

AMD Projects

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CDC's Advanced Molecular Detection and Response to Infectious Disease Outbreaks (AMD) initiative fosters scientific innovation to transform public health and protect people from disease threats.

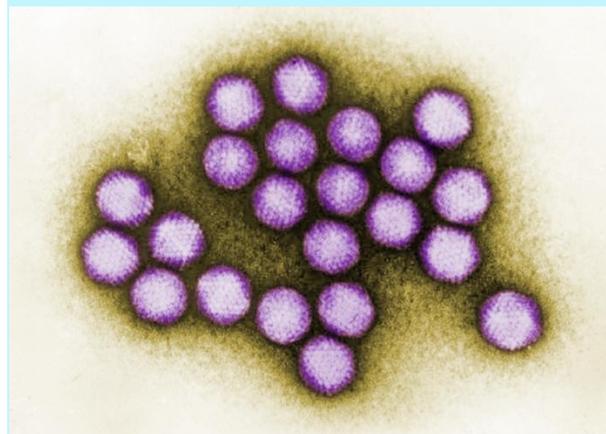
AMD Projects: Identifying Emerging Viruses

AMD methods help scientists develop faster tests for EV-D68 and other viruses

"Rare Respiratory Virus Hospitalizes Hundreds of Children in Midwest and Beyond." Those are the news headlines to which America awoke on September 6, 2014. That's when an outbreak of enterovirus D68 (EV-D68) caused illnesses so severe that some children were placed in intensive care units and a few required mechanical ventilators to help them breathe. EV-D68 is one of more than 250 virus types in the diverse *Enterovirus* genus of the family *Picornaviridae*. Within a month after the news aired, CDC declared a nationwide outbreak. Later reports documented global circulation of the virus.

Though hospitals were able to test for enteroviruses, they did not have the ability to perform detailed tests to determine the specific type of enterovirus that was making children so ill. As the outbreak began, state health departments flooded CDC with specimens for enterovirus typing. But even the routine test that CDC used to type enteroviruses took a few days to deliver results, creating a backlog of specimens waiting for testing. That's where CDC scientists put AMD methods to work.

"The existing test we had required a lot of steps and couldn't be expanded to support a high throughput of samples, so we used AMD methods to develop a specific, real-time RT-PCR EV-D68 test, allowing us to rapidly process a lot more specimens at once," said Dr. Steve Oberste, CDC's Polio and Picornavirus Laboratory Branch chief. 



Adenoviruses cause a wide range of common illnesses, such as colds, and sometimes severe respiratory ailments. AMD methods will help scientists find better ways to identify and control adenoviruses and enteroviruses to detect outbreaks faster and keep more people from getting sick.



The new test reduced the time it took to get results from days to just a matter of hours. By the end of November 2014, the lab had tested over 3,100 specimens, more than 1,000 of which were positive for EV-D68. In addition, CDC shared the test's protocol with state public health labs so they could process their own specimens, increasing the nationwide laboratory testing capacity.

CDC has made enteroviruses a high priority. These viruses frequently mutate and recombine, making them potential agents for future emerging human infections. Using the AMD protocols developed during this EV-D68 outbreak, CDC plans to expand the collection of genome sequences of EV-D68 and related human enteroviruses associated with severe acute respiratory infections. This information will allow CDC to better understand how these viruses evolve and possible genetic associations with disease or epidemic potential. Research in this area also could help guide studies to develop antiviral treatments and enhance CDC's capacity to respond rapidly to future outbreaks.

In this project, CDC also is applying AMD methods to adenoviruses, which cause a wide range of common illnesses, such as colds; respiratory illnesses (bronchitis and pneumonia); gastrointestinal illnesses (diarrhea and inflammation of stomach and intestines, known as gastroenteritis); and pink eye (conjunctivitis). While most of these infections are not severe, infants and people who have weakened immune systems or existing respiratory or cardiac disease can experience severe clinical disease. AMD methods will help scientists find better ways to identify outbreaks faster and intervene to control virus spread and reduce human infections.

For more information on the 2014 EV-D68 outbreak, please visit the CDC website at www.cdc.gov/non-polio-enterovirus/about/EV-D68.html.

