



California
Department of
Health Services

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Date: February 6, 2007
To: The Record
From: Infectious Diseases Branch
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850 Marina Bay Parkway
Building P, Second Floor
Richmond, CA 94804
Subject: CA-EPI 06-06: *Escherichia coli* 0157:H7 Infections in Children Associated w
Raw Milk

We are pleased to provide the following report on this investigation undertaken by our Branch Staff with the California Department of Health Services, Division of Communicable Disease Control, Microbial Diseases Laboratory, the Division of Food, Drug, and Radiator Safety, Food and Drug Branch and Food and Drug Laboratory Branch, the California Department of Food and Agriculture, the Nevada County Public Health Department, the Riverside County Department of Public Health, the San Diego County Health and Human Services Agency, the San Bernardino County Department of Public Health, and the Fresno County Department of Public Health.

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***Escherichia coli* O157:H7 Infections in Children Associated with Raw Milk**

On September 18, 2006 the California Department of Health Services (CDHS) was notified of two patients hospitalized with hemolytic uremic syndrome (HUS); one had culture-confirmed *E. coli* O157:H7 infection. Both case-patients had consumed unpasteurized (raw) cow milk in the week prior to onset of illness. Four additional cases of *E. coli* O157:H7 infection in children that had consumed raw cow milk or raw cow colostrum were identified in the following three weeks. In California, intrastate sale of raw milk and raw colostrum is legal. This report summarizes the investigation of these cases conducted by CDHS in collaboration with the California Department of Food and Agriculture (CDFA) and four local health departments.

A case was defined as culture-confirmed *E. coli* O157:H7 infection with the outbreak strain or HUS with illness onset date of 08/01/06 or later in a CA resident who had consumed raw milk products in the week prior to onset of illness. Case finding was conducted by notifying all CA local health departments and infection control practitioners. Six cases were identified. The median age was eight years (range: six - 18 years) and four (67 percent) were boys. All six patients reported bloody diarrhea; three (50 percent) were hospitalized, and two (33 percent) developed HUS. Disease onset occurred from September 6 through September 24, 2006. *E. coli* O157:H7 isolates from all five patients with culture-confirmed infections had indistinguishable pulsed-field gel electrophoresis (PFGE) patterns. These PFGE patterns were new to the national PulseNet database and differed markedly from the patterns of the concurrent *E. coli* O157:H7 outbreak strain associated with spinach consumption.

Five patients reported definite consumption of Brand A raw dairy product(s) prior to their illness onset; two consumed raw whole milk, two consumed raw skim milk, and one consumed raw chocolate colostrum. One of these patients also consumed raw butter. Four patients drank raw milk regularly. One patient drank raw milk only once; he was served raw chocolate colostrum as a snack when visiting a friend. One patient denied drinking Brand A raw milk but his family routinely consumed Brand A raw milk.

A review of 50 consecutive *E. coli* O157:H7 cases reported to CDHS with onsets from October 2004 to June 2006 revealed that 46 of 47 cases with information about raw milk consumption on the case report form did NOT drink raw milk.

Environmental Investigation

Patients consumed raw milk with code dates between 09/03/06 and 09/13/06. Product samples of several lots with code dates of 09/17/06 or later were retrieved from store shelves and the dairy and were tested by CDFA, CDHS, and local health department laboratories. The outbreak strain of *E. coli* O157:H7 was not found in any environmental or product samples. However, standard aerobic plate counts of samples

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of raw skim milk, raw whole milk, raw colostrum, raw chocolate colostrum, raw cream, raw qephor, and raw butter, with code dates from a two-week interval in September and October, ranged from 1800 to 37,000,000 CFU/g. The total coliform counts ranged from <1 to >110,000 MPN/g. At least one sample of each of these products, except qephor, had a standard aerobic plate count of >250,000 CFU/g and a total coliform count of >1500 MPN/g. Colostrum and chocolate colostrum had fecal coliform counts ranging from 320,000 to 140,000,000 MPN/g.

Dairy A is a licensed raw milk dairy. Fecal samples from 199 dairy cows were collected on October 31; samples from 91 dry herd cows and 72 calves/heifers were collected on November 6. Samples were collected manually and composited in groups of three. Composite samples were examined for *E. coli* O157:H7 using the CDHS method that is a modification of the Food Emergency Response Network (FERN) method, supplemented with recirculating immunomagnetic separation (RIMS). *E. coli* O157:H7 was isolated from five of the composite samples. Further examination of samples from individual cows from the positive composites yielded isolates from three cows. The PFGE and multiple-locus variable-number tandem repeat analysis (MLVA) patterns of these isolates differed from the outbreak patterns.

Summary

Six children had *E. coli* O157:H7 infections and/or HUS. The five available *E. coli* O157:H7 isolates had identical and unique PFGE patterns supporting a common source exposure. Five patients consumed raw dairy products from one dairy, and one patient could have consumed raw milk from the same dairy. The environmental investigation at the dairy identified *E. coli* O157:H7 from three cows but the PFGE patterns of these isolates did not match that of the children. Despite not finding the outbreak strain at this dairy, the source of infection for these children was likely raw milk products produced by the dairy.