A VISIT TO A DAIRY FARM: CAMPYLOBACTERIOSIS AND RAW MILK

BACKGROUND

On September 10, 2002 a physician from a local university student health center reported a cluster of ill students who had visited a dairy farm in San Bernardino County and reportedly drank raw, unpasteurized milk. Approximately 20 students went to this farm and 8 of them reported to the student health center complaining of diarrhea; 2 of the students had stool cultures positive for *Campylobacter*. Acute Communicable Disease Control (ACDC) initiated an investigation to determine if there was any risk to the public's health and if control measures were needed.

METHODS

Case Definition: A case of outbreak-associated campylobacteriosis was defined as a person with culture-confirmed campylobacteriosis who visited the dairy farm during the weekend of August 30, 2002. A presumptive case was defined as a person with symptoms consistent with campylobacteriosis and a history of visiting the dairy farm during the weekend of August 30, 2002.

ACDC requested the student health physician provide a line list of ill students who went to the student health center for care and were part of the group that visited the dairy farm. ACDC interviewed students using a standardized questionnaire regarding exposure history and symptoms and other students who attended the weekend retreat. Stool was requested from symptomatic students who had not already submitted a specimen to the student health center. The Los Angeles County Public Health Laboratory tested the specimens for *Salmonella*, *Shigella* and *Campylobacter*. Confirmed cases and presumptive cases were reported individually as cases of campylobacteriosis. An analysis of risk factors was performed with available data. San Bernardino County Department of Public Health and the California State Department of Health Services were notified.

RESULTS

A total of 21 university students attended a work retreat during the weekend of Friday, August 30 to Sunday, September 1, 2002. The students stayed overnight at a church on Friday and Saturday nights. Groceries for meals were purchased at a local market on Friday evening.

Meals, which were exposures common to most attendees, did not include high-risk foods and no meal had a significant risk ratio (RR) for illness:

- Friday night snacks (RR = 1.00, p = 0.69) chips, salsa, veggies, dip, soda
- Saturday brunch (RR = 1.25, p = 0.53) muffins, bread, fruit, juices, bagels and cream cheese, peanut butter and jelly
- Saturday dinner (RR = 0.50, p = 0.10) pizza, salad, soda
- Sunday breakfast (RR = 0.58, p = 0.16) leftovers from brunch, cold pizza
- Sunday lunch (RR = 0.67, p = 0.26) leftover breakfast items, lunchmeat, lettuce and tomatoes

On Saturday afternoon the group visited a dairy farm owned and operated by the father of one of the students, where they were offered raw milk from a cooling vat. The raw milk was placed in a pitcher and then served in cups to those students who wanted it. Some students also petted calves, allowing the animals to suck or lick their fingers. Some students had contact with the dog or cats that lived on the dairy farm. After the farm visit, the students returned to the church for training exercises. Saturday evening they went together to a local Italian restaurant for dinner. Some students went swimming in a pool at the church. One student left after the training.

A total of 20 students responded to the questionnaire (95% response rate); 12 respondents reported illness. All ill students met the case definition for an attack rate of 60%. Only 4 students had *Campylobacter* culture positive stools and 8 additional students met the clinical case definition. The 12 cases ranged in age from 19 to 22 (median = 20.6 years); 6 (50%) were male. All (100%) cases reported having diarrhea; 11 (92%) reported having fever. Most (*n* = 9, 75%) reported having abdominal cramps; 2 (16%) reported having bloody diarrhea; 7 (58%) sought medical care; none were hospitalized. Reported onset dates ranged from September 1, 2002, to September 4, 2002. The mean incubation period was 2.4 days and the mean duration of illness was 4.7 days.

TABLE 1. Exposure Attack Rates

	EXPOSED			***NOT EXPOSED***				
Exposure	**Case**	**Non-case**	**Attack Rate**	**Case**	**Non-case**	**Attack Rate**	**Attack Rate Difference**	**RR (95% CI), *p*-value**
Raw Milk	12	4	0.75	0	4	0.00	0.75	Incalculable, 0.01
Calf	7	3	0.70	5	5	0.50	0.20	1.40 (0.67-2.94), 0.32
Dog	6	3	0.67	6	5	0.55	0.12	1.22 (0.60-2.49), 0.46

The majority of students who visited the dairy farm reported drinking raw milk (16 of 20, 80%). All 12 cases (100%) reported drinking the raw milk, with a significant p-value of 0.01 (the RR was not able to be calculated due to a zero cell). None of the other potential risk factors such as petting calves or dogs could account for more than 7 (58%) of the cases, and none of the RRs were significant.

The dairy was warned by the state Department of Food and Agriculture not to offer raw milk to farm visitors.

DISCUSSION

Drinking raw milk at the dairy farm was the only significant risk factor associated with illness and the most likely cause of the outbreak. The epidemic curve indicated a common source exposure and all 12 cases reported drinking the raw milk. Other non-significant risk factors included having contact with calves or other animals on the dairy farm.

Drinking unpasteurized milk was identified as the source of Cam*pylobacter jejuni* enteritis in an outbreak in Wisconsin in 2001 [1]. Unpasteurized milk is also a vehicle for transmission of other pathogens such as *Brucella* spp., Shiga toxin-producing *E. coli* (e.g., *E. coli* O157, *Salmonella* spp., *Mycobacterium bovis* and *Listeria monoctyogenes* [2]. While sale of raw milk is banned in 26 states, the sale of raw milk from an approved source is legal in the state of California.

REFERENCES

1. Centers for Disease Control and Prevention: Outbreak of *Campylobacter jejuni* infections associated with drinking unpasteurized milk procured through a cow-leasing program—Wisconsin, 2001. MMWR 2002;51(25):548-549.
2. Chin J, ed. Control of Communicable Diseases Manual. 17th ed. Washington, DC: American Public Health Association, 2000.