



DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Disease Control and Prevention

Foodborne and Diarrheal Diseases Branch
Division of Bacterial and Mycotic Diseases
National Center for Infectious Diseases

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Subject: EPI- 2003-71 – Outbreak of intestinal illness among hotel conference center
guests, Westminster, Colorado, September, 2003

BACKGROUND

On September 11, 2003, Colorado Department of Public Health and Environment (CDPHE) notified the Foodborne and Diarrheal Diseases Branch (FDDB), DBMD, NCID, CDC, of a cluster of diarrheal illness among guests of a central Colorado hotel. Investigation of the cluster was being coordinated by two agencies in Colorado. Tri-County Health Department was investigating the environmental aspects of the cluster, hotel premises and hotel staff, including food workers from the kitchen. CDPHE was coordinating the epidemiological investigation.

Hotel A, located between Denver and Boulder, is a 180-room hotel and banquet / reception center with an indoor pool, whirlpool, and fitness center. The lounge and restaurant are adjacent and offer breakfast, lunch, and dinner. Breakfast items are available from a menu as well as a daily breakfast buffet. Full service banquet and reception facilities are available including food preparation.

The first illness reported to CDPHE in a guest of Hotel A originated from a Colorado Infection Control Practitioner on September 9, 2003. This guest had a presumptive diagnosis of pneumonia. Interviews with this patient indicated that a diarrheal illness preceded respiratory symptoms and that other persons who stayed at Hotel A had a similar diarrheal illness. Interviews with three additional persons confirmed that multiple persons had been ill during or following their stay at Hotel A. On September 12, 2003 CDPHE was informed that *Shigella sonnei* had been isolated from another hospitalized guest of Hotel A.

Initial reports received by CDPHE during case finding phone calls indicated that at least twenty-three persons who stayed at or visited the hotel between September 4, 2003 and September 7, 2003 reported profuse diarrhea, fever, vomiting, and abdominal cramps. At least two groups were participating in functions at the hotel during this time. Group 1 persons (n=180) were members of a cohort that attended a wedding reception dinner catered by the hotel on September 6, 2003. Members of the wedding party and other wedding guests were reported to be staying at the hotel although some traveled from their homes in central Colorado for the event. Group 2 members (n=39) were participating in a weekend World War II veterans reunion and banquet held September 7, 2003. Group 2 persons were from Washington, Tennessee, Missouri, Illinois,

Ohio, Virginia, Nevada, Iowa, Pennsylvania, and Calgary, Canada. The majority of veterans were guests of the hotel. Results from fecal culture of six of the eight food handlers were pending, and the restaurant was still operating as of September 12, 2003.

On September 12, 2003 CDPHE invited personnel from the Foodborne and Diarrheal Diseases Branch at CDC to assist with the ongoing epidemiologic investigation being conducted by Alicia Cronquist, RN, MPH, Foodborne and Enteric Diseases Coordinator, CDPHE, and Dayna Ferguson, MD, EIS officer, SB, EPO, CDC. On September 14, 2003 John Dunn, DVM, PhD, EIS officer, FDDB, DBMD, NCID, and Michael Lynch, MD, MPH, EIS officer, FDDB, DBMD, NCID, departed for Denver, Colorado from Atlanta to assist in the investigation. A day later, medical epidemiology elective student, Paul Chittick, departed from Atlanta for Denver. John Painter, DVM, Medical Epidemiologist, FDDB, DBMD, NCID, coordinated CDC's involvement in the investigation as the primary Atlanta-based CDC supervisor.

The objectives of the investigation were to: 1) conduct an epidemiological study describing the etiology and identifying the vehicle of transmission, 2) assess ongoing transmission and the scope of the illnesses, and 3) implement control measures, including on-site interventions and a traceback investigation if needed, to interrupt transmission and prevent similar infections in the future.

SECTION A: STUDY METHODS

Hypothesis generation and case finding

Hypothesis generating interviews of Hotel A guests and visitors were conducted by CDPHE using a brief questionnaire with open-ended questions. Questions were designed to determine if illness occurred and to generate hypotheses about potential modes of transmission, including food vehicles. On September 12 a message was posted on the CDC Foodborne Outbreak Listserve to inform states of the cluster and ongoing investigation. Contact lists for Group 1 and Group 2 participants were obtained. The list obtained for Group 1 included persons invited by the groom, the brides invitation list was unavailable.

Cohort study design and implementation

Because illnesses appeared to have occurred among guests of the hotel from September 4 to 7, 2003, and rosters of hotel guests and event attendees were available, a cohort study design was chosen. Inclusion criteria for cohort membership included being an attendee at an event at Hotel A or being a guest of the hotel from September 4 to 7. Event attendees who did not stay overnight at the hotel were considered "non-guests". A questionnaire was developed based on hotel menus and events (Appendix 1). The questionnaire collected a comprehensive hotel food history for the four day period in question, along with hotel arrival and departure dates, demographic information, clinical characteristics of illness, activities, contacts in their party or family group, and environmental exposures. Exposure to specific food items served at the hotel restaurant, hotel breakfast buffet, catered banquet meals, and other food items were included in the questionnaire. Initial and follow-up interviews were conducted by telephone. We attempted

to enroll all persons in Group 1 and Group 2 for which we had contact information. A systematic random sample of hotel guests, not in Group 1 or Group 2, was taken by calling every fifth person from an alphabetized hotel roster. A case was defined as a person with gastrointestinal illness characterized by three or more episodes of diarrhea in a twenty-four hour period or having both fever and abdominal cramps since staying at or attending an event at Hotel A during the exposure period from September 4 to September 7. Persons were interviewed from 1 to 3 weeks after the exposure period and asked about gastrointestinal illness from the exposure period until the date of the interview. Persons reporting diarrhea but not meeting case definition criteria were excluded as cases.

To assess the possibility that disease transmission occurred prior to September 4 and the potential for ongoing transmission after September 7, we conducted interviews with additional hotel guests using a shortened questionnaire (Appendix 2). A systematic random sample was taken of guests (every fifth hotel guest) from a hotel roster.

Statistical analyses

Statistical analyses were performed using Epi Info version 6.04 (CDC, Stone Mountain, GA, July 1996) and SAS Version 9 (SAS Institute Inc., Cary, NC). "Do not know" responses were entered as a "missing" response. Descriptive statistics detailing the demographics of the cohort, symptoms among cases, and attack rates were calculated. Analysis of risk factors was performed and interpreted using the Relative Risk (RR) of becoming a case for different exposures. For trend, exposures of interest were classified by the number of meals in which each person

consumed a food. Exact P-values were reported if the expected value in a cell was less than 5. P-values of <0.05 were considered significant. Logistic regression was performed to assess variables of interest.

Laboratory investigation

Ill persons were instructed to seek medical care and obtain a stool culture. States were asked to process samples through their state laboratories and inform CDPHE of cultures yielding enteric pathogens. We requested that all *Shigella sonnei* or other enteric pathogens isolated from cases be submitted for pulsed-field gel electrophoresis (PFGE) analysis and antimicrobial susceptibility testing. PFGE patterns were posted to the PulseNet national database.

Investigation of facility kitchen and food handlers

Inspections at the facility and interaction with the hotel personnel were conducted by the Tri-County Health Department. CDC, CDPHE, and a Tri-County Health Department inspector were given a tour of Hotel A on September 15, 2003. The tour was given by the hotel manager and facility maintenance manager. Full access to the facility, including the bar area, banquet hall, restaurant, breakfast buffet, and restaurant kitchen was granted. Investigators were permitted to interact with the kitchen staff and Chef. Food handling and preparation protocols were described during the tour of the kitchen.

On September 24, 2003 CDC and CDPHE visited the kitchen and observed the breakfast buffet preparation. Melon preparation was observed. Storage of produce and hygiene of the kitchen staff were also noted. Temperatures were taken for honeydew melon and cantaloupe from the buffet throughout the morning until the end of the buffet.

SECTION B: RESULTS

Case finding and hypothesis generation

Interviews with ill hotel attendees from Group 1 and Group 2 suggested eating the breakfast buffet, and honeydew melon consumption in particular, as possible vehicles. Anecdotal reports from family members indicated that those who ate cantaloupe melon and honeydew melon became ill, while those who did not remained well. Members of Group 2, the veterans group, were detailed historians regarding food exposures during their hotel stay.

Cohort study

We interviewed 132 persons. Twenty were excluded from the analysis. Of these, eleven did not meet the case definition or had onset before the exposure period. Six were excluded for other reasons, including four persons from a family with similar symptoms (respiratory) that had illness onset before the exposure period. Three persons associated with Group 1 were excluded from the analysis because they were not on the list of wedding guests that we obtained from the groom. Of the 112 cohort members analyzed, 36 were classified as cases and 76 as non-cases.

Of the 36 persons who met the case definition, 13 were from Colorado. The remaining cases were residents of 17 states and Canada. The attack rate in the cohort was 32.1% (36/112). Median age was 54.5 years (range 1-83 years) and 19 (53%) were male. Symptoms are reported in Table 1. Figure 1 depicts the number of cases by hotel arrival date among cohort members that were guests of hotel A. Figure 2 depicts the number of cases by illness onset date for cohort members and hotel employees. The peak arrival day was September 5. Peak illness onset date was September 7.

Univariate results are summarized in Tables 2 and 3. Persons who were guests of the hotel had a significantly increased risk of becoming a case compared with non-guests. Among those who reported eating the breakfast buffet, the relative risk of becoming a case was elevated and statistically significant. Based on univariate analyses, the lack of association with other hotel meals, and anecdotal evidence implicating the breakfast buffet as a potential vehicle, we restricted further analyses to the cohort who reported eating the breakfast buffet.

We analyzed the risk of consuming each breakfast item on each day from September 4 to 7 (Table 3). Statistically significant relative risks included consumption of any honeydew during the exposure period, consumption of any cantaloupe during the exposure period, and consumption of any orange juice during the exposure period.

Stratified analysis was performed for the three significant foods (Table 4). Honeydew melon consumption remained a statistically significant risk factor when stratifying for orange juice

consumption and when stratifying for cantaloupe consumption. Orange juice consumption and cantaloupe consumption were not statistically significant when stratifying for honeydew melon consumption. The stratified analysis suggests that honeydew melon was the vehicle and that persons who ate honeydew also ate cantaloupe and drank orange juice.

To control for the possibility that persons who ate breakfast on multiple days may have had multiple exposures, we restricted the analysis to specific dates of arrival, dates of breakfast buffet consumption, and illness onset dates. Persons arriving September 5, the peak arrival date, who ate honeydew melon from the breakfast buffet on September 6, with disease onset on September 6, September 7, or September 8 had a significantly increased relative risk in comparison to those who did not eat honeydew melon (Table 5). Cantaloupe consumption and orange juice consumption were not statistically significant in this analysis. Analyzing by arrival date further supported the association of becoming infected with *Shigella sonnei* following honeydew melon consumption.

These data were modeled using multivariate logistic regression. The model included any honeydew melon exposure, any orange juice exposure, and any cantaloupe exposure. Again, honeydew melon exposure [Odds ratio (OR)=6.4, 95% Confidence interval (CI): 1.4-29] was significant while controlling for cantaloupe exposure (OR=1.8, 95% CI: 0.4-8.0) and orange juice exposure (OR=2.0, 95% CI: 0.5-8.2).

Linear trend analysis for increasing number of meals (dose-response effect) supported the association between eating honeydew melon and illness. Table 6 reports the number of days

persons ate honeydew, cantaloupe, and orange juice. Chi-square for trend was statistically significant for honeydew melon.

Further evaluation of hotel guests who arrived after September 7 showed that eight of twenty-nine persons described having a diarrheal illness consistent with the case definition indicating that transmission had continued. Secondary transmission from hotel attendees to other persons was not investigated; however, two children of ill hotel attendees became symptomatic following their parents return home from Colorado to California. One of the children was culture-positive for *Shigella sonnei* as reported by Los Angeles County Department of Health Services.

Laboratory investigation

The laboratory investigation was supported by the CDPHE, Tri-County Health Department, and cooperating states where guests of Hotel A resided. Tri-County Health Department cultured honeydew and cantaloupe from Hotel A; both were negative.

There were ten culture-confirmed *Shigella sonnei* infections. Five members of the cohort had *Shigella sonnei* isolated from their stool specimen. Three members of the hotel staff were culture-positive. *Shigella sonnei* was isolated from two other persons stool specimens; a contact of a *Shigella sonnei*-positive hotel kitchen worker and a person who was not in the cohort but attended a function at the hotel on September 4, 2003.

Three isolates were forwarded from CDPHE to CDC's National Antimicrobial Resistance Monitoring System (NARMS) laboratory for more complete antimicrobial susceptibility testing. The isolates were susceptible to amikacin, amoxicillin/clavulanic acid, cefoxitin, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, and nalidixic acid. All were resistant to ampicillin, streptomycin, sulfamethoxazole, tetracycline, and trimethoprim/sulfamethoxazole.

Pulsed-field gel electrophoresis (PFGE) was performed on the isolates. Initially two isolates, one from a kitchen worker and one from a guest of the hotel were determined by CDPHE to have indistinguishable patterns following restriction with a single enzyme. The pattern (03-Q) had never been seen before by in the CDPHE *Shigella* database. CDPHE and the CDC PulseNet laboratory coordinated PFGE analysis. On September 23, 2003 two closely related patterns from the outbreak were posted to PulseNet (J16X01.0380 and J16X01.0381). Matching isolates were reported by Ohio and Virginia that were previously linked to the outbreak. No additional matching isolates were reported in response to the PulseNet posting.

Investigation of facility kitchen and food handling practices

The initial site visit on September 15 by CDC, CDPHE, and Tri-County Health Department did not detect any problems in the kitchen area or in the processes described by the kitchen staff. For example, the kitchen was clean, protocols for washing produce were verbally described, and temperature specifications for freezers and refrigerators were within normal limits.

Previous visits by Tri-County Health Department indicated that the facility environmental inspection was "satisfactory". Initial interviews with hotel food workers and staff did not identify reports of diarrheal illness previous to September 4 or during the outbreak.

Public health interventions by Tri-County Health Department included 1) a September 15 glove order to insure that all kitchen staff were using gloves in preparation of foods, and 2) a September 17 request for voluntary closure of the restaurant and kitchen for cleaning by an outside firm. Hotel A complied with both requests and was able to reopen by September 18.

On September 18, following confirmation of two culture confirmed cases of *Shigella sonnei* among the kitchen staff, more detailed interviews were conducted among the kitchen staff and other hotel employees. Twenty-five interviews were conducted among the wait staff, bartenders, and other hotel employees. Three persons reported diarrheal illnesses consistent with that of the hotel guests. A kitchen supervisor, who worked September 4 and September 5, reported eating the breakfast buffet fruits, including honeydew, and had onset of diarrhea on September 6. A kitchen chef who worked September 4-6 and reportedly tastes all the breakfast foods including fruits, had illness onset on September 8. The chef continued to work September 9-13. The kitchen chef also reported that a close personal contact (not a hotel employee) was ill and required hospitalization. Each of these three case-patients were culture confirmed. The third hotel employee reporting illness was a bartender who reported that the only item eaten from September 4-7 was a bowl of honeydew melon on September 7. The bartender's onset date was September 9. Illness among Hotel A employees did not precede illness among hotel attendees and hotel employees reported eating the same breakfast buffet items (including honeydew) as

hotel attendees. Infected food service workers were not allowed back to work until they had two consecutive negative fecal cultures.

Tri-County Health Department personnel questioned the kitchen staff regarding preparation of fruit, specifically honeydew melon. Reportedly two individuals in the kitchen prepared the melon. The protocol described by the primary person who cuts melon involves washing with cold water in the vegetable prep sink, peeling the rind, slicing, seed removal, and dicing. A kitchen supervisor indicated that he requires a dilute bleach wash prior to cutting the melons, but is unsure if this is performed when he is not present. Melon is stored in a clean pan and placed into the serving pan with tongs. Serving pans are placed on the buffet on ice. The pan is then stored in the walk-in cooler. If needed, the buffet is refilled from the refrigerated stored melon. There were conflicting reports about how many days the cut melon was used. Kitchen staff indicated that melon is cut up daily, while the supervisor indicated that enough melon is cut up for a 3-day supply.

Two distributors had been supplying the kitchen with honeydew melons. Reports from some kitchen staff indicated that recent melon shipments were excessively dirty or of low quality. Invoices were obtained for a traceback investigation. U.S. Food and Drug Administration personnel conducted the traceback investigation. Implicated farms were identified in California. No source of contamination was identified.

September 24 CDC and CDPHE EIS officers returned to the kitchen to observe preparation, serving, and dismantling of the breakfast buffet. Observations are as follows:

1. Food preparation began at four A.M. Melon preparation was observed. Melons were not washed prior to being cut up. The Chef recognized that the melons were not washed and instructed the preparer to begin again. Melons were then washed and treated with a commercially available vegetable wash recently ordered by the visiting Chef.
2. Gloves were used the majority of the time that we observed the kitchen staff. Gloves were not changed consistently after non-food handling tasks (e.g. entering the walk-in cooler).
3. Conversations with the individual preparing the melon indicated that meat and vegetables/fruit were sometimes placed in the same sink.
4. The employee break room was clean; no leftover foods were present in the refrigerator. Employee bathrooms were clean, although soap was not available in all dispensers. Clean dry paper towels were available. Non-kitchen hotel staff entered the kitchen to get coffee.
5. Melon temperatures were monitored throughout the morning on the breakfast buffet using a digital thermocouple thermometer. At 6:45 a.m. the honeydew melon temperature was 39.8 ° F at the bottom of the serving tray and 42.4°F at the top. The temperatures rose throughout the morning. At 10:30 a.m. the melon at the top of the serving tray was 51.2 ° F.

6. Serving tongs, although present in both the honeydew melon and cantaloupe, were both found in one of the serving trays indicating that the tongs from one serving tray are used to serve fruit from other trays.
7. Honeydew melon that remained at the end of the buffet was discarded. Whole melons were stored in the kitchen walk-in cooler and a walk-in cooler located in the basement.

SECTION C: Summary of findings

Results of the investigation coordinated by CDPHE, CDC, and Tri-County Health Department indicated that an outbreak of *Shigella sonnei* occurred among guests and employees of Hotel A. Epidemiologic and environmental evidence implicated the honeydew melon served at the breakfast buffet. Other buffet items with elevated risk ratios were not significant when controlling for honeydew or when analyzing the data by date of arrival at the hotel.

Contamination cannot be pinpointed to a specific day but likely occurred during the period of September 4-7. Transmission over several days is likely to have occurred because honeydew melon was reportedly prepared as a batch for serving over multiple days. Kitchen workers were ill following this period and involved in food preparation. Because *Shigella sonnei* is reportedly transmitted by as few as ten organisms, secondary transmission or contamination of foods could have occurred from infected kitchen staff.

A request for a U.S. Food and Drug Administration traceback on honeydew melon used at Hotel A was made on September 23, 2003. Participants in the conference call included persons

involved in the investigation from CDPHE, CDC, and Tri-County Health Department. FDA Center for Food Safety and Applied Nutrition, FDA Emergency Operations Center, FDA Denver Field Office, and Colorado Consumer Protection were the other participants during the call. Dr. Dayna Ferguson presented the results of the investigation. FDA agreed with the findings and conducted a traceback investigation on the lot number(s) and source(s) of the honeydew melon.

Honeydew melons were traced to two farms in California from which the implicated melons were shipped. The U.S. FDA investigation was inconclusive with respect to a possible source of contamination. There were no indications that farm workers were ill at the time of harvest and handling for shipment. Canal water samples on the farms were negative for *Shigella*.

Summary Conclusions:

1. New infections with *Shigella sonnei* associated with Hotel A did not appear to be ongoing during the investigation, although numerous persons were still having symptoms. These persons were advised to see their physician and maintain good hygiene to prevent secondary transmission.
2. Analytic epidemiology studies associated eating honeydew melon with becoming infected.
3. Evidence of an infected food worker grossly contaminating the honeydew melon was not found during the investigation. Hotel employees that reported illness did not report illness

prior to hotel attendees. Neither person who prepared melon reported illness. However, the possibility of an infected food handler cannot be ruled out.

4. Some practices of the kitchen food handlers are not optimal.
5. The U.S. FDA traceback investigation on honeydew melons served from September 4 to September 7, 2003 identified the two source farms. The source of contamination was not determined.

Recommendations:

Surveillance

1. We recommended that the hotel continue surveillance for gastrointestinal illness for a period of two months. PulseNet laboratories should perform PFGE on all isolates of *Shigella sonnei* for thirty days to determine whether additional cases occurred in new states which might indicate other potentially associated clusters caused by the distribution of the contaminated honeydew melon.
2. The hotel should communicate additional findings with Tri-County Health Department.

Hotel food handling and employee training at Hotel A

1. Food-handling kitchen staff should not prepare food or serve food if they have a diarrheal illness. Employees should be encouraged to report illness to their supervisor. Sick pay leave should be available to food service employees.
2. Preparation of raw fruits should minimize contamination from the peel or rind. Washing and sanitizing the outer surface of fruits, if followed by thorough drying, may reduce risk. Washing without thorough drying may promote contamination from the peel or rind onto the cut fruit surface. Cutting boards should be changed or sanitized between different types of raw fruits and vegetables.
3. Employees should be trained to monitor the temperature of chilled food items and to verify that foods served from a buffet are kept at appropriate temperatures.
4. Employees should thoroughly wash their hands with soap and water after completing non-food handling tasks. Gloves should be required and changed frequently, specifically after handling raw food items.
5. Food service training courses and certification programs should be required of restaurants. Proper supervision and training will promote safe food preparation practices.

Recommendations to case-patients

Case-patients were advised to see their physician if symptoms do not resolve and maintain good hygiene. Persons working in the food service industry or in nursing home or childcare settings should be cautioned about returning to work.

FIGURES

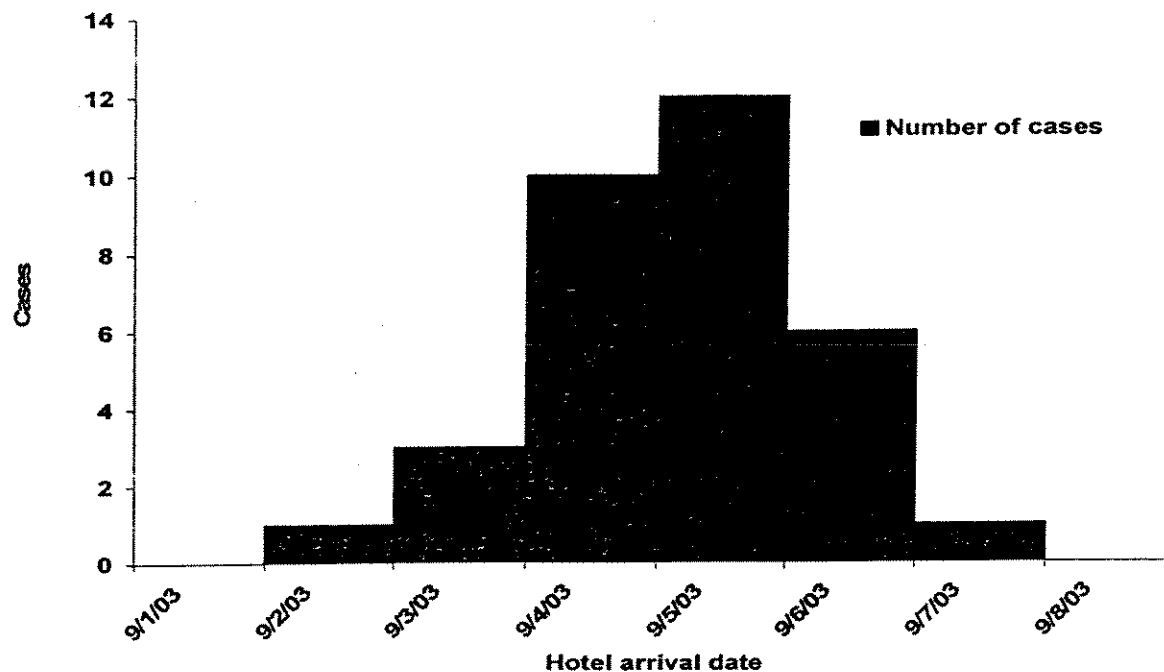


Figure 1. *Shigella sonnei* cases (n=33) among cohort members who were hotel guests by hotel arrival date, Hotel A Outbreak, Westminster, Colorado, September, 2003

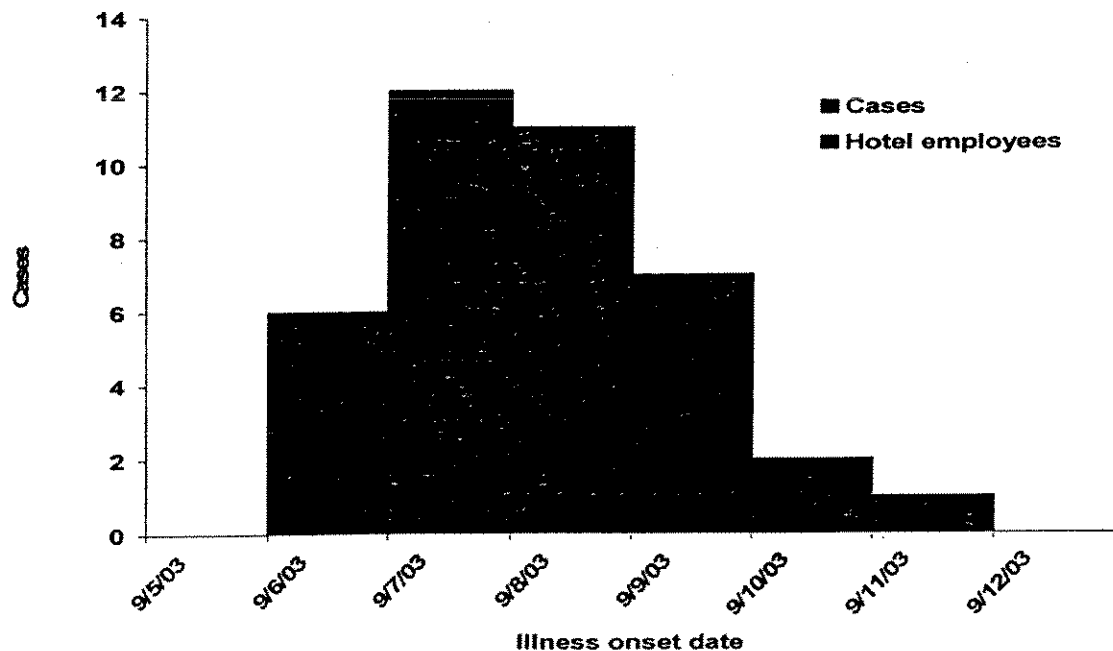


Figure 2. *Shigella sonnei* cases (n=39) among cohort members and hotel employees by illness onset date, Hotel A Outbreak, Westminster, Colorado, September, 2003

TABLES

Table 1. Symptoms of persons with *Shigella sonnei* infection, Hotel A Outbreak, Westminster, Colorado, September, 2003

Symptoms		
Diarrhea	36/36	100.0%
Fatigue	30/34	88.2%
Cramps	28/35	80.0%
Myalgias	23/35	65.7%
Nausea	22/34	64.7%
Headache	20/34	58.8%
Fever	17/31	54.8%
Vomiting	10/36	27.8%
Bloody stool	4/36	11.1%

Table 2. Univariate analysis of *Shigella sonnei* Hotel A Outbreak, Westminster, Colorado, September, 2003

Risk factor	Exposed		Unexposed		Relative Risk	95% CI
	Ill	Well	Ill	Well		
Guest of hotel	33	49	3	27	4.0	1.3-12.2
Stayed at hotel on 9/4	14	20	22	56	1.5	0.9-2.5
Stayed at hotel on 9/5	26	33	10	43	2.3	1.2-4.4
Stayed at hotel on 9/6	31	35	5	41	4.3	1.8-10.3
Stayed at hotel on 9/7	30	40	6	36	3.0	1.4-6.6
Stayed at hotel on 9/8	22	18	13	58	3.1	1.7-5.4
Ate at the breakfast buffet during the exposure period	24	24	12	52	2.7	1.5-4.8
Attended wedding reception	4	30	32	46	0.3	0.1-0.7
Attended veterans banquet	17	17	19	59	2.1	1.2-3.4
Other hotel guest, did not attend wedding or vets event	15	29	21	44	1.1	0.6-1.9
Attended wedding reception, did not eat breakfast buffet	2	23	10	29	0.3	0.1-1.3
Attended veterans banquet, did not eat breakfast buffet	2	4	10	48	1.9	0.5-6.8
Other hotel guest, did not eat breakfast buffet	8	25	4	27	1.9	0.6-5.6

Table 3. Univariate analysis of food items during the exposure period among persons who ate the breakfast buffet, *Shigella sonnei* Hotel A outbreak, Colorado, September, 2003

Risk factor	Exposed		Unexposed		Relative Risk	95% CI
	Ill	Well	Ill	Well		
Consumed honeydew melon	18	5	6	18	3.1	1.5-6.5
Consumed cantaloupe	18	9	6	13	2.1	1.0-4.3
Consumed orange juice	17	10	6	13	2.0	1.8-4.1
Consumed bacon	17	19	6	4	0.8	0.4-1.5
Consumed sausage	13	13	11	11	1.0	0.6-1.8
Consumed strawberries	8	6	14	18	1.3	0.7-2.3
Ice in beverage	13	12	11	12	1.1	0.6-1.9
Consumed honeydew or cantaloupe, or drank orange juice	23	14	1	8	5.6	0.9-36.1

Table 4. Stratified analysis of suspected food vehicles in *Shigella sonnei* Hotel A Outbreak, Westminster, Colorado, September, 2003

Risk factor	Stratified by food item	Exposed		Unexposed		Relative Risk	95% CI	Crude Relative Risk	Summary Relative Risk	95% CI
		Ill	Well	Ill	Well					
Honeydew melon	Orange juice (yes)	14	3	3	7	2.7	1.0-7.3	2.0	2.8	1.3-6.0
	Orange juice (no)	3	2	3	11	2.8	0.8-9.6			
Honeydew melon	Cantaloupe (yes)	16	3	2	6	3.4	1.0-11.4	3.0	2.8	1.1-7.1
	Cantaloupe (no)	2	2	4	11	1.9	0.5-6.9			
Orange juice	Cantaloupe (yes)	12	6	5	3	1.1	0.6-2.0	1.9	1.6	0.9-3.1
	Cantaloupe (no)	5	4	1	9	5.6	0.8-38.5			
Orange juice	Honeydew (yes)	14	3	3	2	1.4	0.6-2.9	2.0	1.4	0.7-2.7
	Honeydew (no)	3	7	3	11	1.4	0.4-5.6			
Cantaloupe	Honeydew (yes)	16	3	2	2	1.7	0.6-4.6	2.1	1.3	0.6-3.1
	Honeydew (no)	2	6	4	11	0.9	0.2-4.1			
Cantaloupe	Orange juice (yes)	12	6	5	4	1.2	0.6-2.3	1.9	1.8	0.9-3.4
	Orange juice (no)	5	3	1	9	6.3	0.9-43.3			

Table 5. Univariate analysis restricted by hotel arrival date, exposure to breakfast bar items, and illness onset date, *Shigella sonnei* Hotel A outbreak, Westminster, Colorado, September, 2003

	Exposed		Unexposed			
Risk factor	Ill	Well	Ill	Well	Relative Risk	CI
Hotel arrival on 9/5, Exposure to food item on 9/6, Illness onset 9/6 or 9/7						
Consumed honeydew on 9/6	3	1	3	14	4.3	1.3, 13.7
Consumed cantaloupe on 9/6	3	6	3	8	1.2	0.3, 4.6
Consumed orange juice on 9/6	4	7	2	8	1.8	0.4, 7.9
Hotel arrival on 9/5, Exposure to food item on 9/6, Illness onset on 9/6 or 9/7 or 9/8						
Consumed honeydew on 9/6	5	1	3	14	4.7	1.6, 14.0
Consumed cantaloupe on 9/6	5	6	3	8	1.7	0.5, 5.3
Consumed orange juice on 9/6	6	7	2	8	2.3	0.6, 5.3

Table 6. Linear trend analysis for the number of days that suspect breakfast buffet items were consumed among ill and well persons in the *Shigella sonnei* Hotel A Outbreak, Westminster, Colorado, September, 2003

Number of days consumed	Honeydew melon		Cantaloupe		Orange juice	
	Ill	Well	Ill	Well	Ill	Well
0	5	18	5	13	5	13
1	9	1	10	2	5	1
2	2	1	2	7	5	6
3	6	2	5	1	7	2
4	1	2	1	1	1	2
Chi-square for trend	4.2		1.8		2.4	
P-value	0.04		0.18		0.11	