

ENTEROVIRUS D68 (EV-D68)

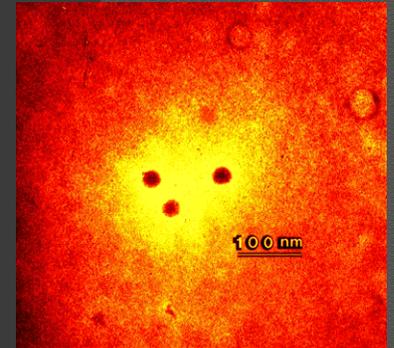
Martha Thompson, MPH
Medical Virology Group Manager
Laboratory Services Section

Lesley Brannan, MPH
Epidemiologist / IRID Team Leader
Emerging and Acute Infectious Disease Branch

Outline

- ① Non-polio enterovirus and EV-D68 background
- ② EV-D68 illnesses and prevention
- ③ Epi investigations and surveillance
- ④ Laboratory testing

Non-Polio Enteroviruses



- ⦿ More than 100 serotypes of non-polio enteroviruses
 - Coxsackieviruses A and B
 - Echoviruses
 - “Numbered” enteroviruses (e.g., EV-D68)
- ⦿ Virus circulation highest in summer and fall
- ⦿ Enterovirus circulation patterns are complex:
 - Circulating enteroviruses change frequently
 - Multiple strains of the same enterovirus type can co-circulate each year

Non-Polio Enterovirus Illnesses

- ⦿ Enteroviruses cause a variety of illnesses:
 - Respiratory
 - Febrile rash
 - Conjunctivitis
 - Neurologic (e.g., aseptic meningitis, encephalitis)
- ⦿ Most illnesses occur in infants, children, and teenagers
- ⦿ Estimated 10–15 million infections annually in US

EV-D68 Viruses

- ◎ First recognized in 1962 in California
 - Small numbers of infections reported annually since 1987
 - Clusters since 2008:
 - Most clusters reported < 30 cases
 - Largest: Japan, 120 cases
 - Most cases not fatal
- ◎ Currently circulating strains are not new
 - At least 3 EV-D68 strains circulating now
 - Most prominent current strain was also detected in 2012 and 2013
- ◎ Similar to rhinoviruses

EV-D68 Illnesses

- ◎ EV-D68 causes respiratory illnesses
 - Infections can result in asymptomatic to severe illness
 - Full illness spectrum unknown
 - Mild: fever, runny nose, sneezing, cough, body/muscle aches
 - Severe: wheezing and difficulty breathing
- ◎ Risk groups
 - Infection: Infants, children, and teenagers
 - Severe illness: Children with asthma
- ◎ EV-D68 virus is found in respiratory secretions
 - Transmission occurs through
 - Direct contact via respiratory droplets
 - Indirect contact with contaminated surfaces
- ◎ Treatment is supportive



EV-D68 Prevention

- ⦿ No vaccine
- ⦿ Asthma patients should have an asthma action plan
- ⦿ General recommendations to prevent respiratory diseases:
 - Wash hands often with soap and water
 - Avoid touching your eyes, nose, and mouth with unwashed hands
 - Avoid kissing, hugging, and sharing cups or eating utensils with people who are sick
 - Disinfect frequently touched surfaces
 - Cover your coughs and sneezes
 - Stay home when feeling sick and consult with your doctor

Healthcare Settings

- ⦿ For patients with suspected EV-D68, employ **standard, contact, and droplet** infection control precautions.
- ⦿ Alcohol-based hand rub vs. soap and water
- ⦿ Environmental disinfection
 - Hospital-grade disinfectant with an EPA label claim for any non-enveloped viruses (e.g., norovirus, rhinovirus)

How was the current outbreak recognized?

- ⊙ August 2014: Hospitals in Missouri and Illinois reported increase compared to previous years in:
 - Number of children hospitalized with severe respiratory illness
 - Detections of enterovirus/rhinovirus by PCR in nasopharyngeal specimens
- ⊙ 30 patients from both clusters positive for EV-D68:
 - Children (6 weeks to 16 years of age)
 - Majority with underlying asthma or wheezing
 - Most afebrile with difficulty breathing and hypoxemia
 - Majority admitted to PICU
 - Chest radiographs showed perihilar infiltrates, often with atelectasis

DSHS Testing Criteria for EV-D68

- ⦿ Specimens may be submitted for EV-D68 testing from patients who meet one of the following criteria:
 1. Pediatric patients (<18 years of age) with all of the following:
 - Admitted to ICU
 - Severe respiratory illness
 - Symptom onset no earlier than August 1, 2014
 - IF enterovirus/rhinovirus testing has been done, the test is positive
 2. Patients (any age) with respiratory illnesses that are part of a suspected EV-D68 cluster as determined by the local health department
 3. Suspected EV-D68 patients (any age) with atypical illness manifestations (e.g., neurological symptoms)
- ⦿ **Submitters should work with their local health departments**

As of 10/21/2014

Current US EV-D68 Outbreak

- US: 938 patients in 46 states with respiratory illness caused by EV-D68
 - 7 persons who died were positive for EV-D68



As of 10/21/14

EV-D68 in Texas

- EV-D68 detected in specimens from 15 Texas residents with respiratory illnesses
 - Average age: 6.7 years (range: 1-13 years)
 - Onsets range from 7/29/14 – 9/29/14
 - No deaths
 - Counties: Anderson, Bexar, Dallas, Denton, Lubbock
- Other currently circulating respiratory viruses may cause similar illnesses

Texas Specimens Tested for EV-D68 at CDC

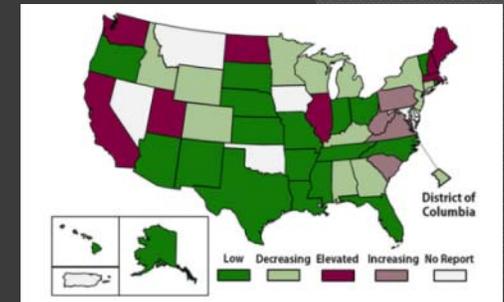
Virus detected	No. (%) of results
EV-D68	15 (28%)
Other enterovirus	24 (44%)
No enterovirus detected	15 (28%)
Total	54

Coxsackievirus B
Rhinoviruses A, B, C

As of 10/21/14

Enhanced EV-D68 Surveillance

- CDC has asked states to report:
 - A weekly EV-D68-like activity level
 - Low and similar to the previous week
 - Increased compared to the previous week
 - Elevated but similar to the previous week
 - Decreased compared to the previous week
 - Syndromic surveillance data for EV-D68-like illnesses (if available)



Laboratory Testing

EV-D68: Laboratory Testing

- ⦿ PCR/Sequencing analysis
- ⦿ Limited Availability, CDC and some state PH Labs
- ⦿ DSHS: Cell culture + PCR + Sequencing
- ⦿ Other platforms in commercial labs:
 - PCR: Enterovirus detected/Not Detected
 - Multiplex: Luminex xTAG/GenMark:
Rhinovirus +

EV-D68: DSHS Lab

- Forwarding 10-15/week to CDC
- TAT varies for results.
- Reported back to submitter
- Screened through DSHS Infectious Disease and/or local HD
- Sent 84 to CDC: as of 10-20-14

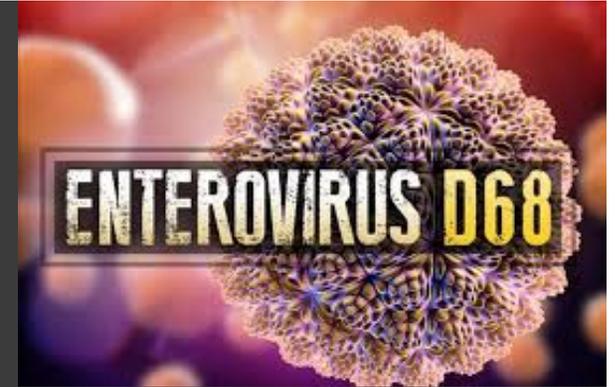
EV-D68: CDC Real Time RT-PCR Protocol

- Sent out protocol through APHL Friday, October 17
- Acceptable Specimen Types:
 - **NP/OP swab**
 - **Other Respiratory: nasal wash, aspirates**
 - *Serum (few tested)
 - Store frozen at -20 °C
 - Any delays in testing, store at -70 °C
 - Reagent overlap from other tests used in PH labs, (Invitrogen and Qiagen, ex FLU)

EV-D68: Further Questions

- ⦿ CDC will provide positive controls, but not a proficiency panel
- ⦿ No EUA plans, Secretary of Health and Human Services would need to declare an emergency
- ⦿ DSHS plans for testing?

Questions



Crystal.Vancleave@dshs.state.tx.us:

Viral Isolation Team Leader: 512-776-7594

Martha.Thompson@dshs.state.tx.us

Medical Virology Group Manager: 512-776-7515

Lesley.Brannan@dshs.state.tx.us

Team Leader, Invasive and Respiratory Infectious
Diseases: 512-776-6354

Johnathan.Ledbetter@dshs.state.tx.us

Influenza Surveillance Coordinator: 512-776-6223