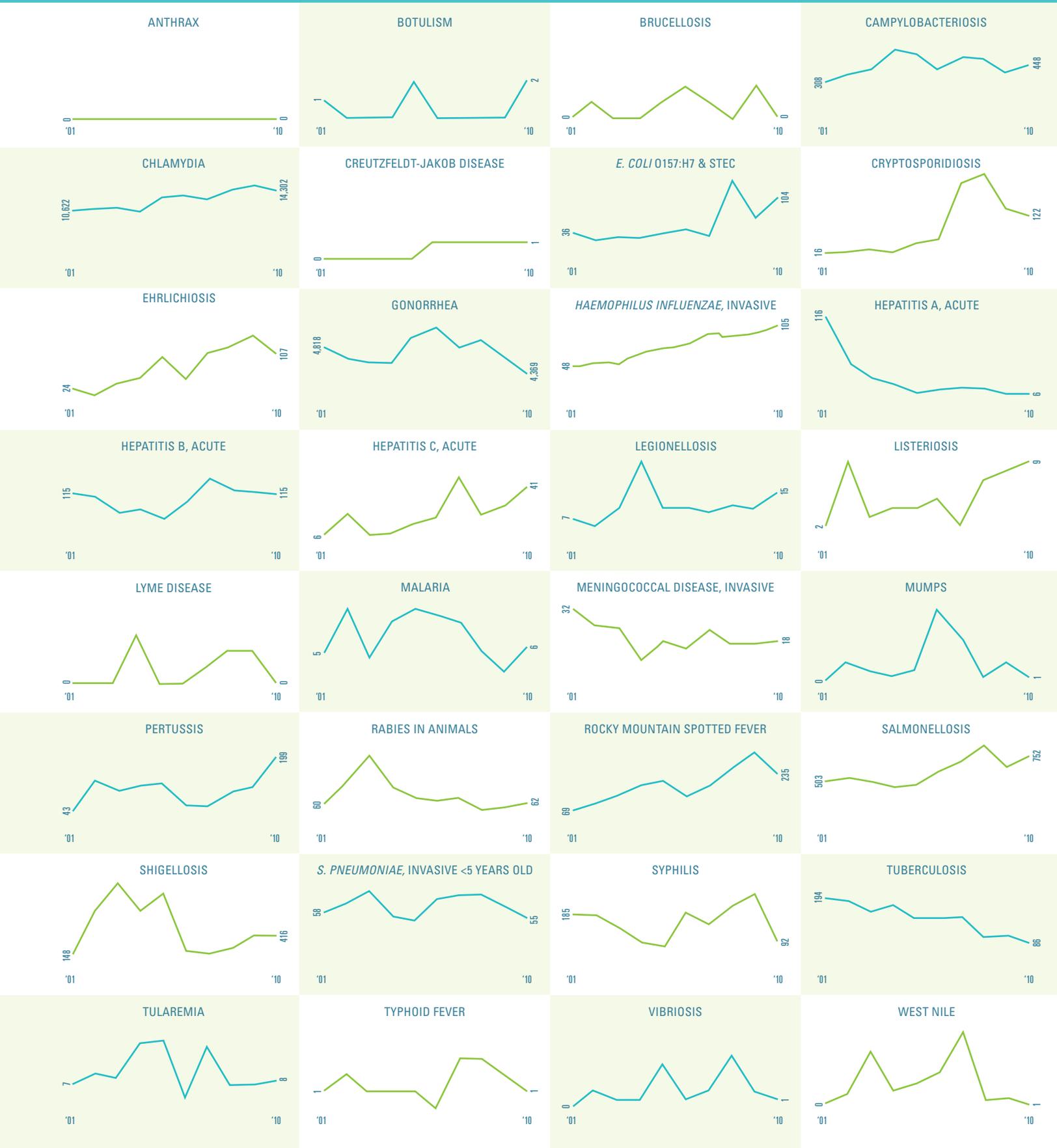


2010

OKLAHOMA STATE DEPARTMENT OF HEALTH

ANNUAL SUMMARY OF INFECTIOUS DISEASES



Executive Summary 2010 Annual Summary of Infectious Diseases

The Oklahoma State Department of Health (OSDH) is pleased to send you a copy of the 2010 Annual Summary of Infectious Diseases. The information contained in this report consolidates summaries of communicable disease surveillance and investigations conducted by the OSDH during 2010. Communicable disease summaries were written by personnel in the OSDH Acute Disease Service, HIV/STD Service, and the Public Health Laboratory. Specifically, the annual summary contains information on the number and incidence rate of infectious disease reports at the state and county level, disease specific data collected during public health investigations, and summaries of program activities.

Title 63 Oklahoma Statute §1-503 as well as Oklahoma Administrative Code (OAC) Title 310, Chapter 515 require that healthcare providers and laboratories report cases of certain communicable diseases to the OSDH. This allows the surveillance, investigation, and control of the spread of disease in the population by public health personnel. A list of the Oklahoma notifiable disease rules is included in this annual summary for your reference. The diseases listed in the Oklahoma disease reporting rules must be reported, along with patient identifiers, demographics, and contact information, to the OSDH upon discovery as dictated in sections OAC 310:515-1-3 and OAC 310:515-1-4. The current "Oklahoma Disease Reporting Manual" is the standard reference for disease-specific diagnostic test results to be reported. The current edition of the "Oklahoma Disease Reporting Manual" and additional disease reporting resources may be accessed from the Acute Disease Service disease reporting web page of the OSDH web site at <http://IDReportingAndAlerts.health.ok.gov>.

Several service areas of the OSDH as well as the county health departments are charged with surveillance, investigation, and control of spread of communicable diseases. Summarized below are a few notable observations regarding the epidemiology of communicable diseases in Oklahoma reported during 2010.

In 2010, 199 cases of pertussis were reported, a 70% increase from the 117 cases reported in 2009. In addition to the increase from 2009, pertussis cases were the highest they have been since 1985 when 209 cases were reported. Several local community increases were observed in different parts of the state contributing to the larger number of cases for the state. Ten cases were reported in Pittsburg county residents leading to an incidence rate (IR) approximately four times the state's rate (21.8 per 100,000). Additionally, Tulsa county saw an increase in cases beginning mid fall and continuing through the end of the year, giving the county a total of 88 cases with an incidence rate almost three times the state's rate (14.6 per 100,000). Pertussis occurs in persons of all ages, but disproportionately affects children less than one year of age. Nearly half of all cases in 2010 were in children less than five years of age, with 28% in infants less than one year of age (IR = 100.6 per 100,000) and followed by 20% in children one to four years of age (IR = 18.0 per 100,000). Forty-seven percent of infants less than one year of age were hospitalized compared to 3.5% of all other ages.

Public health efforts of timely case diagnosis, contact investigation, administration of therapy, prevention, and education, have resulted in a steady decline of tuberculosis (TB) in Oklahoma. The incidence rate of TB has declined 52% from 178 (5.2 per 100,000) cases in 2004 to 86 (2.3 per 100,000) cases in 2010. Racial disparities continued to occur among reported TB cases. In particular, the highest rates of reported TB cases occurred among persons who reported their race as Asian (22.3 per 100,000), American Indian/Alaska Natives (4.7 per 100,000), and Black (3.4 per 100,000) compared to persons who reported their race as White (1.1 per 100,000). Foreign born individual accounted for 27% of reported TB cases in Oklahoma. Prevention, early diagnosis, and treatment are paramount to successful tuberculosis control. TB should be considered in the differential diagnosis of persons presenting with a productive cough, bloody sputum, fevers, and/or unexplained weight loss. Early suspicion and testing are of utmost importance.

In March 2010, the OSDH rapidly responded to an outbreak of invasive meningococcal disease in a rural school district in Northeastern Oklahoma. Five cases of invasive meningococcal disease were identified during this

investigation, including two deaths. Exposed contacts were rapidly identified and recommended to receive antibiotic prophylaxis. During standard investigations of sporadic cases, individuals recommended to receive antibiotic prophylaxis are referred to their private health provider for medication. Because of the magnitude of this outbreak, epidemiologists in the Acute Disease Service and the local county health department (Rogers CHD) immediately conducted clinics at the school to administer chemoprophylaxis to exposed individuals to prevent subsequent cases. A total of 941 individuals were prophylaxed during these clinics. Laboratory testing subsequently identified serogroup C as the causative serogroup and molecular subtyping of isolates revealed all outbreak-associated cases had an indistinguishable pulsed-field gel electrophoresis pattern, which suggested a common exposure among all cases. Based upon meningococcal outbreak control guidance and the recommendation to provide meningococcal vaccine in which cases are due to serogroups included in the vaccine, a mass immunization clinic was held at the school to administer meningococcal vaccine for future protection. Vaccination clinics that targeted students pre-K through seniors, as well as faculty and employees, were conducted by Immunization Service and the Rogers CHD; 1,486 persons received the vaccine.

Significant racial and age disparities continue among reported sexually transmitted diseases. In particular, the highest rates of reported HIV/AIDS, chlamydia and gonorrhea cases occurred among African Americans. In 2010, the incidence rate of reported gonorrhea cases was 18.8 times higher among African Americans compared to the incidence rate among Whites. Similarly, the incidence rate of reported chlamydia cases among African Americans was 6.4 times higher than among Whites. The highest age-specific incidence rates of reported chlamydia and gonorrhea cases occurred among young adults 15 to 19 years of age and 20 to 24 years of age.

The OSDH Public Health Laboratory continues to perform serogroup identification and pulsed-field gel electrophoresis (PFGE), a molecular method of DNA fingerprinting, on all submitted *Salmonella* isolates. PFGE subtyping complements disease surveillance by detecting clusters of indistinguishable PFGE patterns among isolates of Oklahoma cases as well as patterns identified by other state public health laboratories. Once clusters are detected, public health officials rapidly investigate to identify a common source and coordinate with food regulatory agencies to initiate product recalls when indicated, which prevents the continued occurrence of illness among persons who may consume the implicated products.

In 2010, two multistate outbreaks of salmonellosis involving Oklahoma residents were investigated to determine a potential source of infection. One was a multistate outbreak of *S. Chester* associated with consumption of single-serve frozen entrées; 44 cases from 18 states were identified in this outbreak, including one Oklahoma case. Another multistate outbreak involving Oklahoma residents was due to *S. Enteritidis*; approximately 1,939 cases nationwide were associated with this outbreak, including 7 from Oklahoma. An epidemiologic investigation conducted by state public health officials and CDC determined consumption of shell eggs was associated with development of illness. Results from the public health investigation prompted a traceback investigation by the U.S. Food and Drug Administration (FDA) to determine the common source of these shell eggs. The affected eggs were then recalled, and recommendations for safe food handling were provided to egg producers, retail and food establishments, and the public.

It is part of our continuing efforts to return useful information to you from the data you have reported to us. Use of this summary should give you a better idea of the incidence of reportable infectious diseases in your community and epidemiologic trends of infectious diseases in the state of Oklahoma. Additional summaries of reportable diseases in Oklahoma and resources on disease reporting are available on the OSDH website at <http://www.ok.gov/health>.

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Oklahoma State Department of Health
Contact Information

Acute Disease Service

Communicable Disease Division

1000 NE 10th St.

Oklahoma City, OK 73117-1299

Phone Number: (405) 271-4060 — Epidemiologist-on-Call 24 hours per day

Fax Number: (405) 271-6680

Fax Number: (800) 898-6734

Division of Surveillance and Informatics

1000 NE 10th St

Oklahoma City, OK 73117-1299

Phone Number: (405) 271-4060

Fax Number: (405) 271-6680

Tuberculosis Division

1000 NE 10th St.

Oklahoma City, OK 73117-1299

Phone Number: (405) 271-4060

Fax Number: (405) 271-6680

HIV / STD Service

1000 NE 10th St.

Mail Drop 0308

Oklahoma City, OK 73117-1299

Phone Number: (405) 271-4636

Fax Number: (405) 271-5149

Public Health Laboratory

1000 NE 10th St.

Oklahoma City, OK 73117-1299

Phone Number: (405) 271-5070

Fax Number: (405) 271-4850

Mailing Isolates and Samples for Testing

Public Health Laboratory

P.O. Box 24106

OKC, OK 73124-0106

For instructions on sending isolates or clinical specimens to the Public Health Laboratory (PHL), contact the PHL personnel between 8:00 a.m. - 4:30 p.m., Monday through Friday.

All FAX machines are located in locked offices and are monitored to ensure the confidentiality of disease reports.

2010 Annual Summary List of Contributors

Acute Disease Service

Lauri Smithee, Ph.D., Chief

Communicable Disease Division

Laurence Burnsed, M.P.H., Director
Lacey Kovar, M.P.H., Epidemiologist
Becky Coffman, M.P.H., R.N., C.I.C., Epidemiologist
Renee Powell, M.P.H., Epidemiologist
Jolianne Stone, M.P.H., Epidemiologist
Kendra Dougherty, M.S., Epidemiologist

Division of Surveillance and Informatics

Anthony Lee, M.P.H., Director
Jeannie Williams, M.P.H., C.P.H., Surveillance Officer
Christie McDonald-Hamm, M.P.H., Epidemiologist
Kim Mitchell, B.S., Health Alert Network (HAN) Coordinator
Tony McCord, A.A.S., Information Systems Services Coordinator

Tuberculosis Program

Amy Hill, RN, TB Nurse Consultant

HIV / STD Service

Jan Fox, M.P.H., R.N., Chief
Kristen Eberly, M.P.H., Director, Division of Prevention and Intervention
Debbie Purton, M.P.H., R.N., Director, Division of Care Delivery
Sam Nimo, M.P.H., Epidemiologist
Terrainia Harris, M.P.H., Manager, HIV/STD Surveillance and Analysis
Janet Wilson, RN, Manager, Viral Hepatitis and Adult Viral Hepatitis Prevention Coordinator
Mark Turner, M.P.H., Manager, Field Operations
Angela Strawderman, R.N., Perinatal Hepatitis B Coordinator

Public Health Laboratory

Steve Johnson, B.S., A.S.C.P., Clinical Laboratory Administrator
John Murray, B.A., M.B.A., M.P.H., State Training Coordinator

**TITLE 310. OKLAHOMA STATE DEPARTMENT OF HEALTH
CHAPTER 515. COMMUNICABLE DISEASE AND INJURY REPORTING
EFFECTIVE 7/25/2010**

310:515-1-1. Purpose

The rules in this Chapter implement the Communicable Diseases Reporting Regulations, 63 O.S. 1981, § 1-503.

310:515-1-1.1. Definitions

When used in this Chapter, the following words or terms shall have the following meaning unless the context of the sentence requires another meaning:

"**AIDS**" means Acquired Immunodeficiency Syndrome.

"**Anti-HAV-IgM+**" means a positive test result for the hepatitis A virus immunoglobulin M antibody.

"**Anti-HBc-IgM+**" means a positive test result for the hepatitis B core immunoglobulin M antibody.

"**CD4**" means cluster of differentiation 4 glycoprotein that serves as a receptor for HIV on T helper cells.

"**Department**" or "**OSDH**" means the Oklahoma State Department of Health.

"**E. coli**" means *Escherichia coli*.

"**EIA**" means enzyme immunoassay.

"**HBeAg+**" means a positive test result for the hepatitis B "e" antigen.

"**HBsAg+**" means a positive test result for the hepatitis B surface antigen.

"**HBV DNA+**" means a positive test result for deoxyribonucleic acid of the hepatitis B virus.

"**HIV**" means Human Immunodeficiency Virus.

"**PHIDDO**" or "**PHIDDO system**" means Public Health Investigation and Disease Detection of Oklahoma system.

"**NAT for HCV RNA+**" means a nucleic acid amplification test with a positive test result for hepatitis C virus ribonucleic acid.

"**Outbreak of disease**" means two or more cases residing in different households that have a similar clinical syndrome of a potentially infectious disease, toxin, or agent of known or unknown etiology.

"**RIBA**" means recombinant immunoblot assay.

"**S/co**" means the signal-to-cut-off-ratio.

"**Spp.**" is an abbreviation referring to the term "species," and is used to broaden the antecedent term in order to include all organisms that may be found or described within a given genus.

"**Unusual disease or syndrome**" means a case of an uncommon, possibly infectious disease of known or unknown etiology, even if laboratory testing may be pending or inconclusive, or if testing for common etiologies is negative. Such cases of disease may not normally be endemic to Oklahoma, may be an emerging or re-emerging disease, and/or represent diseases for which a public health intervention may be needed. Examples of such unusual diseases or syndromes include but are not limited to, unexplained adult respiratory distress syndrome, rash illness with atypical presentation, or an illness occurring along with an unusual pattern of illness or death among animals.

"**VISA**" means vancomycin intermediate *Staphylococcus aureus*.

"**VRSA**" means vancomycin resistant *Staphylococcus aureus*.

310:515-1-2. Diseases to be reported

The diseases listed in this Chapter must be reported, along with patient identifiers, demographics, and contact information, to the Department upon discovery as dictated in sections OAC 310:515-1-3 and OAC 310:515-1-4. The current "Oklahoma Disease Reporting Manual" shall serve as the standard for disease-specific diagnostic test results to be reported. Ancillary laboratory test results, signs, and symptoms must be reported upon request. The current edition of the "Oklahoma Disease Reporting Manual" may be accessed from the Acute Disease Service disease reporting and alerts web page of the OSDH web site at <http://IDReportingAndAlerts.health.ok.gov>. Laboratories having greater than 400 positive tests performed on-site per year for reportable diseases described in 310:515-1-3, 310:515-1-4(1) and 310:515-1-4(2), or as may be otherwise required to be reported by OSDH, shall begin reporting no later than August 30, 2010 using secure electronic data transmission.

310:515-1-3. Diseases to be reported immediately

The following diseases must be reported by any health practitioner or laboratory personnel to the OSDH electronically via the secure web-based Public Health Investigation and Disease Detection of Oklahoma system or by telephone (405-271-4060 or 800-234-5963) immediately upon suspicion, diagnosis, or testing as specified in the "Oklahoma Disease Reporting Manual".

- (1) Anthrax (*Bacillus anthracis*).
- (2) Bioterrorism – suspected disease.
- (3) Botulism (*Clostridium botulinum*).
- (4) Diphtheria (*Corynebacterium diphtheriae*).
- (5) *Haemophilus influenzae* invasive disease.
- (6) Hepatitis A (Anti-HAV-IgM+).
- (7) Hepatitis B during pregnancy (HBsAg+).
- (8) Measles (Rubeola).
- (9) Meningococcal invasive disease (*Neisseria meningitidis*).
- (10) Outbreaks of apparent infectious disease.
- (11) Plague (*Yersinia pestis*).
- (12) Poliomyelitis.
- (13) Rabies.
- (14) Smallpox.
- (15) Tularemia (*Francisella tularensis*).
- (16) Typhoid fever (*Salmonella Typhi*).
- (17) Viral hemorrhagic fever.

310:515-1-4. Additional diseases, conditions, and injuries to be reported

The following diseases, conditions and injuries must be reported by physicians, laboratories, and hospitals (by infection control practitioners, medical records personnel, and other designees) to the OSDH as dictated in the following subsections:

(1) **Infectious diseases.** Reports of infectious diseases and conditions listed in this subsection must be submitted electronically via the PHIDDO system, telephoned, faxed, or submitted via secure electronic data transmission to the OSDH within one (1) business day of diagnosis or positive test as specified in the "Oklahoma Disease Reporting Manual".

- (A) Acid Fast Bacillus (AFB) positive smear.
- (B) AIDS (Acquired Immunodeficiency Syndrome).
- (C) Arboviral infections (West Nile virus, St. Louis encephalitis virus, Eastern equine encephalitis virus, Western equine encephalitis virus, Powassan virus, California serogroup virus).
- (D) Brucellosis (*Brucella* spp.).
- (E) Campylobacteriosis (*Campylobacter* spp.).
- (F) Congenital rubella syndrome.
- (G) Cryptosporidiosis (*Cryptosporidium* spp.).
- (H) Dengue Fever.
- (I) *E. coli* O157, O157:H7, or a Shiga toxin producing *E. coli* (STEC infections).
- (J) Ehrlichiosis (*Ehrlichia* or *Anaplasma* spp.).
- (K) Hantavirus pulmonary syndrome.
- (L) Hemolytic uremic syndrome, postdiarrheal.
- (M) Hepatitis B. If HBsAg+, anti-HBc-IgM+, HBeAg+, or HBV DNA+ then report results of the entire hepatitis panel.
- (N) Hepatitis C in persons < or = 40 years or in persons having jaundice or ALT > or = 400 regardless of age with laboratory confirmation. If hepatitis C EIA is confirmed by RIBA or NAT for HCV RNA, or signal-to-cut-off (s/co) ratio or index is predictive of a true positive then report results of the entire hepatitis panel.
- (O) Human Immunodeficiency Virus (HIV) infection.

- (P) Influenza associated pediatric mortality
- (Q) Legionellosis (*Legionella* spp.).
- (R) Leptospirosis (*Leptospira interrogans*).
- (S) Listeriosis (*Listeria monocytogenes*).
- (T) Lyme disease (*Borrelia burgdorferi*).
- (U) Malaria (*Plasmodium* spp.).
- (V) Mumps.
- (W) Pertussis (*Bordetella pertussis*).
- (X) Psittacosis (*Chlamydia psittaci*).
- (Y) Q Fever (*Coxiella burnetii*).
- (Z) Rocky Mountain Spotted Fever (*Rickettsia rickettsii*).
- (AA) Rubella.
- (BB) Salmonellosis (*Salmonella* spp.).
- (CC) Shigellosis (*Shigella* spp.).
- (DD) *Staphylococcus aureus* with reduced susceptibility to vancomycin (VISA or VRSA).
- (EE) *Streptococcus pneumoniae* invasive disease, in persons less than 5 years of age.
- (FF) Syphilis (*Treponema pallidum*).
- (GG) Tetanus (*Clostridium tetani*).
- (HH) Trichinellosis (*Trichinella spiralis*).
- (II) Tuberculosis (*Mycobacterium tuberculosis*).
- (JJ) Unusual disease or syndrome.
- (KK) *Vibrio* spp. infections including cholera.
- (LL) Yellow Fever.

(2) **Infectious diseases.** Reports of infectious diseases and conditions listed in this subsection must be reported to the OSDH within one (1) month of diagnosis or positive test as specified in the OSDH Disease Reporting Manual.

- (A) CD4 cell count < 500 with corresponding CD4 cell count percentage of total (by laboratories only).
- (B) Chlamydia infections (*Chlamydia trachomatis*).
- (C) Creutzfeldt-Jakob disease.
- (D) Gonorrhea (*Neisseria gonorrhoeae*).
- (E) HIV viral load.
- (F) Pelvic inflammatory disease (PID).

(3) **Occupational or Environmental diseases.** Laboratories must report blood lead level results greater than 10 ug/dL within one (1) week and results less than 10 ug/dL within one (1) month. Health care providers must report blood lead level results 20 ug/dL or greater within twenty-four (24) hours and results 10-19 ug/dL within one (1) week.

(4) **Injuries (hospitalized and fatal cases only).**

- (A) Burns.
- (B) Drownings and Near Drownings.
- (C) Traumatic Brain Injuries.
- (D) Traumatic Spinal Cord Injuries.

310:515-1-6. Additional diseases may be designated

The Commissioner of Health may designate any disease or condition as reportable for a designated period of time for the purpose of special investigation.

310:515-1-7. Control of Communicable Diseases Manual

The OSDH adopts the most recently published edition of the publication, "Control of Communicable Diseases Manual," published by the American Public Health Association, as a guideline for the prevention and control of communicable diseases. In order to determine the most recently published edition of the "Control of Communicable Diseases Manual," access the American Public Health Association web site at <https://secure.apha.org/source/orders/index.cfm>.

310:515-1-8. Organisms/specimens to be sent to the Public Health Laboratory

(a) Isolates or appropriate specimens of the following organisms shall be sent to the OSDH Public Health Laboratory for typing.

- (1) *Bacillus anthracis*.
- (2) *Brucella* spp.
- (3) *E. coli* O157, O157:H7, or a Shiga toxin producing *E. coli* (STEC).
- (4) *Francisella tularensis*.
- (5) *Haemophilus influenzae* (sterile site).
- (6) *Listeria monocytogenes* (sterile site).
- (7) *Mycobacterium tuberculosis*.
- (8) *Neisseria meningitidis* (sterile site).
- (9) *Plasmodium* spp.
- (10) *Salmonella* spp.
- (11) *Staphylococcus aureus* that are VISA or VRSA
- (12) *Vibrio* spp.
- (13) *Yersinia* spp.

(b) Following consultation with an OSDH epidemiologist, clinical specimens from suspected cases of Botulism must be sent to the OSDH Public Health Laboratory for testing.

SUBCHAPTER 3. DISCLOSURES AND USES OF DISEASE PREVENTION AND CONTROL INFORMATION

310:515-3-1. General provisions

Information received, created and/or maintained by the Department pursuant to the provisions of the Public Health Code relating to Disease Prevention and Control is confidential and shall be protected from disclosure unless release or disclosure is sought in accordance with this subchapter or is otherwise authorized by law.

310:515-3-2. Disclosures upon written consent

Information received, created and/or maintained by the Department pursuant to the provisions of the Public Health Code relating to Disease Prevention and Control may be disclosed to a requesting person upon the presentation of a valid written consent executed by the person whose information is being kept confidential or the legal guardian or legal custodian of such person, under the following conditions:

- (1) If the written consent is delivered to the Department by a person other than the person whose information is being kept confidential or the legal guardian or legal custodian of such person, the written consent must either be verified under oath or contain some form of attestation certifying or confirming the authenticity of the signature of the person whose information is being kept confidential or the legal guardian or legal custodian of such person.
- (2) The written consent must advise the person whose information is being kept confidential or the legal guardian or legal custodian of such person the identity of all persons and/or entities who are likely or intended to receive or view the information sought to be released or disclosed. The identity must include the full name, address and title or office of such person or entity identified in the written consent. The written consent must state that the information will not be released or disclosed to any person or entity not so identified.
- (3) The written consent must include a notice thereon, in bold typeface, that the information authorized for release may include records that may indicate the presence of a communicable or venereal disease, which may include, but are not limited to, diseases such as hepatitis, syphilis, gonorrhea and the human immunodeficiency virus, also known as Acquired Immune Deficiency Syndrome (AIDS).
- (4) The written consent must advise the person whose information is being kept confidential or the legal guardian or legal custodian of such person of the provisions of 63 O.S.Supp.2005, § 1-502.2.

310:515-3-3. Grounds for denial

A person whose information is being kept confidential or the legal guardian or legal custodian of such person may be denied access to information if the information was obtained from someone other than a health care provider under a promise of confidentiality, the access requested would be reasonably likely to reveal the confidential source of the information and the requested information cannot be presented in a manner that preserves the confidentiality of the source. The Department incorporates HIPAA, 42 C.F.R. § 164.524(a)(2)(v)(2006) only as guidance in applying this section.

310:515-3-4. Disclosures permitted without a written consent

Information received, created and/or maintained by the Department pursuant to the provisions of the Public Health Code relating to Disease Prevention and Control may, without first obtaining a written consent in accordance with this subchapter, be disclosed, shared and/or disseminated with health professionals engaged in activities described or identified in the provisions of the Public Health Code relating to Disease Prevention and Control.

Table One. Number of Reported Cases of Communicable Diseases, Oklahoma, 1981 - 2010

Disease	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Anthrax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Botulism (Foodborne)	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0
Botulism (Infant)	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0	0
Brucellosis	8	8	6	7	5	0	5	3	4	1	2	1	0	0	1	1
Campylobacteriosis	56	116	*212	216	305	288	252	212	223	247	205	267	199	187	289	281
Chlamydia	0	0	0	0	0	0	0	0	0	0	*5714	5220	4886	3784	5050	7371
Cholera	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
Congenital Rubella Syndrome	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Creutzfeldt-Jakob disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptosporidiosis	0	0	0	81	27	11	14	11	12	6	8	0	1	1	12	10
Dengue Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diphtheria	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Escherichia coli</i> O157:H7 and other Shiga toxin producing <i>E. coli</i>	0	0	0	0	0	0	0	0	6	4	0	5	8	*13	16	14
Ehrlichiosis	0	0	0	0	0	0	23	14	1	1	3	8	0	0	0	0
Gonorrhea	15909	16021	15230	13088	13005	12572	9657	7411	6846	6464	6546	6432	4855	4935	5652	4897
<i>Haemophilus influenzae</i> , Invasive Disease (Total)	97	120	*179	240	303	290	244	236	154	134	76	33	45	44	33	31
<i>Haemophilus influenzae</i> , Invasive Disease, type b, <5 yrs	0	2	*13	39	6	3	0	0	0	78	33	3	1	4	3	0
Hantavirus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hemolytic Uremic Syndrome, post diarrheal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hepatitis A	344	821	833	548	491	390	338	580	501	588	273	217	206	395	1497	2516
Hepatitis B	256	358	354	208	256	240	250	209	221	183	198	174	193	129	176	60
Hepatitis C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
Influenza Associated Pediatric Mortality	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Legionellosis	7	13	*12	19	24	24	32	20	26	15	24	12	14	7	8	16
Leptospirosis	0	0	4	0	1	0	0	0	0	1	0	0	0	0	0	0
Listeriosis	1	3	0	1	10	20	17	14	17	16	6	8	12	11	11	5
Lyme Disease	0	0	0	0	0	0	3	9	16	20	23	25	20	111	57	34
Malaria	8	8	9	14	8	12	5	11	8	10	9	5	5	9	1	3
Measles	6	30	1	9	1	41	4	8	73	88	0	12	0	0	0	0
Meningococcal Invasive Disease	47	33	39	30	41	38	40	27	29	21	16	18	36	52	49	46
Mumps	0	0	0	0	0	0	102	295	184	74	15	20	11	*13	1	4
Pertussis	3	10	348	248	209	149	173	72	54	48	48	53	60	19	47	21

*First year disease was reportable by law

^*H. influenzae* isolates required to be sent to OSDH PHL for serotyping.

Table One. Number of Reported Cases of Communicable Diseases, Oklahoma, 1981 - 2010

Disease	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Plague	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Poliomyelitis	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Psittacosis	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Q Fever	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Rabies (Animal)	219	191	108	104	111	62	35	38	102	132	173	219	65	40	32	38
Rabies (Human)	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rocky Mountain spotted fever	101	89	221	137	103	110	86	103	60	68	95	111	46	36	48	45
Rubella	4	3	1	0	2	0	6	1	1	1	2	0	1	4	0	0
<i>Staphylococcus aureus</i> , Vancomycin intermediate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Staphylococcus aureus</i> , Vancomycin resistant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Streptococcus pneumoniae</i> , Invasive disease, <5 years	22	38	20	18	29	199	16	11	20	37	28	13	87	73	48	19
Salmonellosis	424	516	613	445	474	512	474	500	446	441	481	368	320	444	471	520
Shigellosis	470	440	241	220	301	256	166	233	236	510	192	252	472	200	266	305
St. Louis Encephalitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Syphilis	479	593	571	532	538	489	552	479	375	589	596	709	636	399	489	398
Tetanus	2	1	0	2	1	1	1	1	2	0	0	1	1	1	0	1
Trichinellosis	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Tuberculosis	381	335	331	262	264	267	250	277	218	243	206	216	209	261	237	201
Tularemia	44	36	35	24	22	19	27	17	8	10	12	10	16	4	7	4
Typhoid Fever	5	4	3	5	2	3	6	0	1	3	3	0	1	3	1	0
<i>Vibrio</i> spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1
<i>Vibrio parahaemolyticus</i>	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
<i>Vibrio vulnificus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Nile Virus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*First year disease was reportable by law

^*H. influenzae* isolates required to be sent to OSDH PHL for serotyping.

Table One. Number of Reported Cases of Communicable Diseases, Oklahoma, 1981 - 2010

Disease	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Anthrax	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Botulism (Foodborne)	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Botulism (Infant)	0	0	1	0	1	0	0	0	1	0	0	0	0	2
Brucellosis	0	0	0	1	0	1	0	0	1	2	1	0	2	0
Campylobacteriosis	247	241	320	361	308	362	417	591	544	405	530	486	384	448
Chlamydia	7566	9378	8737	9346	10622	10732	10983	10371	12957	13206	12529	14173	14991	14302
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Congenital Rubella Syndrome	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Creutzfeldt-Jakob disease	0	0	0	0	0	0	*0	0	0	1	1	1	1	1
Cryptosporidiosis	12	7	14	*30	16	16	24	22	46	56	216	238	141	122
Dengue Fever	0	1	0	0	0	*0	1	0	2	0	3	2	0	4
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Escherichia coli</i> O157:H7 and other Shiga toxin producing <i>E. coli</i>	13	26	41	19	36	25	30	29	38	43	33	135	64	104
Ehrlichiosis	0	2	12	*12	24	13	36	49	96	47	106	121	147	107
Gonorrhea	4840	4225	4291	5236	4818	4624	4543	4543	5031	5170	4827	4945	4661	4369
<i>Haemophilus influenzae</i> , Invasive Disease (Total)	33	35	47	^46	48	53	52	67	74	78	93	90	92	105
<i>Haemophilus influenzae</i> , Invasive Disease, type b, <5 yrs	1	1	0	^0	0	0	0	0	0	0	0	0	2	0
Hantavirus	0	0	0	*0	1	0	0	0	0	0	0	0	0	0
Hemolytic Uremic Syndrome, post diarrheal	0	0	1	*2	4	3	4	2	5	3	8	51	17	11
Hepatitis A	1441	667	534	271	116	52	29	19	6	11	13	13	6	6
Hepatitis B	63	169	185	179	115	111	73	80	59	96	152	129	122	115
Hepatitis C	10	23	13	*13	6	21	6	7	14	19	49	21	27	41
Influenza Associated Pediatric Mortality	0	0	0	0	0	0	0	0	0	0	0	2	*9	2
Legionellosis	4	18	6	5	7	5	10	24	10	10	9	11	10	15
Leptospirosis	0	0	1	0	0	1	0	0	0	0	1	0	0	1
Listeriosis	9	19	12	*8	2	9	3	4	4	5	2	7	8	9
Lyme Disease	45	12	8	1	0	0	0	3	0	0	1	2	2	0
Malaria	9	4	2	10	5	12	4	10	12	11	10	5	2	6
Measles	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Meningococcal Invasive Disease	45	44	40	34	32	25	24	10	18	15	23	17	17	18
Mumps	3	4	5	3	0	3	2	1	2	11	7	1	3	1
Pertussis	60	36	40	60	43	135	106	122	125	64	58	100	117	199

*First year disease was reportable by law

^*H. influenzae* isolates required to be sent to OSDH PHL for serotyping.

Table One. Number of Reported Cases of Communicable Diseases, Oklahoma, 1981 - 2010

Disease	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Plague	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poliomyelitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacosis	0	4	0	*0	0	0	0	0	0	0	0	0	0	0
Q Fever	0	0	0	0	0	0	0	1	3	0	2	3	*2	0
Rabies (Animal)	113	107	94	58	60	126	204	113	79	69	78	42	49	62
Rabies (Human)	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Rocky Mountain spotted fever	30	39	29	37	69	99	138	190	206	135	187	267	342	235
Rubella	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>Staphylococcus aureus</i> , Vancomycin intermediate	0	0	0	0	0	0	0	0	0	0	*1	0	0	0
<i>Staphylococcus aureus</i> , Vancomycin resistant	0	0	0	0	0	0	0	0	0	0	*0	0	0	0
<i>Streptococcus pneumoniae</i> , Invasive disease, <5 years	22	26	45	38	58	67	81	52	48	73	77	76	63	55
Salmonellosis	392	501	468	404	503	524	494	425	448	604	709	901	657	752
Shigellosis	293	712	560	131	148	717	1078	724	936	196	162	234	399	416
St. Louis Encephalitis	0	0	0	0	1	*0	0	0	0	0	0	0	0	0
Syphilis	275	264	347	245	185	183	141	88	73	193	150	212	256	92
Tetanus	2	0	0	0	1	0	0	0	0	1	0	0	0	0
Trichinellosis	0	0	0	*0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	211	198	208	154	194	190	163	178	144	144	149	100	102	86
Tularemia	5	5	7	11	7	10	9	19	20	3	18	7	7	8
Typhoid Fever	3	1	0	1	1	2	1	1	1	0	3	3	2	1
<i>Vibrio</i> spp.	0	9	1	0	0	1	*1	0	3	1	2	5	2	0
<i>Vibrio parahaemolyticus</i>	0	0	0	0	0	0	*0	0	1	0	0	1	0	0
<i>Vibrio vulnificus</i>	0	0	0	1	0	1	*0	1	1	0	0	0	0	1
West Nile Virus	0	0	0	0	0	*17	79	22	33	48	107	9	10	1

*First year disease was reportable by law

^*H. influenzae* isolates required to be sent to OSDH PHL for serotyping.

Table Two. Incidence Rate per 100,000 Oklahoma Population of Reported Communicable Diseases, Oklahoma 1981 - 2010*

Disease	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Anthrax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Botulism (Foodborne)	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
Botulism (Infant)	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00
Brucellosis	0.26	0.26	0.20	0.23	0.17	0.00	0.17	0.10	0.13	0.03	0.06	0.03	0.00	0.00	0.03
Campylobacteriosis	1.85	3.83	7.01	7.14	10.08	9.52	8.33	7.01	7.37	7.85	6.52	8.49	6.33	5.94	9.19
Chlamydia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	181.7	165.9	155.3	120.3	160.5
Cholera	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Congenital Rubella Syndrome	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Creutzfeldt-Jakob disease	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cryptosporidiosis	0.00	0.00	0.00	2.68	0.89	0.36	0.46	0.36	0.40	0.19	0.25	0.00	0.03	0.03	0.38
Dengue Fever	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diphtheria	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Escherichia coli</i> O157:H7 and other Shiga toxin producing <i>E. coli</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.13	0.00	0.16	0.25	0.41	0.51
Ehrlichiosis	0.00	0.00	0.00	0.00	0.00	0.00	0.76	0.46	0.03	0.03	0.10	0.25	0.00	0.00	0.00
Gonorrhea	525.9	529.6	503.4	432.6	429.9	415.6	319.2	245.0	226.3	205.5	208.1	204.5	154.3	156.9	179.7
<i>Haemophilus influenzae</i> , Invasive Disease (Total)	3.21	3.97	5.92	7.93	10.02	9.59	8.07	7.80	5.09	4.26	2.42	1.05	1.43	1.40	1.05
<i>Haemophilus influenzae</i> , Invasive Disease, type b, <5 yrs	0.00	0.86	5.60	16.79	2.58	1.29	0.00	0.00	0.00	34.43	14.57	1.32	0.44	1.77	1.32
Hantavirus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hemolytic Uremic Syndrome, post diarrheal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hepatitis A	11.37	27.14	27.53	18.11	16.23	12.89	11.17	19.17	16.56	18.69	8.68	6.90	6.55	12.56	47.59
Hepatitis B	8.46	11.83	11.70	6.88	8.46	7.93	8.26	6.91	7.31	5.82	6.29	5.53	6.14	4.10	5.60
Hepatitis C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Influenza Associated Pediatric Mortality	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Legionellosis	0.23	0.43	0.40	0.63	0.79	0.79	1.06	0.66	0.86	0.48	0.76	0.38	0.45	0.22	0.25
Leptospirosis	0.00	0.00	0.13	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
Listeriosis	0.03	0.10	0.00	0.03	0.33	0.66	0.56	0.46	0.56	0.51	0.19	0.25	0.38	0.35	0.35
Lyme Disease	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.30	0.53	0.64	0.73	0.79	0.64	3.53	1.81
Malaria	0.26	0.26	0.30	0.46	0.26	0.40	0.17	0.36	0.26	0.32	0.29	0.16	0.16	0.29	0.03
Measles	0.20	0.99	0.03	0.30	0.03	1.36	0.13	0.26	2.41	2.80	0.00	0.38	0.00	0.00	0.00
Meningococcal Invasive Disease	1.55	1.09	1.29	0.99	1.36	1.26	1.32	0.89	0.96	0.67	0.51	0.57	1.14	1.65	1.56
Mumps	0.00	0.00	0.00	0.00	0.00	0.00	3.37	9.75	6.08	2.35	0.48	0.64	0.35	0.41	0.03
Pertussis	0.10	0.33	11.50	8.20	6.91	4.93	5.72	2.38	1.78	1.53	1.53	1.68	1.91	0.60	1.49

*Oklahoma population numbers are obtained from the U.S. Census Bureau Decennial Census numbers.

Table Two. Incidence Rate per 100,000 Oklahoma Population of Reported Communicable Diseases, Oklahoma 1981 - 2010*

Disease	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Plague	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
Poliomyelitis	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Psittacosis	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
Q Fever	0.00	0.03	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rabies (Human)	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rocky Mountain spotted fever	3.34	2.94	7.31	4.53	3.40	3.64	2.84	3.40	1.98	2.16	3.02	3.53	1.46	1.14	1.53
Rubella	0.13	0.10	0.03	0.00	0.07	0.00	0.20	0.03	0.03	0.03	0.06	0.00	0.03	0.13	0.00
<i>Staphylococcus aureus</i> , Vancomycin intermediate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Staphylococcus aureus</i> , Vancomycin resistant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Streptococcus pneumoniae</i> , Invasive disease, <5 years	9.47	16.36	8.61	7.75	12.48	85.66	6.89	4.74	8.61	16.33	12.36	5.74	38.41	32.23	21.19
Salmonellosis	14.02	17.06	20.26	14.71	15.67	16.92	15.67	16.53	14.74	14.02	15.29	11.70	10.17	14.12	14.97
Shigellosis	15.54	14.54	7.97	7.27	9.95	8.46	5.49	7.70	7.80	16.21	6.10	8.01	15.01	6.36	8.46
St. Louis Encephalitis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Syphilis	15.83	19.60	18.87	17.59	17.78	16.16	18.25	15.83	12.40	18.72	18.95	22.54	20.22	12.68	15.55
Tetanus	0.07	0.03	0.00	0.07	0.03	0.03	0.03	0.03	0.07	0.00	0.00	0.03	0.03	0.03	0.00
Trichinellosis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Tuberculosis	12.59	11.07	10.94	8.66	8.73	8.83	8.26	9.16	7.21	7.73	6.55	6.87	6.64	8.30	7.53
Tularemia	1.45	1.19	1.16	0.79	0.73	0.63	0.89	0.56	0.26	0.32	0.38	0.32	0.51	0.13	0.22
Typhoid Fever	0.17	0.13	0.10	0.17	0.07	0.10	0.20	0.00	0.03	0.10	0.10	0.00	0.03	0.10	0.03
<i>Vibrio</i> spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
<i>Vibrio parahaemolyticus</i>	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Vibrio vulnificus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West Nile Virus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*Oklahoma population numbers are obtained from the U.S. Census Bureau Decennial Census numbers.

Table Two. Incidence Rate per 100,000 Oklahoma Population of Reported Communicable Diseases, Oklahoma 1981 - 2010*

Disease	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Anthrax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Botulism (Foodborne)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
Botulism (Infant)	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.05
Brucellosis	0.03	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.03	0.06	0.03	0.00	0.05	0.00
Campylobacteriosis	8.93	7.85	7.66	10.17	10.46	8.93	10.49	12.08	17.13	15.77	11.74	15.36	13.34	10.54	12.15
Chlamydia	234.3	240.5	298.1	277.8	270.8	307.8	311.0	318.3	300.6	375.5	382.7	363.1	389.1	411.6	387.90
Cholera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Congenital Rubella Syndrome	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Creutzfeldt-Jakob disease	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.03
Cryptosporidiosis	0.32	0.38	0.22	0.45	0.87	0.46	0.46	0.70	0.64	1.33	1.62	6.26	6.53	3.87	3.31
Dengue Fever	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.09	0.05	0.00	0.11
Diphtheria	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Escherichia coli</i> O157:H7 and other Shiga toxin producing <i>E. coli</i>	0.45	0.41	0.83	1.30	0.55	1.04	0.72	0.87	0.84	1.10	1.25	0.96	3.71	1.76	2.82
Ehrlichiosis	0.00	0.00	0.06	0.38	0.35	0.70	0.38	1.04	1.42	2.78	1.36	3.07	3.32	4.04	2.85
Gonorrhea	155.7	153.9	134.3	136.4	151.7	139.6	134.0	131.7	131.7	145.8	149.8	139.9	135.8	128.0	116.46
<i>Haemophilus influenzae</i> , Invasive Disease (Total)	0.99	1.05	1.11	1.49	1.33	1.39	1.54	1.51	1.94	2.14	2.26	2.70	2.47	2.53	0.00
<i>Haemophilus influenzae</i> , Invasive Disease, type b, <5 yrs	0.00	0.44	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00
Hantavirus	0.03	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hemolytic Uremic Syndrome, post diarrheal	0.00	0.00	0.00	0.03	0.06	0.12	0.09	0.12	0.06	0.14	0.09	0.23	1.40	0.47	0.29
Hepatitis A	79.99	45.81	21.20	16.98	7.85	3.36	1.51	0.84	0.55	0.17	0.32	0.38	0.36	0.16	0.16
Hepatitis B	1.91	2.00	5.37	5.88	5.19	3.33	3.22	2.12	2.32	1.71	2.78	4.40	3.54	3.35	3.12
Hepatitis C	0.25	0.32	0.73	0.41	0.38	0.17	0.61	0.17	0.20	0.41	0.55	1.42	0.58	0.74	1.09
Influenza Associated Pediatric Mortality	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.98	0.22
Legionellosis	0.51	0.13	0.57	0.19	0.14	0.20	0.14	0.29	0.70	0.29	0.29	0.26	0.30	0.27	0.40
Leptospirosis	0.00	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.03
Listeriosis	0.16	0.29	0.60	0.38	0.23	0.06	0.26	0.09	0.12	0.12	0.14	0.06	0.19	0.22	0.24
Lyme Disease	1.08	1.43	0.38	0.25	0.03	0.00	0.00	0.00	0.09	0.00	0.00	0.03	0.05	0.05	0.00
Malaria	0.10	0.29	0.13	0.06	0.29	0.14	0.35	0.12	0.29	0.35	0.32	0.29	0.14	0.05	0.16
Measles	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Meningococcal Invasive Disease	1.46	1.43	1.40	1.27	0.99	0.93	0.72	0.70	0.29	0.52	0.43	0.67	0.47	0.47	0.48
Mumps	0.13	0.10	0.13	0.16	0.09	0.00	0.09	0.06	0.03	0.06	0.32	0.20	0.03	0.08	0.03
Pertussis	0.67	1.91	1.14	1.27	1.74	1.25	3.91	3.07	3.54	3.62	1.85	1.68	2.75	3.21	5.40

*Oklahoma population numbers are obtained from the U.S. Census Bureau Decennial Census numbers.

Table Two. Incidence Rate per 100,000 Oklahoma Population of Reported Communicable Diseases, Oklahoma 1981 - 2010*

Disease	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Plague	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poliomyelitis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Psittacosis	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q Fever	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.09	0.00	0.06	0.08	0.05	0.00
Rabies (Human)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Rocky Mountain spotted fever	1.43	0.95	1.24	0.92	1.07	2.00	2.87	4.00	5.51	5.97	3.91	5.42	7.33	9.39	6.37
Rubella	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Staphylococcus aureus</i> , Vancomycin intermediate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.03
<i>Staphylococcus aureus</i> , Vancomycin resistant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Streptococcus pneumoniae</i> , Invasive disease, <5 years	8.39	9.71	11.48	19.87	16.08	24.54	28.35	34.27	22.00	20.31	30.89	32.58	28.60	23.17	20.23
Salmonellosis	16.53	12.46	15.93	14.88	11.71	14.58	15.19	14.32	12.32	12.98	17.50	20.55	24.74	18.04	20.05
Shigellosis	9.70	9.31	22.63	17.80	3.80	4.29	20.78	31.24	20.98	27.13	5.68	4.69	6.42	10.95	11.09
St. Louis Encephalitis	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Syphilis	12.65	8.74	8.39	11.03	7.10	5.36	5.30	4.09	2.55	2.12	5.59	4.35	5.82	7.03	2.45
Tetanus	0.03	0.06	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
Trichinellosis	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuberculosis	6.39	6.71	6.29	6.61	4.46	5.62	5.51	4.72	5.16	4.17	4.17	4.32	2.75	2.80	2.29
Tularemia	0.13	0.16	0.16	0.22	0.32	0.20	0.29	0.26	0.55	0.58	0.09	0.52	0.19	0.19	0.21
Typhoid Fever	0.00	0.10	0.03	0.00	0.03	0.03	0.06	0.03	0.03	0.03	0.00	0.09	0.08	0.05	0.03
<i>Vibrio</i> spp.	0.03	0.00	0.29	0.03	0.00	0.00	0.03	0.03	0.00	0.09	0.03	0.06	0.14	0.05	0.00
<i>Vibrio parahaemolyticus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.00
<i>Vibrio vulnificus</i>	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.03
West Nile Virus	0.00	0.00	0.00	0.00	0.00	0.00	0.49	2.29	0.64	0.96	1.39	3.10	0.25	0.27	0.03

*Oklahoma population numbers are obtained from the U.S. Census Bureau Decennial Census numbers.

Table Three. Reportable Diseases by County, Oklahoma, 2010[^]

County	Campylobacteriosis		Cryptosporidiosis		<i>E. coli</i> O157:H7 and other STEC		Ehrlichiosis	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Adair County	5	22.88	0	*	0	*	1	4.58
Alfalfa County	3	54.73	0	*	0	*	0	*
Atoka County	2	13.80	0	*	0	*	1	6.90
Beaver County	1	18.98	1	18.98	0	*	0	*
Beckham County	3	14.21	0	*	0	*	0	*
Blaine County	2	15.86	0	*	0	*	0	*
Bryan County	2	4.90	0	*	0	*	0	*
Caddo County	4	13.16	3	9.87	1	3.29	1	3.29
Canadian County	9	8.21	4	3.65	15	13.68	0	*
Carter County	6	12.42	16	33.11	0	*	1	2.07
Cherokee County	9	19.55	0	*	2	4.35	3	6.52
Choctaw County	1	6.72	0	*	0	*	2	13.45
Cimarron County	2	76.05	0	*	0	*	0	*
Cleveland County	16	6.54	9	3.68	1	0.41	4	1.64
Coal County	1	17.08	0	*	0	*	0	*
Comanche County	2	1.77	0	*	1	0.88	0	*
Cotton County	0	*	0	*	2	31.48	0	*
Craig County	4	26.39	0	*	1	6.60	0	*
Creek County	10	14.24	0	*	1	1.42	5	7.12
Custer County	3	11.23	0	*	0	*	0	*
Delaware County	7	17.26	0	*	2	4.93	1	2.47
Dewey County	1	22.71	0	*	0	*	0	*
Ellis County	1	25.48	1	25.48	0	*	0	*
Garfield County	17	28.85	0	*	5	8.48	0	*
Garvin County	8	29.51	1	3.69	0	*	0	*
Grady County	21	40.66	0	*	3	5.81	1	1.94
Grant County	0	*	0	*	0	*	0	*
Greer County	2	34.31	1	17.15	1	17.15	0	*
Harmon County	0	*	0	*	0	*	0	*
Harper County	2	59.22	0	*	0	*	0	*
Haskell County	1	8.07	0	*	0	*	3	24.21
Hughes County	1	7.24	0	*	0	*	1	7.24
Jackson County	12	47.30	3	11.83	1	3.94	0	*
Jefferson County	2	31.65	1	15.83	0	*	0	*
Johnston County	1	9.55	3	28.66	2	19.11	0	*
Kay County	7	15.18	0	*	3	6.51	0	*
Kingfisher County	2	13.90	0	*	0	*	0	*
Kiowa County	3	32.96	0	*	0	*	0	*

[^]2010 rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2009 Census Bureau county population estimate and multiplying by 100,000

Table Three. Reportable Diseases by County, Oklahoma, 2010[^]

County	Campylobacteriosis		Cryptosporidiosis		<i>E. coli</i> O157:H7 and other STEC		Ehrlichiosis	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Latimer County	0	*	0	*	0	*	2	18.83
Le Flore County	10	20.03	1	2.00	0	*	6	12.02
Lincoln County	7	21.74	0	*	1	3.11	1	3.11
Logan County	9	22.90	2	5.09	1	2.54	1	2.54
Love County	0	*	2	21.92	0	*	0	*
McClain County	5	15.07	2	6.03	0	*	2	6.03
McCurain County	3	8.99	0	*	0	*	1	3.00
McIntosh County	1	5.05	0	*	0	*	2	10.10
Major County	0	*	0	*	0	*	0	*
Marshall County	2	13.32	2	13.32	0	*	0	*
Mayer County	8	19.97	2	4.99	2	4.99	5	12.48
Murray County	3	23.15	0	*	0	*	0	*
Muskogee County	12	16.80	6	8.40	0	*	3	4.20
Noble County	4	36.53	0	*	5	45.66	1	9.13
Nowata County	0	*	1	9.50	0	*	0	*
Okfuskee County	2	18.31	0	*	0	*	2	18.31
Oklahoma County	69	9.63	22	3.07	9	1.26	6	0.84
Okmulgee County	5	12.73	1	2.55	2	5.09	5	12.73
Osage County	2	4.44	0	*	0	*	3	6.66
Ottawa County	5	15.81	0	*	1	3.16	3	9.48
Pawnee County	2	12.18	1	6.09	0	*	0	*
Payne County	14	17.56	1	1.25	5	6.27	1	1.25
Pittsburg County	5	11.06	1	2.21	2	4.42	9	19.91
Pontotoc County	6	16.03	0	*	0	*	0	*
Pottawatomie County	11	15.65	2	2.85	0	*	0	*
Pushmataha County	2	16.93	0	*	0	*	3	25.40
Roger Mills County	1	29.35	0	*	0	*	0	*
Rogers County	7	8.17	0	*	9	10.51	1	1.17
Seminole County	0	*	0	*	0	*	1	4.12
Sequoyah County	3	7.24	0	*	1	2.41	2	4.83
Stephens County	6	13.80	9	20.70	3	6.90	1	2.30
Texas County	2	9.46	1	4.73	0	*	0	*
Tillman County	1	12.83	0	*	0	*	0	*
Tulsa County	53	8.80	20	3.32	17	2.82	19	3.16
Wagoner County	5	7.10	1	1.42	2	2.84	2	2.84
Washington County	4	7.89	2	3.94	3	5.92	1	1.97
Washita County	0	*	0	*	0	*	0	*
Woods County	2	23.76	0	*	0	*	0	*
Woodward County	3	15.03	0	*	0	*	0	*
State of Oklahoma	448	12.15	122	3.31	104	2.82	107	2.90

[^]2010 rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2009 Census Bureau county population estimate and multiplying by 100,000

Table Three. Reportable Diseases by County, Oklahoma, 2010[^]

County	<i>Haemophilus influenzae</i> , invasive		Hepatitis A		Hepatitis B		Hepatitis C	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Adair County	1	4.85	0	*	1	4.58	0	*
Alfalfa County	0	*	0	*	0	*	0	*
Atoka County	0	*	0	*	0	*	0	*
Beaver County	0	*	0	*	0	*	0	*
Beckham County	0	*	0	*	0	*	0	*
Blaine County	0	*	0	*	0	*	0	*
Bryan County	0	*	0	*	0	*	0	*
Caddo County	1	3.29	0	*	1	3.29	1	3.29
Canadian County	1	0.91	2	1.82	1	0.91	3	2.74
Carter County	3	6.21	0	*	1	2.07	1	2.07
Cherokee County	0	*	0	*	0	*	1	2.17
Choctaw County	0	*	0	*	0	*	0	*
Cimarron County	0	*	0	*	0	*	0	*
Cleveland County	7	2.86	0	*	8	3.27	1	0.41
Coal County	0	*	0	*	0	*	0	*
Comanche County	1	0.88	0	*	0	*	2	1.77
Cotton County	0	*	0	*	0	*	0	*
Craig County	0	*	0	*	0	*	0	*
Creek County	4	5.69	0	*	3	4.27	1	1.42
Custer County	0	*	0	*	1	3.74	0	*
Delaware County	0	*	0	*	0	*	0	*
Dewey County	0	*	0	*	0	*	0	*
Ellis County	0	*	0	*	0	*	0	*
Garfield County	4	6.79	1	1.70	2	3.39	0	*
Garvin County	0	*	0	*	2	7.38	0	*
Grady County	1	1.94	0	*	1	1.94	0	*
Grant County	3	69.49	0	*	0	*	0	*
Greer County	0	*	0	*	0	*	0	*
Harmon County	0	*	0	*	0	*	0	*
Harper County	0	*	0	*	0	*	0	*
Haskell County	0	*	0	*	0	*	1	8.07
Hughes County	1	7.24	0	*	1	7.24	0	*
Jackson County	0	*	0	*	1	3.94	0	*
Jefferson County	0	*	0	*	0	*	0	*
Johnston County	1	9.55	0	*	2	19.11	0	*
Kay County	1	2.17	0	*	0	*	2	4.34
Kingfisher County	0	*	0	*	1	6.95	0	*
Kiowa County	0	*	0	*	0	*	0	*

[^]2010 rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2009 Census Bureau county population estimate and multiplying by 100,000

Table Three. Reportable Diseases by County, Oklahoma, 2010[^]

County	<i>Haemophilus influenzae</i> , invasive		Hepatitis A		Hepatitis B		Hepatitis C	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Latimer County	0	0.00	0	*	1	9.42	1	9.42
Le Flore County	0	0.00	0	*	7	14.02	0	*
Lincoln County	2	6.21	1	3.11	1	3.11	0	*
Logan County	0	0.00	0	*	1	2.54	0	*
Love County	1	10.96	0	*	0	*	0	*
McClain County	2	6.03	0	*	0	*	0	*
McCurtain County	0	0.00	0	*	0	*	1	3.00
McIntosh County	1	5.05	0	*	0	*	0	*
Major County	1	13.91	0	*	0	*	0	*
Marshall County	0	0.00	0	*	0	*	0	*
Mayer County	3	7.49	0	*	3	7.49	0	*
Murray County	1	7.72	0	*	0	*	0	*
Muskogee County	0	0.00	0	*	2	2.80	2	2.80
Noble County	0	0.00	0	*	0	*	0	*
Nowata County	0	0.00	0	*	0	*	0	*
Okfuskee County	0	0.00	0	*	0	*	0	*
Oklahoma County	28	3.91	0	*	16	2.23	3	0.42
Okmulgee County	1	2.55	0	*	4	10.18	3	7.64
Osage County	0	0.00	0	*	7	15.54	1	2.22
Ottawa County	0	0.00	0	*	2	6.32	0	*
Pawnee County	0	0.00	0	*	0	*	2	12.18
Payne County	0	0.00	0	*	0	*	1	1.25
Pittsburg County	1	2.21	0	*	5	11.06	0	*
Pontotoc County	2	5.34	0	*	1	2.67	0	*
Pottawatomie County	4	5.69	0	*	4	5.69	1	1.42
Pushmataha County	0	0.00	0	*	0	*	0	*
Roger Mills County	0	0.00	0	*	0	*	0	*
Rogers County	2	2.33	1	1.17	0	*	1	1.17
Seminole County	3	12.35	0	*	1	4.12	1	4.12
Sequoyah County	0	0.00	0	*	3	7.24	2	4.83
Stephens County	0	0.00	0	*	1	2.30	0	*
Texas County	1	4.73	0	*	0	*	0	*
Tillman County	0	0.00	0	*	0	*	0	*
Tulsa County	20	3.32	1	0.17	25	4.15	9	1.50
Wagoner County	2	2.84	0	*	2	2.84	0	*
Washington County	1	1.97	0	*	1	1.97	0	*
Washita County	0	0.00	0	*	0	*	0	*
Woods County	0	0.00	0	*	0	*	0	*
Woodward County	0	0.00	0	*	2	10.02	0	*
State of Oklahoma	105	2.85	6	0.16	115	3.12	41	1.11

[^]2010 rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2009 Census Bureau county population estimate and multiplying by 100,000

Table Three. Reportable Diseases by County, Oklahoma, 2010[^]

County	Meningococcal invasive disease		Pertussis		Rocky Mountain Spotted Fever		Salmonellosis	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Adair County	1	4.58	1	4.58	1	4.58	1	4.58
Alfalfa County	0	*	0	*	0	*	4	72.98
Atoka County	0	*	1	6.90	2	13.80	1	6.90
Beaver County	0	*	0	*	0	*	2	37.95
Beckham County	0	*	0	*	0	*	4	18.94
Blaine County	0	*	0	*	2	15.86	0	*
Bryan County	0	*	0	*	0	*	15	36.78
Caddo County	0	*	1	3.29	1	3.29	6	19.74
Canadian County	0	*	5	4.56	7	6.38	32	29.18
Carter County	0	*	4	8.28	0	*	16	33.11
Cherokee County	0	*	1	2.17	1	2.17	3	6.52
Choctaw County	0	*	0	*	0	*	1	6.72
Cimarron County	0	*	0	*	0	*	0	*
Cleveland County	0	*	2	0.82	4	1.64	44	17.99
Coal County	0	*	0	*	0	*	3	51.23
Comanche County	0	*	2	1.77	4	3.53	23	20.31
Cotton County	0	*	0	*	0	*	1	15.92
Craig County	1	6.60	0	*	1	6.60	0	*
Creek County	0	*	6	8.54	6	8.54	17	24.20
Custer County	0	*	0	*	2	7.49	5	18.71
Delaware County	0	*	3	7.40	5	12.33	8	19.73
Dewey County	0	*	0	*	0	*	0	*
Ellis County	0	*	0	*	0	*	1	25.48
Garfield County	0	*	0	*	1	1.70	8	13.58
Garvin County	0	*	4	14.75	3	11.06	8	29.51
Grady County	0	*	7	13.55	2	3.87	13	25.17
Grant County	0	*	0	*	0	*	0	*
Greer County	0	*	0	*	0	*	1	17.15
Harmon County	0	*	0	*	0	*	0	*
Harper County	0	*	0	*	0	*	4	118.45
Haskell County	0	*	0	*	3	24.21	4	32.28
Hughes County	1	7.24	1	7.24	1	7.24	2	14.47
Jackson County	0	*	0	*	0	*	8	31.53
Jefferson County	0	*	0	*	0	*	0	*
Johnston County	0	*	0	*	0	*	3	28.66
Kay County	1	2.17	4	8.67	1	2.17	6	13.01
Kingfisher County	0	*	0	*	2	13.90	6	41.71
Kiowa County	0	*	0	*	0	*	3	32.96

[^]2010 rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2009 Census Bureau county population estimate and multiplying by 100,000

Table Three. Reportable Diseases by County, Oklahoma, 2010[^]

County	Meningococcal invasive disease		Pertussis		Rocky Mountain Spotted Fever		Salmonellosis	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Latimer County	0	*	1	9.42	15	141.23	2	18.83
Le Flore County	0	*	0	*	19	38.06	11	22.04
Lincoln County	0	*	2	6.21	6	18.63	14	43.48
Logan County	0	*	0	*	2	5.09	13	33.08
Love County	0	*	0	*	0	*	3	32.88
McClain County	0	*	0	*	2	6.03	13	39.19
McCurtain County	0	*	0	*	8	23.97	8	23.97
McIntosh County	0	*	1	5.05	3	15.15	3	15.15
Major County	0	*	0	*	0	*	3	41.73
Marshall County	0	*	0	*	0	*	2	13.32
Mayes County	0	*	1	2.50	3	7.49	8	19.97
Murray County	0	*	1	7.72	0	*	3	23.15
Muskogee County	0	*	1	1.40	6	8.40	9	12.60
Noble County	0	*	0	*	0	*	6	54.79
Nowata County	0	*	0	*	2	19.00	3	28.50
Okfuskee County	0	*	2	18.31	3	27.46	4	36.62
Oklahoma County	2	0.28	29	4.05	15	2.09	132	18.42
Okmulgee County	0	*	4	10.18	5	12.73	4	10.18
Osage County	0	*	1	2.22	5	11.10	9	19.98
Ottawa County	1	3.16	0	*	4	12.65	8	25.29
Pawnee County	0	*	1	6.09	1	6.09	9	54.81
Payne County	0	*	1	1.25	5	6.27	30	37.63
Pittsburg County	1	2.21	10	22.12	17	37.60	10	22.12
Pontotoc County	0	*	0	*	1	2.67	10	26.72
Pottawatomie County	1	1.42	0	*	8	11.38	20	28.46
Pushmataha County	0	*	0	*	8	67.73	0	*
Roger Mills County	0	*	0	*	0	*	0	*
Rogers County	4	4.67	6	7.00	2	2.33	20	23.35
Seminole County	0	*	0	*	6	24.70	7	28.81
Sequoyah County	0	*	2	4.83	3	7.24	8	19.31
Stephens County	0	*	0	*	3	6.90	20	45.99
Texas County	0	*	0	*	0	*	7	33.12
Tillman County	0	*	0	*	0	*	4	51.31
Tulsa County	4	0.66	88	14.62	24	3.99	67	11.13
Wagoner County	1	1.42	1	1.42	8	11.36	10	14.21
Washington County	0	*	2	3.94	2	3.94	6	11.83
Washita County	0	*	0	*	0	*	2	16.93
Woods County	0	*	0	*	0	*	4	47.52
Woodward County	0	*	3	15.03	0	*	7	35.07
State of Oklahoma	18	0.49	199	5.40	235	6.37	752	20.40

[^]2010 rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2009 Census Bureau county population estimate and multiplying by 100,000

Table Three. Reportable Diseases by County, Oklahoma, 2010[^]

County	Shigellosis		<i>S. pneumoniae</i> , invasive, < 5 yrs.		Tuberculosis		Tularemia	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Adair County	10	45.75	1	4.58	0	*	0	*
Alfalfa County	0	*	0	*	0	*	0	*
Atoka County	0	*	0	*	0	*	0	*
Beaver County	4	75.90	0	*	1	18.98	0	*
Beckham County	7	33.15	1	4.74	0	*	0	*
Blaine County	0	*	0	*	0	*	0	*
Bryan County	0	*	0	*	1	2.45	0	*
Caddo County	13	42.77	0	*	2	6.58	0	*
Canadian County	34	31.00	1	0.91	4	3.65	0	*
Carter County	3	6.21	1	2.07	0	*	0	*
Cherokee County	5	10.86	1	2.17	1	2.17	1	2.17
Choctaw County	0	*	1	6.72	0	*	0	*
Cimarron County	0	*	0	*	0	*	0	*
Cleveland County	38	15.54	3	1.23	1	0.41	1	0.41
Coal County	0	*	0	*	0	*	0	*
Comanche County	9	7.95	4	3.53	3	2.65	0	*
Cotton County	0	*	0	*	1	15.92	0	*
Craig County	0	*	1	6.60	0	*	0	*
Creek County	2	2.85	2	2.85	0	*	0	*
Custer County	2	7.49	0	*	1	3.74	0	*
Delaware County	0	*	0	*	1	2.47	0	*
Dewey County	0	*	0	*	1	22.71	0	*
Ellis County	1	25.48	0	*	0	*	0	*
Garfield County	2	3.39	1	1.70	4	6.79	0	*
Garvin County	0	*	0	*	0	*	0	*
Grady County	4	7.74	0	*	0	*	0	*
Grant County	0	*	1	23.16	0	*	0	*
Greer County	0	*	0	*	0	*	0	*
Harmon County	0	*	0	*	0	*	0	*
Harper County	0	*	0	*	1	29.61	0	*
Haskell County	0	*	0	*	0	*	1	8.07
Hughes County	0	*	0	*	0	*	0	*
Jackson County	14	55.19	0	*	2	7.88	0	*
Jefferson County	0	*	0	*	0	*	0	*
Johnston County	0	*	0	*	0	*	0	*
Kay County	0	*	0	*	1	2.17	1	2.17
Kingfisher County	0	*	0	*	0	*	0	*
Kiowa County	1	10.99	0	*	0	*	0	*

[^]2010 rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2009 Census Bureau county population estimate and multiplying by 100,000

Table Three. Reportable Diseases by County, Oklahoma, 2010[^]

County	Shigellosis		<i>S. pneumoniae</i> , invasive, < 5 yrs.		Tuberculosis		Tularemia	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Latimer County	0	*	0	*	0	*	0	*
Le Flore County	0	*	0	*	3	6.01	0	*
Lincoln County	0	*	2	6.21	0	*	0	*
Logan County	0	*	0	*	0	*	0	*
Love County	0	*	0	*	0	*	0	*
McClain County	13	39.19	0	*	0	*	1	3.01
McCurtain County	0	*	0	*	4	11.99	0	*
McIntosh County	0	*	0	*	1	5.05	0	*
Major County	0	*	0	*	0	*	0	*
Marshall County	0	*	0	*	0	*	0	*
Mayes County	0	*	1	2.50	2	4.99	0	*
Murray County	0	*	0	*	0	*	0	*
Muskogee County	1	1.40	1	1.40	0	*	0	*
Noble County	0	*	0	*	0	*	0	*
Nowata County	0	*	0	*	0	*	0	*
Okfuskee County	6	54.92	0	*	0	*	0	*
Oklahoma County	62	8.65	13	1.81	27	3.77	0	*
Okmulgee County	9	22.91	0	*	0	*	0	*
Osage County	3	6.66	0	*	3	6.66	0	*
Ottawa County	1	3.16	0	*	2	6.32	0	*
Pawnee County	0	*	0	*	1	6.09	0	*
Payne County	5	6.27	0	*	2	2.51	0	*
Pittsburg County	0	0.00	5	11.06	1	2.21	0	*
Pontotoc County	1	2.67	1	2.67	0	*	0	*
Pottawatomie County	0	*	1	1.42	2	2.85	0	*
Pushmataha County	0	*	0	*	0	*	0	*
Roger Mills County	1	29.35	0	*	0	*	1	29.35
Rogers County	22	25.68	1	1.17	0	*	0	*
Seminole County	0	*	0	*	0	*	0	*
Sequoyah County	4	9.65	0	*	0	*	0	*
Stephens County	0	*	3	6.90	0	*	1	2.30
Texas County	0	*	0	*	1	4.73	0	*
Tillman County	0	*	0	*	0	*	0	*
Tulsa County	79	13.12	6	1.00	11	1.83	0	*
Wagoner County	60	85.23	1	1.42	0	*	1	1.42
Washington County	0	*	2	3.94	0	*	0	*
Washita County	0	*	0	*	0	*	0	*
Woods County	0	*	0	*	0	*	0	*
Woodward County	0	*	0	*	1	5.01	0	*
State of Oklahoma	416	11.28	55	1.49	86	2.33	8	0.22

[^]2010 rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2009 Census Bureau county population estimate and multiplying by 100,000

Table Three. Reportable Diseases by County, Oklahoma, 2010[^]

County	Chlamydia		Gonorrhea		Syphilis (Total Early)	
	Number	Rate	Number	Rate	Number	Rate
Adair County	67	295.38	16	70.54	0	*
Alfalfa County	3	53.17	0	*	0	*
Atoka County	46	324.35	5	35.26	0	*
Beaver County	6	106.46	0	*	0	*
Beckham County	53	239.61	9	40.69	0	*
Blaine County	17	142.34	3	25.12	0	*
Bryan County	145	341.85	21	49.51	0	*
Caddo County	92	310.81	7	23.65	0	*
Canadian County	179	154.92	34	29.43	2	1.73
Carter County	173	363.77	67	140.88	0	*
Cherokee County	175	372.44	14	29.80	0	*
Choctaw County	79	519.57	8	52.61	0	*
Cimarron County	1	40.40	0	*	0	*
Cleveland County	607	237.34	113	44.18	2	0.78
Coal County	16	270.04	3	50.63	0	*
Comanche County	1196	963.75	310	249.80	4	3.22
Cotton County	16	258.36	1	16.15	0	*
Craig County	51	339.34	7	46.58	0	*
Creek County	213	304.43	34	48.59	1	1.43
Custer County	63	229.35	8	29.12	0	*
Delaware County	82	197.65	4	9.64	0	*
Dewey County	7	145.53	1	20.79	0	*
Ellis County	2	48.18	0	*	0	*
Garfield County	231	381.31	26	42.92	0	*
Garvin County	68	246.59	9	32.64	0	*
Grady County	109	207.89	17	32.42	2	3.81
Grant County	6	132.54	3	66.27	0	*
Greer County	12	192.34	1	16.03	0	*
Harmon County	7	239.56	2	68.45	0	*
Harper County	2	54.27	1	27.14	0	0.00
Haskell County	15	117.47	0	*	0	0.00
Hughes County	35	249.95	7	49.99	0	0.00
Jackson County	131	495.35	24	90.75	0	0.00
Jefferson County	15	231.77	1	15.45	0	0.00
Johnston County	27	246.42	2	18.25	0	0.00
Kay County	164	352.22	24	51.54	0	0.00
Kingfisher County	19	126.38	2	13.30	0	0.00
Kiowa County	16	169.38	3	31.76	0	0.00

[^]2010 rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2009 Census Bureau county population estimate and multiplying by 100,000

Table Three. Reportable Diseases by County, Oklahoma, 2010[^]

County	Chlamydia		Gonorrhea		Syphilis (Total Early)	
	Number	Rate	Number	Rate	Number	Rate
Latimer County	33	295.86	2	17.93	0	*
Le Flore County	119	236.19	6	11.91	0	*
Lincoln County	92	268.43	12	35.01	0	*
Logan County	177	422.96	57	136.21	2	4.78
Love County	22	233.47	0	*	0	*
McClain County	62	179.68	7	20.29	0	*
McCurtain County	156	470.57	59	177.97	0	*
McIntosh County	74	365.40	16	79.00	0	*
Major County	12	159.43	1	13.29	0	*
Marshall County	21	132.58	0	*	0	*
Mayes County	109	264.18	10	24.24	0	*
Murray County	27	200.18	0	*	0	*
Muskogee County	326	459.22	124	174.67	1	1.41
Noble County	15	129.75	2	17.30	0	*
Nowata County	22	208.81	0	*	0	*
Okfuskee County	23	188.66	4	32.81	0	*
Oklahoma County	3478	483.97	1460	203.16	47	6.54
Okmulgee County	196	489.16	87	217.13	1	2.50
Osage County	96	202.22	18	37.92	0	*
Ottawa County	136	427.03	14	43.96	0	*
Pawnee County	41	247.33	5	30.16	0	*
Payne County	365	471.88	69	89.20	1	1.29
Pittsburg County	127	277.07	25	54.54	1	2.18
Pontotoc County	121	322.74	30	80.02	0	*
Pottawatomie County	310	446.42	98	141.12	1	1.44
Pushmataha County	23	198.76	1	8.64	0	*
Roger Mills County	8	219.36	1	27.42	0	*
Rogers County	173	199.07	21	24.16	0	*
Seminole County	83	325.72	44	172.67	0	*
Sequoyah County	106	250.05	12	28.31	0	*
Stephens County	138	306.34	8	17.76	0	*
Texas County	36	174.42	8	38.76	0	*
Tillman County	27	337.84	4	50.05	0	*
Tulsa County	3146	521.38	1329	220.25	26	4.31
Wagoner County	92	125.88	25	34.21	0	*
Washington County	68	133.40	10	19.62	0	*
Washita County	21	180.58	7	60.19	0	*
Woods County	33	371.71	4	45.06	1	11.26
Woodward County	40	199.19	2	9.96	0	*
State of Oklahoma	14302	381.20	4369	116.46	92	2.45

[^]2010 rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2009 Census Bureau county population estimate and multiplying by 100,000

Botulism

2010 Case Total	2	2010 Incidence Rate	0.06 per 100,000
2009 Case Total	0	2009 Incidence Rate	0.00 per 100,000

Botulism is a collective term for illness or intoxication caused by the bacteria *Clostridium botulinum* or its toxin. For disease classification purposes, the broadest categories of the disease include foodborne botulism, infant botulism, and wound botulism. In 2009, the US had 118 cases of botulism, 10 were categorized as foodborne botulism, 83 were infant botulism, and 25 were either wound botulism or an unspecified category of botulism. In 2010, Oklahoma had two cases of infant botulism. This report summarizes the clinical and laboratory results of both cases.

C. botulinum is ubiquitous in the environment and rarely causes disease when ingested by healthy adults. In infants, ingested spores may multiply in the intestinal lumen and produce toxin, causing neurological illnessⁱ. In the last several years, colonization with *C. botulinum* in adults has also been recognized as a rare clinical entity. Infant botulism has been epidemiologically linked to the consumption of honey, although approximately 85% of infected infants did not ingest honey prior to illness. Some studies suggest that as many as 5% of SIDS deaths are caused by infant botulismⁱⁱ.

The two Oklahoma cases experienced symptoms of weak/altered cry, diminished suckling, hypotonia, and poor feeding. One case also experienced symptoms of paralysis and constipation. Initial tests performed to rule out other diagnoses were a CT scan, lumbar puncture, and stool cultures. Due to the cases clinical presentation and rule out testing of other diagnoses, BabyBIG[®] (Botulism Immune Globulin Intravenous [Human]) was released by the Infant Botulism Treatment and Prevention Program from the California Department of Health. Stool specimens were sent to the Centers for Disease Control and Prevention (CDC) for *C. botulinum* testing. *Clostridium botulinum* toxin was identified in the stool of both cases. Laboratory testing identified *C. botulinum* toxin type A in one case and *C. botulinum* toxin type B was identified in the other case's clinical specimen. Investigations conducted by the Acute Disease Service (ADS) did not identify a potential source, such as consumption of honey, for either case. Prior to 2010, the last infant botulism cases reported in Oklahoma occurred during 2001 and 2005.

Botulism is an immediately notifiable condition in Oklahoma. Clinicians should contact the ADS Epidemiologist-on-Call (available 24/7/365 for disease reporting and consultation) immediately if botulism is suspected based on clinical impression. The ADS Epi-on-Call will work with the clinician and the CDC to coordinate antitoxin or BabyBIG[®] release and clinical specimen collection for laboratory testing. The decision to release antitoxin and BabyBIG[®] are based on symptoms consistent with botulism and initial tests that rule out other potential diagnoses such as LP, brain CT or MRI, edrophonium challenge test, physical exam for ticks, chest x-ray, and EMG. If given before paralysis is complete, antitoxin can prevent worsening of the patient's illness and shorten recovery time. The decision to release antitoxin cannot depend on laboratory confirmation since routine tests cannot confirm *C. botulinum* with the speed required for initiating antitoxin as early as possible during the course of illness.

The mouse bioassay is used by the CDC to test for *C. botulinum*. The Oklahoma State Department of Health Public Health Lab does not perform *C. botulinum* testing. The CDC will only perform *C. botulinum* testing if the patient's symptoms are consistent with botulism or if the antitoxin has been released. Preferred specimens for botulism testing are serum, feces, vomitus, or gastric contents. Serum should be collected before antitoxin treatment is given. Preferred specimens for infant botulism testing are stool or rectal swab. For wound botulism, the preferred specimens are serum, tissue, or feces. Please refer to the OSDH ADS website at <http://ads.health.ok.gov> for additional information about botulism.

ⁱ Nevas M. et al. Infant Botulism Acquired from Household Dust Presenting as Sudden Infant Death Syndrome. *J Clin Microb* 2005;43:511-513.

ⁱⁱ Control of Communicable Diseases Manual, 19th Edition. Heyman D, Ed. American Public Health Association, Washington, DC 2008.

Campylobacteriosis

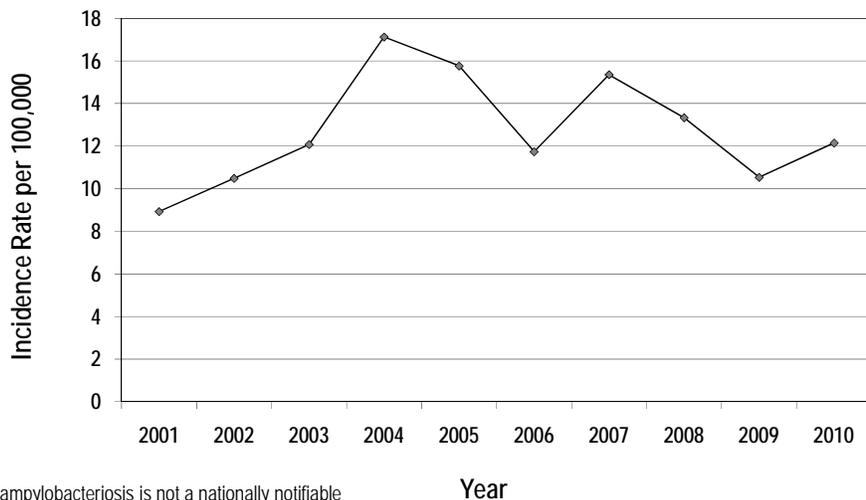
2010 Case Total	448	2010 Incidence Rate	12.2 per 100,000
2009 Case Total	384	2009 Incidence Rate	10.5 per 100,000

Campylobacteriosis is a diarrheal illness caused by *Campylobacter* species and is characterized by an acute onset of diarrhea, sometimes bloody, abdominal cramps, fever, malaise, nausea, and sometimes vomiting. Beginning in October 2009, reported cases of campylobacteriosis are counted rather than investigated by county health department communicable disease nurses. The number of cases reported in 2010 is a 17% increase from the 384 cases reported in 2009. A seasonal trend for campylobacteriosis was seen with more cases occurring during the months of June through August (n = 192, 43%).

The highest incidence rate (IR) by age group occurred among cases less than five years of age (29.79 per 100,000, n = 81), followed by cases 5 to 9 years of age (13.37 per 100,000, n = 34), and cases 60 to 69 years of age (12.90 per 100,000, n = 44). Although the IR of campylobacteriosis is 25% greater among men (13.56 per 100,000, n = 247) than women (10.78 per 100,000, n = 201), the difference is not statistically significant. No outbreaks of campylobacteriosis were reported in 2010.

Cases of campylobacteriosis were reported from 67 counties in Oklahoma. The highest IR of cases occurred among residents of Cimarron County (76.05 per 100,000; n = 2). Other counties with high rates included Harper County (59.22 per 100,000; n = 2), Alfalfa County (54.73 per 100,000; n = 3), and Jackson County (47.30 per 100,000; n = 12). Population size can affect incidence rates, consequently the higher rates seen in counties with smaller population. The largest counties had the highest numbers of cases: Oklahoma had 69 cases (9.6 per 100,000) followed by Tulsa with 53 cases (8.78 per 100,000). Eighteen cases (4%) were hospitalized for campylobacteriosis; there were no deaths due to this disease in 2010. The OSDH PHL received 69 isolates to confirm *Campylobacter* and serogroup identification, representing 15% of the reported cases. Of these isolates, 83% were identified as *C. jejuni*, 7% as *C. jejuni* var. *doylei*, and 10% as *C. coli*.

**Incidence Rate of Reported Cases of Campylobacteriosis
by Year, Oklahoma, 2001-2010***



* Campylobacteriosis is not a nationally notifiable condition, so national data is unavailable for comparison.

Demographic and Clinical Summary of Reported Campylobacteriosis Cases, Oklahoma, 2010 (N = 448)

	Number (%)	Incidence rate per 100,000
Gender		
Male	247 (55%)	13.56
Female	201 (45%)	10.78
Age	Median Age: 30 years (Range: 1 month – 93 years)	
Age Groups		
Less than 5 years	81 (18%)	29.79
5 - 9	34 (8%)	13.37
10 - 19	46 (10%)	9.23
20 - 29	61 (14%)	10.98
30 - 39	44 (10%)	9.59
40 - 49	55 (12%)	11.40
50 - 59	46 (10%)	9.63
60 - 69	44 (10%)	12.90
70 - 79	24 (5%)	11.53
80+	13 (3%)	9.35
Race		
White	203 (45%)	7.06
American Indian or Alaska Native	27 (6%)	9.12
Black or African American	8 (2%)	2.69
Asian	5 (1%)	7.97
Two or More Races	5 (1%)	3.31
Unknown	200 (45%)	--
Hispanic or Latino Ethnicity		
Unknown	283 (63%)	--
Hospitalized	18 (4%)	--

Chlamydia

2010 Case Total 14,302
2009 Case Total 14,991

2010 Incidence Rate 381 per 100,000
2009 Incidence Rate 412 per 100,000

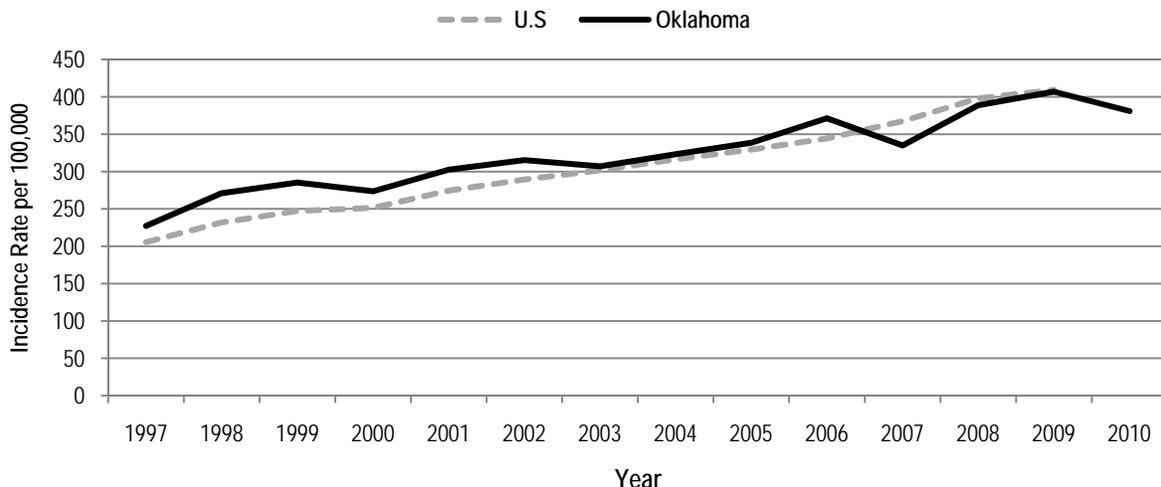
Chlamydia is the most commonly reported notifiable sexually transmitted disease (STD) in the United States and Oklahoma. Caused by the bacterium *Chlamydia trachomatis*, it is the most prevalent STD in Oklahoma accounting for 76% of reported STDs in the state for 2010. Although symptoms of chlamydia are usually mild or absent, serious complications that cause irreversible damage can develop “silently” before a patient ever recognizes a problem. In women, chlamydia can cause pelvic inflammatory disease, ectopic pregnancy, chronic pain, and/or infertility. However, up to 70% of women with chlamydia are asymptomatic. In addition, a pregnant woman infected with chlamydia can transmit the infection to her baby’s eyes during a vaginal birth. The resulting ophthalmic infection can ultimately result in the infant’s blindness. Men infected with chlamydia may have penile discharge while about 1% to 25% of men infected are asymptomatic. Possible complications of male infections include epididymitis, infertility, and Reiter Syndrome (reactive arthritis). In men, receptive anal intercourse may result in chlamydial proctitis.

Oklahoma mandated chlamydia reporting in 1988, when 2,714 cases were reported. In 2010, a total of 14,302 cases were reported. The rate of chlamydia in Oklahoma decreased 4.6% between 2009 and 2010. Oklahoma had an incidence rate of 381.2 per 100,000 in 2010 with 72% of the reported cases being female. Women go to the doctor more frequently than men due to yearly exams and pregnancy; this could account for some of the huge gap in the gender of reported chlamydia cases.

While Oklahoma county had the highest number of reported cases, Comanche county had the highest rate at 963.8 per 100,000, followed by Tulsa county (521.4 per 100,000) and Oklahoma county (483.9 per 100,000). Comanche county had a 15.9% increase between 2009 and 2010, while Oklahoma and Tulsa counties’ rates decreased. Chlamydia occurs in all ages, but age groups 15 to 19 years (1,936.6 per 100,000) and 20 to 24 years (2,031.8 per 100,000) had the highest rates among all the age groups. Age group 45 to 49 years had the highest rate increase at 23.6 per 100,000, 19.6% higher than 2009 (51 to 61 cases, respectively).

Blacks had the highest rate among all racial groups with a rate of 1,594.5 per 100,000, 6.4 times higher when compared to Whites (249.9 per 100,000). Native Americans had the second highest rate (499.6 per 100,000) which was 1.9 times higher than Whites. Asian/Hawaiian/Pacific Islanders had a rate of 227.5 per 100,000. Hispanics had a rate of 415.1 per 100,000 in 2010, which represents a 7.4% decrease from 2009.

Chlamydia Incidence Rates per 100,000 Population, Oklahoma and U.S., 1997-2010*



*U.S. Data for 2010 not available at the time of this report.

Chlamydia Cases and Rates by Demographics for 2010, Oklahoma			
	Number	Percent	Incidence Rate per 100,000
Gender (N = 14,302)*			
Male	3,997	27.9 %	219.4
Female	10,297	72.0 %	552.1
Unknown	8	<1.0 %	*
Age Groups (N = 14,302)*			
< 10 Years	22	<1.0 %	4.2
10 - 14	129	<1.0 %	53.4
15 - 19	4,974	34.8 %	1,936.6
20 - 24	5,705	39.9 %	2,031.8
25 - 29	2,127	14.9 %	774.5
30 - 34	821	5.7 %	356.4
35 - 39	302	2.1 %	132.1
40 - 44	114	<1.0 %	51.0
45 - 49	61	<1.0 %	23.6
> 50 Years	47	<1.0 %	4.0
Race (N = 14,302)			
American Indian/Alaska Native	1,607	11.2 %	499.6
Asian/Pacific Islander	158	1.1 %	227.5
Black/African American	4,427	30.9 %	1,594.5
White	6,764	47.3 %	249.9
Multiple Race	263	1.8 %	173.9
Other	150	1.1 %	97.1
Unknown	933	6.5 %	*
Ethnicity (N = 1,253)			
Hispanic	1,253	8.8 %	415.1
<i>*At the time of publication 2010 population data was not available; therefore, 2009 population data was used to calculate rates.</i>			

Cryptosporidiosis

2010 Case Total	122	2010 Incidence Rate	3.3 per 100,000
2009 Case Total	141	2009 Incidence Rate	3.9 per 100,000

The number of cryptosporidiosis cases reported in Oklahoma during 2010 was a 13.5% decrease compared to the 141 cases reported during 2009. Of the 122 reported cases, 93 (76%) were laboratory-confirmed cases of cryptosporidiosis and 29 (24%) were symptomatic exposed contacts to a confirmed case identified during public health investigations conducted by county health department communicable disease nurses. No outbreaks of cryptosporidiosis were reported in Oklahoma during 2010.

The highest incidence rate of cryptosporidiosis occurred in persons under 10 years of age (5.5 per 100,000 population). Twelve (10%) cases reported working in or attending a child care setting. Twelve (10%) cases reported out-of-state travel and 9 (7%) reported international travel to various countries including Mexico, Ethiopia, Morocco, and Costa Rica. A seasonal trend was observed in 2010 with the majority of cases (60%) reporting onset of symptoms from June through September. The highest incidence rates of cryptosporidiosis occurred among residents of Carter (33.1 per 100,000 population), Johnston (28.7 per 100,000 population), and Ellis Counties (32.8 per 100,000 population). Regular handwashing with soap and water, whether you are ill or well, is the single most important thing you can do to prevent cryptosporidiosis and other diarrheal illnesses. For more information about preventing cryptosporidiosis and other waterborne diseases, visit <http://ads.health.ok.gov>.

Demographic Summary of Reported Cryptosporidiosis Cases, Oklahoma, 2010 (N = 122)

	Number (%)	Incidence Rate per 100,000
Gender		
Female	67 (55%)	3.59
Male	55 (45%)	3.02
Age	Median = 35.5 years (range: 6 months – 91 years)	
Race		
White	94 (77%)	3.27
Black or African American	5 (4%)	1.68
American Indian or Alaskan Native	9 (7%)	3.04
Two or more races	2 (2%)	1.32
Unknown	12 (10%)	-
Ethnicity		
Hispanic or Latino	7 (6%)	2.32
Not Hispanic or Latino	95 (78%)	2.81
Unknown	20 (16%)	-
Hospitalization	28* (23%)	-
Death	0† (0%)	-
Symptoms		
Diarrhea	119 (98%)	-
Watery diarrhea	102 (84%)	-
Abdominal cramps	87 (71%)	-
Anorexia	75 (61%)	-
Duration of diarrhea	Median = 7 days (range: 1 – 120 days)	
Number of loose stools in a 24-hour period	Median = 8 stools (range: 1 – 140 stools)	

* Twenty-eight cases were hospitalized with cryptosporidiosis or found to have cryptosporidiosis during a hospital stay for an underlying condition

† There were three deaths among cases. Each of these cases had additional underlying conditions at the time of death, and cryptosporidiosis was not considered the primary cause of death for any of these cases.

Dengue Fever

2010 Case Total	4	2010 Incidence Rate	0.11 per 100,000
2009 Case Total	0	2009 Incidence Rate	0.00 per 100,000

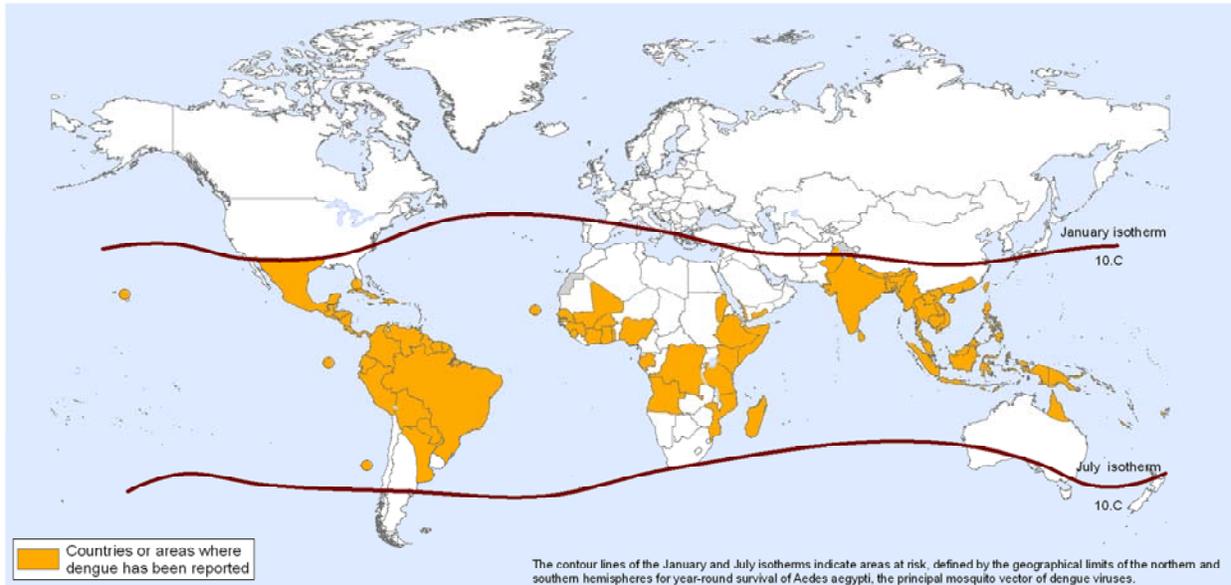
Dengue fever is endemic in at least 100 countries in Asia, the Pacific, the Americas, Africa, and the Caribbean (refer to map). Cases of dengue fever are generally acquired outside of the US (imported or travel-associated), but non-imported cases have been identified in Hawaii in 2001, Texas in 2005, and Florida in 2009 and 2010. Most dengue cases in U.S. citizens occur in endemic areas, such as, Puerto Rico, the U.S. Virgin Islands, Samoa, and Guam.

In Oklahoma, all dengue fever cases reported in 2010 were imported. Two cases reported visiting the Caribbean, one case visited Central American, and one case visited Southeast Asia during the incubation period. Only one case was hospitalized for this illness. All four cases reported being bitten by mosquitoes. Only one of the cases reported using mosquito repellent/prevention methods. The cases' ages ranged from 12 to 23 years. All four cases reported fever and myalgia. Three of the cases reported chills and anorexia and two cases reported rash, vomiting, backache, and eye pain. Other symptoms associated with dengue include intense headache, arthralgia, and a generalized maculo-papular rash.

Dengue fever is transmitted through the bite of an infected mosquito. Prevention of dengue fever may be achieved by routine use of an insect repellent containing 20 to 30% DEET (N, N-diethyl-m-toluamide) when visiting or residing in an endemic area along with sleeping indoors with screened windows or mosquito netting protection. The CDC Division of Vectorborne Infectious Diseases website has recommendations, news and updates for travelers and clinicians regarding dengue fever at <http://www.cdc.gov/NCIDOD/DVBID/dengue>. Persons planning travel to areas where dengue is endemic can check the CDC Traveler's Health recommendations by accessing the website www.cdc.gov/travel.

If a case of dengue fever is reported to the Oklahoma State Department of Health (OSDH), further testing may be performed by the Center for Disease Control Dengue Branch (CDC) upon request by the Acute Disease Service (ADS). The diagnosis and treatment of dengue and dengue hemorrhagic fever are guided by the symptoms and findings the patient presents, and cannot depend on laboratory confirmation, since routine tests can not confirm dengue with the speed required for patients in critical condition. Commercial laboratories are capable of testing for dengue. Confirmatory testing is performed only by the CDC using acute and convalesce blood samples. For unique circumstances, the OSDH ADS can arrange confirmatory testing at the CDC.

Dengue, countries or areas at risk, 2010



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Public Health Information
and Geographic Information Systems (GIS)
World Health Organization

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Source: WHO, International Travel and Health <http://www.who.int/ith/en/>

Shiga Toxin-producing *Escherichia coli* (STEC)

2010 Case Total	104	2010 Incidence Rate	2.82 per 100,000
2009 Case Total	64	2009 Incidence Rate	1.76 per 100,000

Nationally, *E. coli* O157:H7 is the most commonly reported serotype of Shiga toxin-producing *E. coli* (STEC); however, the number of reported non-O157 STEC cases each year is increasing.ⁱ This increase may be partially due to more widely used laboratory tests that identify other serotypes of STEC beyond O157:H7. The number of reported STEC cases reported in 2010 is a 63% increase from the 64 cases reported in 2009. This increase may be in part due to an outbreak involving a correctional facility described elsewhere in this publication. A seasonal trend was observed with the highest number of cases reported during the summer months of June and July (n = 44, 43%).

STEC cases in 2010 occurred among residents of 30 Oklahoma counties. The five counties with the highest incidence rates were Noble (45.66 per 100,000, n = 5), Cotton (31.84 per 100,000, n = 2), Johnston (19.11 per 100,000, n = 2), Greer (17.15 per 100,000, n = 1), and Canadian (13.68 per 100,000, n = 15) counties. The highest incidence rate occurred among males less than five years of age with an incidence of 18.73 per 100,000 (n = 26). The second highest incidence rate occurred among females less than five years of age (8.27 per 100,000, n = 11).

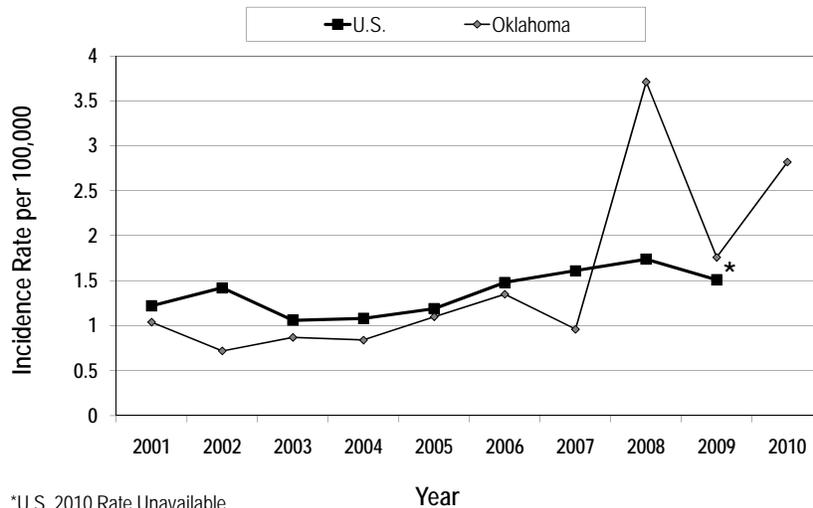
Demographic and Clinical Summary of Reported STEC Cases, Oklahoma, 2010 (N = 104)

	Number (%)	Incidence Rate per 100,000
Gender		
Male	60 (58%)	3.29
Female	44 (42%)	2.36
Age	Median Age: 15 years (Range: 6 months – 75 years)	
Race		
White	78 (75%)	2.71
African American or Black	8 (8%)	2.69
Two or more races	8 (8%)	5.29
American Indian or Alaska Native	6 (6%)	2.03
Unknown	4 (4%)	--
Ethnicity		
Hispanic or Latino	4 (4%)	1.33
Not Hispanic or Latino	83 (80%)	--
Unknown	17 (17%)	--
Hospitalized	18 (17%)	---
Hemolytic Uremic Syndrome	6 (6%)	--
Symptoms		
Diarrhea	93 (89%)	--
Abdominal Cramps	79 (76%)	--
Bloody Diarrhea	51 (51%)	--
Nausea	42 (40%)	--
Vomiting	41 (39%)	--
Fever	31 (30%)	--

Twenty-nine (28%) cases reported an affiliation with high-risk settings. Of those, 17 (59%) were associated with child care settings, ten (34%) resided in a correctional facility, and two (7%) worked in food service. Secondary cases were reported in two child care settings. Of the 104 cases, 87 (84%) were laboratory-confirmed STEC and 17 (16%) were epidemiologically-linked symptomatic contacts identified by the county health department communicable disease nurse during case investigations.

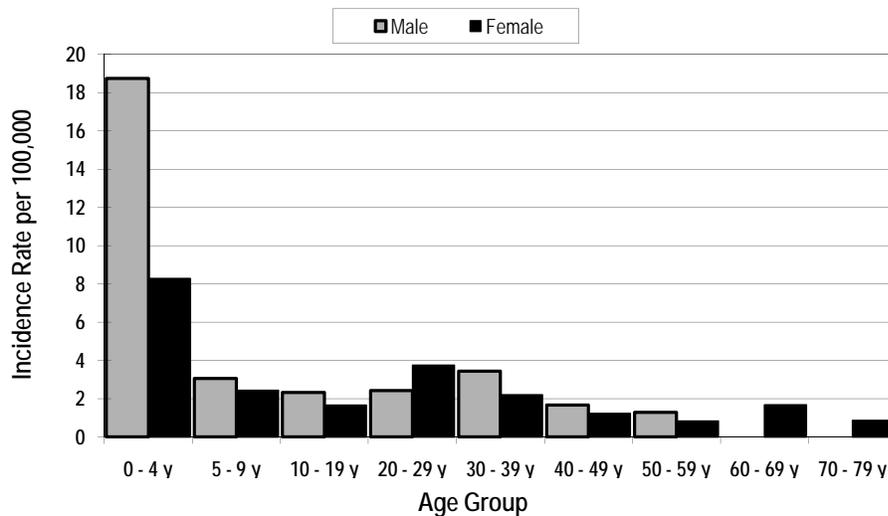
All suspected STEC isolates are required to be forwarded to the Oklahoma State Department of Health Public Health Laboratory (OSDH PHL) for confirmation and serogroup identification. In 2010, STEC isolates were forwarded to the OSDH PHL for all 87 confirmed cases. Of the 87 isolates, 41 (47%) were confirmed *E. coli* O157:H7 and 46 (53%) were STEC non-O157.

Incidence Rate of Reported Cases of Shiga Toxin-producing *E. coli* by Year, Oklahoma and U.S., 2001-2010*



*U.S. 2010 Rate Unavailable

Incidence Rate of Reported Cases of Shiga Toxin-producing *E. coli* by Age Group and Gender, Oklahoma, 2010



ⁱ Centers for Disease Control and Prevention. [Summary of notifiable diseases—United States, 2009]. Published May 12, 2011 for MMWR 2011;58(No. 53):74

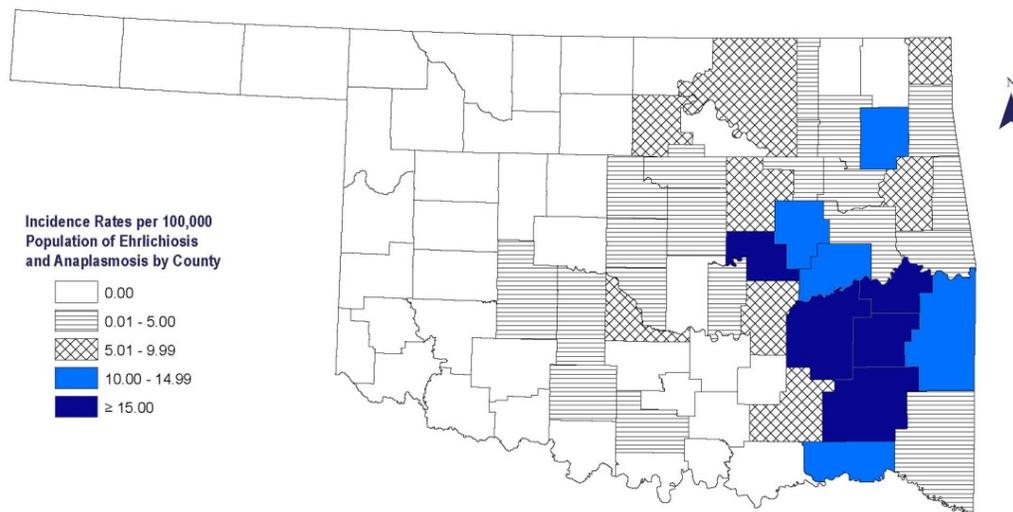
Ehrlichiosis and Anaplasmosis

2010 Case Total	107	2010 Incidence Rate	2.90 per 100,000
2009 Case Total	147	2009 Incidence Rate	4.04 per 100,000

Human monocytic ehrlichiosis (HME) and human granulocytic anaplasmosis (HGA, formerly called human granulocytic ehrlichiosis, or HGE) are distinct but closely related tickborne diseases with similar clinical presentations. For purposes of epidemiologic description, ehrlichiosis and anaplasmosis will be combined in this report. In 2010, the incidence rate (IR) of ehrlichiosis and anaplasmosis in Oklahoma represented a 27% decrease from 2009. However, the decline in cases may have partially been affected by changes in investigation processes; the Acute Disease Service focused on investigating reports with serologic titers above 1:64. From 2001 to 2010, the median annual number of reported cases in Oklahoma was 73 (range, 13 to 147). Eastern Oklahoma had higher incidence rates corresponding with its higher tick population. The counties with the highest rates of disease in 2010 were Pushmataha county (25.40 per 100,000, n = 3), followed by Haskell county (24.21 per 100,000, n = 3). The majority of the cases occurred during the warmer months of the year, when tick exposure is more likely. Onsets of illness were elevated from May to August and peaked in June.

Serologic testing is the most widely available and frequently used laboratory method for diagnosis. Both IgM and IgG antibody levels are used to confirm illness. Collection of acute (within a week of onset) and convalescent (2 to 4 weeks later) specimens are recommended for confirming the diagnosis. Treatment should be initiated before lab confirmation, when there is high suspicion of tickborne illness, to reduce the severity of disease. Doxycycline is the primary drug of choice for the treatment of ehrlichiosis and anaplasmosis.¹

Incidence Rate of Ehrlichiosis and Anaplasmosis Cases
by County of Residence, Oklahoma, 2010 (N = 107)



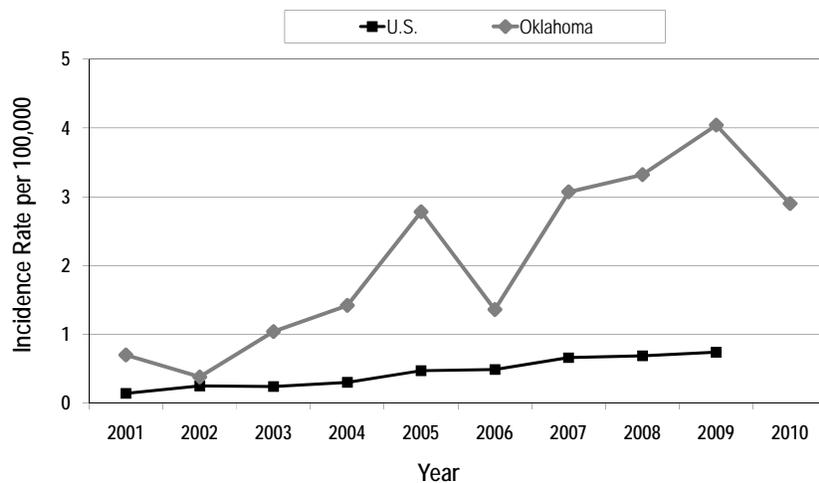
Data Source: OK State Department of Health, Acute Disease Service

Created: 06.15.2011

Descriptive and Clinical Summary of Reported Ehrlichiosis and Anaplasmosis Cases, Oklahoma, 2010 (N = 107)

	Number (%)	Incidence rate per 100,000
Gender		
Male	67 (63%)	3.68
Female	40 (37%)	2.14
Age	Median Age: 48 years (Range: 21 months – 82 years)	
Race		
White	60 (56%)	2.09
American Indian or Alaska Native	27 (25%)	9.12
Native Hawaiian or Pacific Islander	1 (1%)	25.34
Two or More Races	3 (3%)	1.98
Unknown	16 (15%)	--
Hispanic or Latino Ethnicity	1 (1%)	0.33
Unknown	40 (37%)	--
Disease		
Human Monocytic Ehrlichiosis	98 (92%)	--
Human Granulocytic Anaplasmosis	9 (8%)	--
Symptoms		
Fever	106 (99%)	--
Headache	68 (64%)	--
Myalgia	54 (50%)	--
Rash	28 (26%)	--
Reported Exposures		
Wooded or tick infested area	15 (14%)	--
Tick bite	40 (37%)	--
Hospitalized due to Ehrlichiosis or Anaplasmosis	26 (24%)	--
Died due to Ehrlichiosis or Anaplasmosis	0 (0%)	--

Incidence Rate of Reported Ehrlichiosis and Anaplasmosis Cases by Year, Oklahoma and U.S., 2001-2010*



*U.S. 2010 Rate Unavailable

ⁱ Heymann, David L., Editor. Control of Communicable Diseases Manual. 19th Edition. American Public Health Association, 2008

Gonorrhea

2010 Case Total 4,369
2009 Case Total 4,661

2010 Incidence Rate 116.5 per 100,000
2009 Incidence Rate 128.0 per 100,000

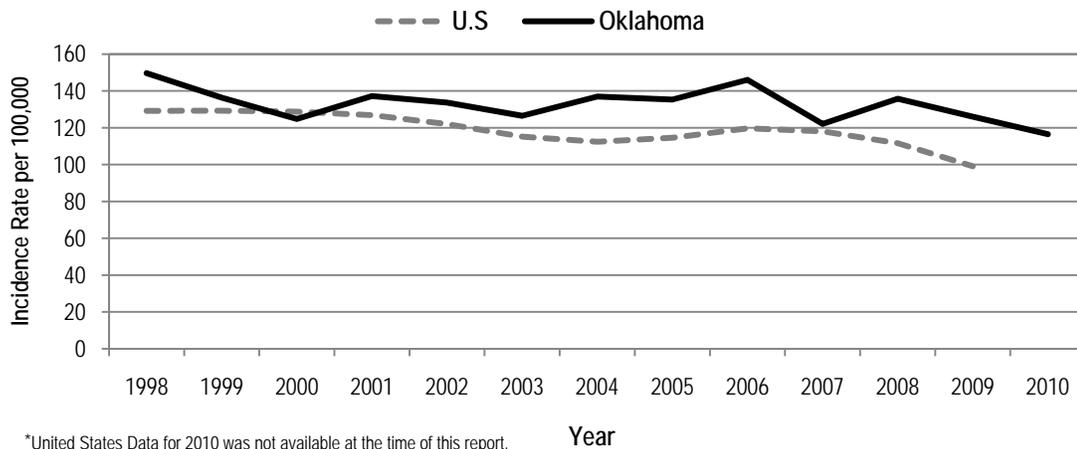
Gonorrhea is the second most prevalent sexually transmitted disease reported in Oklahoma after chlamydia. Gonorrhea is caused by *Neisseria gonorrhoea*, a bacterium that can grow and multiply in warm, moist areas of the reproductive tract, mouth, throat, eyes, and anus. In women, gonorrhea can result in pelvic inflammatory disease, ectopic pregnancy, cervicitis, and eventually infertility. Pregnant women infected with gonorrhea can also infect their unborn babies through the amniotic fluid or during birth. In men, this infection most often manifests as purulent urethral discharge and dysuria, and can cause infertility.

Oklahoma mandated gonorrhea reporting in 1943, when 4,715 cases were reported. Reported gonorrhea cases increased until 1982 when numbers started to slowly drop following a national decline due to the implementation of a national gonorrhea control program in the mid-1970s. In 2010, a total of 4,369 cases were reported in Oklahoma, approximately a 6% decrease from 2009. Oklahoma had an incidence rate of 116.5 per 100,000 in 2010 with 57% of the reported cases being female. In 1989, men made up the majority of gonorrhea cases in the U.S., but since 2002 women have made up the majority of cases. Oklahoma has followed a similar trend.

While Oklahoma County had the highest number of reported cases, Comanche County had the highest rate at 249.8 per 100,000, followed by Tulsa County (220.3 per 100,000) and Okmulgee County (217.1 per 100,000). Comanche County had a 35% rate increase between 2009 and 2010; however, Okmulgee County had a rate increase of 77.9% (122 per 100,000 to 217.1 per 100,000). Oklahoma County decreased by 15.9% and Tulsa County decreased by 9.7%. Gonorrhea occurs in all ages, but age groups 20 to 24 years (562 per 100,000) and 15 to 19 years (482.4 per 100,000) had the highest rates among all the age groups. Although most age groups had a rate decrease from 2009 to 2010, three age groups experienced an increase: 45 to 49 years at 6.2% increase, 25 to 29 years at 3.6% increase, and 30 to 34 years at 1% increase.

Blacks had the highest rate among all racial groups with a rate of 882 per 100,000, 18.8 times higher when compared to Whites (47 per 100,000). American Indians/Alaska Natives had the second highest rate (102 per 100,000) which was 2.2 times higher than Whites. Asian/Pacific Islanders had a rate of 29 per 100,000 but represented only 20 cases in 2010, an 81.8% increase from 2009. Hispanics had a rate of 59 per 100,000 in 2010, which represents a 14.8% decrease from 2009. Whites had the highest increase in gonorrhea rate (10% increase from 2009), while American Indian/Alaska Natives had the largest decrease (9.9% decrease from 2009).

Incidence Rate of Reported Gonorrhea Cases,
Oklahoma and U.S., 1998-2010*



*United States Data for 2010 was not available at the time of this report.

Gonorrhea Cases and Rates by Demographics for 2010, Oklahoma			
	Number	Percent	Incidence Rate per 100,000
Gender*			
Male	1,873	42.9 %	102.8
Female	2,493	57.1 %	133.7
Unknown	3	<1 %	-
Age Groups (N = 4,368)*			
< 10 Years	8	<1 %	1.5
10 - 14	28	<1 %	11.6
15 - 19	1,239	28.4 %	482.4
20 - 24	1,578	36.1 %	562.0
25 - 29	823	18.8 %	299.7
30 - 34	377	8.6 %	163.7
35 - 39	135	3.1 %	59.0
40 - 44	82	1.9 %	36.7
45 - 49	57	1.3 %	22.0
> 50 Years	41	<1 %	3.5
Race			
American Indian/Alaska Native	327	7.5 %	101.7
Black/African American	2,450	56.1 %	882.4
White	1,262	28.9 %	46.6
Asian/Pacific Islander	20	<1 %	28.8
Two or more races	85	1.9 %	N/A
Other	30	<1 %	N/A
Unknown	195	4.5 %	N/A
Ethnicity			
Hispanic	197	4.5 %	59.3

**At the time of publication 2010 population data was not available; therefore, 2009 population data was used to calculate rates.*

Haemophilus influenzae Invasive Disease

2010 Case Total	105	2010 Incidence Rate	2.85 per 100,000
2009 Case Total	92	2009 Incidence Rate	2.53 per 100,000

Invasive *Haemophilus influenzae* (*H. flu*) disease is a reportable condition in Oklahoma, and all *H. flu* sterile-site isolates are required to be submitted to the OSDH Public Health Laboratory (PHL) for confirmation and serotype identification. One hundred and five cases of invasive *H. flu* were reported to the OSDH during 2010 resulting in an incidence rate of 2.85 per 100,000 population, a 14.1% increase from 2009. *H. flu* isolates are serotyped based on the presence of a capsule (serotypes a through f) or absence of a capsule (non-typeable). Both capsulated and nonencapsulated isolates have the ability to cause severe disease. Of the 97 isolates (92% of reported cases) available for serotype identification by the PHL, 53 (54.6%) were non-typeable, 21 (21.6%) were serotype f, 9 (9.3%) were serotype a, 6 (6.2%) were serotype e, 4 (4.1%) were serotype d, and 4 (4.1%) were serotype b. Infection types of the cases included bacteremia/sepsis (97%, n = 102), meningitis (4%, n = 4), and pneumonia (59%, n = 62).

Cases of invasive *H. flu* in 2010 ranged in age from 1 day to 93 years with a median age of 70 years. The highest age-specific incidence rates per 100,000 population occurred among persons 80 years and older (refer to graph). Fourteen (13%) cases occurred among children less than 5 years of age, an age-specific incidence rate of 5.15 per 100,000 population. The highest proportion of cases occurred during the winter months, with over half of reported cases (n = 55, 52%) occurring in January, February, November, and December.

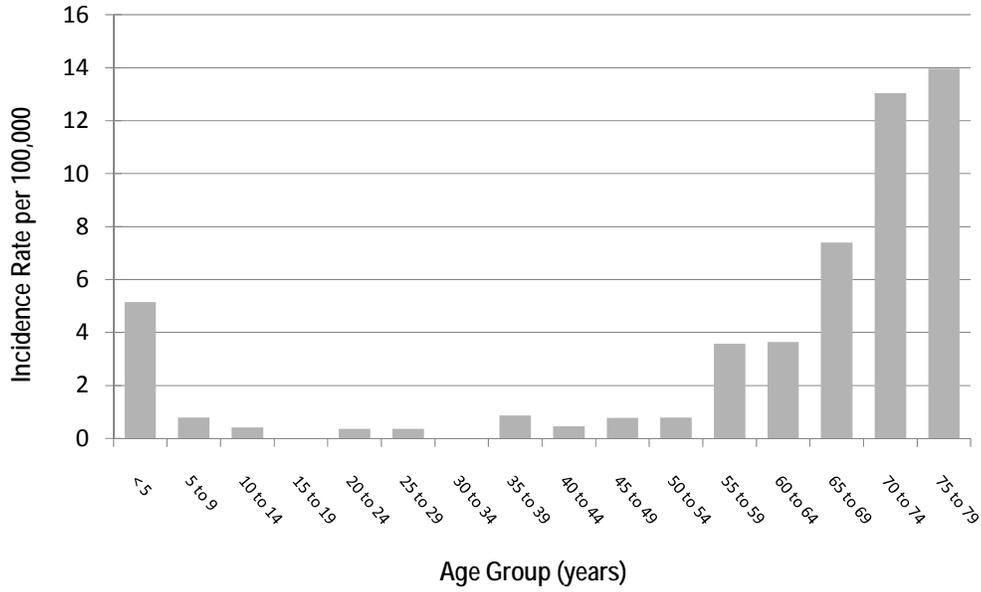
When a case of invasive *Haemophilus influenzae* type b (Hib) is identified, an active contact investigation commences to locate all close contacts less than 4 years of age, review vaccination history, and recommend antibiotic prophylaxis if needed. If any exposed children less than 4 years of age who are either unvaccinated or have not yet received the full primary series of the Hib vaccine are identified, then chemoprophylaxis is recommended to eradicate carriage of the organism. All four Hib cases reported in 2010 were over the age of 70 years. Investigations conducted by county health department public health nurses determined none of the close contacts were less than 4 years of age for three of the cases; therefore, post-exposure chemoprophylaxis was not recommended. Investigation of the fourth case revealed exposed contacts less than 4 years of age that had not yet received the full primary series of the Hib vaccine. During this investigation, OSDH recommended chemoprophylaxis to eradicate carriage of the organism to a total of 10 exposed close, personal contacts. No secondary cases occurred among cases reported during 2010.

Demographic Summary of Reported *Haemophilus influenzae* Invasive Disease Cases, Oklahoma, 2010 (N = 105)

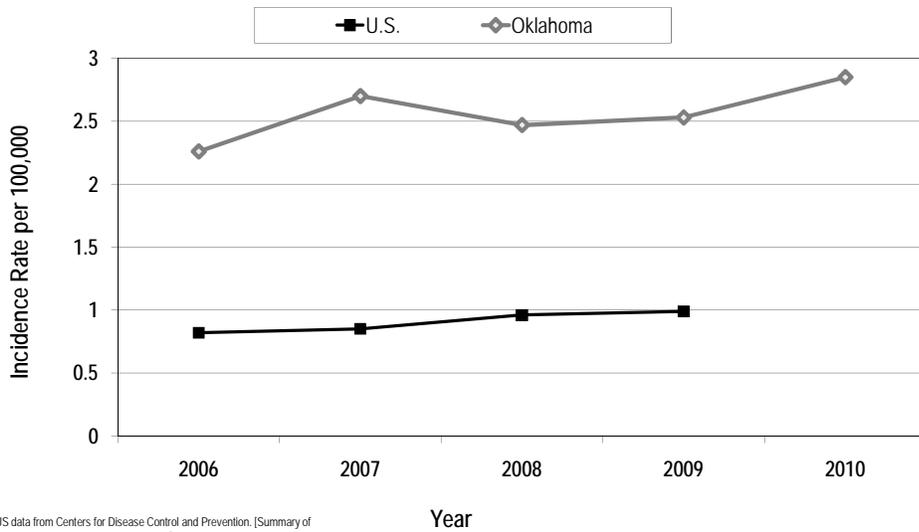
	Number (%)	Incidence Rate per 100,000
Gender		
Male	49 (47%)	2.69
Female	56 (53%)	3.00
Age	Median Age: 70 years (Range: 1 day – 93 years)	
Hospitalized for <i>H. flu</i> (n = 98)*	78 (80%)	-
Deaths due to <i>H. flu</i>	12 (11%)	-
Race		
White	84 (80%)	2.94
Black	4 (4%)	1.35
American Indian or Alaska Native	5 (5%)	1.69
Asian	-	-
Two or more races	2 (2%)	1.32
Unknown	10 (9%)	-
Hispanic Ethnicity (n = 66)	6 (6%)	1.99

*Number hospitalized for *H. flu* out of those hospitalized

Incidence Rate of Reported Invasive *Haemophilus influenzae* Cases by Age Group, Oklahoma, 2010



Haemophilus influenzae Incidence Rate by Year, Oklahoma and U.S., 2006-2010*



*US data from Centers for Disease Control and Prevention. [Summary of notifiable diseases—United States, 2009]. Published May 13, 2011 for MMWR 2009;58(No. 53):83. Data unavailable for 2010.

Hemolytic Uremic Syndrome, Post-diarrheal

2010 Case Total	11	2010 Incidence Rate	0.30 per 100,000
2009 Case Total	17	2009 Incidence Rate	0.47 per 100,000

Hemolytic Uremic Syndrome (HUS) is a condition characterized by an acute onset of microangiopathic hemolytic anemia, renal injury and thrombocytopenia, with the majority of cases preceded by a diarrheal illness. In 2010, the incidence rate (IR) of HUS in Oklahoma represented a 35% decrease from 2009. HUS became a nationally notifiable disease in 2000 and since that time Oklahoma's incidence rate has been similar to the national incidence. From 2001 to 2010, the median annual number of reported HUS cases in Oklahoma was 5 (range, 2 to 51), and the overall case fatality rate was 3%.

In 2010, the highest IR occurred among persons less than 5 years of age (2.21 per 100,000, n = 6), followed by cases 5 to 9 years of age (1.18 per 100,000, n = 3), and 70 to 79 years of age (0.48 per 100,000, n = 1). The incidence of HUS in women (0.38 per 100,000, n = 7) was 1.7 times greater than in men (0.22 per 100,000, n = 4) but was not statistically significant. Cases occurred among residents of nine Oklahoma counties.

The diagnosis of HUS is made through evaluation of a combination of laboratory test results. Anemia with microangiopathic changes shown on a peripheral blood smear was documented for eight (73%) of the cases. Of those with microangiopathic changes, schistocytes were most commonly seen (63%) compared to burr cells (38%) and helmet cells (25%), all non-exclusive. Hematuria was reported in 73% of cases; with proteinuria in 64% of cases. Additionally, elevated creatinine was documented for 82% of cases and thrombocytopenia in 91% of cases. An etiologic agent was identified in six (55%) of the 11 cases, which were *E. coli* O157:H7 (n = 5) and *E. coli* O121:H19 (n = 1) with results confirmed by the OSDH PHL.

Descriptive and Clinical Summary of Reported Hemolytic Uremic Syndrome Cases, Oklahoma, 2010 (N = 11)

	Number (%)	Incidence rate per 100,000
Gender		
Male	4 (36%)	0.22
Female	7 (64%)	0.38
Age	Median Age: 4 years (Range: 23 months – 71 years)	
Race		
White	10 (91%)	0.35
American Indian or Alaska Native	1 (9%)	0.34
Hispanic or Latino Ethnicity	1 (9%)	0.33
Symptoms		
Diarrhea	11 (100%)	--
Abdominal cramps	11 (100%)	--
Bloody diarrhea	9 (82%)	--
Vomiting	9 (82%)	--
Fever	8 (73%)	--
Hospitalized for HUS	11 (100%)	--
Hospitalization	Median Hospitalization: 15 days (Range: 3 days – 31 days)	
Died due to HUS	0 (0%)	--

Hepatitis A

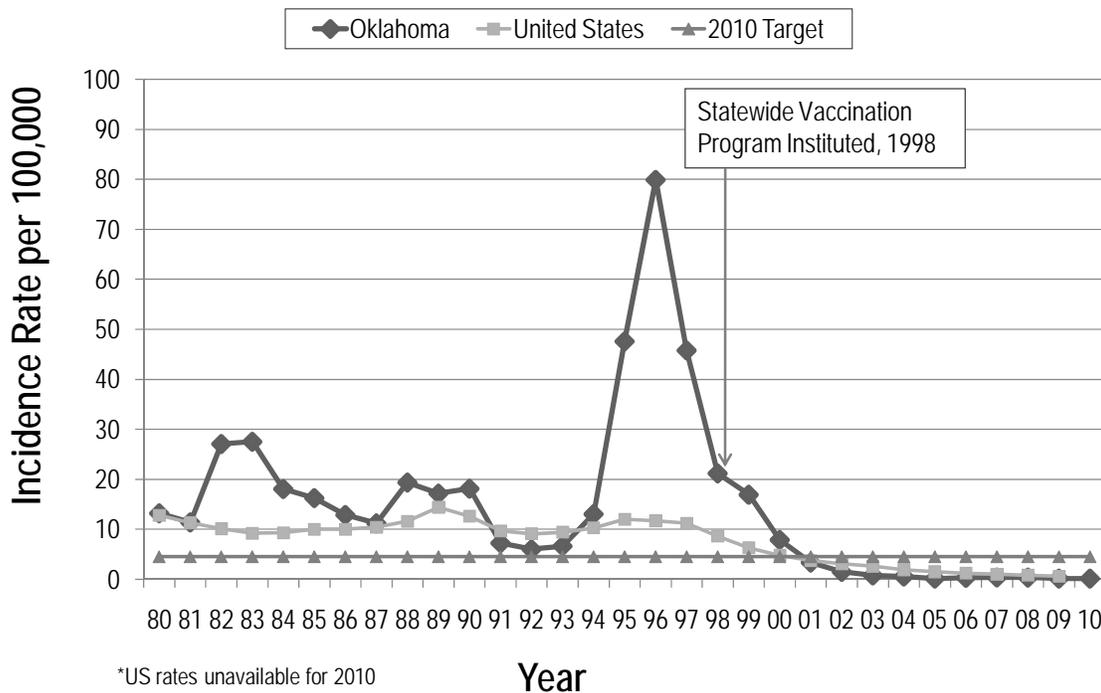
2010 Case Total	6	2010 Incidence Rate	0.16 per 100,000
2009 Case Total	6	2009 Incidence Rate	0.16 per 100,000

Since the hepatitis A epidemic that took place in Oklahoma from 1995 through 1997, with the peak in 1996 of 2,516 cases (incidence rate = 79.99 per 100,000), the incidence of hepatitis A in the state has dramatically declined. The number of cases has been less than 20 per year since 2004.

Of the six cases identified in 2010, none were associated with high-risk settings. One secondary case in a household member was identified through public health investigations. One case was hospitalized, and none of the cases expired.

A total of 45 close contacts were investigated (median: 5, range: 1 – 18 per case). Of those, 18 did not have evidence of immunity through previous testing or history of vaccination, and therefore required post exposure prophylaxis (PEP). The county health departments provide PEP to those identified as close contacts to confirmed hepatitis A cases. In 2007, PEP guidelines were revised by the Advisory Committee on Immunization Practices (ACIP), limiting the use of immunoglobulin (IG) and expanding the use of the hepatitis A vaccine. For persons from 12 months to 40 years of age, the hepatitis A vaccine is now the preferred method of PEP. IG remains the recommended PEP for persons less than 12 months of age, greater than 40 years of age, and for those who are immunocompromised or who have chronic disease such as liver disease or other chronic medical conditions.ⁱ

Incidence Rate of Reported Hepatitis A Cases by Year, Oklahoma and US, 1980-2010*



Hepatitis A should be considered in unvaccinated persons with hallmark symptoms of jaundice, very dark urine and/or clay-colored stools (refer to table for symptoms reported by cases), particularly those with recent exposure to high-risk regions through travel or residence. One case (17%) reported international travel during their exposure period.

A positive hepatitis A IgM titer indicates current infection, although false positive tests are common.ⁱⁱ Healthcare providers should restrict testing for hepatitis A to those clients with clinical evidence of acute hepatitis A infection. Liver function tests are usually markedly elevated in confirmed cases. Of the five cases with known liver function test results, the median alanine transaminase (ALT) was 589 (range: 135 – 1331), median aspartate aminotransferase (AST) of 435 (range: 202 – 1158), and median total bilirubin was 3.0 (range: 0.3 – 7.4).

The hepatitis A vaccine is routinely recommended for individuals 2 years of age or older, and the two-dose regimen is required for entry into childcare or grade school in Oklahoma. The CDC Travelers' Health website has recommendations regarding hepatitis A prevention for those traveling out of the US, and can be accessed at the website www.cdc.gov/travel.

Demographic and Clinical Summary of Reported Hepatitis A Cases, Oklahoma, 2010 (N = 6)

	Number (%)	Incidence Rate per 100,000
Gender		
Female	5 (83%)	0.29
Male	1 (17%)	0.55
Age	Median = 34 years (range: 13 - 74 years)	
Race		
White	4 (67%)	0.14
Two or more races	1 (17%)	0.66
Unknown	1 (17%)	
Ethnicity		
Hispanic or Latino	2 (33%)	0.66
Not Hispanic or Latino	3 (50%)	-
Unknown	1 (17%)	-
Hospitalized for this disease	1 (17%)	-
Died due to this disease	0	-
Hallmark symptoms (not exclusive)		
Jaundice	4 (67%)	-
Dark Urine	3 (50%)	-
Clay-colored stool	2 (33%)	-
Recent travel out of country	1* (17%)	-

*Mexico

ⁱ Centers for Disease Control and Prevention Update: Prevention of Hepatitis A After Exposure to Hepatitis A Virus and in International Travelers. Updated Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2007;56:[1080-1084], available at <http://www.cdc.gov/mmwr/PDF/wk/mm5641.pdf>

ⁱⁱ Centers for Disease Control and Prevention. Positive Test Results for Acute Hepatitis A Virus Infection Among Persons with No Recent History of Acute Hepatitis – United States, 2002-2004. MMWR 2005;54; (453-456), available at <http://www.cdc.gov/mmwr/PDF/wk/mm5418.pdf>

Hepatitis B

2010 Case Total	115	2010 Incidence Rate	3.1 per 100,000
2009 Case Total	122	2009 Incidence Rate	3.3 per 100,000

Numbers of acute hepatitis B cases in Oklahoma reported to the Oklahoma State Department of Health (OSDH) have declined for a third year in a row. This is a 6% decrease in reported cases from 2009 to 2010. The OSDH supports adult vaccination for hepatitis B, and hepatitis A. Through the Adult Viral Hepatitis Program, the OSDH provides these vaccines at no cost to high risk individuals in the Oklahoma Department of Corrections, county health department sexually transmitted disease (STD) clinics, and two metro area medical clinics for the homeless - one in Oklahoma City and one in Tulsa. Adult immunizations coupled with prevention education are key components to decreasing hepatitis B infections.

Sixty-five of the 115 acute hepatitis B cases (57%) were males; fifty (43%) were female. Racial breakdown is as follows: 81 Whites (3.1 per 100,000), 19 American Indians and Alaska Natives (6.7 per 100,000), nine Black or African Americans (3.1 per 100,000), one Hawaiian/Other Pacific Islander (31.8 per 100,000) and five cases were reported as unknown race.

The CDC reports, in the Sexually Transmitted Diseases Treatment Guidelines 2010, the primary risk factors associated with hepatitis B infection among adolescents and adults are unprotected sex with an infected partner, unprotected sex with more than one partner, men who have sex with other men (MSM), a history of other STDs, and illegal injection-drug useⁱ. Forty-nine (43%) of the total number of acute cases reported a risk factor of 2 or more sexual partners. Twenty-six of these 49 respondents reported having more than five sexual partners.

Perinatal Hepatitis B

2010 Case Total	83
2009 Case Total	95

The Perinatal Hepatitis B Program identified 83 babies born to hepatitis B surface antigen (HbsAg) positive women in Oklahoma in 2010. This number is a slight decrease (13%) from 2009.

The CDC recommends that infants born to HbsAg positive women be given hepatitis B immune globulin (HBIG) and hepatitis B vaccine within 12 hours of birth. Seventy (85.4%) of the babies born in Oklahoma hospitals received both injections within 12 hours, seventy-five (91.5%) received both injections within 24 hours and seventy-seven (93.9%) received both injections within 48 hours of birth. Fifty-two (63.4%) of the infants had received HBIG and all three hepatitis B vaccines by 12 months of age.

The ages of the women who were hepatitis B surface antigen positive and who delivered infants ranged from 17 years to 41 years. Forty-seven (57%) of delivering women were between 20 and 30 years of age. Thirty-two (39%) were between 30 and 40 years of age, and four (5%) percent were under 20 years of age.

ⁱ Centers for Disease Control and Prevention. Sexually Transmitted Diseases Treatment Guidelines, 2010. MMWR 2010;59(No. RR-#12), available on the internet at <http://www.cdc.gov/std/treatment/2010/STD-Treatment-2010-RR5912.pdf>

Hepatitis C

2010 Case Total	41	2010 Incidence Rate	1.1 per 100,000
2009 Case Total	27	2009 Incidence Rate	0.7 per 100,000

Hepatitis C can be either acute or chronic but the Oklahoma reportable disease rules specify reporting of hepatitis C in persons aged 40 years or younger, or in persons having jaundice, or alanine transaminase (ALT) of 400 or higher, regardless of age, with laboratory confirmation, which represents only acute cases of hepatitis C infectionⁱ. The acute form is a short-term illness that occurs within the first six months after a person is exposed to the hepatitis C virus (HCV) which causes hepatitis C infection. However, the disease can become chronic, and people who received a blood transfusion before 1992 or are past or current injection-drug users are at risk for chronic hepatitis C, and should be screened for the disease. Chronic HCV infection progresses slowly over the course of 15-30 years and can lead to cirrhosis of the liver or liver cancer. Eight to ten thousand deaths occur annually in the United States as a result of chronic HCV infection.

In 2010, confirmed cases of acute hepatitis C in Oklahoma reflected a 52% increase from 2009. Based on the most current national data, Oklahoma's case rate (1.1 per 100,000) continues to be above the national rate (0.3 per 100,000) for confirmed cases of acute hepatitis C. Tulsa County had the highest number of cases of acute hepatitis C in 2010 with nine cases (22%). The highest incidence rate occurred in Pawnee county with 12.18 cases per 100,000 (n = 2), followed by Haskell county with 8.07 per 100,000 (n = 1) and Okmulgee county with 7.64 per 100,000 (n = 3).

Cases of acute hepatitis C ranged in age from 18 years to 74 years. The highest number of cases, 20 (49%), occurred in the 25 - 34 year age group. Age groups of the remaining cases were as follows: four (9%) 15 to 24 years, ten (24%) 35 to 44 years, five (12%) 45 to 54 years, one (2%) 55 to 64 years, and one (2%) 65 to 74 years. There were 22 females (54%) and 19 males (46%) infected with confirmed acute hepatitis C. The confirmed acute hepatitis C cases broken down by race occurred in: Whites (0.9 per 100,000, n = 27), Native Americans (3.7 per 100,000, n = 11), Black/African American (0.3 pr 100,000, n = 1) and unknown race (n = 2).

The Centers for Disease Control and Prevention states that "of the cases reported in 2007 for which information concerning exposures during the incubation period was available, the most common risk factor identified was IDU [injection drug use] (48%). During 1998–2007, IDU was reported for an average of 44% of persons (range: 38%–54%)".ⁱⁱ In 2010, the risk factors most frequently reported in Oklahoma were: IDU (56%), other drug use besides IDU (54%), tattoos (56%), and 2 or more sexual partners (56%). Nineteen (46%) of the cases reported both IDU and other drug use. Ten (24%) of the cases reported all four of the listed risk factors.

ⁱ Title 310. Oklahoma State Department of Health, Chapter 515. Communicable Disease and Injury Reporting, Effective 7/25/2010. Available at the website www.ok.gov/health/Disease_Prevention_Preparedness/Acute_Disease_Service/Disease_Reporting/index.html.

ⁱⁱ Centers for Disease Control and Prevention. Surveillance for Acute Viral Hepatitis—United States, 2007. Surveillance Summaries, May 29, 2009, MMWR 2009;58(No. SS-3, available at the website <http://www.cdc.gov/mmwr/pdf/ss/ss5803.pdf>

HIV/AIDS

2010 Case Total 300
2009 Case Total 369

2010 Rate 8.0 per 100,000
2009 Rate 10.0 per 100,000

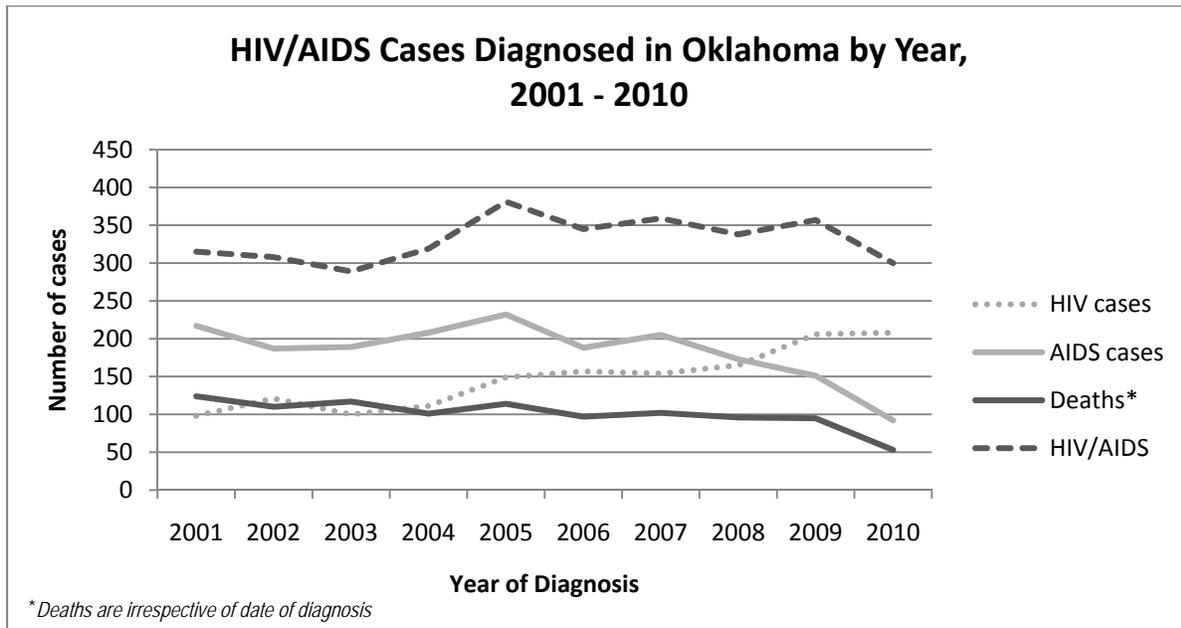
HIV (Human Immunodeficiency Virus) is the virus that causes AIDS (Acquired Immune Deficiency Syndrome). AIDS is the result of an HIV infection and is the most advanced stage of HIV, resulting in severe damage to the immune system. HIV progressively reduces the immune system by destroying specific blood cells, called CD4 positive T-lymphocytes (CD4+ T-cells) and leaves individuals susceptible to opportunistic infections. HIV is transmitted through direct contact of a mucous membrane with a bodily fluid containing HIV, such as blood, semen (including pre-seminal fluid), vaginal fluid, and breast milk. The most common activities which place a person at risk are sexual intercourse (oral, anal, or vaginal), sharing of needles or syringes, or exposure from mother to baby before or during birth or through breast feeding.

AIDS is defined as having HIV with fewer than 200 CD4+ T-cells per cubic milliliter of blood (or less than 14%), and/or any at least one clinical opportunistic infection. People living with HIV may appear and feel healthy for years; however, HIV is still affecting their bodies. Although treatments for AIDS and HIV can slow the course of the disease, there is no known cure or vaccine. Antiretroviral treatment reduces both the mortality and the morbidity of HIV infection. Currently, people can live much longer, even decades, with HIV before they develop AIDS. AIDS was first recognized by the United States Centers for Disease Control and Prevention in 1981 and its cause, HIV, identified in the early 1980s. AIDS became reportable in Oklahoma in 1983 and HIV infection in 1988.

In Oklahoma, two cases of AIDS were first diagnosed in 1982 and two cases of HIV in 1984. By the end of 2010, an estimated 8,462 cases of HIV/AIDS had been diagnosed among residents of Oklahoma. A breakdown of the 8,462 HIV/AIDS cases shows 5,449 AIDS cases and 3,013 HIV cases. Of those diagnoses, 49 were perinatal infections (mother to baby transmission). The race breakdown for the above cases is as follows: 5,441 (64.4%) in Whites, 1,794 (21.2%) in Blacks, 504 (6.0%) in Hispanics, 46 (0.5%) in Asian/Hawaiian Pacific Islanders and 536 (6.3%) in American Indian/Alaskan Natives. Persons who reported belonging to two or more races had 141 (1.7%) cases diagnosed. The ratio of male to female diagnoses was 17:3 (n = 7,216, 85.3% to 1,246, 14.7%). Men having sex with men (MSM) accounted for 4,507 (53.3%) cases, and those MSM who also reported using illegal drugs (MSM/IDU) accounted for 894 (10.6%) cases. Approximately 11% (n = 962 cases) reported their risk as injection drug use (IDU). Similarly, 11.2% (n = 951) of persons reported exposure through heterosexual sex with someone with HIV. Among the age groups, 30 to 39 years of age (n = 3,213, 38.0%) accounted for the largest group of cases, followed by 20 to 29 years of age (n = 2,652, 31.3%). Teenagers (13 to 19 years of age) accounted for almost 3% (n = 224; 2.7%) of the cumulative HIV/AIDS cases, while children under 13 years of age reported less than 1% (n = 70, 0.8%) of the infections. At the end of 2010, an estimated 4,908 cases were living with HIV/AIDS (HIV: n = 2,552, 52.0%; AIDS: n = 2,356, 48.0%).

2010 Summary

In 2010, 300 cases (HIV, 208; AIDS, 92) of HIV/AIDS cases were diagnosed. This resulted in a 16% decrease in the number of cases diagnosed in 2010 compared to 2009. From 2006 to 2010, 1,699 cases of HIV/AIDS have been diagnosed at an average of 340 cases per year, an average of 9.2 cases per 100,000 population. There has been a downward trend of AIDS only from 188 cases in 2006 to 92 cases in 2010; however, the opposite is true for newly diagnosed HIV (not AIDS) cases. In 2006, there were a total of 157 and in 2010 the total was 208. Of the 26 deaths in 2010, seven were diagnosed and died in the same year, and 19 of the deaths were diagnoses from previous years. Three counties in Oklahoma, Oklahoma (n = 85, 27.7%), Tulsa (n = 69, 23.0%), and Cleveland (n = 34, 11.3%), account for the majority (62.0%) of the newly diagnosed HIV/AIDS cases.



Among age groups, 20 to 29 year olds accounted for 35.0% (n = 105), 30 to 39 year olds accounted for 25.7% (n = 77), 40 to 49 year olds accounted for 22.0% (n = 66), and 50 to 59 year olds accounted for 10.0% (n = 30). Teenagers (13 to 19 years of age) accounted for 3.0% (n = 9). Of the 300 cases diagnosed in 2010, males represented 249 cases with a rate of 13.7 per 100,000 population, while females reported 51 cases with a rate of 2.7 per 100,000 population.

Among race and ethnic groups, Blacks or African Americans (n = 105, 35%) had a rate of 34.4 cases per 100,000 population, Whites (n = 138, 46%) had a rate of 5.1 cases per 100,000 population, Hispanics (n = 24, 8%) had a rate of 8.0 cases per 100,000 population and American Indians /Alaskan Natives (n = 21, 7%) had at a rate of 6.6 cases per 100,000 per population.

Of the 300 newly diagnosed HIV/AIDS cases, MSM accounted for 52.0% (n = 156), MSM/IDU accounted for 8.3% (n = 25), heterosexual sex accounted for 10.7% (n = 32), and IDU only accounted for almost 5% (n = 14, 4.7%). Approximately 3% (n = 38, 2.7%) of those diagnosed in 2010, did not report their risk.

Legionellosis

2010 Case Total	15	2010 Incidence Rate	0.41 per 100,000
2009 Case Total	10	2009 Incidence Rate	0.27 per 100,000

The number of legionellosis cases reported in 2010 is a 50% increase from the 10 cases reported in 2009. Since 2000, the annual incidence rate of legionellosis has ranged from 0.14 to 0.41 per 100,000 population with the exception of 2004 when the incidence rate was 0.70 per 100,000 population due to an outbreak. In 2010, lab tests were performed via bronchial culture (7%), sputum culture (7%), and urine antigen testing (87%). No outbreaks of legionellosis were identified in Oklahoma during 2010.

During 2010, cases of legionellosis occurred among residents of ten Oklahoma counties and were spread geographically across all regions of the state except the northwest region. The highest incidence rate occurred among cases 45 to 49 years of age (IR = 1.93, n = 5) followed by cases 70 to 74 years of age (IR = 1.74, n = 2) and 65 to 69 years of age (IR = 1.34, n = 2). Of the cases reported in 2010, 1 (7%) reported travel outside of the state during the incubation period of their illness, and 2 (13%) reported exposure to a respiratory device filled with tap water such as a nebulizer or humidifier.

Prevention of legionellosis is based upon proper maintenance of heating, cooling and plumbing systems. Special attention should also be given to hot tubs and whirlpool baths to keep them free of *Legionella* bacteria. Visit <http://ads.health.ok.gov> and click on the "Disease Information" tab to obtain more information on Legionellosis.

Demographic and Clinical Summary of Reported Legionellosis Cases, Oklahoma, 2010 (N = 15)

	Number (%)	Incidence Rate per 100,000
Gender		
Male	13 (87%)	0.71
Female	2 (13%)	0.11
Age	Median = 48 years (range: 26 – 79 years)	
Race		
Black or African American	1 (7%)	0.35
White	12 (80%)	0.46
Unknown	2 (13%)	-
Ethnicity		
Hispanic or Latino	0 (0%)	0.00
Not Hispanic or Latino	8 (53%)	0.24
Unknown	7 (47%)	-
Symptoms		
Cough	13 (87%)	-
Fever	12 (80%)	-
Headache	2 (13%)	-
Malaise	13 (87%)	-
Myalgia	6 (40%)	-
Chills	9 (60%)	-
Chest pain	5 (33%)	-
Hospitalization	15 (100%)	-
Possible nosocomial infection	2 (13%)	-
Complication/Comorbidity		
Death	1 (7%)	-
Pneumonia	15 (100%)	-
Corticosteroid treatment	2 (13%)	-

Listeriosis

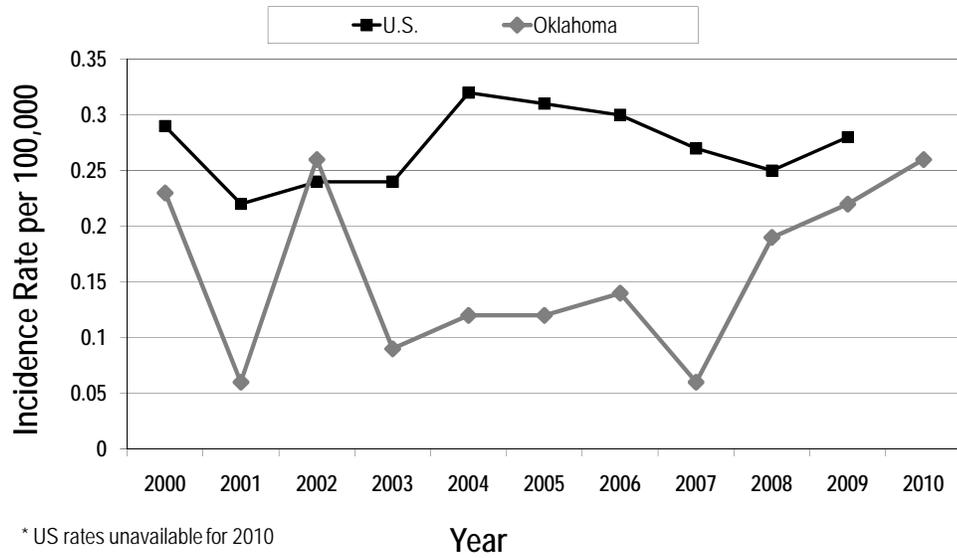
2010 Case Total	9	2010 Incidence Rate	0.26 per 100,000
2009 Case Total	8	2009 Incidence Rate	0.22 per 100,000

Listeriosis is an uncommon but serious infection caused by the bacteria *Listeria monocytogenes*. Although most listeriosis infections involve mild illnesses not requiring medical care, *Listeria* is responsible for approximately 1,591 of the estimated 9.4 million foodborne illnesses and an estimated 257 deaths per year in the U.S.ⁱ Pregnant women are about 20 times more likely than healthy adults to acquire the disease. In pregnancy, the infection can be passed to the fetus and in some cases cause premature delivery, infection of the newborn, or stillbirth. Newborns, rather than the mothers, experience the serious effects of infection during pregnancy; the case-fatality rate is 20 to 30% in infants born alive and the occurrence of abortion and stillbirth increases the overall mortality rate to more than 50%.ⁱⁱ Other specific groups at increased risk include persons with weakened immune systems such as those with cancer, diabetes, kidney disease, AIDS, those who take glucocorticosteroid medications, and individuals older than 60 years.

In Oklahoma, 9 cases of listeriosis were reported to OSDH resulting in an incidence rate that was higher than the previous five year average (2005 through 2009) incidence rate of 0.15 per 100,000 population. *Listeria* was isolated from blood for seven cases (78%), from cerebrospinal fluid for one case (11%), and from placenta for one case (11%). All nine cases were hospitalized and two (22%) cases died due to *Listeria* sepsis. The case ages ranged from 1 day to 77 years and all nine cases were female. Seven (78%) of the cases were White, one was Asian (11%), and one (11%) race was unknown. Two (25%) of the eight cases were Hispanic. Five cases (56%) reported consuming soft cheeses and four cases (44%) reported consuming ready-to-eat deli meats. Six (67%) cases were over the age of 60 and two of the six had a history of underlying medical conditions that compromised their immune system. Two (22%) cases were pregnant at the time of illness.

Most cases of listeriosis are sporadic; however, outbreaks due to consumption of contaminated food have been identified. Prompt reporting of cases can help in the early detection of an outbreak, identification of the sources of infection, and prevention of additional cases. The Communicable Disease Reporting Rules (OAC 310: Chapter 515) require that *Listeria* isolates grown from sterile sites (e.g. blood, cerebrospinal fluid, etc.) be sent to the OSDH Public Health Laboratory (PHL) for confirmation and identification. The PHL then performs pulsed-field gel electrophoresis (PFGE) to identify subtypes. PFGE data is shared through PulseNet, a national electronic database coordinated through the Centers for Disease Control and Prevention (CDC). The CDC and participating laboratories monitor the database for clusters of PFGE patterns, which are then further investigated to detect common exposures. This program assists in detection of outbreaks of many diseases each year, even when affected persons are geographically separated, facilitating faster investigation and implementation of control measures. When a food item is implicated in an illness caused by *Listeria*, actions are taken to identify the source and remove the implicated food from further consumption. PFGE analysis of isolates from cases reported during 2010 revealed none of the cases had a similar PFGE pattern suggesting an outbreak due to a common exposure or were associated with a multistate outbreak due to a widely distributed product.

Listeriosis Incidence Rate by Year, Oklahoma and U.S., 2000-2010*



ⁱ Scallan E, Hoekstra RM, Angulo FJ, Tauxe RV, Widdowson MA, Roy SL, Jones JL, Griffin PM. Foodborne illness acquired in the United States – Major pathogens. *Emerg Infect Dis.* 2011 Jan;17(1):7-9.

ⁱⁱ Mandell, Douglas, and Bennett's principles and practice of infectious diseases / [edited by] Gerald L. Mandell, John E. Bennett, Raphael Dolin.-6th ed. p. 2478-2483.

Malaria

2010 Case Total	6	2010 Incidence Rate	0.16 per 100,000
2009 Case Total	2	2009 Incidence Rate	0.05 per 100,000

All six cases reported in Oklahoma in 2010 had recent travel or residence in countries with endemic malaria. Since 2001, half of the reported malaria cases here had a recent history of traveling or living in Africa (refer to tables). None of the four malaria cases who were interviewed reported taking malaria prophylaxis. The CDC Travelers' Health website has recommendations regarding malaria prophylaxis and prevention of other travel-related diseases at the website www.cdc.gov/travel. These medications should be purchased in the US prior to traveling, because sale of counterfeit malaria prophylaxis medications has been discovered in other countries. Although humans are the reservoir for malaria, the vector is the mosquito; therefore, protection from mosquito bites while traveling is important.

Malaria can be a severe, potentially fatal disease (particularly when caused by *Plasmodium falciparum*) and treatment should be initiated as soon as possible. Malaria should be considered as a possible diagnosis in persons experiencing fever of unknown origin, chills, and/or flu-like illness, and who have a history of recent travel or residence in a high-risk area. This includes international travelers, immigrants, adoptees, military personnel, and international visitors.

Most clinical laboratories are capable of performing preliminary identification of the malaria parasite. Thick and thin slides pre-stained with Giemsa or Giemsa-Wright stain are required to be sent to the OSDH Public Health Laboratory (PHL) for confirmation and speciation. Specimens for five cases were submitted to the OSDH PHL: four were identified as *P. falciparum*, and one was *P. vivax*.

Demographic and Clinical Summary of Reported Malaria Cases, Oklahoma, 2010 (N = 6)

	Number (%)	Incidence Rate per 100,000
Gender		
Male	4 (67%)	0.22
Female	2 (33%)	0.11
Age	Median 42.5 years (range 17 – 67 years)	
Race		
Black	5 (83%)	1.68
White	1 (17%)	0.03
Ethnicity		--
Hispanic or Latino	0	
Not Hispanic or Latino	5 (83%)	
Unknown	1 (17%)	
Hospitalized	4 (17%)	--
Died due to malaria	0	--
Travel history		
Africa	5 (83%)	--
Asia	1 (17%)	--

World Region of Malaria Acquisition Reported by Oklahoma Cases, 2001-2010 (N = 77)

Region	Number (%)
Africa	50 (71%)
Asia	10 (14%)
Central America	1 (1%)
Oceania	1 (1%)
South America	1 (1%)
Unknown	8 (10%)

Meningococcal Invasive Disease

2010 Case Total	18	2010 Incidence Rate	0.49 per 100,000
2009 Case Total	17	2009 Incidence Rate	0.47 per 100,000

In 2010, a total of 18 cases of invasive meningococcal disease were reported to the OSDH. Age-specific incidence rates indicate the highest rates occurred among persons under 10 years, followed by those 80 years and older (see figure). In 2010, 17 (94%) cases were hospitalized, and three deaths occurred in persons with invasive meningococcal disease, resulting in a case fatality rate of 17%.

Laboratory specimens are required to be forwarded to the OSDH Public Health Lab for confirmation of the causative organism, *Neisseria meningitidis*, and for serogroup identification. In 2010, serogroup C accounted for 41.2% of the isolates for which serogroup testing was performed.

The state health department immediately investigates reported cases of invasive meningococcal disease to identify close contacts and recommend prophylaxis. Case investigations conducted by public health nurses identified 157 close contacts (median = 5, range: 1 – 28 contacts) who were recommended to receive prophylaxis. Two cases were associated with a high-risk setting such as a childcare center or long term care center.

In March 2010, the OSDH rapidly responded to an outbreak of meningococcal invasive disease in a rural school district in Northeastern Oklahoma. Five cases of invasive meningococcal disease were identified during this investigation, including two deaths. Exposed contacts were rapidly identified and recommended to receive antibiotic prophylaxis. During standard investigations of sporadic cases, individuals recommended to receive antibiotic prophylaxis are referred to their private health provider for medication. Because of the magnitude of this outbreak, epidemiologists in the Acute Disease Service and the local county health department (Rogers CHD) immediately conducted clinics at the school to administer chemoprophylaxis to exposed individuals to prevent subsequent cases. A total of 941 individuals were prophylaxed during these clinics. Laboratory testing subsequently identified serogroup C as the causative serogroup and molecular subtyping of isolates revealed all outbreak-associated cases had an indistinguishable pulsed-field gel electrophoresis pattern, which suggested a common exposure among all cases. Based upon meningococcal outbreak control guidance and the recommendation to provide meningococcal vaccine in which cases are due to serogroups included in the vaccine, a mass immunization clinic was held at the school to administer meningococcal vaccine for future protection. The tetravalent (serotypes A,C,Y,W-135) meningococcal conjugate vaccine (MCV4) is available to protect against serogroup C and is licensed for persons aged 2 to 55 years, however, is currently not recommended for routine use until ages 11 to 12 years.^{i,ii} Vaccination clinics that targeted students pre-K through seniors, as well as faculty and employees, were conducted by Immunization Service and the Rogers CHD; 1,486 persons received the vaccine.

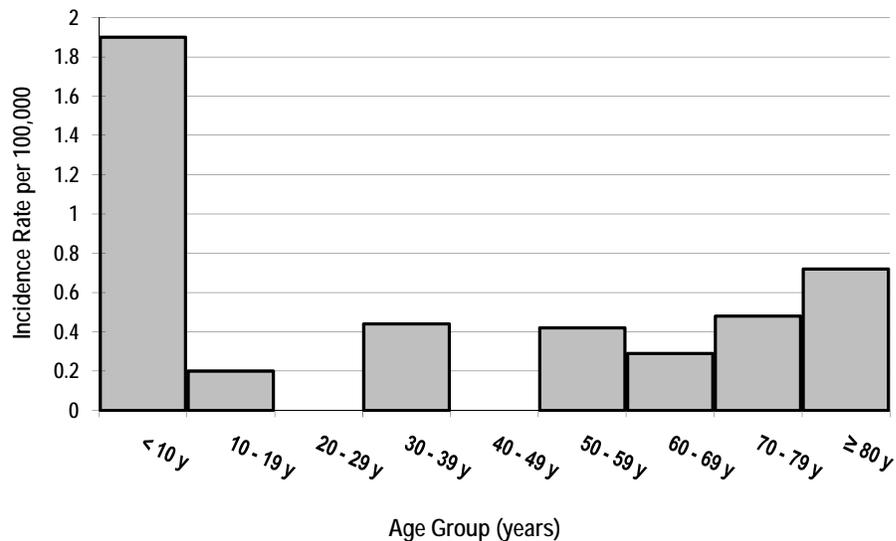
ⁱ CDC. Prevention and Control of Meningococcal Disease Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2005;54(No. RR-7).

ⁱⁱ CDC. Notice to Readers: Revised recommendations of the Advisory Committee on Immunization Practices to vaccinate all persons aged 11-18 years with meningococcal conjugate vaccine. MMWR 2007;56:794-5.

**Demographic and Clinical Summary of Reported Meningococcal Invasive Disease Cases, Oklahoma 2010
(N = 18)**

	Number (%)	Incidence Rate per 100,000
Gender		
Male	9 (50%)	0.49
Female	9 (50%)	0.48
Ages	Median = 8 years (range: 1 month - 83 years)	
Race		
White	11 (61%)	0.38
Black or African American	1 (5.6%)	0.34
American Indian or Alaska Native	3 (16.7%)	1.01
Asian	1 (5.6%)	1.59
Native Hawaiian or Pacific Islander	1 (5.6%)	25.34
Two or more races	1 (5.6%)	0.66
Hispanic or Latino Ethnicity		
Hispanic or Latino	1 (5.6%)	0.33
Not Hispanic or Latino	16 (88.9%)	-
Unknown	1 (5.6%)	-
Hospitalized	17 (94%)	-
Deaths	3 (17%)	-
Infection Types (not mutually exclusive)		
Bacteremia/Sepsis	17 (94%)	-
Meningitis	7 (39%)	-
Pneumonia	2 (11%)	-
Otitis Media	1 (5%)	-
Serogroup (n=17)		
Group B	3 (17.6%)	-
Group C	7 (41.2%)	-
Group Y	5 (29.4%)	-
Not groupable	2 (11.8%)	-

Incidence Rate of Reported Invasive Meningococcal Disease Cases by Age Group, Oklahoma, 2010 (N = 18)



Pertussis

2010 Case Total	199	2010 Incidence Rate	5.40 per 100,000
2009 Case Total	117	2009 Incidence Rate	3.21 per 100,000

Pertussis, otherwise known as “whooping cough”, saw a large increase in the number of reported cases in Oklahoma residents during 2010. One hundred and ninety-nine cases were reported, a 70% increase from the 117 cases reported in 2009. In addition to the increase from 2009, pertussis cases were the highest they have been since 1985 when 209 cases were reported. Several local community increases were observed in different parts of the state contributing to the larger number of cases for the state. Ten cases were reported in Pittsburg county residents leading to an incidence rate (IR) approximately four times the state’s rate (IR = 22.1). Additionally, Tulsa county saw an increase in cases beginning mid fall and continuing through the end of the year giving the county a total of 88 cases with an incidence rate almost three times the state’s rate (IR = 14.6).

Pertussis is known to often have a more severe clinical presentation in children. Nearly half of all cases in 2010 were in children less than five years of age with 28% in infants less than one year of age (IR = 100.6) and followed by 20% in children one to four years of age (IR = 17.5). The median age for pertussis cases was 5.9 years with a range of 11 days to 84 years of age. Forty-seven percent of infants less than one year of age were hospitalized compared to 3.5% of all other ages. Ninety-one percent of all cases reported paroxysmal coughing, 60% reported post-tussive vomiting and nearly half reported inspiratory whoop. Of the 199 cases, 31 (16%) were hospitalized during the course of their illness. No cases died in 2010. Of the cases where the duration of the cough was known, the median cough duration was 35 days with a range of 14 to 120 days.

Polymerase chain reaction (PCR) testing has become the most prevalent type of testing conducted for pertussis. Of the 199 cases in 2010, 91 (46%) had a positive PCR test. Culture for *Bordetella pertussis* accounted for 5% of cases (n = 10). Only one case had both a positive PCR and culture for pertussis. Pertussis serology and direct fluorescent antibody (DFA) testing was also conducted on some cases, although these testing methodologies are not considered confirmatory. In 2010, there was a large increase in the number of positive PCR reports received for Oklahoma residents. Of note, 77 of the 168 positive PCR results received were for individuals whose illness did not meet the clinical case definition for pertussis that is used to classify a report as a case of pertussis. The clinical case definition consists of a cough that lasts for at least two weeks and has one of the following hallmark symptoms of pertussis: paroxysmal cough, inspiratory whoop, or post-tussive vomiting.

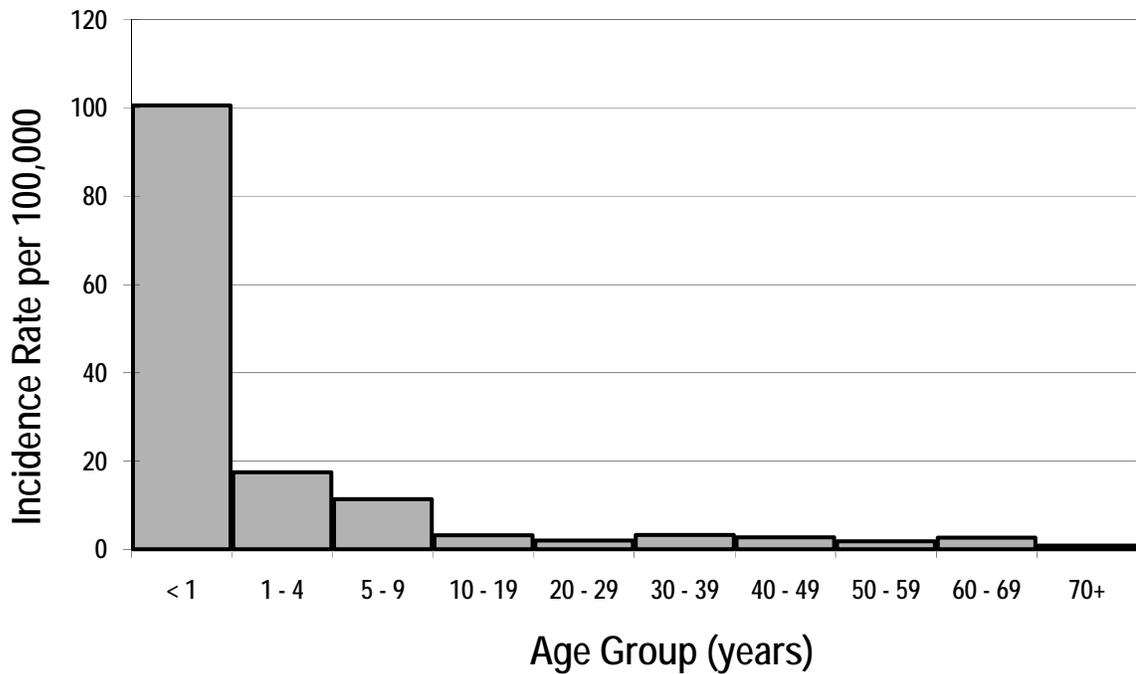
Pertussis vaccination is recommended for children with five doses of DTaP, one dose given at each of the following ages: 2, 4, 6, 15 to 18 months and 4 to 6 years. Additionally, a single dose of Tdap is recommended for persons 10 through 64 years of age. Tdap is recommended for children 7 to 10 years of age who are not fully vaccinated against pertussis. Adults 65 years of age and older who have not previously received Tdap and will be in close contact with an infant are also recommended to receive a single dose of Tdap.

County health department nurses conduct follow up investigations for all reported cases of pertussis. During the case investigation, close contacts to a confirmed case are recommended to receive post exposure prophylaxis to prevent the further transmission of disease and high-risk settings are identified to make sure an outbreak is not occurring and to recommend implementation of procedures to control spread of pertussis. In 2010, 726 close contacts to a case were recommended to receive post-exposure prophylaxis. Additionally, 25 cases either attended or worked in a childcare setting, 33 worked in or attended school and seven worked in a healthcare setting.

Demographic and Clinical Summary of Reported Pertussis Cases, Oklahoma, 2010 (N = 199)

	Number (%)	Incidence Rate per 100,000
Gender		
Female	115 (58%)	6.17
Male	84 (42%)	4.61
Age	Median = 5.9 years (range: 11 days - 84 years)	
Race		
American Indian/Alaskan Native	16 (8%)	4.97
African American/Black	23 (12%)	8.28
Asian	1 (0.5%)	1.54
Native Hawaiian/Pacific Islander	1 (0.5%)	22.89
White	119 (60%)	4.40
Two or more races	14 (7%)	--
Unknown	25 (13%)	--
Ethnicity		
Hispanic or Latino	27 (14%)	8.13
Not Hispanic or Latino	141 (71%)	4.12
Unknown	31 (16%)	--
Hospitalized for this disease	31 (16%)	--
Died due to this disease	0 (0%)	--
Hallmark symptoms (not exclusive)		
Paroxysmal Cough	181 (91%)	-
Inspiratory Whoop	102 (51%)	-
Post-tussive vomiting	120 (60%)	-

Incidence Rate of Reported Pertussis Cases by Age Group, Oklahoma, 2010



Animal Rabies

2010 Case Total 62

2009 Case Total 49

During 2010, the number of animals testing positive for rabies amounted to a 27% increase from 2009. Animal rabies activity in Oklahoma tends to follow a cyclical trend with activity peaks occurring approximately every six to eight years. The peaks correspond to increases in the skunk population. During the most recent peak in 2003, 204 animals were found to be positive for rabies by laboratory testing (refer to Figure 1). Although rabid animals are identified throughout the year, more cases are identified in the spring and summer months. In 2010, 63% of cases occurred between March and August. Generally, the geographic distribution of animal rabies is spread across the state; 32 counties were the origin of at least one animal that tested positive for rabies. Logan County had the highest number of rabid animals (n = 5), followed closely by Grady County with four rabid animals. Beckham, Haskell, Jefferson, LeFlore, McClain, and Roger Mills counties each had three rabid animals. A large percentage of the rabid animals were found in western Oklahoma, with the northwest and southwest regions of Oklahoma accounting for 53% of the rabid animals (refer to Figure 2).

When an animal tests positive for rabies or the result is inconclusive, an epidemiologist in the Acute Disease Service (ADS) of the Oklahoma State Department of Health (OSDH) initiates a thorough investigation of all potentially exposed animals and humans. Recommendations for human postexposure prophylaxis (PEP) and/or requirements for animal quarantine or euthanasia are made based upon the findings of the investigation. The highest risk of exposure to rabies virus results from the bite of a rabid animal, but exposure may also occur if saliva, cerebrospinal fluid, or brain tissue comes in contact with the mucous membrane or broken skin of a contact.

A total of 71 animals were identified as exposed to a confirmed rabid animal. Of the exposed animals, 11 (16%) were currently and properly vaccinated for rabies by a licensed veterinarian and therefore, only required to receive a booster dose of the rabies vaccine along with a 45-day observation period on the owner's property. Of the 60 (84%) exposed pets that were not currently vaccinated, owners of 6 (10%) elected placement in a six-month quarantine under the supervision of a licensed veterinarian, and owners of 54 (90%) chose to have the animal euthanized. According to the Oklahoma Administrative Code 310:599-3-9.1., domestic dogs, cats, or ferrets should be vaccinated against rabies by the time the animal is four months of age and at regular designated intervals thereafter.ⁱ

In 2010, a total of 270 humans were assessed for exposure to a confirmed rabid animal, with 51 (19%) recommended to receive PEP through their health care provider, as it is not provided through Oklahoma state or county health departments. Human rabies is rare in the United States, with most human rabies cases associated with rabid bats. In developing countries dogs are the most common reservoir and vector species.ⁱⁱ Human rabies prophylaxis is nearly 100% effective, and human fatalities in the US are very rare, but do occur in people who fail to seek medical assistance or were unaware of their exposure. The last case of human rabies in Oklahoma occurred in 2004 and was associated with an organ transplant from an undiagnosed rabid donor who had been infected by the bat variant of rabies virus. Prior to that, the most recent human rabies case in Oklahoma was in 1981. While the 1981 human rabies investigation was unable to identify a specific exposure responsible for the infection, testing revealed that the infection was caused by the skunk variant of rabies virus.ⁱⁱⁱ Consultation regarding animal bites and the rabies PEP series is available by contacting the Epidemiologist-on-Call at (405) 271-4060 during or after regular business hours.

The OSDH Public Health Laboratory (PHL) is the only lab in the state of Oklahoma with the capability of testing an animal for rabies. In 2010, a total of 1,178 animals were submitted to the OSDH PHL for rabies testing. Of these, 1,096 (93%) were negative, 19 (2%) had inconclusive (unsatisfactory) results due to a crushed or decomposed head, and the remaining 63 (5%) were positive for rabies.¹ During 2010, 38 of 65 (58%) skunks and 6 of 39 (15%) bats tested positive for rabies.² The most commonly tested animals are dogs and cats; however, they historically have a low percent

¹ Not all animals testing positive for rabies reside in Oklahoma.

² Skunks and bats are the most common reservoir for rabies in Oklahoma

Rocky Mountain Spotted Fever

2010 Case Total	235	2010 Incidence Rate	6.37 per 100,000
2009 Case Total	342	2009 Incidence Rate	9.32 per 100,000

In 2010, the incidence rate (IR) of Rocky Mountain spotted fever (RMSF) in Oklahoma represented a 32% decrease from 2009. However, the decline in RMSF cases may have partially been affected by changes in investigation processes; Acute Disease Service did not conduct investigations of all low RMSF serologic titers of 1:64. From 2001 to 2010, the median annual number of reported cases in Oklahoma was 189 (range = 69 to 342). Oklahoma continues to report one of the highest annual incidence rates in the United States; North Carolina, Oklahoma, Arkansas, Tennessee, and Missouri account for over 60% of the cases reported in the United States.ⁱ Eastern Oklahoma has higher rates of disease due to its more favorable tick habitat. Counties with the highest incidence rates in 2010 were Latimer (141.23 per 100,000, n = 15) and Pushmataha (67.73 per 100,000, n = 8); refer to the figure for the geographic distribution of cases. The seasonal distribution of RMSF is highest during the warmer months with the majority of the cases reported from April through September and peaking in June and July (45% of cases).

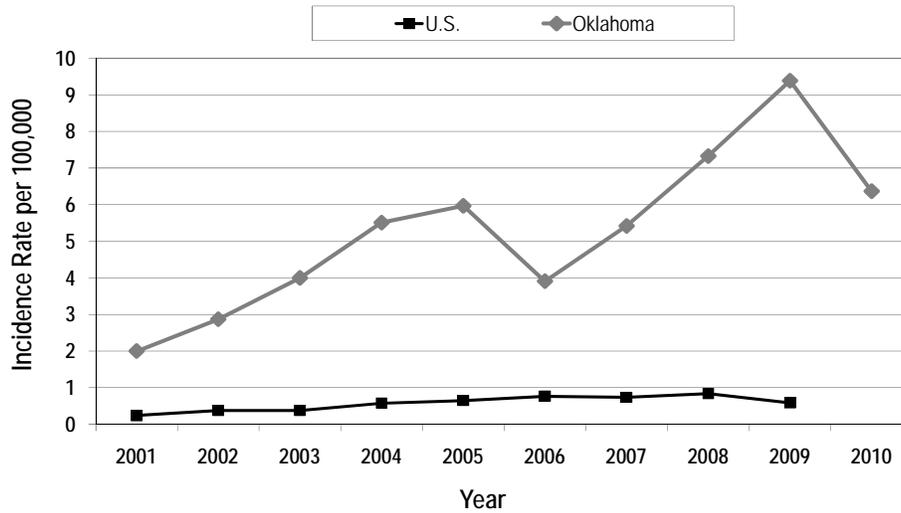
Overall, the IR among males was 2.5 times higher than that of females. The highest incidence of RMSF occurred among persons who reported their race as Native Hawaiian or Pacific Islander (76.01 per 100,000, n = 3) followed by Native American or Alaska Native (18.57 per 100,000, n = 55), which were 12 and 3 times higher respectively than the overall 2010 rate in Oklahoma.

Serologic testing is the most widely available and frequently used laboratory method for diagnosis. A four-fold change in titers between acute (within a week of onset) and convalescent (2 to 4 weeks later) specimens confirms the diagnosis. A single specimen is generally not diagnostic of acute infection since it may indicate past exposure. Treatment for RMSF should be initiated before laboratory confirmation, when there is high suspicion of tickborne illness, to reduce the severity of disease. The recommended antibiotics for treatment are tetracyclines, usually doxycycline.ⁱⁱ

Descriptive and Clinical Summary of Reported Rocky Mountain Spotted Fever Cases, Oklahoma, 2010 (N = 235)

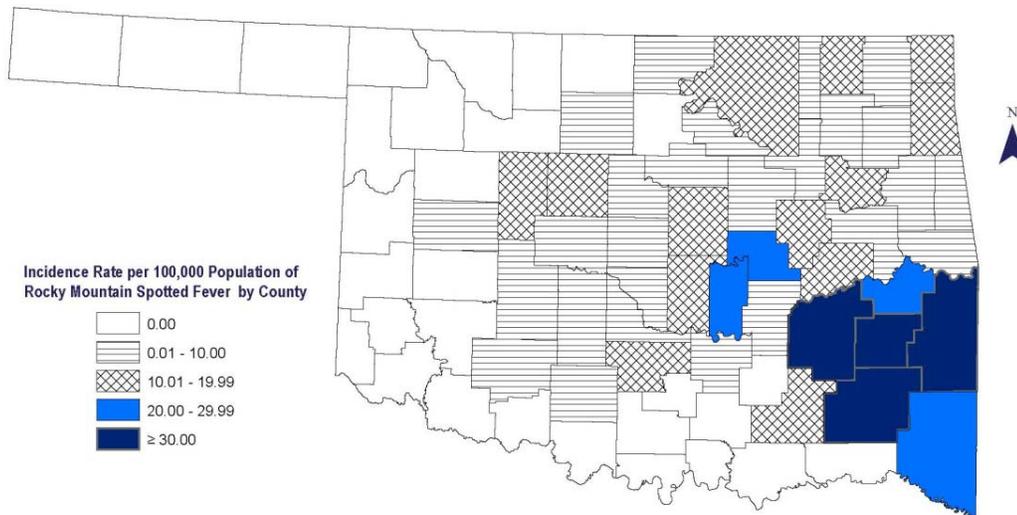
	Number (%)	Incidence rate per 100,000
Gender		
Male	166 (71%)	9.11
Female	69 (29%)	3.70
Age	Median Age: 13 months (Range: 13 months – 88 years)	
Race		
White	102 (43%)	3.55
American Indian or Alaska Native	55 (23%)	18.57
Black or African American	4 (2%)	1.35
Native Hawaiian or Pacific Islander	3 (1%)	76.01
Two or More Races	3 (1%)	1.98
Unknown	68 (29%)	--
Hispanic or Latino Ethnicity	3 (1%)	0.99
Unknown	102 (43%)	--
Symptoms		
Fever	235 (100%)	--
Headache	172 (73%)	--
Myalgia	128 (54%)	--
Chills	93 (40%)	--
Rash	80 (34%)	--
Reported Exposures		
Wooded or tick infested area	23 (10%)	--
Tick bite	93 (40%)	--
Hospitalized due to Rocky Mountain spotted fever	29 (12%)	--
Died due to Rocky Mountain spotted fever	0 (0%)	--

Incidence Rate of Reported Rocky Mountain Spotted Fever Cases by Year, Oklahoma and U.S., 2001-2010*



*U.S. 2010 Rate Unavailable

Incidence Rate of Rocky Mountain Spotted Fever Cases by County of Residence, Oklahoma, 2010 (N = 235)



Data Source: OK State Department of Health, Acute Disease Service

Created: 06.15.2011

ⁱ Centers for Disease Control and Prevention Website, <http://www.cdc.gov/rmsf/stats/>, accessed June 28, 2011.

ⁱⁱ Heymann, M.D., Control of Communicable Diseases Manual 19th Edition, APHA, 2008. Rocky Mountain Spotted Fever, pp 521-523.

Salmonellosis

2010 Case Total	752	2010 Incidence Rate	20.4 per 100,000
2009 Case Total	657	2009 Incidence Rate	17.8 per 100,000

In 2010, salmonellosis increased by 14.5% from the previous year. Of the cases reported, 70 (9%) were epidemiologically linked to confirmed cases during routine case investigations performed by the county health department nurses. Each year a seasonal trend for salmonellosis is noted, with over 50% of cases occurring between July and October, which was again demonstrated in 2010 with 57% of cases reported during that period (n = 428).

Persons with salmonellosis ranged in age from 1 day to 96 years, with a median age of 26 years. The highest age-specific incidence rates (IR) per 100,000 population occurred among children under 10 years of age (IR = 52.1 per 100,000). Eleven deaths were reported to be associated with salmonellosis infection, resulting in a case-fatality rate of 1.5%. The highest proportion of cases occurred in Oklahoma County (18%, n = 132), but based on population size, resulted in an IR of only 18.42 per 100,000. The highest county-specific rate occurred in Harper County with an IR of 118.4 per 100,000 (n = 4). Other counties with high rates for salmonellosis included Alfalfa County (IR = 73 per 100,000, n = 4), Noble County (IR = 54.8 per 100,000, n = 6), Tillman County (IR = 51.3 per 100,000, n = 4), and Coal County (IR = 51.2 per 100,000, n = 3).

Clinical isolates of *Salmonella* species identified by laboratories are required to be submitted to the OSDH Public Health Laboratory (PHL) for confirmation, serotyping, and analysis by pulsed-field gel electrophoresis (PFGE). The OSDH PHL confirmed and serotyped 641 (85%) *Salmonella* isolates of the 752 reported cases in 2010. Fifty-seven different serotypes were identified, with the top four serotypes being Newport (n = 130, 20% of typed isolates), Typhimurium (n = 104, 16%), Enteritidis (n = 53, 8.3%), and Paratyphi B variant L Tartrate + (n = 42, 6.6%).

In fall 2010, a *Salmonella* Paratyphi B variant L Tartrate + outbreak occurred in Canadian Country involving 14 children associated with a local school district. Ten individuals were culture-confirmed cases with indistinguishable PFGE patterns. Investigation indicated eating at the school cafeteria prior to illness onset was associated with illness; however, a specific food item or other source was not identified.

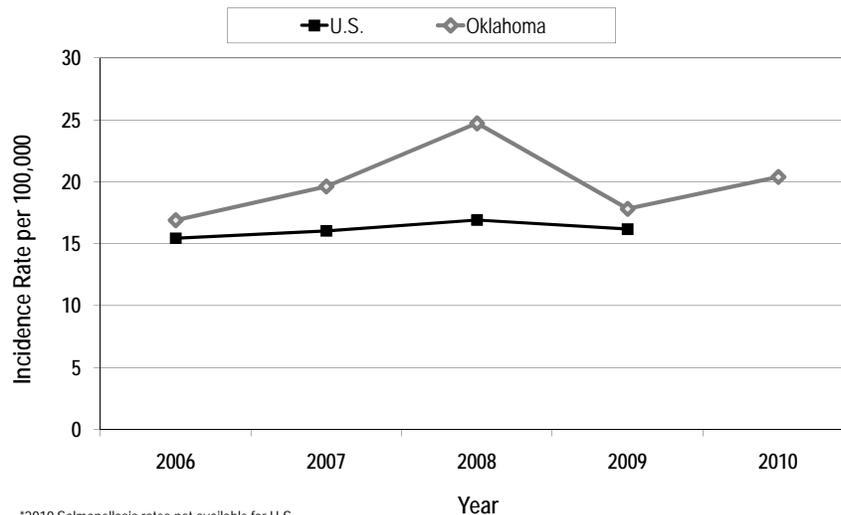
Isolates of salmonellosis are uploaded to a national database for cluster and outbreak identification based upon serogroup and PFGE. In 2010, two multistate outbreaks of salmonellosis involving Oklahoma residents were investigated to determine a potential source of infection. One was a multistate outbreak of *S. Chester* associated with consumption of single-serve frozen entrées; 44 cases from 18 states were identified in this outbreak, including one Oklahoma case. Another multistate outbreak involving Oklahoma residents was due to *S. Enteritidis*; approximately 1,939 cases nationwide were associated with this outbreak, including 7 from Oklahoma. An epidemiologic investigation conducted by state public health officials and CDC determined consumption of shell eggs was associated with development of illness. Results from the public health investigation prompted a traceback investigation by the U.S. Food and Drug Administration (FDA) to determine the common source of these shell eggs. The affected eggs were then recalled, and recommendations for safe food handling were provided to egg producers, retail and food establishments, and the public. Other nationwide outbreaks of Salmonellosis in 2010 without Oklahoma cases include *Salmonella* I 4,[5],12:i:- associated with alfalfa sprouts, *Salmonella* Typhi associated with Frozen Mamey fruit pulp, *Salmonella* I 4,[5],12:i:- associated with frozen rodents, *Salmonella* Newport associated with alfalfa sprouts, and *Salmonella* Typhimurium associated with water frogs.

Demographic and Clinical Summary of Reported Salmonellosis Cases, Oklahoma, 2010 (N = 752)

	Number (%)	Incidence Rate per 100,000
Gender		
Female	394 (52.4%)	21.1
Male	358 (47.6%)	19.7
Age	Median = 26.0 years (range: 1 day – 96 years)	
Race		
White	557 (74%)	19.4
American Indian or Alaska Native	51 (6.8%)	17.2
African American or Black	42 (5.6%)	14.2
Asian	4 (0.5%)	6.4
Native Hawaiian or Other Pacific Islander	1 (0.1%)	25.3
Two or more races	19 (2.5%)	12.6
Unknown	78 (10.4%)	-
Hispanic or Latino Ethnicity		
Hispanic or Latino	56 (7.4%)	18.6
Not Hispanic or Latino	515 (68.5%)	-
Unknown	181 (24.1%)	-
Hospitalized for Salmonellosis (n = 208)*	170 (81.7%)	-
Deaths	11 (1.5%)	-
Exposures (not mutually exclusive)		
Travel outside U.S.	18 (2.4%)	-
Consumed raw or undercooked eggs	68 (9.0%)	-
Consumed raw/unpasteurized milk	4 (0.5%)	-
Consumed raw/unpasteurized cheese	5 (0.7%)	-
Consumed raw/unpasteurized juice	5 (0.7%)	-

*Total number hospitalized

Salmonellosis Incidence Rates by Year, Oklahoma and U.S., 2006 – 2010*



*2010 Salmonellosis rates not available for U.S.

Shigellosis

2010 Case Total	416	2010 Incidence Rate	11.3 per 100,000
2009 Case Total	399	2009 Incidence Rate	10.8 per 100,000

In 2010, a total of 416 cases of shigellosis were reported to the OSHD, an increase of 4.3% from 2009. Of the 416 cases, 261 (63%) were laboratory-confirmed cases and 155 (37%) were epidemiologically linked cases identified during investigations conducted by county health department communicable disease nurses. Revisions were made to the Oklahoma notifiable disease rules (Oklahoma Administrative Code 310, Chapter 515), which became effective July 2010, no longer requiring submission of *Shigella* isolates to the OSDH Public Health Laboratory for confirmation and speciation.

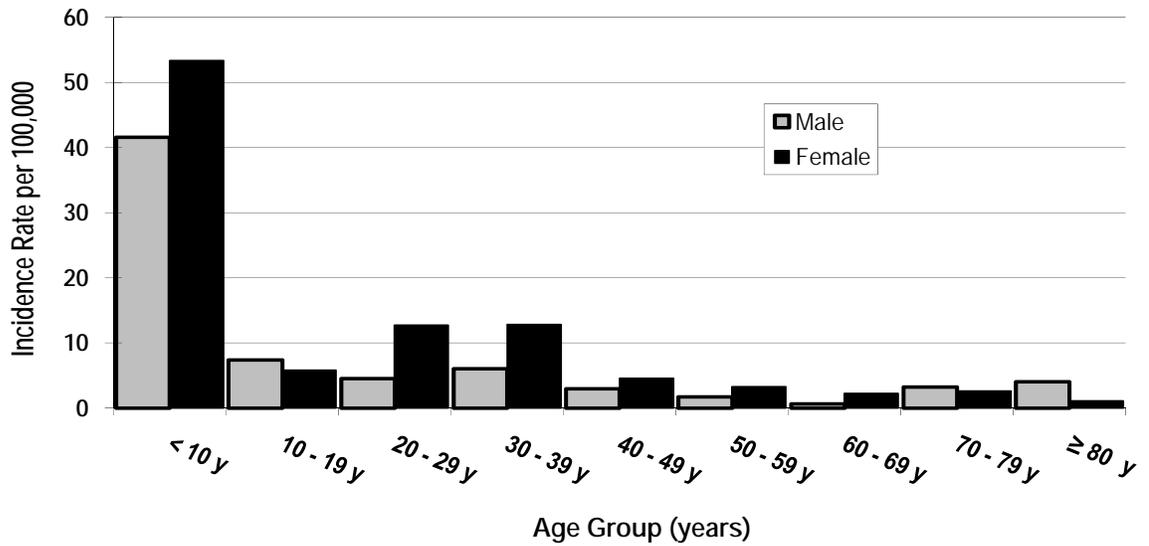
Shigellosis is typically a mild, self-limiting enteric disease with symptoms ranging from asymptomatic infection to severe disease. In 2010, 36 cases (8.7%) required hospitalization for shigellosis and no deaths were reported. Specimen sources of confirmed cases included stool (92%, n = 240), urine (7%, n = 19), and blood (0.4%, n = 1).

In 2010, shigellosis cases were reported in 30 counties in Oklahoma. The counties with the highest rates of *Shigella* were Wagoner (85.2 cases per 100,000 population), Beaver (75.9 cases per 100,000 population), Jackson (55.2 per 100,000 population), and Okfuskee (54.9 cases per 100,000 population). The highest rate of illness occurred in children less than 10 years of age (47.32 per 100,000 population). In 2010, females had higher rates of shigellosis in most age categories except for persons 10 to 19 years of age and greater than or equal to 70 years of age (refer to the figure showing incidence rates by gender and age group). Because of the low infectious dose of 10 to 100 organisms required to cause disease, a high secondary attack rate is normally seen in high-risk settings such as foodservice establishments, child care centers, long-term care facilities, and healthcare settings. Forty-eight percent (n = 187) of the 388 cases in 2010 with known exposure history reported association with a child care setting (CCS). Of those cases associated with a CCS, 118 (63.1%) were attendees, 12 (6.4%) were employees, 2 (1%) were food handlers in the CCS, and 55 (29.4%) had a household member that attended or worked in a CCS. Cases of shigellosis were also reported in persons associated with other high-risk settings including food handlers (1%, n = 4) and healthcare (2.3%, n = 9).

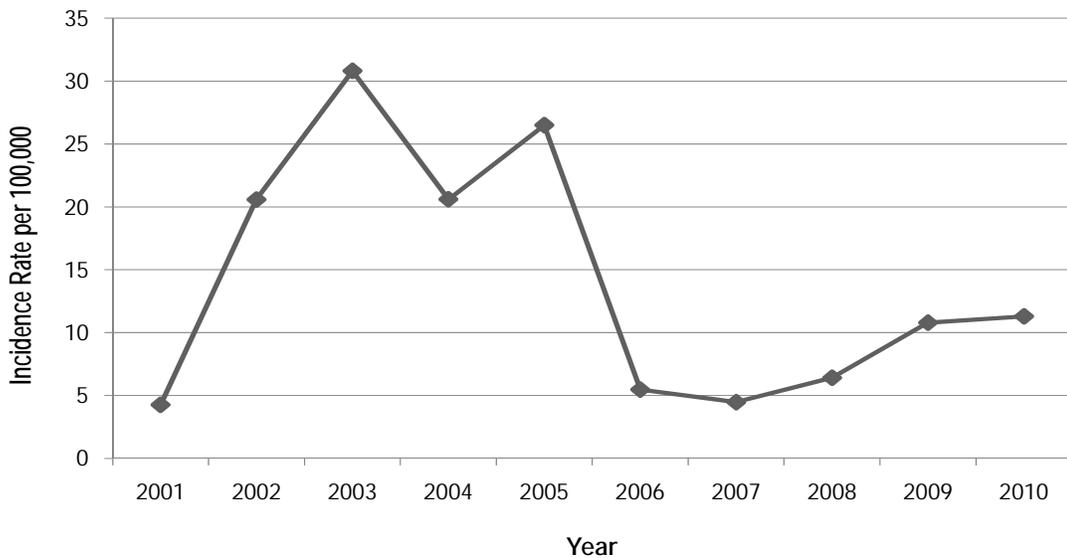
Demographic and Clinical Summary of Reported Shigellosis Cases, Oklahoma, 2010 (N = 416)

	Number (%)	Incidence rate per 100,000
Gender		
Female	241 (58%)	12.92
Male	175 (42%)	9.60
Age	Median = 7 years (range: 5 months – 83 years)	
Race		
White	261 (62.7%)	9.07
American Indian or Alaska Native	45 (10.8%)	15.19
Black or African American	54 (13%)	18.19
Native Hawaiian or other Pacific Islander	1 (0.2%)	25.34
Two or more races	33 (7.9%)	-
Unknown	22 (5.3%)	-
Symptoms (not mutually exclusive)		
Diarrhea	407 (98%)	-
Duration of diarrhea (days)	Median = 5 days (range: 1 day – 42 days)	
Diarrhea, bloody	122 (30%)	-
Abdominal cramps	325 (78%)	-
Vomiting	173 (41%)	-
Mucous in stool	144 (35%)	-

Incidence Rate of Reported Shigellosis Cases by Age Group and Gender, Oklahoma, 2010 (N = 416)



Incidence Rate of Reported Shigellosis Cases by Year, Oklahoma, 2001-2010



Invasive *Streptococcus pneumoniae*, Children <5 Years

2010 Case Total	55	2010 Incidence Rate*	20.2 per 100,000
2009 Case Total	63	2009 Incidence Rate*	23.6 per 100,000

Invasive *Streptococcus pneumoniae* (IPD) causes a wide spectrum of disease including otitis media, pneumonia, bacteremia/sepsis, and meningitis. In February 2010, the Advisory Committee on Immunization Practices (ACIP) issued recommendations for use of a 13-valent pneumococcal conjugate vaccine (PCV13) to succeed the 7-valent vaccine (PCV7) recommended in the childhood immunization schedule since 2000 for prevention of IPD in children. This 13-valent vaccine contains all PCV7 serotypes plus six additional, covering approximately 64% of all serotypes of IPD in children <5 years. For those children aged 14 to 59 months who have completed the full series of PCV7, or those with underlying medical conditions, ACIP also recommends a single supplemental PCV13 dose.

In 2010, the incidence of IPD in children less than 5 years of age decreased 12.7% compared to 2009, making 2010 the third consecutive year in which cases have decreased since the peak in 2007. IPD is a seasonal disease, with 49% (n = 27) of cases in 2010 occurring during the winter months (November through February). Two deaths occurred among reported cases of IPD, resulting in a case-fatality rate of 3.6%. Neither of the deaths had underlying conditions noted in their medical records, and neither was age-appropriately vaccinated with the conjugate pneumococcal vaccination at time of illness onset.

Demographic and Clinical Summary of Reported Invasive *Streptococcus pneumoniae* Cases in Children <5 Years, Oklahoma, 2010 (N = 55)

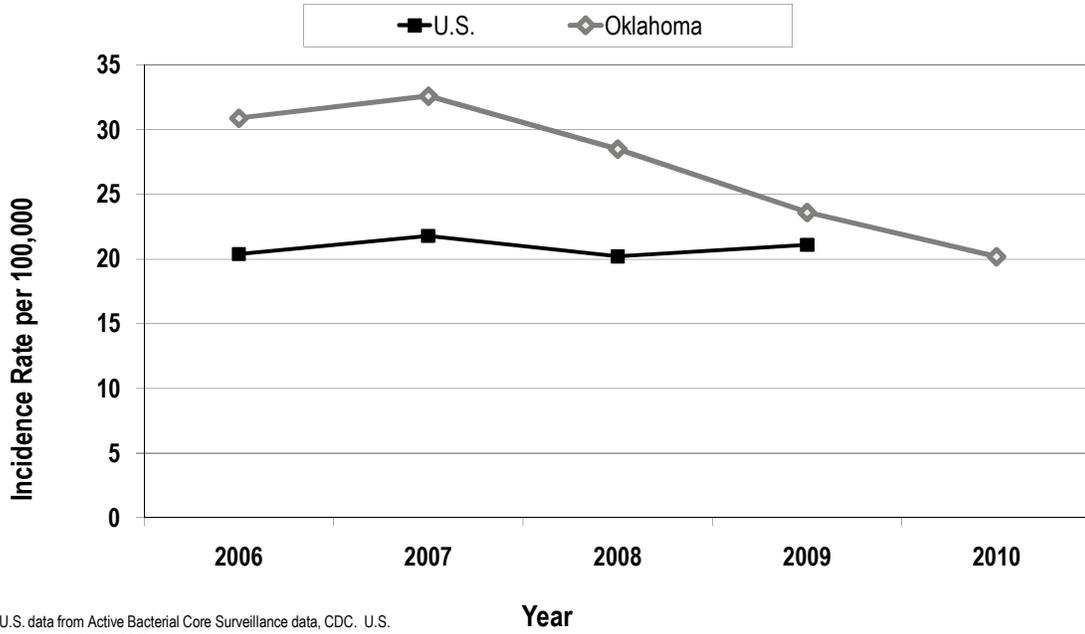
	Number (%)	Incidence Rate per 100,000*
Gender		
Female	17 (31%)	12.9
Male	38 (69%)	27.4
Age	Median= 1.4 years (range: 1 month – 4 years)	
Hospitalized for IPD (n = 45)**	42 (93%)	-
Deaths	2 (3.6%)	-
Race		
White	38 (69%)	19.8
Black	8 (14%)	30
American Indian	7 (13%)	25.8
Unknown	2 (4%)	-
Hispanic or Latino Ethnicity	6 (11%)	14.1
Unknown	13 (24%)	-
Infection Types (not mutually exclusive)		
Bacteremia/sepsis	47 (85%)	--
Meningitis	8 (14%)	--
Pneumonia	21 (38%)	--
Other^	8 (14%)	--
Vaccinated with ≥1 dose pneumococcal conjugate vaccination at time of illness (n = 48)	47 (98%)	-
Age-appropriately vaccinated at time of illness (n = 46)	30 (65%)	

*Incidence rate per 100,000 population based on the number of children less than 5 years of age in Oklahoma.

**Number hospitalized for IPD out of those hospitalized

^Other infection types include otitis media, septic arthritis, osteomyelitis

**Invasive *Streptococcus pneumoniae*, children less than 5 years,
Incidence Rate by Year, Oklahoma and U.S., 2006-2010***



*U.S. data from Active Bacterial Core Surveillance data, CDC. U.S. data not available for 2010.

Tuberculosis

2010 Case Total	86	2010 Incidence Rate	2.3 per 100,000
2009 Case Total	102	2009 Incidence Rate	2.8 per 100,000

Tuberculosis (TB) is often considered a disease of the past. However, nearly one-third of the world's total population, or approximately two billion people, are currently infected with the bacteria that causes TB. Each year, approximately 9 million people around the world develop TB, and almost 2 million deaths are related to TB. TB is the leading killer of people who are HIV infected. Through public health efforts including timely case diagnosis, contact investigation, administration of therapy, prevention, and education, Oklahoma and the US have seen a steady decline of TB (see graph).

In Oklahoma, persons of white race had the highest number of cases (n = 32, see Table 1). Conversely, the highest incidence rate occurred among persons of Native Hawaiian/Pacific Islander race (152 per 100,000, see Table 2). Some races may be under-represented as race is self-reported and more than one race can be declared. The number of cases in special populations decreased, with prisoners, nursing homes and university students having none for the year. Persons ages 65 and older represented the highest rate of illness at 3.6 per 100,000 population followed by two age groups: children 0 to 4 years of age and adults 45 to 64 years of age, both at 2.9 per 100,000 population.

Resistance to isoniazid (INH) decreased from the previous two years. However, one case with multiple-drug resistance (MDR) was identified. This case was in a foreign born individual that had previous TB treatment in their native country, and presented with a 15-month history of a productive cough. Cavitory lesions were present on the chest x-ray, and sputum specimens were smear and culture positive for *M. tuberculosis*, the causative agent of TB. The case also experienced fever, fatigue and weight loss of >10% body weight. The organism was resistant to INH and rifampin, and had partial resistance to ethambutol. The patient improved on multi-drug therapy including intravenous amikacin. Treatment will continue for up to 24 months. During treatment, the patient will be monitored for symptoms of toxicity. A contact investigation revealed one close contact who tested positive and was started on treatment for latent TB infection (LTBI).

People at high risk for TB infection include those who are close contacts to active TB cases, foreign born, low-income and/or homeless individuals, people who work with high risk groups in special settings such as correctional facilities or drug treatment centers, racial and ethnic minorities and people who inject illicit drugs.

People at high risk for progressing from LTBI (non-contagious) to active TB disease (contagious) include those who are immunocompromised, malnourished, substance abusers, people with medical conditions (such as diabetes, severe kidney disease, or silicosis), people who were infected with TB within the previous two years, children under 4 years of age, and people who inject illicit drugs.

Prevention, early diagnosis and treatment are paramount to successful tuberculosis control. TB should be considered in the differential diagnosis of persons presenting with a productive cough, bloody sputum, fevers, and/or unexplained weight loss. Early suspicion and testing are of utmost importance. Delayed diagnosis of TB can result in serious disease as well as community spread of TB. Persons with active TB are treated using directly observed therapy (DOT) in Oklahoma, meaning that each dose of TB medication is supervised to confirm adherence.

Testing for TB includes the Mantoux tuberculin skin test (TST), sputum testing for acid fast bacilli (AFB), chest radiographs, and/or interferon-gamma release assay (IGRA) blood tests. OSDH collaborates with Oklahoma City-County and Tulsa City-County Health Departments to control TB in the state. Physicians who specialize in TB are available for consultation regarding testing, infection control and treatment by calling 405-271-4060 during or after regular business hours.

For information about TB disease and testing, contact the OSDH Acute Disease Service, TB Program at 405-271-4060, visit this Web site: www.health.ok.gov, or contact your local county health department.

Tuberculosis Incidence Rates by Year, Oklahoma and U.S., 2003 – 2010*

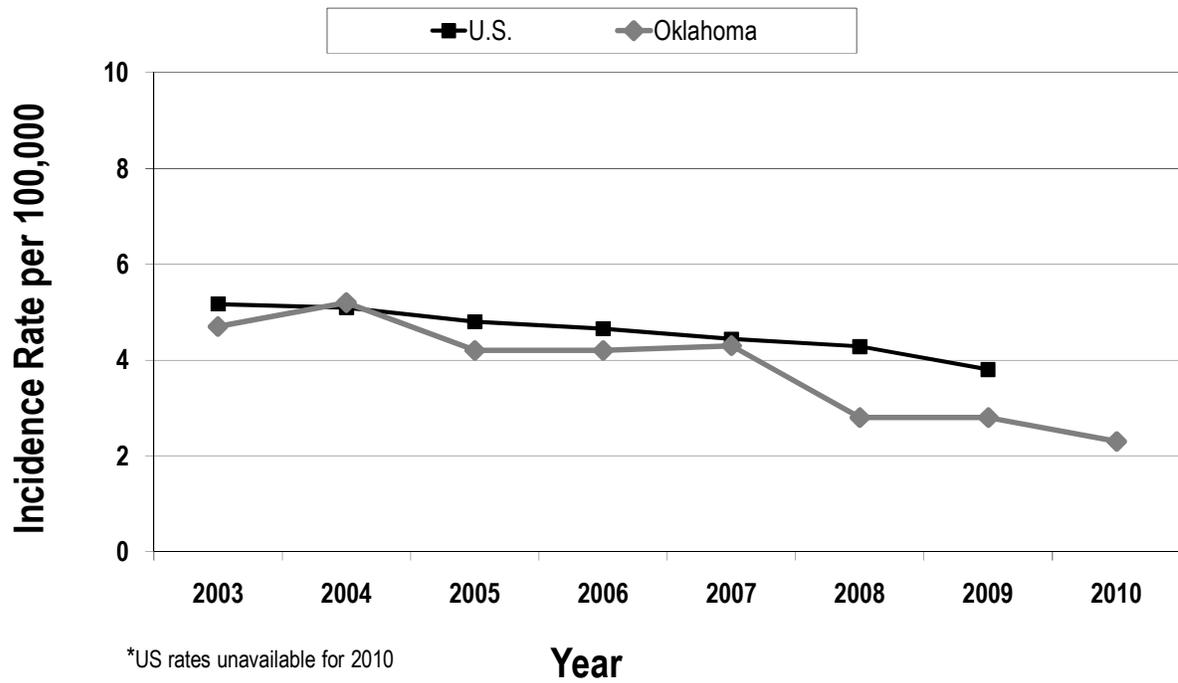


Table 1: Reported Tuberculosis Cases, Oklahoma 2003 - 2010

Year	2003	2004	2005	2006	2007	2008	2009	2010
Tuberculosis Cases	163	178	144	144	149	100	102	86
AGE (years)								
0 - 4	11 (7%)	14 (8%)	12 (8%)	8 (6%)	12 (8%)	12 (12%)	10 (10%)	8 (9%)
5 - 14	1 (1%)	10 (6%)	7 (5%)	3 (2%)	9 (6%)	1 (1%)	7 (7%)	1 (1%)
15 - 24	16 (10%)	24 (13%)	7 (5%)	9 (6%)	11 (7%)	8 (8%)	7 (7%)	9 (11%)
25 - 44	51 (31%)	50 (28%)	40 (28%)	36 (25%)	36 (24%)	29 (29%)	23 (22%)	23 (27%)
45 - 64	52 (32%)	54 (30%)	53 (37%)	56 (39%)	60 (40%)	32 (32%)	38 (37%)	27 (31%)
> 65 Years	32 (20%)	27 (15%)	25 (17%)	32 (22%)	21 (14%)	18 (18%)	17 (17%)	18 (21%)
RACE								
American Indian/ Alaska Native	33 (20%)	36 (20%)	32 (22%)	22 (15%)	30 (20%)	19 (19%)	13 (13%)	14 (16%)
Asian	16 (10%)	20 (11%)	14 (10%)	20 (10%)	8 (5%)	7 (7%)	12 (12%)	14 (16%)
Black	27 (17%)	32 (18%)	21 (15%)	22 (15%)	22 (15%)	23 (23%)	13 (13%)	10 (12%)
Native Hawaiian/ Pacific Islander	0	0	0	0	5 (3%)	6 (6%)	5 (5%)	6 (7%)
White	87 (53%)	88 (50%)	70 (49%)	79 (55%)	84 (56%)	45 (45%)	51 (50%)	32 (37%)
Unknown	-	-	-	-	-	-	-	8 (9%)
Two or more races	0	2 (1%)	7 (4%)	1 (.7%)	-	-	7 (7%)	2 (3%)
Hispanic*	18 (11%)	29 (32%)	21 (15%)	25 (17%)	25 (17%)	13 (13%)	16 (16%)	18 (21%)
SPECIAL POPULATIONS								
Foreign Born	37 (23%)	37 (21%)	35 (24%)	39 (27%)	38 (26%)	30 (30%)	20 (20%)	23 (27%)
University Students	8 (5%)	5 (3%)	2 (1%)	5 (3%)	2 (1%)	1 (1%)	0	0
Homeless	7 (4%)	9 (5%)	13 (9%)	8 (6%)	7 (5%)	8 (8%)	6 (6%)	2 (2%)
Nursing Homes	5 (3%)	5 (3%)	5 (3%)	8 (6%)	4 (3%)	5 (5%)	4 (4%)	0
AIDS/TB	10 (6%)	4 (2%)	10 (7%)	6 (4%)	5 (3%)	3 (3%)	1 (1%)	3 (4%)
Prisoners	6 (4%)	11 (6%)	8 (6%)	7 (5%)	2 (1%)	2 (2%)	2 (2%)	0
BACTERIOLOGY								
Resistance To INH	9 (5.6%)	1 (1%)	5 (5%)	3 (2%)	0	3 (3%)	4 (4%)	2 (2%)
MDR-TB	1 (.8%)	0	1 (1%)	0	0	0	0	1 (1%)
Culture Positive for MTB	126 (77%)	109 (61%)	93 (65%)	73 (51%)	91 (61%)	80 (80%)	54 (53%)	40 (47%)

*Persons of Hispanic ethnicity may also be represented in other races

**Table 2: Tuberculosis Incidence Rates per 100,000 by Age and Race,
Oklahoma 2003 - 2010**

Year	2003	2004	2005	2006	2007	2008	2009	2010
Oklahoma Case Rate*	4.7	5.2	4.2	4.2	4.3	2.8	2.8	2.3
U.S. Case Rate*	5.1	4.9	4.8	4.6	4.2	3.8	3.8	NA
AGE†								
0 - 4	5	6	5	3	5	4.6	3.8	2.9
5 - 14	1	2	1	0.6	2	0.2	1.4	0.2
15 - 24	3	5	1	2	2	1.5	1.3	1.7
25 - 44	5	5	4	4	4	3.0	2.4	2.4
45 - 64	7	7	7	7	8	3.5	4.1	2.9
> 65	7	6	5	7	5	3.7	3.5	3.6
RACE‡								
American Indian/ Alaska Native	12	13	12	8	11	6.7	4.5	4.7
Asian	34	43	30	43	17	11.2	19.1	22.3
Black	9	12	8	8	8	8.0	4.5	3.4
Native Hawaiian/ Pacific Islander	0	0	0	0	210	164.3	129.4	152
White	3	3	3	3	3	1.6	1.8	1.1
Two or more races	0	1	4	0.6	--	--	4.7	1.3
Hispanic***	10	16	7	13	14	5	5.7	6.0

*Rate is 100,000 per population

†Race and Age calculations using census data

‡Persons of Hispanic ethnicity may also be represented in other races.

Tularemia

2010 Case Total	8	2010 Incidence Rate	0.22 per 100,000
2009 Case Total	7	2009 Incidence Rate	0.19 per 100,000

Although tularemia is endemic in Oklahoma, *Francisella tularensis* is classified as a bioterrorism agent and is therefore an immediately notifiable disease. Epidemiologists from the Acute Disease Service rapidly investigate all cases upon receipt to identify the source of exposure and evaluate for case clustering or outbreaks.

There are several different clinical presentations of tularemia. Of the eight reported cases in 2010, six (75%) individuals experienced symptoms consistent with ulceroglandular disease, and two (25%) experienced symptoms characterized as a typhoidal syndrome. Commonly reported symptoms among cases included: fever, chills, swollen lymph nodes, fatigue, myalgia, vomiting, ulcers, and headache.

Although trends in disease are not entirely understood, weather changes do affect tick survival. While cases are reported throughout the year, all of the reported cases in 2010 had onset of symptoms between April and August. Tularemia prevention centers on avoiding tick bites, use of rubber gloves while skinning or handling animals, and thoroughly cooking wild game meat before eating. For more information regarding tularemia or tick bite prevention, visit <http://ads.health.ok.gov> and click on the "Disease Information" tab.

Demographic and Clinical Summary of Reported Tularemia Cases, Oklahoma, 2010 (N = 8)

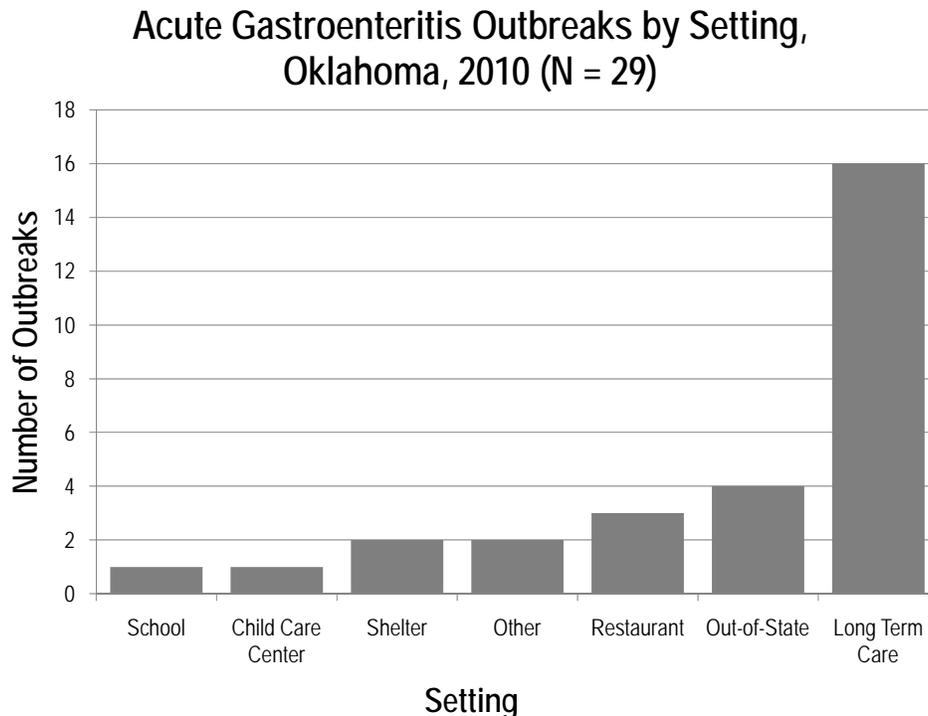
	Number (%)	Incidence Rate per 100,000
Gender		
Male	5 (63%)	0.27
Female	3 (37%)	0.16
Age	Median = 46 years (range: 17 – 82 years)	
Race		
White	5 (63%)	0.17
American Indian/Alaska Native	2 (25%)	0.68
Two or more races	1 (12%)	0.66
Hospitalization	4 (50%)	-
Death	0 (0%)	-
Geographical Distribution		
Cherokee	1 (12%)	2.17
Cleveland	1 (12%)	0.41
Haskell	1 (12%)	8.07
Kay	1 (12%)	2.17
McClain	1 (12%)	3.01
Roger Mills	1 (12%)	29.35
Stephens	1 (12%)	2.30
Wagoner	1 (12%)	1.42
Exposures		
History of recent tick bite	7 (88%)	--
Exposure to tick infested or wooded area	7 (88%)	--

Norovirus Outbreaks in Institutional and Food Service Settings

Noroviruses are the most common cause of acute gastroenteritis in the United States with an estimated 20 million cases per year. The average incubation period for norovirus is 24 to 48 hours, and clinical disease is characterized by acute onset of vomiting, diarrhea, or both, lasting 24 to 48 hours. Outbreaks of norovirus have occurred in multiple settings such as nursing homes and other institutional settings, restaurants and catered events, and cruise ships. The low infectious dose of norovirus (<100 viral particles), person-to-person transmission, and environmental contamination facilitates spread during outbreaks.

The Oklahoma State Department of Health (OSDH), Oklahoma City-County Health Department, and Tulsa-City County Health Department epidemiologists investigate outbreaks of acute gastroenteritis to (1) determine the magnitude of the outbreak; (2) identify the source; and (3) institute control measures. The OSDH Public Health Laboratory (PHL) has the capacity to perform norovirus testing by polymerase chain reaction (PCR) for outbreak investigations. OSDH and City-County Health Department epidemiologists collaborate with clinicians during outbreak investigations to collect stool specimens from symptomatic individuals for norovirus PCR testing.

In 2010, 29 acute gastroenteritis outbreaks with clinical symptoms consistent with norovirus were reported to the OSDH and investigated by public health officials. Twenty-one of the gastroenteritis outbreaks were due to person-to-person transmission within institutional settings such as long-term care centers, temporary shelters, and child care centers; five were foodborne outbreaks associated with a restaurant, two catered events, one conference, and one family reunion; and the mode of transmission for three of the outbreaks was unknown. Nineteen of the gastroenteritis outbreaks were laboratory confirmed by PCR as norovirus. In four of the gastroenteritis outbreaks, Oklahoma residents became ill after attending an out-of-state event. The out-of-state events included two conferences, one triathlon, and one family reunion.



Institutional Settings: Healthcare

Healthcare facilities, including long-term care facilities and hospitals, are the most commonly reported settings for norovirus outbreaks in the United States. Of the 660 norovirus outbreaks investigated by state health departments and reported to CDC between 1994 and 2006, 36% occurred in long-term care facilities. In 2010, Oklahoma had 16 acute gastroenteritis outbreaks at long-term care facilities. Each facility contacted either the county health department or OSDH to report an increase in the number of illnesses at the facility. Once the report was received, an outbreak investigation was initiated to determine attack rates among residents and staff, confirm the etiologic agent, perform active surveillance, and work with staff to implement infection control and prevention measures. Of the 16 long-term care facility associated outbreaks, norovirus was confirmed as the etiologic agent by Public Health Laboratory testing in 11 (69%) of the investigations conducted in this setting. The attack rates for long-term care facilities ranged from 11% to 43.5%. Thirteen out of 15 facilities reported ill staff members and 15 out of 15 facilities reported ill residents.

Institutional Settings: Schools and Child Care Settings

In 2010, acute gastroenteritis outbreaks were reported in a school in Canadian County and a child care setting in Oklahoma County. In the United States, 13% of the 660 norovirus outbreaks investigated by state health departments and reported to CDC between 1994 and 2006 occurred in school settings. Norovirus was confirmed as the etiologic agent of the Canadian County school outbreak based on identification of norovirus in a stool specimen from a school attendee by PCR test. Norovirus was not confirmed as the etiologic agent of the child care center associated outbreak; however, norovirus was the suspected agent based on clinical description and attack rate, and occurrence of person-to-person spread, which is consistent with norovirus outbreaks.

Canadian County School Outbreak:

On October 13, 2010, Canadian County school officials contacted the local county health department to report 125 students absent due to vomiting and diarrhea at the facility. Only 18 students were reported absent the day prior. An outbreak investigation was initiated to determine the scope of the outbreak, the source of the outbreak, and to prevent subsequent illness. Absentee records with contact numbers and electronic meal tickets were obtained to contact and interview a sample of students regarding symptoms and exposure history. Using the absentee list, electronic meal ticket data, and the total number in the school, Acute Disease Service epidemiologists analyzed the data to determine if illness was associated with consumption of food provided by the school cafeteria. A total of 125 of 789 students in the elementary were absent on October 13, 2010 (attack rate = 16%). A stool specimen was obtained on one ill individual contacted during the initial interviewing of absentees. The stool sample was positive for Norovirus genotype I, which is consistent with symptoms reported by ill persons.

Analysis of exposures revealed the only common setting or activity among cases was attendance at the school. Environmental investigation of the school cafeteria did not identify any critical violations during food preparation, handling, or serving. No food handlers reported illness prior to the outbreak, nor did they report any ill household members. Analysis of the school absentee data and the electronic meal data did not identify illness associated with eating meals provided by the school on Monday or Tuesday. Although results from the outbreak investigation did not definitively identify a common source of exposure, epidemiologic data suggested a point source exposure associated with the school.

Foodborne Transmission

Between 1994 and 2006, 31% of the 660 norovirus outbreaks in the United States were associated with restaurants, parties, and events where contaminated food was the identified or suspected source. In 2010, Oklahoma investigated five acute gastroenteritis outbreaks attributed to foodborne transmission. Two of the outbreaks occurred outside of Oklahoma, but Oklahoma residents attended these events and experienced illness. Three of the outbreaks were laboratory-confirmed by the OSDH PHL as norovirus. Two of the three outbreaks occurring in Oklahoma were catered meals. One of the outbreaks was associated with a restaurant located in Comanche County.

Comanche County Outbreak:

The Comanche County Health Department notified the Acute Disease Service (ADS) of a gastrointestinal illness complaint received during October 2010 from a patron that ate with a group at a restaurant in Comanche County. Twenty-five (81%) of the 31 members in the group experienced symptoms of diarrhea or vomiting beginning 30 to 40 hours after the meal. The county health department and ADS also received three separate complaints of gastrointestinal illness from other patrons. An epidemiologic investigation was conducted by public health officials. ADS epidemiologists conducted telephone interviews of both ill and non-ill individuals using a standard questionnaire to gather demographics, symptoms, and foods consumed from the restaurant. An environmental investigation of the establishment was performed by the Comanche County sanitarian to determine if any employee's experienced gastroenteritis prior to or during the outbreak period, and to evaluate food handling practices, including employee hygiene, food storage, and food preparation.

Thirty-one out of forty individuals that consumed food at the establishment developed diarrhea and/or vomiting after consuming the food. Symptoms reported among the 31 ill persons were the following: nausea (90%), vomiting (84%), fatigue (84%), diarrhea (65%), abdominal cramps (58%), watery diarrhea (52%), headache (48%), muscle aches (48%), chills (48%), fever (23%), and bloody diarrhea (3%). None of the thirty-one ill individuals were hospitalized. Norovirus was confirmed by PCR testing of stool submitted by one case.

Environmental investigation revealed the restaurant was out of compliance in several areas, including employee hygiene practices; adequate hand washing facilities; and procedures used for cleaning/sanitizing food contact surfaces, equipment and utensils. During the restaurant visit, the sanitarians were informed of customer had vomited in the dining area during the date and time cases had dined at the establishment. One of the kitchen staff responsible for food preparation cleaned up the vomit using gloves and a bleach solution. During the visit, the sanitarians were also informed of two employees who became ill; ADS personnel interviewed the employees and determined the individuals had illness onsets and symptoms consistent with ill customers. Several recommendations were made by public health officials based on the environmental investigation, including installation of a hand washing station to improve hand hygiene practices and a food safety course for all employees.

Although results from data analysis did not definitively identify a specific exposure associated with illness; epidemiologic, laboratory, and environmental results from the investigation indicates an outbreak of norovirus was associated with consumption of foods prepared by the implicated restaurant. Norovirus GII was confirmed by PCR testing of stool submitted by one case and clinical symptoms reported by other cases were consistent with norovirus gastroenteritis. Environmental assessments indicated poor hand hygiene and food preparation surface cleaning practices at the implicated establishment.

Conclusion

Norovirus is not a reportable disease in Oklahoma; however, the Oklahoma State Department of Health investigates outbreaks of norovirus immediately upon report to identify the source and institute control measures to prevent additional cases. Clinicians are advised to immediately report suspected outbreaks of apparent infectious diseases to the OSDH Acute Disease Service Epidemiologist-on-Call at (405) 271-4060 (24/7/365 availability) for investigation and implementation of control measures.

Outbreak of Shiga Toxin-producing *E. coli* (STEC) Among Offenders at a Correctional Facility in Oklahoma, November - December 2010

On 3 December 2010, the Oklahoma State Department of Health (OSDH) Acute Disease Service (ADS) received a report of a laboratory-confirmed case of *E. coli* O157:H7 (a Shiga toxin-producing *E. coli* or "STEC") in an offender at a correctional facility. Reported symptoms were stomach cramps and bloody diarrhea. In addition to this initial laboratory-confirmed STEC case, the facility suspected a potential outbreak was occurring among offenders as several had reported a recent onset of similar symptoms. A suspected outbreak of an apparent infectious disease is an immediately notifiable condition. The OSDH initiated an outbreak investigation to assess the situation, determine the likely source, and institute appropriate control and prevention measures.

The correctional facility houses approximately 1,400 offenders. The main campus is composed of offenders housed in four units, and a special housing unit. The correctional facility also has a completely separate "camp" on the grounds. Illnesses were only reported in offenders from the four housing units on the main campus.

A case-control study was performed to determine whether illness was associated with any specific exposure(s). The investigation team consisted of ADS epidemiologists, OSDH Public Health Laboratory (PHL) microbiologists, and the local County Health Department sanitarian. A random sample of five controls was chosen for each case, matched by housing unit. The investigation team conducted in-person interviews with offenders using a standard outbreak questionnaire to collect demographics, clinical history, and exposures that occurred during November 22 through December 3, 2010. Exposure questions included foods consumed, sexual activity, and consumption of prison-produced wine or use of illicit drugs.

For the purposes of this investigation, a confirmed case was defined as an offender with laboratory-confirmed STEC and symptom onset between November 22 and December 3, 2010. A probable case was defined as an offender that experienced diarrhea (≥ 3 loose stools in a 24-hour period) with symptom onset from November 25 through December 3, 2010.

The facility has one cafeteria where offenders eat all meals, and one canteen where food items can be purchased. Food-handling duties are assigned only to offenders. A separate kitchen prepared food for the off-site camp. Members of the outbreak team conducted an environmental investigation to evaluate food storage, production, service, and environmental disinfection practices and to collect environmental samples. The team interviewed kitchen staff and supervisors, which included employees and offenders. All interviewed offenders who worked in the kitchen denied experiencing symptoms of illness during the outbreak period.

One hundred and four offenders were interviewed for the case-control study: 21 (20%) cases and 83 (80%) controls. Of the 21 cases, nine (43%) met the confirmed case definition and 12 were classified as probable cases. Of the nine confirmed cases, *E. coli* O157:H7 was identified in eight (88%) cases, and *E. coli* non-O157 was identified in one case. All eight *E. coli* O157:H7 cases had an indistinguishable PFGE pattern. All nine confirmed cases were housed on the main campus, and reported an onset of symptoms ranging from November 25 through December 3, 2010.

Analysis of exposures revealed several foods items were significantly associated with development of illness. Cases were significantly more likely to report consuming the foods as described in the table:

Food Exposure Analysis, Gastrointestinal Outbreak at a Correctional Facility, 2010

Food item	Date served	Odds Ratio	95% Confidence Interval
Cabbage	11/28	6.22	1.82, 21.31
Broccoli salad	11/25	6.03	1.85, 19.67
Chicken fried steak	11/28	3.84	1.18, 12.46
Fresh oranges	11/27	3.50	1.05, 11.66
Tartar sauce	11/22	3.46	1.05, 11.41
Tuna salad	11/26	2.94	1.07, 8.10

Several other foods served on these dates were significantly associated with development of illness; but were consumed by less than half of the cases. With the exception of chicken fried steak, all other significant food items were either completely prepared by the vegetable preparation offender staff or contained raw ingredients prepared by the vegetable preparation staff. Twenty of 21 (95%) cases reported consuming at least one of the statistically implicated foods that contained ingredients handled by the vegetable preparation staff, compared to 49 (64%) of 76 controls (OR = 11.02, 95% CI: 1.40, 86.69).

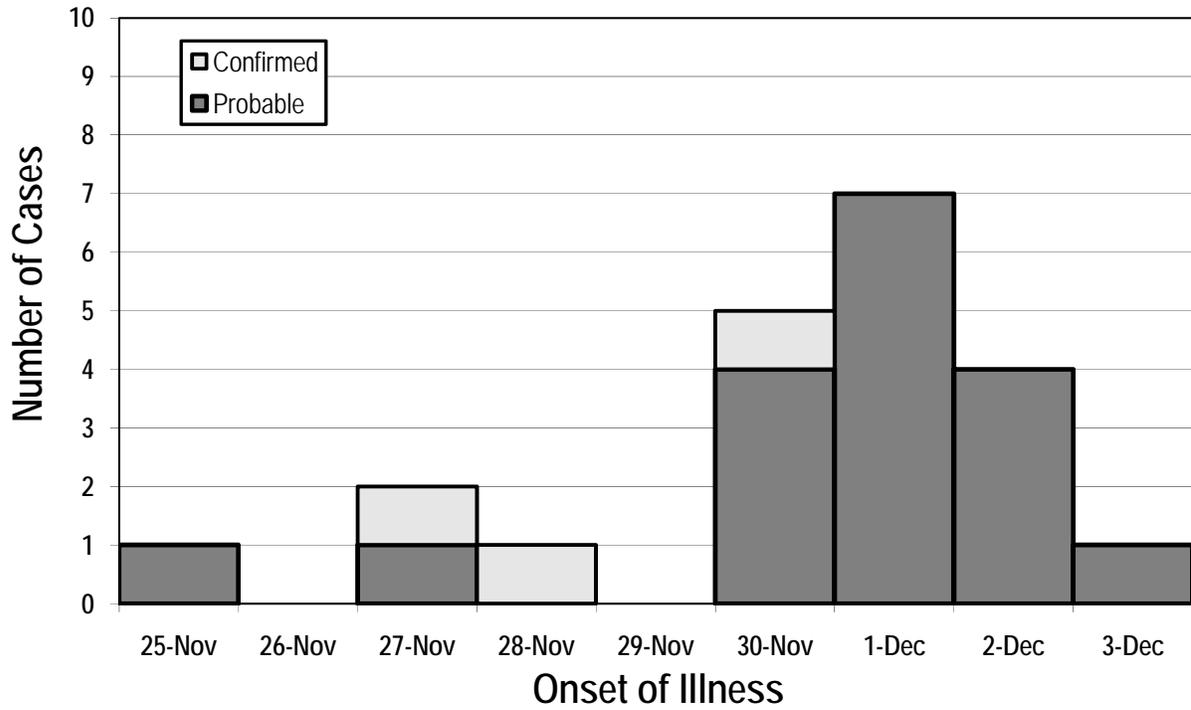
Based on case-control results, the ADS requested offenders with food handling responsibilities to submit a stool specimen for bacteriologic culture and isolation; six kitchen staff offenders submitted stool specimens. *E. coli* O157:H7 was identified in one offender assigned to the vegetable preparation area, and *E. coli* non-O157 and *E. coli* O145 were identified in an offender assigned to the meat preparation area. The PFGE pattern of the *E. coli* O157:H7 isolated from the asymptomatic foodhandler was indistinguishable to the *E. coli* O157:H7 outbreak pattern. The non-O157 PFGE pattern from the asymptomatic meat preparation offender isolate was indistinguishable to the non-O157 PFGE pattern produced from the case isolate. All STEC positive food handlers were removed from food preparation duties until two stool samples were submitted and no pathogenic organisms were isolated.

The environmental investigation identified deficiencies in food storage and preparation practices, including opportunities for cross-contamination due to insufficient environmental cleaning of surfaces and equipment in between food preparation activities. All food samples and environmental swabs were negative for bacterial pathogens.

Results from this outbreak investigation suggest STEC cases were associated with consumption of contaminated foods produced by the correctional facility cafeteria. Epidemiologic, environmental, and laboratory results suggest the outbreak may have been due to several potential contributing factors, including consumption of a food product that was contaminated prior to receipt by the correctional facility foodservice program, contamination of raw food items handled by an infectious foodhandler, and cross-contamination of several food items during preparation. The low frequency of cases identified among the correctional facility population (21 cases among approximately 1,400 incarcerated) may be due to the level of contamination in food(s). The number of STEC organisms found in a contaminated product may not have been evenly distributed in all servings of foods resulting in some individuals consuming an inadequate number of STEC organisms to produce illness.

Control and prevention measures included recommendations regarding exclusion of food handlers from any food handling or preparation duties while having diarrhea, and exclusion of food handlers with STEC until results of two stool specimens are negative for pathogens. Changes in food handling, food preparation and environmental cleaning were also recommended.

Number of Confirmed and Probable Shiga Toxin-producing *E. coli* Cases by Symptom Onset Date, Gastrointestinal Illness Outbreak in a Correctional Facility, Oklahoma, 2010 (N = 21)



***Salmonella* Paratyphi B Variant L Tartrate (+) Outbreak Investigation, September-October, 2010**
Acute Disease Service, Oklahoma State Department of Health

On September 23, 2010, the Canadian County Health Department (CCHD) notified the Oklahoma State Department of Health (OSDH) Acute Disease Service (ADS) to report several laboratory-confirmed *Salmonella* cases with symptom onsets from September 12 through September 21 were determined to be elementary school aged children that attend the same school system. Upon further investigation, twelve laboratory-confirmed cases of *Salmonella* Paratyphi B variant L Tartrate (+) with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns were identified among residents of Canadian (10 cases) and Oklahoma (2 cases) County. An outbreak investigation was initiated to identify other ill individuals, determine the source, and to recommend control measures.

OSDH ADS staff used a hypothesis generating questionnaire to re-interview all initial cases identified by the PHL in Canadian and Oklahoma County to identify common exposures. The initial investigation revealed 9 (90%) Canadian County cases were elementary school aged children enrolled in local schools; one case was a household member to a confirmed case. No specific connection was identified between the Oklahoma and Canadian County cases.

Since the majority of laboratory-confirmed cases occurred among elementary school attendees, the OSDH ADS conducted a case-control study among elementary students to determine whether the illness was associated with any specific exposure(s). School officials provided classroom rosters with parent contact information for all classrooms that included a case. The ADS staff attempted to interview at least four classroom controls for each case. A standard questionnaire was used to collect illness history, food consumption, and participation in school or other extracurricular activities. Cases were interviewed regarding the five days prior to diarrhea onset while exposures were collected from classroom controls for the same five day period as their matched case classmate. ADS staff conducted in-person interviews with each case/control and their parent or by telephone. Information provided by each participant about school breakfast/lunch consumption was verified using absentee records and the electronic meal ticket history provided by the school. If the school records differed from the questionnaire, the individual was contacted to verify their exposure information.

A confirmed case was defined as isolation of *Salmonella* Paratyphi B variant L Tartrate (+) from a clinical specimen with the outbreak strain based on pulsed-field gel electrophoresis (PFGE) testing from a person with symptom onset from August 31 through September 13, 2010. A probable case was defined as an elementary school attendee that experienced bloody diarrhea OR three or more days of diarrhea with a symptom onset date from August 31, 2010 and September 13, 2010.

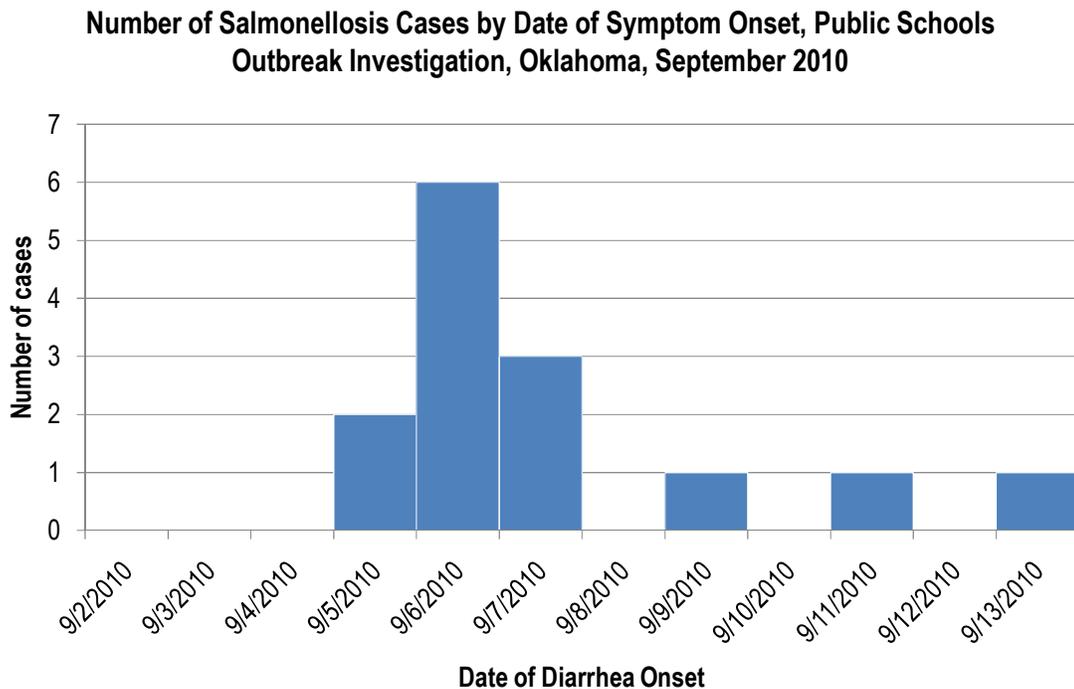
The Canadian County Health Department sanitarian and ADS epidemiologists performed an environmental investigation of the kitchens at two of the elementary schools involved in this outbreak. Food storage and production were evaluated, and cafeteria employees were interviewed about work duties and illness history. Each school has an individual kitchen where the food was prepared. Meals were prepared by cafeteria workers at each school. All meats were precooked, fresh fruits and vegetables were purchased weekly from a local supplier, and other food items were frozen or canned.

Sixty-eight elementary school students were interviewed for the case-control study; 14 (21%) cases and 54 controls (79%). Of the 14 cases, 9 were confirmed and 5 were probable cases. Cases reported an onset of symptoms ranging from September 5 through September 13, 2010. Cases ranged in age from 6 to 11 years with a median age of 8 years.

Analysis of exposures revealed all 14 school-based cases reported consuming foods served for lunch by the elementary school food program during the five days prior to diarrhea onset compared to 45 (83%) of 54 controls. The most common school lunch date reported by cases was September 2; all 11 cases interviewed regarding that date consumed the school lunch compared to 30 (64%) of 47 controls. Analysis of food-specific exposures revealed an elevated odds of consuming lettuce (OR = 2.3, 95% CI: 0.58, 9.43) served on the taco salad and watermelon (OR = 2.55, 95% CI: 0.58, 11.08) among cases compared to controls. These findings were not statistically significant as none of the foods served

by the school lunch program were significantly associated with illness. No other common group settings or activities such as participation in the after-school programs or local sports teams were identified among cases.

Although results from the outbreak investigation did not definitively identify a common source of exposure among salmonellosis cases, epidemiologic data suggest cases that occurred among Canadian County elementary school children were likely associated with consumption of a contaminated food item that was received by the elementary school lunch program and served to students. These foods may have been distributed to other institutions or establishments for consumption by other individuals. This suspected source is supported by the epidemiologic results, which revealed no common exposure among students and the two Oklahoma County cases. A widely distributed food product is also supported by the identification of *Salmonella* cases with the outbreak strain in other states among individuals with similar symptom onsets.



**Odds Ratios and Confidence Intervals for Breakfast and Lunch Food Items Served
September 2, 2010, Canadian County Public School Salmonellosis Outbreak, Oklahoma**

	Odds Ratio	95% Confidence Interval
Breakfast		
French Toast Sticks	2.91	(0.66, 12.81)
Syrup	3.08	(0.70, 13.52)
Strawberries	3.34	(0.66, 17.27)
Low Fat Milk	3.08	(0.70, 13.52)
Lunch		
Taco Salad	1.62	(0.37, 7.10)
Lettuce	2.33	(0.58, 9.43)
Tomato	1.01	(0.23, 4.43)
Cheese	1.86	(0.46, 7.54)
Salsa	0.75	(0.14, 4.08)
Chili Beans	0.65	(0.12, 3.49)
Watermelon	2.55	(0.58, 11.08)
Low Fat Milk	6.11	(0.71, 52.25)

Influenza Surveillance Summary, 2010-2011

The Oklahoma State Department of Health (OSDH) has conducted sentinel surveillance activities year-round since 2007. The Oklahoma Viral Respiratory Illness Sentinel Surveillance System works to detect disease transmission as early as possible, to monitor and describe the intensity and geographic distribution of disease, to measure the impact of influenza on different age groups, and to identify and disseminate information on the circulating types and subtypes of influenza in Oklahoma.

Nineteen sentinel clinicians from 16 geographically distributed counties reported the number and age distribution of patients with influenza-like illness (ILI) via a secure, web-based ILI reporting system. ILI was defined as a fever (100°F [37.8°C], oral or equivalent) AND cough or sore throat in the absence of a known cause other than influenza. Providers also reported the number of patients hospitalized due to ILI as well as the number of positive rapid antigen tests performed. Eleven geographically distributed laboratories reported results of respiratory virus testing (viral culture, DFA, and/or rapid influenza diagnostic tests) on a weekly basis.

During the 2009-2010 influenza pandemic, OSDH monitored the occurrence of severe influenza disease, and that surveillance was continued during the 2010-2011 influenza season. To better describe the epidemiology of severe manifestations of influenza throughout the season, the OSDH designated laboratory-confirmed influenza-associated hospitalizations and deaths among persons of all ages statewide as reportable conditions from September 1, 2010 through August 31, 2011. The epidemiology of outpatient visits due to ILI and influenza-associated hospitalizations and deaths were used to guide public health prevention and control measures. This influenza surveillance article describes both ILI sentinel surveillance and the influenza-associated hospitalization and death surveillance data collected during the 2010-2011 influenza season.

Influenza activity in Oklahoma typically occurs during the winter months and peaks in February each year. Throughout the summer months of 2010, outpatient ILI activity was very low (range: 0.3% to 1.1%) which is typical for influenza. Outpatient ILI activity began to increase the week ending October 16, 2010 (1.0%) and peaked (refer to figure 1) during the week ending January 29, 2011 (14.9%). The proportion of positive influenza tests performed at sentinel laboratories also began to increase during the week ending October 16, 2010 (2.7%) and peaked (refer to figure 2) during the week ending January 22, 2011 (29.6%).

Beginning September 1, 2010, the OSDH Public Health Lab (PHL) accepted influenza specimens, meeting the following testing criteria, for real-time polymerase chain reaction (RT-PCR) testing: hospitalization due to influenza or suspected influenza, suspected influenza death, pregnant woman with suspected influenza, suspected antiviral resistance, or provider in the Oklahoma Viral Respiratory Illness Sentinel Surveillance System. From September 1, 2010 through April 30, 2011, 547 specimens were tested by the OSDH PHL by RT-PCR, and 391 (71.5%) of those specimens were positive for influenza. Of the 391 influenza positive specimens, 251 (64.2%) were positive for influenza A (H3), 20 (5.1%) were positive for 2009 influenza A (H1N1), and 120 (30.7%) were positive for influenza B. The first positive influenza test performed at the PHL was during week ending October 30, 2010. The proportion of positive influenza tests performed at the PHL peaked during week ending January 29, 2011 (94%, 110/117). The increasing proportion of positive PCR tests performed by the PHL during the influenza season was similar to the proportion of positive rapid tests performed by sentinel laboratories (refer to figure 2).

From September 1, 2010 through April 30, 2011, 1,000 influenza-associated hospitalizations were reported among Oklahomans resulting in an incidence rate of 27.2 per 100,000. The first influenza-associated hospitalization occurred during week ending September 11, 2010. The number of influenza-associated hospitalizations continued to increase until activity peaked with 173 hospitalizations during week ending January 29, 2011 (refer to figure 1). A steady decline was observed following the peak in activity during late January. The frequency of influenza-associated hospitalizations by week was similar to the percent of total outpatient visits with ILI; both peaks occurred during late January. The age-specific incidence rate per 100,000 population for influenza-associated hospitalizations was highest for children less than 5 years of age (IR = 124.7) and 65 years of age and older (IR = 56.9) compared to children 5 to 18 years of age (IR =

19.3) and adults 19 to 24 years of age (IR = 12.5), 25 to 49 years of age (IR = 8.6), and 50 to 64 years of age (IR = 14.6). Of the 1,000 influenza-associated hospitalizations, 111 (11.1%) patients were admitted to the intensive care unit (ICU). Forty-nine (4.9%) hospitalizations occurred among women who were pregnant. Forty-seven percent (n = 474) of influenza hospitalizations occurred among children 18 years of age or less (refer to figure 3).

Twenty-five influenza-associated deaths occurred between September 1, 2010, and April 30, 2011. The first influenza-associated death occurred during the week ending October 9, 2010, and the number of influenza-associated deaths peaked during the week ending February 5, 2011 with seven deaths. The age range among mortalities was 25 days to 91 years with a median of 65 years. Fifty-two percent (n = 13) of influenza-associated deaths occurred among adults 65 years and older. All of the influenza-associated deaths had pre-existing conditions and/or complications from secondary bacterial infection. Lab testing for influenza-associated deaths included rapid influenza antigen test (72%), RT-PCR (36%), and viral culture (8%). Among the influenza-associated deaths, lab testing revealed infection with influenza A (56%), influenza B (40%), and influenza A and B co-infection (4%).

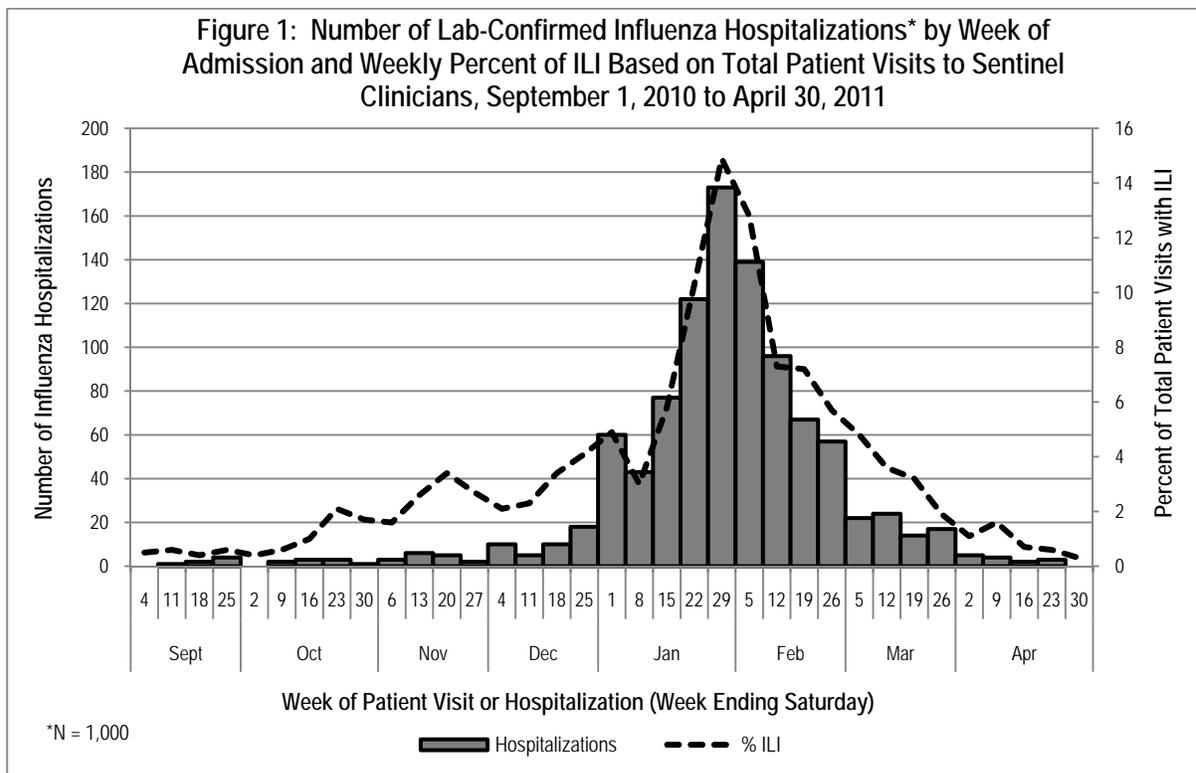


Figure 2: Number of Influenza Positive PCR Tests* at OSDH PHL and Percent of Positive Influenza Tests Performed by Sentinel Laboratories in the Oklahoma Viral Respiratory Illness Sentinel Surveillance System, September 1, 2010 to April 30, 2011

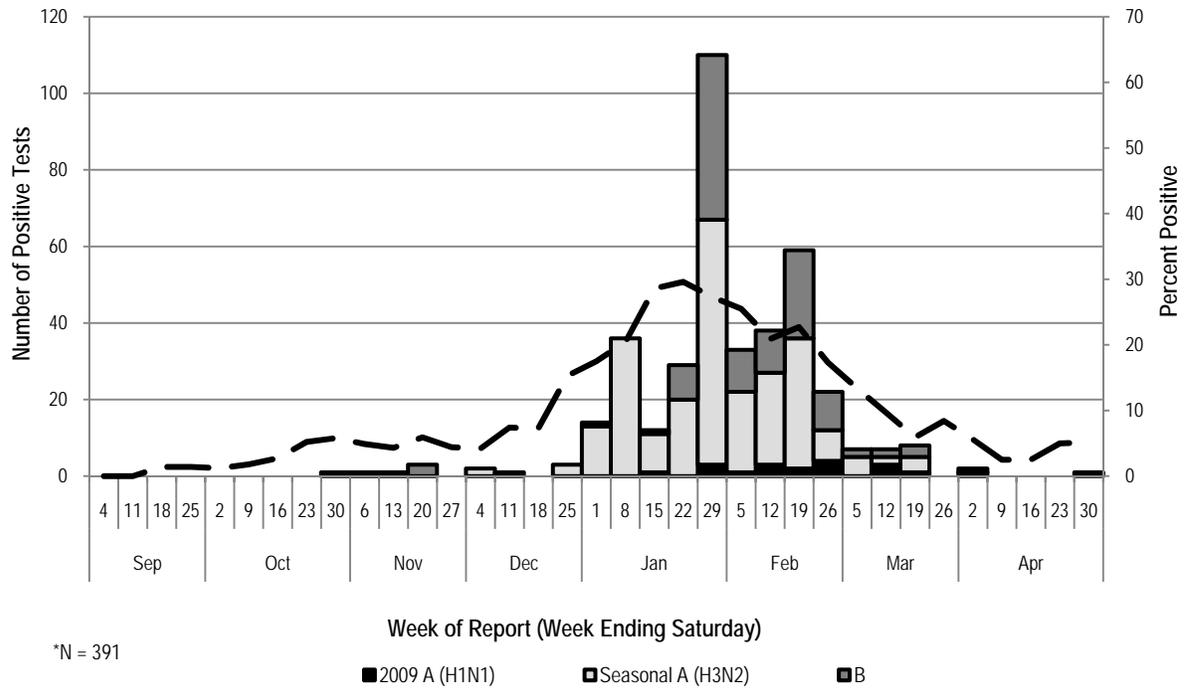
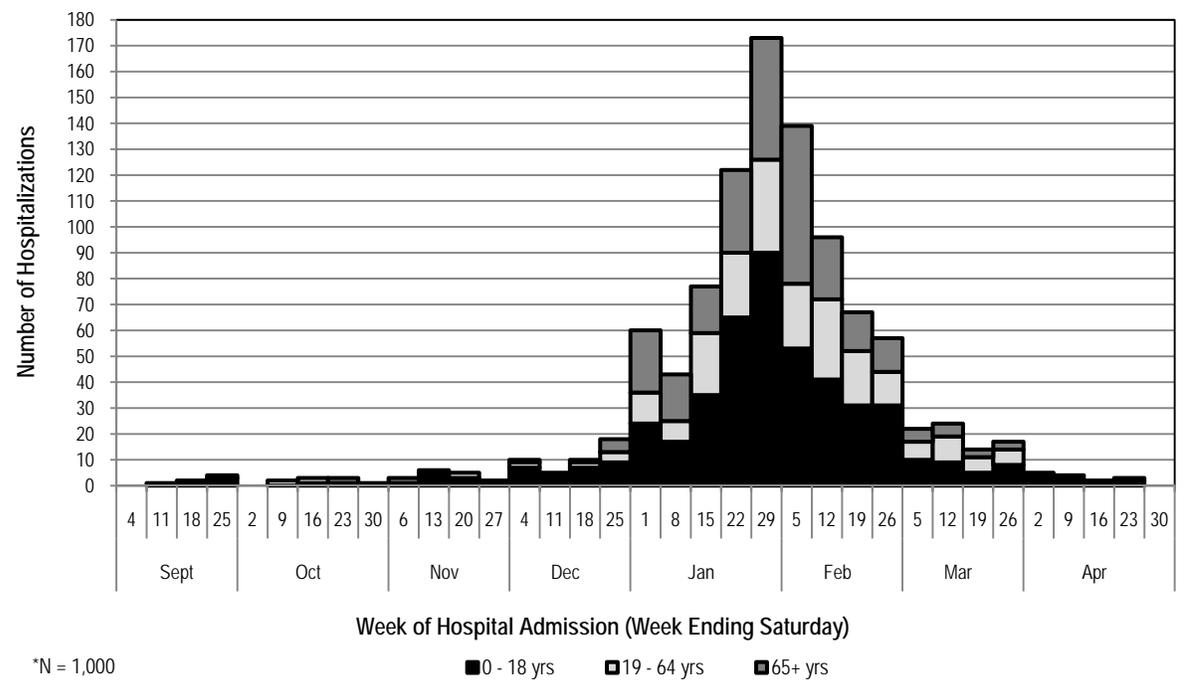


Figure 3: Influenza-Associated Hospitalizations* by Age Group and Admission Week, Oklahoma, September 1, 2010 to April 30, 2011



Oklahoma Health Alert Network (OK-HAN)



A Source of Public Health Information In Oklahoma

❖ What Is OK-HAN?

The Oklahoma Health Alert Network (OK-HAN) is an emergency communications system used to securely provide emergent health information to healthcare professionals. The OK-HAN system serves as part of a nationwide network of Health Alert Networks (HAN) and must follow guidelines and policies set by the Centers for Disease Control and Prevention (CDC). HANs improve public health preparedness among state and local public health partners.

❖ What Can OK-HAN Do For Me?

Becoming a registered OK-HAN user will:

- ◆ Ensure that you can be notified in the event of a public health emergency
- ◆ Provide you with detailed information on health threats and diseases in Oklahoma as well as nationally. Below are examples of recent notifications:
 - ◆ Potential for Human Illness Associated with Blue-green Algae Blooms on Grand Lake (7/1/2011)
 - ◆ Outbreak of Syphilis in Ada and Surrounding Areas Confirmed (6/24/2011)
 - ◆ High Number of Reported Measles Cases in the U.S. in 2011-Linked to Outbreaks Abroad (6/22/2011)
 - ◆ Increased Surveillance for Shiga toxin-positive Diarrheal Illness or Hemolytic Uremic Syndrome among Travelers to Europe and Guidance for Fecal Specimen Testing and Referral to State Public Health Laboratory (5/31/2011)
 - ◆ FDA Requests Reporting of Cases of Necrotizing Enterocolitis in Infants Consuming SimplyThick® (5/24/2011)

❖ Can I Participate?

All Physicians, Physician Assistants, Nurses, Infection Preventionists, and Laboratorians working in a healthcare setting can have access to the secure OK-HAN Web site by requesting an invitation.

❖ How Can I Gain Access?

Notify Kim Mitchell, HAN Coordinator, at (405) 271-4060, email KimberM@health.ok.gov or okhan@health.ok.gov. You will be sent an invitation by email with registration instructions.



Public Health Investigation and Disease Detection Of Oklahoma (PHIDDO) System

What is PHIDDO?

The Oklahoma State Department of Health presents the Public Health Investigation and Disease Detection of Oklahoma (PHIDDO) system to electronically submit cases of reportable diseases and conditions.

- User-friendly system.
- Secure Internet-based application.
- Real-time disease reporting.
- Centralized place for reporting.
- Online case reporting, eliminating paperwork completion, faxing, and mailing to the Oklahoma State Department of Health.
- All data is secured and accessible only to those with specific authorization, e.g., a user from Hospital A can only see cases submitted from Hospital A.
- Ability to update previously submitted reports.

Who should be a PHIDDO user?

- Physicians
- Physician Assistants
- Nurse Practitioners
- Infection Preventionists
- Laboratorians
- Other personnel in a clinic or health care setting who would be submitting cases of reportable diseases and conditions

How can I be a PHIDDO user?

To register for PHIDDO or if you have any questions or problems with PHIDDO, please contact Tony McCord (TonyWM@health.ok.gov) or Anthony Lee (AnthonyL@health.ok.gov) at (405) 271-4060.

Public Health Investigation & Disease Detection of Oklahoma



Welcome to the Oklahoma State Department of Health's Public Health Investigation & Disease Detection of Oklahoma Application.

Unauthorized access is prohibited. You must have a valid User Id and Password to access the system.

To enter, edit, or view a report of a disease or condition, click the button below to launch the PHIDDO application in a new browser window. You will also be prompted to forward an isolate or specimen for confirmation, if required, to the Public Health Lab.

Enter PHIDDO

Oklahoma Public Health Laboratory Annual Report

Mission

The Public Health Laboratory implements and provides essential public health laboratory services to citizens of Oklahoma through a system of county health departments, agency programs, and private health providers. The Public Health Laboratory participates and supports strategies designed to prevent disease, protect our citizens, and to improve the public's health status.

Primary Duties

- Provide analytical services for the State Department of Health, local government and tribal units, healthcare practitioners, and private citizens;
- Specialized public health laboratory procedures and reference testing;
- Training, technical assistance, and consultation for private clinical laboratories of Oklahoma;
- Guidance and training for detection and identification of a terrorist event;
- Applied research and university instruction related to the public health mission of the laboratory;
- Pharmacy services to county health departments.

Narrative:

The Public Health Laboratory (PHL) Service of the Oklahoma State Department of Health has been in continuous operation since 1907. The PHL has a vital role in the detection of infectious disease outbreaks, patient diagnostic testing, and the tracking of disease trends in Oklahoma. In recent years, the PHL has been actively involved in developing rapid molecular methods for identifying possible agents of bioterrorism. These molecular methods have also been applied to the rapid diagnosis of infectious diseases and tests for inherited disorders in newborns.

In 2010, the PHL Service performed 616,362 analytical tests. The table below shows the testing volume for each laboratory section.

Laboratory	Test Number	Percent Tests
Newborn Screening	457,052	74%
Virology	61,956	10%
Immunology	69,666	11%
Molecular	15,110	3%
TB/Mycology	5,814	1%
Bacteriology/Parasitology	6,764	1%

Immunology/Serology Section

The Immunology Section supports the OSDH HIV/STD Service, as well as many other Oklahoma healthcare providers by performing human immunodeficiency virus (HIV) testing. In July 2011, the Immunology Section will begin using a new and improved enzyme linked immunosorbant assay (ELISA) for HIV antibody screening while continuing to use the Western Blot for confirmation. Serological tests for the tickborne diseases (Rocky Mountain spotted fever and *Ehrlichia chaffeensis*) are also performed in this section using an indirect fluorescent assay. Testing for West Nile virus and St. Louis Encephalitis, measles (Rubella), hepatitis B surface antigen, hepatitis C, and syphilis are also available from this section.

Microbiology/Parasitology Section

The Microbiology Section works closely with the Molecular Section to improve our reference services on bacterial identification. The use of DNA sequencing helps in the identification of extremely unusual bacterial isolates. In 2010, the Microbiology Section received 26 isolates that could not be ruled out as possible bioterrorism agents by Oklahoma sentinel clinical laboratories. Of these 26 referred isolates, 5 were identified as *Francisella tularensis*, a select agent

endemic in Oklahoma. The Microbiology Section tested 5 suspicious powders, none of which were positive for biological agents.

In 2010, the Microbiology Section received 337 specimens for *Bordetella pertussis* and *Bordetella parapertussis* testing which resulted in a 7% positivity rate. The Microbiology section also received a total of 109 shiga-toxin positive specimens from clinical laboratories statewide; 42 were identified as *Escherichia coli* O157:H7 and 67 were serotypes other than O157:H7. On September 1, 2010, the Enteric Section implemented serotyping for the six most common serotypes of toxigenic *Escherichia coli*. By performing this testing in house, the PHL will reduce the number of isolates sent to CDC, thereby reducing our turnaround times significantly.

Molecular Section

The Molecular Section continues to perform a variety of rapid, accurate and sensitive tests for other sections within the Public Health Laboratory. These methods include real-time PCR for the detection of virulence factors *stx1* and *stx2* associated with toxigenic *Escherichia coli*, *Bordetella pertussis* and *B. parapertussis* detection, and seasonal influenza, as well as, 2010 influenza A H1N1 detection. Rapid detection of a variety of bioterrorism agents such as *Bacillus anthracis*, *Yersinia pestis*, *Brucella* species, *Francisella tularensis*, *Burkholderia mallei/pseudomallei*, and Ricin toxin is also made possible due to our collaboration with CDC's Lab Response Network (LRN). The Molecular Section offers rapid rule out detection to clinicians, as well as, law enforcement for bioterrorism isolates, clinical, and environmental samples. Molecular methods have even replaced some traditional methods.

The Molecular Section is also an active participant in CDC's PulseNet organization. PulseNet is the standardized international molecular subtyping network, which uses pulsed field gel electrophoresis (PFGE) to generate bacterial DNA patterns for foodborne pathogens. PulseNet allows all 50 states, several large municipalities as well as the Food and Drug Administration, US Department of Agriculture, and Canadian provinces to interact. This allows for quick recognition of outbreaks at the outset, when prevention measures can be effectively taken. PulseNet has recently expanded to include PulseNet Europe, Asia Pacific, Middle East, and Latin America. The Molecular Section currently has three personnel certified to analyze and submit data to CDC's database. In 2010, the Molecular Section performed PFGE on over 2,400 isolates within a 4-day turn-around time as recommended by CDC for all *Salmonella*, *Shigella*, toxigenic *Escherichia coli* and *Listeria monocytogenes* isolates. Molecular personnel alerted epidemiologists about approximately 50 localized clusters of indistinguishable PFGE patterns within Oklahoma in 2010. Molecular Section also posted indistinguishable pattern matches to CDC for 47 national clusters. The PHL is the only PulseNet certified lab in Oklahoma.

The Molecular Section continues to collaborate with CDC, through programs such as PulseNet, LRN and influenza surveillance.

The PHL Molecular Section continues to offer second tier cystic fibrosis transmembrane conductance regulator (CFTR) testing of over 1000 samples annually from the Newborn Screening section.

Newborn Screening Section

The Newborn Screening Section has expanded their panel of tests to include screening for over 50 disorders. Oklahoma's newborn screening panel includes 29 of the 30 core conditions and 22 of the secondary target conditions listed in the recommended uniform screening panel of the Secretary's Advisory Committee on Inheritable Disorders in Newborns and Children. Evaluations for SCID testing are planned for 2011. Once evaluations are completed, the screening panel will include all 30 of the core conditions listed in the recommended uniform screening panel. The Newborn Screening Section screens all babies born in the state of Oklahoma. Without early identification and treatment, these disorders may result in chronic health problems, mental retardation, or death.

Tuberculosis/Mycology Section

The Mycobacteriology Section analyzes samples from a variety of sources for the isolation and identification of *Mycobacterium tuberculosis* complex. In 2010, the Mycobacteriology Section processed over 5,200 patient specimens.

Slightly over 19% of the specimens processed had *Mycobacterium* spp. isolated and 32% of the culture positive specimens were positive for *Mycobacterium tuberculosis*. The Mycobacteriology Section continues to use a high-pressure liquid chromatography (HPLC) system to identify organisms through the analysis of mycolic acid patterns. The use of the HPLC has decreased the time from growth detection to identification to one day. The Mycobacteriology Section is currently in the process of validating the Cepheid GeneXpert system to replace the MTD test that is currently in use. These are molecular tests for the rapid detection of *Mycobacterium tuberculosis complex* from direct respiratory specimens. This laboratory also performs reference mycology testing. This section identifies yeasts and molds for clinical laboratories across the state. Presently, only fungal isolates, not patient specimens, can be accepted for identification due to fiscal constraints. The PHL readily accepts any dimorphic or suspected dimorphic submission. The Mycology Section provides confirmation capability for the select agent, *Coccidioides immitis*, and all other systemic fungi.

Virology/CT-GC Section

The Virology Section performs virus isolation and identification, by cell culture, on all common viral agents. This section participates yearly as a World Health Organization (WHO) collaborating laboratory by providing influenza isolates to assist in the determination of yearly vaccine strain selection and the efficacy of the vaccine. The Rabies laboratory continues to play a key role in the prevention and control of rabies in Oklahoma. It is the only laboratory in Oklahoma that provides rabies testing. In 2010, 5.4% of the specimens submitted were positive for the rabies virus, with skunks being the leading species.

The Virology Section also participates in the Infertility Prevention Project by testing for *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (GC), using an amplified DNA assay. Urine samples from the juvenile detention centers, a high-risk population for CT/GC, are also tested using this assay. In 2010, 10% tested positive for CT, 2.2% tested positive for GC and 1.3% tested positive for both CT/GC. Early diagnosis of CT/GC leads to timely treatment, thereby reducing the possibility of complications and the risk of further transmission.

Laboratory Shipping and Receiving Section:

The Shipping and Receiving section of the Public Health Laboratory is responsible for receiving, delivering, and storing all equipment and laboratory supplies used by the Public Health Laboratory. This section also prepares and ships enteric, parasite, TB, pertussis, CT/GC, group B and virus isolation kits to all county health departments and private providers. The PKU forms used by all of the hospitals are housed in this section for shipment to the hospitals. Employees of this section are certified in the shipping and packaging of infectious substances. This allows the PHL to ship infectious substances to CDC and other locations in a correct and safe manner protecting the public from accidental releases of this type of agent.

Accessioning Section:

The Accessioning section receives incoming specimens from county health departments and private providers for testing in the Public Health Laboratory sections. Accessioning is responsible for determining acceptability of a specimen (according to the PHL Resource Manual criteria), assigning the appropriate laboratory number to the specimen, entering demographic information into the Laboratory Information System, centrifuging, and delivering the specimens to the appropriate laboratory.

QC/Media Prep Section:

The Quality Control (QC) Section of this area performs quality control on all incoming commercial and prepared media used by each laboratory. The control and internal proficiency organisms are grown and sent to each specific Laboratory for use. The Media Prep Section prepares media and reagents for use in the laboratories and maintains the current stock of commercial media.

Field Laboratory Section:

The Public Health Laboratory is responsible for 95 testing sites. All sites continue to operate under a Provider-Performed Microscopy CLIA license. The Field Operations section provides technical consultation for testing procedures, quality systems, laboratory techniques, and equipment evaluation. Annual or semi-annual site visits (Quality

Assurance Reviews) are conducted to evaluate and document county health department laboratory performance, and to make recommendations to improve the quality of testing. Training for the following tests is provided: wet preparation / KOH, hemoglobin, and urinalysis. A Good Laboratory Practice Manual has been prepared and implemented to meet the recent federal requirements of CLIA. The manual also provides a quick reference for quality control and assurance guidelines for the county health departments. It also contains written procedures for the laboratory tests that are performed by the county health departments.

Laboratory Training/Outreach/Preparedness Section:

The Public Health Laboratory continues to work with its partners to reduce response time to bioterrorism, chemical terrorism, foodborne outbreaks and pandemic events. Partners include hospital laboratories and emergency departments, reference laboratories, Homeland Security Chemical, Biological, Radiological and Nuclear (CBRN) response teams, National Guard Civil Support Team, and Communicable Disease Nurses.

Shipping/Packaging Trainings: The proper packaging, handling and transportation of laboratory specimens are regulated by federal departments and professional associations. Properly packaged laboratory specimens provide safety for the sending laboratory, the public during transportation, and the receiving laboratory. The PHL trained 86 laboratorians from 40 hospitals, city/county health departments, and physician office laboratories in 2010.

Chemical Terrorism Training: Three hospital laboratories and emergency departments received on-site chemical terrorism training in 2010. Nineteen personnel were trained in specimen collection guidelines, PHL notification and chain-of-custody requirements. These 3 facilities successfully participated in a post-training exercise in terrorism response. The PHL is a Level 3 Laboratory Response Network-Chemical (LRN-C) laboratory and successfully participated in the annually required LRN chemical Specimen, Collection, Packaging and Shipping (SCPaS) exercise. The OSDH PHL also provided internal training and exercises for accessioning personnel in chemical terrorism response and initiated/administered a state to state chemical terrorism shipping exercise with the Texas, Florida, Indiana, Louisiana, and Nebraska PHLs.

Sentinel Laboratory Activities: PHL training specialists visited twenty-six sentinel laboratories microbiology departments to instruct 135 laboratorians in the bioterrorism response protocols, and to provide information on STEC screening, use of the PHL website, and accessing the PHL resource manual. Fifty-one laboratorians from 11 hospital and reference laboratories participated in 4 case studies delivered through the sentinel bioterrorism Secure Telecommunication and Terminal Package (STATPack) system. Laboratories were responsible for navigating the STATPack system to complete the studies. Oklahoma sentinel laboratories using PHL protocols referred 30 possible select agent isolates to the PHL for confirmatory testing. The PHL also partnered with the College of American Pathologist (CAP) and participating Oklahoma sentinel laboratories to test referral and shipping protocols during the CAP bioterrorism surveys. The PHL along with the Association of Public Health Laboratories and the Center for Disease Control and Prevention presented biosafety/biosecurity workshops in the Oklahoma City and Tulsa areas to 29 laboratorians from 24 clinical laboratories. Workshops addressed case studies and best practices associated with Biosafety Levels II and III practices and facilities.

Other Preparedness Activities: The Public Health Laboratory developed protocols, collection kits and trainings for responding to foodborne outbreaks. These trainings and kits were delivered to OSDH, Oklahoma City County Health Department, Tulsa City County Health Department, and Indian Health Services public health specialists and epidemiologists. The PHL participated as a subject matter expert in Operation Raindrops, the statewide exercise in spring of 2010. Also in the spring of 2010, the Newborn Screening section exercised the Emergency Medical Assistance Compact (EMAC) with Missouri PHL's Newborn Screening department. Oklahoma City's Hazmat team participated in refresher trainings on collection of suspicious substances and partnered with the PHL in a drill on the same. The PHL also purchased proficiency tests for Oklahoma's Homeland Security CBRN response teams for field detection of unknowns.

Recent Accomplishments

- Added Biotinidase to the standard Newborn Screening panel. The identification of biotinidase deficiency through newborn screening aids the newborn in remaining asymptomatic by early initiation of therapy.
- Added testing of the 6 most common serotypes of toxigenic *E. coli*. This testing addition reduces the turn-around-time to results, aiding epidemiologic investigations and outbreak response.
- Developed a foodborne response system through collaboration with Acute Disease Service, Protective Health Service, the Department of Agriculture's laboratory and the Department of Environmental Quality.
- The Oklahoma PHL participated in an Emergency Medical Assistance Compact (EMAC) exercise with Missouri's Public Health Laboratory. This exercise defined roles and capabilities of the Oklahoma and Missouri PHLs in the event of an emergency that devastates the Oklahoma PHLs capacity to provide testing in NBS.
- Scientists from the PHL performed on-site visits to hospital laboratories to provide refresher training in the Ruling-Out and Referral (ROAR) of select agents of bioterrorism and to explain the benefits of shiga-toxin producing *Escherichia coli* (STEC) testing.
- The PHL web page: (<http://www.phl.health.ok.gov/>) contains information on services, directory, laboratory preparedness, training, forms, shipping, and packaging.



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