

Outbreak of *Escherichia coli* O157:H7 in a Texas Prison

On June 26, 2000, the Texas Department of Health was contacted by infirmary staff for a correctional facility in Palo Pinto County about a cluster of inmates with bloody diarrhea. The facility houses approximately 2,500 inmates, most nearing the end of their sentences. TDH Region 2/3 staff initiated an investigation, which for security reasons required infirmary staff to distribute questionnaires for self-administration by inmates.

Of forty-five inmates who reported illness in this cluster, 16 had bloody diarrhea, and 29 had other gastrointestinal symptoms. Whether there were more inmates with non-bloody diarrhea during this time period could not be ascertained from infirmary records. Ten of the inmates with bloody diarrhea had stool specimens tested; all of these were positive for *Escherichia coli* O157:H7. Infirmary staff also collected stool for culture from 40 of 120 asymptomatic inmates who worked in the mess hall. The stool specimens from 2 of these 40 inmates were positive for *E. coli* O157:H7. None of the staff who worked in the mess hall had stool specimens tested and none reported being ill. Four non-mess hall prison staff were rumored to be ill, but none responded to TDH inquiries, and no medical providers in nearby towns reported any suspected cases.

Questionnaires were completed by all 45 ill inmates and 42 non-ill inmates (controls). More completed questionnaires were sought for non-ill inmates, but it became difficult to obtain responses from non-ill inmates after the outbreak peaked.

A case was defined as illness in an inmate who had either a stool culture positive for *E. coli* O157:H7 or at least 2 of the following: diarrhea (bloody or non-bloody), cramps, or nausea. The most commonly reported symptoms were cramps (84%), diarrhea (82%), headache (78%), weakness (73%), myalgias (69%), arthralgias (58%), nausea (56%), and fever (51%) (Table 1). All of the identified cases were male inmates. None of the ill inmates developed hemolytic uremic syndrome. During the outbreak investigation, food consumption histories focused on two weeks worth of mess hall meals. Four food items, Cajun potatoes (6/17 lunch), gravy (6/18 dinner), rice (6/18 lunch), and chili (6/18 lunch), were very strongly ($p < .02$) associated with illness (Table 2).

Table 1. Symptoms reported (n=45 patients)

Symptoms Reported	No.	%
Abdominal pain/cramps	38	84
Diarrhea (any)	37	82
Headache	35	78
Weakness	33	73
Myalgia	31	69
Arthralgia	26	58
Nausea	25	56
Fever	23	51
Lower back pain	19	42
Bloody diarrhea	16	36
Vomiting	11	24
Loss of appetite	3	7
Bloody urine	2	4

The epidemiologic curve was bimodal (Figure 1). This curve, plus pulsed-field gel electrophoresis (PFGE) evidence of person-to-person transmission, suggests early foodborne transmission and subsequent person-to-person spread. The *E. coli* O157 strains found in the 2 asymptomatic inmate kitchen staff tested were indistinguishable by PFGE (Table 3). They were also indistinguishable from isolates from two inmates with illness onset dates during the peak of the outbreak (June 21-23). A review of the job duties of the 2 culture-positive mess hall inmates indicated that neither was assigned to handle high risk foods (postcooked or uncooked). Like other inmates who worked in the mess hall, both may have been called upon to serve for short periods, although neither could recall doing so.

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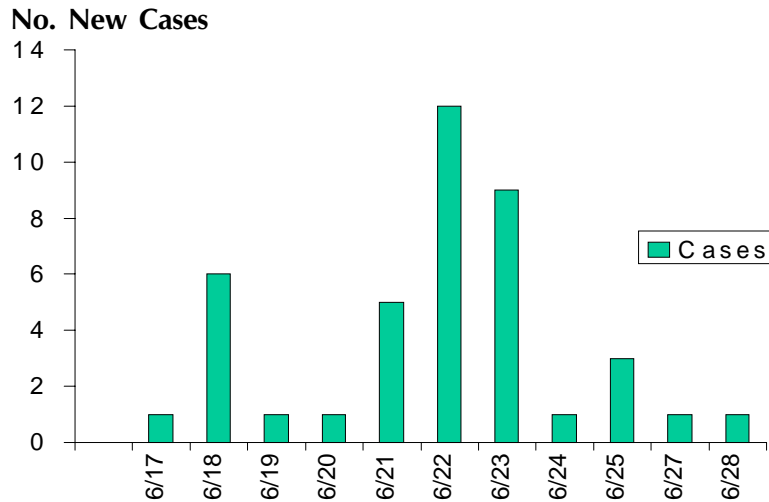
Table 2. Food History Results*

Food item/date	Odds Ratio	95% CI	X ²	P-value	Comments
Gravy, 6/18 dinner	5.57	1.25 - 28.22	6.96	0.008	
Rice, 6/18 lunch	10.24	1.19 - 230.33	6.49	0.011	2 X 2 table contained one cell with a single entry; one-tailed Fisher exact p = 0.009
Chili, 6/18 lunch	6.04	1.10 - 43.57	5.90	0.015	
Cajun potatoes, 6/17 lunch	6.00	1.08 - 43.68	5.78	0.016	
Gravy, 6/20 lunch	3.75	0.95 - 15.96	4.69	0.030	

*Only from patients with onset during the period 6/19 - 6/24

Four of the 5 *E. coli* O157:H7 strains detected in stools obtained during the outbreak were quite similar to each other. These strains—PFGE labels XB-ECH7-031, XB-ECH7-033, XB-ECH7-034, and XB-ECH7-035—are similar enough it can be concluded that they

fragments. Such a large number of differences would be caused by at least 3 genetic events; differences of this magnitude are not expected to be found in strains associated with the same outbreak.¹ The inmate whose stool specimen grew out this strain had an illness onset date in the middle of the outbreak. It is possible, but cannot be demonstrated, that there were two very different strains of *E. coli* O157:H7 in the food that caused the outbreak. The strain found in only one tested inmate could have been present at lower levels in the food or been less infective.

Figure 1. Onset Dates of *E. Coli* O157:H7: Palo Pinto County Correctional Facility, 2000

are all part of a single source outbreak.¹ The fifth strain, PFGE label XB-ECH7-032, is different from any of the other strains by more than 7 restriction

The investigators conclude that the prison could benefit from a better procedure for case finding during outbreaks and from better compliance with sanitarians' recommendations resulting from kitchen inspections, including hand-washing. Before the outbreak, the mess hall kitchen had received several poor ratings from the local city restaurant inspector, with the biggest area of concern being poor

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Table 3. PFGE results of *E. coli* O157:H7 isolates

PFGE Label	No. Inmates	Illness Onset	Respective Dormitory Room
XB-ECH7-031	4	6/21, 6/23**	772, 767, 676, unknown
XB-ECH7-032	1	6/21	779
XB-ECH7-033	1	6/23	772
XB-ECH7-034	5	6/17, 6/18, 6/21, 6/22, 6/22	751, 756, 751, 751, 770
XB-ECH7-035	1	6/23	770

** The other 2 inmates, mess hall workers, were asymptomatic

Guide for Health Authorities in a Public Health Emergency

The Office of General Counsel has published *Communicable Disease Control Measures in Texas: A Guide for Health Authorities in a Public Health Emergency*. This publication was developed in the wake of the anthrax mailings and widespread desire to be prepared for bioterrorism expressed by local health authorities and the commissioner. The book delineates Texas laws that could be used to combat an outbreak or incident of communicable disease from any cause.

It consists of a short "Question and Answer" introduction to the laws; forms and instructions to accompany each of the four types of control measures (they may be imposed on individuals, property, an area, or common carriers); and an appendix containing the text of the laws.

The issue of state and local government's ability to combat bioterrorist attacks has received a large amount of publicity and generated the "Model State Emergency Public Health Act" which has been considered in some state legislatures. The Texas laws allow health authorities to investigate, isolate or treat infected individuals, property, or areas. They are among the oldest laws in the Health and Safety Code, but those on mandatory treatment of individuals were revised in the 1980s to incorporate modern due process concepts.

The 2002 Guide is intended to assist health authorities in carrying out their duties under the Communicable Disease Prevention and Control Act. Whether an outbreak of a communicable disease occurs from a natural biological event or a terrorist act, the health and safety of citizens throughout the State depend on health authorities who must use their medical judgement to order and enforce the best public health practices. Implementing control measures such as individual or area quarantines requires close coordination with the city, county, or district attorney as well as law enforcement officials. Procedures described in the Guide may be customized to fit the particular circumstances and control measures needed.

The Guide has five sections: Common Questions and Answers on the Imposition of Control Measures, Control Measures for Individuals, Control Measures for Property, Control Measures for Area, and Control Measures for Common Carriers. Included are model orders/forms, directions for their use, and reference material on Texas law.

An electronic version of the Guide, with downloadable forms, is at www.tdh.state.tx.us/phpep/lha.

For further information contact the Office of Public Health Practice at 512/458-7770.

St. Louis Virus Arrived this Year in June

St. Louis encephalitis virus was isolated from *Culex quinquefasciatus* mosquitoes collected 6/11/02 in Nueces County by Corpus Christi-Nueces County Public Health District Vector Control. Both St. Louis encephalitis virus and West Nile virus are arthropod-borne Flaviviruses that are transmitted to humans and other animals via mosquitoes.

For further mosquito information contact Paul Fournier, MPH, BCE, Supervisor, TDH Entomology Branch at 512/458-7615, e-mail: paul.fournier@tdh.state.tx.us. For questions regarding human illness, contact your local health department or Erik Svenkerud, MD, at 512/458-7455 or erik.svenkerud@tdh.state.tx.us.



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handwashing compliance. Prison administrators were given literature and recommendations for controlling person-to-person transmission of disease in institutional settings, including material to use for handouts given to inmates.



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Reference

1. Tenover FC, Arbeit RD, Goering RV, Mickelsen PA, Murray BE, Persing DH, and Swaminathan B. Interpreting Chromosomal DNA Restriction Patterns Produced by Pulsed-Field Gel Electrophoresis: Criteria for Bacterial Strain Typing. *J Clin Microbiol* 1995;33:2233-2239.

West Nile Virus Detected in Texas

"West Nile Virus: A Risk in Texas?" is the title for the April 22, 2002, *Disease Prevention News* feature article. On June 19 Harris County public health officials answered that question in the affirmative with their announcement that West Nile virus (WNV) has been confirmed in 2 blue jays in their county. This is the first confirmation of the mosquito-borne virus in Texas. State and local public health officials have been conducting an expanded surveillance program since 2000, searching for the virus in mosquitos, blue jays, crows, and other animals. The surveillance has been concentrated in the eastern part of the state. No human WNV cases have been reported in Texas.

The April 22 DPN features an indepth WNV report, which includes symptoms of various arboviral encephalitides, differential diagnosis, diagnostic laboratory tests, instructions for laboratory submission of samples for testing, and primary prevention measures. Access this issue online at www.tdh.state.tx.us/phpep/dpn/ISSUES/dpn62n09.pdf.

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