CDC Acute Flaccid Myelitis Update

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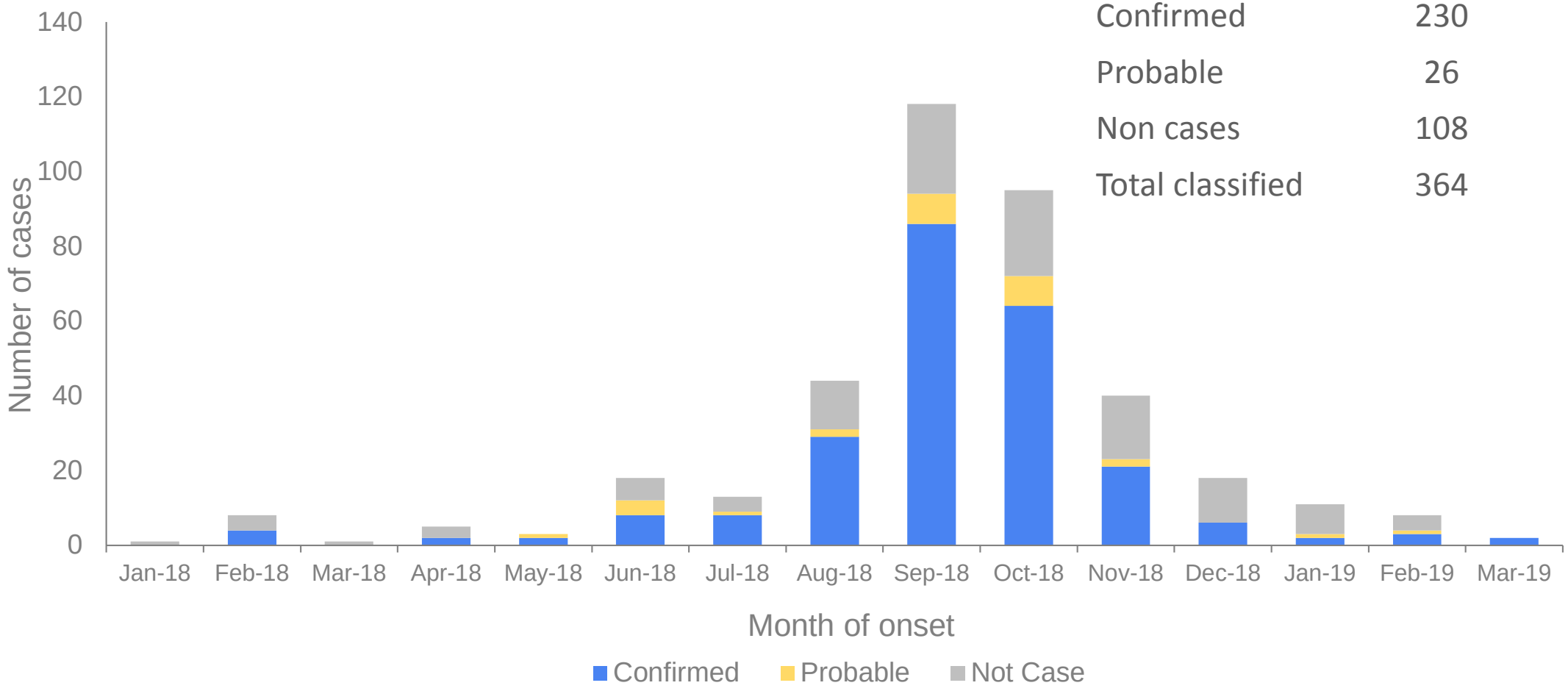
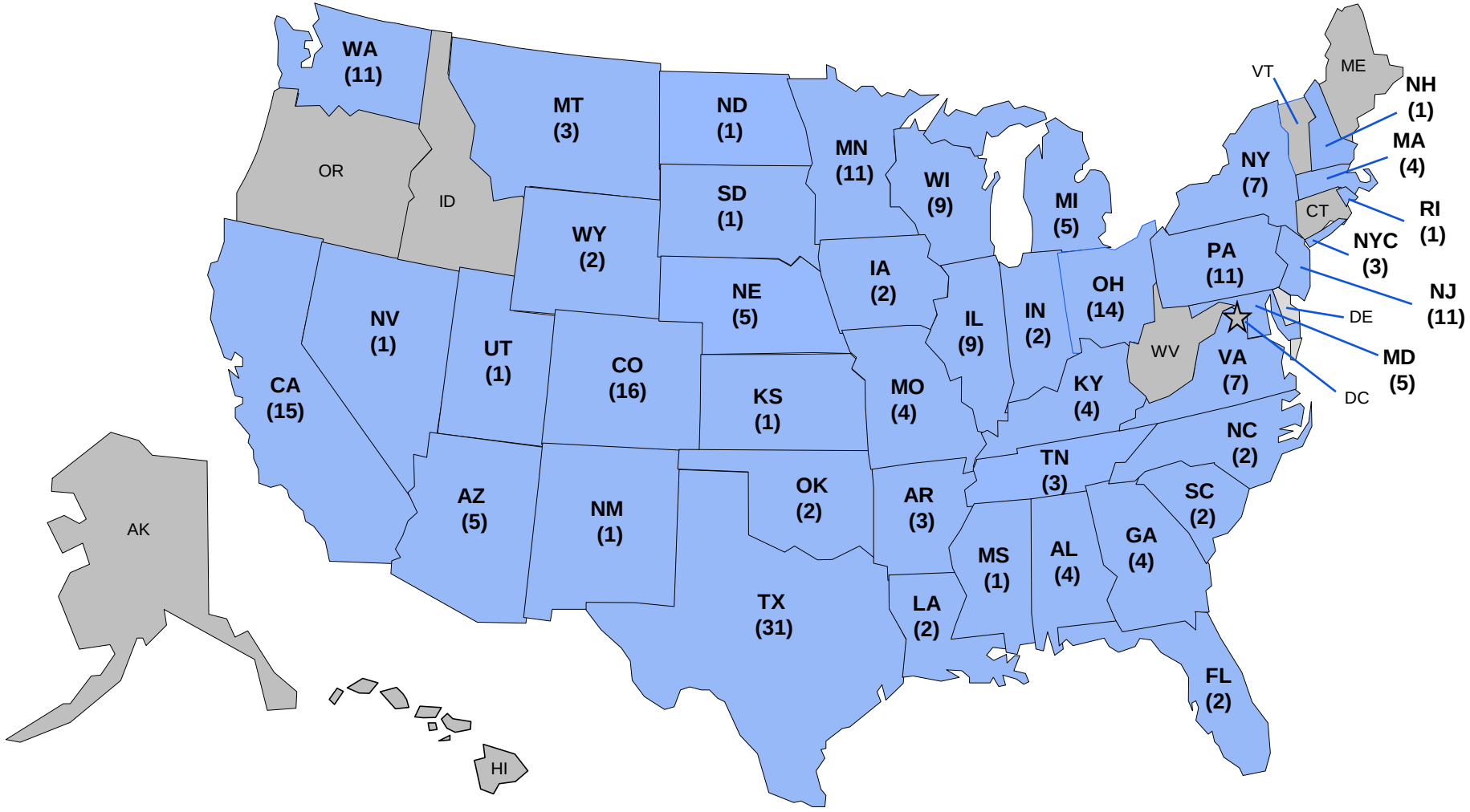
AFM reports to CDC by case status and month of onset, January 2018-April 2019

	2018	2019
Confirmed	230	7
Probable	26	2
Non cases	108	12
Total classified	364	21



2018 confirmed cases of acute flaccid myelitis (AFM) by state (N=230)*



*Confirmed AFM cases as of May 3, 2019. Patients under investigation are still being classified, and the case counts are subject to change.

One of the confirmed cases is a foreign resident (based on the country of usual residence) and therefore not included in the state map.

CDC AFM laboratory testing, 2018 – 2019

- **Cerebrospinal fluid (CSF)**: remains low-yield (3%)
  - 1 for enterovirus-D68 (EV-D68)
  - 1 for enterovirus-A71 (EV-A71)
- **Stool**: 13% tested positive
  - mix of enteroviruses/rhinoviruses (EV/RV) and parechoviruses
  - all negative for polio
- **Respiratory**: 45% tested positive, consistent with other peak years
  - 25% of specimens positive for EV-D68
  - 20% of specimens positive for other EV/RV
- 2019 testing has yielded only 1 positive respiratory sample (EV/RV untyped)

CDC AFM Epidemiology Activities

Advance understanding of the clinical presentation and outcomes of patients with AFM

- Abstracted clinical information from 2018 AFM patient medical records
  - Describe clinical phenotypes of confirmed cases
  - Compare clinical characteristics between cases and non-cases
  - Compare clinical data between peak and non-peak years
- Long-term follow-up of AFM cases in progress
  - Interview 2018 confirmed and probable cases
  - Functional assessment at 2, 6 and 12 months post onset using a validated questionnaire

Further interpret the temporal and geographical association between AFM cases and enteroviruses

- Conduct modeling of AFM case and EV testing data in partnership with a commercial laboratory and AFM Task Force colleagues
- Conduct enhanced AFM surveillance alongside active, prospective surveillance for gastroenteritis and respiratory illness in seven pediatric academic centers (WA, TX, MO, OH, TN, PA, NY)
  - Help to define baseline incidence of AFM
  - Compare monthly/seasonal incidence of AFM to viral circulation patterns detected by this surveillance system

Describe the natural history of AFM and determine risk factors for illness

- Collaborate in the NIH natural history study to better understand clinical presentation, etiologies, and outcomes of patients with AFM
- Case-series investigation (hypothesis-generating) to identify potential exposures common to AFM patients
  - Interview of 2018 confirmed AFM cases in summer 2019
  - Variables include: medical and illness exposure history, care seeking behaviors for preceding illness and limb weakness, trauma, intra-muscular injections, vector exposure, genetic and environmental factors

CDC AFM Laboratory Activities

Develop assays to look for indirect evidence of a viral infection

- Work with academic partners to examine EV-specific antibodies in CSF, which would provide additional support for a role of EV in AFM
- Develop EV-D68 monoclonal antibodies to facilitate IgM and IgA assays to look for serum and intrathecal antibodies as evidence of exposure to virus
- Investigate the immunophenotype of peripheral blood cells in AFM patients, to better understand what may be stimulating an immune response
- Characterize cytokine/chemokine patterns in CSF and serum of confirmed AFM patients as potential hallmark biomarkers

Explore the association between EV-D68 and AFM

- Understand the evolution of EV-D68
  - Generate complete genome sequences for viruses detected in AFM patient specimens and generate infectious clones
  - Use neuronal and respiratory cell models to understand EV-D68 infection and cytopathology
- Further investigate the high seroprevalence to EV-D68 across all age groups in Kansas City by planning a similar study using more nationally representative samples
- Develop assay for EV-D68 antibody-dependent disease enhancement

CDC AFM Communications Activities

AFM Vital Signs Release (July 9, 2019)

- MMWR about 2018 cases, timing of care and reporting lags
- Fact sheet targeting health care workers with specific messages on diagnosis and reporting
- Emphasize distinction between patient diagnosis and public health surveillance
  - Diagnosis of AFM should be rapid for medical management and independent of the CDC case classification
  - CDC case classification is meant specifically for surveillance-to understand disease burden and illness trends over time

Outreach to first-line pediatric responders and AFM parent group

- Connect with primary care clinicians, urgent care and emergency provider organizations for ongoing AFM education and research on healthcare provider knowledge, attitudes, and behaviors
- Communicate with AFM parent group through regular question and answer sessions and in-depth focus group discussions

Conclusions

- AFM cases continue to occur in seasonal, every-other-year outbreaks
- Growing evidence suggests that enteroviruses, including EV-D68, are leading etiologic candidates; however other causes and mechanisms for disease should be explored
- Robust surveillance and laboratory investigations will improve our understanding of the epidemiology and etiology of these outbreaks
- Provider outreach through Vital Signs release should improve case recognition and reporting and encourage early specimen collection for improved pathogen detection

Thank you