

AFM 'POLIO-LIKE' illness



Professor Michael Kossove

Is this a new disease?

- No, but doctors only began noticing it in 2014. That's when dozens of [children began showing up in hospitals](#) unable to move their arms or legs.
- Ultimately, 120 children were diagnosed with AFM that year. There was another burst of cases in 2016, and we're in the midst of a third one now

- Some experts believe that it is linked to a biennial summer virus, because cases tend to peak in the late summer and early fall in alternating years.
- “Despite all of our efforts, we haven’t been able to identify the cause of this mystery illness,” Dr. Nancy Meissonier, director of the Centers for Disease Control and Prevention’s [National Center for Immunization and Respiratory Diseases](#), said this week.

- Not common at all. There have been 386 cases in the United States since 2014. That works out to a rate of less than 1 in a million, according to Meissonier.

- Acute flaccid myelitis (AFM) is a rare but serious condition. It affects the nervous system, specifically the area of spinal cord called gray matter, which causes the muscles and reflexes in the body to become weak. This condition is not new, but the increase in cases we saw starting in 2014 is new. Still, CDC estimates that less than one in a million people in the United States will get AFM every year.
- There are a variety of possible causes of AFM, such as viruses, environmental toxins, and genetic disorders. Most of the cases that CDC has learned about have been in children.

How do you get it?

- Without knowing what's causing the condition, it's hard to say. Doctors are unsure who is at risk and why.
- Are certain people more vulnerable than others?
- Children seem to face a higher risk than adults. The average age of patients diagnosed with AFM since January is 4.
- Cases of AFM have been confirmed in 22 states across the U.S.

Can Parents Protect Themselves and their Children

- Doctors recommend washing your hands, staying up to date on your vaccinations and using insect repellent to ward off mosquito bites.
- Anyone experiencing sudden muscle weakness should seek immediate medical attention.

Symptoms of AFM

- AFM is rare, but it can lead to serious neurologic problems. You should seek medical care right away if you or your child develops any of these symptoms:
- weakness and loss of muscle tone and reflexes in the arms or legs
- facial droop or weakness
- difficulty moving the eyes
- drooping eyelids
- difficulty swallowing
- slurred speech

Infections That Can Cause Conditions like AFM

- Certain viruses, such as [poliovirus](#) and [West Nile virus](#), may sometimes lead to conditions like AFM. You can protect yourself and your children from these viruses by:
- Making sure you are all up to date on polio vaccinations.
- Protecting against bites from mosquitoes, which can carry West Nile virus, by using mosquito repellent, staying indoors at dusk and dawn (when bites are more common), and removing standing or stagnant water near your home (where mosquitoes can breed).

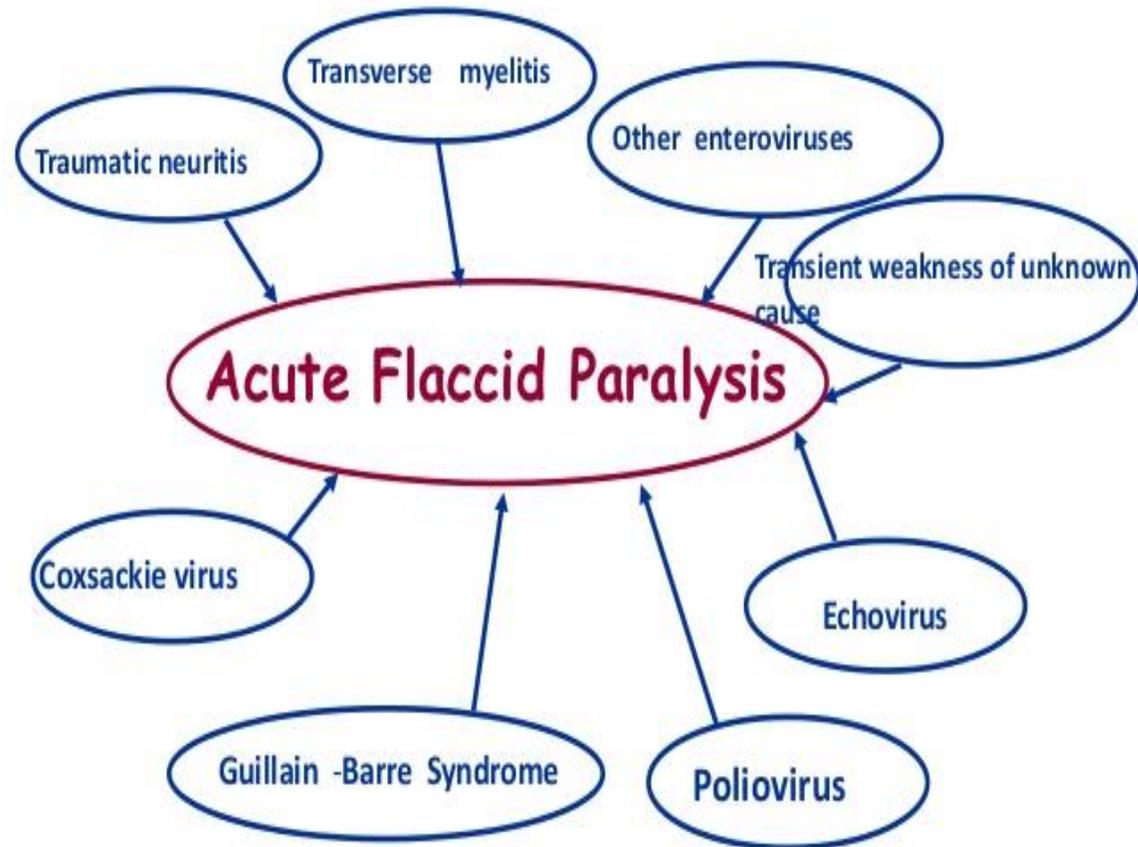
For Parents Who Have a Child With AFM

- CDC understands that parents who have had a child diagnosed with AFM have many concerns and questions. AFM is a serious condition that can be difficult for children and their parents or caregivers. You are in the best position to be an advocate for your child. Talk to the doctor about any discomfort your child may have and ask about treatment options. Ask your child's school about resources they may have to accommodate this illness. Spending time with others is also an important part of wellbeing and recovery. Encourage friends and family to spend time with your child if they feel well enough for visitors.

SYMPTOMS

- Numbness or tingling is rare in people with AFM, although some people have pain in their arms or legs. Some people with AFM may be unable to pass urine . The most severe symptom of AFM is respiratory failure that can happen when the muscles involved with breathing become weak. This can require urgent ventilator support.
- In very rare cases, it is possible that the process in the body that triggers AFM may also trigger other serious neurologic complications that could lead to death.

Differential Diagnosis for AFP



Differential diagnosis

Poliomyelitis should be considered in the differential diagnosis of any case of acute flaccid paralysis (?)

- Guillian-Barre syndrome
- Infectious : non-polio enteroviruses, west-nile virus, rabies, varicella, botulism..
- Acute transverse myelitis
- Tick bite paralysis
- Polymyositis

Possible Causes of AFM

- AFM or similar neurologic conditions may have a variety of possible causes such as viruses, environmental toxins, and genetic disorders.
- Certain viruses that can cause AFM or similar neurologic conditions are
- [poliovirus](#) and [non-polio enteroviruses](#),
- [West Nile virus \(WNV\)](#) and viruses in the same family as WNV, specifically Japanese encephalitis virus and Saint Louis encephalitis virus, and
- [adenoviruses](#).
- Oftentimes, despite extensive lab tests, the cause of a patient's AFM is not identified.

DIAGNOSIS

- AFM is diagnosed by examining a patient's nervous system in combination with reviewing pictures of the spinal cord. A doctor can examine a patient's nervous system and the places on the body where he or she has weakness, poor muscle tone, and decreased reflexes. A doctor can also do an MRI (magnetic resonance imaging) to look at a patient's brain and spinal cord, do lab tests on the cerebrospinal fluid (the fluid around the brain and spinal cord), and may check nerve conduction (impulse sent along a nerve fiber) and response. It is important that the tests are done as soon as possible after the patient develops symptoms.

Treatment

- There is no specific treatment for AFM, but a doctor who specializes in treating brain and spinal cord illnesses (neurologist) may recommend certain interventions on a case-by-case basis. For example, neurologists may recommend physical or occupational therapy to help with arm or leg weakness caused by AFM.
- We do not know the long-term outcomes (prognosis) of people with AFM.

- While we don't know if it is effective in preventing AFM, [washing your hands often](#) with soap and water is one of the best ways to avoid getting sick and spreading germs to other people.



ENTEROVIRUS D-68

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Enterovirus 68

- **Enterovirus 68 (EV68, EV-D68, HEV68)** is a member of the [*Picornaviridae*](#) family, an [enterovirus](#). First isolated in California in 1962 and once considered rare, it has been on a worldwide upswing in the 21st century. With some uncertainty, it has been implicated in cases of a polio-like disorder called [acute flaccid myelitis](#).

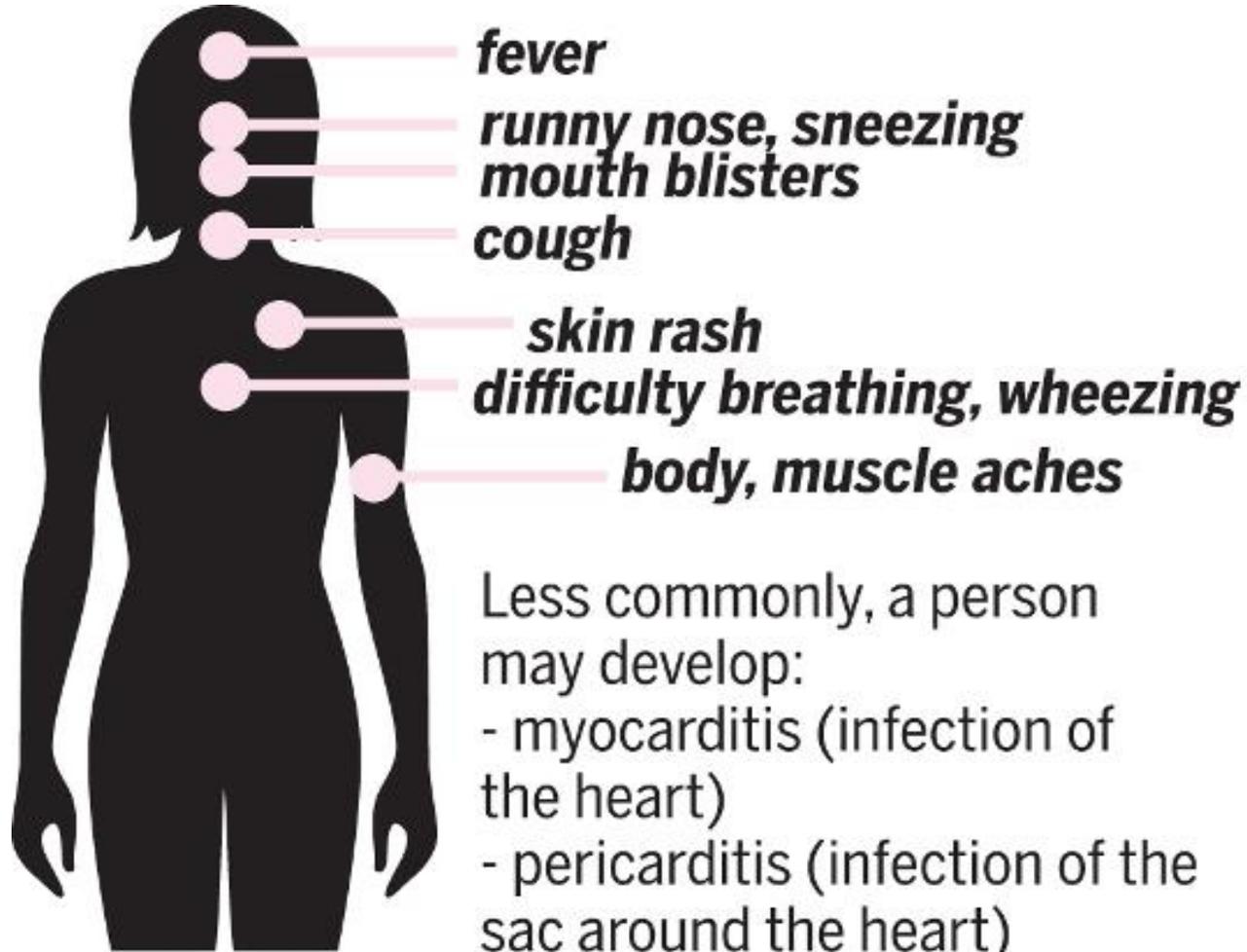
Predisposing factors

- Children less than 5 years old and children with [asthma](#) appear to be most at risk for the illness, although illness in adults with asthma and [immunosuppression](#) have also been reported.

EV-D68 Symptoms



- *Runny nose
- *Sneezing
- *Coughing
- *Wheezing
- *Fever
- *Muscle aches



fever

runny nose, sneezing

mouth blisters

cough

skin rash

difficulty breathing, wheezing

body, muscle aches

Less commonly, a person may develop:

- myocarditis (infection of the heart)
- pericarditis (infection of the sac around the heart)
- encephalitis (infection of the brain)
- paralysis

Signs and symptoms

- EV68 almost exclusively causes [respiratory illness](#), which varies from mild to severe, but can cause a range of symptoms, from none at all, to subtle flu-like symptoms, to debilitating respiratory illness and a suspected rare involvement in a syndrome with [polio](#)-like symptoms. Like all enteroviruses, it can cause variable skin [rashes](#), abdominal pain and soft stools. Initial symptoms are similar to those for the [common cold](#), including a runny nose, sore throat, cough, and fever. As the disease progresses, more serious symptoms may occur, including difficulty breathing as in [pneumonia](#), reduced alertness, a reduction in urine production, and dehydration, and may lead to [respiratory failure](#).[[]

- The degree of severity of symptoms experienced seems to depend on the demographic population in question. Experts estimate that the majority of the population has, in fact, been exposed to the enterovirus, but that no symptoms are exhibited in healthy adults. In contrast, EV-D68 is disproportionately debilitating in very young children, as well as the very weak. While several hundred people (472), mostly youth, have been exposed to the disease, less than a hundred of those patients have been diagnosed with severe symptoms (such as paralysis), and during the recent outbreak in the US just a single death was recorded over the last weekend of September 2014. The death was of a 10-year-old girl in New Hampshire.

- The virus has been suspected as one cause of [acute flaccid myelitis](#) a rare muscle weakness, usually due to [polio](#), since two California children who tested positive for the virus had [paralysis](#) of one or more limbs reaching peak severity within 48 hours of onset. "Recovery of motor function was poor at 6-month follow-up. The CDC recently issued a statement on October 17, 2018 claiming "Right now, we know that poliovirus is not the cause of these AFM cases. CDC has tested every stool specimen from the AFM patients, none of the specimens have tested positive for the poliovirus."

- ."As of October 2014, the CDC was investigating 10 cases of paralysis and/or cranial dysfunction in Colorado and other reports around the country, coinciding with the increase in enterovirus D68 activity. As of October 2014 it was believed that the actual number of cases might be 100 or more. As of 2018 the link of EV-D68 and the paralysis is strong, meeting six [Bradford Hill criteria](#) fully and two partially

BRADFORD HILL CRITERIA

- The **Bradford Hill criteria**, otherwise known as **Hill's criteria for causation**, are a group of 9 principles, established in 1965 by the English epidemiologist Sir [Austin Bradford Hill](#). They can be useful in establishing [epidemiologic](#) evidence of a [causal relationship](#) between a presumed cause and an observed effect and have been widely used in [public health](#) research. Their exact application and limits of the criteria continue to be debated.

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