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HEALTH DISTRICT

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Measles Outbreak Investigation
Grant County Health District
October 22, 2008

Summary:

This report describes the investigation and findings of a measles outbreak in Grant County with rash onsets from April 12 through May 30, 2008. A total of 19 cases were reported, with 18 occurring in adolescents and children between 9 months and 18 years of age, none of whom had previously received any doses of measles-containing vaccine. 16 of those 18 were school-aged children who were either home-schooled or were exempted from school vaccination requirements.

The 19th case was an adult who had previously received 2 doses of MMR (Measles, Mumps, Rubella) vaccine, and had a potentially immunocompromising medical condition.

The index case-patient, two siblings, and one additional measles case-patient had attended a religious conference in King County from March 25-29. The conference was attended by approximately 3000 persons, primarily students from junior high through university ages. Participants were from 12 states, and several foreign countries including Japan, Canada, and Mexico. None of these countries or states has since reported confirmed measles cases in persons who attended this conference.

Viral Genotype D5 was isolated from 4 case-patients. School, religious activities, and piano lessons provided linkages between the initial 2 cases and the subsequent 15 cases.

1075 primary contacts were identified; exposures settings for contacts included: school and school activities (325), health-care setting (216), religious activities (74), and retail store (303). 255 individuals were monitored for rash and other measles symptoms. 26 (non-measles rash illness) cases were investigated and ruled out.

A report in power-point summary format is also available.

The outbreak has been summarized in the Centers for Disease Control and Prevention's MMWR, August 22, 2008 (<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5733a1.htm>).

Background:

Cases 1-8: April 28, 2008, Grant County Health District (GCHD) officials received a verbal phone report from a Franklin County healthcare provider stating that he had diagnosed measles in 3 children

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from Moses Lake on April 24. After consultation with the healthcare provider and immediate notification of Washington Department of Health's Communicable Disease Epidemiologist Chas DeBolt, local health officer Dr. Alexander Brzezny requested testing on the children. Phone interviews were conducted with the mother of the children, providing information that all 8 of the children in the home had experienced the same symptoms over the preceding 2 weeks, with some variation of rash onset and severity of symptoms, the first rash onset being April 12, the latest being April 21. Some children were experiencing respiratory symptoms including cough. Nasopharyngeal, urine, and serum specimens were obtained by the healthcare provider and transported by bus to the Washington State DOH Public Health Laboratory (PHL), IgM was reported as positive for all 3 individuals tested. Viral isolation testing was later found negative but PCR testing was positive on all 3. 5 siblings who met case definition were "epi-linked" as cases. All 8 children were unvaccinated and were home-schooled.

Case 9: On May 2, 2008 a local healthcare provider called to state that he believed there had been healthcare exposures on 2 separate visits, related to an unimmunized child that he suspected had measles. Rash onset was April 30. This child was a student at a private school, Moses Lake Christian Academy. The clinic was given guidance from both Washington Department of Health (DOH) and the Grant County Health District. Specimens were obtained and transported by GCHD staff to PHL, and a positive IgM result was reported out by midnight. Measles virus was also eventually isolated in laboratory specimens, and PCR testing was positive.

Case 10: On May 3, the same clinic called with a report of another suspect measles case, an unimmunized child who attended a different private school, Covenant Christian School. At this time healthcare exposures were also reported. Rash onset was May 2. Specimens were again obtained and transported by GCHD staff to PHL, with positive IgM reported; measles virus isolation and positive PCR testing followed.

Staff were mobilized to work through Saturday and Sunday, May 3 and 4, and the Region 7 Epidemiologist was called in. An epidemiologist from Spokane Regional Health District also provided assistance. ICS-like structure was implemented and a team meeting was held in the Ephrata office with specific assignments made.

The Ephrata office was set as the measles EOC, as administrative personnel were working with the involved schools regarding documentation of immunization status, and the Moses Lake office was less malleable to serve the measles issues due to physical set-up, client flow and ongoing workload characteristics. A phone extension was dedicated to measles calls. Immunizations for affected contacts were primarily provided through the Moses Lake office for reasons of client accessibility.

Client and contact interviews were being conducted as well as verification of immunity or non-immunity to measles for contacts from school, healthcare and other settings. Individuals found to be non-immune at the time of contact were confined to home and placed on "rash watch" with regular calls from public health staff. Individuals who had previously one MMR or history of measles were not confined to home but were restricted from high risk settings until full immunity by immunization or titer could be documented.

The PIO was preparing information for the public and for healthcare providers, emergency responders, and the Grant County Healthcare Emergencies Alliance, including emergency responders. GCHD was in frequent communication with DOH staff; as the outbreak and investigation escalated, communications became more challenged due to staffing shortages at the Health District and the high need to answer calls with respect to school staff and families, church groups, healthcare and general public. A

proactive approach was implemented, encouraging and promoting the vaccination and/or verification of immunity of not only students and staff at schools and child care settings, but also staff at healthcare settings.

Cases 11-12: During the investigation, a parent of 2 unimmunized student contacts of the case at MLCA agreed to have their children tested because they had been ill during the month. Both tested positive for IgM, with one testing positive for IgG also. The child with the positive test for IgG had experienced a rash onset one day later than the first rash onset identified in the first cluster of cases.

Cases 13-15: During the investigation, because of information shared at church activities with contacts of some of the case patients, a parent called the Health District to report that their 3 unimmunized children had been ill with measles symptoms. Upon interviewing, it was found that the children, who were all home-schooled, were found to meet the clinical case definition. No specimens were obtained for laboratory evaluation; epi-linkages appropriately defined these as cases.

Case 16: A previously unimmunized sibling of Case 10 above had been vaccinated on May 3, when the measles was suspected. This individual developed symptoms of measles, with rash onset May 14. A healthcare exposure occurred in Benton County during infectious period, prior to rash onset, as grandparents were caring for this child and had not been fully informed by the child's parent regarding restrictions. Viral isolates and PCR were positive for measles.

Case 17: 9 month old infant, who was a household contact to Case 9 above had been vaccinated on May 3. The infant developed symptoms of measles with rash onset date of May 14. PCR on urine was positive for measles.

Case 18: 15-1/2 month old infant was seen at an ER in the Portland, Oregon, area on May 12, with fever, cough, and rash (onset May 10). The family was detained in Oregon and was visited by a public health nurse there. Infectious period prior to rash onset was spent in Oregon, traveling to Moses Lake, with 2 days spent in Moses Lake, and then traveling again to Oregon. Specimens were obtained in Oregon, and subsequently transported to the Washington PHL, where IgM was positive and measles virus was isolated from throat specimen.

Case 19: Healthcare facility called on Sunday, June 8, to report a positive IgM. The individual had previously received 2 MMR's, and no reports of specimens or pending cases had been provided to public health. The case patient was a 23 year old who had presented to a walk-in facility on May 31 with fever and sore throat (which motivated the doctor visit) and also had a rash onset May 30. Investigation commenced and new specimens were obtained. Public health coordinated with the commercial lab to have specimens tested at the same time. The original IgM result was confirmed as positive and the new specimen was also IgM positive. The case patient had developed a positive IgG by the time the second specimen was taken.

Epidemiological Investigation:

Local public health staff commenced investigation, following the report of the initial 8 cases, and continued to investigate when case 9 was reported. On Saturday, May 3, when case 10 was reported, an epidemiologist through Spokane Regional Health District, Bill Edstrom, and Region 7 Epidemiologist Jackie Dawson responded to assist. Bill assisted during the weekend only, and Jackie stayed to assist Grant County Health District for an extended period of time, until the end of June. All of the first 18

cases were eventually shown to have some linkage(s), although direct linkage is less clear in some cases than others. “Christian Circles” as identified by some of the interviewees supports some less specific linkage. The 19th case has not been specifically or non-specifically linked to any previous cases.

The outbreak investigation was formally and cautiously closed July 22, 2008; there have not been any subsequent cases.

Control Measures:

Administrators of the affected schools were cooperative in implementing control measures in their school buildings. In the case of one school, there was a delay in getting the immunization information requested by the investigation staff; however, once the information was provided, the school was cooperative in implementing exclusions as appropriate.

Washington State Department of Health guidelines for controlling measles in the school setting were adopted, allowing for exclusion from school for anyone without 2 prior doses of Measles-containing vaccine, until they either showed by a blood test (titer) that they were immune, or they received their first or second vaccine, OR produced immunization records verifying first and second vaccines. Grant County Health District staff authorized the return to school for each individual who complied.

As the outbreak expanded, the control measures also expanded, including the expansion to the school staff population born before 1957, who were required to receive vaccine if they did not have record of immunity or any vaccines on file.

Where individuals were excluded from school, it became necessary to issue health officer directives or orders to show assurance of legal authority and to provide clear explanation of the expectations for “quarantine” as not being limited only to exclusion from school.

Individual’s who had been potentially exposed were provided one-on-one personal or phone consultation, utilizing individuals speaking English, Spanish, or Russian. GCHD provided on-site clinic hours in both Moses Lake and Ephrata offices and also provided referral to healthcare providers for MMR vaccinations; fees were waived for children’s vaccines (State-provided vaccines were used) and in limited cases for adults. Healthcare providers were encouraged to vaccinate babies at 12 months. Healthcare offices were encouraged to assure that their staff established immunity. GCHD provided IG injections for appropriate individuals meeting exposure criteria. Titers were encouraged for all pregnant women potentially or actually exposed.

There were multiple healthcare exposures to measles cases in one specific clinic; a healthcare exposure occurred in another county, requiring investigation on the part of that county’s local public health jurisdiction. There were no reported cases resulting from any healthcare setting exposures. Roller skating rink exposures occurred when 3 individuals were there during infectious period; there were no resulting cases reported. Attempts were made to increase the vaccination rates in the school district where the roller rink was located, with little success; calls were made to families in English, Russian, and Spanish.

Local healthcare facilities were responsive to the local health officer’s request to post signage urging the wearing of a mask in cases of fever and cough; however, many facilities reported that the posting of

signs was not effective, and facilities did not have adequate manpower to provide staff at facility entrances.

The 19th case went to a local Wal-Mart store during the infectious period of his illness. Wal-Mart patrons were offered vaccines for these exposures; potentially exposed Wal-Mart employees were sent for titers or vaccines, with Wal-Mart assuming the expense. Local Wal-Mart management worked closely with local Public Health staff to return excluded employees to work as timely as possible. GCHD required stricter criteria for return to work than the (newly revised) Department of Health guidelines, adding the requirement for the second MMR for exposed Wal-Mart workers who had previously had one MMR.

Health Officer directives were used twice for obtaining lists of contacts related to travel or other groups, for quarantine activities and for preventing travel on the part of a case and their closest contacts.

Communications:

Communications between local and state public health were challenged by local public health not fully understanding required information and timelines required for CDC report requirements, coupled with the high intensity of local communications that were occurring making it difficult for State staff to reach local staff. Local public health staff were working with less than full staffing (due to recently vacated positions) and also were working to control a varicella outbreak in a Moses Lake school. State/local communications were also challenged by process and procedures, for example results from the State lab could not be released until the administrative “sign off” process had been completed, delaying local public health staff’s ability to provide guidance within the community with respect to healthcare-related exposures and possible pending exclusions from work, childcare or school.

All incoming communications regarding measles were routed to the Ephrata office, where investigation staff were placed. Maintaining adequate communications with all staff was challenging due to changes in our Health District staffing levels and the high intensity of communications between Ephrata office staff and the public.

Communications with the local Wal-Mart were challenged by the fact that their corporate office did not communicate on the same level as their local managers, with whom local public health communicated well. Public health managers received a call from a local legislator who was concerned about what was happening at Wal-Mart.

Outgoing communications included: 7 alerts to healthcare providers, with the most recent being July 2, 2008; one alert to all schools, public and private, urging assurance of measles immunity through vaccination or titer, and appropriate documentation; 5 media alerts.

Washington State Department of Health provided 3 statewide public health alerts (SECURES) regarding Grant County’s measles cases.

Costs:

Total costs of \$213,858 were identified and reported. This is a limited estimate as multiple entities did not report their costs.

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Community entities most closely involved (2 private schools and 1 local Wal-Mart) did not share their costs related to the measles outbreak. One clinic that had experienced healthcare exposures and also partnered to meet the community's needs for the obtaining of laboratory specimens for measles estimated its costs to be at \$30,000 or more.

Washington State Department of Health's Communicable Disease and Epidemiology reported staff time costs of \$23,697; laboratory staff time: \$14,558; lab supplies at \$2,500, and overhead costs of \$8,225, total costs \$46,480.

Local public health costs in cash outlay have been conservatively estimated at \$99,532. Considered for this figure were staffing costs, including environmental health sanitarians who assisted with phone calls and CHLD profile look-ups for contacts; as well as supplies including MMR vaccines; travel costs (specimens had to be transported directly to Seattle to the Public Health Laboratory or to a neighboring city's bus station because the Moses Lake bus station site did not cooperate to support meeting the shipping needs).

Additional costs identified included (\$37,846) included: Kittitas County's staff time and mileage for preparedness training obtained through the measles outbreak: \$2,367; Region 7 staff time for the entire outbreak period and travel costs for the first 2 weeks only: \$19,604 (Region 7 was not able to support travel expenses after the first 2 weeks); exempt staff extra hours valued at \$15,275; and volunteer staff time valued at \$600.

Lessons Learned:

The following "lessons learned" are taken from evaluation information provided through: internal staff evaluations; Washington DOH evaluation; 49 community-based respondents to measles outbreak survey.

1. Provide timely written notification of any Health Officer requested or ordered restriction; delivering these in person is effective.
2. Hold daily update meetings with staff in both offices. Closing the offices for 30 to 60 minutes in the morning would allow for daily conferencing; closing early when needed would allow for update at the end of the day.
3. An Incident Command System (ICS) - like structure was used; increased specificity of assignments and accountability will be obtained through use of actual ICS structure.
4. Job action sheets for all interventions, with "just in time" training updates should be implemented.
5. Work closely with commercial laboratories and local healthcare providers to assure "collection" and reporting of all suspect patients and to obtain rapid results.
6. Negotiating a specific time and mode for communications with DOH to support easy information flow.
7. Established protocols for investigation and follow-up via DOH should be followed, unless modification is bilaterally acceptable.
8. A healthcare facility's use of an isolated location for collecting laboratory samples for their patients and others was very helpful.
9. Measles hotline set up on a specific extension at GCHD was helpful, but more help with the phones could have been used; prioritizing voicemails was necessary.
10. Having GCHD immunity to measles completed and documented was helpful.

11. Consise alerting to the healthcare providers is important, allowing for reference to sites with previously distributed information available.
12. All formal communications (to heathcare providers, to media, to schools, etc.) should be shared with all staff.

Acknowledgements:

All staff at the Grant County Health District, along with Jackie Dawson, Region 7 Epidemiologist (lead investigator) were active participants in controlling the outbreak, at times working 7 days a week, with very long hours each day. Kittitas County Health Department also provided staffing assistance. Local volunteer staff assisted in immunization interventions. Washington State Department of Health Department of Communicable Disease Epidemiology and the Washington State Public Health Laboratory were instrumental in assisting the outbreak control effort. Staff at DOH worked late at night at times, as did local public health staff. Jackie Dawson was primary investigator.

It is noted that most likely ALL healthcare providers and facilities in Grant County actively participated in the outbreak control measures. The Moses Lake Clinic Walk-In and Laboratory assisted in the obtaining of specimens from suspect patients, regardless of who the healthcare providers were. Samaritan Laboratory provided titers for close contacts and other individuals at reduced costs, and has continued to do so, for measles and a number of other vaccine-preventable diseases. Columbia Basin Health Association Laboratory personnel also demonstrated great effort in supporting the timely diagnosis of measles cases.

Affected schools demonstrated significant effort in complying with necessary measures, and less affected schools have also been working to achieve and document immunity to measles and other diseases, as have childcare facilities throughout the county.

The Grant County Health District wishes to thank all those mentioned and all others who have offered support for the prevention and control of measles during and subsequent to the outbreak.

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