0.82, 1.70)	1.20 (0.84, 1.72)
Binge drinking	94	16.74 (0.03)	18 657	16.23 (< 0.01)	1.04 (0.73, 1.48)	1.05 (0.71, 1.54)
Body mass index						
< 18.5	10	1.13 (0.01)	2 347	1.76 (< 0.01)	1 (Ref)	1 (Ref)
18.5–24.9	193	24.23 (0.03)	45 740	32.95 (< 0.01)	1.14 (0.43, 3.07)	1.13 (0.42, 3.06)
25.0–29.9	238	46.47 (0.04)	51 864	34.85 (< 0.01)	2.07 (0.78, 5.55)	2.07 (0.76, 5.65)
≥ 30.0	221	28.16 (0.03)	43 790	30.43 (< 0.01)	1.44 (0.54, 3.82)	1.42 (0.53, 3.86)
Always wears seatbelt	566	78.27 (0.03)	129 459	84.41 (< 0.01)	0.66 (0.44, 1.00)	0.65 (0.44, 0.97)

Note. CI = confidence interval; OR = odds ratio. Percentages are weighted. The sample size was n = 151 456.

[a]Adjusted for age group.

than cisgender individuals with respect to health care access and use; specifically, more transgender than cisgender people lacked health care coverage, a health care provider, and dental visits over the period of a year.

At the same time, however, we found no disparities in several significant areas of health such as diabetes, kidney disease, arthritis, asthma, chronic obstructive pulmonary disease, cancers, stroke, angina, and depressive disorders. Significantly, and distinctly from some other studies (including that of Conron et al.[11]), we found no disparities in terms of BMI distribution, smoking, binge drinking, or use of a seatbelt. Surprisingly, disparities between transgender and cisgender populations were not broad, centered on several but not all of the health status measures

assessed, and were not always of high magnitude. Although our results are surprising when they are compared with findings from nonprobability samples (as described in the introduction), they are consistent with those of Conron et al.,[11] the only other researchers reporting findings from a probability sample.

Limitations

In reviewing the results, we referred to a discussion of the US transgender population, but there are a few clear limitations to doing so. Our data were derived from only 19 states and one US territory for which 2014 BRFSS data on transgender individuals are available. Our findings are not representative of any population that significantly differs from the populations captured in these geographic regions. Lacking any US population data (e.g., census data) against which to assess our findings, we are unable to assess our sample in any formal way. A preliminary review of the states included in our study revealed that all of the 4 census regions were represented among our 19 states (Northeast, n = 5; Midwest, n = 7; South, n = 3; and West, n = 4). In addition, by the time of data collection in 2014, about half of these states (n = 10) had expanded their Medicaid health insurance as part of the

TABLE 4—Health Care Access and Use Among Transgender and Cisgender Adults: Pooled Behavioral Risk Factor Surveillance System Sample, United States, 2014

Variable	Transgender Group (n = 691) No.	Transgender Group (n = 691) % (SE)	Cisgender Group (n = 150 765) No.	Cisgender Group (n = 150 765) % (SE)	Transgender vs Cisgender OR (95% CI)	Transgender vs Cisgender Adjusted OR[a] (95% CI)
No current health care coverage	80	17.98 (0.03)	10 843	10.98 (< 0.01)	1.78 (1.19, 2.66)	1.87 (1.25, 2.80)
No personal health care provider	117	25.25 (0.03)	21 115	18.80 (< 0.01)	1.46 (1.02, 2.09)	1.58 (1.05, 2.37)
No health care coverage (among respondents aged 18–64 y)	75	21.56 (0.04)	10 227	13.49 (< 0.01)	1.76 (1.16, 2.68)	1.91 (1.26, 2.88)
Could not afford doctor when needed (past year)	95	19.85 (0.03)	14 739	12.76 (< 0.01)	1.69 (1.13, 2.53)	1.72 (1.14, 2.62)
Routine checkup in past year	508	68.43 (0.04)	111 214	71.61 (< 0.01)	0.86 (0.61, 1.21)	0.85 (0.59, 1.21)
Colonoscopy or sigmoidoscopy	294	66.25 (0.05)	72 169	70.03 (< 0.01)	0.84 (0.54, 1.32)	0.84 (0.53, 1.34)
Ever tested for HIV	190	32.07 (0.04)	39 502	35.03 (< 0.01)	0.88 (0.64, 1.20)	0.87 (0.62, 1.23)
Flu vaccine in past year	301	33.20 (0.03)	70 619	40.19 (< 0.01)	0.74 (0.56, 0.98)	0.74 (0.56, 0.98)
Visited dentist/hygienist in past year	420	59.79 (0.04)	103 797	67.05 (< 0.01)	0.73 (0.54, 0.99)	0.71 (0.53, 0.96)

Note. CI = confidence interval; OR = odds ratio. Percentages are weighted. The sample size was n = 151 456.

[a]Adjusted for age group.

Affordable Care Act (Pub L No. 111-148); the other half had not done so.

There are several plausible methodological reasons why our probability sample might indicate that the population of transgender individuals differs from that observed in certain nonprobability samples. For example, the transgender population definition is still quite variable across studies (regardless of sampling approach). With different definitions, studies may capture subpopulations of transgender individuals that may be distinct with respect to their demographic and health profiles. As noted, the BRFSS survey asked about transgender identity. However, not all individuals classified by researchers as transgender self-identify as transgender. For instance, individuals whose current gender identity differs from the sex they were assigned at birth may identify as a woman or a man and avoid or even shun a transgender identity. To the extent that such populations are different from the transgender populations sampled in other studies, this might explain the observed differences in outcomes.

One example of the importance of population definitions concerns our finding of no differences in veteran status between transgender and cisgender respondents. This result contradicts findings of others suggesting that transgender people, defined according to a diagnosis of gender identity disorder, are overrepresented among US veterans.[18] If transgender veterans with a gender identity disorder diagnosis are less likely to identify with the term transgender, they may be underrepresented here.

Another limitation concerns the lack of measures specifically assessing issues of concern to transgender individuals. For example, our findings regarding binge drinking, in which standards for men and women are different, are limited in that they rely on BRFSS algorithms that involved the use of male or female gender, most commonly recorded by the interviewer. No standards for determining binge drinking are available specifically for transgender individuals. Similarly, the BRFSS has no available data on HIV status or substance use, outcomes for which transgender people may be at increased risk but that our study cannot describe.[6]

Finally, as with many health surveys, the BRFSS relies on self-reports only, adding potential error and biased estimates. For example, several outcomes require reporting of a diagnosed condition. This requirement could lead to underrepresentation of disorders among transgender respondents who, as we report here, are less likely to be seen by a health care provider and thus less likely to report a diagnosed health condition.

Study Implications

Despite these limitations, our data provide the most comprehensive view of the transgender population to date. The results from our probability sample reveal a more nuanced picture of the transgender population than the one often produced through nonprobability samples. Our findings indicate that the transgender population is racially and ethnically diverse. Racial/ethnic distributions in studies involving transgender nonprobability samples have been mixed, with some indicating underrepresentation of racial/ethnic minorities and some indicating overrepresentation.[3,19] Also, despite somewhat lower education and work status, we found that transgender people are not markedly different from cisgender people in terms of likelihood of owning a home, being married, and having children. In contrast to previous reports, we did not find that transgender people are more likely to have served in the military.[19,20]

Although ours is the first study to include a representative sample of US transgender adults in more than one state, it is still limited in scope and coverage. We call on researchers and policymakers to include assessments of transgender populations in future studies to enhance the knowledge base on these populations. Population studies conducted in the United States and beyond would benefit from inclusion of multiple items to assess transgender status.[6] A 2-step method of asking about sex assigned at birth and current gender identity would allow researchers to categorize as transgender individuals whose gender identity differs from their assigned sex even if they do not use transgender as an identity.[21]

Our results show that there are unmet needs in the transgender population that public health researchers and policymakers should address. In particular, we found that transgender individuals had worse outcomes than cisgender individuals with respect to general health, limitations in activities, and health care access. In the context of general population studies showing a strong association between health ratings and mortality, our finding on overall health status is concerning for the future health of the transgender population.[22,23]

Our findings also show that, in a number of areas of health, many transgender people are as healthy as cisgender people. Thus, our results indicate areas of resilience as well as vulnerability among transgender people.

Here we have reported on BRFSS data from 2014. Data from 2015, also including partial regions of the United States, have now become available. It is our hope that future research involving the BRFSS survey or other national surveys will rely on complete data for the US transgender population and, in so doing, advance our understanding of vulnerabilities and resiliencies among this population. Such data can inform policies and interventions designed to reduce health disparities and improve the health and well-being of transgender individuals. AJPH

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