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Deaths from Falls Among Persons Aged ≥65 Years — United States, 2007–2016

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Deaths from unintentional injuries are the seventh leading cause of death among older adults (*1*), and falls account for the largest percentage of those deaths. Approximately one in four U.S. residents aged ≥65 years (older adults) report falling each year (*2*), and fall-related emergency department visits are estimated at approximately 3 million per year.* In 2016, a total of 29,668 U.S. residents aged ≥65 years died as the result of a fall (age-adjusted rate† = 61.6 per 100,000), compared with 18,334 deaths (47.0) in 2007. To evaluate this increase, CDC produced age-adjusted rates and trends for deaths from falls among persons aged ≥65 years, by selected characteristics (sex, age group, race/ethnicity, and urban/rural status) and state from 2007 to 2016. The rate of deaths from falls increased in the United States by an average of 3.0% per year during 2007–2016, and the rate increased in 30 states and the District of Columbia (DC) during that period. In eight states, the rate of deaths from falls increased for a portion of the study period. The rate increased in almost every demographic category included in the analysis, with the largest increase per year among persons aged ≥85 years. Health care providers should be aware that deaths from falls are increasing nationally among older adults but that falls are preventable. Falls and fall prevention should be discussed during annual wellness visits, when health care providers can assess fall risk, educate patients about falls, and select appropriate interventions.

Mortality data from death certificates filed in 50 states and DC were analyzed to determine the number of deaths from falls among persons aged ≥65 years by selected characteristics, year, and state in which the death occurred. Each certificate identifies demographic data and a single underlying cause of death. Falls were identified using *International Classification of Diseases, Tenth Revision* codes W00–W19. Queries to CDC WONDER§ were used to generate the 2007 and 2016 age-specific rates for three age groups (65–74, 75–84, and ≥85 years) and age-adjusted rates by sex, race/ethnicity (non-Hispanic white, non-Hispanic black, American Indian/Alaska Native, Asian/Pacific Islander, or Hispanic), and urban/rural status.¶ The years 2007–2016 were selected to produce 10-year age-adjusted trends for the United States, 49 U.S. states,** and DC. Population estimates produced by the U.S. Census with CDC's National Center for Health Statistics were used to calculate mortality rates. Age-standardized rates were produced using

* https://www.cdc.gov/injury/wisqars.
† All rates in this report are age-adjusted and restricted to adults aged ≥65 years.
§ https://wonder.cdc.gov/.
¶ 2013 NCHS Urban-Rural Classification Scheme for Counties. https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf.
** Alaska did not have enough data to examine trends.

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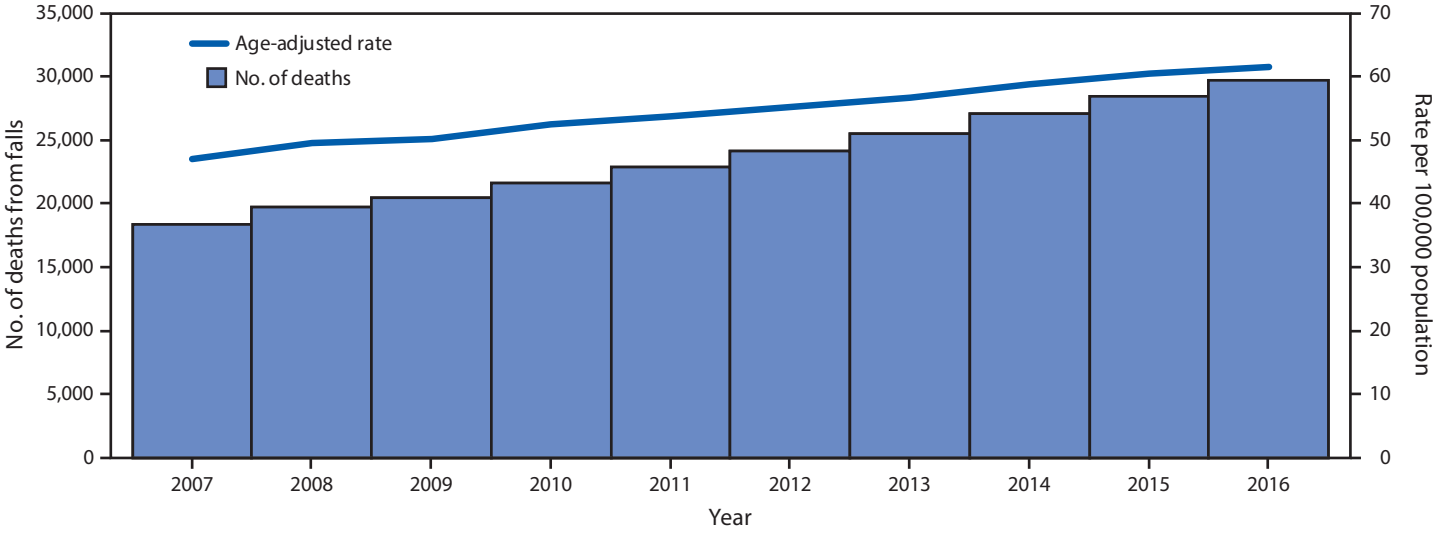
the 2000 U.S. standard population. All rates in this report are age-adjusted and restricted to adults aged ≥65 years.

National and state-specific trends were evaluated using joinpoint software,[††] which identifies statistically significant changes in a trend using Monte Carlo permutation, then fits them as a series of joined trend segments. An annual percentage change (APC) for each segment, an average APC (AAPC) for the 10 years, and confidence intervals at $\alpha = 0.05$ were calculated.

The overall rate of older adult deaths from falls increased 31% from 2007 to 2016 (3.0% per year) (Figure 1). Nationwide, 29,668 (61.6 per 100,000) U.S. residents aged ≥65 years died from fall-related causes in 2016. State-specific rates ranged from 24.4 (Alabama) to 142.7 (Wisconsin) (Figure 2) (Supplementary Table; https://stacks.cdc.gov/view/cdc/53652).

[††] For all analyses, a p-value of <0.05 was considered to be statistically significant. https://surveillance.cancer.gov/joinpoint/.

FIGURE 1. Number of deaths from falls and age-adjusted rates* among adults aged ≥65 years — United States, 2007–2016



* Age-adjusted death rates were calculated by applying age-specific death rates to the 2000 U.S standard population age distribution.

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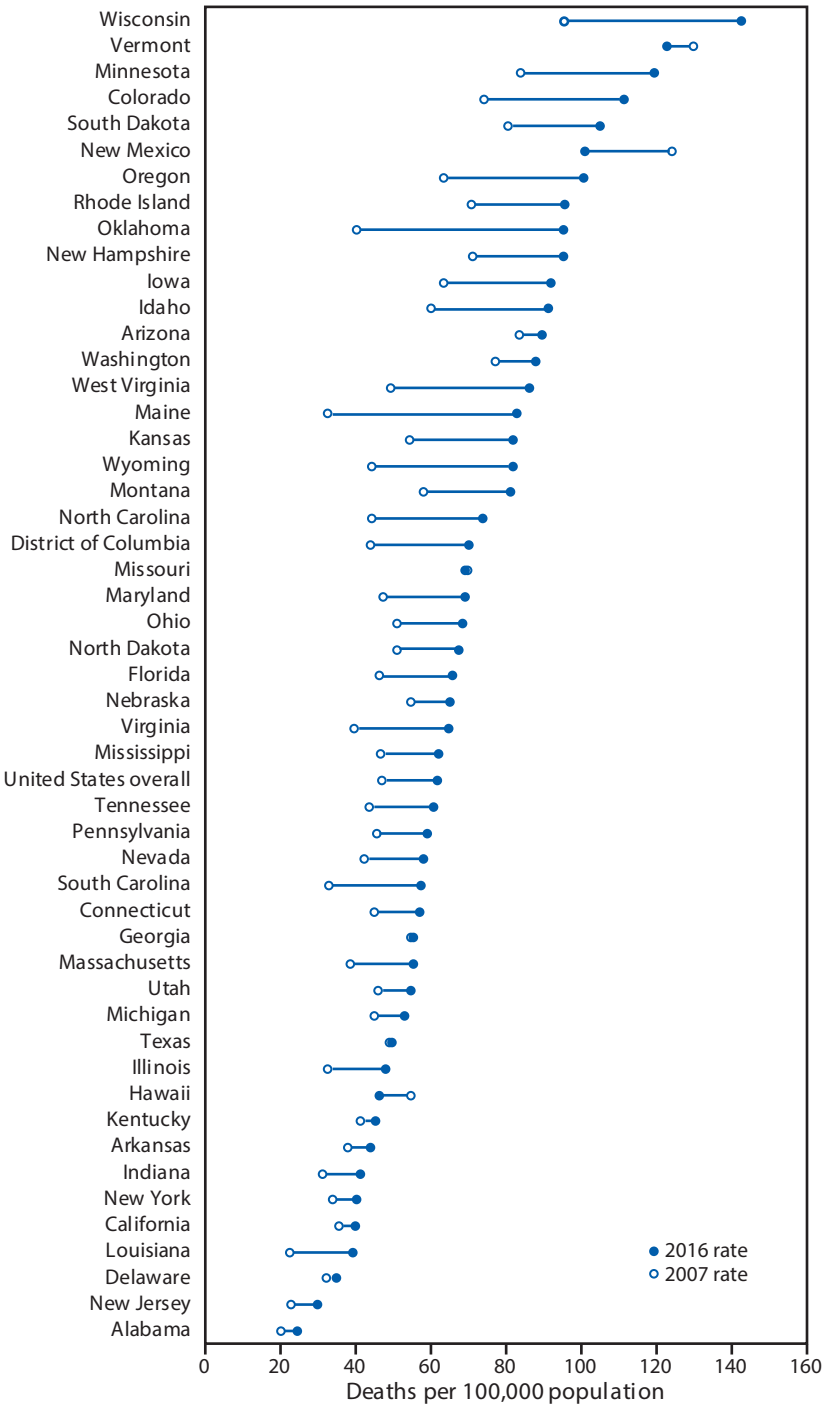
FIGURE 2. Age-adjusted rate* of deaths from falls† among persons aged ≥65 years, by state and overall — United States, 2007 and 2016§



Source: CDC. National Vital Statistics System, Mortality. CDC WONDER. https://wonder.cdc.gov/.

* Rates shown are the number of deaths per 100,000 population. Age-adjusted death rates were calculated by applying age-specific death rates to the 2000 U.S standard population age distribution.

† Deaths from falls were identified using *International Classification of Diseases, Tenth Revision* (ICD–10) underlying cause-of-death codes W00–W19.

§ Joinpoint regression examining changes in trends indicated that, from 2007 to 2016, the District of Columbia and 30 states had significant increases in the rate of deaths from falling (Arkansas, California, Connecticut, Florida, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Virginia, Washington, West Virginia, and Wyoming). Colorado, Oregon, and Tennessee had initial increases, followed by stable rates during this period. Arizona, Nevada, and Wisconsin had an initial period of stability followed by a significant increase. In Missouri, there was a decrease from 2007 to 2012, followed by an increase from 2012 to 2016. In Utah there was an increase from 2007 to 2012 followed by a decrease to 2016. Eleven states had nonsignificant trends during this period (Alabama, Delaware, Georgia, Hawaii, Mississippi, Nebraska, New Hampshire, New Mexico, North Dakota, Texas, and Vermont). Alaska did not have enough data to examine trends.

The largest AAPC in mortality rates from falls (11.0% per year) occurred in Maine, followed by Oklahoma (10.9%) and West Virginia (7.8%). A significant increase in the rate from 2007 to 2016 occurred in 30 states (Arkansas, California, Connecticut, Florida, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Virginia, Washington, West Virginia, and Wyoming) and DC. No significant change in fall mortality rates occurred in 11 states (Alabama, Delaware, Georgia, Hawaii, Mississippi, Nebraska, New Hampshire, New Mexico, North Dakota, Texas, and Vermont). After an initial increase, rates stabilized in three states (Colorado, Oregon, and Tennessee). Arizona, Nevada, and Wisconsin had initial periods of stability followed by a significant increase in fall death rates. The death rate from falls decreased in Missouri during 2007–2012, followed by an increase during 2012–2016, and increased in Utah during 2007–2012, followed by a decrease during 2012–2016.

In 2016, death rates from falls were higher among adults aged ≥85 years (257.9), men (72.3), and whites (68.7) than among corresponding groups (Table). From 2007 to 2016, rates increased among all demographic subgroups except American Indians/Alaska Natives. The annual rate increase was larger among adults aged ≥85 years (3.9% per year) than among those aged 65–74 years (1.8%) and 75–84 years (2.3%).

Summary

What is already known about this topic?

Falls are the leading cause of injury-related deaths among persons aged ≥65 years, and the age-adjusted rate of deaths from falls is increasing.

What is added by this report?

The rate of deaths from falls among persons aged ≥65 years increased 31% from 2007 to 2016, increasing in 30 states and the District of Columbia, and among men and women. Among states in 2016, rates ranged from 24.4 per 100,000 (Alabama) to 142.7 (Wisconsin). The fastest-growing rate was among persons aged ≥85 years (3.9% per year).

What are the implications for public health practice?

As the U.S. population aged ≥65 years increases, health care providers can address the rising number of deaths from falls in this age group by asking about fall occurrences, assessing gait and balance, reviewing medications, and prescribing interventions such as strength and balance exercises or physical therapy.

TABLE. Number and age-adjusted rates* for deaths from falls and annual percentage changes† among persons aged ≥65 years, by selected characteristics — United States, 2007–2016

Characteristic	2007		2016		2007–2016
	No. of deaths	Deaths per 100,000 (95% CI)	No. of deaths	Deaths per 100,000 (95% CI)	APC (95% CI)
Total	**18,334**	**47.0 (46.4–47.7)**	**29,668**	**61.6 (60.9–62.3)**	**3.0 (2.8–3.2)**
Sex					
Men	8,408	57.9 (56.7–59.2)	13,721	72.3 (71.1–73.5)	2.4 (2.1–2.7)
Women	9,926	40.2 (39.4–41.0)	15,947	54.0 (53.1–54.8)	3.8 (3.2–4.4)
Age group (yrs)					
65–74	2,594	13.2 (12.7–13.7)	4,479	15.6 (15.2–16.1)	1.8 (1.3–2.3)
75–85	6,552	50.1 (48.9–51.3)	8,735	61.4 (60.1–62.7)	2.3 (1.8–2.7)
≥85	9,188	182.3 (178.6–186.0)	16,454	257.9 (253.9–261.8)	3.9 (3.7–4.0)
Race/Ethnicity§					
White, non-Hispanic	16,609	50.7 (49.9–51.4)	26,370	68.7 (67.8–69.5)	3.4 (3.2–3.6)
Black, non-Hispanic	595	19.9 (18.3–21.5)	1,089	27.1 (25.5–28.7)	3.2 (2.1–4.4)
American Indian/Alaska Native	74	47.3 (36.9–59.8)	111	47.0 (38.1–55.9)	-1.5 (-3.6 0.6)
Asian/Pacific Islander	343	31.1 (27.8–34.4)	738	36.7 (34.0 –- 39.4)	1.5 (0.7–2.4)
Hispanic	681	32.4 (29.9–34.9)	1,296	35.7 (33.8–37.7)	1.2 (0.2–2.2)
Urban/Rural status¶					
Large central metro	5,008	47.4 (46.1–48.7)	7,442	57.0 (55.7–58.3)	2.2 (1.9–2.4)
Large fringe metro	3,990	44.0 (42.7–45.4)	7,000	59.9 (58.5–61.3)	3.4 (2.6–4.2)
Medium metro	4,008	48.3 (46.8–49.8)	6,879	66.1 (64.5–67.7)	3.3 (2.9–3.7)
Small metro	1,918	49.3 (47.1–51.5)	3,186	66.4 (64.1–68.7)	3.3 (2.5–4.0)
Micropolitan (non-metro)	1,976	49.6 (47.4–51.8)	2,970	64.2 (61.9–66.6)	2.8 (2.4–3.3)
Non-core (non-metro)	1,434	44.9 (42.6–47.2)	2,191	60.9 (58.3–63.5)	3.3 (3.0–3.7)

Source: CDC, National Vital Statistics System, Mortality. CDC WONDER. https://wonder.cdc.gov/.
Abbreviations: APC = annual percentage change; CI = confidence interval.
* Rates standardized to the 2000 U.S. population with age groups 65–74, 75–84, and ≥85 years.
† The annual percentage change was also the average annual percentage change for the years 2007–2016 because no significant change in trend was identified during this period using joinpoint regression.
§ Persons in the four racial categories were all non-Hispanic. Hispanic persons might be of any race.
¶ Status follows the 2013 Urban-Rural Classification Scheme for Counties of CDC's National Center for Health Statistics.

Discussion

Approximately 30,000 adults aged ≥65 years died as the result of a fall in 2016, and state-specific rates for deaths from falls ranged from 24.4 per 100,000 in Alabama to 142.7 in Wisconsin. The rate of deaths from falls among older adults increased steadily from 2007 to 2016 in 30 states and DC. The 31% increase in the national rate of deaths from falls from 2007 to 2016 is consistent with findings from a 2010 study that estimated a 42% increase from 2000 to 2006 (*3*).

The differences in rates among states might have resulted, in part, from differences in the racial composition or general health of the states' residents. For example, in 2016, the rate of deaths from falls was higher among older white adults than among other racial/ethnic groups. Thus, the higher rate in Wisconsin, compared with that in Alabama, might be partially attributable to a higher proportion of white older adults in Wisconsin than in Alabama.[§§] Differential coding practices for external causes of injury on the death certificate might also contribute to variation in both the rate and APC (*4*,*5*). In addition, some states require a medical examiner to complete a death certificate, whereas others employ coroners; a 2012 study of national trends and coding patterns in fall-related mortality among the elderly found that coroners recorded 14% fewer deaths from falls than did medical examiners (*5*).

In 2016, there was a higher rate of fatal falls among older men, in contrast to the rate of nonfatal falls, which is higher among older women (*2*). This might have resulted from differences in the circumstance of a fall (e.g., from a ladder or while drinking) (*6*,*7*), leading to more serious injuries, including head trauma, or higher rates of postfall complications in men (*7*). The higher rates of deaths from falls among older age groups is consistent with advancing age being an independent risk factor for falls as well as being associated with other risk factors such as 1) reduced activity; 2) chronic conditions, including arthritis, neurologic disease, and incontinence; 3) increased use of prescription medications, which might act synergistically on the central nervous system; and 4) age-related changes in gait and balance (*8*).

The population of older adults in the United States is increasing; adults aged ≥85 years are the fastest-growing age group among U.S. residents and will reach approximately 8.9 million in 2030 (*9*). Although the rate of deaths from falls is increasing among all persons aged ≥65 years, it is increasing fastest among those aged ≥85 years (3.9% per year). Nationally, the rate of deaths from falls might be increasing because of longer survival after the onset of common diseases such as heart disease, cancer, and stroke (*6*). If the current rate remains stable, an estimated 43,000 U.S. residents aged ≥65 years will die because of a fall in 2030, and if the rate continues to increase, 59,000 fall-related deaths could result.

The findings in this report are subject to at least five limitations. First, changes in coding of cause of death might have occurred during the study period, which might contribute to the increased rate of deaths from falls. Second, information about race and Hispanic ethnicity is generally reported by the funeral director and might be based on observation, which could lead to an underestimation of deaths among Hispanics, Asians/Pacific Islanders, and American Indians/Alaska Natives.[¶¶] Third, the age-adjusted rates were based on information from the U.S. Census, which reports as a limitation that it might undercount persons aged ≥65 years; this could result in an overestimation of death rates. Fourth, misclassifications of deaths might have produced overestimates or underestimates of deaths from falls. Finally, standard age-adjusted populations might not fully adjust populations at older age groups (e.g., ≥85 years) and could explain differences between subgroups and states.

As the population of persons aged ≥65 years in the United States, increases, the rising number of deaths from falls in this age group can be addressed by screening for fall risk and intervening to address modifiable risk factors such as polypharmacy or gait, strength, and balance issues. Interventions that target multiple risk factors can reduce the rate of falls (*10*) and can be initiated during annual wellness visits.[***] Initiatives such as CDC's STEADI (Stopping Elderly Accidents, Deaths, and Injuries),[†††] can assist health care providers in assessing fall risk, educating patients, and selecting interventions.

[§§] https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5YR_DP05&src=pt.

[¶¶] https://wonder.cdc.gov/wonder/help/cmf.html#.

[***] https://www.medicareinteractive.org/get-answers/medicare-covered-services/preventive-care-services/annual-wellness-visit.

[†††] https://www.cdc.gov/steadi/.

Conflict of Interest

No conflicts of interest were reported.

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Enterovirus and Parechovirus Surveillance — United States, 2014–2016

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Infections caused by enteroviruses (EV) and parechoviruses (PeV), members of the Picornaviridae family, are associated with various clinical manifestations, including hand, foot, and mouth disease; respiratory illness; myocarditis; meningitis; and sepsis; and can result in death. The genus *Enterovirus* includes four species of enterovirus (A–D) known to infect humans, and the genus *Parechovirus* includes one species (A) that infects humans. These species are further divided into types, some of which are associated with specific clinical manifestations. During 2014–2016, a total of 2,967 U.S. cases of EV and PeV infections were reported to the National Enterovirus Surveillance System (NESS). The largest number of reports during that time (2,051) occurred in 2014, when a large nationwide outbreak of enterovirus D68 (EV-D68) occurred, accounting for 68% of cases reported to NESS that year (*1*). Reports to the National Respiratory and Enteric Virus Surveillance System (NREVSS) during 2014–2016 indicated that circulation of EV peaks annually in the summer and early fall. Because the predominant types of EV and PeV circulating from year to year tend to vary, tracking these trends requires consistent and complete reports from laboratories with the capacity to perform typing.

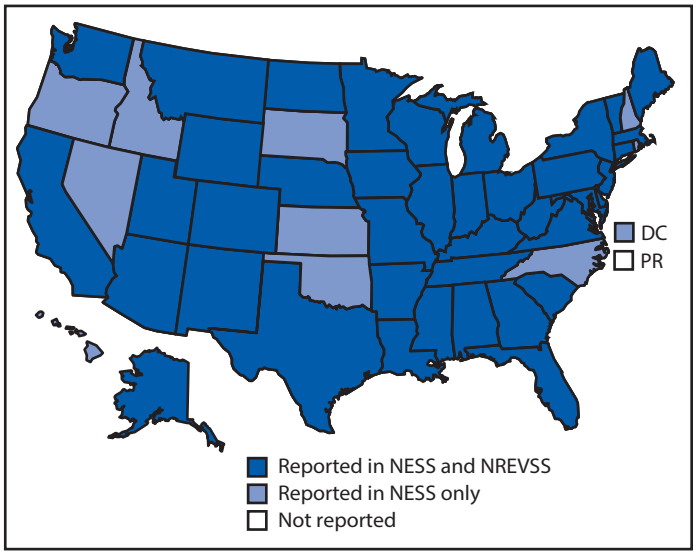
NESS is a passive, laboratory-based surveillance system that has been used to track EV and PeV reports since the 1960s and is the most comprehensive database of these reports in the United States. During 2014–2016, 11 laboratories reported to NESS, including nine state health departments, one municipal health department, and the CDC Polio and Picornavirus Laboratory Branch (PPLB). The largest contributor of reports to NESS was PPLB (1,553), which serves as a reference laboratory for jurisdictions with no or limited EV and PeV typing capacity. Testing data for untyped EV are also collected through NREVSS, a passive, laboratory-based surveillance system that collects aggregate reports of tests for EV and the percentage positive by week.

During 2014–2016, a total of 2,967 EV and PeV cases were reported to NESS, including 2,758 (93.0%) for which the type was known. Reports that included virus type represented 2,734 individual patients, among whom one virus type was identified from 2,726 (99.7%) and two types were identified from eight (0.3%). Among 2,370 (86.7%) patients with known sex, 1,422 (60.0%) were male, and among 1,351 (90.1%) for whom age was known, the median age was 4 years (interquartile range = 1–10 years). State of residence was known for 2,727 (99.7%) patients; among these, California was the most frequently reported state (413, 15.1%), followed by New York (366, 13.4%). Residents from all 50 states and the District of Columbia were represented (Figure 1). The largest number of reports to NESS that included EV and PeV type (2,051) occurred in 2014 (Box); these reports accounted for 74% of the 2,758 reports for all 3 years.

EV-D68 was the most frequently reported type during 2014–2016, accounting for 1,542 (55.9%) reports for this period, including 1,395 (68.0%) in 2014, when a large nationwide outbreak of respiratory disease associated with EV-D68 occurred. In 2015, EV-D68 accounted for only nine (2.4%) reports that included virus type. EV-D68 again constituted a large percentage (40.9%) of reported types in 2016, but the 138 reports represented <10% of the EV-D68 reports in 2014. Overall, 1,351 (86.7%) EV-D68 detections were from respiratory specimens; 154 (9.9%) were from specimens whose source was unknown.

After EV-D68, the most frequently reported types during 2014–2016 were echovirus 30 (159; 13.1% of 1,216 reports of non–EV-D68 types), coxsackievirus (CV)-A6 (152; 12.5%), echovirus 18 (116; 9.5%), and CV-B3 (109; 9.0%). Among reports in which a type other than EV-D68 was detected (1,466), the most frequently reported specimen source was cerebrospinal

FIGURE 1. States from which enterovirus-positive or parechovirus-positive results were reported, by surveillance system — United States, 2014–2016



Abbreviations: DC = District of Columbia; NESS = National Enterovirus Surveillance System; NREVSS = National Respiratory and Enteric Virus Surveillance System; PR = Puerto Rico.

fluid (493; 38.0% of 1,298 specimens with known source), followed by throat/nasopharyngeal swab (487; 37.5%).

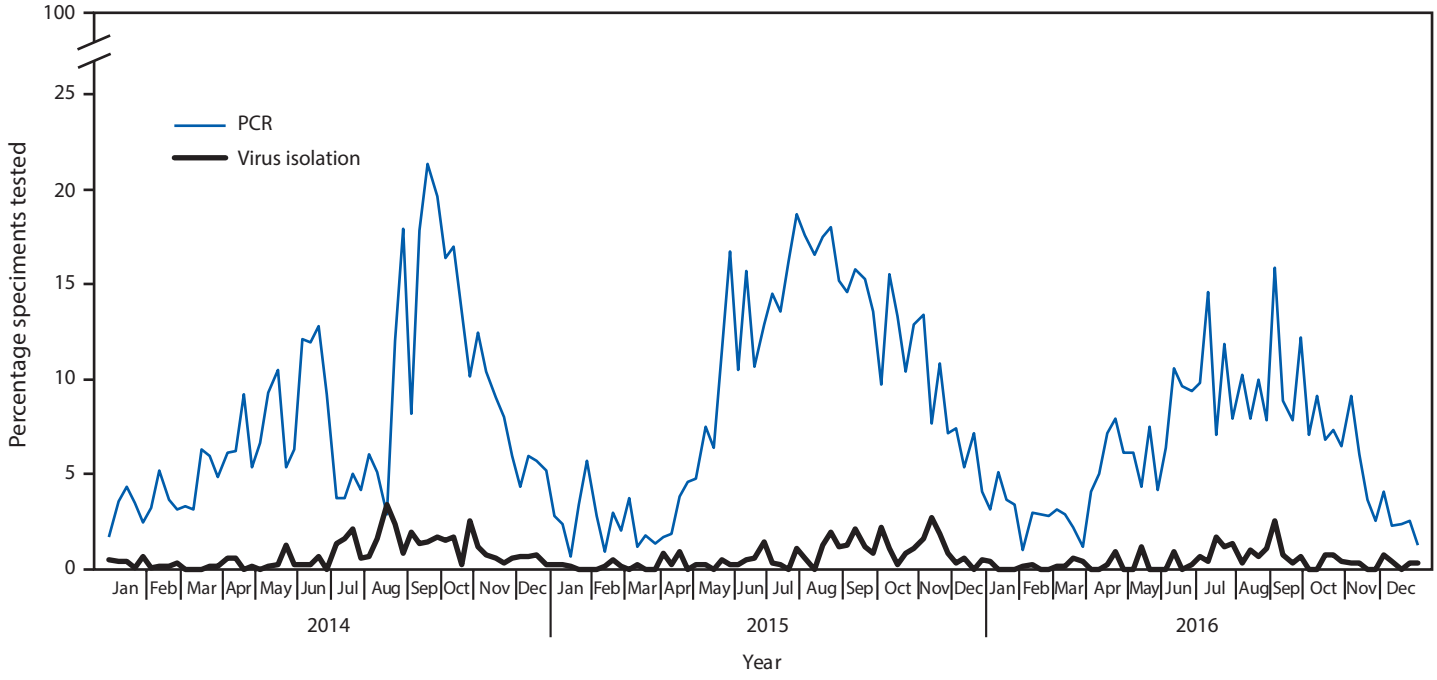
Data reported to NREVSS were used to evaluate trends in the percentage of tests positive for EV over time. Among 62,210 specimens from which virus isolation was attempted in 47 laboratories, 0.6% (347) tested positive for untyped EV; among 70,915 specimens tested in 72 laboratories by reverse transcription–polymerase chain reaction, 5,555 (7.8%) tested positive. The percentage of specimens testing positive peaked in summer or early fall for all years (Figure 2). The decline in

BOX. Distribution of the 15 enterovirus and human parechovirus types most frequently reported, by year — National Enterovirus Surveillance System, United States, 2014–2016

2014 (N = 2,051)		2015 (N = 370)		2016 (N = 337)		2014–2016 (N = 2,758)	
Type	No. (%)	Type	No. (%)	Type	No. (%)	Type	No (%)
Enterovirus D68	1,395 (68.0)	Echovirus 30	100 (27.0)	Enterovirus D68	138 (40.9)	Enterovirus D68	1,542 (55.9)
Coxsackievirus B3	98 (4.8)	Echovirus 18	61 (16.5)	Coxsackievirus A6	39 (11.6)	Echovirus 30	159 (5.8)
Coxsackievirus A6	86 (4.2)	Coxsackievirus A6	27 (7.3)	Coxsackievirus B4	18 (5.3)	Coxsackievirus A6	152 (5.5)
Echovirus 11	52 (2.5)	Echovirus 3	21 (5.7)	Echovirus 6	15 (4.5)	Echovirus 18	116 (4.2)
Echovirus 18	52 (2.5)	Echovirus 9	21 (5.7)	Parechovirus A3	15 (4.5)	Coxsackievirus B3	109 (4.0)
Echovirus 30	49 (2.4)	Coxsackievirus A9	19 (5.1)	Coxsackievirus A9	14 (4.2)	Echovirus 9	65 (2.4)
Parechovirus A3	43 (2.1)	Coxsackievirus B4	15 (4.1)	Coxsackievirus B2	10 (3.0)	Echovirus 11	64 (2.3)
Echovirus 9	41 (2.0)	Coxsackievirus B5	15 (4.1)	Echovirus 30	10 (3.0)	Parechovirus A3	62 (2.3)
Coxsackievirus B2	36 (1.8)	Echovirus 6	11 (3.0)	Coxsackievirus B1	9 (2.7)	Coxsackievirus B4	55 (2.0)
Coxsackievirus B5	32 (1.6)	Echovirus 25	10 (2.7)	Parechovirus A1	9 (2.7)	Coxsackievirus B5	53 (1.9)
Coxsackievirus A21	27 (1.3)	Coxsackievirus B3	9 (2.4)	Echovirus 11	8 (2.4)	Coxsackievirus B2	50 (1.8)
Enterovirus A71	23 (1.1)	Enterovirus D68	9 (2.4)	Coxsackievirus A10	7 (2.1)	Coxsackievirus A9	40 (1.5)
Coxsackievirus B4	22 (1.1)	Coxsackievirus A16	8 (2.2)	Coxsackievirus B5	6 (1.8)	Echovirus 6	40 (1.5)
Coxsackievirus A16	14 (0.7)	Coxsackievirus A5	6 (1.6)	Coxsackievirus A16	5 (1.5)	Echovirus 3	33 (1.2)
Echovirus 6	14 (0.7)	Coxsackievirus A10	5 (1.4)	Coxsackievirus A2	5 (1.5)	Coxsackievirus A16	27 (1.0)
—	—	Parechovirus A1*	5 (1.4)	—	—	Coxsackievirus A21*	27 (1.0)
Total	**1,984 (96.8)**	**Total**	**342 (92.4)**	**Total**	**308 (91.4)**	**Total**	**2,594 (94.1)**

* Additional types are shown where the least common type shown occurred with equal frequency.

FIGURE 2. Percentage of specimens tested that were enterovirus-positive, by week and testing method used — National Respiratory and Enteric Virus Surveillance System, United States, 2014–2016



Abbreviation: PCR = polymerase chain reaction.

the percentage of positive results during July and August 2014 was associated with a substantial increase in the number of EV tests performed during the EV-D68 outbreak period.

Discussion

EV and PeV type surveillance in the United States was affected by the 2014 EV-D68 outbreak (*1*); this type accounted for 68% of identified types in 2014 and 56% of all reported types during 2014–2016. Increased vigilance and the need for rapid identification of new cases led to a large increase in diagnostic testing for EV and respiratory viruses among patients with respiratory illness during the late summer and autumn months of 2014. The number of reports with known type in 2014 was approximately three times higher than the 594 reports of EV and PeV in 2012, the year during the 2009–2013 period that witnessed the largest number of reports of typed EV and PeV (*2*,*3*).

The objectives of type-based EV and PeV surveillance in the United States are to 1) help public health practitioners determine long-term patterns of circulation for individual types, 2) interpret trends in picornavirus-associated illnesses by associating them with circulating types, 3) support recognition of disease outbreaks associated with circulating types, 4) guide the development of new diagnostic tests and therapies, and 5) monitor detections of poliovirus, which is nationally notifiable in the United States.

Reports to NESS continue to be affected by changes in diagnostic practices. For example, qualitative pan-EV molecular testing has largely replaced traditional cell culture virus isolation techniques in clinical settings because it produces results in a clinically relevant time frame and is more analytically sensitive (*4*). However, pan-EV molecular testing does not produce type-level results provided by viral culture, resulting in a lower frequency of reporting to NESS compared with prior decades (*4*). A CDC-developed real-time reverse transcription–polymerase chain reaction test for EV-D68 was widely adopted among public health laboratories in 2014. Qualitative pan-PeV testing is not as common as pan-EV testing in clinical laboratories in the United States, and PeV typing, for the most part, is limited to reference laboratories.

The findings in this report are subject to at least four limitations. First, NESS is a passive surveillance system that relies on voluntary reports from laboratories, and EV and PeV infections, except for polio, are not nationally notifiable in the United States. Second, to minimize the reporting burden for participating laboratories, patient-level clinical information is not routinely collected, so it is not possible to associate reported types with specific clinical manifestations or severity of illness. Third, typing tends to occur primarily during summer months, which might lead to underreporting of EV and PeV during other times of the year. Finally, although participating laboratories are encouraged to report monthly, reports are often delayed, making the timely compilation of data difficult.

Summary

What is already known about this topic?

Enterovirus (EV) and parechovirus (PeV) infections can cause a variety of illnesses, ranging from asymptomatic infection to severe illness and death, and are divided into types.

What is added by this report?

During 2014–2016, reports of EV and PeV peaked in summer and early fall. Enterovirus D68 was the most frequently reported type (56%); echovirus 30, coxsackievirus A6, echovirus 18, and coxsackievirus B3 were also frequently reported.

What are the implications for public health practice?

Improved type-based surveillance can inform disease prevention strategies by supporting outbreak detection and guiding the development of new tests and interventions. Improving surveillance would require increasing the number and capacity of participating laboratories and timely reporting.

Recent outbreaks, such as those of EV-D68–associated respiratory illness, CV-A6–associated severe hand, foot, and mouth disease, and a cluster of severe PeV-A3 infections among infants (*1*,*3*,*5*), highlight the continuing need for robust EV and PeV type surveillance. The associations between certain EV and PeV types and specific clinical manifestations have been well documented, but the epidemiology and associated clinical syndromes of many other EV and PeV types remain poorly characterized. Timely and robust type-based EV and PeV surveillance has the potential to inform disease prevention strategies by supporting the recognition of outbreaks and guiding the development of diagnostic tests and interventions. To do so would require improved maintenance and modernization of typing capacity within laboratories, timely and consistent reports from participating laboratories, and an increase in the number of reporting laboratories.

Conflict of Interest

W. Allan Nix and M. Steven Oberste report U.S. patent number 7,247,457 issued for the detection and identification of enteroviruses by seminested amplification of the enterovirus VP1 protein; U.S. patent number 7,714,122 issued for kits used for detecting and identifying enteroviruses using nucleic acid molecules VP1 and VP3; U.S. patent number 8,048,630 issued for methods and agents for detecting parechovirus. W. Allan Nix also reports pending patent for compositions and methods for detecting enterovirus D68, provisional patent application serial no. 62/171,657. No other conflicts of interest were reported.

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Tobacco Cessation Interventions and Smoke-Free Policies in Mental Health and Substance Abuse Treatment Facilities — United States, 2016

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Persons with mental or substance use disorders or both are more than twice as likely to smoke cigarettes as persons without such disorders and are more likely to die from smoking-related illness than from their behavioral health conditions (*1*,*2*). However, many persons with behavioral health conditions want to and are able to quit smoking, although they might require more intensive treatment (*2*,*3*). Smoking cessation reduces smoking-related disease risk and could improve mental health and drug and alcohol recovery outcomes (*1*,*3*,*4*). To assess tobacco-related policies and practices in mental health and substance abuse treatment facilities (i.e., behavioral health treatment facilities) in the United States (including Puerto Rico), CDC and the Substance Abuse and Mental Health Services Administration (SAMHSA) analyzed data from the 2016 National Mental Health Services Survey (N-MHSS) and the 2016 National Survey of Substance Abuse Treatment Services (N-SSATS). In 2016, among mental health treatment facilities, 48.9% reported screening patients for tobacco use, 37.6% offered tobacco cessation counseling, 25.2% offered nicotine replacement therapy (NRT), 21.5% offered non-nicotine tobacco cessation medications, and 48.6% prohibited smoking in all indoor and outdoor locations (i.e., smoke-free campus). In 2016, among substance abuse treatment facilities, 64.0% reported screening patients for tobacco use, 47.4% offered tobacco cessation counseling, 26.2% offered NRT, 20.3% offered non-nicotine tobacco cessation medications, and 34.5% had smoke-free campuses. Full integration of tobacco cessation interventions into behavioral health treatment, coupled with implementation of tobacco-free campus policies in behavioral health treatment settings, could decrease tobacco use and tobacco-related disease and could improve behavioral health outcomes among persons with mental and substance use disorders (*1*–*4*).

SAMHSA conducts N-MHSS and N-SSATS annually among all known public and private facilities in the United States that provide mental health or substance abuse treatment services.* Survey respondents are typically facility administrators or others knowledgeable about facility operations; web-based and paper options for completion are available. In 2016, 12,745 eligible mental health treatment facilities responded to N-MHSS (response rate = 91.1%) and 14,632 eligible substance abuse treatment facilities responded to N-SSATS (91.4%). Facilities in U.S. territories, except Puerto Rico, and facilities that did not respond to one or more tobacco-related questions assessed in this report were excluded, yielding a total of 12,136 mental health and 14,263 substance abuse treatment facilities.† Descriptive statistics were assessed nationally and by state.

In 2016, tobacco screening was the most commonly implemented tobacco-related practice in mental health (48.9%) and substance abuse (64.0%) treatment facilities (Table). Cessation counseling was the most commonly offered tobacco dependence treatment in mental health (37.6%) and substance abuse (47.4%) treatment facilities. Approximately one fourth of all mental health (25.2%) and substance abuse (26.2%) treatment facilities offered NRT, and approximately one fifth of mental health (21.5%) and substance abuse (20.3%) treatment facilities offered non-nicotine medications. Approximately half of mental health (48.6%) and one third of substance abuse treatment facilities (34.5%) reported having smoke-free campuses. Among facilities with smoke-free campuses, 57.3% of mental health and 39.4% of substance abuse treatment facilities did not report offering counseling, 67.6% of mental health and 65.7% of substance abuse treatment facilities did not report offering NRT, and 74.6% and 75.8% did not report offering non-nicotine medications.

By state, the percentage of facilities offering tobacco cessation counseling ranged from 20.5% (Idaho) to 68.2% (Oklahoma) among mental health facilities and from 26.9% (Kentucky) to 85.0% (New York) among substance abuse treatment facilities. The percentage of facilities with smoke-free campus policies ranged from 19.9% (Idaho) to 77.7% (Oklahoma) among mental health treatment facilities and from 10.0% (Idaho) to 83.0% (New York) among substance abuse treatment facilities. In 31 states, fewer than half of mental health facilities

*N-MHSS: https://www.samhsa.gov/data/sites/default/files/2016_National_Mental_Health_Services_Survey.pdf. N-SATSS: https://www.samhsa.gov/data/sites/default/files/2016_NSSATS.pdf. Excluded for N-MHSS were facilities whose client counts were included in other facilities' counts and whose facility characteristics were not reported separately and facilities that provided administrative services only. Excluded for N-SSATS were nontreatment halfway houses, solo practices not approved by the state agency for inclusion, and facilities that treated incarcerated clients only.

† This report does not include data collected from the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, Guam, the Republic of Palau, or the U.S. Virgin Islands because they are not reported separately by N-MHSS and N-SSATS.

TABLE. Number and percentage of mental health and substance abuse treatment facilities that offer tobacco screening and cessation treatment and that prohibit smoking in all indoor and outdoor settings, by type of facility — National Mental Health Services Survey and National Survey of Substance Abuse Treatment Services, United States, including Puerto Rico, 2016

Characteristic/ Location	Mental health treatment facilities*						Substance abuse treatment facilities†					
		% Offering treatment/smoke-free campus						% Offering treatment/smoke-free campus				
	No. of facilities	Screening for tobacco use	Smoking/ Tobacco cessation counseling	Nicotine replacement therapy	Non-nicotine cessation medications	Smoke-free campus	No. of facilities	Screening for tobacco use	Smoking/ Tobacco cessation counseling	Nicotine replacement therapy	Non-nicotine cessation medications	Smoke-free campus
Overall§	**12,136**	**48.9**	**37.6**	**25.2**	**21.5**	**48.6**	**14,263**	**64.0**	**47.4**	**26.2**	**20.3**	**34.5**
Facility type												
Private for-profit	2,152	41.6	36.3	24.0	19.7	39.2	5,044	54.9	39.1	19.3	16.3	22.4
Private nonprofit	7,700	47.0	34.1	21.1	17.9	52.8	7,600	67.5	50.5	28.0	20.2	41.3
Public agency/ department	2,284	61.9	50.6	40.1	35.0	43.3	1,619	75.7	58.7	39.5	32.9	40.7
State												
Alabama	193	39.9	31.1	26.4	19.2	31.1	135	34.8	37.0	17.0	10.4	10.4
Alaska	99	57.6	38.4	22.2	15.2	67.7	94	78.7	54.3	17.0	13.8	47.9
Arizona	377	46.7	38.7	17.2	21.0	27.3	355	62.0	43.1	30.1	27.3	30.1
Arkansas	235	32.8	27.2	16.6	11.5	41.3	113	51.3	48.7	20.4	12.4	47.8
California	877	37.6	26.9	17.2	13.1	41.2	1,413	51.5	42.3	19.6	15.6	22.4
Colorado	185	55.7	48.6	32.4	25.4	61.1	393	63.6	45.8	19.8	17.8	34.1
Connecticut	230	52.6	44.8	33.0	32.2	57.8	223	79.4	55.6	43.5	35.4	39.0
Delaware	29	41.4	37.9	20.7	24.1	55.2	45	60.0	40.0	26.7	20.0	33.3
District of Columbia	41	46.3	36.6	14.6	17.1	51.2	34	38.2	32.4	23.5	17.6	32.4
Florida	488	47.1	35.2	26.8	19.1	45.7	706	55.4	44.8	33.4	22.8	28.9
Georgia	219	42.9	27.4	20.1	16.4	39.3	311	45.7	32.8	19.9	16.7	25.1
Hawaii	45	48.9	62.2	33.3	40.0	42.2	174	82.8	66.7	6.3	5.2	65.5
Idaho	176	24.4	20.5	10.8	13.6	19.9	140	42.1	30.0	10.7	15.0	10.0
Illinois	391	42.5	30.7	24.8	20.5	43.5	671	50.1	28.2	16.5	13.1	24.6
Indiana	301	67.8	56.8	37.5	35.9	73.8	262	69.1	48.1	26.3	26.0	59.5
Iowa	155	38.7	26.5	20.0	16.8	58.1	163	78.5	43.6	29.4	18.4	58.9
Kansas	119	35.3	21.8	21.8	14.3	44.5	200	41.0	33.5	14.5	14.0	22.5
Kentucky	221	41.2	22.6	16.7	11.8	34.8	361	57.1	26.9	13.9	9.1	15.8
Louisiana	186	54.8	44.1	37.1	31.7	43.5	150	65.3	49.3	40.7	24.7	30.7
Maine	203	49.8	36.0	11.8	11.8	59.1	228	72.4	49.1	21.1	16.2	46.5
Maryland	291	45.0	34.4	19.2	17.2	45.4	397	71.8	49.4	20.7	13.4	30.5
Massachusetts	337	50.1	39.5	27.6	21.4	57.3	351	87.2	77.5	43.9	35.3	34.2
Michigan	359	49.0	41.5	28.4	22.8	49.0	477	56.2	38.8	19.3	15.3	32.3
Minnesota	240	52.9	39.6	26.7	25.8	44.6	369	58.3	31.2	24.1	16.5	15.2
Mississippi	180	39.4	30.6	21.1	16.7	38.9	94	43.6	37.2	26.6	16.0	25.5
Missouri	219	59.4	50.7	42.9	32.9	55.3	286	61.9	44.1	24.5	19.9	28.3
Montana	88	42.0	25.0	17.0	17.0	39.8	64	50.0	39.1	29.7	17.2	26.6
Nebraska	128	54.7	32.0	22.7	18.8	43.0	136	61.0	41.2	26.5	24.3	35.3
Nevada	51	39.2	27.5	23.5	15.7	23.5	80	56.3	46.3	31.3	27.5	40.0
New Hampshire	61	67.2	50.8	41.0	32.8	55.7	64	78.1	59.4	34.4	34.4	37.5
New Jersey	318	37.7	37.4	23.6	20.8	42.5	368	67.7	54.1	24.2	16.3	29.1
New Mexico	72	44.4	34.7	34.7	19.4	48.6	153	60.8	34.6	22.2	20.9	34.0
New York	896	77.2	62.8	38.1	38.3	65.6	916	94.0	85.0	58.5	39.1	83.0
North Carolina	303	39.9	30.4	21.8	19.1	51.5	483	59.6	42.9	23.8	20.9	26.3
North Dakota	31	67.7	38.7	25.8	19.4	74.2	59	81.4	42.4	15.3	16.9	18.6
Ohio	574	38.9	31.5	20.0	15.7	48.3	398	60.1	37.4	28.6	20.9	30.9
Oklahoma	148	75.0	68.2	38.5	40.5	77.7	204	81.9	68.6	23.5	19.6	68.6
Oregon	170	54.1	39.4	27.6	21.8	63.5	221	89.1	72.9	27.1	19.5	56.6
Pennsylvania	586	51.0	32.4	24.1	20.3	42.7	524	62.0	40.1	23.3	16.4	17.9
Puerto Rico	88	40.9	44.3	17.0	20.5	67.0	140	41.4	41.4	13.6	13.6	34.3
Rhode Island	62	62.9	50.0	22.6	21.0	35.5	52	78.8	57.7	42.3	36.5	26.9
South Carolina	121	33.1	33.9	29.8	23.1	44.6	113	72.6	48.7	22.1	15.0	34.5
South Dakota	48	47.9	33.3	18.8	22.9	45.8	62	87.1	40.3	27.4	24.2	35.5
Tennessee	292	51.4	28.8	26.0	17.5	41.1	226	50.4	31.9	23.5	24.3	22.1
Texas	361	58.4	46.3	43.8	30.7	53.2	484	70.2	55.4	24.0	16.5	34.3
Utah	116	51.7	57.8	25.0	26.7	70.7	233	68.7	62.7	33.5	30.9	48.5
Vermont	76	47.4	46.1	34.2	32.9	63.2	46	93.5	63.0	54.3	41.3	69.6
Virginia	273	52.4	33.3	23.1	17.9	45.8	226	64.2	41.2	23.5	21.7	28.3
Washington	283	54.4	30.0	15.2	12.7	46.3	425	78.6	49.9	15.3	11.3	33.9
West Virginia	113	33.6	27.4	22.1	15.9	40.7	106	50.9	36.8	32.1	24.5	25.5
Wisconsin	430	37.0	30.9	15.6	14.0	47.4	277	60.6	47.7	28.9	30.0	37.2
Wyoming	51	58.8	33.3	13.7	17.6	51.0	58	72.4	72.4	50.0	34.5	43.1

* Data from National Mental Health Services Survey, 2016.
† Data from National Survey of Substance Abuse Treatment Services, 2016.
§ Does not include Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Republic of Palau, or U.S. Virgin Islands.

had smoke-free campuses (Figure 1), and fewer than half of substance abuse facilities had smoke-free campuses in 43 states, the District of Columbia, and Puerto Rico (Figure 2).

Discussion

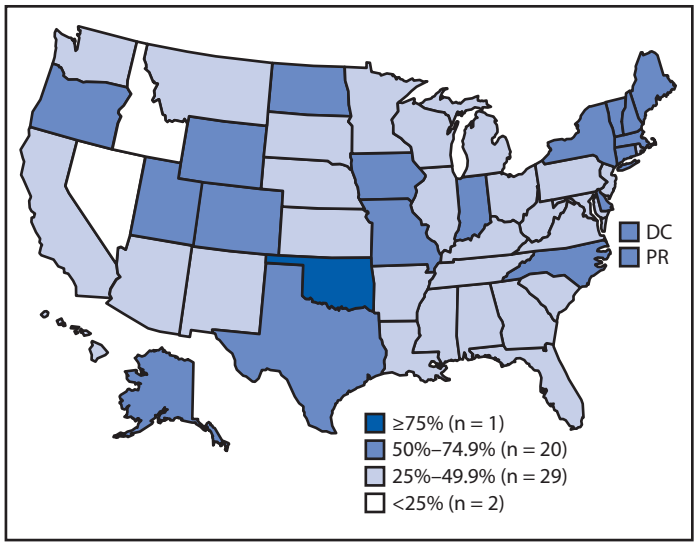
Opportunities exist to enhance both smoke-free environments and tobacco cessation treatment in mental health and substance abuse treatment settings. In 2016, fewer than half of such facilities in the United States (including Puerto Rico) offered evidence-based tobacco cessation treatments, and substantial proportions of facilities with smoke-free campus policies did not report offering tobacco cessation counseling or medications. Given that tobacco cessation in behavioral health treatment could improve both physical and behavioral health outcomes, and continued smoking worsens those outcomes, behavioral health treatment facilities are an important setting for evidence-based tobacco cessation interventions (*3*,*4*).

Several factors might contribute to the relatively low availability of evidence-based tobacco cessation treatments and smoke-free environments in behavioral health settings. First, some behavioral health treatment providers have viewed smoking cessation as a low priority relative to treatment of behavioral health conditions (*2*,*5*). Although smoking cessation could improve behavioral health outcomes (*3*,*4*), some providers are concerned that receiving smoking cessation treatment or quitting smoking during behavioral health treatment could exacerbate mental health symptoms or jeopardize substance abuse recovery (*3*,*4*). However, the latest evidence does not support these concerns (*1*,*3*,*5*). Notwithstanding, it is important to monitor patients during smoking cessation; for example, because smoking increases metabolism of some psychotropic medications, dosages might need to be adjusted among patients who have quit (*1*,*3*,*5*). Some behavioral health providers also believe that behavioral health patients who smoke are either unable or unwilling to quit (*1*–*3*). However, many smokers with behavioral health conditions want to quit smoking, are able to quit, and benefit from evidence-based smoking cessation treatments (*1*–*3*). Second, a lack of provider incentives for delivering tobacco cessation treatment, including reimbursement challenges, might pose additional barriers (*5*). Finally, in the past, the tobacco industry has opposed smoke-free psychiatric hospital policies, donated cigarettes to mental health facilities, and funded research suggesting that patients with psychiatric illnesses need tobacco for self-medication (*1*,*2*).

Several actions could help address actual and perceived barriers to integrating tobacco dependence treatment into behavioral health treatment. These actions could include removing administrative and financial barriers to delivery of cessation interventions and integrating tobacco screening and treatment protocols into facilities' workflows and electronic health record systems (*1*,*2*,*5*). In addition, outreach to behavioral health providers could emphasize that their patients can benefit from evidence-based cessation treatments, although longer duration or more intensive cessation treatments might be indicated (*1*,*5*).

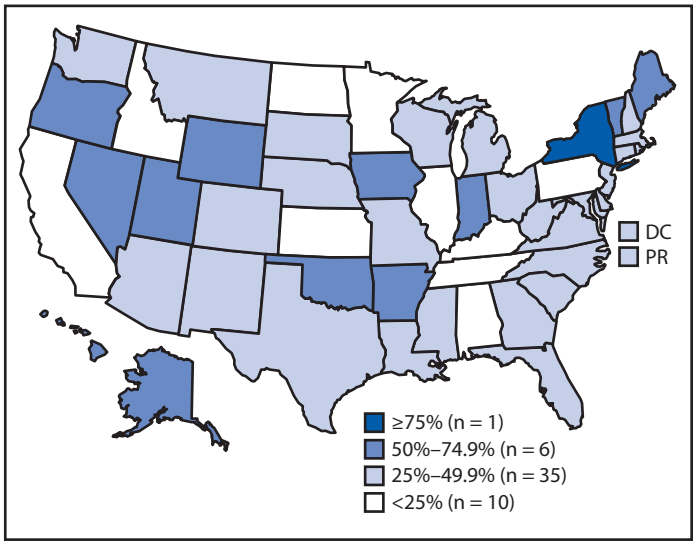
Progress has been achieved in recent years in addressing tobacco use in behavioral health treatment settings.[§] For

FIGURE 1. Percentage of mental health treatment facilities that prohibit smoking in all indoor and outdoor locations — National Mental Health Services Survey, United States, 2016



Abbreviations: DC = District of Columbia; PR = Puerto Rico.

FIGURE 2. Percentage of substance abuse treatment facilities that prohibit smoking in all indoor and outdoor locations — National Survey of Substance Abuse Treatment Services, United States, 2016



Abbreviations: DC = District of Columbia; PR = Puerto Rico.

[§] https://smokingcessationleadership.ucsf.edu/leadership-and-policy-academies.

example, New York adopted regulations requiring tobacco-free campus policies in state-funded or state-certified substance abuse treatment programs and expanded Medicaid cessation benefits to allow unlimited quit attempts per year. Oklahoma improved access to treatment by eliminating copayments and prior authorization for tobacco cessation treatment for Medicaid enrollees. In addition, Oklahoma required that all substance abuse treatment facilities and state-contracted mental health treatment facilities implement tobacco-free campus policies, conduct evidence-based clinical cessation interventions, and document tobacco quitline referrals. In 2016, the Smoking Cessation Leadership Center and the American Cancer Society convened health experts, organizations, and federal agencies, including CDC and SAMHSA, to create a national action plan to reduce smoking among persons with behavioral health issues from 34% in 2015 to 30% by the year 2020.¶

The association between cigarette smoking and both substance abuse onset and relapse reinforces the importance of tobacco prevention and cessation efforts across the lifespan. Preventing tobacco use initiation might be viewed as a primary substance abuse prevention strategy because of the association between adolescent cigarette smoking and subsequent drug dependence (*6*). Animal models suggest that adolescent exposure to nicotine increases susceptibility to addiction to other substances (*6*), including alcohol, cocaine, methamphetamine (*6*), and opioids (*7*). In the current context of rising demand for opioid addiction treatment,** it is noteworthy that nicotine and opioid addictions are mutually reinforcing, whereas smoking cessation is associated with long-term abstinence after opioid treatment (*8*,*9*). In addition, cigarette smoking and chronic pain might interact in ways that might make smokers with chronic pain especially susceptible to opioid misuse (*8*). Therefore, efforts to increase tobacco cessation and prevent youth tobacco initiation, including during substance abuse treatment, are important components of a comprehensive strategy to prevent and reduce substance abuse.

The findings in this report are subject to at least three limitations. First, data are self-reported by facility personnel and might be subject to bias. Second, data are at the facility level rather than patient level and facilities are counted equally regardless of size, precluding estimates of individual patients' access to cessation interventions. Finally, use of cessation treatments or implementation of smoke-free policies could not be assessed, including whether policies permit use of e-cigarettes and other tobacco products. Tobacco-free campus policies that prohibit all forms of tobacco product use, including use of e-cigarettes and smokeless tobacco, can support tobacco cessation, reinforce tobacco-free norms, and eliminate exposure to secondhand tobacco product emissions (*6*).

A comprehensive effort to reduce tobacco-related disparities among persons with behavioral health conditions includes clinical cessation interventions, as well as population-level measures to reduce the appeal, accessibility, and social acceptability of tobacco use outside the clinical context (*1*). Proven interventions, including raising tobacco prices, implementing comprehensive smoke-free laws, conducting media campaigns, and providing barrier-free access to proven cessation treatments, are critical to reduce smoking-related disease and death in the United States (*1*,*6*).

Summary

What is already known about this topic?

Many persons with mental or substance use disorders who smoke want to and can quit smoking.

What is added by this report?

In 2016, among mental health facilities, 49% screened patients for tobacco use, 38% offered tobacco cessation counseling, and 49% had smoke-free campuses; corresponding estimates for substance abuse facilities were 64%, 47%, and 35%, respectively. Approximately one in four behavioral health treatment facilities offered nicotine replacement therapy; one in five offered non-nicotine cessation medications.

What are the implications for public health practice?

Tobacco-free campus policies and integration of tobacco cessation interventions in behavioral health treatment facilities could decrease tobacco-related disease and death and could improve behavioral health outcomes among persons with mental and substance use disorders.

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Conflict of Interest

No conflicts of interest were reported.

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¶ https://smokingcessationleadership.ucsf.edu/national-partnership-behavioral-health-and-tobacco-use.

** See example at https://psychcentral.com/news/2016/12/26/many-rural-opioid-users-on-long-waiting-lists-for-treatment/114354.html.

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Progress Toward Polio Eradication — Worldwide, January 2016–March 2018

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In 1988, when an estimated 350,000 cases of poliomyelitis occurred in 125 countries, the World Health Assembly resolved to eradicate polio globally. Transmission of wild poliovirus (WPV) continues uninterrupted in only three countries (Afghanistan, Nigeria, and Pakistan) (*1*), and among the three serotypes, WPV type 1 (WPV1) remains the only confirmed circulating type. This report describes global progress toward polio eradication during January 2016–March 2018, and updates previous reports (*2*). In 2017, 22 WPV1 cases were reported, a 41% decrease from the 37 WPV1 cases reported in 2016. As of April 24, 2018, eight WPV1 cases have been reported (seven in Afghanistan and one in Pakistan), compared with five cases during the same period in 2017. In Pakistan, continuing WPV1 transmission has been confirmed in multiple areas in 2018 by isolation from wastewater samples. In Nigeria, ongoing endemic WPV1 transmission was confirmed in 2016 (*3*); although WPV was not detected in 2017 or in 2018 to date, limitations in access for vaccination and surveillance in insurgent-held areas in northeastern Nigeria might permit continued undetected poliovirus transmission. Substantial progress toward polio eradication has continued in recent years; however, interruption of WPV transmission will require overcoming remaining challenges to reaching and vaccinating every missed child. Until poliovirus eradication is achieved, all countries must remain vigilant by maintaining high population immunity and sensitive poliovirus surveillance.

Routine Poliovirus Vaccination Coverage

Among infants aged 1 year, the estimated global coverage with 3 doses of poliovirus vaccines (Pol3, mostly oral poliovirus vaccine [OPV]) through routine immunization services was 85% in 2016 (the most recent year for which data are available). World Health Organization (WHO)/United Nations Children's Fund estimates for Pol3 coverage in 2016 were 73% in the African Region, 92% in the Region of the Americas, 80% in the Eastern Mediterranean Region, 94% in the European Region, 87% in the South-East Asia Region, and 95% in the Western Pacific Region, with heterogeneity in coverage among countries in all regions.* National Pol3 coverage with the third dose of OPV (OPV3) in the three countries with endemic WPV transmission in 2016 was 60% in Afghanistan, 72% in Pakistan, and 49% in Nigeria. OPV3 coverage is substantially lower in areas of WPV transmission, where children in high-risk mobile populations or areas of conflict are repeatedly missed (*4*,*5*). Rarely, in areas with low vaccination coverage, Sabin-like viruses can spread and revert to neurovirulence, resulting in outbreaks of disease caused by circulating vaccine-derived polioviruses (cVDPV). Approximately 90% of cVPDV cases reported since 2006 have been caused by type 2 (cVDPV2). In countries with recent cVDPV detections, Pol3 coverage was 74% in the Democratic Republic of the Congo (DRC), 48% in Syria, 47% in Somalia, and 83% in Laos (*6*). In these countries, OPV3 coverage was substantially lower in subnational areas with cVDPV emergence and transmission.

Following certification of the eradication of WPV type 2 (WPV2) in 2015, a global, synchronized withdrawal of trivalent OPV (tOPV, containing types 1, 2, and 3 live, attenuated polioviruses), and switch to bivalent OPV (bOPV, containing types 1 and 3 only), was completed by the end of April 2016 (*7*). Starting in 2015, injectable trivalent inactivated poliovirus vaccine (IPV) was introduced into routine immunization schedules in OPV-using countries, generally at 14 weeks of age. Some countries had to delay introduction of IPV until 2018 because of global shortages of the vaccine.

Supplementary Immunization Activities

In 2016, 186 supplementary immunization activities (SIAs) were conducted in five WHO regions, during which approximately two billion total OPV and IPV doses were administered (Table 1), including 1,264,552,301 (63%) doses administered during national immunization days, 710,995,110 (36%) during subnational immunization days, and 17,603,036 (1%) doses during focused SIAs in areas of known or suspected poliovirus circulation ("mop-up" activities). In the event of cVDPV2 outbreaks, on advice of the monovalent OPV type 2 (mOPV2) Global Advisory Group, the WHO Director-General releases mOPV2 for outbreak response immunization. Of the administered doses, more than half (51%) were tOPV and approximately half (47%) were bOPV; an additional 1.4% were mOPV2, 0.05% were IPV plus bOPV, 0.2% were IPV alone, and 0.15% were fractional IPV (0.1 mL administered intradermally).

In 2017, 172 SIAs were conducted in five WHO regions, during which approximately 1.79 billion total OPV and IPV doses were administered, including 1,110,923,756 (62%) doses administered during national immunization days, 672,091,158

* http://apps.who.int/immunization_monitoring/globalsummary/timeseries/tswucoveragepol3.html.

TABLE 1. Number of supplementary immunization activities (SIAs) conducted, and number of oral poliovirus vaccine (OPV) and inactivated poliovirus (IPV) doses administered, by World Health Organization (WHO) region — worldwide, 2016–2017

Year/SIAs/Vaccine doses administered	Region						
	Global	AFR	AMR	EMR	EUR	SEAR	WPR
2016							
SIAs (no.)	**186**	97	0	67	2	14	6
Vaccine (no. of doses administered)							
mOPV2	**28,357,599**	28,357,599	0	0	0	0	0
bOPV	**940,622,006**	274,197,570		397,909,506	54,880,271	206,507,773	7,126,886
tOPV	**1,017,074,205**	407,366,635	0	103,470,392	1,097,605	496,401,815	8,737,758
IPV	**3,293,021**	1,943,763		134,9258	0	0	0
IPV + bOPV	**904,050**	0	0	904,050	0	0	0
fIPV	**2,899,566**	0	0	252,354	0	2,647,212	0
Total doses	**1,993,150,447**	**711,865,567**	**0**	**503,885,560**	**55,977,876**	**705,556,800**	**15,864,644**
2017							
SIAs (no.)	**172**	82	0	79	2	8	1
Vaccine (no. of doses administered)							
mOPV2	**70,356,186**	65,067,196	0	5,288,990	0	0	0
bOPV	**1,705,913,274**	519,920,180	0	488,368,342	389,314	696,180,796	1,054,642
tOPV	**0**	0	0	0	0	0	0
IPV	**3,522,237**	558,897	0	2,963,340	0	0	0
IPV + bOPV	**8,920,134**		0	8,920,134	0	0	0
fIPV	**0**	0	0	0	0	0	0
Total doses	**1,788,711,831**	**585,546,273**	**0**	**505,540,806**	**389,314**	**696,180,796**	**1,054,642**

Abbreviations: AFR = African Region, AMR = Region of the Americas; bOPV2 = bivalent oral poliovirus, types 1 and 3; EMR = Eastern Mediterranean Region; EUR = European Region; fIPV = fractional dose inactivated poliovirus vaccine (one fifth of a 0.5 mL intramuscular dose, given intradermally); IPV = inactivated poliovirus vaccine; mOPV2 = monovalent oral poliovirus, type 2; SEAR = South-East Asia Region; tOPV2 = trivalent oral poliovirus, types 1, 2, 3; WPR = Western Pacific Region.

(38%) during subnational immunization days, and 5,696,917 (0.3%) during mop-up activities. Of the administered doses, 95% were bOPV, 3.9% were mOPV2, 0.5% were IPV plus bOPV, and 0.2% were IPV alone.

Poliovirus Surveillance

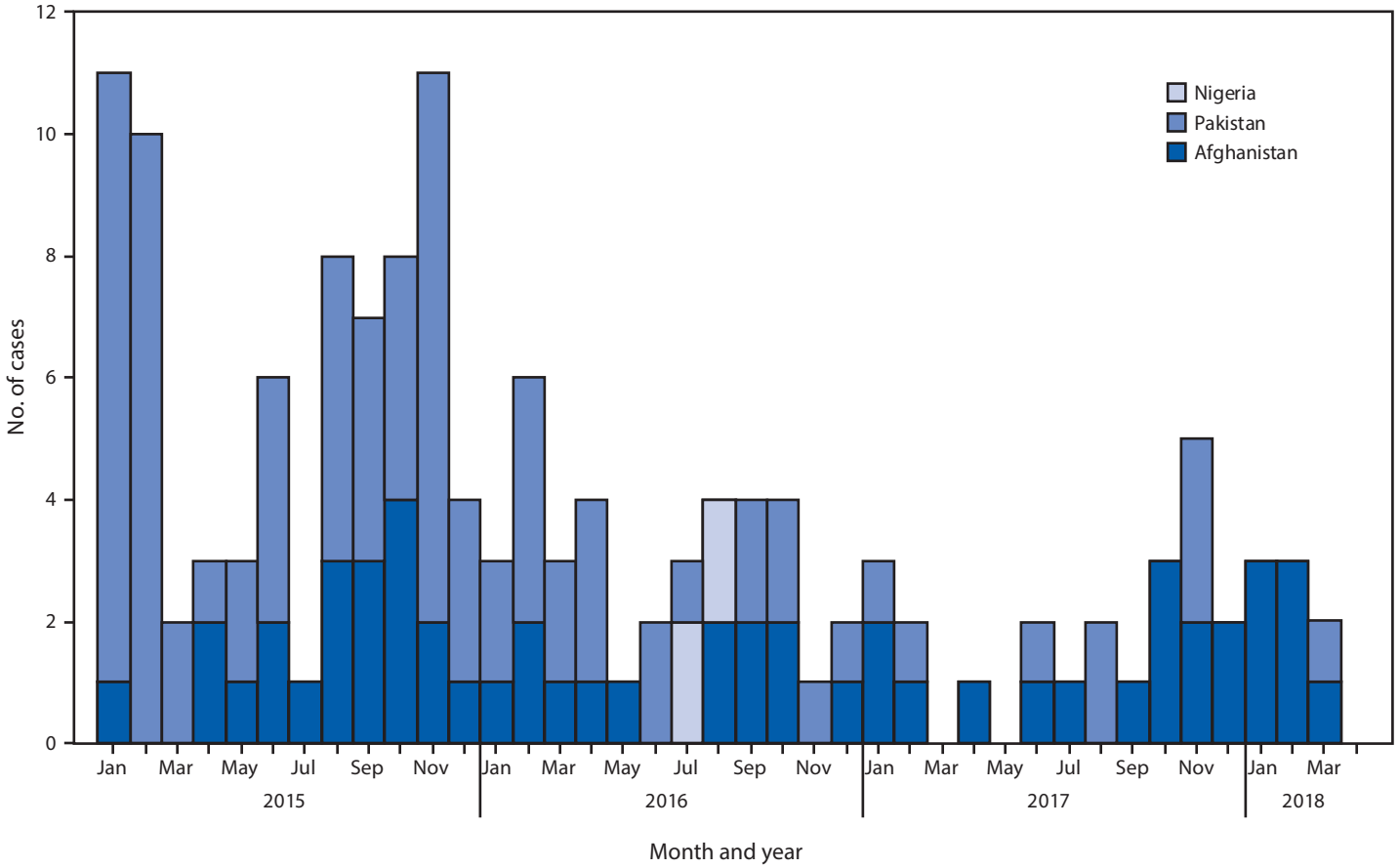
Surveillance for acute flaccid paralysis (AFP) is the means of detecting polio cases caused by WPV or cVDPV, confirmed by stool specimen testing through the Global Polio Laboratory Network. The performance of AFP surveillance is assessed through two main indicators: sensitivity and completeness of case investigation. An annual nonpolio AFP rate of ≥1 case per 100,000 population aged <15 years for countries in the WHO regions certified as poliofree, or ≥2 for all other countries is considered sufficiently sensitive to detect a case of polio, should it occur. Case investigation is considered to be sufficiently complete if at least 80% of reported AFP cases have adequate stool specimens collected (i.e., two stool specimens collected ≥24 hours apart, within 14 days of paralysis onset, with arrival at a WHO-accredited laboratory in good condition). In 2016, among the four countries reporting polio cases, three (Afghanistan, Nigeria, Pakistan) met both performance indicators and one (Laos) did not. Among the five countries reporting polio cases in 2017, four (Afghanistan, DRC, Nigeria, Pakistan) met both performance indicators and one (Syria) did not. Although Nigeria and DRC meet AFP surveillance indicators nationally and subnationally in most provinces, both countries are affected by substantial issues in population accessibility and other impediments to AFP surveillance (*1*). AFP surveillance has been supplemented by environmental surveillance through testing of sewage in many countries, including poliofree countries as well as those with endemic transmission (*1*).

Reported Poliovirus Cases

Countries reporting WPV cases. In 2016, 37 WPV cases were detected (Figure): 13 (35%) in Afghanistan, 20 (54%) in Pakistan, and four (11%) in Nigeria. In 2017, 22 WPV cases were identified: 14 (64%) in Afghanistan and eight (36%) in Pakistan. No WPV cases have been identified in countries outside of Afghanistan, Nigeria, and Pakistan since 2014. During January 1–March 30, 2018, as of April 24, the low poliovirus transmission season, eight WPV1 cases were reported (seven in Afghanistan; one in Pakistan) (Figure) (Table 2).

Afghanistan reported 13 WPV1 cases in four districts in 2016, compared with 14 WPV1 cases in nine districts in 2017 (7.7% increase). In 2016, 54% of WPV1 cases in Afghanistan were reported from Paktika province in the southeastern region. In 2017, 50% of WPV1 cases were reported from Kandahar province in the southern region. During January 1–March 30, 2018, seven WPV1 cases were detected (four in Kandahar province, one in Nangahar province, and two in Kunar province; the

FIGURE. Number of cases of wild poliovirus, by month of onset — worldwide, January 2015–March 2018*



* Data as of April 24, 2018.

latter two provinces are in the eastern region), compared with three WPV1 cases detected during the same period in 2017.

Pakistan reported a 60% decrease in the number of WPV1 cases, from 20 cases in four districts in 2016 to eight cases in seven districts in 2017. During January 1–March 30, 2018, one WPV1 case was reported (in Balochistan province), compared with two reported during the same period in 2017. WPV1 continues to be isolated from environmental surveillance sites in five provinces of the country (Balochistan, Islamabad, Khyber Pakhtunkhwa, Punjab, and Sindh).

Nigeria reported four WPV1 cases in 2016. No WPV1 cases were reported in 2017 and none to date in 2018.

Countries reporting cVDPV cases and isolations. In 2016, five cVDPV cases were reported from three countries (*8*). In Laos, an outbreak that began with eight cVDPV type 1 cases in 2015 continued into 2016 with three additional cases reported. One cVDVPV2 case was reported in 2016 in Nigeria and another in Pakistan. In 2017, a total of 96 cVDPV2 cases were reported, including 74 cases from Syria (most recent case in September 2017) and 22 from DRC. The outbreak in DRC has continued into 2018, with four cases to date, as of April 24, 2018 (the most recent case occurring in February) (*9*). Isolation of cVDVP2 from environmental samples in Mogadishu, Somalia, in late 2017 and early 2018, and related cVDPV2 from environmental samples in Nairobi, Kenya, in early 2018, has confirmed long-term cVDPV2 transmission, in a broad area, although no associated polio cases have been detected to date. cVDPV type 3 has been isolated in Mogadishu from sewage samples collected in March 2018, again, with no associated polio cases having been detected to date. In Nigeria, cVDPV2 has been recently detected by environmental surveillance in two states in early 2018; no associated polio cases having been detected to date. Response immunization is underway or planned for all these cVDPV cases and isolations.

Discussion

Although substantial progress was made toward polio eradication during 2016–2017, challenges remain in the countries with endemic transmission. Continued circulation of WPV1 has been confirmed in Afghanistan and Pakistan in the 2018

TABLE 2. Number of reported polio cases, by country — Worldwide, January 1, 2016–March 30, 2018*

Classification/Country	2016 (Jan 1–Dec 31)		2017 (Jan 1–Dec 31)		2017 (Jan 1–Mar 30)		2018 (Jan 1–Mar 30)	
	WPV	cVDPV	WPV	cVDPV	WPV	cVDPV	WPV	cVDPV
Countries with endemic polio								
Afghanistan	13	0	14	0	3	0	7	0
Pakistan	20	1	8	0	2	0	1	0
Nigeria	4	1	0	0	0	0	0	0
Total cases in endemic countries	**37**	**2**	**22**	**0**	**5**	**0**	**8**	**0**
Other countries with reported cVDPV cases								
Laos	0	3	0	0	0	0	0	0
Democratic Republic of the Congo	0	0	0	22	0	0	0	3
Syria	0	0	0	74	0	0	0	0
Total cases in other countries	**0**	**3**	**0**	**96**	**0**	**0**	**0**	**3**
Total paralytic polio cases	**37**	**5**	**22**	**96**	**5**	**0**	**8**	**3**

Abbreviations: cVDPV = circulating vaccine-derived poliovirus; WPV = wild poliovirus.
* Data as of April 24, 2018.

low WPV season, and it remains uncertain if WPV circulation has been interrupted in Nigeria (*3*).

The number of WPV cases in Afghanistan declined from 2015 to 2016, but the decrease did not continue in 2017. Although negotiations to obtain local access are constantly being undertaken, the number of children who were inaccessible to vaccination in the south and east because of insecurity increased during 2017 (*5*). In Pakistan, a decline in WPV1 cases since 2014 continued during 2016 and 2017. The detection of WPV in environmental surveillance samples in the absence of WPV-positive AFP cases in several provinces might indicate either surveillance gaps or waning in the intensity of transmission. Intensified SIA schedules and efforts to reach previously unvaccinated children, along with expansion of community-based initiatives employing local permanent vaccinators and ensuring worker safety have helped reduce the number of WPV cases. Large-scale movement of high-risk populations across Pakistan's border with Afghanistan in both directions continues to pose a challenge to interrupting WPV transmission, and crossborder collaborative vaccination efforts made in 2017 are being enhanced in 2018 (*4*).

In Nigeria, WPV1 circulation went undetected from mid-2014 to mid-2016, and the discovery of both endemic WPV1 and long-standing cVDVP2 transmission in 2016 in Borno State illuminated gaps in surveillance. Continued inaccessibility of insurgent-held areas hinders both immunization and surveillance efforts (*3*). Enhancement of initiatives for collaborating with the military to reach currently unvaccinated children will be helpful in ensuring interruption of WPV transmission. In the other countries of the Lake Chad basin bordering Borno State (Cameroon, Chad, and Niger), problems with inaccessibility related to insecurity and a large number of difficult-to-access islands have been addressed through progressive improvements in microplanning and implementation of SIAs, but uncertainties remain regarding SIA quality and success in interrupting undetected WPV transmission.

Summary

What is already known about this topic?

Transmission of wild poliovirus type 1 (WPV1) has not been interrupted in Afghanistan, Nigeria, and Pakistan. A global, synchronized switch to bivalent oral poliovirus vaccine (bOPV, types 1 and 3 only) was completed in April 2016.

What is added by this report?

Compared with 2016, the number of WPV1 cases overall decreased in 2017. Some transmission of circulating vaccine-derived poliovirus type 2 (cVDPV2) has been identified more than 1 year following the switch to bOPV in 2016.

What are the implications for public health practice?

Interruption of transmission of WPV1 and of cVDPV2 will require addressing persistent challenges to vaccinating every missed child. Until poliovirus eradication is achieved, all countries must maintain high population immunity and sensitive poliovirus surveillance.

Global WPV2 eradication was certified in 2015 after no detection since 1999 (*2*). WPV type 3 has not been detected since 2012 (*2*). A minimum of 3 years of sensitive AFP surveillance without detection of WPV is required to certify a WHO region as being poliofree (*10*). Four of six WHO regions (the Region of the Americas, European, South-East Asia, and Western Pacific regions) have been certified free of indigenous WPV. Improvements in AFP surveillance performance in critical subnational areas are required to achieve poliofree certification of the African and Eastern Mediterranean regions.

Because efforts to increase immunity to poliovirus type 2 before the global tOPV to bOPV switch did not reach all persistently unvaccinated children in hard-to-reach areas, some cVDPV2 emergences have been detected following the switch.

Reaching all children for vaccination in areas with cVDPV2 transmission is also an ongoing challenge.

Although progress toward global polio eradication has continued, challenges in identifying and vaccinating every missed child remain. Much of the recent progress reaching previously missed children has been associated with recruitment of trusted community volunteers who are invested in their locality for vaccination and surveillance efforts. Intensification of efforts to improve the quality of immunization and surveillance activities and to develop additional innovations in addressing persisting challenges is necessary. Until poliovirus eradication is achieved, all countries must remain vigilant by maintaining high population immunity and sensitive poliovirus surveillance.

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Conflict of Interest

No conflicts of interest were reported.

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Access to Syringe Services Programs — Kentucky, North Carolina, and West Virginia, 2013–2017

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The Appalachian region of the United States is experiencing a large increase in hepatitis C virus (HCV) infections related to injection drug use (IDU) (*1*). Syringe services programs (SSPs) providing sufficient access to safe injection equipment can reduce hepatitis C transmission by 56%; combined SSPs and medication-assisted treatment can reduce transmission by 74% (*2*). However, access to SSPs has been limited in the United States, especially in rural areas and southern and midwestern states (*3*). This report describes the expansion of SSPs in Kentucky, North Carolina, and West Virginia during 2013–August 1, 2017. State-level data on the number of SSPs, client visits, and services offered were collected by each state through surveys of SSPs and aggregated in a standard format for this report. In 2013, one SSP operated in a free clinic in West Virginia, and SSPs were illegal in Kentucky and North Carolina; by August 2017, SSPs had been legalized in Kentucky and North Carolina, and 53 SSPs operated in the three states. In many cases, SSPs provide integrated services to address hepatitis and human immunodeficiency virus (HIV) infection, overdose, addiction, unintended pregnancy, neonatal abstinence syndrome, and other complications of IDU. Prioritizing development of SSPs with sufficient capacity, particularly in states with counties vulnerable to epidemics of hepatitis and HIV infection related to IDU, can expand access to care for populations at risk.

Kentucky

Before new legislation* in March 2015, SSPs were illegal in Kentucky. The new law allowed public health departments to operate SSPs after approval from relevant county boards of health, county fiscal courts, and city councils. Extensive education of official and community members about SSPs, addressing of concerns, and provision of data to dispel misimpressions (e.g., concerns that SSPs enable drug use) were required to achieve multiple levels of approval. Some counties held town hall meetings, inviting community members to learn about SSPs and have their questions answered. Counties that went through this process before beginning SSP operations reported increased support from law enforcement, the judicial system, community leaders, and community members. By the end of 2015, three counties in Kentucky had operational SSPs (Figure), including in the two largest cities, Louisville and Lexington. By August 2017, 31 counties had operational SSPs serving an estimated 8,078 clients; five counties had full approval but were not yet operational; and 10 counties were in some stage of gaining approval. Among 54 counties considered vulnerable to outbreaks of HIV and HCV (*4*), 21 (39%) had SSPs that were operational or approved to open by August 1, 2017. Location within public health departments facilitates client access to many other services (Table). Ten local health departments have their SSP integrated into daily public health clinics, so they are open 4 or 5 days per week, averaging 7.5 hours per day.

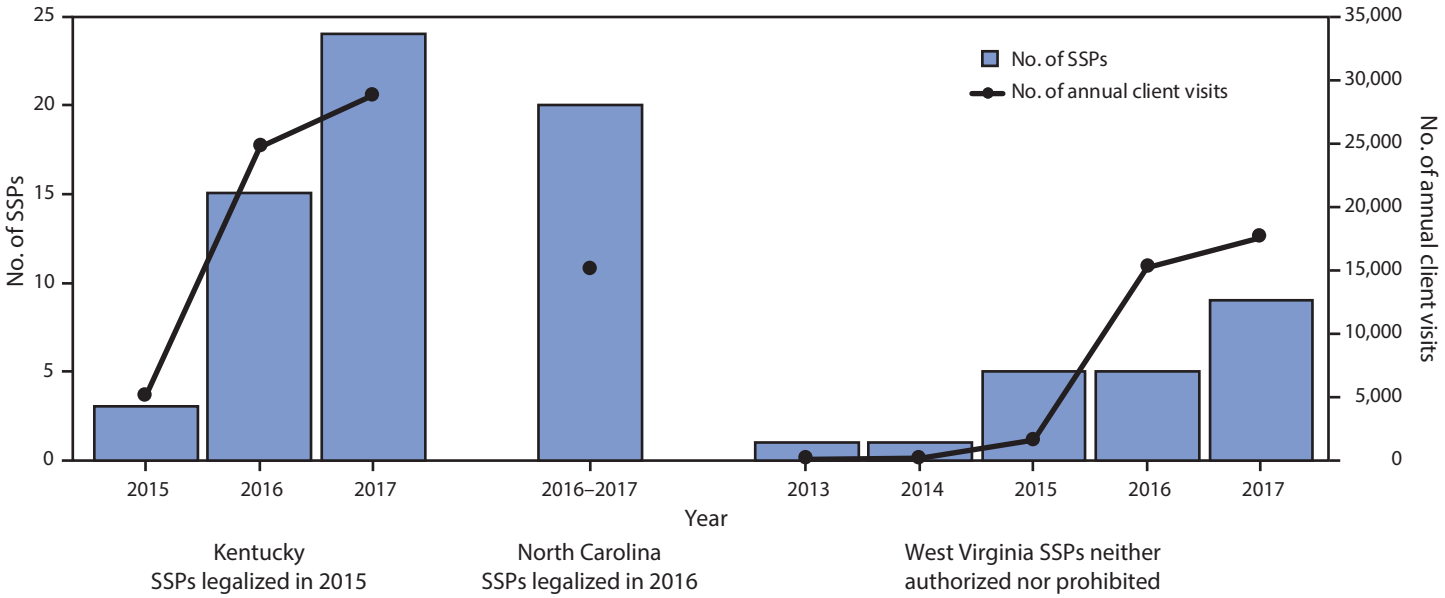
North Carolina

In 2013, the North Carolina legislature passed the 911 Good Samaritan/Naloxone Access Law† and a law protecting persons from being charged for possession of drug paraphernalia if they alert a law enforcement officer to the presence of a hypodermic needle or other sharp object before search by the officer. On July 11, 2016, new legislation allowed any governmental or nongovernmental organization that "promotes scientifically proven ways of mitigating health risks associated with drug use" to start an SSP. Organizations were required to notify the North Carolina Safer Syringe Initiative (NCSSI) in the North Carolina Division of Public Health of the intention to establish an SSP before commencing operations. Registered programs are required to report data (e.g., services offered, referrals made, and syringes dispensed and returned) to NCSSI on an annual basis. As of August 1, 2017, 20 operational SSPs (Figure) served an estimated 3,983 clients in 52 of North Carolina's 100 counties. SSPs are sponsored by 10 harm reduction coalitions, three churches or church partners of harm reduction coalitions, two acquired immunodeficiency syndrome (AIDS) service organizations, two local health departments, two substance use treatment centers, and a drug user union, offering services through a variety of models (Table). None of five counties in North Carolina classified as vulnerable to outbreaks of HIV and HCV (*4*) had SSPs during the first year of the program although some residents of vulnerable counties are served by existing SSPs.

* https://law.justia.com/codes/kentucky/2015/chapter-218a/section-218a.500.

† https://www.ncleg.net/EnactedLegislation/Statutes/PDF/BySection/Chapter_90/GS_90-96.2.pdf.

FIGURE. Syringe service programs (SSPs) and client visits to SSPs by persons who inject drugs — Kentucky, North Carolina, and West Virginia, 2013–2017*,†



* Current as of August 1, 2017.
† North Carolina's visits represent total attendees for the first full year of operation. Kentucky and West Virginia reported data on a calendar-year basis.

West Virginia

SSPs are neither prohibited nor expressly permitted by state law in West Virginia. The first known SSP began operation in a free clinic, fully integrated with primary health care services. In 2015, the West Virginia Bureau for Public Health funded a pilot project at the Cabell-Huntington Health Department as proposed by the Mayor's Office of Drug Control Policy in Huntington, West Virginia. The West Virginia Harm Reduction Coalition was formed in February 2017 to support harm reduction activities and SSPs operating in the state. As of August 1, 2017, nine SSPs were known by the coalition to be operating in the state (Figure) serving an estimated 4,376 clients; four of these SSPs were located in three (11%) of 28 counties classified as vulnerable to outbreaks of HIV and HCV (*4*). Seven known SSPs were run by local health departments, and two operated out of free clinics, thereby facilitating access to other services needed by persons who inject drugs (Table). All SSPs were based in fixed sites; five also offered mobile services, five offered peer delivery (delivery of sterile injection equipment through a peer intermediary), and six had peer counselors (Table).

Discussion

During 2013–2017, the number of operational SSPs increased from one to approximately 50 in Kentucky, North Carolina, and West Virginia. Visits to SSPs by clients who inject drugs also increased. In Kentucky and North Carolina, this increase followed changes in laws permitting access to sterile injecting supplies; in West Virginia, SSPs were never prohibited under state law. In North Carolina, any group can start an SSP after notifying the state health department; Kentucky requires a lengthy approval process for local health departments before offering syringe services. This paper demonstrates that increasing access to SSPs is possible with community support using a variety of models if SSPs are not prohibited by law.

The increase in client visits to SSPs by persons who inject drugs represents an unprecedented opportunity to improve access to care for this highly stigmatized population. In addition to increased access to sterile needles, syringes, and injection paraphernalia (*5*), comprehensive syringe services programs should also improve access to medication-assisted treatment, counseling, and social support to address substance use disorder (*6*); naloxone and lay naloxone training to prevent fatal overdose (*7*); the full range of contraceptives, including long acting reversible contraceptives to prevent unintended opioid-exposed pregnancy; prenatal care and medication-assisted treatment to reduce harm from substance use disorder in pregnant women and their infants (*8*); vaccination; and HCV, HIV, and hepatitis B virus (HBV) screening and treatment (*5*). State and local health departments that are actively addressing the health effects of the opioid crisis might consider a formal evaluation process to improve service quality and access for persons who inject drugs, including those attending SSPs. Process evaluation indicators for SSPs should include number of clients,

TABLE. Services offered by syringe service programs — Kentucky, North Carolina, and West Virginia, as of August 1, 2017

Services	Kentucky, no. (%)	North Carolina, no. (%)	West Virginia, no. (%)
Needle and syringe exchange	24 (100)	20 (100)	9 (100)
Other drug paraphernalia provided			
Filters	14 (58)	—	6 (67)
Cookers	11 (46)	—	6 (67)
Sterile water	8 (33)	—	6 (67)
Alcohol wipes or swabs	21 (88)	—	7 (78)
Tourniquets	14 (58)	—	5 (56)
Service delivery models			
Fixed site	24 (100)	16 (80)	9 (100)
Peer counselors or peer workers	8 (33)	13 (65)	6 (67)
Mobile services	2 (8)	13 (65)	5 (56)
Secondary or peer-delivery model	1 (4)	0 (0)	5 (56)
Delivery	0 (0)	0 (0)	1 (11)
Pharmacy distribution	0 (0)	0 (0)	1 (11)
Education provided			
Safe injection practices	23 (96)	20 (100)	7 (78)
Naloxone administration	17 (71)	20 (100)	8 (89)
Wound care	17 (71)	—	7 (78)
Hepatitis B			
Vaccination	13 (54)	—	7 (78)
Screening	6 (25)	—	7 (78)
Linkage to treatment	22 (92)	—	7 (78)
Hepatitis C			
Screening	20 (83)	8 (40)	7 (78)
Linkage to treatment	24 (100)	20 (100)	9 (100)
Human immunodeficiency virus			
Screening	20 (83)	11 (55)	9 (100)
Linkage to treatment	24 (100)	18 (90)	6 (67)
Contact tracing and partner services	6 (25)	—	5 (56)
Sexually transmitted diseases			
Condom provision	24 (100)	—	9 (100)
Screening	16 (67)	—	9 (100)
Treatment	13 (54)	—	8 (89)
Substance use disorder			
Motivational interviewing	13 (54)	—	4 (44)
Linkage to medication assisted treatment	24 (100)	—	5 (56)
Linkage to behavioral treatment	24 (100)	17 (85)	6 (67)
Reproductive health			
Family planning services	14 (58)	—	8 (89)
Pregnancy testing	15 (63)	—	9 (100)
Linkage to prenatal services	20 (83)	—	8 (89)
Social services			
Housing assistance	6 (25)	—	3 (33)
Transportation assistance	6 (25)	—	3 (33)
Food assistance	6 (25)	—	3 (33)
Health insurance enrollment	10 (42)	—	3 (33)
Mean (median [range]) hrs per week	**12 (3 [1.5–42.5])**	**18 (8 [4–60])**	**10 (4 [2–50])**

number of syringes distributed, number of syringes returned, availability of services in hours per week, summary statistics on HIV, HBV, and HCV testing, and number and type of services (e.g., patient-centered family planning services and naloxone) and referrals provided (e.g., medication assisted treatment, prenatal care, HIV, and hepatitis treatment) (*9*). Evaluation should also include health indicators such as rates of hepatitis, HIV, fatal and nonfatal overdose, unintended pregnancy and neonatal abstinence syndrome, and initiation and retention in drug treatment. CDC has published a framework to guide evaluation of public health programs (*10*), which might be useful for evaluating access to essential services at the community level for persons who inject drugs.

The findings in this report are subject to at least six limitations. First, data were self-reported from SSPs and are therefore subject to bias. Second, because some programs do not collect identifying information, the total numbers of clients served is estimated. Third, at the time of this analysis, North Carolina was in its first year of implementation, and limited data are available. Fourth, no data were obtained for SSPs operating

Summary

What is already known about this topic?

Opioid overdose, human immunodeficiency virus, and viral hepatitis have increased among persons who inject drugs in the United States. Comprehensive syringe services programs (SSPs) reduce risks associated with injection drug use (IDU); however, access to SSPs has been limited.

What is added by this report?

SSPs have increased dramatically in Kentucky, North Carolina and West Virginiawith support from government officials, community advocates, and healthcare providers.

What are the implications for public health practice?

Comprehensive SSPs can mitigate the health effects of IDU. With appropriate authorization and support, agencies can successfully implement SSPs in underserved areas.

underground (i.e., outside the legal framework). Fifth, growth of SSPs and service integration in these states is rapid, and the most recent data on SSPs should be sought through the state or local health department or harm reduction coalition. Finally, these data cannot be used to evaluate quality of service delivery and whether service delivery is adequate to meet the needs of the population.

SSPs can be implemented through a variety of models and by a variety of agencies and organizations including those in rural areas. Demand for syringe services is growing rapidly in these three states with underserved populations of persons who inject drugs, representing an opportunity to implement, evaluate, and improve access to evidence-based services known to reduce the considerable morbidity and mortality associated with injection drug use.

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Conflict of Interest

No conflicts of interest were reported.

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Notes from the Field

Diarrhea and Acute Respiratory Infection, Oral Cholera Vaccination Coverage, and Care-Seeking Behaviors of Rohingya Refugees — Cox's Bazar, Bangladesh, October–November 2017

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Violence in the Rakhine State of Myanmar, which began on August 25, 2017, prompted mass displacement of Rohingya to the bordering district of Cox's Bazar, Bangladesh. Joining the nearly 213,000 Rohingya already in the region, an estimated 45,000 persons settled in two preexisting refugee camps, Nayapara and Kutupalong, and nearly 550,000 into new makeshift settlements (*1*). Mass violence and displacement, accompanied by malnutrition, overcrowding, poor hygiene, and lack of access to safe water and health care increase the vulnerability of children to infectious diseases, including pneumonia and diarrhea (*2*).

To prevent an outbreak of cholera, which is endemic in Bangladesh, a fixed-site, mass oral cholera vaccination (OCV) campaign targeting all persons aged ≥1 year was conducted among Rohingya refugees during October 10–18, with a follow-up campaign targeting children aged 1–4 years November 4–9 (*3*). Three cross-sectional population-representative household surveys were conducted in Kutupalong (October 22–28), makeshift settlements (October 29–November 20), and Nayapara (November 20–27). Sampling frames included all households in each area regardless of whether they were registered with the Office of the United Nations High Commissioner for Refugees (UNHCR). Registered refugees had access to a full spectrum of services provided by UNHCR, including health care, food vouchers, and nutrition treatment programs. In Kutupalong and Nayapara, households were selected using simple random sampling. Camps were enumerated the week preceding data collection. Because of the large population residing in the makeshift settlements, households in these sites were selected using multistage cluster sampling; the Inter Sector Coordination Group (a coordination body consisting of international and domestic agencies responding to the refugee crisis and led by the International Organization for Migration) provided block populations.

The surveys assessed diarrhea and acute respiratory infection (ARI)–associated morbidity in children aged 6–59 months and care-seeking behaviors of parents or caregivers for those children with diarrhea or ARI-associated morbidity, as well as receipt of at least one OCV dose in all persons aged ≥1 year. A 2-week cumulative incidence of diarrhea was ascertained by asking caregivers whether the child had three or more loose stools within the 2 weeks preceding the survey; ARI was defined as having cough with rapid breathing or difficulty breathing and a fever within the 2 weeks preceding the survey. Caregivers reporting morbidity were asked separately for each condition whether the child had been taken for treatment at a clinic or hospital managed by the Bangladesh government or a humanitarian organization (the formal health system), a traditional healer, a local pharmacy, another location/provider, or were not taken for treatment. P values were calculated using two-proportion t-tests to assess differences between registered and unregistered refugees in Kutupalong and Nayapara camps and old arrivals and new arrivals in makeshift settlements. Analysis of data from makeshift settlements accounted for the multistage cluster survey design.

Two-week cumulative incidence of ARI (50.3%–57.7%) and diarrhea (34.3%–41.3%) were high in all settings (Table). In Kutupalong Camp, unregistered refugees had significantly higher diarrhea-associated morbidity ($p<0.001$), and ARI-associated morbidity ($p = 0.002$) than did registered refugees. In Nayapara Camp, only diarrhea-associated morbidity was significantly higher among unregistered refugees than among registered refugees ($p = 0.004$). A large proportion of parents or caregivers sought health care for their children outside the formal health care system or did not seek care for their children with ARI (27.4%–44.2%) or diarrhea (36.4%–49.6%), even among registered refugees. Coverage with at least 1 OCV dose was high in Nayapara and makeshift settlements (>81%), however, coverage in Kutupalong was lower (72.6% and 78.9% in children aged 1–4 years and persons aged ≥5 years, respectively) because of the low coverage among unregistered refugees (Table). OCV coverage within camps was similar among children aged 1–4 years and persons aged ≥5 years in all groups (overall, registered, and unregistered refugees) except in Nayapara where coverage among children aged 1–4 years was approximately 10 percentage points higher than that among persons aged ≥5 years in all groups.

Outbreaks of infectious diseases are common in sites like the assessed camps, which are densely populated and have limited infrastructure and sanitation (*2*), and high cumulative incidence of ARI and diarrhea were observed in this survey population. Coverage with at least 1 dose of OCV was high in all settings except among unregistered refugees in Kutupalong Camp, which might be a consequence of their arrival in the midst of the campaign; survey respondents were not asked

TABLE. Cumulative 2-week incidence of acute respiratory infections (ARI) and diarrhea, percentage of caregivers seeking care for Rohingya children, and oral cholera vaccine (OCV) coverage in Kutupalong Refugee Camp, Nayapara Refugee Camp, and makeshift settlements — Cox's Bazar, Bangladesh, October–November, 2017

Location	Overall		Unregistered		Registered	
Population/Health indicator	**No.**	**% (95% CI)**	**No.**	**% (95% CI)**	**No.**	**% (95% CI)**
Kutupalong Refugee Camp*						
Children aged 6–59 mos (total no.)	**309**	—	**141**	—	**161**	—
ARI	172	55.7 (50.1–61.1)	92	65.3 (57.0–72.7)	77	47.8 (40.2–55.6)
ARI treatment						
Formal health system	96	55.8 (48.2–63.1)	48	52.2 (41.9–62.3)	45	58.4 (47.1–69.0)
Other§	51	29.7 (23.3–37.0)	26	28.3 (19.9–38.4)	25	32.5 (22.9–43.8)
None	25	14.5 (10.0–20.7)	18	19.6 (12.6–29.0)	7	9.1 (4.4–18.0)
Diarrhea	125	40.5 (35.1–46.1)	73	51.8 (43.5–59.9)	49	30.4 (23.8–38.0)
Diarrhea treatment						
Formal health system	63	50.4 (41.6–59.2)	33	45.2 (34.1–56.8)	27	55.1 (41.0–68.5)
Other§	43	34.4 (26.5–43.3)	24	32.9 (23.0–44.6)	19	38.8 (26.1–53.2)
None	19	15.2 (9.9–22.7)	16	21.9 (13.8–33.0)	3	6.1 (2.0–17.6)
Receipt of OCV						
Children aged 1–4 yrs (no.)	277	—	126	—	144	—
Received OCV¶,**	201	72.6 (67.0–77.5)	61	48.4 (39.8–57.2)	135	93.8 (88.4–96.7)
Persons aged ≥5 yrs (no.)	1,847	—	581	—	1,226	—
Received OCV¶,**	1,458	78.9 (77.0–80.7)	288	49.6 (45.5–53.6)	1,135	92.6 (91.0–93.9)
Nayapara Refugee Camp*						
Children aged 6–59 mos (total no.)	408	—	199	—	186	—
ARI	205	50.3 (45.4–55.1)	100	50.3 (43.3–57.2)	94	50.5 (43.4–57.7)
ARI treatment						
Formal health system	149	72.7 (66.1–78.4)	72	72.0 (62.3–80.0)	72	76.6 (66.9–84.1)
Other§	27	13.2 (9.2–18.6)	10	10.0 (5.4–17.7)	14	14.9 (9.0–23.7)
None	29	14.2 (10.0–19.7)	18	18.0 (11.6–26.9)	8	8.5 (4.3–16.2)
Diarrhea	140	34.3 (29.9–39.1)	81	40.7 (34.1–47.7)	50	26.9 (21.0–33.7)
Diarrhea treatment						
Formal health system	89	63.6 (55.2–71.2)	53	65.4 (54.3–75.1)	30	60.0 (45.8–72.7)
Other§	28	20.0 (14.1–27.6)	13	16.1 (9.5–25.9)	13	26.0 (15.6–40.0)
None	23	16.4 (11.1–23.6)	15	18.5 (11.4–28.6)	7	14.0 (6.8–26.8)
Receipt of OCV						
Children aged 1–4 yrs (total no.)	373	—	182	—	170	—
Received OCV¶,**	355	95.2 (92.5–97.0)	167	91.8 (86.8–95.0)	168	98.8 (95.4–99.7)
Persons aged ≥5 yrs (total no.)	2,629	—	976	—	168	—
Received OCV¶,**	2,265	86.2 (84.8–87.4)	796	81.6 (79.0–83.9)	1,363	88.8 (87.1–90.3)
New makeshift settlements†						
Children aged 6–59 mos (total no.)	1,110	—	954	—	145	—
ARI	640	57.7 (52.8–62.4)	547	57.3 (52.2–62.4)	83	57.2 (45.6–68.1)
ARI treatment						
Formal health system	415	64.8 (58.3–70.9)	355	64.9 (57.7–71.5)	56	67.5 (55.1–77.8)
Other§	105	16.4 (12.9–20.6)	86	15.7 (12.0–20.4)	16	19.3 (11.7–30.1)
None	120	18.8 (14.2–24.3)	106	19.4 (14.3–25.8)	11	13.3 (8.5–20.0)
Diarrhea	458	41.3 (36.5–46.2)	399	41.8 (36.8–47.0)	50	34.5 (22.4–49.0)
Diarrhea treatment						
Formal health system	261	57.0 (47.7–65.8)	239	59.9 (49.5–69.5)	21	42.0 (30.6–54.3)
Other§	141	30.8 (22.5–40.6)	116	29.1 (20.1–40.1)	18	36.0 (23.4–50.9)
None	56	12.2 (8.5–17.2)	44	11.0 (7.7–15.6)	11	22.0 (11.0–39.1)
Receipt of OCV						
Children aged 1–4 yrs (total no.)	974	—	832	—	134	—
Received OCV¶,**	886	91.0 (86.2–94.2)	747	89.8 (84.3–93.5)	131	97.8 (91.0–99.5)
Persons aged ≥5 yrs (total no.)	4,897	—	4,180	—	670	—
Received OCV¶,**	4,309	88.0 (83.4–91.4)	3,612	86.4 (81.2–90.3)	670	97.1 (92.1–99.0)

Abbreviation: CI = confidence interval.

* Overall results include registered refugees, unregistered refugees arriving before August 25, 2017, and unregistered refugees arriving after August 25, 2017; disaggregated analysis excludes unregistered refugees arriving before August 25, 2017.

† Overall results include registered refugees, old arrivals (unregistered refugees arriving before August 25, 2017), and new arrivals (unregistered refugees arriving after August 25, 2017); disaggregated analysis excludes registered refugees.

§ Other treatment includes all those outside of formal health clinics and hospitals including community or traditional healers, local pharmacies, and other not specified.

¶ OCV coverage ascertained by recall.

** First round of the OCV campaign occurred October 10–18, 2017, targeting all persons aged ≥1 year; second round of the OCV campaign occurred November 4–9, 2017, targeting children aged 1–4 years; these coverage data include receipt of 1 dose of OCV for persons aged ≥5 years and at least 1 dose of OCV for children aged 1–4 years.

about reasons for nonvaccination. In a study of the protective efficacy of OCV in an area where cholera is highly endemic, a single dose of OCV provided 40% protection 6 months after vaccination among persons vaccinated at age 1 year or older (*4*). Thus, at least 2 OCV doses are recommended, depending on the vaccine used, particularly among younger children (*5*).

In response to the high ARI-associated morbidity and an ongoing diphtheria outbreak, a mass vaccination campaign with pentavalent (protecting against diphtheria, pertussis, tetanus, *Haemophilus influenzae* type B, and hepatitis B) and pneumococcal conjugate vaccines was conducted in mid-December, targeting children aged 6 weeks–6 years (*6*). Measures to improve access to safe water and sanitation facilities and hygiene promotion, with an emphasis on handwashing, combined with humanitarian action focused on strengthening the World Health Organization's Expanded Programme on Immunization for all Rohingya refugees would help reduce the incidence of ARI and diarrheal disease (*7*). In addition, promotion of established health care facilities by community outreach programs can help to ensure safe and appropriate treatment.

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Conflict of Interest

No conflicts of interest were reported.

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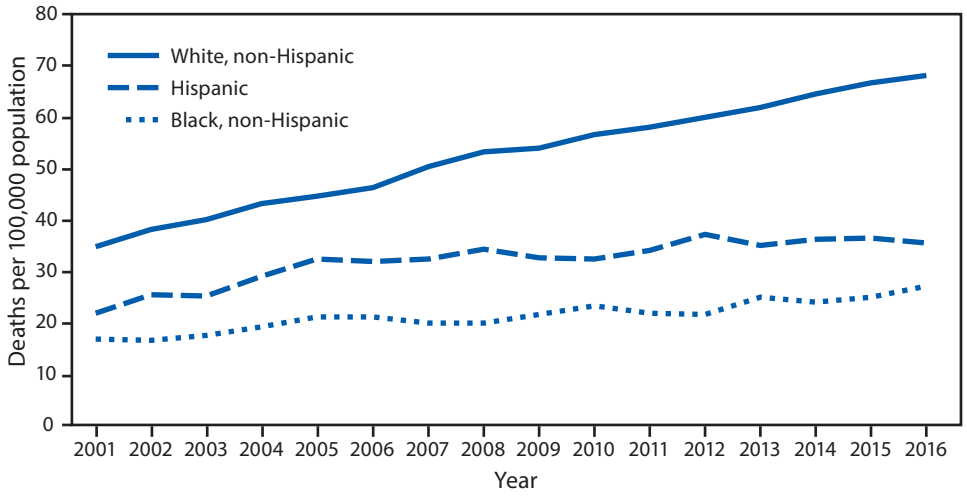
QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Age-Adjusted Death Rates* from Unintentional Falls Among Adults Aged ≥65 Years,† by Race/Ethnicity — National Vital Statistics System, United States, 2001–2016



* Deaths per 100,000 population, age-adjusted to the 2000 U.S. standard population.
† As underlying cause of death, unintentional fall-related deaths are identified with the *International Classification of Diseases, Tenth Revision* codes W00–W19.

During 2001–2016, the age-adjusted death rate for unintentional falls for non-Hispanic white adults aged ≥65 approximately doubled, increasing from 34.9 deaths per 100,000 to 68.7. In that period, the death rate for Hispanic adults increased from 21.9 to 35.7, and the rate for non-Hispanic black adults rose from 16.8 to 27.1. Throughout the period, the death rate from falls for non-Hispanic white adults was 1.4 to 1.9 times the rate for Hispanic adults and 2.1 to 2.8 times the rate for non-Hispanic black adults.

Source: National Vital Statistics System, 2001–2016. https://wonder.cdc.gov/ucd-icd10.html.

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

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