Acute Flaccid Myelitis – Surveillance updates and CDC activities, 2018

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Webinar

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Acute Flaccid Myelitis (AFM)

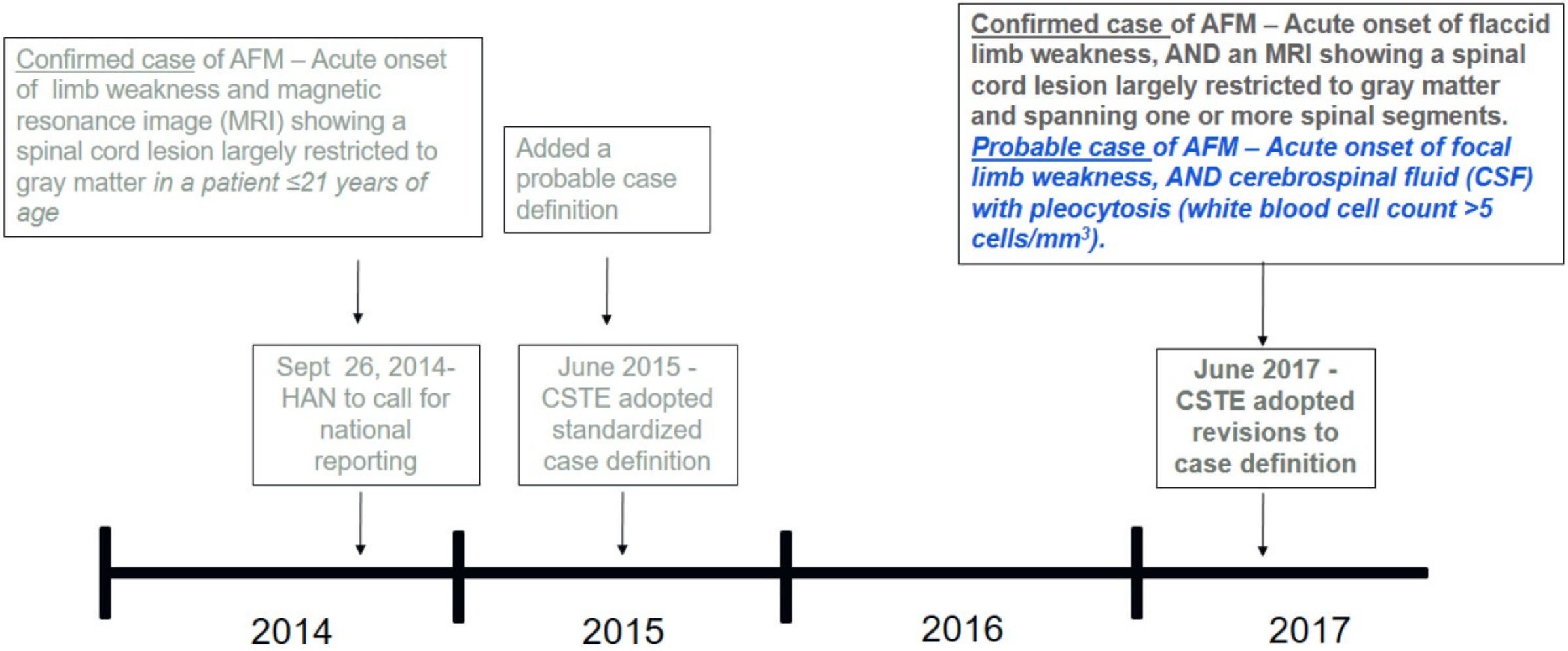
- Sudden onset of limb weakness within hours to a few days
- MRI findings demonstrate spinal cord lesions largely restricted to gray matter
- Risk factors unknown, most cases among children with preceding respiratory or febrile illness
- No proven treatment; management of AFM patients in conjunction with neurology and infectious disease experts

Initial investigations of AFM in the US

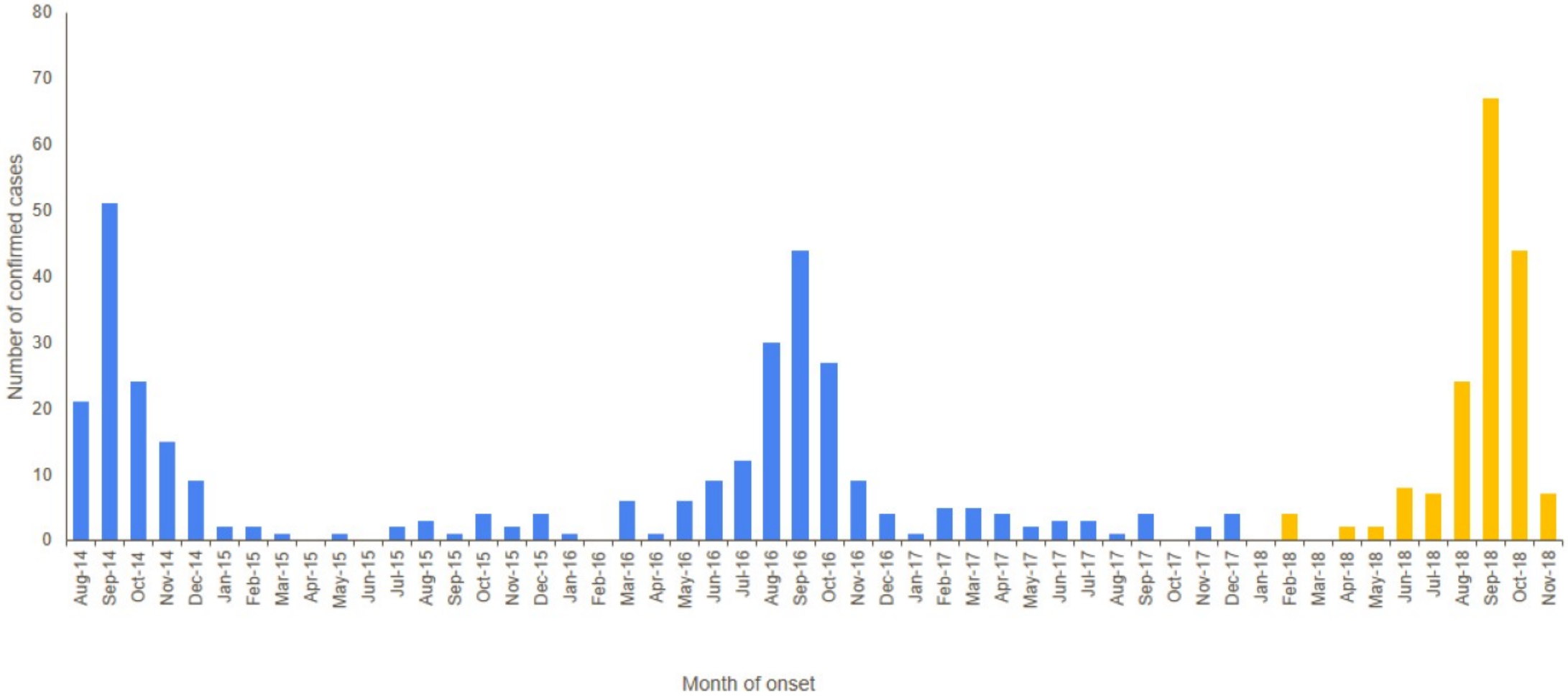
- 2012, CA: Three patients with limb weakness and anterior myelitis on MRI identified in California
  - Total of 23 patients identified from 2012–2014
- 2014, CO: Nine patients with limb weakness and spinal cord gray matter lesions onset dates August–September
- 2014: A national call for additional cases confirmed 120 in 34 states
  - >5 cases reported from: CA, CO, MA, PA and UT

Ayescue, MMWR, 2014; Pastula, MMWR, 2014; Van Haren, JAMA, 2015; Sejvar, CID, 2016

Evolution of the case definition for AFM



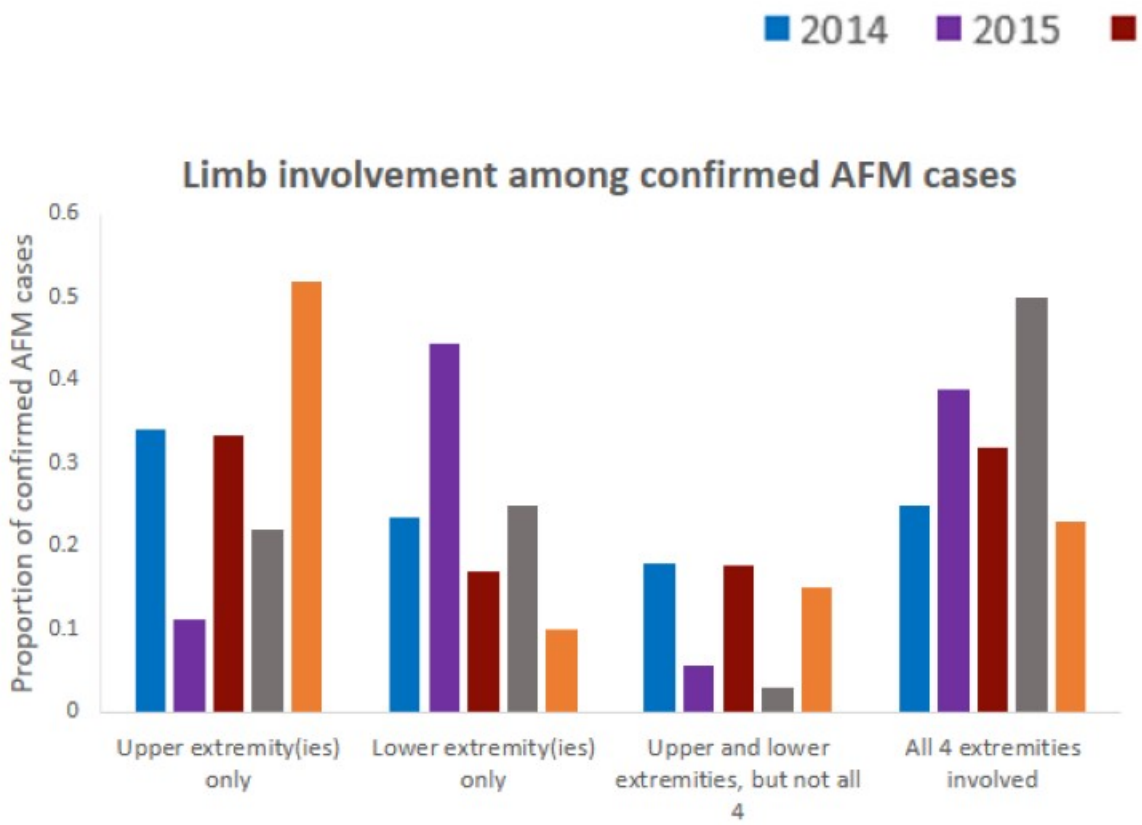
Number of confirmed US AFM cases reported to CDC by month of onset, August 2014-November 2018 (N=491)

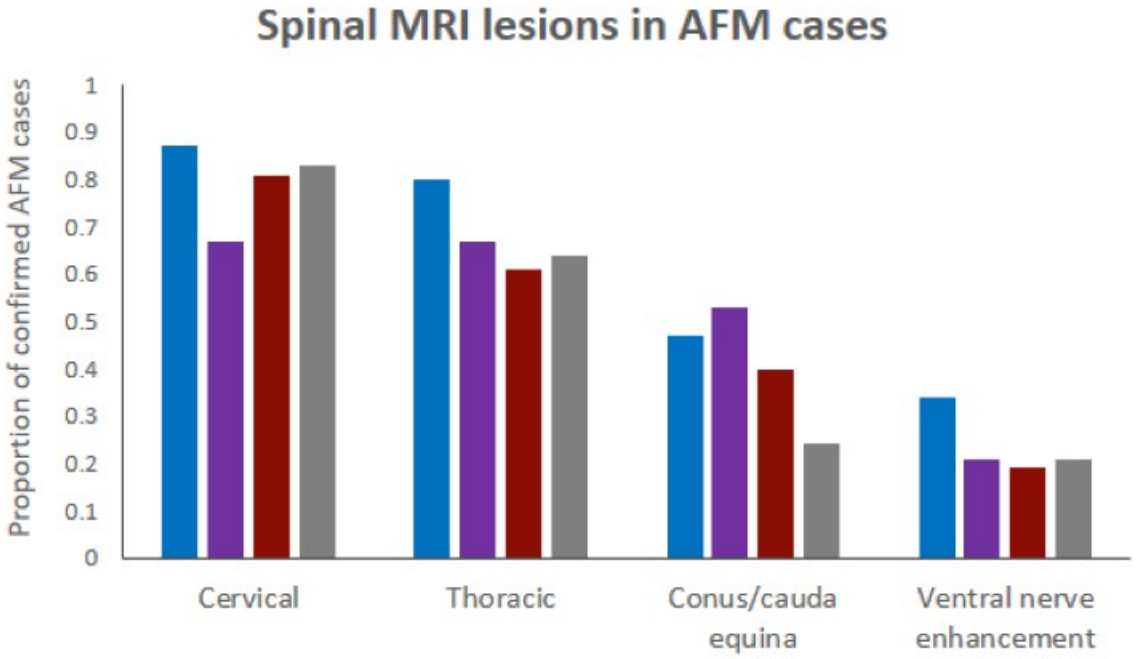


Demographic characteristics of confirmed pediatric cases, Aug 2014–Nov 2018 (N=442)

Year	2014	2015	2016	2017	2018	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Number of Cases	120	18	143	32	129	442
Age in years, median (IQR)	7 (5–12)	6 (2.5–11.5)	5 (3–9)	9 (3–12)	4.5 (2–7)	6.3 (2–12)
Sex						
Male	71 (59)	13 (72)	86 (60)	19 (59)	79 (61)	268 (61)
Female	49 (41)	5 (28)	57 (40)	13 (41)	50 (39)	174 (39)
Race						
AI/AN	1 (1)	0 (0)	3 (2)	0 (0)	0 (0)	4 (1)
Asian	8 (7)	2 (11)	8 (6)	0 (0)	3 (2.3)	21 (5)
Black or African American	8 (7)	6 (33)	24 (17)	7 (22)	13 (10)	58 (13)
White	79 (83)	8 (44)	78 (55)	17 (53)	85 (66)	267 (60)
Ethnicity						
Hispanic or Latino	29 (24)	1 (6)	26 (18)	6 (19)	21 (16)	83 (16)
Not Hispanic or Latino	59 (49)	5 (28)	56 (39)	6 (19)	58 (45)	184 (36)

Clinical characteristics among confirmed pediatric cases, Aug 2014 – Oct 2018





Overall (N=442): 37% upper limb weakness only
18% lower limb weakness only

Overall: 80% had cervical lesions
68% had thoracic lesions
41% had conus lesions

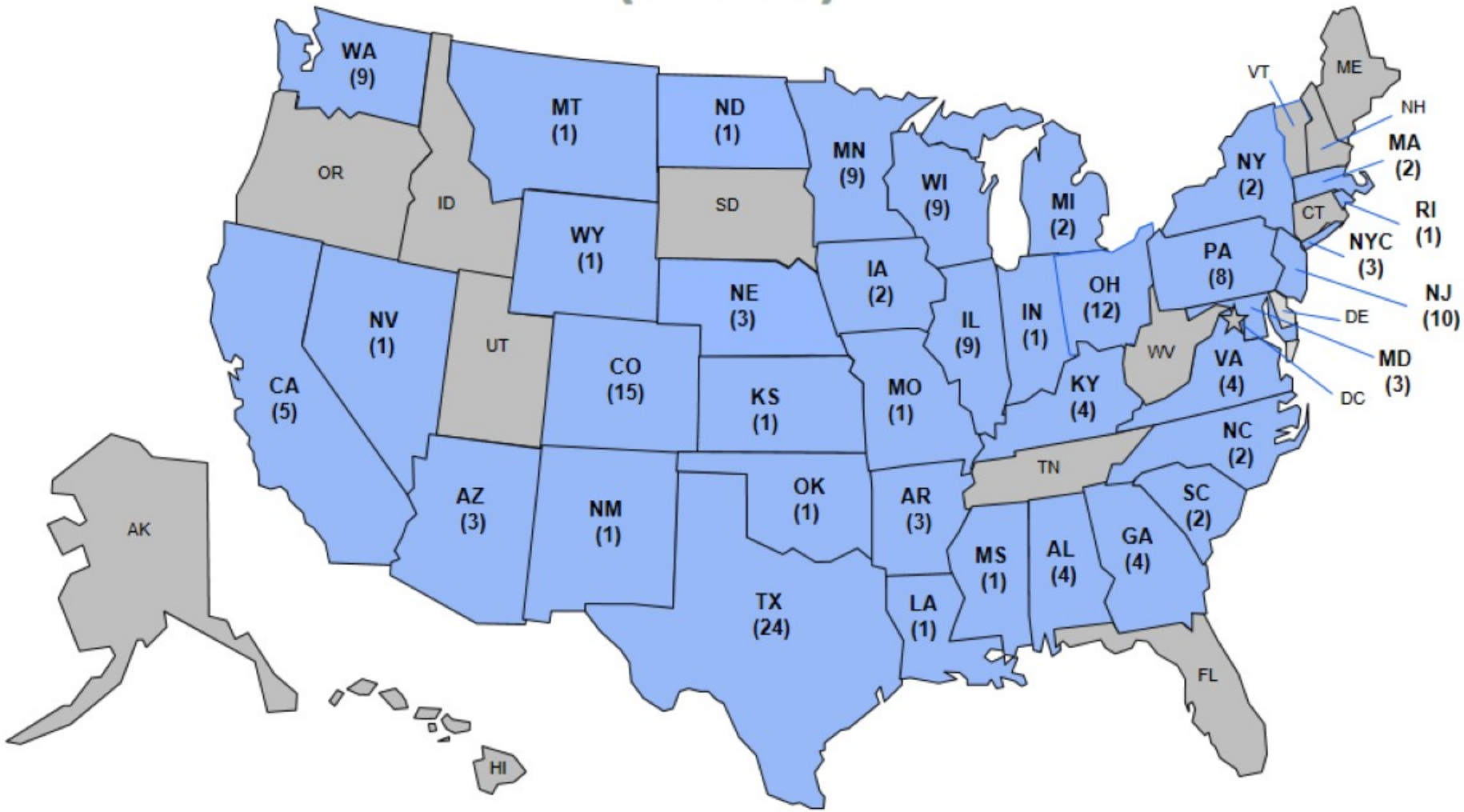
Preceding symptoms of Pediatric Confirmed Cases, August 2014 – November 2018

	YEAR					
	2014	2015	2016	2017	2018	Overall
	N=120 n (%)	N=18 n (%)	N= 143 n (%)	N=32 n (%)	N = 129 n (%)	N= 442 n (%)
Any respiratory illness	95 (81)	5 (28)	106 (74)	16 (50)	104 (81)	326 (74)
Any gastrointestinal illness	n/a	2 (11)*	33 (23)	10 (31)	48 (37)	90 (28)
Any febrile illness	74 (64)	6 (33)	93 (65)	21 (66)	105 (81)	299 (68)
Respiratory or febrile illness	105 (90)	8 (44)	122 (85)	23 (72)	125 (97)	383 (87)

AFM etiologic testing, August 2014 – November 2018

- Cerebrospinal fluid
  - EV-D68, EV-A71, Coxsackievirus A16 in 4 confirmed cases
  - Metagenomics testing in 2014 of 14/35 CSF: GB virus C, human rhinovirus, transfusion-transmitted virus
- Upper respiratory specimens positivity varied
  - 20-30% EV-D68+ during peak years
    - EV-D68 also detected in patients later classified as non-cases
  - ~one-third specimens with other viruses detected
  - ~one-third specimens with no pathogen detected
- All stool tested negative for poliovirus by standard WHO methods

2018 confirmed cases of acute flaccid myelitis (AFM) by state (N=165)*



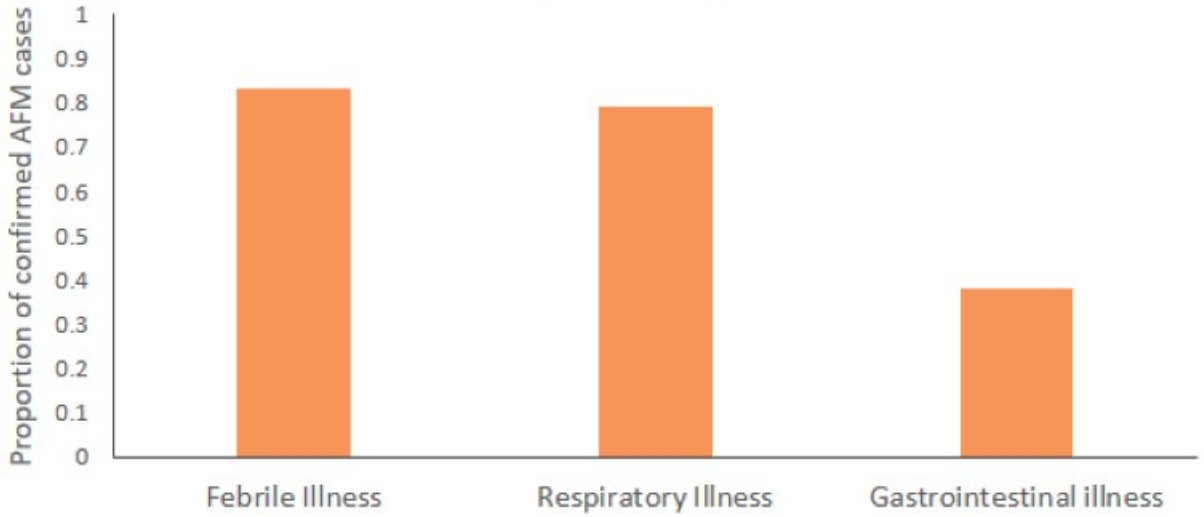
*Confirmed AFM cases as of December 14, 2018. Patients under investigation are still being classified, and the case counts are subject to change. Case counts will be updated every Monday.

Clinical characteristics among confirmed pediatric cases, 2018 (N=129)

- Hospitalization: 96%
- Intensive care unit admission: 58%
- CSF pleocytosis: 104 cases (81%)
  - median cell count 104 cells/mm^3, IQR (51 – 175)
  - Lymphocytic predominance
  - Median time from limb weakness to CSF collection 2 days, IQR (1-3)
- No deaths have been reported among cases confirmed in 2018
  - 1 death in 2017
  - Aware of deaths among cases reported in other years

Clinical characteristics among confirmed pediatric cases, 2018 (N=129)

Illnesses preceding limb weakness*



Overall: 81% febrile illness
81% respiratory illness
37% GI Illness
} 97%

Days from illness onset to limb weakness, 2018 (n = 129)

Illness type	median [(IQR), (range)]
Febrile illness	**2** [(1-5), (0-21)]
Gastrointestinal illness	**2.5** [(1-6), (0-19)]
Respiratory illness	**5** [(3-8), (0-21)]

CDC laboratory test results for confirmed cases of AFM (2018)

Specimen type (# tested)	Positive samples, n (%)	Organism Identified
Cerebral Spinal Fluid (n=32)	2 (6.3)	Enterovirus-A71 (1 adult case) Enterovirus -D68 (1)
Respiratory (n=81)	40 (49.4)¥	Enterovirus -D68 (21) Enterovirus -A71 (10) Rhinoviruses (7) Parechovirus (2) ¥non-typed Enterovirus /Rhinovirus (2)
Stool (n=62)	9 (14.3)	Enterovirus -A71 (1) Enterovirus -D68 (1) Echovirus 11 (1) Coxsackieviruses (3) Parechovirus (1) non-typed Enterovirus /Rhinovirus (1)

Summary

- Despite the increase in cases this year, AFM is still a rare disease
  - Predominately a pediatric illness
  - Every-other-year rise continues to be observed
  - Limited data suggests new epidemiology since 2014
  - Cases reported in 44 states since 2014
- >85% present with a preceding or respiratory illness
  - Virus detected in 50% of respiratory specimens
  - Among 4 confirmed cases since 2014, 3 different viruses identified in CSF
  - Unclear if direct viral invasion of spinal cord versus post-infectious process
    - Limited biopsy or tissue specimens to look at pathology

Objectives of syndromic surveillance for AFM

- Enhance AFM surveillance in jurisdictions
- Examine baseline rates of AFM
- Understand degree of under-reporting of cases of AFM
- Compare trends in AFM with trends in acute respiratory illness from syndromic surveillance
  - Compare trends in AFM surveillance from syndromic surveillance with trends from passive surveillance
- Create “real-time” signal for AFM
  - Could this be done to use as an alert for upcoming increase in AFM activity?

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Thank you

For more information, contact CDC
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TTY: 1-888-232-6348 www.cdc.gov