

Key Points — Enterovirus D68 in the United States, 2014

Note: Newly added information is in red.

- Over the last several months, the United States has experienced a nationwide outbreak of enterovirus D68 (EV-D68) associated with severe respiratory illness.
 - From mid-August to **November 12, 2014**, CDC or state public health laboratories have confirmed a total of **1,116*** people in 47 states and the District of Columbia (AL, AR, AZ, CA, CO, CT, 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.
 - **Reports from states over the last five weeks have indicated reduced EV-D68-like illness activity.** For more information, see <http://www.cdc.gov/non-polio-enterovirus/outbreaks/EV-D68-activity.html>.
- Every year, enteroviruses and rhinoviruses cause millions of respiratory illnesses in children. This year, EV-D68 has been the most common type of enterovirus identified, leading to increases in illnesses among children and affecting those with asthma most severely. Other rhinoviruses and enteroviruses continue to be detected as well.
- CDC has received substantially more specimens for enterovirus lab testing than usual this year, due to the large outbreak of EV-D68 and related hospitalizations.
 - CDC has prioritized testing for the most severe cases since the outbreak began in August to get a better understanding of the disease.
 - Of the more than 2,300 specimens tested by the CDC lab, about 40% have tested positive for EV-D68. About one third have tested positive for a rhinovirus or enterovirus other than EV-D68.
 - 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 developed, and started using on October 14, a new, faster lab test for detecting EV-D68. We have processed the remaining specimens received since mid-September and are now testing and reporting results for new specimens within a few days of receiving them.
- EV-D68 has been detected in specimens from **12**** 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.
 - So far, state and local officials have reported that two of these deaths were caused by EV-D68.
- 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 continue to 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>).

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

**CDC will review and update data every Thursday from patients who died and had samples submitted for testing.

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.
 - Talk to your child's doctor about the best way to control his or her symptoms.
 - 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 developed, and started using on October 14, a new, faster lab test for detecting EV-D68. We have processed the remaining specimens received since mid-September and are now testing and reporting results for new specimens within a few days of receiving them.
 - CDC's new lab test is a real-time reverse transcription polymerase chain reaction, or rRT-PCR, and it identifies all strains of EV-D68 that we have been seeing this summer and fall. The new test has fewer and shorter steps than the test that CDC and some states were using previously during this EV-D68 outbreak.
 - CDC has made the protocols publically available on its website (<http://www.cdc.gov/non-polio-enterovirus/hcp/EV-D68-hcp.html>) and is exploring options for providing test kits 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 infection as a possible cause of acute, unexplained severe respiratory illness, even if the patient does not have fever. For these patients, they should do the following:
 - Consider laboratory testing of respiratory specimens for enteroviruses.
 - Consider EV-D68 testing of specimens that test positive for enterovirus or rhinovirus. State health departments can be approached for diagnostic and molecular typing for enteroviruses. However, contact state or local health department before sending specimens.
 - Follow standard, contact, and droplet infection control measures.
- 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.
- The antiviral drugs pleconaril, pocapavir, and vapendavir, 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.

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.

Activity of Enterovirus D68-like Illness in States

- Reports from states over the last five weeks have indicated reduced EV-D68-like illness activity.
 - Some states over the last two weeks have reported increasing respiratory illness activity, which is likely caused by seasonal viruses such as influenza and respiratory syncytial virus (RSV), not by EV-D68.
 - Therefore, as previously foreshadowed, CDC is no longer requesting EV-D68-like illness activity reports from states, and the map has been removed from the website.
- For more information, see <http://www.cdc.gov/non-polio-enterovirus/outbreaks/EV-D68-activity.html>.

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>
- CDC Activity of Enterovirus D68-like Illness in States website: <http://www.cdc.gov/non-polio-enterovirus/outbreaks/EV-D68-activity.html>
- CDC What Parents Need to Know about Enterovirus D68 webpage: <http://www.cdc.gov/features/evd68/>
- 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)
- 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)
- 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>)