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Acute Flaccid Myelitis Surveillance — United States, January 2020–December 2025

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Abstract

Acute flaccid myelitis (AFM) is a rare but serious neurologic condition that causes paralysis and primarily affects children. Clinically and radiologically, AFM is indistinguishable from the acute flaccid paralysis of poliomyelitis caused by poliovirus. Nationwide surveillance for AFM has been conducted in the United States since 2014, when an increase in AFM was first recognized. Laboratory testing and epidemiologic and clinical data collected through surveillance suggest that enteroviruses, particularly enterovirus D68 (EV-D68), are a common cause of AFM. EV-D68 circulation was associated with biennial peaks in AFM cases in the United States in 2014, 2016, and 2018. This report provides an update to nationwide surveillance of confirmed AFM cases during January 2020–December 2025. During this period, the number of confirmed AFM cases reported to CDC remained low (17–48 cases per year) compared with 2014, 2016, and 2018 (120–238 cases per year). Despite ongoing seasonal enterovirus circulation, including increases in EV-D68–associated respiratory illnesses identified from sentinel surveillance sites in 2022, 2024, and 2025, concurrent increases in AFM cases in nationwide surveillance data were not observed; EV-D68 was detected in one AFM patient specimen received by CDC during this period. A majority (approximately 75%) of confirmed cases of AFM occurred in persons who were reported to be up to date with polio vaccination; approximately one half had stool specimens collected and tested. In 2022, a polio case in an unvaccinated person was identified by testing stool specimens collected through AFM surveillance. Clinicians should ensure that stool samples are collected from patients with acute onset of flaccid weakness or paralysis and report all cases to their local health department.

Introduction

Acute Flaccid Paralysis

Acute flaccid paralysis (AFP) is a clinical syndrome characterized by sudden onset of weakness and reduced muscle tone. AFP is a generalized term for clinical conditions with both noninfectious etiologies (e.g., transverse myelitis and Guillain Barré syndrome) and infectious etiologies (e.g., poliovirus, enteroviruses, and West Nile virus). Surveillance for AFP is not routinely conducted in the United States because poliomyelitis caused by wild poliovirus has been eliminated in the country (*1*).

Acute Flaccid Myelitis

Acute flaccid myelitis (AFM) is a subtype of AFP characterized by acute onset of flaccid weakness in one or more limbs and abnormalities in the spinal cord gray matter. Surveillance for AFM has been conducted in the United States since 2014 (*2*). Although many pathogens can cause AFM, laboratory testing and epidemiologic and clinical data collected through surveillance suggest that enteroviruses, particularly enterovirus D68 (EV-D68), are a common cause. Biennial peaks in AFM cases in the United States in 2014, 2016, and 2018

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were associated with EV-D68 circulation (*2*). Because AFM is clinically and radiologically indistinguishable from polio, cases that meet criteria for AFM detected through AFM surveillance in the United States are also assessed to rule out poliomyelitis caused by poliovirus. Continued AFM surveillance is needed to further understand the epidemiology of AFM and to ensure that the United States remains polio-free. This report provides a surveillance update on confirmed AFM cases reported to CDC during January 2020–December 2025.

Methods

Data Sources

Clinical and radiologic data. As part of nationwide AFM surveillance, U.S. jurisdictions report cases that meet criteria for AFM to CDC. These criteria include 1) acute onset of flaccid limb weakness and 2) the presence of any spinal cord gray matter lesions detected by magnetic resonance imaging (MRI). Health department personnel complete a patient summary form with demographic and clinical information and gather selected elements from patients' medical records for data abstraction at CDC. For surveillance purposes, a confirmed case of AFM is defined as the acute onset of flaccid limb weakness in a patient who received an MRI result indicating a spinal cord lesion largely restricted to gray matter and spanning one or more vertebral segments (*3*).

Vaccination data. To assess the risk for poliomyelitis in a patient with AFM, polio vaccination status is collected using data from health departments, vaccination registries, or patient medical records. Patients who have not received any doses of polio vaccine are considered to be at highest risk for polio.

Laboratory data. When available, cerebrospinal fluid (CSF), respiratory, serum, and stool specimens are submitted to CDC for testing for enteroviruses (including poliovirus) and rhinoviruses using previously described methods (*4*). Enterovirus and rhinovirus test results include those from CDC or external laboratories. Stool specimens are also tested for poliovirus by virus isolation in cell culture. If a stool specimen from a patient with AFM tests positive for poliovirus, that patient is classified as having a confirmed case of paralytic poliomyelitis and not AFM. Since 2017, surveillance for EV-D68 detections in respiratory specimens has been actively conducted through systematic testing provided for children with acute respiratory illness in the New Vaccine Surveillance Network (NVSN) (*5*).

Data Analysis

Analyses of demographic, clinical, and laboratory data were conducted to describe characteristics of U.S. patients with AFM during 2020–2025. Up-to-date polio vaccination status was defined as receipt of ≥3 polio vaccine doses, verified through vaccination registry data or medical record data. Data from NVSN were reviewed to monitor circulation of

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EV-D68 and detect possible associations with increases in AFM cases. This activity was reviewed by CDC, deemed not research, and conducted consistent with applicable federal law and CDC policy.*

Results

Reported AFM Cases

During 2020–2025, a total of 172 confirmed AFM cases were reported to CDC, including 34 in 2020, 29 in 2021, 48 in 2022, 19 in 2023, 25 in 2024, and 17 in 2025 (Figure) (Table 1). Annually, approximately 75% of patients with confirmed AFM during 2020–2025 were aged <18 years. In that group, the median age was 8 years in 2020, 2021, and 2024; 7 years in 2022; 12 years in 2023; and 9 years in 2025.

Clinical Characteristics of Patients with AFM

Respiratory illness history and CSF findings. A higher percentage of patients with confirmed AFM in 2022, 2024, and 2025 had history of any respiratory illness or fever (72%–79%) than did patients in 2020, 2021, and 2023 (42%–62%) (Table 1). A higher percentage of patients with confirmed AFM in 2022 and 2024 had CSF pleocytosis (69%–72%) than did patients in 2020, 2021, 2023, and 2025 (44%–64%).

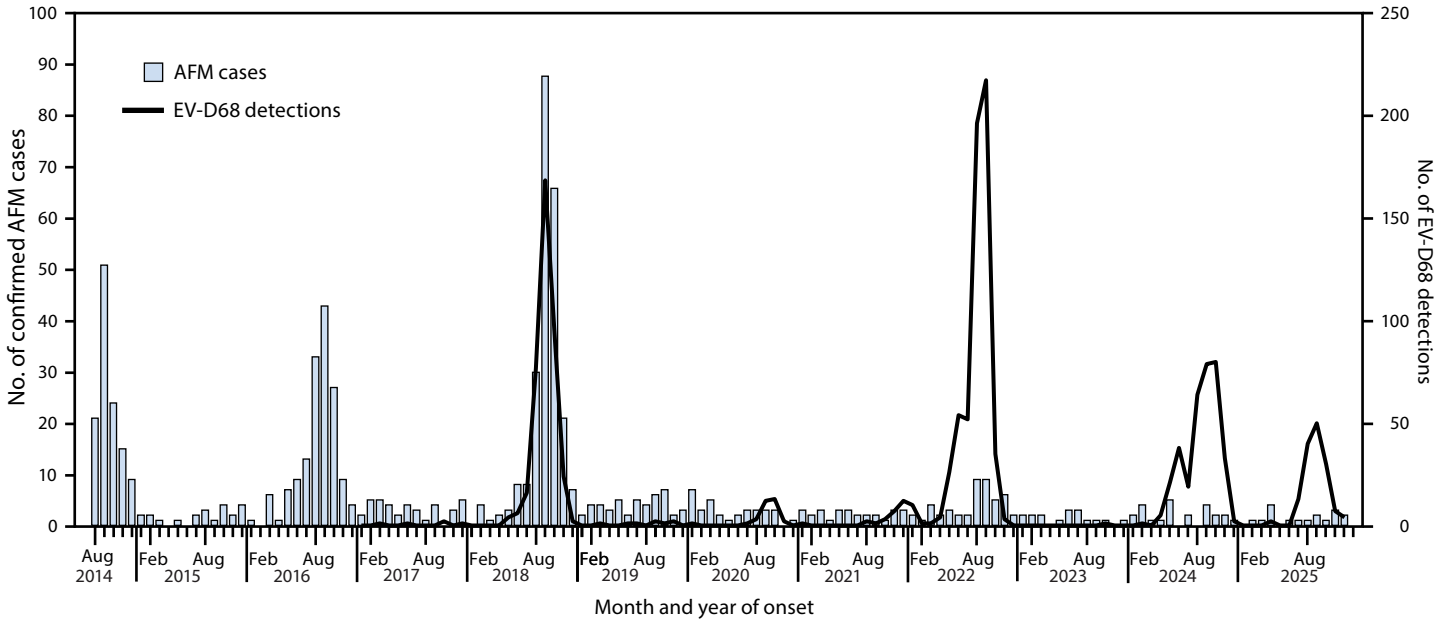
Limb involvement. Among patients with AFM in 2022, 75% had any upper limb involvement, and 65% had any lower limb involvement (Table 1). In all other years, lower limb involvement was more common than upper limb involvement.

Polio Vaccination Status of Patients with AFM

Among patients with confirmed AFM and documented receipt of any polio vaccine doses, up-to-date polio vaccination (receipt of ≥3 vaccine doses) ranged from 75% in 2021 to 100% in 2025. The percentage of patients who had received 1–2 doses of polio vaccine ranged from 0% in 2022 and 2025 to 17% in 2021; 0% (2020 and 2025) to 14% (2024) had received an unknown number of polio vaccine doses (Table 1). The percentage of AFM patients with unknown vaccination status ranged from 0% (2023) to 38% (2020); among these patients, a median of 60% (range = 0%–100%) were aged ≥18 years.

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

FIGURE. Number of confirmed cases of acute flaccid myelitis from nationwide surveillance,* August 2014–December 2025, and enterovirus D68 detections in respiratory specimens — New Vaccine Surveillance Network,† United States, January 2017–December 2025§



Abbreviations: AFM = acute flaccid myelitis; EV-D68 = enterovirus D68.

* AFM surveillance began in August 2014.

† Testing data from children and adolescents aged <18 years evaluated at an enrollment facility (outpatient clinic, emergency department, or inpatient) at one of seven U.S. pediatric medical centers (Seattle, Washington; Kansas City, Missouri; Nashville, Tennessee; Rochester, New York; Pittsburgh, Pennsylvania; Cincinnati, Ohio; or Houston, Texas) for acute respiratory illness. Testing for EV-D68 began in 2017, was seasonal (July through October or November) at most sites before July 2021, and has been conducted year-round at all sites since July 2021. Two sites (Houston, Texas and Rochester, New York) have had year-round testing for EV-D68 since 2017. Within these testing periods, four of seven sites only performed EV-D68 testing for specimens that were positive for rhinovirus, enterovirus, or both, whereas the remaining sites tested all acute respiratory illness specimens for EV-D68 directly.

§ Surveillance for enterovirus D68 began in January 2017.

TABLE 1. Number and percentage of patients with confirmed acute flaccid myelitis, by selected demographic and clinical characteristics and year — United States, 2020–2025

Characteristic	2020 N = 34	2021 N = 29	2022 N = 48	2023 N = 19	2024 N = 25	2025 N = 17
Age group, yrs						
<18, no. (%)	31 (91)	24 (83)	39 (81)	16 (84)	23 (92)	13 (76)
Median age of patients <18 (IQR)	8 (3–11)	8 (5–13)	7 (5–12)	12 (9–15)	8 (2–12)	9 (3–14)
Median age of all patients (IQR)	9 (3–14)	9 (5–16)	11 (6–14)	13 (10–18)	9 (2–13)	11 (6–18)
Sex, no. (%)						
Female	17 (50)	17 (59)	21 (44)	8 (42)	15 (60)	10 (59)
Male	17 (50)	12 (41)	27 (56)	10 (53)	10 (40)	7 (41)
Race and ethnicity, no. (%)						
American Indian or Alaska Native	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
Asian	3 (9)	0 (—)	3 (6)	2 (11)	1 (4)	0 (—)
Black or African American	4 (12)	2 (7)	5 (10)	1 (5)	4 (16)	2 (12)
Hispanic or Latino	9 (26)	10 (34)	6 (12)	7 (37)	7 (28)	2 (12)
Native Hawaiian or Pacific Islander	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
White	13 (38)	12 (41)	28 (58)	8 (42)	13 (52)	12 (71)
Multiple races	0 (—)	1 (3)	1 (2)	0 (—)	0 (—)	0 (—)
Unknown	5 (15)	4 (14)	5 (10)	1 (5)	0 (—)	1 (6)
U.S. Census Bureau region, no. (%)						
Northeast	6 (18)	8 (28)	10 (21)	1 (5)	9 (36)	3 (18)
Midwest	7 (21)	4 (14)	8 (17)	4 (21)	2 (8)	3 (18)
South	12 (35)	11 (38)	14 (29)	7 (37)	10 (40)	6 (35)
West	9 (26)	6 (21)	16 (33)	7 (37)	4 (16)	5 (29)
Limbs affected, no. (%)						
Upper	20 (59)	19 (66)	36 (75)	8 (42)	11 (44)	8 (47)
Lower	28 (82)	26 (90)	31 (65)	19 (100)	21 (84)	16 (94)
Illness during 4 weeks before limb weakness onset, no. (%)						
Any illness	21 (62)	21 (72)	40 (83)	11 (58)	19 (76)	14 (82)
Respiratory illness	15 (44)	14 (48)	29 (60)	7 (37)	15 (60)	11 (65)
Fever	13 (38)	9 (31)	23 (48)	4 (21)	11 (44)	9 (53)
Respiratory illness or fever	21 (62)	17 (59)	38 (79)	8 (42)	18 (72)	13 (76)
Gastrointestinal illness	3 (9)	10 (34)	13 (27)	6 (32)	4 (16)	6 (35)
Median days from prior illness to limb weakness, no. (IQR)						
Any illness	6 (2–12)	6 (3–10)	6 (3–8)	12 (2–20)	7 (2–12)	3 (1–7)
Respiratory illness	6 (2–14)	5 (3–8)	6 (4–8)	18 (2–20)	8 (2–11)	3 (1–7)
Fever	2 (1–6)	3 (2–15)	3 (1–8)	3 (1–15)	4 (1–10)	1 (0–4)
Respiratory illness or fever	6 (2–12)	5 (3–8)	6 (3–8)	10 (1–19)	8 (2–12)	3 (0–6)
Gastrointestinal illness	4 (0–14)	4 (0–7)	2 (0–9)	6 (3–20)	3 (0–6)	0 (0–6)
Cerebrospinal fluid microscopic examination, no. (%)	28 (100)	27 (100)	42 (100)	18 (100)	18 (100)	14 (100)
Pleocytosis, no. (%)	14 (50)	12 (44)	29 (69)	9 (50)	13 (72)	9 (64)
Median white blood cells per mm^3 (IQR)	28 (9–64)	37 (16–86)	53 (24–129)	155 (107–365)	91 (46–156)	94 (27-103)
Polio vaccination, no. (%)						
Status						
IPV or OPV	21 (62)	24 (83)	43 (90)	19 (100)	21 (84)	11 (65)
Unvaccinated	0 (—)	0 (—)	1 (2)	0 (—)	2 (8)	1 (6)
Unknown vaccination status	13 (38)	5 (17)	4 (8)	0 (—)	2 (8)	5 (29)
Doses received (among those vaccinated)						
≥3 doses (up to date)	20 (95)	18 (75)	38 (88)	16 (84)	17 (81)	11 (100)
1–2 doses	1 (5)	4 (17)	0 (—)	1 (5)	1 (5)	0 (—)
Unknown	0 (—)	2 (8)	5 (12)	2 (11)	3 (14)	0 (—)

See table footnotes on the next page.

Clinical Course

Among all patients with confirmed AFM during 2020–2025, 98%–100% were hospitalized, including 58%–85% who were hospitalized within 1 day of onset of limb weakness (Table 1). Most patients (62%–94%) first sought care in a hospital emergency department. The most common treatments, received by 41%–59% of hospitalized patients with confirmed AFM, were steroids and intravenous immunoglobulin. Admission to an intensive care unit ranged from 47% in 2023 to 76% in 2025. Among patients who were hospitalized, 18%–47% required respiratory support and 15%–41% received invasive mechanical ventilation. No patients with confirmed AFM during 2020–2025 died.

TABLE 1. (*Continued*) Number and percentage of patients with confirmed acute flaccid myelitis, by selected demographic and clinical characteristics and year — United States, 2020–2025

Characteristic	2020 N = 34	2021 N = 29	2022 N = 48	2023 N = 19	2024 N = 25	2025 N = 17
Hospitalizations and treatment						
Hospitalizations, no. (%)	34 (100)	29 (100)	47 (98)	19 (100)	25 (100)	17 (100)
Hospitalization before or after limb weakness onset, no. (%)						
Before hospitalization	1 (3)	0 (—)	3 (6)	1 (5)	1 (4)	0 (—)
After hospitalization	33 (97)	29 (100)	44 (94)	18 (95)	24 (96)	17 (100)
Unknown	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
Days from limb weakness onset to hospitalization (among those hospitalized after onset)						
Hospitalized after onset, no. (%)	33 (100)	29 (100)	44 (100)	18 (100)	24 (100)	17 (100)
Median (IQR)	1 (1–1)	1 (0–1)	1 (1–3)	1 (0–1)	1 (0–3)	1 (0–2)
0–1 days, no. (%)	28 (85)	24 (83)	27 (61)	15 (83)	14 (58)	13 (76)
2–3 days, no. (%)	4 (12)	3 (10)	11 (25)	2 (11)	7 (29)	3 (18)
4–7 days, no. (%)	0 (—)	1 (3)	4 (9)	1 (6)	2 (8)	0 (—)
>7 days, no. (%)	1 (3)	1 (3)	2 (5)	0 (—)	1 (4)	1 (6)
Treatment, no. (%)						
Steroids, no IVIG	8 (24)	2 (7)	11 (23)	3 (16)	4 (16)	3 (18)
IVIG, no steroids	6 (18)	8 (28)	10 (21)	1 (5)	3 (12)	3 (18)
Steroids and IVIG	14 (41)	17 (59)	25 (52)	11 (58)	13 (52)	10 (59)
Plasma exchange	11 (32)	7 (24)	12 (25)	8 (42)	14 (56)	11 (65)
Admitted to ICU	20 (59)	21 (72)	24 (50)	9 (47)	16 (64)	13 (76)
Respiratory support	6 (18)	8 (28)	11 (23)	5 (26)	5 (20)	8 (47)
Mechanical ventilation	5 (15)	7 (24)	9 (19)	3 (16)	4 (16)	7 (41)
First health care visit after limb weakness onset						
Location, no. (%)						
Emergency department	24 (71)	19 (66)	30 (62)	12 (63)	17 (68)	16 (94)
Primary care provider	4 (12)	2 (7)	4 (8)	2 (11)	2 (8)	0 (—)
Urgent care provider	1 (3)	3 (10)	2 (4)	1 (5)	2 (8)	1 (6)
Weakness onset during hospitalization	1 (3)	0 (—)	3 (6)	1 (5)	1 (4)	0 (—)
Unknown or other	4 (12)	5 (17)	9 (19)	3 (16)	3 (12)	0 (—)
Days from onset to first health care visit (excludes hospitalizations before onset)						
First visit after onset, no. (%)	33 (100)	29 (100)	45 (100)	18 (100)	24 (100)	17 (100)
Median (IQR)	0 (0–0)	0 (0–1)	0 (0–1)	0 (0–0)	0 (0–1)	0 (0–1)
0–1 days, no. (%)	32 (97)	26 (90)	33 (73)	17 (94)	17 (71)	16 (94)
2–3 days, no. (%)	0 (—)	2 (7)	6 (13)	0 (—)	4 (17)	0 (—)
4–7 days, no. (%)	0 (—)	1 (3)	2 (4)	0 (—)	1 (4)	0 (—)
>7 days, no. (%)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	1 (6)
Unknown, no. (%)	1 (3)	0 (—)	4 (9)	1 (6)	2 (8)	0 (—)

Abbreviations: ICU = intensive care unit; IPV = inactivated polio vaccine; IVIG = intravenous immunoglobulin; OPV = oral polio vaccine.

Laboratory Test Results for Patients with AFM

Among the 172 patients with confirmed AFM reported during 2020–2025, 163 (95%) received laboratory test results from at least one clinical specimen, and a range of 26% (2023) to 55% (2024) of patients received a positive enterovirus or rhinovirus test result from at least one tested specimen (Table 2). Enterovirus or rhinovirus detections were most common in respiratory specimens (58; 40% of all cases); the most common viruses detected were rhinoviruses (24% of all cases positive for enterovirus or rhinovirus) and unknown or untyped enteroviruses (72% of all cases positive for enterovirus or rhinovirus). EV-D68 was detected in the respiratory specimen of one patient in 2025. Enterovirus A-71 was detected in the stool of one patient in 2020 and 2021 and two in 2022. Overall, 95 (55%) patients had stool specimens collected and tested; annual percentages ranged from 44% to 54% in all years except 2023 and 2025, when 74% and 76% of patients, respectively, had stool specimens tested. One case of poliomyelitis caused by poliovirus was detected in New York in 2022 (*6*) and was not included in the count of confirmed AFM cases.

Detection of EV-D68 in Children with Acute Respiratory Illnesses

Data from NVSN identified increases in detections of EV-D68 in respiratory specimens from children with acute respiratory illnesses in 2022, 2024, and 2025; however, these detections followed different annual trends from those of AFM cases nationally and were not associated with a concurrent increase in AFM cases (Figure). In addition, EV-D68 was detected in a specimen from one patient with AFM in 2025 (Table 2). NVSN 2025 data indicated that the increase in EV-D68 detections among children with acute respiratory illnesses began in July, reaching 9% of weekly respiratory cases in September 2025.

TABLE 2. Enterovirus and rhinovirus test results among patients with confirmed acute flaccid myelitis, by specimen type and year — United States, 2020–2025

Specimen type and test results	Year, no. (%)					
	2020 N = 34	2021 N = 29	2022 N = 48	2023 N = 19	2024 N = 25	2025 N = 17
Total patients with enterovirus and rhinovirus test results	**32 (94)**	**28 (97)**	**45 (94)**	**19 (100)**	**22 (88)**	**17 (100)**
Patients with any positive result	9 (28)	12 (43)	21 (47)	5 (26)	12 (55)	8 (47)
Enterovirus-D68	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	1 (12)
Enterovirus-A71	1 (11)	1 (8)	2 (10)	0 (—)	0 (—)	0 (—)
Rhinoviruses	3 (33)	3 (25)	5 (24)	0 (—)	3 (25)	0 (—)
Other typed enteroviruses	0 (—)	2 (17)	3 (14)	0 (—)	0 (—)	0 (—)
Unknown or not typed	5 (56)	6 (50)	11 (52)	5 (100)	9 (75)	7 (88)
Respiratory specimen						
Patients with results	29 (85)	27 (93)	38 (79)	17 (89)	19 (76)	15 (88)
Patients with positive results	8 (28)	9 (33)	19 (50)	5 (29)	10 (53)	7 (47)
Enterovirus-D68	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	1 (14)
Enterovirus-A71	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
Rhinoviruses	3 (38)	3 (33)	5 (26)	0 (—)	3 (30)	0 (—)
Other typed enteroviruses	0 (—)	0 (—)	1 (5)	0 (—)	0 (—)	0 (—)
Unknown or not typed	5 (62)	6 (67)	13 (68)	5 (100)	7 (70)	6 (86)
Stool specimen						
Patients with results	15 (44)	14 (48)	26 (54)	14 (74)	13 (52)	13 (76)
Patients with positive results	2 (13)	3 (21)	5 (19)	0 (—)	3 (23)	1 (8)
Enterovirus-D68	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
Enterovirus-A71	1 (50)	1 (33)	2 (40)	0 (—)	0 (—)	0 (—)
Rhinoviruses	0 (—)	0 (—)	0 (—)	0 (—)	1 (33)	0 (—)
Other typed enteroviruses	0 (—)	2 (67)	3 (60)	0 (—)	0 (—)	0 (—)
Unknown or not typed	1 (50)	0 (—)	0 (—)	0 (—)	2 (67)	1 (100)
Cerebrospinal fluid						
Patients with results	30 (88)	27 (93)	38 (79)	18 (95)	17 (68)	16 (94)
Patients with positive results	0 (—)	1 (4)	0 (—)	0 (—)	0 (—)	1 (6)
Enterovirus-D68	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
Enterovirus-A71	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
Rhinoviruses	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
Other typed enteroviruses	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
Unknown or not typed	0 (—)	1 (100)	0 (—)	0 (—)	0 (—)	1 (100)
Serum specimen						
Patients with results	23 (68)	21 (72)	25 (52)	9 (47)	6 (24)	7 (41)
Patients with positive results	1 (4)	2 (10)	0 (—)	0 (—)	0 (—)	1 (14)
Enterovirus-D68	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
Enterovirus-A71	1 (100)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
Rhinoviruses	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
Other typed enteroviruses	0 (—)	1 (50)	0 (—)	0 (—)	0 (—)	0 (—)
Unknown or not typed	0 (—)	1 (50)	0 (—)	0 (—)	0 (—)	1 (100)

Discussion

During January 2020–December 2025, the number of confirmed AFM cases reported to CDC remained low compared with previous years, despite increases of EV-D68–associated respiratory illness in 2022, 2024, and 2025. Although clinical characteristics of patients with AFM in 2022 and 2024 were similar to those from 2018 (*2*), a year when the large increase in cases was attributed to EV-D68, only one AFM patient during 2020–2025 had EV-D68 detected in any specimens. Although additional patients with AFM during this period might have had EV-D68 infection, detection was limited by timing of specimen collection. Specimens from patients with AFM are typically collected after onset of limb weakness rather than during the prodromal illness that can occur up to 7 days before weakness onset, when viral detection might be more likely. Furthermore, many specimens that tested positive for enterovirus or rhinovirus might not have been typed if they were not submitted to CDC for sequencing.

During 2020–2021, nonpharmaceutical interventions implemented during the COVID-19 pandemic likely led to decreased circulation of respiratory viruses, including EV-D68 (*7*). Detections of EV-D68 respiratory cases, as measured in NVSN sentinel surveillance sites, returned in 2022, exceeding 2018 levels (*8*), and also increased in 2024 and 2025. NVSN data suggest a possible return to the biennial pattern for EV-D68 circulation (*5*,*9*), whereas AFM cases have remained at baseline levels since 2018. Reasons for this finding remain unclear. One hypothesis is that the EV-D68 strains circulating

Summary

What is already known about this topic?

Acute flaccid myelitis (AFM) is a rare but serious neurologic condition that has been associated with enterovirus D68 (EV-D68). EV-D68 circulation was associated with U.S. peaks in AFM cases in 2014, 2016, and 2018 (120–238 cases per year). AFM is clinically and radiologically indistinguishable from paralytic poliomyelitis caused by poliovirus.

What is added by this report?

During 2020–2025, 17–48 AFM cases were reported annually, despite increases in EV-D68–associated respiratory illnesses in 2022, 2024, and 2025. Approximately one half of AFM patients had stool specimens tested for poliovirus; 75%–100% of AFM patients had received ≥3 polio vaccine doses. One polio case was identified in New York in 2022.

What are the implications for public health practice?

Remaining current with polio vaccinations can reduce the risk for poliovirus infection. To ensure detection of polio cases, stool specimens should be collected and tested from all patients suspected of having AFM. Reporting AFM cases to health departments is important for AFM and polio surveillance. Continued AFM surveillance is needed to further understand the epidemiology of AFM and its association with EV-D68.

in 2022, 2024 and 2025 (and possibly in years to come) are less neurovirulent. A recent study found that the predominant EV-D68 strains being detected lack some of the amino acid substitutions in the viral capsid protein VP1 that induce neurovirulence in mouse and neuron models (*9*,*10*). Additional studies that directly test the phenotype of recent amino acid changes are warranted to assess this hypothesis.

Based on a presumed biennial pattern in EV-D68 circulation, the increase in EV-D68 detections beginning in July 2025 was unexpected. Efforts are underway to better understand EV-D68 trends both locally and across the NVSN sites after possible pandemic interruptions.

Because AFM and poliomyelitis caused by poliovirus are clinically and radiologically indistinguishable, collecting stool specimens from patients who meet the criteria for AFM is critical to rule out polio. During 2020–2025, approximately one half of patients with confirmed AFM cases had stool specimens collected and tested for poliovirus, which is less than the 80% recommended for AFP surveillance internationally. However, in the United States, the health care system provides access to resources (e.g., imaging and laboratory testing) that providers can use to develop alternative diagnoses for cases of AFP. Furthermore, 75%–100% of patients with confirmed AFM were up to date with polio vaccination and considered to be at low risk for having polio.

In 2022, a case of paralytic poliomyelitis was identified in a person in New York (*6*). The patient was an unvaccinated young adult who was initially evaluated as having a possible case of AFM. Following AFM surveillance protocol, serum, CSF, and respiratory and stool specimens were collected for testing and confirmed that the patient had poliomyelitis caused by poliovirus. Because the patient had no history of international travel, and the last case of indigenous polio in the United States occurred in 1979, poliomyelitis caused by poliovirus was not initially suspected. Poliovirus circulates in the environment for months after being shed in the stool of an infected person and can infect susceptible persons. Polio vaccination is critical for decreasing the number of cases in the community and preventing paralytic polio. The occurrence of this case underscores the importance of collection of stool specimens for testing from all patients with suspected AFM, especially from persons who are not up to date with their polio vaccinations; however, only approximately one half of patients with confirmed AFM had stool collected and tested in recent years, with the exception of 2023 (74%), possibly because of heightened awareness after the occurrence of the 2022 polio case, and 2025 (76%). Few patients with AFM were completely unvaccinated (2%) or undervaccinated (5%). Because patients whose vaccination status was unknown were more likely to be aged ≥18 years, they might have been immune to polio but did not have vaccination documentation of or could not remember being vaccinated.

Limitations

The findings in this report are subject to at least three limitations. First, the clinical data for this analysis were collected through a patient summary form completed by health department personnel and through a review of the patient's clinical records; therefore, information might be incomplete. Second, although efforts were made to validate polio vaccination statuses through vaccination registries, data were not always available. These unknown records might have resulted in an underestimate of the percentage of persons who were vaccinated. Finally, cases with suspected AFM are passively reported to CDC, which could result in an underestimate of the number of AFM cases in the United States.

Implications for Public Health Practice

The timing of the next increase in AFM remains uncertain, especially because the 2022, 2024, and 2025 increases in respiratory detections of EV-D68 were not associated with a concurrent increase in AFM. Given the unexpected EV-D68 increase in 2025, clinicians should remain alert for patients suspected of having AFM and report these cases to their local or state health department. In addition, persons should remain up to date with polio vaccination to reduce their risk for infection with poliovirus. Because AFM and poliomyelitis caused by poliovirus are clinically and radiologically indistinguishable,

obtaining polio vaccination status, collecting stool specimens from patients suspected of having AFM, and retaining high polio vaccination levels are critical for detecting and maintaining the elimination of polio in the United States.

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Norovirus, COVID-19, and Influenza Outbreaks Among Residents and Staff Members at the Eaton Wildfire Evacuation Shelter — Pasadena, California, January–February 2025

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Abstract

The Eaton wildfire burned during January 7–31, 2025, displacing approximately 100,000 residents, destroying 9,419 structures, and resulting in the deaths of 19 residents of the greater Pasadena, California, area. An evacuation shelter opened on January 7. On January 13, the Pasadena Public Health Department (PPHD) received reports of acute gastrointestinal illness, COVID-19, and influenza cases among shelter residents. An outbreak response was initiated, which included enhanced surveillance and improved infection prevention and control (IPC) measures. On January 18, additional assistance was requested from the California Department of Public Health (CDPH). During January 7–February 16 shelter operations, enhanced surveillance implemented in response to the outbreak identified 104 cases of norovirus, 56 of COVID-19, 29 of influenza, and 30 of nonspecified respiratory illness among residents and staff members. Reported norovirus, COVID-19, and influenza cases decreased sharply after January 22. The last case of reported illness was a COVID-19 case on February 6. Rapid implementation of isolation and IPC protocols and interagency communication were temporally associated with declines in reported cases. This response highlights the importance of ongoing adherence to and coordination of IPC measures for outbreak mitigation to protect the health of residents and staff members in shelters established in response to public health emergencies or disasters.

Investigation and Results

The Eaton wildfire began on January 7, 2025, and was contained by January 31, 2025 (*1*). The fire burned 14,021 acres, destroyed 9,419 structures, and resulted in the deaths of 19 residents in the greater Pasadena area (i.e., Altadena, Pasadena, and Sierra Madre), an urban area with a population of approximately 230,000 persons (*1*,*2*).

Opening of Wildfire Evacuation Shelter

Within the first 24 hours of the Eaton wildfire, approximately 100,000 residents were evacuated, including an estimated 1,800 residents of 25 assisted living facilities and 10 skilled nursing facilities (City of Pasadena, PPHD, unpublished data, 2025) and staff members and employees from PPHD and other City of Pasadena facilities. These estimates were derived using a count of facilities within the evacuation zone and licensed bed counts. An evacuation shelter was opened at the Pasadena Convention Center the same day the wildfire began. The convention center (approximately 97,000 sq ft) was divided into separate halls for the general population, families, residents with pets, and dining. Approximately 300 residents arrived on the first evening, January 7. By the following evening, the shelter housed approximately 1,700 evacuees.

Implementation of Isolation and IPC Protocols

By January 11, PPHD had developed shelter isolation and IPC protocols for norovirus, COVID-19, and influenza based on local community wastewater trends, laboratory testing surveillance data,[†] and documented infectious disease outbreak risks in evacuation shelters, including a norovirus outbreak during the 2018 Camp fire (*3*). On January 12, management of the Pasadena Convention Center, including IPC responsibilities, was transferred from PPHD to a nongovernmental organization (NGO) with experience operating emergency shelters as part of a disaster response protocol. During the transition, PPHD reduced on-site staff member presence and provided isolation and IPC protocols to NGO partners for outbreak preparedness. Clinical support was available on-site from health care providers throughout shelter operations.[§] This report summarizes enhanced surveillance findings and the interagency IPC strategies implemented in response to concurrent norovirus, COVID-19, and influenza outbreaks in the shelter. This activity was reviewed by CDC, deemed

[*] These authors contributed equally to this report

[†] Norovirus wastewater detections had been increasing in Los Angeles County since late November 2024, and the number of reported norovirus outbreaks in Pasadena was higher than in previous years (City of Pasadena, PPHD, unpublished data, 2025). The percentage of positive COVID-19 and influenza test results (3.5% and 26.1%, respectively) had been increasing in Los Angeles County in early January 2025.

[§] Health care partners included Kaiser Permanente Southern California, AltaMed, International Medical Corps, and Los Angeles County Department of Mental Health. They provided on-site medical care, pharmacy services, and testing for COVID-19 and influenza.

not research, and conducted consistent with applicable federal law and CDC policy.[¶]

Identification of Initial Cases

On January 13, PPHD received reports from on-site health care providers of residents with positive COVID-19 and influenza test results and residents who were experiencing acute diarrhea or vomiting. In response, separate isolation halls were opened and patients with acute gastrointestinal illness (AGI) received testing. On January 18, after receiving additional reports of AGI and respiratory illnesses, PPHD requested assistance from CDPH.

Enhanced Surveillance and Case Finding

PPHD and CDPH conducted enhanced surveillance by creating and validating line lists for cases of norovirus, COVID-19, influenza, and other nonspecified respiratory illnesses. Case counts were not mutually exclusive (i.e., persons could be included in more than one disease line list).

Resident cases. Resident cases were identified through passive care-seeking encounters with on-site medical providers. Systematic screening of asymptomatic persons was not conducted. Age, sex, reported symptoms, date of symptom onset, testing status (if available), date of testing and results, and hospitalization status were abstracted from on-site medical records. COVID-19 and influenza antiviral medications were not available on-site and treatment data during hospitalization were not collected.

Staff member cases. Cases among staff members were identified from on-site testing and illness reported to employers through passive reporting mechanisms; available data collected included onset date and symptoms. To protect staff member privacy and confidentiality, identifying information was not collected. By January 23, line lists were established for staff member cases from all on-site agencies, including cases retrospectively identified since commencement of shelter operations.

Case Definitions

Norovirus. Persons with symptoms consistent with AGI were considered to have a probable case of norovirus. The first five identified patients with probable norovirus were offered a Biofire Diagnostics gastrointestinal panel.[**] Testing was discontinued after a norovirus outbreak was declared (at least two clinically compatible illnesses with a positive stool norovirus test result with the common exposure of being in the shelter); probable and confirmed (laboratory-positive stool sample) cases were subsequently considered together.

COVID-19. A confirmed case of COVID-19 was defined as a positive COVID-19 test result using a combined COVID-19/influenza rapid test (iHealth; Sunnyvale, California)[††] in a person with signs and symptoms of COVID-19. These might include fever, chills, cough, shortness of breath, fatigue, sore throat, congestion, or runny nose.

Influenza. A confirmed case of influenza was defined as a positive influenza test result using the on-site combined COVID-19/influenza rapid test (iHealth, Sunnyvale, California) in a person with signs and symptoms of influenza. These might include fever, chills, cough, sore throat, body aches, fatigue, nasal congestion, or runny nose.

Nonspecified respiratory illness. A symptomatic respiratory illness in a person who either received a negative combined COVID-19/influenza rapid test result or who did not receive testing was considered a case of nonspecified respiratory illness. Nonspecified respiratory illness might reflect a heterogeneous mix of false-negative COVID-19 or influenza antigen test results, an infection with another respiratory pathogen, or a respiratory condition with a noninfectious cause.

Shelter occupancy peaked during the first 24 hours with approximately 1,700 residents and decreased to approximately 200 residents during the last week of operations (February 10–16). Enhanced surveillance identified 104 norovirus (100 probable and four confirmed), 56 COVID-19, 29 influenza, and 30 nonspecified respiratory illness cases among residents and staff members (Table) (Figure 1). Eleven shelter residents had more than one diagnosis (four with norovirus and COVID-19, five with norovirus and influenza, and two with COVID-19 and influenza). Whether staff members also had multiple diagnoses could not be determined because staff member illnesses were reported as de-identified aggregate counts. Nine (8.7%) patients with norovirus infection and six (10.7%) with COVID-19 were hospitalized (Table).

Public Health Response

The first ill persons were identified on January 13; PPHD staff members conducted a site visit on the same day. Gaps in isolation protocol implementation were identified, including inadequate hand hygiene and personal protective equipment use and lack of an appropriate isolation area for ill persons separate from the general population. In addition, use of cleaners that were not effective against norovirus was observed; subsequently, recommended use of Environmental Protection

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

[**] Because PPHD was evacuated, AGI testing supplies were provided by Los Angeles County Public Health Department and testing was conducted by Los Angeles County Public Health Laboratory. Testing ceased after norovirus was confirmed.

[††] Antigen tests for COVID-19 and influenza have low to moderate sensitivity, which might have resulted in misclassification.

TABLE. Cases of norovirus, COVID-19, influenza, and nonspecific respiratory illness identified among residents and staff members of the Eaton wildfire evacuation shelter — Pasadena, California, January–February 2025

Disease	No. (row %)*							
	Case status			Person with infection				
	Total	Confirmed	Probable	Resident	Staff member	Hospitalized	First detection	Last detection
Norovirus†	**104**	4 (3.8)	100 (96.2)§	66 (63.5)	38 (36.5)	9 (8.7)	Jan 11	Jan 31
COVID-19¶	**56**	56 (100.0)	0 (—)	48 (85.7)	8 (14.3)	6 (10.7)	Jan 11	Feb 6
Influenza**	**29**	29 (100.0)	0 (—)	23 (79.3)	6 (20.7)	0 (—)	Jan 11	Jan 30
Nonspecific respiratory illness††	**30**	—	—	1 (3.3)	29 (96.7)	0 (—)	Jan 15	Feb 4

* Case counts for norovirus, COVID-19, influenza, and nonspecified respiratory illness are not mutually exclusive.
† Norovirus cases include confirmed cases (laboratory-positive stool sample) and probable cases (symptoms consistent with acute gastrointestinal illness).
§ Includes one resident who received a negative norovirus test result. After the norovirus outbreak definition was met (at least two illnesses with stool tests positive for norovirus), laboratory testing was discontinued, and persons with symptoms consistent with acute gastrointestinal illness (i.e., nausea, vomiting, or diarrhea) were considered to have a probable case of norovirus.
¶ COVID-19 cases include confirmed cases (positive COVID-19 on-site combined COVID-19/influenza iHealth rapid test result) in a person with a clinically compatible illness.
** Influenza cases include confirmed cases (positive influenza on-site combined COVID-19/influenza iHealth rapid test result) in a person with a clinically compatible illness.
†† Nonspecified respiratory illness cases include no test result or negative COVID-19 and influenza test results in a person with symptomatic illness.

Agency List G-approved disinfectants for norovirus was reinforced. After the site visit on January 13, additional IPC interventions were implemented by shelter staff members (Figure 2). Subsequently, PPHD and CDPH staff members conducted daily site visits and audits to ensure sustained IPC improvements and implementation. By January 27, after regular auditing and feedback regarding IPC, the presence of on-site cleaning personnel increased, recommended cleaning agents were used throughout the shelter, and adherence with respirator mask guidance was observed to be high among staff members. Reports of norovirus, COVID-19, and influenza cases decreased sharply after January 22. The last reported illness was a case of COVID-19 on February 6. All ill residents were released from isolation by February 12, and shelter operations ended on February 16 (Figure 1).

Discussion

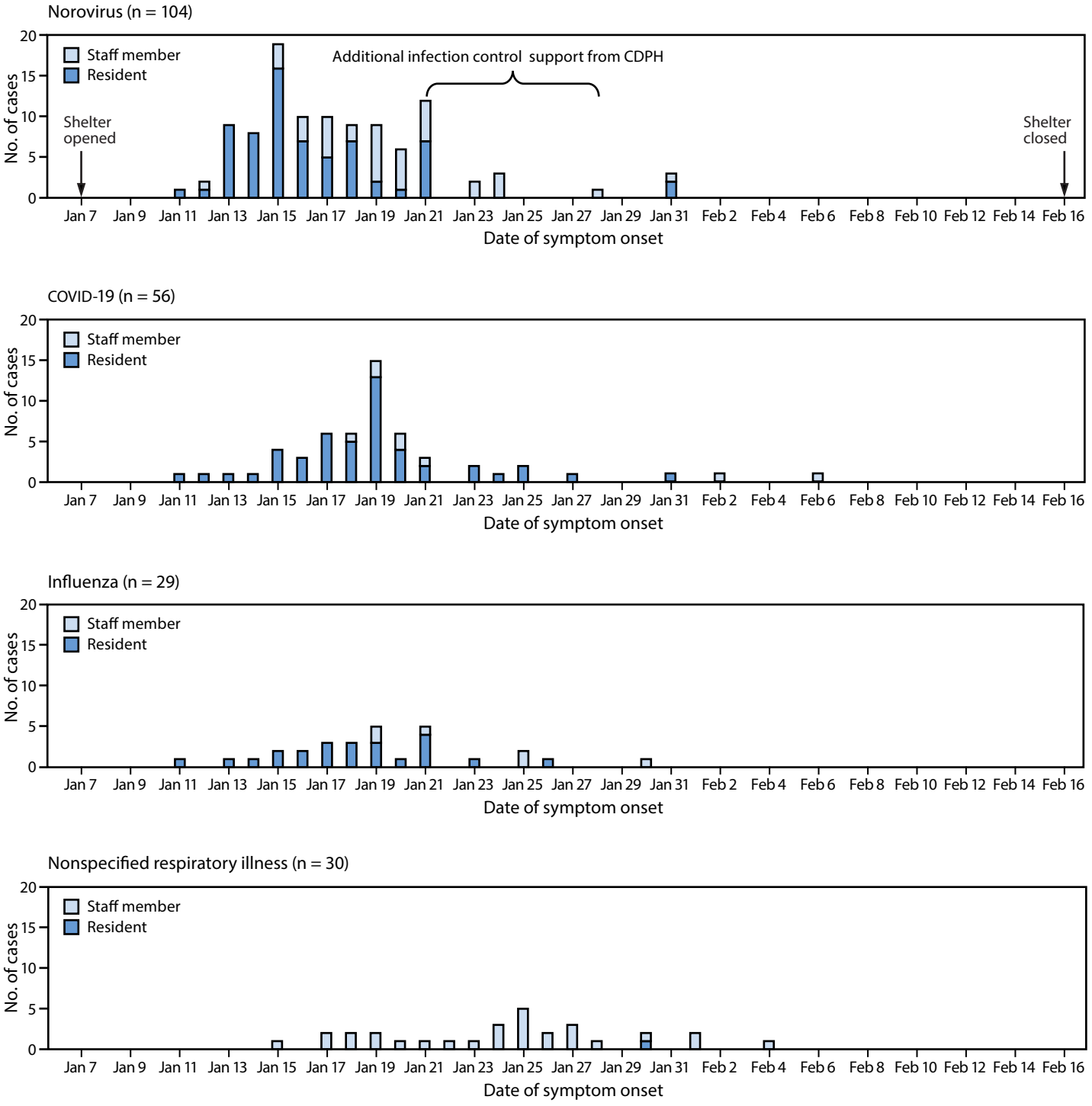
Infectious disease outbreaks in evacuation shelters are an important public health concern and exacerbate the challenges faced by persons seeking safety during and after an emergency (*4*). Outbreak control measures can be challenging to implement after disasters, when many persons with limited alternative housing options and varying medical needs are seeking immediate shelter (*4*). This challenge can be exacerbated when multiple communicable diseases are circulating within a community, each requiring a tailored prevention approach. Rapid implementation and sustained adherence to standardized IPC protocols should be part of standard shelter establishment procedures. Early adaptation of these measures can reduce transmission, morbidity, and mortality and decrease the likelihood of outbreaks. This report highlights the challenges of managing concurrent outbreaks with pathogen-specific transmission characteristics and control measures in a high-density shelter setting; however, because this analysis was observational, the effectiveness of specific interventions could not be definitively determined.

Implementing robust IPC measures before illness onset and hospitalization is a critical strategy for outbreak prevention and containment. To control outbreaks in the Eaton wildfire evacuation shelter, PPHD and CDPH partnered with NGOs and health care agencies to swiftly designate clear roles and responsibilities for IPC. PPHD and CDPH also performed regular IPC audits and enhanced surveillance to track illnesses among residents and staff members. This outbreak response underscored the value of establishing early and clear IPC assignments; ensuring the maintenance and transferability of IPC protocols throughout the entirety of shelter operations was critical to sustaining outbreak control efforts. Effective communication and collaboration among public health agents, shelter staff members, and health care partners supported improvements in surveillance and IPC implementation during concurrent outbreaks. Agreement to prioritize IPC implementation and standardize protocols for illness reporting and management among partners was crucial to maintaining consistent practices, even with staff member turnover. Extending surveillance and IPC measures to include staff members, while preserving confidentiality and privacy, enhanced illness identification and improved containment efforts. Regular audits and feedback regarding appropriate mask use, hand hygiene, and environmental cleaning practices, combined with interagency collaboration, helped maintain IPC standards and reduce transmission risk.

Limitations

The findings in this report are subject to at least seven limitations. First, numbers of cases of COVID-19, influenza, and norovirus were likely underestimated because data were only available from persons who sought care; thus, milder cases might have been missed. Second, because of the low sensitivity

FIGURE 1. Number of confirmed and probable cases of norovirus,* COVID-19,† influenza,§ and nonspecified respiratory illness¶ among residents and staff members of the Eaton wildfire evacuation shelter — Pasadena, California, January–February 2025



Abbreviation: CDPH = California Department of Public Health.

* Norovirus cases include confirmed cases (laboratory-positive stool sample) and probable cases (symptoms consistent with acute gastrointestinal illness).

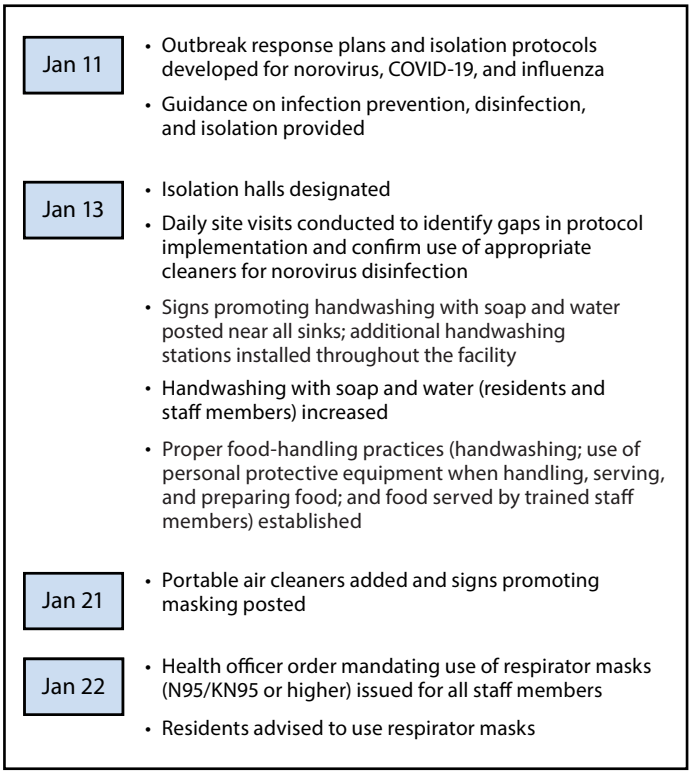
† COVID-19 cases include confirmed cases (positive COVID-19 on-site combined COVID-19/influenza iHealth rapid test result) in a person with a clinically compatible illness.

§ Influenza cases include confirmed cases (positive influenza on-site combined COVID-19/influenza iHealth rapid test result) in a person with a clinically compatible illness.

¶ Nonspecified respiratory illness cases include no test result or negative COVID-19 and influenza test results in a person with symptomatic illness.

** Case counts for norovirus, COVID-19, influenza, and nonspecified respiratory illness are not mutually exclusive.

FIGURE 2. Implementation timeline for infection prevention and control interventions* at the Eaton wildfire evacuation shelter — Pasadena, California, January 7–February 16, 2025



* Persons with acute gastrointestinal illness, influenza, or nonspecified respiratory illness were isolated in separate areas (designated isolation halls) until 48 hours after symptoms subsided; persons in isolation had separate showers and bathrooms. Persons with COVID-19 were isolated in off-site hotel rooms for 10 days. Staff members were advised to wash hands with soap and water on entering and leaving isolation areas, and required to wear face masks. Use of recommended Environmental Protection Agency List G–approved cleaning disinfectants for norovirus was reinforced.

of on-site COVID-19/influenza rapid tests, COVID-19 and influenza cases might have been misclassified as nonspecified respiratory illness. Third, surveillance of staff member illness was established later in the response, thus some cases might not have been retrospectively identified. Fourth, demographic characteristics could not be assessed for ill residents and staff members because information was not consistently collected. Fifth, trends in census at the shelter could not be assessed because movement of residents in and out of the shelter throughout the day and turnover of staff members prevented accurate daily census counts. Sixth, it was not possible to ascertain whether the declining shelter population over time contributed to fewer cases. Finally, information on antiviral treatment for COVID-19 and influenza was not collected because hospitalization and treatment data were not accessible.

Summary

What is already known about this topic?

Since 2015, multiple evacuation shelters have opened in response to California wildfires. High-density living conditions increase the risk for transmission of infectious diseases, increasing the risk for outbreaks in these shelters.

What is added by this report?

The Eaton wildfire evacuation shelter operated during January 7–February 16, 2025. Enhanced surveillance identified 104 cases of norovirus, 56 of COVID-19, 29 of influenza, and 30 of nonspecified respiratory illness. Implementation of isolation and infection prevention and control (IPC) protocols by multiple agencies were temporally associated with declines in reported cases.

What are the implications for public health practice?

Sustained and coordinated adherence to IPC measures in disaster evacuation shelters, particularly when multiple agencies are involved in relief operations, can protect residents and staff members from infectious diseases and mitigate outbreaks.

Implications for Public Health Practice

Interagency collaboration regarding the health and safety of shelter residents can support IPC of multiple potential outbreaks in evacuation shelters. This outbreak response highlights how developing early preparedness plans, establishing shared priorities among response partners (i.e., IPC and standardized disease surveillance), prioritizing communication among agencies during transitions in management, regularly identifying and improving gaps in shelter workflows (e.g., logistics, communication, and management), and ensuring consistent adherence to IPC measures are important to successful outbreak mitigation when multiple agencies are involved.

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