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# Angle

## Foodborne illness in Taiwan, 1981-1989

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During 1981 to 1989, 622 outbreaks of foodborne illness (15,627 cases) were reported in Taiwan, with more outbreaks in summer than other times of the year. Outbreaks were mainly caused by mishandling of food in the home and in the food service industry. Seafood products were the major sources; only a few outbreaks were attributed to dairy products. Pathogens accounted for 80% of the confirmed incidents. Chemical agents and natural toxins appeared to be minor causes. The most frequently identified bacterial isolate was *Vibrio parahaemolyticus*, followed by *Staphylococcus aureus* and enteropathogenic *E. coli*.

Taiwan, one of the most densely populated places in the world, is a subtropical island (36,000 square km), high in humidity (85 to 100% in summer) and hot in temperature (average 30°C from June to October). Therefore people on the island are likely to be subjected to a high risk of potentially hazardous food. This report overviews foodborne illness in Taiwan for the nine years from 1981 to 1989. The information is evaluated and discussed in association with the local customs and eating styles.

### Source of data

The Bureau of Food Sanitation in the Department of Health was established in July 1981. Statistical data on foodborne illness in Taiwan are published annually by the Bureau. The incidents reported from hospitals, private physicians and general consumers were investigated by local health agencies, according to the definitions of outbreaks by the Centers for Disease Control, USA. The collected food samples were analysed for the causative agents in the National Laboratories of Foods and Drugs. The laboratory examinations for pathogens were conducted in relation to the symptoms and latent period of illness and the variety of food.

The results were submitted to the Bureau of Food Sanitation. The data were then classified according to the year, month, location, transmission vehicle and causative agent for the purpose of this paper.

### Number of Outbreaks, Cases and Deaths

A total of 622 outbreaks of foodborne illness were cumulatively reported to the Department during 1981 to 1989 (Figure 1). There were 15,627 cases and 39 deaths in these outbreaks. The average cases per outbreak was 25 which indicated that only large outbreaks and serious incidents involving hospitalisation or death were reported.

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The number of outbreaks and cases, analysed by month, showed that foodborne illness was much more frequent during warmer months (June to October) than any other period (Figure 2). This frequency of illness was mainly due to school holidays and the Chinese Spirit Festival (the 7th lunar month). However, there were significant decreases in the month of August, both in outbreaks and cases, no doubt because wedding ceremonies and feasts are not held in that month.

### Locations of mishandling of food

Food prepared in private households accounted for the largest number (44%) of reported outbreaks of foodborne illness in Taiwan (Table 1). In comparison, schools contributed 31%. Over 90% of the outbreaks occurred where food was prepared in the home, in restaurants, cafeterias, schools and offices. Therefore, in educational

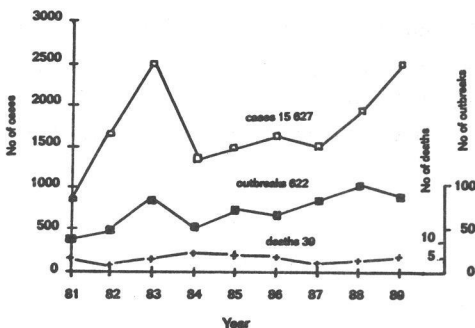


Figure 1. Foodborne illness in Taiwan, 1981-1989

efforts, correct heating and storage procedures need to be emphasised in order to reduce foodborne illness. The major number of deaths (32 in 39) occurred in the home and were related to lack of awareness of hazardous food.

**Foods involved in illnesses**

Outbreaks and cases of foodborne illness were categorised according to the food involved (Table 2). It was not possible to link many of the outbreaks (68%) and cases (54%) with a specific food variety. However, seafood products were the main identified vehicles of transmission, followed by prepared mixed dishes and meat and meat products. In terms of number of cases, prepared mixed dishes posed the highest risk of illness. The Chinese style lunch box, prepared in advance of serving, was classified into this mixed dishes category. Milk and dairy products were very minor causes of outbreaks compared with Western countries because of the different eating habits of people in Taiwan.

**Causative agents of confirmed incidents**

In over half of the outbreaks (51%) of foodborne diseases in Taiwan it was not possible to identify the causative agents (Table 3). Most confirmed incidents were caused by bacterial agents (88.7% in confirmed outbreaks). Chemical agents and natural toxins contributed to a small portion of incidents and to several confirmed deaths.

The most significant organisms identified in foodborne illness were *Vibrio parahaemolyticus* followed by *Staphylococcus aureus* and enteropathogenic *E. coli*. *Vibrio parahaemolyticus* has a marine origin and is often found in fish and shellfish. Raw fish with green mustard is one of the most favoured dishes in Taiwan and therefore illness caused by *Vibrio parahaemolyticus* is common and expected.

The large number of outbreaks in which no pathogen was identified emphasises the need to improve investigative skills and diagnostic and laboratory procedures. An intensive publicity and public education campaign about foodborne illness will be reinforced in Taiwan.

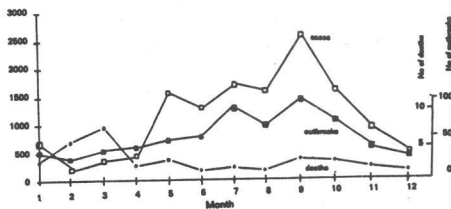


Figure 2. Monthly distribution of foodborne illness in Taiwan, 1983-1989

**Bibliography (in Chinese)**

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**Table 1. Location of mishandling of food implicated in foodborne illness in Taiwan, 1981-1989**

Location	Outbreaks		Cases		Deaths	
	No.	%	No.	%	No.	%
Homes	274	44.0	3172	20.2	32	82.1
Food Service	109	17.5	3293	21.0	0	0
Schools	104	16.7	4892	31.3	0	0
Offices	90	14.5	3100	19.8	1	2.6
Transport vehicles	3	0.9	38	0.2	0	0
Street vendors	5	0.8	109	0.7	0	0
Military camps	11	1.8	313	2.0	0	0
Other	9	1.4	326	2.1	5	12.8
Unknown	17	2.7	394	2.5	1	2.6
Total	622		15637		39	

**Table 2. Food associated with foodborne illness in Taiwan, 1981-1989**

Food	Incidents		Cases	
	No.	%	No.	%
Fish/shellfish	70	11.2	2688	16.2
Meat/meat products	31	5.0	875	5.3
Eggs	6	1.0	162	1.0
Dairy foods	1	0.2	3	0.02
Cereal products	18	3.0	332	2.0
Vegetables & Fruit	17	2.7	309	2.0
Confectionary	14	2.3	205	1.2
Mixed dishes	59	9.5	2849	17.2
Others	11	1.7	283	1.7
Unknown	424	68.2	8859	53.5

**Table 3: Causative agents of foodborne illness in Taiwan, 1981-1989**

Agents	Outbreaks		No. of Deaths	
	No.	%		
Bacterial	268	43.1	3	
V parahaemolyticus	142	22.8		
S aureus	74	11.9		
Enteropathogenic E. coli	38	6.1		
Salmonella	23	3.7		
Bacillus cereus	36	5.8		
Clostridium botulinum (A)	5	0.8		
Other	7	1.1		
Chemical	12	1.9		4
Natural origins	22	3.5		
Unknown	320	51.4		
Total	622			39