

## Key Points — Enterovirus D68 in the United States, 2014

*Note: Newly added information is in red.*

- The United States is currently experiencing a nationwide outbreak of enterovirus D68 (EV-D68) associated with severe respiratory illness.
  - From mid-August to **October 10, 2014**, CDC or state public health laboratories have confirmed a total of **691\*** people in 46 states and the District of Columbia (AL, AR, CA, CO, CT, DC, DE, FL, GA, IL, IN, IA, ID, KS, KY, LA, MA, ME, MD, MI, MN, MO, MS, MT, NC, NE, NH, NJ, NM, NY, ND, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WV, WI, WY) with respiratory illness caused by EV-D68.\*\* This indicates that at least one case has been detected in each state listed but does not indicate how widespread infections are in each state.
  - In the United States, people are more likely to get infected with enteroviruses in the summer and fall. We are currently in the middle of the enterovirus season. EV-D68 infections are likely to decline later in fall.
- Many state health departments are currently investigating reported increases in cases of severe respiratory illness in children. This increase could be caused by many different viruses that are common during this time of year. EV-D68 appears to be the predominant type of enterovirus this year and is likely contributing to the increases in severe respiratory illnesses.
  - Hospitals in Missouri and Illinois were the first to document this increase that was later identified to be caused predominantly by EV-D68 infection.
  - Due to increasing knowledge about the nationwide EV-D68 outbreak, there has been a very large increase in the number of specimens tested from patients with severe respiratory illness. Awareness of these initial results is also contributing to increased recognition of new cases.
- CDC is prioritizing testing of specimens from children with severe respiratory illness. There are likely many children affected with milder forms of illness.
  - Of the specimens tested by the CDC lab, about half have tested positive for EV-D68. About one third have tested positive for an enterovirus or rhinovirus other than EV-D68.
- EV-D68 has been detected in specimens from five\*\*\* patients who died and had samples submitted for testing. CDC is reporting the test results to state health departments as we obtain them.
  - State and local officials have the authority to determine the cause of death, including whether EV-D68 infection may have played a role. They also have the authority to determine the appropriate information to release, and the time to release it. CDC will defer to states to provide this information.
  - On October 1, the Rhode Island Department of Health reported that a specimen from a Rhode Island patient who died tested positive at CDC for EV-D68. On October 3, the New Jersey Department of Health reported that a specimen from a New Jersey patient who died tested positive at CDC for EV-D68. These are both included in the five positive specimens we reported above.
  - CDC will review and update these data every Wednesday.
- Almost all of the CDC-confirmed cases this year of EV-D68 infection have been among children. Many of the children had asthma or a history of wheezing.
- CDC understands that Americans may be concerned about these severe respiratory illnesses. Severe illness is always a concern to us, especially when infants and children are affected. We will share information as soon as we have it, and post updates on our website (<http://www.cdc.gov/non-polio-enterovirus/outbreaks/EV-D68-outbreaks.html>).
- Clinicians should consider EV-D68 as a possible cause of severe respiratory illness, particularly in children, and report unusual increases in the number of patients with severe respiratory illness to their health department.
- The general public can help protect themselves from respiratory illnesses by washing hands with soap and water, avoiding close contact with sick people, and disinfecting frequently touched surfaces. Anyone with respiratory illness should contact their doctor if they are having difficulty breathing, or if their symptoms are getting worse.

\*Total confirmed case count includes results from State Public Health Laboratories that can do testing to determine type of enterovirus.

\*\*The primary reason for current increases in cases is that a backlog of specimens is being processed from several states that are investigating clusters of people with severe respiratory illness. It can take a while to test specimens and obtain lab results because the testing is complex and slow, and can only be done by CDC and a small number of state public health laboratories. These increases will not necessarily reflect changes in real time, or mean that the situation is getting worse.

\*\*\*Investigations are ongoing; CDC will review and update available data every Wednesday.

## General Key Points — Enteroviruses and Enterovirus D68

### Background

#### Enteroviruses

- Enteroviruses are very common viruses; there are more than 100 types.
- It is estimated that 10 to 15 million enterovirus infections occur in the United States each year. Tens of thousands of people are hospitalized each year for illnesses caused by enteroviruses.
- Different enteroviruses can cause different illnesses, such as respiratory, febrile rash, and neurologic [e.g., aseptic meningitis (swelling of the tissue covering the brain and spinal cord) and encephalitis (swelling of the brain)].
- In general, the spread of enteroviruses is often quite unpredictable. A mix of enteroviruses circulates every year, and different types of enteroviruses can be common in different years.
- In the United States, people are more likely to get infected with enteroviruses in the summer and fall.

#### Enterovirus D68

- EV-D68 was first recognized in California in 1962. Small numbers of EV-D68 have been reported regularly to CDC since 1987. However, this year the number of people with confirmed EV-D68 infections is much greater than that reported in previous years.
- The strains of EV-D68 circulating this year are not new.
  - CDC, working with state health departments, has identified at least three separate strains of EV-D68 that are causing infections in the United States this year.
    - It is common for multiple strains of the same enterovirus type to be co-circulating in the same year.
  - CDC extensively compared the strains circulating in this year to strains from previous years. We found that the most prominent strain has been in the United States for the last three years and is not a recent introduction. It is also related to strains of EV-D68 detected in previous years in countries in Europe and Asia.
    - There is no evidence that unaccompanied children brought EV-D68 to the United States; we are not aware of any of these children testing positive for the virus.
- Respiratory illnesses can be caused by many different viruses and have similar symptoms. Not all respiratory illnesses occurring now are due to EV-D68.
- EV-D68 has been previously referred to as human enterovirus 68 (or HEV-68) and human rhinovirus 87 (or HRV-87). They are all the same virus. The D stands for enterovirus species D.

### Symptoms

- EV-D68 infections can cause mild to severe respiratory illness, or no symptoms at all.
  - Mild symptoms may include fever, runny nose, sneezing, cough, and body and muscle aches.
  - Severe symptoms may include wheezing and difficulty breathing.
- Anyone with respiratory illness should contact their doctor if they are having difficulty breathing, or if their symptoms are getting worse.
- Enteroviruses are known to be one of the causes of acute neurologic disease in children. They most commonly cause aseptic meningitis, less commonly encephalitis, and rarely, acute myelitis and paralysis.
  - CDC is aware of two published reports of children with neurologic illnesses confirmed as EV-D68 infection from cerebrospinal fluid (CSF) testing.

### People at risk

- In general, infants, children, and teenagers are most likely to get infected with enteroviruses and become sick. That's because they do not yet have immunity (protection) from previous exposures to these viruses. We believe this is also true for EV-D68. Adults can get infected with enteroviruses, but they are more likely to have no symptoms or mild symptoms.
- Children with asthma may have a higher risk for severe respiratory illness caused by EV-D68 infection.

### Transmission

- Since EV-D68 causes respiratory illness, the virus can be found in an infected person's respiratory secretions, such as saliva, nasal mucus, or sputum.
- The virus likely spreads from person to person when an infected person coughs, sneezes, or touches a surface that is then touched by others.

**Diagnosis**

- EV-D68 can only be diagnosed by doing specific lab tests on specimens from a person's nose and throat.
- Many hospitals and some doctor's offices can test sick patients to see if they have enterovirus infection. However, most cannot do specific testing to determine the type of enterovirus, like EV-D68. CDC and some state health departments can do this sort of testing.
- CDC recommends that clinicians only consider EV-D68 testing for patients with severe respiratory illness and when the cause is unclear.

**Treatment**

- There is no specific treatment for people with respiratory illness caused by EV-D68 infection.
  - For mild respiratory illness, you can help relieve symptoms by taking over-the-counter medications for pain and fever. Aspirin should not be given to children.
  - Some people with severe respiratory illness caused by EV-D68 may need to be hospitalized and receive intensive supportive therapy.
- There are no antiviral medications currently available for people who become infected with EV-D68.

**Prevention**

- You can help protect yourself from getting and spreading EV-D68 by following these steps:
  - Wash hands often with soap and water for 20 seconds
  - Avoid touching eyes, nose and mouth with unwashed hands
  - Avoid close contact such as kissing, hugging, and sharing cups or eating utensils with people who are sick, or when you are sick
  - Cover your coughs and sneezes with a tissue or shirt sleeve, not your hands
  - Clean and disinfect frequently touched surfaces, such as toys and doorknobs, especially if someone is sick
  - Stay home when you are sick
- There are no vaccines for preventing EV-D68 infections.
- Children with asthma are at risk for severe symptoms from EV-D68 and other respiratory illnesses. They should follow CDC's guidance to maintain control of their illness during this time:
  - Discuss and update your asthma action plan with your primary care provider.
  - Take your prescribed asthma medications as directed, especially long term control medication(s).
  - Be sure to keep your reliever medication with you.
  - Get a flu vaccine when available.
  - If you develop new or worsening asthma symptoms, follow the steps of your asthma action plan. If your symptoms do not go away, call your doctor right away.
  - Parents should make sure the child's caregiver and/or teacher is aware of his/her condition, and that they know how to help if the child experiences any symptoms related to asthma.

**What CDC is doing**

- CDC continues to collect information from states and assess the situation to better understand
  - EV-D68 and the illness caused by this virus and
  - how widespread EV-D68 infections may be within states and the populations affected.
- CDC is helping states with diagnostic and molecular typing for EV-D68.
- We are working with state and local health departments and clinical and state laboratories to
  - enhance their capacity to identify and investigate outbreaks, and
  - perform diagnostic and molecular typing tests to improve detection of enteroviruses and enhance surveillance.
- CDC has developed and is validating a rapid diagnostic test that will allow state health departments across the country to detect EV-D68 in specimens. CDC will explore options for providing test kits and protocols to state public health labs.
- We are providing information to healthcare professionals, policymakers, general public, and partners in numerous formats, including Morbidity and Mortality Weekly Reports (MMWRs), health alerts, websites, social media, podcasts, infographics, and presentations.

- CDC has obtained one complete genomic sequence and six nearly complete genomic sequences from viruses representing the three known strains of EV-D68 that are causing infection at this time.
  - Comparison of these sequences to sequences from previous years shows they are genetically related to strains of EV-D68 that were detected in previous years in the United States, Europe, and Asia.
  - CDC has submitted the sequences to GenBank to make them available to the scientific community for further testing and analysis.

### **Guidance for Clinicians**

- Clinicians should
  - consider EV-D68 as a possible cause of acute, unexplained severe respiratory illness, even if the patient does not have fever.
  - report suspected clusters of severe respiratory illness to local and state health departments. EV-D68 is not nationally notifiable, but state and local health departments may have additional guidance on reporting.
  - consider laboratory testing of respiratory specimens for enteroviruses when the cause of respiratory illness in severely ill patients is unclear.
  - consider testing to confirm the presence of EV-D68. State health departments can be approached for diagnostic and molecular typing for enteroviruses.
  - contact your state or local health department before sending specimens for diagnostic and molecular typing.
  - follow standard, contact, and droplet infection control measures
- The antiviral drugs pleconaril, pocapavir, and vapedavir, have significant activity against a wide range of enteroviruses and rhinoviruses. CDC has tested these drugs for activity against currently circulating strains of enterovirus D68 (EV-D68), and none of them has activity against EV-D68 at clinically relevant concentrations.

Additional information is provided in the CDC health alert released on September 12, 2014 (<http://emergency.cdc.gov/han/han00369.asp>).

### **Surveillance**

- U.S. healthcare professionals are not required to report known or suspected cases of EV-D68 infection to health departments because it is not a nationally notifiable disease in the United States. Also, CDC does not have a surveillance system that specifically collects information on EV-D68 infections.
- No data is currently available regarding the overall burden of morbidity or mortality from EV-D68 in the United States. Any data CDC receives about EV-D68 infections or outbreaks are voluntarily provided by labs to CDC's National Enterovirus Surveillance System (NESS). NESS collects limited data, focusing on circulating types of enteroviruses and parechoviruses.

### **More information**

- CDC Enterovirus D68 in the United States, 2014 website: <http://www.cdc.gov/non-polio-enterovirus/outbreaks/EV-D68-outbreaks.html>
- CDC Enterovirus D68 general website: <http://www.cdc.gov/non-polio-enterovirus/about/EV-D68.html>
- CDC Enterovirus D68 for Health Care Professionals website: <http://www.cdc.gov/non-polio-enterovirus/hcp/EV-D68-hcp.html>
- Enterovirus D68 in the United States: Epidemiology, Diagnosis & Treatment, COCA Call, September 16, 2014 ([http://www.bt.cdc.gov/coca/calls/2014/callinfo\\_091614.asp](http://www.bt.cdc.gov/coca/calls/2014/callinfo_091614.asp))
- Severe Respiratory Illness Associated with Enterovirus D68 – Multiple States, 2014, Health Alert Network, September 12, 2014 (<http://emergency.cdc.gov/han/han00369.asp>)
- Severe Respiratory Illness Associated with Enterovirus D68 – Missouri and Illinois, 2014, MMWR, September 8, 2014 ([http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6336a4.htm?s\\_cid=mm6336a4\\_w](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6336a4.htm?s_cid=mm6336a4_w))
- Clusters of Acute Respiratory Illness Associated with Human Enterovirus 68 --- Asia, Europe, and United States, 2008--2010, MMWR, September 30, 2011 (<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6038a1.htm>)