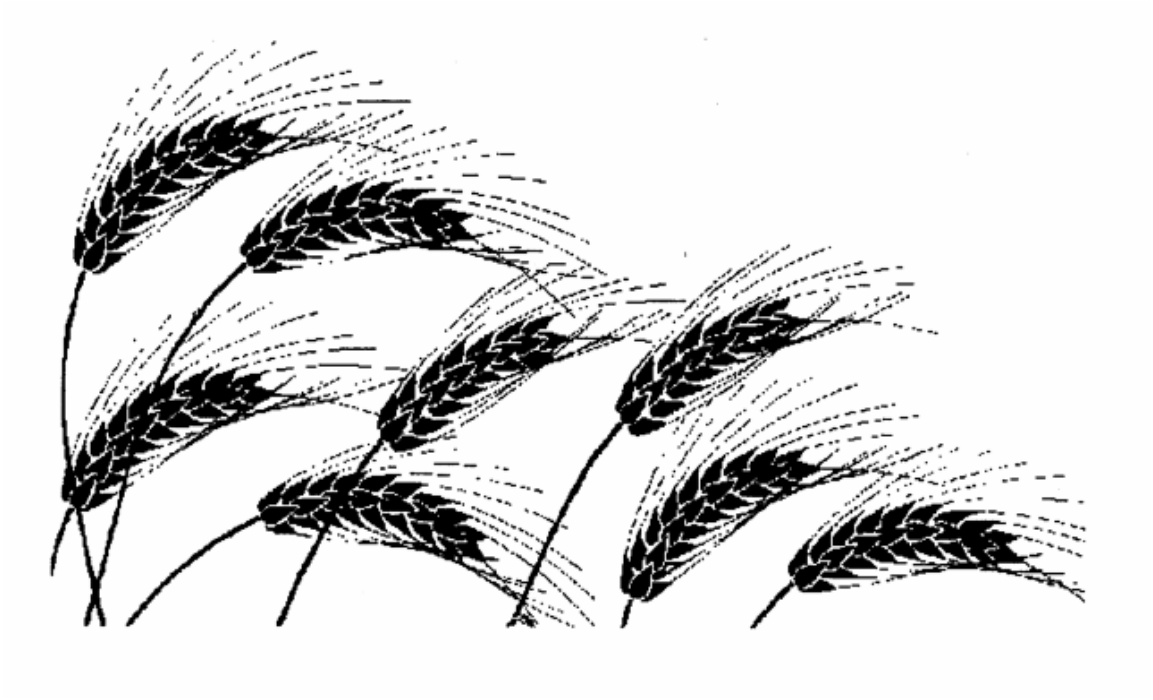
Reportable Diseases in Kansas

2005 Summary



Kansas Department of Health and Environment
Bureau of Epidemiology and Disease Prevention

REPORTABLE

INFECTIOUS DISEASES

IN

KANSAS

2005 SUMMARY

Published September, 2006

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INTRODUCTION

Purpose and format of this report

This is the fourteenth annual summary of reportable diseases published by the Kansas Department of Health and Environment (KDHE). The purpose of this report is to provide useful information for health care providers, public health workers, and policy makers about infectious diseases in Kansas.

The report is divided into three sections. Section I presents summaries of infectious, reportable diseases or conditions of public health importance. While 56 diseases were reportable in Kansas during 2005, many were not detected; summaries are presented for those 34 conditions that were reported. Cases must meet the surveillance definition for a confirmed case and be reported to KDHE before February 29, 2006 to be included in this document. Each of the disease summaries includes a brief overview, laboratory tests commonly used for diagnosis, and the surveillance case definition. Tables and graphs supplement a review of the disease in Kansas, including key statistics and trends. Rates by demographic characteristics and proportional changes from the previous year are reported only if more than 50 cases of a disease was reported. Rates have been calculated from the Vintage 2004 Population Estimates provided by the U.S. Census Bureau and National Center for Health Statistics. Whenever possible, information about disease trends for the United States has been included for comparison with Kansas' trends. Due to confidentiality concerns, limited demographic information is presented if fewer than five total cases of a disease were reported.

Disease incidence of urban and non-urban counties has been included for many diseases. Urban counties are designated based upon population density. Five counties account for approximately half of the state population: Johnson, Wyandotte, Sedgwick, Shawnee, and Douglas. The remaining 100 counties in the state are aggregated into the "non-urban" category.

Race data is collected uniformly for most diseases as follows: American Indian/Alaskan Native (AIAN), Asian/pacific Islander (API), Black/African-American, and White. Ethnicity data is reported as either Hispanic or non-Hispanic.

Section II includes special studies and reports. Section III includes reference documents and supplementary tables.

Disease reporting in Kansas

Health care providers, laboratories, and hospitals are required by Kansas law (K.S.A. 65-118, 65-128; 65-6001 through 65-6007; K.A.R. 28-1-2, 28-1-4, and 28-1-18) to report selected diseases and conditions. Reports of infectious diseases are initially sent to KDHE's Bureau of Epidemiology and Disease Prevention (BEDP), where they are reviewed and forwarded to local health departments. The local health departments are

responsible for any required investigation and for instituting basic public health interventions.

Case reports are stored in the Kansas integrated electronic disease surveillance system (also known as HAWK). HAWK is a central, statewide database of reportable and selected non-reportable diseases and conditions. It can be accessed via the internet by authorized public health officials. To protect restricted, confidential, health and clinical data of individuals, internal security structures are in place. The HAWK system allows users to report disease occurrences rapidly and efficiently; user may also generate summary statistics and reports to assist in evaluating public health efforts. Kansas' disease incidence numbers are transmitted from HAWK to the Centers for Disease Control and Prevention (CDC) every week for inclusion in *Morbidity and Mortality Weekly Report* (*MMWR*), a series of publications produced by the CDC's Epidemiology Program Office.

In collaboration with the Council of State and Territorial Epidemiologists (CSTE), CDC publishes case definitions for public health surveillance - the CDC/CSTE surveillance case definitions combine clinical, laboratory, and epidemiologic criteria. By providing uniform criteria for disease reporting, case definitions allow greater specificity and comparability of diseases reported from different geographic regions. The CDC/CSTE case definitions can be found at:

- http://www.cdc.gov/mmwr/preview/mmwrhtml/00047449.htm
- http://www.cdc.gov/epo/dphsi/casedef/case_definitions.htm
- Centers for Disease Control and Prevention. Case definitions for infectious conditions under public health surveillance. MMWR 1997; 46 (no. RR-10).

The usefulness of public health surveillance data depends on its uniformity, simplicity, and timeliness. The case definitions in this report follow the CDC/CSTE surveillance definitions for disease reporting and should not be confused with clinical diagnoses. The use of additional clinical, epidemiologic, and laboratory data may enable a physician to diagnose a disease even though the formal standardized surveillance case definition may not be met.

Interpretation of the data

When interpreting the data in this report, it is important to remember that the completeness of disease reporting is variable. For example, reporting of AIDS cases is estimated to be 90% complete, while nationwide reporting of salmonellosis is estimated to be 2% complete. When interpreting data, absolute numbers are less meaningful than trends; however, trends can be influenced by changes in case definitions, reporting patterns, and by random fluctuations. It is also important to note that small numbers affect rates and interpretation of rates. Small case numbers can produce artificially high disease rates and unstable, widely fluctuating disease trends.

SECTION ONE - DISEASE SUMMARIES

AMEBIASIS

Clinical Features: There are two forms of amebiasis: intestinal and extraintestinal. The intestinal form of the disease is usually asymptomatic, ranging from acute mild abdominal discomfort to chronic diarrhea and fulminating dysentery. Fever, chills, and bloody mucoid diarrhea may also be present. Diarrheal episodes may alternate with periods of constipation or remission. The extraintestinal form appears in severe cases, often characterized by amebic liver abscesses. Infection also may be asymptomatic.

Causative Agent: The protozoan parasite, *Entamoeba histolytica*.

Mode of Transmission: *E. histolytica* predominantly infects humans and other primates. Transmission among humans most often occurs through ingestion of chlorine-resistant amebic cysts present in fecally contaminated water or food. Oral-anal sexual contact is also a risk factor for infection.

Incubation Period: Onset of symptoms usually occurs 2 to 4 weeks after infection, but this may be variable.

Period of Communicability: Infection may occur as long as cysts are present in stool, which may continue for years.

Public Health Significance: Amebiasis is of public health concern due to the prolonged shedding period and the severe complications that may develop, usually involving the liver. Immunocompromised persons are also at increased risk of developing the severe form of disease. Treatment (e.g. iodoquinol, paromomycin, metronidazole) is available for both intestinal and extraintestinal amebiasis.

Reportable Disease in Kansas Since: 1982.

Clinical Criteria

- Infection of the large intestine by *Entamoeba histolytica* may result in an illness of variable severity ranging from mild, chronic diarrhea to fulminant dysentery. Extraintestinal infection also can occur (e.g., hepatic abscess).

Laboratory Criteria for Surveillance Purposes

- Intestinal amebiasis
  - Demonstration of cysts or trophozoites of *E. histolytica* in stool or
  - Demonstration of trophozoites in tissue biopsy or ulcer scrapings by culture or histopathology
- Extraintestinal amebiasis

- Demonstration of *E. histolytica* trophozoites in extraintestinal tissue

Surveillance Case Definitions

- *Confirmed, intestinal amebiasis*: a clinically compatible illness that is laboratory confirmed. Asymptomatic intestinal carriage of *E. histolytica* should not be reported.

- *Confirmed, extraintestinal amebiasis*: a parasitologically confirmed infection of extraintestinal tissue, or among symptomatic persons (with clinical or radiographic findings consistent with extraintestinal infection), demonstration of specific antibody against *E. histolytica* as measured by indirect hemagglutination or other reliable immunodiagnostic test (e.g., enzyme-linked immunosorbent assay). Among asymptomatic persons, a positive serologic test does not necessarily indicate extraintestinal amebiasis.

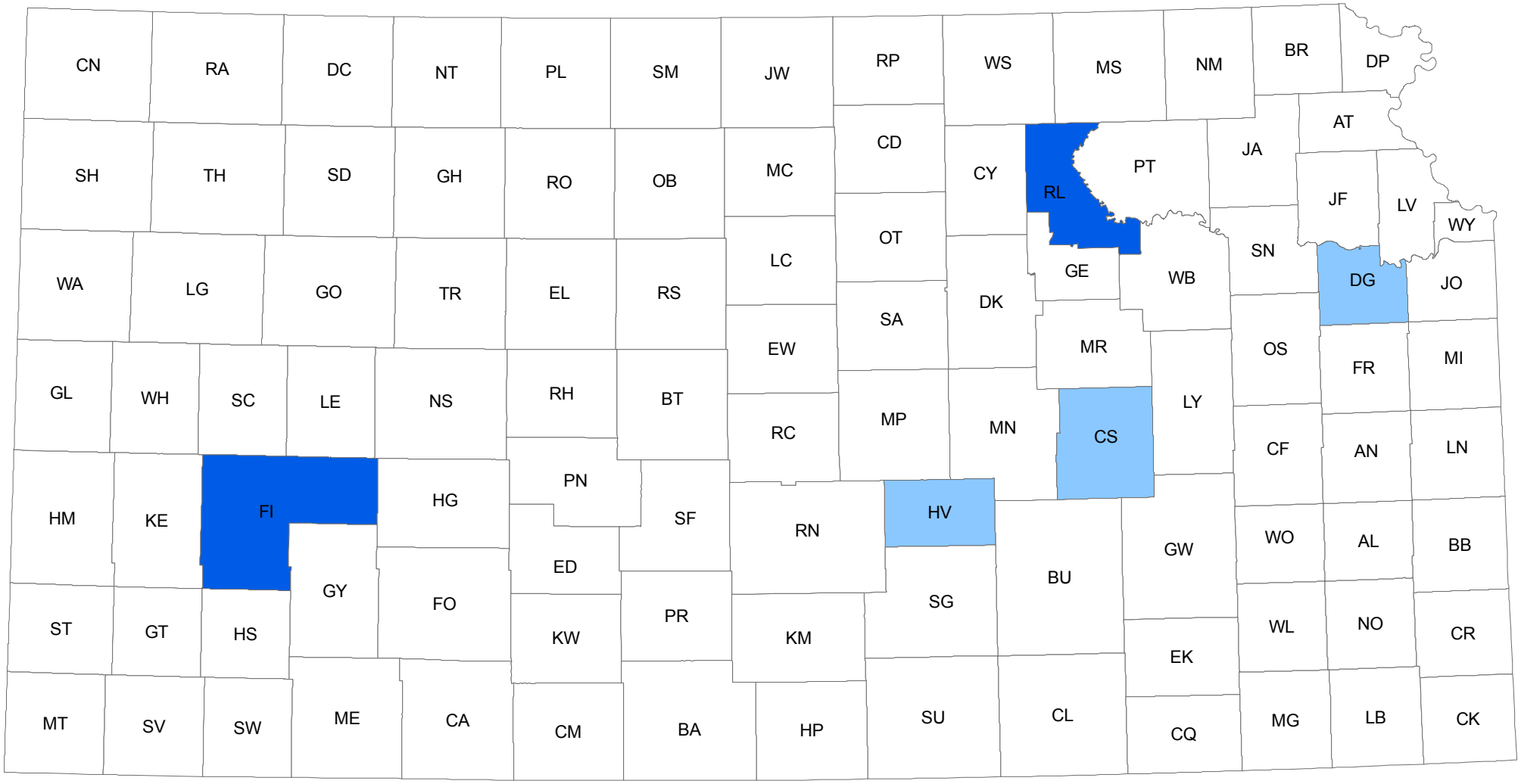
Epidemiology and Trends

2005 Kansas Count: 7

	Rate per 100,000	*95% CI*
Kansas Rate	0.3	(0.1 - 0.4)
U.S. Rate (2004)	*NA*	*NA*

Seven cases of intestinal amebiasis were reported during 2005. No cases were reported during 2004; the three-year median for 2002-2004 was four cases.

Amebiasis Cases by County, 2005



Cases 0 1 2

BRUCELLOSIS

Clinical Features: Acute or insidious onset of intermittent or irregular fever, chills, profuse night sweats, weakness, profound fatigue, depression, weight loss, arthralgia and generalized aching. Localized suppurative infections of organs, including liver and spleen, as well as chronic localized infections may occur. Subclinical disease has been reported. Symptoms may last for weeks, months, or years if not adequately treated.

Causative Agent: *Brucella* spp., small gram-negative coccobacilli. Generally caused by *B. abortus*, *B. melitensis*, *B. suis*, and rarely *B. canis*.

Mode of Transmission: Several animals are reservoirs, including cattle, sheep, goats, pigs, bison, elk, deer, caribou, and dogs. Transmission occurs through breaks in skin after direct contact with an infected animal's tissues, blood, urine, vaginal discharges, placenta, or aborted fetuses; or through the ingestion of unpasteurized milk or dairy products from an infected animal. Inhalation of aerosols has resulted in transmission among animals in pens and stables and with humans in laboratories. Accidental self-inoculation of animal vaccine strains has resulted in a few cases. Rare instances of transmission through human breast milk and sexual contact have been documented.

Incubation Period: Highly variable, usually 5-60 days but occasionally several months.

Period of Communicability: As long as the agent is in an animal's tissues or body fluids. Person-to-person transmission does not occur.

Public Health Significance: Brucellosis is a disease that has been nearly eliminated in the U.S. because of vigorous animal health control measures and milk pasteurization. The United States Department of Agriculture (USDA) considers Kansas to be a brucellosis free state. *Brucella* may be used as a biological weapon; however, routine case investigations focus on contaminated diary products.

Reportable Disease in Kansas Since: 1982

Clinical Criteria

- An illness characterized by acute or insidious onset of fever, night sweats, undue fatigue, anorexia, weight loss, headache, and arthralgia.

Laboratory Criteria for Surveillance Purposes

- Isolation of Brucella spp. from a clinical specimen, ***OR***

- Fourfold or greater rise in Brucella agglutination titer between acute and convalescent phase serum specimens obtained ≥ 2 weeks apart and studied at the same laboratory, ***OR***

- Demonstration by immunofluorescence of Brucella spp. in a clinical specimen.

Surveillance Case Definitions

- *Confirmed:* A clinically compatible illness that is laboratory confirmed.

- *Probable:* A clinically compatible case that is epidemiologically linked to a confirmed case or that has supportive serology (i.e., *Brucella* agglutination titer of greater than or equal to 160 in one or more serum specimens obtained after onset of symptoms)

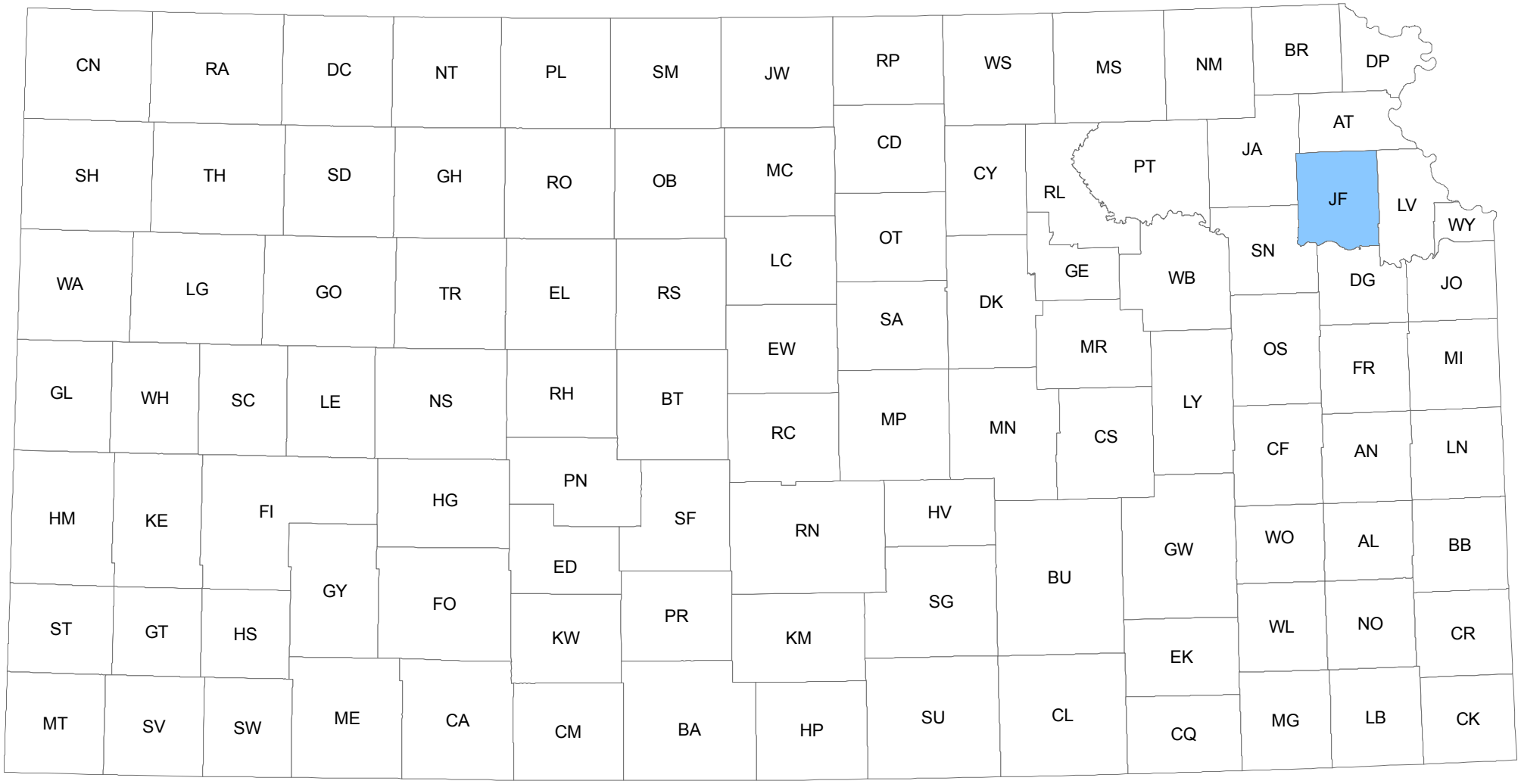
Epidemiology and Trends

2005 Kansas Count: 1

	Rate per 100,000	*95% CI*
Kansas Rate	<0.1	(0.0 – 0.1)
U.S. Rate (2004)	<0.1	*NA*

One confirmed case of brucellosis reported in Kansas during 2005. Zero to one case has been reported annually in Kansas since 1994, for a total of five cases.

Brucellosis Cases by County, 2005



Cases 0 1

CAMPYLOBACTERIOSIS

Clinical Features: An illness characterized by diarrhea, abdominal pain, malaise, fever, nausea, and vomiting. Stools may contain visible or occult blood. Clinical manifestations from *Campylobacter* can range from mild infections lasting 1 to 2 days to severe persistent infections. Occasionally, long-term consequences may result from infection, including Guillain-Barre′ syndrome (GBS), a rare disease that affects the nervous system.

Causative Agent: *Campylobacter spp*., most commonly *Campylobacter jejuni*

Mode of Transmission: Occurs after ingestion of contaminated liquids (particularly untreated water or unpasteurized milk and juices) or food (undercooked chicken or pork). Direct contact with fecal material from infected animals and person-to-person contact are less frequent causes of infection. Reservoirs include animals, most commonly poultry and cattle. Puppies, kittens, other pets, swine, sheep, rodents, and birds may also be sources of human infection. Chronic infection of poultry and other animals constitutes the primary source of infection.

Incubation Period: Usually 2 to 5 days, with a range of 1-10 days

Period of Communicability: Throughout the course of infection; usually from several days to several weeks; can last from 2 to 7 weeks if not treated with antibiotics

Public Health Significance: *Campylobacter spp.* is an important cause of diarrheal illness in all parts of the world and in all age groups. Common source outbreaks have occurred, most often associated with foods, especially undercooked chicken, unpasteurized milk, and nonchlorinated water

Reportable Disease in Kansas Since: 1990

Laboratory Criteria for Surveillance Purposes

- Isolation of *Campylobacter* from any clinical specimen.

Surveillance Case Definitions

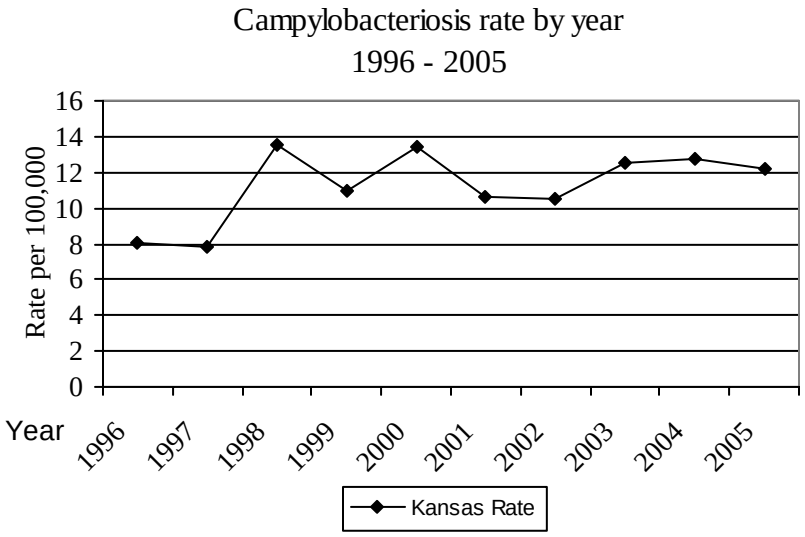
- *Confirmed:* A case that meets the clinical case definition and is laboratory confirmed.

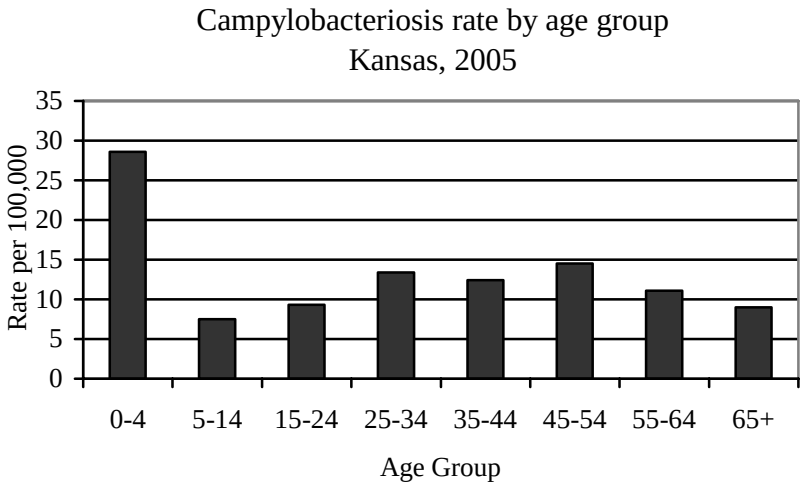
- *Probable:* A case that meets the clinical case definition and occurs in a person who has an epidemiologic link with a person who has laboratory-confirmed campylobacteriosis.

Epidemiology and Trends

2005 Kansas Count: 335

	Rate per 100,000	*95% CI*
Kansas Rate	12.2	(10.9 – 13.6)
U.S. Rate (2004)	*NA*	*NA*
Gender		
Male	13.6	(11.7 – 15.6)
Female	10.9	(9.1 – 12.6)
Race		
White	9.4	(8.1 – 10.6)
Black	3.5	(0.7 – 6.2)
Asian/Pacific Islander	6.4	(0.1 – 12.7)
Native American	3.3	(0 – 9.7)
Ethnicity		
Hispanic	6.4	(3.0 – 9.7)
Non-Hispanic	6.9	(5.9 – 7.9)
Geographic area		
Urban County	11.1	(9.4 – 12.9)
Non-Urban County	13.4	(11.4 – 15.3)





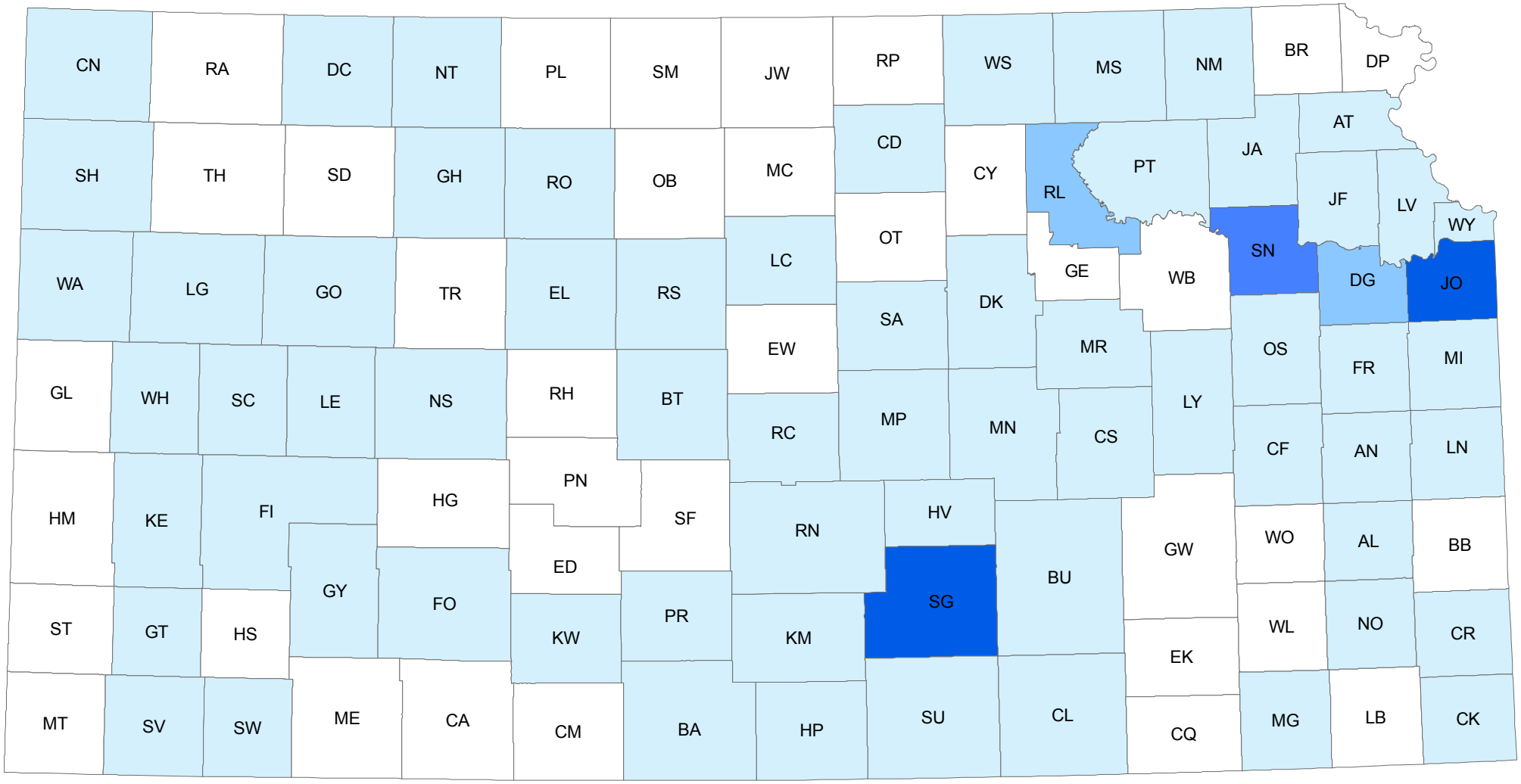
Campylobacter is one of the most commonly reported causes of gastrointestinal illnesses in Kansas. In 2005, 335 cases were reported; 13 fewer cases than the total reported in 2004. The three-year median for 2002-2004 was 339; the number of reported cases had increased each year over that three-year period.

A decrease was noted during 2005 because many cases failed to meet the laboratory criteria for a confirmed case. Instead of isolating *Campylobacter* from a clinical specimen, one southwest Kansas hospital performed EIA tests to diagnose *Campylobacter* infection. (This practice has been occurring for many years at this hospital, but KDHE only became aware of it during 2005.) As a result, 49 EIA-positive patients from that hospital were classified as "suspect" cases rather than "confirmed". If confirmatory tests had been performed on the 49 suspect cases, it is likely that the total number of confirmed cases would have risen for a fourth consecutive year.

The exclusion of the 49 suspect cases may also explain the decrease in the 2005 incidence rate among Hispanics. In 2005, the incidence rate of *Campylobacter* was 6.4 per 100,000, a decrease from the rate of 14.1 per 100,000 that was reported during 2004. Southwest Kansas is home to many of the state's Hispanic residents, including 16 (33%) of the suspect *Campylobacter* cases. Ethnicity was unknown for 19 (39%) of the suspect cases, and 148 (44%) of the confirmed cases.

Confirmed cases ranged in age from less than one year to 98 years of age. The median age of cases was 34 years. The highest incidence rate occurred in those under 5 years of age (28.6/100,000). Of the campylobacteriosis cases reported in 2005, 193 (58%) were *jejuni*, four (1%) were *coli*, one (0.1%) was *upsaliensis*, and the remainder (41%) were not speciated.

Campylobacteriosis Cases by County, 2005



Cases 0 | 1 - 10 | 11 - 20 | 21 - 40 | 41 - 52

CHLAMYDIA

Clinical Features: Chlamydia is a sexually transmitted disease (STD) that is responsible for an increasing variety of clinical syndromes, many closely resembling infections caused by gonorrhea. Chlamydia is manifested by a broad spectrum of clinical features including asymptomatic and symptomatic local infections, local complicated infections, and systemic dissemination. Asymptomatic infections can occur at the urethra endocervix, rectum, and pharynx. Symptomatic infections can include urethritis [nongonococcal urethritis (NGU)], mucopurulent cervicitis (MPC), proctitis, pharyngitis, bartholinitis, and conjunctivitis. Local complications can include salpingitis, epididymitis, Bartholin's Glands abscess, lymphangitis, and prostatitis. Systemic dissemination can result in Reiter's syndrome.

Causative Agent: *Chlamydia trachomatis*, a gram-negative bacterium.

Mode of Transmission: Chlamydia can be spread from person to person via contact with exudate from infected mucous membranes through sexual activity. Infected pregnant women can infect their newborn children during childbirth.

Incubation Period: Due to the preponderance of asymptomatic chlamydia cases (80% in men and 50% in women), the incubation period is poorly defined. Symptoms will generally occur 7 to 21 days after infection in symptomatic individuals.

Period of Communicability: May extend for months in untreated individuals.

***Public Health Significance*:** Many STDs may be prevented through sexual abstinence or through correct, consistent use of condoms. Chlamydia is the leading cause of infertility among Kansas women — screening efforts focus on sexually active women age 24 and under. Chlamydia infection is associated with an increased risk of acquiring HIV.

Reportable Disease in Kansas Since: 1985

Laboratory Criteria for Surveillance Purposes

- Isolation of *C. trachomatis* by culture, ***OR***
- Demonstration of *C. trachomatis* in a clinical specimen by detection of antigen or nucleic acid

Surveillance Case Definitions

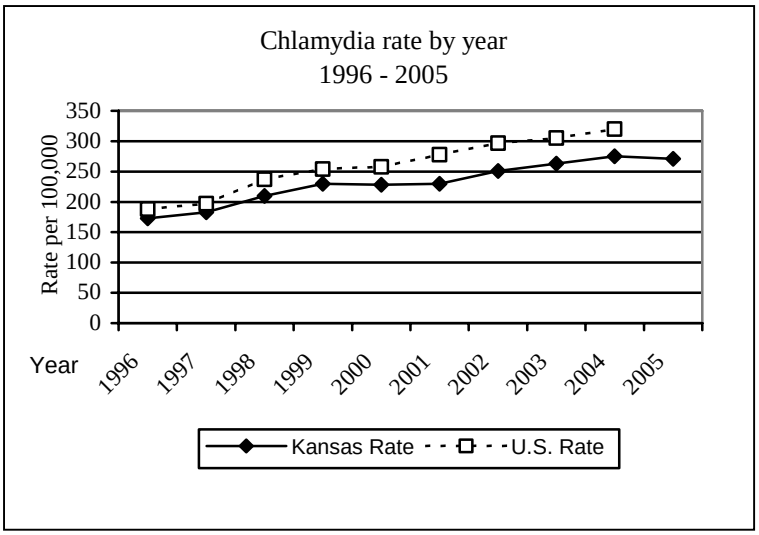
- *Confirmed:* case meets clinical criteria and is laboratory confirmed.

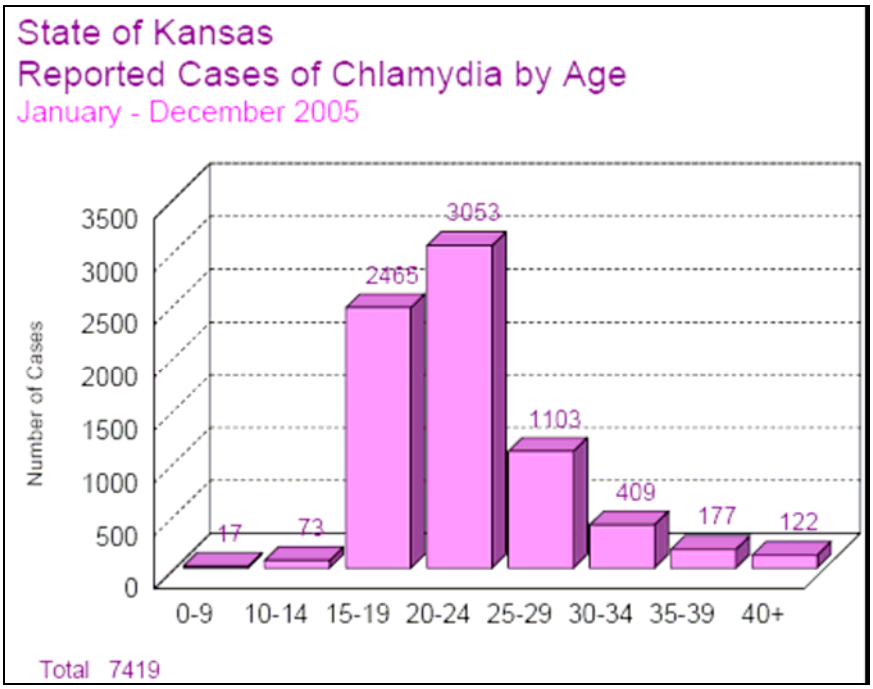
Epidemiology and Trends

2005 Kansas Count: 7419

	Rate per 100,000	*95% CI*
Kansas Rate	271	(268 - 281)
U.S. Rate (2004)	320	*NA*
Gender		
Male	99	(83 - 109)
Female	446	(439 - 463)
Race*		
White	111	(121 - 136)
Black	960	(1013 - 1215)
Asian/Pacific Islander	61	(0 - 342)
Native American	280	(0 - 1076)
Hispanic	312	(287 - 447)
Geographic area		
Urban County	337	(332 - 356)
Non-Urban County	203	(192 - 218)

**The STD program at KDHE designates "Hispanic" as a race category. As a result, analysis by Hispanic ethnicity is not presented.*





Chlamydia continues to be the most frequently reported STD in the state, with 86 of 105 counties reporting at least one case in calendar year (CY)2005. During CY2005, 30,216 tests were performed by the Division of Health and Environmental Laboratories (DHEL), Sedgwick and Wyandotte County laboratories, with 6.9 percent positive (2,077). These numbers represent an 11 percent decrease in screening and a 5 percent decrease in positives compared to CY2004.

There were 7,419 chlamydia infections reported in CY2005 which is a one percent (76 cases) decrease compared to CY2004. This represents the first decrease in total chlamydia cases since a one percent decrease in CY2000. Nineteen percent of reports were from public providers in the CY2005 compare to 20 percent in CY2004. The incidence of chlamydia infections in Kansas for CY2005 was 271/100,000.

Chlamydia infections continue to disproportionately affect females in their childbearing years. Forty-one percent (3,053 cases) of all reported cases in the CY2005 occurred in the 20-24 age group. This translated to a case rate of 1,419/100,000, closely followed by the 15-19 age group, which accounted for 33 percent (2,466 cases) of all reported infections and a case rate of 1,213/100,000. Combined, the 15-24 age group accounted for 74 percent (5,519 cases) of all chlamydia infections reported in CY2005. The 25-29 age group represented 15 percent (1,103 cases) of all cases and a case rate of 598/100,000 followed by the 30-34 age group with six percent (409 cases) and a case rate of 235/100,000. The 35-39 age group accounted for two percent (177) and a case rate of 100/100,000; all the other age groups had one percent or less of all the chlamydia cases reported in the CY2005.

Minorities continued to be disproportionately affected by chlamydia in CY2005. The case rate for Whites was 121/100,000 (2,734 cases). Among African-Americans, the case rate was

959/100,000 (1,663 cases). Hispanics, with no race elicited, had a case rate of 332/100,000 (688 cases), followed by Native Americans (276/100,000, 85 cases), and Asian/Pacific Islanders (63/100,000, 39 cases). No race was recorded for 2,211 cases (30 percent) reported in CY2005. Minorities may be disproportionately represented due to reporting bias (e.g., African-Americans may use public STD and Family Planning clinics more often for health care and be more likely to be screened and reported if positive). However, even when looking within screening sites, the positivity rates of chlamydia were higher among minorities than among whites.

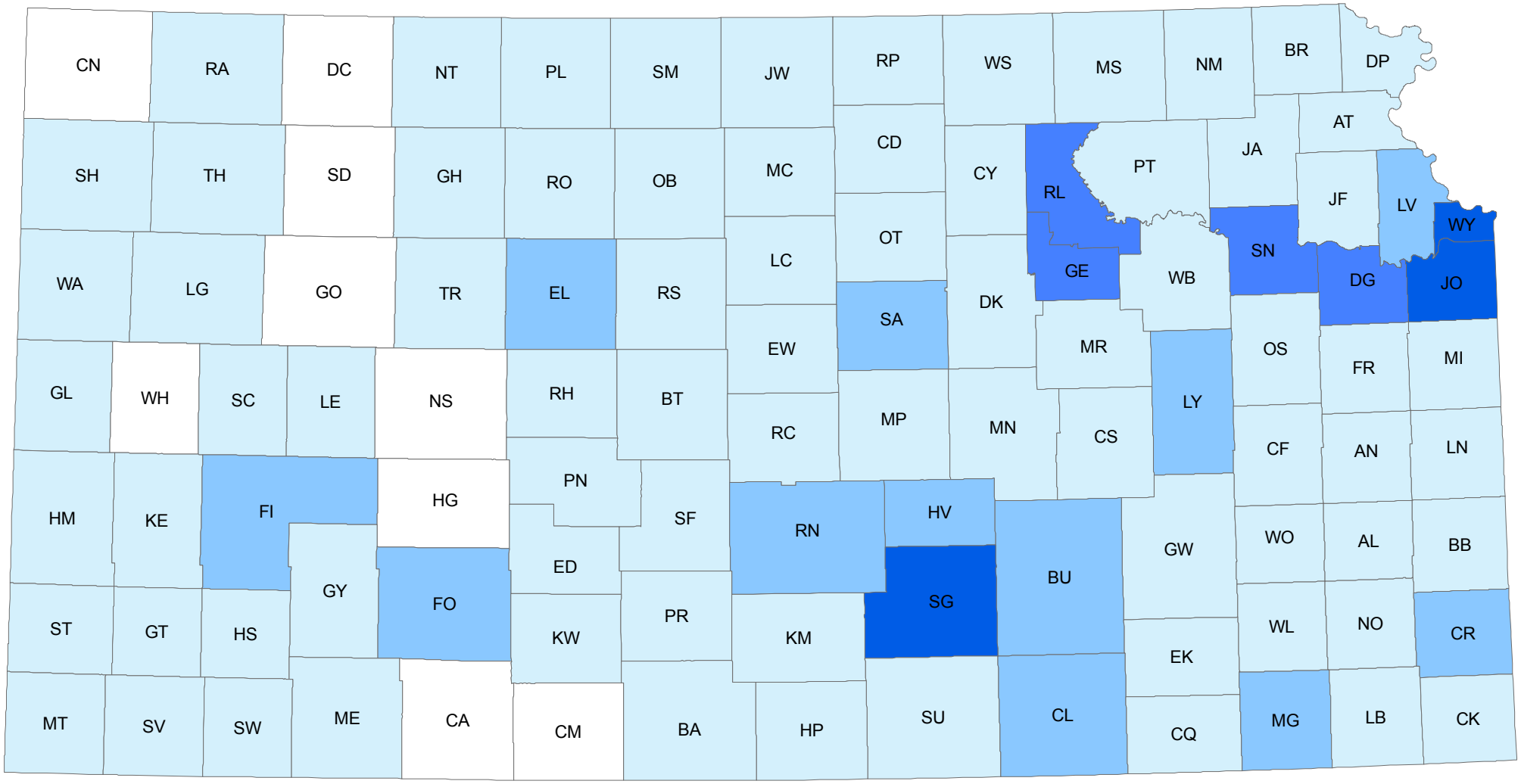
Correspondingly, six counties that had the greatest non-White population distribution also had case rates in excess of the state mean rate of 271/100,000. All six counties are located in the eastern third of the state. Geary County, which hosts Fort Riley, reported the largest case rate in the state at 1,290/100,000. Wyandotte County, which includes Kansas City, had a case rate of 596/100,000, followed by Sedgwick County (Wichita) and Shawnee County (Topeka) with case rates of 415/100,000 and 387/100,000, respectively. Riley County (Manhattan), the home of Kansas State University, had a case rate of 387/100,000 and Douglas County (Lawrence), the home of Kansas University, had a case rate of 354/100,000.

Females accounted for 82 percent (6,054 cases) of the reported infections; however, this figure is skewed due to the focused screening efforts for women. Males accounted for 18 percent (1,365) of reported infections in CY2005. The female to male ratio was 4.4:1.

The current guidelines for chlamydia screening target:

- All females in prenatal and STD clinics
- All females 24 years of age and under in family planning clinics
- Females 25 to 29 years old in family planning clinics that have symptoms of a chlamydial infection, or have had sexual contact with an STD-positive male or a male with urethritis

Chlamydia Cases by County, 2005



Cases 0 | 1 - 50 | 51 - 200 | 201 - 700 | > 700

CRYPTOSPORIDIOSIS

Clinical Features: An illness characterized by profuse, watery diarrhea. Other symptoms that may appear include abdominal cramps, loss of appetite, severe weight loss, low-grade fever, nausea, and vomiting. Symptoms often wax and wane and disappear in two weeks among healthy people. Asymptomatic infections are also common.

Causative Agent: *Cryptosporidium* spp., a spore-forming coccidian protozoa. *C. parvum* and *C. hominis* are the most common species affecting humans.

Mode of Transmission: Occurs person-to-person, animal-to-person, waterborne and foodborne via the fecal-oral route. Reservoirs include humans, cattle, and other domestic animals.

Incubation Period: 1 to 12 days (average 7 days)

Period of Communicability: As long as oocysts are present in the stool. Oocysts may be shed in the stool from the onset of symptoms to several weeks after symptoms resolve.

Public Health Significance: *C. parvum* has been the cause of several large waterborne outbreaks (drinking and recreational) in recent decades. The oocysts are highly resistant to normal amounts of chemical disinfectants, including chlorine, and filtration is needed to remove the oocysts from public water supplies.

With a low infectious dose (as low as 10 organisms) and a long shedding period (sometimes up to 2 months), cryptosporidiosis is extremely contagious and may be easily transmitted person-to-person. Attack rates of 30% to 60% have been reported in outbreaks associated with childcare centers.

Though all individuals are at risk for infection, young children and pregnant women may be more susceptible to dehydration. Illness among immunocompromised individuals, especially persons with HIV/AIDS, may be life-threatening.

Reportable Disease in Kansas Since: 1997

Laboratory Criteria for Surveillance Purposes

- Laboratory-confirmed cryptosporidiosis shall be defined as the detection—in symptomatic or asymptomatic persons—of *Cryptosporidium*

1. oocysts in stool by microscopic examination, ***OR***
2. in intestinal fluid or small-bowel biopsy specimens, ***OR***

3. oocyst or sporozoite antigens by immunodiagnostic methods, e.g., ELISA, ***OR***
4. by PCR techniques when routinely available, ***OR***
5. demonstration of reproductive stages in tissue preparations.

Surveillance Case Definitions

- Confirmed, symptomatic: a laboratory-confirmed case associated with one of the symptoms described above

- Confirmed, asymptomatic: a laboratory-confirmed case associated with none of the above symptoms

Epidemiology and Trends

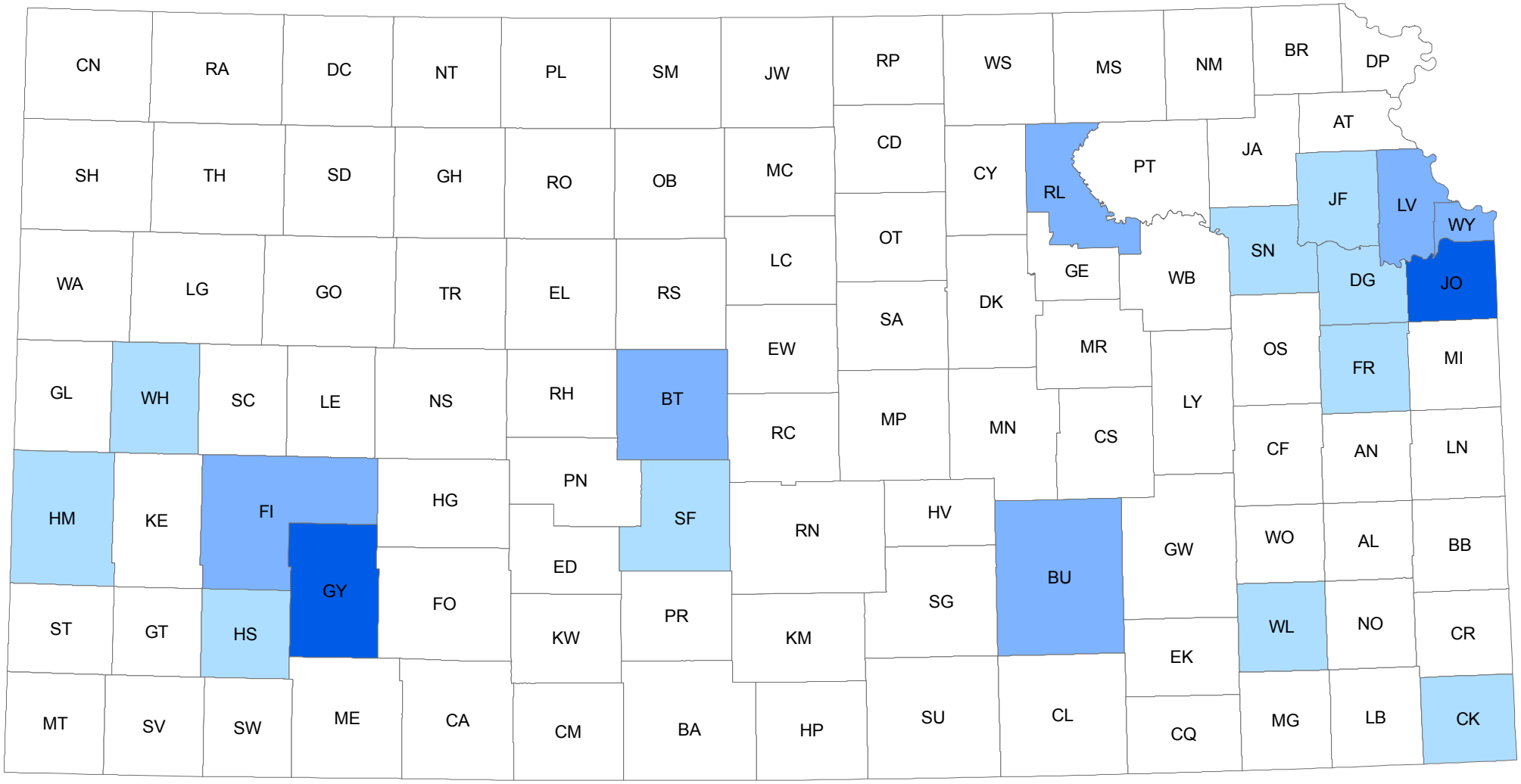
2005 Kansas Count: 40

	Rate per 100,000	*95% CI*
Kansas Rate	1.5	(1.0 – 1.9)
U.S. Rate (2004)	1.2	*NA*

Forty cases were reported during 2005, including seven cases that were identified as part of a waterborne outbreak.[*] The three-year median from 2002-2004 was 31 cases.

[*] A detailed outbreak report may be found in Section II of this document, "Special Reports".

Cryptosporidiosis Cases by County, 2005



Cases 0 1 2 - 5 6 - 8

ENCEPHALITIS, OTHER INFECTIOUS

Clinical Features: Signs and symptoms vary in severity and rate of progression. Severe infections may result in acute onset of headache, high fever, stupor, disorientation, coma, tremors, convulsions (especially in children), and paralysis.

Causative Agent: May be viral, fungal, or bacterial.

Mode of Transmission: Varies - dependent on the causative agent.

Incubation Period: Varies - dependent on the causative agent.

Period of Communicability: Direct person-to-person spread does not occur.

Public Health Significance: Preventative measures may be taken to prevent many types of infectious encephalitis; for example, precautions against insect bites could prevent some forms of viral encephalitis.

Reportable Disease in Kansas Since: 1982

Laboratory Criteria for Surveillance Purposes

- Fourfold or greater change in serum antibody titer, **OR**
- Isolation of infectious agent, demonstration of viral antigen, or demonstration of genomic sequences from tissue, blood, cerebrospinal fluid, or other body fluid, **OR**
- Specific IgM antibody by enzyme immunoassay (EIA) antibody captured in CSF or serum. Serum IgM antibodies alone should be confirmed by demonstration of IgG antibodies by another serologic assay (e.g., neutralization of hemagglutination inhibition).

Surveillance Case Definitions

- *Probable:* A clinically compatible case with supportive, but not definitive, serology.
- *Confirmed:* A clinically compatible case that is laboratory confirmed.

Epidemiology and Trends

2005 Kansas Count: 3

	Rate per 100,000	*95% CI*
Kansas Rate	0.1	(0.0 – 0.2)
U.S. Rate (2004)	*NA*	*NA*

"Other" encephalitis includes any reported case of encephalitis not caused by West Nile virus—West Nile encephalitis is reported separately. Two of the cases reported during 2005 were diagnosed with herpes simplex encephalitis. The other case of non-West Nile infectious encephalitis was St. Louis encephalitis.

The St. Louis encephalitis virus, like West Nile virus, is transmitted to humans through the bite of an infected mosquito. According to the CDC, 12 cases of St. Louis encephalitis were reported in the U.S. in 2004. Reported incidence is very low in Kansas; only three cases have been reported in the last ten years.

A comparable national rate for “other” encephalitis is not available.

DIARRHEA-CAUSING *ESCHERICHIA COLI*

Clinical Features: Most strains of *E. coli* are harmless and live in the intestines of healthy humans and animals; other strains may cause disease in humans. The most virulent of these strains is Shiga toxin-producing *E. coli* (STEC), formally known as enterohemorrhagic *E. coli* (EHEC). *E. coli* O157:H7 is the predominant EHEC serotype. Illness due to STEC is usually self-limiting and consists of severe abdominal cramping and bloody diarrhea. Serious clinical manifestations, including hemolytic-uremic syndrome (HUS), a complication that alters normal kidney function, and postdiarhreal thrombotic thrombocytopenic purpura (TTP), a blood and kidney illness that affects the nervous system, may occur, particularly among immunocomprised individuals, young children, and the elderly.

Causative Agent: at least five strains of diarrhea-producing *Escherichia coli* bacteria have been identified: Shiga toxin-producing *E. coli* (STEC), enteropathogenic *E. coli* (EPEC), enterotoxigenic *E. coli* (ETEC), enteroinvasive *E. coli* (EIEC), and enteroaggregative *E.coli* (EAEC).

Mode of Transmission: Transmission of STEC strains occurs via the fecal-oral route, during which susceptible individuals ingest food or liquids contaminated with human or animal feces. Outbreaks of STEC infections have been linked to eating undercooked ground beef, consuming contaminated produce, and drinking contaminated water or unpasteurized juice. Person-to-person transmission may also occur, especially within daycare settings and nursing homes.

Incubation Period: may range from 2-8 days (usually for 3-4 days).

Period of Communicability: The duration of excretion of the pathogen may vary by age group. Adults typically shed STEC for up to one week; however, infected children have been found to shed STEC for three weeks. A prolonged carriage state is not common.

Public Health Significance: Diarrhea-causing *E. coli* is often associated with contaminated beef and food products. Monitoring this disease serves as a potential indicator to problems in meat, fruit, and/or vegetable processing. A product recall may be issued if *E. coli* contamination is suspected—the USDA enforces a "zero tolerance" policy on this pathogen.

Reportable Disease in Kansas Since: 1997

Laboratory Criteria for Surveillance Purposes

- Isolation of *Escherichia coli* O157:H7 from a specimen, ***OR***
- Isolation of Shiga toxin-producing *E. coli* from a clinical specimen*

Surveillance Case Definitions

- *Suspect*: A case of postdiarrheal HUS or TTP

- *Probable*:
  - A case with isolation of *E. coli* O157 from a clinical specimen, pending confirmation of H7 or Shiga toxin production, ***OR***
  - A clinically compatible case that is epidemiologically linked to a confirmed or probable case, ***OR***
  - Identification of Shiga toxin in a specimen from a clinically compatible case, ***OR***
  - Definitive evidence of an elevated antibody titer to a known EHEC (also known as STEC) serotype from a clinically compatible case

- *Confirmed*: A case that meets the laboratory criteria for diagnosis.

Epidemiology and Trends

2005 Kansas Count: 49

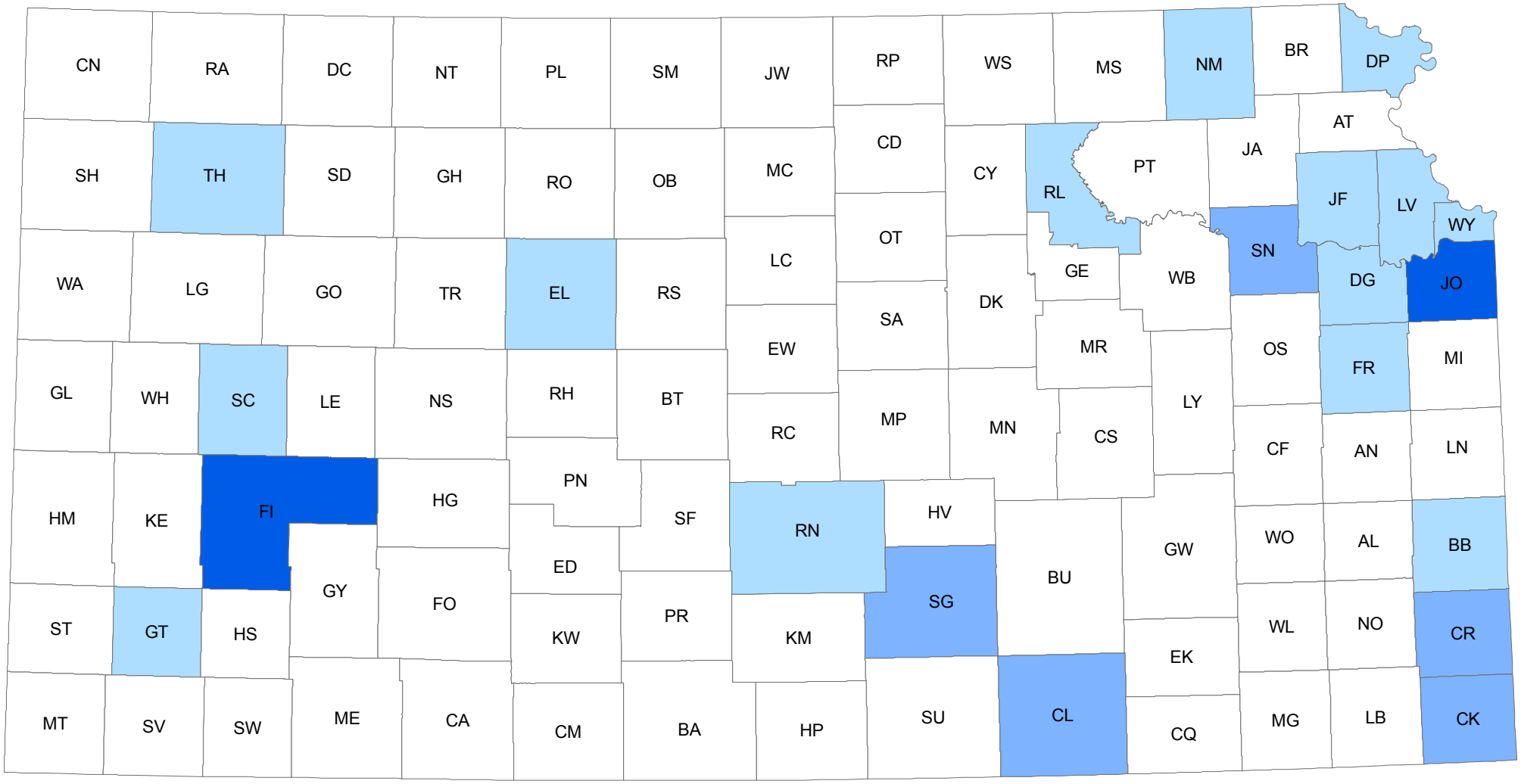
	Rate per 100,000	*95% CI*
Kansas Rate	1.8	(1.3 – 2.3)
U.S. Rate (2004)	*NA*	*NA*

Of the 49 cases of diarrhea-causing *E. coli* reported in Kansas during 2005, 45 were caused by *E. coli* O157:H7. The remaining four cases were attributed to other STEC strains. In 2004, the national incidence rate of *E. coli* O157:H7 was 0.9 per 100,000 population. The national incidence rate of both non-O157 and unserogrouped ETECs was 0.1 per 100,000.

No outbreaks were reported in Kansas in 2005. The three-year median for 2002-2004 was 47 cases.

* Shiga toxin enzyme immunoassay (EIA) laboratory methods only identify the presence of Shiga toxin in a clinical specimen and should not be used as a confirmatory test. Any Shiga toxin positive stool should be sent to the KDHE Laboratory for further identification. K.A.R. 28-1-18 also requires that isolates of positive cultures of *E. coli* O157:H7 and other EHEC, EPEC, and ETEC be sent to the KDHE Laboratory.

Diarrhea-causing *E. coli* Cases by County, 2005



Cases 0 | 1 - 2 | 3 - 4 | 5 - 6

GIARDIASIS

Clinical Features: The disease is often asymptomatic. When symptomatic, most common symptoms include chronic diarrhea, abdominal cramps, bloating, frequent loose and pale stools, malabsorption of fat and fat-soluble vitamins, fatigue, and weight loss. In severe giardiasis, damage to the duodenal and jejunal mucosal cells may occur.

Causative Agent: *Giardia lamblia*, a protozoan parasite

Mode of Transmission: Person-to-person transmission, especially in institutions and day care centers, is the principal mode of spread. Transmission is via the fecal-oral route, through ingestion of contaminated drinking water and recreational water, and less often from contaminated food. Humans are the principal reservoir of the infection. Dogs, cats, beavers, and other animals could be infected.

Incubation Period: Ranges from 3-25 days or longer (average of 7-10 days).

Period of Communicability: Entire period of infection. *Giardia* is often shed in the stool for months.

Public Health Significance: Disease may be prevented by promotion of good hand washing. Institutional outbreaks, especially in child day care centers, may result from person-to-person transmission - exclusion policies may apply to infected day care enrollees, foodworkers, and direct patient care providers.

Reportable Disease in Kansas Since: 1982

Laboratory Criteria for Surveillance Purposes

- Demonstration of *Giardia lamblia* cysts in stool, **OR**
- Demonstration of *Giardia lamblia* trophozoites in stool, duodenal fluid, or small bowel biopsy, **OR**
- Demonstration of *Giardia lamblia* antigen in stool by a specific immunodiagnostic test (e.g., enzyme-linked immunosorbent assay - ELISA).

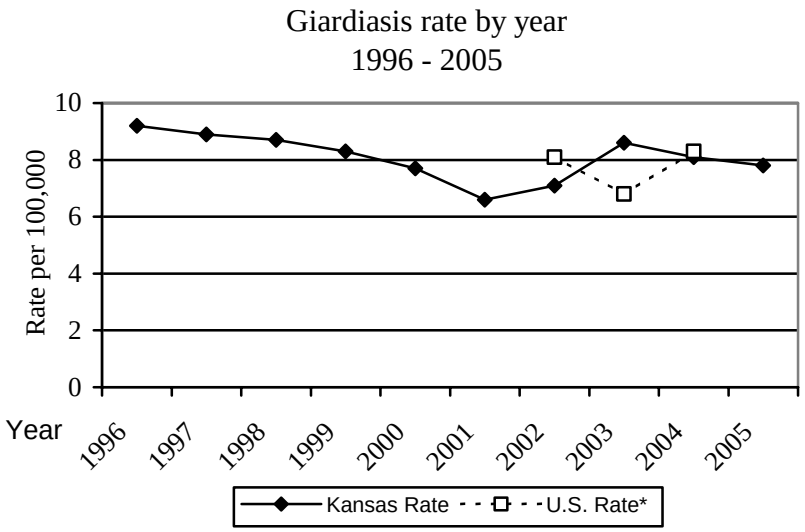
Surveillance Case Definitions

- *Confirmed:* a case that is laboratory confirmed.
- *Probable:* a clinically compatible case that is epidemiologically linked to a confirmed case.

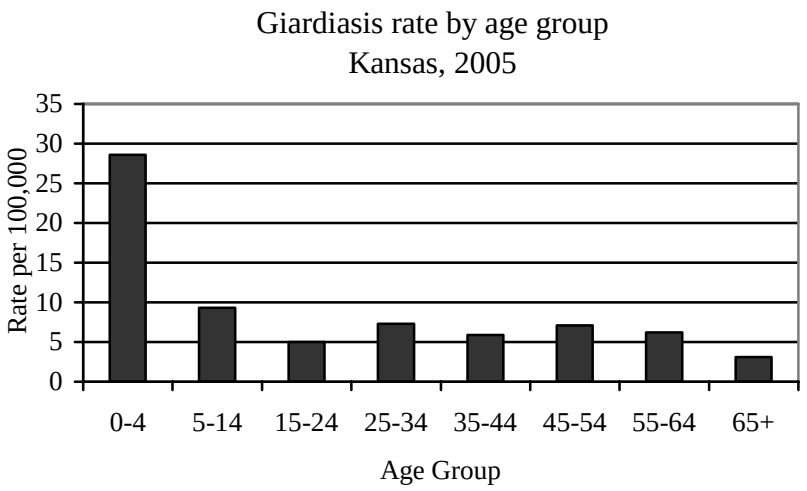
Epidemiology and Trends

2005 Kansas Count: 214

	Rate per 100,000	*95% CI*
Kansas Rate	7.8	(6.8 – 8.9)
U.S. Rate (2004)	8.3	*NA*
Gender		
Male	9.1	(7.5 - 10.7)
Female	6.5	(5.2 - 7.9)
Race		
White	4.3	(3.4 - 5.1)
Black	12.1	(6.9 - 17.3)
Asian/Pacific Islander	16.0	(6.1 - 26.0)
Ethnicity		
Hispanic	3.2	(0.8 - 5.5)
Non-Hispanic	4.6	(3.8 - 5.5)
Geographic area		
Urban County	9.0	(7.4 - 10.6)
Non-Urban County	6.6	(5.2 - 8.0)



**Not nationally notifiable until 2002*



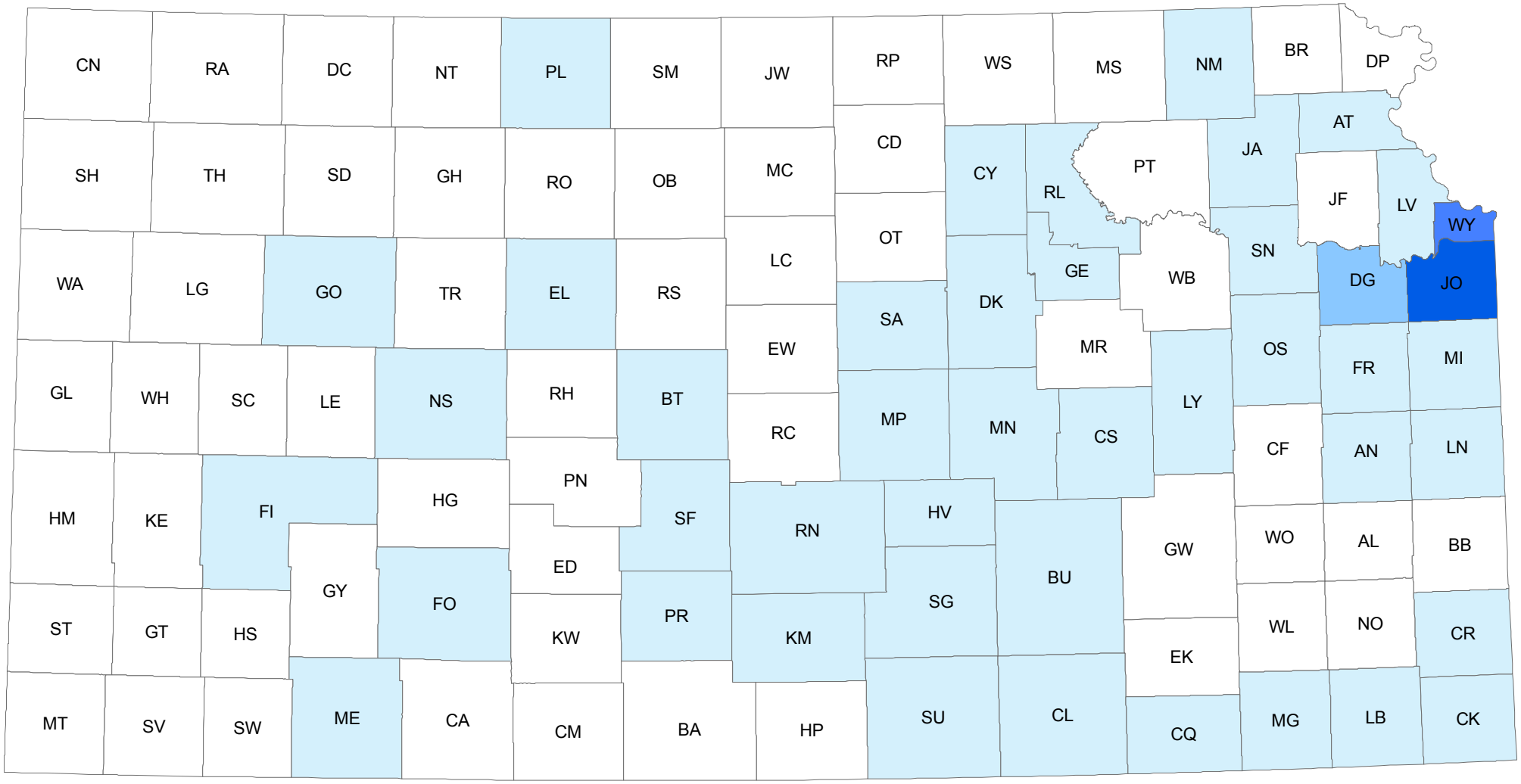
Reported cases of giardiasis decreased for the second consecutive year. In 2005, 214 cases (7.8 per 100,000 residents) were reported in Kansas, a decrease of seven cases from the previous year, when 221 cases (8.1 per 100,000 residents) were reported.

As in previous years, the incidence rate of disease in 2005 was higher among those residing in urban areas (9.0 per 100,000 residents) compared to non-urban areas (6.6 per 100,000 residents). Cases reported from the Kansas City area, among Douglas, Johnson, and Wyandotte county residents, accounted for 51% (n=110) of the state total. The reasons for this concentration are not clear; other urban counties in Kansas reported lower rates of giardiasis:

URBAN COUNTY	*GIARDIASIS CASES*	*GIARDIASIS RATE*
Douglas	***18***	***17.5***
Johnson	***61***	***12.3***
Sedgwick	10	2.2
Shawnee	5	2.9
Wyandotte	***31***	***19.8***

No giardiasis outbreaks were reported during 2005.

Giardiasis Cases by County, 2005



Cases 0 | 1 - 10 | 11 - 20 | 21 - 60 | > 60

GONORRHEA

Clinical Features: May manifest as a broad spectrum of clinical features, including asymptomatic and symptomatic local infections, local complicated infections, and systemic dissemination. Asymptomatic infections can occur at the urethra, endocervix, rectum, and pharynx. Symptomatic infections can include urethritis, cervicitis, proctitis, pharyngitis, bartholinitis, and conjunctivitis. Local complications can include salpingitis, epididymitis, Bartholin's Glands abscess, lymphangitis, and prostatitis. Systemic dissemination can result in disseminated gonococcal infection (DGI).

Causative Agent: *Neisseria gonorrheoae*, a gram-negative bacterium.

Mode of Transmission: Contact with exudate from infected mucous membrane of infected individuals through sexual activity. Infected pregnant women can infect their newborn children during childbirth.

Incubation Period:

- *Men*: When symptoms occur (approximately 80% of the time) they usually develop within 3 to 5 days of infection but can take up to 30 days.
- *Women:*When symptoms occur (approximately 30% of the time) they usually develop within 10 days of infection but can take up to 30 days.

Period of Communicability: May extend for months in untreated individuals.

***Public Health Significance*:** Many STDs may be prevented through sexual abstinence or through correct, consistent use of condoms. Gonorrhea infection is associated with an increased risk of acquiring HIV.

Reportable Disease in Kansas Since: 1973

Laboratory Criteria for Surveillance Purposes

- Isolation of typical gram-negative, oxidase-positive diplococci (presumptive *N. gonnorrheoae*) from a clinical specimen, ***OR***
- Demonstration of *N. gonnorrheoae* in a clinical specimen by detection of antigen or nucleic acid, ***OR***
- Observation of gram-negative intracellular diplococci in a urethral smear obtained from a male

Surveillance Case Definitions

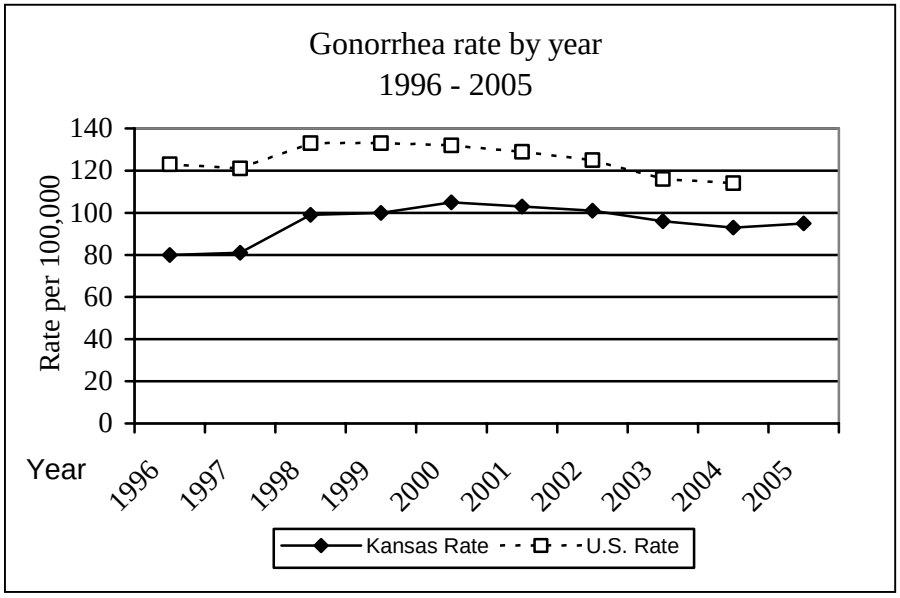
- *Confirmed:* A case that is laboratory confirmed.

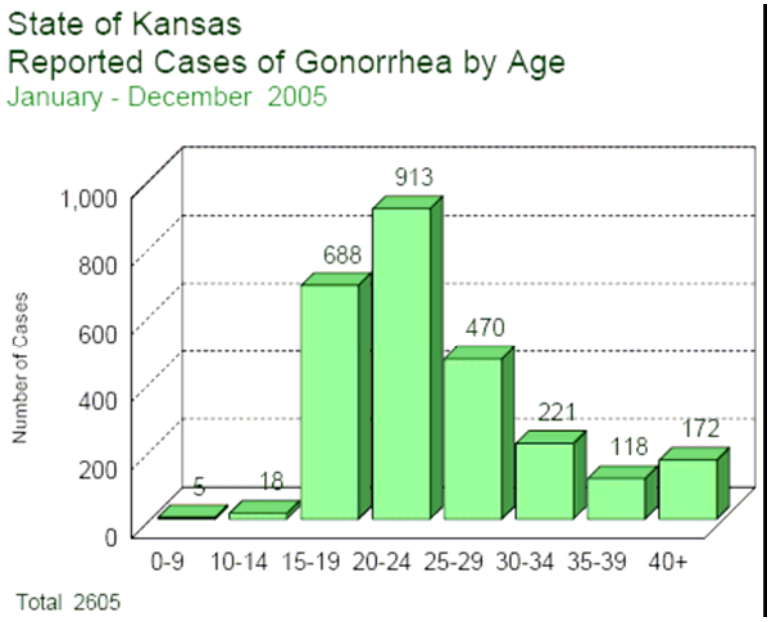
Epidemiology and Trends

2005 Kansas Count: 2605

	Rate per 100,000	*95% CI*
Kansas Rate	95	(89 - 97)
U.S. Rate (2004)	114	*NA*
Gender		
Male	71	(65 - 79)
Female	119	(107 - 121)
Race*		
White	25	(24 - 32)
Black	705	(698 - 816)
Asian/Pacific Islander	6	(0 - 176)
Native American	91	(0 - 475)
Hispanic	64	(22 - 115)
Geographic area		
Urban County	147	(136 - 150)
Non-Urban County	41	(35 - 49)

**The STD program at KDHE designates "Hispanic" as a race category. As a result, analysis by Hispanic ethnicity is not presented.*





In calendar year (CY) 2005, 2,606 cases were reported compared to 2,544 cases reported in CY2004; which is a two percent increase**.** This is the first increase in gonorrhea case reports since CY2000. The gonorrhea case rate for the state was 95/100,000 in CY2005. Twenty-nine percent of reported cases were from public providers in CY2005, which was a three percent increase compared to CY2004.

Like chlamydia, gonorrhea affects more young adults than any other age group. In CY2005, 35 percent (914 cases) of infections were reported in the 20-24 age group, a case rate of 425/100,000, followed by the 15-19 age group with 26 percent of reports (688) and a case rate of 338/100,000. Combined, these two age groups accounted for 61 percent of all reported cases of gonorrhea in CY2005. The 25-29 age group represented 18 percent (470 cases) of all cases and a case rate of 255/100,000 followed by the 30-34 age group with eight percent (221 cases) and case rate of 127/100,000 and the 35-39 age group with five percent (118 cases) and a case rate of 66/100,000 and the 40-44 and 45-54 age groups each with three percent of the cases.

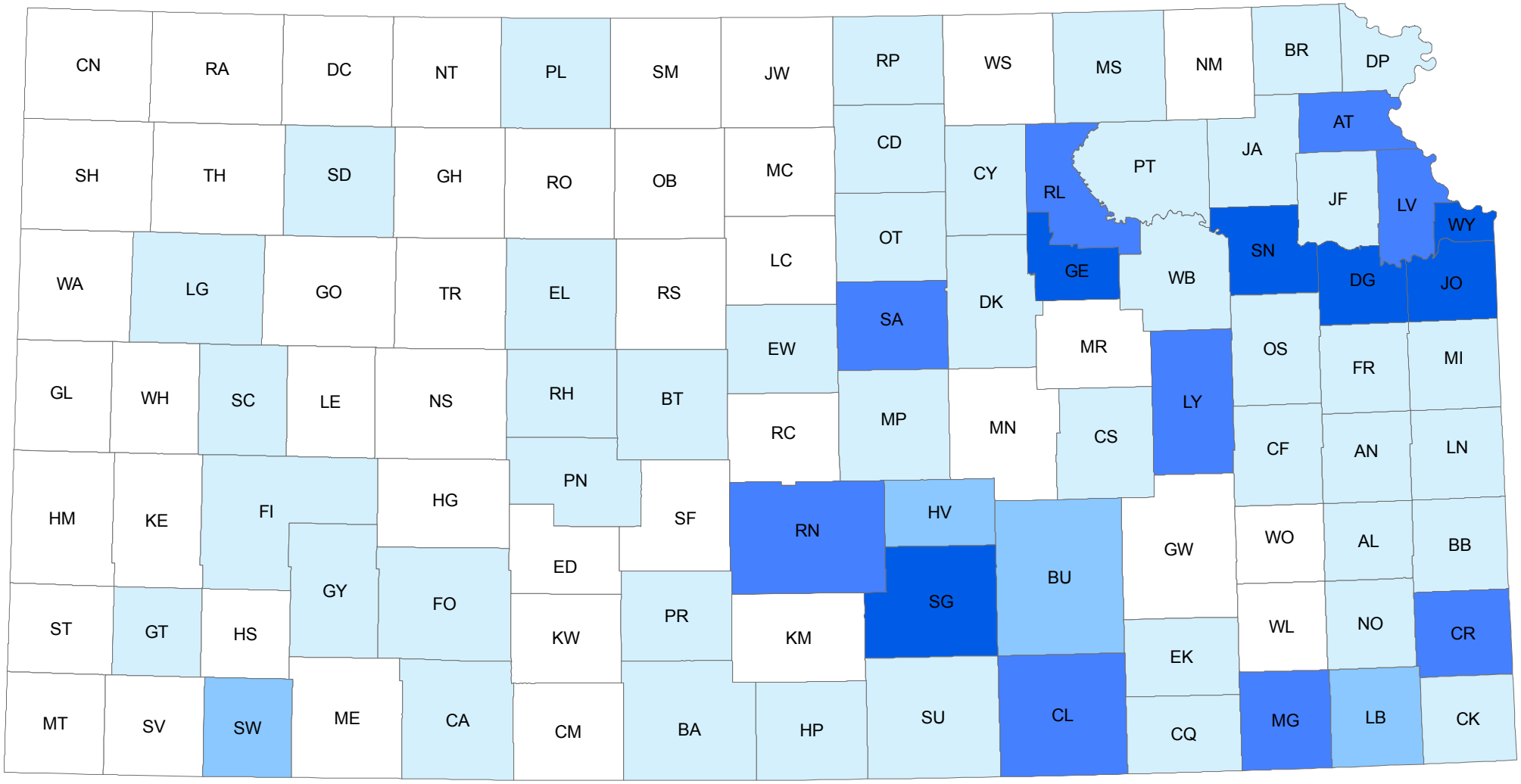
In CY2005, as in previous periods, urban areas continue to report the majority of gonorrhea infections. Sedgwick County (Wichita) reported a case rate of 142/100,000 (657 cases), Wyandotte County (Kansas City) reported a case rate of 397/100,000 (621 cases) and Shawnee County (Topeka) reported a case rate of 230/100,000 (395 cases). Zip codes 66104 (Kansas City) and 67214 (Wichita), recorded 13 percent (350 cases) of the state's total morbidity for CY2005. Three zip codes (66101, 66104, and 66105) in Kansas City represented 17 percent (445 cases) of all infections within the state. Three zip codes within Wichita (67214, 67208 and 67218) accounted for 11 percent (279) of the state's total reported gonorrhea reported in CY2005 and three zip codes within Topeka (66604, 66605 and 66607) accounted for 9 percent (241) of the state's total morbidity. Combined these nine zip codes accounted for 37 percent of all reported gonorrhea

infections throughout Kansas in CY2005. The state of Kansas has four stand alone STD clinics, three of which are located in Sedgwick, Wyandotte and Shawnee Counties.

As reported with chlamydial infections, members of the African-American population continued to be disproportionately affected by gonorrhea. African-Americans accounted for 47 percent (1,222 cases) of all reported gonorrhea infections in CY2005 for a case rate of 705/100,000. Hispanics, with no race elicited, had a case rate of 68/100,000 (142 cases) for five percent. Whites had a case rate of 27/100,000 (627 cases). Native Americans reported 26 cases for a rate of 104/100,000 and Asian/Pacific Islanders had a case rate of 10/100,000 (6 cases). There was no race recorded for 583 cases (22 percent) reported in CY2005. Minorities may be disproportionately represented due to reporting bias (e.g., African-Americans may use public STD and Family Planning clinics more often for health care and be more likely to be screened and reported if positive). However, even when looking within screening sites, the positivity rate of gonorrhea was higher among minorities than among whites.

A breakdown by gender shows that 1,646 females and 960 males were reported with gonorrhea in CY2005, for a female to male ratio of 1.7:1. Compared to the female to male ratio of chlamydia, the gonorrhea ration ratio is not as skewed, even though females are screened for gonorrhea through the KIPP. Males commonly do not have symptoms with chlamydial infections and do not seek medical care; however, males commonly voluntarily present at clinics with symptoms of gonorrhea and are tested and treated.

Gonorrhea Cases by County, 2005



Cases 0 | 1 - 10 | 11 - 20 | 21 - 100 | 101 - 657

HAEMOPHILUS INFLUENZAE, INVASIVE DISEASE

Clinical Features: Several clinical syndromes including meningitis, septic arthritis, epiglottitis, cellulitis, bacteremia, and pneumonia may characterize invasive infection. Symptoms of meningitis may include fever, headache, lethargy, vomiting, and stiff neck. Other symptoms depend on the part of the body affected.

Causative Agent: *Haemophilus influenzae*, a gram-negative bacterium with six serotypes (a through f)

Mode of Transmission: Found in the upper respiratory tract of humans, the organism may be transmitted by direct contact or droplet inhalation of respiratory tract secretions.

Incubation Period: Unknown; probably short, 2-4 days.

Period of Communicability: As long as organisms are present, which may be for a prolonged period, even without nasal discharge. Considered noncommunicable within 24-48 hours after starting effective antibiotic therapy.

Public Health Significance: Before *H. influenzae* type B (HiB) conjugate vaccinations, *H. influenzae* type B was the leading cause of invasive diseases among children under 5 years of age. Immunization has been an effective method of limiting invasive HiB disease. Preventive antibiotics may prevent illness in close contacts to known cases of HiB, especially susceptible children.

Reportable Disease in Kansas Since: 1997

Laboratory Criteria for Surveillance Purposes

- Isolation of *H. influenzae* from a normally sterile site, such as blood, bone, joint, pericardial fluid, peritoneal fluid, or spinal fluid. (Note: Positive antigen test results from urine or serum samples are unreliable for diagnosis of *H. influenzae*.)

Surveillance Case Definitions

- *Confirmed:* A clinically compatible case that is laboratory confirmed.

- *Probable:* A clinically compatible case with detection of *H. influenzae* type B antigen in CSF.

Epidemiology and Trends

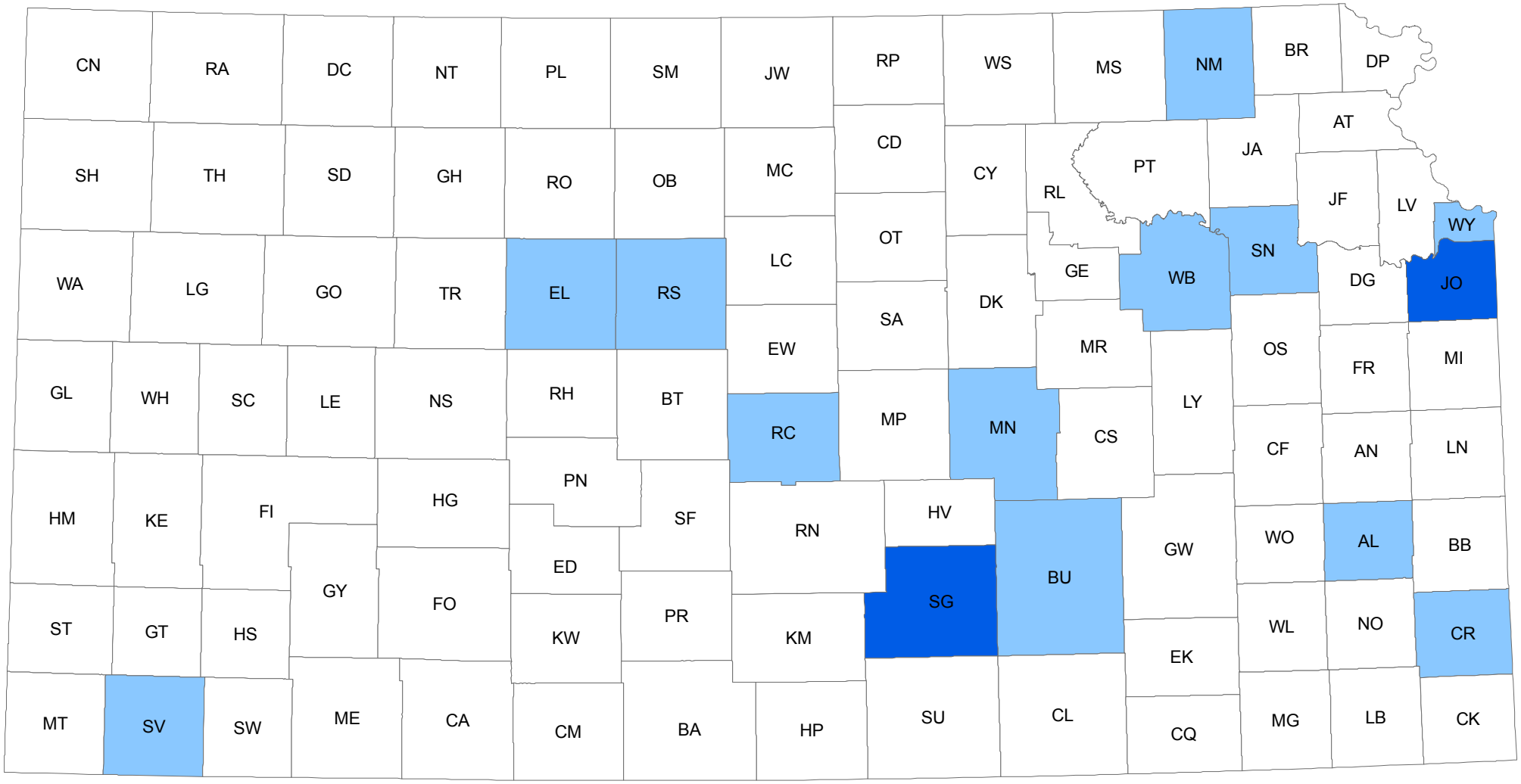
2005 Kansas Count: 18

	Rate per 100,000	*95% CI*
Kansas Rate	0.7	(0.4 – 1.0)
U.S. Rate (2004)	0.7	*NA*

In 2005, there were 18 reported cases of invasive *Haemophilus influenzae* infections in Kansas, an increase from the eight cases reported in 2004. The three-year median for 2002-2004 was eight cases; since 1997 there have been zero to 18 cases reported annually. The cases ranged from eight to 94 years of age.

No cases of HiB were reported.

Haemophilus influenzae Invasive Disease Cases by County, 2005



Cases 0 1 2 - 3

HANTAVIRUS PULMONARY SYNDROME (HPS)

Clinical Features: Typically, HPS begins nonspecifically with fever, myalgia, gastrointestinal complaints, headache, chills, and cough. This is followed by an abrupt onset of respiratory distress, hypotension, and pulmonary edema leading to respiratory failure. Mortality rate for HPS is approximately 40 – 50%. Survivors rapidly recover from the acute illness, but may have lingering pulmonary effects. Normal lung function will usually return.

Causative Agent: Multiple hantaviruses. In North America the most common is the *Sin Nombre* virus. The deer mouse is the primary reservoir for the virus.

Mode of Transmission: Inhalation of aerosolized rodent excreta is the presumed method of infection. The white-footed deer mouse (*Peromyscus maniculatus)* is the rodent vector for the virus; antibodies have also been found in other species of rodents.

Incubation Period: Ranges from several days to six weeks, usually about 2 weeks.

Period of Communicability: None. Human to human transmission does not occur.

Public Health Significance: Infections may be prevented through the control of rodents.

Reportable Disease in Kansas Since: 1997

Clinical Criteria

An illness characterized by one of the following:

- A febrile illness (temperature > 101.0 ^{o}F) characterized by bilateral diffuse interstitial edema that may radiographically resemble ARDS, with respiratory compromise requiring supplemental oxygen, developing within 72 hours of hospitalization, and occurring in a previously healthy person; ***OR***
- An unexplained respiratory illness resulting in death, with an autopsy examination demonstrating noncariogenic pulmonary edema without an identifiable cause.

Laboratory Criteria for Surveillance Purposes

- Detection of hantavirus-specific IgM or rising titers of hantavirus-specific IgG; ***OR***
- Detection of hantavirus-specific ribonucleic acid sequence by polymerase chain reaction in clinical-specimens; ***OR***
- Detection of hantavirus antigen by immunohistochemistry.

Surveillance Case Definitions

- *Confirmed:* A clinically compatible case that is laboratory confirmed.

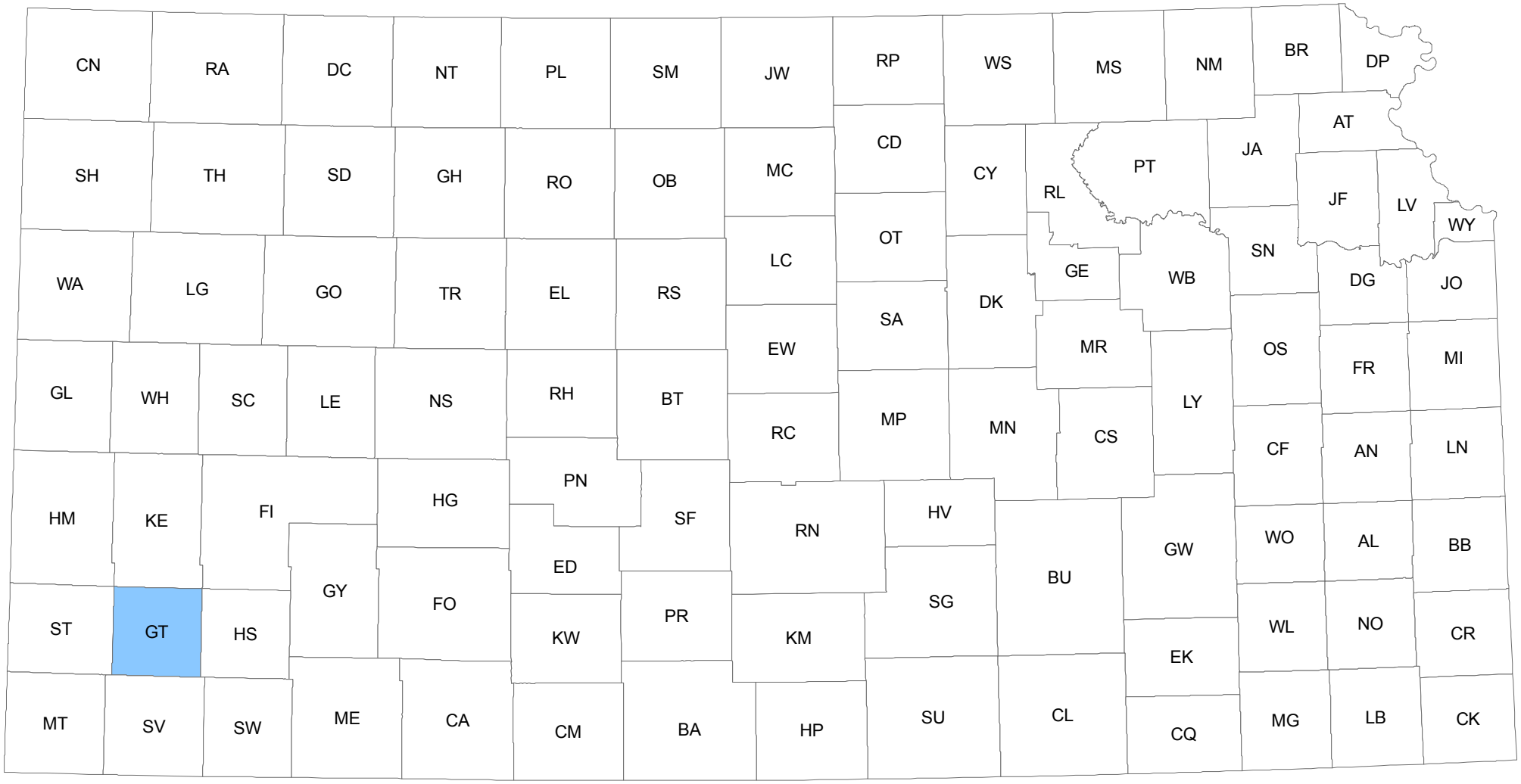
Epidemiology and Trends

2005 Kansas Count: 1

	Rate per 100,000	*95% CI*
Kansas Rate	<0.1	(0 - 0.1)
U.S. Rate (2004)	<0.1	*NA*

In 2005 there was one confirmed, non-fatal case of hantavirus pulmonary syndrome. The three-year median for 2002-2004 was 1.5 cases. Since 1993, there have been 0 - 4 cases reported annually, for a total of 19 cases. Six (32%) of these cases have been fatal.

Hantavirus Pulmonary Syndrome Cases by County, 2005



Cases 0 1

HEMOLYTIC UREMIC SYNDROME, POSTDIARRHEAL

Clinical Features: Hemolytic uremic syndrome (HUS) is characterized by the acute onset of microangiopathic hemolytic anemia, renal injury, and low platelet count. Thrombotic thrombocytopenic purpura (TTP) also is characterized by these features but can include central nervous system (CNS) involvement and fever and may have a more gradual onset. Most cases of HUS (but few cases of TTP) occur after an acute gastrointestinal illness (usually diarrheal). Some evidence has suggested that the use of antimicrobial therapy may precipitate complications like HUS.

Causative Agent: Shiga toxin-producing bacteria. *E. coli* O157:H7 causes an estimated 90% of HUS cases; *Shigella dysenteriae* type 1 may also cause HUS.

Mode of Transmission: HUS is not transmissible, although its causative agent may be transmitted via the fecal-oral route—susceptible individuals ingest food or liquids contaminated with human or animal feces. Outbreaks have been linked to animal contact, eating undercooked ground beef, consuming contaminated produce, and drinking contaminated water or unpasteurized juice. Person-to-person transmission may also occur, especially within daycare settings and nursing homes.

Incubation Period: Undefined. HUS is typically diagnosed a week or more after the onset of diarrhea

Period of Communicability: *N/A*

Public Health Significance: HUS is most commonly caused by *E. coli* O157:H7, a bacterium often associated with contaminated beef and food products. Monitoring this disease serves as a potential indicator to problems in meat, fruit, and/or vegetable processing. Risk for HUS may be lowered if *E. coli* O157:H7 enteritis patients are not treated with antimicrobial agents.

Reportable Disease in Kansas Since: 2000

Laboratory Criteria for Surveillance Purposes

- Anemia (acute onset) with microangiopathic changes (i.e., schistocytes, burr cells, or helmet cells) on peripheral blood smear, ***AND***

- Renal injury (acute onset) evidenced by either hematuria, proteinuria, or elevated creatinine level (i.e., greater than or equal to 1.0 mg/dL in a child aged less than 13 years or greater than or equal to 1.5 mg/dL in a person aged greater than or equal to 13 years, or greater than or equal to 50% increase over baseline)

Surveillance Case Definitions

- *Probable*:

  - An acute illness diagnosed as HUS or TTP that meets the laboratory criteria in a patient who does not have a clear history of acute or bloody diarrhea in preceding 3 weeks, ***OR***

  - An acute illness diagnosed as HUS or TTP, that a) has onset within 3 weeks after onset of an acute or bloody diarrhea and b) meets the laboratory criteria except that microangiopathic changes are not confirmed

- *Confirmed*: an acute illness diagnosed as HUS or TTP that both meets the laboratory criteria and began within 3 weeks after onset of an episode of acute or bloody diarrhea

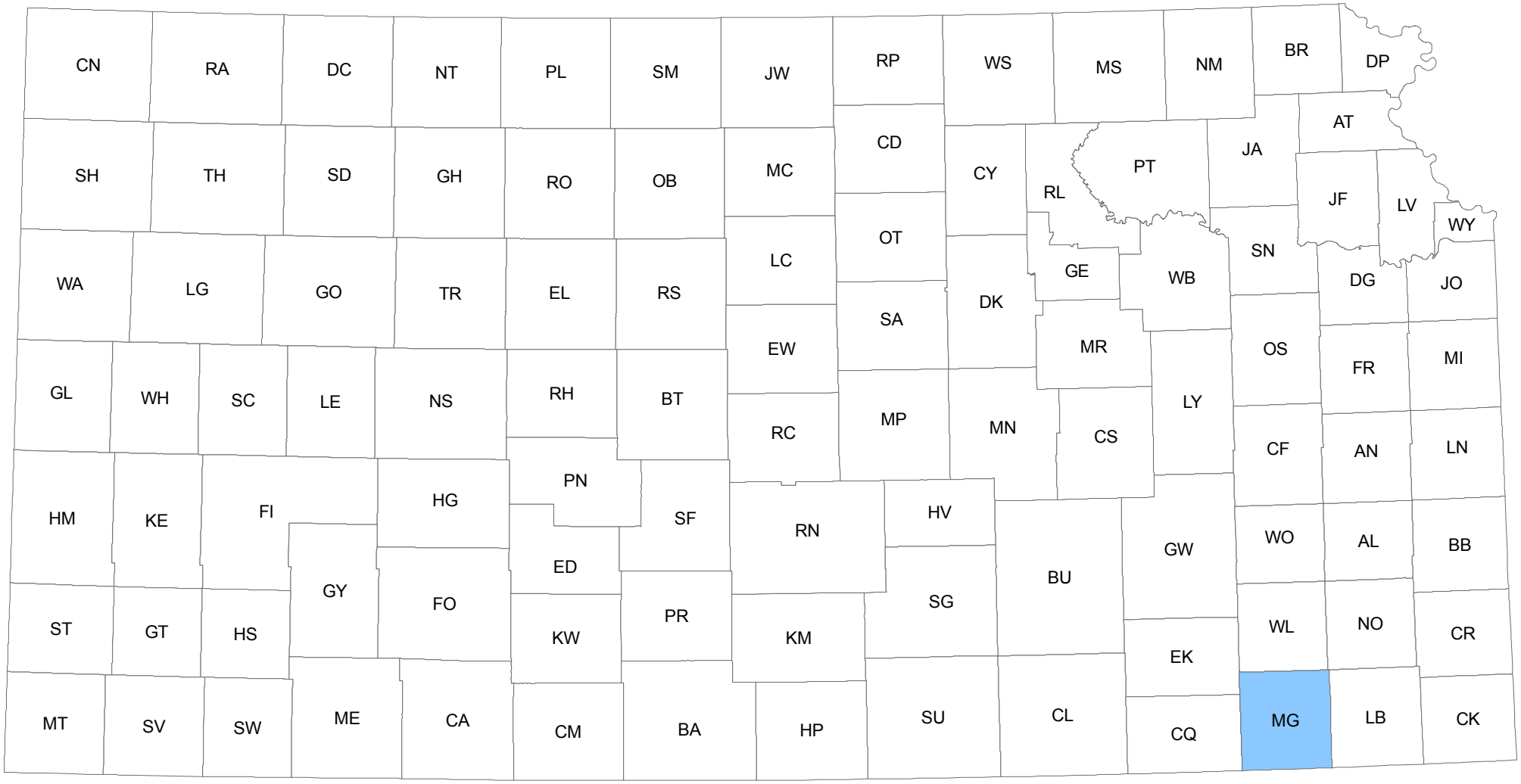
Epidemiology and Trends

2005 Kansas Count: 2

	Rate per 100,000	*95% CI*
Kansas Rate	0.1	(0.0 – 0.2)
U.S. Rate (2004)	0.1	*NA*

Two cases of postdiarrheal hemolytic uremic syndrome were confirmed in Kansas in 2005. The causative agent was not isolated from either case.

Hemolyic Uremic Syndrome Cases by County, 2005



Cases 0 1 - 2

HEPATITIS A

Clinical Features: Abrupt onset of fever, malaise, anorexia, abdominal cramps, and sometimes diarrhea. Jaundice may develop a few days after onset.

Causative Agent: Hepatitis A virus

Mode of Transmission: Transmission is through person-to-person, direct fecal-oral contact; consumption of food or beverages contaminated by an infectious person (indirect-fecal oral contact); or consumption of undercooked food exposed to contaminated water or feces (i.e., mollusks, lettuce, strawberries)

Incubation Period: 15 to 50 days (average 28 to 30 days)

Period of Communicability: From the latter half of the incubation period to a maximum of 7 days after the onset of jaundice. This can be as long as one month.

Public Health Significance: Hepatitis A continues to be one of the most frequently reported vaccine-preventable diseases in the United States. An inactivated hepatitis A vaccine is very effective in preventing infection; it is recommended for travelers to countries where hepatitis A is a common infection as well as for high-risk adults and children residing in these countries.

Gamma globulin (IG) can help prevent hepatitis A if administered soon after infection, and is recommended for people who live in the same house as a person with hepatitis A, for sexual contacts of a person with hepatitis A, and for children in the same day care center with a child with hepatitis A. IG is **NOT** given to casual contacts of a person with hepatitis A because the risk of infection in these situations is extremely small.

The goal of hepatitis A surveillance in Kansas is to identify cases and apply appropriate control measures. Control measures include contact identification and administration of post-exposure prophylaxis. If control measures are completed in a timely fashion, outbreaks can be prevented.

Reportable Disease in Kansas Since: 1982

Clinical Criteria

- An acute illness with (a) discrete onset of symptoms, ***AND*** (b) jaundice or elevated serum aminotranferase levels.

Laboratory Criteria for Surveillance Purposes

- Immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV) positive.

Surveillance Case Definitions

- *Confirmed:*

  - A case that meets the clinical case definition and is laboratory confirmed, ***OR***

  - A case that meets the clinical case definition and occurs in a person who has an epidemiologic link with a person who has laboratory-confirmed hepatitis A (e.g., household or sexual contact with an infected person during the 15-50 days before the onset of symptoms).

Epidemiology and Trends

2005 Kansas Count: 16

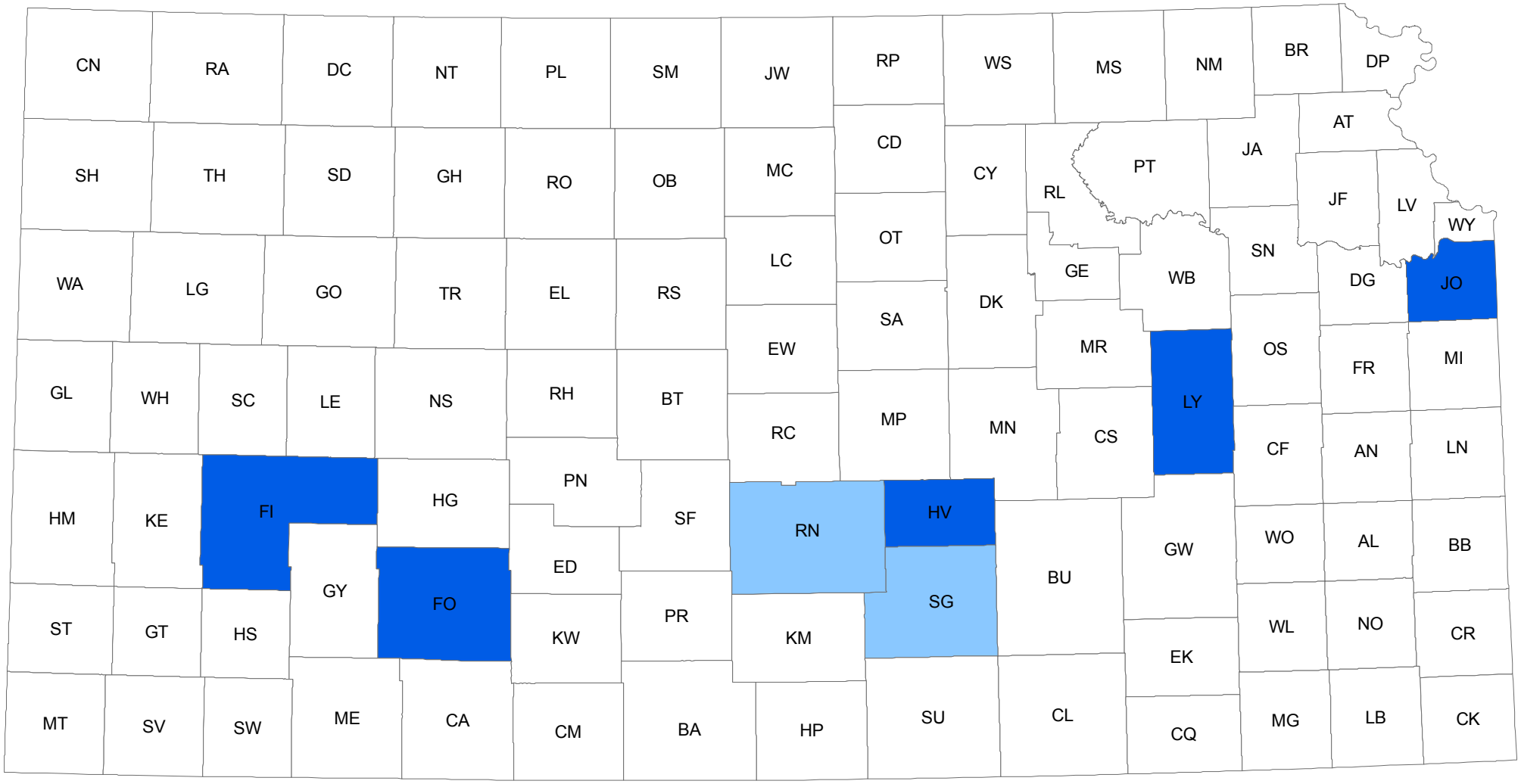
	Rate per 100,000	*95% CI*
Kansas Rate	0.6	(0.3 – 0.9)
U.S. Rate (2004)	1.9	*NA*

Sixteen cases of hepatitis A were reported in Kansas in 2005, a decrease compared to the 22 cases reported in the previous year. The three-year median for 2002-2004 was 26 cases. The 2005 cases ranged in age from three to 75 years; the median age was 15 years. No outbreaks of hepatitis A were detected; two cases of secondary transmission were noted.

The majority of cases (n=10, 63%) occurred in females. Ethnicity was known for 14 cases—eight (57%) were Hispanic. The incidence rate among Hispanics was higher (3.6 per 100,000) compared to non-Hispanics (0.2 per 100,000).

Risk factors during the 2-6 weeks prior to illness were noted in 10 of the 16 cases. Reported risk factors included contact with a hepatitis A case (2), and history of foreign travel (8). Regions and countries traveled included South / Central America (5) and India (2) — one travel history was not specified.

Hepatitis A Cases by County, 2005



Cases 0 1 2 - 4

HEPATITIS B

Clinical Features: Acute hepatitis B is an acute illness characterized by anorexia, abdominal discomfort, nausea and vomiting. Jaundice is present in <10% of children and <50% of adults. A low-grade fever, rash, and joint pain may also be present. Chronic hepatitis B illness may or may not demonstrate symptoms of hepatic inflammation. Only about one third of patients have elevated aminotransferase levels, which may fluctuate with intermittent exacerbations of hepatic inflammation. Chronic cases may have no evidence of liver disease or may have a spectrum of disease ranging from chronic hepatitis to cirrhosis or liver cancer.

Causative Agent: Hepatitis B virus

Mode of Transmission: Transmission occurs via percutaneous or permucaosal exposure: i.e. (1) infected blood or body fluids introduced at birth, (2) through sexual contact, or (3) by contaminated needles. Blood (and serum-derived fluids), saliva, semen, and vaginal fluids have been shown to be infectious. The likelihood of transmission is greater if the *e* antigen or viral DNA is present in an individual's blood.

Incubation Period: 45 to 180 days (average 60 to 90 days)

Period of Communicability: All persons who are hepatits B surface antigen (HbsAg) positive are potentially infectious; some individuals may clear the surface antigen from their blood, while others may not.

Public Health Significance: According to CDC, both acute and chronic hepatitis B cases are major causes of morbidity and mortality in the US. However, transmission of hepatitis B can be interrupted by vaccination and early identification of cases and their contacts. Timely identification of susceptible contacts of hepatitis B cases allows for effective post-exposure prophylaxis. Timely post-exposure prophylaxis is highly effective in preventing hepatitis B transmission from mother to infant. For this reason, all pregnant mothers are required to be tested for hepatitis B during pregnancy.

Routine hepatitis B vaccine is recommended for all children at birth, 1-2 and 6-18 months of age or, if not previously received, at 11-12 years of age. Hepatitis B vaccine is also recommended for persons in the following high risk groups: persons with occupational risk, clients and staff of institutions for the developmentally disabled; hemodialysis patients; recipients of certain blood products; household and sexual partners of HBsAg carriers; international travelers visiting high prevalence areas; injecting drug users; sexually active persons with multiple partners; and inmates of long-term facilities.

Reportable Disease in Kansas Since: 1982

ACUTE HEPATITIS B

Clinical Criteria

- An acute illness with a) discrete onset of symptoms and b) jaundice or elevated serum aminotransferase levels

Laboratory Criteria for Surveillance Purposes

- IgM antibody to hepatitis B core antigen (anti-HBc) positive or hepatitis B surface antigen (HBsAg) positive, ***AND***
- IgM anti-HAV negative (if done)

Surveillance Case Definitions

- *Confirmed:* a case that meets the clinical case definition and is laboratory confirmed

Epidemiology and Trends

2005 Kansas Count: 32

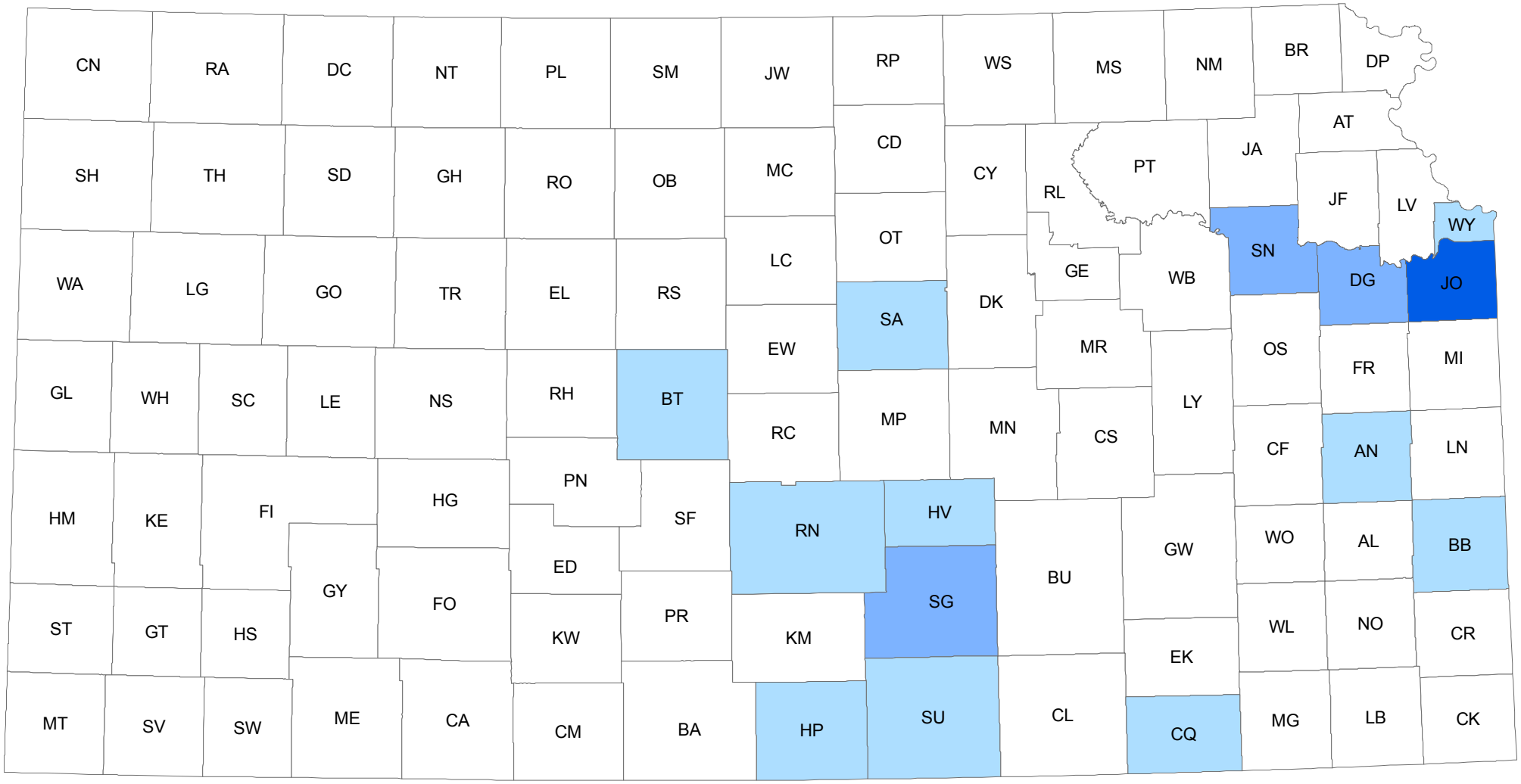
	Rate per 100,000	*95% CI*
Kansas Rate	1.2	(0.8 – 1.6)
U.S. Rate (2004)	2.1	*NA*

In 2005, 32 acute cases of hepatitis B were reported in Kansas, an increase of 14 cases compared to the previous year. The three-year median for 2002-2004 was 18 cases.

Cases ranged from 17 to 74 years of age; the median age was 37.5 years. The majority of cases (n=22, 69%) were residents of urban counties. Race was recorded for 26 (81%) of the cases: 23 (88%) were White, two (8%) were African-American, and one (4%) was Asian. Ethnicity was recorded for 22 (69%) of the cases: 20 (91%) were non-Hispanic and two (9%) were Hispanic.

The use of injected street drugs, a risk factor for hepatitis B, was reported by 13 (41%) of the confirmed cases.

Acute Hepatitis B Cases by County, 2005



Cases 0 | 1 - 2 | 3 - 4 | 5 - 9

CHRONIC HEPATITIS B

Laboratory Criteria for Surveillance Purposes

- Hepatitis B surface antigen (HBsAg) positive, total anti-HBc positive (if done) and IgM anti-HBc negative, ***OR***
- HBsAg positive two times at least 6 months apart

Surveillance Case Definitions

- *Confirmed:* A case that is laboratory confirmed

Epidemiology and Trends

2005 Kansas Count: 33

	Rate per 100,000	*95% CI*
Kansas Rate	1.2	(0.8 – 1.6)
U.S. Rate (2004)	*NA*	*NA*

Prior to 2005, prevalent cases of hepatitis B were defined as individuals that tested positive for HBsAg, HBeAg, or hepatitis B virus DNA by Positive Polymerase Chain Reaction (PCR). This was amended to reflect the 2003 CDC case definition, which states that an individual must test positive for HBsAg twice, with a minimum of six months between the tests, to be considered a confirmed case. HBeAg and PCR tests are now classified as non-confirmed cases.

In 2004, 502 prevalent cases were reported. As a result of the change in case definition, only 33 chronic cases of hepatitis B were reported during 2005.

The cases ranged from 14 to 78 years of age; the median age was 45 years. The majority of cases (n=26, 79%) were reported among residents of urban counties. Race was reported for 26 (79%) of the chronic cases: 12 (46%) were Asian, 10 (38%) were White, and four (15%) were African-American.

Hepatitis B prevalence is highly endemic in Southeast Asia, China, and the Pacific Islands (except Australia, Japan, and New Zealand). In these countries, more than 8% of the population has chronic hepatitis B. This may explain the high proportion of reported chronic hepatitis B within Asian and Pacific Islanders compared to other racial groups.

HEPATITIS C

Clinical Features: Initial infection may be asymptomatic or mild (<90% of cases), chronic infection is common (55% to 85% of cases). Approximately 70% of the chronically infected will develop chronic liver disease, cirrhosis or hepatocellular carcinoma. Liver function tests may be elevated or normal during chronic disease.

Causative Agent: The hepatitis C virus is an enveloped RNA virus in the Flavivirdae family.

Mode of Transmission: Primarily as a bloodborne pathogen (e.g. sharing of contaminated objects especially needles and syringes) - transmission through sexual contact may also occur, although this is rare.

Incubation Period: The incubation period ranges from 2 weeks to 6 months, averaging 6-9 weeks. Acute hepatitis C infection will convert to a chronic carrier state within 6 months if the acute infection does not resolve. Chronic infection may persist for 10 to 20 years prior to onset of symptoms.

Period of Communicability: Communicability persists as long as virus is present in the body. Chronic cases are considered infectious for life. Peaks in virus concentration correlate with peaks in ALT activity.

Public Health Significance: Preventative measures for hepatitis C include behavior modifications that also lower risk factors for acquiring other diseases, such as HIV. While no vaccine exists for hepatitis C, vaccination against hepatitis A and B are recommended for infected individuals.

Reportable Disease in Kansas Since: 2000

ACUTE HEPATITIS C

Laboratory Criteria for Surveillance Purposes

- Serum alanine aminotransferase levels greater than 7 times the upper limit of normal, and IgM antibody to hepatitis A virus (IgM anti-HAV) negative (if done), ***AND***
- IgM antibody to hepatitis B core antigen (IgM anti-HBc) negative, or if not done, hepatitis B surface antigen (HBsAg) negative, ***AND***
    - Antibody to hepatitis C virus (anti-HCV) screening-test-positive (repeat reactive) verified by an additional more specific assay (e.g. recombinant immunoblot assay [RIBA] for anti-HCV or nucleic acid testing for hepatitis C virus [HCV] RNA), ***OR***
    - Anti-HCV screening-test-positive with a signal to cut-off ratio predictive of a true positive as determined for the particular assay (e.g., ≥3.8 for the enzyme immunoassays)

Surveillance Case Definitions

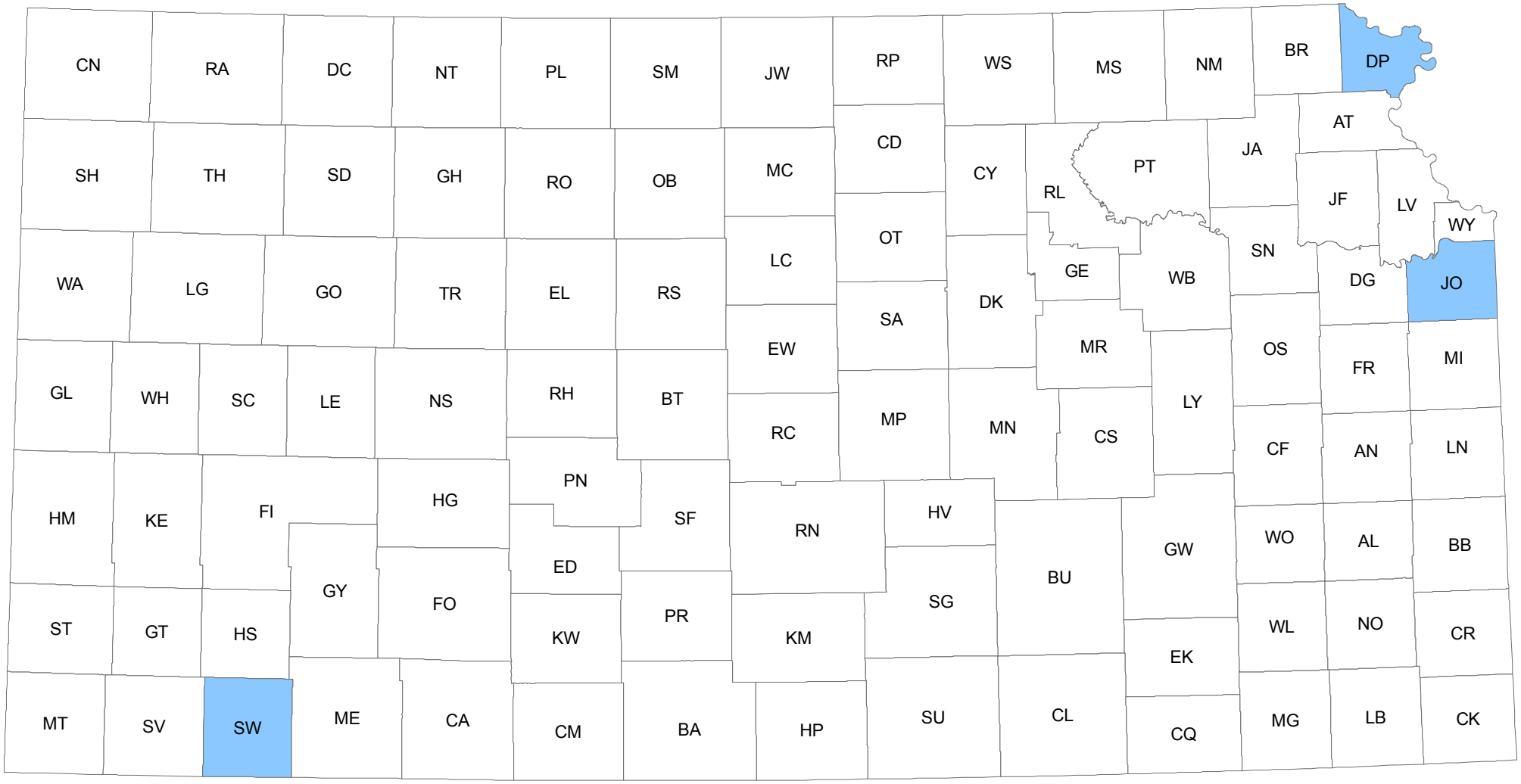
Confirmed: A case that meets the clinical case definition and is laboratory confirmed

2005 Kansas Count: 3

	Rate per 100,000	*95% CI*
Kansas Rate	0.1	(0.0 - 0.2)
U.S. Rate (2004)	0.3	*NA*

Three acute cases of hepatitis C were reported in 2005. These are the first confirmed cases recorded in Kansas since 2002, when five cases were reported. The true incidence rate is likely higher; the strict surveillance case definition precludes some cases from classified as "confirmed". Six cases were classified as "probable" in 2005.

Acute Hepatitis C Cases by County, 2005



Cases 0 1

CHRONIC HEPATITIS C

Laboratory Criteria for Surveillance Purposes

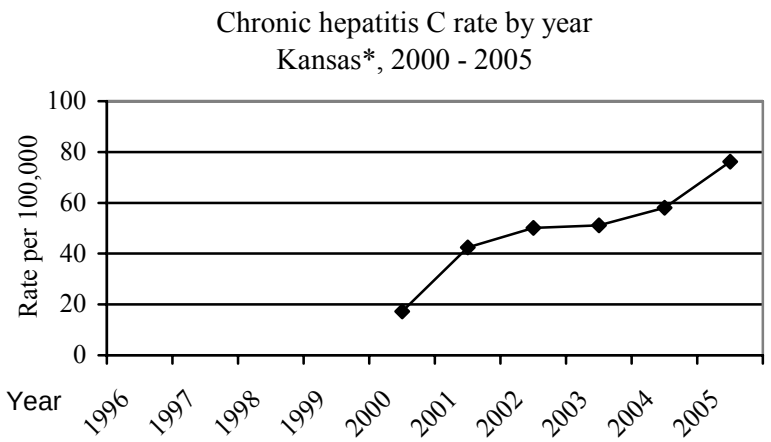
- Anti-HCV positive by EIA, verified by an additional specific assay (e.g. RIBA for anti-HCV or nucleic acid testing (PCR) for HCV RNA, ***OR***
- HCV RIBA positive, ***OR***
- Nucleic acid test (PCR) for HCV RNA positive, ***OR***
- Report of HCV genotype, ***OR***
- Anti-HCV positive screening with a signal to cut-off ratio ≥ 3.8 (KDHE laboratory) and ≥ 3.0 (Private laboratory).

Surveillance Case Definitions

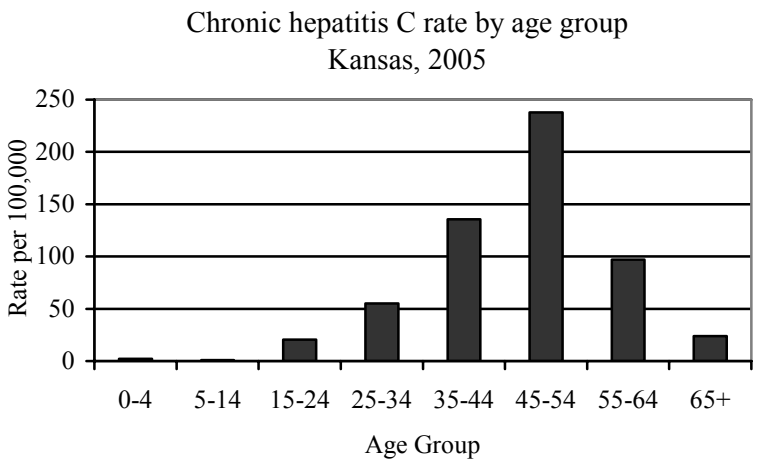
Confirmed: A case that is laboratory confirmed and that does not meet the case definition for acute hepatitis C.

2005 Kansas Count: 2085

	Rate per 100,000	*95% CI*
Kansas Rate	76.2	(72.9 - 79.5)
U.S. Rate (2004)	NA	NA
Gender		
Male	96.6	(91.6 - 102.1)
Female	55.5	(51.5 - 59.4)
Race		
White	30.5	(28.3 - 32.2)
Black	66.3	(54.2 - 78.4)
Asian/Pacific Islander	20.8	(9.5 - 32.2)
Native American	52.0	(26.5 - 77.5)
Ethnicity		
Hispanic	32.2	(24.7 - 39.7)
Non-Hispanic	25.1	(23.2 - 27.1)
Geographic area		
Urban County	85.7	(80.8 - 90.5)
Non-Urban County	66.4	(62.1 - 70.8)



**A comparable U.S. rate is not available.*



In 2005, 2085 chronic hepatitis C cases were reported - a 25% increase when compared with 2004. The three-year median for 2002-2004 was 1387 cases. Reports of chronic hepatitis C have steadily increased since the disease became reportable in 2000; this may be due to increasing awareness and availability of testing, or due to improvement in the reporting of cases to KDHE.

The ages of reported, chronic HCV cases ranged from less than 1 to 97 years of age (48.5 years median age). Hepatitis C was reported in all age groups, but 1,457 (69%) of all cases occurred in the 35-44 (525 cases) and 45-54 (932 cases) age categories. Cases in these two age categories may represent prior unreported infections. Alternatively, chronic HCV is often asymptomatic; persons in these two age categories may have been infected 10 to 20 years prior to positive-HCV confirmation.

The ratio of males to females was 1.7:1. Cases from the urban counties—Douglas, Johnson, Sedgwick, Shawnee, and Wyandotte—represented 57% of all cases reported. Of the 2005 cases, 753 (36%) were White, 115 (6%) were African-American, 13 (1%)

were Asian/Pacific Islanders, and 16 (1%) were Native American. Race was not reported for 1188 (43%) of the cases. Hispanic ethnicity accounted for 71 (3%) of the cases, although ethnicity was not reported in 1,382 (66%) of the cases. Improved collection of race and ethnicity information is needed to more definitively describe the burden of chronic HCV prevalence.

HUMAN IMMUNODEFICIENCY VIRUS (HIV)
AND
ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)

Clinical features: HIV, a retroviral pathogen that damages the body's immune system, is the causative agent for AIDS. With a weakened immune system, other pathogens may easily invade the body, allowing opportunistic diseases to develop and cause death. Most people infected with HIV develop detectable antibodies within 1-3 months after infection, but may remain free of signs or symptoms for several months to years. AIDS is a severe, life-threatening condition first recognized as a distinct syndrome in 1981. Clinical illness may include lymphadenopathy, chronic diarrhea, weight loss, fever, and fatigue. The severity of HIV-related illness is, in general, directly related to the degree of immune dysfunction.

Causative agent: Human immunodeficiency virus (HIV), a retrovirus. Two types have been identified: type 1 (HIV-1) and type 2 (HIV-2). These viruses are serologically and geographically distinct.

Mode of transmission: HIV can be transmitted from person to person through sexual contact, as a bloodborne pathogen (e.g. sharing of contaminated needles and syringes; transfusion of blood or its components; transplantation of HIV infected tissues or organs) and HIV infected pregnant women can infect their children before or during birth, during breastfeeding, or (rarely) following exposure to HIV- tainted blood or blood products after birth.

Incubation period: Variable, although the time from infection to the development of detectable antibodies is generally 1-3 months. The time from HIV infection to diagnosis of AIDS has been observed to range from less than one year to 15 years or longer.

Period of communicability: Unknown, presumed to begin early after onset of HIV infection and extend throughout life.

Public health significance: HIV is currently pandemic. As a preventable infectious disease with chronic health implications and no recognized cure, initiation of appropriate medical care and preventive services is important to reducing the burden of the disease on the infected and potentially susceptible public. Case reports initiate disease intervention specialist interviews for cases and contacts that help to establish links between cases and case management services (Ryan White CARE funding, drug and housing assistance programs) and physicians specializing in the treatment of HIV infected individuals. Additionally, these interviews serve to counsel individuals on methods for preventing further transmission of the disease to other persons.

Reportable disease in Kansas since: AIDS-1981; HIV-July 1, 1999

Criteria for Surveillance Purposes

AIDS

- Detection of either a) CD4+ T-lymphocytes/µL <200; b) a CD4+ T-lymphocyte percentage of total lymphocytes of <14%; or c) any of 24 specific diseases or syndromes.

HIV

- Western blot confirmed (positive/reactive) antibody test, HIV p24 antigen test, HIV nucleic acid (DNA or RNA) detection, HIV isolation (viral cultures).

Surveillance Case Definitions

AIDS

- All HIV-infected adolescents aged 13 years and adults who have either (a) a CD4+ t-lymphocyte count <200 or <14% or (b) been diagnosed with one of the AIDS defining opportunistic infections. Complete information on the case definition can be found in MMWR 1997; 46 (No. RR-10).

- The AIDS surveillance case definition for children aged <13 years includes the clinical conditions listed in the AIDS surveillance case definition found in MMWR 1997; 46 (No. RR-10).

HIV

- A case that is laboratory confirmed.

Note:

- The case definitions for adult and pediatric HIV infections have been expanded effective 1/1/2000. It includes HIV nucleic acid (DNA or RNA) detection tests (viral load tests) that were not available when the AIDS case definition was revised in 1993.
- HIV infection and AIDS are reportable in Kansas. A person previously reported as HIV infected is reported again as an AIDS case if an AIDS diagnosis is made.
- More detailed information on AIDS is available in the Kansas AIDS/STD Update, the "HIV/AIDS Epidemiologic Profile", and at http://www.kdhe.state.ks.us/hiv-std.

HIV Disease[1] Epidemiology and Trends

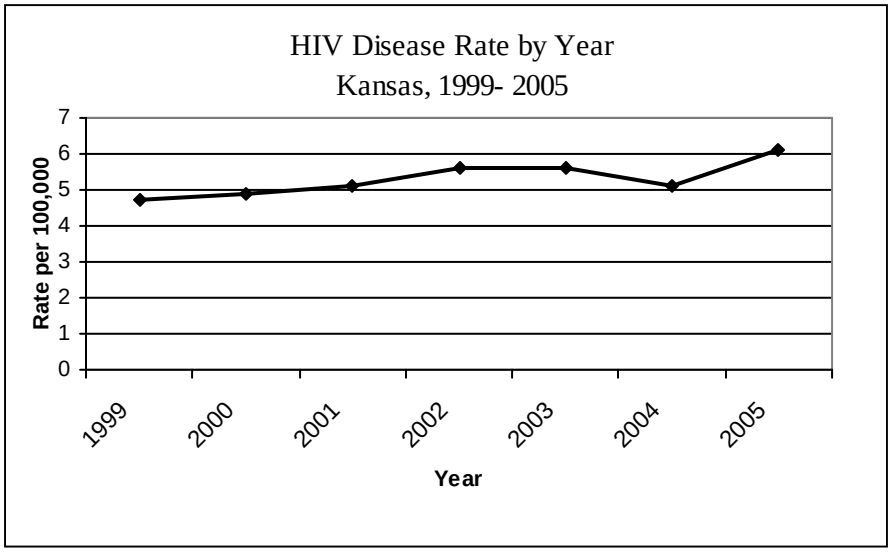
2005 Kansas Count: 166

	Rate per 100,000	*95% CI*
Kansas Rate	6.1	(5.1 – 7.0)
U.S. Rate (2004)[2]	*NA*	*NA*
Gender		
Male	9.2	(7.6 – 10.8)
Female	3.0	(2.1 – 3.9)
Race and Ethnicity*		
White	3.1	(2.4 – 3.8)
Black	39.2	(29.9 – 48.5)
Native American	6.5	(0 – 15.5)
Hispanic	10.6	(6.2 – 15.0)
Geographic area		
Urban County	9.3	(7.7 – 10.9)
Non-Urban County	2.7	(1.8 – 3.5)

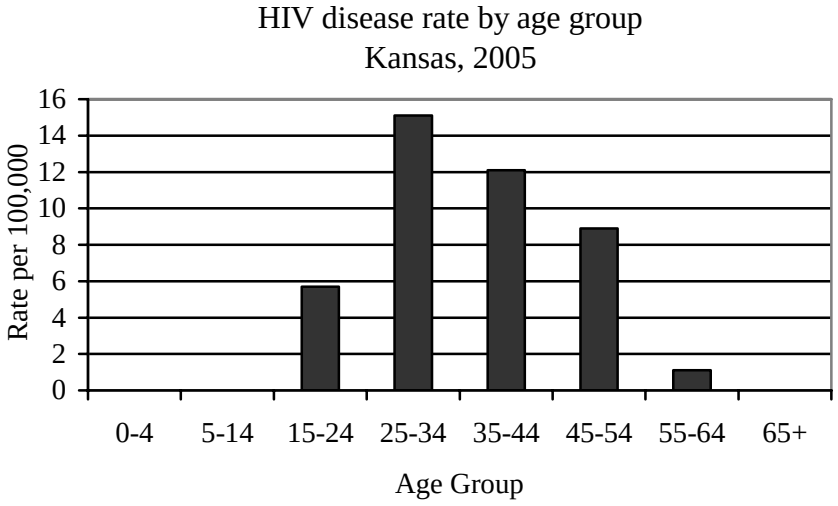
[1]HIV disease is defined as new cases of HIV infection in a particular yearregardless of AIDS status.

[2] CDC does not calculate a rate for HIV regardless of AIDS status.

****The HIV/AIDS program at KDHE combines race and ethnicity for analysis purposes. The denominators used for HIV/AIDS race rates differed from those used for other diseases: White 2,261632; Black 173,385; Hispanic 207,357; Native American 30,764; Asian/Pacific Islander 62,364.***



HIV disease is defined as new cases of HIV infection in a particular year regardless of AIDS status.
Data Source: HIV/AIDS Reporting System (HARS)



HIV disease is defined as new cases of HIV infection in a particular year regardless of AIDS status.
Data Source: HIV/AIDS Reporting System (HARS)

***Since 2005 population estimates for various population sub-groups in Kansas were not available at the time of analysis to calculate rates, 2004 Kansas population estimates have been used for denominators, while for numerators 2005 data have been used.*

Newly diagnosed and reported HIV infections are the only available indicator for changes in the HIV/AIDS epidemic in Kansas. Previous reports have divided AIDS and HIV data into separate categories; however, in the interest of providing an improved picture of the actual changes in the HIV epidemic the two will no longer be separated in this report. HIV infection will be considered regardless of the diagnostic status (AIDS or HIV) of the newly diagnosed individuals.

At the end of 2005, the state of Kansas HIV/STD Surveillance Program reported 1,679 individuals presumed to be living in Kansas and infected with HIV; among those 1178 (70%) had been diagnosed with AIDS. The numbers of newly diagnosed HIV disease cases (regardless of AIDS status) increased by 20% from 2004 to 2005, from 138 to 166 cases, respectively. Of the 166 newly diagnosed HIV infections in 2005, 65 (39 %) were also diagnosed with AIDS. The associated rate of infection for all newly diagnosed HIV cases based on the entire state population is 6.1 infections per 100,000 persons.

The age (at diagnosis) distribution for newly diagnosed HIV cases from 2005 includes individuals ranging from 16-72 years old, with a median age of 36. Excluding the lack of cases among Asian/Pacific Islanders for this reporting period, rates by race/ethnicity illustrate trends are similar to the national rates. However, the small minority populations in Kansas make it difficult to make statistically significant conclusions based on the elevated rates for Black/African-Americans and Hispanics. The difference in rates in Kansas between males (9.2 cases per 100,000 persons) and females (3.0 cases per 100,000 persons) represents the distribution of the disease burden where males accounted for 75% of all newly diagnosed HIV infections in Kansas and does not represent a change from the distribution of newly diagnosed cases last year. Additionally, the five most populated counties in Kansas account for 50.7% of the state's population and 78.3% of the new HIV cases. The rate for these urban counties is 9.3 cases per 100,000 persons and the 100 non-urban counties in the state have a rate of 2.7 cases per 100,000 persons.

Among the newly diagnosed cases 33.1% were among men who have sex with men, 16.9% were among those reporting risky heterosexual contact, and 35.5% are identified as having no classifiable risk factors for transmission. This 35.5% that cannot currently be classified are divided among those who report heterosexual contact with a person of unknown risk (20 /59, 33.9%), those who report heterosexual contact with a person of unknown risk and report a country of origin outside the United States (14 /59, 23.7%), and those who have no reported risks of any kind.

One key to improving outcomes for patients is the identification of new HIV infections prior to the conversion to AIDS. According to a study done by Neal and Fleming (CDC), "from 1994 through 1999, an estimated 43,089 (41%) had HIV diagnosed late."** Comparatively, the statistics for Kansas indicate that 66 percent of HIV cases are converting to AIDS within one year. Compared to previous years this statistic has increased and it continues to be a prevention priority to encourage testing with the hopes of capturing cases earlier in the course of the disease.

**Neal JJ, Fleming PL. Frequency and predictors of late HIV diagnosis in the United States, 1994 through 1999. In: Final program and abstracts of the 9th Conference on Retroviruses and Opportunistic Infections, Seattle, Washington, February 24-28, 2992. Alexandria, VA: Foundation of Retrovirology and Human Health.

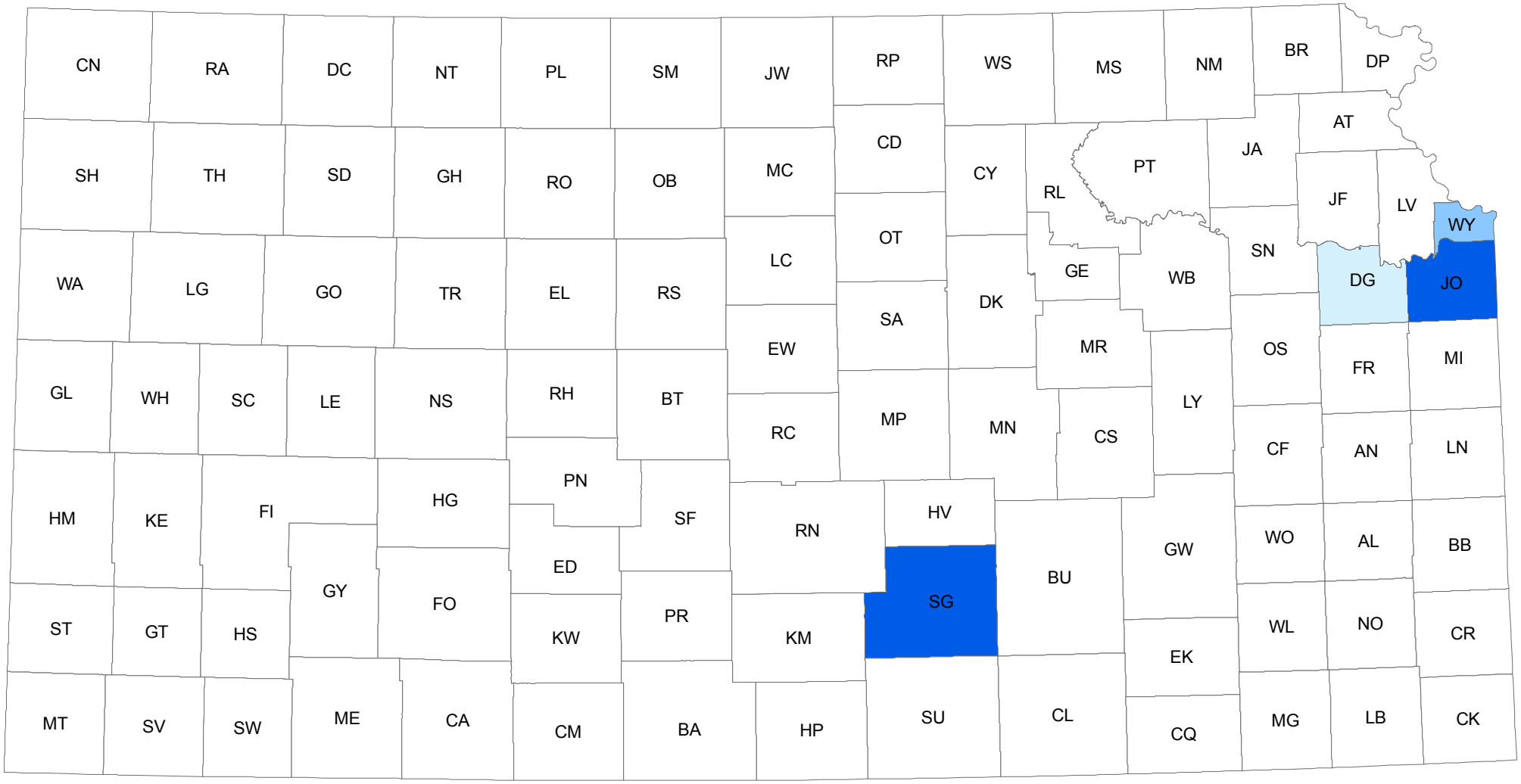
Interval between 1st HIV positive test and AIDS diagnosis in Kansas, 2004*

Interval	2004
12 Months or Less	55 (66%)
13 to 60 Months	15 (18%)
Greater than 60 Months	13 (16%)
Total	83 (100%)

Data Source: HIV/AIDS Reporting System (HARS)

♣*Note: This table represents the total number of cases diagnosed in 2004 and therefore totals differ from the above rate table, which uses the 2005 date of report for reference.*

Newly Reported HIV/AIDS Cases by County, 2005



Cases 0 - 5 | 6 - 20 | 21 - 30 | 31 - 40 | 41 - 46

PEDIATRIC LEAD POISONING

Clinical features: The common warning signs of lead poisoning such as headache, stomachache, fatigue, loss of appetite or sleep disturbances, can easily be mistaken for common childhood problems. Most children have no symptoms of lead poisoning until the blood lead levels are very high. A blood lead test is the only way to tell if a child has an elevated blood lead level and is recommended as part of standard pediatric check-up. Blood lead testing is mandated as part of Kan Be Healthy health assessment for children under six receiving Medicaid benefits.

Causative agent: Children under the age of six most often become lead-poisoned by ingesting lead contaminated dust through frequent hand-to-mouth activity typical of this age group such as thumb-sucking, chewing on toys, pacifiers, and other objects that have been in contact with dust and soil. Lead-based paint in homes built before 1978 is the most common source of lead exposure for children when painted surfaces are peeling, deteriorating, or disturbed during renovation or remodeling. Other potential sources of lead poisoning include water from leaded pipes, occupational or hobby exposure of the parent, soil contaminated from previous industry and leaded gas emissions, and food contaminated by imported dishes or cans containing lead. Children are considered to be at high risk for lead poisoning if they:

- Live in or visit a house or apartment built before 1960? (This could include a day care center, preschool, the home of a baby-sitter or relative, etc.)
- Live in or regularly visit a house or apartment built before1960 with previous, ongoing or planned renovation or remodeling?
- Have a family member with an elevated blood lead level?
- Interact with an adult whose job or hobby involves exposure to lead? (Furniture refinishing, making stained glass, electronics, soldering, automotive repair, making fishing weights and lures, reloading shotgun shells and bullets, firing guns at a shooting range, doing home repairs and remodeling, painting/stripping paint, antique/imported toys, and making pottery)
- Live near a lead smelter, battery plant or other lead industry? (Ammunition/explosives, auto repair/auto body, cable/wire striping, splicing or production, ceramics, firing range, leaded glass factory, industrial machinery/equipment, jewelry manufacturer or repair, lead mine, paint/pigment manufacturer, plumbing, radiator repair, salvage metal or batteries, steel metalwork, molten metal, or foundry work)
- Use pottery, ceramic, or crystal-wear for cooking, eating, or drinking?”

Mode of transmission: The pathways to lead exposure are inhalation and ingestion.

Incubation period: Lead poisoning is not an infectious disease.

Period of communicability: None

Public health significance: Lead poisoning is a preventable pediatric health problem affecting Kansas' children. In young children lead levels can affect the developing nervous system, resulting in delayed development, decreased IQ, and learning and behavior problems. High levels of lead poisoning (greater than 20 µg/dL) can have adverse effects on the kidneys and blood-producing organs as well as the digestive and reproductive systems. Very high blood lead levels (greater than 70 µg/dL) can cause devastating health consequences, including seizures, coma and death. The developing fetus is very susceptible to lead exposure and blood lead levels of the mother. Early identification and treatment of lead poisoning reduces the risk that children will suffer permanent damage. According to the Kansas Blood Lead Testing guidelines, child health care providers shall use a blood lead test[1] to screen the following children:

- Child is 12 or 24 months of age[2],
- Child under 6 years of age who has never received a blood lead test[3]
- Child is receiving a Kan-Be-Healthy physical assessment[3],
- Child receives services from Social and Rehabilitation Services (SRS) , Women, Infants and Children (WIC), FirstGuard Health Plan (FG), HealthWave or HealthConnect,
- Child lives within the high-risk (gray on map) areas in Hutchinson, Kansas City, Overland Park, Salina, Topeka, or Wichita.
- Child does not fit the criteria above, but parent/guardian answers "Yes" to any of the following questions[4]:

  "Does your child…
  - ☐ Live in or visit a house or apartment built before 1960? (This could include a day care center, preschool, the home of a baby-sitter or relative, etc.)
  - ☐ Live in or regularly visit a house or apartment built before 1960 with previous, ongoing or planned renovation or remodeling?
  - ☐ Have a family member with an elevated blood lead level?
  - ☐ Interact with an adult whose job or hobby involves exposure to lead? (Furniture refinishing, making stained glass, electronics, soldering, automotive repair, making fishing weights and lures, reloading shotgun shells and bullets, firing guns at a shooting range, doing home repairs and remodeling, painting/stripping paint, antique/imported toys, and making pottery)
  - ☐ Live near a lead smelter, battery plant or other lead industry? [Ammunition/explosives, auto repair/auto body, cable/wire striping, splicing or production, ceramics, firing range, leaded glass factory, industrial machinery/equipment, jewelry manufacturer or repair, lead mine, paint/pigment manufacturer, plumbing, radiator repair, salvage metal or batteries, steel metalwork, or molten metal (foundry work)]
  - ☐ Use pottery, ceramic, or crystal wear for cooking, eating, or drinking?"

[1]A blood lead test for lead poisoning is a laboratory analysis for lead in the blood of a child or adult.

[2]Recommended by the American Academy of Pediatrics and the Centers for Disease Control and Prevention.

[3]Centers for Medicare and Medicaid Services (CMS) and the Kansas Department of Social and Rehabilitation Services (Kan Be Healthy) require a blood lead test at 12 and 24 months. Children between the ages of 36-72 months of age must receive a blood lead test if they have not been previously screened for lead poisoning.

[4]The risk questionnaire is critical to finding children who are not subject to targeted screening owing to risk factors such as Medicaid eligibility or pre-1960 housing. One
positive response to any of the questions requires a blood lead test at this time.

Reportable disease in Kansas since: Effective December 2002, laboratories are required to submit all blood leads test.

Clinical Criteria: None

Laboratory Criteria for Surveillance Purposes

- One venous BLL ≥10 µg/dL , ***OR***
- Two BLLs of ≥10 µg/dL within 12 weeks (capillary or venous).

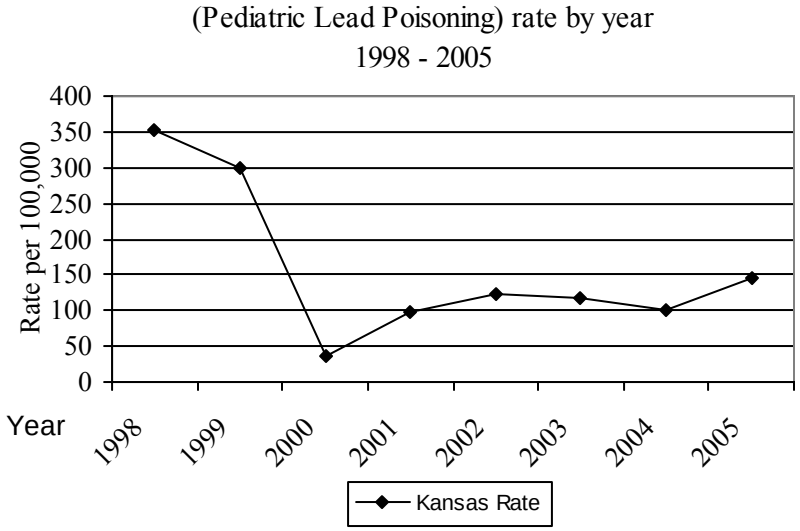
Surveillance Case Definitions

- *Confirmed:* a case that is laboratory confimed.

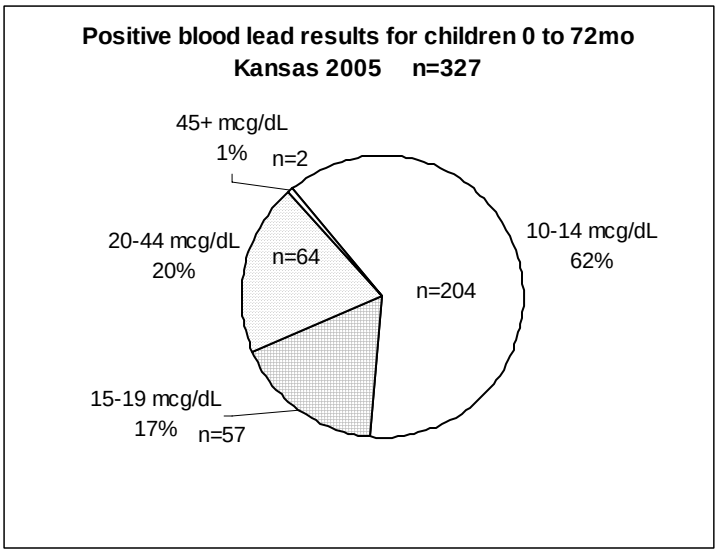
Epidemiology and Trends

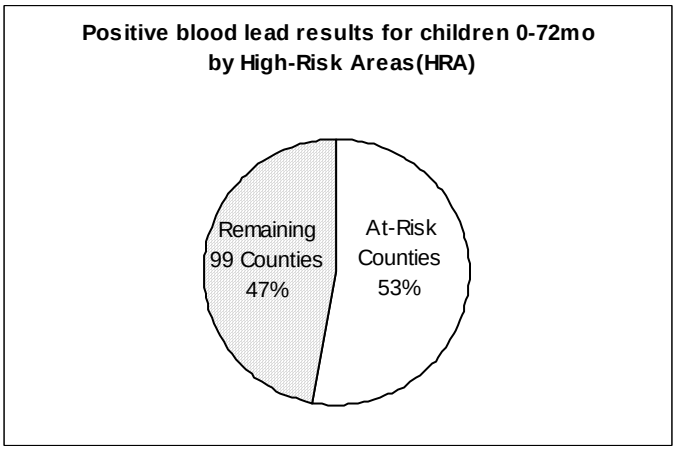
2005 Kansas Count: 327*

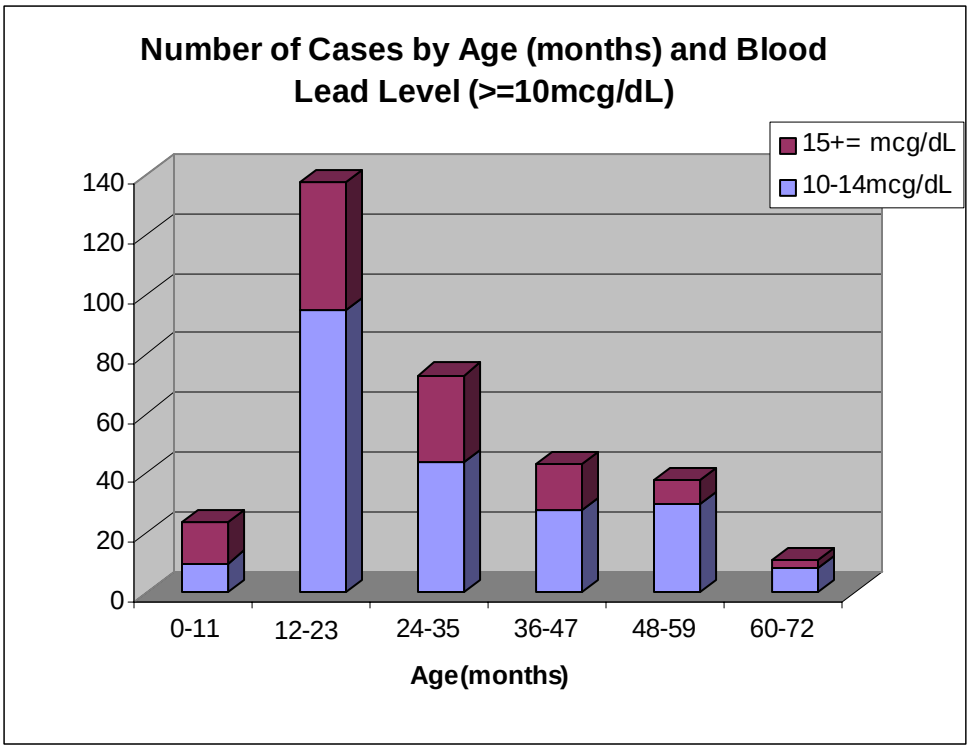
	Rate per 100,000
Kansas Rate	12.0
U.S. Rate (2004)	*NA*
Gender	
Male	13.4
Female	10.5
Race	
White	3.4
Black	13.3
Ethnicity	
Hispanic	18.2
Non-Hispanic	1.2
Geographic area	
Urban County	11.0
Non-Urban County	12.9

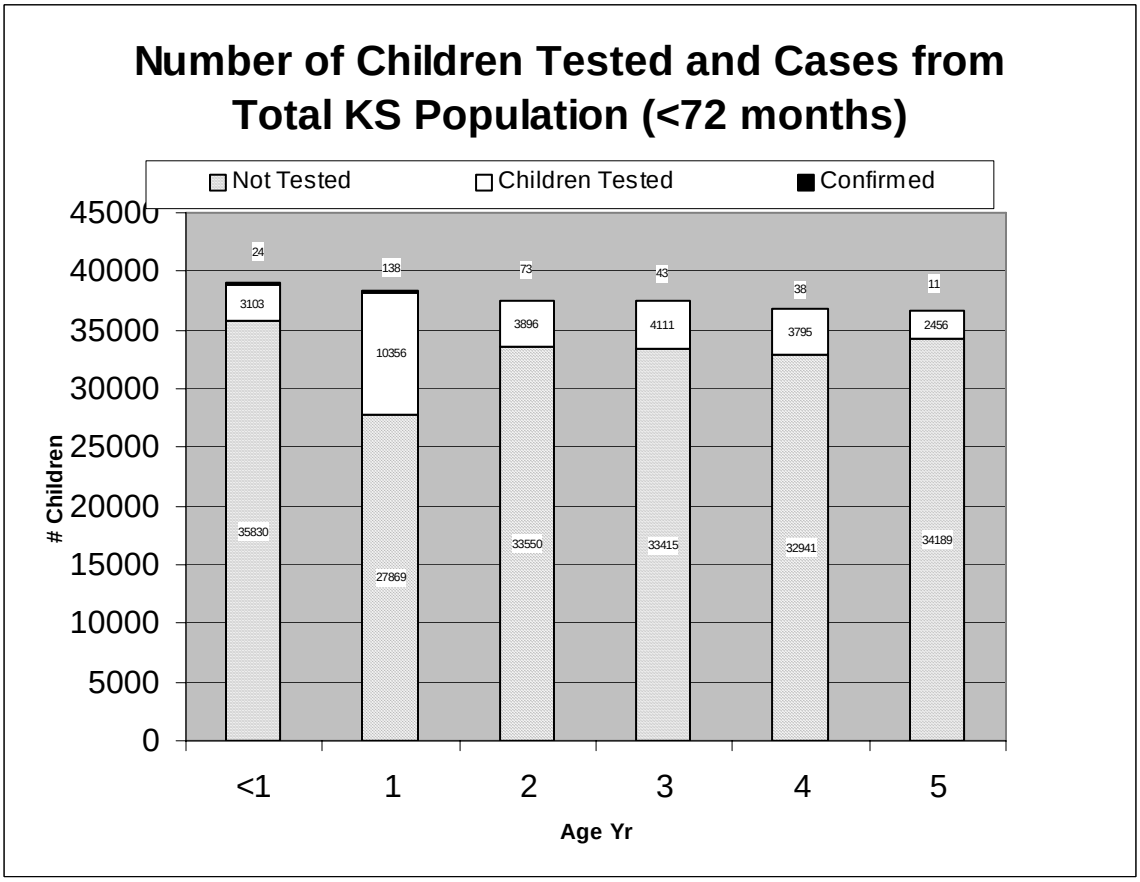


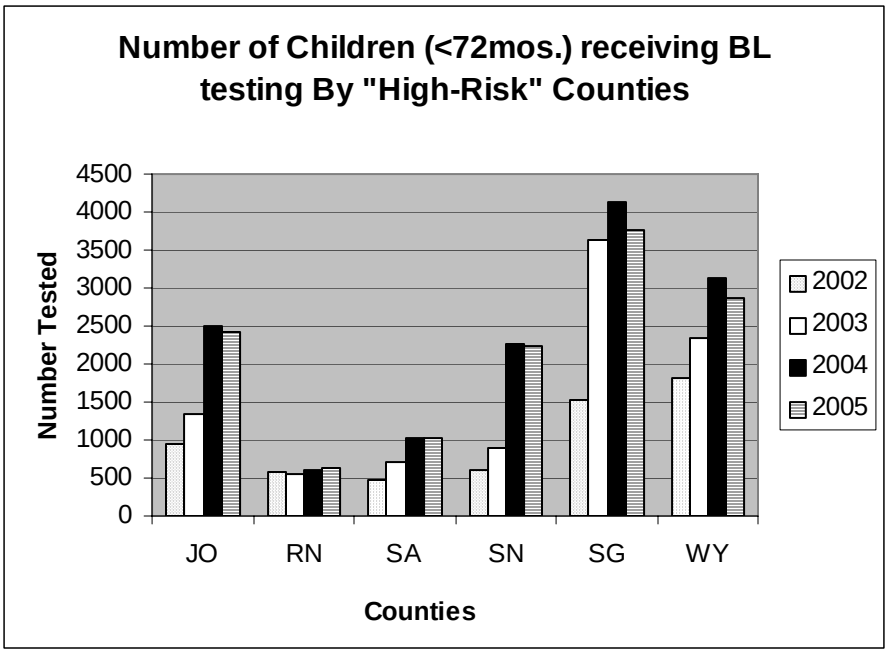
* Pediatric lead poisoning data is maintained by the Kansas Childhood Lead Poisoning Prevention Program (KCLPPP). See http://www.unleadedks.com/


Positive blood lead results for children 0 to 72mo
Kansas 2005 n=327
45+ mcg/dL
1%
n=2
20-44 mcg/dL
20%
n=64
10-14 mcg/dL
62%
n=204
15-19 mcg/dL
17%
n=57


Positive blood lead results for children 0-72mo
by High-Risk Areas(HRA)
Remaining
99 Counties
47%
At-Risk
Counties
53%


Number of Cases by Age (months) and Blood Lead Level (>=10mcg/dL)
15+= mcg/dL
10-14mcg/dL
140
120
100
80
60
40
20
0
0-11
12-23
24-35
36-47
48-59
60-72
Age(months)


Number of Children Tested and Cases from Total KS Population (<72 months)
Not Tested
Children Tested
Confirmed
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Children
24
3103
35830
138
10356
27869
73
3896
33550
43
4111
33415
38
3795
32941
11
2456
34189
<1
1
2
3
4
5
Age Yr



The number of children <72 months of age screened in 2004 was 27,723 compared to 27,717 in 2005. No major increase of children screened occurred due to screening rate dropping nearly 30% for various Medicaid programs. In 2005, the number of **confirmed** pediatric lead poisoning cases reporting in children <6 years old was 327, a increase of 105 cases from 2004. A factor in the increase of identified cases may be due to revisions made to the Kansas Testing and Case Management Guidelines and follow up contacts made for children with blood lead levels ≥10µg/dL to be retested.

The age range of confirmed cases was from 0-71 months. The 12-23 month age group accounted for 42% of the reported cases and the 24-47 month age group represented 22% of the pediatric lead cases. The ratio of male to female is about one to one. There were 66 cases (20.2%) with a blood lead level ≥20µg/dL, a level that might warrant an environmental risk assessment.

A targeting model was developed to determine "High-Risk" areas using four population-density variables: 1) minority population, 2) impoverished population, 3) children age five and under, and 4) housing density of pre-1960 construction. The six "High-Risk" counties were identified as Johnson, Reno, Saline, Sedgwick, Shawnee, and Wyandotte. These six counties account for 50% of **confirmed** pediatric lead cases.

LEGIONELLOSIS

Clinical Features: Infection may result in either of two distinct illnesses: Legionnaires' disease, characterized by fever, myalgia, cough, and pneumonia, and Pontiac Fever, a milder form of the illness without pneumonia.

Causative Agent: *Legionella spp.*, gram-negative bacilli. *L. pneumophila* serogroup 1 is most commonly associated with disease.

Mode of Transmission: Inhalation of contaminated aerosols from a soil or water source; other modes are possible, but have not been conclusively proven.

Incubation Period: Ranges from 2-10 days. Pontiac Fever has a shorter average incubation period (1-2 days) compared to Legionnaires' disease (5-6 days).

Period of Communicability: Person-to-person spread has not been documented.

Public Health Significance: Legionellosis is an emerging infection that most frequently occurs in the elderly and the immunocompromised. Although most illnesses are sporadic, many outbreaks have been linked to contaminated water tanks, air conditioning cooling towers, evaporative condensers, and soil at excavation sites. Public health goals are outbreak identification and environmental remediation.

Reportable Disease in Kansas Since: 1982

Laboratory Criteria for Surveillance Purposes

- Isolation of *Legionella* from respiratory secretions, lung tissue, pleural fluid, or other normally sterile fluids, ***OR***
- Detection of *Legionella pneumophila* serogroup 1 antigen in urine using validated reagents, ***OR***
- Seroconversion: fourfold or greater rise in specific serum antibody titer to *Legionella pneumophila* serogroup 1 using validated reagents.

Surveillance Case Definitions

Confirmed: A clinically compatible case that meets at least one of the confirmatory laboratory criteria.

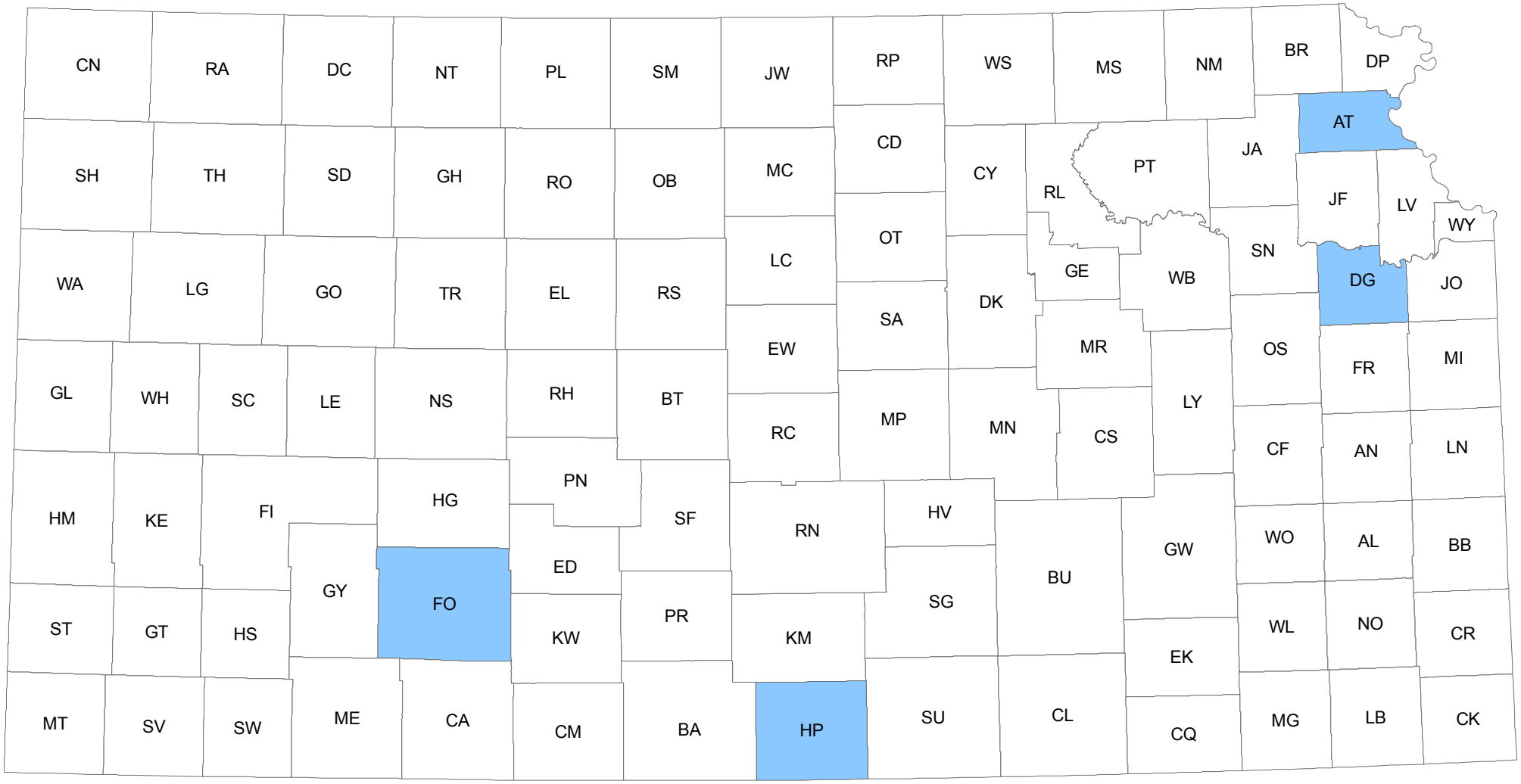
Epidemiology and Trends

2005 Kansas Count: 4

	Rate per 100,000	*95% CI*
Kansas Rate	0.1	(0.0 – 0.3)
U.S. Rate (2004)	0.7	*NA*

In 2005, four cases of Legionellosis were reported in Kansas. All four cases were female, and most were from rural counties. The median age was 68 years (range 54-81 years). Each of the cases was hospitalized; one was death reported. The cases were sporadic and did not appear to be related. The three-year median for 2002-2004 was six cases.

Legionellosis Cases by County, 2005



Cases 0 1

LISTERIOSIS

Clinical Features: Symptoms vary and are dependent on the individual affected. Neonates, elderly, immunocompromised individuals, and pregnant women are at highest risk. Symptoms include fever, malaise, headache, nausea, vomiting, meningitis, septicemia, delirium, and coma. On rare occasion, symptoms may include endocarditis, granulomatous lesions in the liver and other organs, localized internal or external abscesses, and pustular or papular cutaneous lesion. In pregnant women, infection can be transmitted to the fetus, and infants may be stillborn, born with septicemia, or develop meningitis in the neonatal period - even though the mother may be asymptomatic at delivery.

Causative Agent: *Listeria monocytogenes*, a gram-positive bacterium.

Mode of Transmission: Ingestion of raw or contaminated milk, soft cheeses, vegetables, pate, unwashed raw vegetables, and ready to eat meats, such as deli meat and hot dogs. Direct contact with infected materials may lead to pupular lesions on hands and arms. In utero transmission from mother to fetus may occur; transmission during passage through the infected birth canal is also possible. The principal reservoir of *Listeria monocytogenes* is in soil, forage, water, mud and silage. Other reservoirs include infected domestic and wild mammals, fowl, and people. Asymptomatic fecal carriage is common in humans.

Incubation Period: Ranges from 3-70 days (average 3 weeks).

Period of Communicability: Mothers of infected newborn infants can shed the infectious agent in vaginal discharges and urine for 7-10 days after delivery, rarely longer. However, infected individuals can shed the organisms in their stool for several months.

Public Health Significance: Pregnant women, fetuses and newborns infants are highly susceptible. The postpartum course of the mother is usually uneventful, but the case fatality rate is 30% in newborn infants and approaches 50% when onset occurs in the first 4 days. Severe disease in adults, including pregnant women, associated with contaminated food emphasized that older children and adults can have systemic disease with mortality. Listeriosis is often associated with contaminated food products. A product recall may be issued if *Listeria* contamination is suspected.

Reportable Disease in Kansas Since: 2000

Laboratory Criteria for Surveillance Purposes

- Isolation of *L. monocytogenes* from a normally sterile site (e.g., blood or cerebrospinal fluid [CSF] or, less commonly, joint, pleural, or pericardial fluid), ***OR***
- In the setting of miscarriage or stillbirth, isolation of L. monocytogenes from placental or fetal tissues.

Surveillance Case Definitions

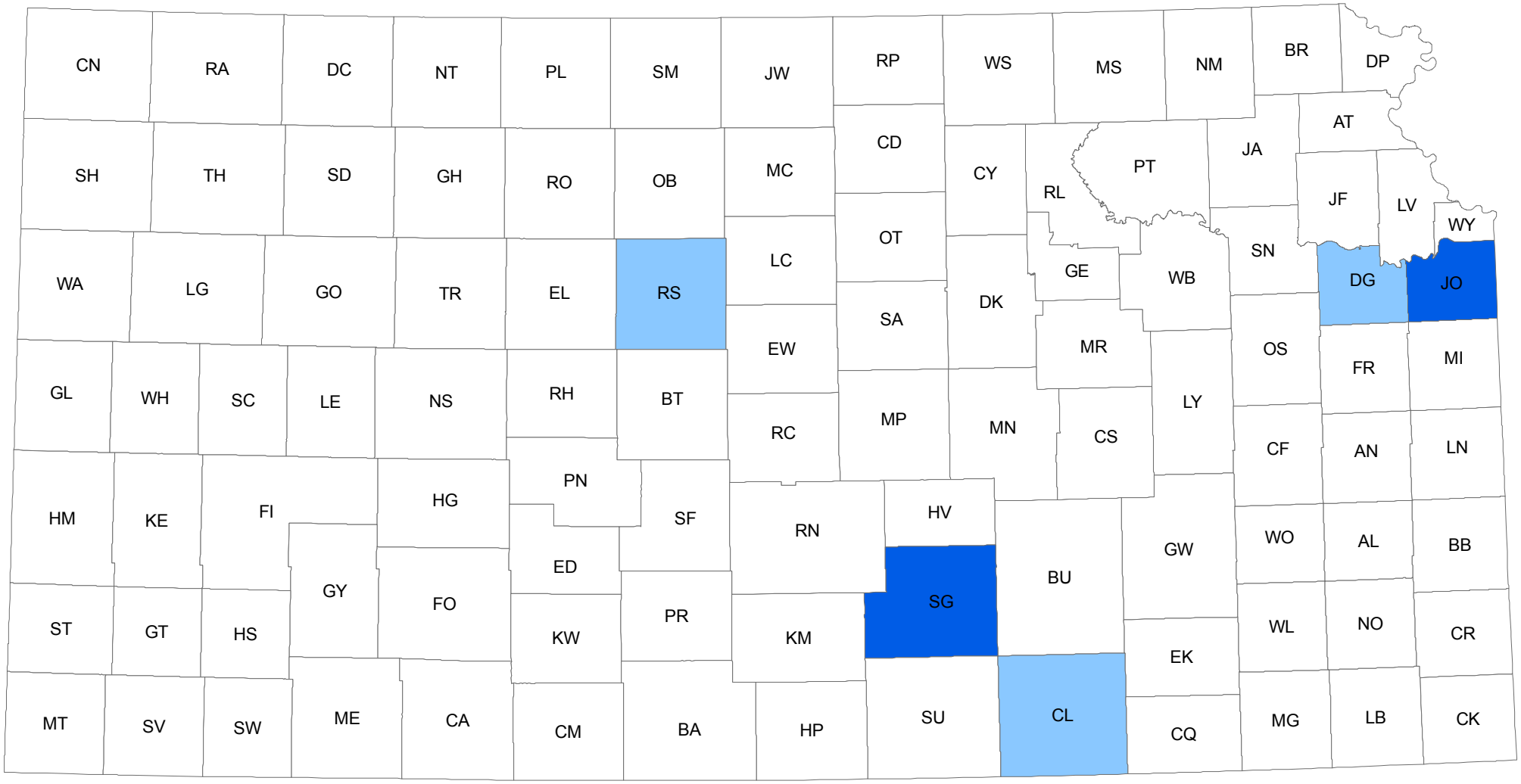
- *Confirmed:* A clinically compatible case that is laboratory confirmed.
- *Probable:* A clinically compatible case that is epidemiologically linked to a confirmed case.

2005 Kansas Count: 7

	Rate per 100,000	*95% CI*
Kansas Rate	0.3	(0.1 – 0.4)
U.S. Rate (2004)	0.3	*NA*

Seven cases of listeriosis were reported in Kansas in 2005. Five (71%) of the seven cases were female; cases ranged from 53 to 75 years in age, with a median age of 71 years. Hospitalization status was obtained for four of the seven cases—all four were hospitalized because of their illness. No deaths were reported.

Listeriosis Cases by County, 2005



Cases 0 1 2

LYME DISEASE

Clinical Features: A systemic, tick-borne disease, almost never fatal, with manifestations affecting skin, nervous system, heart and/or joints. In early stages, 60%-80% of patients present with a characteristic "bull's-eye" rash, erythema migrans (EM), accompanied by nonspecific symptoms such as fever, malaise, fatigue, headache, myalgia, and arthralgia. If untreated, some patients may develop arthritis; neurologic abnormalities, such as aseptic meningitis, facial palsy, nerve inflammation and encephalitis; and cardiac problems.

Causative Agent: *Borrelia burgdorferi*, a spirochete bacterium

Mode of Transmission: Maintained in the blood and tissues of small rodents and deer, the organism is transmitted by blood to feeding ticks, specifically the *Ixode*s species including the deer tick (*I. scapularis*) and the western black-legged tick (*I. pacificus*). During its feeding process, the infected tick will transmit the organism to humans and other mammals. Transmission occurs after $\geq$24 hours of tick attachment.

Incubation Period: After tick exposure, 3-32 days, with an average of 7-10 days.

Period of Communicability: Person-to-person transmission has not been documented.

Public Health Significance: A vaccine against Lyme disease was available in 2001, but has since been withdrawn by the manufacturer. The role of the health department is limited to providing education on the mode of tick transmission and means of personal protection.

Reportable Disease in Kansas Since: 1990

Clinical Criteria

- Erythema migrans diagnosed by a physician and defined by a single primary lesion $\geq$5 cm in size and/or the occurrence of secondary lesions, ***OR***
- At least one late manifestation, as defined below, with laboratory confirmation of *B. burgdorferi* infection and without an alternate explanation found.

    - *Musculoskeletal system*. Recurrent, brief attacks (weeks or months) of objective joint swelling in one or a few joints, sometimes followed by chronic arthritis in one or a few joints. Manifestations not considered as criteria for diagnosis include chronic progressive arthritis not preceded by brief attacks and chronic symmetrical polyarthritis. Additionally, arthralgia, myalgia, or fibromyalgia syndromes alone are not criteria for musculoskeletal involvement.

- *Nervous system*. Any of the following, alone or in combination: lymphocytic meningitis; cranial neuritis, particularly facial palsy (may be bilateral); radiculoneuropathy; or, rarely, encephalomyelitis. Encephalomyelitis must be confirmed by demonstration of antibody production against *B. burgdorferi* in the CSF, evidenced by a higher titer of antibody in CSF than in serum. Headache, fatigue, paresthesia, or mildly stiff neck alone is not criteria for neurologic involvement.

- *Cardiovascular system*. Acute onset of high-grade (2nd-degree or 3rd-degree) atrioventricular conduction defects that resolve in days to weeks and are sometimes associated with myocarditis. Palpitations, bradycardia, bundle branch block, or myocarditis alone are not criteria for cardiovascular involvement.

Laboratory Criteria for Surveillance Purposes

- Isolation of *B. burgdorferi* from a clinical specimen, ***OR***
- Demonstration of diagnostic IgM or IgG antibodies to *B. burgdorferi* in serum or cerebrospinal fluid (CSF). A two-test approach using a sensitive enzyme immunoassay or immunofluorescence antibody followed by Western blot is recommended.

Surveillance Case Definitions

- *Confirmed:*
  - A case with erythema migrans, ***OR***
  - A case with at least one late manifestation (as defined above) that is laboratory confirmed.

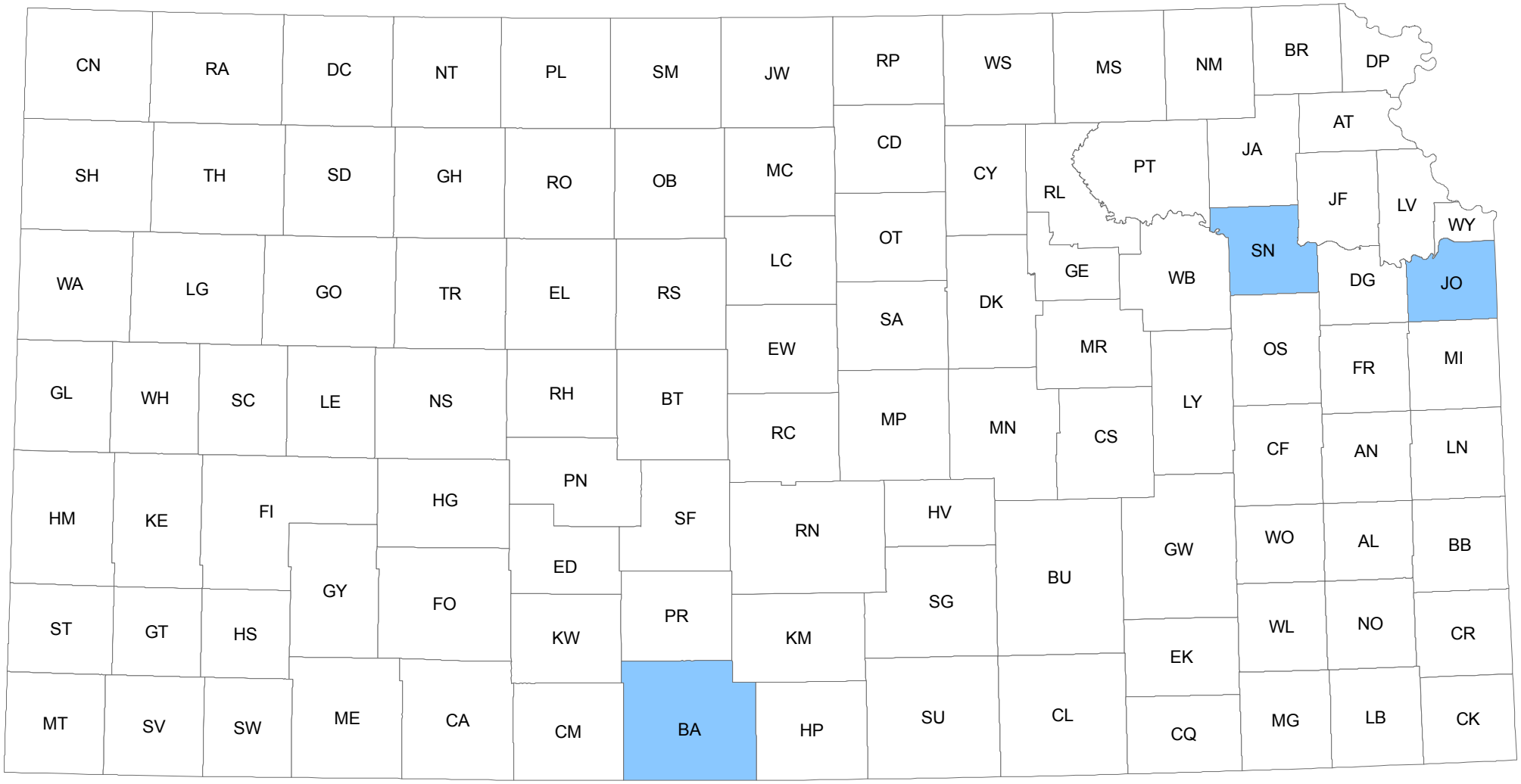
2005 Kansas Count: 3

	Rate per 100,000	*95% CI*
Kansas Rate	0.1	(0.0 – 0.2)
U.S. Rate (2004)	6.8	*NA*

Three confirmed cases of lyme disease were reported in Kansas during 2005. Two of the cases were diagnosed with erythema migrans, the characteristic "bulls-eye" rash. Persons who do not develop erythema migrans often do not meet the strict definition for a confirmed case.

The three-year median for 2002-2004 was 4 cases.

Lyme Disease Cases by County, 2005



Cases 0 1

MALARIA

Clinical Features: The symptoms of malaria include high fever, chills, rigor, and headache, which may be recurrent and suddenly. If untreated fever and other symptom may occur in a cyclical pattern every second or third day. Other commonly associated symptoms include back pain, sweats, myalgia, nausea, vomiting, diarrhea, and cough. Untreated *Plasmodium falciparum* infection can lead to coma, renal failure, pulmonary edema, and death. The diagnosis of malaria should be considered for any person who has these symptoms and who has traveled to an area in which malaria is endemic. Asymptomatic parasitemia can occur among persons who have been long-term residents of areas in which malaria is endemic.

Causative Agent: *Plasmodium vivax, P. ovale, P. malaria,* or *P. falciparum*

Mode of Transmission: By the bite of an infective female *Anopheles spp.* mosquito. Most species feed at dusk and during early night hours; some important vectors have biting peaks around midnight or early hours of morning. Malaria may also be transmitted by injection or transfusion of blood of infected persons or by use of contaminated needles or syringes, as by drug users. Humans are the only important reservoir of human malaria.

Incubation Period: The time between the infective bite and the appearance of clinical symptoms is approximately 9 to 14 days for *P. falciparum*, 12 to 18 days for *P. vivax* and *P. ovale*, and 18 to 40 days for *P. malariae*.

Period of Communicability: *Plasmodium* may be passed on to biting mosquitoes as long as infective gametocytes are present in human blood; this varies from one to five years depending on the parasite species and response to treatment. The mosquito remains infective for life. Transmission by transfusion may occur as long as asexual forms remain in the circulating blood, up to 40 years. Stored blood can remain infective for at least one month.

Public Health Significance: Even though malaria is not endemic to the United States or Kansas, it remains a public health threat for several reasons: (1) most persons have no protective immunity and can develop a rapid severe disease, (2) malaria cases can transmit the parasites to local mosquitoes, which in turn can pass it onto local residents.

Cases of malaria in Kansas have been reported in individuals with history of foreign travel. However, cases of malaria in travelers are preventable. Persons traveling to areas at high risk for malaria can protect themselves by taking effective antimalarial drugs and following measures to prevent mosquito bites.

Reportable Disease in Kansas Since: 1982

Laboratory Criteria for Surveillance Purposes

- Demonstration of malaria parasites in blood films

Surveillance Case Definitions

- *Confirmed:* an episode of microscopically confirmed malaria parasitemia in any person (symptomatic or asymptomatic) diagnosed in the United States, regardless of whether the person experienced previous episodes of malaria while outside the country.

Comment

- A subsequent attack caused by a different *Plasmodium spp*. is counted as an incident case. In the United States, a subsequent attack caused by the same species may indicate a relapsing infection or treatment failure caused by drug resistance.

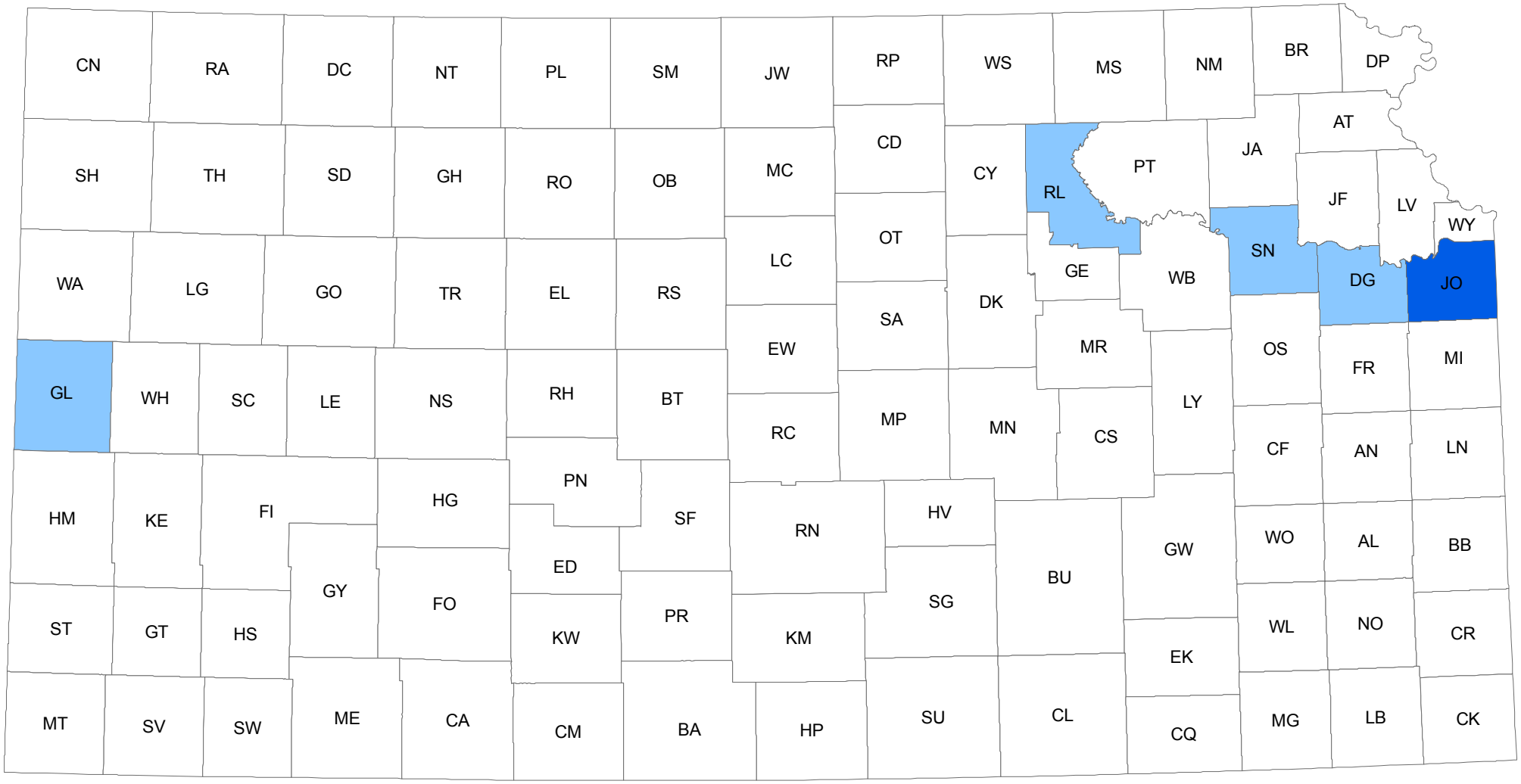
Epidemiology and Trends

2005 Kansas Count: 7

	Rate per 100,000	*95% CI*
Kansas Rate	0.3	(0.1 - 0.4)
U.S. Rate (2004)	0.5	*NA*

In 2005, seven cases of malaria were reported in Kansas. The cases ranged in age from 3 to 61 years with a median of 25 years. All of the cases reported recent foreign travel to malaria endemic regions, including Africa (Cameroon, Gambia, and Nigeria) and the Caribbean (Dominican Republic). The species of malaria causing infection was available for five of the seven cases - three cases were infected with *P. falciparum*, one was infected with *P. vivax*, and one case was infected with *P. malariae.*

Malaria Cases by County, 2005



Cases 0 1 2 - 3

MENINGITIS, OTHER BACTERIAL
(non-meningococcal and non-*Haemophilus influenzae* type B)

Clinical Features: May include fever, headache, stiff neck, vomiting, and rash.

Causative Agent: For the purposes of this document, "other" bacterial meningitis is defined as an infection of the meninges caused by bacteria other than *Neisseria meningitidis* or *Haemophilus influenzae* type B.

Mode of Transmission: Direct person-to-person contact, including respiratory droplets from the nose or throat of infected individuals.

Incubation Period: ranges from 2 to 10 days

Period of Communicability: Untreated patients are most infectious for 2-3 weeks after the illness onset, although transmission may occur until the bacteria are no longer found in respiratory secretions.

Public Health Significance: Meningitis caused by *Streptococcus pneumoniae* may be prevented through vaccination. Contacts of non-meningococcal and non-HiB meningitis normally do not require post-exposure prophylaxis.

Reportable Disease in Kansas Since: 1982

Laboratory Criteria for Surveillance Purposes

- Isolation and identification of a bacterial pathogen from CSF or blood.

Surveillance Case Definitions

Confirmed: A clinically compatible case that is laboratory confirmed.

Epidemiology and Trends

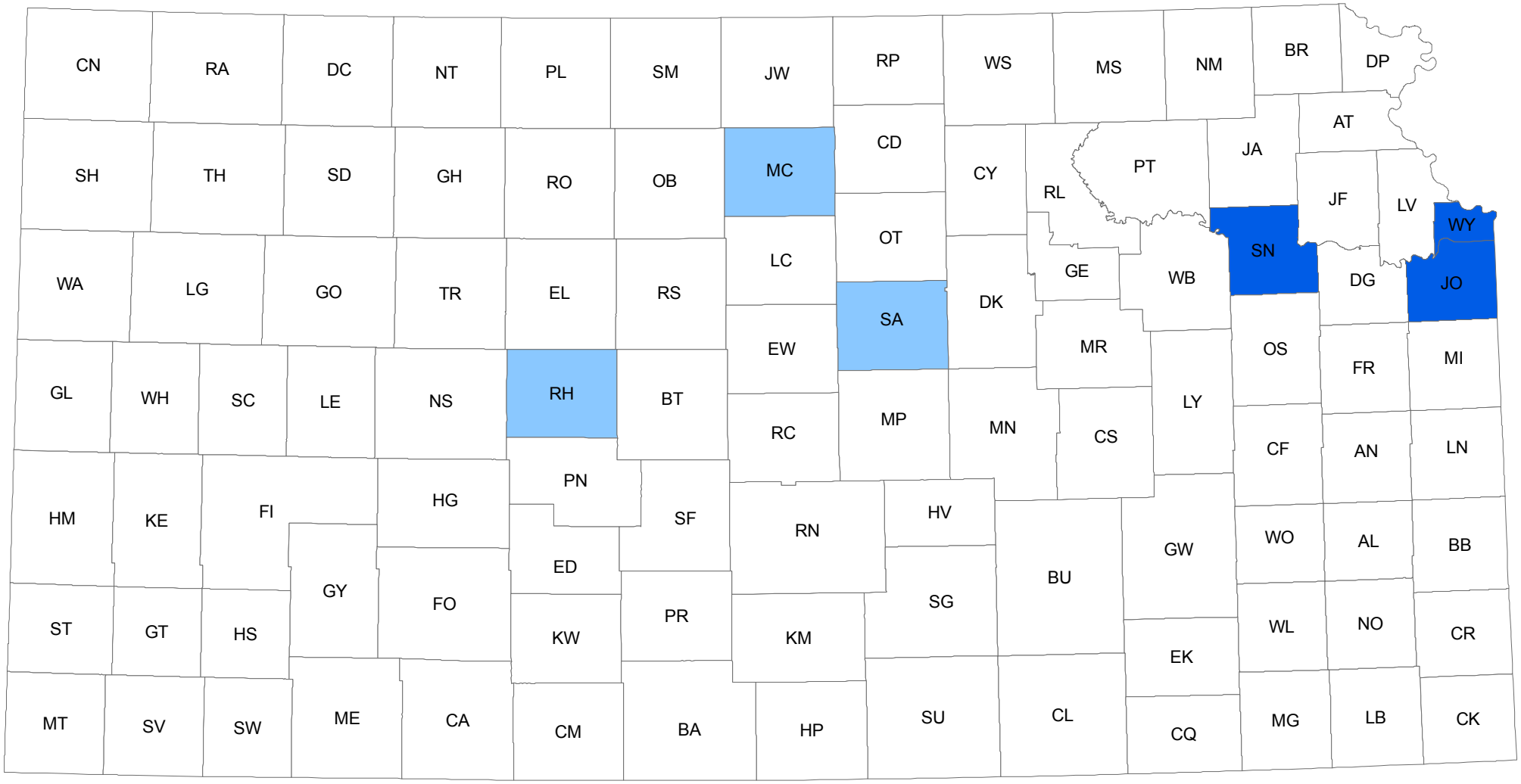
2005 Kansas Count: 19

	Rate per 100,000	*95% CI*
Kansas Rate	0.7	(0.4 - 1.0)
U.S. Rate (2004)	*NA*	*NA*

In 2005, there were 19 cases of non-meningococcal, non-*Haemophilus influenza*e type B bacterial meningitis. Seven of the cases were caused by *Streptococcus pneumoniae*. Two cases were caused by alpha hemolytic *Streptococcus* that were not further characterized. Group B *Streptococcus* caused two of the infections — one isolate was determined to be *Streptococcus agalactiae*, while the other was not speciated. *Haemophilus influenza*e caused three cases. One isolate was found to be biotype IV, one was found to be biotype II, and the third was not further characterized. Other isolates included *Staphylococcus epidermidis*, *Salmonella* Heidelberg, *Streptococcus viridans*, and an unknown *Staphylococcus* species.

The cases ranged from less than 1 year to 53 years of age.

Other Bacterial Meningitis Cases by County, 2005



Cases 0 1 2 - 4

MENINGOCOCCAL DISEASE

Clinical Features: The disease manifests most commonly as meningitis and/or meningococcemia that may progress rapidly to purpura fulminant, shock, and death. The disease is characterized by sudden onset with fever, intense headache, nausea (often with vomiting), and stiff neck. Up to 15% of the population may carry *N. meningitidis* in the nasopharynx without developing invasive disease, while a few develop bacteremia, sepsis, meningitis, or pneumonia. Even with early diagnosis and appropriate treatment, the fatality rate of meningococcal meningitis is 5-15%.

Causative Agent: Meningococcal disease is an acute bacterial disease caused by *Neisseria meningitidis*, a gram-negative, diplococcus bacterium. The most common serogroups of *N. meningitidis* in the United States are B, C, W-135, and Y.

Mode of Transmission: Transmission of *N. meningitidis* is from person to person by direct contact with respiratory droplets from the nose and throat of infected individuals. Late winter to early spring is the peak season for infection, but infections can occur at any time of the year. Humans are the reservoir.

Incubation Period: The incubation period is usually three or four days, but may range from two to 10 days.

Period of Communicability: Individuals are communicable until meningococci are no longer present in the discharges from the nose and mouth. Meningococci usually disappear from the nasopharynx within 24 hours after the institution of appropriate therapy. Penicillin will temporarily suppress the organisms but will not eradicate them.

Public Health Significance: Vaccination and post-exposure prophylaxis are effective in preventing meningococcemia. Vaccines are available to prevent disease caused by types A, C, Y, and W-135. There is no vaccine for serogroup B, historically responsible for 20-30% of reported cases in Kansas. Chemoprophylaxis is used for close contacts of cases (e.g., household members, intimate contacts, health care personnel performing mouth-to-mouth resuscitation, day care center playmates). No chemoprophylaxis is recommended for less intimate contacts (e.g., school classmates, health care workers with minimal contact, and etc.) except during an outbreak or in a child care center.

Reportable Disease in Kansas Since: 1982

Laboratory Criteria for Surveillance Purposes

- Isolation of *Neisseria meningitidis* from a normally sterile site (e.g., blood or cerebrospinal fluid [CSF] or, joint, pleural, or pericardial fluid). (Note: a positive antigen test is not sufficient to confirm a case for surveillance purposes. Positive antigen test results from urine or serum samples are unreliable for diagnosing meningococcal disease.)

Surveillance Case Definitions

- *Confirmed:* a clinically compatible case that is laboratory confirmed.
- *Probable*: a case with a positive antigen test in CSF or clinical purpura fulminant in the absence of a positive blood culture.

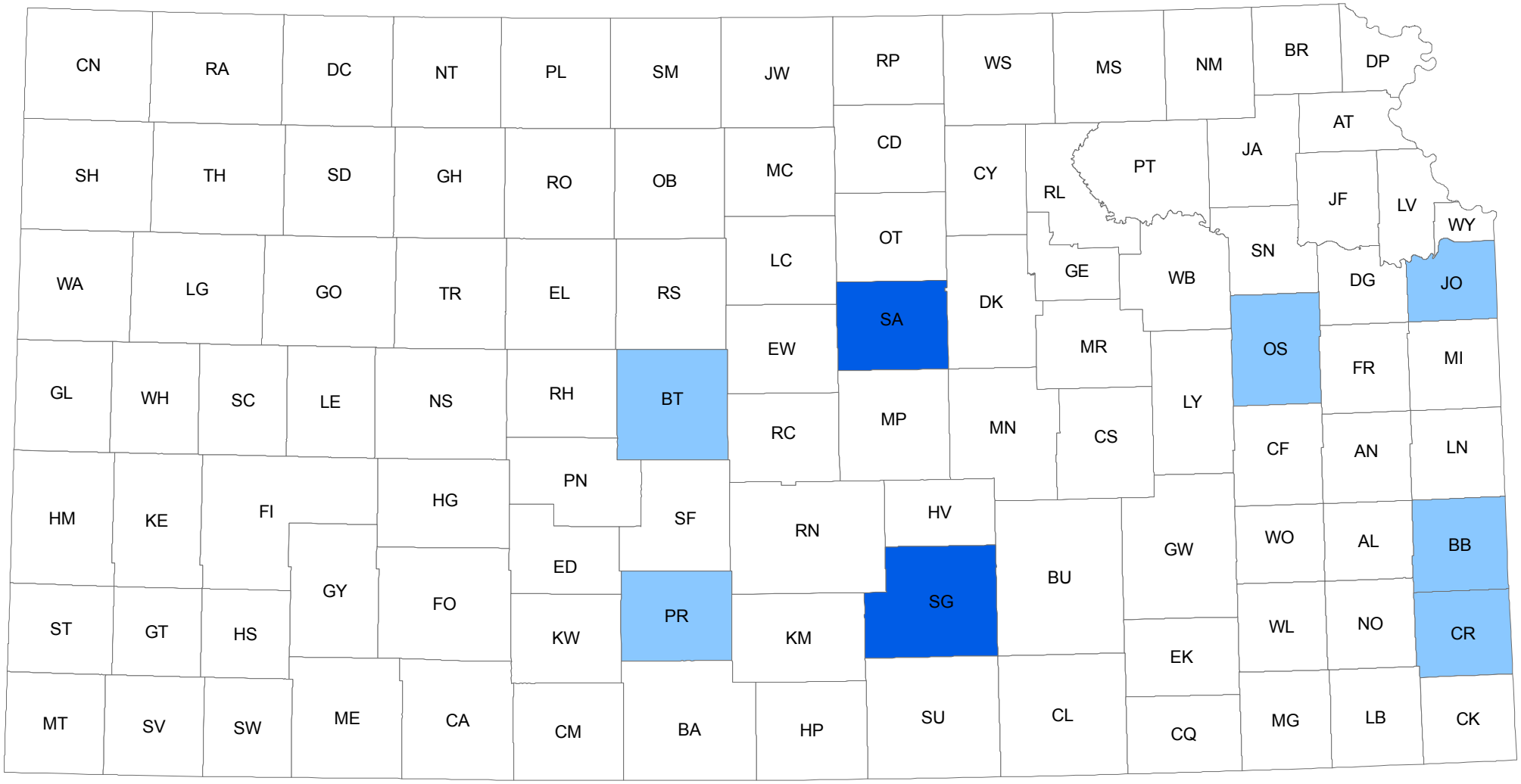
Epidemiology and Trends

2005 Kansas Count: 11

	Rate per 100,000	*95% CI*
Kansas Rate	0.4	(0.2 - 0.6)
U.S. Rate (2004)	0.5	*NA*

The number of cases of meningococcal disease for 2005 (n=11) was less than the number of cases (n=14) reported in 2004. The three-year median for 2002-2004 was 15 cases. No outbreaks were detected in 2005. Cases ranged in age from less than 1 year to 89 years. There were 3 cases of meningitis and 8 cases of meningococcemia. Six cases (55%) were reported among children ≤14 years of age. The majority of cases (73%) were reported from non-urban areas. The median age was 14 years. All isolates, eight from blood samples and three from cerebrospinal fluid, were serogrouped at the state laboratory. Six (55%) isolates were group B, four (36%) were group Y, and one (9%) was group C.

Meningococcal Disease Cases by County, 2005



Cases 0 1 2 - 3

PERTUSSIS (WHOOPING COUGH)

Clinical Features: A prolonged, paroxysmal cough with characteristic inspiratory "whoop" is the primary symptom; posttussive vomiting may also occur. Infants may present with apnea or cyanosis, while adults may present only with a chronic spasmodic cough.

Causative Agent: *Bordetella pertussis*, a bacillus bacterium.

Mode of Transmission: Contact with respiratory secretions of infected persons.

Incubation Period: Ranges from 5-21 days (average 5-10 days).

Period of Communicability: Most transmissible in the period before cough becomes paroxysmal. Communicability gradually decreases and becomes negligible after 3 weeks. Patients are considered infectious until 5 days after beginning treatment.

Public Health Significance: Pertussis affects all age groups, but the disease is most severe in infants and young children. A vaccine exists to prevent illness in this age group (i.e., children under seven years old). In addition, a booster vaccine is licensed for those 11-64 years old.

Reportable Disease in Kansas Since: 1982

Clinical Criteria

- A cough illness lasting ≥2 weeks with one of the following: paroxysms of coughing, inspiratory "whoop", or posttussive vomiting, without other apparent cause.

Laboratory Criteria for Surveillance Purposes

- Isolation of *Bordetella pertussis* from clinical specimen, ***OR***
- Positive polymerase chain reaction (PCR) for *B. pertussis*.

Surveillance Case Definitions

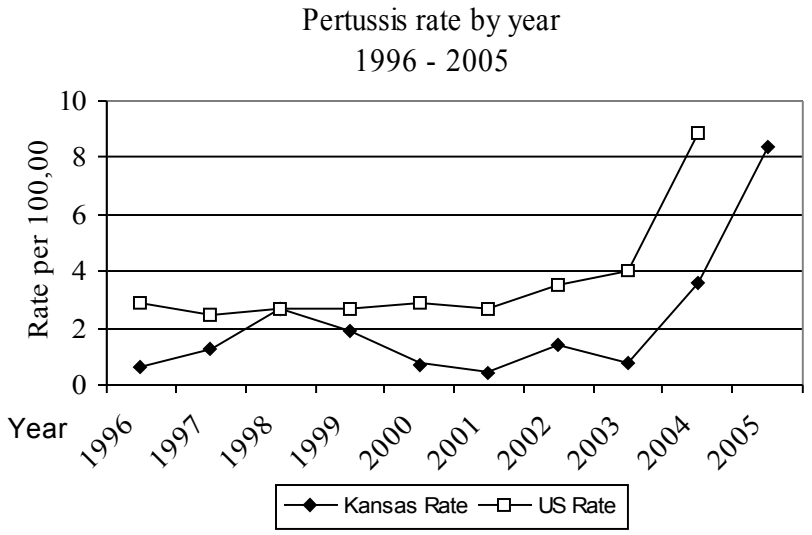
- *Confirmed:*
  - A case that is culture positive and in which an acute cough illness of any duration is present, ***OR***
  - A case that meets the clinical case definition and is confirmed by positive PCR, ***OR***
  - A case that meets the clinical case definition and is epidemiologically linked directly to a case confirmed by either culture or PCR

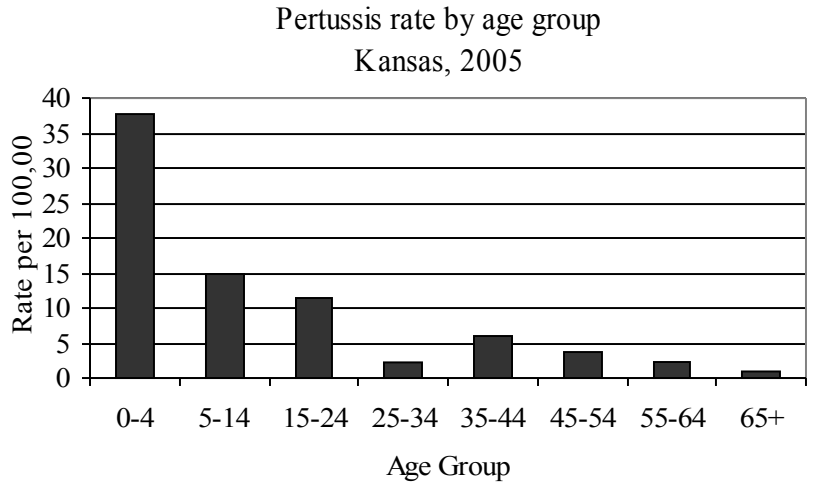
- *Probable:* A case that meets the clinical case definition, is not laboratory confirmed, and is not epidemiologically linked to a laboratory-confirmed case.

Epidemiology and Trends

2005 Kansas Count: 229

	Rate per 100,000	*95% CI*
Kansas Rate	8.4	(7.3 - 9.5)
U.S. Rate (2004)	8.9	*NA*
Gender		
Male	7.4	(5.9 - 8.8)
Female	9.3	(7.7 - 10.9)
Race		
White	7.3	(6.2 - 8.4)
Black	6.3	(2.6 - 10.1)
Asian/Pacific Islander	3.2	(0.0 - 7.7)
Ethnicity		
Hispanic	10.9	(6.5 - 15.3)
Non-Hispanic	6.4	(5.4 - 7.3)
Geographic area		
Urban County	10.3	(8.6 - 12.0)
Non-Urban County	6.4	(5.0 - 7.8)



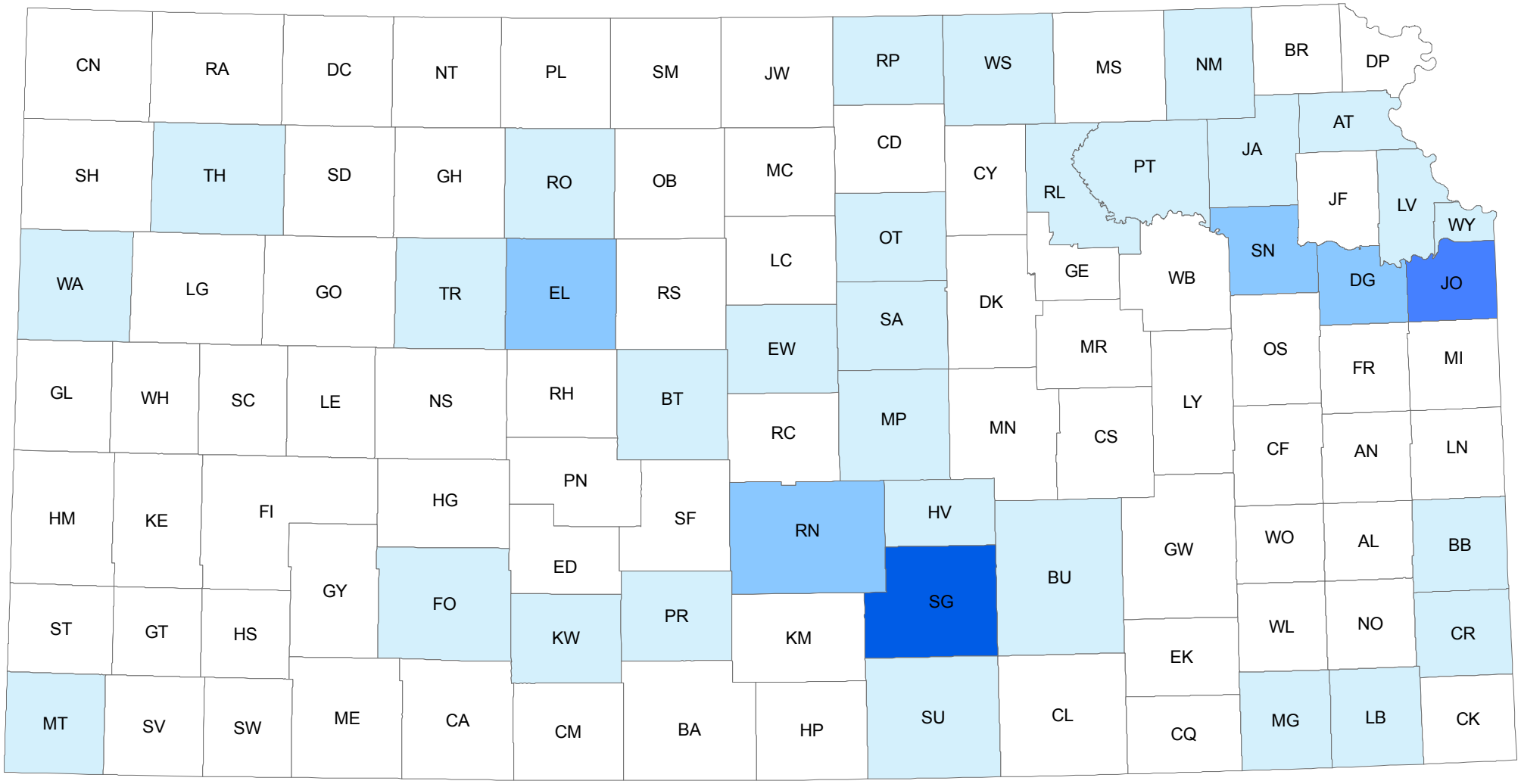


A continuing, statewide outbreak* of pertussis in 2005 resulted in 229 confirmed cases, more than double the 98 confirmed cases reported during 2004. The three-year median of cases for 2002-2004 was 38 cases.

Cases ranged in age from less than one year to 72 years; the median age was 12 years. The majority of confirmed cases (n=170, 74%) were in individuals less than 19 years of age. Thirty-eight confirmed cases (17%) occurred among individuals that were younger than six months of age. According to the childhood vaccination schedule, children in this age group have received less than three doses of pertussis vaccine, and are not yet fully protected from the disease. Vaccine efficacy among those that have received at least 3 doses is estimated to be 80%.

* A detailed report regarding the 2005 pertussis outbreak can be found in section II of this document, "Special Reports".

Pertussis Cases by County, 2005



Cases 0 | 1 - 10 | 11 - 20 | 21 - 30 | 31 - 84

RABIES, ANIMAL

Clinical Features: In animals, the disease has three phases. The first phase (prodromal) often presents as gastrointestinal symptoms (diarrhea, vomiting, etc.), progressing to furious then dumb (paralytic) rabies. During furious rabies, animals may become very aggressive and may roam, biting humans and other animals. In dumb rabies, paralysis is the predominant manifestation of the disease. This often begins with paralysis of the jaw accompanied by excessive salivation because of an inability to swallow. Owners may think the animal has a foreign body stuck in its throat and expose themselves while attempting to remove the "foreign object".

Causative Agent: Lyssavirus

Mode of Transmission: Wild mammals are the most important source of infection for both humans and animals in the United States. Skunks are the main reservoir for rabies in Kansas. Transmission may occur through bites and non-bite exposures. Bite exposures are most common - if the skin is broken during the bite, virus particles may reach a nerve and cause infection. A non-bite exposure occurs if an open wound, scratch, abrasion, or mucous membrane is contaminated with saliva, brain material, or cerebrospinal fluid from a rabid animal; a scratch from a rabid animal is also considered a non-bite exposure.

Incubation Period: The incubation period in animals varies by species.

Period of Communicability: In dogs, cats, and ferrets, rabies is communicable 3-7 days before the onset of clinical signs, and throughout the illness until death. The period of communicability in other species is unknown.

Public Health Significance: A dog, cat, or ferret inflicting a bite may be observed daily for 10 days (if a human was exposed) or quarantined for 6 months (if another animal was exposed) following the exposure to rule out the risk of rabies transmission. If the animal develops signs of rabies or dies during the observation or quarantine period, or if the animal is considered wildlife or an exotic species, it must be humanely euthanized and tested for rabies. As rabies is fatal, those who have been bitten by a rabid animal should receive PEP as soon as possible - PEP consists of one dose of Human Rabies Immune Globulin (HRIG) and doses of rabies vaccine on days 0, 3, 7, 14, and 28.

Reportable Disease in Kansas Since: 1982

Laboratory Criteria for Surveillance Purposes

- Positive direct fluorescent antibody test (preferably performed on central nervous system tissue), ***OR***
- Isolation of rabies virus in cell culture or in a laboratory animal

Surveillance Case Definitions

- *Confirmed:* a case that is laboratory confirmed.

Epidemiology and Trends

2005 Kansas Count: 80*

In Kansas, 80 laboratory confirmed cases of rabies in animals were reported during 2005, a decrease from the 99 cases reported in 2004. The three-year mean for 2002-2004 was 153 cases. Confirmed cases per year may not represent an actual change in rabies prevalence, but rather a change in the number of animal-to-animal or animal-to-human exposures. In Kansas, animals are not usually tested unless an exposure has occurred. In 2005, 6.6% of all animal submissions tested positive for rabies; the five-year median for 2000-2004 was 8.1%. The number of animals submitted for testing and the number of rabies-positive animals tend to follow the cyclical pattern of the skunk population in the state.

Skunks were the most common animals to test positive (Table 1). The state's predominant strain, the "south central skunk" strain, was found in nearly all of the terrestrial animals tested in Kansas in 2005. The “raccoon strain” seen on the East Coast of the U.S. has not been identified in Kansas.

Table 1 - Positive animal rabies species, Kansas, 2005

	Species	*Number Tested*	*Number Positive*	*Percent Positive*
Domestic	Cat	401	6	1.5
	Dog	327	4	1.2
Wildlife	Bat	151	4	2.6
	Fox	2	2	100.0
	Skunk	92	56	60.9
Livestock	Cow	52	5	9.6
	Horse	28	3	10.7

As in previous years, more cats tested positive than dogs. The state regulations on rabies, K.A.R. 28-1-2, do not mandate rabies vaccination for any domestic animal, though several local jurisdictions require vaccinations of some domestic animals, usually dogs.

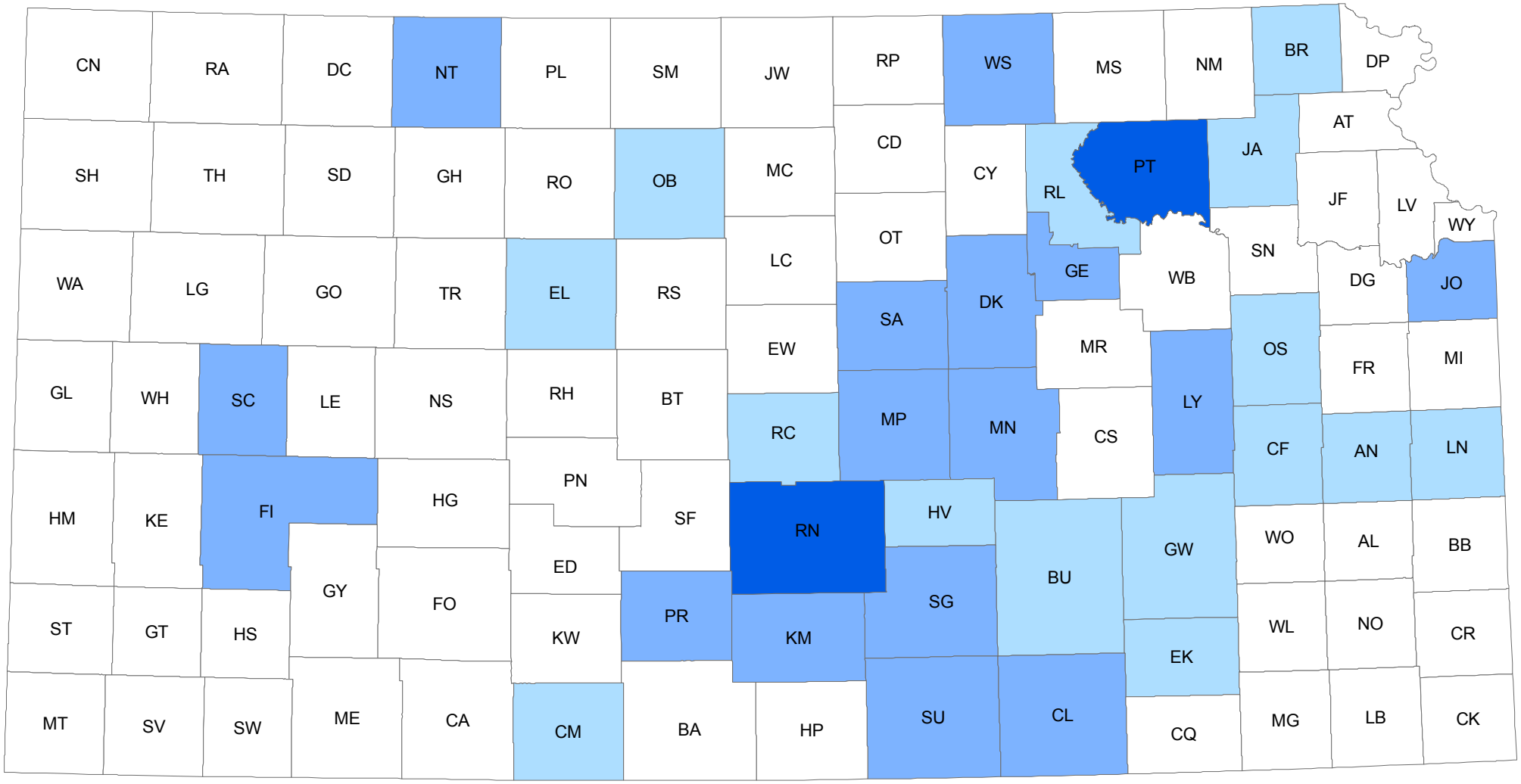
* Animal rabies data is maintained by the Kansas State University College of Veterinary Medicine’s Rabies Laboratory. See http://www.vet.ksu.edu/depts/rabies/

There were no human rabies cases in Kansas in 2005; the last human rabies case in Kansas was reported in 1968. Bats have been associated with most of the human cases in the U.S. Four of the 151 submitted bats tested positive for rabies in Kansas in 2004—all of the positive bats were Big Brown bats, *Eptesicus fuscus*.

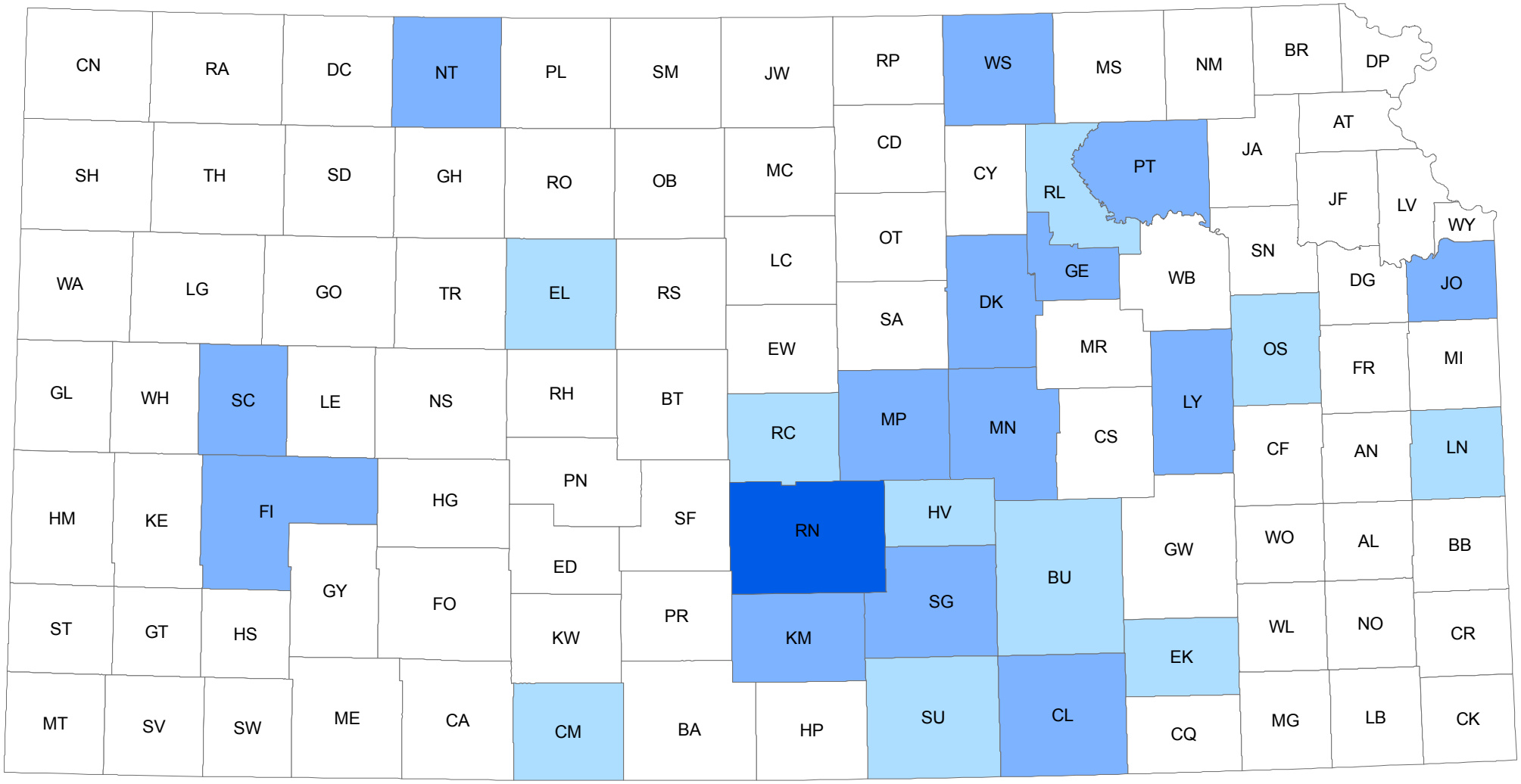
Rabies was tested for but not found in the following animals in Kansas during the past 15 years (1991-2005):

Alpaca, Antelope, Baboon, Badger, Beaver, Bison, Chipmunk, Coati, Cougar, Deer, Ferret, Genet, Gerbil, Goat, Gopher, Groundhog, Ground Squirrel, Guinea Pig, Hamster, Hedgehog, Human, Lion, Llama, Mink, Mole, Mouse, Muskrat, Pig, Porcine, Porcupine, Prairie Dog, Primate, Pronghorn, Rabbit, Rat, Ringtail, Squirrel, Tiger, Weasel, Wolf, Woodchuck

Animal Rabies Cases by County, 2005

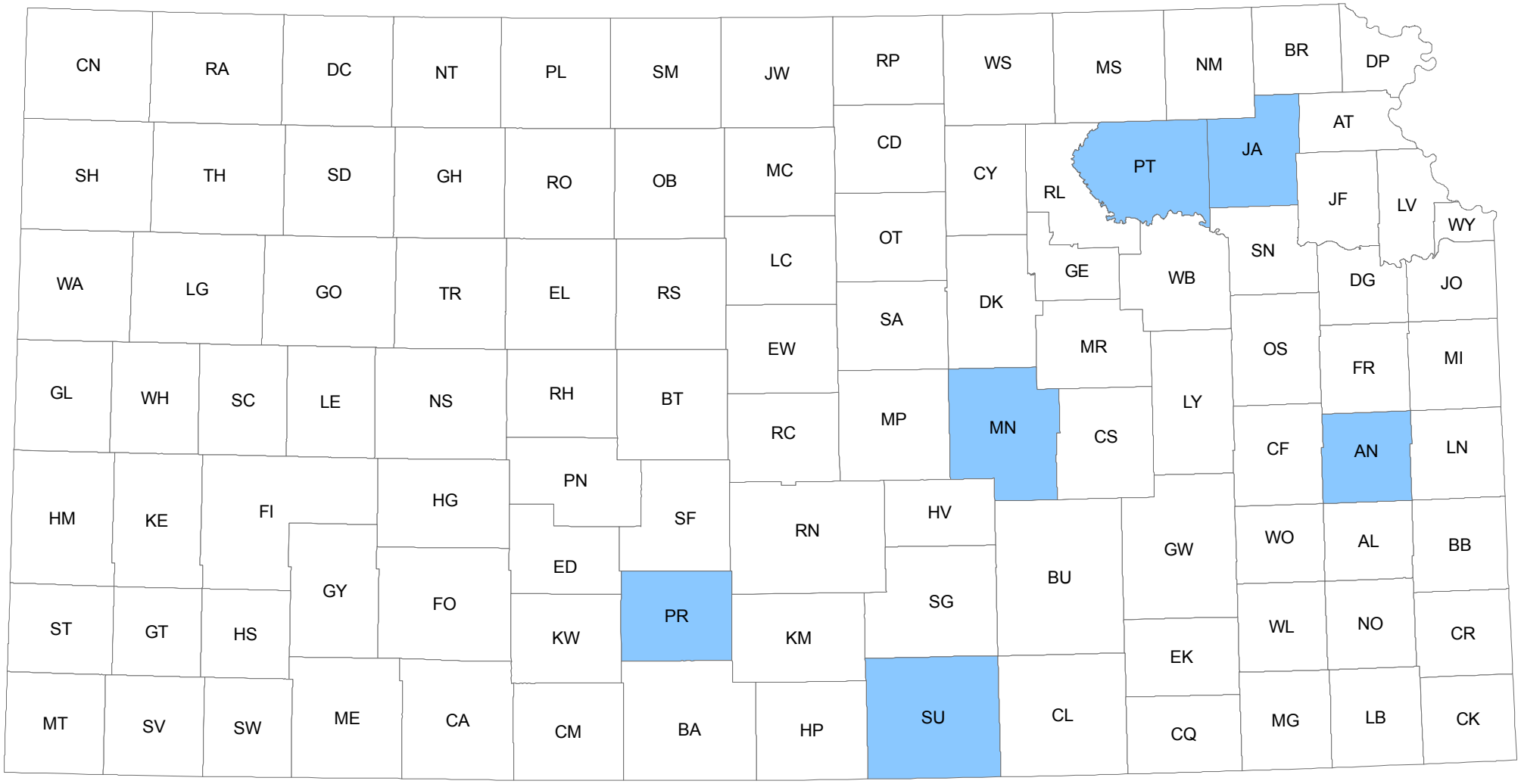


Rabies by County, Skunks, 2005



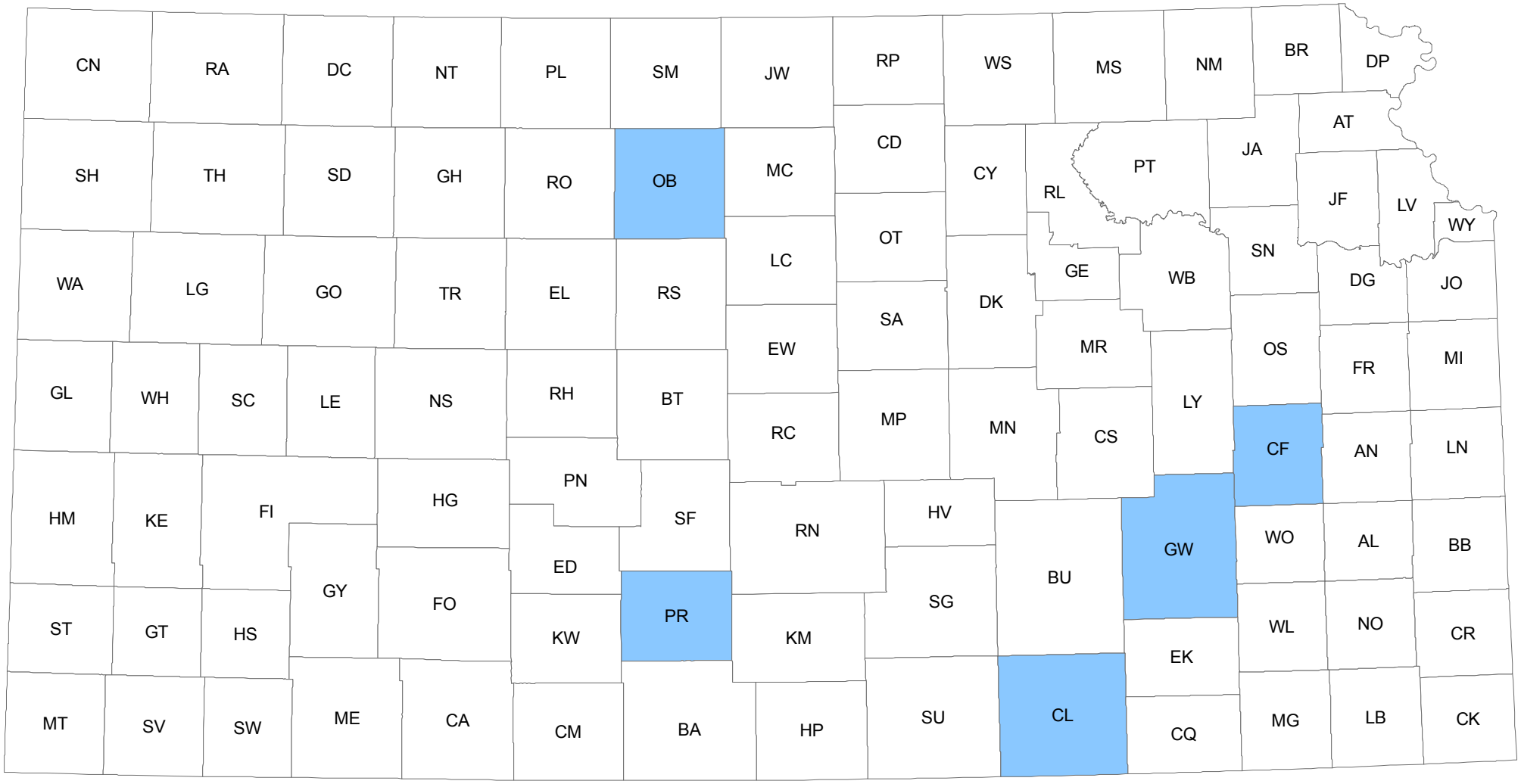
Cases 0 1 2 - 5 > 5

Rabies by County, Cats, 2005



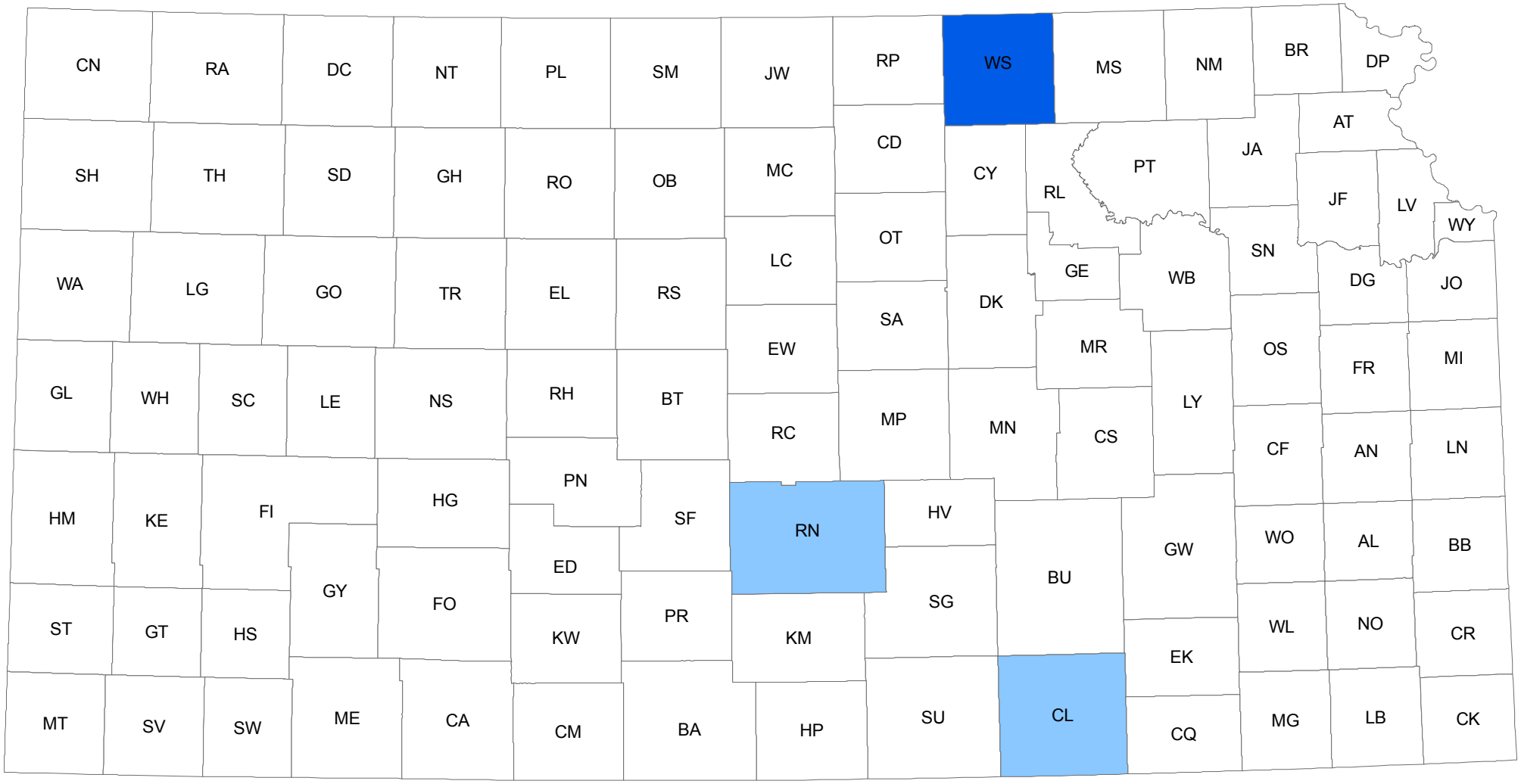
Cases 0 1

Rabies by County, Cows, 2005



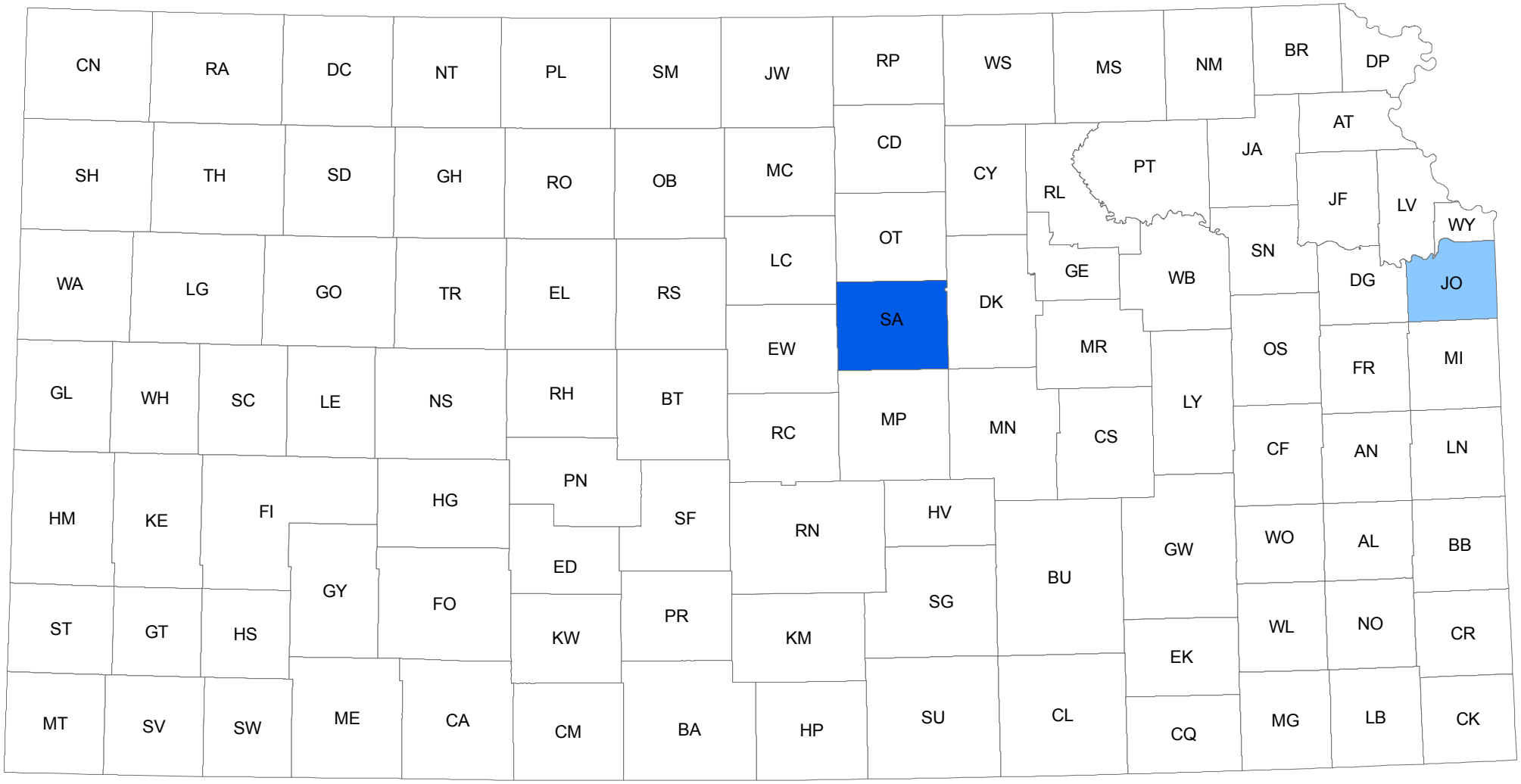
Cases 0 1

Rabies by County, Dogs, 2005



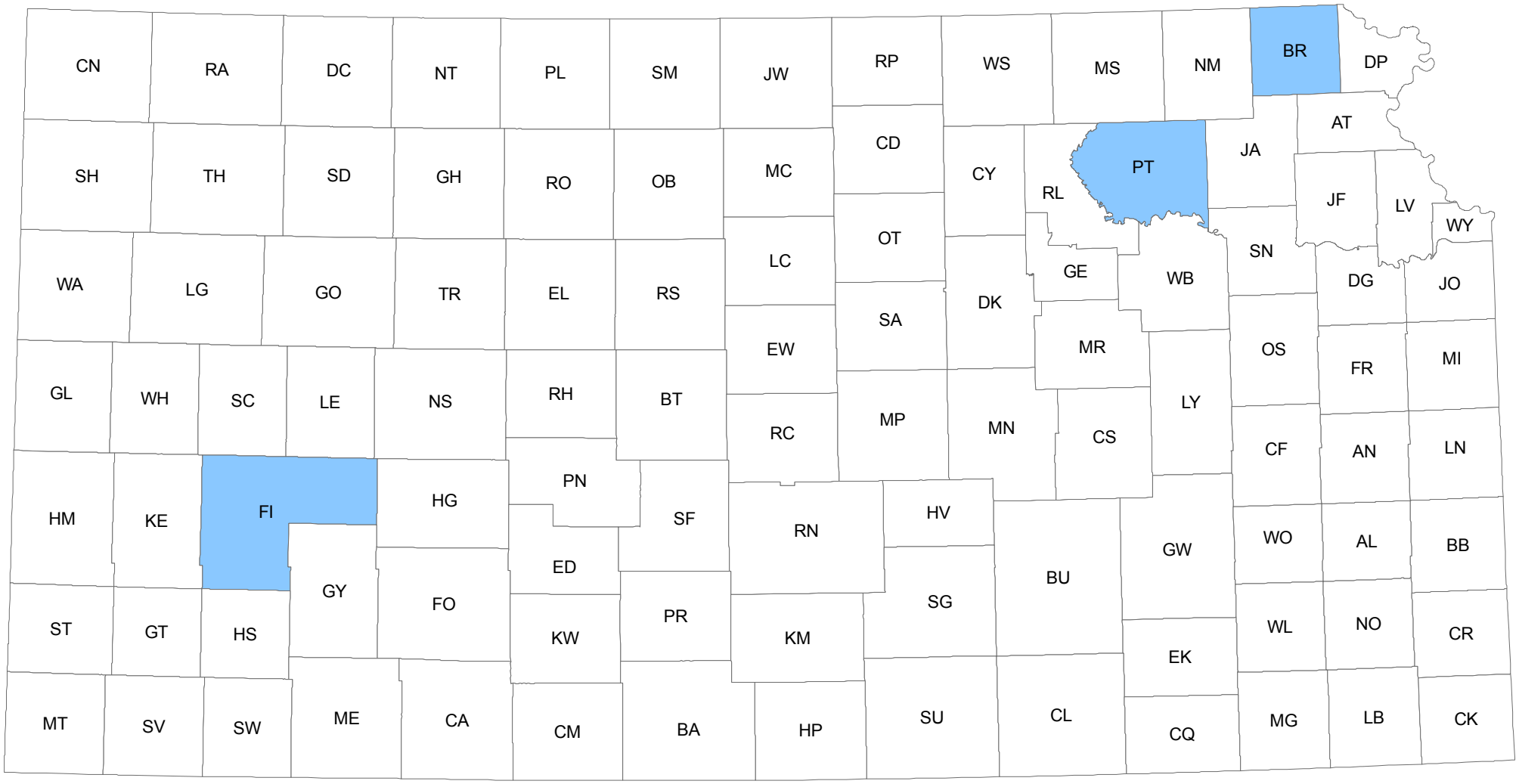
Cases 0 1 2

Rabies by County, Bats, 2005



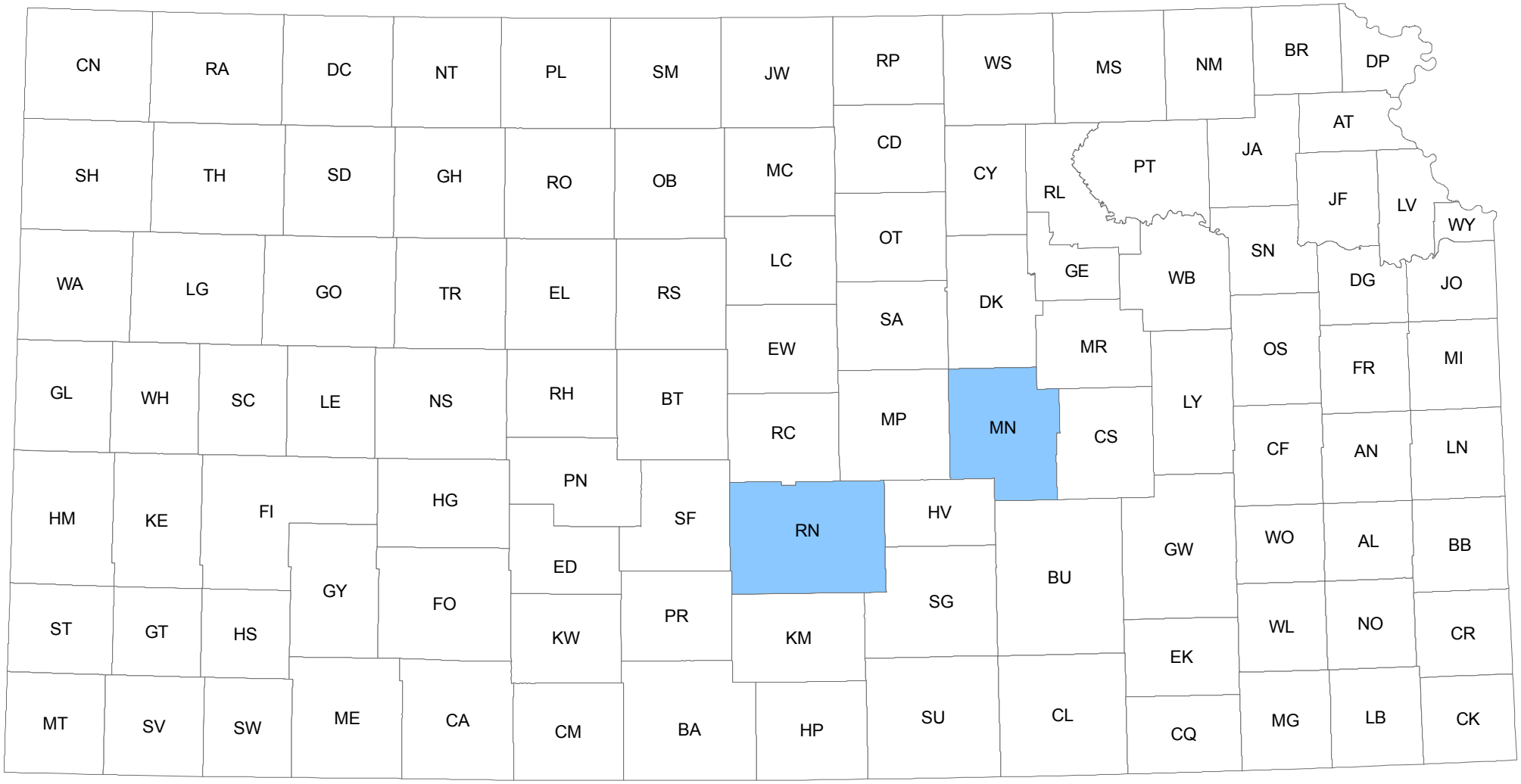
Cases 0 1 - 2 3

Rabies by County, Horses, 2005



Cases 0 1

Rabies by County, Foxes, 2005



Cases 0 1

ROCKY MOUNTAIN SPOTTED FEVER

Clinical Features: Initially, cases will present with sudden onset of moderate to high fever, malaise, deep muscle pain, severe headache, chills, and loss of appetite. A rash will appear 2 – 5 days after the onset of fever, and may be accompanied by abdominal pain, joint pain, and diarrhea. The characteristic rash will typically begin on the extremities, including the palms of the hands and soles of the feet, and may spread rapidly to the rest of the body

Causative Agent: *Rickettsia rickettsii*, which is maintained in nature during the complete life cycle of ticks and can be transmitted to dogs, rodents, and other animals; although animal infections are generally subclinical.

Mode of Transmission: Through the bite of an infected tick, or by contamination of broken skin by infected tick feces or blood. Typically, at least 4-6 hours of attachment is required for the rickettsae to reactivate and become infectious to humans.

Incubation Period: From 3 days to about 14 days.

Period of Communicability: None, there is no direct transmission from person-to-person. Ticks remain infectious for their entire life, as long as 18 months.

Public Health Significance: Disease may be prevented through personal protective measures against ticks. No vaccine is currently licensed in the US. Case fatality rate for untreated cases is between 13% and 25%; death is uncommon in cases with prompt recognition and treatment.

Reportable Disease in Kansas Since: 1982

Laboratory Criteria for Surveillance Purposes

- Serological evidence of a significant change in serum antibody titer reactive with *Rickettsia rickettsii* antigens between paired serum specimens, as measured by a standardized assay conducted in a commercial, state, or reference laboratory, ***OR***
- Demonstration of *R. rickettsii* antigen in a clinical specimen by immunohistochemical methods, ***OR***
- Detection of *R. rickettsii* DNA in a clinical specimen by the polymerase chain reaction (PCR assay), ***OR***
- Isolation of *R. rickettsii* from a clinical specimen in cell culture.

Surveillance Case Definitions

- *Confirmed:* A clinically compatible case that is laboratory confirmed.

- *Probable:* A clinically compatible case with serologic evidence of antibody reactive with *R. rickettsii* in a single serum sample at a titer considered indicative of current or past infection (cutoff titers are determined by individual laboratories).

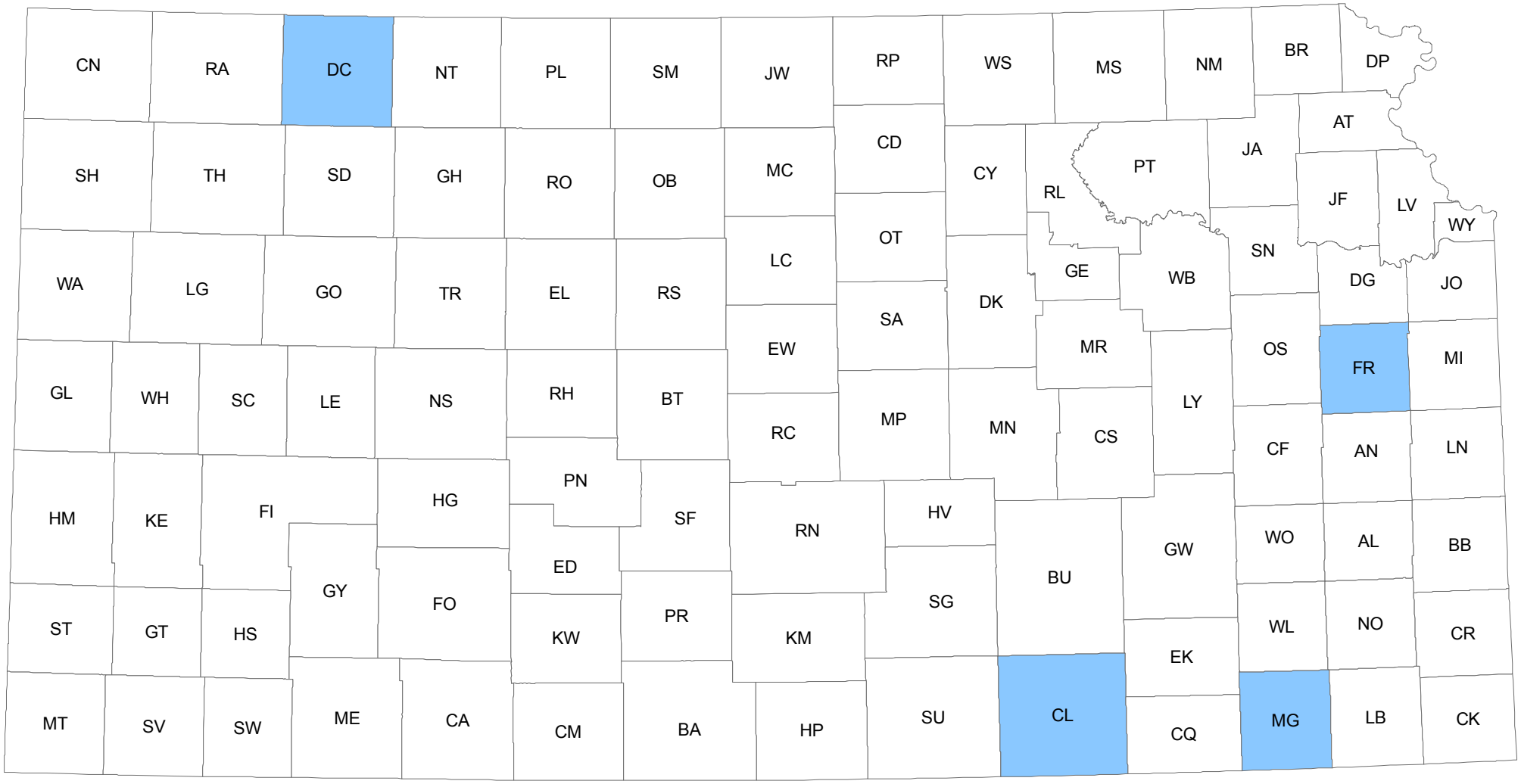
Epidemiology and Trends

2005 Kansas Count: 4

	Rate per 100,000	*95% CI*
Kansas Rate	0.1	(0.0 - 0.3)
U.S. Rate (2004)	0.6	*NA*

Four cases of Rocky Mountain spotted fever were reported in Kansas in 2005. Cases ranged from five to 43 years in age; the median age was eight years. The three-year median for 2002-2004 was 0.5 cases.

Rocky Mountain Spotted Fever Cases by County, 2005



Cases 0 1

SALMONELLOSIS
(non-typhoidal)

Clinical Features: Acute gastroenteritis with sudden onset of fever, headache, diarrhea, abdominal pain, nausea, and sometimes vomiting. Dehydration may be severe. Asymptomatic infections and extraintestinal infections can occur. Children younger than 4 years of age, elderly individuals, and persons with immunosuppressive conditions may experience severe complications, including invasive infection and mortality.

Causative Agent: *Salmonella enterica* subsp. *enterica* serovars, gram-negative bacteria (~2,000 serotypes cause human infection)

Mode of Transmission: Naturally found in a wide range of domestic and wild animals, such as poultry, livestock, reptiles, and pets. Transmission occurs by ingestion of organisms in water or food contaminated by feces of an infected animal or person or food derived from infected animals. Handling raw meat or poultry products, or contact with infected reptiles, can also result in transmission.

Incubation Period: 6-72 hours, usually 12-36 hours.

Period of Communicability: Extremely variable, usually several days to several weeks dependent upon the course of infection. A carrier state can continue for over 1 year in 1% of adults and 5% of children under 5 years of age, especially infants. Prolonged, asymptomatic fecal shedding can promote person-to-person transmission.

Public Health Significance: Disease can be prevented by promotion of good hand washing and food handling practices. Symptomatic food handlers should be excluded from normal duties. Outbreak situations should be examined for a common vehicle of transmission. Situations in which control cannot be established may require exclusion of infected persons from daycare, patient care, or food handling.

Reportable Disease in Kansas Since: 1982

Laboratory Criteria for Surveillance Purposes

- Isolation of *Salmonella* from a clinical specimen.

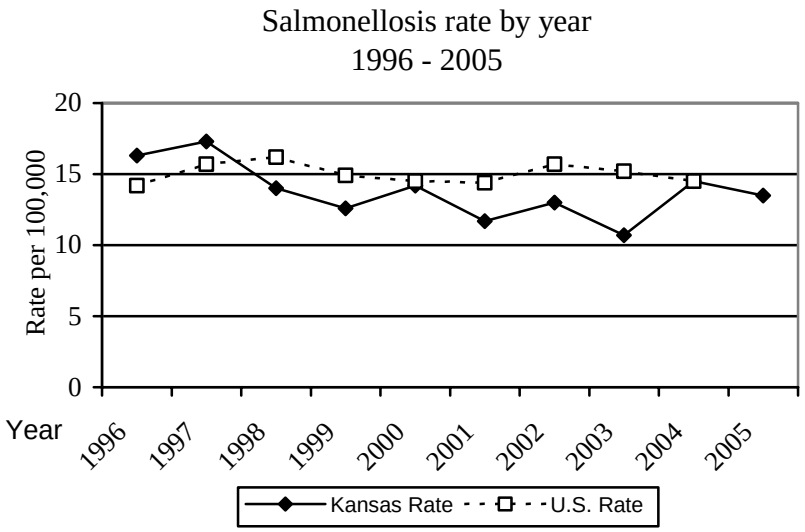
Surveillance Case Definitions

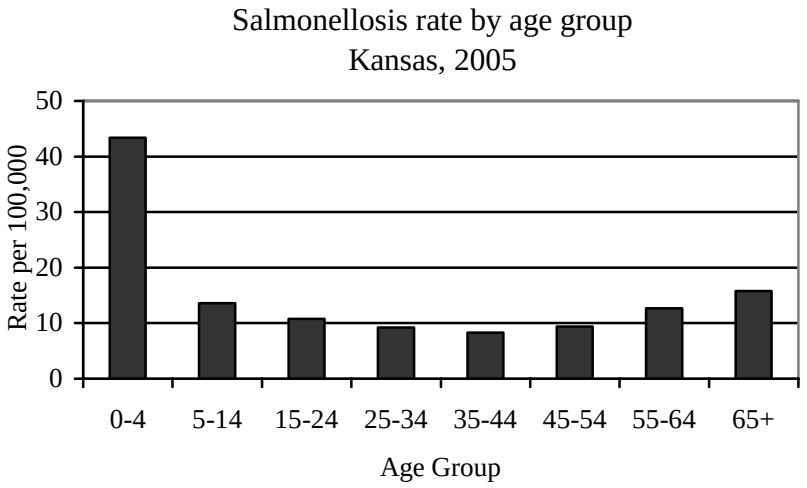
- *Confirmed:* A case that is laboratory confirmed.
- *Probable:* A clinically compatible case that is epidemiologically linked to a confirmed case.

Epidemiology and Trends

2005 Kansas Count: 369

	Rate per 100,000	*95% CI*
Kansas Rate	13.5	(12.1 - 14.9)
U.S. Rate (2004)	14.5	*NA*
Gender		
Male	13.6	(11.6 - 15.6)
Female	13.4	(11.4 - 15.3)
Race		
White	9.9	(8.6 - 11.1)
Black	5.8	(2.3 - 9.3)
Asian/Pacific Islander	9.6	(1.9 - 17.3)
Ethnicity		
Hispanic	10.4	(6.2 - 14.7)
Non-Hispanic	7.8	(6.7 - 8.9)
Geographic area		
Urban County	12.9	(11.0 - 14.8)
Non-Urban County	14.1	(12.1 - 16.1)





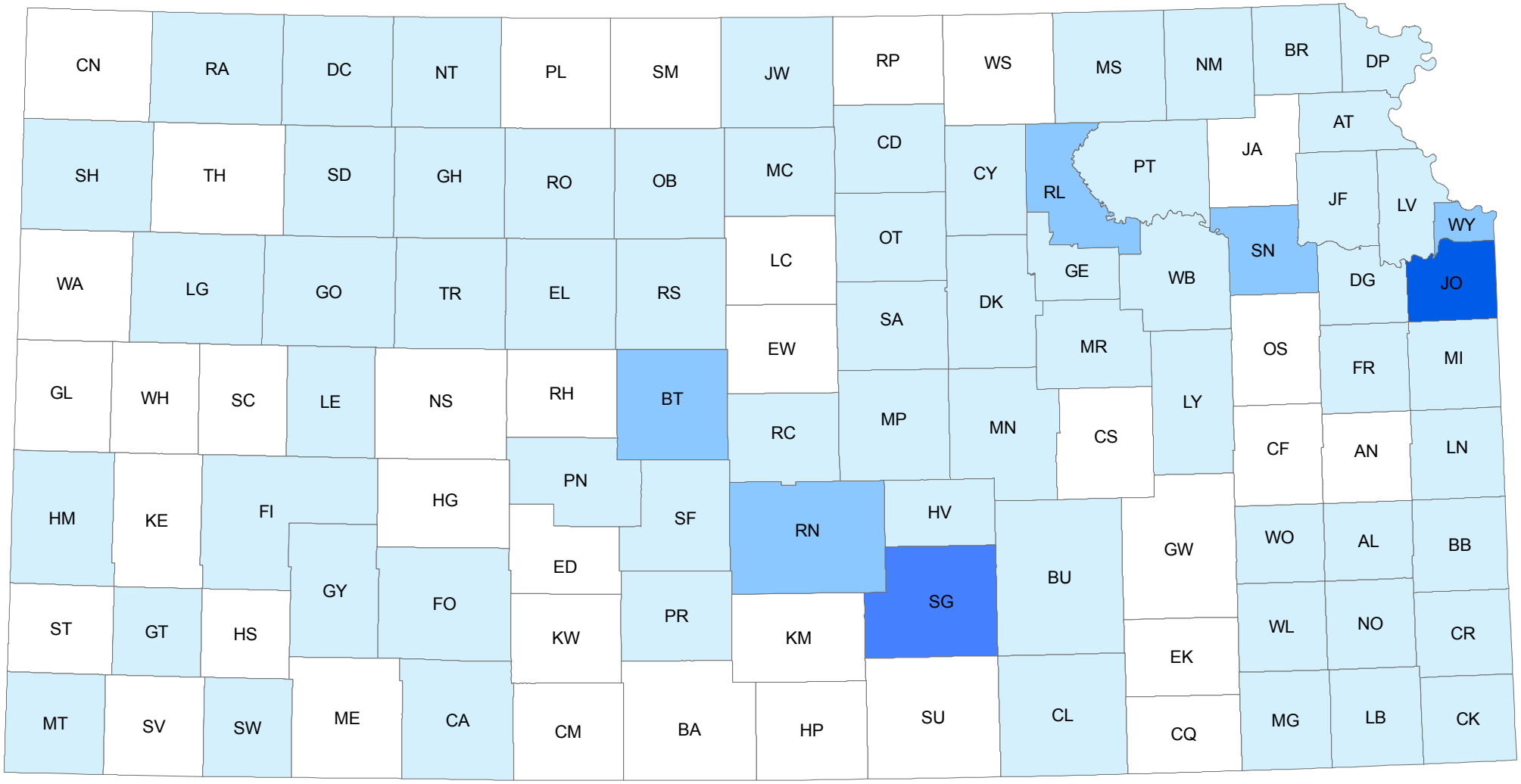
In 2005, 369 cases of salmonellosis were reported in Kansas, 25 fewer cases than what was reported in 2004. The three-year median for 2002-2004 was 354. In 2005, the cases ranged in age from less than 1 year to 92 years, with a median age of 26 years. Though salmonellosis occurred in persons of all age groups, 22% of cases occurred in those less than 5 years of age (43.4 per 100,000).

Nearly all of the reported cases were apparently sporadic. No in-state outbreaks were identified; however, cases of *S.* Braenderup, *S.* Enteritidis, *S.* Typhimurium, and *S.* Montevideo were investigated for a possible connection to various multistate outbreaks.

Serotype information was available for 80% (294) of the salmonellosis cases reported. The five most frequently isolated serotypes were: *S.* Typhimurium (50), *S.* Enteritidis (46), *S.* Newport (33), *S.* Heidelberg (18), and *S.* Infantis (7). Forty-six isolates were characterized as *S.* Subspecies I, Group B, and 16 isolates were characterized as Group C—the state laboratory was unable to complete serotyping on these isolates.

Other serotypes reported in 2005 were: Agona, Anatum, Apapa, Arechavaleta, Arizona, Assen, Bareilly, Berta, Chester, Choleraesius, Derby, Hartford, Java, Javiana, Livingstone, Litchfield, Minnesota, Montevideo, Muenchen, Norwich, Oranienberg, Panama, Paratyphi A, Saintpaul, Senftenberg, Tennessee, Thompson, Virchow.

Salmonellosis Cases by County, 2005



Cases 0 | 1 - 10 | 11 - 30 | 31 - 50 | > 50

SHIGELLOSIS

Clinical Features: Illness of variable severity characterized by diarrhea, fever, nausea, cramps, and tenesmus. Asymptomatic infections may occur.

Causative Agent: *Shigella* spp., a gram-negative bacterium, including *S. flexneri, S. sonnei, S. boydii,* and *S. dysenteriae.*

Mode of Transmission: Primarily spread through fecal-oral transmission through direct or indirect contact. May also be spread through water or milk by direct fecal contamination. Humans are the natural host for *Shigella*.

Incubation Period: Ranges from 12 hours to 7 days (average 2 to 4 days).

Period of Communicability: During the acute illness until the organism is no longer present in feces. Organism will usually clear within 4 weeks of illness onset, although in rare cases it may persist for months.

Public Health Significance: Disease may be prevented by promotion of good hand washing. Outbreaks are common among homosexual men, in conditions of overcrowding, and in day care and institutional settings; exclusion policies may apply in some outbreak situations.

Reportable Disease in Kansas Since: 1982

Laboratory Criteria for Surveillance Purposes

- Isolation of *Shigella* spp. from a clinical specimen.

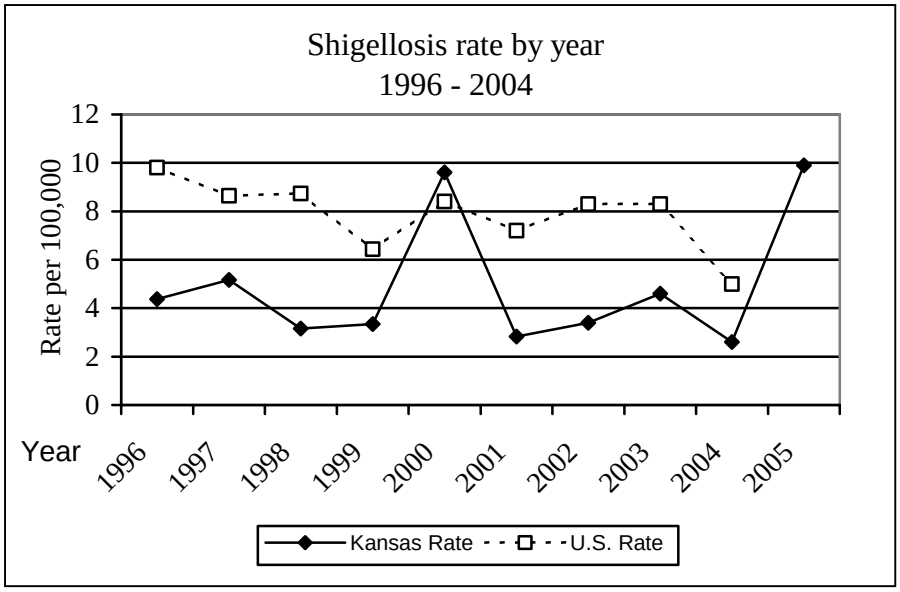
Surveillance Case Definitions

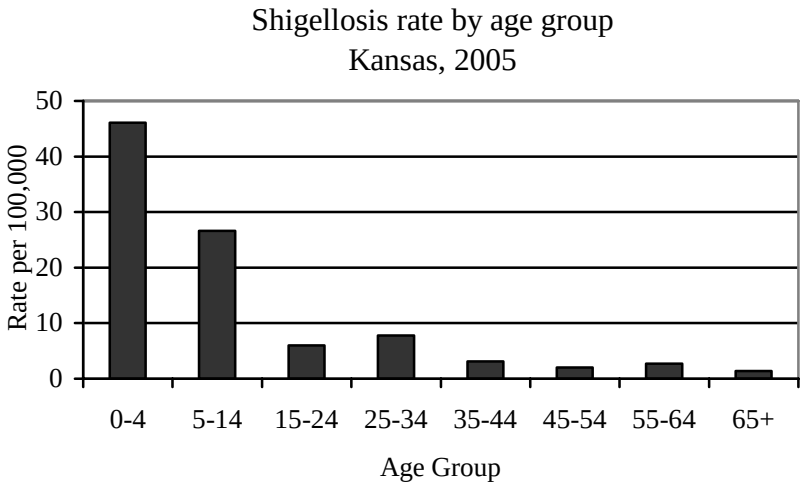
- *Confirmed:* A case that is laboratory confirmed.
- *Probable:* A clinically compatible case that is epidemiologically linked to a confirmed case.

Epidemiology and Trends

2005 Kansas Count: 272

	Rate per 100,000	*95% CI*
Kansas Rate	9.9	(8.7 - 9.8)
U.S. Rate (2004)	5.0	*NA*
Gender		
Male	8.1	(6.6 - 9.6)
Female	11.7	(9.9 - 13.5)
Race		
White	4.0	(3.2 - 4.8)
Black	58.3	(46.9 - 69.6)
Asian/Pacific Islander	6.4	(0.1 - 12.7)
Ethnicity		
Hispanic	13.2	(8.4 - 18.0)
Non-Hispanic	5.8	(4.8 - 6.7)
Geographic area		
Urban County	16.3	(14.2 - 18.4)
Non-Urban County	3.3	(2.4 - 4.3)





In 2005, there were 272 confirmed cases of shigellosis in Kansas, a large increase compared to the 81 cases reported in 2004. The three-year median for 2002-2004 was 92 cases.

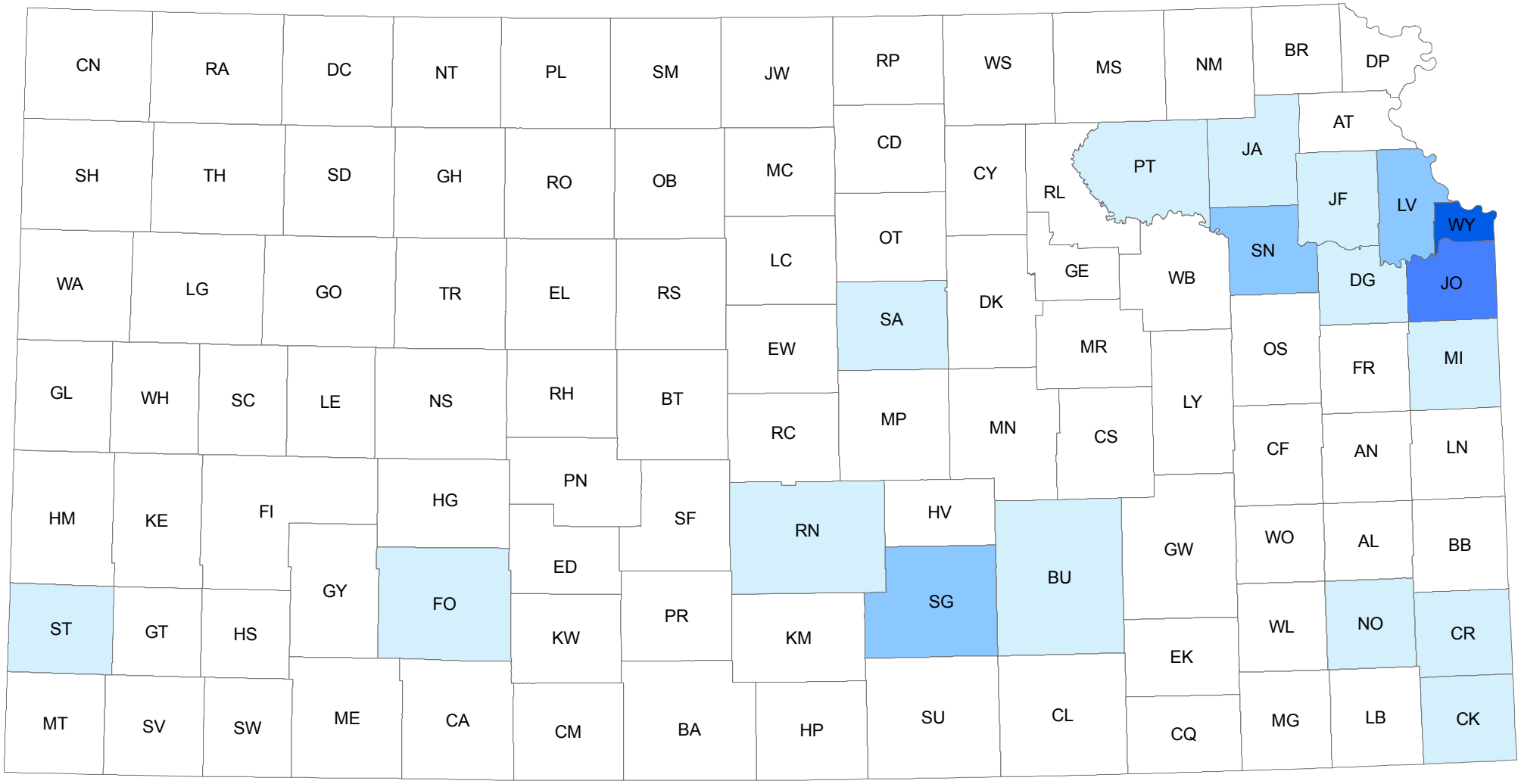
An increase of shigellosis was identified in Greater Kansas City, Missouri, in early 2005. The source of infection was unknown, but transmission was propagated through person-to-person transmission. Kansas City, Kansas, reported an increase of shigellosis by the summer. Infection first spread among school-aged children and adults, then progressed to diaper-aged children. Local and state health department staff met with school district administrators to distribute information regarding prevention measures and establish procedures to exclude ill students from school. Prevention messages consisted of a campaign to educate school-aged children and parents about proper hand hygiene and transmission of infection.

As a result of the outbreak[*], Kansas City area counties reported the greatest number of shigellosis cases. Wyandotte, Johnson, and Leavenworth Counties reported 217 cases, 80% of the state total. Children younger than 10 years of age comprised 69% (n=187) of the total shigellosis cases.

Isolates forwarded to the state laboratory were speciated. Isolates were characterized for for 238 (86%) of the 272 cases; 226 (95%) were *S. sonnei*, and 12 (5%) were *S. flexneri*.

[*] A detailed report regarding the 2005 shigellosis outbreak can be found in section II of this document, "Special Reports".

Shigellosis Cases by County, 2005



Cases 0 | 1 - 10 | 11 - 30 | 31 - 50 | > 50

STREPTOCOCCAL INVASIVE DISEASE
Group A *Streptococcus* or *Streptococcus pneumoniae*

Clinical Features: Symptoms vary and are dependent on the site of infection (e.g. acute otitis media, pneumonia, bacteremia, or meningitis). Group A infections are characterized by sudden onset of fever, shaking chill, pleural pain, dyspnea, tachypnea, and leukocytosis. Infants and young children may experience fever, vomiting, and convulsions.

Causative Agent: Group A *Streptococcus* (*Streptococcus pyogenes*) or *Streptococcus pneumoniae*

Mode of Transmission: The organisms may spread directly via respiratory droplets and oral contact. Contact with articles (e.g. tissues) that have been freshly soiled with respiratory discharges may result in indirect transmission. Although the bacteria that cause invasive disease are commonly transmitted from person-to-person, invasive disease is not. Invasive illness among a patient's close and casual contacts is infrequent.

Incubation Period: 14 hours to 3 days. (The incubation period is not clearly defined; it may be dependent on the route of infection.)

Period of Communicability: Untreated patients are most infectious for 2-3 weeks after the illness onset, although transmission may occur until the bacteria are no longer found in respiratory secretions. Patients are not considered infectious 24 hours after treatment has begun.

Public Health Significance: School and day care exclusions apply to those with streptococcal pharyngitis or skin infections. Most types of pneumococcal disease (invasive *Streptococcus pneumoniae* infections) can be prevented through vaccination.

Reportable Disease in Kansas Since: All cases of Streptococcal invasive disease have been reportable since 2000; previously, only drug-resistant strains of *Streptococcus pneumoniae* were reportable.

Laboratory Criteria for Surveillance Purposes

- Isolation of Group A *Streptococcus* (*Streptococcus pyogenes*) or *Streptococcus pneumoniae* by culture from a normally sterile site (e.g., blood, cerebrospinal fluid, joint, pleural, or pericardial fluid).

Surveillance Case Definitions

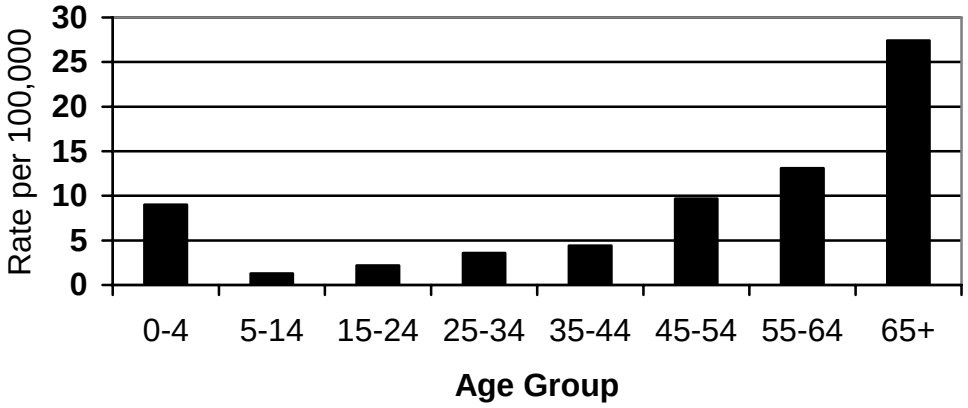
- *Confirmed:* A clinically compatible case that is laboratory confirmed.

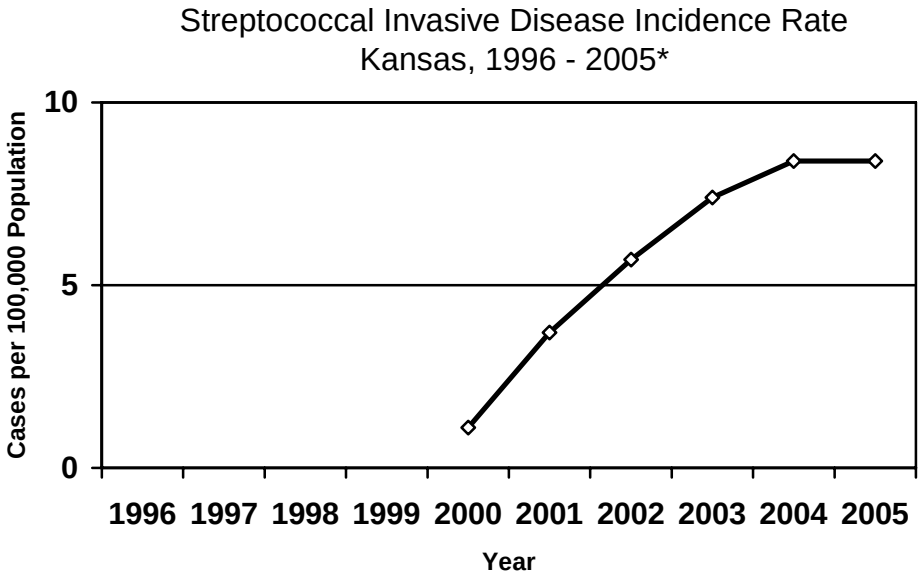
Epidemiology and Trends

2005 Kansas Count: 231

	Rate per 100,000	*95% CI*
Kansas Rate	8.4	(7.3 - 9.5)
U.S. Rate (2004)	*NA*	*NA*
Gender		
Male	8.2	(6.7 - 9.7)
Female	8.5	(7.0 - 10.0)
Race		
White	5.9	(5.0 - 6.9)
Black	11.0	(6.0 - 15.9)
Asian/Pacific Islander	3.2	(0.0 - 7.7)
Native American	3.3	(0.0 - 9.6)
Ethnicity		
Hispanic	4.1	(1.4 - 6.8)
Non-Hispanic	3.7	(2.9 - 4.4)
Geographic area		
Urban County	9.8	(8.2 - 11.5)
Non-Urban County	6.9	(5.5 - 8.3)

Streptococcal invasive disease rate by age group, Kansas, 2005





**A comparable U.S. rate is not available.*

In 2005, 231 cases of streptococcal invasive disease were reported (8.4 cases per 100,000 population), an increase of only 3 cases from the previous year (8.4 cases per 100,000 population). The three-year median from 2002-2004 was 200 cases. This marks the first year that the incidence rate has not risen since 2000, when the current case definition was established. The Kansas rate cannot be compared to a national rate due to a difference in case definition; unlike Kansas, the CDC monitors the rate of invasive, drug-resistant *Streptococcus pneumoniae* infections, invasive *S. pneumoniae* infections among those less than five years of age, and invasive Group A *Streptococcus* infections. Kansas' reporting requirements will be changed to reflect the national guidelines in 2006.

The 231 cases of streptococcal invasive disease were comprised of 40 Group A *Streptococcus* infections and 191 *S. pneumoniae* infections. Of the 191 *S. pneumoniae* infections, 7 were cases of meningitis.[*]

As in previous years, the rate of disease was higher among those residing in an urban county (9.8 per 100,000 residents) compared to those residing in non-urban counties (7.9 per 100,000 residents). Urban county residents accounted for 137 (59%) of streptococcal invasive disease cases. Although the total number of African-Americans affected by streptococcal invasive disease in 2004 was low (19 cases), the disease incidence rate among African-Americans was high (11.0 per 100,000 population) compared to Whites (5.9 per 100,000 population). This reflects national trends; in the United States, the risk of bacteremia is higher among non-Whites.[#]

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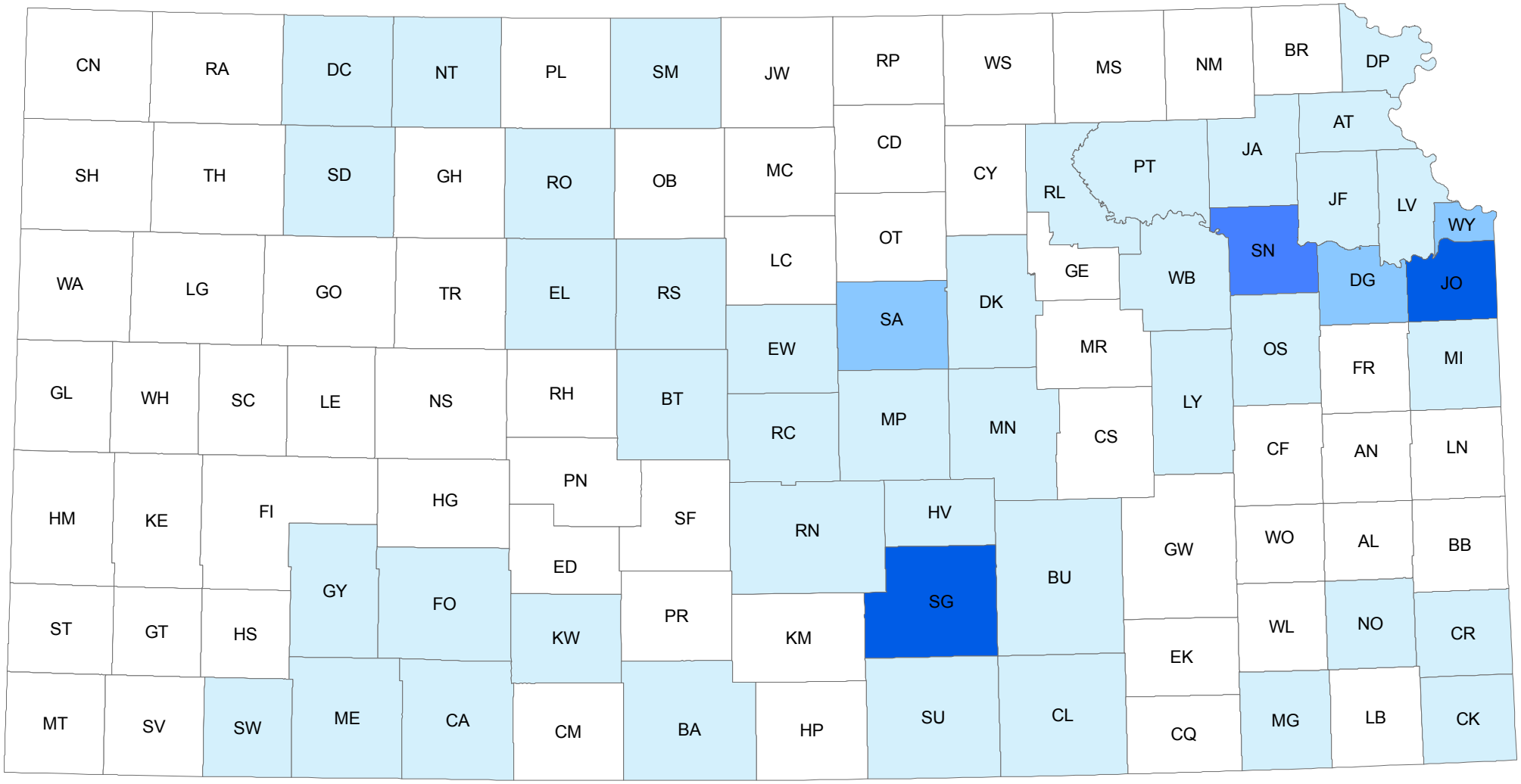
[*] These 7 cases are also counted as cases of non-meningococcal, non-HiB bacterial meningtitis. See the section titled "Meningitis, Other Bacterial".

[#] CDC. Prevention of pneumococcal disease: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 1997;46(No. RR-8):1--24.

Pneumococcal vaccine is recommended for adults age 65 and older. Analysis of the 2005 data showed that 79 *S. pneumoniae* cases (43%) belonged to this age group. A similar percentage (49%) from this age group was reported in 2004. The vaccination status of these cases is unknown; the pneumococcal vaccination rate among Kansans age 65 and older is 65.8%, according to the 2005 Kansas Behavioral Risk Factor Surveillance System (BRFSS). This is a slight increase from the 62.5% pnuemococcal vaccination rate that was reported by the BRFSS in 2004.

Streptococcal Invasive Disease Cases by County, 2005



Cases 0 | 1 - 10 | 11 - 20 | 21 - 30 | > 30

SYPHILIS

Clinical Features: An acute and chronic treponemal disease characterized clinically by a primary lesion, a secondary eruption involving skin and mucous membranes, long periods of latency, and late lesions of skin, bone, the central nervous system, and cardiovascular system.

Causative Agent: *Treponema pallidum*, a gram-negative bacterium.

Mode of Transmission: Syphilis is transmitted person to person through sexual contact with the exception of congenital syphilis, when the infant acquires the infection by transplacental transmission of *T. pallidum*. Transmission by sexual contact requires exposure to infectious moist mucosal or cutaneous lesions.

Incubation Period: May range from 10 days to 3 months (usually 3 weeks).

Period of Communicability: Individuals are usually only infectious during periods when they have primary or secondary mucosal or cutaneous lesions. Individuals are not commonly infectious beyond the first year of infection.

Public Health Significance: Many STDs may be prevented through sexual abstinence or through correct, consistent use of condoms. Syphilis is associated with an increased risk of acquiring HIV.

Reportable Disease in Kansas Since: 1950

Clinical Criteria:

PRIMARY SYPHILIS:

- A stage of infection characterized by one or more chancres (ulcers); chancres might differ considerably in clinical appearance.

SECONDARY SYPHILIS:

- A stage of infection characterized by localized or diffuse mucocutaneous lesions, often with generalized lymphadenopathy. The primary chancre may still be present.

LATENT SYPHILIS:

- A stage of infection in which organisms persist in the body of the infected person without causing symptoms or signs. Latent syphilis is subdivided into early, late, and unknown categories based on the duration of infection.

Laboratory Criteria for Surveillance Purposes:

PRIMARY SYPHILIS:

- Demonstration of *T. pallidum* in clinical specimens by darkfield microscopy, direct fluorescent antibody (DFA-TP), or equivalent methods.

SECONDARY SYPHILIS:

- Demonstration of T. pallidum in clinical specimens by darkfield microscopy, DFA-TP, or equivalent methods

Surveillance Case Definitions:

PRIMARY SYPHILIS:

- *Probable case*: a clinically compatible case with one or more ulcers (chancres) consistent with primary syphilis and a reactive serologic test (nontreponemal: VDRL or RPR; or treponemal: FTA-ABS or MHA-TP).

- *Confirmed case*: a clinically compatible case that is laboratory confirmed

SECONDARY SYPHILIS:

- *Probable case*: a clinically compatible case with a nontreponemal (VDRL or RPR) titer greater than or equal to 4.

- *Confirmed case*: a clinically compatible case that is laboratory confirmed.

LATENT SYPHILIS:

- *Probable case*: No clinical signs or symptoms of syphilis and the presence of one of the following:

  - No past history of syphilis and reactive nontreponemal test (RPR, VDRL) and a reactive treponemal test (MHATP,FTA).
  - A past history of syphilis therapy and a current nontreponemal test titer demonstrating fourfold or greater increase from the last nontreponemal test titer.

Epidemiology and Trends

2005 Kansas Count (All Stages): 88

	Rate per 100,000	95% CI
Kansas Rate	3.2	(2.5 - 3.8)
U.S. Rate (2004)	11.5	*NA*

Kansas reported the same number of cases (37 cases) in calendar year (CY) 2005 as in CY2004. In CY2005, an outbreak that had begun among MSM (men who have sex with men) who frequent social/sexual networks out of the state, particularly in Kansas City, MO, continued throughout the year. The outbreak accounted for 22 of 37 total early syphilis cases reported in Kansas.

During CY2005, 19 (51%) of 37 early syphilis cases reported in Kansas were diagnosed as primary or secondary syphilis. This represents a five case (14%) decrease compared to CY2004. Seventeen of the nineteen primary and secondary (P&S) cases were diagnosed in MSM. Although MSM early syphilis cases in CY2005 were distributed across five different counties (Wyandotte, Johnson, Douglas, Leavenworth and Shawnee), all 22 cases associated with the outbreak lived within 60 miles of Kansas City, MO and named partners at sexual venues (such as bookstores) in the greater Kansas City area. Wyandotte and Johnson Counties reported 11 and 7 P&S syphilis cases respectively for CY2005. The only other P&S case was reported in Leavenworth County. A total of 18 cases of early latent (EL) syphilis were reported in CY2005; which represents a five case increase compared to CY2004. The case rate for all early syphilis in CY2005 was 1.4/100,000 and for P&S syphilis was 0.7/100,000. Thirty percent (11) of the early syphilis cases were diagnosed through public providers. Within the MSM outbreak, individuals typically are urban, white and affluent. They are seeking diagnosis and treatment at their private provider's office.

In CY2005, the Central Office received reports of 989 reactive serologies from 79 different reporting sources. Seventy-one percent (701 reports) of these reactive serologies were either administrative or record search closed and 29 percent (288 reports) were sent to the field for further evaluation. Of the 288 serologies sent to DIS for evaluation, 37 were closed as new early syphilis cases and 51 were closed as late latent syphilis cases.

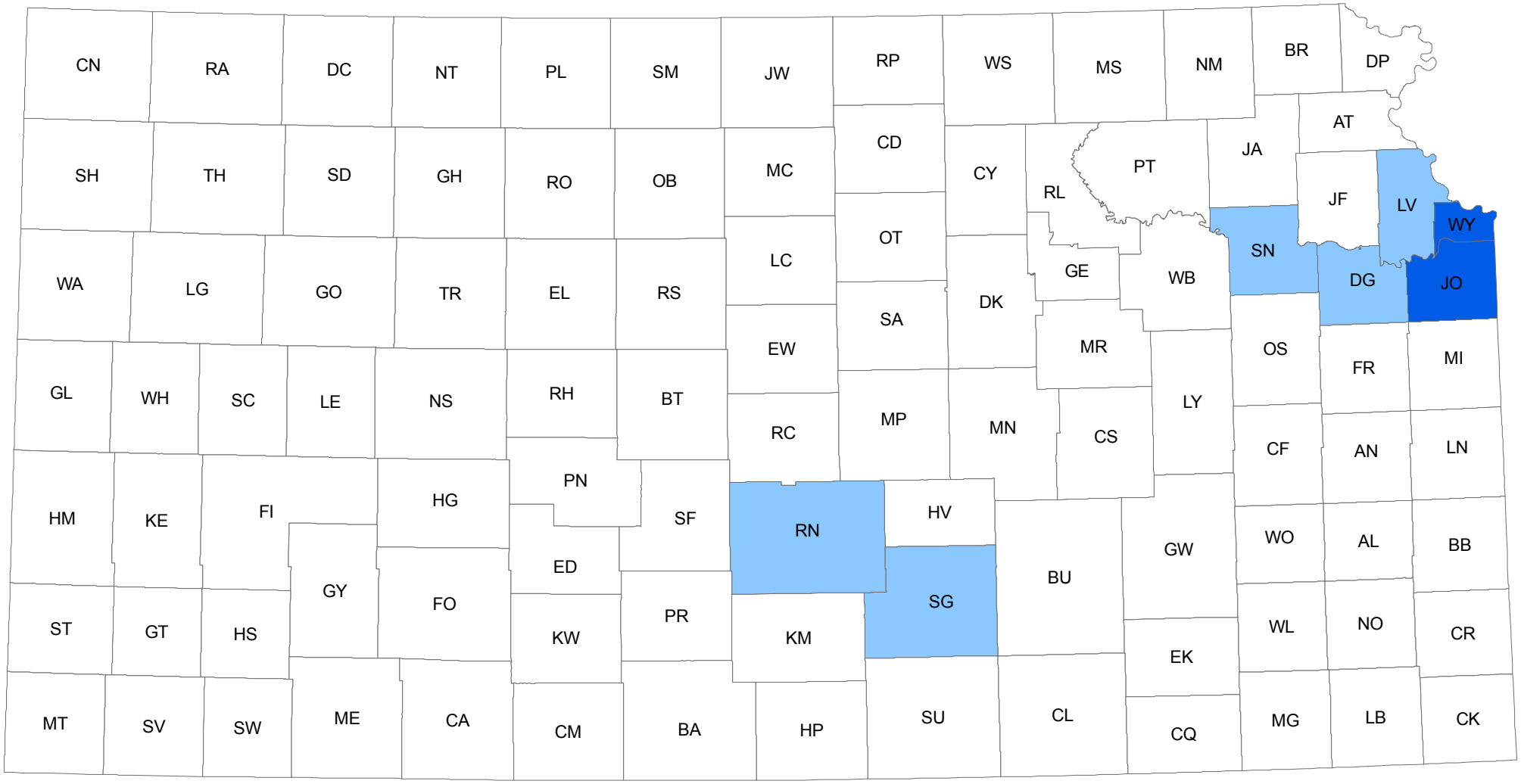
During CY2005, 22 percent (8 cases) of the early syphilis cases were reported in the 45-54 age group while 19 percent (7 cases) were reported in the 40-44 age group. Fourteen (5 cases) percent were in each the 30-34 and 35-39 age groups. There were four (11%) cases in each of the 20-24 and 25-29 age groups. There was one case each in the 15-19 and 55 and over age groups.

Whites accounted for 51 percent (19 cases) of the early syphilis cases in CY2005. African-Americans accounted for 41 percent (15 cases) of the reported early syphilis cases in Kansas. Hawaiian/Pacific Islanders accounted for one case. Hispanics, with no race elicited, accounted for the remaining five percent (2 cases) of the reported early syphilis cases. African-Americans had a case rate of 8.7/100,000 in CY2005; while Whites had a case rate of 0.8/100,000.

The male to female ratio of the 37 early syphilis cases in Kansas for CY2005 was 1:0.3 (28:9). The ratio is weighted heavily towards males due to the high percentage (59%) of cases diagnosed in MSM.

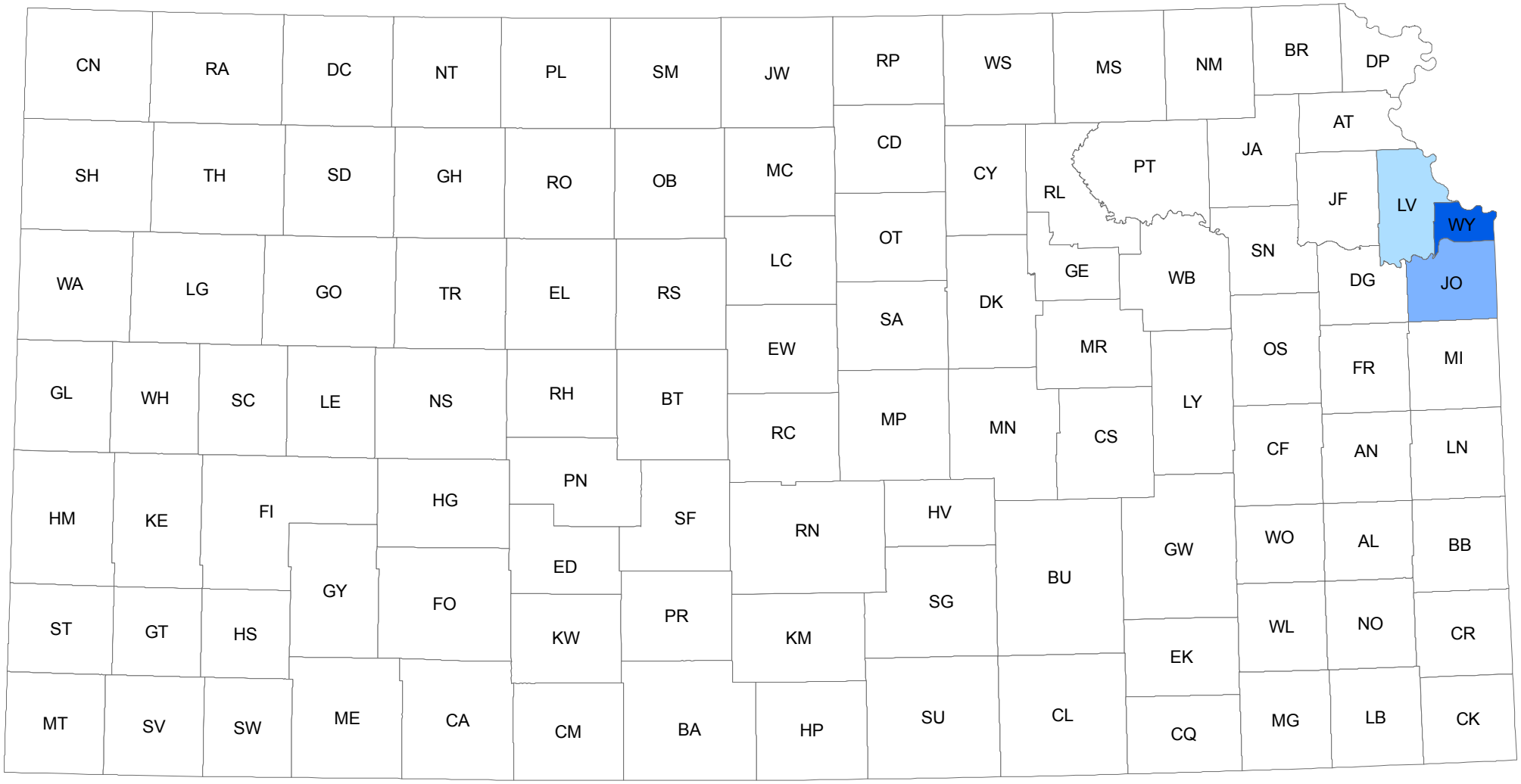
There were no congenital syphilis cases reported in Kansas in CY2005.

Early Syphilis Cases by County, 2005



Cases 0 | 1 - 10 | 11 - 16

Primary and Secondary Syphilis Cases by County, 2005



Cases 0 | 1 - 5 | 6 - 10 | > 10

TOXIC SHOCK SYNDROME
Streptococcal and Staphylococcal

Clinical Features: An acute illness characterized by fever (≥102.0ºF), rash, rapid-onset hypotension, rapidly accelerated renal failure, disseminated intravascular coagulation (DIC), and multisystem organ involvement. Profuse watery diarrhea, vomiting, generalized erythroderma, conjunctival injection, and severe myalgias may be present. It may be associated with local soft tissue infection (cellulites, abscess, myositis, or nercotizing fasciitis) with severe increasing pain, pneumonia, osteomyelitis, bacteremia, pyarthrosis, or endocarditis. Infection with *Staphylococcal aureus* is associated with menses. Toxic Shock can be confused with Rocky Mountain Spotted fever, Leptospirosis, and measles.

Causative Agent: *Streptococcus pyogenes* or *Staphylococcal aureus*, gram-positive bacteria

Mode of Transmission: Person-to-person transmission is rare. Nosocomial cases are uncommon and most often have followed surgical procedures.

Incubation Period: Not well defined, could be as short as 12 hours for postoperative TSS or 14 hours in cases associated with accidental subcutaneous inoculation of organism; such as during childbirth or after penetrating trauma. Menses-related cases generally develop on the third or fourth day of menses.

Period of Communicability: Not applicable

Public Health Significance: In many cases, *Staphylococcal* TSS may be prevented through proper use of tampons, contraceptive diaphragms, and vaginal contraceptive sponges.

Reportable Disease in Kansas Since: 1993

Clinical Criteria

- *Fever* temperature greater than or equal to 102.0ºF (greater than or equal to 38.9 ºC)
- Rash: diffuse macular erythroderma
- *Desquamation*: 1-2 weeks after onset of illness, particularly on the palms and soles
- *Hypotension*: systolic blood pressure less than or equal to 90 mm Hg for adults or less than fifth percentile by age for children aged less than 16 years; orthostatic drop in diastolic blood pressure greater than or equal to 15 mm Hg from lying to sitting, orthostatic syncope, or orthostatic dizziness
- Multisystem involvement (three or more of the following):
    - *Gastrointestinal*: vomiting or diarrhea at onset of illness
    - *Muscular*: severe myalgia or creatine phosphokinase level at least twice the upper limit of normal Mucous membrane: vaginal, oropharyngeal, or conjunctival hyperemia
    - *Renal*: blood urea nitrogen or creatinine at least twice the upper limit of normal for laboratory or urinary sediment with pyuria (greater than or equal to 5 leukocytes per high-power field) in the absence of urinary tract infection
    - *Hepatic*: total bilirubin, alanine aminotransferase enzyme, or asparate aminotransferase enzyme levels at least twice the upper limit of normal for laboratory
    - *Hematologic*: platelets less than 100,000/mm3
    - *Central nervous system*: disorientation or alterations in consciousness without focal neurologic signs when fever and hypotension are absent

Laboratory Criteria for Surveillance Purposes

Negative results on the following tests, if obtained:

- Blood, throat, or cerebrospinal fluid cultures (blood culture may be positive for Staphylococcus aureus)
- Rise in titer to Rocky Mountain spotted fever, leptospirosis, or measles

Surveillance Case Definitions

- *Confirmed:* a case in which all six of the clinical findings described above are present, including desquamation, unless the patient dies before desquamation occurs
- *Probable*: a case in which five of the six clinical findings described above are present

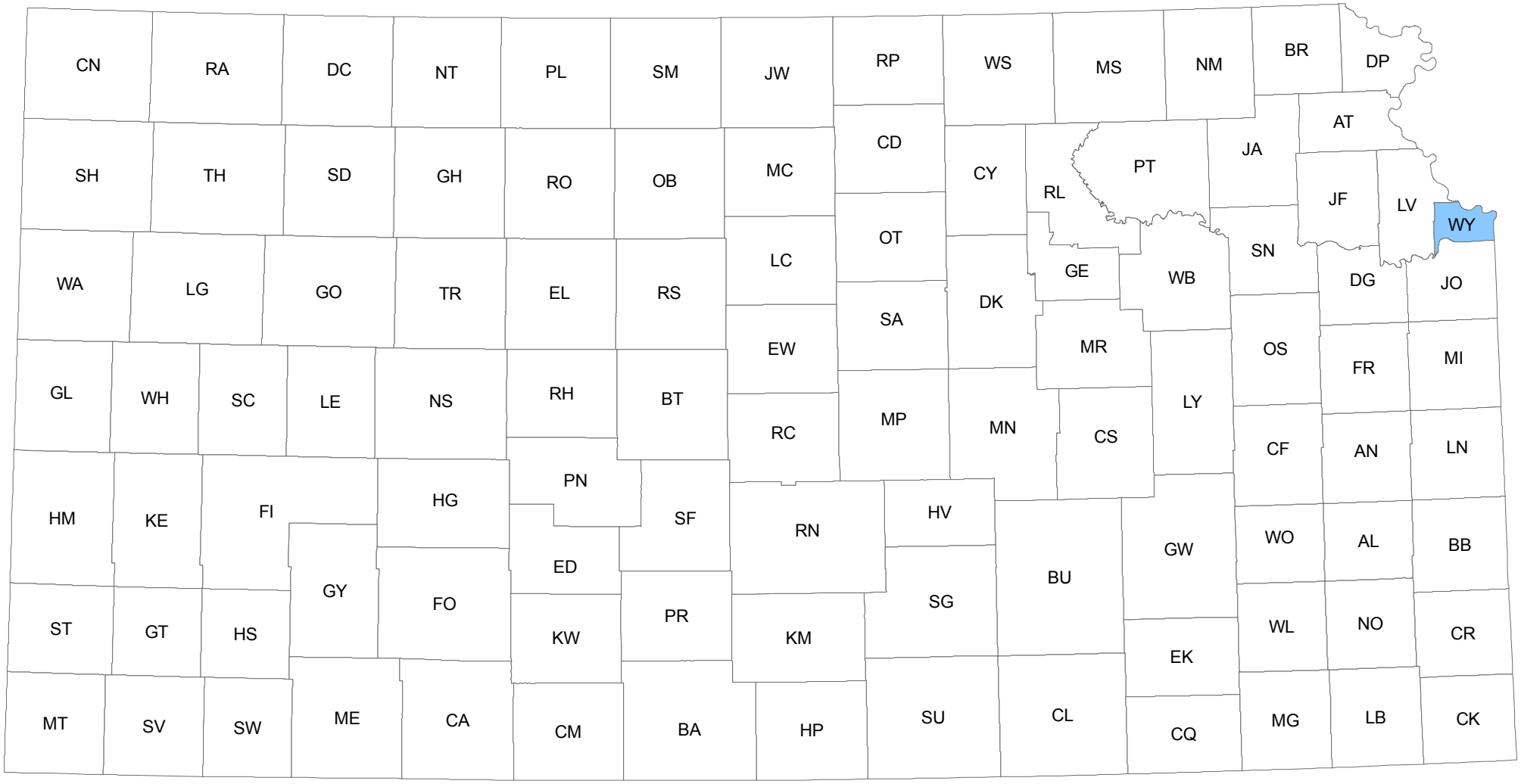
Epidemiology and Trends

2005 Kansas Count: 1

	Rate per 100,000	*95% CI*
Kansas Rate	<0.1	(0.0 – 0.1)
U.S. Rate (2004)	<0.1	*NA*

One case of streptococcal toxic shock syndrome was reported in 2005. The three-year median for 2002-2004 was one case.

Toxic Shock Syndrome Cases by County, 2005



Cases 0 1

TUBERCULOSIS (TB), ACTIVE DISEASE

Clinical Features: The most common site of disease is the lungs (pulmonary TB), but other organs (extrapulmonary TB) may be involved (e.g., brain, lymph nodes, kidneys, bones, joints, larynx, intestines, eyes). Systemic symptoms include low-grade fever, night sweats, fatigue, and weight loss. In pulmonary or laryngeal TB, there may also be hemoptysis (bloody sputum), a persistent and productive cough, chest pain, and shortness of breath.

Causative Agent: Mycobacterium tuberculosis complex. This complex includes *M. tuberculosis* and *M. africanum* (primarily from humans), and *M. bovis* (primarily from cattle).

Mode of Transmission: Exposure to tubercle bacilli through inhalation of airborne droplet nuclei from a person with active pulmonary/laryngeal TB. Prolonged close contact with an infectious case may lead to infection.

Incubation Period: approximately 2–12 weeks from infection to demonstrable primary lesion or significant tuberculin reaction. A latent, dormant TB infection can become active years after the initial infection; the incubation period can last for years.

Period of Communicability: Varies from case to case and is dependent upon the location of disease, the symptoms of disease, and smear status. Pulmonary and laryngeal clients pose the greatest risk for spreading tuberculosis. A client with a productive cough is considered a greater risk to transmit the disease than an individual without a cough. All smear positive pulmonary clients are considered contagious. Individuals that are smear negative upon diagnosis are generally not considered contagious unless they have symptoms of TB (i.e. a productive cough). An individual is presumed to be contagious until he/she has met three criteria: treated with appropriate tuberculosis medications for at least 2 weeks, improvement in symptoms, and three negative sputum smears.

Public Health Significance: Epidemics of tuberculosis have occurred among individuals in enclosed places, such as nursing homes, jails, hospitals, schools, office buildings, and factories. Tuberculosis is treatable with the use of medications; isoniazid, rifampin, pyrazinamide, and ethambutol. There are multi-drug resistant (i.e., resistant to both isoniazid and rifampin) forms of *M. tuberculosis*; fortunately, these strains have been reported only rarely in Kansas.

Reportable Disease in Kansas Since: 1982

Clinical Criteria

A case that meets all of the following criteria:

- A positive tuberculin skin test result
- Other signs and symptoms compatible with tuberculosis, such as an abnormal, unstable (i.e., worsening or improving) chest radiograph, or clinical evidence of current disease
- Treatment with two or more antituberculosis medications
- A completed diagnostic evaluation

Laboratory Criteria for Surveillance Purposes

- Isolation of *M. tuberculosis* from a clinical specimen, ***OR***
- Demonstration of *M. tuberculosis* from a clinical specimen by nucleic acid amplification test, ***OR***
- Demonstration of acid-fast bacilli in a clinical specimen when a culture has not been or cannot be obtained

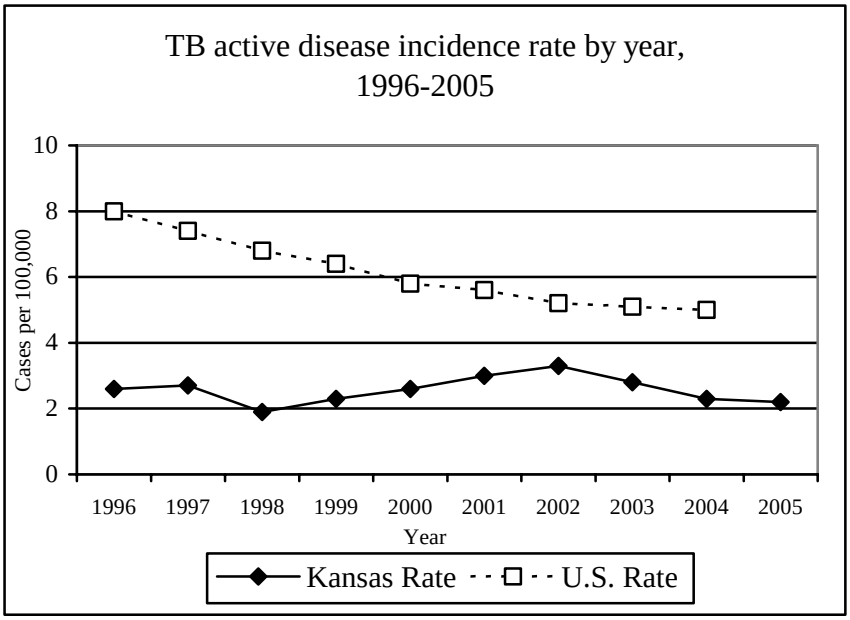
Surveillance Case Definitions

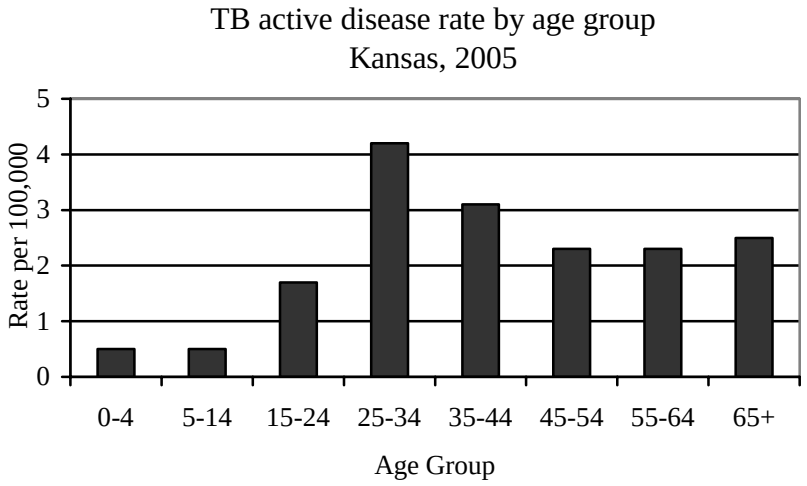
- *Confirmed:* A case that meets the clinical case definition or is laboratory confirmed.

Epidemiology and Trends

2005 Kansas Count: 61

	Rate per 100,000	*95% CI*
Kansas Rate	2.2	(1.7 - 2.8)
U.S. Rate (2004)	5.0	*NA*
Gender		
Male	2.4	(1.6 - 3.3)
Female	2.0	(1.3 - 2.8)
Race		
White	1.2	(0.8 - 1.6)
Black	9.8	(5.1 - 14.5)
Asian/Pacific Islander	16.0	(6.1 - 26.0)
Native American	3.3	(0.0 - 9.6)
Ethnicity		
Hispanic	8.2	(4.4 - 11.9)
Non-Hispanic	1.7	(1.2 - 2.2)
Geographic area		
Urban County	2.9	(2.0 - 3.8)
Non-Urban County	1.6	(0.9 - 2.2)





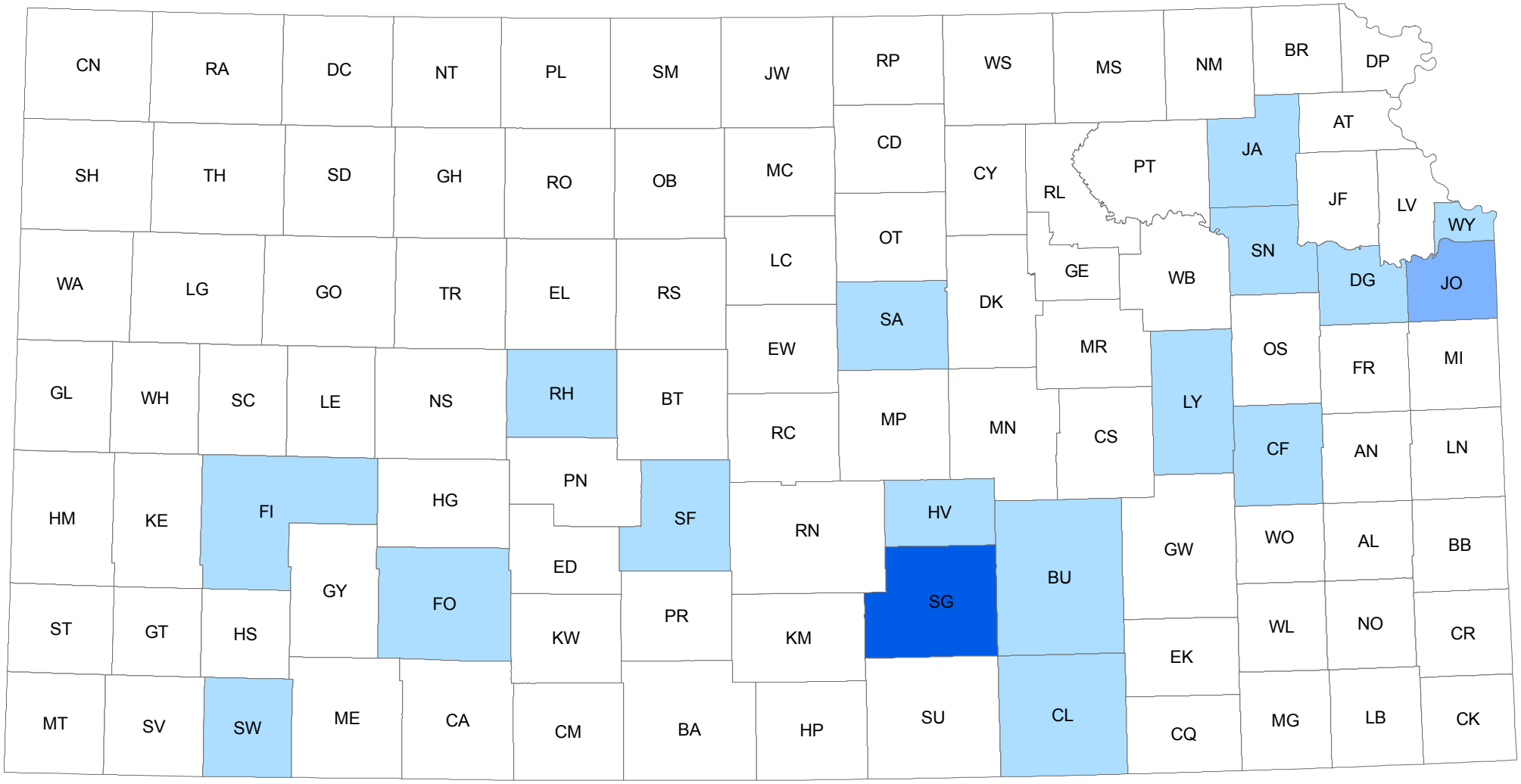
Kansas reported 61 cases of active tuberculosis disease in 2005, one case fewer than what was reported in 2004. This is the third consecutive year that the case count has declined; it is the lowest case count since 56 cases were recorded in 1998. The three-year median for 2002-2004 was 75 cases.

The majority of cases (n=40, 66%) were reported among residents of urban counties. The combined total for Sedgwick County (n=22) and Johnson County (n=11) accounted for 54% of all reported cases.

The incidence rate was highest among minority populations. Asians and Pacific Islanders had the highest rate of disease (16.0 per 100,000), followed by African-Americans (9.8 per 100,000) and Hispanics (8.2 per 100,000).

Seven cases of HIV/TB co-infection were reported in 2005. This was the highest number of co-infection cases ever recorded in Kansas. Prior to 2005, one to four cases of co-infection were reported annually.

Tuberculosis Active Disease Cases by County, 2005



Cases 0 | 1 - 10 | 11 - 20 | > 20

TUBERCULOSIS, LATENT INFECTION (LTBI)

Clinical Features: There are no systemic symptoms for latent TB infection (LTBI). Targeted testing programs exist to identify persons who are at high risk for LTBI and who would benefit from treatment.

Causative Agent: Mycobacterium tuberculosis complex. This complex includes *M. tuberculosis* and *M. africanum* (primarily from humans), and *M. bovis* (primarily from cattle).

Mode of Transmission: Exposure to tubercle bacilli through inhalation of airborne droplet nuclei from a person with active pulmonary/laryngeal TB. Prolonged close contact with an infectious case may lead to infection.

Incubation Period: approximately 2 –12 weeks from infection to demonstrable primary lesion or significant tuberculin reaction. A latent, dormant TB infection can become active years after the initial infection; the incubation period can last for years.

Period of Communicability: By definition, LTBI is not infectious.

Public Health Significance: Epidemics of tuberculosis have occurred among individuals in enclosed places, such as nursing homes, jails, hospitals, schools, office buildings, and factories. Recent immigrants, close contacts of an active TB case, HIV positive individuals, and persons with certain medical conditions (i.e. diabetes, cancer) are all high risk for developing TB disease once infected with *M. tuberculosis*. Thus, the treatment of LTBI is essential to controlling and eliminating TB in the United States. Treatment of LTBI substantially reduces the risk that TB infection will progress to TB disease. LTBI is treatable with the use of medications: isoniazid (INH) for 9 months, or rifampin (RIF) for 4 months (RIF is typically reserved for those who cannot tolerate the INH). Preventive medications for individuals with TB infection are provided at no cost to local health departments or other medical providers.

Reportable Disease in Kansas Since: 2004

Clinical Criteria

A case that meets all of the following criteria:

- A positive tuberculin skin test result (based upon risk factors)

≥ 5 mm is classified as positive in

- HIV positive persons
- Recent contacts of a TB case
- Persons with fibrotic changes on chest radiography consistent with old, healed TB
- Patients with organ transplants and other immunosuppressed patients

≥ 10 mm is classified as positive in

- Recent arrivals from high-prevalence countries
- Injection drug users
- Residents and employees of high-risk congregate settings
- Mycobacteriology laboratory personnel
- Persons with clinical conditions that place them at high risk
- Children <4 years of age, or children and adolescents exposed to adults in high-risk categories

≥ 15 mm is classified positive in

- Persons with no known risk factors for TB:
  - No signs and symptoms of active disease (i.e., productive cough, fever, night sweats)
  - Normal chest x-ray or an x-ray that is read as Negative for active TB disease
  - A completed diagnostic evaluation

Laboratory Criteria for Surveillance Purposes

- QuantiFERON® Gold is a blood test for detection of immune responses to latent tuberculosis TB infection. This test is new, and is not readily available for all Kansans to use due to the low percentage of labs certified in testing.

Surveillance Case Definitions

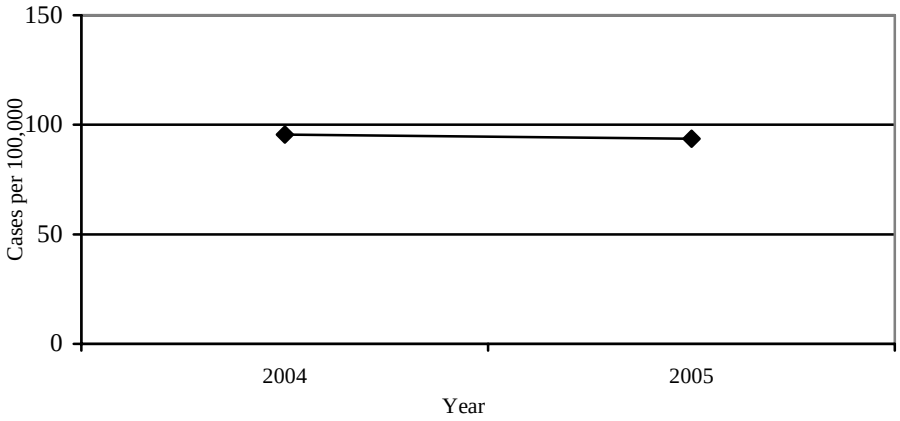
- *Confirmed:* A case that meets the clinical case definition ***OR*** is laboratory confirmed.

Epidemiology and Trends

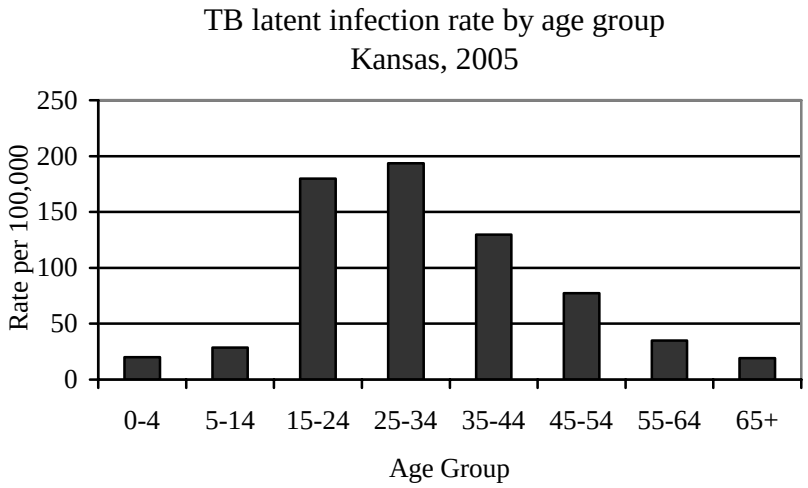
2005 Kansas Count: **2561**

	Rate per 100,000	*95% CI*
Kansas Rate	93.6	(90.0 - 97.2)
U.S. Rate (2004)	*NA*	*NA*
Gender		
Male	105.1	(99.6 - 110.5)
Female	81.9	(77.1 - 86.7)
Race		
White	56.9	(53.9 - 59.9)
Black	231.9	(209.2 - 254.5)
Asian/Pacific Islander	745.6	(677.9 - 813.4)
Native American	58.5	(31.5 - 85.5)
Ethnicity		
Hispanic	419.0	(392.0 - 446.0)
Non-Hispanic	58.2	(55.2 - 61.2)
Geographic area		
Urban County	83.3	(78.5 - 88.1)
Non-Urban County	104.3	(98.9 - 109.8)

Latent TB infection incidence rate by year, Kansas*, 2004-2005

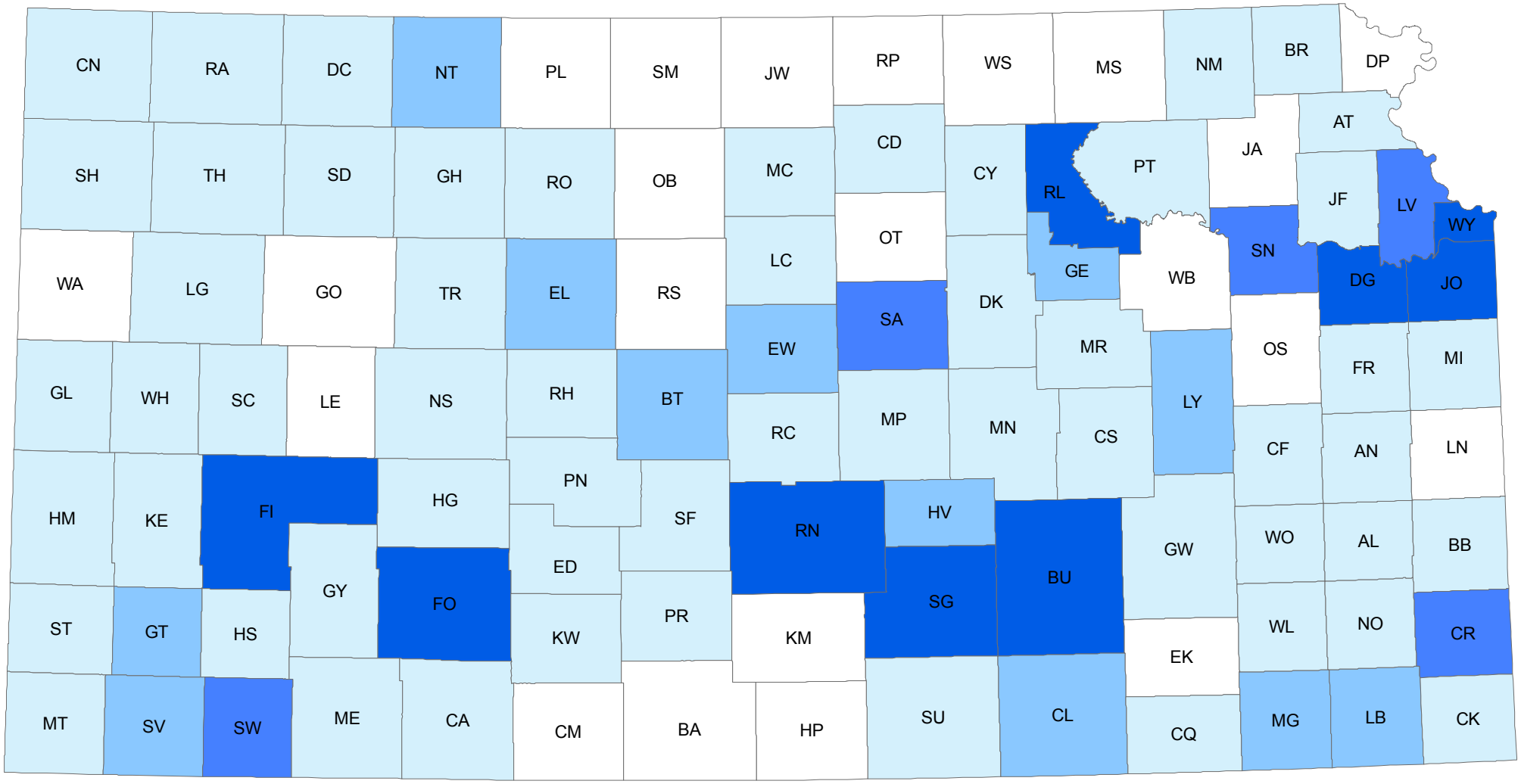


**A comparable U.S. rate is not available.*



In 2005, 2,561 latent tuberculosis infections were reported in Kansas. Latent tuberculosis infections were first listed on the Kansas reportable disease list in 2004, when 2,611 cases were recorded. Infections are not tracked nationally—no comparable U.S. rate is available.

Latent Tuberculosis Infection Cases by County, 2005



Cases 0 | 1 - 10 | 11 - 50 | 51 - 100 | 101 - 541

TULAREMIA

Clinical Features: Most cases characterized by acute onset of fever, chills, myalgia, and headache appearing with various clinical syndromes dependent on the route of infection. Syndromes include an ulcer at the site of inoculation with regional lymphadenopathy (ulceroglandular); regional lymphadenopathy with no ulcer (glandular); conjunctivitis with preauricular lymphadenopathy (oculoglandular); stomatitis or pharyngitis or tonsillitis with cervical lymphadenopathy (oropharyngeal); intestinal pain, vomiting and diarrhea (intestinal); febrile illness without localizing signs and symptoms (typhoidal); and primary pleuropulmonary disease (pneumonic). Cases with pneumonia can develop chest pain, difficulty breathing, bloody sputum, and respiratory failure.

Causative Agent: *Francisella tularensis,* a gram-negative bacterium.

Mode of Transmission: Found in numerous wild animals, especially rabbits, hares, voles, muskrats, beavers, some domestic animals, and various hard ticks, the organism is transmitted through the bite of arthropods; by inoculation of skin, conjunctiva or oropharyngeal mucosa with contaminated water, blood or tissue from infected animal carcasses; by handling or ingesting insufficiently cooked meat of infected animals; by drinking contaminated water; by inhalation of contaminated dust or aerosols; rarely, from bites of carnivores whose mouth presumably was contaminated from eating an infected animal; and from contaminated pelts and paws of animals.

Incubation Period: The incubation period ranges from 1-14 days (usually 3-5 days).

Period of Communicability: Not transmitted person-to-person. Draining lesions are potentially infectious.

Public Health Significance: In the U.S., risk of exposure is greater for those who spend a great deal of time outdoors; incidence is higher during hunting seasons and when ticks and deer flies are abundant. Illness may be prevented through education on the following risk factors: exposure to arthropod bites, exposure to potentially contaminated water, handling sick or dead wildlife, handling wild game carcasses, and ingestion of undercooked wild game. Tularemia is a potential bioterrorism agent, particularly if distributed as an aerosol.

Reportable Disease in Kansas Since: 1990

Laboratory Criteria for Surveillance Purposes

- Confirmed infection:
  - Isolation of *F. tularensis* from a clinical specimen, ***OR***
  - Fourfold or greater change in serum antibody titer to *F. tularensis* antigen.

- Presumptive infection:
  - Elevated serum antibody titer(s) to *F. tularensis* antigen (without documented fourfold or greater change) in a patient with no history of tularemia vaccination, ***OR***
  - Detection of *F. tularensis* in a clinical specimen by fluorescent assay.

Surveillance Case Definitions

- *Confirmed:* A clinically compatible illness that is laboratory confirmed.

Epidemiology and Trends

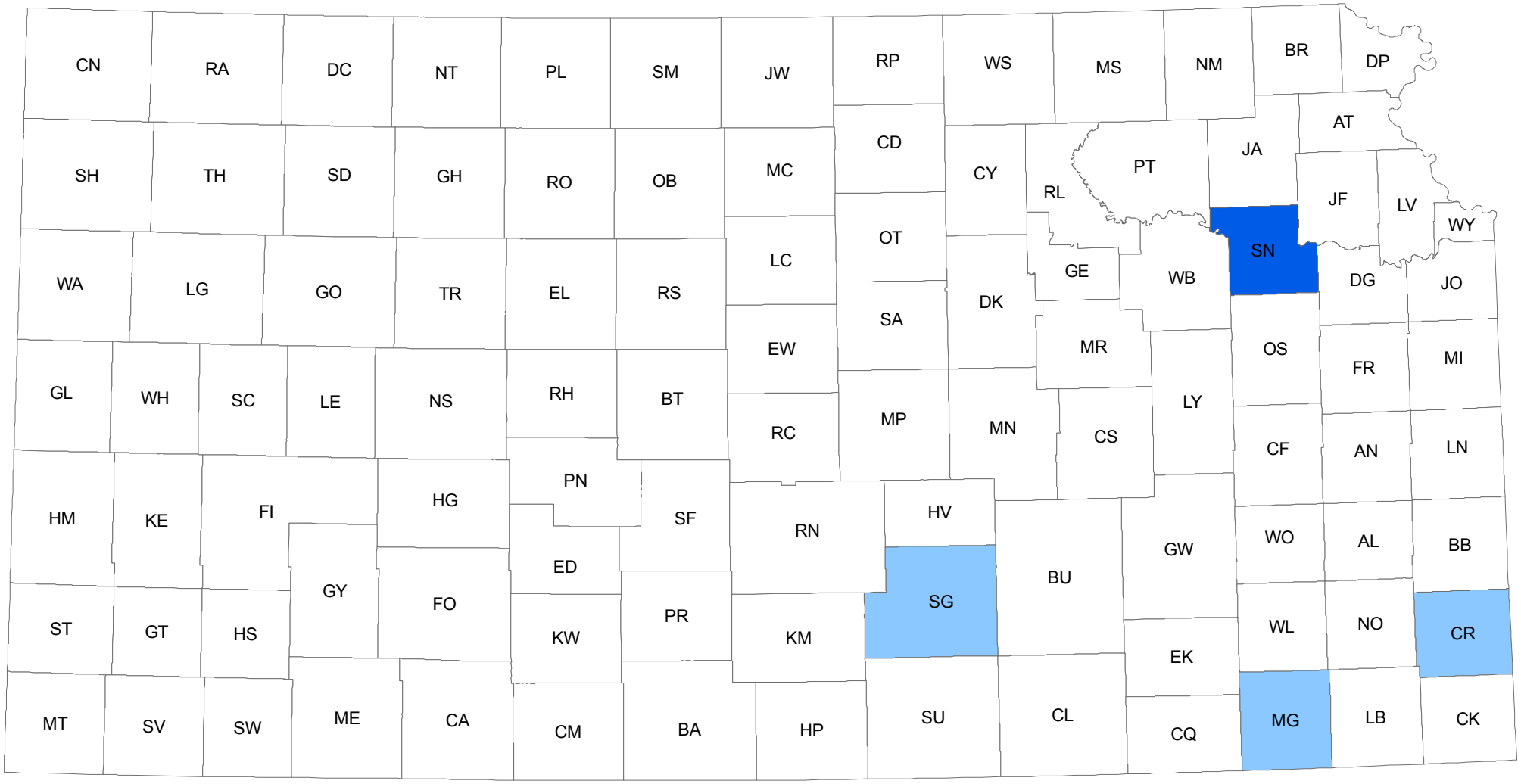
2005 Kansas Count: 5

	Rate per 100,000	*95% CI*
Kansas Rate	0.2	(0.0 - 0.3)
U.S. Rate (2004)	≤0.1	*NA*

Five confirmed cases of tularemia were reported in Kansas during 2005. The three-year median for 2002-2004 was three cases; zero to 12 cases have been confirmed annually since 1993.

Illness information was available for three of the cases—two reported ulceroglandular tularemia, and one reported glandular tularemia. Three of the five cases reported a tularemia risk factor. Two cases reported contact with rabbits, while one case reported a tick bite.

Tularemia Cases by County, 2005



Cases 0 1 2

TYPHIOD FEVER

Clinical Features: Insidious onset of sustained fever, marked headache, malaise, anorexia, relative bradycardia, splenomegaly, constipation or diarrhea, rose spots on the trunk and nonproductive cough. Severity of symptoms can range from mild illness to invasive disease and complications, including death. Many mild and atypical infections occur, especially in endemic areas. Carriage of *S.* Typhi may be prolonged.

Causative Agent: *S.* Typhi bacterium (*S. enterica* subsp. e*nterica* serovar Typhi, formerly known as *S. typhi*).

Mode of Transmission: Humans are the only reservoir; therefore, ingestion of food (shellfish, fruit, vegetables) and water contaminated by feces and urine of *S.*Typhi cases and asymptomatic carriers are the main sources of infection. Flies also promote spread of disease.

Incubation Period: From 3 days to over 60 days, usual range 8-14 days.

Period of Communicability: Dependent upon the presence of organisms in excreta, communicability is usually from the first week throughout convalescence. Among 10% of untreated patients, this can be up to 3 months. Between 2% and 5% become permanent carriers.

Public Health Significance: Despite the availability of a vaccine and treatment, about 12.5 million persons in developing countries experience typhoid fever annually. A case-fatality rate of 15-20% is also observed among cases who do not receive prompt treatment. Typhoid fever infection can be prevented through access to safe water, proper sanitation, avoiding consumption of risky foods and liquids, and becoming immunized.

Reportable Disease in Kansas Since: 1982

Clinical Criteria

- Insidious onset of sustained fever, headache, malaise, anorexia, relative bradycardia, constipation or diarrhea, and nonproductive cough.

Laboratory Criteria for Surveillance Purposes

- Isolation of *S. typhi* from blood, stool, or other clinical specimen.

Surveillance Case Definitions

- *Confirmed:* A clinically compatible case that is laboratory confirmed

- *Probable:* A clinically compatible case that is epidemiologically linked to a confirmed case in an outbreak

  NOTE: Isolation of the organism is required for confirmation. Serologic evidence alone is not sufficient for diagnosis. Asymptomatic carriage should not be reported as typhoid fever.

Epidemiology and Trends

2005 Kansas Count: 1

	Rate per 100,000	*95% CI*
Kansas Rate	<0.1	(0.0 – 0.1)
U.S. Rate (2004)	0.1	*NA*

Approximately 400 cases of typhoid fever are reported in the United States annually[1]. Of these cases, more than two-thirds are acquired while traveling internationally to endemic areas of Asia, Africa, the Indian subcontinent, and Latin America. Two typhoid vaccines are currently licensed for use in the U.S. Protection is limited, with demonstrated efficacy of these vaccines ranging from 50% to 80%[2].

The one confirmed case of typhoid fever reported in Kansas during 2005 traveled to Ecuador prior to disease onset.

Since 1994, zero to two cases have been reported annually, for a total of 10 cases.

[1] Centers for Disease Control and Prevention. Typhoid Fever. http://www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

[2] American Academy of Pediatrics. Salmonella Infections. In: Pickering LK, Ed. *Red Book: 2003 Report of the Committee on Infectious Diseases.* 26th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2003: 541.

VARICELLA (CHICKENPOX)

Clinical Features: The disease is characterized by a generalized, pruritic rash that progresses from macules to papules to vesicular lesions before crusting. Healthy, unvaccinated children normally have 200-500 lesions in 2 to 4 successive crops — the lesions are more highly concentrated on the trunk than the extremities. Rash is usually the first sign of disease in children, followed by malaise, fever, and itching. Adults may experience fever and malaise in the 1 - 2 days prior to rash onset; the clinical course in adults is often more severe than what is seen in children. Adults also have a higher risk of complications, including secondary bacterial infections, pneumonia, dehydration, aseptic meningitis, and encephalitis.

Causative Agent: varicella zoster virus (VZV)

Mode of Transmission: The virus is highly transmissible from person to person. Direct contact with a case, or contact with a case's vesicle fluid or respiratory secretions (via airborne or droplet spread) may cause infection. Indirect transmission may occur if a case's vesicle fluid or respiratory secretions have soiled clothing, linens, etc.

Incubation Period: The incubation period may range from 10 to 21 days; the average incubation period is 14 - 16 days from exposure.

Period of Communicability: Cases are usually infective from 1 - 2 days before the onset of rash until all lesions are crusted. Cases with altered immunity may be infectious for a longer period of time.

Public Health Significance: A vaccine to protect against VZV is available; vaccination is required for school entry in Kansas. Disease has been reported in vaccinated children, although these "breakout" illnesses have been mild — vaccinated children that contract varicella normally report fewer lesions (less than 50), no fever, and a shorter duration of illness compared to non-vaccinated individuals. School and daycare restrictions apply to infected enrollees. The vaccine is also effective as postexposure prophylaxis in susceptible persons.

Reportable Disease in Kansas Since: 2003

Clinical Criteria

- An illness with acute onset of diffuse (generalized) maculo-papulovesicular rash without other apparent cause.

Laboratory Criteria for Surveillance Purposes

- Isolation of varicella virus from a clinical specimen, ***OR***
- Direct fluorescent antibody (DFA), ***OR***
- Polymerase chain reaction (PCR), ***OR***
- Significant rise in serum varicella immunoglobulin G (IgG) antibody level by any standard serologic assay

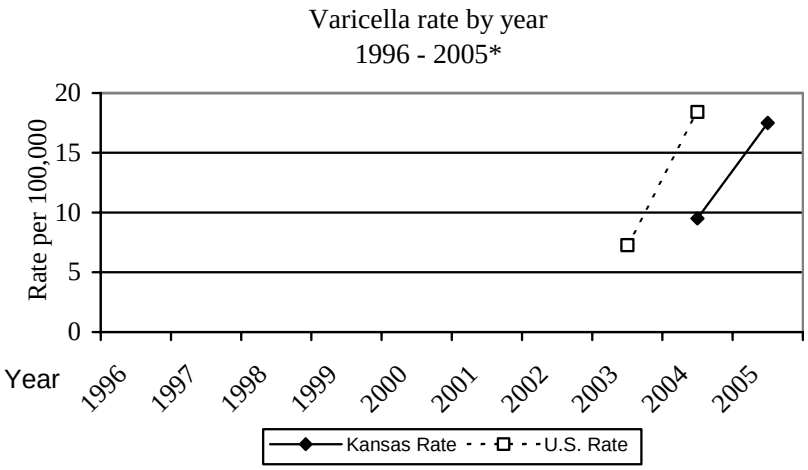
Surveillance Case Definitions

- *Confirmed:*
    - A case that is laboratory confirmed, ***OR***
    - A case that meets the clinical case definition and is epidemiologically linked to a confirmed or probable case (Two probable cases that are epidemiologically linked would be considered confirmed, even in the absence of laboratory confirmation.)
- *Probable:* A case that meets the clinical case definition, is not laboratory confirmed, and is not epidemiologically linked to another probable or confirmed case

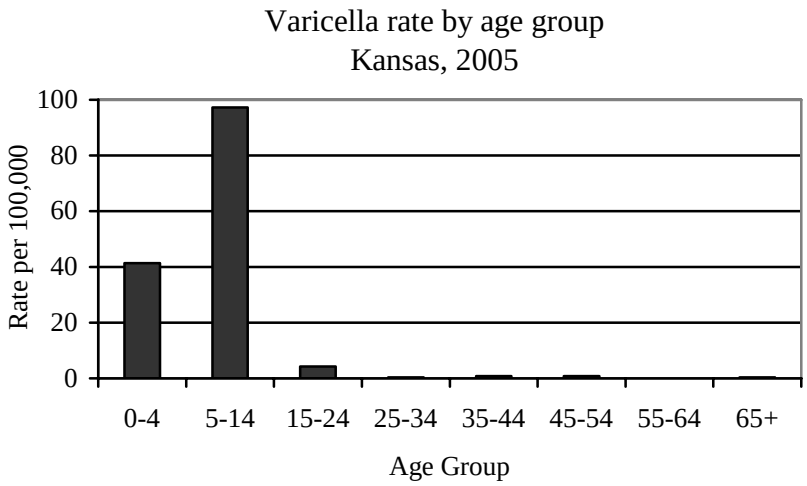
Epidemiology and Trends

2005 Kansas Count: 478

	Rate per 100,000	*95% CI*
Kansas Rate	17.5	(15.9 - 19.0)
U.S. Rate (2004)	18.4	*NA*
Gender		
Male	18.0	(15.8 - 20.3)
Female	16.4	(14.3 - 18.6)
Race		
White	15.7	(14.1 - 17.2)
Black	11.5	(6.5 - 16.6)
Asian/Pacific Islander	14.4	(5.0 - 23.9)
Native American	9.8	(0 - 20.8)
Ethnicity		
Hispanic	13.6	(8.7 - 18.5)
Non-Hispanic	13.2	(11.8 - 14.7)
Geographic area		
Urban County	15.8	(13.7 - 17.9)
Non-Urban County	19.2	(16.8 - 21.5)



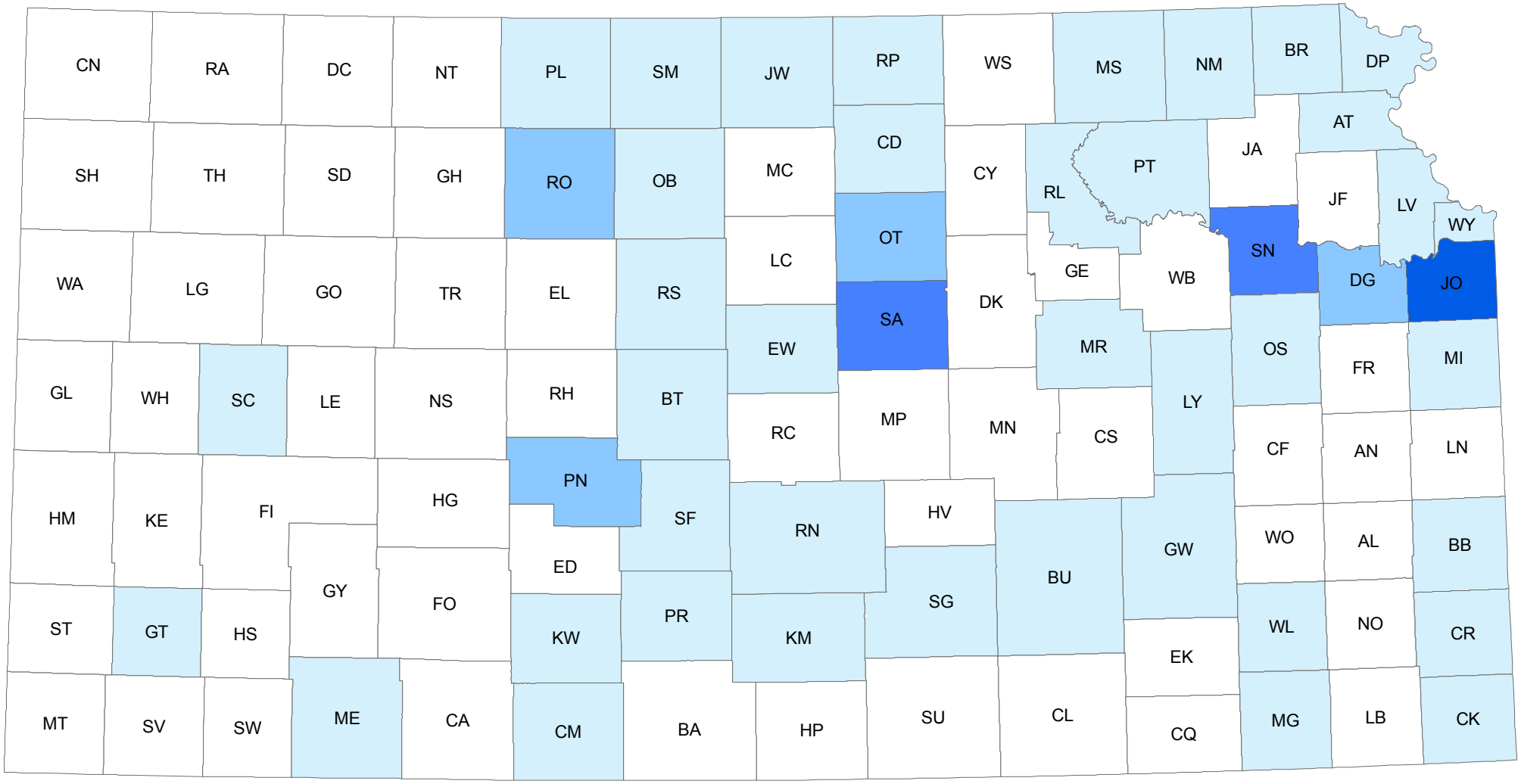
**Varicella was not nationally reportable before 2003 and not reportable in Kansas before 2004.*



In 2005, 478 confirmed cases of chickenpox were reported in Kansas, an increase of 219 cases from the previous year. The increase is attributed to more complete reporting by health care providers, laboratories, and schools during 2005. Varicella has been a reportable disease since 2004 in Kansas—previously, only deaths resulting from varicella were reportable.

Although a vaccine is now licensed to prevent varicella, the incidence remains high. The vast number of case reports during 2005 precluded exhaustive investigation of every possible case; as a result, many cases may not have been reported as “confirmed”. For example, a case may be counted as "confirmed" if it is linked to another infected person, but this link may not be revealed without intensive follow-up. Unlinked, non-laboratory confirmed cases are counted as “probable” cases—577 probable cases were reported during 2005.

Varicella Cases by County, 2005



Cases 0 | 1 - 10 | 11 - 30 | 31 - 100 | 101 - 123

WEST NILE VIRUS ENCEPHALITIS/MENINGITIS

Clinical Features: West Nile Virus (WNV) (and other arboviral) infections may be asymptomatic or may result in illness of variable severity, sometimes associated with central nervous system (CNS) involvement. When the CNS is affected, clinical syndromes ranging from febrile headache to aseptic meningitis to encephalitis may occur. WNV presents clinical features similar to other causative agents of meningitis and encephalitis. Meningitis is characterized by fever, headache, stiff neck, and pleocytosis. Encephalitis is characterized by fever, headache, and altered mental status ranging from confusion to coma with or without additional signs of brain dysfunction (e.g., paresis or paralysis, cranial nerve palsies, sensory deficits, abnormal reflexes, generalized convulsions, and abnormal movements).

Causative Agent: West Nile Virus, a flavivirus.

Mode of Transmission: WNV is transmitted by the bite of an infected mosquito; several species of mosquitoes are known to transmit WNV. West Nile Virus encephalitis/meningitis is an arboviral (arthropod-borne virus) disease. The natural transmission of WNV involves birds and mosquitoes. Mosquitoes transmit the virus obtained by feeding on infected birds. Several species of North American birds, including crow, blue jays, magpies and birds of prey appear to be especially likely to die if they contract the disease. Humans and horses do not circulate enough virus to re-infect a blood-feeding mosquito, and thus are referred to as "dead-end" or "accidental" hosts. Human-to-human transmission of West Nile Virus is exceptionally rare, but has occurred among blood and organ recipients.

Incubation Period: Ranges from 3 to 15 days (usually 6 days)

Period of Communicability: The virus is identified in geographic areas through testing of mosquito breeding pools and testing of dead birds from the previously identified species. When WNV has been found in either pools or birds it is an indicator of the presence of the virus in the geographic location. This usually occurs seasonally with the emergence of species of mosquitoes that have the capability of transmitting WNV.

Public Health Significance: Surveillance is important in understanding the impact of emerging infections. Emerging infections, as defined by the World Health Organization, include existing diseases spreading to new geographic areas or populations. As the name indicates, WNV's presence on the African continent had been known. It was first discovered in North America in 1999 - since that time, public health surveillance activities have tracked its movement across the country. Being a vector-borne disease, prevention is primarily accomplished through adopting personal behaviors to prevent being bitten by mosquitoes and reducing the sources and sites where mosquitoes breed. There is no human vaccine or PEP available.

Reportable Disease in Kansas Since: 2002

Laboratory Criteria for Surveillance Purposes

- Fourfold or greater change in virus-specific serum antibody titer, ***OR***
- Isolation of virus from or demonstration of specific viral antigen or genomic sequences in tissue, blood, cerebral spinal fluid (CSF), or other body fluid, ***OR***
- Virus specific immunoglobulin M (IgM) antibodies demonstrated in CSF by antibody-capture enzyme immunoassay (EIA), ***OR***
- Virus-specific IgM antibodies demonstrated in serum by antibody-capture EIA and confirmed by demonstration of virus-specific serum immunoglobulin G (IgG) antibodies in the same or a later specimen by another serologic assay (e.g., neutralization or hemagglutination inhibition).

Surveillance Case Definitions

- *Confirmed:* an encephalitis or meningitis case that is laboratory confirmed.
- *Probable:* an encephalitis or meningitis case occurring during a period when arboviral transmission is likely and with the following supportive serology:

    1) a single or stable (less than or equal to twofold change) but elevated titer of virus-specific serum antibodies; ***OR***

    2) serum IgM antibodies detected by antibody-capture EIA but with no available results of a confirmatory test for virus-specific serum IgG antibodies in the same or later specimen.

Comments

- KDHEL provided confirmatory testing for WNV specimens
- Tests that were inconclusive by state testing were sent to CDC.
- Because closely related arboviruses exhibit serologic cross-reactivity, positive results of serologic tests using antigens from a single arbovirus can be misleading.

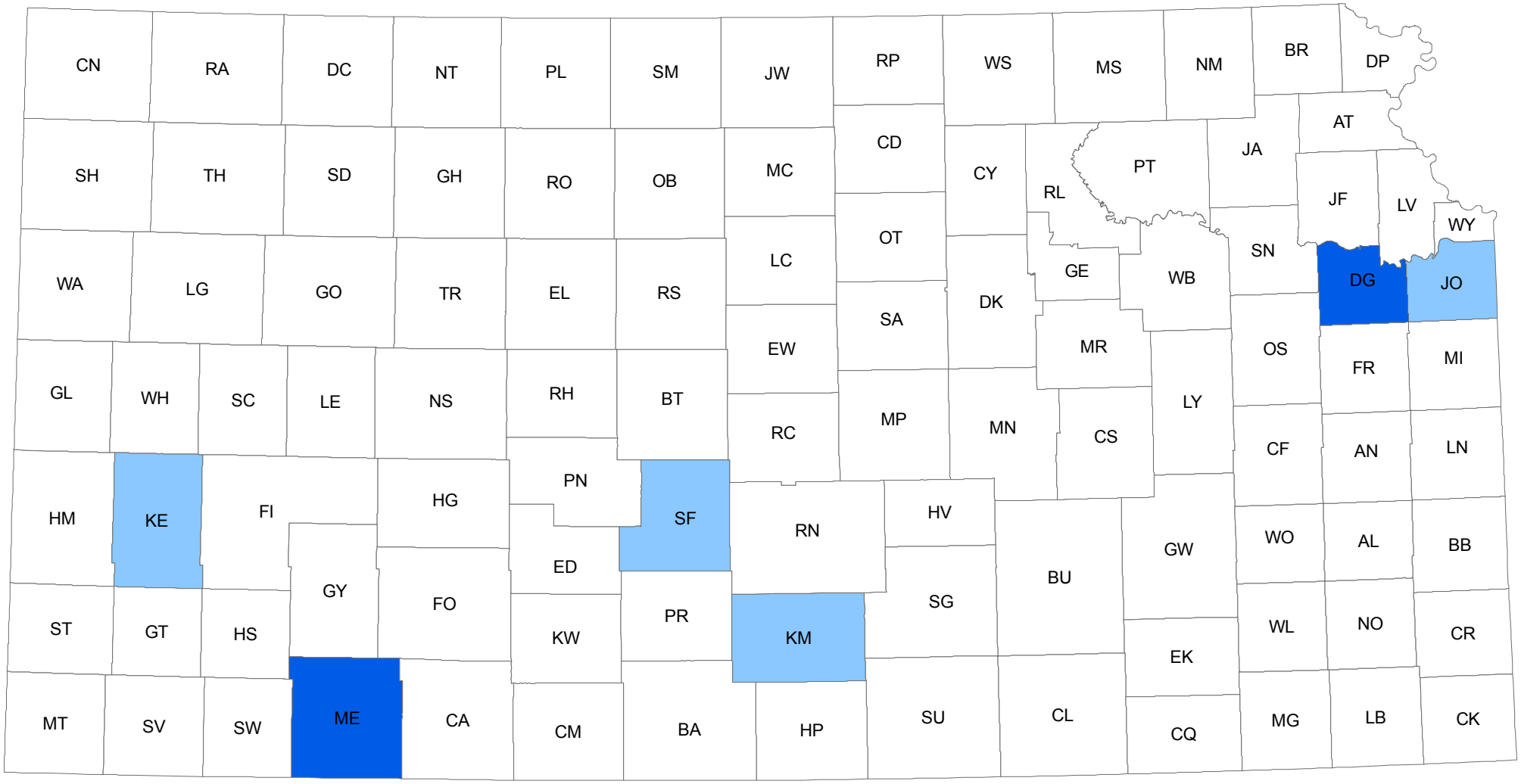
Epidemiology and Trends

2005 Kansas Count: 9

	Rate per 100,000	*95% CI*
Kansas Rate	0.3	(0.1 – 0.5)
U.S. Rate (2004)	0.4	*NA*

In 2005, nine cases of WNV meningitis/encephalitis in humans were reported in Kansas. The three-year median for 2002-2004 was 22 cases. Incidence declined sharply after 2003; this is likely due to acquired immunity through exposure to the virus. Historically, neuroinvasive WNV cases have been reported most frequently among persons aged 50 years and older. In 2005, cases ranged from 21 to 82 years of age. The median age was 44 years.

West Nile Encephalitis/Meningitis Cases by County, 2005



Cases 0 1 2 - 3

SECTION TWO - SPECIAL REPORTS

Kansas Influenza Surveillance, 2005-2006

Influenza Morbidity Reports from Kansas Sentinel Sites

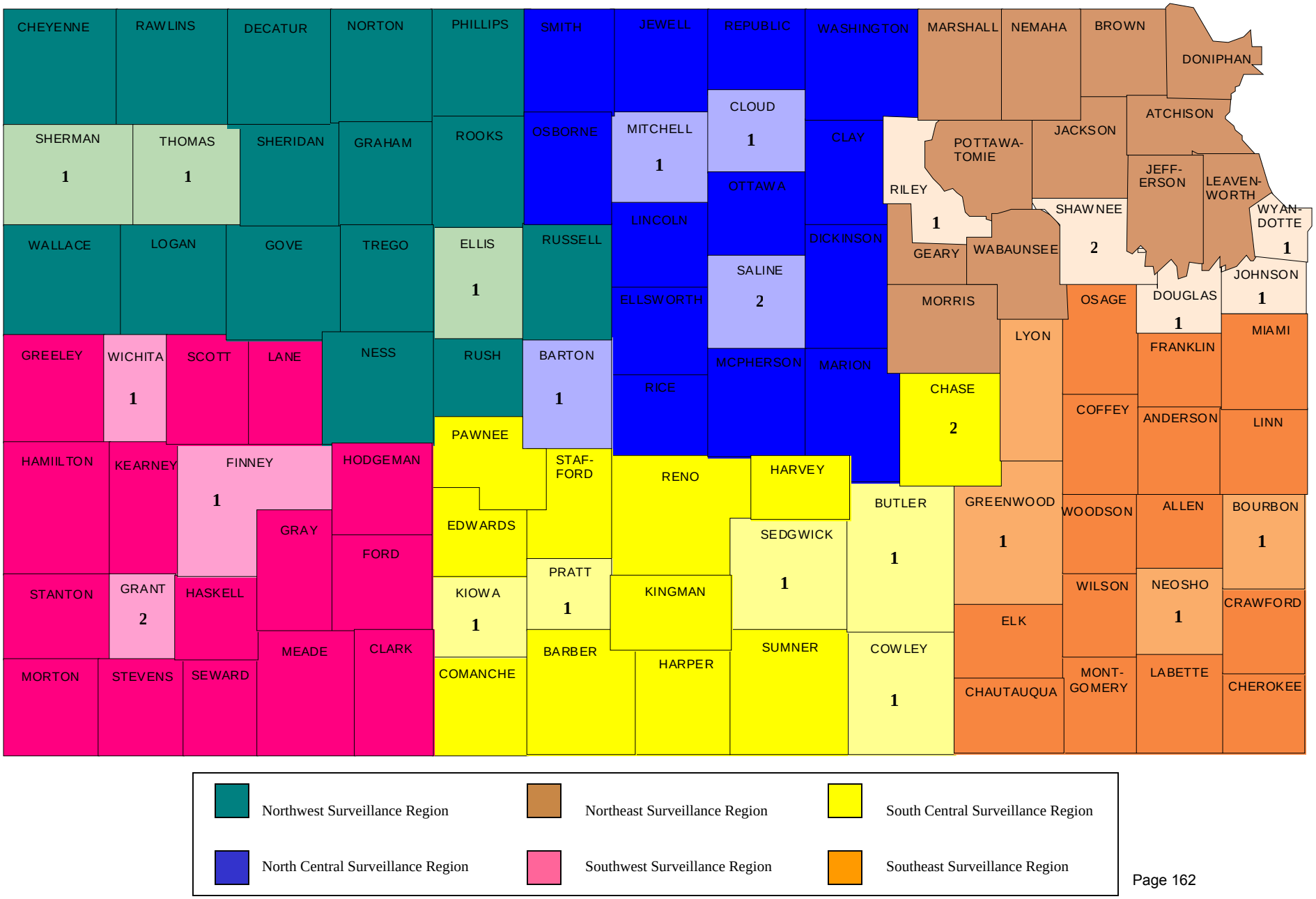
The Kansas Department of Health and Environment (KDHE) conducts sentinel influenza surveillance in collaboration with the Centers for Disease Control and Prevention (CDC), the Kansas Division of Health and Environmental Laboratories (KDHEL), and health care providers throughout the state of Kansas. The purpose of the surveillance is to:

- Track influenza-like illness (ILI),
- Recognize trends in influenza transmission,
- Determine the type of influenza circulating, and
- Detect seasonal changes in influenza viruses.

During the 2005-2006 influenza season, influenza surveillance was conducted in cooperation with 27 health care providers throughout the state: fifteen family practice clinics, six hospital emergency departments, five university student health centers, three long term care facilities, and two pediatric clinics (Figure 1). Each week, sentinel site personnel determined the total number of patients seen with ILI during the previous week by age group — preschool (0-4 years), school age through college (5-24 years), adults (25-64 years), and older adults (>64 years). Influenza-like illness is defined by the CDC as fever (≥100°F or ≥37.8°C, measured either at the sentinel site or at the patient's home) with cough and/or sore throat, in the absence of a known cause other than influenza. In addition, the total number of patients seen during the previous week for any illness was recorded. The Influenza Sentinel Provider Reporting System, which allows reporting by fax and the Internet, was used to transfer weekly data to CDC. Sites had the option of reporting directly to CDC or to KDHE.

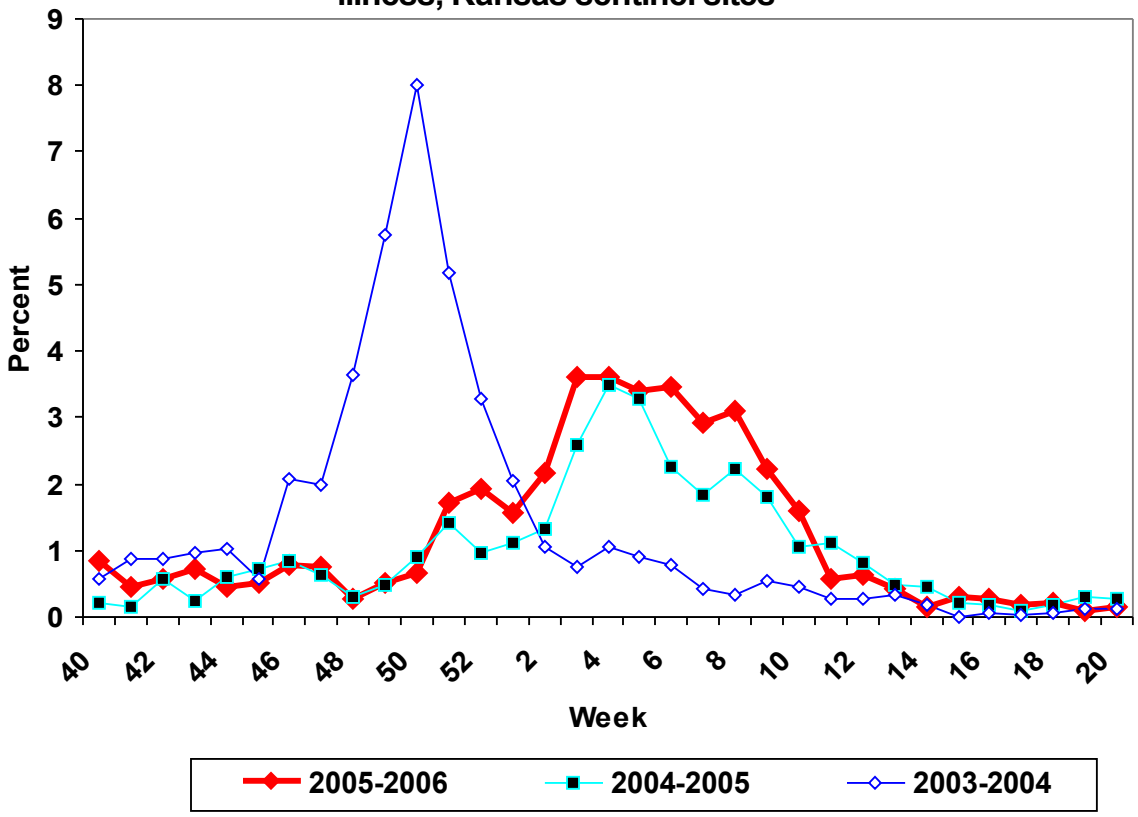
Figure 1 - Kansas Influenza Sentinel Surveillance Network, 2005–2006 Season

Counties with Sentinel Surveillance sites are represented by a lighter color in each region (number represents # of sites)



During the influenza surveillance period, starting October 3, 2005 (week 40) and ending May 19, 2006 (week 20), sentinel sites observed a total of 159,810 patients — 2,141 (1.3%) sought care for ILI. The season began with 4,556 total patient visits — 39 patients (0.9%) presented with ILI during the week ending 10/8/2005 (week 40) (Figure 2). Influenza-like illness visits gradually increased over time, and peaked during weeks three (ending January 21, 2006) and four (ending January 28, 2006), a few weeks earlier than the national peak, seen at week 52. Sentinel sites recorded 5,162 patient visits during week three; 187 (3.6%) presented with ILI. The same percentage was reported the following week, week four. Sentinel sites recorded 5,815 patient visits, with 211 patients presenting with ILI.

Figure 2: Percent of patients seeking care for influenza-like illness, Kansas sentinel sites*

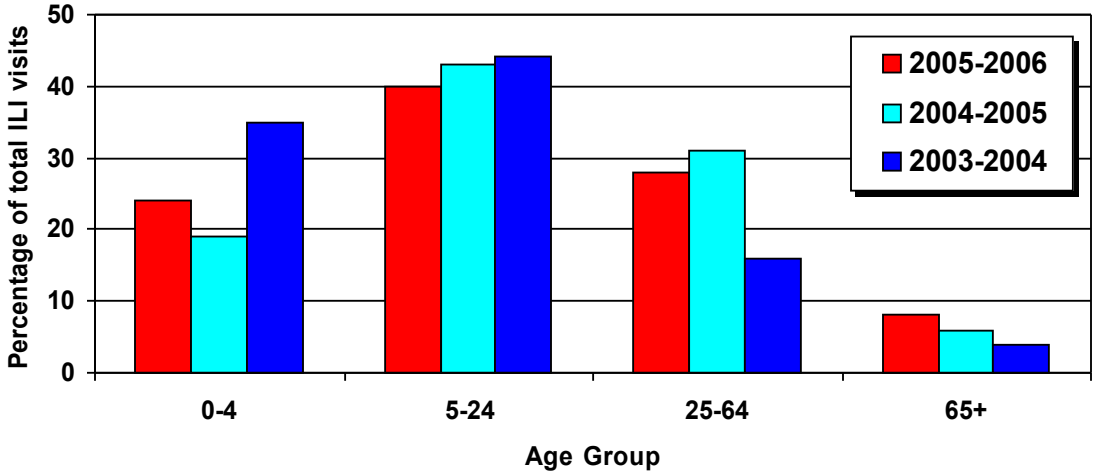


**Sentinel sites may vary in number and type (student health, family practice, etc.) each season.*

The number of ILI visits to sentinel sites during 2005-2006 followed the previous year's pattern closely. Influenza-like Illness activity began to rise in late December, and decreased markedly in the end of February, as during 2004-2005. Activity peaked one week earlier than the previous year, and persisted at higher levels before declining. At the week ending March 18, 2006 (week 11), the percentage of patient ILI visits decreased to less than 1%; ILI remained very low for the remainder of the season.

ILI was reported in every age group; the majority of cases (40%) were seen in the 5-24 year age group (Figure 3).

Figure 3: Percentage of ILI visits to Kansas sentinel sites* by age group



**Sentinel sites may vary in number and type (student health, family practice, etc.) each season.*

More sentinel sites participated in influenza reporting during 2005-2006 than any previous year in Kansas. As a result, Kansas recorded 2,141 ILI visits, more than any previous year. The number of ILI visits was significantly greater ($p<.0001$) than the 1,608 ILI visits seen during the previous season. The percentage of Kansas sentinel site patients seen for ILI remained low (1.3%), due to the corresponding increase in the number of total patient visits. The percentage was slightly higher than what was reported during the 2004-2005 season (1.0%).

Laboratory Surveillance

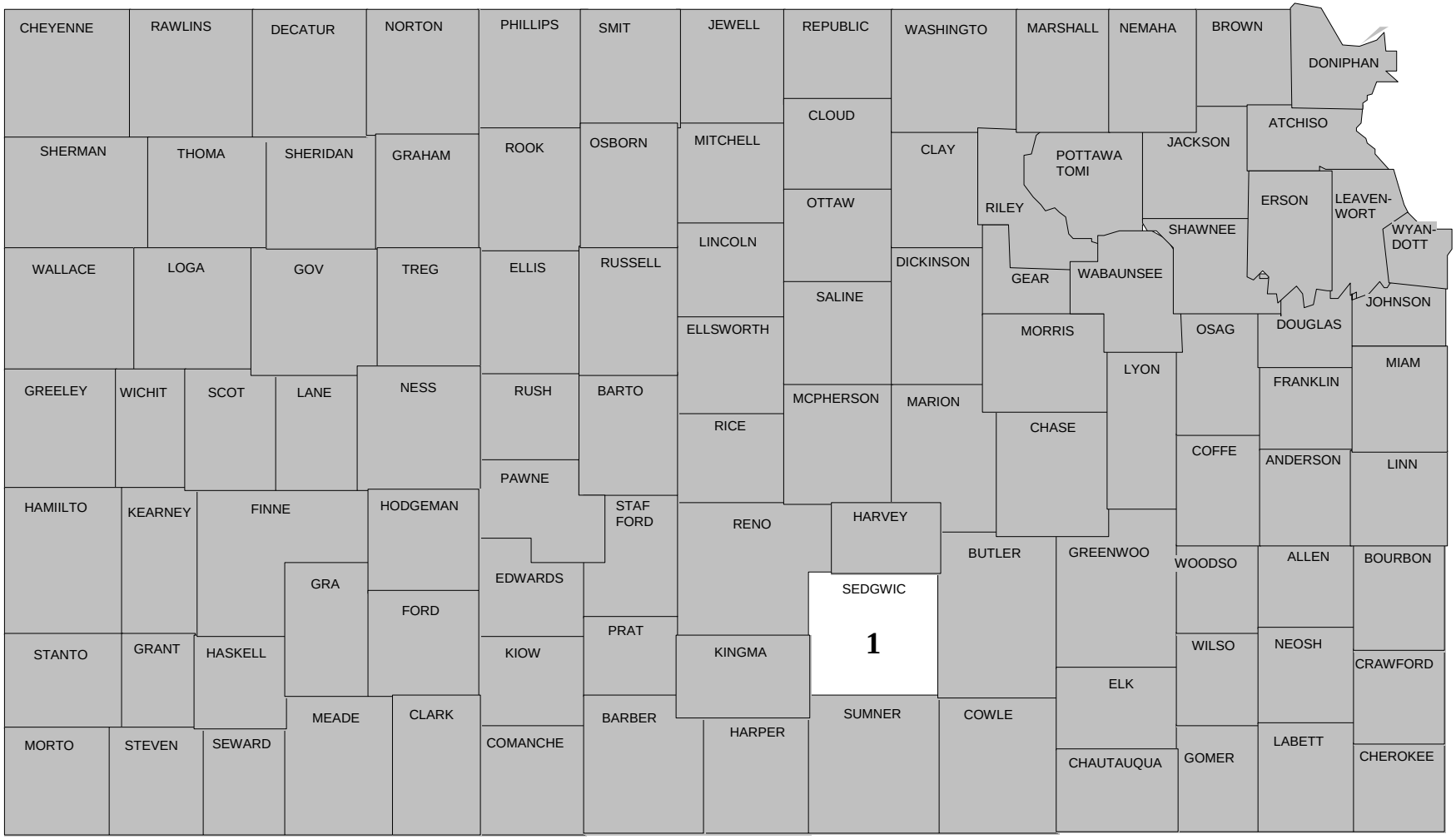
KDHEL provided confirmatory testing for sentinel site patients with ILI, as well as for patients of other health care providers in the state. Viral isolation and Polymerase Chain Reaction (PCR) tests were used to analyze pharyngeal swabs for presence of influenza virus; positive specimens were typed and sub-typed. Laboratory data was sent weekly to CDC by the KDHEL to compare to regional and national activity. In addition, KDHEL forwarded some viral specimens to CDC for antigenic characterization.

A total of 91 pharyngeal swabs were tested at KDHEL during the 2005-2006 season — 53 (58%) were positive (Figure 4, Figure 5), including 33 positive specimens from sentinel sites. The first positive specimen was collected on December 9, 2005, and the final positive specimen was collected on May 7, 2006. Nearly all positive specimens (n=52, 98%) were influenza A viruses; only one (2%) was an influenza B virus. All but one of the influenza A viruses were able to by typed by PCR — 51 were found to be influenza A subtype H3. Nine A/H3 specimens were forwarded to CDC for further testing; all of these specimens were found to be influenza A subtype H3N2. The lone influenza B virus was subtype B/Shanghai.

Figure 4: KDHEL-confirmed influenza A/H3 specimens by county of collection, Kansas, 2005–2006 season (N = 51*)

**One untypeable influenza A specimen from Lyon County is not shown.*

Figure 5: KDHEL-confirmed influenza B/Shanghai specimens by county of collection, Kansas, 2005–2006 season (N = 1)

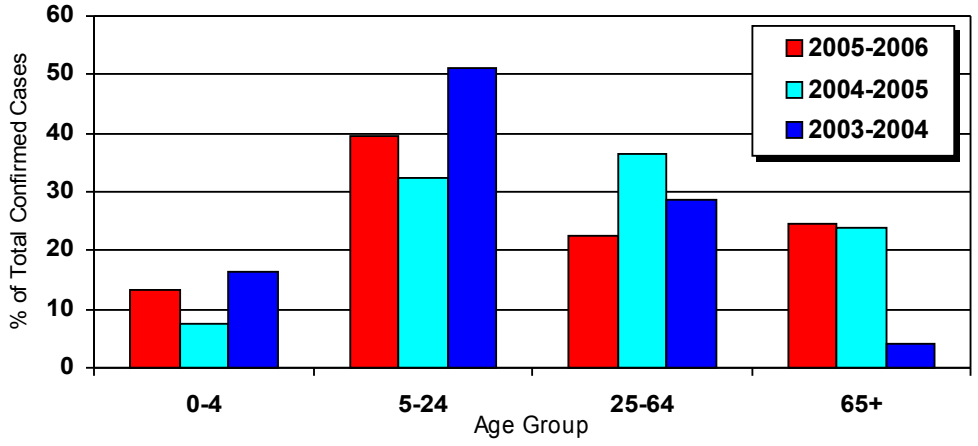


One specimen, collected January 5, 2006, and tested at the Missouri Department of Health and at the CDC, was determined to be the North American Swine Virus, A/H1N1. The case was a seven-year-old Johnson County resident. The case reported receiving flu vaccine for the 2005-2006 season, and was not hospitalized for this infection. A parent was interviewed, and denied swine flu risk factors, including travel, contact with foreign travelers, and contact with pigs or other animals.

The predominance of influenza A was seen nationally. CDC typed a total of 23,549 positive influenza specimens — 17,997 (79.7%) of the specimens were type A, compared to 3,642 (20.3%) type B viruses. Of the subtyped A viruses, 73% were found to be antigenically similar to the A(H3N2) component of the 2005-2006 influenza vaccine, A/California/7/2004-like.

Positive specimens originated from every age group. Of the 53 specimens confirmed at KDHEL, 21 (40%) originated from the 25-64 age group (Figure 6). Thirty-two (60%) of the positive specimens were from female patients.

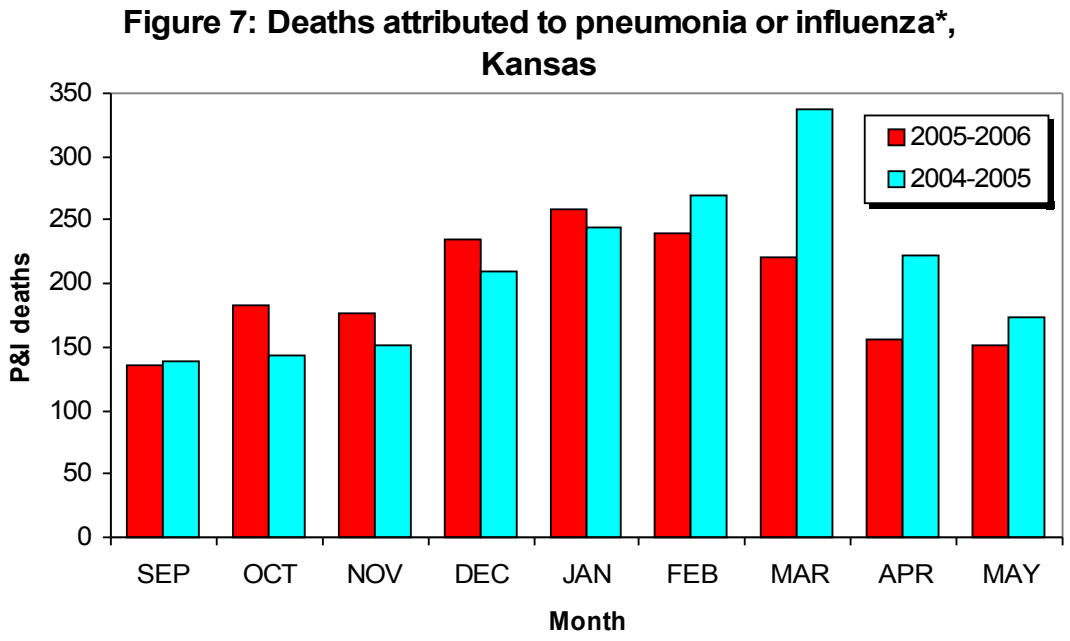
Figure 6: KDHEL-confirmed influenza specimens by by age group, Kansas



Pneumonia and Influenza (P&I) Mortality

KDHE's Center for Health and Environmental Statistics monitors trends in influenza-related mortality. Death certificate data is collected to determine the number of deaths caused by pneumonia or influenza (P&I). Mortality is divided among three categories: pneumonia or influenza recorded as a contributing factor of death, influenza recorded as the direct cause of death, and pneumonia recorded as the direct cause of death.

Pnuemonia and influenza-related deaths peaked in January, two months earlier than the previous season (Figure 7).



**Death certificate lists pneumonia or influenza as a contributing factor or direct cause of death. 2005-2006 data is provisional and subject to change.*

The total number of P&I deaths (n=1,756) was slightly lower than the previous season (n=1,889; Table 1). The number of reported deaths directly attributed to influenza (n=21) was lower than the 33 recorded in previous season. The number of reported deaths directly attributed to pneumonia and the total number of P&I deaths were comparable to the previous two seasons.

Table 1: Pneumonia and influenza mortality by causal relationship, Kansas

	2003-2004 Influenza Season		2004-2005 Influenza Season		2005-2006 Influenza Season	
	N	*Percent*	*N*	*Percent*	*N*	*Percent*
Pneumonia or Influenza - Contributing factor in death	1187	67.9	1284	68.0	1210	68.9
Influenza - Direct cause of death	48	2.7	33	1.7	21	1.2
Pneumonia - Direct cause of death	512	29.3	572	30.3	525	29.9
P&I Total	1747	100.0	1889	100.0	1756	100.0

Influenza Deaths in Children Less Than 18 Years of Age

Since 2004, CDC has requested information on influenza-associated pediatric deaths. For surveillance purposes, pediatric deaths are considered influenza-related if there was no period of complete recovery between the clinically compatible illness and death, and if the diagnosis was confirmed to be influenza by an appropriate laboratory or rapid diagnostic test.

Kansas reported two confirmed influenza-associated pediatric deaths during the 2005-2006 season. One of the cases suffered from a pre-existing medical condition.

Influenza Vaccine Coverage

CDC encourages all individuals to be immunized against influenza. Priority groups for vaccination include:

- Children aged 6-23 months
- Adults 65 years of age and older
- Persons 2-64 years of age with chronic medical conditions
- Pregnant women
- Residents of nursing homes and long term care facilities
- Children 6 months - 18 years of age on chronic aspirin therapy
- Health care workers involved with direct, hands-on patient care, especially patient care of high risk individuals
- Out-of-home caregivers and household contacts of children less than 6 months of age

Vaccine coverage levels are measured by the Kansas Behavioral Risk Factor Surveillance System (BRFSS). Self-reported vaccine coverage levels among certain priority groups and among all Kansans were lower during 2005 compared to the previous two years (Table 2). The coverage levels among other priority groups cannot be examined due to limitations of the BRFSS survey.

Table 2: Individuals reporting influenza vaccination in the past 12 months, Kansas, BRFSS survey

	2003	2004	2005
Age 50 and older	54.1	54.6	45.3
Age 65 and older	70.8	68.1	65.9
Adults with asthma	37.5	41.0	35.2
Adults with diabetes	61.3	61.9	56.8
All ages	35.4	35.7	27.3

Discussion

Disease incidence during the 2005-2006 influenza season was similar to what was reported during 2004-2005, with ILI rising in December and peaking in late January. No notable changes were found in the percent of patients seeking care for ILI or the age groups affected. It is important to note, however, that the number and type of sentinel sites reporting ILI has changed each of the past three influenza seasons. (For example, KDHE gathered data from 14 family practice clinics during 2004-2005, and received data from 15 family practice clinics during 2005-2006.) Yearly changes in the sentinel network preclude direct comparison to data collected in previous influenza seasons.

Rates of pneumonia and influenza mortality were also similar to what was reported during the previous year's influenza season. The number of deaths directly attributed to influenza was slightly lower (21 deaths) in 2005-2006 compared to the 2004-2005 (33 deaths) — this difference was not significant ($p=0.1751$). It is not known if deaths attributed to pneumonia or influenza were among individuals that were vaccinated — such data is not available.

The A/California/7/2004-like strain was most prevalent during both 2004-2005 and 2005-2006, both in Kansas and in the U.S., and may partially explain the correlation between the two seasons' surveillance data.

Influenza vaccine shortages have hampered immunization campaigns in recent years. During the 2005-2006 season, many providers reported delays in receiving their supply of vaccine, forcing some individuals to wait later than usual — October and November are typically the peak months for vaccination — to receive a flu shot. This delay may partially explain the lower coverage rates seen in the 2005 BRFSS. The BRFSS data is limited to the 2005 calendar year rather than the 2005-2006 influenza season; individuals that were counted as "unvaccinated" by BRFSS may have been vaccinated later in the season.

Acknowledgements

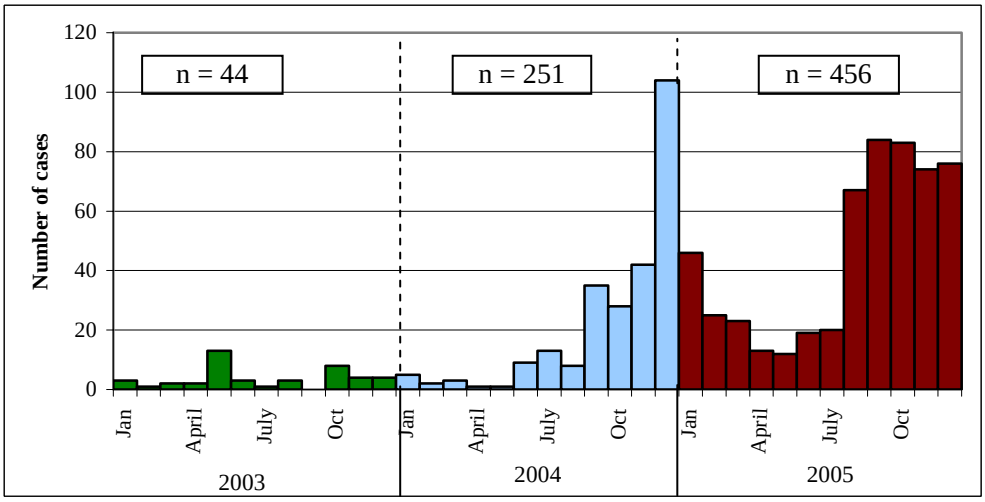
KDHE acknowledges the following sentinel sites for their important contributions during the 2005-2006 influenza season.

Arbor Creek Family Care
Ashley Clinic
Cherry Village Nursing Center
Cloud County Health Center
Colby Community College
Emporia State Student Health
Eudora Nursing Center
Family Practice Associates
Goodland Family Health Center
Greensburg Family Practice
Greenwood County Hospital
Hess Clinic
Irwin Army Community Hospital
KU Children's Center
Lafene Student Health Center
Newman Regional Health Center
Pediatric Partners
Plaza Medical Center
Pratt Regional Medical Center
Presbyterian Manor
Primary Care Clinic
Salina Family Health Care
Stormont-Vail Regional Health Center
Susan B Allen Memorial Hospital
Ulysses Family Physicians
Washburn University Student Health
Wichita County Health Center
Wichita State University Student Health
William Newton Hospital

BACKGROUND

Despite being a vaccine-preventable disease, the number of reported pertussis cases in Kansas has increased during the past several years. Pertussis is an acute respiratory infection caused by the bacterium *Bordetella pertussis*. From 2000 to 2003, the average number of confirmed and probable pertussis cases reported in Kansas was 45. An outbreak of pertussis started in the second half 2004 and resulted in 251 confirmed and probable cases. In 2005, a total of 456 confirmed and probable cases of pertussis cases were reported in Kansas (Figure 1).

Figure 1: Epidemiologic Curve of Confirmed and Probable Pertussis Cases Reported in Kansas, 2003 – 2005.



Clinical Features

The clinical course of illness is divided into three stages: 1) catarrhal, 2) paroxysmal, and 3) convalescent. [1] During the catarrhal stage, persons experience insidious onset of coryza (runny nose), sneezing, and cough. The cough gradually becomes paroxysmal one to two weeks later and can last for one to two months.[2] Adolescents and adults who are partially protected by vaccination may have a milder illness. Their infection may be asymptomatic, or present as illness ranging from a mild cold to classic pertussis with persistent cough without the inspiratory whoop.[1] The average incubation period of pertussis is 5 – 10 days with a range of 5 – 21 days. Pertussis is transmitted through contact with respiratory secretions of infected persons.

Prevention and Treatment

Routine vaccination against pertussis is recommended for all persons. Children should receive four doses of vaccine by 2 years of age. For children who receive the forth dose of DTaP (diphtheria, tetanus, pertussis) before age 4 years, a fifth dose is recommend before school entry. In the spring of 2005, a vaccine containing the pertussis component was licensed for use in adolescents and adults (Tdap).

Antibiotic treatment is recommended for persons diagnosed with pertussis regardless of vaccination status. Erythromycin, clarithromycin, and azithromycin are preferred for the treatment of pertussis in persons aged $\geq$1 month; however, special consideration must be given for infants younger than 6 months of age. Erythromycin has been the antibiotic of choice for treatment of pertussis. Newer antibiotics, clarithromycin and azithromycin, are as effective as erythromycin and have less side effects.[4] For infants aged <1 month, azithromycin is preferred; erythromycin and clarithromycin are

not recommended. For treatment of persons aged ≥2 months, an alternative agent to macrolides is trimethoprim-sulfamethoxazole (TMP--SMZ).[3] Pertussis treatment should begin within 3 weeks of cough onset unless less than 1 year of age, then treatment should begin within 6 weeks of cough onset. After that time, its use is not recommended.

Chemoprophylaxis with an appropriate antimicrobial agent is recommended for all household and other close contacts, regardless of age and immunization status.[4]

METHODS

Population and Period

All Kansas residents reported to Kansas Department of Health and Environment (KDHE) from January 1 to December 31, 2005 were included in this descriptive study. All persons suspected of having pertussis were investigated by Kansas Immunization Program staff and local health department staff. Cases were classified using the surveillance case definition listed below.[5] Both confirmed and probable cases were included in the analysis for this report.

Clinical case definition

A cough illness lasting at least 2 weeks with one of the following: paroxysms of coughing, inspiratory "whoop," or post-tussive vomiting, without other apparent cause (as reported by a health professional)

Laboratory Criteria for Diagnosis

- Isolation of *Bordetella pertussis* from clinical specimen
- Positive polymerase chain reaction (PCR) for *B. pertussis*

Case classification

- *Probable*: meets the clinical case definition, is not laboratory confirmed, and is not epidemiologically linked to a laboratory-confirmed case
- *Confirmed*: a case that is culture positive and in which an acute cough illness of any duration is present; or a case that meets the clinical case definition and is confirmed by positive PCR; or a case that meets the clinical case definition and is epidemiologically linked directly to a case confirmed by either culture or PCR

Pertussis cases were divided into five age groups (<1, 1-4, 5-9, 10-14, 15-19, and 20+ years). These age groups were selected because persons aged less than one year are not fully vaccinated against pertussis and are at increased risk for infection; children aged 1-4 years and 5-9 years are recently vaccinated children; persons aged 10-14 years and 15-19 years are for whom the new vaccine Tdap is recommended; and persons 20 years and older include individuals who take part in care-taker roles (e.g., parents, day care workers, health care workers, etc.).

Laboratory Testing

Testing was performed at both public (KDHE) and private laboratories. Sources of specimens included blood and nasopharyngeal swabs. Several diagnostic and screening tests are available for pertussis diagnosis. The Centers for Disease Control and Prevention (CDC) recommends confirmation of infection by culture, which is considered the gold standard, and polymerase chain reaction (PCR) testing. Other tests include serology and direct fluorescent antibody (DFA).

Data Analysis

Data were collected using the HAWK surveillance system and analyzed using SAS 9.1.[6]

RESULTS

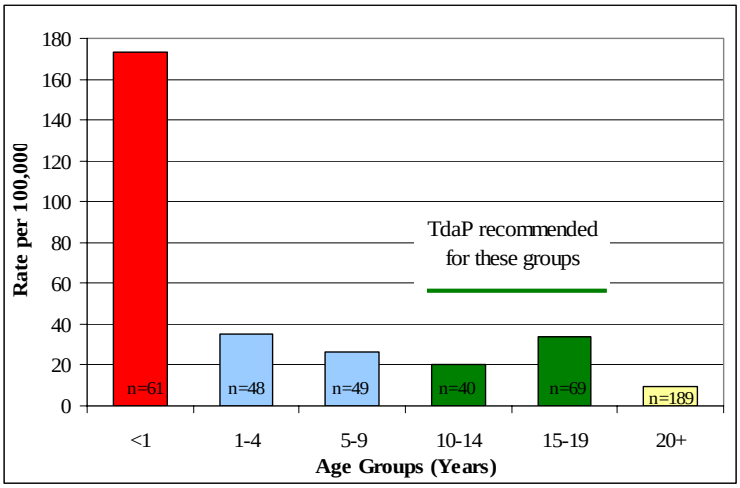
Incidence

Over 1100 persons were investigated for possible pertussis infection and 456 met the surveillance case definition for confirmed or probable; 50% (n = 229) of these met the confirmed surveillance case definition. The incidence of confirmed and probable pertussis cases in 2005 was 16.7 persons per 100,000. Compared to Asian and black / African American race groups, the incidence rate among whites was two times higher (14.5 versus 6.4 & 8.1 cases per 100,000, respectively) (Table 1). Even though non-Hispanics accounted for 70% of the cases, Hispanics had a higher incidence rate (17.7 versus 12.8 per 100,000 cases). The median age of pertussis cases was 17 years (range: 4 days, 88 years). The two oldest age groups (15-19, 20+) contributed the most cases to the outbreak. The incidence rate was highest among persons less than 1 year of age (173 cases per 100,000); all other age groups had an incidence rate of less than 35 cases per 100,000 (Figure 2).

Table 1: Incidence of Confirmed and Probable Pertussis Cases in Kansas, by Demographic Factors, 2005

	n	%	Rate / 100,000
Gender			
Female	265	58.5	19.2
Male	188	41.5	13.8
Race			
Asian	4	<1	6.4
American Indian / Alaskan Native	0	0	0
Black / African American	14	3.1	8.1
Native Hawaiian / Pacific Islander	0	0	0
White	357	78.3	14.5
Multiple Race	22	4.8	N/A
Unknown / Other	59	12.9	N/A
Ethnicity			
Hispanic / Latino	39	8.5	17.7
Not Hispanic Latino	321	70.4	12.8
Ethnicity, not otherwise specified	96	21.1	N/A

Figure 2: Incidence Rate of Confirmed and Probable Pertussis Cases by Age Group in Kansas, 2005



Clinical Information and Complications

The median number of days of cough was 21 with a range of 3 to 190 days (Table 2). Paroxysms and posttussive vomiting were the most common symptoms. Whoop, apnea, and cyanosis were more commonly identified among children less than 1 year of age than among other age groups. Complications due to pertussis infection were rare; less than one percent of the cases experienced encephalopathy or seizures. Forty persons (8.8%) were hospitalized because of pertussis infection. Twenty-three (57%) of the hospitalized cases were less than 1 year of age.

Table 2: Descriptive Epidemiology of Confirmed and Probable Pertussis Cases in Kansas, 2005

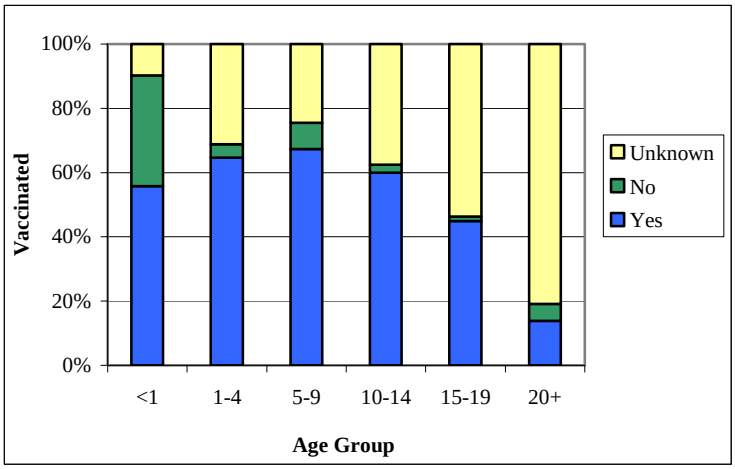
Symptom		
Cough Duration (days)		
Mean	27.5	
Median	21	
Range	3 - 190	
	n	**%**
Paroxysmal	386	84.6
Post-tussive Vomiting	290	63.6
Whoop	141	30.9
Apnea	111	24.3
Cyanosis	58	12.7
Complications		
Hosptialized	40	8.8
Pneumonia	38	8.3
Encephlopathy	1	<1
Seizures	1	<1

Vaccination History

Vaccination history was known for less than half (48.8%) of the pertussis cases. Thirty-nine percent of all cases had received at least one pertussis containing vaccine. Completeness of vaccination history varied by age group. Cases that were less than one year of age had the most

complete information on vaccination history (90.1%) while those 20 years and over had the least information (19.1%). (Figure 3).

Figure 3: Percentage of Vaccination History by Age Group of Confirmed and Probable Pertussis Cases, Kansas 2005



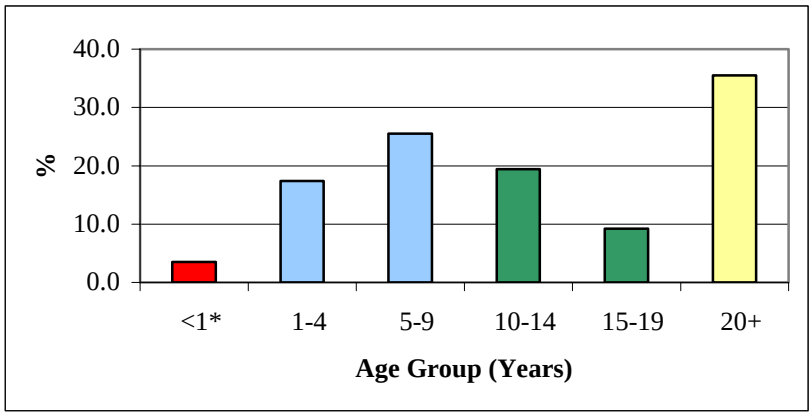
Antimicrobial Agents

Use of antimicrobial agents were recommended for treatment and reduction of spread in pertussis cases and 97% (442) of cases were prescribed an antibiotic for treatment of pertussis in 2005. The most frequent antibiotic prescribed was Clarithromycin / Azithromycin (Table 3). Although many factors affect the length of communicability[4], infected persons are most infectious during the catarrhal stage and the first two weeks after onset of cough; communicability is negligible after three weeks.[2] The CDC recommends initiation of antimicrobial therapy within three weeks.[3] Twenty-three percent of pertussis cases started antibiotic treatment more than three weeks after onset of symptoms after it is no longer recommended. Persons twenty years and older were the most frequent age group (35% of cases in age group) prescribed antibiotics after it was no longer recommended (Figure 4).

Table 3: Type of Antibiotic Prescribed for Treatment of Pertussis Infection, Kansas 2005.

Antibiotics	n	%
Clarithromycin / azithromycin	249	56.3
Erythromycin	53	12.0
Amoxicillin / Penicillin	28	6.3
Trimethoprim-sulfamethoxazole	19	4.3
Tetracycline / doxycycline	4	0.9
Other	82	18.5
Unknown	7	1.6

Figure 4: Percent of Persons Prescribed Antibiotics for Pertussis after Recommended Time, by Age Group, Kansas 2005



*Children less than 1 year can start antibiotic treatment until 6 weeks after cough onset.

Laboratory Testing

Of the 456 pertussis cases, 416 (91%) cases had at least one test for pertussis. For persons tested, 68% of the first test performed was within 3 weeks of cough onset (infectious period). The median number of days from cough onset to collection of specimen for testing was 16 (range 0 – 152). Forty-four specimens were culture positive for *Bordetella pertussis* and 217 specimens were positive by polymerase chain reaction (PCR).

Figure 5: Length of Time between Cough Onset and Specimen Collection for Pertussis Cases, Kansas, 2005. *

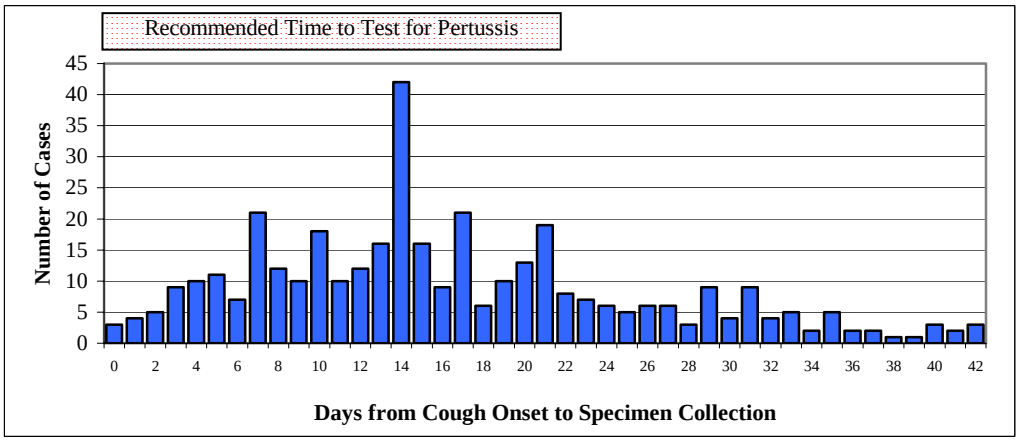


Figure 6: Length of Time between Cough Onset and Specimen Collection for Culture Confirmed Pertussis Cases, Kansas, 2005.

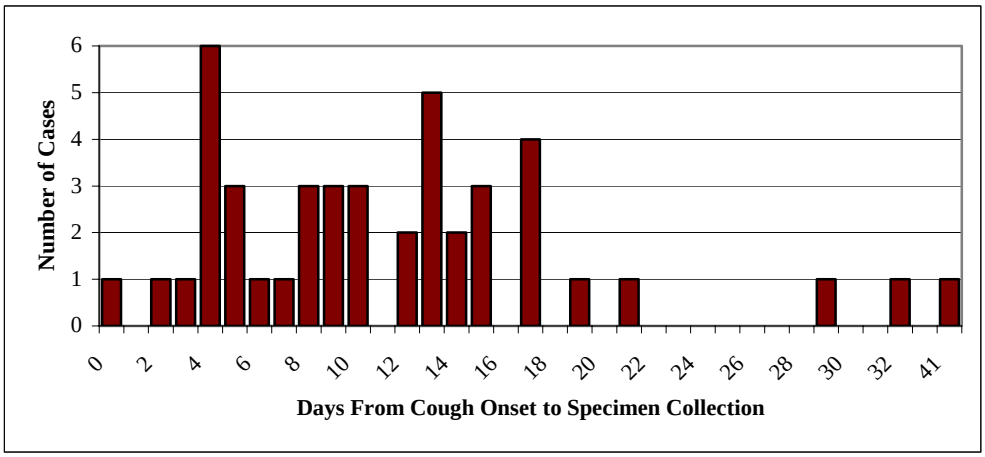
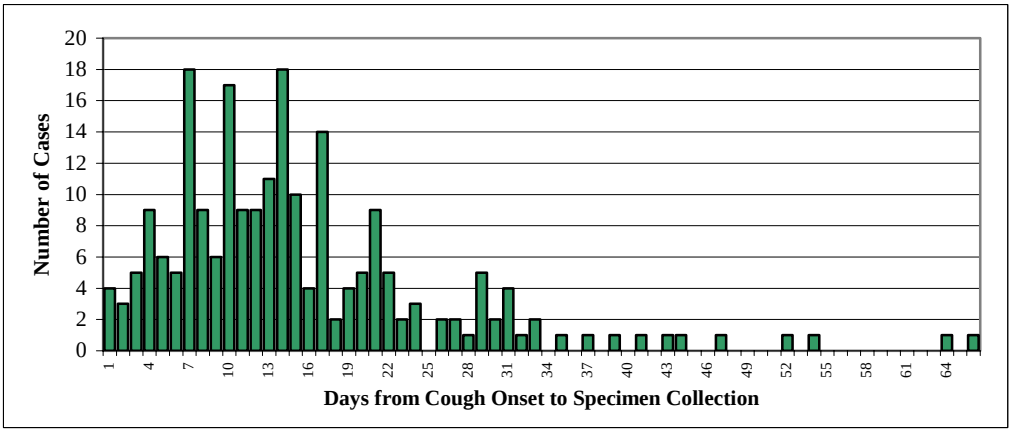


Figure 7: Length of Time between Cough Onset and Specimen Collection for PCR Confirmed Pertussis Cases, Kansas, 2005. *



DISCUSSION

During the pertussis outbreak in 2005, 456 cases were identified. This outbreak was a continuation of the pertussis outbreak that started in the second half of 2004. From 2000 to 2003, the incidence of confirmed and probable pertussis cases was 1.6 per 100,000 persons 1.6 in 2000, 1.1 in 2001, 2.3 in 2002, and 1.6 in 2003). Incidence rates began to rise in 2004 (9.1 per 100,000) and continued to rise to 16.7 per 100,000 in 2005. The 2005 incidence rate represented a 10-fold increase from the 2000 incidence rate.

The incidence among females was higher than among males. This is influenced by the persons twenty and over where females represent two-thirds of the cases in that age group. The higher incidence among females may be due to higher risks of exposure in care-giving roles and professions (e.g., child care providers, teachers, homemakers, etc.) that are more commonly held by females. Information on occupation and transmission setting for cases in Kansas was limited and data was not able to be analyzed to support this theory.

Children less than one year of age have a high morbidity but adults and adolescents account for a majority of the pertussis cases. In 2005, only 61 cases were reported among children less than one year of age (173 cases per 100,000 population), compared to 189 cases among persons 20 years of age and older (9.7 cases per 100,000 population). Of the 40 persons who were hospitalized, 57% of these where children under the age of one year (age range 4 days to 2 months).

Universal vaccination of all infants and children is the core of prevention. By age 6, children should have received 5 doses of DTaP vaccine with a booster (Tdap) at 11 to 12 years of age. Adults and adolescents become susceptible to disease approximately 5-10 years after pertussis vaccination when vaccine-induced immunity wanes.[7] During 2005, two pertussis-containing vaccines were licensed for use in persons 11 to 64 years of age. The Advisory Committee on Immunization Practices (ACIP) recommended that all adolescents (11-18 years) receive a dose of Tdap instead of a Td booster.[8] ACIP also developed provisional recommendations for adults 19-64 years of age: a single dose of Tdap to replace the Td booster.[9]

Vaccination history of all cases was available for less than half of the cases. The most incomplete information existed in persons over 20 years of age where only 19% of cases had vaccination history reported. The lack of information may be because those cases could not remember history and were not able to locate immunization records from their childhood. As data populates the new Kansas Immunization Registry (KSWebIZ) more immunization histories will be available to the public health staff investigating the case.

Despite missing vaccination history, the Retrospective Immunization Coverage Survey of Kindergarteners shows that starting in 1996 almost 80% of two year olds have received 4 doses of DTP. Through 2000, the coverage levels among two-year olds continue to be 80% or greater. In the 2004-05 school year, 91% of kindergartners were fully immunized for their age (five doses of DTP).

Ninety-seven percent of the pertussis cases were prescribed antibiotics for treatment and reduction in spread of pertussis. However, twenty-three percent of those persons started antibiotics when they were no longer recommended. Persons twenty years and older had the highest frequency of antibiotic prescriptions after the recommended time period. The use of antibiotics to lessen the effects of pertussis is only effective when it is started during the catarrhal phase. Also, administration of antibiotics within three weeks of cough onset can eliminate *B. pertussis* from the airway and reduce the spread of the organism.

The recommended antibiotics for treatment and prevention of pertussis spread are: azithromycin, clarithromycin, erythromycin, and trimethoprim-sulfamethoxazole. The clinical effectiveness of other antibiotics, such as ampicillin, amoxicillin, and tetracycline, has not been demonstrated and are these drugs are not recommended for treatment. Seventy-three percent of the pertussis cases were prescribed the recommended antibiotics. Over 7% of cases were prescribed ampicillin, amoxicillin, or tetracycline, which are not useful in treatment or prevention of pertussis.

As noted by the Advisory Committee on Immunization Practices, “Many factors affect the sensitivity, specificity, and interpretation of diagnostic tests for *B. pertussis*, including the sate of the disease, antimicrobial administration, previous vaccination, the quality of technique used to collect the specimen, transport conditions to the testing laboratory, experience of laboratory, contamination of the sample and use of nonstandardized tests.”[10]

Culture of *B. pertussis* is the gold standard for laboratory confirmation of infection. Isolation of *B. pertussis* is most successful during the catarrhal stage.[1] Polymerase chain reaction (PCR) is rapid, sensitive and specific for diagnosis but is not standardized among all laboratories. Also, it is impossible to determine if the organism is viable. PCR should be used in conjunction with culture. CDC does not recommend using direct florescent antibody (DFA) tests for pertussis diagnosis since this test is less sensitive than culture and interpretation is subjective. CDC extends the same recommendation for serology because of the lack of standardized tests and difficulty in interpretation due to vaccination.

Optimal specimen collection occurs during the infectious period of 2 to 3 weeks after cough onset and before antibiotic treatment. After that time, the ability to culture *B. pertussis* greatly decreases. Almost one-third of tests were preformed after 3 weeks of symptoms.

Regardless of laboratory testing and results, all persons reported and / or tested were investigated by state and local public health staff. This resulted in case investigation of more than 1100 people in addition to their contacts.

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[1] Centers for Disease Control and Prevention (CDC).Epidemiology and Prevention of Vaccine-Preventable Diseases. Atkinson W, Hamborsky J, McIntyre L, Wolfe S, eds. 9th ed. Washington DC: Public Health Foundation, 2006.
[2] Heymann DL, ed. Control of communicable diseases manual. 18th ed. Washington, DC: American Public Health Association; 2004:399-404.
[3] CDC. Recommended antimicrobial agents for the treatment and postexposure prophylaxis of pertussis. 2005 CDC Guidelines. Morbidity and Mortality Weekly Report (MMWR) 2005;54(No. RR-14).
[4] American Academy of Pediatrics. Pertussis. In: Pickering LK, Baker CJ, Long SS, McMillan JA, eds. Red Book: 2006 Report of the Committee on Infectious Diseases. 27th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2006:498-520.
[5]CDC. Case definitions for infectious conditions under public health surveillance. MMWR 1997; 46(No. RR-10).
[6] SAS Institute, Inc. SAS Version 9.1. Cary, North Carolina: SAS Institute Inc, 2002-03.
[7] MMWR Summary of Notifiable Disease – United States, 2004. Published June 16, 2006 for MMWR 2004;53(No. 53):14.
[8] Advisory Committee on Immunization Practices (ACIP). General Recommendations on Immunization Practices. MMWR 2006; 55(No. RR-15).
[9]ACIP Votes to Recommend Use of Combine Tetanus, Diphtheria and Pertussis (Tdap) Vaccine for Adults. March 2, 2006. http://www.cdc.gov/nip/vaccine/tdap/tdap_adult_recs.pdf.
[10]CDC. Preventing Tetanus, Diphtheria, and Pertussis Among Adolescents: Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR. 2006;55(No. RR-03):1-34.

OUTBREAK OF *SHIGELLA SONNEI* IN KANSAS CITY METRO AREA IN KANSAS, 2005

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Report Date
April, 2006

Introduction
The Kansas City (KC), Kansas metro *Shigella sonnei* outbreak started following the initial phase of the Kansas City Missouri metro *Shigella* outbreak which started in January of 2005. Early cases of *Shigella sonnei* was first noticed among Kansans residents in Johnson and Wyandotte County in late March through April of 2005. The number of new cases peaked in July of 2005 following a cluster of cases in a Summer Camp in Wyandotte County. The number of new cases continues to fluctuate until December 2005. A decline in new cases occurred in late December 2005 through early January of 2006.

A total of 210 confirmed cases and 12 probable cases were identified from the beginning in March, 2005 to end of January, 2006 when the outbreak was determined to be over.

Background
Kansas City metro includes counties in Kansas and Missouri across shared borders in Kansas City metro area with virtually no identifiable land space separating the two states in KC. The Missouri side of the metro consists of five counties, and there are three counties on the Kansas side, with a total of 10 public health departments. The Kansas counties are Leavenworth, Johnson and Wyandotte. According to the 2004 population estimate, the total population of Kansas is 2735,502. Johnson County is the first largest County in Kansas with a population of 496,691, Wyandotte is the fourth Largest with a population of 156,487 and Leavenworth has a population of 72,439. The Kansas metro Counties (Johnson, Leavenworth and Wyandotte) together make up 27% of the Kansas population, while Johnson and Wyandotte alone make up 24% of the Kansas population.

Shigella is an enteric illness of variable severity, clinically manifested by diarrhea which may be bloody or contain mucous, fever, nausea, cramp, and tenesmus. The causative organism is bacteria including *Shigella dysenteri, S. flexneri, S. boydii, and S.sonnei. Shigella sonnei* is the most commonly occurring of the *Shigella* species and have been implicated with most outbreaks. Incubation period varies from 1 to 7 days, with average of 2-4 days. Source of infection is from feces of infected humans, and transmission is mainly through fecal-oral directly or indirectly from a patient or carrier. No animal reservoir is known. Person infected with *Shigella* is infections through the period of acute illness until the organism is no longer present in the feces.

Outbreak Investigation

In March-April of 2005, following increase in number of cases of *Shigella sonnei* reported in Johnson and Wyandotte County with no known common exposures, epidemiological investigation was initiated at the County level to actively follow-up on any new cases of *Shigella*. This decision was also partially based on the knowledge that counties on the Missouri side of the metro have been investigating increase number of cases of *Shigella sonnei*.

In July, 2005, investigations in Wyandotte County lead to identification of cluster of new cases of *Shigella sonnei* in a summer camp in eastern Wyandotte. A total of 22 cases were associated with this cluster, 10 confirmed cases and 12 probable cases. The Summer Camp cluster was followed up and investigated separately, but considered a pocket of the on-going outbreak.

Phone interviews were conducted by staff of Wyandotte County Health Department, Division of Communicable Disease, using the enteric questionnaire.

The case definition was: a student or teacher at the elementary school summer camp or their family contact who had diarrhea or abdominal cramping starting July 8, 2005 to the end of the summer camp in August 4, 2005.

In September 2005, Kansas City Missouri Health Department invited CDC to assist in the metro outbreak. A bi-state meeting was held at the City Health Department with four CDC representatives from the Division of Diarrhea Diseases.

After the meeting, CDC team decided to work very closely with the Counties in Missouri to study the outbreak over on the Missouri side, and then share the findings and recommendations with both states. This decision was made because Kansas did not have an outbreak in any of the child-care centers unlike in Missouri. Also a lot of intervention measures were already in place on the Kansas side.

The details of the CDC studies will be presented in a different report and in a bi-state MMWR article on the whole metro outbreak.

Interventions

During the initial phase of the outbreak, Kansas Counties worked with the Missouri Counties, the regional state epidemiologists and the County public relation officers to create a common health alert message. This was distributed to Local Health Departments in northeast region of Kansas, physicians, schools and child-care centers via the state public health information system (PHIX) and the counties health alert network system (HAN).

Regular updates on prevention, control, sensitivity and treatment were provided through PHIX and HAN to the physicians, schools and child-care centers.

In late July to early August 2005 before the beginning of the school year, a letter was sent out to the School Superintendent office in Wyandotte Counties, which is the county where we have seen majority of the cases. Enclosed in the letter were samples of educational fliers to send home with students and posters on *shigell*a and hand washing.

Educational fliers were distributed to the retailers in Wyandotte County. County nurse worked with the school nurses to demonstrate proper hand washing in schools using the glow worm kit. Guidelines for prevention and control of *Shigella* outbreak in school-age children was developed in anticipation of any outbreak in school that could not be prevented with the control measures already in place.

Laboratory Method

Cases were tested mostly through their primary physicians, and depending on which state the hospital, clinic or initial testing laboratory was located, isolates were sent to either Kansas State or Missouri State Laboratory for the purpose of performing pulse-field gel electrophoresis (PFGE) DNA sub typing. 91% (203) of the cases had PFGE DNA sub typing performed on their isolates. Of these 203, 64 were done in Kansas and 139 were done in Missouri. Among those done in Kansas, PFGE SONx088 (21) was the most frequently occurring pattern, followed by SONx073 (10), and then SONx121 (6). Among those done in Missouri, PFGE MOS165 (26) and MOS307 (26) were the two most frequently occurring patterns, followed by MOS234 (25), and then MOS188 (13).

The PFGE patterns from both states could not be matched because of the different naming system used by each state.

Outbreak Investigation Result

A total of 222 cases were association with the Kansas City metro *Shigella sonnei* outbreak; 210 (94.6%) laboratory confirmed cases and 12 (5.4%) probable cases. Cases ranged in age from 0-93 years old. Of the 222 cases, 22 were associated with the summer camp cluster.

Of the 22 cases, 10 were laboratory confirmed and 12 were epidemiologically linked to a confirmed case. 59% (13) were male and 41% (9) were female. Camp cases; primary and secondary ranged in age from 1 to 40 years old, with 64% (14) within the age group of 5-12 years.

Table 1. Number and Percent of Kansas City, Kansas Cases by County, Sex, Age group and Zip code

Characteristic		Case No.	Case (%)
County	n=222		
Johnson		46	21
Leavenworth		28	12
Wyandotte		148	67
Sex	n=222		
Male		95	43
Female		127	57
Age group	n=221		
0-3 years		50	23
4-9 years		89	40
10-19 years		19	9
20-39 years		43	20
40 and above		17	7
Unknown		3	1
Zip (with cases >=10)	n=219		
66104		46	21
66102		32	15
66048		24	11
66106		22	10
66112		14	6
66109		13	6
Others		68	31

Figure 1.

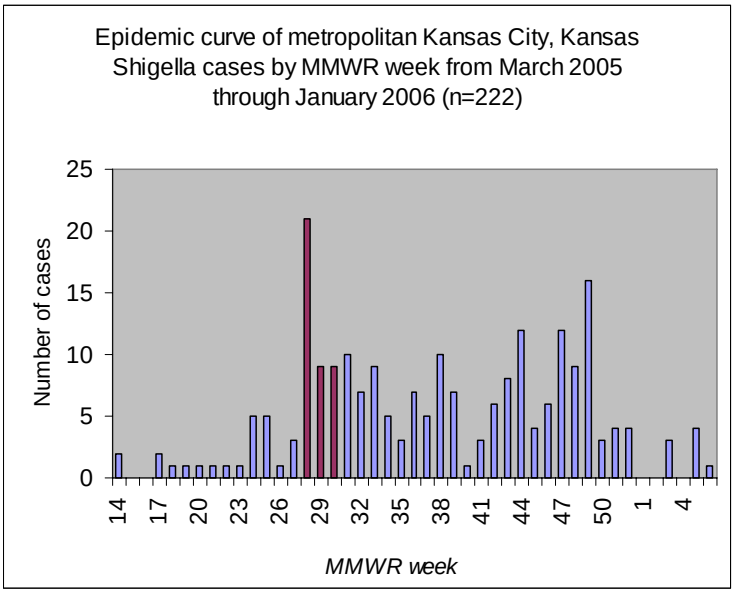
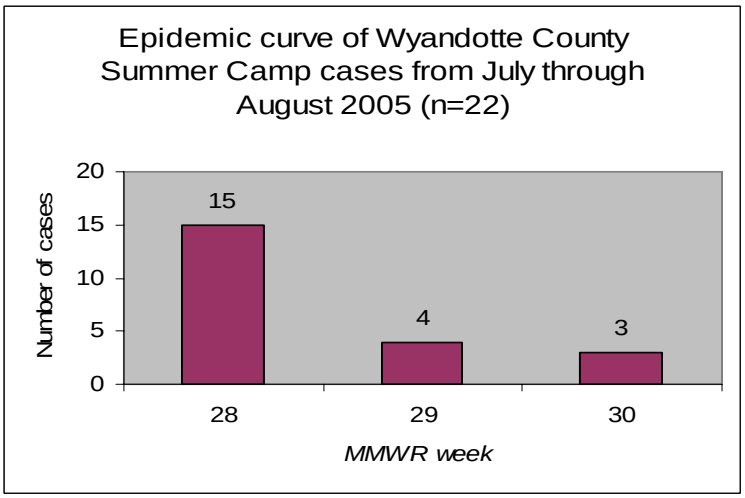


Figure 2.



Discussion

The shape of the epidemic curve suggests an initial possible person-to-person transmission, with some intermittent common source exposures resulting to the spikes noticed for the MMWR weeks 28, 44 and 49. The first spike on week 28 represents the summer camp cluster which most likely resulted from a common source exposure that was never determined, since cases started having symptoms within the same incubation period after the school field trip to a Missouri park.

The studies conducted by the Epidemiology (EPI) Aide team from CDC were not gear towards determining the source of the outbreak. They were meant to study the

predisposing factors in day-care facilities, physicians' willingness to recommend laboratory testing for *shigella*, physicians' willingness to prescribe antibiotic treatment, and the burden of *shigella* outbreak on local agencies; day-care centers and public health departments.

Cases were seen in day-cares during the investigations, but no outbreak was determined to have occurred in any of the child-care facilities in Kansas. Of the 60% (139) of our cases who were between the ages of 0-9 years old that could possibly be attending daycare, information on whether the case attended any day care facility was obtained from only 25% (35) of them. 13% (18) of these children aged 0-9 years old were determined to be in a day-care system.

Conclusion

Based on the information collected during the outbreak investigation, the primary source of the outbreak could not be determined regardless of vigorous efforts made by both the state and county officials. The various intervention methods taken; the regular health alert updates, the demonstration of proper hand washing technique in schools, the distribution of educational fliers on *shigella* prevention and control in school and grocery stores, and the new guideline for prevention and control of s*higella* outbreak in school-aged children, may have helped contained the outbreak and had prevented an outbreak in any of the child-care facilities and schools.

The nature of this outbreak, crossing state borders, required much cooperation between city, county, and local health departments in both states. Every level of public health was involved with the addition of the EPI Aide team from CDC invited to assist Missouri. The teamwork involved resulted in strengthened relationships between the public health departments in KC metro on both sides of the border, and also between different agencies in the local health departments.

Limitations

The metro *shigella* outbreak was a challenge to investigate because of its magnitude and cross-border issues. Majority of the cases were reported from the laboratory following a positive result, and most of the time the case had gone through the greater part of their infectious period before the health department was notified. Parents and guardians were very reluctant to release needed information on their children to the County Health Departments for fear that their children will be excluded from day-care and/or school. This resulted to an incomplete collection of data. Some families never returned calls from their local health officials and as a result, some opportunities to link cases were missed. Enough resources were not available to pursue very many individual cases.
Few physicians especially pediatricians were not willing to recommend testing for symptomatic persons, referring to the symptoms as "stomach flu". Some others were treating with antibiotics without testing. *Shigella* developed resistant to different antibiotic during the course of the outbreak. A day-care provider with a positive stool culture was treated with three courses of antibiotic therapy, using antibiotics for which the organism was resistant because the doctor never looked at the antibiotic sensitivity result.

POSSIBLE OUTBREAK ASSOCIATED WITH A SCHOOL
GARDEN CITY, FINNEY COUNTY, KANSAS
JANUARY 2005

Report date
April 8, 2005

Epidemiologic Investigators
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Introduction

On Thursday, January 27, 2005, the Finney County Health Department (FCHD) notified the Epidemiologic Services Section (ESS) within the Bureau of Epidemiology and Disease Prevention (BEDP) at the Kansas Department of Health and Environment (KDHE) of a possible outbreak in Garden City, Finney County, Kansas. Preliminary information revealed that 15 students and two staff members at a school (School X) experienced gastrointestinal illness early that Thursday afternoon.

With the cooperation of ESS and the regional bioterrorism coordinator, the Finney County Health Department conducted further follow-up to verify the existence of an outbreak at School X and to determine if an epidemiologic outbreak investigation was necessary.

Background

During the 2004-05 school year, School X enrolled 465 students and employed 47 certified employees and five teacher aides[1]. Food served at School X is centralized, with other schools in the district receiving the same pre-packaged meals.

Epidemiologic Follow-Up

FCHD generated a line list to gather more information related to the ill persons and to verify the existence of an outbreak. Information collected revealed that 21 (5%) of the 465 students and two (4%) of the 47 staff members reported symptoms of nausea, vomiting, or diarrhea. Of those reporting illness, only 13 persons met the case definition: a student or staff member who experienced vomiting or diarrhea on January 27, 2005. The other 10 persons reported experiencing only nausea.

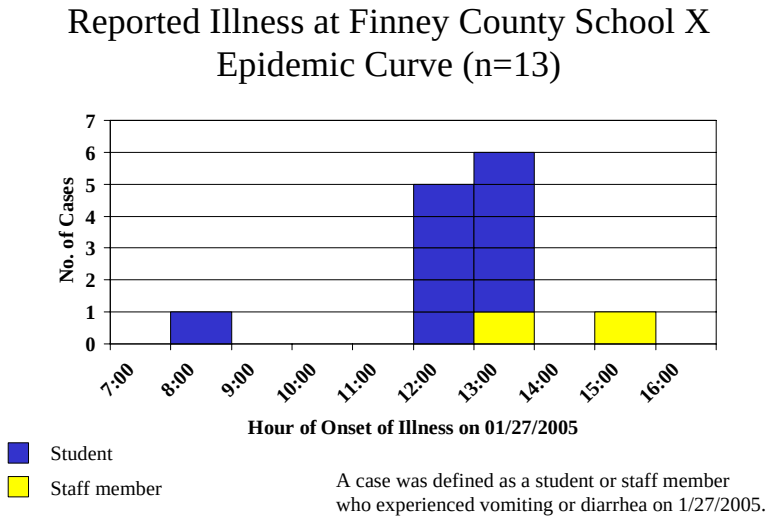
[1] Kansas State Department of Education: Quality Performance Accreditation (QPA) Annual Report, 2004-05. http://www.ksbe.state.ks.us.

Of the 13 cases, 11 were students and two were staff members (Table 1). The 11 students were all male, with a median age of 12 years, and were distributed among four different classrooms. The two ill staff members included the school nurse and the custodian who cleaned the affected area.

Table 1. Persons Meeting Case Definition (n=13)

	Student (n=11)		Staff (n=2)	
	No.	**(%)**	**No.**	**(%)**
Gender:				
Male	11	(100)	0	(0)
Female	0	(0)	2	(100)
Classroom distribution:				
Teacher A	3	(30)	NA	
Teacher B	2	(20)	NA	
Teacher C	1	(10)	NA	
Teacher D	4	(40)	NA	
Age, median years:	12		53	
Reported the following symptoms:				
Nausea	11	(100)	2	(100)
Vomiting	11	(100)	2	(100)
Diarrhea	2	(18)	2	(100)

Figure 1. Epidemic Curve



As seen in Figure 1, the majority of the cases reported onsets of illness between 12 P.M. and 2 P.M. Symptoms usually lasted less than one day. None of the ill individuals sought medical care or submitted a specimen for diagnostic testing.

Most of the students reported eating the school breakfast and lunch on January 25th, 26th, and 27th, but the two staff members did not eat the food served at the school. Though no additional illnesses were reported among other students or staff or in other schools in the district, a food inspector was notified to conduct a food inspection.

Discussion

The attack rate of 3% among the total school population was not unexpected or unusual. In addition, no commonality, such as a particular classroom or a school meal consumed, appeared to be the source of illness among the 13 cases. However, the epidemic curve is consistent with a point-source outbreak in which the onsets of illness are clustered in time.

Several possibilities may account for this occurrence. First, psychosomatic illness among this age group is a plausible explanation for the clustering of cases. Second, other commonalities (i.e., snacks shared, other school-based interactions, neighborhood or family connections) not identified during the epidemiologic follow-up may have been the source of illness. Third, investigations of several outbreaks, particularly those caused by Norovirus, have suggested that infection may be spread through inhalation of aerosolized vomitus[1,2,3]. The school nurse stated that a student vomited in a well-frequented hallway on January 25th around noon and that most of the cases reporting vomiting on January 27th passed by this student as he was vomiting. The custodian, who cleaned the hallway, also reported illness 48 hours after exposure to the vomit.

Conclusions

The cause and source of illness could not be determined for this group of individuals. Nonetheless, the clustered onsets of illness are an indication that some common source exposure shared among the cases could have led to illness.

Recommendations

To prevent potential occurrences in the future, the following are recommended:

- Encourage students and staff to leave school after experiencing illness
- Practice proper procedures when cleaning up bodily fluid spills and disinfecting contaminated surfaces

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[1] Caul EO. Small round structured viruses: airborne transmission and hospital control. Lancet 1994;343:1240–2.

[2] Chadwick PR, McCann R. Transmission of a small round structured virus by vomiting during a hospital outbreak of gastroenteritis. J Hosp Infect 1994;26:251–9.

[3] Marks PJ, Vipond IB, Carlisle D, Deakin D, Fey RE, Caul EO. Evidence for airborne transmission of Norwalk-like virus (NLV) in a hotel restaurant. Epidemiol Infect 2000;124:481–7.

GASTROENTERIC OUTBREAK AMONG DAYCARE ATTENDEES
SEDGWICK COUNTY, KANSAS
FEBRUARY 2005

FINAL REPORT DATE
April 12, 2005

INVESTIGATORS
Pilar E. Cordes MPH, Senior Disease Investigator, Sedgwick County Health Department
Kathy Jackson, City of Wichita's Environmental Health Department
Judy Schremmer, Child Care Licensure Unit, Sedgwick County Health Department

REPORTED BY
Michael S. Kopf, Medical Investigator, KDHE –BEDP Epidemiological Services

BACKGROUND
On Feb. 16, 2005, a complaint of a possible foodborne outbreak associated with Restaurant X was reported to the City of Wichita's Environmental Health Department (EHD). The complainant stated that six children (ages 2-4 years) at Daycare A experienced illness after eating at Restaurant X following a field trip to the library on February 15th. Preliminary information revealed that all six children experienced vomiting, diarrhea, or fever approximately seven hours after consuming chicken nuggets, fries, and a drink at Restaurant X.) Epidemiological Services at the Sedgwick County Health Department (SGCHD) notified the Epidemiologic Services Section (ESS) at the Kansas Department of Health and Environment (KDHE) of the potential foodborne outbreak and initiated an outbreak investigation.

METHODS
On February 18, 2005 the Senior Disease Investigator at the SGCHD interviewed the daycare provider at Daycare A about the illnesses experienced by the six children, and among other attendees and staff, and about current procedures? The SGCHD investigator also provided *enteric exposure* questionnaires for parents of the ill children to complete and return to Daycare A for the purpose of collecting data related to illness and potential sources of infection, including foods eaten.

Inspections of both Restaurant X and Daycare A were conducted on February 17 and 18 by the City of Wichita's EHD and the SCHD Child Care Licensure Unit (CCLU), respectively. No stool samples or food samples were available for laboratory testing.

RESULTS
Brief illness and food consumption histories were obtained from the six Daycare A children who became ill. Individual meal histories from daycare staff and a meal history from the daycare facility were not collected.

Three of the ill children were reported to have had 4-5 episodes of loose stools within the 24-hour period between February 15th and 16th. The median incubation period was 4.5

hours (range, 2.5 to 9.5 hours). The illness was self-limiting, with recovery shortly after purging.

Table 1: Illness history (n=6)

Child #	Symptoms *	Onset	Recovery
1	Vomiting	February 15@ 1430	February 16
2	Vomiting	February 15@ 1430	February 16
3	Vomiting	February 15@ 1500	February 16
4	Vomiting	February 15@ 1600	February 16
5	Vomiting	February 15@ 1730	February 16
6	Vomiting	February 15@ 2130	February 16

* 3 cases were reported to have had 4-5 episodes of loose stools within this 24-hour period.

The restaurant inspection conducted on February 17, 2005 revealed improper hand washing and improper chemical storage. Measures were taken to correct these critical violations, with verification by the inspector while on site.

No violations were observed by the CCLU during the inspection of Daycare A. However, the daycare staff was informed about common infections associated with daycare settings and about preventive measures to reduce the occurrences of these infections.

No additional illness among the Daycare A attendees or staff were reported. Moreover, Restaurant X and SGCHD did not receive any other complaints from restaurant patrons.

DISCUSSION

Though initial information implicated the Restaurant X meal as the source of illness, other sources of infection may exist. First, person-to-person transmission among the six Daycare A attendees is highly likely. Outbreaks of enteric illnesses are common in daycare facilities, especially those that care for children who are not toilet trained. The high frequency of hand-to-mouth activity that occurs among young children facilitate the spread of disease. Second, the daycare provider had reported that one child had been ill with vomiting on February 14th, almost two days prior to the six children becoming ill. Investigations of several documented outbreaks, particularly those caused by Norovirus (average incubation period of 24-48 hours), suggest that infection may be spread through inhalation of aerosolized vomitus[1,2,3]. However, additional data would be needed to better assess the possibility of infection from exposure to vomitus in this outbreak.

Finally, other, unidentified exposures may have been the source of infection, including other meals served and asymptomatic carriers among staff or attendees.

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[1] Caul EO. Small round structured viruses: airborne transmission and hospital control. Lancet 1994;343:1240–2.

[2] Chadwick PR, McCann R. Transmission of a small round structured virus by vomiting during a hospital outbreak of gastroenteritis. J Hosp Infect 1994;26:251–9.

[3] Marks PJ, Vipond IB, Carlisle D, Deakin D, Fey RE, Caul EO. Evidence for airborne transmission of Norwalk-like virus (NLV) in a hotel restaurant. Epidemiol Infect 2000;124:481–7.

CONCLUSION

A gastroenteric outbreak occurred among six Daycare A children who consumed a common meal served at Restaurant X. The illnesses presented similar symptoms with comparable onsets and duration, indicating a common-source exposure. Neither the etiology of the outbreak nor the vehicle of transmission could be determined due to the lack of a definitive diagnosis, and the possibility of other common exposures among the six cases.

ACKNOWLEDGEMENTS

EES Epidemiologists Cheryl BañezOcfemia, MPH and David Stuever, MPH for their assistance with this investigation

Attachments: none

K A N S A S

RODERICK L. BREMBY, SECRETARY

KATHLEEN SEBELIUS, GOVERNOR

DEPARTMENT OF HEALTH AND ENVIRONMENT

Foodborne Outbreak among Staff Members at a Junior High School
Finney County, Kansas, February 2005

Report Date:
May 2005

Investigators:
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Finney County Health Department
Melissa Hathaway
Finney County Health Department
Mary Ella Vajnar, Medical Investigator
Epidemiologic Services Section
Kansas Department of Health and Environment
School Nurse
Junior High School X
Finney County, Kansas

Author:
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Kansas Department of Health and Environment

BACKGROUND

On February 18, 2005, the staff members at Junior High School X held a potluck luncheon. Several staff members brought in food that was either store-bought or prepared at home. Individuals began eating shortly after 10am with most people eating between 11am and 1pm. Staff members reported illness within several hours after eating at the luncheon.

During a routine inspection of the cafeteria at Junior High X on February 22, school officials made the Bureau of Consumer Health aware of the possible foodborne outbreak associated with the potluck of February 18, 2005. The Bureau of Consumer Health notified Epidemiology Services Section (ESS) on February 22, 2005 of the potential outbreak. ESS then notified the Finney County Health Department (FILHD) and the Kansas Department of Education.

DIVISION OF HEALTH
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Epidemiologic Services Section
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Voice 785-296-8156 Fax 785-291-3775 http://www.kdhe.state.ks.us
Disease Reporting & Public Health Emergencies:Toll Free Phone 1-800-427-7317 Toll Free FAX 1-877-427-7318

During the initial investigation, FILHD, ESS, and the school nurse determined that 20 staff members had become ill with diarrhea approximately 8 hours after eating at the potluck meal. One person was hospitalized. Junior High X has a total of 80 staff members, however, the total number of individuals who ate at the luncheon was unknown.

METHODS

Epidemiologic

Our investigation started with the school nurse collecting a line listing of ill individuals to determine the extent of the outbreak. In order to determine the possible source of the outbreak we asked staff members to record food items that they brought to the potluck. We created a questionnaire based on that food list, which was distributed by the school nurse to staff members who ate at the potluck. FILHD collected the completed questionnaires and forwarded them to ESS for data entry and analysis. The data were analyzed using SAS 9.1.

For purposes of our investigation we defined a case as: any staff member who ate food served at the luncheon on February 18, 2005, and became ill with diarrhea on February 18, after the potluck.

Environmental

Since this was a private function and none of the school's licensed kitchen facilities were used to prepare or store the potluck food items, no inspection was performed at the school.

Lab and Clinical

Stool samples were collected from the hospitalized case. No other samples were collected from the cases in this outbreak.

RESULTS

Epidemiologic

Of the thirty-two questionnaires returned, 31 individuals ate at the potluck. Seventeen (17) of the 31 individuals who ate at the luncheon met the case definition for this outbreak. The individuals in the cohort were predominately female (84%) and were 20-49 years of age (55%). The ill and non-ill groups do not differ among gender, age, and occupation (Appendix).

The three most common symptoms reported by the cases were diarrhea, stomachache and nausea (Table 1). One individual was hospitalized with bloody diarrhea and complications from an underlying gastrointestinal disorder. The median incubation time for illness was 8.1 hours and the median duration of illness was 73 hours (3 days) (Figure 1).

Table 1: Distribution of symptoms in individuals who met the case definition among staff members who ate the potluck lunch in Finney County, February 2005.

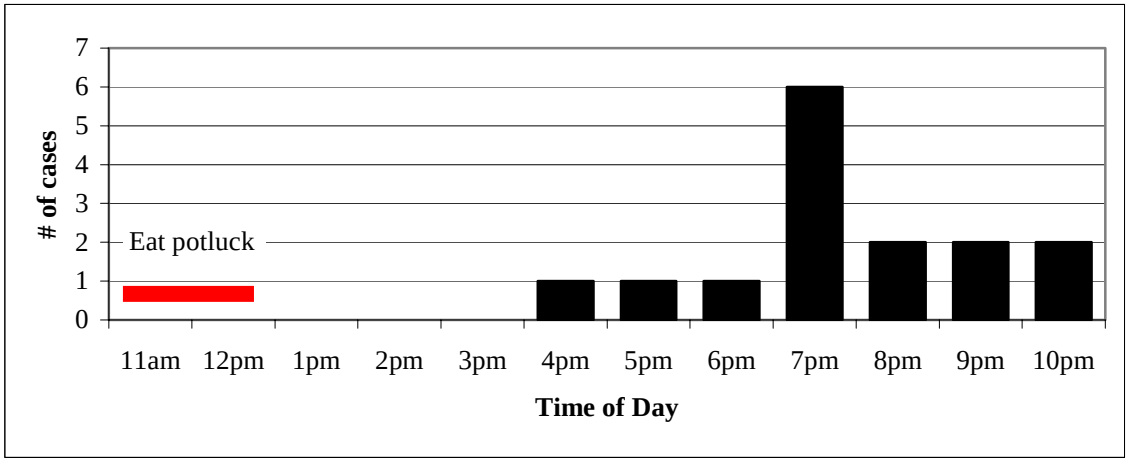
Symptoms	Number (%)
Diarrhea	17 (100)
Stomach Ache	16 (94.1)
Nausea	11 (64.7)
Muscle Ache	8 (47)
Chills	6 (35.3)
Fever	3 (17.6)
Bloody Diarrhea	2 (11.8)
Vomiting	1 (5.9)

All food items were initially examined but only those items that were eaten at the potluck by more than 6 individuals were included in the analysis (Table 2). Less than 11 (35%) people reported eating several of the analyzed foods (*). Individuals who ate the green chili were 15.2 times more likely to become ill when compared to those who did not eat the green chili.

LABORATORY

The single stool specimen collected from the hospitalized case tested negative for enteric pathogens. However, the case had been on antibiotics for 48 hours prior to testing for pathogens.

Figure 1: Number of persons meeting the case definition based on onset of symptoms, in hours, Finney County, February 2005.



DIVISION OF HEALTH
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Table 2: Attack Rates and Relative Risks for Food Items Eaten at Potluck at a Junior High School, Finney County, KS on February 18,2005.

	# Ill / # Exposed	# Ill / # Not Exposed	Relative Risk (95% CI)
Food	(attack rate)	(attack rate)	
Angel food Cake*	2/7 (30%)	15/24 (62%)	0.45 (0.1, 1.5)
Apple Pie*	7/10 (70%)	10/21 (48%)	1.5 (0.8, 2.7)
Brownie*	5/7 (71%)	12/24 (50%)	1.4 (0.8, 2.6)
Cheese	10/17 (59%)	7/14 (50%)	1.2 (0.6, 2.3)
Flour Tortillas	8/11 (73%)	9/20 (45%)	1.6 (0.9, 3.0)
Green Chilli**	17/22 (77%)	0/9 (0%)	15.2 (1.0, 229)
Nacho Cheese Soup*	2/9 (22%)	15/22 (68%)	0.3 (0.1, 1.1)
Pinto Beans	6/11 (54%)	11/20 (55%)	1.0 (0.5, 1.9)

** Note: 0.5 was added to each cell in the analysis of Green Chili to compensate for the 0 ill in the not exposed group.

DISCUSSION

Prior to investigation of the outbreak, some of the staff members decided that the food item causing the illness was the "green chili" due to their observation later in the afternoon that it had begun to foam and had a foul odor. This predetermined perception may have lead to bias in reporting. The item called "green chili" is a South American dish called Caldo de Manguera**:** A soup made of pig intestines stuffed with blood and rice.

Less than 11 (35% of cohort) people mentioned eat several of the food items. More than 70% of all individuals reported eating the green chili. Seventy-seven percent of the persons eating green chili became ill. Based on this information, the green chili is the most likely cause of the illness.

Only one stool specimen was collected from the ill individuals and no organism was isolated. But based on the symptoms, incubation periods, and foods served, C*lostridium perfringens* toxin is the likely cause of the illness. The incubation period for C*lostridium perfringens* toxin is 6 to 24 hours and the symptoms include diarrhea, nausea, and abdominal cramps. C*lostridium perfringens* is found the gastrointestinal tract of healthy individuals and animals (cattle, fish, pigs, and poultry). In almost all outbreaks, C*lostridium perfringens* toxin is associated with inadequately heated or reheated meats, often stews, meat pies and gravies made from beef, chicken or turkey (Heymann 2004).

LIMITATIONS

One limitation of this outbreak is the amount of time between the outbreak and when it was reported (4 days) resulting in potential recall bias. Also, more stool specimens were needed for testing. Another limitation is that most persons seemed to have decided on the cause of the illness prior to the outbreak investigation.

RECOMMENDATIONS

Persons preparing food at home should remember the following steps to keep food safe:

- Clean – Wash hands and surfaces often.
- Separate – Don't cross contaminate food items.
- Cook – Cook to proper temperatures.
- Chill – Refrigerate promptly.

Also, prepared foods that need to be reheated must reach a temperature of 165°F and be kept at or above 145°F. Cold foods should be place on ice and kept at 40°F. Perishable food items, such as meat, poultry, eggs, and casseroles should not be left out in the "danger zone" (40-140°F) for more than two hours. These recommendations were taken from "Cooking for Groups: A Volunteer's Guide to Food Safety" USDA, Food Safety and Inspection Service. (http://www.fsis.usda.gov/OA/pubs/cfg/CookGroups.pdf)

ACKLNOWLEDGEMENTS

Megan Speers – Finney County Health Department
Melissa Hathaway – Finney County Health Department
Mary Ella Vajnar – KDHE, ESS
School Nurse – Junior High School in Finney County

SUPPORTING DOCUMENTS

Questionnaire
Spoon and Fork Form - Final

APPENDIX Age, Gender, and Occupation of Cohort and of Ill and Non-Ill Persons

	All number (%)	**Ill** number (%)	**Non-ill** number (%)
Age (years)			
Mean	45.8	44.3	47
Median	48.2	48	48.5
Range	24.6-79.1	24.6-60.1	24.6-79.1
Gender			
Female	26 (84)	14 (82.3)	12 (85.7)
Male	5 (16)	3 (17.6)	2 (14.3)
Occupation			
Teacher / Para Teacher	23 (74.2)	14 (82.3)	9 (64.3)
Other	6 (19.3)	2 (11.8)	4 (28.6)
Adminstration	1 (3.2)	–	1 (7.1)
Unknown	1 (3.2)	1 (5.9)	–

There is no statistical difference by the descriptive characteristics, between those who were ill and those who were not ill.

VIRAL GASTROENTERITIS OUTBREAK ATTRIBUTED TO NOROVIRUS
OSAGE COUNTY, KANSAS
MARCH, 2005

FINAL REPORT DATE
May 18, 2005

REPORTED BY
Daniel Neises, MPH, Epidemiologist

BACKGROUND
On Wednesday, March 30, 2005, the Osage County Health Department (OCHD) notified the Kansas Department of Health and Environment (KDHE) of gastrointestinal illnesses among half the students and the teacher in one classroom. The school nurse also reported that several baby chicks had been kept in the affected classroom for an unknown number of days.

METHODS
KDHE recommended OCHD construct a line list including the symptom history of all ill students, collect both human and chick stool samples for laboratory testing, and conduct a cohort study. The distance between OCHD and the school, combined with a lack of OCHD resources, prevented OCHD from leading the investigation. Instead, an epidemiologist from KDHE drove to the school and worked on-site with the school nurse, the school district nurse, and the grade school administrative staff to construct a line list of ill students. Absenteeism data was obtained from the school's records. KDHE transported stool sample collection kits to the grade school. Kansas Department of Health and Environment Laboratories tested the three stool samples that were submitted by ill students; the baby chicks were removed from the classroom before samples could be collected. The case definition was: absenteeism any time between Monday, March 28 through Monday, April 4 due to vomiting and/or diarrhea. An unconfirmed illness was defined as absenteeism during that time period due to an unspecified illness. The cohort study was deemed an inefficient use of the limited resources available.

RESULTS
Absenteeism was higher than normal from March 28 - April 4. School records indicated 70 students were absent due some sort of illness; 14 of those ill students were known to meet the case definition.

The true number of students experiencing vomiting and/or diarrhea was not known, as not every ill student was interviewed. Eleven of the 14 students that met the case definition were interviewed. All but one of these 11 (91%) reported vomiting, while 8 (73%) reported diarrhea. Symptom onset and duration was not available for many of the confirmed cases; however, three students had recovered—two reported illness duration of 24 hours, while the third reported recovery after 14.5 hours. Anecdotal evidence

indicated that students who were not interviewed had similar symptoms. Information taken from school records (Table 1.0) indicated 55 of the 70 absent students (79%) recovered within one day. Preliminary data suggested the illnesses were a result of person-to-person transmission of norovirus

The epidemic curve (Figure 1.0) generated from the line list suggested a point-source outbreak—illness histories suggested viral gastroenteritis. Contaminated ready-to-eat food has been implicated as a vehicle of viral gastroenteritis in past outbreaks; accordingly, food histories were obtained for those students that were interviewed. All students reported eating the lunch provided by the school, and no common restaurant or event exposures were reported.

The school nurse was alarmed by the number of ill students originating from a sixth grade classroom with baby chicks—chicks have previously been implicated in outbreaks of salmonellosis. The chicks belonged to a student's family, and were brought to the classroom for a learning activity beginning Monday, March 28. The chicks were removed from the school on an unknown date before Thursday, March 31. Seven of the 11 interviewed students reported contact with the chicks, including two students outside of the sixth grade. The incubation and duration of illness in those with exposure to the animals was similar to those without exposure to the animals, and not consistent with salmonellosis.

Three stool samples were submitted to KDHE Laboratories. All were positive for Norovirus—no bacterial pathogens were isolated.

CONCLUSION

The epidemic curve suggests this was a point-source outbreak of Norovirus. Despite attempts to link the ill to a common event or food, none was identified. This outbreak was most likely propagated by person-to-person transmission of Norovirus. A number of students were likely infected during the spring break period and passed the illness to their classmates upon returning to school—the apparent "point-source" of the outbreak was likely the common event of the school's re-opening.

Norovirus is the leading cause of foodborne illness in the United States; an estimated 28 million people are infected with Norovirus every year—40% of these infections may be foodborne.[*] Onset of diarrhea and vomiting are common 12-48 hours after infection, and may last from 12 to 60 hours. Vomiting is more prevalent in children than adults. The disease is transmitted through fecal-oral routes. Historically, Norovirus outbreaks have been associated with fecally contaminated foods, especially ready-to-eat foods such as salads, sandwiches, ice, cookies, and fruit.[#] Person-to-person outbreaks propagated by poor hygiene are also common.

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[*] Mead PS. Food related illness and death in the United States. Emerging Infectious Diseases, 1999. 5(6):607-625.

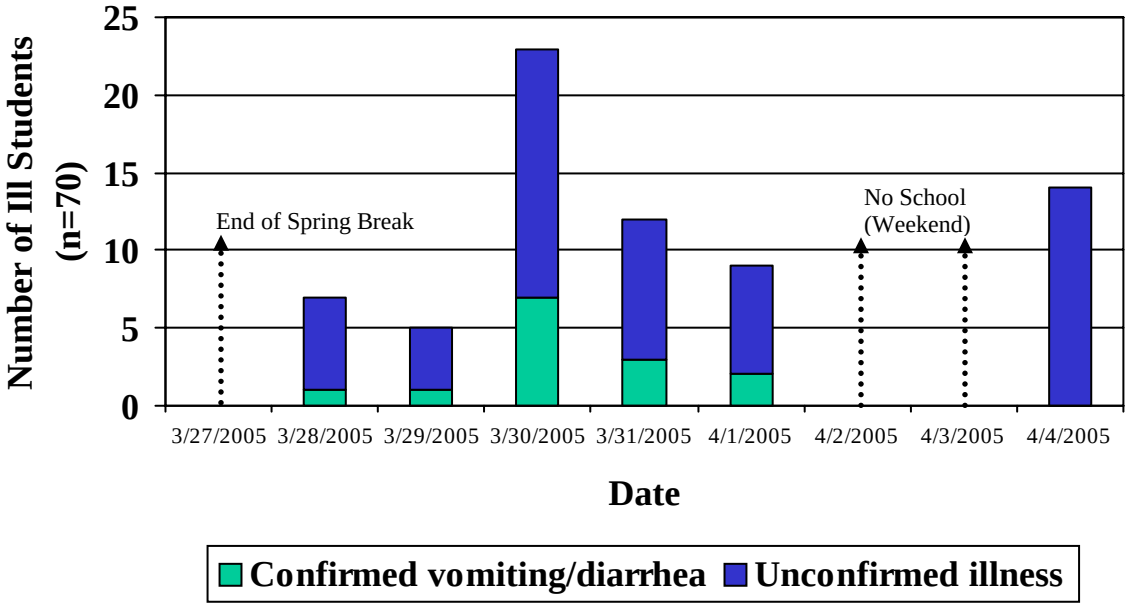
[#] Centers for Disease Control and Prevention. "Diagnosis and Management of Foodborne Illnesses: A Primer for Physicians and other Health Care Professionals." MMWR 2004:53(No. RR-4).

TABLE 1.0 – ILL STUDENTS BY GRADE AND DAYS ABSENT

GRADE	*ILL STUDENTS*		*DAYS ABSENT*	
	Unconfirmed	**Confirmed**	**1 Day**	**More than 1 day***
Kindergarten	4	0	3	1
First	8	2	7	1
Second	8	2	6	2
Third	9	1	7	2
Fourth	8	1	6	2
Fifth	7	1	6	1
Sixth	12	7	8	4
Seventh	8	0	6	2
Eighth	6	0	6	0
TOTAL	**70**	**14**	**55**	**15**

*The median number of days absent among these 15 students was 2 days (mean=2.5 days).

Figure 1.0 - Grade School X Absenteeism
Osage County, 2005



FOODBORNE OUTBREAK AMONG STAFF AND RESIDENTS AT AN ASSISTED LIVING FACILITY GREENWOOD COUNTY, KANSAS APRIL, 2005

Report Date:
May 2005

Investigators:
Greenwood County Health Department
Deina Rockhill
Shannon Hughes
Cathy Coon

Author:
Jennifer M. Hill, MPH, Epidemiologist
Epidemiologic Services Section
Bureau of Epidemiology and Disease Prevention
Kansas Department of Health and Environment

BACKGROUND

On April 5, 2005, Greenwood Local Health Department (GWLHD) notified the Epidemiologic Services Section (ESS) about a potential outbreak in an assisted living facility (Facility X). GWLHD had been informed that four persons from the same facility were hospitalized and that 6 additional persons in the facility were also ill.

GWLHD began a line list of all residents and staff at Facility X. Common symptoms of ill persons included nausea, vomiting, and diarrhea. It was determined that only two of the four hospitalized persons had symptoms consistent with the outbreak. By April 6, 23 persons were ill. At Facility X, there are 25 residents and 16 staff members. During the time of the outbreak one staff member was on vacation and was excluded from the analysis.

METHODS

Epidemiologic

Data collected from the initial line list and the epidemiological curve provided information for development of a food questionnaire. The case definition was: any person who lives or works at Facility X and became ill on or after March 30, 2005 with at least two of three symptoms (diarrhea, nausea, vomiting).

RESULTS

Epidemiologic

Of the thirty-seven questionnaires returned, 36 persons either worked or lived at Facility X during the time period analyzed. One person was on vacation during the time of the outbreak. Food history questionnaires were not collected from the four individuals that had been hospitalized but symptoms and onset date information was collected. The individuals in the cohort were predominately female (85%) and the median age was 70.3 years. The ill and non-ill groups do not differ by gender, age, or occupation (Appendix 1).

The three most common symptoms reported were diarrhea, nausea, and vomiting (Table 1). Two persons were hospitalized due to these three symptoms. Incubation time was not calculated since specific date and time of exposure was not identified. Based on the recovery dates of 6 cases (27%), the recovery time was 1.5 days.

Table 1: Distribution of symptoms in individuals who met the case definition among residents and staff members in Greenwood County, April 2005.

Symptom	Number (%)
Diarrhea	20 (90.9)
Nausea	18 (81.8)
Vomiting	17 (77.3)
Fever	11 (50.0)
Cramps	8 (36.4)
Chills	7 (31.8)

The overall attack rate was 55% (22 ill persons / 40 total persons). Food history was analyzed from the returned questionnaires. No specific food items, meals, or days showed an increased risk of becoming ill.

Laboratory

Stool specimens were collected and tested negative for enteric bacterial organisms. The specimens were not tested for norovirus because the media in which they were collected was not suitable.

Environmental

A layout map of Facility X was obtained. Facility X has four sections: North, South, West, and Center. Nine (60%) of 15 staff members reported working in all sections of Facility X. Residential cases were plotted on the map and no section had more cases than the others.

DISCUSSION

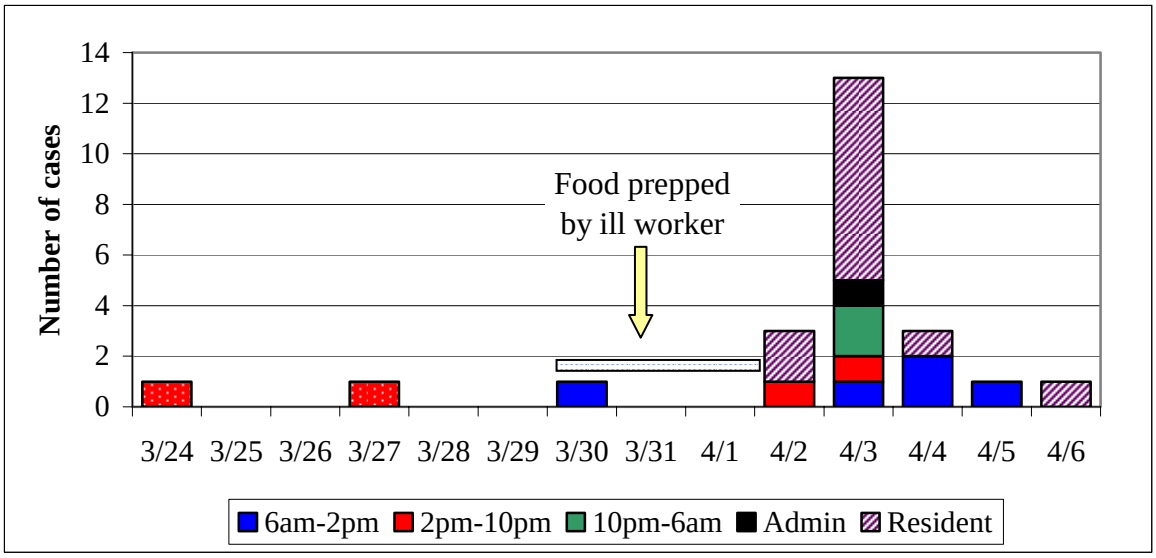
Based on the epidemiological information, several scenarios are possible for this outbreak. According to the epidemiological curve (Figure), the outbreak is a point source outbreak and a likely source could have been a staff member who prepared foods including ready-to-eat foods while ill with symptoms of diarrhea. This staff member was not trained as a food preparation worker and was filling in for another absent staff member.

Two other staff members prepared food prior to becoming ill and worked on the day of onset of symptoms. However, their dates of onset occurred at the same time as other cases in the outbreak and not prior to the outbreak.

Additionally, two staff members were ill prior to April 30 and are not a likely source of the outbreak. However, these two persons may have transmitted the organism person to person prior to the point source outbreak.

Staff members were recommended to not work while ill. Contract nurses worked along with assisted living nursing staff during the outbreak. Contract nursing staff had been instructed by their supervisor to restrict the residents to their rooms. GWLHD verified this matter with BEDP and then removed the restriction as long as the persons were able to independently maintain good hygiene practices. (Appendix 2 for definitions of isolation and quarantine according to Kansas Law)

Figure: Number of persons meeting the case definition based on onset of symptoms, Greenwood County, April 2005.



RECOMMENDATIONS

Several precautions can be taken to reduce the spread off diarrheal illness.

- Ill persons with diarrhea should not continue to work, especially in food preparation.
- All persons preparing food should have training on correct preparation, storing, and serving food.
- Proper handwashing.
- Ill persons with similar illnesses should be cohorted when possible.

SUPPORTING DOCUMENTS

EFORS form
Questionnaire
Map of facility

APPENDIX 1: Age, Gender, and Occupation of Cohort and of Ill and Non-Ill Persons

	All number (%)	**Ill** number (%)	**Non-ill** number (%)
Age (years)			
Mean	70.8	68.3	73.9
Median	83.5	67.5	83.5
Range	18-95	31-95	18-92
Gender			
Female	34 (85.0)	20 (90.9)	14 (77.8)
Male	15 (12.5)	2 (9.1)	3 (16.7)
Unknown	1 (2.5)	N/A	1 (5.5)
Occupation			
Resident	25 (62.5)	12 (54.5)	13 (72.2)
Staff	15 (37.5)	10 (45.5)	5 (27.8)
Number	40	22	18

*There is no statistical difference by the descriptive characteristics, between those who were ill and those who were not ill.

APPENDIX 2

Isolation: the separation, for the period of communicability, of infected persons or animals from others, in places and under conditions that prevent the direct or indirect conveyance of the infectious agents from those infected to those who are susceptible or who may spread the agent to others [K.A. R. 28-1-1(n)]

Quarantine: the limitation of freedom of movement of well persons or domestic animals that have been exposed to a communicable disease. (Authorized by and implementing K.S.A. 1981 Supp. 65-101; effective May 1, 1982.) [K. A. R. 28-1-1(q)]

GASTROENTERIC OUTBREAK AMONG ATTENDEES OF ANNIVERSARY PARTY IN RESTAURANT SHAWNEE COUNTY, KANSAS JUNE 2005

FINAL REPORT DATE
July 13, 2005

INVESTIGATORS
Nestoria Lopez-Wright, Epidemiologist, Shawnee County Health Agency

REPORTED BY
David Stuever, MPH, Epidemiologist, KDHE –BEDP Epidemiology Services Section

BACKGROUND
On June 17, 2005, a complaint of a possible foodborne outbreak associated with Restaurant X was reported to the Kansas Department of Health and Environment's (KDHE) Epidemiology Services Section (ESS) by a Bureau of Consumer Health (BCH) food inspector. The complainant stated ten individuals experienced illness after eating food at Restaurant X on June 12th. Individuals ate at this restaurant as part of a group of 25 for an anniversary party, with food served to the group "family style" in large bowls. Preliminary information revealed 10 individuals experienced diarrhea and vomiting approximately 36 to 72 hours after consuming the food at Restaurant X. Other symptoms included abdominal cramps, nausea, and fever. The KDHE Bureau of Consumer Health (BCH) and ESS notified the Shawnee County Health Agency's (SCHA) epidemiologist.

METHODS
On June 20, 2005 the Epidemiologist at the SCHA interviewed the complainant and 11 other ill individuals from the party using the standard seven-day enteric questionnaire. The information gathered in these interviews was used to create a line listing of cases, which was then used to develop the case definition. A case was defined as an individual who ate at Restaurant X and became ill between June 14 and 15 with symptoms of abdominal cramps, diarrhea, vomiting and nausea.

One case submitted a stool sample upon a visit to a local hospital. Six other individuals were willing to submit stool samples. Three of these individuals were from the state of Ohio and three were from Shawnee County. KDHE contacted the Ohio Department of Health Foodborne Epidemiologist to request assistance with obtaining these samples.

KDHE's Bureau of Consumer Health (BCH) conducted an inspection of Restaurant X on June 17. No food samples were available for laboratory testing.

RESULTS
Of the 12 individuals interviewed over the course of the investigation, 10 met the case definition. The incubation period for the infection ranged from 40 – 77 hours, with an average incubation period of 52.5 hours.

The stool sample submitted by one case was negative for enteric bacteria and parasites. The sample was destroyed before it was submitted to the KDHE Lab for Norovirus testing. Three samples from individuals in Shawnee County were not obtained due to difficulties with submission of stool kits to those individuals. The sample obtained from one case in Ohio was positive for Norovirus.

During the restaurant inspection, the inspector observed several critical violations including hand washing, improper hot and cold holding, date markings, cross contamination and improper chemical storage. Measures were taken, including education and disposal of food to correct these critical violations on site, with verification by the inspector. The restaurant was to be reinspected on approximately June 24th.

Restaurant X and SCHA did not receive any other complaints from restaurant patrons.

DISCUSSION

Though initial information implicated the Restaurant X group meal as the source of illness, other sources of infection may exist. First, other common meals may have been eaten either prior to or following the meal at Restaurant X. Person-to-person transmission among the 12 ill individuals is also possible. This investigation revealed at least 2 individuals with an illness onset date later than June 18, suggesting the possibility of secondary transmission. Individuals with onset dates after June 18th were not included as cases in this investigation.

Investigations of several documented outbreaks, particularly those caused by Norovirus (average incubation period of 24 – 48 hours, range of 15 – 77 hours), suggest that infection may be spread through inhalation of aerosolized vomitus[1,2,3]. However, additional data would be needed to better assess the possibility of infection from exposure to vomit in this outbreak.

Finally, other, unidentified exposures may have been the source of infection.

CONCLUSION

A gastroenteric outbreak occurred among approximately 13 extended family members who consumed at least one common meal from Restaurant X. The illnesses presented with similar symptoms with varying onsets and duration. The suspected etiology of the outbreak is Norovirus. The vehicle of transmission could not be definitively determined due to the lack of food histories of the members of the group and the possibility of other common exposures among the 10 cases.

Attachments: Table 1: Case Illness History

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[1] Caul EO. Small round structured viruses: airborne transmission and hospital control. Lancet 1994;343:1240–2.

[2] Chadwick PR, McCann R. Transmission of a small round structured virus by vomiting during a hospital outbreak of gastroenteritis. J Hosp Infect 1994;26:251–9.

[3] Marks PJ, Vipond IB, Carlisle D, Deakin D, Fey RE, Caul EO. Evidence for airborne transmission of Norwalk-like virus (NLV) in a hotel restaurant. Epidemiol Infect 2000;124:481–7.

Table 1: Case Illness History

Case	Age	Gender	Symptoms *	Date Onset	Time Onset	Incubation Period	Recovery Date
1	30	F	D V N S F	6/14/05	1900	52 hrs	6/17/05
2	10	F	D V N S	6/15/05	2000	77 hrs	6/17/05
3	43	M	D V N S	6/15/05	UNK	57-81 hrs	6/19/05
4	16	M	D V N S F	6/14/05	2000	53 hrs	6/16/05
5	22	F	D V N S	6/16/05	UNK	82-106 hrs	6/17/05
6	81	F	D V N S F	6/15/05	0600	63 hrs	6/18/05
7	28	M	D V N S F	6/14/05	1400	47 hrs	6/17/05
8	26	F	D V N S F	6/14/05	1500	48 hrs	6/16/05
9	58	F	D V N S	6/14/05	0700	40 hrs	6/16/05
10	20	M	D V N S F	6/14/05	0700	40 hrs	6/17/05

V = Vomitting; D=Diarrhea; N = Nausea S=Stomach Cramps F = Fever

VIRAL GASTROENTERITIS OUTBREAK ATTRIBUTED TO NOROVIRUS
MARION COUNTY, KANSAS
JULY 2005

FINAL REPORT DATE
July 20, 2005

OUTBREAK INVESTIGATORS
Diedre Serene, Public Health Nurse[1]
Michael Kopf, Medical Investigator[2]
Ella Vajnar, Medical Investigator[2]
Cheryl Bańez Ocfemia, Epidemiologist[2]
Lindsey Jones[2]
Daniel Neises, Epidemiologist[2]
Chuck Hildebrandt, Food Protection Investigator[3]
Mark Lackey, District Manager[3]
Jolianne Stone, Epidemiologist[4]

REPORTED BY
Daniel Neises

BACKGROUND
On Tuesday, July 5, 2005, a Marion County citizen reported a possible foodborne outbreak to the Kansas Department of Health and Environment (KDHE). The caller stated 96 individuals from nine states (KS, AZ, CA, CO, FL, NE, OK, TX, WY) visited Marion County for a family reunion July 3—31 attendees had since experienced vomiting or diarrhea. Nearly all attendees ate a catered lunch at approximately 12:30 p.m. July 3. Foods were served buffet-style and included cubed pork, cole slaw, macaroni salad, potato salad, dinner rolls, and baked beans. Homemade desserts, iced tea, water, and lemonade were also served. Some attendees also shared other meals, including a July 3rd dinner where leftovers were served. KDHE and the Marion County Health Department (MCHD) initiated an outbreak investigation to determine the source of illness and implement appropriate control and prevention measures.

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[1]Marion County Health Department
[2]Kansas Department of Health and Environment, Division of Epidemiology Services
[3]Kansas Department of Health and Environment, Central District Office
[4]Oklahoma State Department of Health

METHODS

A cohort study was conducted to determine the cause of illness. MCHD and the Oklahoma State Department of Health assisted KDHE with interviewing reunion attendees. Each agency administered a uniform questionnaire to gather each individual's symptoms, food history, and travel history (see appendix).

Stool samples from seven ill individuals were submitted to KDHE Laboratories.

KDHE performed two inspections at the catering facility, including a Hazard Analysis and Critical Control Point (HACCP) inspection.

Cases were defined as individuals who experienced vomiting and/or diarrhea (more than three loose stools in a 24 hour period) after eating food served at the reunion Sunday, July 3.

RESULTS

Interviews were completed for 77 of the 96 attendees. Fifty-two (68%) individuals reported illness, and 43 (56%) met the case definition. The median age of the cases was 45 years (range, 2 - 79 years), and 44% were male.

Given the reported reunion lunchtime of 12:30 p.m., the median incubation period was 38 hours (range, 11 - 92.5 hours; see epidemic curve, Figure 1.0). The cases reported nausea (86%), vomiting (81%), stomachache (79%), diarrhea (63%), muscle aches (60%), and fever (42%). Illness duration varied. Among cases that had recovered before their interview (n=26) and mentioned a specific time and date of recovery (n=14), the median recovery time was 38.5 hours.

Univariate analysis of data from the cohort study demonstrated a significant association between potato salad consumption and illness. Persons who ate potato salad at lunch were at increased risk for illness (relative risk, 3.02; 95% confidence interval, 1.38 - 6.63; p=0.0002), as were persons who ate potato salad for dinner (relative risk, 3.20; 95% confidence interval, 0.94 - 10.84; p=0.0110). The same potato salad was served during both lunch and dinner July 3rd; however, not all attendees ate both meals. Risk of illness from eating potato salad at either meal was significantly associated with illness (relative risk, 2.09; 95% confidence interval, 1.37 - 3.18; p<0.0001). No other food or travel exposure was statistically linked to illness.

All seven stool samples tested positive for Norovirus—no bacterial pathogens were isolated. Two of the positive samples were forwarded to the Minnesota Department of Health for further characterization.

Three critical violations were observed during the initial catering facility inspection: unclean food equipment (can opener), an unlabeled chemical spray bottle, and a cold holding violation. A bare hand contact violation was observed during the HACCP inpection. No caterers reported illness prior to the reunion meal, including the foodhandler that prepared the potato salad.

CONCLUSION

The epidemiologic, clinical, and laboratory data collected regarding this outbreak are consistent with a point-source outbreak of Norovirus. Catered potato salad was statistically implicated as the cause of illness—persons who ate the dish were twice as likely to become ill compared to those that did not eat the potato salad. No food samples were tested to confirm viral contamination; historically, isolation of Norovirus from food has been difficult.[*] The caterer who made the dish denied illness prior to the time of its preparation; however, asymptomatic carriers have been previously noted. Asymptomatic shedding of Norovirus may last for up to two weeks after initial infection.[*] Alternatively, a reunion attendee may have introduced the virus into the salad while passing through the buffet line. This scenario is less likely, as 77 of the 96 attendees (all of those interviewed) denied gastrointestinal illness among household contacts in the week prior to the reunion, and only the potato salad was implicated as the source of illness. An ill attendee would likely have contaminated many items in the buffet line, not just one.

Norovirus is the leading cause of foodborne illness in the United States; an estimated 28 million people are infected with Norovirus every year—40% of these infections may be foodborne.[#] Onset of diarrhea and vomiting are common 12-48 hours after infection, and may last from 12 to 60 hours. Vomiting is more prevalent in children than adults. The disease is transmitted through fecal-oral routes; historically, Norovirus outbreaks have been associated with fecally contaminated foods, especially ready-to-eat foods such as salads, sandwiches, ice, cookies, and fruit.[¶]

Special care should be taken to avoid Norovirus contamination of ready-to-eat foods. Foodhandlers should be educated on proper handwashing and discouraged from bare hand contact with such foods.

ACKNOWLEDGEMENTS

KDHE is grateful for the assistance provided by the reunion attendees in completing outbreak questionnaires and obtaining stool specimens for testing.

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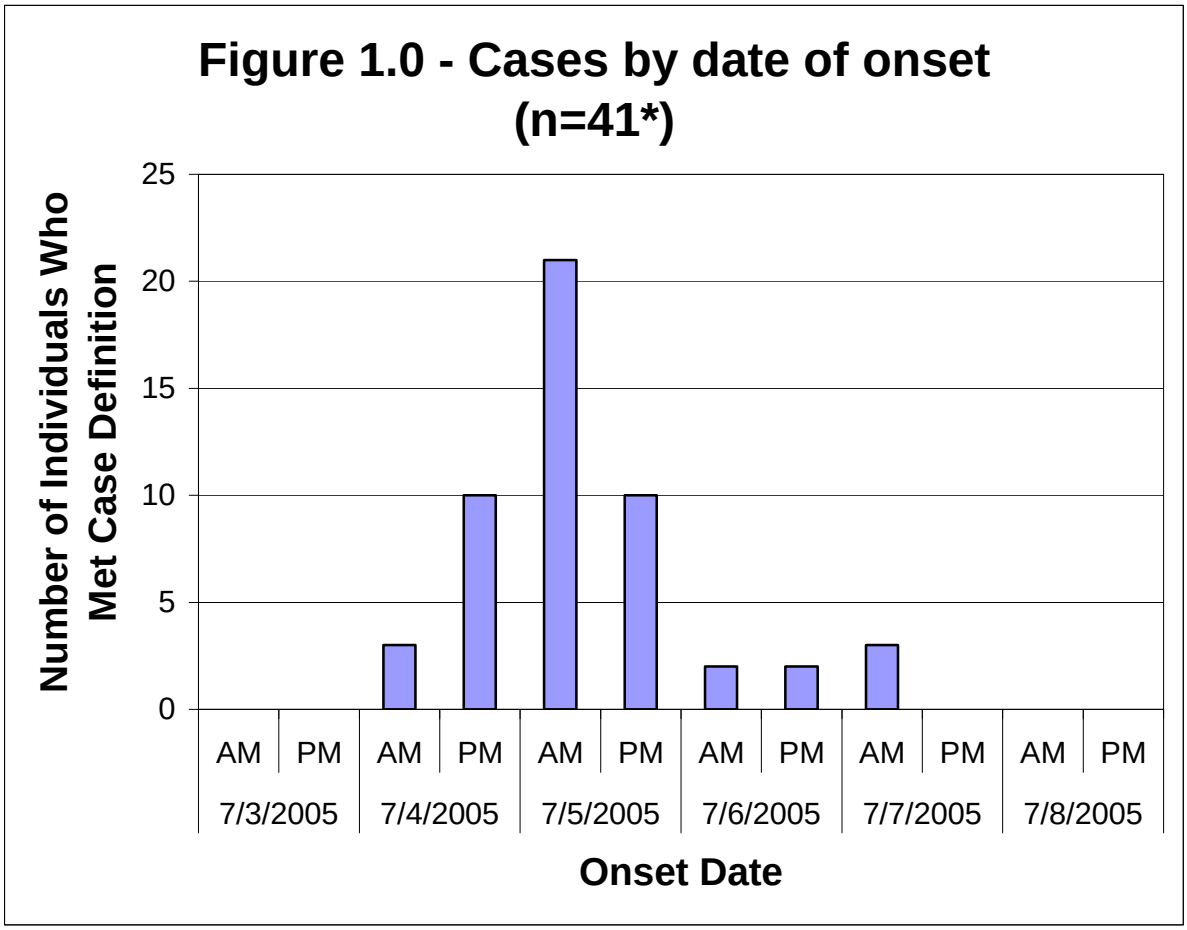
[*] Centers for Disease Control and Prevention. "Norwalk-Like Viruses: Public Health Consequences and Outbreak Management." MMWR 2001:50(No. RR-09);1-18

[*] Centers for Disease Control and Prevention. "Norwalk-Like Viruses: Public Health Consequences and Outbreak Management." MMWR 2001:50(No. RR-09);1-18

[#] Mead PS. Food related illness and death in the United States. Emerging Infectious Diseases, 1999. 5(6):607-625.

[¶] Centers for Disease Control and Prevention. "Diagnosis and Management of Foodborne Illnesses: A Primer for Physicians and other Health Care Professionals." MMWR 2004:53(No. RR-4).



*Two individuals that met the case definition (individuals who experienced vomiting and/or diarrhea after eating food served at the reunion Sunday, July 3) are excluded from Figure 1.0. One case's onset was 7/4/2005, but a time of illness was not obtained. The second case's onset was 7/9/2005, and may have been secondarily infected by an ill household contact.

Marion County, July 3, 2005

Date: _____

Interviewer: _____

Hello, my name is _____ and I am calling from the _____. We are investigating reports of possible foodborne illness in Marion County, Kansas. To determine the cause of illness, we need to interview individuals that attended the Marion County reunion -- we need to speak to those who became ill as well as those that did NOT become ill. Your participation is voluntary, and any information you provide will be kept confidential. The interview will take about 5 to 10 minutes. May I begin?

Last Name_____ First Name_____ Phone number_____

Address_____ City_____ State___ Zip code_____

Date of birth_____ Sex____

What day did you arrive in Marion County? _____

What day did you depart? _____

Where did you stay while visiting Marion County (hotel, with family, etc.)?

_____

Food History

Saturday, July 2, 2005

Breakfast:

Restaurant? Y N (*If yes*, Name _____ Location _____)

Foods eaten _____

_____

Lunch:

Restaurant? Y N (*If yes*, Name _____ Location _____)

Foods eaten _____

_____

Dinner:

Restaurant? Y N (*If yes*, Name _____ Location _____)

Foods eaten _____

_____

Other (snacks): _____

Sunday, July 3, 2005

Breakfast:

Restaurant? Y N (*If yes*, Name _____ Location _____)

Foods eaten _____

_____

Did you eat at the reunion lunch catered by X?

Y N (*if "no", list where and foods eaten*:_____)

Pork	Y	N	Unk	
Gravy	Y	N	Unk	
Cole Slaw	Y	N	Unk	
Macaroni Salad	Y	N	Unk	
Potato Salad	Y	N	Unk	
Dinner Rolls	Y	N	Unk	
Cake	Y	N	Unk	Type: Pineapple upside down, confetti, jello poke
Pie	Y	N	Unk	
Brownie	Y	N	Unk	
Tea	Y	N	Unk	
Water	Y	N	Unk	
Ice	Y	N	Unk	
Other foods	Y	N	Unk	_____
				_____

Did you eat at the reunion dinner?

Y N (*if "no", list where and foods eaten*:_____)

Fried Chicken	Y	N	Unk	
Cole Slaw	Y	N	Unk	
Macaroni Salad	Y	N	Unk	
Potato Salad	Y	N	Unk	
Dinner Rolls	Y	N	Unk	
Cake	Y	N	Unk	*Type*: Pineapple upside down, confetti, jello poke
Pie	Y	N	Unk	
Brownie	Y	N	Unk	
Tea	Y	N	Unk	
Water	Y	N	Unk	
Ice	Y	N	Unk	
Other foods	Y	N	Unk	_____

Monday, July 4, 2005

Breakfast:

Restaurant? Y N (*If yes*, Name _____ Location _____)

Foods eaten _____

_____

Lunch:

Restaurant? Y N (*If yes*, Name _____ Location _____)

Foods eaten _____

_____

Dinner:

Restaurant? Y N (*If yes*, Name _____ Location _____)

Foods eaten _____

_____

Other (snacks): _____

Did you become ill after visiting Marion County? Y N *(if "no", skip to next page)*

First symptom _____ Date _____ Time _____ AM PM

Indicate all symptoms:

Diarrhea (more than 3 loose stools in a 24 hour period): Y N

Bloody diarrhea: Y N Number stools/24 hours: _____

Stomach ache: Y N Nausea: Y N

Vomiting: Y N Muscle aches/pains: Y N

Fever: Y N Highest temperature_____

Other symptoms?_____

Did you completely recover? Y N If so: Date: _____ Time _____ AM PM

Did you see or contact a doctor? Y N Name of doctor _____

Was a stool specimen collected? Y N

Were you hospitalized? Y N

Did anyone in your household experience vomiting or diarrheal illness in the week PRIOR to the reunion?

Name_____ Age_____ Onset date _____

Name_____ Age_____ Onset date _____

Name_____ Age_____ Onset date _____

Did anyone in your household that did <u>not</u> attend the reunion become ill?

Name_____ Age_____ Onset date _____

Name_____ Age_____ Onset date _____

Name_____ Age_____ Onset date _____

WATERBORNE OUTBREAK ASSOCIATED WITH A RECREATIONAL WATER FACILITY
FORD COUNTY, KANSAS
AUGUST, 2005

Report Date:
February 2006

Investigators:
Kansas Department of Health and Environment – Jennifer Hill, Mary Ella Vajnar, Angela Huang
Gray County Health Department – Rayne Maddox
Ford County Health Department – Mary Alverez, Angela Elders, Debbie Noble, Mark Shriwise
Finney County Health Department – Megan Speer
Comanche County Health Department – Karen Oller

Author:
Jennifer M. Hill, MPH, Epidemiologist
Epidemiologic Services Section
Bureau of Epidemiology and Disease Prevention
Kansas Department of Health and Environment

INTRODUCTION
On August 11, 2005, Ford County Health Department contacted KDHE BEDP concerning a complaint made by a private citizen. Initially, the citizen claimed that after a group function (Group A) at a recreational water facility, 22 persons became ill with diarrhea and nausea. Gray County Health Department began collection a line list of all persons in Group A, who went to the recreational water facility.

BACKGROUND
Several local health departments in southwestern Kansas began working together to gather more information on individuals and groups of people who reported attending the recreational water facility and then developed diarrhea. The Water and Environmental consultant from CDC and the environmental inspector from Ford County Health Department were contacted to aid in the investigation. Eighty persons in two cohorts of persons who went to the recreational water facility were identified. Information on 60 persons who rode the slide was collected and 52 (87%) became ill with diarrhea. The most common symptoms were diarrhea (100%), stomach cramps (86%), and nausea (81%).

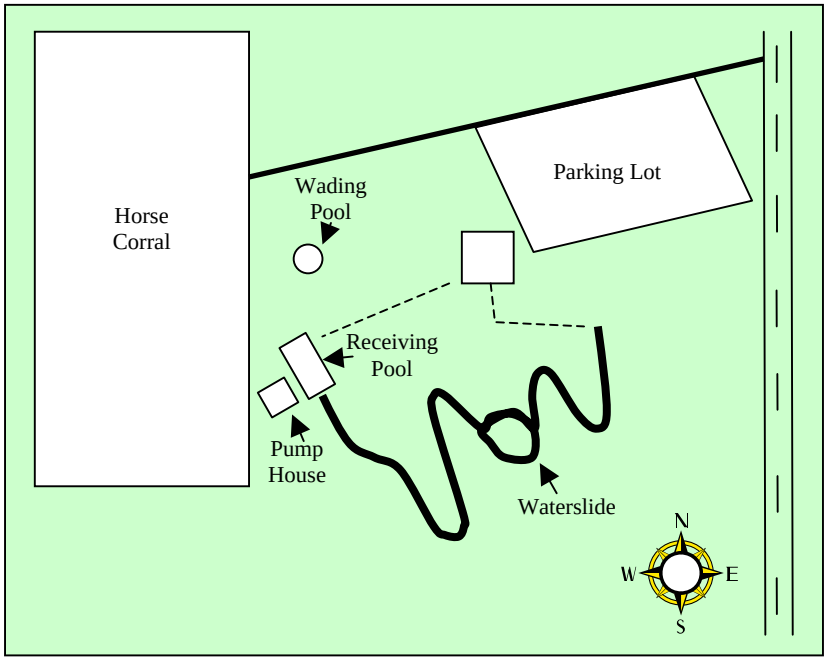
METHODS
Epidemiologic
Case definition: having attended the recreational water facility between July 23 through August 15 and developed diarrhea one to 12 days later or a household contact with diarrhea to a case. Information for 119 persons was collected by phone using a questionnaire and line list. The questionnaire assessed symptoms, exposure to the recreational water facility, other recreational

water, restaurants, social gatherings, farm animals, and source of drinking water. Data collected was used for both a case series and cohort investigations.

Laboratory and Clinical
A total of 7 stool samples were collected and submitted to Kansas Department of Health and Environment Laboratory (KDHEL) for testing. Specimens were tested for bacteria, viruses, and parasites.

Environmental
The recreational water facility was visited by an environmental inspector from Ford County Health Department on August 15. Information on the water filtration and layout of facility was collected. At the same time of the inspection, hyper-chlorination of the water was performed. Hyper-chlorination was completed on August 16, 2005.

Figure 1: Layout of Recreational Water Facility, Ford County, Kansas.



RESULTS
Epidemiologic
Eighty-five persons where identified in the waterborne outbreak in Ford County. One individual rode water slide at the recreational water facility twice while symptomatic with diarrhea. From both cohort investigations and individual case reports, a total of 81 persons reported developing diarrhea after attending the recreational water facility. Another 3 household contacts that did not use the recreational water facility developed diarrhea.

Cases were identified in the following counties: Comanche (2), Finney (2), Ford (23), Gray (56), and Sedgwick (2). During this investigation along with individual cases/ families, three cohorts were also identified: Group A (40 cases / 50 persons who rode the slide), Group B (12 cases / 14 persons), and Group C (8 cases / 9 persons).

The mean age of the cases was 16 years with a minimum and maximum of 1 year and 48 years, respectively. The most common symptoms were diarrhea, stomach ache, and nausea (Table 1). The average incubation period was 6.1 days (min, max: 1, 12) and the average recovery period was 3.6 days (min, max: 1, 7).

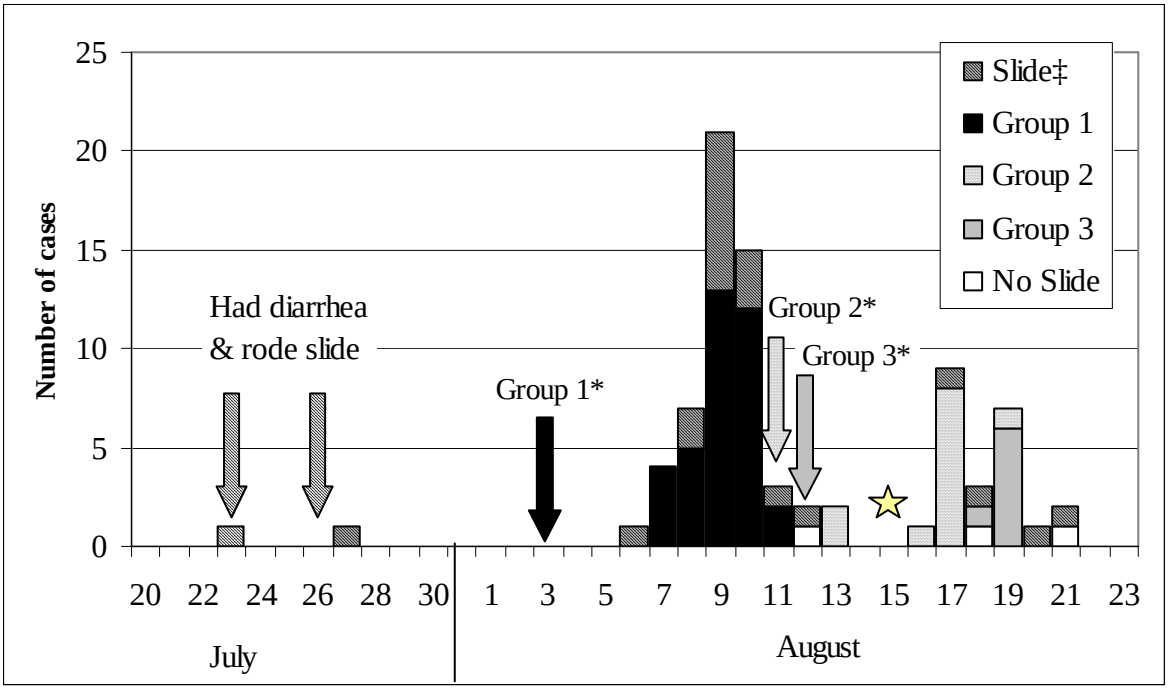
Table 1: Distribution of symptoms in individuals who met the case definition, Ford County 2005.

Symptom	n (%)
Diarrhea	85 (100)
Stomach ache	61 (72)
Nausea	55 (65)
Muscle aches	29 (34)
Fever/chills	15 (18)
Vomiting	12 (14)

Individuals associated with this outbreak visited the recreational water facility between July 23 and August 12, 2005. No persons reported visiting the facility and developing diarrhea after the water was hyper-chlorinated on August 15, 2005.
During the outbreak investigation, 3 cohorts of individuals were identified. For analysis purposes, these cohorts were combined into one. Information was gathered for 90 individuals who went to recreational water facility. The attack rate was 81.1% (60 of the 74 persons who rode the slide became ill with diarrhea). Persons who rode the water slide were 11.35 times more likely to become ill with diarrhea compared to those who did not ride the water slide (relative risk, 95% CI: 11.35, 1.71 – 75.05).

Laboratory and Clinical
All 7 specimens submitted to KDHE DHEL for testing were positive for cryptosporidium.

Figure 1: Number of persons meeting the case definition based on onset of symptoms, Ford County, July - August 2005.



*Date respective groups visited recreational water facility

‡ This cases were not associated with any group but had exposure to the recreational water facility.

☆ Recreational water facility hyperchlorinated.

Environmental

From the site visit of the recreational water facility, the water and grounds appeared clean. Daily procedures for the recreational water facility were based on recommendations from a local retail pool outlet. These procedures included daily changing of the water and the addition of specific amount of chlorine at certain time of the day. Patrons used foam mats at the facility. Also, a horse corral was located only 20 to 25 feet from the pool.

In order to kill cryptosporidium, the water at the facility was hyperchlorinated. To hyperchlorinate, the chlorine levels must be raised to 10 parts per million (ppm) for 16 hours or 20 ppm for 8 hours. On the evening of the initial visit, the chlorine levels were increased to over 20 ppm and remained at these levels until the next morning. According to the environmental inspector for Ford County, the free chlorine levels were 20 mg/l or greater for more than 12 hours. The foam mats were soaked in a bleach solution for the time period that would kill cryptosporidium as well.

DISCUSSION

The outbreak of cryptosporidium was associated with use of the recreational water facility in Ford County. The index case of the outbreak used the recreational water facility while

symptomatic with diarrhea and is a possible source of the outbreak. The average incubation period from use of recreational water facility to onset of symptoms is 6 days which is consistent with the incubation period of cryptosporidiosis. Seven persons who became symptomatic after use of the water facility tested positive for cryptosporidium.

RECOMMENDATIONS

Halting the outbreak was the result of several factors including: prompt response and investigation of initial report to local health department, co-operation between the water facility staff, local health departments and KDHE, and frequent communication with all involved counties. Once the association between illness and use of recreational water facility was identified, the facility was hyperchlorinated. One week after this new prevention measure, no new cases were reported.

Several recommendations were made to reduce the chances of this situation reoccurring . These recommendations apply to all recreational water facilities:

- Good general hygiene
- Individuals with diarrhea should be excluded from use of recreational water facilities while symptomatic.
- Daily equipment sanitizing
- Sand filter must be in service, constantly. Frequent backwashing is a must.
- Install showers and have swimmers bathe before and after swimming
- Test for free chlorine residual each hour. Document the date, time, test results, and number of swimmers
- Expand tests done – pH, temperature, “M” alkalinity, chlorine (total and free), turbidity, and color
- Post warning signs before swimmers enter water. If a swimmer is sick, they should speak with manager before entering water.
- Document any abnormal happenings and all daily operations and maintenance

SUPPORTING DOCUMENTS

Fecal Accident Response Recommendations for Aquatics Staff (CDC)
http://www.cdc.gov/healthyswimming/fecalacc.htm

GASTROENTERITIS OUTBREAK ATTRIBUTED TO NOROVIRUS
FRANKLIN COUNTY, KANSAS
DECEMBER 2005

FINAL REPORT DATE
January 5, 2006

OUTBREAK INVESTIGATORS
Donna Shead, Public Health Nurse[1]
Daniel Neises, Epidemiologist[2]
Amber Barham, Food Protection Investigator[3]

REPORTED BY
Daniel Neises

BACKGROUND

On Thursday, December 28, 2005, a Kansas Department of Health and Environment (KDHE) Food Protection Investigator notified the KDHE Division of Epidemiology Services of a foodborne illness complaint. The complainant, a citizen from Franklin County, stated five individuals from two households experienced vomiting and/or diarrhea after eating at a Franklin County restaurant. Each individual ate dinner at approximately 7:00 p.m. December 22, 2005; they denied any other common meals. KDHE and the Franklin County Health Department (FCHD) initiated an outbreak investigation to determine the source of illness and implement appropriate control and prevention measures.

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[1]Franklin County Health Department
[2]Kansas Department of Health and Environment, Division of Epidemiology Services
[3]Kansas Department of Health and Environment, Northeast District Office

METHODS

The FCHD administered a questionnaire to gather each individual's symptoms. A comprehensive food history for each individual was not obtained.

No food samples or stool samples were collected for testing.

KDHE performed an inspection of the restaurant on December 28, 2005.

Cases were defined as individuals who experienced vomiting and/or diarrhea (more than three loose stools in a 24 hour period) after eating at the Franklin County restaurant on December 22, 2005.

RESULTS

All five individuals that ate together at the restaurant were interviewed. All (100%) reported illness, and all (100%) met the case definition. The median age of the cases was 30 years (range, 21 - 54 years), and 60% were female.

Given the reported mealtime of 7:00 p.m., the median incubation period was 10 hours (range, 6 - 12 hours; see epidemic curve, Figure 1.0). The cases reported nausea (100%), stomachache (100%), fever (100%), muscle aches (100%), diarrhea (80%), and vomiting (60%). The duration of symptoms was approximately the same for all cases. Each case's symptoms resolved between 12:00 p.m. and 12:00 a.m. December 23—exact recovery times were not reported. As a result, the illness duration was estimated to be 36 hours after the onset of symptoms.

Three violations were observed during the restaurant inspection: unclean food equipment (can opener, plates), a hot holding violation (reheated sauce), and a handwashing violation. No employees reported illness.

CONCLUSION

The epidemiologic and clinical data collected regarding this outbreak are consistent with a point-source outbreak of Norovirus. No food item could be statistically implicated as the cause of illness, as everyone who ate became ill. Anecdotally, those diners that ate the most chips with cheese dip were more severely ill than those who ate less. No food samples were tested to confirm viral contamination; historically, isolation of Norovirus from food has been difficult.[*] Both the restaurant employees and the complainants denied illness prior to the meal; however, asymptomatic carriers have been previously noted. Asymptomatic shedding of Norovirus may last for up to two weeks after initial infection.[*]

Norovirus is the leading cause of foodborne illness in the United States; an estimated 28 million people are infected with Norovirus every year—40% of these infections may be

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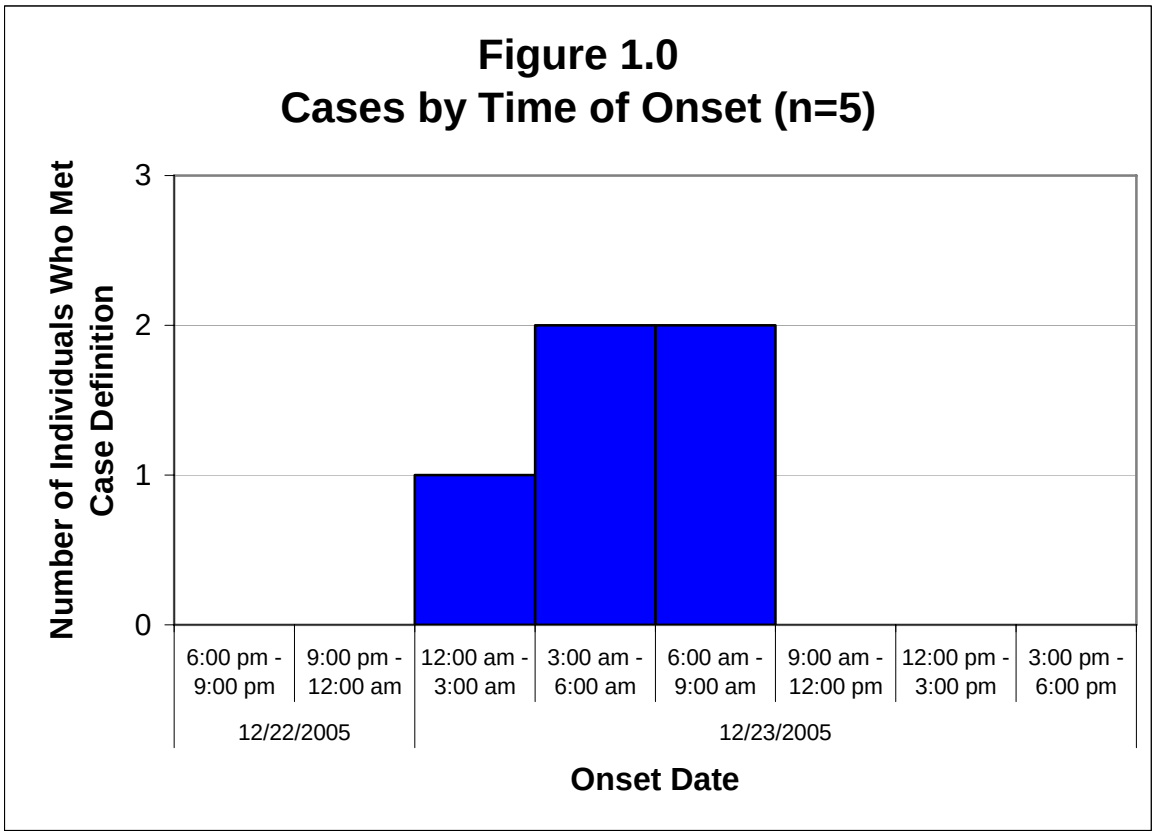
[*] Centers for Disease Control and Prevention. "Norwalk-Like Viruses: Public Health Consequences and Outbreak Management." MMWR 2001:50(No. RR-09);1-18

foodborne.[#] Onset of diarrhea and vomiting are common 12-48 hours after infection, and may last from 12 to 60 hours. Vomiting is more prevalent in children than adults. The disease is transmitted through the fecal-oral route; historically, Norovirus outbreaks have been associated with fecally contaminated foods, especially ready-to-eat foods such as salads, sandwiches, ice, cookies, and fruit.[¶]

Special care should be taken to avoid Norovirus contamination of ready-to-eat foods. Foodhandlers should be educated on proper handwashing and discouraged from bare hand contact with such foods.

This investigation was hindered by an informational delay. Although the cases began to feel ill early December 23, the foodborne illness complaint was not received by KDHE until December 27. It is not clear if the lag was due to the closure of KDHE offices for the Christmas holiday weekend (offices were closed December 24, 25, and 26), or if the complainant delayed contacting KDHE for several days. The delay prevented timely surveillance for additional cases as well as obtaining specimens for testing.



[#] Mead PS. Food related illness and death in the United States. Emerging Infectious Diseases, 1999. 5(6):607-625.
[¶] Centers for Disease Control and Prevention. "Diagnosis and Management of Foodborne Illnesses: A Primer for Physicians and other Health Care Professionals." MMWR 2004:53(No. RR-4).

Staphylococcal Food Poisoning Outbreak in Southeast Kansas
December, 2005

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Staphylococcal Food Poisoning Outbreak in Southeast Kansas — December 2005

Final Report Date
May 19, 2006

Introduction

On December 13, 2005, an emergency department physician at a southeast Kansas hospital notified the Kansas Department of Health and Environment (KDHE) and the local health department (LHD) of a potential foodborne illness outbreak. Approximately 30 employees from a Kansas company (Company X) had presented with severe vomiting and diarrhea at the emergency department. Preliminary information revealed that the ill employees had eaten a catered meal served at Company X on the evening of December 12.

With the cooperation of Company X, KDHE and the LHD initiated an outbreak investigation on December 13. The purpose of the investigation was to characterize the outbreak, to identify the source of illness, and to recommend and implement appropriate prevention and control measures.

Background

Company X had offered a catered meal to employees who worked during one of three different shifts.

- Shift 1: Approximately 100 employees were served a meal on Sunday, December 11 between 12:00 p.m. and 1:00 p.m.
- Shift 2: Approximately 600 employees were served a meal on Monday, December 12 between 12:00 p.m. and 1:00 p.m.
- Shift 3: Approximately 400 employees were served a meal on Monday, December 12 between 9:30 p.m. and 10:30 p.m.

Caterer A, who is licensed in Oklahoma, prepared and delivered all the meals. The meals consisted of sliced beef brisket, smoked sausage, barbecue beans, potato salad, bread, peach cobbler, iced tea, soda drinks, and condiments (barbecue sauce and pre-packaged lemon juice). The same meal was served during all three shifts; however, only Shift 3 employees reported subsequent illness.

Methods

Epidemiologic Investigation

KDHE and the LHD conducted a retrospective cohort study among Shift 3 employees who ate the evening meal served on December 12. Food and illness histories were collected using a self-administered questionnaire distributed on site and by mail.

A case for this outbreak was defined as any Shift 3 employee who experienced diarrhea or vomiting within 24 hours after eating the catered meal. Diarrhea was defined as three or more loose stools in a 24-hour period.

Completed questionnaires were entered into Microsoft Office Access and analyzed using Stata 8. Aggregate descriptive analyses were performed and risk ratios (RR) were calculated to assess the association between consumption of individual food items and subsequent illness.

Because employees of the company were residents of Kansas, Oklahoma, and Missouri, the Oklahoma State Department of Health and Missouri Department of Health and Senior Services were notified. In addition, other public health partners, including the United States Department of Agriculture Food Safety and Inspection Service (FSIS) and the Centers for Disease Control and Prevention (CDC), were informed of the incident to determine if other similar large-scale foodborne outbreaks had been reported nationally.

Environmental Assessment

The Oklahoma State Department of Health (OSDH) conducted an environmental assessment to identify risk factors that may have contributed to illness. OSDH interviewed Caterer A about purchase, storage, preparation, and transportation of the food served. Leftover samples of smoked sausage, peach cobbler, potato salad, and beef brisket were also collected from the catering facility for testing.

Laboratory Analysis

Stool specimens were collected from six ill persons seen at an emergency department. A portion of each fresh stool sample was cultured for bacteria at the local hospital. Remaining stool was preserved in polyvinyl alcohol (PVA) and tested for ova and parasites at a commercial laboratory. The Minnesota Public Health Laboratory (MPHL), the reference laboratory for KDHE, conducted additional analyses: pulsed-field gel electrophoresis (PFGE)[*] using the stool cultures and polymerase chain reaction (PCR)[†] using PVA preserved stool. The four food samples collected from the catering facility were submitted to the Minnesota Department of Agriculture Laboratory (MDAL) for direct toxin testing, non-selective culture, and quantitative culture.

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[*] Pulsed-field gel electrophoresis (PFGE) is a DNA-based, molecular subtyping method that may be used to distinguish between strains of organisms. During PFGE, bacterial isolates are separated into genetic fragments that form a unique DNA "fingerprint" or pattern that may be compared and analyzed.

[†] Polymerase chain reaction (PCR) is a method used to rapidly amplify specific segments of DNA.

Results

Epidemiologic Investigation

Three hundred sixty-four questionnaires were collected from approximately 400 employees who worked Shift 3. Of these, 306 (84%) employees reported eating the catered meal served between 9:30 p.m. and 10:30 p.m. Among the employees who ate this meal, 138 (45%) met the outbreak case definition. (Sixty-two individuals who reportedly did not consume the catered meal were excluded from analyses.)

Gender distribution was similar for cases and non-cases, with a higher percentage of males than females in both groups. The median age for the cases was 29.5 years while the median age for non-cases was 37 years. The age range for the study population was 18-69 years (Table 1).

TABLE 1. Characteristics of study population (n=306)

	Cases (n=138)		**Non-cases (n=168)**		**Total (n=306)**	
Sex						
	No.	(%)	No.	(%)	No.	(%)
Male	77	(56)	96	(57)	173	(57)
Female	61	(44)	72	(43)	133	(43)
Age, yrs						
Median	29.5		37		33	
Range	18-68		18-69		18-69	

Among the 138 cases, nausea was the most reported symptom, followed by stomachache, diarrhea, and vomiting. More than one-fourth of the cases reportedly sought medical care and less than one percent reported hospitalization. A majority of the cases reported recovery from illness within 48 hours (Table 2).

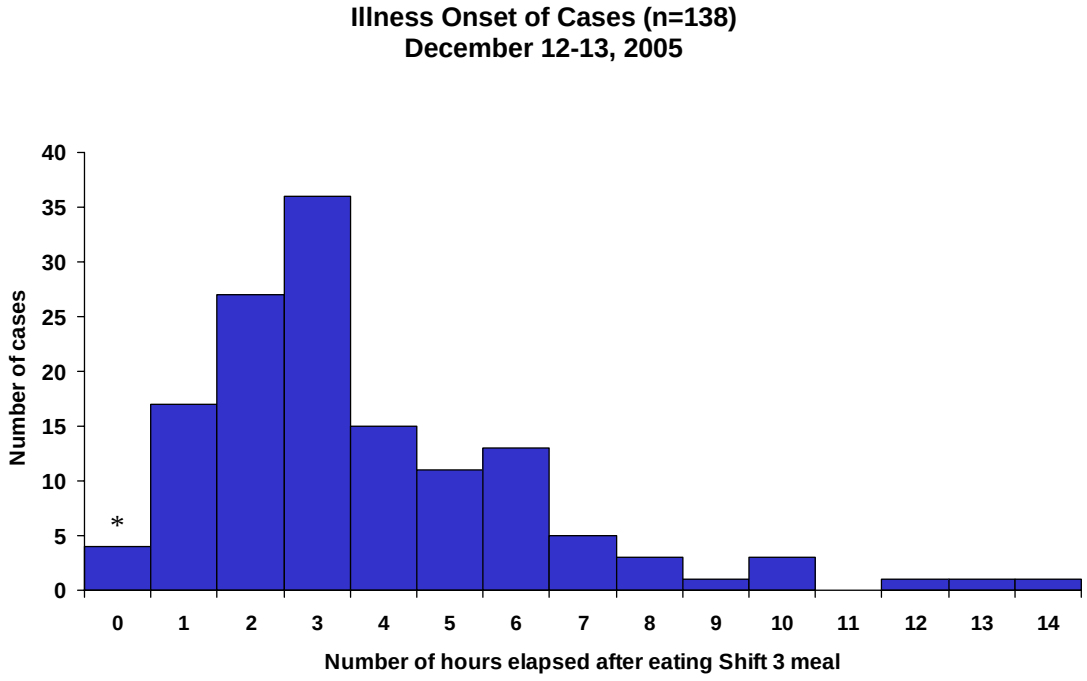
TABLE 2. Features of illness reported by cases (n=138)

Symptom / Outcome	No.	(%)
Nausea	126	(91)
Stomachache	124	(90)
Diarrhea*	120	(87)
Vomiting	111	(80)
Sought medical care	37	(27)
Hospitalized	19	(<1)
Recovered within 48 hours	114	(83)

* Diarrhea was defined as three or more loose stools in a 24-hour period.

Figure 1 shows that cases had onsets of illness between 0 to 14 hours after the Shift 3 meal was eaten. Almost two-thirds of the cases experienced illness within three hours of food consumption, as seen by the highest peak. The sharp increase and slow decline in illness during a short period of time demonstrate a common-source outbreak.

FIGURE 1. Epidemic Curve



* Meal served on Dec 12 between 9:30 p.m. and 10:30 p.m.

Among the foods analyzed, the highest risk of illness was associated with consumption of the smoked sausage, and this association was statistically significant (risk ratio = 3.24; 95% confidence interval=1.3–8.1). Risk of illness from eating the other food items served was minimal and not statistically significant (Table 3).

TABLE 3. Risk of illness by food item served on the evening of December 12, 2005

	Ate Food Item			Did Not Eat Food Item				
Food Item	**Ill**	**Not Ill**	**(% Ill)**	**Ill**	**Not Ill**	**(% Ill)**	**RR***	**95% C.I.** †
Smoked sausage	**131**	**142**	**(48)**	**4**	**23**	**(15)**	**3.2**	**1.3–8.1**
Peach cobbler	109	120	(48)	26	44	(37)	1.3	0.9–1.8
Barbecue beans	120	141	(46)	14	22	(39)	1.2	0.8–1.8
Barbecue sauce	94	98	(49)	39	55	(41)	1.2	0.9–1.6
Potato salad	117	141	(45)	17	27	(39)	1.2	0.8–1.7
Soda	20	21	(49)	80	112	(42)	1.2	0.8-1.7
Ice	77	92	(46)	45	54	(45)	1.0	0.8–1.3
Bread	113	141	(44)	20	23	(47)	0.9	0.7–1.4
Lemon juice	10	15	(40)	96	124	(44)	0.9	0.6-1.5
Beef brisket	130	162	(45)	7	6	(54)	0.8	0.5–1.4

* The risk ratio (RR) was calculated by dividing the percent ill who ate the food item by the percent ill who did not eat the food item.
† The confidence interval is an estimated range of values within which the true RR is likely to fall 95% of the time.

Environmental Assessment

The catering facility was located in Oklahoma, approximately two hours away from Company X. Caterer A solely purchased and prepared the food items at the Oklahoma facility and transported the catered meals to Company X using catering hot holding units.

All the food items, including 425 pounds of smoked sausage, were purchased precooked from two commercial retailers. In preparation for serving, the precooked, frozen sausage was thawed in a refrigerator over a two-day period. Once thawed, the sausage was removed from the casings, sliced into smaller pieces, placed back into the casings, and refrigerated.

Before each of the three meals, the Caterer A cooked portions of the sausage pieces in 2” shallow baking pans at 350ºF for approximately one hour. The remaining sausage pieces were kept in the refrigerator until needed for cooking. The 2” shallow pans of sausage and the other food items were then placed into the catering hot holding units for transport to Company X.

Three food handlers from the catering facility helped with preparation at Company X. The 2” pans of sausage were removed from the catering hot holding units, transferred into three 4” chafing pans, and kept hot with chafing fuel. More sausage was added to the chafing pans as needed throughout the meal.

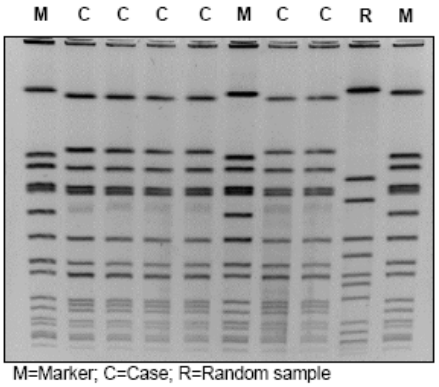
Opened, leftover pans of sausage were discarded after each of the three Shift meals. However, two unused pans from the December 12 noon meal were left in the hot holding units, transported back to the catering facility in Oklahoma, refrigerated, and reheated for the December 12 evening meal. The two leftover pans of sausage from the noon meal and two additional pans of sausage were transported to Company X for the Shift 3 meal.

Unused pans of sausage from the lunch meal were estimated to have been kept in the hot holding units for approximately nine hours on December 12. No temperatures were monitored during the hot holding, cool-down, or reheating process of the sausage for any of the meals. Additionally, examination of the caterer’s hands one day after the outbreak did not reveal obvious wounds.

Laboratory Analysis

Staphylococcal enterotoxin A (SEA)-producing *Staphylococcus aureus* were isolated from all six stool specimens. The six isolates also formed indistinguishable patterns when PFGE was conducted (Figure 3). Using PCR, the SEA-gene sequence was detected in four of six PVA preserved stool samples.

FIGURE 3. PFGE image of *S. aureus* isolates



M=Marker; C=Case; R=Random sample

Photo provided by D. Boxrud

Direct toxin testing of the sausage, peach cobbler, potato salad, and beef brisket food samples was negative for SEA. No *S. aureus* was found by semi-qualitative, non-selective, or quantitative cultures. However, *Bacillus licheniformis* was isolated from a sample of sausage.

Discussion

Staphylococcal food poisoning, which is caused by enterotoxin-producing *S. aureus*, is one of the most common foodborne intoxications. An estimated 185,000 cases are reported annually in the United States, though the actual number of cases may be 38 times higher[1]. Characterized by abrupt onset of vomiting and diarrhea, illness usually appears within two to four hours after ingestion of enterotoxin-contaminated food and may last for one or two days. Long-term complications and death are rare; however, severe dehydration and hospitalization may occur in very young children or older individuals[2].

S. aureus is ubiquitous in the environment and may be found on the skin, in the nose, mouth, and throat of many healthy persons. Foods may become contaminated with *S. aureus* when someone handles food with bare hands or when foods come into contact with equipment that has not been adequately cleaned. In order for staphylococcal food poisoning to occur, the following criteria must be present: (1) a food must be contaminated with enterotoxin-producing *S. aureus*; (2) the food must have the necessary requirements for bacterial growth; (3) adequate time and temperature must be present for the bacteria to multiply and produce enterotoxin; and (4) a sufficient amount of enterotoxin must be consumed[3]. Staphylococci thrive in protein-rich foods with high-salt content, such as ham, and grow in the temperature range of 45ºF and 118ºF. Heat-resistant enterotoxins are produced between the temperature range of 68ºF and 99ºF[4].

The results of the outbreak investigation confirm that Company X employees became ill with staphylococcal enterotoxin A (SEA) after consuming the catered meal served on the evening of December 12, 2005. Of the foods served, the smoked sausage was statistically implicated as the vehicle for disease transmission. Persons who consumed the sausage were three times more likely to become ill compared to those who did not eat the smoked sausage (RR=3.24; 95% C.I.=1.3–8.1).

The sausage sample tested negative for SEA and *S. aureus*. This may be a result of sampling error; the bacteria and enterotoxin may not have been uniformly distributed in the food. In addition, the samples may have been taken from pans of sausage that had not been subjected to prolonged storage. However, *B. licheniformis*, another toxin-producing bacterium that can cause food poisoning, was isolated from a sausage sample. Unlike *S. aureus* intoxication, *B. licheniformis* illness occurs approximately eight hours after consumption of contaminated food and is characterized predominantly by diarrhea[5,6]. The characteristics of the Company X outbreak were more consistent with staphylococcal food poisoning as compared with *B. licheniformis* gastrointestinal illness. The positive laboratory results (isolation of SEA-producing *S. aureus* and detection of the SEA-gene sequence) from the human samples provided additional evidence for this conclusion.

Contamination of the sausage may have occurred during any stage of food processing, from slaughtering, sausage production, to serving. Despite public health partners being alerted of the outbreak, no other large-scale staphylococcal food poisoning outbreaks were reported nationally during the same time period.

Environmental factors that may have contributed to bacterial growth and enterotoxin production in the sausage include substantial food handling during preparation, lack of temperature monitoring during food preparation and transportation, and prolonged storage of food in the catering hot holding units. The hot holding units used by the caterer did not have any heating elements. Even when the units were not opened, temperature for the stored food likely decreased over time.

To prevent the growth of *S. aureus* and the production of enterotoxins, meats should be heated to an internal temperature of 165ºF to 170ºF to sufficiently inactivate enterotoxin-producing *S. aureus* that may be present, and appropriate holding temperatures should be maintained[7]. Proper food handling should also be implemented, including good hand washing before handling food and having minimal bare hand contact with food.

Strengths
The communication and collaboration with partners at the local, state, and federal levels promoted a prompt, thorough, and successful outbreak investigation. This outbreak also provided an opportunity to employ PCR using PVA preserved stool to confirm SEA as the causative agent.

Areas of Improvement
Though the laboratory results of the stool samples confirmed the outbreak to be caused by SEA, testing of vomitus could have expedited this confirmation. Better specimen collection guidance for healthcare providers could have also aided the outbreak investigation. Furthermore, testing of the food handler for *S. aureus* carriage, even though no obvious wounds were present, could have provided additional information.

Recommendations

To prevent future outbreaks of enterotoxin-associated food poisoning, food handling practices should be reinforced among caterers, especially the storage and transport of cooked, ready-to-serve foods. Similarly, consumers should be aware of food preparation and food safety practices when hiring caterers. Specimen collection guidelines for healthcare providers should also be developed. These guidelines would assist in the proper collection of appropriate samples needed to identify the causative agent of outbreaks. Lastly, the utility of PCR in detecting enterotoxin genes in stool using control and case samples during foodborne outbreak investigations should be evaluated.

Conclusions

The epidemiologic evidence and laboratory results of the stool samples confirmed this outbreak to be caused by enterotoxin A produced by *Staphylococcus aureus*. The smoked sausage served as a good medium for *S. aureus* growth and enterotoxin production when proper food handling practices were not implemented. Improved food handling guidelines specifically for caterers may help prevent similar outbreaks in the future.

Acknowledgements
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Minnesota Department of Agriculture Laboratory – C Braymen
Kansas Department of Health and Environment – A Huang, C Bañez Ocfemia, DC Hunt

References
1. Mead PS, Slutsker L, Dietz V, et al. Food-related illness and death in the United States. Emerg Infect Dis 1999;5:607-25.
2. Heymann DL. Control of Communicable Diseases Manual. 18th ed. Washington, DC: American Public Health Association, 2004.
3. Armstrong GL, Hollingsworth J, Morris, Jr. JG. Bacterial foodborne disease. In: Evans AS, Brachman PS, eds. Bacterial Infections in Humans: Epidemiology and Control. 3rd ed. New York: Kluwer Academic/Plenum Publishers, 1998:109-138.
4. CDC. Outbreak of staphylococcal food poisoning associated with precooked ham – Florida, 1997. MMWR 1997:46:1189-1191.
5. Tuazon CU. Other bacillus species. In: Mandell GL, Bennett JE, Dolin R, eds. Principles and Practice of Infectious Diseases. 5th ed. Philadelphia: Churchill Livingstone, 2000:2220-2226.
6. Griffiths MW, Schraft H. Bacillus cereus food poisoning. In: Cliver DO, Riemann HP, eds. Foodborne Diseases. 2nd ed. San Diego: Academic Press, 2002:261-270.
7. Wong ACL, Burgdoll MS. Staphylococcal food poisoning. In: Cliver DO, Riemann HP, eds. Foodborne Diseases. 2nd ed. San Diego: Academic Press, 2002:231-248.

Attachments
1. Outbreak questionnaire
2. Environmental inspection report (names have been omitted for confidentiality purposes)
3. Fact sheet on staphylococcal food poisoning

ATTACHMENT 1
Outbreak Questionnaire

Kansas Department of Health and Environment
Employee Foodborne Illness Outbreak Survey
December 14, 2005

Information collected from the survey is used strictly for the investigation of the foodborne illness outbreak that occurred on December 12, 2005. Your participation is voluntary, and any information you provide that identifies you will be kept confidential.

Please mark answers to the best of your recollection. When you finish, please return this form to one of the health department representatives. Thank you.

1. Last Name: _____ **2. First Name:** _____

3. Age: _____Years **4. Sex:** ❑ Male ❑ Female

5. Did you eat the catered meal provided on Monday, December 12, 2005?
❑ Y ❑ N → If no, you have completed the survey. Thank you.

6. What time did you eat? ❑ 9:30 pm ❑ 10:00 pm ❑ Other (Specify: _____)

7. Please indicate how many times you went through each of the following buffet lines.
Left Line: _____Times Center Line: _____Times Right Line: _____Times

8. Did you eat any of the following items?

Sliced brisket?	❑ Yes	❑ No	❑ Can't remember
Smoked sausage?	❑ Yes	❑ No	❑ Can't remember
BBQ sauce from dispenser?	❑ Yes	❑ No	❑ Can't remember
Potato salad?	❑ Yes	❑ No	❑ Can't remember
BBQ beans?	❑ Yes	❑ No	❑ Can't remember
Bread?	❑ Yes	❑ No	❑ Can't remember
Peach cobbler?	❑ Yes	❑ No	❑ Can't remember
Iced tea?	❑ Yes	❑ No	❑ Can't remember
Soda?	❑ Yes	❑ No	❑ Can't remember
Ice (including ice in drinks)?	❑ Yes	❑ No	❑ Can't remember
Pre-packaged lemon juice?	❑ Yes	❑ No	❑ Can't remember

9. Please list any other food eaten while at work on December 12, 2005.

_____

Please continue on reverse side……

10. Did you become ill after you ate? ❑ Yes ❑ No →If no, skip to question 20

11. When did you start feeling ill? Date ____/____/_____ Time ____:_____AM/PM
MM DD YYYY

12. What was your first symptom? _____

13. Did you have any of the following symptoms?

Nausea?	❑ Yes	❑ No	❑ Don't know
Vomiting?	❑ Yes	❑ No	❑ Don't know
Stomach Ache?	❑ Yes	❑ No	❑ Don't know
Diarrhea? (more than 3 loose stools in a 24 hour period)	❑ Yes	❑ No	❑ Don't know

If yes, number of stools in 24 hours? _____

Bloody diarrhea?	❑ Yes	❑ No	❑ Don't know
Fever?	❑ Yes	❑ No	❑ Don't know

If yes, highest temperature? _____

Did you have any other symptoms? _____

14. Did you see a doctor or other healthcare professional? ❑ Yes ❑ No

15. Were you hospitalized? ❑ Yes ❑ No

If yes, where? _____

16. Was a stool specimen collected? ❑ Yes ❑ No

17. Are you still ill? ❑ Yes ❑ No

If no, when did you recover? Date _____ Time _____

18. Did anyone else in your household eat food from the catered event (i.e., food you may have taken home)? Do not include other household members who work on the evening shift and ate at work on December 12th. ❑ Yes ❑ No

19. Has anyone else in your household had the same symptoms within the past 7 days (since Thursday, December 8th)? ❑ Yes ❑ No
If yes, relationship:_____ Date illness began:____/_____/_____
MM DD YYYY

20. Do you have other comments or information you would like to share?

_____

_____

Thank you for completing the survey. Happy holidays!

ATTACHMENT 2
Environmental Inspection Report

(Names have been omitted for confidentiality purposes)

[redacted] Catered Event / Suspected Outbreak – Dec. 11 and 12, 2005

An investigation was performed on December 13, 2005 at [redacted] located on [redacted] Drive on the northwest side of [redacted] The investigation was in regard to a suspected food-borne illness outbreak that allegedly occurred from a catered event on December 11th and 12th at the [redacted] facilities in [redacted] KS. This investigation included an inspection and an interview done by W. Kent Smith, health inspector from the Washington County Health Department, Bartlesville, OK with the owner and operator of the restaurant, [redacted]

The catered meal consisted of brisket, sausage, potato salad, bar-b-que beans, peach cobbler, and iced tea. There were three separate catered occasions in two days at the [redacted] facilities. The first one was on Sunday, Dec. 11, and the meal was served to two groups – one at 12 noon and the other at 12:30 pm. A total of 100 people were served. The second event took place on Monday, Dec. 12 and food was served at 12 noon and 12:30 pm. During this serving period approximately 500 to 600 people were served. The last event was later that Sunday night and the food was served at 9:30 and then at 10 pm and 400 people were served

The employees of [redacted] that served this Christmas meal consisted of four people. The owner, [redacted] is the sole person who prepared and delivered all of the food to the events. The food was prepared at his restaurant near [redacted] The other three food handlers only helped with the preparations at the event site. Their names are [redacted] and a girl named [redacted] whose last name was not remembered at the time of the investigation. The individuals who served the foods in the catering line were managers of [redacted]

When asked about the overall health of his employees, [redacted] said that none of them had any obvious symptoms of illness or infection at the time of the events. [redacted] appeared healthy at time of investigation, and had no obvious symptoms, cuts or infections on hands, etc.

Also when asked, [redacted] said that no employees took any of the foods home with them and none of the [redacted] Employees brought additional foods to be served at the event.

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The following food items were purchased for the event at [redacted] in [redacted] on December 10, 2005:

1) [redacted] pre-cooked beef brisket, fresh, 425 lbs.
2) [redacted] brand beans, 60 large cans

[redacted] in [redacted] delivered the following food items to the restaurant on December 6, 2005:

1) [redacted] Smoked Sausage, frozen, 425 lbs.
2) [redacted] Potato salad, 330 lbs.
3) [redacted] Peach Cobbler, 18 cases
4) [redacted] Bar-B-Que Sauce, 12 gallons

The following notes regarding the preparation of the foods were received during the interview with [redacted]

The pre-cooked brisket was taken out of the refrigerator, the fat was trimmed off, the meat was placed into 2" deep baking pans and [redacted] chicken broth was added. This prep time took about 15 minutes per brisket. The pans were then covered with aluminum foil and placed into refrigeration until it was time for cooking. At cooking time, the pans were placed into the convection ovens at 350°F for 45 minutes to one hour. Once cooked, they were then taken out of the ovens, the foil was removed, plastic wrap was used to cover the cooked brisket and fresh foil was then placed over that. The pans were then placed into the [redacted] catering hot holding units until it was time to deliver foods to the event. The maximum length of time that the hot briskets remained in [hot holding units] prior to serving was approximately 6 hours. Cooking and hot holding temperatures were not taken during the preparation of the event, except for the Monday afternoon event where [redacted] said that the foods were all above 140°F prior to serving. At serving time two 2" pans of brisket were emptied into a 4" chaffing pan that was covered and placed over sterno to keep the meat hot. All dirty food containers, utensils, etc. were brought back to the restaurant where they were washed and sanitized in the three-compartment sink. Chlorine solution of 100 ppm was used for sanitizing. The containers of foods that were opened and that foods were served from were not re-used. This food was discarded after the serving period. However, two unopened pans of brisket (and two unopened pans of sausage) from the Monday afternoon event was left in the [hot holding units], was brought back to the restaurant, refrigerated, and later

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reheated for the Monday night event. A conservative estimate on how ling these pans of meat were left in [hot holding units] was approximately 9 hours. Again, temperatures of these leftovers were not monitored, neither hot hold, cool-down nor reheat.

The pre-cooked frozen sausage was thawed in refrigeration and this process took two days. Once thawed, the sausage was removed from the bag in the case and sliced into smaller pieces – approximately ¼ " in diameter. This meat was then put back into the original bag and case and placed back into the refrigerator. This prep time was about 10 to 15 minutes per case. When it was time to cook the sausage it was placed into 2" deep baking pans and [redacted] chicken broth was pored over the meats. The pans were covered with foil and placed into the convection ovens at 350°F for 45 minutes to 1 hour. Cooking temperatures were not monitored. The foil was removed and new plastic wrap and foil was used to cover the hot meats. The hot meat was then placed directly into [hot holding units] where it stayed for about 6 hours before serving time. As with the brisket, two 2" pans of sausage were emptied into a 4" chaffing pan that was covered and placed over sterno. As already mentioned, two 2" pans of sausage were left over from the Monday afternoon event. This meat was brought back to the restaurant, refrigerated and reheated for the 9:30 pm event. The cook did not properly monitor the hot hold, cool-down and reheat temperatures.

The canned beans were drained, placed into 2" baking pans and bar-b-que sauce was added. The mixture was stirred, covered with foil and then placed into the convection oven and cooked at 350°F for 45 minutes to 1 hour. Because of the large volume of food being prepared, [redacted] also cooked some of the beans on the stove, poured the hot food into 2" baking pans, covered the pans with foil, and placed them into the cambro units. He did say that he checked the temperatures of the beans during the cooking process because they have to be stirred. His temperatures ranged from 160° to 180°F. As with the meats, the 2" pans of beans were emptied into 4"chaffing pans, covered and placed over sterno prior to serving. There were no leftover beans from any of the three serving periods.

The commercially prepared potato salad was kept in refrigeration until all of the hot foods were in the [hot holding units] and ready for transporting. The potato salad was placed into [redacted] coolers without ice, but [redacted] did

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say that he checked temperatures for the Monday afternoon event and the temperature of the potato salad was below 40°F. He also said that the potato salad was in the cooler for no longer than 1-½ hours before the initial serving time. The potato salad was removed from the containers and placed into the chaffing pan without ice. No opened product was saved as a leftover. At the end of the serving period Monday afternoon there was some unopened leftover potato salad, which had been left in the cooler. It was covered with ice and served at the Monday pm event.

The cobbler is an uncooked, frozen product that was placed into the convection oven at 350°F and was cooked for over an hour. The cobbler was then placed uncovered on a shelf in the kitchen, cooled down to room temperature, covered and then placed back into the original box for transporting to the site. The product was then served into individual disposable bowls and placed at the end of the serving line. It was not refrigerated or kept cold at any time after cooking

The tea was made from large [redacted] tea bags that were boiled in a pot on the stove. The warm tea concentrate was poured over ice in a large [redacted] drink cooler. Water was then added until the drink cooler is full. The cooler was covered with a lid and transported. The tea was made fresh the mornings of the two afternoon events and the afternoon of the night event.

The Department of Environmental Quality does monitor the restaurant's well by submitting annual water samples. The last samples were taken on May 19, 2005 and the results showed that there were no coliform bacteria found. The water sample report also indicated that the water samples met the Safe Drinking Water Act standards.

The restaurant owner's original intent was to throw away all of the leftover foods from the last catered event on Monday night. He stayed overnight in a [redacted] motel, the leftover foods were left in the trailer and food temperatures were not maintained. Although these leftovers were to be thrown out and were found at 52°F, they were embargoed in case any samples of the foods need to be taken.

The facility at the time of the investigation appeared to be in satisfactory condition. Although there were some non-critical violations, the

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facility and it's equipment all appeared to be in good working order. Refrigerated foods were found to be at 36°to 37°F. The hand sinks were properly stocked and ready for use. Chlorine sanitizer was available for use. Overall the facility and the equipment were clean and well maintained.

The foods that appear to be most in question are the leftovers brisket and sausage. These meats' hot holding, cool-down and reheat temperatures were not monitored and temperature abuse could have taken place prior to serving the Monday night group. Another food that was not handled properly was the potato salad. There could have been some temperature abuse in the portion that was also leftover for the Monday night's event, as it was not iced down before leaving the restaurant. The peach cobbler might at first appear to be an issue as it was left out at room temperature for a lengthy time. The sugar content, however, probably keeps it from being a potentially hazardous food.

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Oklahoma State Department of Health
1000 NE 10th Street, Oklahoma City, OK 73117-1299
Telephone (405) 271-5243 FAX (405) 271-3458

Consumer Protection Division Page 1 of 6

FOOD INSPECTION REPORT

Reg. #	Mo.	Day	Yr.	Insp. Time	Mgr. Cert.	County #	Establishment#	Date of Exp.	Type Class	Priority
1448	12	13	05	11 AM		57	[redacted]	45	P	M

Purpose of Inspection: 1-Routine 2- Compliance 3- Issue License Application 4-Complaint 5- Other 6-Out of Business 7-Follow-Up Activity

Establishment: [redacted] Owner: [redacted]

City: [redacted] Zip: [redacted] Phone: [redacted]

OAC 310:256	√	I. Food (PHF) Temperature/Time Requirements Violations Require Immediate Corrective Action (CDI)=corrected during inspection	Remarks	Correct by Date
5-55		*1. Proper Cooling for Cooked/Prepared Food (140° - 70°F in 2 hrs./ 70° - 41°F in 4 hrs.)		
5-57(2), 60		*2. Cold Hold (41°F)/Time Control		
5-57(1), 60		*3. Hot Hold (140° F)/Time Control		
5-45		*4. Proper Cooking Temperatures per PHF		
5-51		*5. Rapid Reheating (165° F in 2 hrs)		

Food	Temp	Process	Location	Time	Food	Temp	Process	Location	Time
Brisket	36°F	CH	Refrig.						
Ham	36°F	"							

		II. Personnel/ Handling/Source Requirements - Requires Immediate Corrective Action	Remarks	Date
3-5		*6. Personnel with Infections Restricted/Excluded		
3-9,10;5-20		*7. Proper Handwashing / Proper Handling of Ready-To-Eat		
3-16		8. Good Hygienic Practices (Eating/Drinking/Smoking/Other)		
5-1, 2		*9. Approved Source/Sound Condition		
5-22,28,40,44		10. Food Protected during Storage, Display, Transportation, Service		
5-22		*11. Cross-Contamination of Raw/Cooked Foods/Other		
3-1, 2, 3, 4		12. Demonstration of Knowledge / Person In Charge		
9-8,9		13. Hot and Cold Water Under Pressure / Sufficient Capacity		

		III. Facility and Equipment Requirements - Requires Corrective Action Within 10 Days	Remarks	Date
7-50, 7-56		14. Equipment Adequate to Maintain Product Temperature/Accurate Thermometers Provided		
3-19,26;11-24,25		15. Handwash Facilities Adequate/Accessible with Soap and Towels		
11-15,49,53		16. Evidence of Rodent/Insect Contamination/Other Animals/Outer Openings Protected		
13-4-19		17. Toxic Items Properly Used/Stored/Labeled		
7-72,73,75		18. Manual/Mechanical Warewashing and Sanitizing at ( ) ppm/temperature Chlorine		
3-[illegible],72,52,30		19. Approved Water Supply/Sewage Disposal Systems/Cross-Connections		
7-82,83	X	20. Food Contact Surfaces of Equipment and Utensils Cleaned/Sanitized/Good Repair		
5-58, 59, 67		21. Date Marking; Consumer Advisory		

See Next Page(s)

4e Floors dirty under equipment
3f Restroom fixtures are dirty
(20) Drip pan of stove is dirty
3f Storage cabinets are dirty

County Health Dept. Phone # 335-3005

Follow-up Req. Yes No Date: To be determined

Foods condemned - ~~still~~ in trailer - was left to be thrown out - will save for eval if sampling desired - approx 2#

Based on an inspection this day, the items documented above identify the violations in operations or facilities, which must be corrected. Items 1-13 must be corrected immediately, items 14-21 must be corrected within 10 days, and all additional items must be corrected within 90 days or as noted. Failure to comply with any time limits for corrections specified in this notice may result in cessation of your Retail Food Establishment operation.

Inspected by: [signature] RPS 1448 [redacted] Title

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Consumer Protection Division
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INSPECTION REPORT

Establishment	License No.	Date
[redacted]	[redacted]	12-13-05
Address	**City**	**Time**
[redacted]	[redacted]	11 AM

Food	Temp	Process	Location	Time	Food	Temp	Process	Location	Time

Violation Item Number	Based on an inspection this day, the items documented below identify the violations in operations or facilities, which must be corrected. As indicated on the inspection form, items 1-13 must be corrected immediately. Items 14-21 must be corrected within 10 days. All additional items must be corrected within 90 days or such shorter time as specified by the regulatory authority. Failure to comply with any time limits for corrections specified in this notice may result in cessation of your Retail Food Establishment operation.	Correct By Date/ (Time)
	Employees consist of owner who prepares and delivers food to catering site and 3 other helpers that work only at catering sites that help set up. During this event the [redacted] managers helped serve foods.	
	Names of employees owner [redacted] and helpers [redacted]	
	Events totalled 3 —	
	1st Sunday 12/11 @ 12 Noon & 12:30 PM — total 100 people served	
	2nd Monday 12/12 @ 12 Noon & 12:30 PM - total 500-600 served	
	3rd Monday 12/12 @ 9:30 & 10 PM - total 400 served	
	Food items served: Pre-cooked [redacted] sliced beef brisket —	
	bought 12/10 [redacted] lbs: bought at [redacted], date 11/19/04	
	425 [redacted] Smoked Sausage, frozen delivered by	
	425 lbs [redacted]	
	330 lbs (11 cases) Potato Salad — [redacted] 01/6/06	
	(18 cases) Peach Cobbler — [redacted]	
	12 gallons 3 cases [redacted] BBQ Sauce — [redacted]	
	60 cans [redacted] brand beans — [redacted]	
	No employees took food home	
	No additional items from [redacted] employees were served	

Comments: [redacted] did not cater any other events in last week

Inspected by Registered Sanitarian No. 1458	Received by [redacted]	Title

Oklahoma State Department of Health
Protective Health Services

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Oklahoma State Department of Health
Consumer Protection Division
1000 NE 10th Street, Oklahoma City, OK 73117-1299
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Page 3 of 6

INSPECTION REPORT

Establishment	License No.	Date
[redacted]	[redacted]	12-13-05
Address	City	Time

Food	Temp	Process	Location	Time	Food	Temp	Process	Location	Time

Violation Item Number	Based on an inspection this day, the items documented below identify the violations in operations or facilities, which must be corrected. As indicated on the inspection form, items 1-13 must be corrected immediately. Items 14-21 must be corrected within 10 days. All additional items must be corrected within 90 days or such shorter time as specified by the regulatory authority. Failure to comply with any time limits for corrections specified in this notice may result in cessation of your Retail Food Establishment operation.	Correct By Date/ (Time)
	Brisket – pre cooked put into refrigerator	
	– has to be delivered from [redacted]	
	briskets taken out of case and stored in for delivery	
	– brisket taken out of package, fat is trimmed	
	15 mins + the briskets put into pan, covered w/ foil	
	– placed back into refrigeration until time for cooking	
	– place into convection oven at 350°F 45 minutes	
	– temperature to be obtained 160 to 180°F, but to be	
	temps not checked.	
	– removed from convec. oven, foil removed,	
	covered w/ Saran wrap + aluminum foil	
	max 5 min per pan + then placed into [Hot holding unit] – delivered to site	
	in approximately 6 hrs food is placed	
	6 hrs time in into chafing unit heated by sterno	
	+ covered – larger food pans (4" pan)	
	35 mins per deep pan – once line of customers formed lids are removed	
	+ food is served.	
	– temperatures were checked Sunday Noon	
	+ hot foods were in mid to high 140's	
	– temps were not checked at 9:30 PM serving.	
	– Some leftovers from Sunday noon serving were	
	9 hrs kept ~~stored~~ into [redacted] brought back to restaurant	
	refrigerated + the reheated for 9:30 PM serving.	
	16 hrs	
	– No reheat temperatures taken	
	– new foods heated up for each serving event.	
	– leftovers from Sun PM to be discarded + embargoed	

Comments:

Inspected by Registered Sanitarian No. 1499 Received by [redacted] Title

Oklahoma State Department of Health
Protective Health Services

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Consumer Protection Division
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INSPECTION REPORT

Establishment	License No.	Date
[redacted]	[redacted]	12-13-06
Address	City	Time

Food	Temp	Process	Location	Time	Food	Temp	Process	Location	Time

Violation Item Number	Based on an inspection this day, the items documented below identify the violations in operations or facilities, which must be corrected. As indicated on the inspection form, items 1-13 must be corrected immediately. Items 14-21 must be corrected within 10 days. All additional items must be corrected within 90 days or such shorter time as specified by the regulatory authority. Failure to comply with any time limits for corrections specified in this notice may result in cessation of your Retail Food Establishment operation.	Correct By Date/ (Time)
	Sausage – pre-cooked product / delivered by [redacted]	
	– put directly into freezer	
	– thawed in refrigerator – takes 2 days	
	10-15 minutes – cut into small pieces, put back into bag in box + back into refrigerator	
	– put into 2" shallow pan w/ [redacted] Chicken broth (can) foil on top + then into convection oven	
	– cooked 350°F for 45 mins to 1 hr.	
	– then placed into oven bro – 6 hrs before served	
	– delivered to site, placed into chafing pans w/ sterno.	
	– foods on the line ~~were~~ are not kept as leftovers – only unopened pans of meats were kept, refrigerated + then reheated for serving later Sunday night.	
	– approx 2 shallow 2" pans of unopened meats, both brisket + sausage, were used later that night.	

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Comments:

Inspected by: Registered Sanitarian No. 1468	Received by [redacted]	Title

Oklahoma State Department of Health
Protective Health Services

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Oklahoma State Department of Health
Consumer Protection Division
1000 NE 10th Street, Oklahoma City, OK 73117-1299
Telephone (405) 271-5243 FAX (405) 271-3458

INSPECTION REPORT

Establishment	License No.	Date
[redacted]	[redacted]	12-13-05
Address	City	Time

Food	Temp	Process	Location	Time	Food	Temp	Process	Location	Time

Violation Item Number	Based on an inspection this day, the items documented below identify the violations in operations or facilities, which must be corrected. As indicated on the inspection form, items 1-13 must be corrected immediately. Items 14-21 must be corrected within 10 days. All additional items must be corrected within 90 days or such shorter time as specified by the regulatory authority. Failure to comply with any time limits for corrections specified in this notice may result in cessation of your Retail Food Establishment operation.	Correct By Date/ (Time)
	Beans — canned, liquid poured off + BBQ sauce added — foil to cover pan (2" shallow) and placed into convection oven — to 160 – 180°F. — Cooked at 350°F — 45 mins / 1 hr. — temps checked + product stirred in mid-cycle — temp out at 160 – 180°F — delivered — placed into [Hot holding unit] — placed into chafing pans w/ sterno — kept in refrigeration until leaving for site	
	also did some beans on stove top	
	Potato salad — refrigerated — transported into 1/2 100 qt cooler — no ice for transport of serving — transferred from lg. bag to deep pan at catering event site — served w/in 30 min — temperature checked Sun Am — less than 40°F	
	— leftover potato salad put into cooler with ice to be later served Mon. 9:30 AM	
	Owner, at time of investigation, had no apparent symptoms of illness or infection — she stated same for helpers	

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Comments:

Inspected by Registered Sanitarian No. 1468 | Registered [redacted] | Title Owner

Oklahoma State Department of Health
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Oklahoma State Department of Health
Consumer Protection Division
1000 NE 10th Street, Oklahoma City, OK 73117-1299
Telephone (405) 271-5243 FAX (405) 271-3458

INSPECTION REPORT

Establishment	License No.	Date
[redacted]	[redacted]	12-13-05
Address	City	Time

Food	Temp	Process	Location	Time	Food	Temp	Process	Location	Time

Violation Item Number	Based on an inspection this day, the items documented below identify the violations in operations or facilities, which must be corrected. As indicated on the inspection form, items 1-13 must be corrected immediately. Items 14-21 must be corrected within 10 days. All additional items must be corrected within 90 days or such shorter time as specified by the regulatory authority. Failure to comply with any time limits for corrections specified in this notice may result in cessation of your Retail Food Establishment operation.	Correct By Date/ (Time)
	Cobbler — frozen — put into convection 350°F — put onto shelf, cooled down, placed back into box, transported to catering site — opened, served into individual bowls & customers take product at end of line	1hr +
	Tea — large [redacted] bags boiled — concentrate — poured cooled concentrated tea onto ice in [redacted] drink cooler, water added	
	DEQ checks well — taking samples annually — last one taken 5/19/05 — no coliform present — sample met Safe Drinking Water act standard	

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Comments:

Inspected by Registered Sanitarian No. 1608 | Re[redacted] | Title

Oklahoma State Department of Health
Protective Health Services

ODH #542
(REV. 08/01)

PROTECTIVE HEALTH SERVICES

Oklahoma State Department of Health
Protective Health Services
Consumer Protection Division
1000 NE 10th Street
Oklahoma City, OK 73117-1299
Telephone: (405) 271-6868
FAX: (405) 271-3442

NOTICE OF EMBARGO OF FOOD, DRUGS, DEVICES, COSMETICS, AND HAZARDOUS SUBSTANCES

TO: [redacted]

Sample No. _____

Date: 12/13/05
1:30 Pm

In accordance with the provisions of the Oklahoma Public Health Code 1963 Sections 1105, 1405, 1605 you are hereby notified that the following described merchandise now in your possession or custody is suspected of being adulterated or misbranded and is hereby detained or embargoed.

Hold Tag No.		Description
#2	12/13/05	Brisket – [redacted] – 6 lbs. each / 12 in a case
#1	12/13/05	Sausage – [redacted] – 10 lbs each
#3	12/13/05	Potato Salad – [redacted]
#4	12/13/05	Cobbler – [redacted] – 30 lbs each

Location of embargoed merchandise: [redacted]

The removal of this merchandise without permission of the Agent or a court of proper jurisdiction is unlawful, and all persons having any interest or right in the embargoed merchandise should be so warned.

By: _____
Agent of the Commissioner

James M. Crutcher, M.D., J.D.
Commissioner of Health and
State Health Officer

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Oklahoma State Department of Health
Protective Health Services

ODH Form 552
(Rev. 01/04)

ATTACHMENT 3
Fact Sheet on Staphylococcal Food Poisoning

Division of Bacterial and Mycotic Diseases

Staphylococcal Food Poisoning

Frequently Asked Questions

- What is *Staphylococcus*?
- What is staphylococcal food poisoning?
- What are the symptoms of staphylococcal food poisoning?
- How do I know if I have staphylococcal food poisoning?
- How should a patient with suspected staphylococcal food poisoning be treated?
- Is a sick patient infectious?
- How can staphylococcal food poisoning be prevented?
- Could staphylococcal toxins be used in a bioterrorist attack?

What is *Staphylococcus*?

Staphylococcus aureus is a common bacterium found on the skin and in the noses of up to 25% of healthy people and animals. *Staphylococcus aureus* is important because it has the ability to make seven different toxins that are frequently responsible for food poisoning.

What is staphylococcal food poisoning?

Staphylococcal food poisoning is a gastrointestinal illness. It is caused by eating foods contaminated with toxins produced by *Staphylococcus aureus* . The most common way for food to be contaminated with *Staphylococcus* is through contact with food workers who carry the bacteria or through contaminated milk and cheeses. *Staphylococcus* is salt tolerant and can grow in salty foods like ham. As the germ multiplies in food, it produces toxins that can cause illness. Staphylococcal toxins are resistant to heat and cannot be destroyed by cooking. Foods at highest risk of contamination with *Staphylococcus aureus* and subsequent toxin production are those that are made by hand and require no cooking. Some examples of foods that have caused staphylococcal food poisoning are sliced meat, puddings, some pastries and sandwiches.

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What are the symptoms of staphylococcal food poisoning?

Staphylococcal toxins are fast acting, sometimes causing illness in as little as 30 minutes. Symptoms usually develop within one to six hours after eating contaminated food. Patients typically experience several of the following: nausea, vomiting, stomach cramps, and diarrhea. The illness is usually mild and most patients recover after one to three days. In a small minority of patients the illness may be more severe.

How do I know if I have staphylococcal food poisoning?

Toxin-producing *Staphylococcus aureus* can be identified in stool or vomit, and toxin can be detected in food items. Diagnosis of staphylococcal food poisoning in an individual is generally based only on the signs and symptoms of the patient. Testing for the toxin-producing bacteria or the toxin is not usually done in individual patients. Testing is usually reserved for outbreaks involving several persons. If you think you may have food poisoning, contact your physician.

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How should a patient with suspected staphylococcal food poisoning be treated?

For most patients, staphylococcal food poisoning will cause a brief illness. The best treatments for these patients are rest, plenty of fluids, and medicines to calm their stomachs. Highly susceptible patients, such as the young and the elderly, are more likely to have severe illness requiring intravenous therapy and care in a hospital.

Antibiotics are not useful in treating this illness. The toxin is not affected by antibiotics.

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Is a sick patient infectious?

Patients with this illness are not contagious. Toxins are not transmitted from one person to another.

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How can staphylococcal food poisoning be prevented?

It is important to prevent the contamination of food with *Staphylococcus* before the toxin can be produced.

- Wash hands and under fingernails vigorously with soap and water before handling and preparing food.
- Do not prepare food if you have a nose or eye infection.
- Do not prepare or serve food for others if you have wounds or skin infections on your hands or wrists.
- Keep kitchens and food-serving areas clean and sanitized.
- If food is to be stored longer than two hours, keep hot foods hot (over 140°F) and cold foods cold (40°F or under).
- Store cooked food in a wide, shallow container and refrigerate as soon as possible.

Could staphylococcal toxins be used in a bioterrorist attack?

Staphylococcal toxins could be used as a biological agent either by contamination of food/water or by aerosolization and inhalation. Breathing in low doses of staphylococcal enterotoxin B may cause fever, cough, difficulty breathing, headache, and some vomiting and nausea. High doses of the toxin have a much more serious effect

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Date: March 29, 2006
Content source: National Center for Infectious Diseases/Division of Bacterial and Mycotic Diseases

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Centers for Disease Control and Prevention,1600 Clifton Rd, Atlanta, GA 30333, U.S.A
Tel: (404) 639-3311 / Public Inquiries: (404) 639-3534 / (800) 311-3435

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Department of Health and Human Services

SECTION THREE - APPENDICES

KANSAS NOTIFIABLE DISEASE FORM

Today's Date: ____ / ____ /____

Patient's Name: _____
Last First Middle

Day Phone: _____ **Evening Phone:** _____

Residential Address: _____

City: _____ **Zip:** _____ **County:** _____

Ethnicity: Hispanic or Latino Not Hispanic or Latino Unknown

Race: ***(Circle all that apply)***

American Indian/Alaska Native Asian Black or African American

Native Hawaiian or Other Pacific Islander White Unknown

Sex: M F **Date of Birth:** _____ / _____ / _____ **Age if DOB unknown:** _____

Disease Name: _____

Symptoms: Onset: ___ / ___ /____ **List the 3 most prominent symptoms**:

Symptom 1: _____ Symptom 2:_____ Symptom 3:_____

Outbreak associated? Y N **Died?** Y N **Hospitalized?** Y N

Institutional Residence? None Nursing Home Correctional Residential Hospital Psych

Physician Name: _____ **Physician Phone:** _____

Laboratory Information:

Specimen Collection Date: _____ / _____ / _____ Date Reported To You: _____ / _____ / _____

Name of Test Performed: _____ Results of Test: _____

Name of Laboratory: _____ Laboratory Results Attached? Y N

Treatment Information:

Date of Treatment: _____ / _____ / _____ Treatment Type and Dosage: _____

Treatment Status: Complete On-going Discontinued

Name of person reporting: _____ **Phone:** _____

Comments: _____

Mail reports to your local health department or to: BEDP – Disease Surveillance, 1000 SW Jackson, Suite 210, Topeka, KS 66612-1274. Reports can also be ***faxed toll free*** to: 1-877-427-7318. (Rev. 04/2004)

2004 REPORTABLE DISEASES IN KANSAS for health care providers, hospitals, and laboratories
(K.S.A. 65-118, 65-128, 65-6001 through 65-6007, K.A.R. 28-1-2, 28-1-4, and 28-1-18)

☏ ***Bold*** --Telephone report within four hours of *suspect* or *confirmed* cases to KDHE toll free at **1-877-427-7317**.

ⓘ **Isolates must be sent to:** Division of Health and Environmental Laboratories
Forbes Field, Building #740, Topeka, KS 66620-0001
Phone: (785) 296-1636

☏ DISEASES REQUIRING SPECIAL ATTENTION ☏

Anthrax ☏
Botulism ☏
Cholera ☏
Measles (rubeola) ☏
Meningitis, bacterial ☏
Meningococcemia ⓘ☏
Mumps ☏
Pertussis (whooping cough) ☏
Plague ☏
Poliomyelitis ☏
Q Fever ☏
Rabies, human and animal ☏
Rubella, including congenital rubella syndrome ☏
Severe Acute Respiratory Syndrome (SARS) ⓘ☏
Smallpox ☏
Tuberculosis, active disease ⓘ ☏
Viral hemorrhagic fever ☏
Escherichia coli O157:H7
(and other enterohemorrhagic, enteropathogenic and enteroinvasive *E. coli)* ⓘ
Salmonellosis, including typhoid fever ⓘ
Shigellosis ⓘ
Streptococcal invasive disease, Group A *Streptococcus* or *Streptococcus pneumoniae* ⓘ

Acquired Immune Deficiency Syndrome (AIDS)
Amebiasis
Anthrax ☏
Botulism ☏
Brucellosis
Campylobacter infections
Chancroid
Chlamydia trachomatis genital infection
Cholera ☏
Cryptosporidiosis
Cyclospora infection
Diphtheria
Ehrlichiosis
Encephalitis, infectious (includes West Nile virus)
Escherichia coli O157:H7
(and other enterohemorrhagic, enteropathogenic and enteroinvasive *E. coli)* ⓘ
Giardiasis
Gonorrhea
Haemophilus influenza, invasive disease
Hantavirus Pulmonary Syndrome
Hemolytic uremic syndrome, postdiarrheal
Hepatitis, viral (acute and chronic)
Hepatitis B during pregnancy
Human Immunodeficiency Virus (HIV) (includes Viral Load Tests)
Legionellosis
Leprosy (Hansen disease)
Listeriosis
Lyme disease
Malaria
Measles (rubeola) ☏
Meningitis, arboviral (includes West Nile virus)
Meningitis, bacterial ☏
Meningococcemia ⓘ☏
Mumps ☏
Pertussis (whooping cough) ☏
Plague ☏
Poliomyelitis ☏
Psittacosis
Q Fever ☏
Rabies, human and animal ☏
Rocky Mountain Spotted Fever
Rubella, including congenital rubella syndrome ☏
Salmonellosis, including typhoid fever ⓘ
Severe Acute Respiratory Syndrome (SARS) ⓘ☏
Shigellosis ⓘ
Smallpox ☏
Streptococcal invasive disease, Group A *Streptococcus* or *Streptococcus pneumoniae* ⓘ
Syphilis, including congenital syphilis
Tetanus
Toxic shock syndrome, streptococcal and staphylococcal
Trichinosis
Tuberculosis, active disease ⓘ☏
Tuberculosis, latent infection
Tularemia
Varicella (chickenpox)
Viral hemorrhagic fever ☏
Yellow fever

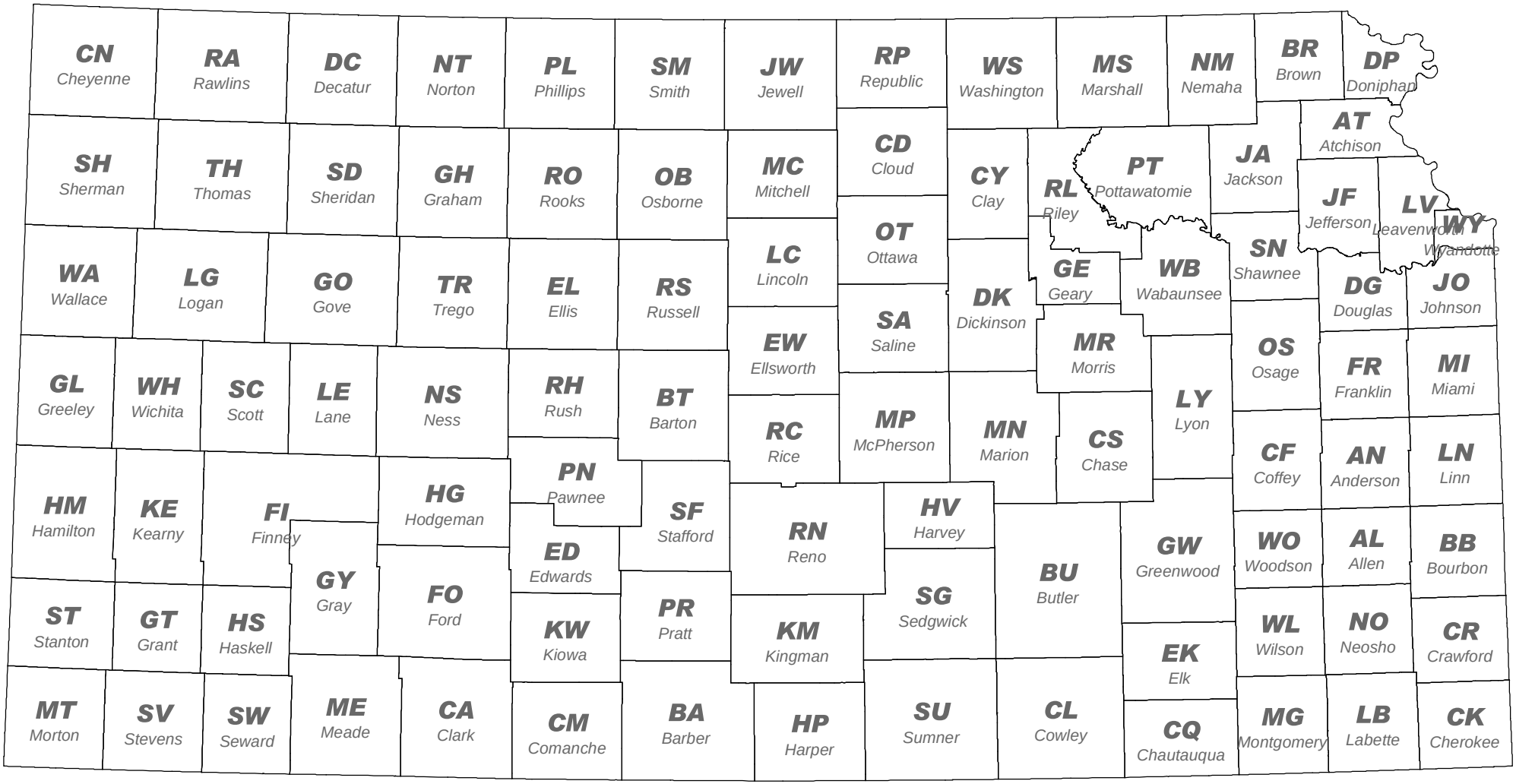
In addition, laboratories must report:

- Viral load results of reportable diseases
- ALL blood lead levels, as of 12/2002 (KCLPPP/ABLES)
- CD4+ T-lymphocyte count < 500/ µl or CD4+ T-lymphocytes <29% of total lymphocytes

Outbreaks, unusual occurrence of any disease, exotic or newly recognized diseases, and suspect acts of terrorism should be reported within 4 hours by telephone to the Epidemiology Hotline: 1-877-427-7317

Mail or fax reports to your local health department or to:
Bureau of Epidemiology & Disease Prevention - Disease Surveillance, 1000 SW Jackson, Suite 210 Topeka, KS 66612-1274
Fax: 1-877-427-7318 (toll free)

Kansas Counties



KANSAS COUNTY ABBREVIATIONS

AL	Allen	**GL**	Greeley	**OB**	Osborne
AN	Anderson	**GW**	Greenwood	**OT**	Ottawa
AT	Atchison	**HM**	Hamilton	**PN**	Pawnee
BA	Barber	**HP**	Harper	**PL**	Phillips
BT	Barton	**HV**	Harvey	**PT**	Pottawatomie
BB	Bourbon	**HS**	Haskell	**PR**	Pratt
BR	Brown	**HG**	Hodgeman	**RA**	Rawlins
BU	Butler	**JA**	Jackson	**RN**	Reno
CS	Chase	**JF**	Jefferson	**RP**	Republic
CQ	Chautauqua	**JW**	Jewell	**RC**	Rice
CK	Cherokee	**JO**	Johnson	**RL**	Riley
CN	Cheyenne	**KE**	Kearny	**RO**	Rooks
CA	Clark	**KM**	Kingman	**RH**	Rush
CY	Clay	**KW**	Kiowa	**RS**	Russell
CD	Cloud	**LB**	Labette	**SA**	Saline
CF	Coffey	**LE**	Lane	**SC**	Scott
CM	Comanche	**LV**	Leavenworth	**SG**	Sedgwick
CL	Cowley	**LC**	Lincoln	**SW**	Seward
CR	Crawford	**LN**	Linn	**SN**	Shawnee
DC	Decatur	**LG**	Logan	**SD**	Sheridan
DK	Dickinson	**LY**	Lyon	**SH**	Sherman
DP	Doniphan	**MN**	Marion	**SM**	Smith
DG	Douglas	**MS**	Marshall	**SF**	Stafford
ED	Edwards	**MP**	McPherson	**ST**	Stanton
EK	Elk	**ME**	Meade	**SV**	Stevens
EL	Ellis	**MI**	Miami	**SU**	Sumner
EW	Ellsworth	**MC**	Mitchell	**TH**	Thomas
FI	Finney	**MG**	Montgomery	**TR**	Trego
FO	Ford	**MR**	Morris	**WB**	Wabaunsee
FR	Franklin	**MT**	Morton	**WA**	Wallace
GE	Geary	**NM**	Nemaha	**WS**	Washington
GO	Gove	**NO**	Neosho	**WH**	Wichita
GH	Graham	**NS**	Ness	**WL**	Wilson
GT	Grant	**NT**	Norton	**WO**	Woodson
GY	Gray	**OS**	Osage	**WY**	Wyandotte

KANSAS COUNTY POPULATIONS

Bridged 2004 U.S. Census Bureau / National Center for Health Statistics Estimates

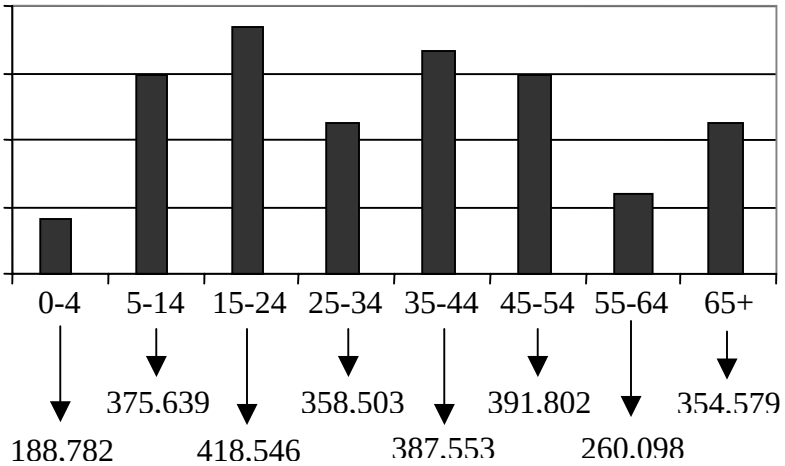
Allen	13,949	Greeley	1,415	Osborne	4,100
Anderson	8,191	Greenwood	7,538	Ottawa	6,175
Atchison	16,848	Hamilton	2,654	Pawnee	6,795
Barber	4,999	Harper	6,238	Phillips	5,583
Barton	27,367	Harvey	33,769	Pottawatomie	18,871
Bourbon	15,066	Haskell	4,272	Pratt	9,417
Brown	10,362	Hodgeman	2,089	Rawlins	2,765
Butler	61,828	Jackson	13,169	Reno	63,676
Chase	3,068	Jefferson	18,906	Republic	5,224
Chautauqua	4,178	Jewell	3,422	Rice	10,497
Cherokee	21,950	Johnson	496,691	Riley	63,069
Cheyenne	2,979	Kearny	4,515	Rooks	5,386
Clark	2,343	Kingman	8,390	Rush	3,466
Clay	8,597	Kiowa	3,084	Russell	6,978
Cloud	9,779	Labette	22,269	Saline	53,943
Coffey	8,759	Lane	1,950	Scott	4,691
Comanche	1,903	Leavenworth	72,439	Sedgwick	463,802
Cowley	35,772	Lincoln	3,416	Seward	23,237
Crawford	38,060	Linn	9,775	Shawnee	171,716
Decatur	3,274	Logan	2,827	Sheridan	2,614
Dickinson	19,132	Lyon	35,717	Sherman	6,218
Doniphan	8,062	Marion	29,413	Smith	4,179
Douglas	102,786	Marshall	13,010	Stafford	4,512
Edwards	3,308	McPherson	10,402	Stanton	2,374
Elk	3,117	Meade	4,592	Stevens	5,520
Ellis	27,060	Miami	29,712	Sumner	25,272
Ellsworth	6,350	Mitchell	6,564	Thomas	7,801
Finney	39,271	Montgomery	34,975	Trego	3,158
Ford	33,278	Morris	5,977	Wabaunsee	6,938
Franklin	26,049	Morton	3,269	Wallace	1,579
Geary	25,111	Nemaha	10,458	Washington	6,107
Gove	2,845	Neosho	16,555	Wichita	2,360
Graham	2,745	Ness	3,080	Wilson	9,946
Grant	7,685	Norton	5,799	Woodson	3,553
Gray	5,980	Osage	17,091	Wyandotte	156,487

DENOMINATORS USED FOR RATE CALCULATIONS

Rate calculations were performed when the reported disease count was 50 or more. Denominators were taken from the bridged 2004 estimates provided by the U.S. Census Bureau and National Center for Health Statistics.*

	Rate per 100,000	
Kansas Rate	#.#	Denominator = 2.735.502
U.S. Rate (2004)	#.#	**Taken from: www.cdc.gov/mmwr/summary**
Gender		
Male	#.#	Denominator = 1.358.381
Female	#.#	Denominator = 1.377.121
Race		
White	#.#	Denominator = 2.468.989
Black	#.#	Denominator = 173.385
Asian/Pacific Islander	#.#	Denominator = 62.364
Native American	#.#	Denominator = 30.764
Ethnicity		
Hispanic	#.#	**Denominator = 220.288**
Non-Hispanic	#.#	**Denominator = 2.515.214**
Geographic area		
Urban County	#.#	**Numerator = cases from** DG, JO, SN, SG, WY counties **Denominator = 1,391,482**
Non-Urban County	#.#	Numerator = cases ***NOT*** from DG, JO, SN, SG, WY counties **Denominator = 1,344,020**

Rate denominators by age group



* The HIV/AIDS program at KDHE combines race and ethnicity for analysis purposes. The denominators used for HIV/AIDS race rates differed from those used for other diseases: White, 2,261632; Black, 173,385; Hispanic, 207,357; Native American, 30,764; Asian/Pacific Islander, 62,364.

Selected Reportable Diseases, January - December, Kansas

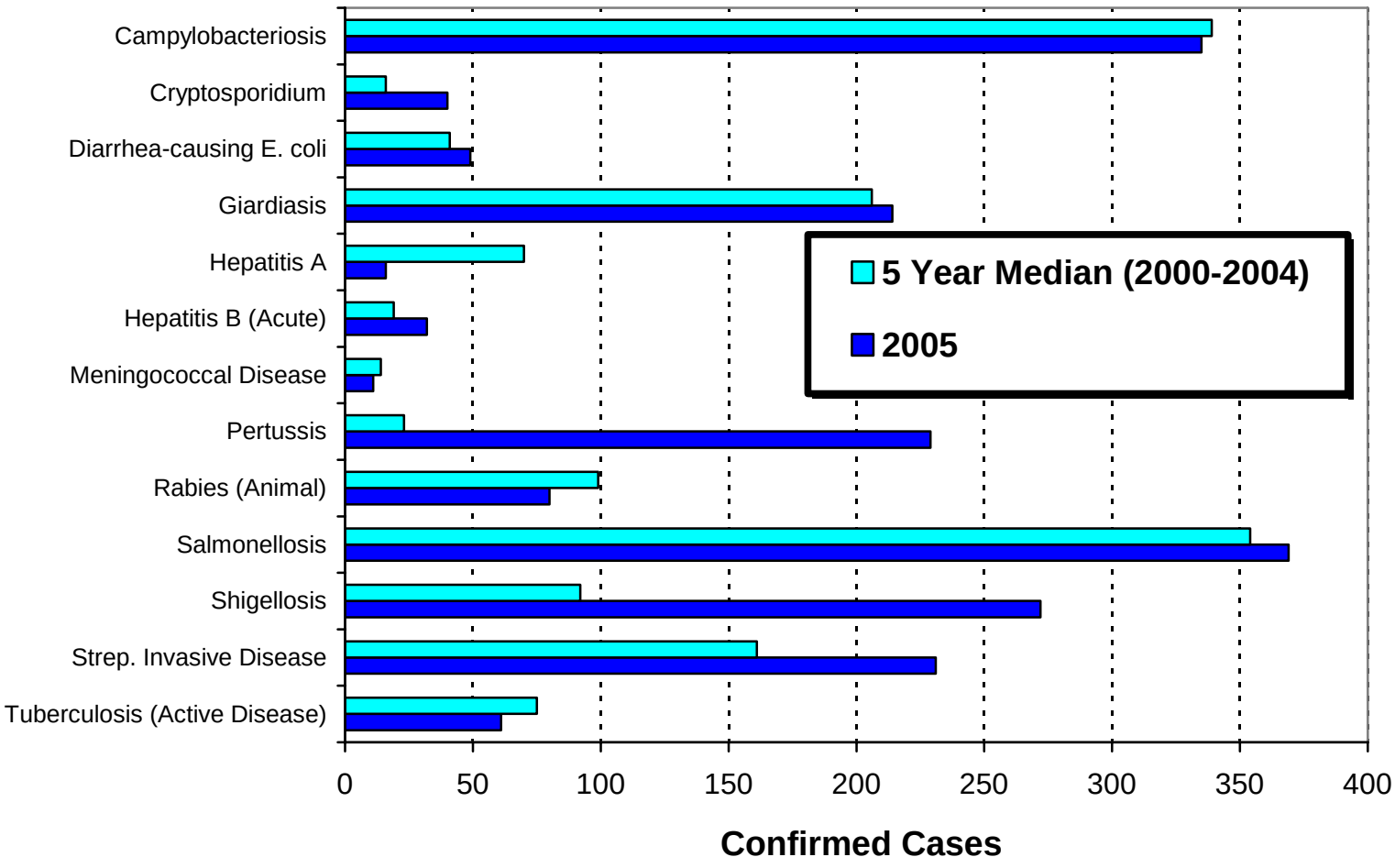


TABLE 1. REPORTABLE DISEASE CASES BY YEAR, KANSAS, 1996-2005

DISEASE	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
AMEBIASIS	8	9	5	9	5	2	4	4	0	7
ANTHRAX	0	0	0	0	0	0	0	0	0	0
BOTULISM, FOODBORNE	0	0	0	0	0	0	0	0	0	0
BOTULISM, INFANT	1	0	0	0	0	0	1	0	1	0
BOTULISM, OTHER	0	0	0	0	0	0	0	0	0	0
BRUCELLOSIS	1	0	0	0	1	1	0	0	1	1
CAMPYLOBACTERIOSIS	208	200	351	290	355	286	284	339	348	335
CHANCROID	2	0	1	0	0	0	0	0	0	0
CHLAMYDIA	4448	4698	5446	6093	6057	6172	6758	7150	7495	7419
CHOLERA	0	0	0	0	0	0	0	0	0	0
CRYPTOSPORIDIOSIS	11	14	11	2	9	4	16	174	31	40
DIPTHERIA	0	0	0	0	0	0	0	0	0	0
DIARRHEA-CAUSING *E. coli*	33	30	39	31	31	28	32	47	48	49
EHRLICHIOSIS***	-	-	-	-	0	5	3	2	1	0
ENCEPHALITIS, INFECTIOUS	2	2	1	1	0	0	1	2	1	0
ENCEPHALITIS, SLE	0	0	0	0	0	0	0	1	1	0
ENCEPHALITIS, WEE	0	0	0	0	0	0	0	0	0	0
ENCEPHALITIS, WNV^	-	-	-	0	0	0	22	90	9	9
GIARDIASIS	237	230	226	220	205	178	193	233	221	214
GONORRHEA	2043	2094	2574	2665	2795	2761	2701	2595	2544	2605
H. influenzae, INVASIVE*	-	-	7	8	5	2	5	15	8	18
HANSEN'S DISEASE	0	0	0	1	0	0	0	0	0	0

**Became reportable in 1997.*
***Became reportable in 1999.*
****Became reportable in 2000.*
*****Became reportable in 2001.*
******Became reportable in 2004.*

^Not endemic to North America until 1999.
§Case definition altered in 2000.

TABLE 1. REPORTABLE DISEASE CASES BY YEAR, KANSAS, 1996-2005

DISEASE	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
HANTAVIRUS PULM. SYN.	2	2	2	2	1	0	1	2	1	1
HEMOLYTIC UREMIC SYN.***	-	-	-	-	1	0	1	0	2	2
HEPATITIS A	393	262	109	66	111	181	70	26	22	16
HEPATITIS B, ACUTE	32	32	28	17	27	14	24	18	18	32
HEP C / NON-A NON-B, ACUTE	16	13	2	1	9	8	5	0	0	3
HIV / AIDS***	135	145	87	127	289	158	137	126	138	166
LEGIONELLOSIS	6	7	11	0	4	1	1	10	6	4
LISTERIOSIS***	-	-	-	-	0	5	1	3	0	7
LYME DISEASE	36	4	11	16	17	2	7	4	3	3
MALARIA	7	4	10	5	7	6	13	12	9	7
MEASLES	1	0	0	0	2	0	0	0	0	0
MENINGITIS, HiB	3	0	1	2	0	0	1	0	0	0
MENINGITIS, OTHER	18	52	25	28	22	22	14	27	8	12
MENINGOCOCCAL DISEASE	27	26	37	23	11	15	15	15	14	11
MUMPS	2	1	2	3	0	2	2	1	4	0
PERTUSSIS	14	33	71	49	18	11	38	23	98	239
PLAGUE	0	0	0	0	0	0	0	0	0	0
POLIOMYELITIS	0	0	0	0	0	0	0	0	0	0
PSITTACOSIS	0	0	0	0	0	0	0	0	0	0
Q FEVER****	-	-	-	-	-	0	2	1	0	0
RABIES, ANIMAL	37	89	99	107	97	100	153	165	99	80
RABIES, HUMAN	0	0	0	0	0	0	0	0	0	0

**Became reportable in 1997.*
***Became reportable in 1999.*
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^Not endemic to North America until 1999.
§Case definition altered in 2000.

TABLE 1. REPORTABLE DISEASE CASES BY YEAR, KANSAS, 1996-2005

DISEASE	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
ROCKY MT. SPOTTED FEVER	2	7	3	2	3	0	0	1	0	4
RUBELLA	0	0	36	0	0	1	0	0	0	0
RUBELLA, CONGENITAL	0	0	0	0	0	0	0	0	0	0
SALMONELLOSIS	419	446	363	333	378	314	354	291	394	369
SHIGELLOSIS	112	133	82	89	255	76	92	124	81	272
SMALLPOX****	-	-	-	-	0	0	0	0	0	0
STREP., INVASIVE[§]	0	1	16	15	30	98	154	200	228	231
SYPHILIS, P AND S	28	32	12	14	6	26	24	20	24	19
SYPHILIS, CONGENITAL	0	0	0	0	1	2	0	0	0	0
SYPHILIS, ALL STAGES	136	174	106	95	67	93	80	68	85	88
TETANUS	0	0	0	1	1	2	0	0	0	0
TOXIC SHOCK SYN.	5	1	4	5	6	4	1	1	0	1
TRICHINOSIS	0	0	0	1	0	0	0	0	0	0
TUBERCULOSIS	73	78	56	69	77	80	89	75	63	61
TULAREMIA	3	4	4	2	11	7	2	3	9	5
TYPHOID FEVER	1	2	0	1	1	0	1	0	1	1
VARICELLA*****	-	-	-	-	-	-	-	-	259	478
VIRAL HEMMORRHAGIC FEVER****	-	-	-	-	-	0	0	0	0	0
YELLOW FEVER	0	0	0	0	0	0	0	0	0	0

**Became reportable in 1997.*
***Became reportable in 1999.*
****Became reportable in 2000.*
*****Became reportable in 2001.*
******Became reportable in 2004.*

[^]Not endemic to North America until 1999.
[§]Case definition altered in 2000.

TABLE 2. REPORTABLE DISEASE CASES BY COUNTY, KANSAS, 2005

	AL	AN	AT	BA	BT	BB	BR	BU	CS	CQ	CK	CN	CA	CY	CD	STATE TOTAL
AMEBIASIS	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	7
BRUCELLOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
CAMPYLOBACTERIOSIS	5	2	3	2	9	0	0	4	1	0	2	2	0	0	1	335
CHLAMYDIA	27	11	48	7	36	36	10	91	2	5	28	0	0	6	19	7419
CRYPTOSPORIDIOSIS	0	0	0	0	2	0	0	2	0	0	1	0	0	0	0	40
DIARRHEA-CAUSING *E. coli*	0	0	0	0	0	1	0	0	0	0	4	0	0	0	0	49
ENCEPHALITIS, INFECTIOUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
ENCEPHALITIS, WEST NILE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
GIARDIASIS	0	2	1	0	7	0	0	2	1	2	2	0	0	1	0	214
GONORRHEA	1	3	21	1	6	9	2	12	2	3	2	0	1	1	3	2605
H. influenzae, INVASIVE	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	18
HANTAVIRUS PULM. SYN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
HEMOLYTIC UREMIC SYN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
HEPATITIS A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
HEPATITIS B, ACUTE	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	32
HEPATITIS C, ACUTE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
HIV	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	166
LEGIONELLOSIS	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4
LISTERIOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
LYME DISEASE	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
MALARIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
MENINGITIS, BACTERIAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
MENINGOCOCCAL DISEASE	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	11
PERTUSSIS	0	0	1	0	1	2	0	3	0	0	0	0	0	0	0	229
ROCKY MT. SPOTTED FEVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
RABIES, ANIMAL	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	80
SALMONELLOSIS	2	0	1	0	12	1	1	3	0	0	3	0	2	2	1	369
SHIGELLOSIS	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	272
STREP., INVASIVE	0	0	3	1	1	0	0	1	0	0	1	0	1	0	0	231
SYPHILIS, P AND S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
SYPHILIS, EARLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
TOXIC SHOCK SYNDROME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TUBERCULOSIS DISEASE	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	61
TUBERCULOSIS INFECTION	4	1	2	0	12	2	1	163	3	1	8	5	3	6	1	2561
TULAREMIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
TYPHOID FEVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
VARICELLA	0	0	2	0	2	1	2	1	0	0	7	0	0	0	7	478

***Zero to five cases reported. Not shown to protect confidentiality.**

TABLE 2. REPORTABLE DISEASE CASES BY COUNTY, KANSAS, 2005

	CF	CM	CL	CR	DC	DK	DP	DG	ED	EK	EL	EW	FI	FO	FR	STATE TOTAL
AMEBIASIS	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	7
BRUCELLOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
CAMPYLOBACTERIOSIS	2	0	1	7	1	6	0	16	0	0	8	0	3	8	2	335
CHLAMYDIA	11	0	92	97	0	28	19	364	2	1	94	6	105	64	46	7419
CRYPTOSPORIDIOSIS	0	0	0	0	0	0	0	1	0	0	0	0	5	0	1	40
DIARRHEA-CAUSING *E. coli*	0	0	3	3	0	0	1	1	0	0	2	0	6	0	1	49
ENCEPHALITIS, INFECTIOUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
ENCEPHALITIS, WEST NILE	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	9
GIARDIASIS	0	0	4	2	0	1	0	18	0	0	4	0	3	4	3	214
GONORRHEA	3	0	23	23	0	2	2	133	0	1	10	1	10	10	5	2605
H. influenzae, INVASIVE	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	18
HANTAVIRUS PULM. SYN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
HEMOLYTIC UREMIC SYN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
HEPATITIS A	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	16
HEPATITIS B, ACUTE	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	32
HEPATITIS C, ACUTE	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3
HIV	*	*	*	*	*	*	*	6	*	*	*	*	*	*	*	166
LEGIONELLOSIS	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	4
LISTERIOSIS	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	7
LYME DISEASE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
MALARIA	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	7
MENINGITIS, BACTERIAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
MENINGOCOCCAL DISEASE	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	11
PERTUSSIS	0	0	0	1	0	0	0	13	0	0	13	1	0	2	0	229
ROCKY MT. SPOTTED FEVER	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	4
RABIES, ANIMAL	1	1	4	0	0	2	0	0	0	1	1	0	3	0	0	80
SALMONELLOSIS	0	0	3	5	2	2	4	7	0	0	6	0	7	1	2	369
SHIGELLOSIS	0	0	0	1	0	0	0	3	0	0	0	0	0	1	0	272
STREP., INVASIVE	0	0	1	9	1	1	1	12	0	0	5	1	0	6	0	231
SYPHILIS, P AND S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
SYPHILIS, EARLY	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	37
TOXIC SHOCK SYNDROME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TUBERCULOSIS DISEASE	1	0	1	0	0	0	0	1	0	0	0	0	3	6	0	61
TUBERCULOSIS INFECTION	2	0	37	65	1	3	0	124	1	0	26	29	138	117	2	2561
TULAREMIA	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5
TYPHOID FEVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
VARICELLA	0	2	0	2	0	0	8	27	0	0	0	5	0	0	0	478

***Zero to five cases reported. Not shown to protect confidentiality.**

TABLE 2. REPORTABLE DISEASE CASES BY COUNTY, KANSAS, 2005

	GE	GO	GH	GT	GY	GL	GW	HM	HP	HV	HS	HG	JA	JF	JW	STATE TOTAL
AMEBIASIS	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	7
BRUCELLOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
CAMPYLOBACTERIOSIS	0	1	1	6	1	0	0	0	1	1	0	0	5	4	0	335
CHLAMYDIA	324	0	1	25	6	3	8	1	6	57	4	0	15	19	1	7419
CRYPTOSPORIDIOSIS	0	0	0	0	6	0	0	1	0	0	1	0	0	1	0	40
DIARRHEA-CAUSING *E. coli*	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	49
ENCEPHALITIS, INFECTIOUS	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3
ENCEPHALITIS, WEST NILE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
GIARDIASIS	2	1	0	0	0	0	0	0	0	2	0	0	2	0	0	214
GONORRHEA	104	0	0	1	1	0	0	0	3	12	0	0	1	4	0	2605
H. influenzae, INVASIVE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
HANTAVIRUS PULM. SYN.	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
HEMOLYTIC UREMIC SYN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
HEPATITIS A	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	16
HEPATITIS B, ACUTE	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	32
HEPATITIS C, ACUTE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
HIV	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	166
LEGIONELLOSIS	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4
LISTERIOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
LYME DISEASE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
MALARIA	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	7
MENINGITIS, BACTERIAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
MENINGOCOCCAL DISEASE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
PERTUSSIS	0	0	0	0	0	0	0	0	0	5	0	0	1	0	0	229
ROCKY MT. SPOTTED FEVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
RABIES, ANIMAL	4	0	0	0	0	0	1	0	0	1	0	0	1	0	0	80
SALMONELLOSIS	5	2	1	7	1	0	0	2	0	5	0	0	0	1	1	369
SHIGELLOSIS	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	272
STREP., INVASIVE	0	0	0	0	1	0	0	0	0	2	0	0	1	2	0	231
SYPHILIS, P AND S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
SYPHILIS, EARLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
TOXIC SHOCK SYNDROME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TUBERCULOSIS DISEASE	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	61
TUBERCULOSIS INFECTION	38	0	1	39	7	1	2	1	0	13	6	2	0	3	0	2561
TULAREMIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
TYPHOID FEVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
VARICELLA	0	0	0	1	0	0	7	0	0	0	0	0	0	0	1	478

***Zero to five cases reported. Not shown to protect confidentiality.**

TABLE 2. REPORTABLE DISEASE CASES BY COUNTY, KANSAS, 2005

	JO	KE	KM	KW	LB	LE	LV	LC	LN	LG	LY	MN	MS	MP	ME	STATE TOTAL
AMEBIASIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
BRUCELLOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
CAMPYLOBACTERIOSIS	50	1	1	1	0	3	4	1	1	1	1	4	1	5	0	335
CHLAMYDIA	804	8	6	1	30	2	167	2	4	1	137	9	9	36	3	7419
CRYPTOSPORIDIOSIS	8	0	0	0	0	0	2	0	0	0	0	0	0	0	0	40
DIARRHEA-CAUSING *E. coli*	6	0	0	0	0	0	2	0	0	0	0	0	0	0	0	49
ENCEPHALITIS, INFECTIOUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
ENCEPHALITIS, WEST NILE	1	1	1	0	0	0	0	0	0	0	0	0	0	0	3	9
GIARDIASIS	61	0	1	0	1	0	1	0	2	0	1	1	0	2	2	214
GONORRHEA	244	0	0	0	12	0	33	0	1	2	28	0	1	4	0	2605
H. influenzae, INVASIVE	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	18
HANTAVIRUS PULM. SYN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
HEMOLYTIC UREMIC SYN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
HEPATITIS A	4	0	0	0	0	0	0	0	0	0	2	0	0	0	0	16
HEPATITIS B, ACUTE	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
HEPATITIS C, ACUTE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
HIV	45	*	*	*	*	*	*	*	*	*	*	*	*	*	*	166
LEGIONELLOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
LISTERIOSIS	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
LYME DISEASE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
MALARIA	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
MENINGITIS, BACTERIAL	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
MENINGOCOCCAL DISEASE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
PERTUSSIS	27	0	0	8	3	0	5	0	0	0	0	0	0	3	0	229
ROCKY MT. SPOTTED FEVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
RABIES, ANIMAL	5	0	2	0	0	0	0	0	1	0	3	5	0	2	0	80
SALMONELLOSIS	95	0	0	0	2	2	8	0	3	1	2	2	3	7	0	369
SHIGELLOSIS	47	0	0	0	0	0	26	0	0	0	0	0	0	0	0	272
STREP., INVASIVE	33	0	0	1	0	0	9	0	0	0	1	1	0	1	1	231
SYPHILIS, P AND S	6	0	0	0	0	0	2	0	0	0	0	0	0	0	0	19
SYPHILIS, EARLY	11	0	0	0	0	0	2	0	0	0	0	0	0	0	0	37
TOXIC SHOCK SYNDROME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TUBERCULOSIS DISEASE	11	0	0	0	0	0	0	0	0	0	1	0	0	0	0	61
TUBERCULOSIS INFECTION	249	2	0	3	14	0	63	1	0	2	34	1	0	2	7	2561
TULAREMIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
TYPHOID FEVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
VARICELLA	123	0	1	5	0	0	2	0	0	0	2	0	1	0	1	478

***Zero to five cases reported. Not shown to protect confidentiality.**

TABLE 2. REPORTABLE DISEASE CASES BY COUNTY, KANSAS, 2005

	MI	MC	MG	MR	MT	NM	NO	NS	NT	OS	OB	OT	PN	PL	PT	STATE TOTAL
AMEBIASIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
BRUCELLOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
CAMPYLOBACTERIOSIS	4	0	1	1	0	4	3	1	1	2	0	0	0	0	7	335
CHLAMYDIA	41	8	79	2	3	4	39	0	2	23	7	4	7	1	7	7419
CRYPTOSPORIDIOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
DIARRHEA-CAUSING *E. coli*	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	49
ENCEPHALITIS, INFECTIOUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
ENCEPHALITIS, WEST NILE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
GIARDIASIS	2	0	7	0	0	1	0	1	0	1	0	0	0	1	0	214
GONORRHEA	4	0	39	0	0	0	8	0	0	7	0	2	2	2	3	2605
H. influenzae, INVASIVE	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	18
HANTAVIRUS PULM. SYN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
HEMOLYTIC UREMIC SYN.	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
HEPATITIS A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
HEPATITIS B, ACUTE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
HEPATITIS C, ACUTE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
HIV	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	166
LEGIONELLOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
LISTERIOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
LYME DISEASE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
MALARIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
MENINGITIS, BACTERIAL	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	11
MENINGOCOCCAL DISEASE	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	11
PERTUSSIS	0	0	1	0	1	2	0	0	0	0	0	1	0	0	1	229
ROCKY MT. SPOTTED FEVER	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4
RABIES, ANIMAL	0	0	0	0	0	0	0	0	5	1	1	0	0	0	6	80
SALMONELLOSIS	4	1	2	1	1	3	1	0	2	0	1	1	2	0	2	369
SHIGELLOSIS	5	0	0	0	0	0	1	0	0	0	0	0	0	0	1	272
STREP., INVASIVE	2	0	1	0	0	0	1	0	1	1	0	0	0	0	1	231
SYPHILIS, P AND S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
SYPHILIS, EARLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
TOXIC SHOCK SYNDROME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TUBERCULOSIS DISEASE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61
TUBERCULOSIS INFECTION	1	2	13	2	6	2	3	6	28	0	0	0	6	0	5	2561
TULAREMIA	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	5
TYPHOID FEVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
VARICELLA	1	0	5	1	0	2	0	0	0	1	7	21	12	1	1	478

***Zero to five cases reported. Not shown to protect confidentiality.**

TABLE 2. REPORTABLE DISEASE CASES BY COUNTY, KANSAS, 2005

	PR	RA	RN	RP	RC	RL	RO	RH	RS	SA	SC	SG	SW	SN	SD	STATE TOTAL
AMEBIASIS	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	7
BRUCELLOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
CAMPYLOBACTERIOSIS	1	0	5	0	2	11	4	0	1	6	1	52	2	31	0	335
CHLAMYDIA	13	1	148	1	8	244	8	1	5	168	1	1923	45	665	0	7419
CRYPTOSPORIDIOSIS	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	40
DIARRHEA-CAUSING *E. coli*	0	0	1	0	0	1	0	0	0	0	2	4	0	3	0	49
ENCEPHALITIS, INFECTIOUS	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3
ENCEPHALITIS, WEST NILE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
GIARDIASIS	1	0	6	0	0	1	0	0	0	4	0	10	0	5	0	214
GONORRHEA	2	0	31	1	0	47	0	1	0	22	1	657	12	395	2	2605
H. influenzae, INVASIVE	0	0	0	0	1	0	0	0	1	0	0	3	0	1	0	18
HANTAVIRUS PULM. SYN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
HEMOLYTIC UREMIC SYN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
HEPATITIS A	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	16
HEPATITIS B, ACUTE	0	0	1	0	0	0	0	0	0	2	0	4	0	4	0	32
HEPATITIS C, ACUTE	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3
HIV	*	*	*	*	*	*	*	*	*	*	*	46	*	*	*	166
LEGIONELLOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
LISTERIOSIS	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	7
LYME DISEASE	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3
MALARIA	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	7
MENINGITIS, BACTERIAL	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0	11
MENINGOCOCCAL DISEASE	1	0	0	0	0	0	0	0	0	3	0	2	0	0	0	11
PERTUSSIS	1	0	13	1	0	1	1	0	0	7	0	84	0	11	0	229
ROCKY MT. SPOTTED FEVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
RABIES, ANIMAL	2	0	8	0	1	1	0	0	0	3	3	2	0	0	0	80
SALMONELLOSIS	1	1	12	0	2	11	1	0	2	6	0	46	5	14	1	369
SHIGELLOSIS	0	0	1	0	0	0	0	0	0	2	0	16	0	17	0	272
STREP., INVASIVE	0	0	4	0	2	1	1	0	3	13	0	46	5	29	1	231
SYPHILIS, P AND S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
SYPHILIS, EARLY	0	0	1	0	0	0	0	0	0	0	0	4	0	1	0	37
TOXIC SHOCK SYNDROME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TUBERCULOSIS DISEASE	0	0	0	0	0	0	0	1	0	1	0	22	2	1	0	61
TUBERCULOSIS INFECTION	3	2	118	0	5	154	6	5	0	61	5	541	53	62	1	2561
TULAREMIA	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	5
TYPHOID FEVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
VARICELLA	5	0	6	3	0	2	27	0	9	81	1	2	0	63	0	478

***Zero to five cases reported. Not shown to protect confidentiality.**

TABLE 2. REPORTABLE DISEASE CASES BY COUNTY, KANSAS, 2005

	SH	SM	SF	ST	SV	SU	TH	TR	WB	WA	WS	WH	WL	WO	WY	STATE TOTAL
AMEBIASIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
BRUCELLOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
CAMPYLOBACTERIOSIS	2	0	0	0	1	4	0	0	0	1	1	1	0	0	6	335
CHLAMYDIA	8	1	5	1	2	36	7	5	5	2	2	0	8	3	932	7419
CRYPTOSPORIDIOSIS	0	0	1	0	0	0	0	0	0	0	0	1	1	0	2	40
DIARRHEA-CAUSING *E. coli*	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	49
ENCEPHALITIS, INFECTIOUS	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
ENCEPHALITIS, WEST NILE	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	9
GIARDIASIS	0	0	1	0	0	6	0	0	0	0	0	0	0	0	31	214
GONORRHEA	0	0	0	0	0	3	0	0	2	0	0	0	0	0	621	2605
H. influenzae, INVASIVE	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	18
HANTAVIRUS PULM. SYN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
HEMOLYTIC UREMIC SYN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
HEPATITIS A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
HEPATITIS B, ACUTE	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	32
HEPATITIS C, ACUTE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
HIV	*	*	*	*	*	*	*	*	*	*	*	*	*	*	29	166
LEGIONELLOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
LISTERIOSIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
LYME DISEASE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
MALARIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
MENINGITIS, BACTERIAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	11
MENINGOCOCCAL DISEASE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
PERTUSSIS	0	0	0	0	0	1	1	2	0	2	1	0	0	0	8	229
ROCKY MT. SPOTTED FEVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
RABIES, ANIMAL	0	0	0	0	0	2	0	0	0	0	4	0	0	0	0	80
SALMONELLOSIS	2	0	1	0	0	0	0	1	2	0	0	0	3	2	18	369
SHIGELLOSIS	0	0	0	1	0	0	0	0	0	0	0	0	0	0	144	272
STREP., INVASIVE	0	1	0	0	0	2	0	0	1	0	0	0	0	0	17	231
SYPHILIS, P AND S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	19
SYPHILIS, EARLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	37
TOXIC SHOCK SYNDROME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
TUBERCULOSIS DISEASE	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	61
TUBERCULOSIS INFECTION	1	0	2	3	17	3	7	2	0	0	0	3	1	1	183	2561
TULAREMIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
TYPHOID FEVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
VARICELLA	0	2	9	0	0	0	0	0	0	0	0	0	1	0	5	478

***Zero to five cases reported. Not shown to protect confidentiality.**

TABLE 3
Reportable diseases with no known cases, Kansas, 2005

Disease	Year of last reported case
Anthrax	1972
Botulism	2004
Chancroid	1998
Cholera	1988
Diphtheria	1964
Ehrlichiosis	2004
Leprosy (Hansen's Disease)	1999
Measles (Rubeola)	2000
Mumps	2004
Plague	Unknown
Poliomyelitis	1967
Psittacosis	1992
Q Fever	2003
Rabies, Human	1968
Rubella (including congenital rubella syndrome)	2001
Smallpox	1949
Tetanus	2001
Trichinosis	1999
Viral Hemorrhagic Fever	Unknown
Yellow Fever	Unknown

REFERENCES

- Heymann D, ed. Control of Communicable Diseases Manual. 18th ed. Washington, D.C.: American Public Health Association; 2004.

- American Academy of Pediatrics. Pickering LK, ed. 2000 Red Book: Report of the Committee on Infectious Diseases. 25th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2000.

- Centers for Disease Control and Prevention. Case definitions for infectious conditions under public health surveillance. MMWR 1997;46(No. RR-10). Available online at: http://www.cdc.gov/epo/dphsi/casedef/index.htm

- Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases, 2004. 8th ed.

- Centers for Disease Control and Prevention. Summary of notifiable diseases — United States, 2002. Published April 30, 2004, for MMWR 2002;51(No. 53).

- U.S. Census Bureau and National Center for Health Statistics. Bridged 2004 Population Estimates. Prepared by KDHE Center for Health and Environmental Statistics.