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Two Measles Cases in Unvaccinated Children with a Secondary Healthcare Exposure, Orange and Osceola County

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(from the October 2011 Florida Department of Health "Epi Update")*

Introduction

On May 9, 2011 the Orange County Health Department Epidemiology Program was notified by Hospital A of a suspected measles case in an unvaccinated Orange County boy aged four years. Three weeks later, a second measles case was reported to the Osceola County Health Department from Hospital A in an unvaccinated girl aged 15-months.

Background

Measles is a highly communicable acute viral disease that causes a red blotchy rash, cough, conjunctivitis, fever, and Koplik spots. The illness starts with a respiratory prodrome of fever, cough, conjunctivitis, and runny nose. The rash usually appears on the face between day three and day seven after onset, and then spreads generally across the body. It will last approximately four to seven days. Infants and adults generally have more severe disease than children.¹

Measles is transmitted through airborne droplets produced by the cough of an infected person or from contact with nasal or throat secretions directly.¹ The cells in the back of the throat and lungs are where the virus normally grows. The nose and throat harbor the virus in the mucus and the virus can live for up to two hours on contaminated surfaces.² The incubation period for measles is between 7-18 days, with an average of 10 days from exposure to fever onset. The infectious period lasts from onset of respiratory symptoms and fever to four days after the appearance of a rash.¹ Diagnosis of measles in an unvaccinated person is confirmed by the detection of measles-specific IgM antibodies after rash onset, or a four-fold or greater increase in IgG antibodies. If a child is suspected of having measles and has clinical signs of the disease, it is recommended for the child to be isolated at home from onset of symptoms to four days after onset of rash.¹

Because of widespread immunization from a comprehensive measles immunization strategy, measles cases have significantly declined in industrialized nations. In the last year, due to falling immunization coverage in young children, there

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have been increased outbreaks in Europe, with over 15,000 cases in France, the hardest hit country. The U.S. is currently experiencing the highest number of measles cases in 15 years with 196 cases reported from January 1 to September 30, 2011, mostly associated with imported cases from endemic countries.^{3,4} In developing countries, it is estimated that the case-fatality rate for measles is between 3%-5% and is as high as 10%-30% in some areas. A live attenuated vaccine is available, and it is recommended to get a two-dose measles vaccination series at 12-15 months and another dose at four to six years.¹

Case Investigations

On May 4, 2011 case-patient 1 was taken to the pediatrician's office with a three-day history of low grade fever and vomiting. On May 6, the child was admitted to Hospital A with symptoms of rash, fever, cough, runny nose, and coryza. Initial diagnosis was Kawasaki Disease, but upon evaluation by three infectious disease doctors, the patient was clinically diagnosed with measles. IVIG was started and measles serology was drawn. Serology results were positive for measles IgG on May 9. The child was isolated and masked a short time before discharge that same day. Case-patient 1 had not received the MMR vaccine due to a religious exemption. Based on the clinical diagnosis and the child's vaccination status, an epidemiological investigation was initiated.

The activity history for case-patient 1 was obtained and appropriate contact investigation protocols were initiated. The child was likely exposed during a trip to New York, Pennsylvania, and New Jersey; however, no other linked cases were identified in these states. The child's pediatrician was contacted and three susceptible contacts were identified. Self-quarantine was recommended to the contacts. The child's unvaccinated sibling was referred for MMR vaccine and was excluded from school pending test results. The case-patient had attended an event at the school during his infectious period. A letter was sent to the contacts at the school and self-quarantine was recommended for susceptible contacts.

On May 11, the hospital's reference lab reported a measles IgM positive result and on May 13 the Florida Department of Health (FDOH), Bureau of Laboratories (BOL) -Jacksonville confirmed the results indicating the case was strongly IgM positive for measles; additionally, both a throat swab and urine specimens were positive by RT-PCR. A media release on the case was issued on May 13, as well as a physician blast email notification for enhanced rash illness surveillance.

On May 31, the Osceola County Health Department Epidemiology Program received an email from BOL-Jacksonville regarding a positive measles IgM in a 15-month old (case-patient 2) and a negative IgM and positive IgG in his four-week old sibling (likely maternal immunity).

On May 19, case-patient 2 had an onset of fever (102.1 F), cough, runny nose, flu-like symptoms, and conjunctivitis. The child was taken to the emergency room at Hospital B, but went home shortly after. On May 23, the child experienced onset of a rash described as blotchy, flat at first, which became raised two days later. The child was taken to Hospital A on May 26 with generalized rash and fever. Case-patient 2 was unvaccinated against measles due to familial time constraints.

The activity history for case-patient 2 was obtained and appropriate contact investigation protocols were initiated. The family reported no travel history in the 2-3 weeks prior to the patient's onset of symptoms. The family had very limited interaction with other people outside of family members and two friends who were all vaccinated per the case's mother. The mother did report that case-patient 2 had been admitted to Hospital A from May 5 to May 6 due to rotavirus infection.

Further investigation into the potential epidemiologic link between case-patient 2 and case-patient 1 was initiated. Case-patient 1 had been admitted to hospital A from May 6 to May 9 with an initial diagnosis of Kawasaki disease and a final diagnosis of measles.

On June 2, site visits were made to Hospitals A and B by Orange and Osceola CHD Epidemiology staff to understand the facilities' layouts and to discuss the hospitals' infection control measures (both hospitals are in

Orange County). Tours were conducted with infection control staff of the emergency room and pediatric units of Hospital A and the emergency unit of hospital B to ascertain potential exposures during the case-patients' infectious periods. Transport routes for the case patients were reviewed from ER triage area to admit room at Hospital A and information on any procedures or activities conducted outside of case-patient 1's hospital room were reviewed. In addition, hospital contact investigations to date were evaluated.

Per the Hospital A Infection Preventionist (IP), case-patient 1 was admitted to the hospital via the ER, was taken to the triage area that consists of all private rooms and from there was transported via staff elevators to the pediatric floor. The ER triage area has a heating and air-conditioning ventilation system that consists of three filtration units filtering at 40%, 50%, and then 95% in each room prior to recirculation. The IP reported that the case-patients' rooms were two doors away from each other on the pediatric unit. Each room on the pediatric unit had an individual window air conditioning unit. The IP reported that there was a 1.5-hour window between the time case-patient 1 was admitted, and case-patient 2 was discharged. Case-patient 1's activities included an x-ray in the radiology department during which the IP reported that he had no contact with other patients as per protocol, and a visit to the playroom. The patient was masked and placed on isolation precautions shortly before his discharge on May 9. Hospital contact investigation up to the date of the site visit had consisted of follow-up with staff involved in the care of case-patient 1 during his three-day hospitalization for immunization status, and notification of patients in the playroom and the ER during the exposure period.

Case-patient 2 was seen in the ER of Hospital B on May 22. The patient was placed in a curtained triage room where she was evaluated for approximately three hours. No mask was utilized on the patient during this period. On May 26, case-patient 2 was seen in the ER of Hospital A. Measles serology was drawn during this approximately three-hour encounter, but no isolation precautions were utilized.

On June 3, the Orange CHD staff, in consultation with the FDOH Bureau's of Epidemiology and Immunization, developed recommendations for Hospital A and B. Recommendations to Hospital A infection control included notification of all staff and patients on the pediatric unit from May 6-May 9 and all patients and staff in the ER triage area on May 6 and May 26 of their possible exposure to a confirmed case of measles. Recommendations for Hospital B included notification of all patients and staff who were in the waiting room and ER on May 22 of possible exposure to a confirmed case of measles. Exposed hospital employees were notified and vaccination status evaluated by each hospital's Employee Health program. Both hospitals were advised to have patients with possible symptoms contact the Orange CHD Epidemiology Program. In addition, the Infection Control programs for both hospitals were instructed to conduct education for staff about recognition and diagnosis of measles and the notification procedures for such cases.

Osceola and Orange Counties put out a joint press release on the epidemiologically linked cases. In total, 43 patients and 44 employees were identified as having possible exposure at Hospital A, and 14 patients and 38 employees were identified from Hospital B. The hospital protocol for contact with patients included contact (or attempted contact) by telephone and delivery of a certified letter from the hospital. No additional cases associated with either case-patient were identified.

Discussion

Measles is a communicable disease that is now rare in the U.S. due to the availability of vaccine. In the instance of case-patient 1 and case-patient 2, the children were both unvaccinated at the time of exposure. Case-patient 1 had travel history, but the family was not aware of exposure to any people with the appropriate symptoms while traveling. Case-patient 2 had no travel history.

The cases did not appear to have any physical contact with each other, but were housed two doors away from each other on the same hospital floor. It is likely that case-patient 2 was exposed during a 1.5-hour win-

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Thank You For Your Participation!

The Epidemiology Program would like to thank the following healthcare providers for their diligence in timely reporting from Florida's "List of Reportable Diseases/Conditions":

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For more information about Florida's List of Reportable Diseases/Conditions, please contact Gregory Danyluk, PhD at 407-665-3266.

Selected Diseases/Conditions Reported to the Seminole County Health Department	2011 through Week 39	2010 through Week 39	2009 through Week 39	2008-2010 Average through Week 39
AIDS*	28	32	37	33.3
Animal Bite to Humans**	17	13	23	16.0
Animal Rabies	3	4	6	4.7
Campylobacteriosis	28	9	10	8.7
Chlamydia	1107	1019	927	909.7
Cryptosporidiosis	2	3	5	5.0
Cyclosporiasis	1	1	3	1.3
Dengue	0	3	0	1.0
<i>E. coli</i> Shiga toxin-producing	8	3	1	1.3
Giardiasis	11	27	16	22.3
Gonorrhea	167	272	286	271.0
<i>Haemophilus influenzae</i> (invasive)	4	1	2	1.0
Hepatitis A	2	0	5	2.0
Hepatitis B (acute and chronic)	84	48	41	45.3
Hepatitis C (acute and chronic)	251	234	168	204.7
Hepatitis B in Pregnant Women	9	6	4	7.3
HIV*	45	49	56	59.3
Lead poisoning	2	4	2	3.0
Legionellosis	0	2	8	5.3
Lyme Disease	2	1	4	1.7
Meningococcal Disease	0	0	1	0.3
Pertussis	2	1	4	1.7
Salmonellosis	67	76	87	75.7
Shigellosis	10	10	2	7.3
<i>S. pneumoniae</i> – drug resistant	9	13	5	9.7
Syphilis	25	16	34	26.7
Tuberculosis	13	5	5	4.7
Varicella	15	23	17	19.0

* HIV data includes those cases that have converted to AIDS. These HIV cases cannot be added with AIDS cases to get combined totals since the categories are not mutually exclusive. Current AIDS/HIV data are provisional at the county level.

** Animal bite to humans by a potentially rabid animal resulting in a county health department or state health office recommendation for post-exposure prophylaxis (PEP), or a bite by a non-human primate.

Reported cases of diseases/conditions in **Bold** are >10% higher than the previous three year average for the same time period.

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dow period in which he was being discharged, and case-patient 1 was admitted. No other measles cases were reported in Orange or Osceola Counties during this period.

Case-patient 1 was not hospitalized in a negative pressure room, which is required to prevent the airborne spread of the measles virus.⁵ In addition, neither case-patient was placed in a negative pressure room when they presented to the hospital ERs while infectious with measles. Although the room doors for the ER triage area in Hospital A remained closed due to protocol and the rooms had a multi-level filtration system in use, contaminated air could still escape out underneath the door or when staff entered or exited the room. Hospital B's ER area consisted of curtained-off rooms, which would have done little to prevent the airborne spread of the virus. In hospital A's initial contact investigation, case-patient 2 was not identified as exposed to case-patient 1.

It is important that hospital staff be educated on proper protocol to follow when infectious or potentially infectious patients enter the hospital. When measles is diagnosed, public health officials should be notified so that additional follow-up can be made. Identification of household contacts and other close contacts should be explored and monitored. To prevent the occurrence of measles, it is recommended that every child be vaccinated at the recommended ages. Public health professionals should also carry out effective surveillance for measles to ensure quick response to all cases.

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