

should be held below 10°C during a maximum transport time of 6 hours³. When local conditions necessitate delays in delivery of longer than 6 hours, samples should be examined in the field. Factories should be encouraged to connect to municipal water supplies, and wells, if present, should be constructed according to the Drinking Water Control Code which specifies that wells must be located at least 15 meters from a septic tank⁴.

We conclude that the system for protecting the health of workers in factories should be improved. County health bureaus are urged to play an active role in the detection and prevention of health problems in the work place, and should coordinate their efforts with the Factory and Mine Bureau of the Labor Ministry.

References

1. Ministry of Interior Labor Health and Safety Law, Chapter 13, Section 6, paragraph 372
2. Ministry of Economics. Factory Survey Report, 1984:38.
3. American Public Health Association, American Water Works Association, and Water Pollution Control Federation. *Standard methods for the examination of water and waste water*, 15th ed Washington D C : American Public Health Association, 1980:907
4. Department of Health, Executive Yuan. Drinking Water Control Code, Chapter 2, Paragraph 6.

Outbreak of Gastroenteritis Due to *Vibrio parahemolyticus* – Ta Liao Village, Kaohsiung County

In October 1985, an outbreak of gastroenteritis occurred among wedding banquet attendees in Ta Liao Village in Kaohsiung County. The banquet was served from 7-9 PM on October 12, and many attendees became ill within 12-24 hours. Although approximately 600 persons attended the banquet, many came from other towns and cities, and a complete guest list was unavailable. A door-to-door search in Ta Liao Village identified a total of 140 persons who either attended the banquet or ate leftover food. Of these, 99 (71%) were ill. Symptoms included diarrhea (92%), abdominal pain (62%), nausea or vomiting (32%), and fever (17%). The median incubation period was 14 hours and the median duration of illness was 1-2 days. Thirty-seven (37%) cases sought medical attention, 7 (7%) required hospitalization. Stool specimens were obtained from 21 ill persons; 9 were positive for *Vibrio parahemolyticus*, K-8 serotype

Of the 22 dishes served at the banquet, 6 contained seafood. Only one dish was significantly associated with illness: abalone with bamboo shoots (67 of 99 ill compared to 15 of 41 well persons ate this dish; $p < 0.002$, chi-square). Canned abalone was purchased from a local supplier, placed in a plastic bag, and stored in a freezer overnight. On the day of the banquet, the abalone was partially thawed in a metal container used for other foods including raw seafoods. About one hour before the banquet, partially thawed abalone was sliced on a cutting board also used for preparing raw seafoods. Fresh bamboo

shoots were purchased from a local market the morning of the banquet, shelled and boiled for about one hour. After boiling, the warm bamboo shoots were also placed in a metal container used for other foods including raw seafoods, and allowed to cool at room temperature for several hours. About half an hour before the banquet, bamboo and abalone were placed together on a dish and served.

Although leftover food from the banquet was obtained by the village health station for testing, individual foods were not labeled, were not placed in separate containers, and were not adequately refrigerated en route to the laboratory. Of the six bags of food specimens tested, one was positive for *V. parahemolyticus* (serotype not tested by Bureau of Food and Drug Laboratory).

Reported by Food Sanitation and Disease Control Sections, Kaohsiung County Health Bureau; Tainan Branch Laboratory, National Institute of Preventive Medicine; Bureau of Food and Drug Laboratory and Bureau of Disease Control, Department of Health, Executive Yuan.

Editorial note: *V. parahemolyticus* is a common cause of gastroenteritis in Taiwan: in 1984, 14 (33%) of 42 food specimens from outbreaks tested by the Bureau of Food and Drug Laboratory were positive for this organism. *V. parahemolyticus* can be found in coastal waters throughout the world, and this organism accounts for about half of all foodborne outbreaks in Japan¹. During winter months, the organism survives in the sediment of coastal waters, and in spring and summer, shellfish and crustaceans become colonized. Ingestion of raw or undercooked seafood can result in illness. Other foods can also become vehicles of infection if they are cross-contaminated by raw seafood during preparation. In the outbreak in Ta Liao Village, the warm bamboo shoots were probably cross-contaminated by raw seafood after they were cooked. Holding the bamboo at a warm temperature for several hours probably allowed the organism to multiply to a high concentration; the number of *V. parahemolyticus* organisms can double in 10-12 minutes under suitable growth conditions². Unfortunately, food specimens from the banquet were not individually collected and labeled before being transported to the laboratory, so the vehicle in this outbreak cannot be known with certainty.

From this investigation, the following recommendations were made:

1. Care should be taken when preparing seafoods to avoid cross-contaminating other foods. Hands, cutting boards, knives, and utensils should all be washed thoroughly after contact with raw seafood.
2. Cooked foods should either be held at a high enough temperature (>60°C), or they should be rapidly cooled (<4°C) to inhibit the growth of microorganisms.
3. Local health authorities should be trained to collect and transport food specimens to the laboratory properly. Food items should be collected in separate containers, labeled, and transported to the Bureau of Food and Drug Laboratory with a sufficient quantity of ice to inhibit further growth of microorganisms. The Department of Health, Bureau of Disease Control (02-396-2847) or the Bureau of Food Sanitation (02-396-5625) should be notified immediately in addition to the Provincial Health Department (049-33-2323) when any outbreak occurs.

References

1. Roderick GE, Hood MA, Blake NJ. Human vibrio gastroenteritis. *Med Clin North Am* 1982;66:665-73
2. Joseph SW, Colwell RR, Kaper JB. *Vibrio parahemolyticus* and related halophilic vibrios. *CRC Crit Rev Microbiol* 1982;10:77-124.