

H1N1 Influenza Outbreak of Foreign Students in a Chinese Summer Camp

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On June 6, 2009, Taiwan Centers for Disease Control (Taiwan CDC) received a report from a university personnel using the 1922 phone report system in Taipei City. The report stated that several students from the States, Canada, and Hong Kong who were participating in a Chinese language summer camp program started to show symptoms of respiratory infection and were asking for medical assistance. After receiving the report, the Department of Health of Taipei City Government immediately visited the program's counselors and collected health status information from each student. They also asked that university to provide the medical records of the summer camp students. The data was then analyzed by the First Branch of Taiwan CDC. Eight of the cases' specimens were tested positive for the H1N1 influenza by the Research and Diagnostic Center of Taiwan CDC; thus becoming the first H1N1 influenza outbreak in the country.

This Chinese language summer camp program was established when a university in Taipei City accepted the commission of two different organizations to handle an International Chinese language summer camp.

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The program enrolled Chinese immigrants or foreign students interested in learning Chinese. The students were from different countries and aged between 10 to 18 years. With the two different organizations, the students were separated into the U.S. group and United group. The students were also grouped into different classes (A to G) according to Chinese language ability level. Classes A to F were within the United group whereas class G is the U.S. group. There were totally 80 students and 48 teachers and staff members in this camp.

The program for the U.S. group started from June 22 and continued until July 31, 2009 (six weeks) with a total of 16 students, 3 teachers, and 2 family members of the teachers. All of the activities were group activities. 20 of the members were from Alabama State. They met up with another teacher at the Los Angeles airport and arrived in Taiwan on June 20. They toured Seimon on the 21st and started class on the 22nd of June. All of the members were arranged to stay in a Taipei City hotel.

The United group program activities started from June 22 and ended on July 17 with 64 (62 of foreign nationalities and 2 Taiwanese) students. The foreign students arrived at different times in Taiwan separately and were arranged in two groups for accommodation at the school dormitory (24 members) and with friends or family (40 members). Those that stayed at the school's dormitory were first accommodated at a Taipei City hotel (the same one as those in the U.S. group) from June 19 to June 23. These members moved into the dormitory on the 24th of June. Due to the outbreak, they were later accommodated again into the hotel on June 28.

In the Chinese language summer camp program, the students took classes from Monday to Thursday. They visited the Yingge Ceramics

Museum, participated in pottery classes, and visited the old streets and Temple of San-sia on Friday. The two groups of students had separate classes but were interacting after class.

Specimens were collected from the students showing symptoms and sent to the Research and Diagnostic Center of Taiwan CDC for real-time RT-PCR testing. If the results of the test were RT-PCR positive for type A influenza but were unable to be categorized or were tested RT-PCR negative for human H1 or H3, they were tested swine H1 again using real-time PCR. The testing for the H1N1 influenza is conducted according to the WHO standard operation using the virus's specific primer, probe, and reaction solution.

For this investigation, the case was defined as having any one of the following influenza-like symptoms: fever, coughing, tiredness, and sore throat. And the confirmed case is defined as tested positive for H1N1.

The Chinese language summer camp included 128 members (students, teachers and counselors). Until July 13, a total of 39 members showed symptoms, with an attack rate of 30.5% (39/128). Their main symptoms included: fever 17.9% (23/128), coughing 10.9% (14/128), and sore throats 11.7% (15/128). The number of the camp members (students, teachers, the family members and counselors), cases, and confirmed cases can be seen in Table 1.



Table 1. Number of people, cases and confirmed cases in Chinese language summer camp

Group	Class	No. of people	No. of cases	No. of confirmed cases
United	A	7	3	
	B	12	3	1
	C	10	3	1
	D	8	4	2
	E	13	3	2
	F	14	2	1
U.S.	G	16	14	
	Teachers	26	3	
	Teachers' family members	2	1	
	Counselors	18	3	
	Dormitory Warden	1		
	Coordinator	1		1
	Total	128	39	8

Thirty-nine suspected cases sought medical assistance through clinics, hospitals and school infirmary ward, took medicine by self, or did not seek any medical assistance. During June 25 and 28, 22 cases sought medical assistance at one branch of the Taipei City Hospital. The branch sent 8 specimens to the Center for Research and Diagnostics of CDC for real-time PCR swine H1 test. The results of the test showed that all of the 8 specimens were positive for H1N1. Therefore, we can confirm that the main pathogen of this outbreak is the H1N1 virus.

It is known by now that the H1N1 influenza is transmitted through airborne droplets and contact. Normally, the disease is contagious starting the day before symptoms begin to appear until seven days after. However, for those cases with a long duration of symptoms, it is still possible that he/she is contagious during that time. After investigation, it was found that

one of the students from the U.S. group had symptoms of coughing and headaches one week (June 13) prior entering Taiwan, who may be the index case. , The members of the U.S. group, entering Taiwan on June 20 and starting activities on June 22, started to show symptoms of the disease until June 25. A total 14 out of 17 persons were infected with an attack rate of 82.4% (14/17). After June 25, students in the United group also started to show symptoms. Numbers of cases by the date of onset was drawn out (Figure 1). This figure shows that the transmission route was through person-person contact with the peak on the 25th of June.

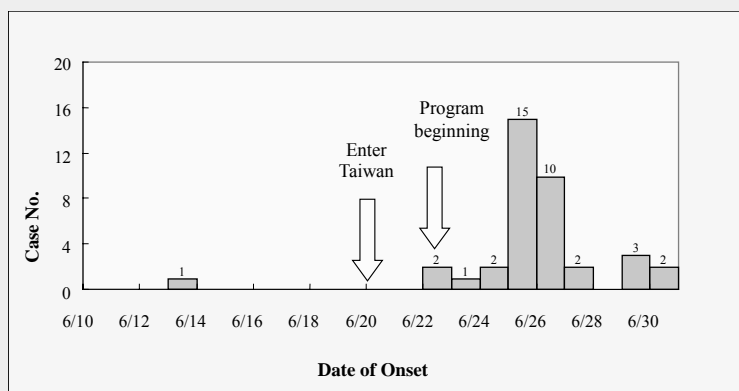


Figure 1. Distribution of onset date of respiratory infection cases in Chinese language summer camp

It is speculated that there are three possible transmission routes: first, different students were infected within home country and started to show symptoms after entering Taiwan; secondly, one of the students was infected abroad and then came to Taiwan and infected other students; thirdly, there is an unidentified case in Taiwan who has infected the summer camp students. The index case showed suspected symptoms one



week prior entering Taiwan. After the activities started, students from the U.S. group started to show symptoms. Although the U.S. group and United group took their classes separately, the students mingled after classes. Therefore, it is speculated that the first wave of cases were imported possibly from the U.S. Afterwards, the infection spread through contact between the students. No suspected cases showed during the time between June 13 and June 21. This may be due to the fact that symptoms were not obvious enough, the students did not know they were infected, or that they did not remember.

The two organizations expressed that the students' body temperatures were taken each day after the activities started. Any one with suspected symptoms were assisted to seek medical assistance and prohibited from attending classes. In order to prevent the spread of the outbreak, health officials arranged for a meeting with the organizations on July 1. The meeting came to the consensus for the following preventive measures: 1) any new cases will be prohibited to class for 3 days; if the symptoms persist on the fourth day, the students will be allowed back to class wearing facemask. Those who had showed symptoms over three days were also allowed back to class wearing facemask; 2) if the visited friends and family members of the students showed no symptoms, the students could remain in class. However, if they showed symptoms, they would be reported and some measures like health education would be taken; and 3) the organizers of the program will continue to monitor the health status of the students and enhance personal hygiene habits such as washing hands and other preventive measures. After conducting the preventive measures, no new suspected cases appeared after July 6. Health officials continued

monitoring until July 20. The United group classes ended on the 17th of July, whereas the U.S. group ends on July 31. All of the members left Taiwan on August 2nd.

Acknowledgements

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