



An Outbreak of Gastrointestinal Illness Among Attendees of a High School Prom in Miami-Dade County, May 2005

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Background

On May 16, 2004, the Office of Epidemiology and Disease Control (OEDC) of the Miami-Dade County Health Department (MDCHD) received a report from the Florida Poison Information Center Network (FPIC) in Miami of two cases of possible foodborne illness. These cases were associated with a prom activity held at a local hotel on Saturday May 14. The prom included a dinner and dance that was attended by about 1,000 students, staff, and parents from a large Miami-Dade senior high school. On May 17 and 18, the Department of Business and Professional Regulation (DBPR) and OEDC staff received additional reports of illness related to this event. These reports suggested that the majority of prom attendees experienced illness, the symptoms of which included diarrhea, nausea, and vomiting. The OEDC initiated an investigation immediately.

Methods

Environmental, Epidemiologic, and Laboratory Investigation

On May 18, DBPR and OEDC staff conducted a joint visit to the hotel where the prom activity had occurred. The visit included a kitchen tour as well as a preliminary Hazard Analysis of Critical Control Points (HACCP) inspection. DBPR and OEDC staff met with the hotel management and the Executive Chef to discuss the timeline of the prom activity, food preparation steps associated with the activity, and the menu for the event. No food samples were collected, as all leftover food items had been discarded on the evening of the prom.

That same day, OEDC staff also visited the high school that sponsored the prom to enlist the help of the administration in case finding and interviewing. OEDC then distributed stool collection containers to ill students. On May 19, OEDC, the State Bureau of Laboratories-Miami, and MDCHD School Health staff returned to the school to administer a questionnaire to prom attendees. This questionnaire included information on demographics, illness history and symptoms, and food consumption at the prom. Stool containers were distributed and



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samples collected during this visit. Samples from 33 individuals were submitted to the State Bureau of Laboratories for bacteria, ova and parasites, and enterotoxin testing. Norovirus testing was not conducted, as incubation period and symptom information collected from prom attendees was not consistent with Norovirus infection.

Case Control Study

A case-control study was conducted to determine if gastrointestinal illness was associated with any specific food item consumed at the event. A *probable* case was defined as a person who attended the prom on May 14 and subsequently developed symptoms of diarrhea or vomiting or at least three of the following symptoms; nausea, abdominal cramps, fever, chills, dizziness, headache and weakness.

Controls were persons without any reported illness who attended the prom. Odds ratios were calculated to assess associations between specific food items and illness. Multiple logistic regression was used to adjust for confounding that may have existed among food items. Epi Info 2000 was used for statistical analyses.

Results

Environmental Results

The preliminary HACCP inspection conducted by DBPR did identify critical points at which the food preparation was to be monitored closely. However, no evidence of sanitary violations was found at these points. Interviews with kitchen staff by the hotel management later revealed that the chicken for the event had been left out at room temperature by mistake for about 48 hours prior to cooking. An additional visit to the facility by the HACCP team to observe food preparation procedures will take place during the next inspection.

Epidemiologic & Case-Control Study Results

Five hundred twenty-six individuals who met the probable case definition and sixty-four controls were included in the study. Controls were very

similar to cases with respect to both age and gender. The median age for both cases and controls was 18, and there were slightly more females than males in both groups (**Table 1**).

Figure 1 reflects the number of hours between meal consumption and illness onset. The prom activity dinner was served at 9 p.m. The largest peak in the epidemic curve occurred about 11 hours later. The median incubation period was 9 hours (range 0 to 70 hours). Nearly all (93.5%) cases reported diarrhea as a symptom of illness. Other common symptoms included abdominal pain (73.2%), nausea (58.0%), and vomiting (26.3%) (**Table 2**). Five individuals sought medical care from a physician. Most individuals recovered within 12 to 24 hours.

The meal for the prom activity included chicken (with or without lemon butter sauce), yellow rice, Caesar salad (with or without salad dressing), broccoli, carrots, chocolate mousse cake, bread, butter, soda, water, ice, coffee and tea. In bivariate analysis, all of the food items appeared to be associated with illness except the tea, coffee, and bottled water (**Table 3**). In multivariate analysis; however, only the chicken and lemon butter sauce were associated with illness. Those who ate chicken at the prom were 21 times more likely to become ill than those who did not eat chicken. Likewise, those who ate the lemon butter sauce were 8 times more likely to become ill.

Laboratory Results

No common pathogen was identified from laboratory analysis. Collected stool specimens were all negative for ova and parasites, bacterial pathogens, and enterotoxins. Norovirus testing was not performed, as the median incubation period for this outbreak was not consistent with Norovirus, which has a median incubation of 24 hours.



Table 1. Demographic characteristics of cases and controls.

Characteristic	Cases (n=526)		Controls (n=64)		p value
	n	%	n	%	
Age					
<18	181	34.4	22	35.5	0.81
18-19	33	63.9	40	64.5	
20-21	2	0.4	0	0.0	
22+	6	1.1	0	0.0	
Unknown	1	0.2	0	0.0	
Median Age (Range)	18	16-54	18	17-19	0.65
Sex					
Male	222	42.2	24	38.7	0.43
Female	304	57.8	38	61.3	

Table 3. Crude (Non-Adjusted) Odds Ratios for

Food Item	Crude OR	p value*
Bottled Water	444.6	0.31
Coffee	160.9	0.32
Chicken	54.0	<.0001
Lemon Butter Sauce	22.3	<0.0001
Yellow Rice	13.2	<0.0001
Caesar Salad	4.2	<0.0001
Salad Dressing	4.1	<0.0001
Bread	3.9	0.001
Chocolate Mousse Cake	3.7	<0.0001
Broccoli	3.4	<0.0001
Soda	3.0	0.0001
Butter	2.6	0.0001
Carrots	2.4	0.004
Water	2.2	0.01
Ice	1.8	0.03
Tea	0.2	0.36

*Foods with p values less than 0.05 are considered significant in this analysis

Table 2. Symptoms of Illness Reported by Cases in Case Control Study (n=526)

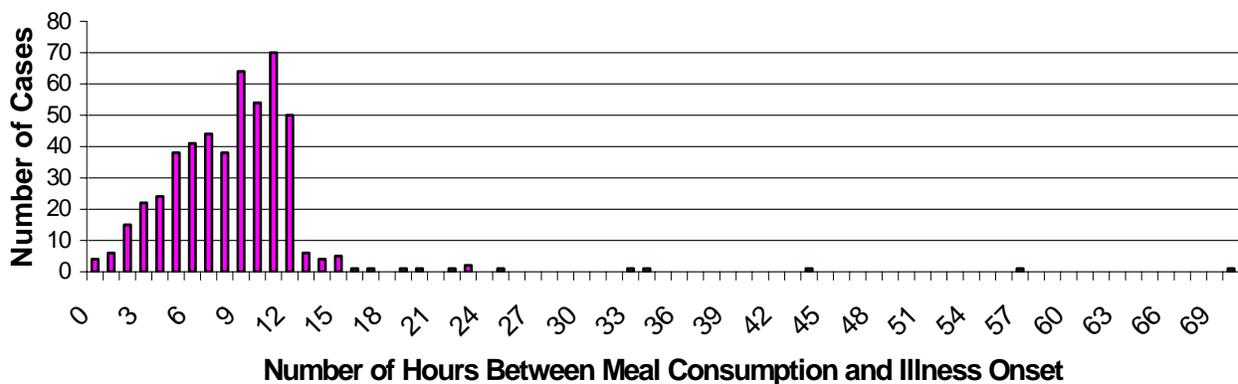
Symptom	n	%
Diarrhea	492	93.5
Abdominal Pain	385	73.2
Nausea	305	58.0
Headache	217	41.3
Dizziness	175	33.3
Vomiting	155	26.3
Chills	150	28.5
Fever	42	8.0



Table 4. Adjusted ORs for Food Items found to be significantly associated

Food Item	Crude OR	Lower Limit	Upper Limit	Adjusted OR	Lower Limit	Upper Limit
Chicken	54.0	26.4	110.6	21.4	10.0	45.8
Lemon Butter Sauce	22.3	9.4	52.9	8.3	3.3	21.3

Figure 1. Epidemic Curve of Gastrointestinal Illness at a High School Prom



Discussion

This outbreak was most likely caused by consumption of food at the prom, with the chicken being the most likely source. The single large peak in the epidemic curve clearly suggests a common source exposure rather than person-to-person illness transmission. Further, the very high adjusted odds ratio for the chicken (OR 21.4) provides strong evidence for labeling this food item as the transmission vehicle.

We were not able to isolate a pathogen associated with this outbreak. During the laboratory investigation, we tested for ova, parasites, and bacteria. We were not, however, able to test for enterotoxins. The available epidemiologic information (e.g. symptomatology, incubation period) is consistent with enterotoxin poisoning. Further, unrefrigerated

chicken is an ideal vehicle for enterotoxin transmission. We cannot, however, conclusively label this as the cause of the outbreak, since we were not able to identify a common pathogen in laboratory analysis.

Some selection bias may have occurred in obtaining our cases and controls, as they were identified through self-report rather than random selection. We were notified that nearly 1000 students, teachers, and others attended the prom. This study does not include data on kitchen staff, teachers nor dates from other high schools that attended.

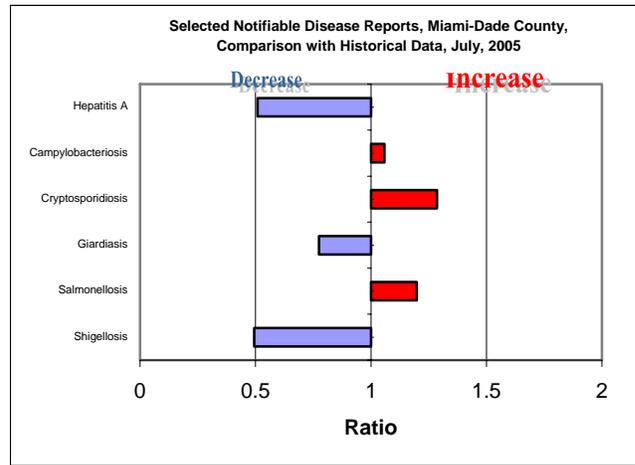
Throughout this investigation, MDCHD provided recommendations to hotel management and school administrators to control the outbreak. The following prevention measures are recommended:

- Because harmful bacteria grow at room temperature hot food should be kept hot at 140° F or higher, and cold food should be kept cold at 40° F or cooler.
- Poultry should be cooked until it has an internal temperature of 180° F . It is done when the juices run clear and it is white in the middle. Poultry should never be eaten rare.
- Perishable foods should not be left out at room temperature for more than two hours.

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- MDCHD School Health Program



*Ratio of current month total to mean of 15 month totals (from previous, comparable, and subsequent month periods for the past 5 years).



TO REPORT ANY DISEASE AND FOR INFORMATION CALL:



Office of Epidemiology and Disease Control

Childhood Lead Poisoning Prevention Program	(305) 470-6877
Hepatitis	(305) 470-5536
Other diseases and outbreaks	(305) 470-5660
HIV/AIDS Program	(305) 470-6999
STD Program	(305) 325-3242
Tuberculosis Program	(305) 324-2470
Special Immunization Program	(786) 845-0550



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Monthly Report

Selected Reportable Diseases/Conditions in Miami-Dade County, July 2005

Diseases/Conditions	2005 this Month	2005 Year to Date	2004 Year to Date	2003 Year to Date	2002 Year to Date	2001 Year to Date
AIDS ^{Provisional}	99	860	874	618	669	800
Animal Rabies	0	0	0	0	0	1
Campylobacteriosis	17	83	87	78	59	73
<i>Chlamydia trachomatis</i>	265	2240	2231	2597	2732	1999
Ciguatera Poisoning	0	0	0	0	0	0
Cryptosporidiosis	3	15	11	7	3	9
Cyclosporiasis	11	11	1	1	1	0
Diphtheria	0	0	0	0	0	0
<i>E. coli</i> , O157:H7	0	1	2	0	0	0
<i>E. coli</i> , Non-O157	1	1	0	0	1	0
<i>E. coli</i> , Other	0	0	0	0	0	0
Encephalitis (except WNV)	0	0	1	0	1	0
Encephalitis, West Nile Virus	0	0	3	0	0	0
West Nile Fever	0	0	0	0	0	0
Giardiasis, Acute	20	114	174	97	122	145
Gonorrhea	112	942	799	1113	1217	1014
Hepatitis A	6	33	20	25	83	90
Hepatitis B	4	30	24	35	11	30
HIV ^{Provisional}	109	907	1076	975	1193	951
Lead Poisoning	26	105	177	141	155	150
Legionnaire's Disease	0	2	6	4	1	1
Leptospirosis	1	2	0	0	0	0
Lyme disease	0	0	2	2	1	4
Malaria	3	4	10	5	8	12
Measles	0	0	0	0	0	0
Meningitis (except aseptic)	2	9	8	2	4	7
Meningococcal Disease	0	5	12	3	11	12
Mumps	0	0	0	0	0	0
Pertussis	4	8	7	4	4	1
Polio	0	0	0	0	0	0
Rubella	0	0	0	0	0	0
Rubella, Congenital	0	0	0	0	0	0
Salmonellosis	56	255	225	254	153	132
Shigellosis	11	167	109	187	126	70
<i>Streptococcus pneumoniae</i> , Drug Resistant	16	43	50	71	81	124
Syphilis, Infectious	10	94	98	99	120	118
Syphilis, Other	50	347	450	633	621	433
Tetanus	0	0	0	0	0	1
Toxoplasmosis	7	7	4	5	14	7
Tuberculosis ^{Provisional}	15	104	133	128	130	117
Typhoid Fever	0	2	2	2	2	0
<i>Vibrio cholera</i> Type O1	0	0	0	0	0	0
<i>Vibrio cholera</i> Non-O1	0	0	0	0	1	0
<i>Vibrio</i> , Other	0	0	0	1	0	0

* Data on AIDS are provisional at the county level and are subject to edit checks by state and federal agencies.

** Data on tuberculosis are provisional at the county level.

