

# ***Epidemiology Bulletin***

*REPUBLIC OF CHINA*

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## **Outbreak of Gastroenteritis in Tong Ho Junior High School, Yun Lin County**

On September 18, 1989, an outbreak of gastroenteritis occurred in students of Tong Ho Junior High School who had had box lunches at school. The school had 825 students. While few students took care of their own meal, majority of the students had box lunches at school. The box lunches were supplied by two companies, company A and company B. Among one hundred and seventeen students who had box lunches supplied by company A, no one was sick. Among six hundred and twenty students who had box lunches supplied by company B, one hundred and twenty students (19.4%) became ill three to four hours after the lunch. Abdominal pain, vomiting and headache were main symptoms. Most of the sick students recovered within one day after supportive treatment in the emergency room of Yun-Lin County Hospital.

Questionnaires were sent to all students who had taken the box lunches supplied by company B, and 577 (93%) were returned. A case of gastroenteritis was defined as a student who had two or more of the following symptoms: abdominal pain, vomiting, headache (dizziness), diarrhea and fever. Two hundred and twenty-eight (40%) of 577 students met this case definition. Symptoms included abdominal pain (80.7%), vomiting (59.6%), headache or dizziness (50%), diarrhea (33%) and fever (19%). The symptoms occurred about one hour after taking box lunch (fig 1) and lasted for about one day. The median incubation period was 5 hours. Box lunches from company B contained 7 different dishes. To identify the vehicle(s) in this outbreak, food exposure histories were analyzed. Only fish cake was significantly associated with illness ( $P < 0.05$ ,  $CI = 1.17-1.59$ ) (table 1). *Staphylococcus* (enterotoxin type A) was identified from the vomitus and foods. Because the boss of the company B just took over the business from other, and had no conception of food hygiene, the foodborne outbreak happened in less than one month after he took over the business. The fish cake, the suspected food, was bought from Chia Yi vegetable market at 9 A.M. on September 18, and was put into the lunch box without any reheating. As the manufacture of fish cake could not be traced, there was no way to understand whether the fish cake was contaminated during manufacturing or in the company preparing the box lunches.

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**Editorial note:**

Two peaks can be demonstrated from the epidemic curve of onset time (figure 1), 4 to 5 hours and 20 hours after onset respectively. According to the medical record of Taiwan Provincial Yun Lin County Hospital, there were 12 cases who had an incubation period of more than 20 hours. More than 20 cases experienced 2 attacks, the 1st, 4-5 hours and later 15-21 hours after having lunch. According to the literature review (1), *Bacillus cereus* may cause two different kinds of incubation period, one is 1-6 hours (nausea, vomiting) the other is 8 - 16 hours (abdominal cramps and diarrhea). This outbreak may be caused by *Staphylococcus aureus* and *Bacillus cereus*. Further study is required to substantiate this point.

Including this investigation, there are three food poisonings caused by *Staphylococcus aureus* which contaminated the fish cake in recent 3 years (2,3). The fish cake is easily contaminated by *Staphylococcus aureus* when the food is handled, slicing and mixing can spread microorganisms easily. The bacterial culture of the specimens from hands and nares of the cooks were not conducted. Besides, the investigation failed to detect the temperature of the box lunches and it was probably much less than 60°C the minimal temperature required to inhibit the growth of microorganisms. Keeping the fish cake at room temperature for 4 hours would provide ample opportunity for a small inoculum of *Staphylococcus aureus* to multiply and produce enterotoxin. This outbreak illustrated the food handlers not only stored foods at improper temperature (>4°C or <60°C) but also bought a lot of foods (fish cake, ham, sausage) of unknown origin to lower the cost. They kept foods at room temperature overnight without any covering and warmed them up the next day. Intensive food sanitation education is badly needed to prevent foodborne outbreak in our country.

**Reference:**

1. Hughes James M. Food poisoning. In: Mandell GL, Douglas RG, Bennett JE, eds. Principles and Practices of Infectious Disease. 2nd ed. New York, John Wiley & Sons, 1979: 681.
2. Department of Health, Outbreak of Staphylococcal Food poisoning in a Tour Group-Hualien and Ilan counties. Epidemiol Bull (R O C) 1986, 2: 69-71.
3. Department of Health, Outbreak of staphylococcal Food poisoning in a school-Tainan county. Epidemiol Bull (R O C) 1987, 3: 13-15.

**Table 1. Food-specific attack rates for 288 Tong Ho Junior High School Students Who ate box lunches On September 18, 1989, Yun Lin County.**

Food items	eat		not eat		Chi-square	P	95% CI
	Ill	Well	Ill	Well			
Beam curd	173	270	55	74	0.40	0.53	0.80 ~ 1.11
Salt Vegetable	187	287	41	57	0.11	0.74	0.80 ~ 1.15
Fish Cake	217	302	11	42	8.04	0.0045*	1.17 ~ 1.59
Fish	152	222	76	122	0.19	0.66	0.90 ~ 1.19
Vegetable	179	285	49	59	1.41	0.23	0.74 ~ 1.07
Ham	151	247	77	97	1.76	0.18	0.77 ~ 1.05
Pork	206	305	22	39	0.25	0.62	0.88 ~ 1.31

$\alpha = 0.05$

**Figure 1. Cases of gastroenteritis among Tong Ho junior high school by time of onset, Yun Lin County, September 18, 1 (N = 228)**

