

ERU ACTIVITY SUMMARY REPORT

INVESTIGATION NAME: 15016_GoatShare_Cow_SantaClaraCounty_EcoliO157H7_050415		ASSIGNMENT DATE: 05/05/15
ERU LEAD: Brandon Adcock		
FIRM NAME: Private Residences		
ADDRESS: [REDACTED] Ln.	CITY: Morgan Hill	ZIP CODE: 95037
FIRM CONTACT: n/a	PHONE: n/a	OTHER CONTACT INFO: n/a
REPORTING PERSON/AGENCY: Dr. George Han – Santa Clara County		PHONE: 408-792-5222

ACTIVITY:

PRODUCE INVESTIGATION
 PFR ENVIRONMENTAL
 RETAIL ENVIRONMENTAL
 TRACEBACK INVESTIGATION
 TAMPERING
 COMPLAINT
 SAMPLING
 TECHNICAL ASSISTANCE
 OTHER: Outbreak Investigation

BACKGROUND:

On 5/4/15, the California Department of Public Health (CDPH), Division of Communicable Disease Control (DCDC) Infectious Diseases Branch (IDB) notified the CDPH, Food and Drug Branch (FDB) Emergency Response Unit (ERU) of a cluster of Shiga toxin-producing *Escherichia coli* O157 (STEC O157) illnesses in Santa Clara County. Initially, IDB reported that nine children from two neighboring families (Families B and C) in Morgan Hill, California, were diagnosed with STEC O157. One child (from Family C) was hospitalized with hemolytic uremic syndrome (HUS), a potentially life threatening complication of STEC infections. The illness onset dates for these case patients were between 4/23/15 and 5/2/15 (See Attachment 1).

Shared exposures between the ill children that were considered to be potential sources of STEC O157 included: (1) raw (unpasteurized) goat milk obtained from a neighbor (Family A), and (2) strawberries from a roadside stand.

On 5/4/15, Dr. George Han, Deputy Health Officer with Santa Clara County, requested FDB assistance with product testing and completing an environmental assessment at the home of Family A.



Figure 1: Map showing relative proximity of the homes of families involved in this outbreak.

SUMMARY OF ACTIVITY:

Santa Clara Public Health Laboratory - Product Samples

On 5/5/15, ERU received two samples of raw, unpasteurized goat milk and one sample of raw, unpasteurized goat milk yogurt from [REDACTED], Santa Clara County Public Health Laboratory, San Jose, CA (Attachment 2). A Santa Clara County Public Health Nurse had collected these three samples from Families A, B, and C on 5/1/15 (see Table 1 below). The raw goat milk in the samples and the raw goat milk used to make the yogurt originated from Family A's goat. The milk samples were in Mason jars with notations on the lids, indicating which goat the milk originated from and the milking date. The yogurt was in an unlabeled, plastic, Ziploc-style bag. The milk and yogurt samples were shipped to the CDPH Food and Drug Laboratory Branch (FDLB), on 5/6/15 for *E. coli* O157:H7 analysis. Also on 5/1/15, a Santa Clara County Public Health Nurse collected a sample of six strawberries from Family B. The Santa Clara County Public Health Laboratory retained the strawberry sample until they were later transferred to the CDPH, Microbial Diseases Laboratory (MDL) for STEC O157 analysis.

Description	Family Providing Sample	Santa Clara Co. Sample ID	FDB IS #
Goat Milk in Mason Jar	Family C	15SCPH08759	710050515-001
Goat Milk in Mason Jar	Family A	15SCPH08760	710050515-002
Goat Milk Yogurt made from Family A's Goat Milk	Family B	15SCPH08761	710050515-003
Strawberries	Family B	15SCPH08762	n/a

Table 1 – Summary of Samples Obtained from Santa Clara County Public Health Laboratory

Family A Residence

On 5/5/15, the ERU investigative team met with Dr. Han of Santa Clara County, and visited the home of Family A ([REDACTED], [REDACTED] Lane, Morgan Hill, CA) to meet with [REDACTED] [REDACTED] of Family A, who milked the goats of interest. The home of Family A was on a lot that contained multiple livestock pens. At the time of inspection, these pens included two horse pens containing one horse each, one pen containing two cows, one pen containing numerous chickens and turkeys, and one pen containing three goats (see Exhibit A). Ms. [REDACTED] raised all of the livestock for personal use, including the goats for milk. Additionally, Ms. [REDACTED] stated that two of the three goats that were present at the time of inspection, belonged to another family and were being temporarily boarded and milked by Family A. The two goats belonging to Family A were named Claire and Bertie. At the time of inspection, Bertie was present on the premises, as well as the two visiting goats. Claire, the other goat belonging to Family A, was being treated for mastitis offsite. According to Ms. [REDACTED] Bertie and Claire were the only goats present during the timeframe of interest.

Ms. [REDACTED] stated that her family (Family A) drank the raw goat milk on a regular basis and did not have a history of recent gastrointestinal illness. Family A gave milk that they could not use to Families B and C. Ms. [REDACTED] informed the investigative team that generally, only Claire's milk was consumed in the form of raw milk. The families used nearly all of Bertie's milk and a small portion of Claire's milk to make small quantities of cheese, yogurt, or other products for personal use.

Milking Process

No written milking procedures were available for review, as expected with milking for personal use. Since the goats were not ready for milking and direct observation at the time of inspection, Ms. [REDACTED] described her milking process as follows:

- 1) Family A milked the goats twice per day, once in the morning and once in the evening.
- 2) Before milking, they washed the goat's udders using [REDACTED] brand udder wash, which was mixed using [REDACTED] per gallon of water.
- 3) Prior to collection, a small amount of the milk in the goat's udders was milked into a separate container and discarded.
- 4) The goat was then milked by hand into a bucket which was covered immediately after completion of milking.
 - a. Immediately after milking, the milk was taken inside the house, poured through a [REDACTED] inline milk filter, and collected in a clean mason jar.
 - b. The mason jars were cleaned beforehand with antibacterial soap and placed in boiling water for 5 minutes prior to use.
- 5) The jar containing the filtered milk was labeled with an identifier for the goat or goats and the date of milking (e.g., B 5-4 for Bertie's milk on 5/4).
- 6) The person milking the goats, before milking the next goat, washed hands and all milking equipment including buckets, filters, and funnels with hot water and anti-bacterial soap.
- 7) All equipment was washed by hand, with hot water and antibacterial dish soap, after each use and stored in a clean, covered, food-grade, plastic bucket until the next use.

The water used throughout the milking process was municipal water provided by the City of Morgan Hill. [REDACTED] stated that the milk was stored at the home refrigerator of Family A and had a shelf life of approximately one day; however, the milk did not usually last that long due to consumption patterns of Family A.

Samples Collected

The ERU investigation team collected four samples of goat feces from the goat pen area, one sample of goat feces from the area labeled "Empty Area" on the map (Exhibit A), and one sample of cow feces from the entry to the cow pen immediately adjacent to the goat pen. Claire had been in the "Empty Area" several days earlier and the feces collected there was likely from her. Additionally, the ERU team collected two jars of raw goat milk (Attachments 3 and 4). A member of the ERU team transported and submitted these eight samples to FDLB with tamper-evident seals in an ice chest with reusable ice packs on 5/6/15 for *E. coli* O157:H7 analysis.

Families B and C Residences

During the investigation on 5/5/15, the ERU team also met with [REDACTED] of Family B ([REDACTED] Lane, Morgan Hill, CA). The property of Family B contained a home with a large back yard. Ms. [REDACTED] stated that she also had permission to provide the team information and property access for Family C ([REDACTED] Lane, Morgan Hill, CA). The property of Family C had a home, a water well, and two "pen" areas on the premises. The family used these two "pen" areas to contain animals several years ago, but they have since been converted for other uses - one pen area converted into a go-cart track and the other contained a play structure for children (see Exhibit A). Ms. [REDACTED] stated that the children from Families B and C both played in the play structure area and drove go-carts in the track area. The children from Family A reportedly did not play in Family C's yard.

Ms. [REDACTED] stated that all homes on the street used municipal water supplied by the City of Morgan Hill for drinking and other household uses. Families B and C used the well on the property of Family C for landscape watering and other outdoor purposes, but not for drinking.

Samples Collected

The team collected 100 mL of well water from a spigot near the play area on the property of Family C and one sample of goat or llama feces from the play area near an open gate that lead to an adjacent property at [REDACTED] Lane (see Exhibit A and Attachment 4). A member of the investigative team submitted these samples to FDLB with tamper-evident seals in an ice chest with reusable ice packs on 5/6/15 for *E. coli* O157:H7 analysis.

Neighboring Property to Family C

While investigating the property of Family C on 5/5/15, the ERU team observed a gate on the southwest end of Family C's property that was open, allowing the goat and llama from the neighboring property ([REDACTED] Lane, Morgan Hill, CA) to enter Family C's property. Ms. Knapp stated that the goat and llama in the neighboring yard were used for vegetation control, and to the knowledge of Ms. Knapp, neither animal was used for milk. Ms. Knapp stated she did not have permission from the neighboring homeowner to grant the team access for sampling on the adjacent property. The team attempted to contact the occupants of the neighboring house several times, but received no answer. Dr. Han informed the sampling team that he would send someone from his department to collect goat and/or llama feces from the property the next day (5/6/15).

Santa Clara County Public Health - Environmental Sampling

On 5/6/15, Claire had returned to the home of Family A in a trailer after she was treated for mastitis. Santa Clara County Public Health personnel collected the feces from a trailer in which Claire was transported. In the same visit, they collected feces from the [REDACTED] Lane property left on the ground by the llama and goat that resided on the property. All of these samples were stored at the Santa Clara County Public Health Laboratory until they were sent to ERU on 5/7/15 via Golden State Overnight courier service. These samples arrived at ERU's office on 5/8/15 (Attachment 5). A member of the ERU investigative team re-packaged these samples in an ice chest with reusable ice packs and tamper-evident seals after verifying the samples. ERU delivered the samples to FDLB on 5/8/15 for *E. coli* O157:H7 analysis (Attachment 4).

Clinical Laboratory Results

Nine clinical STEC O157 isolates were identified with the indistinguishable Pulsed Field Gel Electrophoresis (PFGE) pattern combination EXHX01.0124/EXHA26.0015 (Attachment 1), and was given the Centers for Disease Control and Prevention (CDC) cluster code 1505CAEXH-1. Eight of the nine clinical isolates came from ill members of Families B and C. An additional Family C member who was symptomatic but culture negative was included as part of this outbreak investigation as a probable case. One of the outbreak pattern STEC O157 isolates came from an ill child (CA010) who was not associated with Family B or C.

On 5/7/15 IDB and Santa Clara County Public Health notified ERU of CA010. This case patient was a resident of Morgan Hill, but was not associated with either Family B or C. This case-patient consumed strawberries purchased from the same roadside stand as the other case-patients, but did not share raw goat milk exposure (Attachment 1). On 5/11/15, it was discovered by Santa Clara County Public Health officials and IDB that case CA010 was exposed to one of Family A's cows prior to illness onset, including walking in the cow's pen on the premises of Family A and petting the cow.

Santa Clara County Strawberry Farm Investigation

On 5/8/15, Santa Clara County Public Health officials, along with representatives from other Santa Clara County departments, conducted an investigation at the field in Morgan Hill where the strawberries common to all 10 cases were grown. The Santa Clara County team collected two strawberries from the stand and one strawberry from the field. Additionally, the team collected a sample of well water used for irrigation at the strawberry farm. The water and strawberry samples collected at the farm, along with the six strawberries that Santa Clara County staff had previously collected from Family C, were submitted to MDL for STEC O157 testing.

SAMPLE RESULTS:

ERU and the Santa Clara County Department of Public Health collected nine cow, goat, and llama feces samples during this investigation. Of the nine fecal samples, five (55%) tested positive for *E. coli* O157:H7 including four samples of goat feces, and one sample of cow feces (Attachment 4). PFGE analysis indicated that these five samples had a matching pattern combination to the outbreak strain; PFGE pattern EXHX01.0124/EXHA26.0015. This was an uncommon PFGE pattern combination in the PulseNet database. This evidence indicated that the clinical cases most likely acquired this strain of bacteria directly from the environment or from animals on the property of Family A.

STEC O157 was not detected in any other samples collected by ERU or Santa Clara County, including the goat milk and strawberries.

CONCLUSIONS:

In spring of 2015, an outbreak of STEC O157 occurred, involving ten children in Morgan Hill. Epidemiologic, environmental, and laboratory data suggest that the most likely source of the outbreak was exposure to animals belonging to Family A. Case-patient samples and Family A animal samples yielded the same, uncommon, outbreak strain of STEC O157.

Contributing factors for illness included insufficient hand washing after exposure to Family A's animals, including walking in the cow pen and petting the cow. Consumption of unpasteurized (raw) goat milk may have contributed to illness of some of the cases. Finally, person-to-person transmission within Family B and C households cannot be excluded as a possible transmission route as well.

Santa Clara County Public Health officials followed up with the families involved and provided guidance on hand washing and other procedures to limit exposure to possible pathogens present in animal feces and emphasized the risks associated with raw milk consumption.

SUPPORTING DOCUMENTATION:

Attachments

- Attachment 1: Case Patient Line List (1 pg.)
- Attachment 2: Santa Clara Public Health Lab Evidence Receipt and Chain of Custody – Foods (7 pgs.)
- Attachment 3: Consumer Sample Evidence Receipt (1 pg.)
- Attachment 4: Master Laboratory Reporting Sheet (4 pgs.)
- Attachment 5: Santa Clara Public Health Lab Evidence Receipt and Chain of Custody – Feces (6 pgs.)
- Attachment 6: MDL Results (1 pg.)

Exhibits

- Exhibit A: Environmental Sampling Summary Map (1 pg.)

ERU ELECTRONIC FILE LOCATION:

J:\ERU\Investigations\Investigations
2015\15016_GoatShare_Cow_SantaClaraCounty_EcoliO157H7_050415\REPORTS

ENFORCEMENT ACTIONS: NOV ISSUED EMBARGO VC&D REG LETTER REFERRAL
 OTHER: NONE

RECOMMENDATIONS: NAI MINOR VIOLATIONS / FIRM CORRECTING OTHER:

COMMENTS / FOLLOW-UP ACTION:
No follow-up is necessary from ERU.

ERU LEAD SIGNATURE:



INV.#

710

REPORT DATE:

7/20/16

SUPERVISOR SIGNATURE:



DATE REVIEWED:

SUPERVISOR DISPOSITION:

No further action indicated.

(8/28/08- ERU ACTIVITY SUMMARY FORM)