

Fighting measles is expensive. See what it cost to contain 10 cases.

A week-by-week breakdown of why the public health response to outbreaks is so costly.

By [Naema Ahmed](#), [Lena H. Sun](#) and [Aaron Steckelberg](#)

Today at 6:00 a.m. EDT

Half a million dollars.

That's about how much it cost several public health agencies to contain one small measles outbreak in the Denver area this year. Though it was a relatively modest cluster — a total of 10 cases involving nine children and one adult — it nevertheless consumed 6,785 hours of labor by state and local workers to track and snuff out the outbreak after exposed individuals traveled through grocery stores, schools, fast-food restaurants and more.

Measles is the most contagious vaccine-preventable disease, and time is of the essence to contain the spread. Most children recover after several miserable days of fever, cough, congestion and pink eye, but measles can also cause pneumonia, brain swelling, deafness, intellectual disability and death. In Colorado, dozens of investigators traced patient movements, checked vaccination records and quarantined people at risk while also examining how often air circulated through a medical clinic.



In a year in which the United States has recorded the most measles cases in 35 years, the Colorado outbreak shows the human and financial investment required to control the disease as the nation's defenses against the virus weaken.



Feb. 25: First case detected

A person suspected of having measles potentially exposes others at a medical clinic. This encounter counts as **one exposure event**, in which susceptible individuals may come in contact with the virus. Colorado health officials are notified and launch the department's effort to contain an outbreak.



Exposure at a medical facility

First positive measles test

The test comes back positive. Health officials identify **11 exposure events** in which the person may have previously exposed others going back to Feb. 19, including on a bus and at a PetSmart. Measles can linger in the air for up to two hours, and people can spread the virus before they know they're sick.



School



Restaurant



Transit, other public places

1 day after first positive test, 2 cases total

The next day, another person tests positive. Investigators learn the second person may have exposed others at several locations, including a high school,

Chick-fil-A and Chipotle, adding **six exposure events** to investigate.



3 days after first positive test, 3 cases total

As health officials try to track where those who test positive have visited in recent days and test people with symptoms, they find a third case, adding **five exposure events**. The investigation now centers on a middle school and adjacent high school.

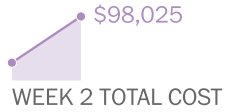


- \$27,182

WEEK 1 TOTAL COST

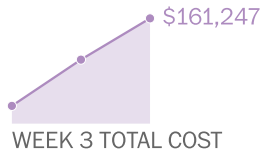
6 days after first positive test, 7 cases total

The costs for a labor-intensive tracing and monitoring process and lab testing mount. Four more people test positive. Investigators learn those people interacted with others during **13 exposure events** as early as Feb. 16, including at Denver International Airport, a church, an ice cream parlor, an Arby's and two medical clinics.



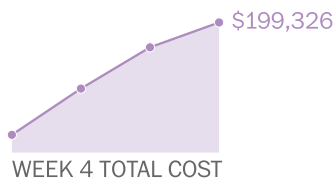
14 days after first positive, 10 cases total

Three more cases are found among household members of people already infected. One visited a pub and a hospital, adding **two exposure events** in which susceptible people may have been exposed. Measles is infectious from four days before through four days after the telltale rash appears.



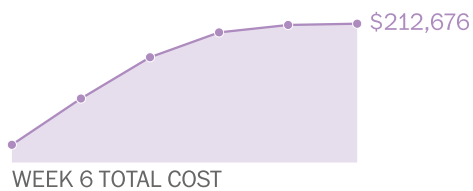
Risk at medical facilities

Medical facility waiting rooms are often poorly ventilated, making them high-risk. At a Kaiser clinic, health officials assessed the clinic's airflow. They also identified 375 patients and 116 staff members potentially exposed in the waiting room and adjacent exam room. Officials told about 20 people without proof of immunity to quarantine. No one became infected.



Risk at schools

Schools are higher-risk settings because children have frequent physical contact with each other. At the high school, officials considered all 1,700 students and 270 staff members potentially exposed because students move throughout the building. Health officials reviewed vaccination records to determine who needed to quarantine and miss school.



26 days after first positive, 10 cases total

At this point, there are 10 measles cases, 91 people quarantined, 68 tests ordered and 512 days of school missed by infected and quarantining students. State and local agencies have spent \$491,175 responding to the outbreak, with 189 staff members logging 6,876 hours. The state health department's costs account for \$212,676.

“No two outbreaks are the same,” said Ginger Stringer, an epidemiology response program manager at Colorado’s Department of Public Health and Environment. “This outbreak was unique in that both of the schools that were



affected had very high vaccination rates. That is why we’re looking at a few weeks of data and not a few months of data to complete this investigation.”

The state health department didn’t identify how much each of the smaller local agencies spent on helping to contain the outbreak. But earlier news releases said some of the agencies involved in the investigation include health officials from Boulder County, Adams County and Weld County.

Advertisement

Feb. 16



Feb. 25



Eight additional local agencies

\$278,499

Outbreaks in other parts of the country this year have included hundreds of people, probably ballooning the costs by multitudes for those communities. Each measles case in the U.S. last year cost almost \$60,000, according to a [recent study](#). At the same time, [vaccine exemptions](#) among kindergartners have reached a record high, leaving more children in school without required vaccinations.

The United States has already recorded more measles cases [this year](#) than in any year since 1991, with months to go.

About this story

For this story, the Colorado Department of Public Health and Environment (CDPHE) detailed the work it conducted in response to an outbreak in February. CDPHE provided data on cases, costs and vaccination rates.

 **Comments**



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