

E. coli O157:H7 Outbreak Associated with Consumption of Unpasteurized Milk, Kentucky, 2014



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Background

In September 2014, the Kentucky Department for Public Health and local health departments investigated an outbreak of *E. coli* O157:H7 infections and pediatric Hemolytic Uremic Syndrome (HUS) cases with a common exposure of consumption of unpasteurized milk.

Methods

- Interviews
 - Standard foodborne illness questionnaire
- Interview Analysis
 - Identify common exposures and establish case definition.
- Case definition
 - Any Kentuckian with a positive laboratory result of *E. coli* O157:H7, Shiga toxin detected, *E. coli* Shiga-like, and/or has a clinically compatible case of Hemolytic Uremic Syndrome (HUS) with illness onset after 8/12/14.*
- Retrospective review of exposure information
 - Results compared to the “FoodNet Population Survey Atlas of Exposures, 2006-2007”.
- State-wide active surveillance for HUS cases
- Prioritization of all *E. coli* isolates at State Public Health Lab
- Environmental assessment and environmental samples collected from a dairy which provided unpasteurized milk and milk products to a buying club common to the case patients (Dairy A and Buying Club A).

Results

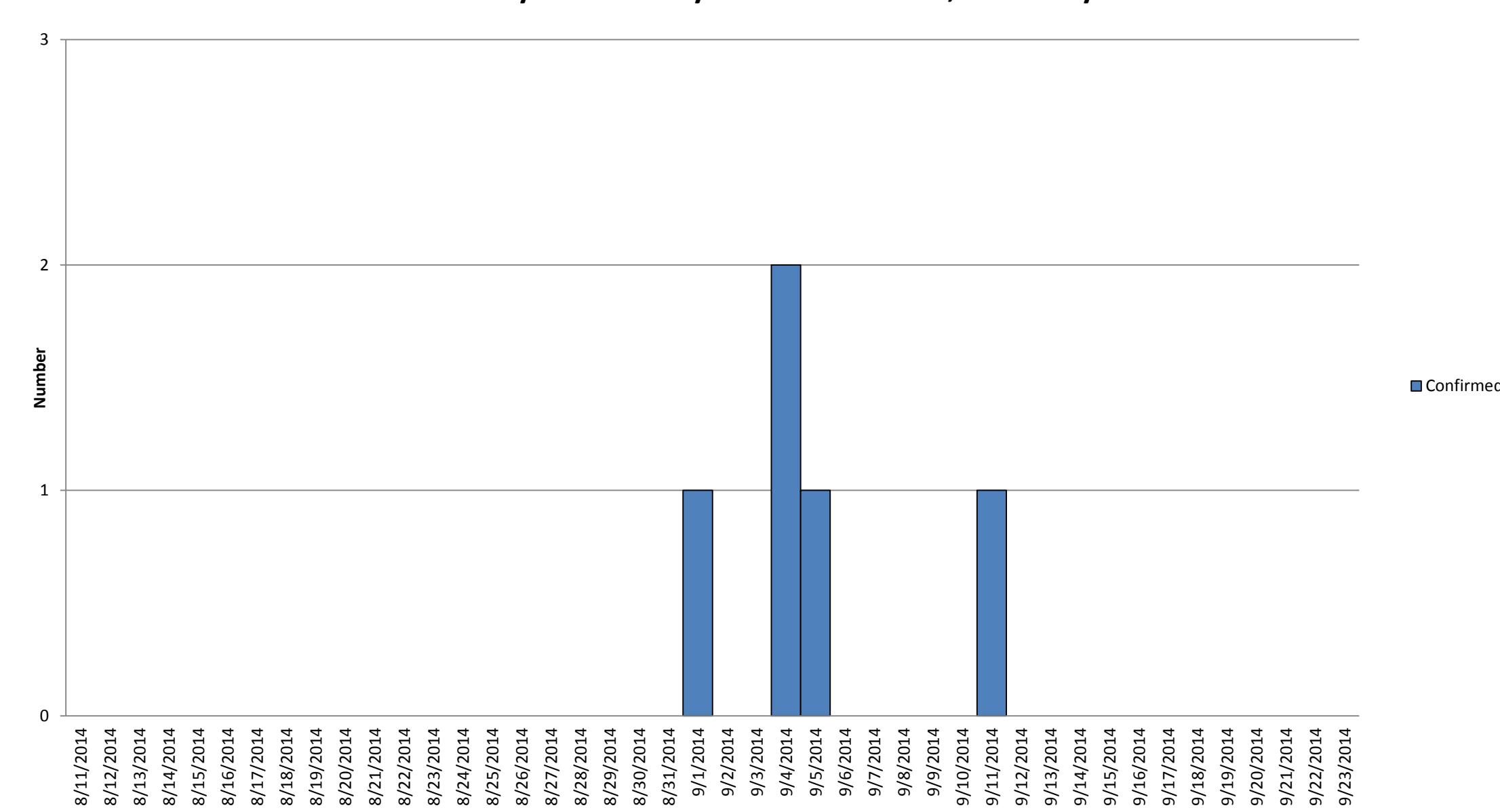
Epidemiologic Investigation

Five children from three families, residing in two counties in Kentucky, were identified as part of this outbreak.

- All cases reported consuming unpasteurized milk
- Purchased through Buying Club A, supplied by Dairy A.
- Four of the 5 cases developed HUS.
- Clinical specimens were obtained from four of the children, representing all affected families.

Food Exposure Comparison			
Product	Expected (FoodNet Population Survey)	Total Reporting Exposure (%)	Binomial Probability
Milk	78.5%	0/4 (0%)	1 (p value .000214)
Yogurt	43.3%	3/4 (75%) (no exposure info for case 4) Yogurt is reported to be purchased from either the buying club or local stores	.2193 (p value .18412)
Strawberries	45%	3/4 (75%) (no exposure info for case 4) Produce is reported to be purchased from either the buying club or local stores.	.2415 (p value .20048)
Bananas	70%	4/4 (100%) (no exposure info for case 4) Produce is reported to be purchased from either the buying club or local stores.	.2401 (p value .24010)
Ground Beef	39.8%	1/4 (25%) (no exposure info for case 4)	.8687 (p value .34732)
Watermelon	27.5%	3/4 (75%) (no exposure info for case 4) Produce is reported to be purchased from either the buying club or local stores.	.0660 (p value .06031)
Unpasteurized Milk	3%	5/5 (100%) (case 4 exposure taken from hospital notes)	.0 (p value .0)

E. coli O157:H7 and Hemolytic Uremic Syndrome Outbreak, Kentucky 2014



Results

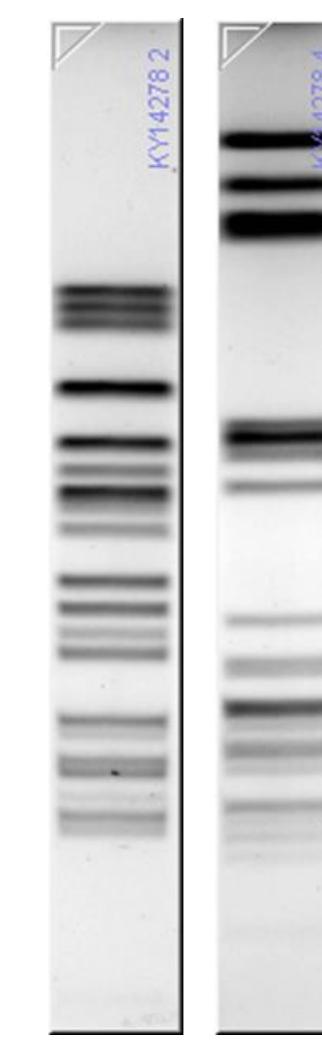
Environmental Investigation

- Buying Club A
 - The buying club sold items, such as: unpasteurized dairy products, meat, eggs, produce, etc.
 - Unpasteurized milk
 - Available to members through a cow sharing program
 - Picked up at Buying Club A
 - Membership fee paid by individuals
- Dairy A
 - Distributed products to buying groups in multiple Kentucky counties.
 - Environmental samples were collected, including manure, environmental swabs, and milk
- Milk samples from partially consumed and un-opened containers were collected from the case patients' homes.
- All 35 environmental samples collected from ill patients' homes and the dairy tested negative for *E. coli* O157:H7 and Shiga toxin.

Laboratory

- Clinical isolates
 - Identified *E. coli* O157:H7 PFGE XbaI pattern EXHX01.2401 and BlnI pattern EXHA26.0071 in 3 of 4 specimens
- PFGE pattern combination was extremely rare
 - Primary enzyme pattern (XbaI) appeared in the PulseNet database 18 times (.04% of *E. coli* O157:H7 isolates);
 - Secondary enzyme pattern (BlnI) appeared in the PulseNet database 440 times (1.0% of *E. coli* O157:H7 isolates)

This pattern combination was unique to Kentucky and to the PulseNet database.



Conclusion

- Environmental samples collected from the case patients' homes and Dairy A were negative for *E. coli* O157:H7. **HOWEVER**
- Epidemiologic evidence indicated:
 - Consumption of unpasteurized milk from Dairy A, sold through Buying Club A was the source of this outbreak.
 - Unique PFGE pattern further supported connection of unrelated case patients
 - Only link between patients was consumption of unpasteurized milk from Dairy A.

Recommendations

- Rapid investigation of ill individuals and suspected source
- Prompt environmental assessment and sample collection
- Timely public information
- Information sharing between agencies is crucial to a successful investigation
- Education about the risks of consuming unpasteurized products

Acknowledgements

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