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National Gay Men's HIV/AIDS Awareness Day — September 27, 2018

National Gay Men's HIV/AIDS Awareness Day (https://www.cdc.gov/features/ngmhaad/index.html) is observed on September 27, 2018, to direct attention to the ongoing and disproportionate impact of human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) on gay, bisexual, and other men who have sex with men (MSM) in the United States. Whereas MSM represent approximately 2% of the U.S. population (*1*), in 2016 they accounted for 66.8% of new diagnoses of HIV infection; MSM who inject drugs account for an additional 3.0% (*2*). Among MSM with new diagnoses of HIV infection in 2016, 49.4% were aged 13–29 years, 38.2% were aged 30–49 years, and 12.4% were aged ≥50 years (*3*). During 2008–2016, the number of annual new diagnoses increased 3% per year among MSM aged 13–29 years, decreased 4% per year among MSM aged 30–49 years, and was stable among those aged ≥50 years.

CDC supports a range of efforts to reduce HIV infection among MSM. These include HIV prevention services that increase diagnosis of HIV infection (https://www.cdc.gov/hiv/group/msm/index.html), support the linkage and engagement of MSM in care and treatment, and reduce the risk for acquiring and transmitting HIV infection (https://www.cdc.gov/msmhealth; https://www.cdc.gov/hiv/group/msm/bmsm.html).

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Age-Associated Trends in Diagnosis and Prevalence of Infection with HIV Among Men Who Have Sex with Men — United States, 2008–2016

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In 2016, two thirds of diagnosed human immunodeficiency virus (HIV) infections in the United States were attributed to male-to-male sexual contact (*1*). The risk for sexual acquisition and transmission of HIV changes through the lifespan (*2*); to better guide prevention efforts for gay, bisexual, and other men who have sex with men (MSM*), CDC analyzed National HIV Surveillance System† (NHSS) data for MSM aged ≥13 years by age group (13–29, 30–49, and ≥50 years) in 50 states and the District of Columbia (DC). During 2008–2016, the annual number of diagnoses of HIV infection increased 3% per year among MSM aged 13–29 years, decreased 4% per year among those aged 30–49 years and was stable for MSM

* Excluding men who have sex with men and inject drugs.

† The National HIV Surveillance System is the primary source for monitoring HIV trends in the United States. Through the system, information about cases of HIV infection is collected, analyzed, and disseminated.

INSIDE

Continuing Education examination available at https://www.cdc.gov/mmwr/cme/conted_info.html#weekly.

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aged ≥50 years. The number of HIV diagnoses among MSM aged 13–29 years was four times that of MSM aged ≥50 years. During 2008–2015, the number of MSM aged ≥50 years living with diagnosed HIV infection (prevalence of HIV infection) increased an average of 11% per year and at year-end 2015 was three times that of MSM aged 13–29 years. Racial/ethnic disparities in HIV infection persisted, particularly among younger black/African American MSM who accounted for 49% of all diagnoses among MSM aged 13–29 years during 2008–2016. To avert the most infections and improve health outcomes (*3*), sexually active MSM at risk for HIV infection should be tested at least once a year, and, if positive, linked to and retained in HIV medical care to achieve viral suppression (*4*). Those testing negative should be provided HIV prevention services, including preexposure prophylaxis (PrEP) (*5*).

All states and U.S. dependent areas report cases of HIV infection and associated patient demographic and clinical information to NHSS. CDC analyzed data reported through December 2017 from the U.S. states and DC, statistically adjusted for missing risk factor information (*6*), for MSM aged ≥13 years. Data were analyzed for MSM aged 13–29, 30–49, and ≥50 years.

Trends in annual diagnoses of HIV infection among MSM during 2008–2016 were measured using estimated annual percent change (APC) tabulated by age group and race/ethnicity and by age group and region of residence at diagnosis. The APC is calculated by using a generalized log linear model. Prevalence trends among MSM living with diagnosed HIV infection were measured using APCs tabulated by age group and last known jurisdiction of residence at year-end during 2008–2015. Changes were considered statistically significant if the APC's 95% confidence interval (CI) excluded zero.

Among 236,150 MSM with HIV infection diagnosed during 2008–2016, a total of 106,258 (45%) were aged 13–29 years, 100,857 (43%) were aged 30–49 years, and 29,034 (12%) were aged ≥50 years (Table 1). During this period, the annual number of diagnoses increased among MSM aged 13–29 years (APC = 2.9). The largest percentage increases in HIV diagnoses in this age group were among American Indians/Alaska Natives (APC = 14.8), Asians (12.0), and residents of the South (3.7). Among MSM aged 30–49 years, the annual number of diagnoses decreased (APC = -3.5). Among those aged ≥50 years, the overall trend was stable, although diagnoses increased among Asians (APC = 7.0) and Hispanics/Latinos (4.1). During 2008–2016, among MSM aged 13–29 years, blacks/African Americans (blacks) accounted for 49%, Hispanics/Latinos for 25%, and whites for 19% of diagnoses of HIV infection; among MSM aged 30–49 years, blacks and Hispanic/Latinos each accounted for 28% of diagnoses; and among MSM aged ≥50 years, blacks accounted for 25% of diagnoses.

During 2008–2015, the number of MSM living with diagnosed HIV infection increased 4.5% per year, including a 7.7% annual increase among MSM aged 13–29 years, from 40,991 in 2008 to 69,505 in 2015 (Table 2). Among MSM aged 30–49 years, the number living with HIV infection decreased 0.4% per year, from 234,056 in 2008 to 230,003

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TABLE 1. Trends in annual numbers of diagnoses of HIV infection among men who have sex with men* aged ≥13 years, by age group and race/ethnicity and by age group and region of residence at diagnosis — National HIV Surveillance System, United States and District of Columbia, 2008—2016

Characteristic		Year of diagnosis				
		2008	2016	2008–2016		
					Estimated APC	
Age at diagnosis	Characteristic	No. (%)	No. (%)	No. (%)	% (95% CI)	P-value†
13–29 yrs	**Race/Ethnicity**					
	AI/AN	27 (0.3)	69 (0.5)	388 (0.4)	14.8 (10.2 to 19.5)	<0.01
	Asian	155 (1.5)	299 (2.3)	1,977 (1.9)	12.0 (10.0 to 14.0)	<0.01
	Black/African American	5,078 (49.2)	6,320 (49.1)	52,496 (49.4)	2.8 (2.5 to 3.2)	<0.01
	Hispanic/Latino§	2,454 (23.8)	3,445 (26.7)	26,059 (24.5)	4.5 (4.0 to 5.0)	<0.01
	NH/OPI	10 (0.1)	9 (0.1)	125 (0.1)	—¶	—¶
	White	2,116 (20.5)	2,355 (18.3)	20,631 (19.4)	1.5 (1.0 to 2.1)	<0.01
	Multiple races	487 (4.7)	388 (3.0)	4,585 (4.3)	-2.5 (-3.6 to -1.4)	<0.01
	Region of residence at diagnosis**					
	Northeast	1,713 (16.6)	1,767 (13.7)	16,326 (15.4)	0.6 (0.0 to 1.2)	<0.01
	Midwest	1,498 (14.5)	1,834 (14.2)	15,821 (14.9)	2.2 (1.6 to 2.8)	<0.01
	South	5,090 (49.3)	6,751 (52.4)	54,283 (51.1)	3.7 (3.4 to 4.1)	<0.01
	West	2,027 (19.6)	2,531 (19.6)	19,828 (18.7)	3.3 (2.8 to 3.9)	<0.01
	Subtotal	10,329 (100.0)	12,883 (100.0)	106,258 (100.0)	2.9 (2.7 to 3.2)	<0.01
30–49 yrs	**Race/Ethnicity**					
	AI/AN	48 (0.4)	64 (0.6)	392 (0.4)	2.9 (-1.0 to 6.9)	0.15
	Asian	298 (2.2)	351 (3.5)	2,807 (2.8)	2.8 (1.3 to 4.3)	<0.01
	Black/African American	3,842 (29.0)	2,855 (28.7)	28,498 (28.3)	-3.6 (-4.1 to -3.2)	<0.01
	Hispanic/Latino§	3,218 (24.3)	3,305 (33.2)	28,284 (28.0)	0.6 (0.1 to 1.1)	0.01
	NH/OPI	26 (0.2)	14 (0.1)	179 (0.2)	-2.3 (-7.8 to 3.5)	0.43
	White	5,288 (39.9)	3,113 (31.3)	37,124 (36.8)	-6.4 (-6.7 to -6.0)	<0.01
	Multiple races	548 (4.1)	246 (2.5)	3,578 (3.5)	-8.8 (-10.0 to -7.6)	<0.01
	Region of residence at diagnosis**					
	Northeast	2,178 (16.4)	1,493 (15.0)	16,394 (16.3)	-4.7 (-5.3 to -4.2)	<0.01
	Midwest	1,637 (12.3)	1,177 (11.8)	12,919 (12.8)	-4.0 (-4.7 to -3.4)	<0.01
	South	6,159 (46.4)	4,781 (48.1)	46,485 (46.1)	-3.1 (-3.4 to -2.7)	<0.01
	West	3,294 (24.8)	2,496 (25.1)	25,061 (24.8)	-3.0 (-3.5 to -2.6)	<0.01
	Subtotal	13,268 (100.0)	9,947 (100.0)	100,857 (100.0)	-3.5 (-3.7 to -3.2)	<0.01
≥50 yrs	**Race/Ethnicity**					
	AI/AN	11 (0.3)	13 (0.4)	82 (0.3)	—¶	—¶
	Asian	45 (1.4)	73 (2.3)	454 (1.6)	7.0 (2.9 to 11.3)	<0.01
	Black/African American	882 (27.4)	762 (23.6)	7,229 (24.9)	-1.8 (-2.9 to -0.8)	<0.01
	Hispanic/Latino§	450 (14.0)	625 (19.4)	4,855 (16.7)	4.1 (2.9 to 5.3)	<0.01
	NH/OPI	3 (0.1)	3 (0.1)	34 (0.1)	—¶	—¶
	White	1,704 (52.9)	1,676 (51.9)	15,461 (53.3)	0.1 (-0.6 to 0.7)	0.87
	Multiple races	125 (3.9)	76 (2.4)	921 (3.2)	-6.7 (-9.1 to -4.2)	<0.01
	Region of residence at diagnosis**					
	Northeast	502 (15.6)	480 (14.9)	4,628 (15.9)	0.2 (-1.1 to 1.4)	0.80
	Midwest	397 (12.3)	472 (14.6)	3,856 (13.3)	2.1 (0.8 to 3.4)	<0.01
	South	1,598 (49.6)	1,466 (45.4)	13,624 (46.9)	-0.6 (-1.3 to 0.1)	0.09
	West	723 (22.5)	810 (25.1)	6,930 (23.9)	0.5 (-0.4 to 1.5)	0.29
	Subtotal	3,220 (100.0)	3,227 (100.0)	29,034 (100.0)	0.1 (-0.3 to 0.6)	0.58
All ages	**Total**	**26,816**	**26,057**	**236,150**	**-0.2 (-0.3 to-0.03)**	**0.03**

Abbreviations: AIDS = acquired immunodeficiency syndrome; AI/AN = American Indian/Alaska Native; APC = annual percent change; CI = confidence interval; HIV = human immunodeficiency virus; NH/OPI = Native Hawaiian/Other Pacific Islander.

* Data reflect records of all diagnoses of HIV infection, any stage (0, 1, 2, 3 [AIDS], or Unknown) among men who have sex with men. Numbers include diagnoses made from 2008 through 2016 and reported to the national HIV surveillance system by December 31, 2017. Numbers <12 should be interpreted with caution. Data statistically adjusted to account for missing transmission category. Values might not sum to column subtotals and total.

† P<0.05 indicate statistically significant trends.

§ Hispanics/Latinos can be of any race.

¶ Estimated annual percent change not applicable because of small (value <12) cell sizes.

** Four regions as defined by the U.S. Census comprise: *Region I, Northeast*: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; *Region II, Midwest*: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; *Region III, South*: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; and *Region IV, West*: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

in 2015. During this period, the number of MSM aged 13–29 years living with HIV increased in 42 jurisdictions, remained stable in five, and decreased in one (APC was not calculated in three jurisdictions, each with cell values <12). The highest APC (11.9%) among MSM in this age group was in Arkansas.

The number of MSM aged ≥50 years living with HIV infection increased in all jurisdictions, ranging from an estimated average of 7.8% in Alaska to 16.0% per year in Idaho. Among MSM aged ≥50 years, the number of persons living with HIV infection increased 10.8% per year, from 108,544 in 2008 to 223,210 in 2015. In 12 jurisdictions, at least half of MSM living with diagnosed HIV infection were aged ≥50 years. Seven of these states were in the West (Colorado, Hawaii, Idaho, Montana, New Mexico, Oregon, and Wyoming), four were in the Northeast (Maine, New Hampshire, Massachusetts, and Vermont) and one was in the Midwest (South Dakota). Nine of 10 states with the highest percentages of MSM living with diagnosed HIV infection aged 13–29 years were in the South.

Discussion

During 2008–2016, the annual number of diagnoses of HIV infection among MSM increased 3% per year among persons aged 13–29 years, decreased 4% per year among those aged 30–49 years and was stable among those aged ≥50 years. The number of diagnoses among MSM aged 13–29 years was four times that among MSM ≥50 years.

Racial/ethnic disparities in the occurrence of annual diagnoses of HIV infection persisted, particularly among younger MSM. Compared with non-Hispanic whites, blacks and Hispanics/Latinos accounted for a disproportionate number of cases. Among MSM aged 13–29 years, American Indians/Alaska Natives, Asians, and residents of the South experienced the steepest increases in trends in annual diagnoses of HIV infection compared with other racial/ethnic groups and other U.S. regions; however, the numbers of annual diagnoses of HIV infection among American Indian/Alaska Native and Asian MSM were small.

During 2008–2015, the number of MSM aged ≥50 years living with diagnosed HIV infection increased by 11% per year, and at year-end 2015, this group accounted for the largest age group of MSM living with diagnosed HIV infection, presumably as a result of increased survival associated with widespread use of antiretroviral therapy (*7*), surviving middle age, and advancing to the older group. In light of the large and increasing percentage of older MSM living with diagnosed HIV infection, care and treatment that includes achieving viral suppression and managing age-related comorbidities is essential (*8*).

Summary

What is already known about this topic?

In 2016, 67% of diagnosed human immunodeficiency virus (HIV) infections were attributed to male-to-male sexual contact.

What is added by this report?

During 2008–2016, the number of HIV diagnoses increased 3% annually among men who have sex with men (MSM) aged 13–29 years. The number of HIV diagnoses among MSM aged 13–29 years was four times that of MSM aged ≥50 years. Racial/ethnic inequities in HIV persisted, particularly among younger black/African American and Hispanic/Latino MSM.

What are the implications for public health practice?

MSM may be tested at least annually and, if positive, linked to and retained in HIV medical care. Those testing negative might benefit from prevention services, including preexposure prophylaxis. Strengthened efforts can reduce racial/ethnic inequities.

The increase in annual diagnosis of HIV infections among younger MSM might reflect increased HIV testing, in addition to ongoing transmission. Intensified efforts to increase the rate of HIV testing are particularly important for younger MSM because they account for the highest percentage of MSM with undiagnosed HIV infection (*9*). Increasing HIV testing can help diagnose HIV infection sooner, enable MSM to access HIV treatment (*4*), and reduce HIV transmission to others (*10*). To avert the largest number of infections and improve health outcomes, MSM should be tested at least once a year (*3*) and, if positive, linked to and retained in HIV medical care to achieve viral suppression (*4*). Those testing negative should receive HIV prevention services, including PrEP (*5*).

The findings in this report are subject to at least three limitations. First, some cases of HIV infection are reported to CDC without an identified risk factor. Statistical adjustments were applied for missing risk factor information (*6*); as a result of this imputation, estimated numbers of reported cases attributable to male-to-male sexual contact are higher than numbers of cases reported to CDC with male-to-male sexual contact indicated. Second, although NHSS data reflect high completeness of reporting from jurisdictions,[§] some diagnoses of HIV infection might not have been reported to CDC (resulting in an underestimation), and some might reflect duplicate reporting (resulting in an overestimation). These are mitigated by collecting all HIV-related laboratory and case information from providers of surveillance data and intrastate and interstate

[§] CDC. Evaluation Framework. Oral presentation at the PS18-1802: Integrated HIV Surveillance and Prevention Programs for Health Departments: Recipient Orientation Meeting. Jun 6, 2018. Atlanta, Georgia.

TABLE 2. Trends in number of men who have sex with men* aged ≥13 years living with diagnosed HIV infection, by age group and last known residence at year-end, 2008 and 2015 and estimated annual percent change — National HIV Surveillance System, United States and District of Columbia, 2008–2015

Period/ Jurisdiction	Total	Age group (yrs) 13–29	30–49	≥50
Year end 2008	**No.**	**No. (%)**	**No. (%)**	**No. (%)**
Alabama	4,844	706 (14.6)	2,986 (61.7)	1,152 (23.8)
Alaska	277	14 (5.2)	174 (62.8)	89 (32.0)
Arizona	7,107	657 (9.2)	4,441 (62.5)	2,010 (28.3)
Arkansas	2,247	251 (11.2)	1,438 (64.0)	558 (24.8)
California	69,198	5,351 (7.7)	40,966 (59.2)	22,880 (33.1)
Colorado	6,849	391 (5.7)	3,943 (57.6)	2,515 (36.7)
Connecticut	2,433	214 (8.8)	1,406 (57.8)	814 (33.4)
Delaware	849	117 (13.7)	493 (58.1)	239 (28.1)
District of Columbia	5,427	609 (11.2)	3,199 (58.9)	1,619 (29.8)
Florida	37,098	3,494 (9.4)	23,066 (62.2)	10,538 (28.4)
Georgia	17,290	2,794 (16.2)	11,004 (63.6)	3,491 (20.2)
Hawaii	1,462	64 (4.4)	754 (51.6)	644 (44.1)
Idaho	378	45 (11.8)	229 (60.7)	104 (27.5)
Illinois	15,592	1,900 (12.2)	9,593 (61.5)	4,099 (26.3)
Indiana	4,738	517 (10.9)	3,085 (65.1)	1,135 (24.0)
Iowa	833	70 (8.4)	506 (60.7)	257 (30.9)
Kansas	1,313	163 (12.4)	832 (63.4)	318 (24.2)
Kentucky	2,779	351 (12.6)	1,732 (62.3)	696 (25.0)
Louisiana	6,732	961 (14.3)	4,056 (60.2)	1,715 (25.5)
Maine	624	41 (6.6)	337 (54.0)	246 (39.4)
Maryland	7,168	1,158 (16.2)	4,110 (57.3)	1,899 (26.5)
Massachusetts	6,475	385 (5.9)	3,934 (60.8)	2,156 (33.3)
Michigan	7,218	1,009 (14.0)	4,433 (61.4)	1,776 (24.6)
Minnesota	3,553	294 (8.3)	2,255 (63.5)	1,004 (28.3)
Mississippi	3,382	607 (17.9)	2,078 (61.4)	697 (20.6)
Missouri	6,562	755 (11.5)	4,108 (62.6)	1,698 (25.9)
Montana	172	15 (8.6)	93 (54.1)	64 (37.3)
Nebraska	770	82 (10.6)	507 (65.9)	181 (23.5)
Nevada	3,964	378 (9.5)	2,484 (62.7)	1,101 (27.8)
New Hampshire	510	27 (5.4)	327 (64.1)	156 (30.6)
New Jersey	10,389	1,089 (10.5)	6,299 (60.6)	3,001 (28.9)
New Mexico	1,353	125 (9.3)	810 (59.9)	418 (30.9)
New York	43,998	4,397 (10.0)	26,303 (59.8)	13,298 (30.2)
North Carolina	9,708	1,595 (16.4)	6,090 (62.7)	2,024 (20.8)
North Dakota	98	11 (11.3)	64 (65.0)	23 (23.7)
Ohio	9,633	1,104 (11.5)	5,947 (61.7)	2,583 (26.8)
Oklahoma	2,565	256 (10.0)	1,665 (64.9)	644 (25.1)
Oregon	3,028	219 (7.2)	1,765 (58.3)	1,044 (34.5)
Pennsylvania	9,540	1,147 (12.0)	5,477 (57.4)	2,915 (30.6)
Rhode Island	729	68 (9.3)	429 (58.8)	232 (31.9)
South Carolina	5,605	807 (14.4)	3,529 (63.0)	1,269 (22.6)
South Dakota	154	13 (8.3)	97 (63.2)	44 (28.5)
Tennessee	6,981	970 (13.9)	4,446 (63.7)	1,565 (22.4)
Texas	31,487	3,769 (12.0)	20,068 (63.7)	7,650 (24.3)
Utah	1,270	91 (7.1)	815 (64.2)	364 (28.7)
Vermont	239	14 (5.7)	129 (53.8)	97 (40.5)
Virginia	9,116	1,079 (11.8)	5,540 (60.8)	2,497 (27.4)
Washington	6,311	432 (6.8)	3,859 (61.1)	2,021 (32.0)
West Virginia	755	84 (11.1)	463 (61.3)	208 (27.6)
Wisconsin	2,692	291 (10.8)	1,648 (61.2)	752 (27.9)
Wyoming	97	10 (10.2)	45 (46.8)	42 (42.9)
Total	**383,590**	**40,991 (10.7)**	**234,056 (61.0)**	**108,544 (28.3)**

See table footnotes on page 1030.

TABLE 2. (*Continued*) Trends in number of men who have sex with men* aged ≥13 years living with diagnosed HIV infection, by age group and last known residence at year-end, 2008 and 2015 and estimated annual percent change — National HIV Surveillance System, United States and District of Columbia, 2008–2015

Period/ Jurisdiction	Total	Age group (yrs) 13–29	30–49	≥50
Year-end 2015	**No.**	**No. (%)**	**No. (%)**	**No. (%)**
Alabama	6,624	1,351 (20.4)	2,956 (44.6)	2,317 (35.0)
Alaska	330	28 (8.6)	142 (42.9)	160 (48.4)
Arizona	9,868	1,060 (10.7)	4,365 (44.2)	4,443 (45.0)
Arkansas	3,123	509 (16.3)	1,414 (45.3)	1,200 (38.4)
California	87,910	8,035 (9.1)	37,532 (42.7)	42,343 (48.2)
Colorado	7,756	538 (6.9)	2,950 (38.0)	4,269 (55.0)
Connecticut	3,271	380 (11.6)	1,328 (40.6)	1,564 (47.8)
Delaware	1,213	157 (12.9)	493 (40.6)	563 (46.4)
District of Columbia	7,288	822 (11.3)	3,293 (45.2)	3,174 (43.5)
Florida	51,053	5,921 (11.6)	21,302 (41.7)	23,830 (46.7)
Georgia	29,077	5,305 (18.2)	14,380 (49.5)	9,391 (32.3)
Hawaii	1,958	116 (5.9)	656 (33.5)	1,186 (60.6)
Idaho	583	37 (6.3)	240 (41.2)	306 (52.5)
Illinois	21,211	3,258 (15.4)	9,632 (45.4)	8,322 (39.2)
Indiana	6,331	941 (14.9)	2,802 (44.3)	2,588 (40.9)
Iowa	1,419	147 (10.4)	616 (43.4)	656 (46.2)
Kansas	1,710	221 (12.9)	770 (45.0)	719 (42.0)
Kentucky	4,110	584 (14.2)	1,857 (45.2)	1,670 (40.6)
Louisiana	9,397	1,897 (20.2)	4,174 (44.4)	3,326 (35.4)
Maine	904	33 (3.6)	320 (35.3)	552 (61.0)
Maryland	11,631	1,929 (16.6)	5,368 (46.1)	4,335 (37.3)
Massachusetts	8,644	685 (7.9)	3,443 (39.8)	4,517 (52.3)
Michigan	8,922	1,622 (18.2)	3,754 (42.1)	3,546 (39.7)
Minnesota	4,595	470 (10.2)	2,003 (43.6)	2,122 (46.2)
Mississippi	4,668	1,006 (21.6)	2,065 (44.2)	1,597 (34.2)
Missouri	7,899	1,102 (13.9)	3,349 (42.4)	3,448 (43.6)
Montana	333	21 (6.4)	140 (42.2)	171 (51.3)
Nebraska	1,144	137 (12.0)	538 (47.0)	469 (41.0)
Nevada	5,912	753 (12.7)	2,756 (46.6)	2,403 (40.6)
New Hampshire	677	34 (5.0)	271 (40.0)	372 (55.0)
New Jersey	13,050	1,562 (12.0)	5,668 (43.4)	5,820 (44.6)
New Mexico	2,120	222 (10.4)	832 (39.2)	1,067 (50.3)
New York	55,542	6,504 (11.7)	24,833 (44.7)	24,204 (43.6)
North Carolina	14,813	2,614 (17.6)	6,856 (46.3)	5,342 (36.1)
North Dakota	171	22 (12.7)	88 (51.7)	61 (35.6)
Ohio	13,268	2,106 (15.9)	5,577 (42.0)	5,586 (42.1)
Oklahoma	3,531	501 (14.2)	1,571 (44.5)	1,459 (41.3)
Oregon	4,482	314 (7.0)	1,923 (42.9)	2,246 (50.1)
Pennsylvania	13,198	2,120 (16.1)	5,278 (40.0)	5,801 (44.0)
Rhode Island	1,041	98 (9.4)	449 (43.1)	494 (47.5)
South Carolina	7,791	1,460 (18.7)	3,382 (43.4)	2,949 (37.9)
South Dakota	196	13 (6.6)	86 (43.6)	98 (49.8)
Tennessee	8,859	1,471 (16.6)	4,142 (46.8)	3,245 (36.6)
Texas	48,524	8,234 (17.0)	23,116 (47.6)	17,174 (35.4)
Utah	1,614	140 (8.7)	730 (45.2)	744 (46.1)
Vermont	397	16 (4.0)	144 (36.3)	238 (59.8)
Virginia	11,500	1,794 (15.6)	4,767 (41.5)	4,939 (43.0)
Washington	8,287	621 (7.5)	3,649 (44.0)	4,017 (48.5)
West Virginia	975	85 (8.7)	414 (42.4)	477 (48.9)
Wisconsin	3,644	506 (13.9)	1,523 (41.8)	1,616 (44.3)
Wyoming	151	8 (5.0)	68 (45.3)	75 (49.7)
Total	**522,718**	**69,505 (13.3)**	**230,003 (44.0)**	**223,210 (42.7)**

See table footnotes on page 1030.

TABLE 2. (*Continued*) Trends in number of men who have sex with men* aged ≥13 years living with diagnosed HIV infection, by age group and last known residence at year-end, 2008 and 2015 and estimated annual percent change — National HIV Surveillance System, United States and District of Columbia, 2008–2015

Period/ Jurisdiction	Age group (yrs)			
	Total	13–29	30–49	≥50
2008–2015	**APC (95% CI)**	**APC (95% CI)**	**APC (95% CI)**	**APC (95% CI)**
Alabama	4.8 (4.4 to 5.3)	9.5 (8.5 to 10.6)	0.2 (-0.4 to 0.8)	10.5 (9.7 to 11.4)
Alaska	2.0 (0.2 to 3.7)	10.9 (3.9 to 18.4)	-3.4 (-5.6 to -1.1)	7.8 (4.8 to 10.8)
Arizona	4.7 (4.4 to 5.0)	7.4 (6.2 to 8.5)	-0.6 (-1.1 to -0.1)	12.0 (11.3 to 12.6)
Arkansas	4.9 (4.3 to 5.5)	11.9 (10.1 to 13.7)	-0.4 (-1.2 to 0.4)	11.6 (10.4 to 12.8)
California	3.4 (3.3 to 3.5)	5.9 (5.5 to 6.3)	-1.4 (-1.6 to -1.2)	9.2 (9.0 to 9.4)
Colorado	1.8 (1.5 to 2.2)	4.4 (3.0 to 5.9)	-4.3 (-4.8 to -3.8)	8.0 (7.4 to 8.5)
Connecticut	4.1 (3.6 to 4.7)	8.0 (6.1 to 10.0)	-1.0 (-1.8 to -0.2)	9.5 (8.5 to 10.5)
Delaware	5.1 (4.1 to 6.1)	4.0 (1.5 to 6.7)	-0.4 (-1.8 to 1.0)	13.2 (11.4 to 14.9)
District of Columbia	4.2 (3.9 to 4.6)	4.6 (3.4 to 5.7)	0.5 (-0.1 to 1.0)	9.8 (9.1 to 10.5)
Florida	4.7 (4.6 to 4.9)	7.7 (7.2 to 8.2)	-1.2 (-1.4 to -1.0)	12.5 (12.2 to 12.8)
Georgia	7.5 (7.3 to 7.7)	9.0 (8.5 to 9.6)	3.7 (-3.4 to 4.0)	14.8 (14.3 to 15.3)
Hawaii	3.9 (3.1 to 4.6)	7.1 (3.7 to 10.6)	-2.6 (-3.7 to -1.5)	9.0 (7.9 to 10.1)
Idaho	6.1 (4.6 to 7.6)	-2.8 (-7.1 to 1.7)	0.3 (-1.6 to 2.3)	16.0 (13.5 to 18.6)
Illinois	4.4 (4.2 to 4.7)	7.7 (7.1 to 8.4)	0.0 (-0.3 to 0.3)	10.7 (10.3 to 11.2)
Indiana	4.2 (3.8 to 4.6)	9.3 (8.0 to 10.5)	-1.6 (-2.1 to -1.0)	12.3 (11.5 to 13.1)
Iowa	7.6 (6.7 to 8.6)	10.5 (7.3 to 13.8)	2.9 (1.6 to 4.2)	13.7 (12.0 to 15.4)
Kansas	3.8 (3.0 to 4.6)	3.9 (1.7 to 6.2)	-1.1 (-2.1 to -0.002)	11.9 (10.4 to 13.5)
Kentucky	5.8 (5.3 to 6.4)	7.7 (6.2 to 9.2)	0.9 (0.2 to 1.6)	13.5 (12.5 to 14.6)
Louisiana	4.9 (4.6 to 5.3)	10.1 (9.2 to 11.0)	0.3 (-0.2 to 0.8)	9.9 (9.2 to 10.7)
Maine	5.1 (4.0 to 6.3)	-5.7 (-10.7 to -0.5)	-0.6 (-2.2 to 1.0)	11.7 (10.0 to 13.4)
Maryland	6.8 (6.4 to 7.1)	6.7 (5.9 to 7.5)	3.4 (2.9 to 3.8)	12.4 (11.7 to 13.1)
Massachusetts	4.4 (4.0 to 4.8)	9.3 (7.8 to 10.8)	-1.8 (-2.3 to -1.3)	11.2 (10.6 to 11.8)
Michigan	3.2 (2.9 to 3.6)	7.2 (6.4 to 8.1)	-2.3 (-2.8 to -1.9)	10.4 (9.7 to 11.0)
Minnesota	3.7 (3.2 to 4.2)	5.6 (3.9 to 7.2)	-1.8 (-2.5 to -1.1)	11.4 (10.5 to 12.3)
Mississippi	4.7 (4.2 to 5.2)	7.4 (6.2 to 8.6)	-0.2 (-0.9 to 0.5)	12.5 (11.4 to 13.6)
Missouri	2.7 (2.4 to 3.1)	5.2 (4.2 to 6.3)	-2.9 (-3.4 to -2.4)	10.9 (10.2 to 11.6)
Montana	8.9 (6.9 to 10.9)	1.0 (-5.7 to 8.3)	5.5 (2.6 to 8.4)	14.2 (11.0 to 17.6)
Nebraska	5.5 (4.4 to 6.5)	7.4 (4.2 to 10.7)	0.5 (-0.8 to 1.9)	14.0 (12.0 to 16.0)
Nevada	5.7 (5.3 to 6.2)	10.9 (9.4 to 12.3)	1.1 (0.5 to 1.7)	11.7 (10.8 to 12.5)
New Hampshire	4.2 (2.9 to 5.5)	2.9 (-2.4 to 8.4)	-2.7 (-4.4 to -0.9)	13.1 (10.9 to 15.3)
New Jersey	3.4 (3.1 to 3.7)	5.3 (4.4 to 6.2)	-1.6 (-2.0 to -1.1)	10.1 (9.5 to 10.6)
New Mexico	5.8 (5.1 to 6.6)	7.9 (5.3 to 10.5)	-0.3 (-1.3 to 0.7)	13.1 (11.8 to 14.4)
New York	3.4 (3.3 to 3.6)	5.9 (5.4 to 6.3)	-0.9 (-1.1 to -0.7)	8.9 (8.7 to 9.2)
North Carolina	6.1 (5.8 to 6.4)	7.1 (6.3 to 7.8)	1.6 (1.2 to 1.9)	14.6 (13.9 to 15.2)
North Dakota	8.8 (5.8 to 11.9)	—†	4.6 (0.9 to 8.4)	15.6 (9.8 to 21.8)
Ohio	4.6 (4.3 to 4.9)	9.6 (8.7 to 10.4)	-1.0 (-1.4 to -0.6)	11.4 (10.9 to 12.0)
Oklahoma	4.6 (4.0 to 5.2)	9.8 (8.0 to 11.5)	-1.1 (-1.8 to -0.3)	12.5 (11.4 to 13.6)
Oregon	5.3 (4.8 to 5.8)	4.4 (2.5 to 6.3)	0.7 (-0.02 to 1.4)	11.2 (10.4 to 12.0)
Pennsylvania	4.6 (4.3 to 4.9)	8.5 (7.7 to 9.3)	-0.7 (-1.1 to -0.3)	10.3 (9.8 to 10.8)
Rhode Island	4.9 (3.9 to 6.0)	5.0 (1.6 to 8.4)	0.4 (-1.0 to 1.9)	11.3 (9.5 to 13.2)
South Carolina	4.6 (4.2 to 5.0)	8.9 (7.9 to 9.9)	-0.9 (-1.4 to -0.4)	12.3 (11.5 to 13.1)
South Dakota	3.5 (1.1 to 6.0)	—†	-2.4 (-5.6 to 0.8)	13.1 (8.8 to 17.5)
Tennessee	3.4 (3.0 to 3.7)	5.9 (5.0 to 6.8)	-1.1 (-1.5 to -0.6)	10.8 (10.1 to 11.5)
Texas	6.4 (6.2 to 6.5)	11.6 (11.2 to 12.1)	1.9 (1.7 to 2.1)	12.2 (11.9 to 12.5)
Utah	3.6 (2.8 to 4.5)	6.0 (2.9 to 9.1)	-1.6 (-2.7 to -0.5)	10.5 (9.0 to 11.9)
Vermont	8.6 (6.8 to 10.6)	5.5 (-2.5 to 14.1)	2.3 (-0.2 to 5.0)	15.2 (12.3 to 18.2)
Virginia	3.4 (3.1 to 3.7)	7.2 (6.3 to 8.1)	-2.0 (-2.5 to -1.6)	10.2 (9.6 to 10.7)
Washington	3.9 (3.6 to 4.3)	4.4 (3.0 to 5.8)	-0.9 (-1.4 to -0.4)	10.4 (9.7 to 11.0)
West Virginia	3.7 (2.7 to 4.8)	1.5 (-1.9 to 5.0)	-1.6 (-3.0 to -0.2)	11.9 (10.1 to 13.8)
Wisconsin	4.6 (4.0 to 5.2)	7.9 (6.3 to 9.6)	-1.1 (-1.9 to -0.3)	11.7 (10.7 to 12.7)
Wyoming	5.9 (3.0 to 8.9)	—†	4.9 (0.9 to 9.2)	8.5 (4.2 to 13.1)
Total	**4.5 (4.4 to 4.5)**	**7.7 (7.5 to 7.8)**	**-0.4 (-0.4 to -0.3)**	**10.8 (10.7 to 10.9)**

See table footnotes on page 1030.

Abbreviations: AIDS = acquired immunodeficiency syndrome; APC = annual percent change; CI = confidence interval; HIV = human immunodeficiency virus.

* Data reflect records of all diagnoses of HIV infection, any stage (0, 1, 2, 3 [AIDS], or Unknown) among men who have sex with men. Numbers include cases diagnosed through 2015 and reported to the national HIV surveillance system by December 31, 2017. Numbers <12 should be interpreted with caution. Data statistically adjusted to account for missing transmission category. Values might not sum to column totals.

† Estimated annual percent change not applicable because of small (value <12) cell sizes.

deduplication,[¶] yielding reliable numbers of annual diagnoses. Finally, because of small numbers of annual HIV diagnoses in American Indians/Alaska Natives and Asians, comparisons of trends by race/ethnicity should be undertaken with caution.

These findings highlight the need to strengthen interventions for all MSM, including risk-reduction counseling and screening, and provision of PrEP to MSM at high risk for HIV acquisition (*5*). Promotion of care and treatment by public health agencies and private sector partners to achieve viral suppression among MSM with diagnosed HIV infection will improve health outcomes and reduce transmission to others, particularly if prevention efforts are tailored to specific age groups. To reduce disparities in HIV transmission and acquisition, more widespread implementation of interventions[**] for those with disproportionate risk and burden of HIV infection, such as black and Hispanic/Latino MSM, are needed.

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Multidrug-Resistant *Campylobacter jejuni* Outbreak Linked to Puppy Exposure — United States, 2016–2018

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Campylobacter causes an estimated 1.3 million diarrheal illnesses in the United States annually (*1*). In August 2017, the Florida Department of Health notified CDC of six *Campylobacter jejuni* infections linked to company A, a national pet store chain based in Ohio. CDC examined whole-genome sequencing (WGS) data and identified six isolates from company A puppies in Florida that were highly related to an isolate from a company A customer in Ohio. This information prompted a multistate investigation by local and state health and agriculture departments and CDC to identify the outbreak source and prevent additional illness. Health officials from six states visited pet stores to collect puppy fecal samples, antibiotic records, and traceback information. Nationally, 118 persons, including 29 pet store employees, in 18 states were identified with illness onset during January 5, 2016–February 4, 2018. In total, six pet store companies were linked to the outbreak. Outbreak isolates were resistant by antibiotic susceptibility testing to all antibiotics commonly used to treat *Campylobacter* infections, including macrolides and quinolones. Store record reviews revealed that among 149 investigated puppies, 142 (95%) received one or more courses of antibiotics, raising concern that antibiotic use might have led to development of resistance. Public health authorities issued infection prevention recommendations to affected pet stores and recommendations for testing puppies to veterinarians. This outbreak demonstrates that puppies can be a source of multidrug-resistant *Campylobacter* infections in humans, warranting a closer look at antimicrobial use in the commercial dog industry.

Epidemiologic Investigation

Campylobacteriosis became a nationally notifiable condition in 2015, and many states routinely interview patients with campylobacteriosis.* For this investigation, a standardized, supplemental questionnaire was used by state and local health departments to collect dog exposure information from persons with *Campylobacter* infection who reported recent dog or pet store exposure during routine interview. A case definition relevant to this outbreak (Box) was developed to aid in case finding and characterization.

* https://wwwn.cdc.gov/nndss/conditions/campylobacteriosis/case-definition/2015/.

By February 28, 2018, a total of 118 persons meeting the case definition for *Campylobacter* infection, including 29 pet store employees, were reported from 18 states.† Age was available for 115 persons and ranged from <1 year to 85 years (median = 26 years); 74 of 115 (63%) infected persons were female. Among 107 persons for whom hospitalization information was available, 26 (24%) were hospitalized; no deaths occurred. In total, 105 of 106 (99%) infected persons reported dog exposure, including 101 (95%) who had contact with a pet store puppy (Table). Eight patients reported

† Connecticut (two patients), Florida (20), Georgia (five), Illinois (11), Kansas (seven), Massachusetts (two), Maryland (five), Michigan (one), Missouri (two), New Hampshire (two), New York (two), Ohio (34), Oklahoma (one), Pennsylvania (six), Tennessee (two), Utah (four), Wisconsin (nine), and Wyoming (three).

BOX. Case definition for multidrug-resistant *Campylobacter jejuni* outbreak linked to puppy exposure — United States, 2016–2018*

Confirmed case

Campylobacteriosis in a patient with onset during January 1, 2016–February 28, 2018 who had either

- A clinical isolate closely related* to the outbreak strains by whole-genome sequencing (WGS), or
- Other laboratory evidence (culture or culture-independent diagnostic testing) of *Campylobacter* infection and worked in, visited, or had contact with a puppy from a pet store within 7 days before illness onset.

Probable case

An illness compatible with *Campylobacter* infection in a patient who had worked in, visited, or had contact with a puppy from a pet store within 7 days before illness onset, but without laboratory confirmation of *Campylobacter* infection.

Exclusion criteria

Exposure criteria met, but isolate unrelated to the outbreak strains by WGS.

* Relatedness of outbreak strains was determined by whole-genome multilocus sequence typing (wgMLST). Because no published wgMLST cutoff values exist, genetic relatedness was determined based on epidemiologic concordance and comparison with background *Campylobacter jejuni* isolates.

TABLE. Number of reported persons with *Campylobacter jejuni* infection during a multidrug-resistant outbreak, by reported puppy exposure — United States, 2016–2018*

Source	No. of infected persons reported
Exposed to pet store puppy (n = 101)	
Company A	92
Company B	3
Company C	2
Company D	1
Company E	1
Company F	1
Company unknown	1
Purchased puppy from breeder	3
Adult dog exposure reported	1
No known dog exposure	1
Total reported	**106**

* Excludes 12 patients for whom dog exposure questions were unknown.

buying or having contact with puppies from five pet store companies other than company A (companies B–F), indicating that puppies became infected with *Campylobacter* before reaching pet stores.

State and local health and agriculture departments in four states (Kentucky, Ohio, Pennsylvania, and Wisconsin) visited 20 pet stores and collected antibiotic administration records for 154 puppies. Among 149 puppies with available information, 142 (95%) received one or more antibiotic courses before arriving or while at the store. Among 142 puppies that received antibiotics, treatment indication was available for 134 (94%); 78 (55%) treated puppies received antibiotics for prophylaxis only, 54 (38%) for prophylaxis and treatment, and two (1%) for treatment only. Median antibiotic treatment duration was 15 days (range = 2–67 days). Four antibiotics (metronidazole, sulfadimethoxine, doxycycline, and azithromycin) accounted for 81% of all antibiotics administered (Figure). Use of broad-spectrum antibiotics also was noted, including tetracyclines, quinolones, aminoglycosides, and chloramphenicol.

Laboratory Investigation

Stool specimens from infected persons or *Campylobacter* isolates were submitted to state public health laboratories. Health and agriculture officials from six states (Florida, Kansas, Kentucky, Ohio, Pennsylvania, and Wisconsin) visited 29 pet stores (27 company A and two company B) to collect puppy fecal samples. All company A and B stores in Ohio were visited, and a convenience sample of stores in other states was selected. Some states also requested fecal samples from patient households that had purchased puppies. Human stool specimens and puppy fecal samples underwent *Campylobacter* culture, and whole-genome multilocus sequence typing (wgMLST) was performed to compare genetic relatedness. Antibiotic susceptibility testing for nine antibiotics was performed by broth microdilution (Sensititer, Thermo Fisher Scientific) on selected isolates and interpreted using epidemiologic cutoff values established by the European Committee on Antimicrobial Susceptibility Testing. In this report, "resistant" refers to isolates with non–wild-type results (*2*). To explore pet food as a possible source of *Campylobacter* infection in puppies, dog food samples from company A and one person's home were collected for culture.

Campylobacter jejuni isolates were obtained for 51 persons and 23 puppies. Outbreak isolates from 45 persons and 11 puppies grouped into three distinct clades by wgMLST. Six persons whose illnesses did not meet the case definition because their isolates were unrelated by wgMLST were excluded. Twelve puppy isolates were also unrelated to the outbreak by wgMLST. Two clades contained isolates from persons and puppies that were genetically related (≤32 alleles difference within each clade). The third clade contained six patient isolates that were related (≤30 alleles difference). Eighteen outbreak isolates (10 human and eight puppy) representing all three clades were selected for antibiotic susceptibility testing, and all were resistant to azithromycin, ciprofloxacin, clindamycin, erythromycin, nalidixic acid, telithromycin, and tetracycline. In addition, 16 of 18 isolates were resistant to gentamicin, and four of 18 were resistant to florfenicol. None of the cultures of 12 dog food samples yielded *Campylobacter*.

Summary

What is already known about this topic?

Dogs, especially puppies, are a known source of sporadic *Campylobacter* infections in humans, but are uncommonly reported to cause outbreaks.

What is added by this report?

Investigation of a multistate, multidrug-resistant outbreak of *Campylobacter jejuni* infections implicated puppies from breeders and distributors sold through pet stores as the outbreak source. Outbreak strains were resistant to all antibiotics commonly used to treat *Campylobacter* infections.

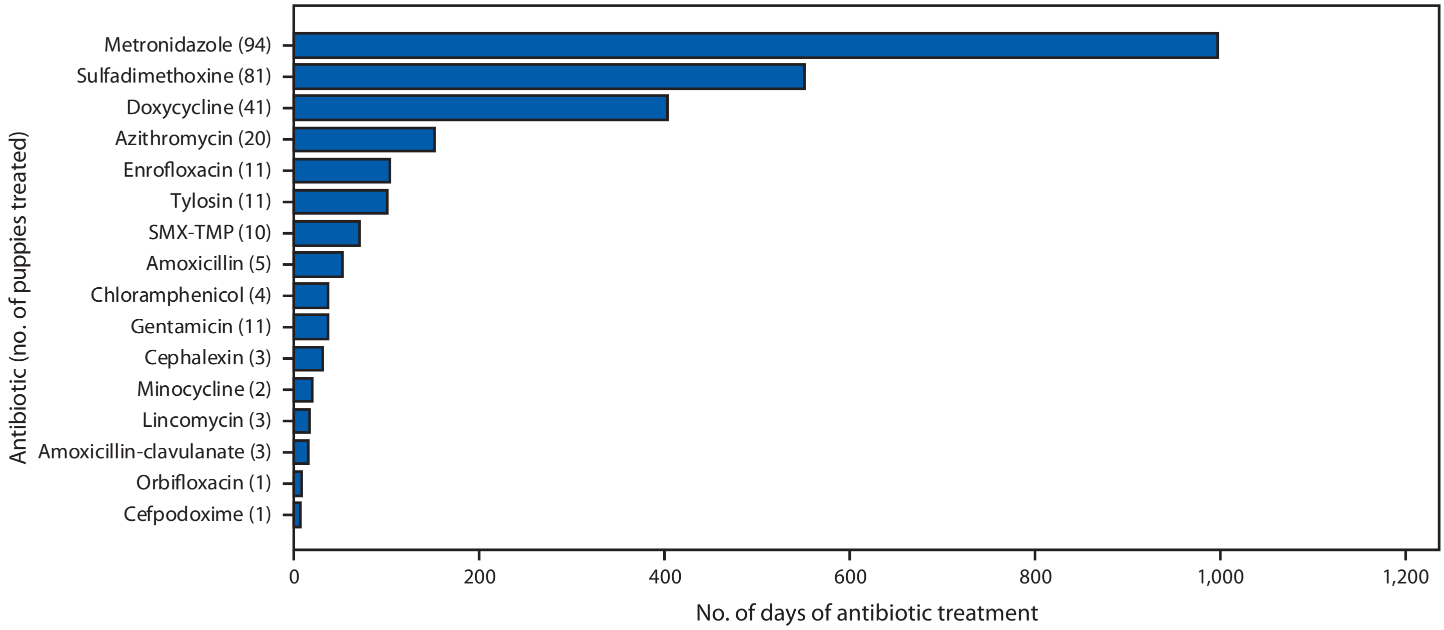
What are the implications for public health practice?

Consumers, employees, and clinicians should be aware of the risk for disease transmission from puppies, including the possibility of exposure to multidrug-resistant pathogens. Greater adherence to implementation of antibiotic stewardship practices in the commercial dog industry might be needed.

Traceback Investigations

Records, including microchip identification numbers of puppies when available, were collected for puppies owned by infected persons and those sampled in stores. Microchips are implanted subcutaneously, usually before the puppy arrives at the store, and their corresponding identification numbers allowed investigators to trace puppies back to their breeders and distributors. Distributors are companies that purchase

FIGURE. Number of days of antibiotics administered to 149 pet store puppies* assessed during a multidrug-resistant *Campylobacter jejuni* outbreak, by type of antibiotic — United States, 2016–2018



Abbreviation: SMX-TMP = sulfamethoxazole-trimethoprim.
* Excludes five puppies with missing information on number of days treated.

puppies wholesale from breeders and sell them to pet stores and other locations. Additional transport information was collected from stores when available. Practices identified during records review indicated that pet store puppies travel from breeders to distributors to stores by third-party transport companies. Information collected for eight puppies owned by infected persons and 20 puppies with fecal samples that were positive for *Campylobacter jejuni* traced back to 25 breeders and eight distributors. No single breeder, distributor, or transporter was identified as the infection source. However, potential for *Campylobacter* transmission among puppies exists because puppies from different breeders were commingled at distributors, during transport, and in stores.

Public Health Response

CDC developed educational materials on campylobacteriosis prevention. CDC and states shared these with pet industry partners, including retail pet stores. Educational messages focused on handwashing, separating human eating areas from animal areas, and using personal protective equipment correctly, such as wearing gloves when cleaning cages in pet stores. CDC posted an outbreak advisory online, which included information for clinicians and veterinarians recommending culture and antibiotic susceptibility testing to guide antibiotic treatment decisions (*3*).

Discussion

Epidemiologic, laboratory, and traceback evidence indicates that puppies sold through the commercial dog industry, an uncommon source of *Campylobacter* outbreaks, were the source of a multistate outbreak of multidrug-resistant *Campylobacter* infections. This evidence, combined with the prolonged nature of the outbreak and the potential for puppy commingling, indicates a potential for continued transmission of multidrug-resistant *Campylobacter* industrywide, including at breeders, distributors, transporters, and stores, and ultimately in customers' homes. Although the investigation is completed, the risk for multidrug-resistant *Campylobacter* transmission to employees and consumers continues.

Dog-associated *Campylobacter* outbreaks have been reported previously, but those outbreaks involved fewer illnesses, and the isolates were not multidrug-resistant (*4*–*6*). The investigation of this outbreak revealed widespread administration of multiple antibiotic classes, including all classes to which the outbreak *Campylobacter* strains were resistant. Hygiene and animal husbandry practices can reduce the need for antibiotics and decrease transmission of *Campylobacter* between animals and from animals to humans (*7*). Adherence to antibiotic stewardship practices in these settings might reduce the selection of highly drug-resistant *Campylobacter*. Implementation of antibiotic stewardship principles and practices in the commercial dog industry is needed.

Clinicians should consider that persons can acquire *Campylobacter* infections, including multidrug-resistant infections, from puppies. If antibiotics are indicated, consider stool culture and antibiotic susceptibility testing. Pet stores, commercial distributors, transporters, and breeders should ensure that existing biosecurity measures are sufficient to reduce ongoing risk for *Campylobacter* transmission between puppies and humans. Pet stores should provide employee and customer education and training on handwashing and provide employees with personal protective equipment when cleaning animal areas (*8*). Educational information[§] that veterinarians and pet stores provide to pet owners could include information on reducing the risk for pathogen transmission. Finally, antibiotics should only be administered under veterinary supervision with a valid veterinary-client-patient relationship, consistent with existing stewardship principles.[¶]

[§] https://www.cdc.gov/healthywater/hygiene/etiquette/around_animals.html.
[¶] https://www.avma.org/KB/Policies/Pages/Antimicrobial-Stewardship-Definition-and-Core-Principles.aspx.

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CDC Grand Rounds: Promoting Well-Being and Independence in Older Adults

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Healthy aging is not merely the absence of disease or disability, but requires physical and mental health and ongoing social engagement (*1*). As the average U.S. life expectancy increases, recognition that public health can play a vital role in promoting healthy, successful aging even in the face of increased prevalence of chronic diseases, including types of dementia, among older adults (i.e., aged ≥65 years) has grown. Furthermore, actively engaging adults in prevention and wellness along with involving their caregivers (i.e., the family and friends of older adults who provide them with unpaid and informal support and services) can serve to prevent or delay the onset of physical disabilities and cognitive decline. Adults often are reluctant to discuss their concerns about worsening memory with their health care providers although such discussions can lead to earlier diagnosis and better care, planning, and support. As advances in public health and health care have helped increase life expectancy, public health professionals and health care providers have the opportunity to improve the quality of life for older adults and their caregivers and reduce the burdens associated with aging.

Each day, approximately 10,000 Americans reach age 65 years. By 2030, one in five Americans, 72.7 million, will be aged ≥65 years; this number is projected to reach 83.7 million by 2050. Within this group, the fastest growing age group will be persons aged ≥85 years, which is projected to increase from 5.9 million in 2012 to 8.9 million by 2030 (*2*). Longevity also provides advantages for society: Americans aged ≥50 years generate $7.6 trillion in economic activity each year (*3*). Along with benefits of longevity, however, the prevalence of chronic diseases (e.g., hypertension, diabetes, and arthritis) and other challenges increase with aging. Among adults aged ≥65 years, 80% have at least one chronic condition (*4*). Approximately one in three adults aged ≥65 years experiences limitations in their activities of daily living (e.g., eating, bathing, and dressing). One third of persons aged ≥65 years live alone, which can compound challenges associated with activities of daily living and increase social isolation risks (*5*,*6*).

This is another in a series of occasional MMWR *reports titled CDC Grand Rounds. These reports are based on grand rounds presentations at CDC on high-profile issues in public health science, practice, and policy. Information about CDC Grand Rounds is available at https://www.cdc.gov/grand-rounds.*

To help address these challenges, in 2015, the National Prevention Council, chaired by the U.S. Surgeon General, developed the *Healthy Aging in Action** report to identify recommendations and actions that promote healthy aging and improve health and well-being in later life (*6*). *Healthy Aging in Action* outlines strategies to eliminate health disparities, encourage safe and healthy communities, promote clinical and community preventive services, and empower older adults to make healthy decisions (*6*). One example of expanding older Americans' access to clinical preventive services is through Vote & Vax.† A community health organization known as Sickness Prevention Achieved through Regional Collaboration partners with many different collaborators at the federal, state, and local levels to increase the number of Americans who receive influenza vaccine by offering vaccination near polling places (*7*). In 2012, Vote & Vax served 651 polling locations across the majority of states and the District of Columbia. Approximately half (47.7%) of recipients reported that they had not received a flu shot the previous year or would not otherwise have been vaccinated. As well, 45% of persons receiving influenza vaccine at Vote & Vax clinics identified as African American or Hispanic, providing a potential strategy to reduce racial and ethnic disparities in receipt of influenza vaccination (*7*).§

Medicare, the primary health care payer for Americans aged ≥65 years, has incorporated prevention and screening services into two types of visits: the Welcome to Medicare visit and the Annual Wellness Visit. During the Welcome to Medicare visit, providers conduct a prevention-focused physical examination¶ and review beneficiaries' medical and social history, risk for depression and mood disorders, functional ability, diet and physical activities, and their history of tobacco use (*8*). A written plan, similar to a checklist, is created to promote ongoing use of clinical preventive services and the discussion of important health topics, such as advance directives. Annual Wellness Visits** encompass personalized prevention plan services including a comprehensive health risk assessment,

* https://www.cdc.gov/aging/pdf/healthy-aging-in-action508.pdf.
† http://www.voteandvax.org/.
§ The population of older adults is becoming increasingly more racially and ethnically diverse. From 2014 to 2060, the percentage of U.S. adults aged ≥65 who identify as non-Hispanic white is projected to decrease from 78.3% to 54.6%. https://assets.prb.org/pdf16/aging-us-population-bulletin.pdf.
¶ https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/MPS_QRI_IPPE001a.pdf.
** https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/AWV_chart_ICN905706.pdf.

assessments to detect cognitive impairment, diabetes, hypertension, and missed vaccinations (*8*,*9*). However, these Medicare prevention and wellness benefits are not as widely used by older Americans as they could be; in 2013, only 6.8% of new Medicare enrollees took advantage of the Welcome to Medicare visit (*10*), and in 2014, approximately 16% of Medicare recipients had an Annual Wellness Visit; only an estimated 7% of Medicare beneficiaries receive all recommended preventive services (*9*,*11*). Annual Wellness Visit barriers include the relatively long duration of the visit (1 hour), low reimbursement rate for providers, and patient confusion about what is included in the visit (*11*). The U.S. Department of Health and Human Services established improving the rates of the Welcome to Medicare visits as an important *Healthy People 2020* objective (*10*).

Healthy Body, Healthy Brain: The State of the Science and the Way Forward

Dementia is a general term used to describe symptoms characterized by the loss of cognitive function. Of the several forms of dementia, the most common is Alzheimer's disease (*12*). Current estimates indicate that approximately 5.7 million Americans live with Alzheimer's disease; it is the fifth leading cause of death for adults aged ≥65 years (*12*). African Americans and Hispanics have a higher risk for developing Alzheimer's. From 1999 to 2014, the age-adjusted Alzheimer's mortality rate increased 55%, from 16.5 to 25.4 per 100,000, and the number of deaths from Alzheimer's increased 110%, from 44,536 to 93,541 (*13*). The high morbidity associated with dementia makes it the most costly disease in America (*14*). In 2017, caring for persons with dementia was estimated to cost the health and long-term care systems $259 billion. In addition, each year, approximately 15 million caregivers provide an estimated $230 billion in unpaid care (*14*).

Adults can, however, reduce their risk for, and lessen the impact and burden of, dementia. In 2015, both the Institute of Medicine and the Alzheimer's Association independently concluded that regular physical exercise, smoking cessation, and the management of certain cardiovascular risk factors (e.g., diabetes, midlife hypertension, and midlife obesity) are steps that adults can take to lower their risk for cognitive decline (*15*,*16*). Another important step is to talk to a health care provider if worsening memory is a concern. Approximately half of the persons who are experiencing worsening memory have not talked about this concern with a health care provider (*17*). Early detection and diagnosis of dementia, as well as disclosure of the diagnosis to the patient and potential caregivers, are critical components of secondary prevention measures and facilitate accessing available treatments, building a care team, and improving medication management. Early diagnosis also can help persons with dementia and their families access support services, create advance directives, and address driving and safety issues (*18*).

Finally, care planning for adults with dementia can facilitate the coordination of care and improve its quality through better management of comorbid conditions. Better disease and medication management can result in fewer hospitalizations and emergency department visits (*19*). Medicare now covers care planning for persons with cognitive impairment. This includes evaluating cognition and function, assessing neuropsychiatric symptoms, evaluating safety, identifying the primary caregiver, and helping develop advance care directives (*20*).

Healthy Caregiver, Healthy Patient: Importance of Healthy Aging for Caregivers

Informal or "family" caregivers are unpaid caregivers who provide care to a person, most often a relative, friend, or neighbor in the community or home setting, who needs assistance with activities of daily living and instrumental activities of daily living (e.g., preparing meals, shopping, or medical and nursing tasks). When backed by training and support (e.g., respite care), caregivers can help patients avoid unnecessary hospitalization and live in the community longer (*5*). Caregivers are not only critical in allowing adults to age within their chosen community; caregivers also can advocate on their behalf to health care providers and help manage medications, care plans, and transitions between care settings (*5*). On average, caregivers spend 24.4 hours each week providing help. Approximately one third of all caregivers are considered "high intensity caregivers" because they provide ≥21 hours of care weekly; on average, these caregivers provide 62.2 hours of care per week (*5*). Many caregivers, in addition to the hours they spend providing care, work in paid positions either full-time (34%) or part-time (25%) (*5*). Approximately one quarter (28%) of caregivers simultaneously provide care to an older adult in addition to raising their own children or grandchildren. These "sandwich generation" caregivers often also need to manage their own health, wellness, and financial needs because many are still in their prime working years before retirement (*5*). When providing care for persons with high-burden diseases (e.g., dementia and cancer), caregivers might experience declining health themselves. Many caregivers report high psychological stress and report an average of nearly $7,000 in out-of-pocket costs associated with caregiving each year (*5*,*21*).

Evidence-based interventions exist to promote the health and well-being of caregivers. The Resources for Enhancing Alzheimer's Caregiver Health (REACH)[††] program is an in-home, tailored, caregiver support intervention administered

[††] http://www.rosalynncarter.org/rci_reach.

through the Department of Veterans Affairs, the Rosalynn Carter Institute, and other sites. REACH provides education and support for caregivers to improve overall caregiver health and reduce the burden from caregiving and the risk for depression (*22*). Identifying caregivers and assessing their stresses and needs can help maintain caregiver health and the health of the person receiving care and postpone costly alternatives such as placement in long-term care facilities (*23*).

Currently, only 15 states include family caregiver assessments within their Medicaid Home and Community-Based Services Waiver program, a program that supports persons who choose to receive long-term care services in their home or community rather than in an institutional setting (*23*). The Welcome to Medicare and Medicare Annual Wellness Visits also offer avenues for improving caregiver health and well-being by providing resources to caregivers who are supporting a patient with a chronic disease, including dementia (*8*).

Public Health Activities and Programs

CDC's Alzheimer's Disease and Healthy Aging Program[§§] developed important programs that focus on keeping older Americans healthy and independent (*24*). CDC's Healthy Brain Initiative was established in 2005 through a Congressional appropriation (*24*). The Healthy Brain Initiative uses the tools of public health to catalyze action at state and local levels. *State and Local Public Health Partnerships to Address Dementia, The 2018–2023 Road Map,*[¶¶] the third in the Road Map series, was released in 2018 and identifies 25 actions that state and local public health agencies and their partners can implement to promote cognitive health and address cognitive impairment and the needs of caregivers (*25*). The Road Map, which complements the National Plan to Address Alzheimer's Disease, categorized the action items into four traditional domains of public health: monitoring and evaluation, education of the public, policies and partnership development, and assurance of workforce competency (*25*). The 2018–2023 Road Map action items emphasize diagnosis and disclosure of Alzheimer's, risk reduction for Alzheimer's, and caregiving for persons with Alzheimer's.

In addition, CDC launched the Healthy Aging Data Portal,[***] a free, publicly accessible online tool that provides data on essential indicators of health and well-being, including tobacco and alcohol use, screenings and vaccinations, mental and cognitive health, and caregiving at national, regional, and state levels (*24*). The Portal enables public health professionals and policymakers to examine a snapshot of the health of older adults in their states to prioritize and evaluate public health interventions.

Training and educating a workforce to work with older adults and those with Alzheimer's disease is important (*4*). The Alzheimer's Association, CDC, and Emory University's Rollins School of Public Health Centers for Technical Assistance and Training has developed a curriculum[†††] for undergraduate public health students that expands awareness of Alzheimer's disease and related types of dementia as a growing, multilayered issue and is tied to the Core Competencies for Public Health Professionals (*26*). Health care providers are another important focus of education and training programs. The Gerontological Society of America developed the KAER toolkit[§§§] to increase the use of evidence-based tools for assessing cognitive impairment by primary care providers and to promote better use of the Welcome to Medicare and Annual Wellness Visits (*27*). The toolkit improves detection of cognitive impairment and promotes earlier diagnostic evaluation and referrals for education and supportive community services for persons with dementia and their family caregivers.

Numerous opportunities exist to help promote the health, well-being, and independence of older Americans. Promoting available preventive services such as the use of Annual Wellness Visits and receiving all recommended vaccinations can improve well-being among older adults. Health care providers can use the tools discussed in this report to promote better health and care to ensure healthy aging for their patients. Federal, state, and local public health programs should employ approaches to optimize brain health and potentially prevent cognitive decline. Until better preventive strategies or therapies exist, public health professionals can disseminate and use data and tools from CDC's Healthy Brain Initiative for the benefit of persons living with dementia and their caregivers.

§§ https://www.cdc.gov/aging.

¶¶ https://www.cdc.gov/aging/healthybrain/roadmap.htm/.

*** https://www.cdc.gov/aging/agingdata/index.html.

††† https://www.alz.org/media/Documents/curriculum-outline.pdf.

§§§ "Kickstart" the cognition conversation, "assess" for cognitive impairment, "evaluate" for dementia, "refer" for community resources (KAER). https://www.geron.org/programs-services/alliances-and-multi-stakeholder-collaborations/cognitive-impairment-detection-and-earlier-diagnosis.

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Notes from the Field

Responding to an Outbreak of Monkeypox Using the One Health Approach — Nigeria, 2017–2018

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On September 22, 2017, a suspected human case of monkeypox was reported to the Nigeria Centre for Disease Control (NCDC) from Bayelsa State in southern Nigeria. Because monkeypox had not been reported in Nigeria since 1978 (*1*), the case raised national and international concern. A multisectoral, international outbreak investigation was undertaken to identify sources and risk factors, establish surveillance, and enhance preparedness. A suspected case was defined as the sudden onset of fever, followed by a vesiculopustular rash primarily on the face, palms, and soles. A confirmed case was any suspected case with laboratory confirmation (by serology, molecular detection of viral DNA, or virus isolation). A probable case was a suspected case epidemiologically linked to a confirmed case. As of February 25, 2018, a total of 228 suspected cases (including 89 confirmed and three probable cases) had been investigated in 24 of Nigeria's 36 states and the Federal Capital Territory. Six deaths (6.7%) were recorded among the 89 confirmed cases. The outbreak has not been declared over, and NCDC continues to collect data to develop a baseline level for this disease, which had not been reported in 40 years and now might be endemic to Nigeria. Given the zoonotic nature of the disease, this outbreak has required a robust One Health outbreak collaboration among human, animal, and environmental health institutions.

Monkeypox virus is a zoonotic orthopoxvirus. Although the animal reservoir is not known, small mammals appear to play a role in the circulation of the virus in nature (*2*). Monkeypox virus can be transmitted to humans through bites and direct contact with infected animals, including during preparation of meat, and case fatality rates can reach 10%. Currently no drugs are licensed for treatment of monkeypox; smallpox vaccine, which historically demonstrated approximately 85% protection against monkeypox, has not been in widespread use since the eradication of smallpox in 1980 (*3,4*).

A multiagency interdisciplinary emergency operations center (EOC) was activated on October 9, 2017; the EOC facilitated joint epidemiologic investigations, targeted risk communication, and developed laboratory diagnostic capacity for human and animal specimens.* An incident action plan and interim national guidelines were developed, and a protocol for active monkeypox surveillance in animals was developed, targeting high-risk areas at the human-animal interface, such as markets that sell bush meat (meat from nondomesticated animals hunted for food), wildlife parks, zoos, and farms. To enhance laboratory diagnostic capacity, personnel from the NCDC National Reference Laboratory and the National Veterinary Research Institute received training in monkeypox molecular diagnosis.

Joint human and animal health teams conducted field investigations to study the human, animal, and environmental sources of infection, as well as risk factors and modes of transmission. Human-to-human transmission was presumed in a limited number of cases through investigation into clusters (within individual households) of confirmed cases. A human-to-human transmission chain was presumed when symptom onset occurred in a close contact of a confirmed case at an interval consistent with the incubation period of 5–13 days. Most cases could not be epidemiologically linked, suggesting a multisource outbreak or previously undetected endemic transmission. Links to zoonotic origin also could not be determined, and the role of environmental factors is not known. Further institutional collaboration for research in these areas has been identified. The communications team developed and implemented a plan focused on alleviating public fear and anxiety regarding this largely unknown disease. Key messages, health advisories, frequently asked questions, press releases, and a risk communication activity tracker were formulated in collaboration with animal health partners with contents addressing possible risk factors identified during the investigation. Key messages included avoiding physical contact with persons infected with monkeypox, avoiding contact with wild animals (especially those found dead), cooking animal food products thoroughly before consumption, frequent handwashing, and early medical evaluation of persons with compatible signs or symptoms.

This outbreak likely resulted from a complex intersection of events and, given the zoonotic nature of the disease, required a robust outbreak response collaboration among human, animal, and environmental health institutions. The Economic Community of West African States, in partnership with its member states, has in the past adopted a One Health multidisciplinary approach to human, animal, and environmental

* The EOC included representatives from the Federal Ministry of Agriculture and Rural Development; World Health Organization; CDC; African Field Epidemiology Network; University of Maryland; United National Children's Fund; Africa CDC; and eHealth Africa.

health in implementing outbreak response and preparedness, surveillance, communications, coordination, and epidemiologic investigations (*5*). This method facilitates efficient use of scarce resources and leverages various sectors' capabilities.

The response to this outbreak demonstrates the utility of multisectoral collaboration for the investigation and control of zoonotic disease outbreaks. As is best practice in emergency management models, an after-action review involving all partners will be critical in upholding successes, addressing weaknesses, and preparing for future outbreaks.

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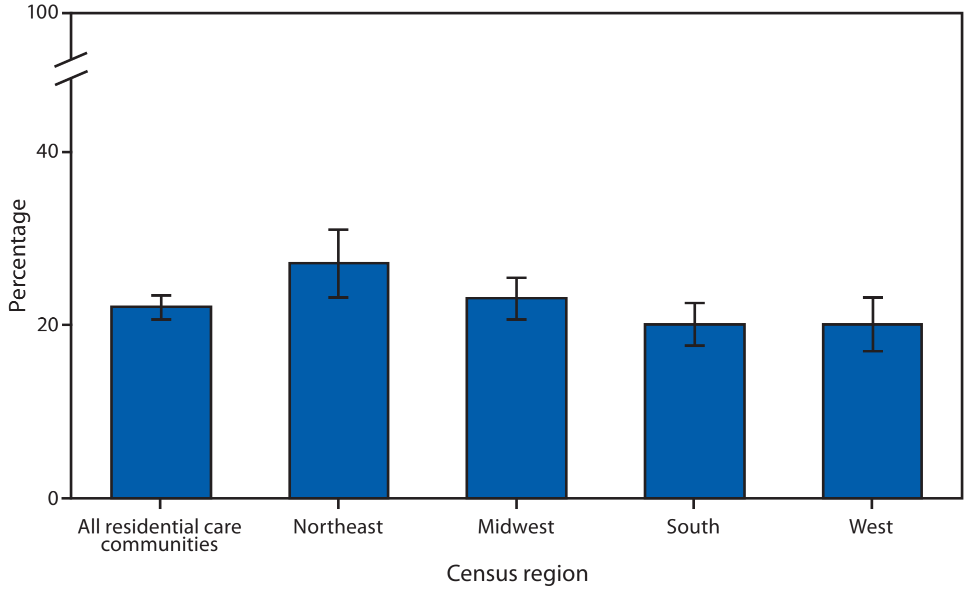
QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage* of Residential Care Community† Residents with a Fall,§ by Census Region — United States, 2016¶



* With 95% confidence intervals indicated with error bars.

† Residential care communities include those that were state-regulated; had four or more beds; and provided room and board with at least two meals a day, around-the-clock on-site supervision, and help with personal care, such as bathing and dressing or health-related services such as medication management. Residential care communities licensed to exclusively serve the mentally ill or the intellectually disabled/developmentally disabled populations were excluded.

§ Respondents were asked, "As best you know, about how many of your current residents had a fall in the last 90 days? Please include falls that occurred in your residential care community or off-site, whether or not the resident was injured, and whether or not anyone saw the resident fall or caught them. Please just count one fall per resident who fell, even if the resident fell more than one time. If one of your residents fell during the last 90 days, but is currently in the hospital or rehabilitation facility, please include that person in your count."

¶ Residential care communities with missing data were excluded.

In 2016, 22% of current residents living in residential care communities had a fall in the past 90 days, representing 175,000 residents in the United States. By region, 27% of residents living in communities in the Northeast, 23% of residents in Midwest communities, and 20% of residents in communities in the South and West, respectively, had a fall. A higher percentage of residents in the Northeast had a fall compared with residents in the South and West.

Source: National Study of Long-Term Care Providers, 2016 data. https://www.cdc.gov/nchs/nsltcp/nsltcp_rdc.htm.

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