

2015 MEASLES OUTBREAK IN CLALLAM COUNTY

Response Activities and Cost Analysis

On January 28, 2015, Clallam County Health and Human Services (CCHHS) received notice of a multistate measles outbreak associated with a theme park in California. A health care provider alert was issued by the Health Officer describing measles symptoms and vaccination recommendations.

On February 3, 2015, the first measles case in Clallam County in 20 years was confirmed. The genotype (D9), however, was determined to be a different from the California outbreak (B3). The source of infection for this patient was (and remains) unknown. The patient exposed at least 149 persons while infectious.

On February 12, CCHHS was notified of a second case of measles in Clallam County who was linked to the first case. This patient exposed over 100 people while infectious including students and staff in a private school in Port Angeles.

On February 17, 2015, the Clallam County Board of Health passed a resolution establishing a state of public health emergency, allowing CCHHS access to county Public Health emergency funds. Ultimately, five cases of measles were reported to CCHHS before the outbreak was declared over by the Washington State Department of Health on April 19, 2015. One additional case, resulting in the death of a young woman, was discovered after the outbreak was declared over.

CCHHS and partners undertook many activities in response to the outbreak to limit the number of cases of this highly infectious disease. Each partner was asked to examine costs related to the measles outbreak for the time period of February 1 to May 31, 2015, including costs for staff time, travel, laboratory testing and supplies, vaccine, and communications.

This report highlights response efforts and costs incurred by CCHHS, Washington State Department of Health, and Olympic Medical Center. Additional costs have accumulated due to the measles death but are not included in this analysis. Other partners in the outbreak response characterized their response activities but largely were unable to provide cost figures. A description of their activities is provided to help the reader understand the far-reaching impact of the outbreak on the community. Since all partners could not report cost impacts and cost resulting from response to the measles death are not included, the final figure is a gross underestimate of the costs to contain this outbreak.

CLALLAM COUNTY DEPARTMENT OF HEALTH AND HUMAN SERVICES (CCHHS)

CCHHS-Public Health staff had primary responsibility for measles surveillance and investigation of possible cases. With the help of the Washington State Department of Health (DOH), CCHHS staff worked closely with local health care providers to evaluate rash-like illnesses in the community and arrange confirmatory testing.

Each suspect measles case (or their parent) was interviewed at length on one or more occasions to confirm the diagnosis of measles, dates of communicability, likely source of exposure, and persons exposed to the case during the case's infectious period.

CCHHS staff and partners telephoned all persons exposed to confirmed cases of measles ("contacts") to determine their susceptibility to measles based on year of birth, vaccination status, past history of measles, and laboratory testing. If a contact was determined to be susceptible, administration of measles vaccine or immune globulin, or home quarantine were undertaken according to DOH protocols. Individuals who were quarantined were monitored by CCHHS staff and others on a daily basis for

measles symptoms for up to 21 days (maximum incubation period for measles). Over 250 contacts were interviewed by CCHHS and partners (Table 1).

To help prevent the spread of measles in the community, CCHHS conducted no cost immunization clinics, providing measles, mumps, and rubella (MMR) vaccine at no cost to members of the community. Because local stocks of MMR vaccine were insufficient to carry out the proposed clinics, vaccine was gathered from other counties, DOH (210 doses), and the Centers for Disease Control and Prevention (CDC) (200 doses). An additional 450 doses were ordered from private companies.

CCHHS provided vaccine for 31 no cost MMR clinics conducted during the course of the outbreak. West End partners administered the vaccine at three clinics; HHS-Public Health staff administered the vaccine at the remaining clinics.

Communications was a critical component in the response to the outbreak. Clallam County Information Technology staff created a Measles Webpage and CCHHS staff updated the information periodically with press releases and possible sites of measles exposure. CCHHS also distributed intermittent alerts to health care providers and schools, prepared press releases, and spoke with media contacts. In addition, staff answered hundreds of phone calls from persons exposed to measles cases as well as from concerned citizens. CCHHS also coordinated intermittent meetings with partners to plan strategies and share information, ensuring consistency in response approaches and messages to the public and rational use of laboratory resources.

CCHHS estimates its total costs related to the measles outbreak at \$104,105.21. (Table 2)

OLYMPIC MEDICAL CENTER (OMC)

OMC was a critical partner in assessing persons with rash-like illnesses presenting not only to their Emergency Department but referred by local health officers for collection of laboratory specimens. OMC Laboratory staff collected, packaged, and shipped nasopharyngeal swabs and blood specimens for testing at the State Public Health Laboratory, if approved by CCHHS, or other commercial laboratories.

Because of the very contagious nature of measles, OMC placed a yellow triage tent by the Emergency Department Entrance so that possible cases could be screened without entering the hospital, limiting additional exposures and possibly preventing hundreds of cases.

Infection control staff from OMC received many questions from local health care providers with regards to the diagnosis and laboratory confirmation of measles as well as recommended infection control procedures. They also hosted a health care provider educational forum for local health care providers and nurses on the diagnosis and testing of suspect measles cases and talking with patients about vaccinating their children on March 30.

OMC estimates its total costs related to the measles outbreak at \$36,000. (Table 2)

WASHINGTON DEPARTMENT OF HEALTH (WDOH)

Support from WDOH came in many forms. The WDOH Epidemiology Section has vast measles knowledge and experience in outbreaks and provided guidance to CCHHS staff in implementing response protocols, conducting case investigations, ordering laboratory tests, and interpreting results.

In addition to multiple telephone consultations, WDOH sent staff beginning February 4 (including an epidemiologist, senior epidemiologist, and CDC intern) for more extended lengths of time to assist CCHHS in the response effort. Once onsite, WDOH staff participated in meetings, developed special

scripts for interviewing cases and contacts, developed a worksheet for assessing rash-like illnesses, and created databases to help track case and contact investigations and findings.

When a child developed a measles-like rash that could not be traced back to the original cluster of cases, signaling a possible heightened level of disease transmission, WDOH sent six staff to consult with CCHHS staff including a communications officer, two emergency preparedness staff, a CDC intern, an epidemiologist, and a senior epidemiologist. Ultimately, the case was determined to be a measles vaccine reaction, not a case of measles associated with the outbreak.

The State Public Health Laboratory supported the outbreak investigation through (often) expedited testing of clinical specimens to confirm a measles diagnosis including measles antibody titers (to determine if a person was immune to or newly infected with measles), polymerase chain reaction (PCR) (to detect the presence of measles RNA), and viral culture. If more specialized testing was needed (genotyping of the virus), WDOH was the liaison with CDC and reference laboratories and arranged for shipping and testing of specimens.

WDOH estimates its total costs related to the measles outbreak at \$18,918.69. (Table 2)

OTHER PARTNERS (limited cost figures available)

Local health care providers. The local medical community assessed a multitude of rash-like illnesses in their patient populations (the vast majority of which were determined not to be measles), reviewed immunization records of patients, and recalled those in need of measles vaccination. Hundreds of measles antibody titers were ordered and MMR vaccinations given by local health care providers.

The Lower Elwha Clinic, Peninsula Children's Clinic, and OMC also helped in contacting persons exposed to measles cases in their facilities while infectious to determine susceptibility to measles among exposed person and appropriate follow-up.

In addition, a health care provider at one facility who was exposed to a measles case during the case's infectious period was found not to be immune to measles and had to be quarantined. The health care provider was put on leave with pay during the 2-week quarantine period, costing the facility \$5,600.

Schools. Following the occurrence of measles in a school-aged child, schools were directed to verify vaccination status of all students and staff in case exclusion of susceptibles was ordered by the Health Officer at a later date.

School nurses from all five Clallam County public school districts, some with the assistance of administrative staff, identified students in their schools who were unimmunized or under immunized (using Skyward data system) and called their parents to encourage them to get their children vaccinated. Nurses explained to parents that if a measles case occurred in a student or staff member at the school that students who were not immune to measles would be excluded. These communication efforts took several hours to several days depending on the school district enrollment and vaccination coverage rate.

School nurses sent notices to teachers and other staff about the need to be able to document measles immunity if a measles case occurred at the school. They also made efforts to collect and record staff immune status; however, this effort was not completed in most school districts due to either lack of resources or concerns about staff privacy. One school arranged a special immunization clinic with a local pharmacy for staff.

School nurses also shared CCHHS advisories, media releases, and other measles information with parents and staff by email, posting it to the school/school district's website, or posting it in a visible place at the school.

At the private school where the second measles case had been present while infectious, staff reviewed student and staff vaccination records. A total of 11 students and five staff were determined to be susceptible to measles and were excluded from school for 2 weeks for home quarantine.

A Workplace. The first measles case worked while infectious but before development of a rash, exposing 20 coworkers to measles. The place of employment paid for measles antibody testing for exposed coworkers who could not produce evidence of measles immunity and placed those found to be susceptible on paid leave during their home quarantine. This cost the employer \$23,000.

A Home School Group. Because one Clallam County measles case exposed a large number of individuals during a homeschool event, one parent (the event organizer) contacted all parents of children present at the event; determined (and maintained records on their immune status); provided instructions for home quarantine, where appropriate; and monitored these individuals intermittently to determine if any developed measles symptoms. The parent contacted CCHHS staff on a regular basis, keeping them apprised of the situation.

Sheriff's Office: Clallam County Sheriff's Office took a pro-active approach to protect the health of its employees and jail inmates. Jail medical services did a special MMR clinic for employees that needed a vaccination or additional vaccinations. All inmate records were checked in the state immunization data base and MMR vaccine was given to unimmunized and underimmunized inmates, as appropriate.

CONCLUSION

This analysis only includes the costs of containing the outbreak of this highly infectious disease. It does not include, among other things, the cost of lost productivity among parents due to quarantine of children, health care costs of persons infected with measles, nor the costs of disruption of normal activities at the agencies and businesses affected. Furthermore, the estimated cost of \$226,823.90 is likely an underestimate of the cost of control efforts because total costs to all partners, schools, and businesses were not available.

Nonetheless, it is clear that the Clallam County measles outbreak, although small (only six cases), came at a very large cost including the tragic death of a young woman with an underlying illness. We cannot put a price on that death as the effects on the family and community will be on-going.

The extraordinary cost to our community of this preventable disease is a wake-up call and should compel us all to take full advantage of available and safe vaccines to safeguard our community from outbreaks and protect everyone.

Table 1. Number of persons exposed to a measles case contacted by CCHHS and partners, Clallam County Measles Outbreak, 2015

Means of notification	Number
HHS	47
OMC	51
Lower Elwha Clinic	35
Peninsula Children's Clinic	41
Olympic Christian School	13*
Homeschool event organizer	64
Other	6
TOTAL	257

*includes only susceptibles

Table 2. Cost figures for CCHHS and Primary Partners, Clallam County Measles Outbreak, 2015

	Staff costs*	Vaccine	Laboratory Tests and Supplies	Blast Fax and Mailing	Travel and Training	Miscellaneous	Total
Clallam County HHS	\$70,704.84	\$30,419.68		\$332.82	\$2,346.50	\$301.37	\$104,105.21
WA Dept. of Health	\$7,710.24		\$8,361		\$2,847.45		\$18,918.69
Olympic Medical Center	\$31,000		\$5,000				\$36,000
CDC		\$33,200**					\$33,200
Partners and employer	\$34,600***						\$34,600
Roll-up	\$144,015.08	\$63,619.68	\$13,361	\$332.82	\$5,193.95	\$301.37	\$226,823.90

*Costs through May, 2015

**In-kind cost (Vaccine for Children Vaccine)

***This reflects \$23,000 from the employer of one measles case for assessment of on the job exposures and necessary quarantine of susceptible coworkers; \$5,600 for quarantine of a health care provider at one health care facility; and \$6,000 for vaccinations by Clallam County Sheriff's Office for staff and inmates.