Western Slope Raw Milk Campylobacter Outbreak – Data Summary

Analysis – Updated 10/19/2009

Case definitions:

Confirmed: A person with lab confirmed Campylobacter infection with illness onset since March 15, 2009, who consumed products originating from Kinikin Corner Dairy.

Probable: A person with onset of a *compatible gastrointestinal illness* since March 15, 2009, who is epi-linked to a confirmed case or who consumed products from the Kinikin Corner Dairy within 10 days prior to onset. *Compatible gastrointestinal illness* is defined as a gastrointestinal illness lasting greater than one day with the following symptoms:

- Diarrhea accompanied by at least one other symptom: bloody stool, fever, or abdominal pain;

OR

- Three or more episodes of diarrhea within a 24-hour period.

NOTE: In the following tables, a **"primary"** case is defined as a person who meets the case definitions who has the earliest illness onset within a given household. A **"secondary"** case is person who meets the case definitions who has an illness onset one or more days after a "primary" case.

TABLE 1: Interview information

# of shareholders/consumers	201 on list provided by dairy + 7 who were not on list **TOTAL = 208**
# of shareholders/consumers interviewed	**159 (76% response rate)***
• Counties - N (%)	Delta – 12 (8) Eagle – 14 (9) Garfield – 39 (24) Gunnison – 1 (1) Mesa – 5 (3) Montrose – 35 (22) Ouray – 11 (7) Pitkin – 24 (15) San Miguel – 18 (11)
• # of persons in household	Mean = 3 Median = 3 Range = 1 - 6 (note: 3 shareholders missing household member #)
• # of people within shareholder/consumer households for whom information was gathered	372
- Age (years)	Mean = 32 Median = 36 Range = 1 - 89 (note: 24 household members missing age)
- Female – N (%)	186 (52) (note: 12 household members missing sex)

*Note: Among the 159 shareholders/consumers interviewed:

- 129 (81%) indicated they were current shareholders of Kinikin Dairy
- 29 (18%) indicated there were NOT current shareholders of Kinikin Dairy
  - These 29 persons could have received dairy products from different sources, such as a food coop, CSA, friend/neighbor, etc.
  - Some of these 29 persons were on the shareholder list provided by Kinikin Dairy; some were ascertained through the interview process with other shareholders (i.e., the shareholder provided the interviewer with the name/contact information of persons to whom the shareholder provided Kinikin products)
- 1 (1%) was unsure

TABLE 2: Interviewed shareholder/consumer food product information (N = 159)

Received Kinikin milk since Mar. 1, 2009 – N (%)	151/159 (95)
• How milk received (categories not mutually exclusive) – N (%) - Picked up directly from dairy - Picked up from some other place* - Received from someone else - Received some other way - Unsure	 39 (26) (note: 7 missing responses) 91 (60) (note: 7 missing responses) 19 (13) (note: 7 missing responses) 9 (6) (note: 7 missing responses) 2 (1) (note: 7 missing responses)
• Milk labeling – N (%) Among the 39 who noted labeling: - Labeled as raw or unpastuerized - Labeled with production or use-by date	39 (28) (note: 22 missing responses) 1 (3) (note: 2 missing responses) 29 (76) (note: 1 missing response)
• How often milk received	116 (73) weekly
• Type of milk received (options are not mutually exclusive)	147 (92) – whole milk 36 (23) – cream 4 (3) – skim milk 1 (1) – other (goat milk)
Received eggs – N (%)	26 (17) (note: 9 missing responses)
Received yogurt – N (%)	17 (11) (note: 6 missing responses)
Received kiefer – N (%)	5 (3) (note: 6 missing responses)
Received beef – N (%)	4 (3) (note: 5 missing responses)
Received pork – N (%)	0 (0) (note: 6 missing responses)
Received other products – N (%)**	13 (9) (note: 11 missing responses)
# who served/shared milk or other products with persons outside of household – N (%)	28 (19) (note: 15 missing responses)
# with anyone in household ill with GI symptoms lasting > 1 day since March 15, 2009 - N (%) (note: not all of these meet the case definition)	55 (35) (note: 2 missing responses)
# with ≥ one person in household who meets confirmed or probable case definition – N (%)	50 (31)

* Note: Other places reported include:
- Sustainable Settings co-op (39 respondents)
- Rawma co-op (19 respondents)
- Other shareholder (19 respondents)
- Other co-op (6 respondents)
- From dairy owner directly (3 respondents)
- Austin (2 respondents)
- Doctors office (1 respondent)

** Note: other products include:
- Butter (7 respondents)
- Coconut cream (4 respondents)
- Cream (2 respondents)
- Kinikin Farm Meats (1 respondent)
- Honey (1 respondent)

TABLE 3: Case descriptive data

Confirmed	**12**
• Counties – N (%)	Delta – 1 (8) Eagle – 2 (17) Garfield – 3 (25) Montrose – 4 (33) Ouray – 1 (8) San Miguel – 1 (8)
• Age (years)	Mean = 29 Median = 31 Range = 2 - 79
• Female – N (%)	5 (42)
Probable	**69**
• Counties – N (%)	Delta - 5 (7) Eagle – 2 (3) Garfield – 6 (9) Mesa – 1 (1) Montrose – 20 (29) Ouray – 10 (14) Pitkin – 10 (14) San Miguel – 15 (22)
• Age (years)	Mean = 28 Median = 32 Range = 1 - 63 (note: age missing on 4 probable cases)
• Female – N (%)	31 (48) (note: sex missing on 4 probable cases)
Confirmed + Probable	**81**
• Counties – N (%)	Delta - 6 (7) Eagle – 4 (5) Garfield – 9 (11) Mesa – 1 (1) Montrose – 24 (30) Ouray – 11 (14) Pitkin – 10 (12) San Miguel – 16 (20)
• Age (years)	Mean = 28 Median = 32 Range = 1 - 79 (note: age missing on 4 probable cases)
• Female – N (%)	36 (47) (note: sex missing on 4 probable cases)
Primary cases*	58
Potential secondary cases*	23

*NOTE: A "primary" case is defined as a person who meets the case definitions who has the earliest illness onset within a given household. A "secondary" case is person who meets the case definitions who has an illness onset one or more days after a "primary" case.

TABLE 4: Illness information (includes primary and secondary probable and confirmed cases – N = 81)

Symptom	# for whom information is available	# (%) experiencing symptom
Diarrhea	81	81 (100)
Fatigue	70	61 (87)
Abdominal pain/cramps	74	64 (86)
Fever	72	57 (79)
Chills	65	49 (75)
Headache	65	49 (75)
Body aches	66	45 (68)
Nausea	68	34 (50)
Bloody diarrhea	72	29 (40)
Vomiting	73	16 (22)
Maximum number of stools in 24 hour period	Mean = 11 Median = 10 Range = 2 – 50 (note: information available for 53 cases)	
Maximum temperature (degrees F)	Mean = 102 Median = 102 Range = 100-103 (note: information available for 21 cases)	
Illness duration (days)	Mean = 6 Median = 5 Range = 1 – 18 (note: one confirmed case reported duration of illness as 1 day; duration was missing for 1 case)	
Hospitalizations	1	
Deaths	0	

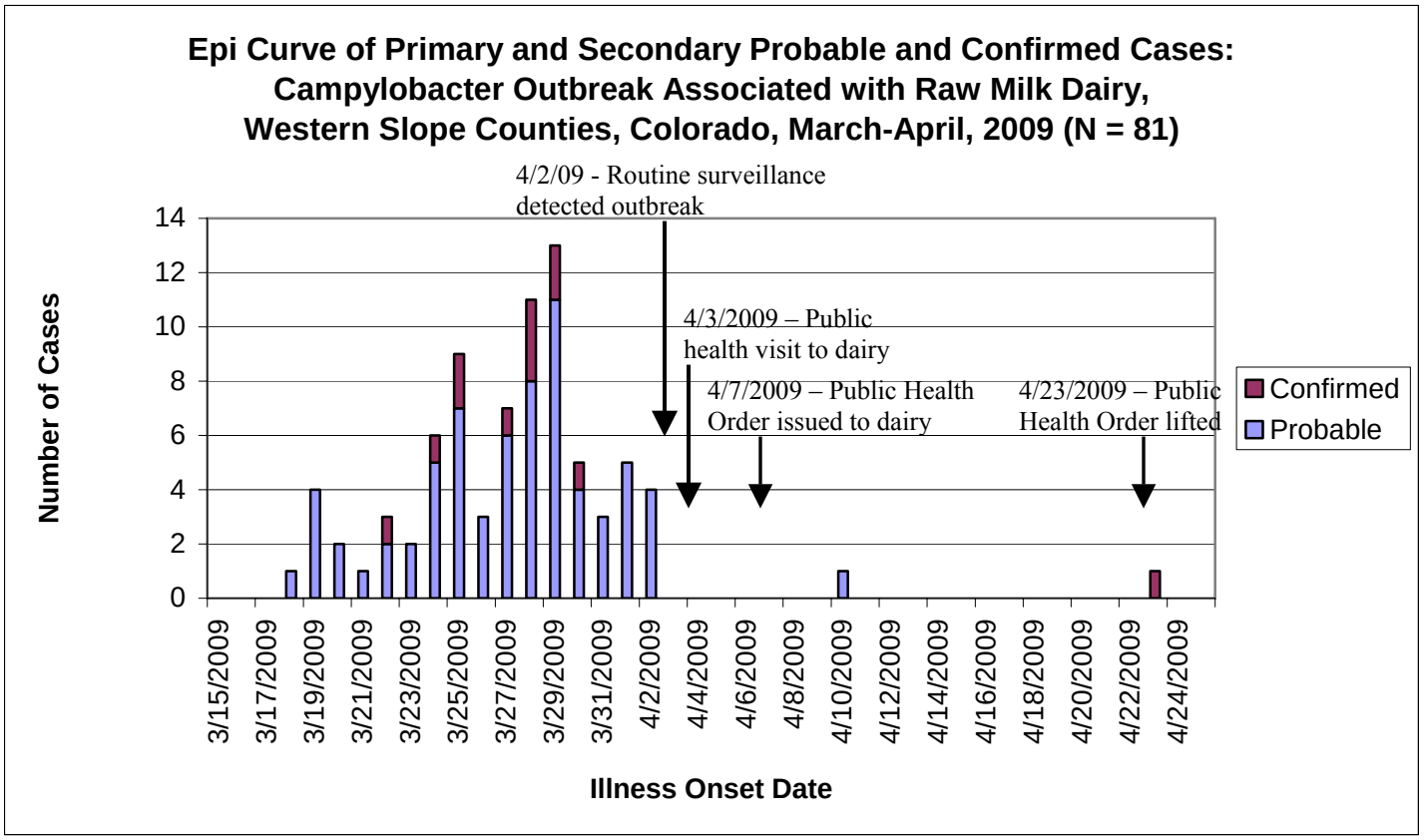

TABLE 5: Attack rates/relative risks for food products from Kinikin consumed since March 15, 2009

5A: Includes **primary and secondary** cases who meet confirmed or probable case definition and well persons (N = 372):

	ATE FOOD				NOT EAT FOOD					
Food	**Ill**	**Well**	**Total ate food**	**Attack rate**	**Ill**	**Well**	**Total not eat food**	**Attack rate**	**Relative risk**	**95% CI**
Milk	71	226	297	24%	10	65	75	13%	1.79	0.97 – 3.31
Yogurt	2	15	17	12%	75	265	340	22%	0.53	0.14 – 1.99
Kiefer	0	4	4	0%	77	277	354	22%	0	N/A
Eggs	3	29	32	9%	75	249	324	23%	0.41	0.14 – 1.21
Beef	0	2	2	0%	77	278	355	22%	0	N/A
Pork	0	0	0	0%	77	279	356	22%	0	N/A
Other Products*	5	24	29	17%	73	256	329	22%	0.78	0.34 – 1.77

* Note: other products include:
- Cream (15 respondents)
- Butter (11 respondents)
- Ice cream (1 respondent)
- Coconut cream (1 respondent)

5B: Includes **only primary** cases who meet confirmed or probable case definition and well persons (N = 349):

	ATE FOOD				NOT EAT FOOD					
Food	**Ill**	**Well**	**Total ate food**	**Attack rate**	**Ill**	**Well**	**Total not eat food**	**Attack rate**	**Relative risk**	**95% CI**
Milk	48	226	274	28%	10	65	75	13%	1.38	0.66 – 2.88
Yogurt	1	15	16	6%	54	265	319	17%	0.37	0.05 – 2.50
Kiefer	0	4	4	0%	54	277	331	16%	0	N/A
Eggs	2	29	31	6%	53	249	302	18%	0.37	0.09 – 1.44
Beef	0	2	2	0%	54	278	332	16%	0	N/A
Pork	0	0	0	0%	54	279	333	16%	0	N/A
Other Products*	3	24	27	11%	52	256	308	17%	0.66	0.18 – 2.12

* Note: other products include:
- Cream (15 respondents)
- Butter (10 respondents)
- Ice cream (1 respondent)
- Coconut cream (1 respondent)

5C: Includes **only confirmed** cases and well persons (N = 303):

	ATE FOOD				NOT EAT FOOD					
Food	**Ill**	**Well**	**Total ate food**	**Attack rate**	**Ill**	**Well**	**Total not eat food**	**Attack rate**	**Relative risk**	**95% CI**
Milk	11	226	237	5%	1**	65	66	2%	3.06	0.40 – 23.30
Yogurt	0	15	15	0%	10	265	275	4%	0	N/A
Kiefer	0	4	4	0%	10	277	287	3%	0	N/A
Eggs	0	20	29	0%	10	249	259	4%	0	N/A
Beef	0	2	2	0%	10	278	288	3%	0	N/A
Pork	0	0	0	0%	10	279	289	3%	0	N/A
Other Products*	0	24	24	0%	10	256	266	4%	0	N/A

* Note: other products include:

- Cream (13 respondents)
- Butter (9 respondents)
- Coconut cream (1 respondent)

** Note: This confirmed case responded "yes" when asked if he ever drank milk from Kinikin Dairy, but did not report consumption information for drinking milk since March 15, 2009,

TABLE 6: Milk dose-response relationship

6A: All respondents **(all ages)** who reported drinking milk and reported quantity information (N = 372): **(includes primary and secondary cases)**

Quantity of milk drank per day since March 15, 2009:	Ill*	Well	Odds Ratio**
None (reference)	10	65	1.00
< 1 cup/day	20	95	1.37
1-2 cups/day	38	100	2.47
> 2 cups/day	13	31	2.73
Mantel-Haenszel chi square for linear trend = 7.97, p = 0.005			

* Includes ill persons who meet confirmed or probable case definition
** Compares each quantity category to the reference group (None)

6B: All respondents **≥ 18 years** who reported drinking milk and reported quantity information (N = 232): **(includes primary and secondary cases)**

Quantity of milk drank per day since March 15, 2009:	Ill*	Well	Odds Ratio**
None (reference)	5	34	1.00
< 1 cup/day	12	69	1.18
1-2 cups/day	25	66	2.58
> 2 cups/day	6	15	2.72
Mantel-Haenszel chi square for linear trend = 5.43, p = 0.02			

* Includes ill persons who meet confirmed or probable case definition
** Compares each quantity category to the reference group (None)

6C: All respondents **(all ages)** who reported drinking milk and reported quantity information (N = 349): **(includes only primary cases)**

Quantity of milk drank per day since March 15, 2009:	Ill*	Well	Odds Ratio**
None (reference)	10	65	1.00
< 1 cup/day	11	95	0.75
1-2 cups/day	26	100	1.69
> 2 cups/day	11	31	2.31
Mantel-Haenszel chi square for linear trend = 5.50, p = 0.02			

* Includes ill persons who meet confirmed or probable case definition
** Compares each quantity category to the reference group (None)

6D: All respondents **≥ 18 years** who reported drinking milk and reported quantity information (N = 232): **(includes only primary cases)**

Quantity of milk drank per day since March 15, 2009:	Ill*	Well	Odds Ratio**
None (reference)	5	34	1.00
< 1 cup/day	7	69	0.69
1-2 cups/day	18	66	1.85
> 2 cups/day	6	15	2.72
Mantel-Haenszel chi square for linear trend = 4.88, p = 0.03			

* Includes ill persons who meet confirmed or probable case definition
** Compares each quantity category to the reference group (None)

TABLE 7: Reasons why people drink milk (N = 372)

Note: Categories are not mutually exclusive

Reason	N (%)
More nutritious	159 (43)
It tastes better	129 (35)
More natural	109 (29)
More creamy	51 (14)
Boosts immune system	51 (14)
Helps with allergies	33 (9)
Lactose intolerant	29 (8)
Other*	123 (33)

* Note: Other reasons:
- Healthier / health benefits and values / health reasons (39 respondents)
- Family drinks it / it's in the home (29 respondents)
- Support local products (13 respondents)
- Avoid pasteurized products (9 respondents)
- Enzymes in product (9 respondents)
- Uses it to make other products (6 respondents)
- Grew up on it (5 respondents)
- Organic (4 respondents)
- No hormones or pesticides (3 respondents)
- Safer than pasteurized milk (3 respondents)
- Cheaper (1 respondent)
- Doctor recommends (1 respondent)
- It's a good idea (1 respondent)
- Loves taste (1 respondent)