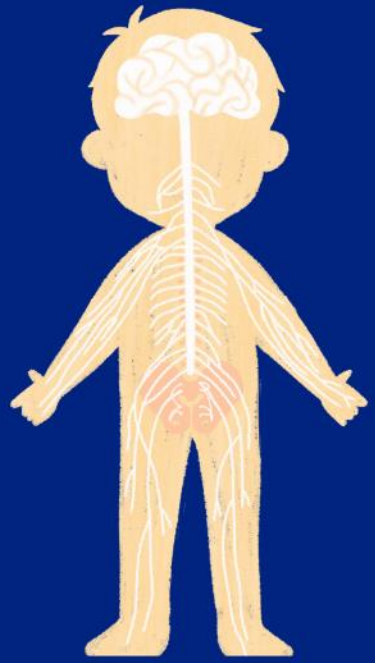
# Acute Flaccid Myelitis (AFM)



Thursday, October 13th at 12:00pm

Illinois Chapter
American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN®

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
IDPH
PROTECTING HEALTH IMPROVING LIVES

CDPH
Chicago Department of Public Health

# Today's Speakers

- Sue Hong, MD (Lurie)
- Marielle Fricchione, MD, FAAP (Rush)
- Stephanie Gretsch, MPH (CDPH)
- Heather Reid, CHES (IDPH)

# Patient Presentation

- Typical patient
  - Median age 5.2 years old
  - Usually previously healthy
    - May have a history of asthma

- Prodromal illness is common (90%)
  - Occurs at a median of 5 days prior to onset of limb weakness
  - Respiratory symptoms are the most common prodrome (78%)
  - Fever is also common (72%)
  - Gastrointestinal symptoms less common (32%)

Lopez A et al. MMWR Vol 68; July 9, 2019
McLaren N et al. Emerging Infectious Disease 2020; 26(2)
Messacar K et al. Annals of Neurology 2016; 80(3):326-38

# Patient Presentation

- Acute onset of neurologic symptoms
  - Preceding neck/back pain, headache, limb pain in limb that will be affected
  - Weakness occurs over hours to days
  - Extremity weakness
    - Hyporeflexic (although early on may be hyperreflexic)
    - Low tone (flaccid)
    - Upper extremities more commonly involved than lower extremities
    - Can involve all 4 extremities (28%)
    - Asymmetric
    - Proximal > distal weakness
  - Cranial nerve dysfunction (26%) including bulbar weakness


McLaren N et al. Emerging Infectious Disease 2020; 26(2).
Messacar K et al. Annals of Neurology 2016; 80(3):326-38.
Yea C et al. Journal of Child Neurology 2017; 32(3): 301-7.

https://www.cdc.gov/acute-flaccid-myelitis/hcp/references-resources.html

# Patient Presentation

- Uncommon Symptoms
  - Encephalopathy
  - Sensory changes other than neuropathic pain

Messacar K et al. Annals of Neurology 2016; 80(3):326-38
Yea C et al. Journal of Child Neurology 2017; 32(3): 301-7

- 60% of children had at least 1 interaction with medical providers (outpatient, urgent care, emergency department) prior to eventual hospitalization for AFM

Unpublished data, National AFM Working Group

- No cases of multiple people within the same household developing AFM

Bove R et al. Pediatr Neurol 2020; 102:20-27

# Differential Diagnoses and Misdiagnoses

- Transverse Myelitis
- Auto-antibody Myelitis
  - anti-NMO and anti-MOG
- ADEM
- Guillain-Barre Syndrome
- Stroke
- Acute cord compression
- Musculoskeletal injury

Reported Misdiagnoses

- Bickerstaff encephalitis/myelitis
- Dehydration
- Toxic hip
- Nursemaid's elbow
- Nothing wrong
- Conversion/Psychogenic Disorder
- Behavioral

Murphy O et al. Semin Neurology 2020; 40(2): 211-218.
Hardy D et al. Arch Dis Child 2020; 105(9):842-47
Hopkins SE et al. JAMA Pediatrics 2019;173(2):117-8
Bove R et al. Pediatr Neurol 2020; 102:20-27.

# Diagnostic Evaluation – Biologic Samples


CSF

- Lumbar Puncture
  - May need sedation depending on child's age and cooperation
  - Commonly will see CSF pleocytosis with lymphocytic predominance, normal glucose, normal to elevated protein
  - Investigation for infectious etiologies: arboviral panel, meningitis/encephalitis PCR panel


Serum

- Blood Draws
  - Investigation for infectious etiologies according to geography/season: West Nile Virus, Lyme
  - Investigation for inflammatory/autoimmune etiologies: anti-AQP4, anti-MOG


Stool

- Stool Sample
  - Enterovirus testing


NP swab

- Nasopharyngeal Swab
  - Respiratory viral panel PCR

# PATHOGENESIS

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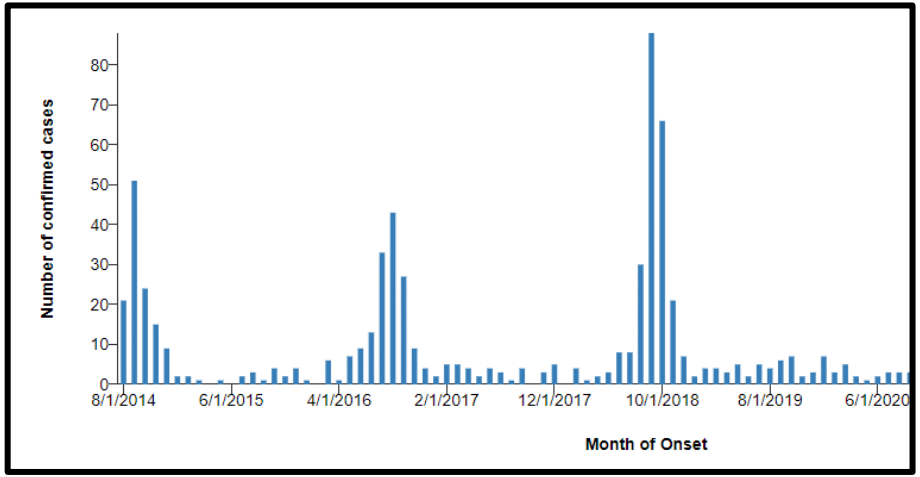
# AFM is a subset of Acute Flaccid Paralysis (AFP)




- Historically CDC AFP surveillance focused on Polioviruses, until 2014…
  - A retrospective search for AFM cases among MRI results and EMRs at 5 large pediatric medical centers found low # of cases from 2005-2013, but an increase in cases in 2014 → *suggesting a new or changing etiology*
  - AFM has distinct gray matter findings on MRI compared to other causes of AFP *?viral evolution → altered tissue tropism*
- AFP has multiple infectious and noninfectious etiologies
  - Poliovirus, nonpolio enteroviruses, flaviviruses like West Nile Virus, adenoviruses
  - Neuroinflammatory conditions or spinal vascular disease

Cortese M et al. PLoS One. 2020;15:e0228671.

# Evolving Understanding of AFM Pathogenesis

- Clinical manifestations and epidemiology of confirmed AFM cases strongly suggests infectious etiology, **probably viral**.
  - **1)** Most AFM cases have prodromal symptoms consistent with a viral illness before onset of limb weakness
  - **2)** AFM patients in peak years are significantly more likely to have prodromal respiratory illness or fever than those in nonpeak years
  - **3)** The 2014 increase in AFM coincided with an unusual increase in severe respiratory illness caused by enterovirus D68 in the US
    - 11 (20%) of 56 AFM patients whose respiratory specimens were tested at CDC in 2014 were positive for EV-D68

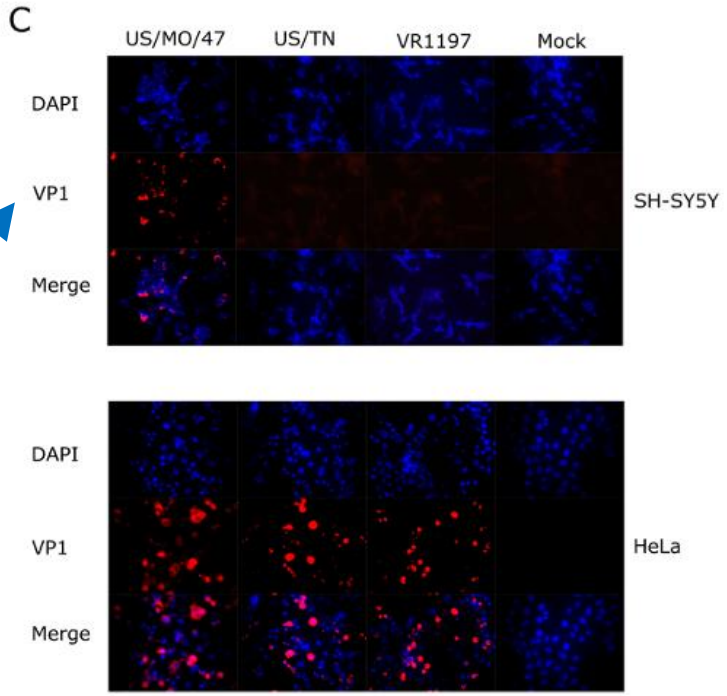
Kidd S et al. Emerg Infect Dis. 2020;26(10):6-12.
McLaren N et al. Emerg Infect Dis. 2020;26:212–9.
Aliabadi N et al . Emerg Infect Dis. 2016;22(8):1387-1394.

# Mechanisms of Neuronal Damage

- Post-2014 EV-D68 strains can enter neurons, replicate, and cause neurotoxic infection in cell culture and animal models
- Spinal cord neuronal damage not likely autoimmune-mediated
  - Median 5 days between prodrome onset and limb weakness suggests direct viral injury 2/2 immediate inflammatory response

Lopez A et al. MMWR. 2019;68:608–14.

- Antibody-dependent enhancement?
  - Like Dengue, coxsackie B, EV-A71

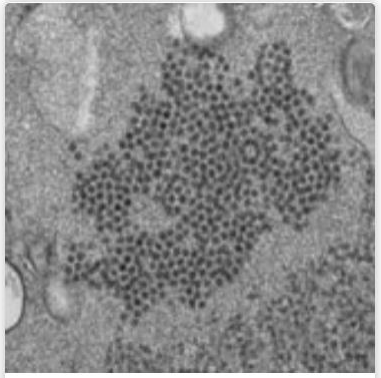



Brown et al. 2018. Figure 1

Hixon A et al. PLoS Pathog. 2017;13:e1006199.
Brown D et al. MBio. 2018;9:e01954–18.
Hixon A et al. J Virol. 2019;93:e00578–19

# Why Can't We Find Proof of CNS Enterovirus Infection in AFM Specimens?

- Timing of specimen collection can impact virus detection – **should obtain as close to onset of symptoms as possible.**
  - Yield of EV/RV and EV-D68 testing among AFM patients higher among respiratory specimens collected within 5–7 days of illness onset
  - In 2016 and 2018, 38% of all AFM patients with >1 clinical specimen tested at CDC were positive for EV/RV, EV-D68 was detected in 21%, enterovirus A71 (EV-A71) in 5%, and various other EV/RV were detected in 12%.
  - We now also need to consider polio as a cause of AFP – more commonly identified in the stool, rarely in CSF
- AFM patients were more likely than non-AFM controls to have enterovirus-specific IgG identified in their CSF

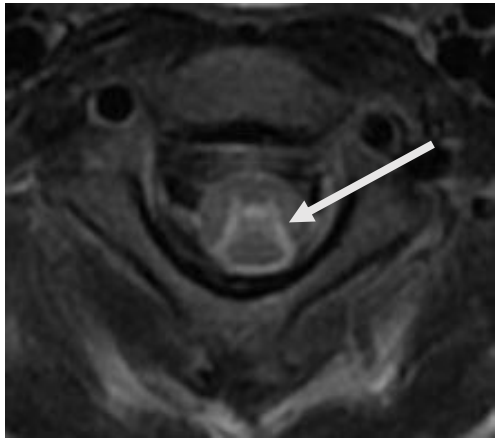


Electron micrograph of EV-D68
Image source: Cynthia S. Goldsmith and Yiting Zhang, CDC

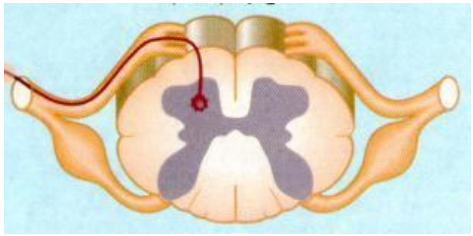
Kidd S et al. Emerg Infect Dis. 2020;26(10):6-12.
McLaren N et al. Emerg Infect Dis. 2020;26:212–9.

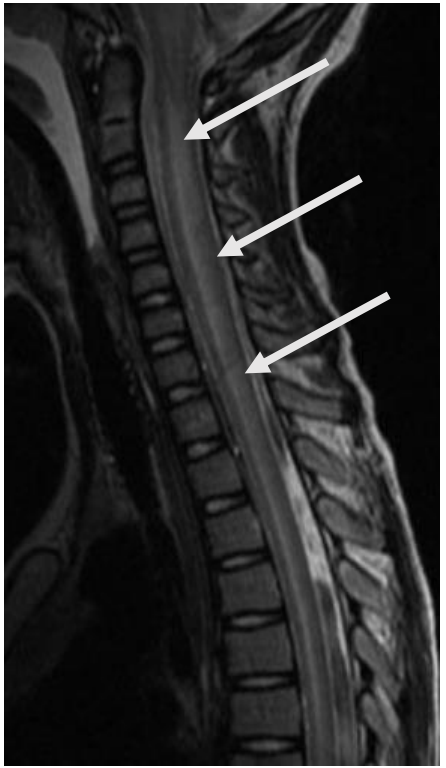
Mishra N et al. MBio. 2019;10:e01903–19.
Schubert R et al. Nat Med. 2019;25:1748–52.

# MRI findings in AFM



Gray-matter predominance





Longitudinally extensive
Cervical cord predilection

| Diagnostic items | Definite | Probable | Possible | Uncertain |
|---|---|---|---|---|
| **H1:** Acute onset of limb(s) weakness (period from onset to nadir: hours to 10 days) | P | P | P* | P |
| **H2:** Prodromal fever or illness† | P/A | P/A | P/A | P |
| **E1:** Weakness involving one or more limbs, neck, face, or cranial nerves | P | P | P* | P |
| **E2:** Decreased muscle tone in at least one weak limb | P | P | P/A | P |
| **E3:** Decreased or absent deep tendon reflexes in at least one weak limb‡ | P | P | P/A | P |
| **MRI:** Spinal cord lesion with predominant grey matter involvement, with or without nerve root enhancement§ | P | P | P | ND |
| **CSF:** Pleocytosis (white cell count >5 cells/L)¶ | P | A or ND | P/A or ND | P/A or ND |

**P – present**
**A – absent**
**ND – Not done**

Murphy OC, et al. Lancet 2021; 397:334-46.

# Acute Treatment for Suspected AFM

- Admit for observation in a hospital with ability to support respiratory failure
  - >98% hospitalized
    - ~60% admitted to ICU
  - Risk for respiratory failure
    - 10-40% require mechanical ventilation
  - Risk for autonomic dysfunction
    - Life threatening hemodynamic instability can occur
    - Also monitor for constipation and urinary retention
  - Supplemental feeding and hydration
    - Weakness may require artificial methods of nutrition

Lopez A et al. MMWR 2019; 68(2):608-14

# Disease Targeted Therapies

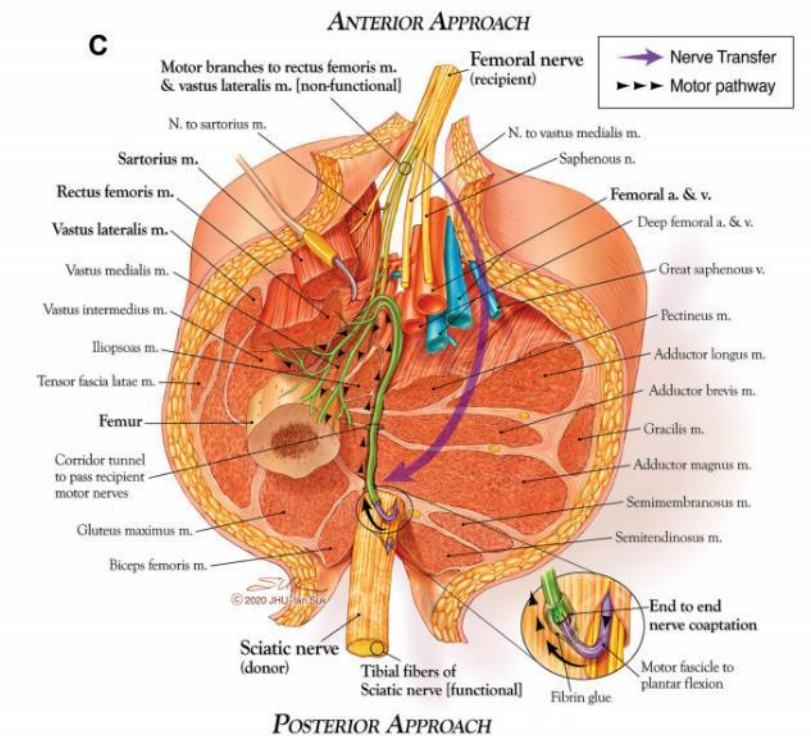
- There is no evidence-based treatment
- Immunomodulatory therapy is commonly used
  - Intravenous immunoglobulin (IVIg)
    - In a mouse model of AFM – IVIg reduced motor impairment in a time dependent fashion
  - Corticosteroids
    - In a mouse model of AFM – steroids increased viral titer, motor impairment, and mortality
  - Plasma exchange
- Future potential therapies
  - Monoclonal antibody
  - EV-D68 vaccine

https://www.cdc.gov/acute-flaccid-myelitis/hcp/clinical-management.html
Hixon AM et al. J Infect Dis 2017; 216(10):1245-53
Vogt MR et al. Science Immunology 2020; 5(49):eaba4902
https://www.intravacc.nl/products/

# Subacute/Chronic Treatment

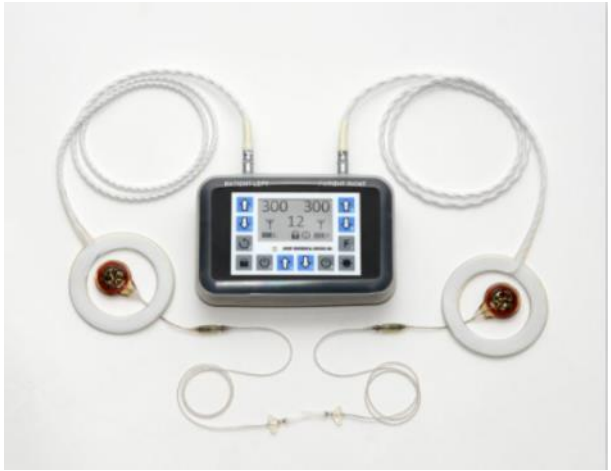

Martin JA et al. Neurology 2017; 89(2):129-37
Bove R et al. Pediatr Neurol 2020; 102:20-27
Melicosta ME et al. J Pediatr Rehabil Med 2019; 12:245-53

# Nerve Transfer




Lubelski D et al. Operative Neurosurgery 2021;1:1-7

# Diaphragm Pacing



Saltzman EB et al. Pediatr Neurol 2018; 88:25-30
Pino PA et al. Ann Neurol 2019; 86:607-15
Edmiston et al. Spinal Cord Ser Cases 2019; 5:67

# Outcomes & Prognosis

- Most have some recovery which occurs most significantly in the first few months but can continue for after a year
- Few with complete recovery (<10% with complete recovery)
- Persistent weakness
  - The most affected extremity is least likely to recover
  - Complications: Muscle atrophy, Joint dislocation/subluxation
  - Scoliosis
- Continued technology dependence
  - Some require long-term tracheostomy and ventilator
    - 10% still on vent after 1 year
  - Some require long-term artificial nutrition

Martin JA et al. Neurology 2017; 89(2):129-37
Bove R et al. Pediatr Neurol 2020; 102:20-27

# EPIDEMIOLOGY

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# Surveillance for AFM

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- National surveillance begin in 2014. Standardized case definition established in 2015.
- Illness that meets any of the following criteria should be considered a possible AFM case and reported to the **local health department (LHD)**:
  - A person with an illness with acute onset of flaccid limb weakness (clinical criteria) **AND** an MRI showing a spinal cord lesion in at least some gray matter and spanning one or more vertebral segments* (laboratory/imaging criteria), **OR**
  - A person whose death certificate lists AFM as the cause of death or a contributing cause of death, **OR**
  - A person with autopsy findings that include histopathologic evidence of inflammation largely involving the anterior horn of the spinal cord
- Review of case information and assignment of final case classification (confirmed, probable, suspect) for all patients under investigation for AFM is done by experts in national AFM surveillance. Classification process is for surveillance purposes only.
  - Not meant to supersede the patient diagnosis or delay treatment and management decisions.

*Excluding persons with gray matter lesions in the spinal cord resulting from physician diagnosed malignancy, vascular disease, or anatomic abnormalities.

# Reporting Algorithm for AFM & Polio

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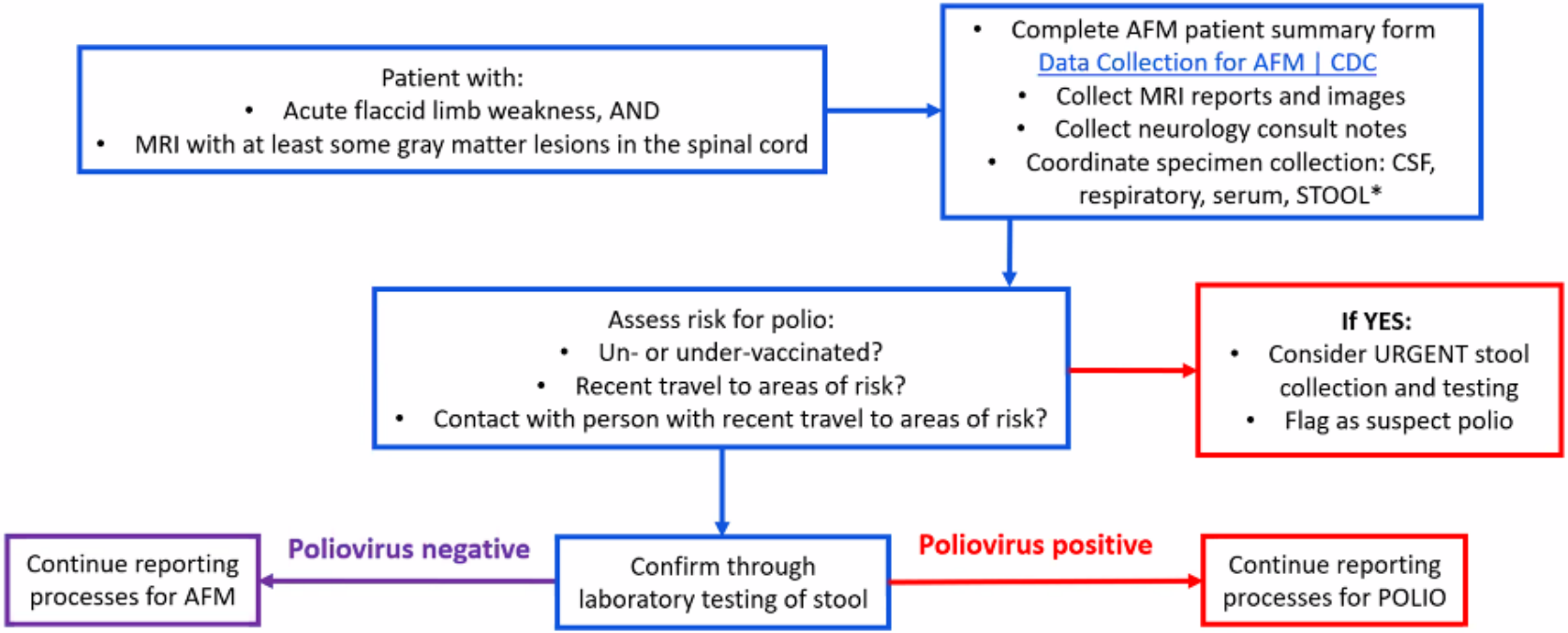
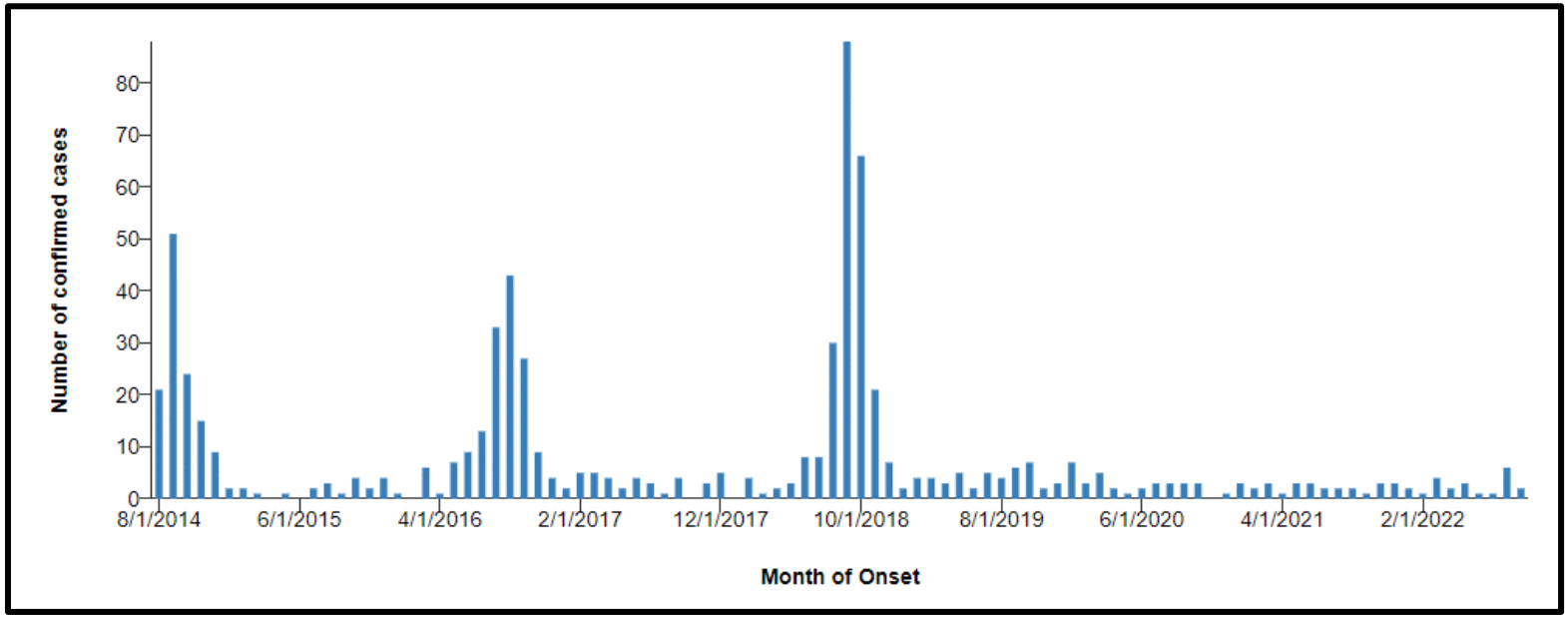



*2 specimens taken at least 24 hours apart during the first 14 days after onset of limb weakness

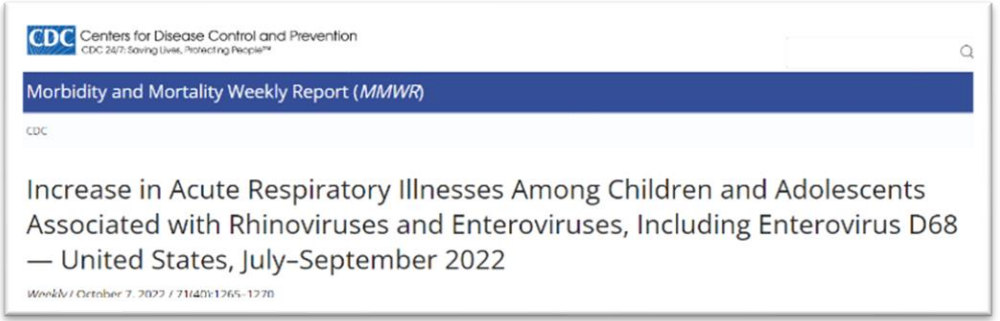
# Confirmed AFM Cases Reported to CDC

701 confirmed cases nationally since CDC began tracking AFM in August of 2014.

18 confirmed cases in Illinois.



# EV-D68 Activity in 2022


CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Morbidity and Mortality Weekly Report (*MMWR*)

CDC

Increase in Acute Respiratory Illnesses Among Children and Adolescents Associated with Rhinoviruses and Enteroviruses, Including Enterovirus D68 — United States, July–September 2022

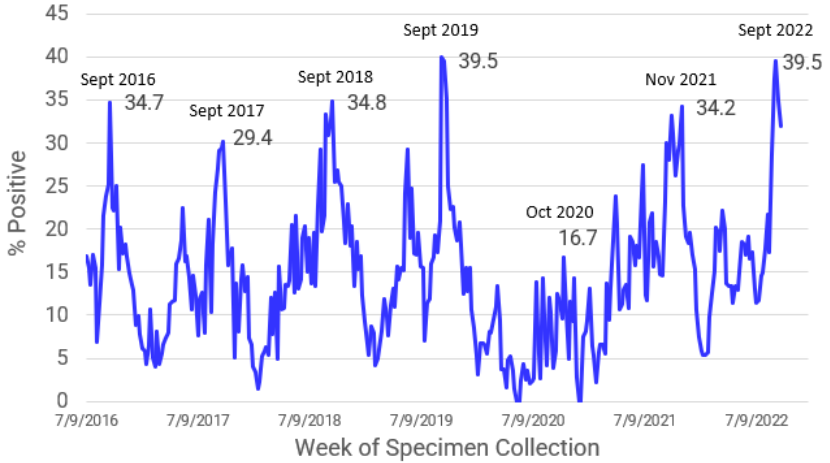
Weekly / October 7, 2022 / 71(40);1265–1270

- Increase in acute respiratory illnesses (ARI) among children and adolescents observed during summer 2022
- This rise is likely attributable, in part, to increased RV/EV circulation and specifically circulation of EV-D68
  - Weekly percentage of positive RV/EV test results in 2022 appears to be increasing at a rate comparable to that in past EV-D68 outbreak years (Source: National Respiratory and Enteric Virus Surveillance System)
  - Among children and adolescents with ARI seeking emergency care or requiring hospitalization enrolled at New Vaccine Surveillance Network sites, the percentage of positive EV-D68 test results during July and August 2022 was higher than that during the same months of 2017 and 2019–2021 and similar to peak levels observed in 2018
- **KEY TAKEAWAY:** Clinicians should have high index of clinical suspicion for AFM in patients with acute flaccid limb weakness, especially after respiratory illness or fever, and ensure prompt hospitalization and referral to specialty care for such cases

# Local Activity and Reported AFM Cases

- Similar trends in RV/EV observed locally;
  - RV/EV test positivity rose sharply in September
- Nationally, 22 confirmed AFM cases out of 51 PUIs have been identified in 2022
  - Two PUIs in Illinois

**RV/EV Test Positivity from Select Chicago Laboratories***




*Weekly aggregate testing data is submitted to the Chicago Department of Public Health by 5 hospital and 2 commercial laboratories. Data are published weekly here.

# REPORTING AFM

# Initial Reporting Criteria

- Acute flaccid limb weakness with spinal cord lesions in at least some gray matter spanning one or more spinal segments.
  - Exclude persons with lesions results from physician diagnosed malignancy, vascular disease, or anatomic abnormalities.

# Reporting Steps

1. Providers should report suspect AFM cases to the **LHD.**
2. The case should also be entered into INEDSS by the facility or LHD as an ACUTE FLACCID MYELITIS case.
3. The LHD (in consultation with IDPH) will review the report to make sure the case criteria for reporting is met. (Acute flaccid limb weakness with spinal cord lesions in at least some gray matter spanning one or more spinal segments and exclude persons with lesions resulting from physician diagnosed malignancy, vascular disease, or anatomic abnormalities.)
4. The LHD should work with the provider to complete the **Patient Summary Form**, obtain the MRI report, and neurology consult notes with images.
5. The patient summary form should be submitted to the LHD and then to CDC by IDPH.
6. A secure CDC web link for uploading images and records will be provided to the LHD and provider when a suspect case is reported.

# IMPORTANT

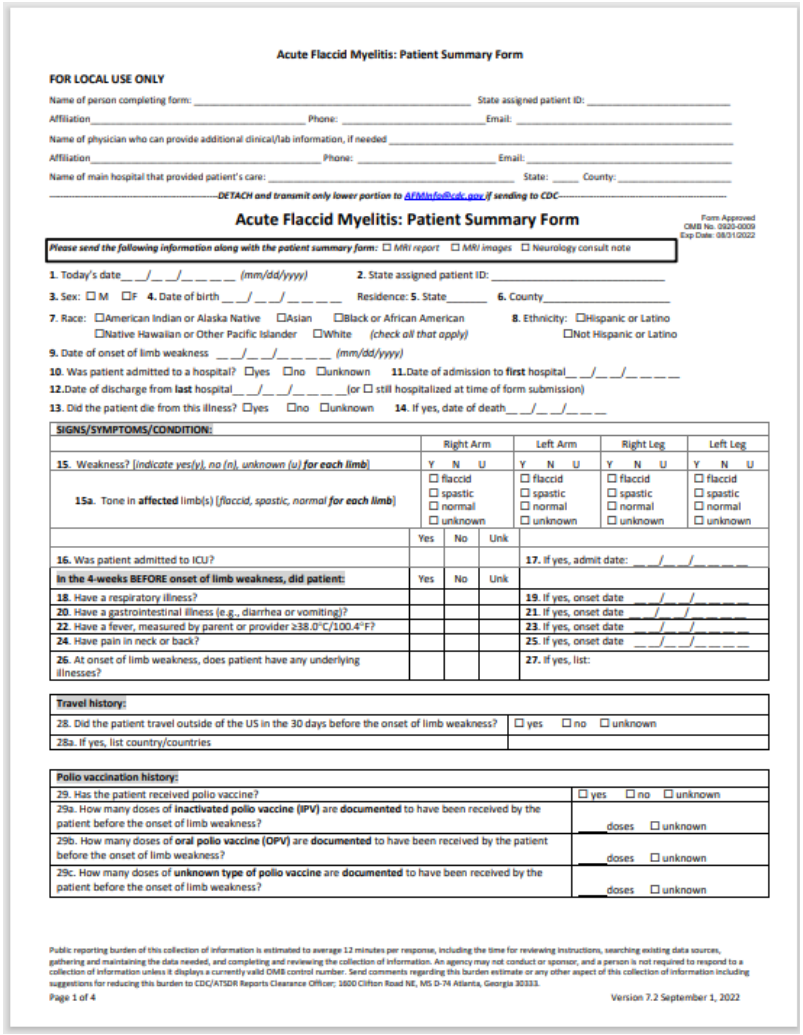
- Please ensure your facility is ready to provide images and records. This is part of the surveillance reporting process.
- CDC will not be able to review the case until images are received and often this holds up the process.
- Making official medical records requests is not ideal so if you can facilitate this process through infection control or other means that is best.

# Reporting Forms

| Patient Summary Form | MRI Report | Neurology consult notes |
| --- | --- | --- |

- **A copy of the patient summary form should ALSO be sent with laboratory specimens.**
- Forms can be found on the IDPH public website or on CDC's website here.

# Patient Summary Form



Acute Flaccid Myelitis: Patient Summary Form

**FOR LOCAL USE ONLY**

Name of person completing form: _____ State assigned patient ID: _____

Affiliation_____ Phone: _____ Email: _____

Name of physician who can provide additional clinical/lab information, if needed _____

Affiliation_____ Phone: _____ Email: _____

Name of main hospital that provided patient's care: _____ State: _____ County: _____

----------***DETACH and transmit only lower portion to AFMinfo@cdc.gov if sending to CDC***----------

## Acute Flaccid Myelitis: Patient Summary Form

Form Approved
OMB No. 0920-0009
Exp Date: 08/31/2022

***Please send the following information along with the patient summary form:*** ☐ *MRI report* ☐ *MRI images* ☐ Neurology consult note

**1.** Today's date__ __/__ __/__ __ __ __ *(mm/dd/yyyy)* **2.** State assigned patient ID: _____

**3.** Sex: ☐ M ☐F **4.** Date of birth __ __/ __ __/ __ __ __ __ Residence: **5.** State_____ **6.** County_____

**7.** Race: ☐American Indian or Alaska Native ☐Asian ☐Black or African American **8.** Ethnicity: ☐Hispanic or Latino
☐Native Hawaiian or Other Pacific Islander ☐White *(check all that apply)* ☐Not Hispanic or Latino

**9.** Date of onset of limb weakness __ __/__ __/__ __ __ __ *(mm/dd/yyyy)*

**10.** Was patient admitted to a hospital? ☐yes ☐no ☐unknown **11.**Date of admission to **first** hospital__ __/__ __/__ __ __ __

**12.**Date of discharge from **last** hospital__ __/__ __/__ __ __ __(or ☐ still hospitalized at time of form submission)

**13.** Did the patient die from this illness? ☐yes ☐no ☐unknown **14.** If yes, date of death__ __/__ __/__ __ __

| **SIGNS/SYMPTOMS/CONDITION:** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Right Arm | | | Left Arm | | | Right Leg | | | Left Leg | | |
| **15.** Weakness? *[indicate yes(y), no (n), unknown (u)* ***for each limb****]* | Y | N | U | Y | N | U | Y | N | U | Y | N | U |
| **15a.** Tone in **affected** limb(s) *[flaccid, spastic, normal* ***for each limb****]* | ☐ flaccid ☐ spastic ☐ normal ☐ unknown | | | ☐ flaccid ☐ spastic ☐ normal ☐ unknown | | | ☐ flaccid ☐ spastic ☐ normal ☐ unknown | | | ☐ flaccid ☐ spastic ☐ normal ☐ unknown | | |

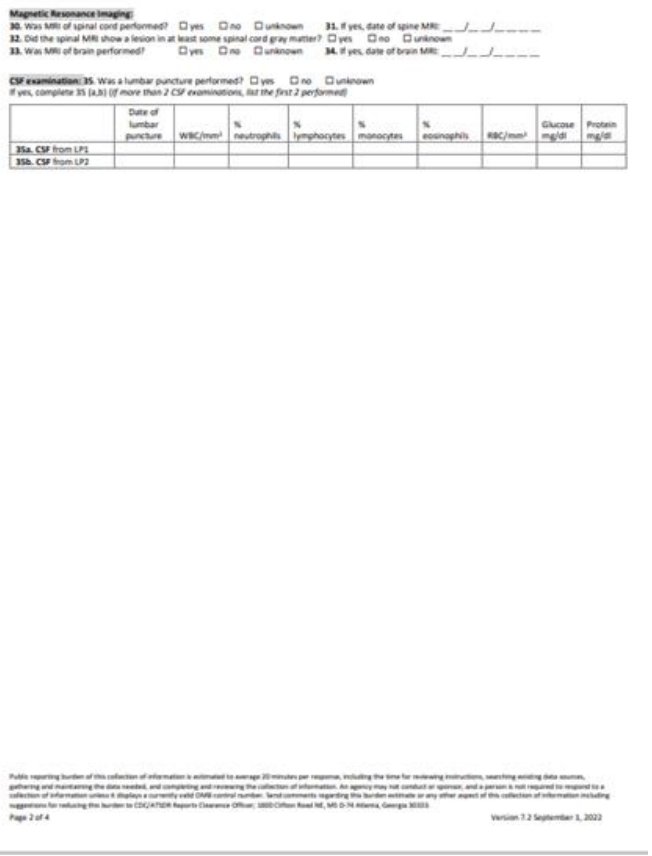
| | Yes | No | Unk | |
|---|---|---|---|---|
| **16.** Was patient admitted to ICU? | | | | **17.** If yes, admit date: __ __/__ __/__ __ __ __ |
| **In the 4-weeks BEFORE onset of limb weakness, did patient:** | Yes | No | Unk | |
| **18.** Have a respiratory illness? | | | | **19.** If yes, onset date __ __/__ __/__ __ __ __ |
| **20.** Have a gastrointestinal illness (e.g., diarrhea or vomiting)? | | | | **21.** If yes, onset date __ __/__ __/__ __ __ __ |
| **22.** Have a fever, measured by parent or provider ≥38.0°C/100.4°F? | | | | **23.** If yes, onset date __ __/__ __/__ __ __ __ |
| **24.** Have pain in neck or back? | | | | **25.** If yes, onset date __ __/__ __/__ __ __ __ |
| **26.** At onset of limb weakness, does patient have any underlying illnesses? | | | | **27.** If yes, list: |

| **Travel history:** | |
|---|---|
| 28. Did the patient travel outside of the US in the 30 days before the onset of limb weakness? | ☐ yes ☐ no ☐ unknown |
| 28a. If yes, list country/countries | |

| **Polio vaccination history:** | |
|---|---|
| 29. Has the patient received polio vaccine? | ☐ yes ☐ no ☐ unknown |
| 29a. How many doses of **inactivated polio vaccine (IPV)** are **documented** to have been received by the patient before the onset of limb weakness? | ___doses ☐ unknown |
| 29b. How many doses of **oral polio vaccine (OPV)** are **documented** to have been received by the patient before the onset of limb weakness? | ___doses ☐ unknown |
| 29c. How many doses of **unknown type of polio vaccine** are **documented** to have been received by the patient before the onset of limb weakness? | ___doses ☐ unknown |







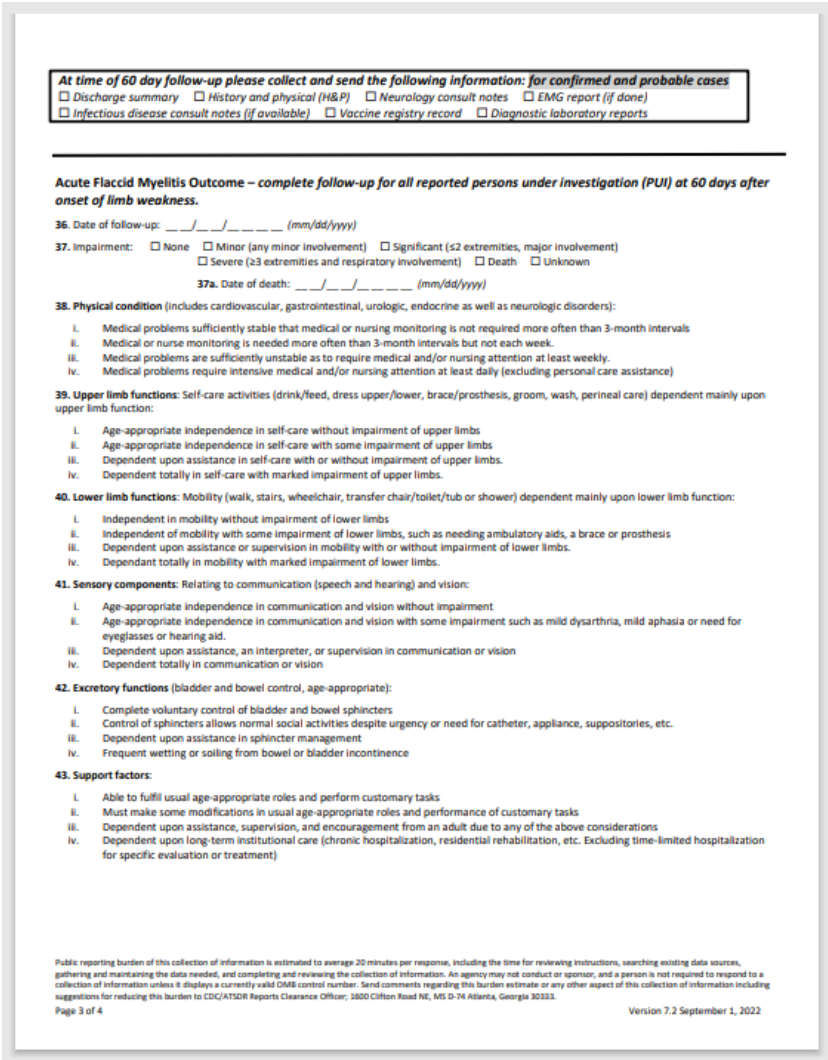
**Magnetic Resonance Imaging:**
**30.** Was MRI of spinal cord performed? ☐ yes ☐ no ☐ unknown **31.** If yes, date of spine MRI: __ __/__ __/__ __ __ __
**32.** Did the spinal MRI show a lesion in at least some spinal cord gray matter? ☐ yes ☐ no ☐ unknown
**33.** Was MRI of brain performed? ☐ yes ☐ no ☐ unknown **34.** If yes, date of brain MRI: __ __/__ __/__ __ __ __

**CSF examination: 35.** Was a lumbar puncture performed? ☐ yes ☐ no ☐ unknown
If yes, complete 35 (a,b) *(if more than 2 CSF examinations, list the first 2 performed)*

| | Date of lumbar puncture | WBC/mm³ | % neutrophils | % lymphocytes | % monocytes | % eosinophils | RBC/mm³ | Glucose mg/dl | Protein mg/dl |
|---|---|---|---|---|---|---|---|---|---|
| **35a. CSF** from LP1 | | | | | | | | | |
| **35b. CSF** from LP2 | | | | | | | | | |

# Patient Summary Form

- Follow up form (last page).
- Follow up is conducted by LHD.
- LHD will reach out to case's family/guardian to answer these questions.



***At time of 60 day follow-up please collect and send the following information: for confirmed and probable cases***
☐ *Discharge summary* ☐ *History and physical (H&P)* ☐ *Neurology consult notes* ☐ *EMG report (if done)*
☐ *Infectious disease consult notes (if available)* ☐ *Vaccine registry record* ☐ *Diagnostic laboratory reports*

**Acute Flaccid Myelitis Outcome – *complete follow-up for all reported persons under investigation (PUI) at 60 days after onset of limb weakness.***

**36.** Date of follow-up: __ __/__ __/__ __ __ __ *(mm/dd/yyyy)*

**37.** Impairment: ☐ None ☐ Minor (any minor involvement) ☐ Significant (≤2 extremities, major involvement)
☐ Severe (≥3 extremities and respiratory involvement) ☐ Death ☐ Unknown

**37a.** Date of death: __ __/__ __/__ __ __ __ *(mm/dd/yyyy)*

**38. Physical condition** (includes cardiovascular, gastrointestinal, urologic, endocrine as well as neurologic disorders):

i. Medical problems sufficiently stable that medical or nursing monitoring is not required more often than 3-month intervals
ii. Medical or nurse monitoring is needed more often than 3-month intervals but not each week.
iii. Medical problems are sufficiently unstable as to require medical and/or nursing attention at least weekly.
iv. Medical problems require intensive medical and/or nursing attention at least daily (excluding personal care assistance)

**39. Upper limb functions**: Self-care activities (drink/feed, dress upper/lower, brace/prosthesis, groom, wash, perineal care) dependent mainly upon upper limb function:

i. Age-appropriate independence in self-care without impairment of upper limbs
ii. Age-appropriate independence in self-care with some impairment of upper limbs
iii. Dependent upon assistance in self-care with or without impairment of upper limbs.
iv. Dependent totally in self-care with marked impairment of upper limbs.

**40. Lower limb functions**: Mobility (walk, stairs, wheelchair, transfer chair/toilet/tub or shower) dependent mainly upon lower limb function:

i. Independent in mobility without impairment of lower limbs
ii. Independent of mobility with some impairment of lower limbs, such as needing ambulatory aids, a brace or prosthesis
iii. Dependent upon assistance or supervision in mobility with or without impairment of lower limbs.
iv. Dependant totally in mobility with marked impairment of lower limbs.

**41. Sensory components**: Relating to communication (speech and hearing) and vision:

i. Age-appropriate independence in communication and vision without impairment
ii. Age-appropriate independence in communication and vision with some impairment such as mild dysarthria, mild aphasia or need for eyeglasses or hearing aid.
iii. Dependent upon assistance, an interpreter, or supervision in communication or vision
iv. Dependent totally in communication or vision

**42. Excretory functions** (bladder and bowel control, age-appropriate):

i. Complete voluntary control of bladder and bowel sphincters
ii. Control of sphincters allows normal social activities despite urgency or need for catheter, appliance, suppositories, etc.
iii. Dependent upon assistance in sphincter management
iv. Frequent wetting or soiling from bowel or bladder incontinence

**43. Support factors**:

i. Able to fulfil usual age-appropriate roles and perform customary tasks
ii. Must make some modifications in usual age-appropriate roles and performance of customary tasks
iii. Dependent upon assistance, supervision, and encouragement from an adult due to any of the above considerations
iv. Dependent upon long-term institutional care (chronic hospitalization, residential rehabilitation, etc. Excluding time-limited hospitalization for specific evaluation or treatment)

# Specimen Collection & Laboratory Testing

- Collect specimens as early as possible in cases where AFM is suspect.
- Specimens that should be collected:
  - cerebrospinal fluid (CSF)
  - serum
  - stool
  - NP swab


- Laboratories should work with their local health dept and IDPH lab to ensure proper collection and submission. Laboratories or HCP should contact their local health dept before shipment of specimens to IDPH lab.
- The LHD will assign an authorization number once submission is approved.

# Specimen Shipment

- After authorization from your LHD, specimens should be shipped to IDPH lab.
- A completed IDPH test requisition form must also be included: available here.
- The authorization number obtained from your LHD should be included on the submission form.
- Ensure you ship and store at appropriate temps and length of time.
- Additional instructions can be found on CDC's website here.

# 60 Day LHD Follow-Up

- LHDs will obtain additional medical records and submit them to IDPH/CDC
  a. Admission notes/History and Physical
  b. Infectious disease consultation notes
  c. Additional MRI reports and images
  d. Diagnostic lab reports
  e. Vaccination records
  f. Discharge summary
  g. EMG report (if done)

- The LHD will complete the 60 day follow up interview with the parent/guardian (found on the back of the **patient summary form**) and submit this to IDPH (Fax or secure email; IDPH will enter this into CDC Redcap project).

# Surveillance Case Classifications

| Case Classification | Description |
|---|---|
| Confirmed | Meets clinical criteria with confirmatory laboratory/imaging evidence,<br>OR<br>Meets other classification criteria. |
| Probable | Meets clinical criteria with presumptive laboratory/imaging evidence. |
| Suspect | Meets clinical criteria with supportive laboratory/imaging evidence,<br>AND<br>Available information is insufficient to classify case as probable or confirmed. |

# EXTRA RESOURCES

- CDC 2020 webinar
- CDC FAQ
- IDPH AFM Page

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
IDPH
PROTECTING HEALTH, IMPROVING LIVES

# THANK YOU

*Communicable Disease Control Section*

*Vaccine Preventable Disease*

*217-782-2016*

*www.dph.illinois.gov*

# Case-Based Review

# Case Presentation

- A 5-year-old, previously healthy female presents with a history of 5 days of cough, congestion, and sore throat, which had been improving.

  Yesterday, she developed pain in the back of her neck and left arm.

  Today, she stopped moving her arm and had difficulty holding up her head, so her family brought her to the emergency department.

# Poll Question: Which of the following features of her history are commonly present in children with acute flaccid myelitis?

A. Preceding viral illness
B. Asymmetric limb weakness
C. Pain in the affected limb
D. All the above
E. None of the above

## Which of the following features of her history are commonly present in children with acute flaccid myelitis?

**Explanation:**

- Characteristic features of patients with AFM include:
  - Preceding viral illness
  - Asymmetric flaccid weakness of extremities
  - Cranial nerve involvement is common
  - Onset of weakness within hours to days
  - Pain in the affected extremity(ies)
- If significant encephalopathy or seizures are present, consider an alternative diagnosis

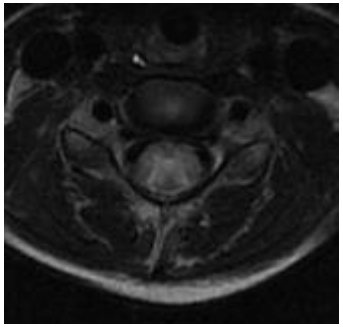
# Poll Question: Which of the following diagnostic tests can be used to confirm the diagnosis of acute flaccid myelitis?

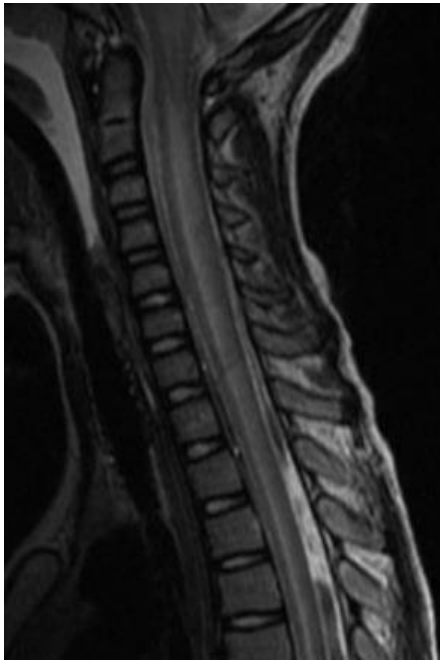
A. MRI of the brain and spinal cord
B. Shoulder X-Ray
C. CT scan of the brain and spinal cord
D. Basic metabolic panel
E. Inflammatory markers

# Case, continued

- An MRI of the brain and spinal cord was obtained to to evaluate for characteristic AFM abnormalities or AFM mimics.

- The MRI revealed longitudinally extensive gray-matter predominant hyperintensities in the cervical cord





# Poll Question: This patient fulfills which of the following initial public health reporting criteria?

A. Acute flaccid limb weakness
B. Spinal cord lesions in at least some gray matter spanning one or more vertebral segments
C. Evidence of vascular disease
D. Evidence of malignancy
E. A + B

# This patient fulfills which of the following initial public health reporting criteria?

## Explanation:

- This suspect AFM case should be reported to the appropriate local public health department (LHD).
- The LHD will work with the provider to complete the Patient Summary Form, obtain the MRI report, and neurology consult notes with images.
- The provider can assist the LHD by working with infection control to provide all of the above without an official medical record request. Since AFM is a reportable condition by law, the submission of this patient information is a reporting requirement covered under IL communicable disease code.

# Poll Question: If suspicious for AFM, which specimens should be collected as early as possible in the course of illness, preferably on the day of onset of limb weakness?

A. NP swab and serum
B. Stool
C. CSF
D. All of the above

# If suspicious for AFM, which specimens should be collected as early as possible in the course of illness, preferably on the day of onset of limb weakness?

## Explanation:

- Laboratory evaluation includes:
  - NP swab for respiratory pathogens
  - Cerebrospinal fluid studies to evaluate for infectious and inflammatory/autoimmune causes
  - Serum tests for infectious and inflammatory/autoimmune causes
  - Stool tests for infectious pathogens
- These tests should be run internally but also set aside for shipping to the nearest IDPH lab as part of AFM reporting.
- Laboratories should work with their local health dept (LHD) and IDPH lab to ensure proper collection and submission. Labs/HCP should contact their LHD before shipment of specimens to IDPH lab. The LHD will assign an authorization number once submission is approved.

# Poll Question: What are potential life-threatening complications of acute flaccid myelitis?

A. Respiratory failure
B. Hemodynamic instability
C. Kidney failure
D. Choices 1 & 2
E. All of the above

# What are potential life-threatening complications of acute flaccid myelitis?

## Explanation

- Acute flaccid myelitis can cause bulbar and respiratory muscle weakness which can lead to respiratory failure.
- Autonomic dysfunction can be severe and can cause hemodynamic instability.
- Bowel and bladder function should be monitored.
- All children with acute flaccid myelitis should be admitted to the hospital for close monitoring.

With Rupali Limaye, PhD, MPH, MA - Deputy Director of the International Vaccine Access Center at Johns Hopkins


# Any questions? Please put them in the chat.

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