

Title: Measles Post-Exposure Follow-up Process: Children's Hospitals and Clinics of Minnesota Experience

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Background:

Measles is a highly contagious viral illness that is transmitted by contact with infectious droplets, primarily by airborne spread. Measles cases are being reported in higher than usual numbers in the United States, with more cases occurring to date in 2011 than have occurred since 1996¹. In Minnesota, a measles outbreak in Hennepin county occurred in spring 2011 that included 20 cases of measles linked to an individual who acquired infection in Kenya². Unrelated to this outbreak, three additional linked cases of measles were confirmed in Dakota county residents in August 2011. Children's Hospitals and Clinics of Minnesota has cared for 13 of these confirmed measles cases. Not all cases were recognized as measles at time of presentation, resulting in lack of immediate rooming into Airborne Infection Isolation (AII) and thus exposed patients who required follow-up.

Methods:

- **Confirm the diagnosis** in consultation with Minnesota Department of Health (MDH)
- Determine contagion period based on rash onset date. Measles is most contagious 4 days prior to and 4 days after the onset of the rash.
- Establish exposure definition based on time patient was not in an AII room, departments exposed and exposure timeframe (Start: Time of patient arrival to department, End: Time of patient departure from department plus 2 hours)
- Create exposed patient list
- Assess MMR immunization status of the exposed using Minnesota Immunization Information Connection (MIIC). Verify records with primary care office as needed.
- Divide and prioritize follow-up type based on patient MMR immunization status:
 - First Priority Group = 0 doses MMR. Follow-up = Call patient and ask them to return for intramuscular immune globulin (IMIG) within 6 days of exposure. If >6 days have passed and patient is >12 months, provide MMR vaccine. Work with MDH on 'quarantine' guidance and follow-up for these patients.
 - Second Priority Group = 1 dose MMR. Follow-up = Call patient and advise them to receive a 2nd dose MMR from their primary healthcare provider as soon as possible (as long as it has been at least 4 weeks since the first MMR (MDH ref?)).
 - Third Priority Group = 2 doses MMR. Follow-up = Call if resources allow, otherwise send letter. Purpose is to inform of exposure in the event unimmunized family members were present and exposed.
- For all of the exposed patients:
 - Also provide guidance as appropriate for those who accompanied the patient during their visit to the healthcare facility.
 - Provide information on symptoms of measles, 7-21 incubation period window based on patients exposure date(s), and advise them to call before visiting a healthcare facility so care can be taken to prevent additional exposures.

- If exposed patient is still admitted, conduct follow-up in person. Discuss with admitting providers.

Results:

The 13 confirmed measles cases cared for at our facility resulted in over 600 patients who met the exposure definition. Of the exposed patients, 27% had 0 MMR, 37% had 1 MMR, 33% had 2 MMR. IMIG was administered to 38 exposed individuals (15% of the 0MMR). Many of the IMIG eligible patients were outside of the 6 day window by the time the case was confirmed. Two of the exposed patients developed measles.

Over 120 staff hours from within the infection prevention and control department were required to respond to the 85 exposed patients associated with our most recent case. Many additional staff hours were spent on IMIG administration.

Lessons Learned:

- Need to be able to identify patient movement through Emergency Department (ED) and clinic. For example, time in waiting room, what room(s) patient was in, and time in room(s).
- Work with IT to create reports. For example, provide IT list of exposed patients in excel and they populate with demographics (language, address, phone, etc).
- Need to collaborate with MDH on interpreting results and determining response for patients with discrepant results (e.g. Serology positive but PCR negative) and results for patients with recent MMR immunization.
- Track follow-up communication in the electronic medical record.
- Verify MMR history for patients with 0 MMR in MIIC before recommending IMIG.
- Exposed patients with 0 MMR and unknown MMR status need to be top priority.
- Access to interpreters for phone calls and translation of letters is important.

Conclusions:

- With increasing international travel and declining immunization rates, measles is not a disease of the past.
- Clinicians need to have ongoing heightened awareness for measles and infection prevention and control departments need to be prepared to respond to confirmed cases.
- Exposure response is time sensitive and resource intense, resulting in other priorities taking a back seat.
- Identify your process now for creating patient exposure lists rather than waiting until you have a case and are in the middle of the scrambling!
- **Close collaboration with MDH is extremely important and helpful!**
- Providing timely notification and recommended actions to exposed patients can prevent further transmission.

References:

- 1) Center for Disease Control and Prevention (Sept 2, 2011). *Notes from the Field: Measles Outbreak—Indiana, June-July, 2011*. Morbidity and Mortality Weekly Report, September 2, 2011. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6034a5.htm?s_cid=mm6034a5_w.
- 2) Minnesota Department of Health (Aug 26, 2011). *Measles (Rubeola)*. Retrieved from <http://www.health.state.mn.us/divs/idepc/diseases/measles/index.html>.