

Outbreak of Foreign Workers Contracted with Rubella in the Miaoli and Taoyuan District, 2007

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From Chinese version, pp,459-468

Abstract

Foreign workers infected with Rubella in Toufen Township of Miaoli County and Guanyin Township of Taoyuan County were reported on the 4th and 6th of June, 2007. After further investigation of the cases, other suspected cases were discovered among the workers living in the dormitories. In order to determine the scale of the epidemic and trace the origin, the medical records of the foreign workers were examined according to their symptoms of Rubella. The cases involved in the two outbreaks were all foreign workers with a total of 46 people diagnosed with Rubella. In consideration of their labor history and the living environment, the Centers of Disease Control administered a wide scale MMR vaccine. A total of 1,662 shots were administered to all foreign workers involved in the two outbreaks. After the preventive measures were administered, no further suspected Rubella cases were reported in Miaoli and Taoyuan counties on July 2 and 14, showing control of the epidemic. In addition, this outbreak of Rubella infections has lead to the prevention of diseases from overseas and

Received: Jan 20, 2008; Accepted: Mar 12, 2008 .

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increasing the validity of the diagnosis report time to become the main points in preventative measures.

Keywords: Rubella, foreign workers, outbreak, MMR vaccine

Introduction

In 1986, Taiwan's government administered a Rubella vaccine to all junior female students (the generation born between September, 1971 and August 1976) in junior-high schools. In 1987, women who reached the age of procreation were encouraged to receive the vaccine on a voluntary basis. In accordance with the Eradication Plan of Rubella, measles, polio, and Tetanus in 1991, all infants receive the MMR (Measles, Mumps, & Rubella) vaccine upon reaching 15 months of age starting in 1992. Furthermore, first-graders are required to receive the second shot of MMR vaccine as from 2001. In addition, foreign persons are required to attach a positive Rubella antibody report with the other required documents when applying for stay or resident in Taiwan in order to insure the management for preventive measures and health care for foreign or Mainland China spouses. If foreign or mainland China spouses are unable to supply a report of positive Rubella antibody or certificate indicating the receiving of the vaccine, health centers can provide free MMR vaccine shots. With the high rate of MMR vaccinated persons, the occurrence of the Rubella has significantly decreased. Apart from years 2000 and 2001 of which the cases of Rubella that occurred exceeded 10 cases, the rest of the years all displayed an average of below 10 cases per year since 1994. In cases of congenital Rubella, apart from the 13 and 11 cases that appeared in 1992 and 1993 and the 3 and 1 cases that appeared in 2001 and 2007, no other confirmed cases occurred in the past 10 years.

During the period between June and July of 2007, clusters of suspected cases of foreign workers contracted with Rubella occurred in both Miaoli and Taoyuan counties. Since the large number of cases exceeded the expected case number, the clusters of suspected cases had become epidemiologically relevant. The Second Branch of Taiwan Centers for Disease Control (CDC) conducted epidemiological investigations at the foreign worker dormitories in Miaoli and Taoyuan counties on July 1 and 3, 2007. The investigation purposes were to estimate scale of the epidemic, determine the source of the infection, and assess the effects of the corresponding preventive measures.

Background

The background information regarding the two clusters of foreign workers infected with Rubella occurred in the Toufen Township of Miaoli County and Guanyin Township of Taoyuan County and the worker dormitories are described in the following sections.

Miaoli County

The foreign worker dormitory in Miaoli County is located in Toufen Township and is a 7-story building that can accommodate 960 foreign workers. It is currently occupied by 729 foreign workers. The first and second floors were originally the women's dormitory. However the women were relocated into another building as of June this year. Therefore, the original building became the men's dormitory. Approximately 11 to 13 bedrooms are on each of the 7 floors. Each room is equipped with 6 bunk beds; thus a room can accommodate 12 persons. The rooms are not air conditioned and although all rooms have windows, space is still compressed. Air ventilation is poor with a low quality of environment sanitation. After investigation of the women's dormitory, none of

the female foreign workers showed suspected symptoms. All of the foreign workers are employed at a paper factory. The work place includes 3 factories with good air ventilation. Due to the fact that the factory produces paper products, all employees are required to wear masks during work hours in prevention of inhaling flock.

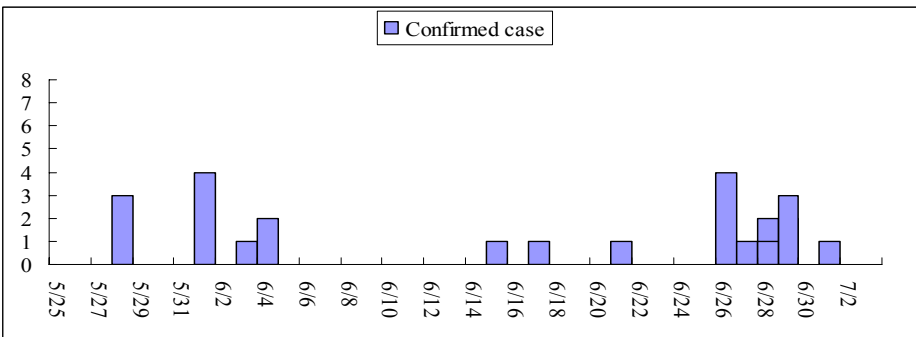
Taoyuan County

The foreign worker dormitories in Taoyuan county include three metal-sheeted two-story buildings: A, B, and C. The dormitories can accommodate 549 persons with currently 486 occupying the dorm. The dormitories do not have separate rooms with only buck beds as a means of separating personal space. Each person has approximately 0.97 ping of personal space. The living environment is cramped and dirty. There are only small windows and a few ventilation ducts, showing poor ventilation. Building A is the dormitory for Thai workers with 60 persons living on the first floor and 55 on the second; thus a total of 115 persons. Building B is a dormitory for both Thai and Vietnamese workers. The first floor accommodates the Vietnamese workers of 94 persons. The second floor accommodates 78 Thai workers; thus a total of 172 persons in building B. Building C is the dormitory for Vietnamese workers with 68 persons living on the first floor and 131 on the second; thus a total of 199 persons. The foreign worker dormitories are supervised by the agency company and all the workers are employed at an electrical factory. The worker's meals are provided by the agency company and are usually prepared by Thai or Vietnamese personnel. Breakfast is usually taken in the dormitories whereas lunch and dinner are sent to the workplace.

Scale of the Epidemic

Miaoli County

After receiving a report of a Thai worker contracted with Rubella on June 4, 2007, the Miaoli County Health Bureau started an epidemic investigation. The investigation drew back to May 28 and continued to August 13 (regarding the latent period, the date was 2 times the normal latent period with 6 weeks after the last documented case). A total of 39 persons showed suspected symptoms and among of which, 23 were confirmed cases of Rubella with an infection rate of 3.2% (23/729). The epidemic curve of the Rubella cases of the foreign workers in Miaoli is shown in Figure 1. The symptoms consist mainly of rash with a 100.0% occurrence rate (n=23). Following are fever 47.8% (n=11) and mumps 13.0% (n=3). None of the cases showed symptoms of conjunctivitis. The confirmed cases were all consisted of males with 21 Vietnamese workers (91.3%) and 2 Thai workers (8.7%). The age span was from 18 to 40 with a median of 22 years of age.

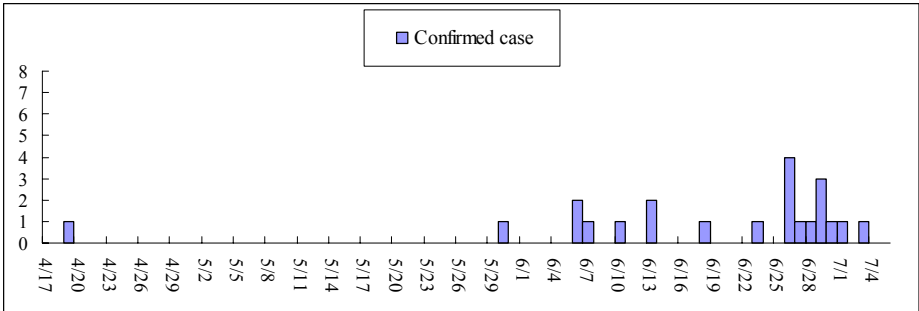


* Confirmed cases before June 22 are retrieved cases and the disease onset dates are replaced with the dates the cases received medical care.

Figure 1. Distribution of onset dates of foreign Rubella cases in Miaoli County

Taoyuan County

After receiving a report of a Vietnamese worker contracted with Rubella on June 25, 2007, the Taoyuan County Health Bureau started an epidemic investigation. The investigation drew back to April 19 and continued to August 24. A total of 44 suspected cases were found with a total of 23 confirmed cases of Rubella. The attack rate is 4.7% (23/486). The epidemic curve of the Rubella cases in foreign workers in Taoyuan is shown in Figure 2. The symptoms consist mainly of rash with a 100.0% occurrence rate (n=23). Following are fever 78.3% (n=18) and mumps 17.3% (n=4). Only one case (4.3%) showed symptoms of conjunctivitis (n=1). The confirmed cases were all consisted of males Vietnamese workers. The age span was from 20 to 33 with a median of 25 years of age.



* Confirmed cases before June 25 are retrieved cases and the disease onset dates are replaced with the dates the cases received medical care.

Figure 2. Distribution of onset dates of foreign Rubella cases in Taoyuan County

The demographic information for the cases of Rubella among foreign workers in Miaoli and Taoyuan counties can be seen in Table 1.

Table 1. Demographic information of confirmed foreign Rubella cases in Miaoli and Taoyuan County

	Miaoli County	Taoyuan County	Total
Number of persons			
Number of foreign workers	729	486	1,215
Suspect number of infected persons	39	44	83
Confirmed number of infected persons	23	23	46
Ages			
15-19	4	1	5
20-39	18	22	40
≥ 40	1	0	1
Nationality			
Vietnamese	21	23	44
Thai	2	0	2
Gender			
Male	23	23	46
Female	0	0	0
Symptoms			
Rash	23	23	46
Fever	11	18	29
Mumps	3	4	7
Conjunctivitis	0	1	1

Investigation Subjects

Two outbreaks of Rubella in foreign workers were reported in Miaoli and Taoyuan counties. After the initial reports on June 4 and 25, other suspicious cases appeared. In order to determine the source of infection, the cases were identified according to the typical Rubella symptoms: (1) rash, (2) a fever $\geq 37.2^{\circ}\text{C}$, and (3) joint pains, acute mumps or conjunctivitis. Therefore, in this investigation, we drew back on the medical records of the foreign workers till four months prior. If any of the medical records showed symptoms of rash, fever, mumps, or conjunctivitis, they are to be categorized into suspected cases. In addition, after the initial reports, the symptoms of the other foreign workers were monitored. Each worker was required to take his/her temperature each morning before work and be inspected for any rash occurrence on the skin surface. If any of the symptoms listed above appears, the case is listed as a suspected case.

This investigation includes a total of 729 Thai and Vietnamese workers in Miaoli County. This includes 608 male subjects and 121 female subjects. In Taoyuan County, a total of 486 foreign workers were involved with 193 Thai workers and 293 Vietnamese workers. The total of investigated subjects in the two counties was 1,215 persons.

Sample collecting and test results

Miaoli County

A total of 39 serum samples and 22 nasal swabs were taken from the cases between June 4 and July 16 in Miaoli County. Tests were conducted for Rubella. The test for the serum resulted in 27 persons IgM (+). This has eliminated the cases of which the antibody was produced by the MMR vaccine. Confirmed cases totaled to 23 persons. All nasal swabs results showed negative.

Taoyuan County

A total of 68 serum samples and 45 nasal swabs were taken from the cases between June 25 and July 30 in Taoyuan County. The test for the serum resulted in 27 persons IgM (+). This has eliminated the cases of which the antibody was produced by the MMR vaccine. Confirmed cases totaled to 23 persons. Only one of the nasal samples resulted positive.

The Rubella virus has been identified as the source of infection in the two outbreaks of foreign workers infected with Rubella. A total of 46 confirmed cases were found in the two counties.

Speculated transmission path

According to the information drawn out from past medical records, the earliest case A in the Taoyuan incident arrived in Taiwan on April 19 from Vietnam. When checking through the checkpoint in Taoyuan airport, his serum

was collected due to fever symptoms. After contact with the Center of Research and Diagnostics of Taiwan CDC, results for the serum collected on April 19 showed IgG (-) and IgM (-). However the results from the serum collected on July 3 showed IgG (+) and IgM (+); thus showing the case has been infected for quite some time. According to the report from the case A, there were no symptoms in Vietnam and only after alighting the plane in Taiwan did the fever and rash symptoms start to appear. It is speculated that the case A was in the early stages of Rubella at the time (April 19) when no antibody has been produced. Thus, the results showed IgG (-) and IgM (-). After infection, IgM can last for 3 months; thus the positive results for July 3 IgG (+) and IgM (+). On the other hand, other relative history was traced for any suspected cases. However, none were found. After this case subject arrived in Taiwan, the disease was spread among the living quarters due to the compressed living space and poor ventilation. In addition, Vietnam and Thailand are not countries that administer regular Rubella vaccine [1]. According to the factors mentioned above, it is speculated that the epidemic in Taoyuan was brought on by a carrier from abroad which later resulted in contamination between persons.

With respect to the outbreak in Miaoli, the earliest suspected case draws back to May 15. According to Rubella epidemiology data, the latent period is 14 - 21 days. Therefore, the infection date may be in late April. The investigation shows that the company brought in 135 foreign workers between March 20 and April 27. After a preliminary medical examination at the hospital, they were immediately located into the worker dormitory. All the health report results were adequate. After investigating the possible contact route between the dormitories and the company's factory, no other contacts with the Taoyuan foreign workers were found. In the process of the investigation, due to the large

number of foreign workers, the limits of different languages that needed translation, and the low level of cooperation (due to the fear of being sent back), the investigation difficulty increased. Therefore, it is difficult to determine the transmission path of this epidemic.

No confirmed local cases of Rubella occurred in Miaoli County in 2007 and the MMR completion rate reached 95%. Due to the fact that the infection rate of Rubella with no symptoms is higher, the infected persons may have not been tested as positive for the antibody when entering the country or may have spread among the foreign workers. Although the two cases have not been epidemiologically proved to be directly related on any level, it is highly suspicious that the chance of the disease entering from abroad is high.

Preventive Measures

Since the Eradication Plan of Rubella, measles, polio, and Tetanus in 1991 and the high rate of MMR vaccines administered, cases for Rubella has drastically decreased over the years. After the epidemic broke out, the chances for inter-infection between the foreign workers is increased due to the large number of workers living together and the poor environment. In addition, the medical records are incomplete or unspecified in regards to whether they had received a vaccine or not. In order to prevent the epidemic from spreading and influencing citizens, the Taiwan CDC decided to administer the MMR vaccine to all the other foreign workers that have not been infected. After the Miaoli County Health Bureau arranged with the factory, the MMR vaccine was administered between the July 1 and July 12. Due to the needs in two locations, 264 foreign workers in Taoyuan County received the vaccine. 1,398 workers received the vaccine in Miaoli County which includes 631 foreign workers and

631 local workers. In addition, in order to increase foreign worker's knowledge of Rubella, the local health centers have offered related information for the factories to translate and post on the announcement boards for the foreign workers. At the same time, in order to stop the transmission route, the factories were requested to monitor the health of the foreign workers and arrange for a separate space to accommodate and isolate the suspected cases.

Apart from the measures taken above, the monitoring of women receiving the MMR vaccine has been enhanced in accordance to community preventive measures. In order to elevate the level of monitoring, local medical facilities have been notified of the incident. Other medical facilities and the media have also been notified in order to elevate the awareness of the incident. This can lead to earlier discovery and protection of pregnant women who are prone to infection.

After the preventive measures were taken, no more cases have occurred in the two locations of foreign workers contracting Rubella in Miaoli and Taoyuan as of July 2 and 14. The epidemic has been monitored until August 13 and 24. Results have shown a control of the epidemic.

Although these two Rubella outbreaks have shown the highest number of infected persons since 1994, the infected persons mostly consist of foreign persons and have not spread to the community. This has proved the high vaccine coverage rate of Rubella in Taiwan. Due to the elevated immunity of the community, the epidemic has not spread to the entire community [2]. However, there are two main concerns in this incident. First, the threat of disease entering the country from abroad is still prominent. Apart from the inflicted foreign workers in this incident, the numbers of foreign and mainland Chinese spouses has increased. There are even studies that show mainland

Chinese and Vietnamese pregnant women have become more prone to being contracted with Rubella [3]. In addition, there is also the threat of Taiwanese businessmen who travel back and forth from Taiwan to China that their children may not have received the vaccine as regulated. Secondly, Rubella has a 20% - 50% of mild or no symptoms despite the fact that the monitoring system has enhanced in the past decade; therefore making it difficult to detect [4]. In this incident when drawing on old medical records, we can see that despite the fact that some symptoms have appeared (such as rash), doctors may have overlooked the possibility of Rubella due to the fact that it is now rarely seen [5]. Currently the Eradication Plan of Rubella, measles, polio, and Tetanus in 1991 is now in its fourth stage. Future preventive measures now focus on preventing diseases from entering from abroad and elevating the time needed to report future epidemics.

Acknowledgement

The authors would like to thank the following persons: Kuei-Mao Hsu (Second Branch), Sung-Hwi Wei (Third Branch), Hui-Chen Lin (Vaccine Center), Donald Dah-Shyong Jiang, Hui-Chu Yeh, Chien-Hsin Liu (Field Epidemiology Training Program), Wen-Yueh Cheng (Center for Research and Diagnostics) of Taiwan CDC, and personnel from both Miaoli and Taoyuan County Health Bureau for their assistance in outbreak investigation, specimens collection, and vaccination.

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