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Factors Associated with Use of HIV Prevention and Health Care Among Transgender Women — Seven Urban Areas, 2019–2020

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Transgender women* are disproportionately affected by HIV. Among 1,608 transgender women who participated in CDC's National HIV Behavioral Surveillance (NHBS) during 2019–2020, 42% received a positive HIV test result (*1*). This report provides results from seven U.S. urban areas where the 2019–2020 NHBS questionnaire was administered. Thirty-eight percent of participants reported having previously received a positive test result for HIV. Detrimental socioeconomic factors, including low income (44%), homelessness (39%), and severe food insecurity in the past 12 months (40%), were common and associated with lower receipt of HIV prevention and treatment services. Having a usual health care source or a provider with whom the participant was comfortable discussing gender-related health issues was associated with improved HIV prevention and treatment outcomes, including HIV testing, preexposure prophylaxis (PrEP) use, and viral suppression. These findings illustrate the benefit of gender-affirming approaches used by health care providers (*2*), and highlight the challenging socioeconomic conditions faced by many transgender women. Ensuring access to gender-affirming health care approaches and addressing the socioeconomic challenges of many transgender women could improve access to and use of HIV prevention and care in this population and will help achieve the goals of the Ending the HIV Epidemic in the United States initiative (*3*).

Initiated in 2003, NHBS conducts biobehavioral surveillance among persons at high risk for HIV infection. During June 2019–February 2020, NHBS surveyed 1,608 transgender women in seven U.S. urban areas using respondent-driven sampling.† Eligible participants§ completed an interviewer-administered questionnaire and were offered an HIV test. The questionnaire included measures of gender identity,¶ income, health insurance, housing,** food

* Persons who were assigned male sex at birth and who currently identify as women or transgender women.

† Respondent-driven sampling is a methodology similar to snowball sampling and is often used when trying to sample hard-to-reach populations. The method relies on multiple waves of peer-to-peer recruitment to achieve the desired sample size. https://www.jstor.org/stable/10.1525/sp.2002.49.1.11?seq=1

§ Eligible persons were those who were aged ≥18 years, had current residence in a participating urban area, had not previously participated in the current survey cycle, had ability to complete the survey in either English or Spanish, provided informed consent, and reported a gender identity of woman or transgender woman and were assigned male sex or intersex at birth.

¶ Participants were asked to report their current gender identity from the following response options: woman, man, transgender woman, transgender man, or a gender not listed here. Participants were able to select more than one response option.

** Participants were asked if they had experienced homelessness during the past 12 months, including living on the street, in a shelter, in a single room occupancy hotel, or in a car. They were also asked to provide the number of nights during the past 12 months that they experienced homelessness.

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insecurity,[††] HIV status, viral suppression (if HIV-positive), comfort with their health care provider in discussing gender-related health issues (hereafter referred to as comfort with a provider), unmet need for health care,[§§] and usual source of health care. Because of racial and ethnic disparities in HIV prevalence, recruitment was focused on Black or African American and Hispanic or Latina transgender women as initial sampling recruits. Incentives were provided for completion of the interview and HIV test. Adjusted prevalence ratios (aPRs) and 95% CIs for prevention and treatment outcomes, by self-reported HIV status, were estimated using log-linked Poisson regression models with generalized estimating equations clustered on recruitment chain and urban area; models were adjusted for age, race and ethnicity, and urban area. Analyses were conducted using SAS software (version 9.4; SAS Institute). This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy.[¶¶]

Data from 1,608 transgender women were included in this analysis (Table 1). Thirty-eight percent reported having previously received a positive HIV test result.[***] Forty-four percent earned <$10,000 annually. During the past 12 months 39% experienced homelessness, and 40% experienced severe food insecurity. Nearly one third (31%) of participants were interviewed in Los Angeles. By urban area, reports of homelessness ranged from 22% to 59%, and reports of recent severe food insecurity ranged from 28% to 47%. Comfort with a provider varied by urban area from 66% to 91%.

Socioeconomic status and health care accessibility were associated with health outcomes (Table 2). Among participants who reported a previous positive test result for HIV, self-reported viral suppression was less common among participants who reported experiencing homelessness during the past 12 months (aPR = 0.88; p = 0.003), and the likelihood of viral suppression decreased as the number of nights of homelessness increased. Severe food insecurity (aPR = 0.84; p<0.001) and unmet need for health care (aPR = 0.89; p = 0.027) were also less common among participants who reported viral suppression. Comfort with a provider (aPR = 1.17; p = 0.007) was more common among participants who reported viral

[††] Severe food insecurity was defined as having not eaten for a whole day because there was not enough money for food at some point during the past 12 months.

[§§] Having an unmet need for care was defined as a "time when you needed medical care but didn't get it because you couldn't afford it" during the past 12 months.

[¶¶] 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

[***] Among participants, 38% self-reported living with HIV during the interview and were asked questions related to HIV treatment. During postinterview HIV testing, an additional 4% of participants received a positive HIV test result, for a total of 42% of participants who received a positive HIV test result (https://www.cdc.gov/hiv/library/reports/hiv-surveillance.html). Those who did not report living with HIV during the interview were not asked about HIV treatment.

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TABLE 1. Structural and health care factors among transgender women (N = 1,608)* — National HIV Behavioral Surveillance System, seven U.S. urban areas, 2019–2020

Characteristic	No. (%)							
			Nights homeless†					
	Transgender women	Severe food insecurity§	365	30–364	<30	None	Has usual source of care¶	Comfort with a health care provider when discussing gender-related issues
Age group, yrs								
18–29	496 (30.9)	244 (49.2)	49 (9.9)	135 (27.2)	57 (11.7)	247 (49.8)	374 (75.4)	357 (72.0)
30–39	461 (28.7)	186 (40.4)	48 (10.4)	105 (22.8)	44 (9.5)	258 (56.0)	372 (80.7)	344 (74.6)
40–49	307 (19.1)	113 (36.8)	23 (7.5)	57 (18.8)	23 (7.5)	192 (62.5)	270 (88.0)	254 (82.7)
≥50	343 (21.3)	94 (27.4)	32 (9.3)	41 (12.0)	15 (4.4)	238 (69.4)	308 (89.8)	295 (86.0)
Race and ethnicity**								
Black, non-Hispanic	569 (35.4)	221 (38.8)	63 (11.1)	124 (21.8)	51 (9.0)	321 (56.4)	469 (82.4)	452 (79.4)
Hispanic or Latina††	643 (40.0)	275 (42.8)	49 (7.6)	122 (19.0)	61 (9.5)	396 (61.6)	532 (82.7)	481 (74.8)
White, non-Hispanic	180 (11.2)	81 (45.0)	25 (13.9)	39 (21.7)	13 (7.2)	98 (54.4)	150 (83.3)	148 (82.2)
Multiple, non-Hispanic	124 (7.7)	44 (35.5)	8 (6.5)	39 (31.5)	9 (7.3)	60 (48.4)	105 (84.7)	107 (86.3)
Other,§§ non-Hispanic	89 (5.5)	15 (16.9)	6 (6.7)	13 (14.6)	6 (6.7)	60 (67.4)	66 (74.2)	61 (68.5)
Gender identity¶¶								
Woman	509 (31.7)	199 (39.1)	57 (11.2)	118 (23.1)	37 (7.3)	287 (56.4)	431 (84.7)	407 (80.0)
Man	6 (0.4)	—***	—	—	—	—	5 (83.3)	—
Transgender woman	1,404 (87.3)	558 (39.7)	131 (9.3)	295 (21.0)	126 (9.0)	817 (58.2)	1,144 (81.5)	1,084 (77.2)
Transgender man	11 (0.7)	—	—	—	—	7 (63.6)	9 (81.8)	6 (54.6)
A gender not listed here	94 (5.9)	40 (42.6)	12 (12.8)	24 (25.5)	7 (7.5)	46 (48.9)	74 (78.7)	64 (68.1)
Currently has health insurance								
Yes	1,337 (83.2)	512 (38.3)	120 (9.0)	281 (21.0)	104 (7.8)	794 (59.4)	1,178 (88.1)	1,127 (84.3)
No	270 (16.8)	124 (45.9)	32 (11.9)	56 (20.7)	36 (13.3)	142 (52.6)	146 (54.1)	124 (45.9)
Unmet need for health care during the past 12 months								
Yes	323 (20.1)	186 (57.6)	37 (11.5)	97 (30.0)	36 (11.2)	147 (45.5)	238 (73.7)	224 (69.4)
No	1,285 (79.9)	451 (35.1)	115 (9.0)	241 (18.8)	104 (8.1)	789 (61.4)	1,087 (84.6)	1,027 (79.9)
Self-reported HIV status†††								
HIV-positive	615 (38.3)	229 (37.2)	60 (9.8)	139 (22.6)	50 (8.1)	350 (56.9)	546 (88.8)	537 (87.3)
HIV-negative or unknown	991 (61.6)	407 (41.1)	92 (9.3)	199 (20.1)	89 (9.0)	585 (59.0)	778 (78.5)	714 (72.1)
Education								
Less than high school	347 (21.6)	168 (48.4)	35 (10.1)	75 (21.6)	33 (9.5)	192 (55.3)	283 (81.6)	268 (77.2)
High school diploma or equivalent	596 (37.1)	247 (41.4)	64 (10.7)	136 (22.8)	61 (10.2)	326 (54.7)	480 (80.5)	447 (75.0)
Some college or technical degree	486 (30.2)	181 (37.2)	40 (8.2)	105 (21.6)	33 (6.8)	290 (59.7)	416 (85.6)	395 (81.3)
College degree or more	177 (11.0)	39 (22.0)	13 (7.3)	21 (11.9)	12 (6.8)	128 (72.3)	144 (81.4)	140 (79.1)
Annual household income, USD								
40,000–74,999	173 (10.8)	25 (14.5)	—	9 (5.2)	13 (7.5)	145 (83.8)	145 (81.8)	140 (80.9)
20,000–39,999	274 (17.0)	78 (28.5)	22 (8.0)	42 (15.3)	20 (7.3)	186 (67.9)	228 (83.2)	218 (79.6)
10,000–19,999	435 (27.1)	155 (35.6)	29 (6.7)	83 (19.1)	30 (6.9)	274 (63.0)	372 (85.5)	358 (82.3)
≤9,999	711 (44.2)	373 (52.5)	94 (13.2)	201 (28.3)	76 (10.7)	324 (45.6)	571 (80.3)	523 (73.6)
Urban area								
Atlanta, Georgia	132 (8.2)	55 (41.7)	12 (9.1)	37 (28.0)	18 (13.6)	62 (47.0)	88 (66.7)	87 (65.9)
Los Angeles, California	504 (31.3)	224 (44.4)	50 (9.9)	136 (27.0)	43 (8.5)	270 (53.6)	420 (83.3)	374 (74.2)
New Orleans, Louisiana	165 (10.3)	77 (46.7)	12 (7.0)	35 (21.2)	11 (6.7)	106 (64.2)	143 (86.7)	136 (82.4)
New York, New York	279 (17.4)	114 (40.9)	21 (7.5)	46 (16.5)	27 (9.7)	181 (64.9)	245 (87.8)	222 (79.6)
Philadelphia, Pennsylvania	220 (13.7)	61 (27.7)	13 (5.9)	35 (15.9)	19 (8.6)	151 (68.6)	174 (79.1)	200 (90.9)
San Francisco, California	198 (12.3)	77 (38.9)	39 (19.7)	37 (18.7)	15 (7.6)	80 (40.4)	179 (90.4)	160 (80.8)
Seattle, Washington	110 (6.8)	29 (26.4)	5 (4.6)	12 (10.9)	7 (6.4)	86 (78.2)	76 (69.1)	72 (65.5)
Total	**1,608 (100)**	**637 (39.6)**	**152 (9.5)**	**338 (21.0)**	**140 (8.7)**	**936 (58.2)**	**1,325 (82.4)**	**1,251 (77.8)**

Abbreviation: USD = U.S. dollars.

* Numbers might not sum to totals because of missing data.

† Homelessness was defined as having lived on the street, in a shelter, in a single room occupancy hotel, or in a car during the past 12 months.

§ Severe food insecurity was defined as not eating for a whole day because there wasn't enough money for food at some point during the past 12 months.

¶ Usual source of care was defined as having a place to go when sick or in need of health advice other than a hospital emergency department.

** Because of racial and ethnic disparities in HIV prevalence, recruitment was focused on Black or African American and Hispanic or Latina transgender women.

†† Hispanic or Latina transgender women might be of any race.

§§ Includes persons who indicated Asian, American Indian or Alaska Native, or Native Hawaiian or other Pacific Islander race.

¶¶ Participants were asked to report their current gender identities from the following response options: woman, man, transgender woman, transgender man, or a gender not listed here. All eligible participants reported a gender identity of "woman" or "transgender woman;" however, participants were able to select more than one response option. Gender identities are not mutually exclusive.

*** Dashes indicate suppression because of small cell size (<5).

††† Participants who reported having a previous positive HIV test result were defined as self-reported HIV–positive.

TABLE 2. HIV treatment among transgender women living with a positive HIV test result — National HIV Behavioral Surveillance System, seven U.S. urban areas,* 2019–2020

Characteristic	No. of transgender women	Viral suppression			Current antiretroviral use		
		No. (%)	aPR† (95% CI)	p-value	No. (%)	aPR† (95% CI)	p-value
Annual household income, USD							
40,000–74,999	51	45 (88.2)	1.12 (1.00–1.25)	0.043	48 (94.1)	1.06 (0.99–1.15)	0.107
20,000–39,999	94	83 (88.3)	1.18 (1.09–1.27)	<0.001	88 (93.6)	1.07 (1.01–1.14)	0.023
10,000–19,999	177	129 (72.9)	0.96 (0.87–1.05)	0.365	165 (93.2)	1.08 (1.02–1.14)	0.012
≤9,999	290	209 (72.1)	Ref	—	249 (85.9)	Ref	—
Education							
Less than high school	144	108 (75.0)	Ref	—	130 (90.3)	Ref	—
High school diploma or equivalent	236	171 (72.5)	1.02 (0.92–1.12)	0.735	210 (89.0)	1.00 (0.95–1.05)	0.967
Some college or technical degree	196	155 (79.1)	1.08 (0.98–1.19)	0.127	177 (90.3)	1.02 (0.95–1.08)	0.606
College degree or more	39	33 (84.6)	1.18 (1.03–1.34)	0.013	34 (87.2)	0.98 (0.88–1.08)	0.661
Experienced homelessness§							
Yes	265	179 (67.6)	0.88 (0.81–0.96)	0.003	226 (85.3)	0.91 (0.88–0.96)	<0.001
No	350	288 (82.3)	Ref	—	325 (92.9)	Ref	—
No. of nights homeless§							
365	60	33 (55.0)	0.75 (0.58–0.96)	0.025	47 (78.3)	0.84 (0.76–0.93)	0.001
30–364	139	97 (69.8)	0.91 (0.83–1.00)	0.048	119 (85.6)	0.92 (0.87–0.98)	0.011
<30	50	39 (78.0)	1.02 (0.88–1.18)	0.804	47 (94.0)	0.99 (0.91–1.08)	0.799
None	350	288 (82.3)	Ref	—	325 (92.9)	Ref	—
Severe food insecurity¶							
Yes	229	150 (65.5)	0.84 (0.76–0.92)	<0.001	193 (84.3)	0.92 (0.87–0.96)	0.001
No	386	317 (82.1)	Ref	—	328 (92.7)	Ref	—
Currently has health insurance							
Yes	560	435 (77.7)	1.14 (0.96–1.35)	0.133	507 (90.5)	1.16 (1.03–1.30)	0.016
No	54	32 (59.3)	Ref	—	43 (79.6)	Ref	—
Unmet need for health care during the past 12 months							
Yes	90	58 (64.4)	0.89 (0.81–0.99)	0.027	74 (82.2)	0.90 (0.84–0.97)	0.008
No	525	409 (77.9)	Ref	—	477 (90.9)	Ref	—
Has usual source of care**							
Yes	546	420 (76.9)	1.07 (0.94–1.22)	0.323	496 (90.8)	1.16 (1.03–1.32)	0.015
No	69	47 (68.1)	Ref	—	55 (79.7)	Ref	—
Comfort with a health care provider††							
Yes	537	423 (78.8)	1.17 (1.04–1.32)	0.007	490 (91.2)	1.16 (1.05–1.29)	0.004
No	78	44 (56.4)	Ref	—	61 (78.2)	Ref	—
Total	**615**	**467 (75.9)**	—	—	**551 (89.6)**	—	—

Abbreviations: aPR = adjusted prevalence ratio; Ref = referent group; USD = U.S. dollars.

* The seven urban areas include Atlanta, Georgia; Los Angeles, California; New Orleans, Louisiana; New York, New York; Philadelphia, Pennsylvania; San Francisco, California; and Seattle, Washington.

† Adjusted for age, race and ethnicity, city, and network size and clustered on urban areas and recruitment chains.

§ Homelessness was defined as having lived on the street, in a shelter, in a single room occupancy hotel, or in a car during the past 12 months.

¶ Severe food insecurity was defined as not eating for a whole day because there was not enough money for food at some point during the past 12 months.

** Usual source of care was defined as having a place to go when sick or in need of health advice other than a hospital emergency department.

†† Comfort with a health care provider was defined as having a health care provider with whom the participant is comfortable discussing gender-related health issues.

suppression. Similar associations were found for current use of antiretroviral medication. Having a usual source of health care was also associated with current use of antiretroviral medication (aPR = 1.16; p = 0.015).

Among participants who did not report a previous positive test result for HIV, testing for HIV during the past 12 months was more likely among those who reported having a usual source of health care (aPR = 1.16; p<0.001) and comfort with a provider (aPR = 1.12; p = 0.004) (Table 3). PrEP use was more common among participants who reported having health insurance (aPR = 1.54; p<0.001), a usual source of health care (aPR = 2.54; p<0.001), and comfort with a provider (aPR = 1.79; p<0.001), and less likely among participants who reported an unmet need for health care (aPR = 0.82; p = 0.050). PrEP use was also more common among participants who had experienced severe food insecurity than those who had not (aPR = 1.23; p = 0.024).

Discussion

Experiencing homelessness, poverty, and food insecurity was common among transgender women and might result from the pervasive experience of stigma and discrimination, which reduce access to education, employment, and health care (*4*). These structural factors are associated with lower likelihood

TABLE 3. HIV prevention services among transgender women without known HIV infection — National HIV Behavioral Surveillance System, seven U.S. urban areas,* 2019–2020

Characteristic	No. of transgender women	HIV test in the past 12 months			PrEP use in the past 12 months		
		No. (%)	aPR† (95% CI)	p-value	No. (%)	aPR† (95% CI)	p-value
Annual household income, USD							
40,000–74,999	122	93 (76.2)	0.93 (0.85–1.01)	0.099	23 (18.8)	0.73 (0.53–0.99)	0.043
20,000–39,999	180	136 (75.6)	0.90 (0.82–0.98)	0.022	55 (30.6)	1.09 (0.90–1.32)	0.377
10,000–19,999	258	214 (82.9)	0.99 (0.94–1.04)	0.640	96 (37.2)	1.45 (1.22–1.74)	<0.001
≤9,999	421	358 (85.0)	Ref	—	113 (26.8)	Ref	—
Education							
Less than high school	203	173 (85.2)	Ref	—	51 (25.1)	Ref	—
High school diploma or equivalent	360	283 (78.6)	0.93 (0.86–1.01)	0.067	110 (30.6)	1.26 (1.02–1.56)	0.033
Some college or technical degree	290	244 (84.1)	1.00 (0.94–1.07)	0.944	91 (31.4)	1.27 (0.97–1.66)	0.087
College degree or more	138	106 (76.8)	0.95 (0.85–1.06)	0.379	36 (26.1)	1.06 (0.81–1.40)	0.662
Experienced homelessness§							
Yes	406	349 (86.0)	1.10 (0.99–1.21)	0.076	126 (31.0)	1.08 (0.93–1.25)	0.332
No	586	458 (78.2)	Ref	—	162 (27.6)	Ref	—
No. of nights homeless§							
365	92	73 (79.3)	1.03 (0.90–1.17)	0.663	24 (26.1)	0.98 (0.70–1.38)	0.899
30–364	199	176 (88.4)	1.12 (1.00–1.25)	0.059	62 (31.2)	1.05 (0.84–1.32)	0.654
<30	90	78 (86.7)	1.10 (0.99–1.21)	0.073	29 (32.2)	1.09 (0.83–1.43)	0.525
None	586	458 (78.2)	Ref	—	162 (27.6)	Ref	—
Severe food insecurity¶							
Yes	408	342 (83.8)	1.02 (0.96–1.10)	0.495	137 (33.6)	1.23 (1.03–1.47)	0.024
No	582	463 (79.5)	Ref	—	149 (25.6)	Ref	—
Currently has health insurance							
Yes	777	638 (82.1)	1.06 (0.98–1.16)	0.155	240 (30.9)	1.54 (1.26–1.88)	<0.001
No	216	170 (78.7)	Ref	—	48 (22.2)	Ref	—
Unmet need for health care during the past 12 months							
Yes	233	190 (81.6)	0.99 (0.93–1.05)	0.792	60 (25.7)	0.82 (0.68–1.00)	0.050
No	760	618 (81.3)	Ref	—	228 (30.0)	Ref	—
Has usual source of care**							
Yes	779	650 (83.4)	1.16 (1.08–1.23)	<0.001	261 (33.5)	2.54 (1.86–3.45)	<0.001
No	210	154 (73.3)	Ref	—	26 (12.4)		—
Comfort with a health care provider††							
Yes	714	601 (84.2)	1.12 (1.04–1.21)	0.004	240 (33.6)	1.79 (1.43–2.24)	<0.001
No	274	206 (75.2)	Ref	—	48 (17.5)	Ref	—
Total	**991**	**786 (82.3)**	—	—	**288 (29.0)**	—	—

Abbreviations: aPR = adjusted prevalence ratio; PrEP = preexposure prophylaxis; Ref = referent group; USD = U.S. dollars.

* The seven urban areas include Atlanta, Georgia; Los Angeles, California; New Orleans, Louisiana; New York, New York; Philadelphia, Pennsylvania; San Francisco, California; and Seattle, Washington.

† Adjusted for age, race and ethnicity, city, and network size and clustered on urban areas and recruitment chains.

§ Homelessness was defined as having lived on the street, in a shelter, in a single room occupancy hotel, or in a car during the past 12 months.

¶ Severe food insecurity was defined as not eating for a whole day because there was not enough money for food at some point during the past 12 months.

** Usual source of care was defined as having a place to go when sick or in need of health advice other than a hospital emergency department.

†† Comfort with a health care provider was defined as having a health care provider with whom the participant is comfortable discussing gender-related health issues.

of viral suppression among transgender women with HIV infection. When a person experiences challenges securing food or housing, prioritization of HIV treatment might be interrupted (*5*). Facilitating transgender women's access to interventions that address socioeconomic conditions, such as the U.S. Department of Housing and Urban Development's Housing Opportunities for Persons with AIDS (HOPWA) program,††† could help ensure that basic needs are met and improve the health of persons with HIV in this population.

Despite existence of need-based programs like the Ryan White HIV/AIDS Program§§§ and Ready, Set, PrEP,¶¶¶ results indicate that participants without health insurance or with an unmet need for health care were less likely to achieve viral suppression or report PrEP use. Evaluation of these and similar programs might help identify barriers to participation that need to be addressed to ensure that persons in need are aware of and accessing these programs.

††† https://www.hud.gov/hudprograms/hopwa

§§§ https://ryanwhite.hrsa.gov/

¶¶¶ https://www.hiv.gov/federal-response/ending-the-hiv-epidemic/prep-program

Summary

What is already known about this topic?

Transgender women are disproportionately affected by HIV.

What is added by this report?

During 2019–2020, 38% of transgender women surveyed in seven major U.S. cities reported receiving a previous positive HIV test result. Low income (44%), experiencing homelessness (39%), and severe food insecurity (40%) were common and associated with lower likelihood of receipt of HIV prevention and health care; having a health care provider with whom the participant is comfortable was positively associated with receiving those services.

What are the implications for public health practice?

Ensuring access to basic needs, such as housing, food, and income, and providing gender-affirming health care could improve access to and use of HIV prevention and treatment services by transgender women.

Having a usual source of health care and comfort with a provider were associated with a higher likelihood of viral suppression, HIV testing, and PrEP use, all of which play key roles in HIV prevention. Comfort with a provider can help alleviate the stigma and discrimination that often deter transgender persons from seeking care (*6*). Perceived interactions with hormones, concerns about side effects, medical mistrust, competing priorities, and the belief that PrEP is specifically for gay men are all documented barriers to PrEP use among transgender persons (*7*). A gender-affirming provider can help transgender women overcome barriers to PrEP use.

The findings in this report are subject to at least four limitations. First, the results are not representative of all transgender women residing outside the seven urban areas. Second, the data are self-reported and are subject to recall and social desirability biases. Third, the findings reported here are associations, and causality cannot be inferred. Finally, gender-affirming health care is a complex, multifaceted construct (*8*), and is not fully described by the measure of comfort with a provider when discussing gender-related health issues that was used in this analysis.

Early detection of HIV, appropriate treatment, and proven prevention interventions are effective tools in the fight against HIV and are key strategies for ending the HIV epidemic (*3*). The findings in this report highlight an additional need for health care providers and other public health officials to ensure appropriate levels of cultural competency when providing services for transgender persons. Providers can use CDC's Patient-Centered Care for Transgender People: Recommended Practices for Health Care Settings**** as a starting point for understanding how to provide affirming services. Although access to health insurance and gender-affirming health care is critical to connecting transgender women to HIV prevention and care services; access to food, housing, and income are also essential.

**** https://www.cdc.gov/hiv/clinicians/transforming-health/health-care-providers/affirmative-care.html

National HIV Behavioral Surveillance among Transgender Women Study Group

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Modifiable Risk Factors for Alzheimer Disease and Related Dementias Among Adults Aged ≥45 Years — United States, 2019

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Alzheimer disease,* the most common cause of dementia, affects an estimated 6.5 million persons aged ≥65 years in the United States (*1*). A growing body of evidence has identified potential modifiable risk factors for Alzheimer disease and related dementias (ADRD) (*1*–*3*). In 2021, the National Plan to Address Alzheimer's Disease (National Plan) introduced a new goal to "accelerate action to promote healthy aging and reduce risk factors for Alzheimer's disease and related dementias" to help delay onset or slow the progression of ADRD (*3*). To assess the status of eight potential modifiable risk factors (i.e., high blood pressure, not meeting the aerobic physical activity guideline, obesity, diabetes, depression, current cigarette smoking, hearing loss, and binge drinking), investigators analyzed data from the cognitive decline module that was administered to adults aged ≥45 years in 31 states and the District of Columbia (DC)† in the 2019 Behavioral Risk Factor Surveillance System (BRFSS) survey. Among the risk factors, prevalence was highest for high blood pressure (49.9%) and lowest for binge drinking (10.3%) and varied by selected demographic characteristics. Adults with subjective cognitive decline (SCD),§ an early indicator of possible future ADRD (*4*), were more likely to report four or more risk factors than were those without SCD (34.3% versus 13.1%). Prevalence of SCD was 11.3% overall and increased from 3.9% among adults with no risk factors to 25.0% among those with four or more risk factors. Implementing evidence-based strategies to address modifiable risk factors can help achieve the National Plan's new goal to reduce risk for ADRD while promoting health aging.¶,**

BRFSS is a cross-sectional, random-digit–dialed, annual telephone survey of noninstitutionalized U.S. adults aged ≥18 years. BRFSS is administered by state and territorial health departments, and responses are weighted to produce data representative of each state. The 2019 combined (landline and mobile) median response rate was 49.4%.†† In 2019, the cognitive decline module was administered to adults aged ≥45 years in 31 states and DC.

Eight modifiable risk factors were assessed: high blood pressure, not meeting the aerobic physical activity guideline, obesity, diabetes, depression, current cigarette smoking, hearing loss, and binge drinking.§§ The total number of risk factors per respondent was defined as the sum of any risk factors reported and was grouped into no, one, two, three, or four or more risk factors. Respondents were classified as experiencing SCD if they responded "yes" when asked if they had experienced worsening or more frequent confusion or memory loss in the previous 12 months. Data were collected from 161,941 respondents; 21,865 (13.5%) respondents who refused to respond to the question assessing SCD or who responded, "don't know/not sure," were excluded. Respondents with missing data for risk factors (ranging from 0.2% for diabetes to 8.8% for obesity) were excluded from corresponding prevalence estimate calculations.

Prevalence of each modifiable risk factor was estimated overall and by SCD status and selected demographic characteristics. The proportion of respondents with no, one, two, three, or four or more risk factors was determined by SCD status. Prevalence of SCD was determined among respondents with and without each risk factor and by number of risk factors. All percentages were

* Although the term "Alzheimer's disease" is frequently used, this report uses "Alzheimer disease" in accordance with the American Medical Association Manual of Style 11th Edition and *MMWR* style.

† The following U.S. jurisdictions administered the SCD module in 2019: Alabama, Connecticut, District of Columbia, Florida, Georgia, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, West Virginia, and Wisconsin.

§ SCD was defined as the self-reported experience of worsening confusion or memory loss in the previous year.

¶ https://www.uspreventiveservicestaskforce.org/uspstf/

** https://www.thecommunityguide.org

†† https://www.cdc.gov/brfss/annual_data/2019/pdf/2019-response-rates-table-508.pdf

§§ BRFSS survey questions and calculated variables for 2019 are available at https://www.cdc.gov/brfss/questionnaires/pdf-ques/2019-BRFSS-Questionnaire-508.pdf and https://www.cdc.gov/brfss/annual_data/2019/pdf/2019-calculated-variables-version4-508.pdf, respectively. Not meeting the aerobic physical activity guideline was defined as answering "no" to question C11.01 or reporting <150 minutes per week of moderate-intensity aerobic activity, or <75 minutes per week of vigorous-intensity aerobic activity, or an equivalent combination of the two based on questions C11.02–C11.07 consistent with the Physical Activity Guidelines for Americans, 2nd edition (https://health.gov/our-work/nutrition-physical-activity/physical-activity-guidelines/current-guidelines). Obesity was defined as having a calculated body mass index of ≥30 kg/m^2 based on self-reported height and weight from questions C08.17 and C08.18. High blood pressure, diabetes, depression, and hearing loss were defined as answering "yes" to questions C04.01 (excluding pregnancy-related high blood pressure), C06.11 (excluding pregnancy-related diabetes), C06.09, and C08.20, respectively. Binge drinking was defined as reporting having had one or more alcoholic beverages in the previous 30 days and responding "one or more" when asked how many times during the past 30 days they had had X [X = 5 for men and X = 4 for women] or more drinks on an occasion (questions C10.01 and C10.03, respectively). Current cigarette smoking was defined as reporting having smoked ≥100 cigarettes in their lifetime and now smoking every day or some days in response to questions C09.01 and C09.02, respectively.

weighted and unadjusted. Analyses were conducted using SAS-callable SUDAAN (version 9.4; SAS Institute) to account for complex survey design and weighting. T-tests were used to determine statistically significant differences by subgroup ($p<0.05$). All estimates met reliability standards by having a relative SE <30%. This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy.¶¶

¶¶ 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

In 2019, the prevalence of SCD among adults aged ≥45 years in 31 participating states and DC was 11.3% (Table 1). The most common modifiable risk factor for ADRD was high blood pressure (49.9%), followed by not meeting the aerobic physical activity guideline (49.7%), obesity (35.3%), diabetes (18.6%), depression (18.0%), current cigarette smoking (14.9%), hearing loss (10.5%), and binge drinking (10.3%). The prevalences of risk factors varied by selected demographic characteristics, including race and ethnicity. For example, the prevalence of several risk factors was higher among adults who

TABLE 1. Prevalence of selected modifiable risk factors* among adults aged ≥45 years, by selected characteristics and subjective cognitive decline† status — Behavioral Risk Factor Surveillance System, 31 states and District of Columbia,§ 2019

Characteristic	Sample No. (%)¶	Prevalence of risk factors, % (95% CI)							
		High blood pressure	Not meeting aerobic physical activity guideline	Obesity	Diabetes	Depression	Current cigarette smoking	Hearing loss	Binge drinking
Overall	**140,076**	**49.9 (49.4–50.4)**	**49.7 (49.2–50.3)**	**35.3 (34.8–35.8)**	**18.6 (18.2–19.0)**	**18.0 (17.6–18.4)**	**14.9 (14.6–15.3)**	**10.5 (10.2–10.8)**	**10.3 (9.9–10.6)**
Age group, yrs									
45–54**	27,500 (28.3)	36.3 (35.3–37.4)	52.7 (51.6–53.9)	39.0 (37.9–40.1)	12.5 (11.7–13.2)	19.9 (19.1–20.8)	18.6 (17.8–19.5)	4.8 (4.4–5.3)	16.2 (15.4–17.0)
55–64	39,421 (30.9)	47.8 (46.8–48.8)††	50.3 (49.3–51.4)††	37.9 (37.0–38.9)	17.9 (17.1–18.6)††	20.7 (19.9–21.4)††	18.8 (18.0–19.5)	7.9 (7.3–8.5)††	11.9 (11.2–12.6)††
65–74	42,016 (24.2)	59.0 (58.0–59.9)††	46.2 (45.2–47.1)††	34.9 (34.0–35.8)††	23.8 (22.9–24.6)††	17.2 (16.5–17.9)††	12.3 (11.7–13.0)††	12.7 (12.1–13.4)††	6.6 (6.0–7.1)††
>75	31,139 (16.6)	63.7 (62.6–64.8)††	48.6 (47.5–50.0)††	24.7 (23.7–25.6)††	23.0 (22.0–23.9)††	11.2 (10.5–11.9)††	5.4 (4.9–5.9)††	22.0 (21.1–22.9)††	2.7 (2.3–3.1)††
Sex									
Men**	60,436 (46.6)	52.5 (51.7–53.3)	46.9 (46.1–47.7)	35.6 (34.8–36.3)	20.1 (19.5–20.7)	12.9 (12.4–13.5)	15.9 (15.3–16.5)	13.3 (12.8–13.9)	14.0 (13.4–14.6)
Women	79,640 (53.4)	47.6 (46.9–48.3)††	52.2 (51.5–52.9)††	35.0 (34.3–35.7)	17.3 (16.8–17.8)††	22.5 (21.9–23.1)††	14.1 (13.6–14.6)††	8.1 (7.7–8.4)††	7.1 (6.7–7.4)††
Sexual and gender minority status									
Non-LGBT**	87,585 (96.1)	50.2 (49.5–50.8)	48.5 (47.8–49.2)	35.0 (34.3–35.6)	18.5 (18.0–19.0)	17.6 (17.1–18.1)	14.7 (14.2–15.2)	10.2 (9.8–10.6)	10.4 (9.9–10.8)
LGBT	3,226 (3.9)	49.2 (45.6–52.7)	53.9 (50.3–57.5)††	33.7 (30.4–37.0)	20.5 (17.9–23.0)	25.4 (22.4–28.5)††	18.1 (15.5–20.7)††	10.1 (8.5–11.7)	13.4 (10.9–15.9††
Race/Ethnicity									
American Indian or Alaska Native, non-Hispanic	2,059 (1.2)	54.1 (48.7–59.5)††	59.8 (55.1–64.6)††	39.4 (34.4–44.4)	24.7 (20.7–28.7)††	22.9 (18.0–27.8)	26.5 (21.8–31.1)††	17.5 (12.9–22.1)††	9.6 (6.8–12.4)
Asian or Pacific Islander, non-Hispanic	923 (2.0)	35.8 (29.8–41.8)††	45.6 (39.2–52.0)	13.6 (9.8–17.5)††	19.0 (14.1–23.9)	7.2 (3.2–11.2)††	5.4 (3.0–7.9)††	4.4 (2.0–6.8)††	5.0 (2.4–7.6)††
Black, non-Hispanic	11,947 (12.4)	64.7 (63.0–66.4)††	57.8 (56.1–59.6)††	45.0 (43.2–46.7)††	27.2 (25.7–28.7)††	15.7 (14.4–17.0)††	17.5 (16.1–18.8)††	6.4 (5.6–7.1)††	8.2 (7.3–9.1)††
Hispanic	5,927 (9.1)	44.3 (41.5–47.0)††	58.6 (55.7–61.4)††	37.3 (34.5–40.1)††	23.3 (21.1–25.6)††	15.9 (14.0–17.9)††	13.1 (11.2–15.0)	8.6 (6.9–10.3)††	11.6 (9.5–13.8)
White, non-Hispanic**	113,697 (73.8)	48.5 (48.0–49.0)	47.2 (46.6–47.7)	33.9 (33.4–34.4)	16.5 (16.1–16.8)	18.9 (18.4–19.3)	14.7 (14.4–15.1)	11.3 (11.0–11.7)	10.7 (10.3–11.0)
Multiple races, non-Hispanic	1,848 (1.0)	52.3 (48.3–56.2)	50.5 (46.4–54.6)	39.3 (35.4–43.2)††	22.5 (19.3–25.8)††	23.9 (20.8–26.9)††	25.1 (21.6–28.5)††	13.5 (10.9–16.2)	11.6 (8.6–14.6)
Other race, non-Hispanic§§	920 (0.6)	46.5 (40.7–52.3)	52.6 (46.4–58.7)	34.7 (28.8–40.5)	20.1 (15.2–25.1)	20.1 (15.1–25.1)	15.2 (11.0–19.3)	12.5 (9.1–15.9)	9.8 (6.4–13.1)
Education level									
Not a high school graduate**,¶¶	10,172 (12.7)	58.1 (56.1–60.1)	67.1 (65.1–69.0)	37.0 (35.1–38.9)	26.9 (25.1–28.6)	23.3 (21.7–25.0)	25.9 (24.3–27.6)	15.4 (14.0–16.8)	9.8 (8.4–11.3)
High school graduate	38,766 (28.8)	54.4 (53.4–55.4)††	56.6 (55.6–57.6)††	38.4 (37.4–39.3)	20.5 (19.8–21.3)††	18.0 (17.3–18.8)††	19.0 (18.3–19.8)††	12.2 (11.6–12.8)††	10.5 (9.9–11.1)
Some college or more	90,690 (58.5)	46.0 (45.4–46.6)††	42.5 (41.9–43.2)††	33.4 (32.8–34.0)††	15.9 (15.5–16.4)††	16.9 (16.5–17.4)††	10.6 (10.2–11.0)††	8.7 (8.4–9.0)††	10.3 (9.9–10.7)

See table footnotes on the next page.

TABLE 1. (*Continued*) Prevalence of selected modifiable risk factors* among adults aged ≥45 years, by selected characteristics and subjective cognitive decline† status — Behavioral Risk Factor Surveillance System, 31 states and District of Columbia,§ 2019

Characteristic	Sample No. (%)¶	Prevalence of risk factors, % (95% CI)							
		High blood pressure	Not meeting aerobic physical activity guideline	Obesity	Diabetes	Depression	Current cigarette smoking	Hearing loss	Binge drinking
Employment status									
Employed**,***	55,023 (45.1)	39.1 (38.3–39.9)	47.6 (46.7–48.4)	35.9 (35.1–36.7)	11.9 (11.4–12.4)	12.7 (12.2–13.2)	13.6 (13.1–14.2)	5.7 (5.3–6.0)	14.7 (14.1–15.3)
Unemployed	3,987 (3.8)	49.0 (45.5–52.5)††	52.2 (48.5–55.9)††	36.3 (33.1–39.5)	18.2 (16.0–20.5)††	29.5 (26.6–32.5)††	28.6 (25.6–31.6)††	9.5 (6.4–12.5)††	15.4 (11.9–19.0)
Retired	61,309 (35.7)	60.3 (59.5–61.1)††	44.5 (43.7–45.3)††	31.9 (31.2–32.7)††	22.8 (22.1–23.5)††	14.9 (14.3–15.4)††	10.5 (10.0–11.0)††	15.7 (15.1–16.2)††	5.9 (5.5–6.3)††
Unable to work	12,686 (10.5)	64.8 (63.1–66.4)††	74.9 (73.4–76.3)††	46.0 (44.3–47.8)††	34.6 (33.0–36.3)††	48.0 (46.3–49.7)††	32.9 (31.3–34.5)††	16.2 (15.0–17.3)††	7.2 (6.4–8.0)††
Other†††	6,251 (4.9)	43.4 (40.9–45.9)††	51.1 (48.4–53.7)††	30.7 (28.3–33.0)††	15.8 (13.9–17.6)††	18.3 (16.3–20.2)††	11.1 (9.4–12.7)††	6.5 (5.5–7.5)	4.6 (3.8–5.5)††
Has a primary care provider									
Yes**	125,402 (88.5)	52.3 (51.7–52.8)	49.1 (48.5–49.6)	36.0 (35.5–36.6)	19.9 (19.4–20.3)	18.5 (18.1–19.0)	13.6 (13.3–14.0)	10.7 (10.4–11.1)	9.6 (9.3–10.0)
No	14,155 (11.5)	31.9 (30.2–33.5)††	54.5 (52.6–56.3)††	29.4 (27.8–31.0)††	9.0 (8.0–9.9)††	14.3 (13.2–15.5)††	24.8 (23.4–26.3)††	8.7 (7.5–9.9)††	15.4 (14.0–16.8)††
SCD†									
Yes	15,608 (11.3)	60.9 (59.4–62.4)††	63.5 (62.0–64.9)††	39.2 (37.7–40.7)††	28.7 (27.3–30.2)††	45.6 (44.1–47.2)††	24.4 (23.0–25.8)††	23.1 (21.9–24.3)††	10.3 (9.4–11.4)
No**	124,468 (88.7)	48.5 (47.9–49.1)	48.0 (47.4–48.5)	34.8 (34.2–35.3)	17.3 (16.9–17.8)	14.5 (14.2–14.9)	13.8 (13.4–14.1)	8.9 (8.6–9.2)	10.3 (9.9–10.7)

Abbreviations: LGBT = lesbian, gay, bisexual, or transgender; SCD = subjective cognitive decline.

* Behavioral Risk Factor Surveillance System survey questions and calculated variables for 2019 are available at https://www.cdc.gov/brfss/questionnaires/pdf-ques/2019-BRFSS-Questionnaire-508.pdf and https://www.cdc.gov/brfss/annual_data/2019/pdf/2019-calculated-variables-version4-508.pdf, respectively. Not meeting the aerobic physical activity guideline was defined as answering "no" to question C11.01 or reporting <150 minutes per week of moderate-intensity aerobic activity, or <75 minutes per week of vigorous-intensity aerobic activity, or an equivalent combination of the two based on questions C11.02–C11.07 consistent with the Physical Activity Guidelines for Americans, 2nd edition (https://health.gov/our-work/nutrition-physical-activity/physical-activity-guidelines/current-guidelines). Obesity was defined as having a calculated body mass index of ≥30 kg/m^2 based on self-reported height and weight from questions C08.17 and C08.18. High blood pressure, diabetes, depression, and hearing loss were defined as answering "yes" to questions C04.01 (excluding pregnancy-related high blood pressure), C06.11 (excluding pregnancy-related diabetes), C06.09, and C08.20, respectively. Binge drinking was defined as reporting having had one or more alcoholic beverages in the previous 30 days and responding "one or more" when asked how many times during the past 30 days they had had X [X = 5 for men and X = 4 for women] or more drinks on an occasion (questions C10.01 and C10.03, respectively). Current cigarette smoking was defined as reporting having smoked ≥100 cigarettes in their lifetime and now smoking every day or some days in response to questions C09.01 and C09.02, respectively.

† SCD was defined as the self-reported experience of worsening confusion or memory loss in the previous year.

§ The following U.S. jurisdictions administered the SCD module in 2019: Alabama, Connecticut, District of Columbia, Florida, Georgia, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, West Virginia, and Wisconsin.

¶ Number of respondents for some characteristics might not sum to overall total because of missing information; column percentages might not sum to 100% because of rounding. Reported totals are unweighted.

** Indicates the referent group used for t-tests to determine significant differences between levels of each characteristic for the prevalence of risk factors (p<0.05).

†† Indicates significant difference (p<0.05) based on t-tests in the prevalence of risk factors between the indicated level of each characteristic and the referent group.

§§ "Other race, non-Hispanic" includes respondents who reported they are of some other race group not listed in the survey question responses and are not of Hispanic origin.

¶¶ Includes general educational development certificate.

*** Includes self-employed persons.

††† Includes students and homemakers.

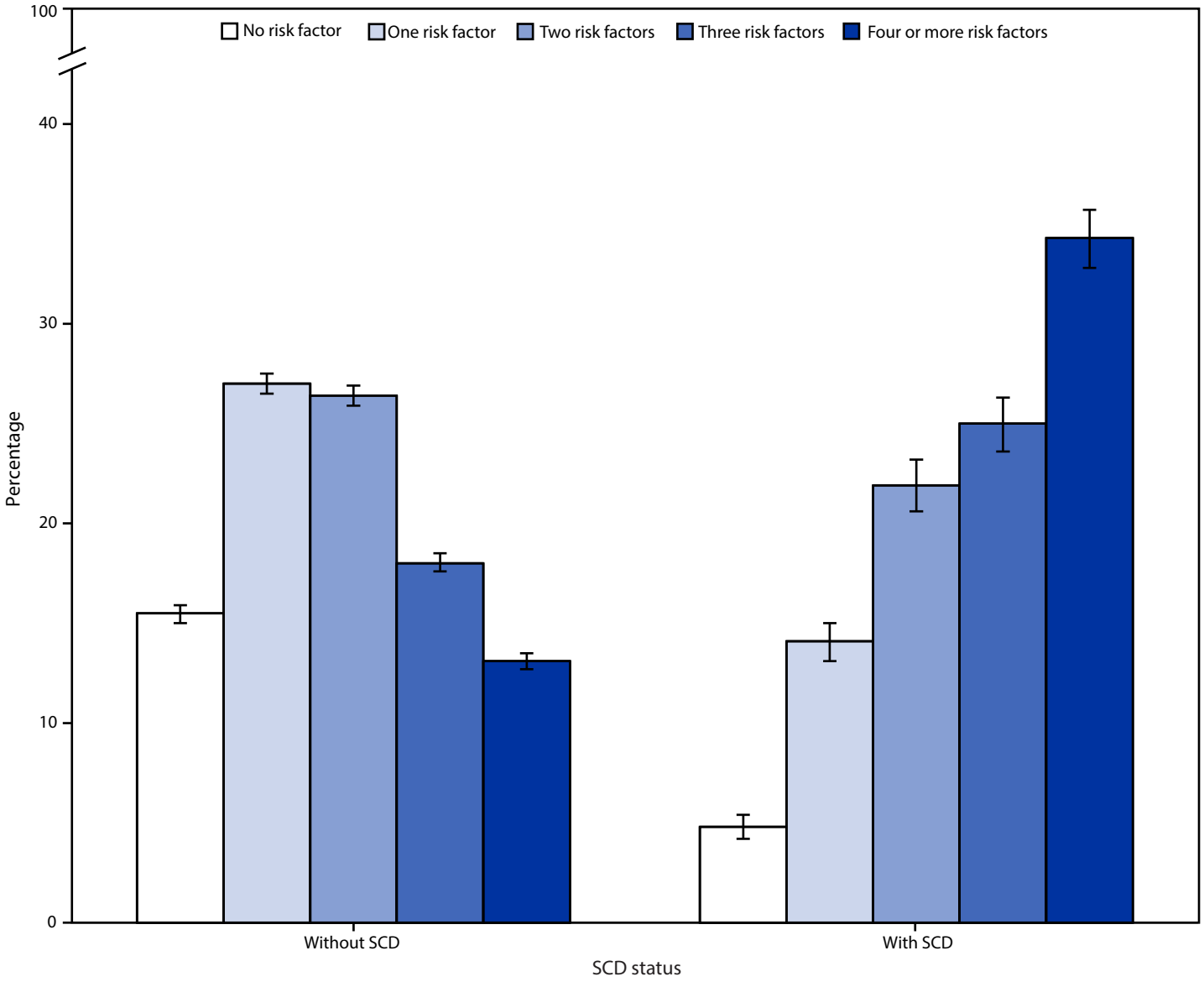
were American Indian or Alaska Native, non-Hispanic Black or African American, or Hispanic, than among non-Hispanic White adults. Adults with SCD were more likely to report most of the modifiable risk factors and were more likely to report four or more risk factors (34.3%) than were those without SCD (13.1%) (Figure).

Adults with each modifiable risk factor, except for binge drinking, were more likely to report SCD than were those without the risk factor (Table 2). Prevalence of SCD ranged from a high of 28.5% among persons with depression and 24.7% among those with hearing loss to 11.3% among those who reported binge drinking. SCD prevalence increased from 3.9% among those with no risk factors to 25.0% among those with four or more risk factors.

Discussion

In 2019, among adults aged ≥45 years in 31 participating states and DC, the most common potentially modifiable risk factors for ADRD were high blood pressure and not meeting the aerobic physical activity guideline; each was found in nearly

FIGURE. Proportion of adults aged ≥45 years with total number of risk factors,* by subjective cognitive decline status† — Behavioral Risk Factor Surveillance System, United States,§ 2019



Abbreviation: SCD = subjective cognitive decline.

* Total number of risk factors was defined as the sum of any of the following risk factors reported by the respondent: high blood pressure, not meeting the aerobic physical activity guideline, obesity, diabetes, depression, current cigarette smoking, hearing loss, or binge drinking.

† SCD was defined as the self-reported experience of worsening confusion or memory loss in the previous year.

§ The following U.S. jurisdictions administered the SCD module in 2019: Alabama, Connecticut, District of Columbia, Florida, Georgia, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, West Virginia, and Wisconsin.

one half of adults. Disparities in the prevalence of risk factors were observed by selected demographic characteristics, including race and ethnicity. Adults with SCD were more likely to report having modifiable risk factors (except binge drinking) and were more likely to report a higher number of risk factors than were those without SCD. Prevalence of SCD was highest among persons with depression, with hearing loss, and with four or more risk factors.

Consistent with previous reports (*1*,*3*), these findings indicate the prevalence of several modifiable risk factors was higher among American Indian or Alaska Native, Black or African American, and Hispanic populations than among other races and ethnicities. These findings are consistent with known understandings of chronic disease disparities which are influenced by differences in the social determinants of health.*** In

*** https://www.cdc.gov/chronicdisease/programs-impact/sdoh.htm

TABLE 2. Prevalence of subjective cognitive decline* among adults aged ≥45 years, by risk factor status† and total number of risk factors§ — Behavioral Risk Factor Surveillance System, United States,¶ 2019

Risk factor	% (95% CI)	p-value **
Overall	**11.3 (11.0–11.6)**	**NA**
High blood pressure		
No	8.8 (8.4–9.3)	Ref
Yes	13.8 (13.3–14.3)	<0.001
Not meeting aerobic physical activity guideline		
No	8.3 (7.9–8.7)	Ref
Yes	14.5 (14.0–15.1)	<0.001
Obesity		
No	10.8 (10.3–11.2)	Ref
Yes	12.7 (12.1–13.3)	<0.001
Diabetes		
No	9.9 (9.6–10.2)	Ref
Yes	17.4 (16.5–18.4)	<0.001
Depression		
No	7.5 (7.2–7.8)	Ref
Yes	28.5 (27.4–29.6)	<0.001
Current cigarette smoking		
No	10.1 (9.7–10.4)	Ref
Yes	18.4 (17.3–19.6)	<0.001
Hearing loss		
No	9.7 (9.4–10.0)	Ref
Yes	24.7 (23.5–26.0)	<0.001
Binge drinking		
No	11.2 (10.9–11.6)	Ref
Yes	11.3 (10.2–12.4)	0.9
Total no. of risk factors§		
None	3.9 (3.4–4.4)	Ref
One	6.2 (5.8–6.7)	<0.001
Two	9.6 (9.0–10.2)	<0.001
Three	15.0 (14.2–15.9)	<0.001
Four or more	25.0 (23.9–26.2)	<0.001

Summary

What is already known about this topic?

The 2021 National Plan to Address Alzheimer's Disease (National Plan) included a goal to reduce the risk for Alzheimer disease and related dementias (ADRD).

What is added by this report?

Adults aged ≥45 years with subjective cognitive decline (SCD) were more likely to report four or more risk factors compared with those without SCD (34.3% versus 13.1%). Prevalence of SCD increased from 3.9% among adults with no risk factors to 25.0% among those with four or more risk factors.

What are the implications for public health practice?

Implementing evidence-based strategies that address modifiable risk factors can help achieve the National Plan's goal to reduce risk for ADRD while promoting healthy aging.

combination with known racial and ethnic differences in the prevalence of ADRD, these findings help identify opportunities to improve health equity through prioritizing and tailoring

TABLE 2. (*Continued*) Prevalence of subjective cognitive decline* among adults aged ≥45 years, by risk factor status† and total number of risk factors§ — Behavioral Risk Factor Surveillance System, United States,¶ 2019

Abbreviations: NA = not applicable; Ref = referent group; SCD = subjective cognitive decline.

* SCD was defined as the self-reported experience of worsening confusion or memory loss in the previous year.

† Behavioral Risk Factor Surveillance System survey questions and calculated variables for 2019 are available at https://www.cdc.gov/brfss/questionnaires/pdf-ques/2019-BRFSS-Questionnaire-508.pdf and https://www.cdc.gov/brfss/annual_data/2019/pdf/2019-calculated-variables-version4-508.pdf, respectively. Not meeting the aerobic physical activity guideline was defined as answering "no" to question C11.01 or reporting <150 minutes per week of moderate-intensity aerobic activity, or <75 minutes per week of vigorous-intensity aerobic activity, or an equivalent combination of the two based on questions C11.02–C11.07 consistent with the Physical Activity Guidelines for Americans, 2nd edition (https://health.gov/our-work/nutrition-physical-activity/physical-activity-guidelines/current-guidelines). Obesity was defined as having a calculated body mass index of ≥30 kg/m^2 based on self-reported height and weight from questions C08.17 and C08.18. High blood pressure, diabetes, depression, and hearing loss were defined as answering "yes" to questions C04.01 (excluding pregnancy-related high blood pressure), C06.11 (excluding pregnancy-related diabetes), C06.09, and C08.20, respectively. Binge drinking was defined as reporting having had one or more alcoholic beverages in the previous 30 days and responding "one or more" when asked how many times during the past 30 days they had had X [X = 5 for men and X = 4 for women] or more drinks on an occasion (questions C10.01 and C10.03, respectively). Current cigarette smoking was defined as reporting having smoked ≥100 cigarettes in their lifetime and now smoking every day or some days in response to questions C09.01 and C09.02, respectively.

§ Total number of risk factors was defined as the sum of any of the following risk factors reported by the respondent: high blood pressure, not meeting the aerobic physical activity guideline, obesity, diabetes, depression, current cigarette smoking, hearing loss, or binge drinking.

¶ The following U.S. jurisdictions administered the SCD module in 2019: Alabama, Connecticut, District of Columbia, Florida, Georgia, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, West Virginia, and Wisconsin.

** p-value using t-tests for comparisons of prevalence of SCD between the following groups: 1) adults with versus without each risk factor, and 2) adults with no risk factors versus one, two, three, or four or more risk factors.

public health strategies for those at highest risk (*1*,*4*–*6*). For example, CDC's National Healthy Brain Initiative††† supports culturally tailored interventions that address ADRD risk factors specifically for American Indian or Alaska Native, Black or African American, or Hispanic populations (*7*).

This analysis focused on SCD, an early indicator of possible future ADRD (*4*) and observed that adults with SCD were more likely to report almost all assessed risk factors, as well as a larger number of risk factors, than were those without SCD. The possible mechanisms of protection from dementia in relation to addressing modifiable risk factors are complex (*2*); however, early detection of SCD and associated risk factors might facilitate early intervention to slow the progression of ADRD and its symptoms. The earlier dementia is diagnosed, the sooner care can be provided, including building a care team, participating in support services and counseling, addressing

††† https://www.cdc.gov/aging/funding/hbi/index.html

other chronic conditions, and better managing medications (*8*). Future research might also seek to understand the relationship between an increasing number of risk factors and related risk for ADRD and evaluate multicomponent strategies or interventions that simultaneously address multiple risk factors.

The findings in this report are subject to at least six limitations. First, causality between risk factors and SCD cannot be inferred from a cross-sectional study, and not everyone who reports SCD will develop ADRD (*9*). Second, self-reported data might be subject to several biases, including recall and social desirability. Third, the low response rates could have resulted in response bias. Fourth, respondents with missing risk factor data were not excluded when calculating the total number of risk factors reported; however, findings were similar in a sensitivity analysis conducted excluding any missing values. Fifth, because data are from 31 states and DC, the findings of this report might not be nationally generalizable. Finally, although this analysis examined common modifiable risk factors for ADRD with available data in the 2019 BRFSS, they are only a subset of suggested risk factors. Major strengths of this study include the large sample size and ability to examine many risk factors and SCD.

Important milestones have been achieved in advancing a public health approach to address risk factors for ADRD in the United States. In 2021, the National Plan was updated to include a new goal to reduce risk factors for ADRD (*3*). Given the prevalence of modifiable risk factors for ADRD and anticipated growth of the older adult population and those with ADRD (*1*,*5*,*10*), this new goal has the potential to benefit a large proportion of U.S. adults. The findings in this report highlight opportunities to accelerate action, particularly among specific populations at high risk. Many evidence-based activities that support healthy aging and prevention and control of various chronic conditions, such as managing hypertension and promoting physical activity, can also serve as potential strategies to achieve this goal. For example, in addition to helping patients discuss concerns about memory loss, health care professionals should also screen patients for modifiable risk factors, counsel patients with risk factors, and refer them to effective programs and interventions where recommended. Public health professionals can implement policy, systems, and environmental strategies to address modifiable risk factors at the population level. Additional resources are available from the Building Our Largest Dementia Infrastructure Public Health Center of Excellence on Dementia Risk Reduction.[§§§]

[§§§] https://www.alz.org/professionals/public-health/public-health-approach/alz-association-efforts

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Rabies in a Dog Imported from Azerbaijan — Pennsylvania, 2021

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On June 16, 2021, rabies virus infection was confirmed in a dog included in a shipment of rescue animals imported into the United States from Azerbaijan. A multistate investigation was conducted to prevent secondary rabies cases, avoid reintroduction of a dog-maintained rabies virus variant (DMRVV), identify persons who might have been exposed and would be recommended to receive rabies postexposure prophylaxis, and investigate the cause of importation control failures. Results of a prospective serologic monitoring (PSM) protocol suggested that seven of 32 (22%) animals from the same shipment as the dog with confirmed rabies virus infection and who had available titer results after rabies vaccine booster had not been adequately vaccinated against rabies before importation. A requirement for rabies vaccination certificates alone will not adequately identify improper vaccination practices or fraudulent paperwork and are insufficient as a stand-alone rabies importation prevention measure. Serologic titers before importation would mitigate the risk for importing DMRVV.

Investigation and Findings

On June 10, 2021, a shipment of 33 dogs and one cat arrived at O'Hare International Airport in Chicago, Illinois, from Baku, Azerbaijan, a country designated by CDC as being at high risk for DMRVV.* All 34 animals had valid rabies vaccination certificates and appeared healthy on visual inspection by CDC quarantine station staff members. The shipment appeared to meet entry requirements in place at the time.† The animals were transferred to caretakers and relocated by ground transportation to nine states: California, Florida, Illinois, Michigan, New Jersey, New York, Ohio, Pennsylvania, and Washington.

On June 13, one dog (dog A), a 5-month-old mixed breed male weighing 18.5 lbs (8.4 kg), was hospitalized at a Pennsylvania veterinary clinic because of diarrhea and neurologic changes that began June 12, including biting invisible objects (i.e., fly-biting behavior), hypersalivation, and agitation. While hospitalized, dog A experienced seizure-like activity, obtundation, and sudden cardiac arrest. Clinical signs were consistent with rabies virus infection. After Dog A was stabilized by cardiopulmonary resuscitation and intubation, its owners elected humane euthanasia. Dog A was euthanized on June 13 and submitted to the Pennsylvania Department of Health, Bureau of Laboratories for rabies testing.

On June 16, the Pennsylvania Department of Health Bureau of Laboratories confirmed rabies virus infection by direct fluorescent antibody test. On June 18, CDC Rabies Laboratory confirmed by antigenic variant typing that dog A was infected with a DMRVV. Complete rabies virus nucleoprotein and glycoprotein sequences displayed high identity (approximately 99.5% and 99%, respectively) with a reference rabies virus isolate from a dog in Azerbaijan in 2002.

Public Health Response

The CDC Poxvirus and Rabies Branch and the Quarantine and Border Health Services Branch led a multistate investigation to implement prevention and control measures and to determine the source of importation control failures. The Chicago Department of Public Health and the Pennsylvania Department of Agriculture investigated potential human exposures to dog A. During June 10–13, dog A traveled by private vehicle to the adopting family's home, two pet stores, and one veterinary clinic. Thirty-seven persons in the United States had potential exposures to dog A during its infectious period from June 2 (10 days before symptom onset) to June 13. After risk assessments, 15 persons, including one airport worker, seven household contacts, three pet store workers, and four veterinary staff members reported exposures that could have resulted in rabies virus infection and were recommended to receive rabies postexposure prophylaxis.§ Three additional persons pursued postexposure prophylaxis out of an abundance of caution. Through the network of national focal points maintained by the World Health Organization under the International Health Regulations, CDC informed the Azerbaijani government and recommended contact tracing.

Antemortem serum specimens from dog A collected on June 13 were tested for rabies virus–neutralizing antibody titer by the rapid fluorescent focus inhibition test at CDC's Rabies

* https://www.cdc.gov/importation/bringing-an-animal-into-the-united-states/high-risk.html

† https://www.cdc.gov/importation/bringing-an-animal-into-the-united-states/vaccine-certificate.html; https://www.govregs.com/regulations/expand/title42_chapterI_part71_subpartF_section71.51#regulation_1

§ https://www.cdc.gov/rabies/medical_care/index.html

Laboratory. The result (0.3 IU/mL) was less than the cut-off value (0.5 IU/mL) established by the World Organisation for Animal Health (OIE) for adequate neutralizing antibody response to rabies vaccination. This finding could reflect an antibody response from inadequate vaccination or early production of neutralizing antibody in response to rabies virus infection.

Whether or not the other animals in the shipment were in direct contact with dog A during its infectious period is unclear; therefore, all animals in the shipment were considered exposed. Vaccination histories for all other animals in the shipment were considered unreliable after dog A was confirmed to have a rabies virus infection. Exposed animals were evaluated by PSM, a method recognized by the National Association of State Public Health Veterinarians for evaluating the vaccination status of dogs or cats with an uncertain vaccine history (*1*). PSM entails drawing a baseline serum sample, then immediately administering a rabies vaccine booster. A second serum sample is obtained between day 5 and day 7, and titers are determined by rapid fluorescent focus inhibition test. Dogs and cats with a second titer result of ≥0.5 IU/mL and more than a twofold rise in titer compared to baseline are considered to be adequately vaccinated against rabies. Failure to meet these criteria offers evidence of inadequate or absent previous rabies vaccination. CDC developed a protocol to assist states with collecting samples and determining quarantine requirements based on serologic results (Supplementary Box, https://stacks.cdc.gov/view/cdc/116629).

State health departments arranged for the 33 exposed animals (32 dogs and one cat) to receive rabies booster vaccination. Among 30 animals with available prebooster serum samples, 14 (47%) had titers <0.5 IU/mL, indicating that they had inadequate titers at importation. Seven of 32 (22%) animals with available postbooster serum samples failed to meet PSM requirements and were considered previously unvaccinated or inadequately vaccinated. One that did not have available serum samples was treated as previously unvaccinated. These eight animals underwent strict quarantine for 4–6 months, in compliance with state laws. Twenty-five of 32 (78%) animals with paired postbooster serum samples met PSM requirements, were considered previously vaccinated, and were required to undergo a 45-day in-home quarantine because of their presumed rabies exposure. None of the exposed animals died or exhibited rabies symptoms under quarantine. All animals completed the required quarantines by December 29, 2021.

The eight dogs that failed to meet PSM requirements had been housed at the same rescue location in Azerbaijan and were reported to have been vaccinated at the same veterinary clinic in Azerbaijan (clinic A) with a vaccine produced by manufacturer A. Manufacturer A reported no issues with efficacy or variation across the vaccine lots recorded for these animals. Among dogs vaccinated at clinic A, the risk for PSM protocol failure was 3.6 times as high among large dogs (i.e., ≥39.7 lbs [18 kg]) compared with that among smaller dogs (i.e., <39.7 lbs) (95% CI = 0.5–25.6) (Table).

CDC received confirmation from the rescue organization and from clinic A that a veterinary intern new to the practice was responsible for rabies vaccinations at the clinic when these animals were reportedly vaccinated. An internal review of this

TABLE. Relative risk of prospective serologic monitoring failure and geometric mean titer of rabies virus–neutralizing antibody* among 24 dogs†,§ in a shipment of rescue animals imported from Azerbaijan, by vaccine history risk factor — United States, June 2021

			Prospective serologic monitoring failure			Geometric mean titer	
Risk factor	**Characteristic**	**No.†**	**No. (%)**	**Relative risk (95% CI)**	**p-value¶**	**Titer (IU/mL)**	**p-value****
Vaccine	Manufacturer A	21	5 (24)	Inf (—)	0.48	2.08	0.29
	Manufacturer B (Ref)	3	0 (—)			7.46	
Rescue	Rescue A	16	5 (31)	Inf (—)	0.13	1.87	0.34
	Other (Ref)	8	0 (—)			4.18	
Veterinary clinic	Clinic A	19	5 (26)	Inf (—)	0.27	2.33	0.82
	Clinic B (Ref)	5	0 (—)			2.92	
Animal body weight††	≥39.7 lbs (18 kg)	11	4 (36)	4.0 (0.5–30.3)	0.17	1.46	0.28
	<39.7 lbs (Ref)	11	1 (9)			3.67	
Veterinary clinic A	≥39.7 lbs	9	4 (44)	3.6 (0.5–25.6)	0.24	0.99	0.11
	<39.7 lbs (Ref)	8	1 (13)			5.21	
Veterinary clinic B	≥39.7 lbs	2	0 (—)	—	—	8.33	0.17
	<39.7 lbs (Ref)	3	0 (—)			1.44	

Abbreviations: Inf = infinity; Ref = referent group.
* Measured by rapid fluorescent focus inhibition test.
† The shipment also included one cat, which was excluded from analysis.
§ Ten dogs were excluded from analysis because of one of the following reasons: known illness, outlier titer result, missing data, or history of multiple vaccinations before import to the United States.
¶ Assessed using Fisher's exact test.
** Assessed using t-test.
†† Body weight was not reported for two dogs.

Summary

What is already known about this topic?

Since the elimination of dog-maintained rabies virus variants (DMRVV) from the United States in 2007, five rabid dogs have been imported into the United States from countries with high risk for DMRVV.

What is added by this report?

This is the first instance since 2007 that an importation of a rabid dog resulted from vaccination failure rather than fraudulent or incomplete paperwork. Serologic testing confirmed that 22% of 32 animals in this shipment from Azerbaijan were not adequately vaccinated before importation.

What are the implications for public health practice?

Rabies vaccination certificates alone will not ensure that dogs from high-risk countries for DMRVV have adequate protection against rabies. Serologic titers before importation would mitigate the risk for importing DMRVV.

intern's workstation revealed numerous rabies vaccine vials with higher than expected residual volume (i.e., used single-dose rabies vaccine vials were found still containing approximately 25%–33% of the original volume). This information, complemented by CDC's analysis, suggests that underdosing of rabies vaccine in dogs vaccinated at clinic A resulted in a higher than expected vaccination failure rate.

Discussion

Ninety-nine percent of the estimated 59,000 human rabies deaths that occur worldwide annually are attributed to DMRVV (*2*). The United States eliminated DMRVV in 2007; therefore, the importation of an infected dog presents a risk for the reintroduction of DMRVV into the United States and risks the lives of persons and animals exposed during transit and rehoming. Public health responses to prevent the spread of DMRVV are costly to states: each DMRVV importation event is estimated to cost >$200,000, including public health response and health care costs (*3*).

During the last 15 years, five other instances of rabid dogs imported into the United States have been documented (*4*–*8*). This is the first instance during that time frame that resulted from vaccination failure rather than fraudulent or incomplete paperwork. OIE recommends that all countries verify adequate vaccination in dogs from countries with endemic rabies by requiring testing of antibody levels before entry. This OIE recommendation is not currently part of U.S. dog importation requirements. Although data about the outcomes of underdosing rabies vaccines in dogs are limited, large dogs might be more likely to have inadequate titers after rabies vaccination (*9*). The high vaccine failure rate detected in this investigation, with a higher likelihood of lower immune response to vaccination in larger dogs, is consistent with the expected immunologic response to low-dose vaccination.

On July 14, 2021, CDC temporarily suspended dog importations from high-risk DMRVV countries.¶ This suspension was implemented after CDC documented a substantial increase in attempts to import dogs with fraudulent or incomplete rabies vaccination certificates into the United States (*10*). As of this writing, the suspension is still in effect, and this investigation highlights the need for stronger controls for the importation of dogs from high-risk countries to prevent the reintroduction of DMRVV because the suspension is temporary and is not a long-term solution. A requirement for rabies vaccination certificates alone will not adequately identify improper vaccination practices or fraudulent paperwork and is insufficient as a stand-alone rabies importation prevention measure. Serologic testing of animals from high-risk countries and electronic reporting of results directly from prequalified laboratories before arrival in the United States should be considered to mitigate the risk of importing DMRVV.**

¶ https://www.govinfo.gov/content/pkg/FR-2021-06-16/pdf/2021-12418.pdf

** https://www.oie.int/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access

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Notes from the Field

Escherichia coli O157:H7 Outbreak in Children with *Clostridioides difficile* Colonization Associated with an Improperly Treated Swimming Pool — Pennsylvania, June 2021

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On June 7, 2021, the Pennsylvania Department of Health (PADOH) received multiple complaints of gastrointestinal illness from patrons of a community swimming pool. Two patrons reported positive Shiga toxin-producing *Escherichia coli* (STEC) and *Clostridioides difficile* from stool specimens. PADOH issued pool closure orders and initiated an outbreak response to identify a source and prevent additional illnesses.

Confirmed cases were defined as isolation of *E. coli* O157:H7 or detection of Shiga toxin or Shiga toxin genes from stool specimens of persons who visited the pool during May 31–June 7, 2021. Probable cases were defined as three or more loose stools in 24 hours with nausea, vomiting, fever, or cramps in persons who visited the pool during the same time frame. *C. difficile* results were deemed incidental upon consultation with experts (LC McDonald, MD, CDC, personal communication, June 2021) and were not included in the case definition.

Fifteen cases (nine confirmed, six probable) in persons aged 4–14 years were identified; 10 patients were male (Table). All persons reported swimming at the pool on May 31, 2021, the seasonal opening date, and had no other common exposures. The total number of pool visitors on this date is unknown. Symptom onsets occurred during June 2–June 4, 2021. Thirteen patients sought medical evaluation, and six were hospitalized. Four received antibiotics for *C. difficile*. None developed hemolytic uremic syndrome.

Early findings suggested an unusual association between exposure to a chlorinated swimming pool and infections caused by two pathogens susceptible to chlorine. Pool inspection revealed an automatic chlorinator malfunction. Record-keeping was inconsistent with local requirements, and the few available records demonstrated at least one instance of no detectable chlorine. The pool reopened following chlorinator repair, after which no additional cases were identified.

The investigation highlighted three important points regarding evaluation of outbreaks of childhood diarrheal disease. First, *C. difficile* testing is only recommended for children aged ≥2 years with prolonged or worsening diarrhea and risk factors, including immunocompromising conditions or relevant exposures (e.g., recent health care visits or antibiotics).* Reported prevalence of asymptomatic *C. difficile* colonization might vary by study population,

* https://academic.oup.com/cid/article/66/7/e1/4855916

TABLE. Laboratory and clinical details for patients associated with an *Escherichia coli* O157:H7 outbreak (N = 15), including three presumed to be colonized with *Clostridioides difficile* — Pennsylvania, June 2021

	E. coli O157:H7 result			*C. difficile* result*				
Patient	Culture	Shiga toxin (EIA)	Shiga toxin (PCR)	GDH	Toxin A/B (EIA)	Toxin DNA (PCR)	Treatment	Hospitalized
A†	Pos	Pos	NT	Pos	Neg	Pos	Vancomycin	No
B†	NT	NT	Pos	NT	Neg	Pos	Azithromycin	Yes
C	NT	NT	NT	Neg	Neg	NT	None	No
D§	Pos	Pos	NT	NT	NT	NT	None	No
E§	NT	NT	NT	NT	NT	NT	None	No
F	Pos	Pos	NT	NT	NT	NT	None	No
G	Pos	Pos	NT	Neg	Neg	NT	None	Yes
H	NT	NT	NT	NT	NT	NT	None	No
I†,§	NT	NT	NT	Pos	Pos	NT	Metronidazole	No
J§	NT	NT	NT	NT	NT	NT	Metronidazole	No
K§	Pos	Pos	NT	NT	NT	NT	None	Yes
L§	Neg	NT	NT	NT	NT	NT	None	Yes
M	Pos	Pos	NT	Neg	Neg	NT	None	Yes
N§	Pos	Pos	NT	Neg	Neg	NT	None	No
O§	Pos	Pos	NT	NT	NT	NT	Cefoxitin¶	Yes

Abbreviations: EIA = enzyme immunoassay; GDH = glutamate dehydrogenase; Neg = negative; NT = not tested; PCR = polymerase chain reaction; Pos = positive.
* Type of testing performed varied by laboratory. The laboratories testing Patients A, C, G, I, M, and N performed *C. difficile* GDH and toxin EIA, with reflex to PCR when GDH and toxin results were discordant. The laboratory testing Patient B, who had the first reported case, performed *C. difficile* toxin DNA PCR testing first. When the test resulted positive, toxin EIA was then performed.
† Patient was presumed to be colonized with *C. difficile*.
§ Patients D and E; I and J; K and L; and N and O are sibling pairs.
¶ Patient received a diagnosis of appendicitis and received 1 dose of preoperative Cefoxitin before the appendectomy.

laboratory detection method, and environmental setting. One study of children aged 1 month–12 years with diarrhea identified *C. difficile* toxin B in 3% of outpatients, 5% of inpatients, and 7% of asymptomatic controls (*1*). Recent studies using molecular techniques reported rates up to 25% in asymptomatic children aged 1–5 years (*2*) and 24% in persons aged 1–18 years without diarrhea (*3*). In the current outbreak, all children were previously healthy and considered to be at low risk for *C. difficile* infection. Thus, *C. difficile* testing was not indicated and provided no relevant clinical or epidemiologic data. Second, laboratory reports should include age-based interpretive suggestions for colonization versus infection and reminders that clinical symptoms are required for a diagnosis of *C. difficile* infection. Provider interpretations should include clinical and epidemiologic information. Finally, antibiotics are usually not required for treatment of diarrheal illnesses. In this STEC outbreak, no adverse outcomes were reported among the children receiving antibiotics. However, among STEC-infected persons, current guidance recommends against antibiotic use because of the risk for hemolytic uremic syndrome (*4*).

Enteric disease outbreaks caused by multiple pathogens rarely occur. Coinfections with *C. difficile* and other pathogens are unusual, but possible (*5*). Full investigation revealed that this outbreak was likely the result of STEC infections among children, some of whom were colonized with *C. difficile*. Recreational waters should be properly treated and maintained,[†] and persons experiencing diarrhea should abstain from swimming.

[†] https://www.cdc.gov/healthywater/swimming/aquatics-professionals/operating-public-swimming-pools.html#:~:text=Maintain%20free%20chlorine%20levels%20continuously%20between%201%E2%80%933%20parts,twice%20per%20day%20%28hourly%20when%20in%20heavy%20use%29 (Accessed May 13, 2022).

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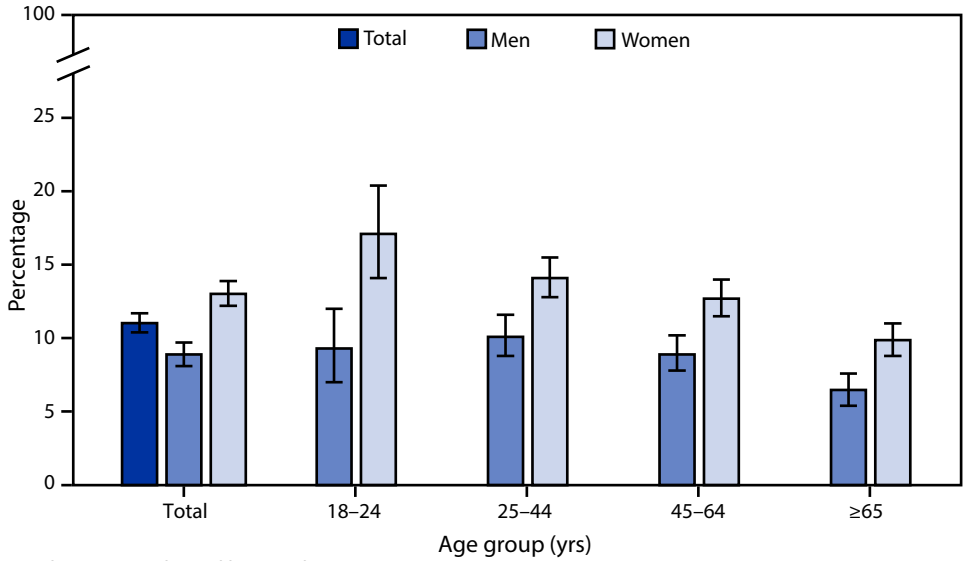
QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage* of Adults Aged ≥18 Years Who Felt That Crime Makes It Unsafe to Walk,† by Sex and Age Group — National Health Interview Survey,§ United States, 2020



* With 95% CIs indicated by error bars.
† Based on response to the survey question, "Does crime make it unsafe for you to walk?" The interviewer could have added "where you live" for clarification if necessary. This question was asked as part of a series of questions (including questions regarding traffic, weather, and the availability and quality of sidewalks and roads) on the sample adult's perception of their walking environment.
§ Estimates were based on household interviews of a sample of the civilian, noninstitutionalized U.S. population.

In 2020, 11.0% of adults aged ≥18 years felt that crime made it unsafe for them to walk. Percentages were lower for men (8.9%) than for women (13.0%). Men were less likely than women to feel unsafe walking because of crime in all age groups (18–24 years: 9.3% of men compared with 17.1% of women; 25–44 years: 10.1% of men compared with 14.1% of women; 45–64 years: 8.9% of men compared with 12.7% of women; ≥65 years: 6.5% of men compared with 9.9% of women). Among both sexes, adults aged ≥65 years were less likely to feel unsafe to walk than those in younger age groups.

Source: National Center for Health Statistics, National Health Interview Survey, 2020. https://www.cdc.gov/nchs/nhis.htm

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For more information on this topic, CDC recommends the following link: https://www.cdc.gov/violenceprevention/index.html

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