MULTI-STATE OUTBREAK ATTRIBUTED TO *SALMONELLA BRAENDERUP*
JOHNSON, DOUGLAS, AND FORD COUNTY, KANSAS
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Introduction

In late June 2004, two clusters of three cases each (N=6) of *Salmonella braenderup* were diagnosed in Kansas. One cluster was located in Johnson County (Northeast Kansas) and the other in Ford County. The six cases had the same pulse field gel electrophoresis (PFGE) pattern and were later linked using the same technique to approximately 137 cases in 19 states.

The Center for Disease Control and Prevention (CDC) coordinated the investigation of cases due to the multi-state nature of the potential outbreak. The CDC decided to conduct a case control study using a survey they developed. The Kansas Department of Health and Environment conducted a separate investigation in conjunction with the two local health departments in the counties where the cases were located.

The information that follows describes the investigation of the two clusters in Kansas by the Epidemiology Services Section (ESS) of the Kansas Department of Health and Environment (KDHE).

Cluster One – Northeast Kansas

Epidemiologic investigation

On June 30, 2004, the ESS received telephone notification from the Johnson County Health Department (JCHD) of a foodborne illness complaint concerning Restaurant X located in their county. The complainant ate at Restaurant X on June 25th, and reported symptoms of fever, vomiting, abdominal cramps and diarrhea beginning approximately 20 hours later. A stool sample from this individual cultured positive for *Salmonella braenderup*

On July 6, an epidemiologist from JCHD reported another positive *Salmonella* isolate from a patient at Medical Center Y. The patient reported eating at Restaurant X on the

night of June 25th and became ill on July 3rd. The patient ate the same dish as the first case.

JCHD epidemiologists interviewed the kitchen workers at Restaurant X on July 9. One of the cooks reported having diarrhea beginning June 26th. At this point the epidemiologists requested that all cooks submit a stool sample for culture. The cook who reported symptoms was the third case in the cluster. The cook initially stated that he ate the same dish as the two other cases but later denied this statement.

JCHD completed a seven-day enteric questionnaire on all three cases. KDHE forwarded information obtained from the questionnaires to the CDC. However, the state and local health department continued our own investigation.

Environmental investigation
Johnson County Environmental Health conducted an inspection of Restaurant X shortly after receiving the complaint in their office on June 29th. This inspection found two temperature violations for meat storage. Inspectors conducted a Hazard Analysis Critical Control Point (HACCP) inspection at the restaurant on July 7th. During this inspection, the inspectors observed kitchen staff preparing the dish implicated by two of the cases. All critical control points observed were in compliance with the critical limit.

Laboratory investigation
Only the stool culture from the symptomatic cook at Restaurant X tested positive for *Salmonella braenderup*. This isolate and the isolates from the previous two cases had the same PFGE patterns.

Cluster 2 – Ford County, KS
Epidemiologic investigation
On July 8, the Ford County Health Department (FCHD) called the ESS hotline to report on three individuals who became ill after eating at a back yard barbeque. All three cases were infected with *Salmonella*, but at the time the serotype was unknown. The barbeque took place on June 27th, and all three cases became ill on June 28th. Two of the individuals were hospitalized on June 28th and the third was hospitalized on June 30th. The two cases hospitalized on June 28th were roommates and both worked together at a meat packing plant.

The FCHD completed seven-day enteric questionnaires on two of the cases. The FCHD attempted to contact the third case, but was unsuccessful after several attempts. After FCHD completing the initial questionnaires, they attempted to contact the cases to follow up for the multi-state outbreak. The cases were uncooperative with the FCHD. The regional Medical Investigator from KDHE attempted to contact all three cases to follow up, but was also unsuccessful. KDHE and FCHD both made attempts to contact the individual who had held the barbeque to obtain a menu of the items served. Despite repeated attempts, we never obtained this information.

Environmental investigation
Not applicable

Laboratory investigation
The three cases from Ford County grew out *Salmonella braenderup* and were matched by PFGE to the three cases in Johnson County by the KDHE Laboratory. On July 13, the KDHE Lab Molecular Biologist retrieved information from Pulse-Net confirming that the cases in Ford County matched six cases in Pennsylvania at one enzyme using PFGE. These three cases were later matched to the cases in Northeast (NE) Kansas.

Conclusion
The cases in Ford County did not report leaving the county for several days prior to onset of symptoms, and the Johnson County cases did not report leaving that area. It is therefore highly unlikely that the two clusters had any interaction with one another prior to the onset of illness. We could not find any common association between the two clusters.

The common food dish was associated with the first cluster, however it was unclear whether the meat storage violations affected the implicated dish. The restaurant employee was infected at Restaurant X but we were not definitively able to connect him with the implicated food dish. Although the second case ate at Restaurant X, the incubation period for *Salmonella* is not consistent with the restaurant as the source of infection. Our investigation did not uncover a cause for the outbreak in Johnson County.

We were not able to uncover the cause of the Ford County cluster either. Our investigation in Ford County was hampered by the lack of cooperation on the part of the host of the barbeque and the cases in Ford County. Despite the difficulty we had in our investigation we continued to work with the CDC on the multi-state investigation.

Multi-State Information

On July 21, 2004, the CDC held a conference call to discuss the multi-state outbreak of *Salmonella braenderup*. Participating in the call were representatives from the states of Kansas, Pennsylvania, Massachusetts, and Virginia, as well as the CDC. A total of 56 suspected or confirmed cases were identified, with approximately 37 of those cases matched through PFGE. In Massachusetts, a common supplier of produce to several restaurants implicated by cases was investigated as a possible source of contaminated product.

The CDC outbreak investigation team asked KDHE to obtain a menu for the party held in Ford County, detailed food histories for all confirmed cases in both clusters, an ingredients list for the dish that was consumed by two of the cases in NE Kansas, and to determine the types of produce used in the dish and the suppliers of the produce. KDHE asked Johnson County Environmental Health to assist with this portion of the investigation.

The CDC developed a questionnaire and designed a case control study to conduct for the multi-state investigation. The questionnaire was sent out on 7/23/04 to participating states, and each state was asked to enroll two controls for every case using a random digit dial method of enrolling the controls. In Kansas, the CDC enrolled ten controls for five of the cases; KDHE enrolled two controls for one of the cases.

KDHE completed the CDC questionnaire with the first reported case by direct interview. The CDC completed the questionnaire with the second case and attempted to contact the kitchen worker from Restaurant X. After several attempts to contact the kitchen worker, he finally refused to complete the CDC questionnaire. The Ford County cases also refused to complete the CDC questionnaire.

Results

CDC held several additional conference calls with participating states. CDC postulated that Roma tomatoes might have been vehicles for infection, based on information from all states involved in the outbreak. On July 30th and August 3rd, JCHD sent KDHE order information from Restaurant X and began a traceback investigation on suppliers of Roma tomatoes, an ingredient in the dish implicated by the first two cases. Restaurant X used two different suppliers. A KDHE epidemiologist contacted both suppliers to determine the source of the tomatoes in question. One supplier received the produce from Mexico, and one from a distributor in California.

From the information KDHE has received thus far, Roma tomatoes are still implicated as the vehicle for the bacteria. Approximately 21 states and upwards of 137 cases are suspected or confirmed to match. We do not have the final results of the study.