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THIRD EPIDEMIOLOGICAL PROBLEM SET

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FOOD POISONING ASSOCIATED WITH FRIED RICE AT TWO CHILD DAY CARE CENTERS

On July 21, 1993, the Lord Fairfax (Virginia) Health District received reports of acute gastrointestinal illness that occurred among children and staff at two jointly owned child day care centers following a catered lunch. This report summarizes the investigation of this outbreak.

The catered lunch was served on July 21 to 82 children aged less than or equal to 6 years and to nine staff; dietary histories were obtained for 80 persons. Staff and all children aged greater than or equal to 4 years were interviewed directly; staff and parents were questioned for children aged less than 4 years.

Of the 80 persons, 67 ate the catered lunch. A case was defined as vomiting by a person who was present at either day care center on July 21. Fourteen (21%) persons who ate the lunch became ill, compared with none of 13 who did not. Symptoms included nausea (71%), abdominal cramps or pain (36%), and diarrhea (14%). Twelve of the 14 cases occurred among children aged 2.5-5 years, and two occurred among staff. The median incubation period was 2 hours (range: 1.5-3.5 hours). Symptoms resolved a median of 4 hours after onset (range: 1.5-22 hours).

Chicken fried rice prepared at a local restaurant was the only food significantly associated with illness; illness occurred in 14 (29%) of 48 persons who ate chicken fried rice, compared with none of 16 who did not (relative risk=undefined; lower confidence limit=1.7); three persons who were not ill were uncertain if they had eaten the rice. "Agent X" was isolated from leftover chicken fried rice ($>10^6$ organisms per gram) and from vomitus from one ill child ($>10^5$ organisms per gram) but not from samples of leftover milk. Other food items (peas and apple rings) were not available for analysis.

The rice had been cooked the night of July 20 and cooled at room temperature before refrigeration. On the morning of the lunch, the rice was pan-fried in oil with pieces of cooked chicken, delivered to the day care centers at approximately 10:30 a.m., held without refrigeration, and served at noon without reheating.

1. What species ("X") was most likely isolated from the food and vomitus?

2. List the specific things the restaurant did that contributed to the problem (do **not** include things they did right).

A DISEASE OUTBREAK ASSOCIATED WITH SEAFOOD

On August 7, an extended Korean family had gathered at Salt Point State Park in Sonoma County, California. They obtained various types of seafood, which they boiled and consumed as a snack between 9 and 11 in the morning. Eleven individuals who had consumed seafood developed symptoms of disease within a few hours, and three had to be hospitalized.

Case #1: A 58-year-old grandmother complained of peripheral numbness in her hands and feet in the early afternoon; she also had a tingling sensation in her lips and was short of breath. By 2:30 in the afternoon she was ataxic and weak and had vomited. A park ranger sent for medevac helicopters to transport the grandmother and cases #2 and #3 to local hospitals. On admission, she was noted to have generalized muscle weakness of all four extremities and facial muscles. She remained lucid and her swallowing ability was unimpaired. By morning August 8, she was fully recovered.

Case #2: A 28-year-old woman, daughter of case #1, began to experience symptoms — tingling of the lips and numbness in her extremities — at approximately 11 a.m. By 1 p.m. she was experiencing difficulty in walking. She was hospitalized and fully recovered by 3 a.m. on August 8.

Case #3: The 4-year-old granddaughter of case #1, was observed to be ataxic in the early afternoon. She was hospitalized; and by 6 a.m. on August 8, she was still ataxic and disoriented. Later that morning she was deemed to be out of danger and was discharged.

Cases #4 through #11: These individuals experienced minor symptoms — circumoral numbness and tingling. All were asymptomatic withing 12 to 24 hours.

1. What is the suspect agent?

2. What is the source?

3. What are the preventive measures?

OUTBREAK OF ENTERITIS ASSOCIATED WITH CROSS-CONTAMINATION OF FOOD — OKLAHOMA, 1996

On August 29, 1996, the Jackson County Health Department (JCHD) in southwestern Oklahoma notified the Oklahoma State Department of Health (OSDH) of a cluster of enteric illnesses that occurred during August 16-20 among persons who had eaten lunch at a local restaurant on August 15. This report summarizes the investigation of these cases and indicates that the infections were most likely acquired from eating lettuce cross-contaminated with raw chicken. This report also emphasizes the need to keep certain foods and cooking utensils separate during food handling.

A case was defined as illness in a person who had eaten lunch at the restaurant on August 15, 1996, and had onset of diarrhea (i.e., three or more loose stools during a 24-hour period) or vomiting during August 16-20. Of 25 persons available for interview who had eaten lunch at the restaurant on August 15, a total of 14 (56%) had had an illness that met the case definition. The median age of patients was 33 years (range: 5-52 years); 10 (71%) were female. All patients reported diarrhea; 13 (93%), fever; 13 (93%), abdominal cramps; 11 (79%), nausea; five (36%), vomiting; and three (21%), visible blood in their stools. The median incubation period was 3 days (range: 1-5 days). Two (14%) patients were hospitalized. Stool specimens were collected from 10 patients; all yielded the same agent. No food items were available for testing.

To identify risk factors for illness, OSDH, in collaboration with JCHD, conducted a case-control study of 14 patients and 11 controls (i.e., persons who had eaten lunch with patients at the implicated restaurant on August 15 but did not become ill). Health department staff visited the restaurant to obtain information about menu items, to observe food preparation, and to inspect the kitchen.

All 14 patients and four (36%) controls reported eating lettuce (odds ratio [OR]=48.3; 95% confidence interval [CI]=2.3-infinity; p less than 0.01). Eleven (79%) patients and three (27%) controls had eaten lasagna (OR=6.7; 95% CI=1.1-42.7; p less than 0.05). Both lettuce and lasagna were statistically associated with illness. Lettuce consumption accounted for all cases, and lasagna consumption accounted for 79% of cases.

Inspection of the restaurant indicated that the countertop surface area was too small to separate raw poultry and other foods adequately during preparation. The cook reported cutting up raw chicken for the dinner meals before preparing salads, lasagna, and sandwiches as luncheon menu items. Lettuce for salads was shredded with a knife, and the cook wore a towel around her waist that she frequently used to dry her hands. Bleach solution at the appropriate temperature (>75°F [>24°C]) and concentration (greater than 50 ppm) was present to sanitize tables
surfaces, but it was uncertain whether the cook had cleaned the countertop after cutting up the

chicken. The lettuce or lasagna was probably contaminated from raw chicken through unwashed or inadequately washed hands, cooking utensils, or the countertop.

1. What was the most likely etiologic agent in this outbreak?

2. Assuming the cutting board was the fomes by which the cross-contamination occurred, can you envision this agent colonizing the work surface? Why or why not?

3. Assuming that the lasagna was thoroughly baked before serving, could the work surface have been a source of contamination?

4. Should the cook have been wearing gloves?

5. Should the investigators have calculated relative risks (RR) rather than odds ratios (OR)?

OUTBREAK OF FOOD POISONING ASSOCIATED WITH PRECOOKED HAM — FLORIDA, 1997

On September 27, 1997, a community hospital in northeastern Florida notified the St. Johns County Health Department about several persons who were treated in the emergency department because of gastrointestinal illnesses suspected of being associated with a common meal. This report summarizes the investigation of the outbreak by the Florida Department of Health; the findings implicated Agent F as the cause of illness among some persons who attended a retirement party on September 26, 1997.

Self-administered questionnaires were distributed to the 125 attendees to document food histories, illnesses, and symptoms. A case was defined as nausea and/or vomiting in a person who attended the party or consumed food served at the party and who became ill within 8 hours after eating. Leftover food was collected and submitted for laboratory analysis. Food preparers were interviewed about the purchase and preparation of food served at the party.

Of the approximately 125 persons who attended the party, 98 completed and returned questionnaires. Of these, 31 persons attended the event but ate nothing, and none of them became ill; they were excluded from further analysis. A total of 18 (19%) persons had illnesses meeting the case definition, including 17 party attendees and one person who ate food brought home from the party. Ill persons reported nausea (94%), vomiting (89%), diarrhea (72%), weakness (67%), sweating (61%), chills (44%), fatigue (39%), myalgia (28%), headache (11%), and fever (11%). Onset of illness occurred at a mean of 3.4 hours after eating (range: 1-7 hours); symptoms lasted a median of 24 hours (range: 2-72 hours). Seven persons sought medical treatment, and two of those were hospitalized overnight. Illness was strongly associated with eating ham (risk ratio = 26.8 {95% confidence interval = 3.8-189.6}). Of the 18 ill persons, 17 (94%) had eaten ham. The ill person who had not attended the party had eaten only leftover ham. None of the other foods served at the party were significantly associated with illness (Table 1).

One sample of leftover cooked ham and one sample of leftover rice pilaf were analyzed by reversed passive latex agglutination to identify Agent F and were positive for Agent F, type A. Samples of stool or vomitus were not obtained from any ill persons, and cultures from nares or skin were not obtained from the food preparers.

On September 25, a food preparer had purchased a 16-pound precooked packaged ham, baked it at home at 400°F (204°C) for 1.5 hours, and transported it to her workplace, a large institutional kitchen, where she sliced the ham while it was hot on a commercial slicer. The food preparer reported having no cuts, sores, or infected wounds on her hands. She reported that she routinely cleaned the slicer in place rather than dismantling it and cleaning it according to recommended procedures and that she did not use an approved sanitizer. All 16 pounds of sliced ham had been placed in a 14-inch by 12-inch by 3-inch plastic container that was covered with

foil and stored in a walk-in cooler for 6 hours, then transported back to the preparer's home and refrigerated overnight. The ham was served cold at the party the next day. The rice pilaf was prepared the day of the party by a different person.

TABLE 1. Attack rates and risk ratios associated with buffet foods, by food type — Florida, September 26, 1997

	Attack rate (%)			
Food	Ate	Did not eat	Risk ratio	(95% CI*)
Ham	65.4	2.4	26.8	(3.8-189.6)
Chicken	30.0	25.5	1.2	(0.5- 2.7)
Turkey	38.9	22.4	1.7	(0.8- 3.8)
Rice pilaf	15.4	29.6	0.5	(0.1- 2.0)
Rolls	47.1	20.0	1.4+	(0.8- 2.3)
Eggs	34.8	22.7	1.5	(0.7- 3.3)
Salad platter	31.3	25.5	1.2	(0.5- 2.9)
Nuts	25.0	27.1	0.9	(0.3- 3.3)
Cake	23.5	28.0	0.8	(0.3- 2.2)
Cookies	11.8	32.0	0.4	(0.1- 1.4)
Punch	18.4	37.9	0.5	(0.2- 1.1)

* Confidence interval.
+ Summary risk ratio after stratifying on ham consumption.

1. What would you have done differently, if you had been the investigator?

2. Should any other vehicle than ham be suspected, on the basis of this evidence?

3. On the evidence provided, was the ham likely to have been contaminated at the time of purchase? With what?

4. At what later stage might the contamination have occurred, so as to lead to this outbreak?

5. What do you suppose was the purpose of warming the ham before slicing it?