# Health Service Regions Outbreak Investigations

# Epidemiology in Texas 2006 Annual Report

Public Health Regions Outbreak Reports

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# Health Service Region 2/3

## Hepatitis A Outbreak in North Texas

### Introduction

Health Service Region 2/3 of the Texas Department of State Health Services recently had an outbreak of hepatitis A between September 7, 2006 and October 10, 2006. The outbreak involved 8 laboratory-confirmed cases identified in 2 schools (noted as School A and School B). An unusual part of this outbreak is that all cases were male students, 11-15 years of age. Upon completion of an investigation, no common source of infection could be found. However, HSR 2/3 did recommend control measures such as proper hand washing, testing symptomatic food service workers, and providing prophylaxis and immunizing close contacts of confirmed cases.

### The Investigation

The Texas Department of State Health Services (DSHS), Health Services Regions (HSR) 2/3 received a report from one of its field offices of 2 laboratory-confirmed cases of hepatitis A on September 7, 2006. The cases were siblings with a recent travel history abroad 1 month prior to the onset of symptoms. The field office staff had obtained the information from a caseworker of a social service agency assisting the family of these patients. These 2 patients attend school A in HSR 3. We investigated these cases and subsequently provided immune globulin (IG) to 3 members of the household as prophylaxis.

(Health Service Regions map)

On October 2, 2006 a nurse from our field office called an epidemiologist of the HSR2/3 to report 2 more suspected cases of hepatitis A in school A. One of these cases was a student with special needs. These additional 2 cases were subsequently confirmed as hepatitis A. On October 3, 2006 another laboratory-confirmed case was reported from the same school.

On October 23, 2006 a school nurse from school A called to report a new case of hepatitis A in a male 14 years of age. The patient's onset was October 14, 2006. Confirmatory laboratory results were received in HSR 2/3 office on October 24, 2006. His girlfriend became symptomatic with influenza-like symptoms on October 14, 2006. Her laboratory tests for hepatitis A were negative.

On October 25, 2006 another 14 year old male child was diagnosed with hepatitis A. This patient attends school B. His onset was October 21, 2006. He presented with vomiting, fever, fatigue, jaundice, dizziness, and headache. He was a laboratory-confirmed case of hepatitis A. On October 26, 2006 HSR 2/3 received another report of a laboratory-confirmed case of hepatitis A from school A. This patient's onset was October 23, 2006. He was symptomatic with vomiting, fever, fatigue, and jaundice.

### Methods

We constructed an outbreak case definition. A case was defined as a student or employee of school A or school B having fever, nausea, vomiting, diarrhea and /or jaundice, and being anti-hepatitis A virus (HAV) IgM antibody positive since August 31, 2006. We obtained information from infection control practitioners, parents of cases, school nurses, and the caseworker of the social service agency. We did not

use any questionnaire to obtain information from the cases, but we interviewed the families.

We identified 8 cases of hepatitis A in students attending school A or school B. They were all anti-HAV IgM antibody positive. All laboratory-confirmed students were males. The patients' ages ranged from 11 to 15 years. We constructed an epidemiologic curve **(Figure 1)**.

**School Kitchen Inspection**

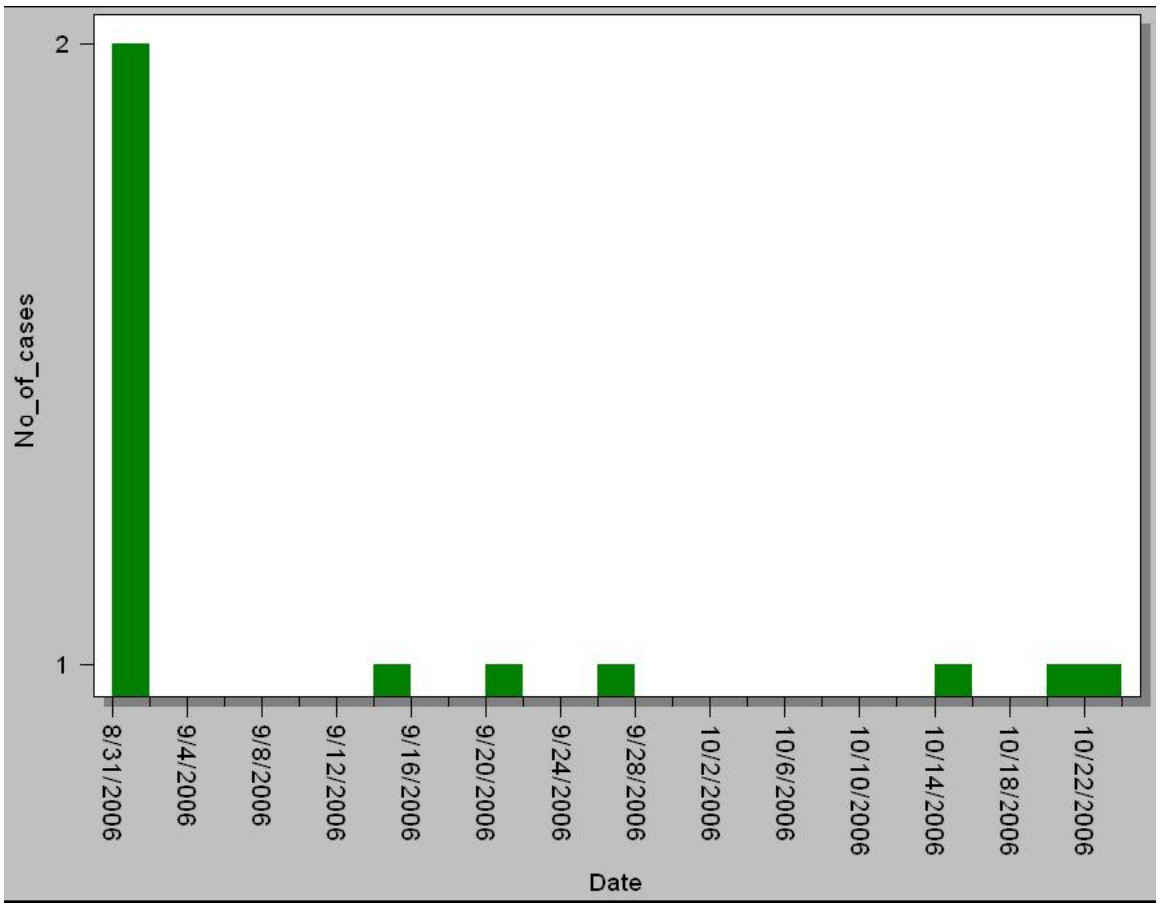
On October 4, 2006, an inspection of the food service area in School A was conducted by the city sanitarian along with an epidemiologist from HSR 2/3. This inspection consisted of a walk through of the food preparation area, service line, and an interview of the cafeteria staff. The inspection of the food preparation area and service line revealed that workers were following proper procedures when handling food and food service items.

**Results**

The interview of 7 workers revealed that one worker was at work while having diarrhea, nausea, and abdominal pain. Her onset date was September 27, 2006 and did not prepare food after September 28, 2006. The worker was excused from work until her laboratory results were finalized. On October 5, 2006, we learned that worker was negative for hepatitis A. She subsequently returned to work.

On October 6, 2006 we received a report that another cafeteria worker

**Figure 2. Epidemiological curve, Hepatitis A outbreak**



presented with signs and symptoms similar to those of the first cafeteria worker. The report was investigated on October 6, 2006. Her onset of symptoms was October 4, 2006. Her last day of food preparation was October 5, 2006. The laboratory specimen of this worker was obtained by our field office nurse on October 9, 2006 and sent to DSHS laboratory in Austin. Her laboratory results were also negative for hepatitis A.

**Control Measures**

The school administration sent letters to the parents of students attending school A and school B informing about the hepatitis A outbreak. They stressed on proper hand washing by students. It was recommended by the Regional Medical Director of HSR 2/3 that household contacts of the confirmed cases and close contacts of the special needs child from school A should be vaccinated and given IG. In compliance with the recommendation, on October 6, 2006, 26 persons were given IG and the vaccine against hepatitis A. The field office carried out these vaccinations. On November 1, 2006, 7 more close contacts of the other cases were immunized with hepatitis A vaccine and immune globulin by the field office staff.

**Recommendations**

- School administration should notify HSR 2/3 staff of any additional cases.
- Enforce proper hand washing by ensuring soap or antiseptic hand cleaner is readily available to staff, students, and cafeteria workers.
- School administration should encourage staff, students, and cafeteria workers to remain at home if ill.

**Conclusions**

Upon completion of our data collection, investigations, and interviews, we were unable to identify a common source of this outbreak. The control measures implemented included immunizing the close and at risk contacts of cases and stressing the importance of proper hand washing. The symptomatic food service workers were excluded from work until they were symptoms free or laboratory tests negative. The case finding continues to date.

*Prepared by Health Service Region 2/3, (817) 264-4500*

# Health Service Region 2/3

## Salmonellosis Outbreak in HSR 2/3

### Introduction

On November 19, 2006 an epidemiologist of the Texas Department of State Health Services (DSHS) Health Services Regions (HSR) 2/3 received a phone call from the infection control practitioner (ICP) of hospital A. She notified DSHS staff of an outbreak of gastroenteritis among attendees of a Thanksgiving luncheon at elementary school A in Granbury, Texas. The epidemiology department of the HSR 2/3 conducted an investigation.

### Background

Granbury is located in Hood County. According to the United States Census, the city population in 2000 was 5,718. The Independent School District (ISD) consists of 12 campuses, which includes elementary school A. It has an enrollment of approximately 505 students.

Approximately 600 people were served Thanksgiving luncheon on November 16, 2006 at elementary school A. Invited guests included students and their family members.

At about 6:30 p.m., the first ill attendees of the luncheon arrived at hospital A with symptoms of nausea, vomiting, diarrhea, abdominal cramps, and fever.

On November 20, 2006, the ICP of hospital A provided an initial list of 54 patients with similar symptoms who were treated there. Of these 54 patients, 3 were laboratory-confirmed for *Salmonella* Newport. On November 21, 2006, the ICP provided us another list with a total number of 61 patients. On November 22, 2006 we received a thrid list of patients. The total number of treated patients at the hospital was then 62.

### Methods

*Epidemiological Investigation*

The Thanksgiving luncheon was served by the food service workers and by some of the parents. There were 2 service lines. The adults were served on 1 line and the students were served from the other. The same food items were served in both lines. The menu included turkey, dressing, green beans, gravy, mashed potatoes, sweet potatoes, fruit salad, rolls, water, iced tea, milk, and other beverages. The food items were prepared at elementary school A by the cafeteria staff.

We interviewed ill and well people who attended the luncheon using a questionnaire about the food items they consumed. The director of the food service contractor (which provides the staffing for the cafeterias in the ISD) notified us that 2 food service workers were also symptomatic. The food service workers reported they became symptomatic after the event. Repeated efforts made to reach 1 of the food service workers to assist us in the investigation were unsuccessful. We were able to contact the other food service worker and learned she became symptomatic on November 17, 2006.

*Laboratory Investigations*

A total of 9 patients, 7 attendees, and 2 food workers provided stool specimens that were laboratory tested. All 9 specimens grew out *Salmonella* and the isolates were sent to the DSHS

laboratory in Austin for serotyping and Pulsed Field Gel Electrophoresis (PFGE).

On November 20, 2006 the city sanitarian collected samples of leftover items from the menu; trays of turkey, gravy, fruit salad, and dressing were sent them to the DSHS laboratory in Austin for testing. Only the dressing was tested. The size of gravy sample was too small for testing and the other items were not implicated as being a source of *Salmonella.*

*Case Control Study*

Once data had been collected, preliminary findings indicated that the illness could have been due to some food item(s) consumed at the event. We conducted a case-control study to test our hypothesis. A case was defined to be a person of any age who ate at the Thanksgiving luncheon at the Elementary School A on November 16, 2006 and developed nausea, vomiting, or diarrhea within 72 hours.

We selected 40 cases who met the case definition from the list that was provided by the ICP of hospital A. We randomly selected 40 controls from a list obtained from ISD administration that included students and staff who attended the luncheon but did not become ill (controls were verified by asking if they ate the meal in question). The questionnaire included demographics, signs and symptoms, laboratory results, treatment history, names of other ill persons, and food exposure items. The questionnaires were administered by telephone. The data were analyzed using 2x2 tables and chi-square statistical testing after telephone interviews of 40 cases and 40 controls.

**Results**

*Epidemiological Investigations*

While interviewing patients from the list received on November 22, 2006 we asked them to give us the names of others who ate at the Elementary School A luncheon and became symptomatic. As a result of these interviews we identified a total of 77 cases that met the definition. Their ages ranged from 9 months to 70 years (mean 23, median 27). A line listing and an epidemic curve was created **(Figure 1** and **Table 1)**.

*Laboratory Investigations*

The specimens for the 7 attendees and the 2 symptomatic food workers grew out *Salmonella*. There were 4 adults (including the 2 food service workers) and 5 children. All of these specimens were serotyped at the DSHS laboratory in Austin. The serotyping revealed that all 9 were *Salmonella* Newport. Pulsed Field Gel Electrophoresis (PFGE) was also performed on 5 isolates and the pattern matched for all 5 specimens. This pattern has been identified in other isolates in the state before. The city sanitarian collected food samples of food items served during this event. From these samples, only the dressing was tested and the specimen did not yield *Salmonella*.

*Case-Control Study*

We calculated odds ratios (OR) to estimate the association of each food item exposure with the disease. We also calculated 95% confidence intervals for each item.

*Statistical Analysis Results*

Of the food items served and consumed, the only exposures

(Continued ☞)

**Figure 1. Epidemic curve (date of onset of illness plotted against number of cases)**

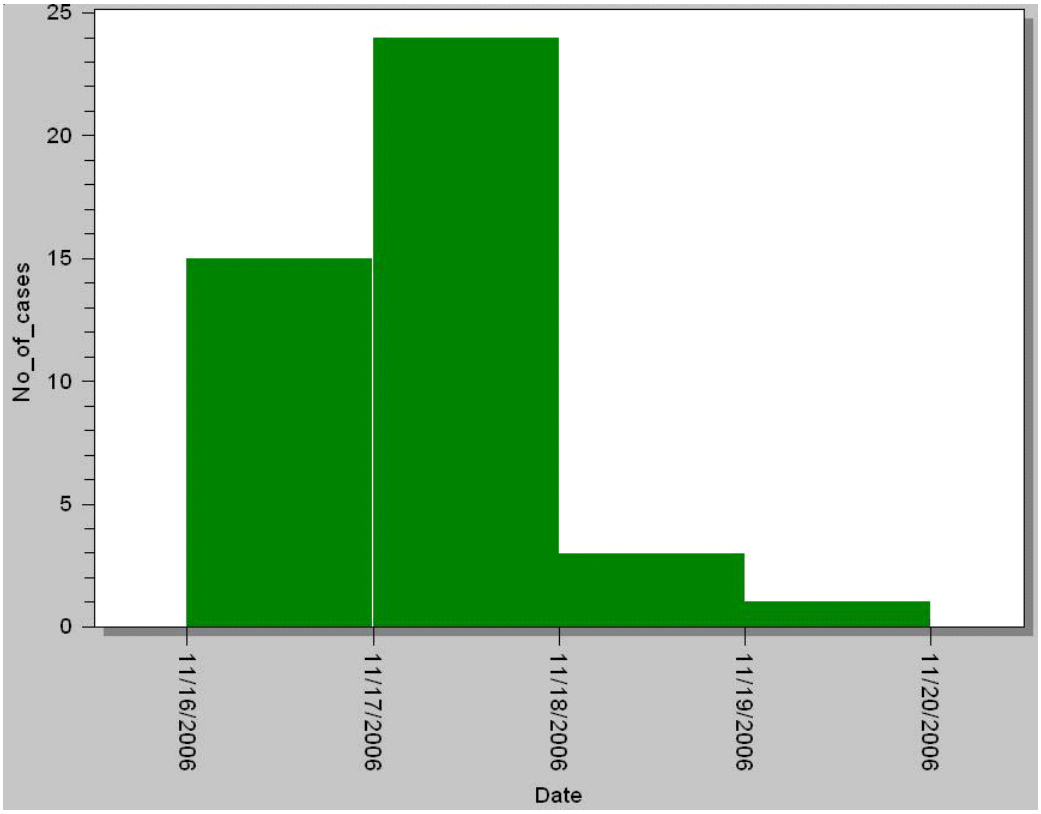



**Table 1. *Salmonella* outbreak case control study**

| | Cases | | | Controls | | | | |
|---|---|---|---|---|---|---|---|---|
| Food Item | Ate | Did not Eat | Attack Rate | Ate | Did not Eat | Odds Ratio | 95% CI | p-value |
| Turkey | 38 | 2 | 95% | 33 | 7 | 4.0 | 0.7-30.4 | |
| Dressing | 37 | 3 | 92.5% | 37 | 3 | 1.0 | 0.2-6.8 | |
| Green Beans | 24 | 16 | 60.0% | 20 | 20 | 1.5 | 0.6-4.0 | |
| Water | 0 | 40 | 0.0% | 1 | 39 | 0.0 | 0.0-17.7 | |
| Milk | 12 | 28 | 30.0% | 22 | 18 | 0.4 | 0.1-1.0 | |
| Gravy | 32 | 8 | 80.0% | 22 | 18 | 3.3 | 1.1-10.0 | 0.017 |
| Mashed Potatoes | 34 | 6 | 85.0% | 26 | 14 | 3.1 | 0.9-10.4 | |
| Fruit Salad | 19 | 21 | 47.5% | 18 | 22 | 1.1 | 0.4-2.9 | |
| Iced Tea | 25 | 15 | 62.5% | 8 | 32 | 6.7 | 2.2-20.9 | 0.0001 |
| Ice with Beverage | 20 | 20 | 50.0% | 12 | 28 | 2.3 | 0.9-6.5 | |
| Roll | 23 | 17 | 57.5% | 28 | 12 | 0.6 | 0.2-1.6 | |
| Sweet potatoes | 14 | 26 | 35.0% | 16 | 24 | 0.8 | 0.3-2.2 | |

significantly associated with illness were gravy (OR= 3.3, 95% CI = 2.0-10.0 p-value = 0.02) and iced tea (OR = 6.7, 95% CI=2.2-20.9, p-value 0.00).

**Control Measures**

The symptomatic food service workers were removed from their food handling duties on December 7, 2006. They were not allowed to perform any food handling duties until 2 consecutive stool specimen were negative. One of the food service workers has had 2 successive stool specimens that were negative. The worker who had 2 *Salmonella*-positive stool samples no longer works at the school cafeteria.

**Discussion**

The iced tea and gravy were associated with gastrointestinal illness as food items consumed. Leftovers of these items were either not available or not available in sufficient quantities for testing and *Salmonella* was not detected in the dressing specimen tested by the laboratory. The food service workers were identified, but they became ill after eating the same food.

**Conclusion**

There were 9 laboratory-confirmed cases of *Salmonella* Newport. The food service workers who were positive for *Salmonella* infection became symptomatic after eating the same food as those who attended the luncheon. Therefore we cannot assume that they were sources of contaminating the food items. We implicated 2 food items after statistical analysis, but samples of these items were inadequate and not tested.

*Prepared by Health Service Region 2/3, (817) 264-4500*

# Health Service Region 7

## Salmonellosis in a Central Texas Rodent Breeding Facility

### Background and Preliminary Findings

In May 2006, the Texas Department of State Health Services (DSHS) was contacted by the Minnesota Department of Health (MDH) about a cluster of *Salmonella* Typhimurium cases. The MDH was investigating a cluster of 6 Minnesota residents with identical subtypes of *S.* Typhimurium with illness onset occurring from December 2005 through March 2006. Four of the 6 individuals were children in the same junior high school class. Preliminary investigations identified frozen mice as the possible source of infection for the 4 children. Environmental samples were collected in the students' classroom. The classroom snake, classroom surfaces, and frozen mice used to feed the snake tested positive for the same strain of *S.* Typhimurium. The remaining 2 Minnesota cases did not report contact with rodents or reptiles. The frozen mice were ordered from a rodent vendor in Central Texas.

A search on PulseNet by the MDH revealed 6 additional cases from other states with this same rare strain of *S.* Typhimurium. Pulse Net is a national network of public health and food regulatory agency laboratories coordinated by the Centers for Disease Control and Prevention that maintains an electronic database of molecular subtyping results for select food-borne pathogens including *Salmonella*. At the time of the investigation, this particular molecular strain had only been reported 41 times in the PulseNet database. Of the 6 additional cases, 2 cases, 1 from Michigan and 1 from Pennsylvania, were linked to reptile or rodent contact. Both cases had a link to frozen rodents from the same vendor in Texas as the Minnesota students.

(Health Service Regions map)

### Investigation of the Rodent Facility

The Texas Office of the State Chemist, Feed, and Fertilizer Services (FFS) regulates pet food production. FFS was designated the lead agency for the site visit and for ensuring compliance. DSHS addressed the public health concerns and collected environmental samples to ascertain the presence of *Salmonella* at the facility.

A field team consisting of 6 people conducted a site visit 5 days after receiving notification of the cluster of human cases. The field team consisted of 4 DSHS Health Service Region 7 personnel, and 1 representative each from FFS and the Food and Drug Administration (FDA). The DSHS team consisted of the Regional Medical Director, 2 epidemiologists, and a zoonosis control specialist.

The facility consisted of 2 small buildings. One building had a single room used for rearing rats. The second building had 3 separate rooms for rearing mice and rats and for storage. The rats and mice were reared in plastic trays the size of a standard cat litter box with a lid made of wood and mesh wire. These trays were on racks ranging from 5 to 6 shelves high **(Figure 1**).

In order to determine if *Salmonella* was present at the Texas vendor's facility, the inspection team used the layout of the facility to create a grid map for random sampling of the rodent trays. Forty-nine environmental samples were collected using a combination of swabs and

**Figure 1. Photo of one of the rooms at the rodent facility.**

scoops. Swabs of select trays were placed in Cary-Blair Culture Medium or were obtained using SpongeSicles™. Three samples of tray shavings were taken from each building. A water sample was collected from the mouse room. Two ill and 2 recently dead mice were collected. Four packages of frozen rodents were also collected.

Environmental samples were submitted to the DSHS laboratory for culturing. Rodents were submitted to the Texas Veterinary Medical Diagnostic Laboratory for pathology and culture. Positive *Salmonella* isolates from both labs were analyzed at the DSHS laboratory using pulsed-field gel electrophoresis (PFGE) and the patterns of these isolates were compared to 2 PFGE patterns from the cluster of human cases in Minnesota.

**Results**

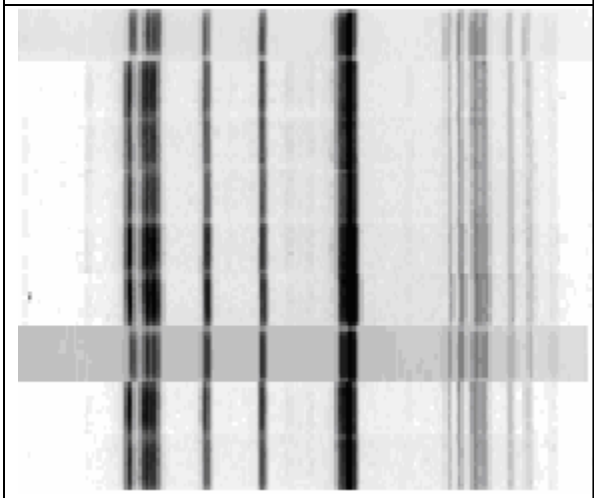
Of the 49 environmental samples collected by DSHS, 7 were positive for *Salmonella* Typhimurium. All feed samples, the water samples, and the ill or recently dead mice collected by DSHS were negative for *Salmonella*. Of the 88 frozen rodents collected by FFS, 1 was positive for *S.* Typhimurium.

The confirmed *S.* Typhimurium isolates were typed as XB-SL-TM-118. The PFGE patterns from the Texas vendor site were identical matches to the PFGE patterns from the human cases in Minnesota **(Figure 2).**

**Conclusions and Public Health Recommendations**

The laboratory results demonstrated that the strain of *Salmonella* at the Texas vendor site was the same strain responsible for the 12 human cases of salmonellosis in 7 states. Therefore, this vendor facility was concluded to have been the source of *Salmonella* infection of those case-patients who had exposure to rats or mice from the facilities, either directly or through a

**Figure 2. PFGE patterns of isolates from rodent-associated salmonellosis investigations in Minnesota and Texas**

| PFGE XbaI Pattern | State | Collection Date | Subtype |
|---|---|---|---|
|  | MN | 02/13/06 | Typhimurium |
| | TX | 05/23/06 | Typhimurium |
| | TX | 05/23/06 | Typhimurium |
| | TX | 05/23/06 | Typhimurium |
| | TX | 05/23/06 | Typhimurium |
| | TX | 05/23/06 | Typhimurium |
| | MN | 01/27/06 | Typhimurium |
| | TX | 05/23/06 | Typhimurium |
| | TX | 05/23/06 | Typhimurium |

reptile. The owners of the rodent facility were informed about sanitation procedures and they were required to develop a product shipping label. The label stated that the users should wash their hands after handling the product and that the product should only be used as reptile or bird of prey food.

The main reservoirs of *Salmonella* organisms are animals including livestock, poultry, pets, and reptiles. Reptiles, particularly small turtles, have frequently been linked to human cases. [1, 2] Awareness of risk associated with handling reptiles is demonstrated by federal laws governing the sale of small turtles and state and local laws requiring signs to be displayed in pet stores concerning the risk of *Salmonella* after handling reptiles. Recent reports have also linked human cases of *Salmonella* with the handling of infected rodents including mice, rats, and hamsters. [3, 4] This investigation further demonstrates the need for increased awareness by the public on the importance of hand washing after handling any animal (dead or alive).

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*Prepared by Health Service Region 7, Texas Department of State Health Services, (254) 778-6744,* glenna.teltow@dshs.state.tx.us, carol.davis@dshs.state.tx.us

# Health Service Region 9/10

## Investigation of an Outbreak of Suspected Foodborne Illness in Andrews, Texas, October 2006

### Background

Eighteen people reported becoming ill within 30 minutes to 2 hours after eating at a local restaurant in Andrews, Texas, between October 13 and October 31, 2006. This included 16 males and 2 females within an age range of 15 to 58 years. The sick individuals reported experiencing nausea (13), vomiting (14), abdominal cramps (15), chills (10),non-bloody diarrhea or loose stools (11), and headache (6). Fifteen individuals saw a physician and were treated for their symptoms. Ten of these were hospitalized. As far as can be determined, all cases were afebrile. Hospitalized individuals were reported to be very dehydrated and treatment focused on rehydration and antibiotics. The first reports of illness were made to the Andrews County Health Department (ACHD) on October 18. The ACHD remained the lead agency throughout the investigation. The Health Service Region (HSR) office of the Department of State Health Services (DSHS) in Midland was notified of the outbreak on October 30.

### Methods

In response to the initial notification, the ACHD sent a sanitarian to conduct an inspection of the implicated restaurant on October 20.

On October 30, an emergency department physician from an Andrews hospital reported to the ACHD treating 5 patients with gastrointestinal illness with symptoms occurring within 30 minutes to 2 hours after eating at the same local restaurant. A public health nurse from the ACHD began interviewing individuals who became ill after eating at this restaurant. The HSR office in Midland was notified.

On October 31, a sanitarian conducted a second inspection of the restaurant. The ACHD received additional reports of gastrointestinal illness in people who had eaten at the restaurant. The Epidemiology Response Team of the Regional DSHS office in Midland was contacted for guidance. The restaurant voluntarily closed at 1:30 p.m. the same day. All employees were sent to the local hospital to provide stool cultures for testing for the presence of *Salmonella*, *Shigella*, *E. coli* 0157:H7, and parasites. As far as can be determined from reports, it appears that only 3 sick restaurant patrons who sought medical treatment for gastrointestinal illness after had stool cultures performed.

On November 1, the public health nurse continued to interview affected individuals. An afternoon conference call was held with ACHD personnel, the Andrews County Judge, Health Service Region DSHS personnel, and DSHS Central Office personnel to discuss the outbreak. Later in the day, the ACHD released a statement to the press on the outbreak.

### Results and Interpretations

A food history was obtained by the ACHD public health nurse from each affected individual who was interviewed. Foods eaten by the respondents were tabulated, but there was no statistical analysis treatment of the data. Only a few people were interviewed who ate the suspected foods, but did not become ill. The first inspection of the restaurant

(Health Service Regions map)

revealed no problems. The second inspection found only minor violations. Restaurant employees reported having eaten the restaurant food during the outbreak period. None reported having gastrointestinal illness or skin lesions.

No abnormal findings from stool cultures on sick restaurant patrons were reported. Stool cultures on the restaurant staff were negative. No leftover food samples were available for testing.

**Discussion and Public Health Implications**

Andrews is a small town with a population of about 11,000. According to local residents, the restaurant in question is one of the busiest and most popular food service establishments in Andrews. Had the restaurant not closed, it is likely that more people in the community would have become ill. However, the ACHD's investigation did not identify the cause of the outbreak. On November 7, ACHD decided to allow the restaurant to re-open on November 9, 2006. A statement was released to the press stating that no food pathogens were identified and that possible sources of any pathogens had been removed.

**Conclusions**

Because of the short incubation periods reported by cases, the duration of illness (about 2 days), and the prominence of vomiting among cases, this outbreak was most likely caused by a calcivirus or a bacterial toxin, such as staphylococcal. A calcivirus, or Norwalk-like virus, is an extremely common cause of foodborne illness, though it is rarely diagnosed, because the laboratory test is not widely available. Calcivirus causes acute gastrointestinal illness, usually with more vomiting than diarrhea, which resolves within 2 days. It is believed that Norwalk-like viruses spread primarily from one infected person to another. Infected kitchen workers can contaminate food as they prepare it if they have the virus on their hands. (CDC, online). Restaurant patrons may have spread the virus among themselves via foods or fomites.

Staphylococcal toxin is produced in food by bacteria following contamination and warm temperatures that promote growth of the bacteria and toxin production. Food workers with uncovered staphylococcal skin infections can introduce the bacteria into food. The organism can also be brought into the restaurant in contaminated foods, such as milk. When people consume the toxin, a rapid onset of gastrointestinal illness commonly occurs. The symptoms may include vomiting and diarrhea, which generally resolve in 1 or 2 days (CDC, online)

Since the hospital laboratory that tested the specimens did not have the capability to test for either calciviruses or staphylococcal toxin, they could not be confirmed as the causative agent.

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*Prepared by Health Service Region 9/10, Texas Department of State, (432) 571-4115*

# Health Service Region 11

*Mycobacterium mucogenicum* outbreak in a hospital in South Texas, 2006

## Introduction

*Mycobacterium mucogenicum* is a rapidly growing nontuberculous mycobacterium associated with invasive pulmonary disease and with skin, soft tissue, and bone infections. It is also associated with infections of central venous catheter (CVC) and other medical devices.[1] Nontuberculous mycobacteria live in soil, dust, and water and are relatively resistant to chlorine. The results of a 1999 study by the United States Environmental Protection Agency showed that 61% of hospitals surveyed had mycobacteria in their drinking water supply.[2] Despite being pervasive in public and hospital water systems, *M. mucogenicum* has rarely caused significant outbreaks. Infection is most frequently found in patients who are immunocompromised.[3]

## Background

In March 2006, infection control practitioners at Hospital A notified the local health department of 5 cases of culture-confirmed *M. mucogenicum* during a 6-week period. All 5 cases were oncology patients in the same unit of the hospital. All patients had CVCs to facilitate chemotherapy. Positive cultures were drawn from 4 of the patients' catheter tips, while a fifth was cultured from a peripheral site. The hospital had no record of *M. mucogenicum* infection during the previous 2 years. There were no other cases reported by other hospitals in the community.

The local health department contacted the regional office of the Texas Department of State Health Services (DSHS) to report the outbreak and request assistance. DSHS, in turn, contacted the Centers for Disease Control and Prevention (CDC) to aid in investigating the infections. The goals for the investigation were to identify potential sources and risk factors for *M. mucogenicum* and to assist the hospital in establishing appropriate prevention and control measures.

The 5 patients were in 4 separate rooms in the oncology unit (same floor) during their hospital stays. Interviews with hospital staff indicated that the 3 floors above the oncology unit were vacant during construction on those floors. There had been a water break that led to plumbing problems on the oncology unit about the same time as the first infection occurred. The hospital had already implemented some changes when handling patients with CVCs, including increased frequency for dressing changes (from once every 7 days or as needed to 3 times a week), bathing restrictions for patients with CVCs, and installation of new shower heads and tubing in the oncology unit.

## Methods

A case-control study was designed. A case patient was defined as a person with culture-positive *M. mucogenicum* who had a hospital stay of longer than 72 hours on the oncology unit between March 1 and May 10, 2006. Three controls were selected for each case. The controls were selected from patients with a hospital stay longer than 72 hours on the oncology unit between March 1 and May 10, 2007, and who did not have a positive culture for *M. mucogenicum*. Charts were abstracted, using a form designed by the CDC.

(Health Service Regions map)

Additionally, water samples were collected from various sources in the hospital and in the community. Samples were sent to CDC for culture, isolation, and molecular typing. Finally, clinical isolates of *M. mucogenicum* from the case patients were obtained from the DSHS lab and sent to the CDC for molecular typing using polymerase chain reaction restriction analysis and pulsed-field gel electrophoresis.

**Results**

Five case-patients were identified. According to analysis performed by the CDC, the mean interval between CVC placement and admission date for 4 of 5 case-patients was 32 days. In contrast, the mean interval between CVC placement and admission date was 492 days for the 9 controls who had CVCs, which was statistically significant ($p = 0.025$). All cases and controls reported bathing and no statistically significant association was identified between case status and exposure to hospital water. However, 4 of 5 case-patient isolates (80%) were in genotypic clusters with environmental water isolates (n=18). Records indicate hospital plumbing failed 5 days prior to the first case-patient's infection.

**Conclusions**

Genetically similar strains of *M. mucogenicum* in clinical and environmental isolates suggest exposure to water was an infection risk in oncology patients with CVCs. Patients with recently placed CVCs may have been less adept at keeping the CVCs covered during bathing, resulting in greater risk for infection from waterborne pathogens. The infected patients had a mean of 32 days between CVC placement and admission to the hospital, while the controls had a mean of 492 days between CVC placement and admission to the hospital. A high organism load in the hospital water due to a plumbing failure may have contributed to infection risk.

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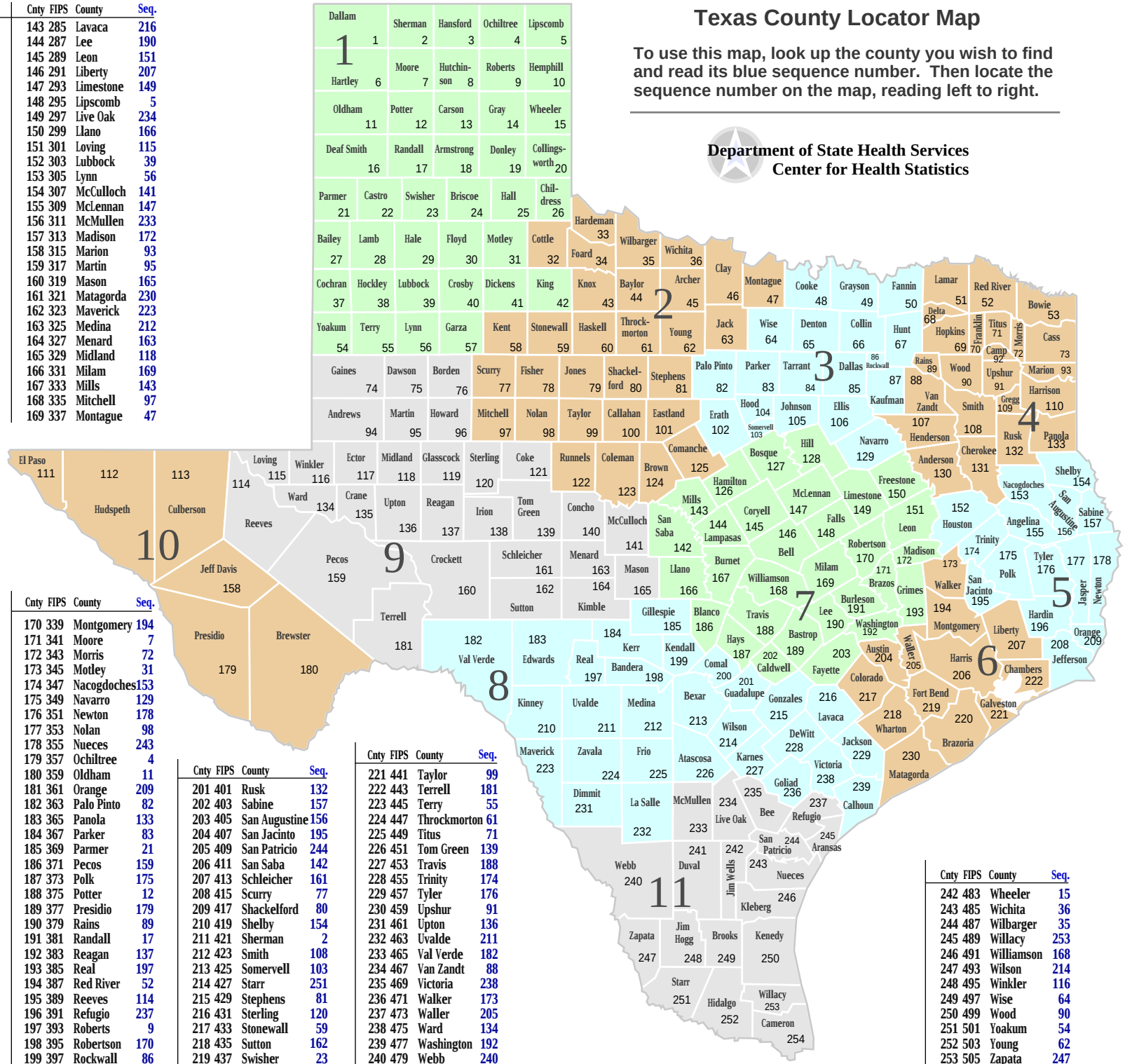
*Prepared by Health Service Region 11, (956) 423-0130*

# Texas County Locator Map

**To use this map, look up the county you wish to find and read its blue sequence number. Then locate the sequence number on the map, reading left to right.**

**Department of State Health Services**
**Center for Health Statistics**




| Cnty | FIPS | County | Seq. |
|---|---|---|---|
| 1 | 1 | Anderson | 130 |
| 2 | 3 | Andrews | 94 |
| 3 | 5 | Angelina | 155 |
| 4 | 7 | Aransas | 245 |
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| 6 | 11 | Armstrong | 18 |
| 7 | 13 | Atascosa | 226 |
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| 9 | 17 | Bailey | 27 |
| 10 | 19 | Bandera | 198 |
| 11 | 21 | Bastrop | 189 |
| 12 | 23 | Baylor | 44 |
| 13 | 25 | Bee | 235 |
| 14 | 27 | Bell | 146 |
| 15 | 29 | Bexar | 213 |
| 16 | 31 | Blanco | 186 |
| 17 | 33 | Borden | 76 |
| 18 | 35 | Bosque | 127 |
| 19 | 37 | Bowie | 53 |
| 20 | 39 | Brazoria | 220 |
| 21 | 41 | Brazos | 171 |
| 22 | 43 | Brewster | 180 |
| 23 | 45 | Briscoe | 24 |
| 24 | 47 | Brooks | 249 |
| 25 | 49 | Brown | 124 |
| 26 | 51 | Burleson | 191 |
| 27 | 53 | Burnet | 167 |
| 28 | 55 | Caldwell | 202 |
| 29 | 57 | Calhoun | 239 |
| 30 | 59 | Callahan | 100 |
| 31 | 61 | Cameron | 254 |
| 32 | 63 | Camp | 92 |
| 33 | 65 | Carson | 13 |
| 34 | 67 | Cass | 73 |
| 35 | 69 | Castro | 22 |
| 36 | 71 | Chambers | 222 |
| 37 | 73 | Cherokee | 131 |
| 38 | 75 | Childress | 26 |
| 39 | 77 | Clay | 46 |
| 40 | 79 | Cochran | 37 |
| 41 | 81 | Coke | 121 |
| 42 | 83 | Coleman | 123 |
| 43 | 85 | Collin | 66 |
| 44 | 87 | Collingsworth | 20 |
| 45 | 89 | Colorado | 217 |
| 46 | 91 | Comal | 200 |
| 47 | 93 | Comanche | 125 |
| 48 | 95 | Concho | 140 |
| 49 | 97 | Cooke | 48 |
| 50 | 99 | Coryell | 145 |
| 51 | 101 | Cottle | 32 |
| 52 | 103 | Crane | 135 |
| 53 | 105 | Crockett | 160 |
| 54 | 107 | Crosby | 40 |
| 55 | 109 | Culberson | 113 |
| 56 | 111 | Dallam | 1 |
| 57 | 113 | Dallas | 85 |
| 58 | 115 | Dawson | 75 |
| 59 | 117 | Deaf Smith | 16 |
| 60 | 119 | Delta | 68 |
| 61 | 121 | Denton | 65 |
| 62 | 123 | DeWitt | 228 |
| 63 | 125 | Dickens | 41 |
| 64 | 127 | Dimmit | 231 |
| 65 | 129 | Donley | 19 |
| 66 | 131 | Duval | 241 |
| 67 | 133 | Eastland | 101 |
| 68 | 135 | Ector | 117 |
| 69 | 137 | Edwards | 183 |
| 70 | 139 | Ellis | 106 |
| 71 | 141 | El Paso | 111 |
| 72 | 143 | Erath | 102 |
| 73 | 145 | Falls | 148 |
| 74 | 147 | Fannin | 50 |
| 75 | 149 | Fayette | 203 |
| 76 | 151 | Fisher | 78 |
| 77 | 153 | Floyd | 30 |
| 78 | 155 | Foard | 34 |
| 79 | 157 | Fort Bend | 219 |
| 80 | 159 | Franklin | 70 |
| 81 | 161 | Freestone | 150 |
| 82 | 163 | Frio | 225 |
| 83 | 165 | Gaines | 74 |
| 84 | 167 | Galveston | 221 |
| 85 | 169 | Garza | 57 |
| 86 | 171 | Gillespie | 185 |
| 87 | 173 | Glasscock | 119 |
| 88 | 175 | Goliad | 236 |
| 89 | 177 | Gonzales | 215 |
| 90 | 179 | Gray | 14 |
| 91 | 181 | Grayson | 49 |
| 92 | 183 | Gregg | 109 |
| 93 | 185 | Grimes | 193 |
| 94 | 187 | Guadalupe | 201 |
| 95 | 189 | Hale | 29 |
| 96 | 191 | Hall | 25 |
| 97 | 193 | Hamilton | 126 |
| 98 | 195 | Hansford | 3 |
| 99 | 197 | Hardeman | 33 |
| 100 | 199 | Hardin | 196 |
| 101 | 201 | Harris | 206 |
| 102 | 203 | Harrison | 110 |
| 103 | 205 | Hartley | 6 |
| 104 | 207 | Haskell | 60 |
| 105 | 209 | Hays | 187 |
| 106 | 211 | Hemphill | 10 |
| 107 | 213 | Henderson | 107 |
| 108 | 215 | Hidalgo | 252 |
| 109 | 217 | Hill | 128 |
| 110 | 219 | Hockley | 38 |
| 111 | 221 | Hood | 104 |
| 112 | 223 | Hopkins | 69 |
| 113 | 225 | Houston | 152 |
| 114 | 227 | Howard | 96 |
| 115 | 229 | Hudspeth | 112 |
| 116 | 231 | Hunt | 67 |
| 117 | 233 | Hutchinson | 8 |
| 118 | 235 | Irion | 138 |
| 119 | 237 | Jack | 63 |
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| 121 | 241 | Jasper | 177 |
| 122 | 243 | Jeff Davis | 158 |
| 123 | 245 | Jefferson | 208 |
| 124 | 247 | Jim Hogg | 248 |
| 125 | 249 | Jim Wells | 242 |
| 126 | 251 | Johnson | 105 |
| 127 | 253 | Jones | 79 |
| 128 | 255 | Karnes | 227 |
| 129 | 257 | Kaufman | 87 |
| 130 | 259 | Kendall | 199 |
| 131 | 261 | Kenedy | 250 |
| 132 | 263 | Kent | 58 |
| 133 | 265 | Kerr | 184 |
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| 135 | 269 | King | 42 |
| 136 | 271 | Kinney | 210 |
| 137 | 273 | Kleberg | 246 |
| 138 | 275 | Knox | 43 |
| 139 | 277 | Lamar | 51 |
| 140 | 279 | Lamb | 28 |
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| 142 | 283 | La Salle | 232 |
| 143 | 285 | Lavaca | 216 |
| 144 | 287 | Lee | 190 |
| 145 | 289 | Leon | 151 |
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| 147 | 293 | Limestone | 149 |
| 148 | 295 | Lipscomb | 5 |
| 149 | 297 | Live Oak | 234 |
| 150 | 299 | Llano | 166 |
| 151 | 301 | Loving | 115 |
| 152 | 303 | Lubbock | 39 |
| 153 | 305 | Lynn | 56 |
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| 155 | 309 | McLennan | 147 |
| 156 | 311 | McMullen | 233 |
| 157 | 313 | Madison | 172 |
| 158 | 315 | Marion | 93 |
| 159 | 317 | Martin | 95 |
| 160 | 319 | Mason | 165 |
| 161 | 321 | Matagorda | 230 |
| 162 | 323 | Maverick | 223 |
| 163 | 325 | Medina | 212 |
| 164 | 327 | Menard | 163 |
| 165 | 329 | Midland | 118 |
| 166 | 331 | Milam | 169 |
| 167 | 333 | Mills | 143 |
| 168 | 335 | Mitchell | 97 |
| 169 | 337 | Montague | 47 |
| 170 | 339 | Montgomery | 194 |
| 171 | 341 | Moore | 7 |
| 172 | 343 | Morris | 72 |
| 173 | 345 | Motley | 31 |
| 174 | 347 | Nacogdoches | 153 |
| 175 | 349 | Navarro | 129 |
| 176 | 351 | Newton | 178 |
| 177 | 353 | Nolan | 98 |
| 178 | 355 | Nueces | 243 |
| 179 | 357 | Ochiltree | 4 |
| 180 | 359 | Oldham | 11 |
| 181 | 361 | Orange | 209 |
| 182 | 363 | Palo Pinto | 82 |
| 183 | 365 | Panola | 133 |
| 184 | 367 | Parker | 83 |
| 185 | 369 | Parmer | 21 |
| 186 | 371 | Pecos | 159 |
| 187 | 373 | Polk | 175 |
| 188 | 375 | Potter | 12 |
| 189 | 377 | Presidio | 179 |
| 190 | 379 | Rains | 89 |
| 191 | 381 | Randall | 17 |
| 192 | 383 | Reagan | 137 |
| 193 | 385 | Real | 197 |
| 194 | 387 | Red River | 52 |
| 195 | 389 | Reeves | 114 |
| 196 | 391 | Refugio | 237 |
| 197 | 393 | Roberts | 9 |
| 198 | 395 | Robertson | 170 |
| 199 | 397 | Rockwall | 86 |
| 200 | 399 | Runnels | 122 |
| 201 | 401 | Rusk | 132 |
| 202 | 403 | Sabine | 157 |
| 203 | 405 | San Augustine | 156 |
| 204 | 407 | San Jacinto | 195 |
| 205 | 409 | San Patricio | 244 |
| 206 | 411 | San Saba | 142 |
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| 208 | 415 | Scurry | 77 |
| 209 | 417 | Shackelford | 80 |
| 210 | 419 | Shelby | 154 |
| 211 | 421 | Sherman | 2 |
| 212 | 423 | Smith | 108 |
| 213 | 425 | Somervell | 103 |
| 214 | 427 | Starr | 251 |
| 215 | 429 | Stephens | 81 |
| 216 | 431 | Sterling | 120 |
| 217 | 433 | Stonewall | 59 |
| 218 | 435 | Sutton | 162 |
| 219 | 437 | Swisher | 23 |
| 220 | 439 | Tarrant | 84 |
| 221 | 441 | Taylor | 99 |
| 222 | 443 | Terrell | 181 |
| 223 | 445 | Terry | 55 |
| 224 | 447 | Throckmorton | 61 |
| 225 | 449 | Titus | 71 |
| 226 | 451 | Tom Green | 139 |
| 227 | 453 | Travis | 188 |
| 228 | 455 | Trinity | 174 |
| 229 | 457 | Tyler | 176 |
| 230 | 459 | Upshur | 91 |
| 231 | 461 | Upton | 136 |
| 232 | 463 | Uvalde | 211 |
| 233 | 465 | Val Verde | 182 |
| 234 | 467 | Van Zandt | 88 |
| 235 | 469 | Victoria | 238 |
| 236 | 471 | Walker | 173 |
| 237 | 473 | Waller | 205 |
| 238 | 475 | Ward | 134 |
| 239 | 477 | Washington | 192 |
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| 241 | 481 | Wharton | 218 |
| 242 | 483 | Wheeler | 15 |
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| 244 | 487 | Wilbarger | 35 |
| 245 | 489 | Willacy | 253 |
| 246 | 491 | Williamson | 168 |
| 247 | 493 | Wilson | 214 |
| 248 | 495 | Winkler | 116 |
| 249 | 497 | Wise | 64 |
| 250 | 499 | Wood | 90 |
| 251 | 501 | Yoakum | 54 |
| 252 | 503 | Young | 62 |
| 253 | 505 | Zapata | 247 |
| 254 | 507 | Zavala | 224 |