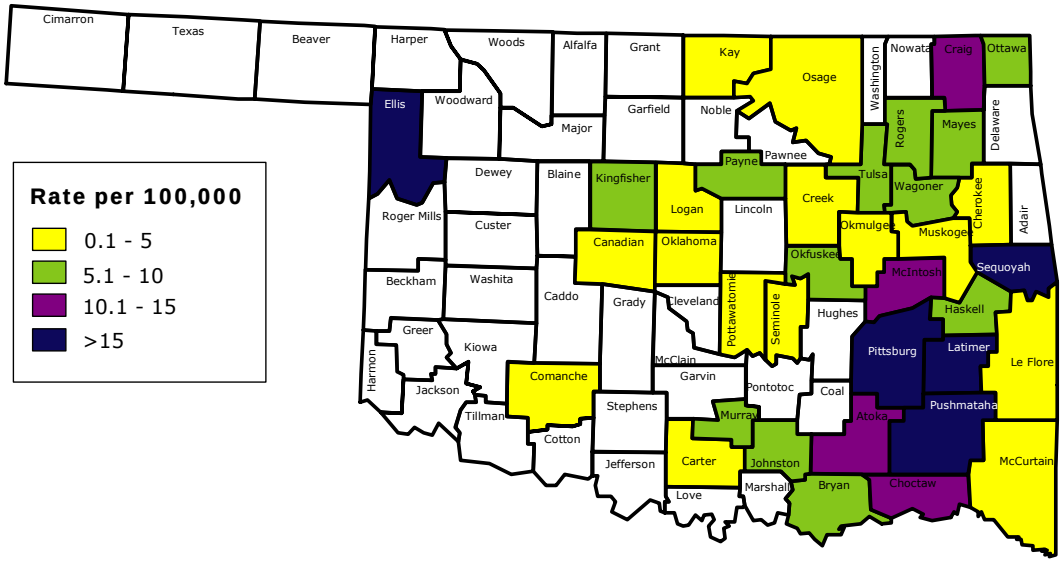
2005 Annual Summary of Infectious Diseases

Rate of Reported Ehrlichiosis Cases by County of Residence, Oklahoma, 2005



Oklahoma State Department of Health

Creating a State of Health

The Annual Summary of Infectious Diseases is issued by the Oklahoma State Department of Health, as authorized by James M. Crutcher, M.D., M.P.H., Commissioner of Health and State Health Officer, Oklahoma State Department of Health. Mercury Press Inc. printed 4,700 copies in August 2006 at a cost of $12,378.00.

2005 Annual Summary
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Oklahoma State Department of Health
Creating a State of Health

August 7, 2006

Dear Colleague:

We are pleased to send you a copy of the Oklahoma Disease Reporting Summary for 2005. The information contained in this summary consolidates surveillance and reports of disease in Oklahoma for 2005. Specifically it contains: 1) information on infectious disease reports at the state and county level, 2) disease specific data by category, and 3) additional information on special surveillance projects and outbreak reports in Oklahoma.

This annual summary was developed for use by health care professionals in Oklahoma. It is my hope that the data in this summary will be helpful to you in your practice. 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, how your county compared to the state, and how Oklahoma compares to the nation.

Sincerely,

James M. Crutcher, M.D., M.P.H.
Commissioner of Health and
State Health Officer

Commissioner of Health and State Health Officer
James M Crutcher, MD, MPH
An Equal Opportunity Employer

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Abbreviations

ACIP	Advisory Committee on Immunization Practices
AIDS	Acquired Immunodeficiency Syndrome
CDC	Centers for Disease Control and Prevention
CDD	Communicable Disease Division
CDN	Communicable Disease Nurse
FDA	Food and Drug Administration
HIV	Human Immunodeficiency Virus
HPV	Human papillomavirus
MSM	Men who have sex with men
OCCHD	Oklahoma City-County Health Department
OSDH	Oklahoma State Department of Health
PCR	Polymerase Chain Reaction
PEP	Post Exposure Prophylaxis
PFGE	Pulsed Field Gel Electrophoresis
PHL	Public Health Laboratory
STD	Sexually Transmitted Diseases
U.S.	United States

TITLE 310. OKLAHOMA STATE DEPARTMENT OF HEALTH
CHAPTER 515. COMMUNICABLE DISEASE AND INJURY REPORTING
EFFECTIVE 7/11/03

310:515-1-1. Purpose

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

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

The diseases listed in this Chapter must be reported, along with patient identifiers, demographics, and contact information, to the Oklahoma State Department of Health upon discovery as dictated in sections OAC 310:515-1-3 and OAC 310:515-1-4. Ancillary laboratory test results, signs, and symptoms must be reported upon request.

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

The following diseases must be reported by any health practitioner or laboratory personnel to the Oklahoma State Department of Health by telephone (405-271-4060 or 800-234-5963) or fax (405-271-6680 or 800-898-6734) immediately upon suspicion, diagnosis, or testing. It is acceptable to report by telephone at anytime, including after hours, weekends, and holidays. It is also acceptable to report by fax during regular office hours (8am through 5pm, Monday through Friday, excluding holidays).

(1) Anthrax (*Bacillus anthracis*).
(2) Bioterrorism – suspected disease.
(3) Botulism (*Clostridium botulinum*).
(4) Brucellosis (*Brucella* spp.).
(5) Diphtheria (*Corynebacterium diphtheriae*).
(6) *Haemophilus influenzae* invasive disease.
(7) Hepatitis A (Anti-HAV-IgM +).
(8) Measles (Rubeola).
(9) Meningococcal invasive disease (*Neisseria meningitidis*).
(10) Outbreaks of apparent infectious disease. An outbreak of an apparent infectiousdisease is a cluster of cases from different households of potentially infectious disease of known or unknown etiology. The cases would have a similar clinical syndrome but laboratory testing would be pending or inconclusive. Examples of such outbreaks include but are not limited to a cluster of cases of gastrointestinal illness, respiratory illness, or rash illness of unknown etiology.
(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 ractitioners, medical records personnel, and other designees) to the Oklahoma State Department of Health as dictated in the following subsections:

(1) Infectious diseases. Reports of infectious diseases and conditions listed in this subsection must be telephoned, faxed, or mailed to the Oklahoma State Department of Health (OSDH) within one (1) business day of diagnosis or positive test as specified in the OSDH Disease Reporting Manual.

(A) Acid Fast Bacillus (AFB) positive smear.
(B) AIDS (Acquired Immunodeficiency Syndrome).
(C) Arboviral infections.
(D) Campylobacteriosis *(Campylobacter* spp.).
(E) Congenital rubella syndrome.
(F) Cryptosporidiosis (*Cryptosporidium parvum*).
(G) Cyclosporiasis (*Cyclospora cayetanensis*).
(H) Dengue Fever.
(I) *E. coli O157*,*E. coli O157:H7*, or a shiga-like toxin producing *E.coli* (EHEC infections).
(J) Ehrlichiosis (*Ehrlichia* spp.).
(K) Encephalitis.
(L) Giardiasis (*Giardia lamblia*).
(M) Hantavirus pulmonary syndrome.
(N) Hemolytic Uremic syndrome, postdiarrheal.
(O) Hepatitis B (acute or chronic, HBsAg+ and/or anti-HBc-IgM+).
(P) Hepatitis C (confirmed by RIBA or PCR only).
(Q) Hepatitis, acute unspecified.
(R) Human Immunodeficiency Virus (HIV) infection.
(S) Legionellosis (*Legionella pneumophila*).
(T) Leprosy (Hansen's Disease).
(U) Leptospirosis (*Leptospira interrogans)*.
(V) Listeriosis (*Listeria monocytogenes*).
(W) Lyme disease (*Borrelia* spp.).
(X) Malaria (*Plasmodium* spp.).
(Y) Mumps.
(Z) Pertussis (*Bordetella pertussis*).
(AA) Psittacosis (*Chlamydia psittaci*).
(BB) Rocky Mountain Spotted Fever (*Rickettsia rickettsii*).
(CC) Rubella.
(DD) Salmonellosis (*Salmonella* spp.).
(EE) Shigellosis (*Shigella* spp.).
(FF) *Streptococcus*, group A invasive disease.
(GG) *Streptococcus pneumoniae*, invasive disease.
(HH) Syphilis (*Treponema pallidum*).

(II) Tetanus (*Clostridium tetani*).
(JJ) Trichinosis (*Trichinella spiralis*).
(KK) Tuberculosis (*Mycobacterium tuberculosis*).
(LL) Unusual disease or syndrome. An unusual disease or syndrome is a case of a rare, possibly infectious disease of known or unknown etiology. Laboratory testing may be pending or inconclusive. Examples of such unusual syndromes or atypical disease presentations include but are not limited to: unexplained adult respiratory distress syndrome, hemorrhagic fever, vesicular rash illness, or an illness associated with an unusual pattern of illness or death among animals.
(MM) *Vibrio* spp. infections including cholera.
(NN) Yellow Fever.

(2) **Infectious diseases.** Reports of infectious diseases and conditions listed in this subsection must be mailed to the Oklahoma State Department of Health (OSDH) within one (1) month of diagnosis or positive test as specified in the OSDH Disease Reporting Manual.
(A) CD4 Cell Count < 500 (by laboratories only).
(B) Chlamydia infections (*Chlamydia trachomatis*).
(C) Cruetzfeldt-Jakob disease.
(D) Gonorrhea (*Neisseria gonorrheae*).
(E) Pelvic Inflammatory Disease (PID).

(3) **Occupational or Environmental diseases.**
(A) Blood Lead Levels. Laboratories must report 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 results 20 ug/dL or greater within twentyfour (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 Oklahoma State Department of Health has adopted the publication "Control of Communicable Diseases Manual", published by the American Public Health Association, Seventeenth Edition, as a guideline for communicable diseases.

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 Oklahoma State Department of Health Public Health Laboratory for typing.

(1) *Bacillus anthracis.*

(2) *Brucella* spp.

(3) Campylobacter spp.

(4) *E.coli O157*, *O157:H7*, or a shiga-like toxin producing *E. coli* (EHEC).

(5) *Francisella tularensis.*

(6) *Haemophilus influenzae* (sterile site).

(7) *Listeria monocytogenes* (sterile site).

(8) *Mycobacterium tuberculosis*.

(9) *Neisseria meningitidis* (sterile site).

(10)*Plasmodium* spp.

(11)*Salmonella* spp.

(12)Shigella spp.

(13)*Vibrio* spp.

(14)*Yersinia* spp.

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

Oklahoma State Department of Health
Contact Information

Communicable Disease Division
1000 NE 10th St.
Mail Drop 0305
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

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

Tuberculosis Division
1000 NE 10th St.
Oklahoma City, OK 73117-1299
Phone Number: (800) 898-6734
Fax Number*: (405) 271-6680

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 OSDH PHL, contact 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 report.**

Number of Reported Cases of Communicable Diseases, Oklahoma, 1991 – 2005

Disease	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Anthrax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Botulism (Infant)	1	1	0	0	0	0	0	0	1	0	1	0	0	0	1
Botulism (Foodborne)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Brucellosis	2	1	0	0	1	1	0	0	0	1	0	1	0	0	1
Campylobacteriosis	205	267	199	187	289	281	247	241	320	361	308	362	417	591	544
Chlamydia	5714	5220	4886	3784	5050	7371	7566	9378	8737	9346	10622	10732	10983	10371	12957
Cholera	0	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	0
Creutzfeldt-Jakob disease	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4
Cryptosporidiosis	8	0	1	1	12	10	12	7	14	30	16	16	24	22	46
Dengue Fever	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
E. coli O157:H7 or other EHEC	0	5	8	* 13	16	14	13	26	41	19	36	25	30	29	38
Ehrlichiosis	3	8	0	0	0	0	0	2	1	12	24	13	36	49	96
GAS Invasive	0	0	0	0	0	8	3	1	12	28	49	56	99	73	132
Giardiasis	211	188	262	252	206	159	152	148	152	96	0	85	145	166	197
Gonorrhea	6546	6432	4855	4935	5652	4897	4840	4225	4291	5236	4818	4624	4543	4543	5031
H. influenzae, Inv. Disease (Total)	41	20	45	44	33	31	33	35	47	46	48	53	52	67	74
H. influenzae, Inv. Disease, <5yrs. Type B	33	3	1	4	3	0	1	1	0	0	0	0	0	0	8
Hantavirus	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0
Hepatitis A	273	217	206	395	1497	2516	1441	667	534	271	116	52	29	19	6
Hepatitis B	198	174	193	129	176	60	63	169	185	179	115	111	73	80	59
Hepatitis C	0	0	0	0	1	8	10	23	13	13	6	21	6	7	14
Hemolytic Uremic Syndrome	0	0	0	0	0	0	0	0	1	2	4	3	4	2	5
Legionellosis	24	8	0	0	8	16	3	18	7	5	7	5	10	24	10
Leptospirosis	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Listeriosis	6	8	12	11	11	5	9	19	12	8	2	9	3	4	4
Lyme Disease	* 23	25	20	111	57	34	45	12	8	1	0	0	0	3	0
Malaria	9	5	5	9	1	3	9	4	2	10	5	12	4	10	12
Measles (Rubeola)	0	12	0	0	0	0	1	0	0	0	0	0	0	0	0
Meningococcal Inf. (*N. meningitidis*)	16	17	0	0	49	46	45	44	40	34	32	25	25	10	18
Mumps	15	20	11	13	1	4	3	4	5	3	0	3	2	1	2
Pertussis	48	53	60	19	47	20	60	36	40	60	43	135	106	120	127

Disease	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Plague	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Primary Amebic Meningoencephalitis	4	6	7	0	0	0	0	2	0	0	1	0	0	0	2
Psittacosis											0	0	0	0	0
Rabies (Animal)	173	219	65	40	32	38	113	107	94	58	60	126	204	113	79
Rocky Mountain Spotted Fever	95	109	46	36	48	45	30	39	29	37	69	99	138	190	206
Rubella	2	0	1	4	0	0	0	0	1	0	0	0	0	0	0
Salmonellosis	481	368	320	444	471	520	392	501	468	405	503	524	494	425	448
Shigellosis	192	252	472	200	266	305	293	712	560	131	148	717	1078	724	937
S. pneumo Invasive	100	90	126	164	131	101	80	73	110	118	324	452	443	460	699
S. pneumo Invasive, <5yrs.	28	11	20	54	22	6	10	13	21	16	32	47	76	52	46
Syphilis (Total Early)	596	709	636	399	489	398	275	264	347	245	185	183	141	88	73
Tetanus	0	1	1	1	0	1	2	1	0	0	1	0	0	0	0
Tuberculosis	206	216	209	261	237	201	211	198	208	154	194	190	163	178	144
Tularemia	12	10	16	4	7	4	5	5	7	11	7	10	9	19	20
Typhoid Fever	3	0	1	3	1	0	3	1	0	1	1	2	1	1	1
Vibrio parahaemolyticus	0	0	0	0	0	1	0	8	0	0	0	0	0	0	1
Vibrio spp	0	0	0	0	1	0	0	0	1	1	0	1	0	0	3
Vibrio vulnificus	0	0	0	0	2	0	0	1	0	0	0	1	1	1	1
Yellow Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* First year disease was reportable by law

Incidence Rate per 100,000 Oklahoma Population^ of Reported Communicable Diseases, Oklahoma, 1991 – 2005

Disease	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
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 (Infant)	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00
Botulism (Foodborne)	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
Brucellosis	0.06	0.03	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.00
Campylobacteriosis	6.50	8.50	6.30	5.94	9.19	8.93	7.85	7.70	10.20	10.50	8.90	10.49	12.08	17.1	15.77
Chlamydia	181.65	165.95	155.33	120.30	160.54	234.33	240.53	298.13	277.75	270.85	307.83	311.01	318.29	300.6	375.5
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	0.00	0.00	0.00	0.00	0.10
Cryptosporidiosis	0.30	0.00	0.03	0.03	0.38	0.32	0.38	0.22	0.45	0.87	0.46	0.46	0.70	0.64	1.33
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	0.10
E. coli O157:H7 or other EHEC	0.00	0.16	0.30	*0.40	0.51	0.45	0.41	0.83	1.30	0.55	1.04	0.72	0.87	0.80	1.1
Ehrlichiosis	0.10	0.25	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.35	0.00	0.00	0.00	0.00	2.72
GAS Invasive	0.00	0.00	0.00	0.00	0.00	0.25	0.10	0.00	0.40	0.81	1.42	1.62	2.87	2.10	3.80
Giardiasis	6.70	6.00	8.30	8.00	6.50	5.10	4.80	4.70	4.80	2.80	0.00	2.50	4.20	4.80	5.70
Gonorrhea	208.10	204.48	154.34	156.89	179.68	155.68	153.87	134.32	136.41	151.74	139.63	134.00	131.66	131.7	145.8
H. influenzae, Inv. Disease	1.30	0.64	1.43	1.40	1.05	0.99	1.05	1.11	1.49	1.33	1.39	1.54	1.51	1.94	2.1
H. influenzae, Inv. Disease, <5yrs. Type B	1.00	0.10	0.00	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20
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
Hepatitis A	8.70	6.90	6.50	12.60	47.60	80.00	45.81	21.20	17.00	7.90	3.36	1.51	0.80	0.55	0.17
Hepatitis B	6.30	5.50	6.10	4.10	5.60	1.90	2.00	5.37	5.88	5.20	3.33	3.20	2.10	2.32	1.17
Hepatitis C	0.00	0.00	0.00	0.00	0.00	0.25	0.32	0.70	0.41	0.38	0.17	0.61	0.20	0.20	0.41
Hemolytic Uremic Syndrome	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10
Legionellosis	0.76	0.30	0.00	0.00	0.25	0.50	0.10	0.60	0.22	0.14	0.20	0.14	0.29	0.7	0.30
Leptospirosis	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	0.00
Listeriosis	0.20	0.30	0.38	0.35	0.35	0.16	0.29	0.60	0.38	0.23	0.06	0.26	0.09	0.12	0.10
Lyme Disease	*0.70	0.80	0.60	3.50	1.80	1.10	1.43	0.40	0.25	0.03	0.00	0.00	0.00	0.09	0.00
Malaria	0.30	0.16	0.16	0.29	0.03	0.10	0.30	0.13	0.06	0.29	0.14	0.32	0.14	0.29	0.30
Measles (Rubeola)	0.00	0.38	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
Meningococcal Inf. (*N. meningitidis*)	0.50	0.50	0.00	0.00	1.56	1.46	1.43	1.40	1.27	0.99	0.93	0.72	0.70	0.29	0.52
Mumps	0.50	0.60	0.30	0.40	0.03	0.12	0.09	0.12	0.14	0.09	0.00	0.09	0.06	0.03	0.10

Disease	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Pertussis	1.50	1.70	1.90	0.60	1.50	0.60	1.90	1.10	1.30	1.70	1.25	3.91	3.07	3.48	3.68
Plague	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
Primary Amebic Meningoencephalitis	0.10	0.20	0.20	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Psittacosis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rabies Animal	5.50	7.00	2.10	1.30	1.00	1.20	3.60	3.40	3.00	1.70	1.70	3.70	5.90	3.30	2.30
Rocky Mountain Spotted Fever	3.00	3.50	1.50	1.10	1.50	1.43	1.00	1.20	0.92	1.10	2.00	2.87	4.00	5.51	5.97
Rubella	0.06	0.00	0.03	0.13	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Salmonellosis	15.29	11.70	10.20	14.10	14.97	16.53	12.46	15.93	14.90	11.74	14.58	15.19	14.32	12.3	12.98
Shigellosis	6.10	8.00	15.00	6.40	8.50	9.70	9.31	22.63	17.80	3.80	4.29	20.78	31.24	20.98	27.15
S. pneumo Invasive	3.18	2.86	4.01	5.21	4.16	3.21	2.54	2.32	3.50	3.42	9.40	13.10	12.80	13.30	15.70
S. pneumo Invasive, <5yrs.	0.90	0.30	0.60	1.70	0.70	0.20	0.30	0.40	0.70	0.50	0.90	1.40	2.20	1.50	1.30
Syphilis (Total Early)	18.95	22.54	20.22	12.68	15.55	12.65	8.74	8.39	11.03	7.10	5.36	5.30	4.09	2.60	3.50
Tetanus	0.00	0.03	0.03	0.03	0.00	0.03	0.06	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00
Tuberculosis	6.55	6.87	6.64	8.30	7.53	6.39	6.71	6.29	6.61	4.46	5.62	5.51	4.72	5.2	4.17
Tularemia	0.40	0.30	0.51	0.10	0.20	0.10	0.20	0.16	0.22	0.32	0.20	0.29	0.26	0.60	0.58
Typhoid Fever	0.10	0.00	0.03	0.10	0.03	0.00	0.10	0.03	0.00	0.03	0.03	0.06	0.03	0.03	0.00
Vibrio parahaemolyticus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrio 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	0.00
Vibrio vulnificus	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	0.10
Yellow 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

* First year disease was reportable by law

^ Oklahoma population numbers are from the U.S. Census Bureau, 1990 and 2000 Census Data available at http://www.census.gov/

Reportable Diseases by County, Oklahoma, 2005

	Campylobacteriosis		Cryptosporidiosis		*E. coli* O157:H7 and other EHEC	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Adair	10	47.53	0	0.00	1	4.75
Alfalfa	3	49.14	0	0.00	0	0.00
Atoka	1	7.21	0	0.00	0	0.00
Beaver	2	34.15	0	0.00	0	0.00
Beckham	3	15.15	0	0.00	1	5.05
Blaine	4	33.40	0	0.00	1	8.35
Bryan	1	2.74	0	0.00	1	2.74
Caddo	4	13.27	0	0.00	0	0.00
Canadian	15	17.10	0	0.00	0	0.00
Carter	18	39.46	1	2.19	0	0.00
Cherokee	6	14.11	0	0.00	0	0.00
Choctaw	0	0.00	0	0.00	0	0.00
Cimarron	0	0.00	0	0.00	0	0.00
Cleveland	22	10.58	2	0.96	0	0.00
Coal	1	16.58	0	0.00	0	0.00
Comanche	19	16.52	0	0.00	3	2.61
Cotton	1	15.12	0	0.00	0	0.00
Craig	0	0.00	0	0.00	0	0.00
Creek	12	17.81	0	0.00	1	1.48
Custer	3	11.48	0	0.00	0	0.00
Delaware	2	5.39	0	0.00	0	0.00
Dewey	0	0.00	0	0.00	0	0.00
Ellis	0	0.00	0	0.00	0	0.00
Garfield	7	12.11	0	0.00	0	0.00
Garvin	4	14.70	0	0.00	0	0.00
Grady	3	6.59	0	0.00	0	0.00
Grant	0	0.00	0	0.00	0	0.00
Greer	0	0.00	0	0.00	0	0.00
Harmon	0	0.00	0	0.00	0	0.00
Harper	2	56.15	0	0.00	0	0.00
Haskell	0	0.00	0	0.00	0	0.00
Hughes	4	28.26	0	0.00	0	0.00
Jackson	8	28.13	0	0.00	0	0.00
Jefferson	3	44.00	1	14.67	0	0.00
Johnston	0	0.00	0	0.00	0	0.00
Kay	12	24.96	0	0.00	0	0.00
Kingfisher	2	14.36	0	0.00	0	0.00
Kiowa	3	29.33	0	0.00	0	0.00
Latimer	3	28.06	0	0.00	0	0.00
LeFlore	12	24.94	0	0.00	0	0.00

^ 2005 Rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2000 Census Bureau county population and multiplying by 100,000.

Reportable Diseases by County, Oklahoma, 2005

	Campylobacteriosis		Cryptosporidiosis		*E. coli* O157:H7 and other EHEC	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Lincoln	10	31.17	0	0.00	0	0.00
Logan	4	11.79	0	0.00	0	0.00
Love	4	45.29	0	0.00	0	0.00
McClain	8	28.84	0	0.00	1	3.60
McCurtain	2	5.81	0	0.00	0	0.00
McIntosh	3	15.42	1	5.14	0	0.00
Major	0	0.00	0	0.00	0	0.00
Marshall	3	22.75	0	0.00	0	0.00
Mayes	10	26.06	0	0.00	0	0.00
Murray	5	39.61	0	0.00	0	0.00
Muskogee	20	28.80	7	10.08	2	2.88
Noble	1	8.76	0	0.00	0	0.00
Nowata	0	0.00	0	0.00	0	0.00
Okfuskee	1	8.46	0	0.00	0	0.00
Oklahoma	131	19.84	12	1.82	4	0.61
Okmulgee	5	12.60	0	0.00	0	0.00
Osage	2	4.50	0	0.00	0	0.00
Ottawa	3	9.04	1	3.01	1	3.01
Pawnee	8	48.16	0	0.00	0	0.00
Payne	6	8.80	1	1.47	1	1.47
Pittsburg	10	22.75	0	0.00	6	13.65
Pontotoc	10	28.46	0	0.00	1	2.85
Pottawatomie	13	19.84	0	0.00	0	0.00
Pushmataha	0	0.00	0	0.00	0	0.00
Roger Mills	1	29.10	0	0.00	0	0.00
Rogers	10	14.16	0	0.00	4	5.66
Seminole	4	16.07	0	0.00	0	0.00
Sequoyah	1	2.57	0	0.00	1	2.57
Stephens	8	18.53	15	34.74	2	4.63
Texas	2	9.95	0	0.00	0	0.00
Tillman	9	96.91	0	0.00	0	0.00
Tulsa	53	9.41	3	0.53	3	0.53
Wagoner	1	1.74	2	3.48	0	0.00
Washington	1	2.04	0	0.00	1	2.04
Washita	1	8.69	0	0.00	0	0.00
Woods	0	0.00	0	0.00	0	0.00
Woodward	4	21.64	0	0.00	0	0.00
State of Oklahoma	**544**	**15.77**	**46**	**1.33**	**35**	**1.01**

^ 2005 Rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2000 Census Bureau county population and multiplying by 100,000.

Reportable Diseases by County, Oklahoma, 2005

	Ehrlichiosis		Giardiasis		*Haemophilus influenzae*, invasive	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Adair	0	0.00	1	4.75	0	0.00
Alfalfa	0	0.00	0	0.00	0	0.00
Atoka	2	14.41	0	0.00	0	0.00
Beaver	0	0.00	0	0.00	0	0.00
Beckham	0	0.00	0	0.00	0	0.00
Blaine	0	0.00	0	0.00	0	0.00
Bryan	2	5.47	0	0.00	0	0.00
Caddo	0	0.00	4	13.27	1	3.32
Canadian	1	1.14	5	5.70	1	1.14
Carter	1	2.19	0	0.00	1	2.19
Cherokee	1	2.35	2	4.70	1	2.35
Choctaw	2	13.04	0	0.00	0	0.00
Cimarron	0	0.00	0	0.00	0	0.00
Cleveland	0	0.00	21	10.10	4	1.92
Coal	0	0.00	0	0.00	0	0.00
Comanche	2	1.74	5	4.35	3	2.61
Cotton	0	0.00	0	0.00	0	0.00
Craig	2	13.38	0	0.00	0	0.00
Creek	3	4.45	1	1.48	2	2.97
Custer	0	0.00	2	7.65	0	0.00
Delaware	0	0.00	0	0.00	0	0.00
Dewey	0	0.00	0	0.00	0	0.00
Ellis	1	24.54	0	0.00	0	0.00
Garfield	0	0.00	14	24.22	6	10.38
Garvin	0	0.00	1	3.68	0	0.00
Grady	0	0.00	3	6.59	3	6.59
Grant	0	0.00	0	0.00	0	0.00
Greer	0	0.00	1	16.50	0	0.00
Harmon	0	0.00	1	30.46	0	0.00
Harper	0	0.00	0	0.00	0	0.00
Haskell	1	8.48	0	0.00	0	0.00
Hughes	0	0.00	1	7.07	0	0.00
Jackson	0	0.00	1	3.52	0	0.00
Jefferson	0	0.00	1	14.67	0	0.00
Johnston	1	9.51	0	0.00	0	0.00
Kay	1	2.08	0	0.00	1	2.08
Kingfisher	1	7.18	0	0.00	0	0.00
Kiowa	0	0.00	1	9.78	1	9.78
Latimer	1	9.35	0	0.00	0	0.00
LeFlore	2	4.16	8	16.63	1	2.08

^ 2005 Rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2000 Census Bureau county population and multiplying by 100,000.

Reportable Diseases by County, Oklahoma, 2005

	Ehrlichiosis		Giardiasis		*Haemophilus influenzae*, invasive	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Lincoln	0	0.00	1	3.12	1	3.12
Logan	1	2.95	2	5.90	0	0.00
Love	0	0.00	0	0.00	1	11.32
McClain	0	0.00	3	10.81	0	0.00
McCurtain	1	2.91	1	2.91	0	0.00
McIntosh	2	10.28	0	0.00	0	0.00
Major	0	0.00	2	26.51	0	0.00
Marshall	0	0.00	1	7.58	0	0.00
Mayes	2	5.21	1	2.61	1	2.61
Murray	1	7.92	0	0.00	0	0.00
Muskogee	2	2.88	12	17.28	2	2.88
Noble	0	0.00	0	0.00	0	0.00
Nowata	0	0.00	2	18.92	0	0.00
Okfuskee	1	8.46	0	0.00	0	0.00
Oklahoma	6	0.91	31	4.69	24	3.63
Okmulgee	1	2.52	0	0.00	1	2.52
Osage	1	2.25	0	0.00	0	0.00
Ottawa	2	6.03	7	21.09	1	3.01
Pawnee	0	0.00	3	18.06	1	6.02
Payne	4	5.87	1	1.47	0	0.00
Pittsburg	8	18.20	1	2.28	1	2.28
Pontotoc	0	0.00	2	5.69	0	0.00
Pottawatomie	1	1.53	1	1.53	0	0.00
Pushmataha	2	17.14	2	17.14	0	0.00
Roger Mills	0	0.00	0	0.00	0	0.00
Rogers	4	5.66	9	12.74	2	2.83
Seminole	1	4.02	2	8.03	0	0.00
Sequoyah	6	15.40	0	0.00	0	0.00
Stephens	0	0.00	3	6.95	1	2.32
Texas	0	0.00	0	0.00	0	0.00
Tillman	0	0.00	0	0.00	0	0.00
Tulsa	22	3.91	34	6.04	10	1.78
Wagoner	2	3.48	1	1.74	1	1.74
Washington	0	0.00	1	2.04	0	0.00
Washita	0	0.00	1	8.69	1	8.69
Woods	0	0.00	0	0.00	0	0.00
Woodward	0	0.00	0	0.00	1	5.41
State of Oklahoma	**94**	**2.72**	**197**	**5.71**	**74**	**2.14**

^ 2005 Rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2000 Census Bureau county population and multiplying by 100,000.

Reportable Diseases by County, Oklahoma, 2005

	Hepatitis A		Hepatitis B		Meningococcal invasive disease	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Adair	0	0.00	0	0.00	0	0.00
Alfalfa	0	0.00	0	0.00	0	0.00
Atoka	0	0.00	1	7.21	0	0.00
Beaver	0	0.00	0	0.00	0	0.00
Beckham	0	0.00	0	0.00	0	0.00
Blaine	0	0.00	0	0.00	0	0.00
Bryan	0	0.00	0	0.00	0	0.00
Caddo	0	0.00	0	0.00	0	0.00
Canadian	0	0.00	0	0.00	0	0.00
Carter	0	0.00	0	0.00	0	0.00
Cherokee	0	0.00	0	0.00	0	0.00
Choctaw	0	0.00	0	0.00	0	0.00
Cimarron	0	0.00	0	0.00	0	0.00
Cleveland	0	0.00	2	0.96	0	0.00
Coal	0	0.00	1	16.58	0	0.00
Comanche	1	0.87	1	0.87	0	0.00
Cotton	0	0.00	0	0.00	0	0.00
Craig	0	0.00	1	6.69	0	0.00
Creek	1	1.48	0	0.00	1	1.48
Custer	0	0.00	1	3.83	0	0.00
Delaware	0	0.00	0	0.00	0	0.00
Dewey	0	0.00	0	0.00	0	0.00
Ellis	0	0.00	0	0.00	0	0.00
Garfield	0	0.00	2	3.46	0	0.00
Garvin	0	0.00	0	0.00	0	0.00
Grady	0	0.00	2	4.39	2	4.39
Grant	0	0.00	0	0.00	0	0.00
Greer	0	0.00	0	0.00	0	0.00
Harmon	0	0.00	0	0.00	0	0.00
Harper	0	0.00	0	0.00	0	0.00
Haskell	0	0.00	1	8.48	0	0.00
Hughes	0	0.00	0	0.00	0	0.00
Jackson	0	0.00	0	0.00	0	0.00
Jefferson	0	0.00	0	0.00	0	0.00
Johnston	0	0.00	0	0.00	0	0.00
Kay	0	0.00	0	0.00	1	2.08
Kingfisher	0	0.00	0	0.00	1	7.18
Kiowa	0	0.00	0	0.00	0	0.00
Latimer	0	0.00	0	0.00	0	0.00
LeFlore	0	0.00	2	4.16	0	0.00

^ 2005 Rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2000 Census Bureau county population and multiplying by 100,000.

Reportable Diseases by County, Oklahoma, 2005

	Hepatitis A		Hepatitis B		Meningococcal invasive disease	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Lincoln	0	0.00	0	0.00	0	0.00
Logan	0	0.00	1	2.95	0	0.00
Love	0	0.00	0	0.00	0	0.00
McClain	0	0.00	0	0.00	0	0.00
McCurtain	0	0.00	0	0.00	0	0.00
McIntosh	0	0.00	0	0.00	0	0.00
Major	0	0.00	0	0.00	0	0.00
Marshall	0	0.00	0	0.00	0	0.00
Mayes	0	0.00	0	0.00	0	0.00
Murray	0	0.00	2	15.84	0	0.00
Muskogee	0	0.00	7	10.08	0	0.00
Noble	0	0.00	0	0.00	0	0.00
Nowata	0	0.00	0	0.00	0	0.00
Okfuskee	0	0.00	0	0.00	0	0.00
Oklahoma	2	0.30	7	1.06	4	0.61
Okmulgee	0	0.00	1	2.52	0	0.00
Osage	0	0.00	0	0.00	0	0.00
Ottawa	0	0.00	0	0.00	0	0.00
Pawnee	0	0.00	0	0.00	0	0.00
Payne	0	0.00	4	5.87	0	0.00
Pittsburg	0	0.00	5	11.38	1	2.28
Pontotoc	0	0.00	0	0.00	0	0.00
Pottawatomie	0	0.00	3	4.58	0	0.00
Pushmataha	0	0.00	0	0.00	0	0.00
Roger Mills	0	0.00	0	0.00	0	0.00
Rogers	0	0.00	1	1.42	1	1.42
Seminole	0	0.00	1	4.02	0	0.00
Sequoyah	0	0.00	2	5.13	0	0.00
Stephens	0	0.00	1	2.32	1	2.32
Texas	0	0.00	0	0.00	0	0.00
Tillman	0	0.00	0	0.00	0	0.00
Tulsa	1	0.18	12	2.13	4	0.71
Wagoner	1	1.74	3	5.22	0	0.00
Washington	0	0.00	0	0.00	0	0.00
Washita	0	0.00	0	0.00	0	0.00
Woods	0	0.00	0	0.00	0	0.00
Woodward	0	0.00	0	0.00	2	10.82
State of Oklahoma	**6**	**0.17**	**59**	**1.71**	**18**	**0.52**

^ 2005 Rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2000 Census Bureau county population and multiplying by 100,000.

Reportable Diseases by County, Oklahoma, 2005

	Pertussis		Rocky Mountain Spotted Fever		Salmonellosis	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Adair	0	0.00	7	33.27	9	42.78
Alfalfa	3	49.14	0	0.00	2	32.76
Atoka	1	7.21	3	21.62	1	7.21
Beaver	0	0.00	0	0.00	0	0.00
Beckham	0	0.00	0	0.00	6	30.30
Blaine	0	0.00	1	8.35	1	8.35
Bryan	2	5.47	2	5.47	2	5.47
Caddo	3	9.95	0	0.00	3	9.95
Canadian	6	6.84	3	3.42	14	15.96
Carter	6	13.15	5	10.96	3	6.58
Cherokee	5	11.76	13	30.57	2	4.70
Choctaw	3	19.55	0	0.00	1	6.52
Cimarron	0	0.00	0	0.00	0	0.00
Cleveland	6	2.88	8	3.85	18	8.65
Coal	0	0.00	1	16.58	0	0.00
Comanche	0	0.00	1	0.87	9	7.83
Cotton	0	0.00	0	0.00	1	15.12
Craig	0	0.00	2	13.38	0	0.00
Creek	1	1.48	4	5.94	13	19.30
Custer	2	7.65	0	0.00	4	15.30
Delaware	2	5.39	2	5.39	3	8.09
Dewey	0	0.00	0	0.00	1	21.08
Ellis	0	0.00	0	0.00	0	0.00
Garfield	1	1.73	1	1.73	6	10.38
Garvin	0	0.00	3	11.03	7	25.73
Grady	1	2.20	1	2.20	10	21.97
Grant	0	0.00	0	0.00	1	19.44
Greer	0	0.00	0	0.00	0	0.00
Harmon	0	0.00	0	0.00	1	30.46
Harper	0	0.00	1	28.07	1	28.07
Haskell	0	0.00	2	16.96	0	0.00
Hughes	0	0.00	2	14.13	1	7.07
Jackson	1	3.52	1	3.52	3	10.55
Jefferson	0	0.00	0	0.00	2	29.33
Johnston	0	0.00	0	0.00	2	19.02
Kay	5	10.40	0	0.00	7	14.56
Kingfisher	0	0.00	1	7.18	1	7.18
Kiowa	0	0.00	1	9.78	0	0.00
Latimer	0	0.00	4	37.41	2	18.71
LeFlore	2	4.16	12	24.94	15	31.18

^ 2005 Rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2000 Census Bureau county population and multiplying by 100,000.

Reportable Diseases by County, Oklahoma, 2005

	Pertussis		Rocky Mountain Spotted Fever		Salmonellosis	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Lincoln	2	6.23	1	3.12	4	12.47
Logan	1	2.95	7	20.63	5	14.74
Love	0	0.00	1	11.32	1	11.32
McClain	0	0.00	1	3.60	5	18.02
McCurtain	0	0.00	5	14.53	3	8.72
McIntosh	0	0.00	3	15.42	6	30.84
Major	0	0.00	1	13.25	0	0.00
Marshall	0	0.00	2	15.17	2	15.17
Mayes	0	0.00	7	18.24	3	7.82
Murray	1	7.92	1	7.92	1	7.92
Muskogee	2	2.88	4	5.76	9	12.96
Noble	0	0.00	1	8.76	0	0.00
Nowata	0	0.00	0	0.00	0	0.00
Okfuskee	0	0.00	0	0.00	4	33.86
Oklahoma	23	3.48	22	3.33	108	16.35
Okmulgee	3	7.56	3	7.56	4	10.08
Osage	1	2.25	1	2.25	1	2.25
Ottawa	2	6.03	0	0.00	1	3.01
Pawnee	1	6.02	0	0.00	0	0.00
Payne	3	4.40	2	2.93	13	19.06
Pittsburg	3	6.83	12	27.30	9	20.48
Pontotoc	0	0.00	3	8.54	6	17.07
Pottawatomie	3	4.58	9	13.74	11	16.79
Pushmataha	0	0.00	4	34.28	2	17.14
Roger Mills	0	0.00	4	116.41	0	0.00
Rogers	6	8.49	0	0.00	11	15.57
Seminole	0	0.00	3	12.05	4	16.07
Sequoyah	0	0.00	7	17.96	4	10.26
Stephens	1	2.32	5	11.58	7	16.21
Texas	0	0.00	0	0.00	3	14.92
Tillman	0	0.00	0	0.00	0	0.00
Tulsa	23	4.08	11	1.95	56	9.94
Wagoner	1	1.74	3	5.22	8	13.92
Washington	0	0.00	0	0.00	5	10.20
Washita	0	0.00	2	17.38	0	0.00
Woods	0	0.00	0	0.00	0	0.00
Woodward	1	5.41	0	0.00	0	0.00
State of Oklahoma	**127**	**3.68**	**206**	**5.97**	**448**	**12.98**

^ 2005 Rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2000 Census Bureau county population and multiplying by 100,000.

Reportable Diseases by County, Oklahoma, 2005

	Shigellosis		*Streptococcus*, Group A Invasive		*Streptococcus pneumoniae*, Inv.	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Adair	5	23.77	0	0.00	4	19.01
Alfalfa	0	0.00	0	0.00	0	0.00
Atoka	0	0.00	0	0.00	0	0.00
Beaver	0	0.00	0	0.00	0	0.00
Beckham	3	15.15	0	0.00	3	15.15
Blaine	1	8.35	0	0.00	1	8.35
Bryan	5	13.69	0	0.00	0	0.00
Caddo	4	13.27	1	3.32	3	9.95
Canadian	42	47.89	5	5.70	10	11.40
Carter	1	2.19	1	2.19	4	8.77
Cherokee	1	2.35	5	11.76	5	11.76
Choctaw	0	0.00	0	0.00	1	6.52
Cimarron	0	0.00	0	0.00	0	0.00
Cleveland	120	57.69	7	3.37	24	11.54
Coal	0	0.00	0	0.00	2	33.16
Comanche	21	18.26	6	5.22	23	20.00
Cotton	3	45.36	0	0.00	0	0.00
Craig	0	0.00	0	0.00	3	20.07
Creek	2	2.97	5	7.42	18	26.72
Custer	1	3.83	0	0.00	5	19.13
Delaware	0	0.00	1	2.70	6	16.18
Dewey	0	0.00	0	0.00	1	21.08
Ellis	0	0.00	0	0.00	0	0.00
Garfield	71	122.81	4	6.92	5	8.65
Garvin	2	7.35	0	0.00	2	7.35
Grady	22	48.33	2	4.39	1	2.20
Grant	0	0.00	1	19.44	0	0.00
Greer	0	0.00	0	0.00	1	16.50
Harmon	0	0.00	0	0.00	0	0.00
Harper	0	0.00	0	0.00	0	0.00
Haskell	0	0.00	1	8.48	1	8.48
Hughes	11	77.72	0	0.00	5	35.33
Jackson	1	3.52	0	0.00	2	7.03
Jefferson	1	14.67	0	0.00	0	0.00
Johnston	0	0.00	0	0.00	3	28.54
Kay	9	18.72	1	2.08	2	4.16
Kingfisher	2	14.36	1	7.18	1	7.18
Kiowa	9	88.00	0	0.00	1	9.78
Latimer	1	9.35	1	9.35	3	28.06
LeFlore	9	18.71	0	0.00	2	4.16

^ 2005 Rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2000 Census Bureau county population and multiplying by 100,000.

Reportable Diseases by County, Oklahoma, 2005

	Shigellosis		*Streptococcus*, Group A Invasive		*Streptococcus pneumoniae*, Inv.	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Lincoln	10	31.17	0	0.00	9	28.05
Logan	3	8.84	0	0.00	3	8.84
Love	1	11.32	2	22.65	0	0.00
McClain	6	21.63	0	0.00	2	7.21
McCurtain	1	2.91	0	0.00	2	5.81
McIntosh	0	0.00	0	0.00	2	10.28
Major	0	0.00	0	0.00	1	13.25
Marshall	7	53.09	1	7.58	4	30.34
Mayes	0	0.00	0	0.00	7	18.24
Murray	2	15.84	0	0.00	2	15.84
Muskogee	2	2.88	0	0.00	19	27.36
Noble	5	43.82	0	0.00	0	0.00
Nowata	0	0.00	1	9.46	1	9.46
Okfuskee	0	0.00	1	8.46	4	33.86
Oklahoma	327	49.51	30	4.54	132	19.99
Okmulgee	0	0.00	0	0.00	7	17.64
Osage	0	0.00	0	0.00	6	13.50
Ottawa	0	0.00	1	3.01	4	12.05
Pawnee	1	6.02	1	6.02	8	48.16
Payne	4	5.87	2	2.93	6	8.80
Pittsburg	5	11.38	2	4.55	16	36.40
Pontotoc	10	28.46	0	0.00	2	5.69
Pottawatomie	141	215.20	0	0.00	13	19.84
Pushmataha	2	17.14	0	0.00	1	8.57
Roger Mills	0	0.00	0	0.00	0	0.00
Rogers	4	5.66	0	0.00	11	15.57
Seminole	6	24.10	0	0.00	6	24.10
Sequoyah	0	0.00	0	0.00	7	17.96
Stephens	32	74.10	4	9.26	4	9.26
Texas	0	0.00	0	0.00	0	0.00
Tillman	0	0.00	1	10.77	1	10.77
Tulsa	16	2.84	40	7.10	109	19.35
Wagoner	1	1.74	1	1.74	2	3.48
Washington	4	8.16	2	4.08	7	14.29
Washita	0	0.00	1	8.69	0	0.00
Woods	0	0.00	0	0.00	1	11.00
Woodward	0	0.00	0	0.00	1	5.41
State of Oklahoma	**937**	**27.15**	**132**	**3.83**	**542**	**15.71**

^ 2005 Rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2000 Census Bureau county population and multiplying by 100,000.

Reportable Diseases by County, Oklahoma, 2005

	Tuberculosis		Tularemia		West Nile Virus	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Adair	2	9.51	1	4.75	0	0.00
Alfalfa	0	0.00	0	0.00	0	0.00
Atoka	0	0.00	0	0.00	0	0.00
Beaver	0	0.00	0	0.00	1	17.07
Beckham	1	5.05	0	0.00	0	0.00
Blaine	0	0.00	0	0.00	0	0.00
Bryan	1	2.74	0	0.00	0	0.00
Caddo	2	6.63	0	0.00	1	3.32
Canadian	3	3.42	0	0.00	1	1.14
Carter	1	2.19	0	0.00	0	0.00
Cherokee	7	16.46	0	0.00	0	0.00
Choctaw	0	0.00	0	0.00	0	0.00
Cimarron	0	0.00	0	0.00	0	0.00
Cleveland	7	3.37	0	0.00	0	0.00
Coal	0	0.00	0	0.00	0	0.00
Comanche	6	5.22	0	0.00	0	0.00
Cotton	0	0.00	0	0.00	0	0.00
Craig	0	0.00	0	0.00	0	0.00
Creek	1	1.48	0	0.00	0	0.00
Custer	1	3.83	0	0.00	0	0.00
Delaware	4	10.79	0	0.00	0	0.00
Dewey	0	0.00	0	0.00	0	0.00
Ellis	1	24.54	0	0.00	0	0.00
Garfield	0	0.00	0	0.00	0	0.00
Garvin	0	0.00	0	0.00	0	0.00
Grady	1	2.20	0	0.00	0	0.00
Grant	0	0.00	0	0.00	1	19.44
Greer	1	16.50	0	0.00	0	0.00
Harmon	0	0.00	0	0.00	0	0.00
Harper	0	0.00	0	0.00	0	0.00
Haskell	0	0.00	1	8.48	0	0.00
Hughes	2	14.13	0	0.00	0	0.00
Jackson	1	3.52	0	0.00	0	0.00
Jefferson	0	0.00	0	0.00	0	0.00
Johnston	0	0.00	0	0.00	0	0.00
Kay	0	0.00	2	4.16	0	0.00
Kingfisher	1	7.18	0	0.00	1	7.18
Kiowa	0	0.00	0	0.00	0	0.00
Latimer	1	9.35	1	9.35	0	0.00
LeFlore	1	2.08	4	8.31	0	0.00

^ 2005 Rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2000 Census Bureau county population and multiplying by 100,000.

Reportable Diseases by County, Oklahoma, 2005

	Tuberculosis		Tularemia		West Nile Virus	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Lincoln	0	0.00	0	0.00	1	3.12
Logan	0	0.00	0	0.00	1	2.95
Love	0	0.00	0	0.00	0	0.00
McClain	0	0.00	0	0.00	0	0.00
McCurtain	8	23.25	0	0.00	0	0.00
McIntosh	0	0.00	0	0.00	0	0.00
Major	0	0.00	0	0.00	0	0.00
Marshall	0	0.00	0	0.00	0	0.00
Mayes	0	0.00	0	0.00	0	0.00
Murray	0	0.00	0	0.00	0	0.00
Muskogee	2	2.88	0	0.00	1	1.44
Noble	0	0.00	2	17.53	1	8.76
Nowata	0	0.00	1	9.46	0	0.00
Okfuskee	1	8.46	0	0.00	0	0.00
Oklahoma	33	5.00	0	0.00	2	0.30
Okmulgee	3	7.56	0	0.00	0	0.00
Osage	2	4.50	0	0.00	0	0.00
Ottawa	0	0.00	0	0.00	0	0.00
Pawnee	0	0.00	0	0.00	0	0.00
Payne	1	1.47	1	1.47	0	0.00
Pittsburg	4	9.10	0	0.00	0	0.00
Pontotoc	0	0.00	0	0.00	0	0.00
Pottawatomie	14	21.37	1	1.53	0	0.00
Pushmataha	0	0.00	2	17.14	0	0.00
Roger Mills	0	0.00	0	0.00	0	0.00
Rogers	2	2.83	0	0.00	0	0.00
Seminole	2	8.03	0	0.00	0	0.00
Sequoyah	0	0.00	2	5.13	1	2.57
Stephens	1	2.32	0	0.00	0	0.00
Texas	2	9.95	0	0.00	1	4.97
Tillman	1	10.77	0	0.00	0	0.00
Tulsa	21	3.73	2	0.36	1	0.18
Wagoner	2	3.48	0	0.00	1	1.74
Washington	0	0.00	0	0.00	0	0.00
Washita	0	0.00	0	0.00	0	0.00
Woods	0	0.00	0	0.00	1	11.00
Woodward	0	0.00	0	0.00	0	0.00
State of Oklahoma	**144**	**4.17**	**20**	**0.58**	**16**	**0.46**

^ 2005 Rates illustrate county specific incidence rates per 100,000 population. Rates calculated by dividing the number of reported cases by the 2000 Census Bureau county population and multiplying by 100,000.

Reportable Sexually Transmitted Diseases by County, Oklahoma, 2005

	Chlamydia		Gonorrhea		Syphilis, Primary & Secondary	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Adair	71	337.48	5	23.77	0	0.00
Alfalfa	5	81.90	2	32.76	0	0.00
Atoka	29	208.95	9	64.85	0	0.00
Beaver	7	119.52	0	0.00	0	0.00
Beckham	52	262.64	7	35.36	0	0.00
Blaine	15	125.25	10	83.50	0	0.00
Bryan	138	377.73	43	117.70	0	0.00
Caddo	93	308.46	17	56.38	0	0.00
Canadian	163	185.87	49	55.87	0	0.00
Carter	105	230.16	65	142.48	0	0.00
Cherokee	213	500.93	41	96.42	0	0.00
Choctaw	66	430.19	18	117.32	0	0.00
Cimarron	1	31.77	0	0.00	0	0.00
Cleveland	487	234.12	129	62.01	0	0.00
Coal	13	215.55	2	33.16	0	0.00
Comanche	775	673.94	398	346.10	11	9.57
Cotton	27	408.22	5	75.60	0	0.00
Craig	45	301.00	4	26.76	0	0.00
Creek	168	249.38	50	74.22	0	0.00
Custer	72	275.42	17	65.03	0	0.00
Delaware	51	137.55	2	5.39	0	0.00
Dewey	5	105.42	1	21.08	0	0.00
Ellis	3	73.62	0	0.00	0	0.00
Garfield	247	427.24	60	103.78	0	0.00
Garvin	52	191.11	8	29.40	0	0.00
Grady	100	219.70	20	43.94	2	4.39
Grant	4	77.76	0	0.00	0	0.00
Greer	11	181.49	4	66.00	0	0.00
Harmon	17	517.82	5	152.30	0	0.00
Harper	6	168.44	0	0.00	0	0.00
Haskell	33	279.85	2	16.96	0	0.00
Hughes	36	254.35	10	70.65	0	0.00
Jackson	115	404.37	35	123.07	0	0.00
Jefferson	10	146.67	2	29.33	0	0.00
Johnston	23	218.78	4	38.05	0	0.00
Kay	133	276.62	27	56.16	1	2.08
Kingfisher	19	136.44	5	35.90	0	0.00
Kiowa	24	234.67	5	48.89	0	0.00
Latimer	29	271.23	4	37.41	0	0.00
LeFlore	163	338.81	28	58.20	0	0.00

^ 2005 Rates illustrate county specific incidence rates per 100,000 population.

* OOS/Unknown: Clients whose county of residence at time of diagnosis/treatment was not a county of Oklahoma, may include cases with a county of residence unknown.

Reportable Sexually Transmitted Diseases by County, Oklahoma, 2005

	Chlamydia		Gonorrhea		Syphilis, Primary & Secondary	
County	**Number**	**Rate^**	**Number**	**Rate^**	**Number**	**Rate^**
Lincoln	53	165.21	10	31.17	0	0.00
Logan	156	459.85	57	168.02	0	0.00
Love	10	113.24	1	11.32	0	0.00
McClain	69	248.74	7	25.23	0	0.00
McCurtain	137	398.23	23	66.86	0	0.00
McIntosh	63	323.81	5	25.70	0	0.00
Major	4	53.02	1	13.25	0	0.00
Marshall	17	128.94	6	45.51	0	0.00
Mayes	82	213.71	10	26.06	0	0.00
Murray	20	158.44	2	15.84	0	0.00
Muskogee	383	551.47	104	149.75	0	0.00
Noble	28	245.38	5	43.82	0	0.00
Nowata	20	189.23	2	18.92	0	0.00
Okfuskee	40	338.58	5	42.32	0	0.00
Oklahoma	3485	527.67	2151	325.69	22	3.33
Okmulgee	148	372.94	58	146.15	1	2.52
Osage	66	148.52	11	24.75	0	0.00
Ottawa	114	343.44	6	18.08	0	0.00
Pawnee	42	252.83	2	12.04	0	0.00
Payne	316	463.41	40	58.66	0	0.00
Pittsburg	134	304.87	46	104.66	0	0.00
Pontotoc	148	421.14	28	79.67	0	0.00
Pottawatomie	182	277.77	45	68.68	0	0.00
Pushmataha	42	359.99	5	42.86	0	0.00
Roger Mills	4	116.41	1	29.10	0	0.00
Rogers	134	189.69	26	36.81	1	1.42
Seminole	114	457.94	23	92.39	0	0.00
Sequoyah	101	259.16	23	59.02	0	0.00
Stephens	99	229.26	22	50.95	0	0.00
Texas	61	303.38	8	39.79	0	0.00
Tillman	45	484.55	3	32.30	0	0.00
Tulsa	2652	470.80	1103	195.81	8	1.42
Wagoner	92	160.03	41	71.32	0	0.00
Washington	85	173.48	17	34.70	0	0.00
Washita	17	147.72	0	0.00	0	0.00
Woods	26	286.06	2	22.00	0	0.00
Woodward	35	189.33	2	10.82	0	0.00
OOS/Unk*	107	N/A	37	N/A	18	N/A
State of Oklahoma	**12957**	**375.49**	**5031**	**145.80**	**49**	**1.42**

^ 2005 Rates illustrate county specific incidence rates per 100,000 population.

* OOS/Unknown: Clients whose county of residence at time of diagnosis/treatment was not a county of Oklahoma, may include cases with a county of residence unknown.

Oklahoma HIV and AIDS Cumulative Case Reports by County*, 1982-2005

County	HIV Cases	AIDS Cases	County	HIV Cases	AIDS Cases
Adair	5	13	Lincoln	6	14
Alfalfa	**	**	Logan	25	28
Atoka	**	13	Love	**	8
Beaver	**	**	Major	3	**
Beckham	5	12	Marshall	5	4
Blaine	9	10	Mayes	5	20
Bryan	12	24	McClain	11	18
Caddo	20	23	McCurtain	9	19
Canadian	39	69	McIntosh	6	16
Carter	12	28	Murray	**	6
Cherokee	8	23	Muskogee	35	66
Choctaw	7	9	Noble	4	**
Cimarron	**	**	Nowata	**	5
Cleveland	137	182	Okfuskee	**	10
Coal	**	**	Oklahoma	965	1,693
Comanche	140	132	Okmulgee	10	30
Cotton	**	4	Osage	11	21
Craig	6	14	Ottawa	9	16
Creek	19	38	Pawnee	9	10
Custer	11	13	Payne	25	52
Delaware	5	14	Pittsburg	14	40
Dewey	3	**	Pontotoc	10	20
Ellis	**	**	Pottawatomie	25	51
Garfield	31	52	Pushmataha	3	5
Garvin	3	8	Roger Mills	**	**
Grady	19	30	Rogers	25	36
Grant	**	3	Seminole	9	15
Greer	4	3	Sequoyah	9	23
Harmon	**	**	Stephens	14	14
Harper	**	**	Texas	6	6
Haskell	**	9	Tillman	**	**
Hughes	**	**	Tulsa	704	1,223
Jackson	7	15	Wagoner	14	23
Jefferson	3	5	Washington	8	25
Johnston	5	**	Washita	**	4
Kay	22	25	Woods	**	3
Kingfisher	5	7	Woodward	8	8
Kiowa	**	5	Other counties	9	56
Latimer	**	4	Out of State	547	1,473
LeFlore	18	31	**Total**	**2,572**	**4,423**

* Resident of a county in Oklahoma at time of diagnosis
** Confidentiality concerns restrict releasing data for counties in Oklahoma that have two or fewer cases
*** Totals do not include 'Out of State' cases
~ Anonymous cases are excluded from this report

Oklahoma HIV Infection Prevalence (Living HIV and/or Living AIDS cases) by County of Residence at Diagnosis per 100,000 Population, 1982-2005

County	Living HIV / AIDS Cases	Prevalence Rate	County	Living HIV / AIDS Cases	Prevalence Rate
Adair	8	38.0	Lincoln	11	34.3
Alfalfa	**	**	Logan	28	82.5
Atoka	4	28.8	Love	4	45.3
Beaver	**	**	Major	3	39.8
Beckham	6	30.3	Marshall	5	37.9
Blaine	11	91.9	Mayes	6	15.6
Bryan	21	57.5	McClain	17	61.3
Caddo	25	82.9	McCurtain	14	40.7
Canadian	54	61.6	McIntosh	10	51.4
Carter	19	41.6	Murray	3	23.8
Cherokee	13	30.6	Muskogee	51	73.4
Choctaw	7	45.6	Noble	5	43.8
Cimarron	**	**	Nowata	**	**
Cleveland	173	83.2	Okfuskee	**	**
Coal	3	49.7	Oklahoma	1,383	209.4
Comanche	160	139.1	Okmulgee	14	35.3
Cotton	**	**	Osage	10	22.5
Craig	10	66.9	Ottawa	13	39.2
Creek	31	46.0	Pawnee	10	60.2
Custer	13	49.7	Payne	29	42.5
Delaware	9	24.3	Pittsburg	21	47.8
Dewey	5	105.4	Pontotoc	16	45.5
Ellis	**	**	Pottawatomie	40	61.0
Garfield	36	62.3	Pushmataha	5	42.9
Garvin	5	18.4	Roger Mills	**	**
Grady	27	59.3	Rogers	33	46.7
Grant	**	**	Seminole	11	44.2
Greer	8	132.0	Sequoyah	16	41.1
Harmon	**	**	Stephens	13	30.1
Harper	**	**	Texas	7	34.8
Haskell	3	25.4	Tillman	**	**
Hughes	**	**	Tulsa	1,032	183.2
Jackson	13	45.7	Wagoner	18	31.3
Jefferson	5	73.3	Washington	17	34.7
Johnston	5	47.6	Washita	**	**
Kay	23	47.8	Woods	**	**
Kingfisher	5	35.9	Woodward	11	59.5
Kiowa	**	**	Unk/Other	787	N/A
Latimer	**	**	Out Of State	980	N/A
LeFlore	23	47.8	**Total****	**4,442**	**128.7**

* Resident of a county in Oklahoma at time of diagnosis
** Confidentiality concerns restrict releasing data for counties in Oklahoma that have two or fewer cases
*** Totals do not include 'Out of State' cases
~ Anonymous cases are excluded from this report

2005 Public Health Laboratory Specimen Summary

CLIA Test Count 2005		Public Helath Lab - Oklahoma State Department of Health									CLIA # 37D0656594	
	jan	**feb**	**mar**	**apr**	**may**	**june**	**july**	**aug**	**sept**	**oct**	**nov**	**dec**	**totals**
Immunohematology													
Rh	100	91	132	106	104	102	94	129	108	93	113	94	1266
Positive	85	82	123	98	87	95	87	127	101	75	104	83	1147
Negative	15	9	9	8	17	7	7	2	7	18	9	11	119
											Speciality Total		**1266**
Syphilis Serology													
RPR	2935	2576	2948	3026	2919	3071	2784	3149	3180	2598	3459	2674	35319
Reactive	33	52	47	61	49		55	53	50	119	48	46	613
Negative	2902	2524	2901	2965	2870	3071	2729	3096	3130	2479	3411	2628	34706
TPPA	33	59	46	54	65	58	53	71	53	53	61	51	657
Positive	31	45	28	31	44	39	42	46	31	30	45	31	443
Negative	2	14	18	23	21	19	11	25	22	23	16	20	214
											Speciality Total		**35976**
General Immunology													
HIV	2744	2712	3218	3004	2061	3763	2656	2928	2979	2575	2664	2767	34071
Positive	70	15	39	28	34	84	33	66	33	35	25	34	496
Negative	2674	2697	3179	2976	2027	3679	2623	2862	2946	2540	2639	2733	33575
Rubella	94	94	131	116	87	95	92	102	108	87	108	101	1215
Positive	89	83	117	105	83	94	75	96	99	79	95	89	1104
Negative	5	11	14	11	4	1	17	6	9	8	13	12	111
Hepatitis B	114	101	138	140	152	157	117	175	150	130	139	133	1646
Positive	5	2	0	5	5	4	0	2	3	0	0	0	26
Negative	109	99	138	135	147	153	117	173	147	130	139	133	1620
Confirmatory	7	2	0	4	9	3	1	2	4	0	0	0	32
Hepatitis C	26	25	76	61	52	18	40	42	16	13	4	4	377
Positive	5	9	16	18	13	3	13	10	6	2	1	0	96
Negative	21	16	60	43	39	15	27	32	10	11	3	4	281
Repeat positive	5	6	19	16	13	6	9	10	6	2	0	1	93
Tick Panel	3	4	8	22	52	57	67	34	56	31	13	4	351
RMSF: Positive > 1:64	1	1	2	4	15	10	19	10	9	9	0	0	80
Negative < 1:64	2	3	6	18	37	47	48	24	47	22	13	4	271
E. Chaff: Positive > 1:64	0	0	0	1	1	5	5	1	0	2	1	0	16
Negative < 1:64	3	4	8	21	51	52	62	33	56	29	12	4	335
Arboviral panel	12	3	1	41	8	14	34	35	7	50	18	11	234
WN IgM > 1:400 Positive	5	1	1	7	2	0	15	21	2	24	7	5	90
Negative	7	2	0	34	6	14	19	14	5	26	11	6	144
SLE IgM > 1:400 Positive	5	2	0	5	2	0	14	21	2	28	8	3	90
Negative	7	1	1	36	6	14	20	14	5	22	10	8	144
											Speciality Total		**37894**

2005 Public Health Laboratory Specimen Summary

NBS													
T4/TSH	4840	4150	4639	3997	4427	4771	4274	5069	4478	4586	4410	4469	54110
Abnormal T4, No TSH	38	38	48	42	55	47	49	63	49	36	36	41	542
TSH > 25	0	2	5	0	2	1	2	2	0	1	0	1	16
TSH> 50	2	4	2	1	2	3	1	4	2	0	4	3	28
T4 30 ug/dl	20	36	37	12	0	0	0	0	0	0	0	0	105
Normal	4802	4112	4591	3955	4372	4724	4225	5006	4429	4550	4374	4428	53568
Galactose	4840	4150	4639	3997	4427	4771	4274	5069	4527	4586	4410	4469	54159
Abnormal	9	8	12	2	4	7	3	1	2	6	6	10	70
Normal	4831	4142	4627	3995	4423	4764	4271	5068	4525	4580	4404	4459	54089
PKU	4843	4156	4646	4000	4431	4778	4279	5074	4533	4589	4413	4469	54211
Abnormal	0	1	0	1	1	4	2	1	0	3	0	2	15
Normal	4843	4155	4646	3999	4430	4774	4277	5073	4533	4586	4413	4467	54196
HBg Kids	4879	4178	4639	4035	4427	4799	4274	5069	4478	4586	4410	4469	54243
Abnormal	108	80	111	116	86	140	96	102	105	85	88	104	1221
Normal	4771	4098	4528	3919	4341	4659	4178	4967	4373	4501	4322	4365	53022
HBg Adults	119	149	161	89	105	114	49	141	77	40	44	50	1138
Positive	2	4	4	5	2	11	5	4	5	3	4	5	54
Negative	117	145	157	84	103	103	44	137	72	37	40	45	1084
CAH		2381	4639	3952	4427	4724	4274	5069	4527	4586	4410	4469	47458
17-OHP Elev / Steroid Panel Normal							1	22	37	32	29	44	165
17-OHP Elev / Steroid Panel abnormal							4	3	2	1	1	1	12
17-OHP High / Steroid Panel Normal							0	6	6	12	7	10	41
CF		2381	4639	3952	4427	4724	4274	5069	4527	4586	4410	4469	47458
IRT Elevated no mutations							72	81	80	98	114	157	602
IRT Elevated 1 mutations							6	5	10	8	7	5	41
IRT Elevated 2 mutations							0	2	5	1	3	1	12
IRT high/ no mutations							1	1	4	3	1	2	12
												Speciality Total	**312777**
Microbiology													
Bacteriology	164	188	171	129	102	148	69	54	59	62	63	179	1388
Positive													
Negative													
Enterics	123	103	141	176	209	228	175	224	197	162	114	88	1940
Positive													
Negative													
												Speciality Total	3328

2005 Public Health Laboratory Specimen Summary

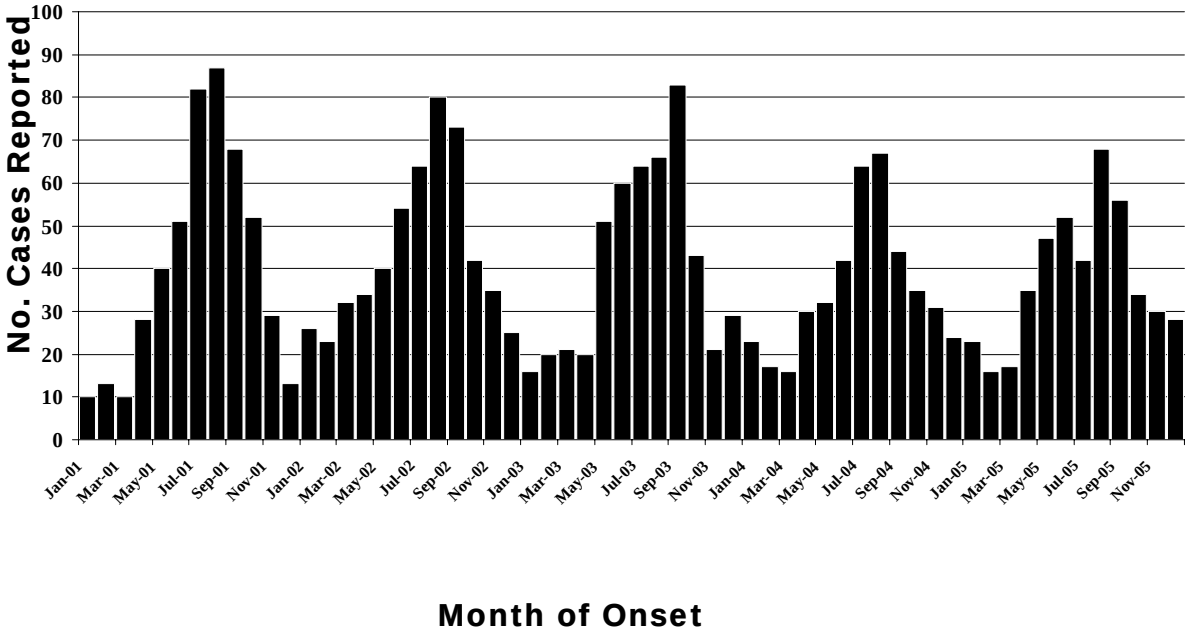
Mycobacteriology	699	650	790	726	682	724	566	669	638	617	677	683	8121
Pos. TB	28	22	26	14	24	19	13	11	31	10	7	0	205
Pos. Mac	11	19	19	15	24	16	30	27	19	16	4	0	200
Pos. M. gordonae	11	14	18	15	22	11	12	13	10	4	1	0	131
Pos. M. kansasii	0	0	1	0	0	0	6	11	2	0	0	0	20
Pos. M. fortuitum qr.	4	2	2	4	1	2	1	5	5	3	5	5	39
Pos. M. chelonae qr.	19	9	22	21	9	27	20	16	15	10	9	8	185
Pos. M. scrofulaceum	1	0	0	3	0	2	0	0	1	1	0	0	8
Pos. M. marinum	0	1	0	1	0	2	0	0	2	3	0	0	9
Pos. other	6	4	6	8	11	4	15	19	2	4	4	4	87
Negative	671	628	764	712	658	705	553	658	607	607	670	683	7916
Mycology	3	8	4	3	9	11	6	14	7	12	26	15	118
Parasitology	24	42	60	52	38	56	49	50	54	52	52	41	570
Virology													
GC/CT	4870	4656	5992	5343	5413	5605	5403	6213	5993	4999	5412	5284	65183
GC: Positive	143	128	136	127	155	178	155	186	161	140	143	157	1809
GC: Negative	4727	4528	5856	5216	5258	5427	5248	6027	5832	4859	5269	5127	63374
CT: Positive	280	303	345	302	322	344	327	574	570	433	501	485	4786
CT: Negative	4590	4353	5647	5041	5091	5261	5076	5639	5423	4566	4911	4799	60397
Urines	235	68	89	115	69	85	64	272	85	61	57	71	1271
GC: Positive	0	1	1	0	2	1	0	2	3	1	1	1	13
GC: Negative	235	67	88	115	67	84	64	270	82	60	56	70	1258
CT: Positive	12	8	12	14	6	11	5	14	9	6	6	6	109
CT: Negative	223	60	77	101	63	74	59	258	76	55	51	65	1162
Rabies	86	94	122	150	142	176	138	116	102	106	95	76	1403
Positive	4	7	14	12	9	4	6	2	6	3	5	4	76
Most common animals submitted:													
Cat	0	0	0	1	0	0	4	0	0	1	0	1	7
Cow	0	0	1	3	1	1	2	0	0	0	0	1	9
Dog	0	2	1	0	0	1	0	0	1	0	0	0	5
Horse	0	0	1	0	1	0	0	0	1	1	0	0	4
Skunk	4	5	11	8	7	2	0	2	3	1	4	2	49
Negative	82	87	108	138	133	172	132	114	96	103	90	72	1327

2005 Public Health Laboratory Specimen Summary

Clinical Specimens	57	93	54	20	35	44	34	45	26	39	29	41	517
HA	14	23	9	2	0	0	7	0	0	0	0	0	55
HI	14	23	9	2	0	0	7	0	0	0	0	0	55
FA	0	0	11	2	0	1	2	3	0	2	3	11	35
Neutralization	0	0	0	2	3	3	2	11	20	9	5	1	56
Most common samples submitted:													
Throat	10	15	4	0	0	0	0	4	1	0	8	9	51
Lesion	19	13	17	8	22	13	9	9	4	14	9	4	141
Feces	0	0	0		0	0	0	0	0	0	1	0	1
CSF	0	1	0	1	2	2	4	6	8	7	1	0	32
Urines	2	0	1	1	0	0	0	0	0	0	3	0	7
NP	26	57	26	3	0	7	14	11	6	5	2	13	170
Vaginal	0	0	0	3	5	10	7	8	6	8	2	10	59
												Speciality Total	**80511**
												TOTAL	**432448**

Enteric / Diarrheal Diseases

Distribution of Reported *Salmonella* Cases in Oklahoma by Month of Onset, 2001 Through 2005



Campylobacteriosis

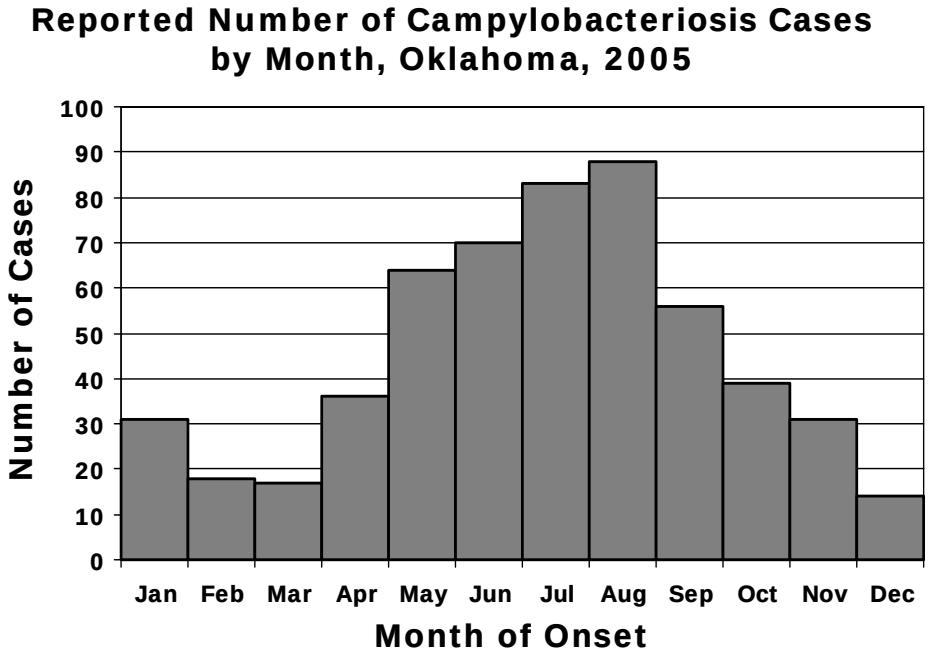
2005 Case Total 547	**2005 Rate 15.9 per 100,000**
2004 Case Total 594	**2004 Rate 17.2 per 100,000**

The rate of campylobacteriosis in Oklahoma reached a peak in 2004 after rising for several years, then declining 8% between 2004 and 2005. Sixty-two of 77 counties had cases of campylobacteriosis in 2005. Counties with rates over two times the state rate include Blaine (4 cases, 33.4 per 100,000), Beaver (2 cases, 34.2 per 100,000), Carter (18 cases, 39.5 per 100,000), Murray (5 cases, 39.6 per 100,000), Jefferson (3 cases, 44.0 per 100,000), Love (4 cases, 45.3 per 100,000), Adair (10 cases, 47.3 per 100,000), Pawnee (8 cases, 48.2 per 100,000), Alfalfa (3 cases, 49.1 per 100,000), Harper (2 cases, 56.2 per 100,000), and Tillman (9 cases, 96.9 per 100,000). None of these counties were associated with a known common source of exposure.

Campylobacteriosis has been observed more often in males than in females over the last several years in Oklahoma. In 2005, 245 females (14.0 per 100,000) and 296 males (17.5 per 100,000) with campylobacteriosis were reported. Children less than five years of age were much more likely to become infected with *Campylobacter* (see accompanying graph). However, the rate of disease drops off among older children. The differences in incidence among boys and girls is marked; why this sex difference lessens after age 19 is not presently known. In 2004 a similar pattern was noted, although 2005 differs from the previous year in that incidence in women age 35-54 was slightly higher than in men. As in previous years, rates of campylobacteriosis incidence are much higher in the warmer months (see graph), although the reasons for this are not well understood. Increased outdoor activities including contact with infected animals, as well as consumption of improperly prepared or stored food (e.g., at a picnic) are possible reasons for the perennial increase during the summer months.

Racial information was available for 70.0% of cases. Among those for whom information is available, Native Americans had the highest rate of disease at 12.8 per 100,000, closely followed by whites at 12.7 per 100,000. Asians had the lowest rate (2.1 per 100,000) and blacks were second lowest at 5.4 per 100,000. Hispanics of any race had higher rates of campylobacteriosis, at 18.4 per 100,000. However, as ethnicity information was only obtainable from 46.4% of reported cases, it is possible the actual rate is higher. Because of incomplete ascertainment of these data, rates by race and ethnicity are useful for comparison to each other only.

While most cases of campylobacteriosis are sporadic, one outbreak associated with consumption of raw milk was investigated in Comanche county in 2005. Four confirmed cases and seven symptomatic but unconfirmed (epi-links) shared a common exposure to raw goat and cow milk at two different farms. Both kinds of milk are known to cause campylobacteriosis infections in humans. Because of the overlap in human exposures, an epidemiologic investigation was not able to determine if one or both kinds of milk were implicated.


Reported Number of Campylobacteriosis Cases
by Month, Oklahoma, 2005
Number of Cases
100
90
80
70
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month of Onset

Parasitic Gastrointestinal Diseases

Three parasitic gastrointestinal diseases are reportable in Oklahoma: cryptosporidiosis, giardiasis, and cyclosporiasis. Paraistic gastrointestinal diseases are associated with diarrhea that may be intermittent and scant, or voluminous, watery stools. The severity of diarrhea varies from individual to individual and may wax and wane or be persistent. Additional symptoms may include weight loss, fever, nausea and vomiting, and abdominal cramps.

Confirmation requires the identification of cysts or trophozoites in a stool specimen. The collection of fecal specimens for ova & parasites (O&P) identification may not be a laboratory test that is routinely performed. Therefore, when a parasitic etiology is suspected, clinicians should request testing for these specific organisms. Clinicians should also request several stool specimens from their patient since oocysts may be passed intermittently and may not be identified from just one stool specimen. A single negative stool specimen does not rule out the diagnosis; three or more at 2 or 3-day intervals may be required. Cases of cryptosporidiosis and giardiasis were reported to the OSDH-CDD in 2004.

Cryptosporidiosis

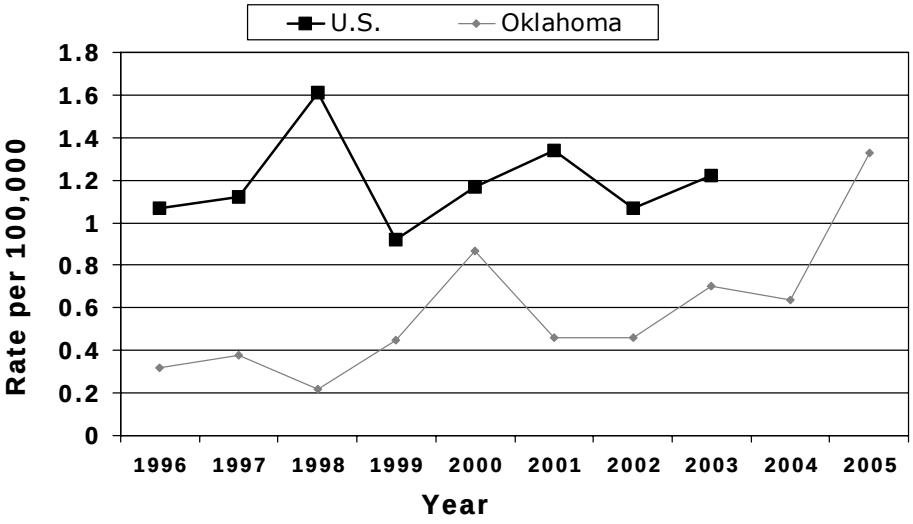
2005 Case Total 46	**2005 Rate 1.33 per 100,000**
2004 Case Total 22	**2004 Rate 0.64 per 100,000**

Twenty-two cases of Cryptosporidiosis were reported to the OSDH-CDD in 2004, which represents an 8% decrease compared to the number of cases reported in 2003. The incidence rate in Oklahoma was 0.64 per 100,000 population, which was slightly higher than the previous five-year (1999-2003) rate of 0.58 per 100,000. Cases occurred among residents of 13 counties (17%). The highest number of cases was reported from Muskogee (3), Oklahoma (3), and Payne County (3). One to two cases were reported from the following counties: Cleveland (2), Delaware (1), Garvin (1), Grady (1), Haskell (1), McClain (1), McIntosh (2), Pittsburg (2), Pottawatomie (1), and Tulsa County (1).

The age range of cryptosporidiosis cases was 1 to 80 years with a median age of 34 years. The majority of cases occurred among males compared to females; 16 cases (73%) were reported among males and 6 cases (27%) among females resulting in gender-specific incidence rates of 0.94 per 100,000 and 0.34 per 100,000, respectively. Thirteen cases (59%) reported their racial background as white, 4 cases (18%) reported their race as Native American, and 3 cases (14%) reported their race as black. Racial background was unknown for 2 cases.

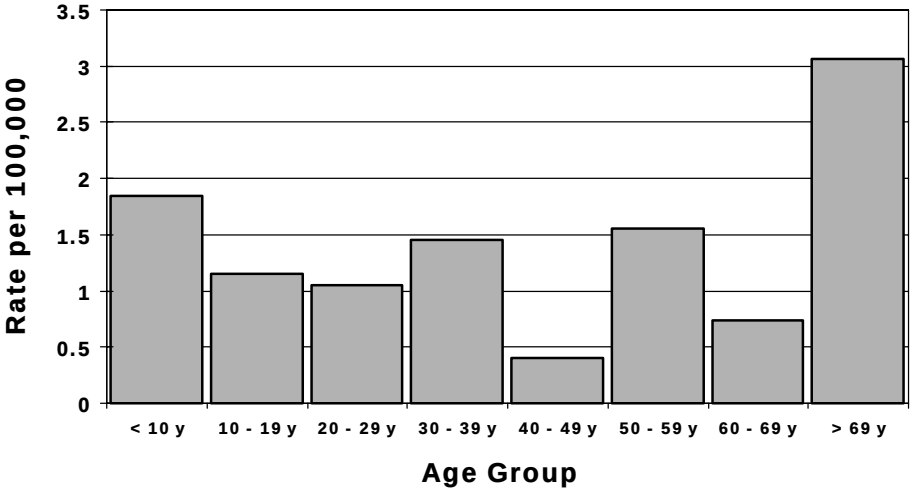
No cases died due to cryptosporidiosis, however, 7 cases (32%) required hospitalization. Persons who were hospitalized ranged in age from 8 to 76 years with a median age of 55 years. Case investigations conducted by local county health department public health nurses did not reveal any outbreaks caused by cryptosporidiosis. No cases were identified in high-risk settings such as attendees or employees of childcare settings, direct patient care providers, or food handlers.

Cryptosporidiosis Incidence Rate by Year, Oklahoma and U.S., 1996 - 2005



* Finalized national cryptosporidiosis data for 2004 and 2005 was not available during the publication of this summary.

Rate of Reported Cryptosporidiosis Cases by Age Group, Oklahoma, 2005



Giardia

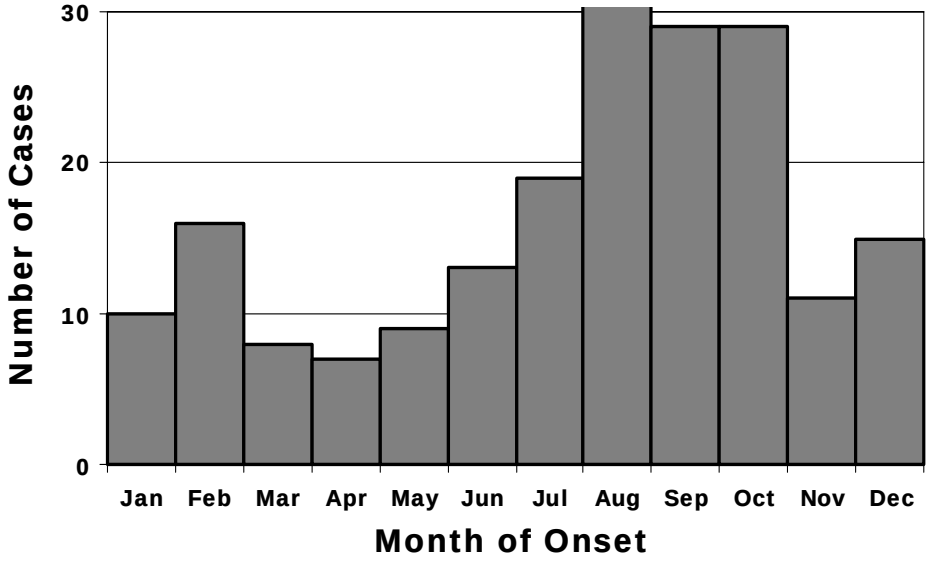
2005 Case Total	**197**	**2005 Rate**	**5.71 per 100,000**
2004 Case Total	**166**	**2004 Rate**	**4.81 per 100,000**

A total of 197 cases of *Giarda* were reported in 2005 to the OSDH representing an 18.7% increase from 2004. *Giardia* was removed from the state list of reportable diseases in 2000 and added to the list again in 2002. From 1994 to 2000, the number of reported cases decreased and tapered off to a steady yearly rate of cases that has continued. The most common species of *Giardia* reported in Oklahoma is *Giardia lambia*. The incidence of *Giardia* in 2005 was 5.71 cases per 100,000 population. Cases occurred among residents of 42 counties (54.5%). Counties with the highest rates of *Giardia* cases were Harmon County (30.5 per 100,000) Major County (26.5 per 100,000) and Garfield County (24.2 per 100,000). The majority of cases were reported in Tulsa County (17.2%), Oklahoma County (15.7%), and Cleveland County (10.6%). Fifty-five percent of cases were reported in the months of July through October. In 2005, *Giardia* peaked in August with 31 (15.7%) cases. Fourteen cases were hospitalized (7.5%), with an equal number of males and females. No cases were known to have died as a result of *Giardia* in 2005.

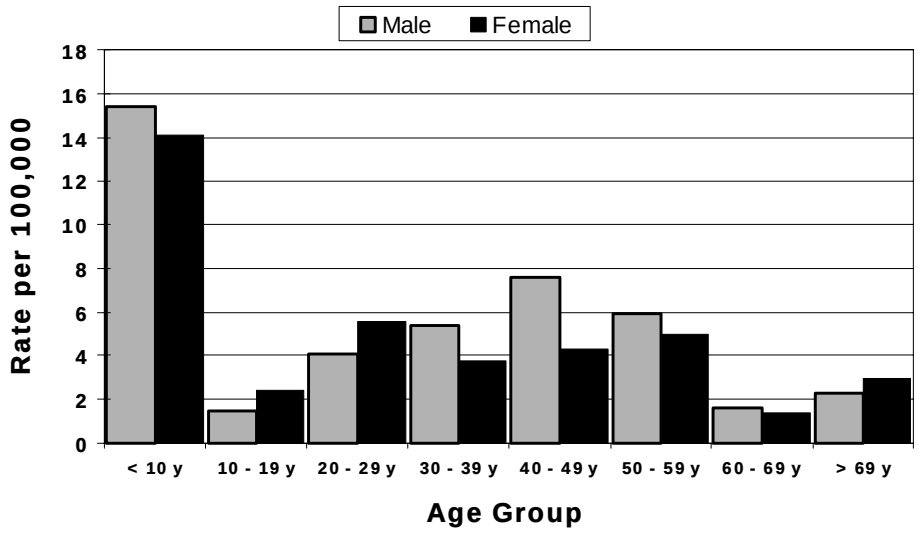
Risk factors for acquiring *Giardia* include drinking or swallowing water or food that is contaminated with sewage or feces from humans or animals. Children who attend daycare centers, child care workers, international travelers, and persons who drink or swallow unfiltered or untreated water are at highest risk for being infected with *Giardia*.

In 2005, cases ranged in age from 10 months to 94 years with a median age of 26 years. Those under the age of 10 years had the highest rate of cases at 15.2 per 100,000. The incidence of disease among men and women were similar (5.96 per 100,000 and 5.13 per 100,000, respectively). Similar incidence rates of giardiasis existed when looking at men and women according to stratified age groups, with higher rates observed among children less than 10 years and adults aged 20 to 57 years old. With reference to racial background, the highest rate of disease occurred in those persons reporting their racial background as Asian (4.28 per 100,000; N=2) followed by blacks at 4.22 per 100,000 (N=11), whites at 3.61 per 100,000 (N=95), and Native American at 3.29 per 100,000 population (N=9). Two cases were reported in food handlers (1%), and twelve cases were associated, attend or work, with a child care setting (6%). No outbreaks of giardiasis were identified in 2005.

Reported Number of *Giardia* Cases by Month, Oklahoma, 2005



Rate of Reported *Giardia* Cases by Age Group and Gender, Oklahoma, 2005



Enterohemorrhagic *Escherichia Coli* Infection and Hemolytic Uremic Syndrome

2005 Case Total 40 **2005 Rate 1.16 per 100,000**
2004 Case Total 29 **2004 Rate 0.84 per 100,000**

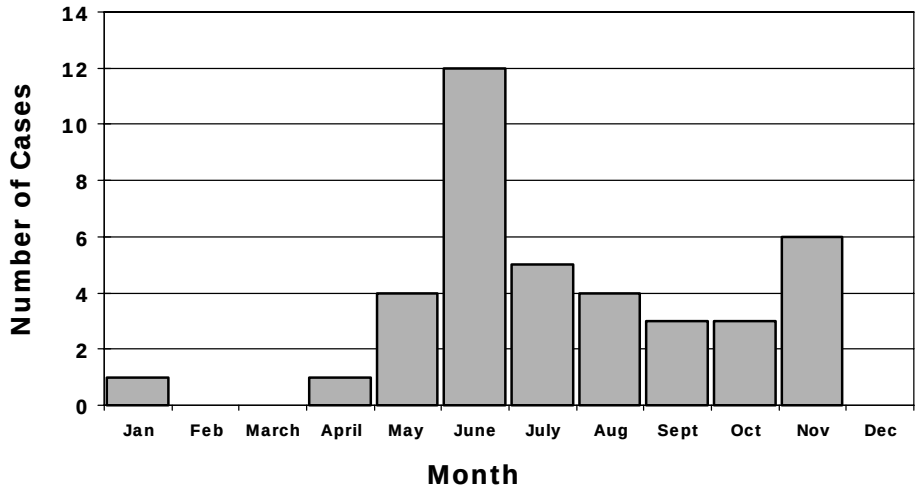
The disease category of enterohemorrhagic *Escherichia Coli* (EHEC) includes infection with species of this bacteria which produce shiga toxin, notably *E. coli* O157:H7, along with several other less common types. Ninety percent (36/40) of Oklahoma's EHEC cases were caused by *E. coli* O157:H7 in 2005. The number of cases of EHEC rose 38% between 2004-2005. Twenty-one of 77 counties had cases of EHEC in 2005. Counties with both a high rate of disease and a high number of cases (that is, more than one or two cases) include Rogers (4 cases, 5.7 per 100,000) and Pittsburg (6 cases, 13.7 per 100,000). Upon investigation, no common exposures were found in either county.

EHEC infection occurred in equal proportions among males and females in 2005 (20 cases each). As in previous years, children continue to be at much higher risk of infection with EHEC. Children less than five years of age had a rate of disease of 5.1 per 100,000, which is over four times the rate for all ages. Rates of EHEC infection incidence are much higher than in the warmer months (see graph), although the reasons for this are not well understood. Increased outdoor activities including contact with infected animals, as well as consumption of contaminated foods are possible causes for this yearly increase. Failure to wash hands after contact with animals, for example, after visiting a petting zoo, is a well known risk factor for EHEC infection.

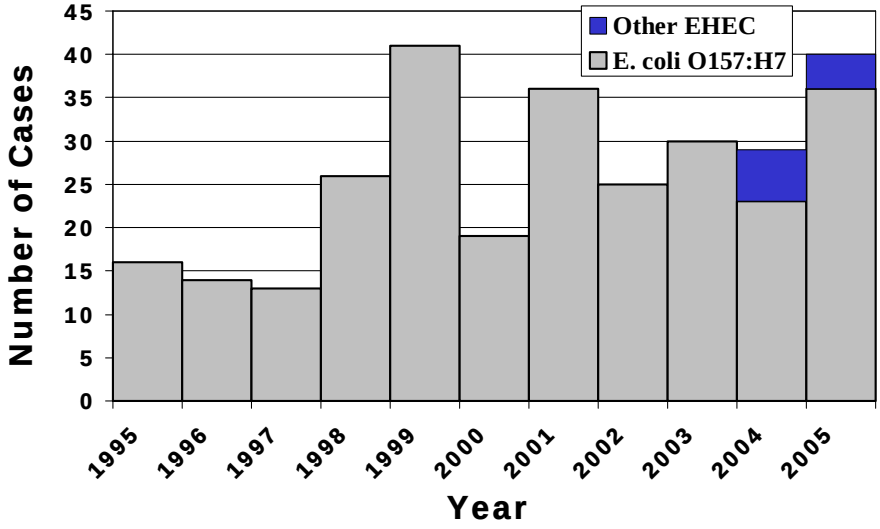
Racial information was available for 29 of 40 (72.5%) of cases. Twenty-eight cases reported their race as white, while the remaining case was Native American. Information regarding Hispanic ethnicity was available for 21 of 40 (52.5%) cases. Of these, all were non-Hispanic. Because of incomplete ascertainment of these data, rates by race and ethnicity are useful for comparison to each other only.

Hemolytic Uremic Syndrome (HUS) follows *E coli* O157:H7 infection in approximately 8% of infections; the rate of HUS may be different following infection with other strains of EHEC. Other infections, such as *Shigella dysenteriae*, as well as non-infectious causes, may lead to HUS. In 2005, five cases of HUS were reported to OSDH. All cases were female, and their ages ranged from 1 to 69 years. All were white, and one was Hispanic; Hispanic ethnicity status was unknown for one case. *E. coli* O157:H7 preceded HUS in two cases, and another species of EHEC preceded HUS in one case. In the other two cases, the preceding infection, if any, was unknown. One case each of HUS had onsets in the months of January, March, May, September, and October.

Incidence of Reported EHEC Cases by Month of Onset, Oklahoma, 2005



Reported Number of *E. coli* O157:H7 and other Enterohemorrhagic *E. coli* (EHEC) Cases by Year, Oklahoma, 1995-2005



Salmonellosis

2005 Case Total 448 **2005 Rate 13.0 per 100,000**
2004 Case Total 422 **2004 Rate 12.4 per 100,000**

Although the rate of *Salmonella* infections in Oklahoma increased by six percent from 2004 to 2005, the rates of salmonellosis have been equal to or slightly lower than the U.S. average for the last six years (see graph, next page). In 2005, fifty-nine of 77 (76.6%) Oklahoma counties had at least one case of salmonellosis. Counties with at least two cases and a disease rate two or more times higher than the state average included Adair (42.8 per 100,000; 9 cases), Alfalfa (32.7 per 100,000; 2 cases), Beckham (30.3 per 100,000; 6 cases), Jefferson (29.3 per 100,000; 2 cases), Le Flore (31.2 per 100,000; 15 cases), McIntosh (30.8 per 100,000; 6 cases), and Okfuskee (33.9 per 100,000; 4 cases).

Salmonella infections typically exhibit a seasonal distribution with higher incidence in the warmer months. The largest number of cases occurred in August (n=68, 15.2% of cases) and September (n=55, 12.3% of cases). May and June had 47 and 52 cases each (10.5 and 11.6% respectively), and July had 42 cases (9.4% of cases). The fewest number of cases occurred in February (16 cases, 3.6% of cases).

The median age of salmonellosis was 23 in 2005. Following a trend seen in earlier years, rates of disease were slightly higher in females than males, but not among all age groups. Overall, the rate of salmonellosis in females in 2005 was 13.6, and 12.2 in males. As can be seen in the accompanying graph, rates were more than twice as high in males age 5-14 than in females of that age. In women 25-39, this trend is reversed, with females having rates over twice that of males.

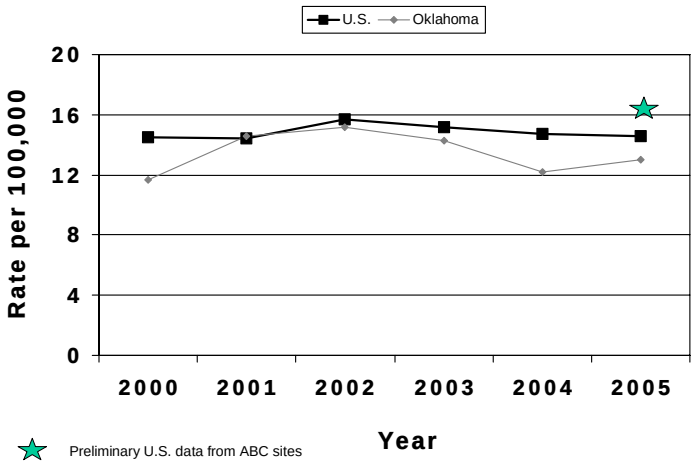
Racial information was obtained on 67.2%, and ethnic information for 58.7%, of reported cases. Asians, and Hispanics of any race, had higher rates of salmonellosis than other groups; at 17.1 and 17.3 per 100,000, respectively, compared to 9.2 for whites, 9.2 for blacks, and 10.3 for Native Americans. Because of incomplete ascertainment of these data, rates by race and ethnicity are useful for comparison to each other only.

Clinical isolates of *Salmonella* are required to be submitted to the OSDH PHL for serotyping. Fifty-four different serotypes were identified in 2005, compared with 45 in 2004 and 60 in 2003. In 2003 *Salmonella* newport and *Salmonella* typhimurium were the most common serotypes, with 79 isolates of each. Overall, these two serotypes accounted for 40.8% of all isolates serotyped at the OSDH PHL. The second most common serotype was *S.* enteriditis, of which there were 41 (10.6% of all islolates in 2005 as compared to 5.3% of the total in 2004).

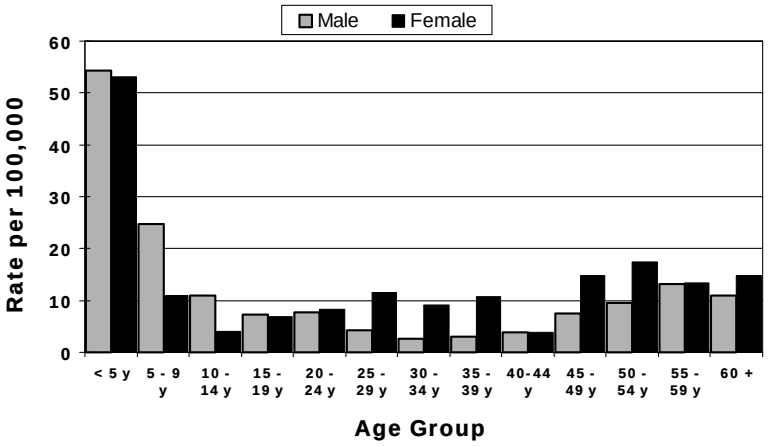
A public health investigation is conducted on each reported case by the county health department CDN. The CDN gathers information in risk factors for disease, attempts to find related cases, and educates the client on disease prevention measures. The majority of cases were sporadic, with no major outbreaks detected.

High-risk settings for the transmission of salmonellosis include food preparation, child daycare settings, and nursing homes. In 2005, food handler status was gathered from 149 of the 448 reported cases. Four of these cases were food handlers. Daycare setting affiliation, including attendance, employment, and family members of an attendee, were collected from 117 of 448 cases. Twenty cases were known to attend daycare, while two cases worked in a daycare setting, and two were family members of children who attended daycare.

Salmonellosis Incidence Rate by Year, Oklahoma and U.S., 2005



Rate of Reported Salmonellosis Cases by Age Group and Gender, Oklahoma, 2005



Shigellosis

2005 Case Total 937	**2005 Rate 27.15 per 100,000**
2004 Case Total 724	**2004 Rate 20.98 per 100,000**

In 2005, a total of 937 cases of shigellosis were reported, an increase of 22.7% from 2004. Of the cases reported in 2005, 578 (61.7%) were laboratory confirmed cases and 359 (38.3%) were probable cases or epidemiologically linked cases. Shigella infections are reportable in Oklahoma, and isolates of Shigella species are required to be forwarded to the OSDH-PHL for confirmation and speciation. *Shigella sonnei* is the most commonly identified *Shigella* species in the U.S. and totaled 98.6% (N=569) of the isolates speciated at the PHL in 2005. *S. flexneri* comprised the other species identified (n=8, 1.4%).

Persons of every age, sex, and race are susceptible to disease caused by *Shigella* species. However, children under 10 have historically had the highest rate of cases reported. In 2005, 343 cases (36.6%) occurred in children less than five years of age (103.87 per 100,000 population), and another 254 (27.1%) occurred in children between five and nine years of age. The ages of cases reported ranged from 16 days to 98 years. Fifty-seven percent of the cases were female and 42% were male (gender was unknown for 1.3% of cases reported). For cases with a reported race, the highest incidence rate occurred in blacks (44.45 cases per 100,000 population), followed by those persons reporting their race as Native American (26.72 per 100,000 population), white (22.83 per 100,000 population), and Asian (10.69 per 100,000).

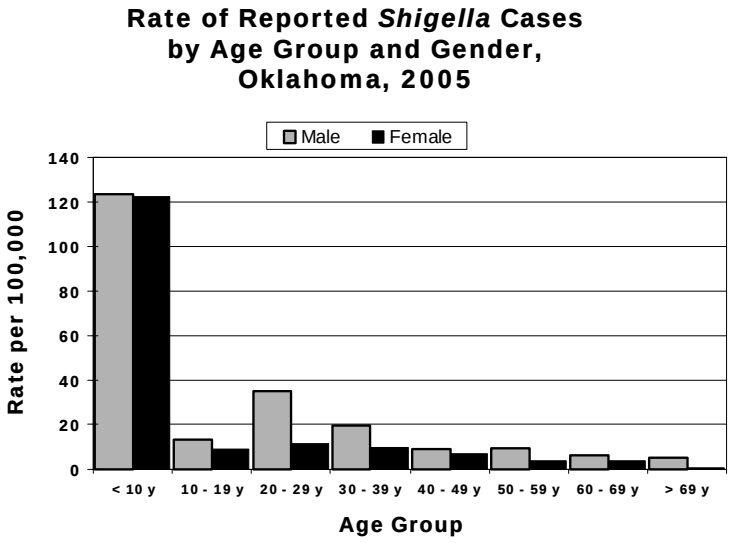
In 2005, shigellosis cases were reported in 46 counties in Oklahoma. Three counties accounted for 62.7% of the total number of reported cases: Oklahoma (49.5 cases per 100,000 population), Pottawatomie (215.2 cases per 100,000 population), and Cleveland (57.7 cases per 100,000 population). The large numbers of cases reported in 2005 are primarily the result of transmission within child care settings (CCS) and among members of the same household. Data regarding CCS associated cases was available for 71.8% (n=673) of reported cases. For cases with a known exposure history, 64.3% (n=433) of cases reported an association to a CCS. Of those cases, 276 (63.7%) were attendees, 20 (4.6%) were employees, and 137 (31.6%) had a family member that attended a CCS. Cases of shigellosis were also reported in persons associated with other high-risk settings including food handlers (2%, N=14). Two cases (0.02%) occurred in connection with long term care facilities in two separate counties.

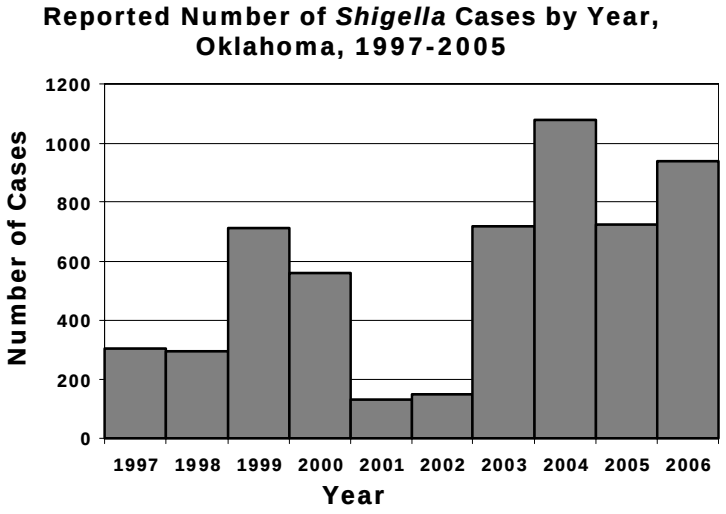
Shigellosis is typically a mild, self-limiting enteric disease with symptoms ranging from asymptomatic infections to severe disease. In 2005, 83 cases (8.9%) required hospitalization[#], and no deaths were reported. Because of the low infectious dose of 10-100 organisms required to cause disease, a high secondary attack rate is normally seen in high-risk settings such as foodservice establishments, child care centers, long-term care facilities, and health care settings. Appropriate antibiotic therapy is recommended for persons in these settings to hopefully lessen the severity of illness and reduce the length of bacterial

shedding. Public health interventions include inspections of these facilities by county health department sanitarians when outbreaks occur.

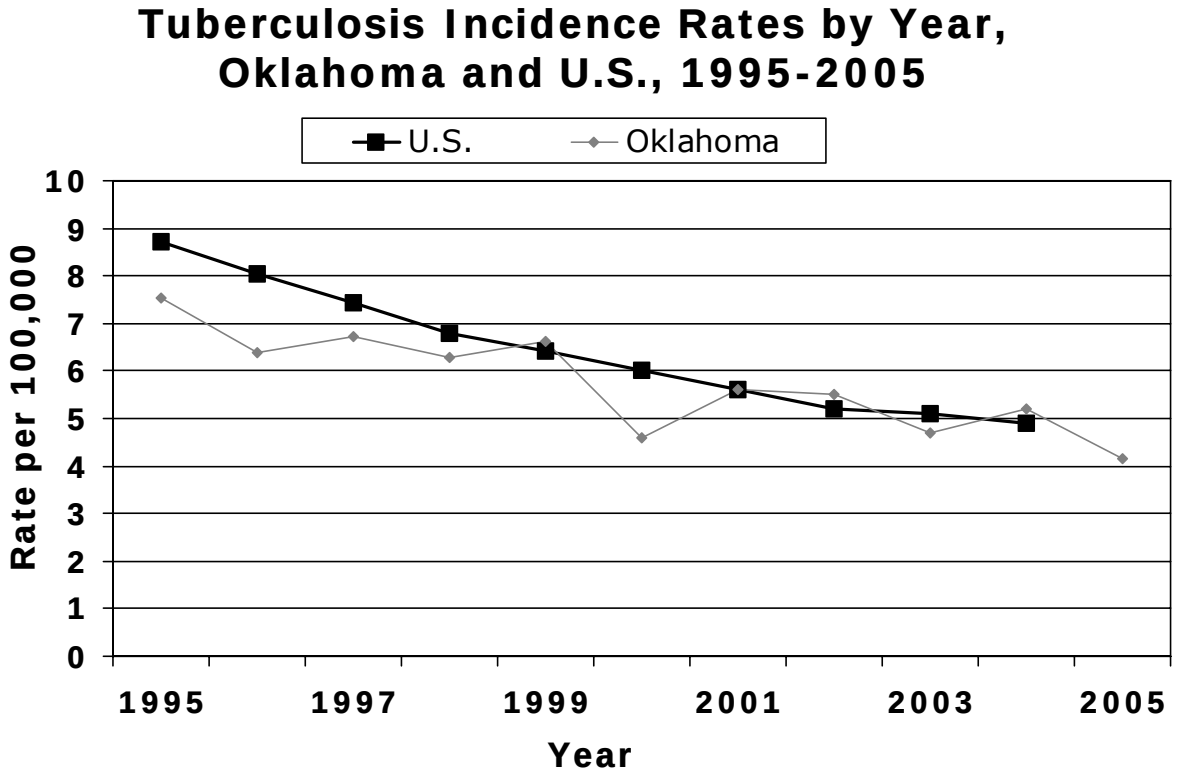
Measures to control transmission begin with increased efforts in rapid identification of suspects and removing them from high-risk settings while diarrhea is present. Other measures include promotion of frequent hand hygiene and environmental cleaning because the organism can persist on inanimate objects for extended periods of time. A vaccine is not available, and immunity after infection is thought to be temporary, possibly contributing to the wide fluctuation in the number of cases per year.

[#] Hospitalization status unknown for 126 cases





General Communicable Diseases



Finalized U.S. Tuberculosis numbers for 2005 not available at the time of this publication

Legionellosis

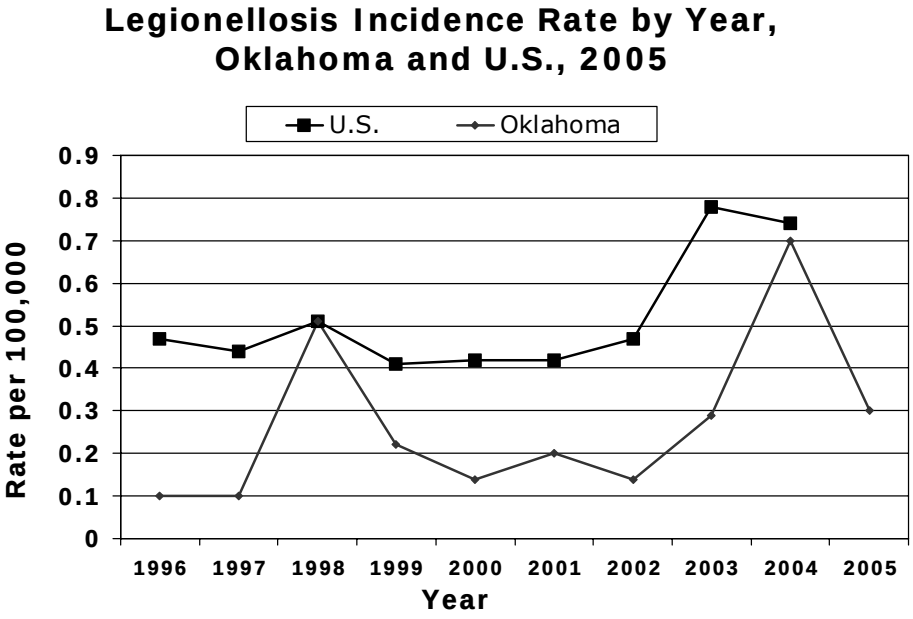
2005 Case Total 10 **2005 Rate 0.3 per 100,000**
2004 Case Total 24 **2004 Rate 0.7 per 100,000**

Ten cases of legionellosis were reported in 2005, a 58.3% decrease from 24 cases in 2004. An outbreak of legionellosis associated with a hotel hot tub and pool caused 2004 to be the year with the highest number of cases reported in the past 10 years.

Cases occurred among residents of 10 Oklahoma counties. The highest number of cases was reported from Tulsa County (3), with an incidence of 0.5 per 100,000. One to two cases were reported from Creek (1), Jackson (1), Muskogee (1), Oklahoma (2), Pottawatomie (1), and Washington (1) counties. The highest rate of legionellosis was from Jackson County with 3.5 per 100,000. The cases ranged from 40 years of age to 75 years of age with a mean age of 54.6 years. The highest age-specific incidence rate occurred in the 50 to 59 year old group with 1.29 per 100,000 representing 50% of the cases.

Seventy percent of cases were males (0.41 per 100,000); the incidence for males was 2.4 times higher than the rate among females (0.17 per 100,000). All of the cases reported their racial background as white. Eighty percent of cases reported having no Hispanic ethnicity, while Hispanic ethnicity was unknown for two cases. Forty percent (4/10) of cases were hospitalized; hospitalized status was unknown for two cases. There were no deaths due to legionellosis reported in 2005. Sixty percent (6/10) of cases were confirmed to be *L. pneumophila* serogroup 1 by urinary antigen testing. Two cases were confirmed by demonstration of a four-fold rise in antibody titer levels between acute and convalescent serology specimens, one case was confirmed by culture from bronchial fluid, and one case was confirmed by culture and isolation of *L. pneumophila* from a bronchoalveolar fluid specimen. The urinary antigen test continues to predominate the other diagnostic tests available because it provides rapid results for infections with *L. pneumophila* serogroup 1.

Laboratory reports positive for *L. pneumophila* are investigated by the CDD to determine if the case is sporadic or part of an outbreak. No outbreaks of legionellosis were identified in Oklahoma during 2005.



* Finalized national legionellosis data for 2005 was not available during the publication of this summary.

Malaria

2005 Case Total 12 **2005 Rate 0.29 per 100,000**
2004 Case Total 10 **2004 Rate 0.29 per 100,000**

Twelve cases of malaria were reported in 2005 representing a 20% increase from the number of cases reported in 2004. All of the cases reported travel to endemic areas during their exposure period including Central America and Africa. Cases were reported among residents of four counties: Oklahoma (7), Tulsa (3), Payne (1) and Cleveland (1). The mean age of cases was 33 years with cases ranging in age from 23 to 44 years. The majority (66.7%) of cases were men with a rate of 0.47 per 100,000, which is two times higher than the rate among females (0.23 per 100,000). The age-specific rates for malaria are as follows: 0.84 per 100,00 among those 20-29 years (N=4), 1.04 per 100,000 (N=5) among those 30-39 years, and 0.59 per 100,000 (N=3) among those 40-49 years. Cases reporting their racial background as black had the highest incidence of malaria with 3.07 per 100,000 population. Twenty-five percent of cases (0.11 per 100,000, N=3) reported their racial background as white; racial background was unknown for 1 case

Fifty-eight percent of the cases were hospitalized and no deaths were reported for 2005. Seventy-five percent of the cases had *Plasmodium falciparum* with 25% having *P. vivax*. International travel was associated with all of the twelve cases. Eighty-percent of cases reported travel to the West African region, Sierra Leone, Nigeria, or Ghana, during their exposure period. One case traveled to Ethiopia and one case traveled to Guatemala. Travel history was unknown for two cases. Only one case reported taking the recommended malaria prophylaxis medications during their international travel to malaria-endemic areas.

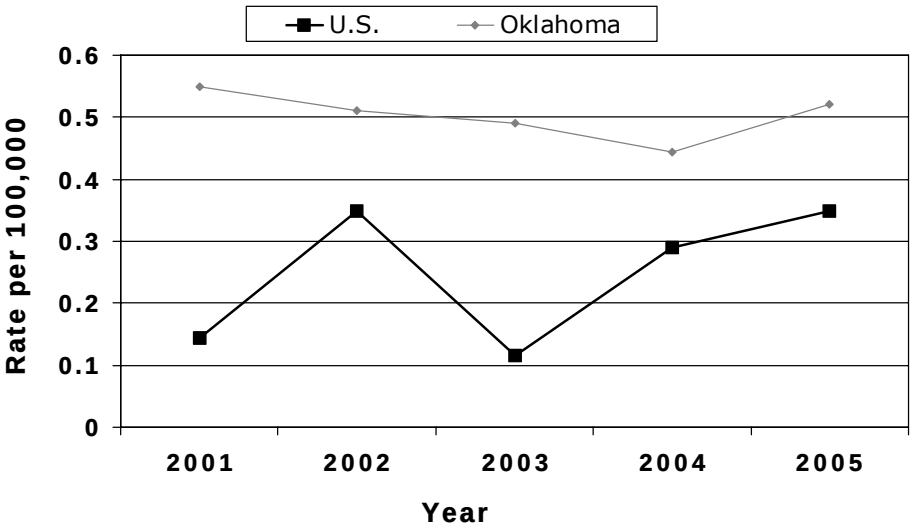
Malaria is a reportable disease in Oklahoma. Confirmation of malaria is accomplished through microscopic identification of the parasites in the patient's blood. Thick and thin slides prestained with Giemsa or Giemsa-Wright stain are required for examination. Slides from suspected malaria cases must be sent to the OSDH-PHL for confirmation (*310 O.A.C. § 315 Subchapter 1 et. seq*.).

Prevention of malaria includes appropriate prophylaxis, use of insect repellent containing DEET (N, N-diethyl-m-toluamide), and use of mosquito nets treated with permethrin, which may also be used on clothing and other items. Use of flying mosquito repellent is also advised. See the CDC Travelers' Health website at http://www.cdc.gov/travel/index.htm for more details and recommendations on prophylaxis and immunizations to prevent a variety of travel-related diseases.

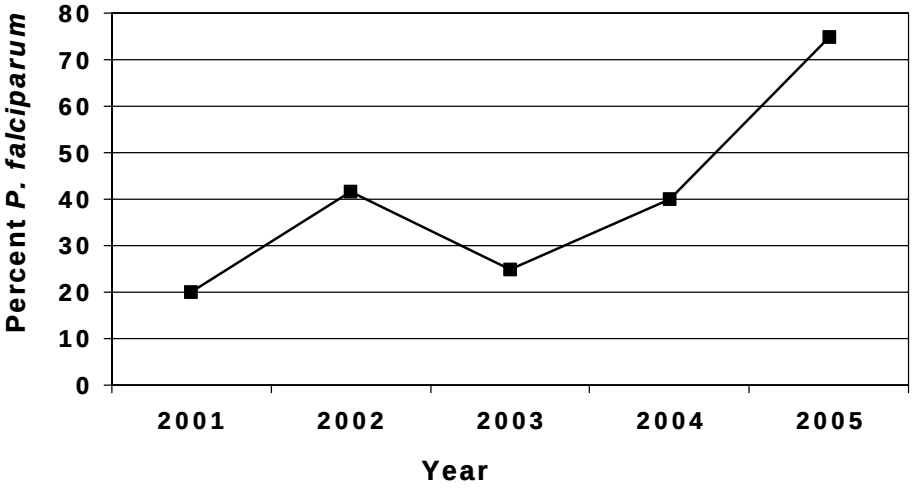
Additional Resources

1. CDC's Malaria website http://www.cdc.gov/malaria/facts.htm
2. OSDH Malaria Fact Sheet http://www.health.ok.gov/program/cdd/malaria.htm

Malaria Incidence Rate by Year, Oklahoma and U.S., 2005



Percent Malaria Cases Confirmed as *Plasmodium falciparum* by Year, Oklahoma



Pertussis

2005 Case Total 127	**2005 Rate 3.68 per 100,000**
2004 Case Total 120	**2004 Rate 3.50 per 100,000**

Oklahoma reported 127 cases of pertussis in 2005 representing a 5.5% increase from 2004 and resulting in an incidence rate of 3.68 per 100,000. Nationwide, 25,827 cases of pertussis were reported in 2004, and the U.S. incidence of reported pertussis cases increased for the third year in a row, to 8.9 cases per 100,000 population, more than twice the rate reported in 2003.

Counties reporting the highest rates of disease include Alfalfa County with 49.1 per 100,000 (N=3), Choctaw County with 19.6 cases per 100,000 (N=3), and Carter County with 13.2 cases per 100,000 (N=6). Other counties reporting high rates of pertussis include Cherokee County with 11.8 cases per 100,000 (N=5), Kay County with 10.4 cases per 100,000 (N=5) and Caddo County with 10.0 cases per 100,000 (N=3). Thirty-six percent (N=46) of the cases were reported from Oklahoma (3.5 per 100,000) and Tulsa (4.1 per 100,000) counties, with 23 cases each.

The incidence rates of pertussis were similar for males (3.6 per 100,000, N=62) and females (3.7 per 100,000, N=65). When stratified by age group, males had higher rates overall except in age categories 5 to 9 years (5.03 vs. 0.80 per 100,000), 20 to 24 years (3.35 vs. 1.56 per 100,000), and 45 to 49 years (4.11 vs. 0.84 per 100,000). In those age groups, women had a substantially higher rate than males. The highest rates of pertussis occurred among those that reported their racial background as Native American (7.7 per 100,000, N=21) and those with Hispanic ethnic background (3.9 per 100,000, N=7). The incidence rate of cases occurred in those who reported their racial background as white was 3.23 per 100,000. Cases ranged in age from 9 days to 70 years with the median age of 9 years. The highest rate of pertussis occurred in those under the age of one year with 96.8 cases per 100,000 (N=46). Other age categories with high rates of pertussis include those 10 to 14 years (7.14 per 100,000) and 35 to 39 years (3.47 per 100,000). Children under the age of 5 years accounted for 45% of cases with an incidence rate of 24.1 per 100,000 (N=57). Infants less than six months of age accounted for 35% of cases (N=44). Adults over the age of twenty accounted for 31% of cases (N=40).

Twenty-seven percent (N=34) of cases were hospitalized due to pertussis; infants under the age of 6 months accounted for 85% of those hospitalized. The median hospital stay due to pertussis was 4 days. There was one death due to pertussis in a one month-old female from Garfield County who had a cough and apnea.

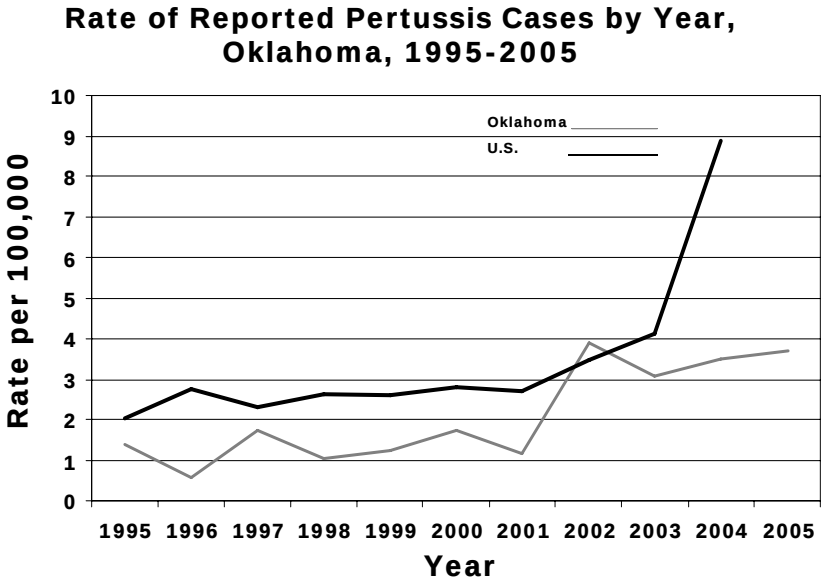
Ninety-three percent of cases reported to have paroxysmal cough, 64% of cases had post-tussive vomiting, 61% reported to have an inspiratory whoop, and 41% of cases reported to have apnea. The median duration of cough was 32 days. Among those under one year of age, 93% (N=42) of cases were reported to have paroxysmal cough, 58% (N=26) of cases were reported to have an inspiratory whoop, 72% (N=33) reported post-tussive vomiting and 63% (N=29) of cases were

reported to have apnea. The most frequently reported symptom among those age 20 and older was paroxysms (95%, N=38) followed by 73% (N=29) reporting an inspiratory whoop and 62.5% (N=25) reporting post-tussive vomiting.

No outbreaks of pertussis were reported in high risk settings such as schools, child care facilities, or other institutional settings in Oklahoma in 2005. However, clusters of cases did occur in family and extended family groups. The median number of contacts per case was 4 and the maximum number of contacts per case was 92.

Percent of Pertussis Cases with Specific Symptoms by Age Group 2005, Oklahoma

Age Group	Number of Cases	Paroxysmal Cough	Whoop	Post-tussive Vomiting	Apnea
<6 mos	44	88.6%	54.5%	68.2%	63.6%
6-11 mos	3	100%	66.6%	100%	33.3%
1-4 yrs	43	95.1%	63.4%	69%	59.5%
5-9 yrs	7	85.7%	57.1%	28.6%	28.6%
10-19 yrs	23	95.7%	47.8%	60.9%	34.8%
20+ yrs	40	95%	73%	62.5%	33.3%



Animal Rabies

2005 Statewide Case Total	**79**
2004 Case Total	**113**

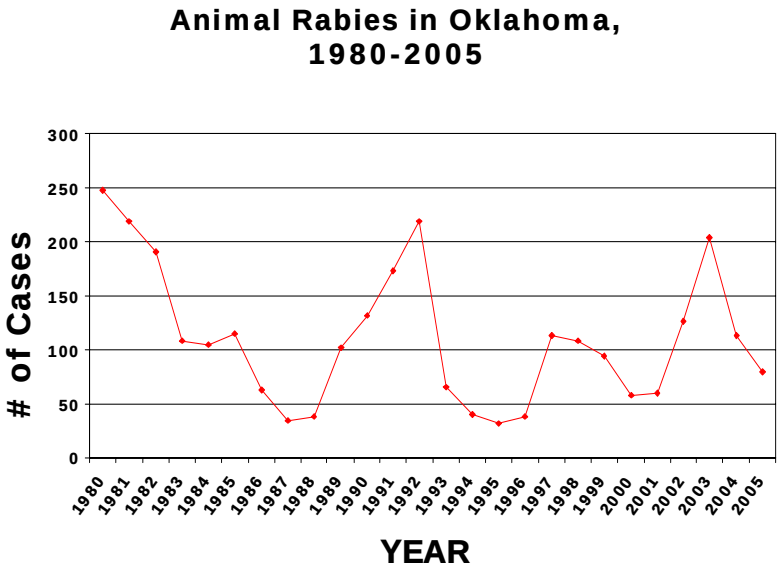
Animal rabies cases in Oklahoma continued to decline for the second consecutive year following an 11-year high reported in 2003. A total of 79 cases of animal rabies were laboratory-confirmed in 2005, compared to 113 documented the previous year. The months of highest incidence were March through May with peak activity of 15 cases occurring in March. Animals testing positive were: 52 (66%) skunks, 8 (10%) cows, 7 (9%) cats, 5 (6%) dogs, 4 (5%) horses, 2 (3%) bats, and 1 (1%) goat. Skunks are the major animal reservoir of rabies in Oklahoma and annually account for greater than 70% of animals testing positive for rabies in the state. The annual number of animal rabies increases as the skunk population fluctuates, peaking approximately every six to eight years.

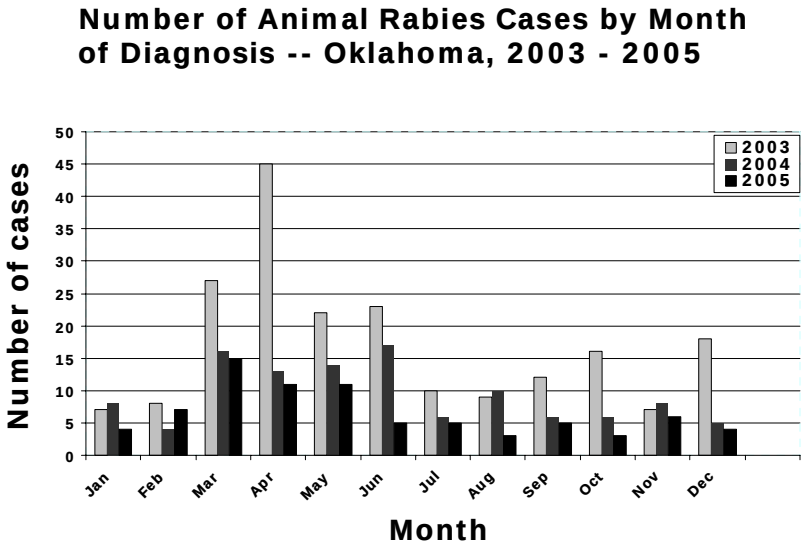
Rabies was confirmed in animals from 43 (56%) of the 77 counties in Oklahoma. In 2005, the counties with the highest number of laboratory confirmed rabid animals included Oklahoma (7 cases), Payne (4 cases), and Pottawatomie (4 cases). Risk assessments performed by CDD epidemiologists identified human exposures in 23% of the rabies cases resulting in recommendations for 161 persons to receive rabies PEP. However, one hundred twenty-five (78%) of those persons receiving rabies PEP were associated with a mass exposure event in Rogers County during December when a cow in a raw milk dairy herd proved to be rabid. Pet or domestic animal exposure was reported in 71% of cases. A sum of 177 owned animals (range 1-16 animals per case) were determined exposed to rabies. Of the animals exposed, 132 (75%) were not currently vaccinated against rabies. One hundred fifteen (87%) of these pets were euthanized and 17 (13%) were quarantined at a licensed veterinarian for up to six months. This action was required as a result of pet owners not having their pets vaccinated against rabies. When a currently vaccinated pet has exposure to a rabid animal, the exposed pet needs only to receive a rabies vaccine booster and be closely observed at the owner's home for 45 days.

Healthy dogs, cats, and ferrets that bite a person may simply be observed for 10 days following the bite incident to rule out the risk of rabies transmission. If the animal develops symptoms of rabies or dies during the 10-day observation period, the brain tissue of that animal should be submitted for rabies testing as soon as possible. Wild carnivorous animals such as skunks, foxes, or coyotes and bats that bite a person should be euthanized and immediately submitted for rabies evaluation. Squirrels, rabbits, rats, mice, and opossums rarely transmit rabies; therefore, it is usually not necessary to test these types of animals unless the animal was exhibiting very unusual behavior.

Rabies surveillance is primarily laboratory-based and the OSDH Laboratory is the only approved rabies testing laboratory in the state. The OSDH Laboratory employs a direct fluorescent antibody test on three different anatomic regions of the brain (medulla, cerebellum, and hippocampus). A conclusive test result requires that at

least two of these three brain sections be tested in an animal. If an animal tests positive for rabies virus infection, an epidemiologist with the OSDH CDD immediately launches a human and animal exposure risk assessment and provides recommendations for any human rabies PEP. Exposed persons are referred to their personal health care provider for administration of the human rabies vaccine and immune globulin. The OSDH and local city county health departments do not supply or administer the rabies PEP. Any livestock or pets deemed to be exposed to a rabid animal are managed according to the state's zoonotic disease control rules (OAC 310, Chapter 599).





Number of Animal Rabies Cases by County, Oklahoma, 2004 – 2005

	Rabies, Animal			Rabies, Animal	
County	**2004 Total**	**2005 Total**	**County**	**2004 Total**	**2005 Total**
Adair	0	0	LeFlore	1	0
Alfalfa	1	1	Lincoln	1	0
Atoka	0	0	Logan	0	3
Beaver	2	2	Love	0	0
Beckham	6	3	McClain	0	1
Blaine	2	3	McCurtain	1	0
Bryan	2	1	McIntosh	2	1
Caddo	1	0	Major	2	0
Canadian	7	2	Marshall	1	0
Carter	2	1	Mayes	1	2
Cherokee	0	2	Murray	1	0
Choctaw	0	0	Muskogee	0	1
Cimarron	0	0	Noble	1	0
Cleveland	5	1	Nowata	1	1
Coal	0	1	Okfuskee	3	2
Comanche	0	3	Oklahoma	8	7
Cotton	1	1	Okmulgee	0	0
Craig	2	0	Osage	1	0
Creek	1	1	Ottawa	0	0
Custer	0	0	Pawnee	0	1
Delaware	1	0	Payne	3	4
Dewey	1	1	Pittsburg	1	0
Ellis	6	1	Pontotoc	1	1
Garfield	7	3	Pottawatomie	5	4
Garvin	7	3	Pushmataha	2	0
Grady	2	0	Roger Mills	1	1
Grant	0	0	Rogers	0	3
Greer	0	1	Seminole	0	1
Harmon	2	1	Sequoyah	0	0
Harper	0	0	Stephens	0	1
Haskell	0	1	Texas	0	1
Hughes	0	0	Tillman	0	3
Jackson	2	0	Tulsa	2	1
Jefferson	0	2	Wagoner	0	0
Johnston	1	0	Washington	3	1
Kay	0	0	Washita	1	0
Kingfisher	1	0	Woods	1	0
Kiowa	0	1	Woodward	6	3
Latimer	1	0	**State of Oklahoma**	113	79

Tuberculosis

2005 Case Total 144	**2005 Rate 4.2 per 100,000**
2004 Case Total 178	**2004 Rate 5.2 per 100,000**

Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, is a treatable, curable and preventable disease. Tuberculosis continues to be an important cause of morbidity and mortality in Oklahoma. In 2005, 144 Oklahomans were diagnosed with active tuberculosis, an incidence rate of 4.2 cases per 100,000. This was a 24% decrease from 2004. Although the incidence of TB has been declining, continued diligent efforts are required.

In 2005, 54/144 (38%) cases were residents of Oklahoma and Tulsa County. The remaining 90 cases were scattered over the state, with many counties having one or two cases (see map). TB can be sporadic and episodic - years may pass in which TB does not occur in a county or area, followed by its reoccurrence in that area.

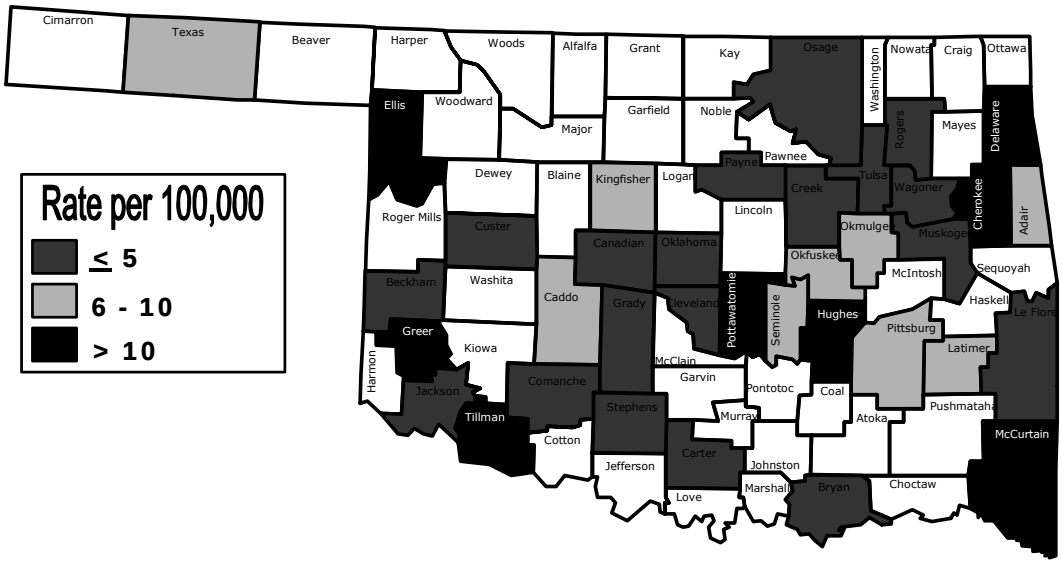
TB primarily affects adults. The rate of TB has decreased in those $\geq$ 65 years from 11 cases/100,000 to 5 cases/100,000 over the last 5 years. For the past five years there has been an average of 12 deaths per year from tuberculosis or as a contributing cause of death. The average age at death for these cases is 63.8 years. In 2005, 13 cases were in the homeless population, 5 cases were from nursing homes, 10 cases were also diagnosed with AIDS, and 8 cases were from the penal system. Five percent (5/93) of culture confirmed cases were resistant to Isoniazid in 2005.

In 2005, Asians had the highest incidence rate of TB with 30 cases per 100,000 population, followed by American Indian with 12 per 100,000, blacks with 8 per 100,000, hispanic with 7 per 100,000 population, and white with 3 per 100,000 population. Oklahoma has experienced a shift in the proportion of incident TB cases occurring among the foreign-born population: from 13% and 17% in 2001 and 2002 to 21% to 24% in 2003 to 2005. This shift is similar to trends seen elsewhere in the U.S.

Persons at higher risk for TB exposure or infection include:

- Close contacts of persons, known or suspected to have TB;
- Foreign-born persons from areas of TB incidence or prevalence such as Asia, Africa, Latin America, Eastern Europe, and Russia;
- Residents and employees of high-risk congregate settings;
- Health care workers who serve high-risk clients;
- Infants, children, and adolescents exposed to adults in high-risk categories;
- Persons identified as intravenous substance abusers; and
- Persons who are Asian, Hispanic, African American, Native American, homeless, and migrant farm workers.

Rate of Reported Tuberculosis Cases by County of Residence, Oklahoma, 2005



Typhoid Fever

2005 Case Total 1	**2005 Rate 0.029 per 100,000**
2004 Case Total 1	**2004 Rate 0.029 per 100,000**

Typhoid fever is a reportable disease in Oklahoma. Cases reported to the OSDH-CDD are investigated to determine if the disease was acquired during international travel to a county where typhoid fever is endemic and to determine if the case is associated with a high-risk setting such as a daycare, foodservice establishment, or a patient care setting. One case of typhoid fever was reported to the OSDH-CDD during 2005. Typhoid fever is an uncommon disease in Oklahoma; three or fewer cases have been reported each year since 1990.

In October 2005, *S. typhi* was isolated from blood and urine specimens collected from a Garfield County resident. Isolates were forwarded to the OSDH-PHL and were subsequently confirmed to be *Salmonella typhi*. The case was a 21-year-old female who had been an Oklahoma residence since 2004. The case was hospitalized for 8 days with fever, abdominal pain and cramps, anorexia, headache, malaise, vomiting, chills, and painful urination. Investigation identified nine household members, however none reported experiencing symptoms of typhoid fever. The case reported traveling to the Marshall Islands between March and April of 2005.

Over the last century, public health measures such as availability of clean water and improved sanitation have played a major part in reducing the incidence of typhoid fever, a disease that use to be a major cause of morbidity and mortality in the U.S. An average of 400 cases of typhoid fever are reported in the U.S. every year; approximately 70% of cases are acquired during travel to developing countries. People who travel to Asia, Africa, and Latin America are at greatest risk of disease due to typhoid fever. A vaccine for typhoid fever is available, although it is only recommended for individuals traveling to higher risk countries where there is a risk for exposure to contaminated food and water. Vaccination is especially recommended for travelers who frequent villages and rural settings. Travelers should be cautioned that the vaccine is not 100% effective in preventing typhoid fever so all travelers to these higher risk areas should be cautious regarding their food and water consumption. Information on typhoid fever and other diseases of concern for travelers is available on the CDC's travelers' health website at www.cdc.gov/travel.

Vibriosis

2005 Case Total 5 **2005 Rate 1.45 per 100,000**
2004 Case Total 1 **2004 Rate 0.03 per 100,000**

Several *Vibrio* species are pathogenic to humans, which include *V. cholerae* O1/O139, *V. cholerae* non-O1/O139, *V. parahaemolyticus*, and *V. vulnificus.* Symptoms of illness range from gastroenteritis and wound infections to septicemia. *Vibrio* infections are reportable in Oklahoma and isolates of *Vibrio* species are required to be forwarded to the OSDH-PHL for confirmation and speciation. In 2005 the OSDH-CDD identified and investigated five Vibrio species cases. There were three cases of *V. cholerae* non-01/0139 (one imported), and one case each of *V. parahaemolyticus* and *V. vulnificus* (imported). The two imported cases occurred in Louisiana residents who survived hurricane Katrina and were temporarily sheltered in Oklahoma, and one of these was diagnosed during a hospitalization for an unrelated reason. No deaths occurred. The following summaries describe the cases.

Vibrio cholerae non-01.0139

One imported *V. cholerae* case from Louisiana was identified in a 42-year-old male Katrina survivor. The organism was cultured from a lower extremity wound site, and the patient described having waded in the floodwaters in New Orleans following the hurricane. Two Oklahoma residents with *V. cholerae* were lost to follow-up despite numerous attempts to make contact. The cases occurred in male's ages 12 and 15 years old. The specimens were stool and urine respectively. Upper extremity skin infections were noted in each of these cases.

Vibrio parahaemolyticus

One 56-year-old female with a history of Crohn's disease developed severe diarrhea and was treated in an emergency room for dehydration. During the investigation, she stated she had consumed raw oysters at a restaurant buffet two days prior to her symptom onset. The county health department subsequently performed a restaurant inspection and found several food code violations. As a result, the restaurant chose to stop serving raw oysters. This represents the first case of *V. parahaemolyticus* reported in Oklahoma since *Vibrio* species became reportable in 2003.

Vibrio vulnificus

One imported *V. vulnificus* case from Louisiana was detected in a 53-year-old male Katrina survivor with a history of diabetes. The organism was cultured from a wound site, and this patient also described having waded in the floodwaters in New Orleans following the hurricane. The infection was discovered during his hospitalization for heart problems.

Vibrio vulnificus infections are uncommon in inland areas, but when they do occur; it is primarily associated with a distinctive soft tissue infection or septicemia. More than 90% of persons that experience *Vibrio vulnificus* septicemia are infected through the ingestion of contaminated, raw seafood during the 7 days prior to illness onset. *V. vulnificus* has been identified as a cause of fatal septicemia in persons with specific underlying medical conditions. Those at highest risk of life threatening illness include persons with: liver disease, alcoholism, diabetes mellitus, malignancies, or immunosuppressive disorders. Typical symptoms of severe illness include fever, chills, decreased blood pressure, and swollen legs with hemorrhagic skin lesions. Clinicians should advise their patients with these conditions not to eat raw or undercooked seafood including raw oysters.

In both healthy and immunocompromised persons, contamination of a superficial wound with *Vibrio vulnificus* causes a rapidly developing cellulitis, necrotizing vasculitis, and ulcer formation at the wound site. Clinicians should suspect *V. vulnificus* in persons with cellulitis with exposure to seawater during the 7 days prior to illness onset.

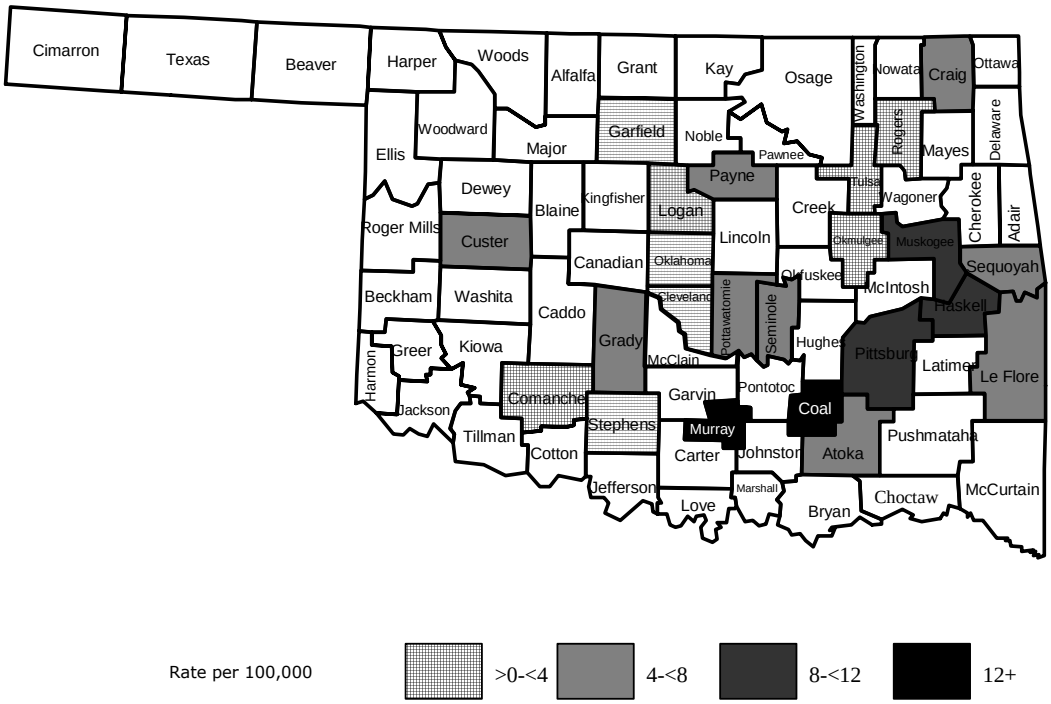
References:

- Mandell GL, Bennett JE, Dolin R. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Fifth Edition, 2000. Churchill Livingstone.

- Centers for Disease Control and Prevention. Two Cases of Toxigenic *Vibrio cholerae* O1 Infection After Hurricanes Katrina and Rita — Louisiana, October 2005. MMWR 2006;55: 31-2.

Hepatitis

Rate of Reported Acute Hepatitis B Cases by County of Residence, Oklahoma, 2005



Hepatitis A

2005 Case Total 7	**2005 Rate 0.20 per 100,000**
2004 Case Total 19	**2004 Rate 0.58 per 100,000**

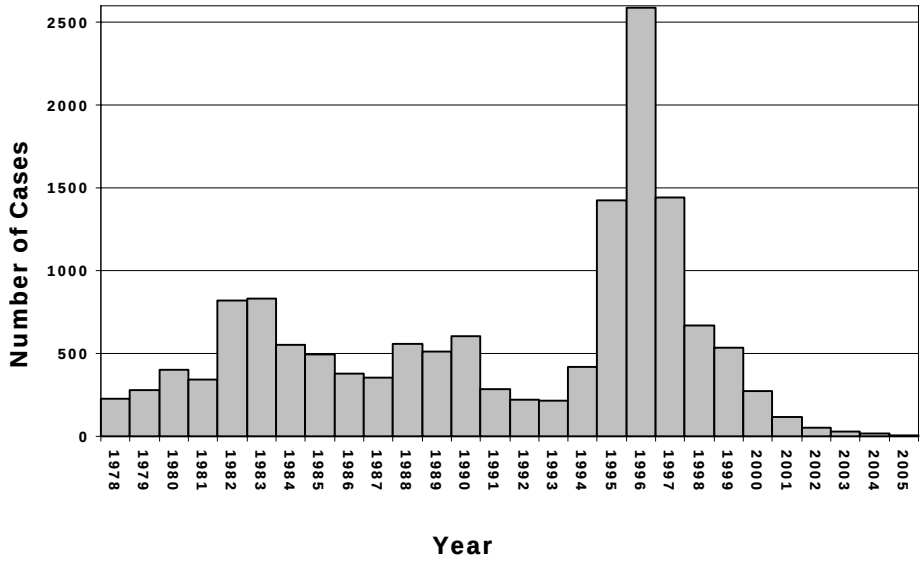
The incidence of hepatitis A continued to decline in 2005, as it has each year following the statewide epidemic during 1995 through 1997. Only 7 cases of hepatitis A were reported to the OSDH-CDD in 2005, an incidence rate of 0.2 per 100,000. Cases were reported among residents from 6 counties: Choctaw (6.5 per 100,000, N=1), Wagoner (1.7 per 100,000, N=1), Creek (1.5 per 100,000, N=2), Oklahoma County (0.3 per 100,000, N=2), Comanche (0.9 per 100,000, N=1) and Tulsa County (0.2 per 100,000, N=1). This is a decrease of 63.2% compared to 2004 (N=19). No outbreaks of hepatitis A were identified in 2005.

The age range of cases was 4 to 46 years with a median age of 33. The cases were fairly evenly distributed between the 20-29 (0.42 per 100,000), 30-39 (0.42 per 100,000), and 40-49 (0.4 per 100,000) year old age groups. The rate of hepatitis A among males (0.35 per 100,000; 85.7%) was six and a half times the rate of hepatitis A in females (0.06 per 100,000; 14.3%). Fifty-seven percent of cases reported their racial background as white (N=4) and 14.1% reported their racial background as black, Asian or other. The highest rate of hepatitis A among categories of racial background occurred among Asians with 2.14 cases per 100,000. Regarding Hispanic ethnicity, 28.6% of cases reported a Hispanic ethnicity (1.12 per 100,000).

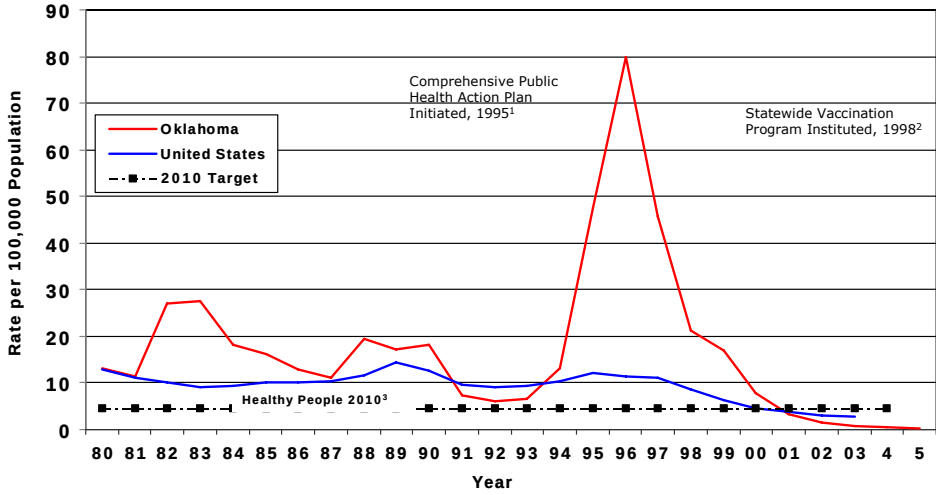
All of the (N=7) cases reported dark urine, 71.4% (N=5) of cases reported jaundice and 14.3% of cases (N=1) reported clay colored stool. Other prominent symptoms reported were fever and nausea (57.1%), vomiting (42.9%) and cramps (28.6%). The median ALT (alanine aminotransferase) was 1,648 (range=157-4, 126), the median AST (aspartate aminotransferase) was 1,178 (range=266-3, 486) and the median total Bilirubin was 5.7 (range=2.2-15). Twenty-nine percent (N=2) of the cases were hospitalized and there were no deaths due to hepatitis A. None of the cases were associated with child care, food handlers, or were close contacts to a known case of hepatitis A. One case was associated with eating raw fish and 1 case reported using drugs or knowing someone who uses drugs during the two to six weeks prior to their onset of illness.

Public Health Investigation: Hepatitis A must be reported to the OSDH immediately upon diagnosis or positive serologic test for IgM antibodies to hepatitis A. County health departments CDN's perform rapid investigation and follow-up of all reported cases. For each case, they determine risk factors for disease acquisition and spread. They prevent transmission of the virus to identified contacts through administration of immune globulin and education. A total of 14 individuals received immune globulin (IG) prophylaxis as a result of being a contact to a case of hepatitis A. The median number of contacts receiving IG was 2 and the number of contacts ranged from one to three.

Reported Cases of Hepatitis A by Year, Oklahoma, 1978-2005



Rate of Hepatitis A
Oklahoma and United States; 1980-2005



[1] Comprehensive Public Health Action Plan consisted of aggressive surveillance, enhanced Hepatitis A testing, aggressive confirmed and epi-link case investigation and contact prophylaxis, and public awareness and prevention media campaigns.

[2]Due to the statewide outbreak of Hepatitis A 1995-1997, Oklahoma became the first state in the nation to mandate Hepatitis A vaccinations for daycare and school (K and 7th grade) admission in 1998.

[3]The Healthy People 2010 Target Rate for Hepatitis A in the United States is 4.5 cases per 100,000 population.

National Data Provided by the Centers for Disease Control Oklahoma Data Provided by the Communicable Disease Division, Oklahoma State Department of Health

Hepatitis B

2005 Case Total 61	**2005 Rate 1.77 per 100,000**
2004 Case Total 80	**2004 Rate 2.32 per 100,000**

Nationwide, the incidence of hepatitis B has dramatically declined over the past ten years. This decline can be attributed to implementation of a comprehensive strategy for achieving the elimination of hepatitis B in the U.S. This strategy includes the following interventions: screening of all pregnant women for HBV infection; administration of post-exposure prophylaxis to infants born to infected women; routine vaccination of all infants and children <19 years; and targeted vaccination of individuals at increased risk of hepatitis B including health care workers, dialysis patients, household contacts and sex partners of persons with chronic HBV infection, recipients of certain blood products, persons with a recent history of having had multiple sex partners or a STD, men who have sex with men, and injecting drug users.

In Oklahoma, reported acute hepatitis B cases decreased from 80 cases in 2004 to 61 cases in 2005, representing a decline of 24%. The overall incidence rate of reported acute cases of 1.77/100,000 is the lowest rate recorded in recent years.

The highest percentage of acute cases were reported among males (52%) over females (48%). Hepatitis B rates vary by age with the highest rates reported among persons aged 35-44 years (4.39/100,000) and aged 25-34 (2.88/100,000). No cases were reported among persons aged <15 years.

Rates of acute hepatitis B were reported to be highest among Asian/Pacific Islanders (4.07/100,000), followed by Native Americans (3.29/100,000), whites (1.75/100,000) and blacks (1.53/100,000). No cases were reported among Hispanics.

Eighty-two percent of acute hepatitis B cases reported jaundice and 28% of cases reported being hospitalized for acute illness. No cases were reported to have died due to illness related to hepatitis B.

In 2005, five counties experienced acute hepatitis B incidence rates of 8/100,000 or greater. These counties were located in southeastern Oklahoma.

Number and Rate per 100,000 Population of Reported (Disease) Cases by Gender and Age Group, 2004-2005, Oklahoma

	Male				Female			
	2004		2005		2004		2005	
Age Group	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Less than 15 years	0	0	0	0	0	0	0	0
15 – 24 years	3	1.12	5	1.87	6	2.40	4	1.60
25 – 34 years	7	3.05	5	2.18	17	7.65	8	3.60
35 – 44 years	13	4.99	13	4.99	7	2.66	10	3.81
Greater than or equal to 45 years	13	2.31	9	1.6	14	2.11	7	1.06
Total	36	2.12	32	1.89	44	2.51	29	1.65

Reported Risk Factors of Persons Reported with Acute Hepatitis B, 2005, Oklahoma

Exposure during the 6 weeks-6 months before illness onset	n	%
Injection drug use	25	41
Sexual contact with hepatitis B infected person	3	5
Household contact of hepatitis B infected person	1	2
Medical employee with contact to blood	2	3
Hemodialysis	0	0
More than one sex partner	57	93
Heterosexual	55	90
Male homosexual or bisexual	2	3
Blood transfusions	5	8
Surgery	10	16
Percutaneous injury	2	3
Tattoo	6	10
Dental work or Oral surgery	11	18

Hepatitis C

2005 Case Total 14 **2005 Rate 0.41 per 100,000**
2004 Case Total 7 **2004 Rate 0.20 per 100,000**

A total of 2,604 positive laboratory tests for hepatitis C were reported to the OSDH in 2005. These reports signify infected individuals who had not been previously reported to the OSDH. Only 14 of the 2,604 were classified as acutely infected based on the acute hepatitis C case definition.

Of the 14 hepatitis C acute cases, six (43%) were male and eight (57%) were female. The highest rates were among the ages of 25-34 years (0.89/100,000), and 35-44 years (0.89/100,000), followed by 15-24 years (0.58/100,000), <15 years (0.14/100,000) and >45 years (0.08/100,000). The highest rates were seen among Native Americans (1.1/100,000), followed by Hispanics (0.56/100,000) and Whites (0.42/100,000).

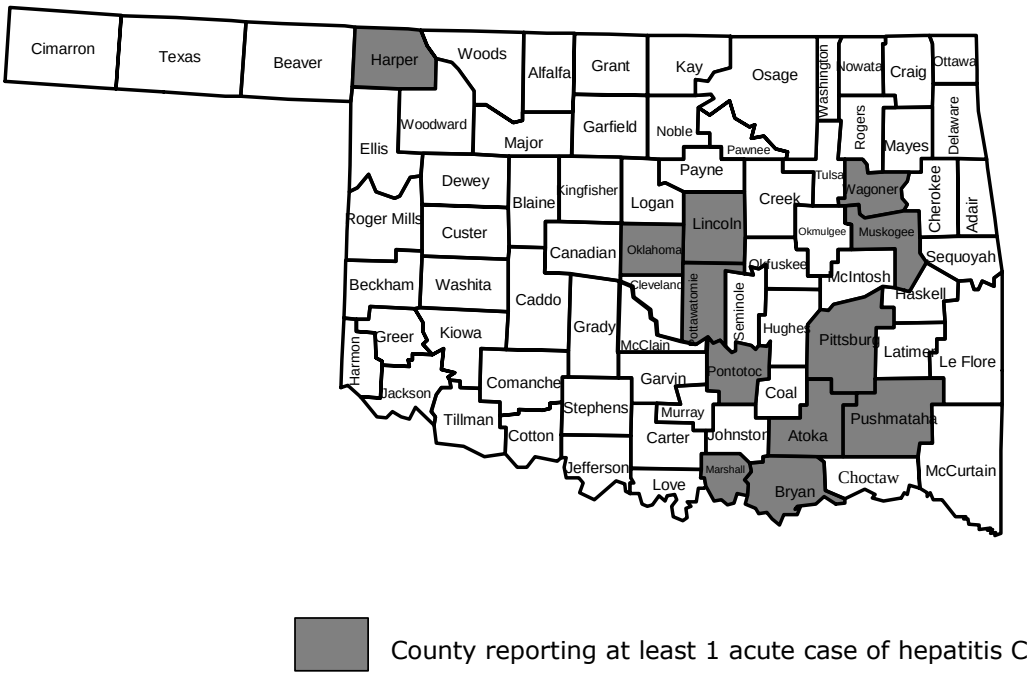
Seven cases (50%) of acute hepatitis C cases reported jaundice and two cases (14%) reported being hospitalized for acute illness. No cases were reported to have died due to illness related to hepatitis C.

Based on Oklahoma 2000 Census data, there are an estimated 44,859 persons living in Oklahoma with chronic hepatitis C infection.

Reported Risk Factors of Persons Reported with Acute Hepatitis C, 2005, Oklahoma

Exposure during the 6 weeks-6 months before illness onset	n	%
Injection drug use	7	50
Sexual contact with hepatitis B infected person	0	0
Household contact of hepatitis B infected person	1	7
Medical employee with contact to blood	0	0
Hemodialysis	0	0
More than one sex partner	14	100
Heterosexual	5	36
Homosexual or bisexual	2	14
Blood transfusions	1	7
Surgery	2	14
Percutaneous injury	0	0
Tattoo	2	14
Dental work or Oral surgery	1	7

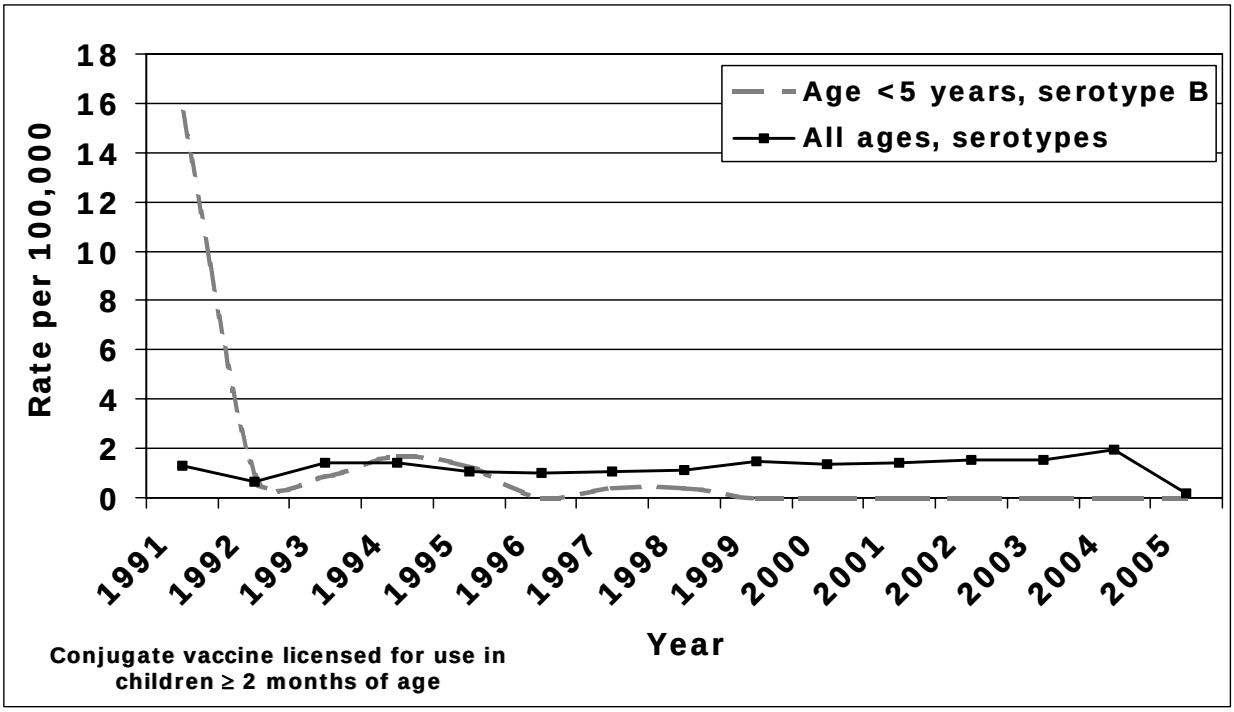
Reported Acute Hepatitis C Cases by County of Residence, Oklahoma, 2005



County reporting at least 1 acute case of hepatitis C

Meningitis / Septicemia

Rate of Reported *H. Influenzae* Cases, All Ages and Serotypes, and < 5 Years, Serotype B, Oklahoma, 1991 – 2005



Invasive *Haemophilus influenzae* Disease in Children Aged <5 Years

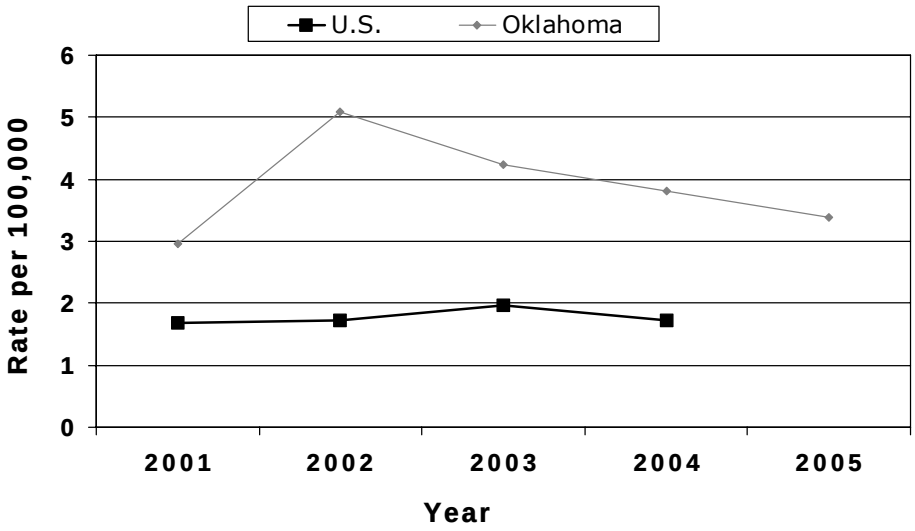
2005 Case Total 8	**2005 Rate 3.38 per 100,000**
2004 Case Total 9	**2004 Rate 3.81 per 100,000**

Eight cases of invasive *Haemophilus influenzae* disease in children aged <5 years were reported in 2005, an 11% decrease from 2004. Over the last ten years, the rate of invasive *Haemophilus influenzae* disease in children aged <5 years has fluctuated in Oklahoma. Since peaking in incidence in 2002 (see graph), rates of invasive *Haemophilus influenzae* disease in children aged <5 years in Oklahoma have been declining, but have still been higher than the national rates. National disease estimates for 2005 are not yet available.

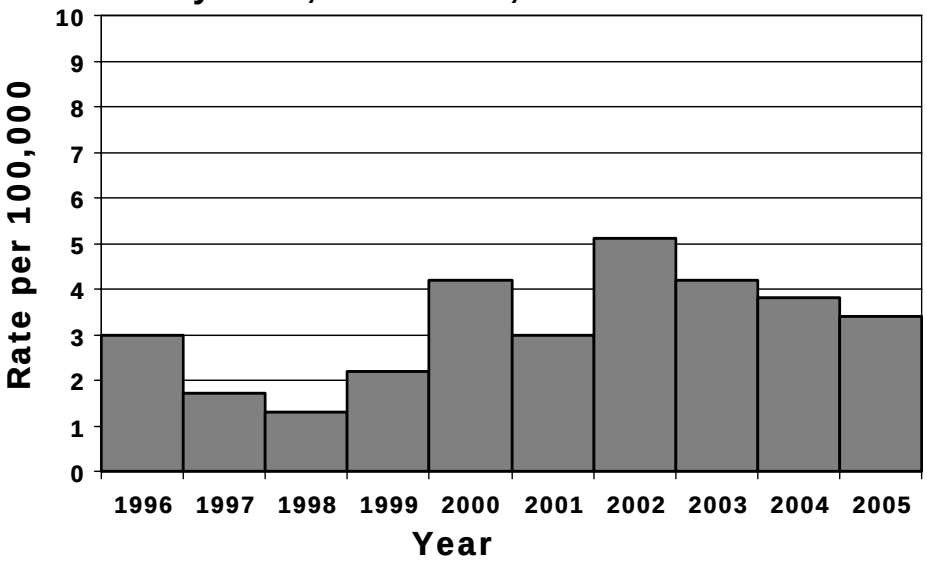
Seven cases (87.5%) of invasive *Haemophilus influenzae* disease in children aged <5 years occurred in females. Among racial groups, whites had the highest number of cases, at 6, followed by one case each in Asians and blacks. In 6 of 8 cases (75%), where Hispanic ethnicity was ascertained, none were Hispanic. Seven (87.5%) cases of invasive *Haemophilus influenzae* disease in children aged <5 years were hospitalized and no deaths were reported.

The occurrence of *H. influenzae* type b (Hib) in Oklahoma continues to remain low since the conjugated Hib vaccine became a required childhood immunization in Oklahoma in the late 1980s. The last case of Hib in a child less than five years of age was in 1998. Laboratories in Oklahoma are required to submit sterile-site isolates of *H. influenzae* to the OSDH-PHL for confirmation and serotyping. Isolates were submitted for all 8 cases of invasive *Haemophilus influenzae* disease from children aged <5 years in 2005; all 8 isolates (100%) were nontypeable.

H. influenzae Invasive Disease Cases in Children <5 Years of Age Incidence Rate by Year, Oklahoma and U.S., 2005



Rate of Reported _H. influenzae_ Invasive Disease Cases in Children <5 Years of Age by Year, Oklahoma, 1996-2005



Invasive Group A Streptococcus

2005 Case Total 132 **2005 Rate 3.83 per 100,000**
2004 Case Total 73 **2004 Rate 2.12 per 100,000**

Invasive Group A Streptococcus was added to the Oklahoma reportable disease list in June of 2000. One hundred thirty-two cases of invasive *S. pyogenes* (3.83 cases per 100,000) were reported in 2005, a 31% increase from the previous year. Since it became reportable four years ago, the average number of cases has been 69 cases per year. No outbreaks, geographic clusters, or other trends were identified.

Occurrence of reported cases by gender was fairly evenly distributed with 68 cases reported among females (51.6%) and 64 cases among males (48.5%). The ages of cases ranged from five months to 92 years, with a median age of 53 years. Sixteen cases (12.12%) occurred in children under 10 years of age, and 52 (39.4%) occurred in persons over age 60. The youngest and older age groups had the highest observed rates of Group A *Strep* invasive disease. The rate of disease among infants less than one year was 6.31 per 100,000 and the rate among persons 70 years old or older was 11.6 per 100,000.

The highest rate of disease occurred among persons that reported their racial background as black with a rate of 6.51 cases per 100,000 population (17 cases), followed closely by American Indians at 4.39 (12 cases) and whites at 3.50 per 100,000 (92 cases). Persons reporting their race as Asian resulted in a race-specific rate of 2.14 per 100,000 (1 case).

Cases were identified in 30 counties across the state with the greatest number of cases occurring in Tulsa (40 cases, 30.3%) and Oklahoma (30 cases, 22.7%) counties. One hundred thirty-one patients' hospitalization status was reported, and of those, 109 (82.21%) were confirmed to have been hospitalized. Of the 127 cases whose outcomes were confirmed, 20 (15.2%) died. Of those who died, 15 (75%) were age 60 or older.

Invasive group A streptococcal infections may manifest as several clinical syndromes, including: pneumonia, bacteremia in association with cutaneous infection (e.g., cellulitis, erysipelas, or infection of a surgical or nonsurgical wound), deep soft-tissue infection (e.g., myositis or necrotizing fasciitis), meningitis, peritonitis, osteomyelitis, septic arthritis, postpartum sepsis (i.e., puerperal fever), neonatal sepsis, and nonfocal bacteremia. The majority of cases were identified through blood cultures (125, 94.7%).

Ten cases of necrotizing fasciitis were identified during this year, and three of those cases expired. The age range of patients with necrotizing fasciitis was 31 to 88 years with a median of 43 years. Of those who died, one had a >10 year history of stroke with hemiplegia and resided in a nursing home (upper extremity site), one had a history of alcoholism with liver damage and refused treatment (lower extremity site) and the third was a patient with a history of alcoholism who did not seek medical attention and was found having expired (lower extremity site).

Invasive *Streptococcus pneumoniae*

2005 Case Total 700 **2005 Rate 20.3 per 100,000**
2004 Case Total 573 **2004 Rate 16.6 per 100,000**

Invasive *Streptococcus pneumoniae* was added to the reportable disease list in Oklahoma in June 2000. All *S. pneumoniae* isolates from a normally sterile site (e.g., blood, cerebrospinal fluid, or, less commonly, joint, pleural, or pericardial fluid) reported to the OSDH-CDD are included in this category. Seven hundred cases were reported in 2005 representing an 18% increase compared to the number of cases reported in 2004. The overall incidence rate in Oklahoma was 20.3 cases per 100,000 population. Six hundred and sixty three cases (94.7%) were confirmed by blood cultures, 22 (3.1%) were confirmed by cerebrospinal fluid cultures. Other cases were confirmed by cultures of pleural fluid, peritoneal fluid and joint aspirate. Cases occurred among residents of 63 counties (82%). Cases were most frequently reported among residents of Oklahoma (174 cases; 26.3 per 100,000), Tulsa (132 cases; 23.4 per 100,000), and Cleveland (37 cases; 17.8 per 100,000) counties.

The reported number of cases by month of symptom onset illustrated a seasonal trend where invasive *S. pneumoniae* cases increased during the winter months. In 2005, invasive *S. pneumoniae* reports peaked in December with 113 cases (16.1%). In 2005, cases ranged in age from 1 day to 98 years with a median age of 59 years. The highest age-specific incidence rates were observed among adults greater than or equal to 65 years (67.9 per 100,000) and in children <1 year (31.6 per 100,000). In children <5 years, the rate was 20.31 per 100,000. Incidence rates were similar between males and females (20.8 and 19.5 per 100,000 population, respectively). Age-specific rates revealed a higher incidence among males than females in all age groups except those persons 10-19 years of age.

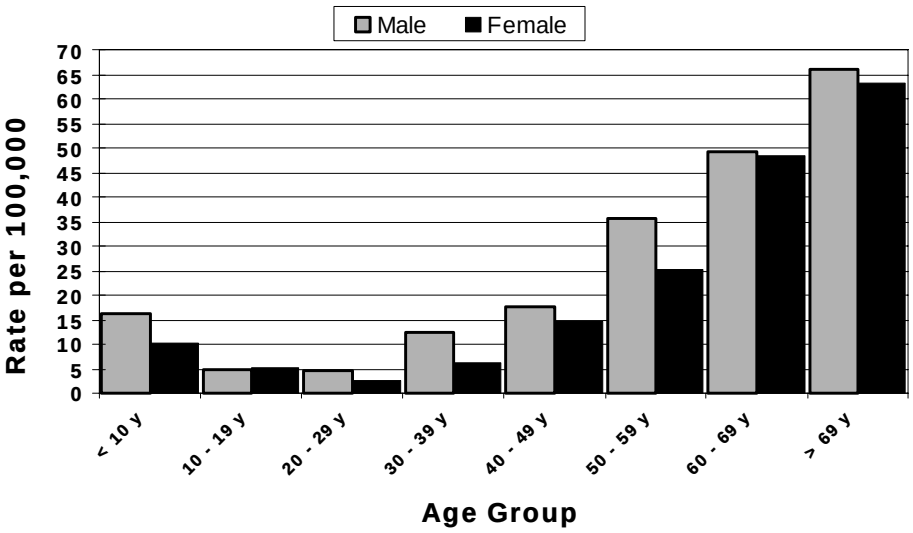
The highest number of cases occurred in whites (79.4%), but the highest rate of *S. pneumoniae* was reported among blacks at 22.6 cases per 100,000. The rate of reported *S. pneumoniae* cases were: white at 21.5 cases per 100,000, American Indians at 13.2 per 100,000, and Asian at 2.1 cases per 100,000. Five hundred and ninety seven cases (85%) were hospitalized; 76 cases died due to invasive *S. pneumoniae* resulting in a case fatality rate of 10.8%. Two hundred and sixty-nine cases (38.4%) and 40 deaths (53%) occurred among persons who were 65 years of age or older.

Two vaccines are available to prevent Pneumococcal disease. The ACIP recommends the pneumococcal polysaccharide vaccine for all adults who are $\geq$ 65 years and for persons $\geq$ 2 years at high risk for disease such as persons with chronic illness, asplenia, HIV infection, or other immunocompromising conditions (MMWR 1997;46 [No. RR-8]). The pneumococcal conjugate vaccine is indicated for infants and toddlers and recommended for all children aged 2-23 months and for children aged 24-59 months who are at increased risk for pneumococcal disease (MMWR 2000;49 [No. RR-9]).

Hospitalizations and Deaths of Reported Invasive *Streptococcus pneumoniae* Cases by Age Group, 2004-2005, Oklahoma

	Hospitalized				Died due to Invasive *Streptococcus pneumoniae*			
	2004		2005		2004		2005	
Age Group	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Less than 10 years	48/72	67	47/64	73	3/72	4	2/64	3
10 – 19 years	10/13	77	19/26	73	0/13	--	1/26	4
20 – 29 years	18/19	95	15/18	83	0/19	--	1/18	6
30 – 39 years	30/37	81	37/46	80	3/37	8	7/46	15
40 – 49 years	80/92	87	69/81	85	4/92	4	9/81	11
50 – 59 years	81/89	91	99/117	85	8/89	9	8/117	7
60 – 69 years	72/76	95	120/133	90	10/76	13	12/133	9
Greater than or equal to 70 years	163/170	96	189/213	89	21/170	12	36/213	17
Total	504/572	88	595/698	85	49/572	9	76/698	11

Rate of Reported Invasive *Streptococcus pneumoniae* Cases by Age Group and Gender, Oklahoma, 2005



Meningococcal Disease

2005 Case Total 20	**2005 Rate 0.58 per 100,000**
2004 Case Total 10	**2004 Rate 0.29 per 100,000**

Twenty cases of invasive meningococcal disease were reported in 2005, a 100% increase from 2004. Over the last ten years, the rate of meningococcal disease has fluctuated from year to year in Oklahoma. Except for a large drop in incidence in 1999 (see graph), rates in Oklahoma have been somewhat higher than the national average, while following a general downward trend. National disease estimates for 2004-2005 are not yet available.

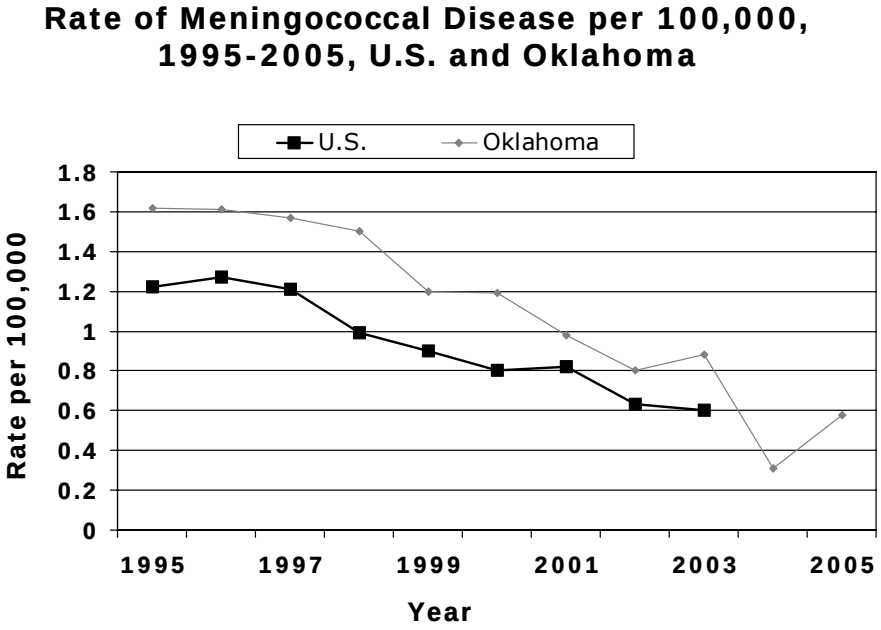
Eight cases of meningococcal disease (40%) occurred in females and 12 (60%) occurred in males. Among racial groups, blacks had the highest rate of disease, at 1.15 per 100,000, a finding that has been observed consistently in previous years. Whites had the second highest rate of disease, followed by 0.61 per 100,000, followed by Native Americans, at 0.37 per 100,000. No Asians with meningococcal disease were reported to OSDH in 2005. Ascertainment of Hispanic ethnicity was achieved in 13 of 20 cases (65%). Hispanic ethnicity was ascertained for 13 cases and one case was Hispanic. The rate of disease in those with known Hispanic ethnicity is calculated at 0.56 per 100,000, although the true rate is unknown due to incomplete ascertainment of ethnicity among cases. The case fatality rate was 20% (n=4). Nationally, approximately 13% of cases of meningococcal disease are fatal; 97% or more of cases are sporadic, meaning they are not associated with any other cases.

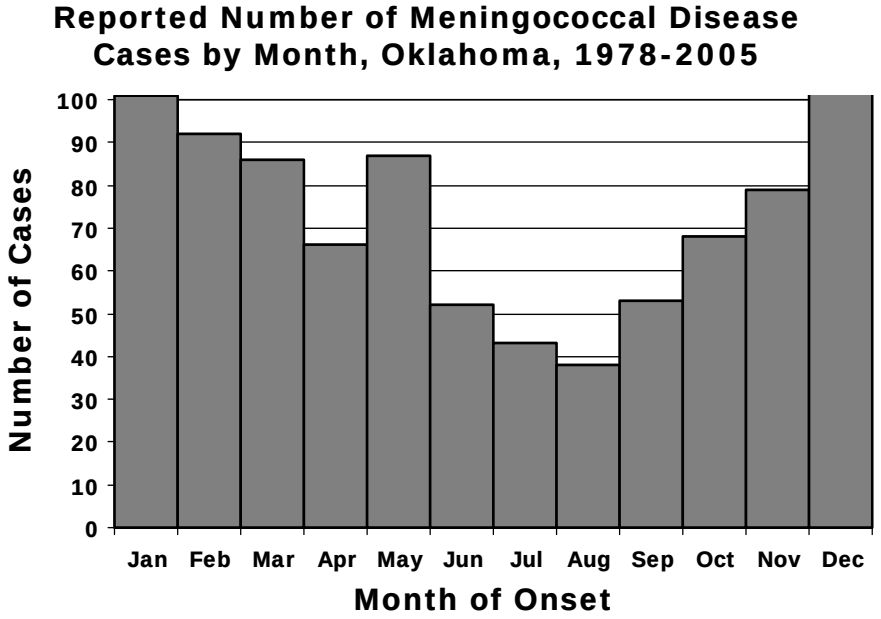
A public health investigation is conducted on each reported case by the county health department CDN. The CDN gathers information in risk factors for disease, locates contacts at risk and recommends prophylaxis. No secondary cases or clusters were noted among case contacts or by county of residence.

Meningococcal disease predominantly affects the very young. In 2005, age at onset ranged from 1 month to 74 years, with a median age of 3 years. Thirty percent of cases occurred in those under 1 year of age. The rate of disease in persons 0-4 years was 5.08 per 100,000, a rate nearly three times higher than that among persons 70-74 years (1.76 per 100,000), the next highest rate. This is in keeping with the historical trend, in which the incidence of meningococcal disease plotted by age follows a U-shaped curve.

Cases of meningococcal disease occurred in 8 of 12 months in 2005. No pattern was noted in their distribution. When yearly historical data is aggregated for the month of onset of disease in Oklahoma, more cases are found to occur in the winter months. An analysis of the cumulative number of cases 1978-2005 (885 cases, see graph) reveals that the highest number of cases occurred in December with 120 cases, (13.6%), and the fewest in August with 38 cases, (4.4%). Reasons for the increased number of cases seen in May are not known.

Laboratories in Oklahoma are required to submit sterile-site isolates of *N. meningitidis* to the OSDH-PHL for confirmation and serogroup typing. Isolates were submitted for 16 of 20 cases in 2005 of which six isolates (33.3%) were not groupable, one was serogroup A, four were serogroup B, two were serogroup C, and three were serogroup Y.





Listeriosis

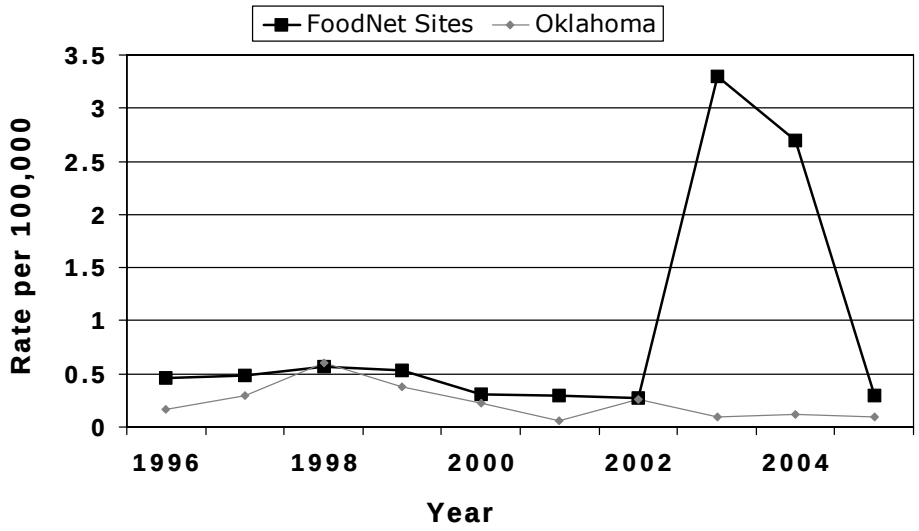
2005 Case Total 4 **2005 Rate 0.12 per 100,000**
2004 Case Total 4 **2004 Rate 0.12 per 100,000**

Listeriosis is an uncommon but serious infection caused by the bacteria *Listeria monocytogenes*. Although it only produces approximately 2,500 of the estimated 76 million foodborne illnesses each year in the U.S., the burden of invasive infections and deaths as a result of listeriosis are an important public health problem. Pregnant women are about 20 times more likely than healthy adults to get the disease. Approximately one-third of cases occur among this group. Listeriosis is a special concern for pregnant women, because 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, suffer the serious effects of infection during pregnancy; the case-fatality rate is 20% in infants born alive and the occurrence of abortion and stillbirth increases the overall mortality rate to more than 50%. Other specific groups at increased risk include persons infected with HIV, cancer, liver disease, diabetes, those who take glucocorticosteroid medications, and the elderly. Healthy adults and children rarely become seriously ill from listeriosis.

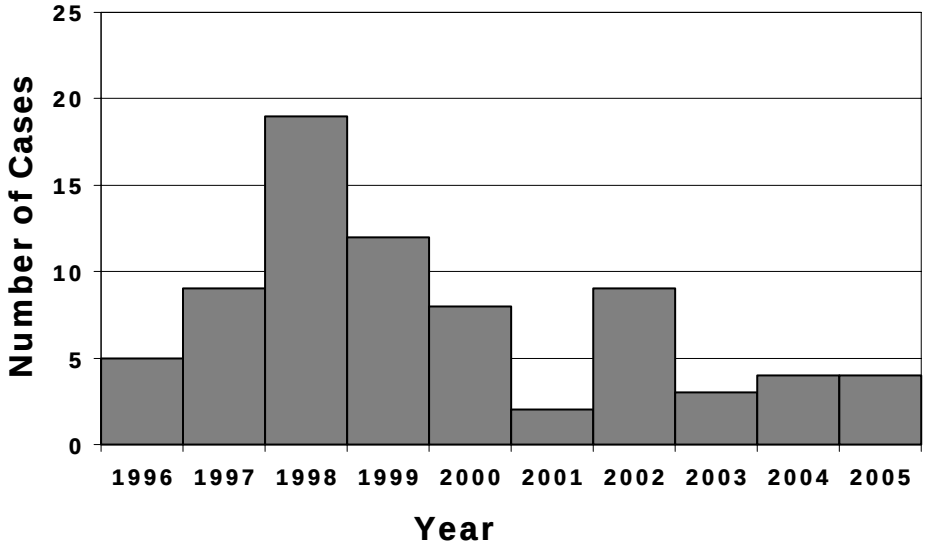
In Oklahoma, listeriosis became a reportable disease in 2000. Four cases were reported in 2005 resulting in an incidence rate of 0.12 per 100,000 population. The incidence rate of reported cases in 2005 is similar to the previous five-year (2000 – 2004) incidence rate of 0.15 per 100,000 population. Three cases reported their racial background as white (75%) and one reported their race as American Indian (25%). Three cases were female (75%). Cases ranged in age from 49 to 82 years with a median age of 55 years. No cases died due to listeriosis in 2005, however, three (60%) cases required hospitalization. *Listeria* was isolated from blood for three cases (75%) with the remaining identified by isolation of the organism from cerebrospinal fluid.

Most cases of listeriosis are sporadic, however, outbreaks due to consumption of contaminated food have occurred. Prompt reporting of cases can help in the early detection of an outbreak, identify the sources of infection, and prevent additional cases. The Communicable Disease Reporting Rules (OAC 310: Chapter 515) require that *Listeria* isolates grown from sterile sites (e.g. blood and cerebrospinal fluid) be sent to the OSDH-PHL for confirmation and identification.

Listeriosis Incidence Rate by Year, Oklahoma and FoodNet Sites, 1996 - 2005

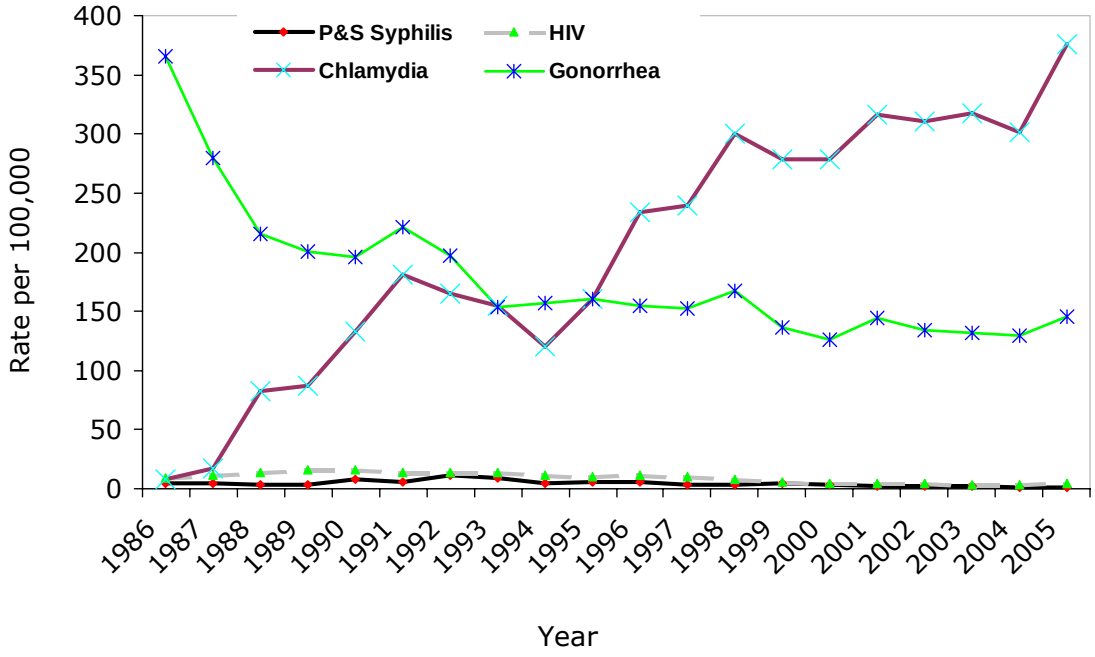


Reported Number of Listeriosis Cases by Year, Oklahoma, 1996-2005



Sexually Transmitted Infections

Rate of Reported Sexually Transmitted Diseases by Year, Oklahoma, 1986 - 2005



HIV/AIDS

2005 Case Total 306 **2005 Rate 8.9 per 100,000**
2004 Case Total 223 **2004 Rate 6.5 per 100,000**

AIDS was first reported in the U.S. in 1981. In Oklahoma, AIDS as a syndrome, became reportable in 1983 and HIV infection in 1988. The term AIDS applies to the most advanced stage of HIV infection. AIDS is defined as an HIV-infected person who has fewer than 200 CD_4 positive T-lymphocytes cells (abbreviated CD_4+ T cells) per cubic milliliter of blood, and/or any of 26 clinical conditions that affect people with compromised immune systems. An estimated 40,000 Americans become infected with HIV every year, and many of these are young persons under the age of 25. African American men and women are among the disproportionately affected populations in the U.S. Even though African Americans make up only approximately 13% of the U.S. population, one half of the estimated new numbers of HIV/AIDS diagnoses in the U.S. are African Americans in this country and more than a third of AIDS deaths to date. Women also remain a particularly vulnerable population, accounting for 29% of all HIV diagnoses in 2004.

At the end of 2004, an estimated 1,147,697 HIV or AIDS cases had been diagnosed in the U.S. and reported to the CDC. Approximately 40,000 AIDS cases have been diagnosed annually. The majority of AIDS cases continue to occur among males; however, the proportion of all AIDS cases increased from 15% (1981-1995) to 27% (2001-2004) for females. Among age groups, the proportion of all AIDS cases decreased from 1.4% (1981-1995) to 0.2% (2001-2004) for persons aged <13 years. In 2004, the estimated number of diagnoses of AIDS in the U.S. was 42,514. Adult and adolescent AIDS cases totaled 42,466 with 31,024 cases in males and 11,442 cases in females. Also in 2004, there were 48 AIDS cases estimated in children under age 13. An estimated one-quarter of people in the U.S. living with HIV do not know that they are infected.

Between 1983 and 1990, the yearly number of newly diagnosed HIV/AIDS cases increased from 2 to 529. From 1991, there was a decline in the number of reported cases. In 2004, there were 223 cases reported, however, in 2005, there was an increase of 37% (83) in the number of newly diagnosed HIV/AIDS cases in Oklahoma. While new cases of AIDS and case mortality rates have declined in Oklahoma and the U.S., the cumulative number of people living with HIV/AIDS has increased since 1999 due in part to Highly Active Antiretroviral Therapy (HAART). Of the 7,459 HIV/AIDS cases reported in Oklahoma between 1983 and 2005, 3,025 (41%) of these patients are known to be deceased. The case mortality rate has declined from 93% in 1983 to 4% in 2005. The national average for HIV cases ranked Oklahoma 26th in 2004 with a rate of 3.6 per 100,000.

As of December 2005, 5,051 (68%) infections have been diagnosed in whites, 1,492 (20%) infections have been diagnosed in blacks, 494 (7%) infections have been diagnosed in American Indian, and 349 (5%) infections have been diagnosed in Hispanic (non-black). MSM accounted for 4,000 cases (54%) and men that reported MSM and injection drug use accounted for 844 (11%). Twelve percent or

888 cases reported a history of injecting drugs as their only risk factor. There were 63 cases of pediatric transmission, of which 41 (65%) were from perinatal HIV exposures (mother with HIV infection).

Among the age groups, the 30-39 year olds accounted for 3,185 (43%) cases; 20-29 year olds accounted for 1,884 (25%) cases; and, 40-49 year olds accounted for 1,563 (21%) cases. Of the 306 HIV or AIDS cases reported in 2005, 260 (85%) were males and 46 (15%) were females. According to racial background and ethnicity, there were 164 (54%) cases among persons who reported their race as white with a rate of 6.2 per 100,000 population and 87 cases (28%) reported their racial background as black with a rate of 33.3 per 100,000 population.

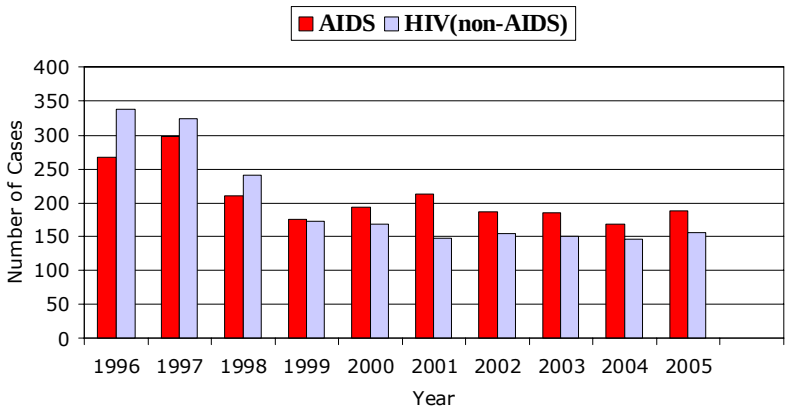
Within the age groups, 90 cases (29%) were reported among persons in the 20-29 year old group with an age-specific rate of 18.9 per 100,000 population. The second highest rate was observed in the 30-39 year old group with 90 cases and a rate of 18.7 per 100,000 population. There were 8 diagnosed cases in the 13-19 year old group at a rate of 2.2 per 100,000 population. The rate of infection was 15.3 per 100,000 population among males and 2.6 per 100,000 population among females. Among male infections, 141 (54%) of the 260 diagnosed cases were reported as MSM. Heterosexual contact was the major mode of exposure reported by females with 19 (41%) cases.

In late 2004, the CDC initiated the HIV incidence surveillance system to focus on new HIV infections. The goal is to provide national and regional HIV incidence estimations using a population-based serologic method to detect recent HIV-1 infection. The use of optimal surveillance methods will incorporate the serologic testing algorithm for recent HIV sero-conversion (STARHS) into routine HIV incidence surveillance activities. STARHS will be applied to diagnostic HIV serum specimens to identify individuals who have a reasonable probability of recent HIV infection (using a detuned assay) and by collecting HIV testing history data from individuals with newly diagnosed HIV infection. A statistical model will then be applied to the number of new infections in regional surveillance areas and nationally to provide HIV incidence data to assist local HIV prevention program planning and evaluation. Oklahoma implemented the HIV Incidence Surveillance system in 2005. National data will be available from CDC soon.

Of the 231 HIV/AIDS cases reported in 2004, 194 (84%) were males with a rate of 11.4 per 100,000 population and 37 (16%) were females with a rate of 2.1 per 100,000 population. According to racial background and ethnicity, there were 141 cases (61%) reported as white with a rate of 5.4 per 100,000 population, compared to 49 (21%) cases among blacks with a rate of 18.8 per 100,000 population. Among the age groups, 86 cases (42%) were reported in the 30 to 39 year old group with a rate of 17.9 per 100,000 population. Twenty-seven percent or 63 cases were reported in the 20-29 year old group with a rate of 13.2 per 100,000 population. There were 7 cases (3%) reported in the 13-19 year old category with a rate of 1.9 per 100,000 population. Fifty seven percent or 110 of the diagnosed cases in males (194 cases) were reported with risk of MSM. Heterosexual contact

with an at-risk partner was the main exposure risk for females with 13 (35%) of the cases (37 cases) reporting this exposure category.

Diagnosed Number of HIV/AIDS Cases by Year, Oklahoma, 1996 - 2005



Rate of Reported HIV/AIDS* Cases by Age Group, 2004 - 2005, Oklahoma

Age Group	2004, Rate per 100,000	2005, Rate per 100,000
Under 5 Years	0.4	0.4
5-12 Years	0.0	0.0
13-19 Years	2.2	2.2
20-29 Years	12.6	18.7
30-39 Years	16.8	18.5
40-49 Years	9.7	17.0
Over 49 Years	2.4	3.4

*HIV/AIDS include HIV or AIDS diagnosis; not both

Diagnosed Number of HIV Infections and AIDS Cases by Mode of Transmission, Oklahoma, 1982-2005

Adult/Adolescent Exposure	Oklahoma HIV						Oklahoma AIDS					
	Jan 05 - Dec 05		Jan 04 - Dec 04		Cumulative Total		Jan 05 - Dec 05		Jan 04 - Dec 04		Cumulative Total	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)
Men who have Sex with Men (MSM)	85	45	63	50	1,230	48	61	39	67	44	2,520	57
Injection Drug Use (IDU)	16	9	15	12	318	13	18	11	17	11	511	12
MSM & IDU	11	6	11	9	236	9	16	10	13	9	537	12
Hemophilia/Clotting Disorder	0	0	0	0	10	0	0	0	0	0	41	1
Heterosexual Contact	20	11	14	11	276	11	19	12	25	17	353	8
Receipt of Blood Transfusion, Component, or Tissue	0	0	0	0	27	1	1	1	2	1	70	2
Risk Not Identified/Other	55	29	22	18	446	18	42	27	27	18	360	8
Adult/Adolescent Subtotal	187	100	125	100	2,543	100	157	100	151	100	4,392	100
Pediatric (<13 Years) Exposure												
Hemophilia/Clotting Disorder	0	0	0	0	4	14	0	0	0	0	12	39
Mother With/At Risk for HIV Infection	1	100	1	100	22	76	0	0	0	0	17	55
Receipt of Blood Transfusion, Component, or Tissue	0	0	0	0	0	0	0	0	0	0	1	3
Risk Not Identified	0	0	0	0	3	10	0	0	0	0	1	3
Pediatric Subtotal	1	100	1	100	29	100	0	0	0	0	31	100
Total	188	100	126	100	2,572	100	157	100	151	100	4,423	100

Chlamydia

2005 Case Total 12,957	**2005 Rate 375.5 per 100,000**
2004 Case Total 10,371	**2004 Rate 300.6 per 100,000**

Chlamydia is a common STD caused by the bacterium *Chlamydia trachomatis*. It is the most prevalent STD in Oklahoma. 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%-25% of men infected are asymptomatic. Possible complications of male infections include epididymitis, infertility, and Reiter syndrome (reactive arthritis). In men, receptive anorectal intercourse may result in chlamydial proctitis.

Oklahoma mandated chlamydia reporting in 1988, when 2,714 cases were reported. The number of cases reported to the OSDH in 2005 increased by 24.9% from the previous year - from 10,371 in 2004 to 12,957 in 2005. About 10,195 (79%) of the reported cases were in females and 2,762 (21%) of cases were in males, for a female-to-male ratio of 4:1. The larger infected female population is largely a direct reflection of screening priorities. Due to funding restrictions, the screening program has been mostly directed toward females. The infected male population consists of clients of county health department STD clinics, partners of positive females identified through Family Planning and Maternity Clinics, and males tested by private health care providers.

Of the chlamydia cases reported in 2005, 4,308 (33%) patients reported their race as African-American with a rate of 1,650.8 per 100,000 population. Among these, 71% were females with a rate of 2,321.4 per 100,000, while 29% were males with a rate of 964.1 per 100,000. By comparison, 1,360 cases were reported in Native Americans at a rate of 497.8 per 100,000, and 6,087 cases among Caucasians at a rate of 231.6 per 100,000.

Of the cases reported in 2005 and 2004, 76.7% and 81% were reported in persons between the ages of 15 and 24 years old, respectively. In 2005, female young adults (20-24 years) were the greatest at risk of infection with 4,057 cases at a rate of 2,107.5 per 100,000 followed by female adolescents (15-19 years) with 4,062 cases at a rate of 1,756.7 per 100,000. There is a pronounced racial disparity among 15-19 year-old females. The incident rate in this age group was 13,984 per 100,000 among African-American females, compared to 2,206.5 per 100,000 among Caucasian females.

Comanche County reported the highest rates in 2004 and 2005 at 669.6 and 673.9 per 100,000, respectively. Other high morbidity counties are Cherokee, Harmon,

Muskogee, and Oklahoma counties. In 2005, about 51 of the 77 counties had infection rates greater than 200.0 per 100,000.

Three activities initiated in 1994 dramatically increased the number of identified and reported cases of chlamydia:

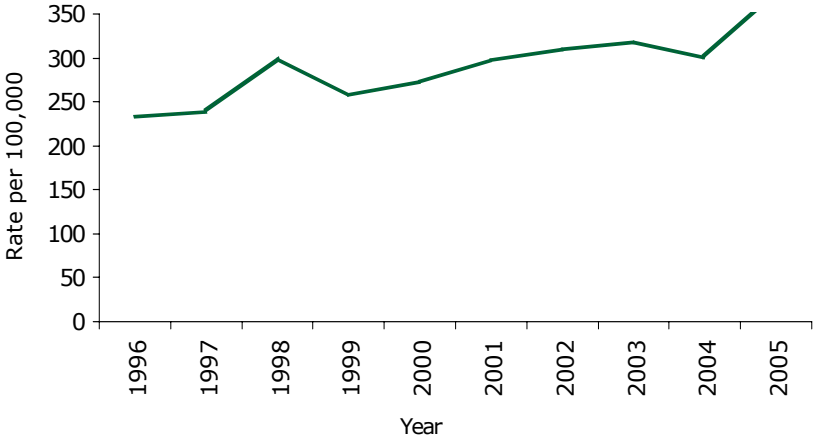
1. In 1994, the CDC increased federal funding for chlamydia screening in selected county health department STD, Family Planning and Maternity Clinics. As a result, 3,784 cases were reported in 1994. As additional funding became available in late 1996, all 69 county health departments in Oklahoma initiated active screening programs.

2. In 1994, the OSDH-PHL began using amplified testing instead of the benchmark culture test. The greater sensitivity of the test permitted the use of specimens other than endocervical swabs for women and urethral swabs for men. The amplified test is the only assay with urine specimen sensitivity equivalent to swab specimen.

3. In 1994, the HIV/STD Service initiated active surveillance for Chlamydia.

In 2002, the HIV/STD Service began providing chlamydia kits to juvenile detection centers in an effort to provide counseling and treatment to infected juveniles and reduce infertility outcomes among them. There was a dramatic increase in the number of cases detected among juveniles due to this additional screening. As a result of these activities, the number of cases reported to the OSDH increased from 3,784 diagnosed cases in 1994 to 12,957 cases in 2005. In 2004, Oklahoma ranked 29th nationally with an infection rate of 295.2 per 100,000, below the national average of 319.6 per 100,000.

Rate of Reported Chlamydia Cases by Year, Oklahoma, 1996 - 2005



Rate per 100,000 of Reported Chlamydia Cases by Age Group, 2004 – 2005, Oklahoma

Age Group	2004, Rate per 100,000	2005, Rate per 100,000
Less than 10 Years	1.7	3.5
10-14 Years	61.1	76.2
15-19 Years	1459.7	1756.7
20-24 Years	1706.1	2109.5
25-29 Years	569.8	771.1
30-34 Years	190.5	281.6
35-39 Years	67.1	52.1
40-44 Years	31.8	34.8
45-49 Years	19.5	23.7
Greater than 49 Years	2.6	4.1

Gonorrhea

2005 Case Total 5,031 **2005 Rate 145.8 per 100,000**
2004 Case Total 4,543 **2004 Rate 129.1 per 100,000**

Gonorrhea is the second most prevalent sexually transmitted disease reported in Oklahoma after Chlamydia. Gonorrhea is caused by *Neisseria gonorrhoeae*, 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 eventual infertility. In addition, pregnant women infected with gonorrhea can also infect their unborn babies through the amniotic fluid or during birth. In men, this infection most often result in purulent urethral discharge, dysuria and can cause infertility.

Four thousand seven hundred fifteen cases of gonorrhea were reported in Oklahoma in 1943. Reports increased until 1982 with 14,529 cases. Since then, the number of cases reported has steadily declined to 4,454 in 2004. However, recently in 2005, the number of cases reported was increased by 13% to 5,031 cases. Of the 5,031 infections of gonorrhea diagnosed in 2005, 3,009 cases (60%) were black,465 cases (29%) were white. According to gender, a rate of 1,157.2 per 100,000 population was reported among black males compared to 35.5 per 100,000 among white males.

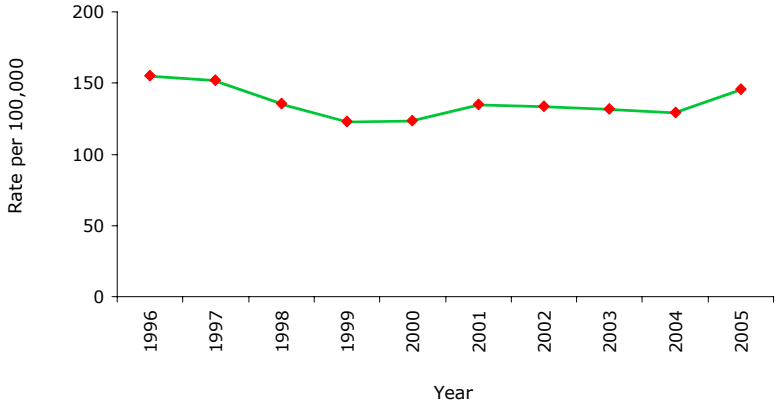
The trend of higher morbidity in blacks has continued since testing began in 1943. A breakdown of gender by race showed that 69.5% of the 2,148 infections among males occurred among black males with a rate of 1,157.2 cases per 100,000. Comparatively, 52.6% of the 2,883 infections among females occurred among black females with a rate of 1,149.0 cases per 100,000. In 2005, the age-specific prevalence rate of gonorrhea in the 15-19 year old black population was 338.4 per 100,000, compared to 16.2 per 100,000 in the 15-19 year old white population. Among this age group in 2005, the racial impact was more evident by analysis of race and gender where the data showed a black to white male infection rate ratio of 32:1 in the 15-19 year old age group. Among the females in this same age group, the infection rate ratio of black to white was 12:1. The distribution of infection among the 20-24 year old age group followed the same trend but at a lower rate ratio.

Comanche, Oklahoma, and Tulsa counties reported the highest rates of gonorrhea at 346.1, 325.7, and 195.8 per 100,000, respectively. For the state as a whole, the prevalence rate increased by12.9% from 129.1 per 100,000 in 2004 to 145.8 per 100,000 in 2005.

In 1994, an increase in federal funding allowed for routine gonorrhea screening in various county health department STD, Family Planning, and Maternity Clinics. This funding was also made available to contracted community-based organizations. That same year, the OSDH Infertility Prevention Screening Project reported 2,624 cases of gonorrhea. All 69 county health departments began to screen for gonorrhea in late 1996, when additional funding became available. In 2005, the

OSDH Infertility Prevention project screened 65,535 clients for gonorrhea, an increase of 7.8% from the previous year. The number of positive tests also increased by 16.5%, bringing the total number of infections to 5,031, from 4,454 in 2004. The total number screened increased by 4,756 (7.8%), and the number of persons who tested positive increased by 349 (16.5%). In 2004, Oklahoma ranked 15th nationally with a rate of 126.8 cases per 100,000, below the national average of 113.5 per 100,000.

Rate of Reported Gonorrhea Cases by Year, Oklahoma, 1996 - 2005



Rate per 100,000 Population of Reported Gonorrhea Cases by Age Group, 2004-2005 Oklahoma

Age Group	2004, Rate per 100,000	2005, Rate per 100,000
Less than 10 Years	0.6	0.4
10-14 Years	19.8	24.2
15-19 Years	468.9	538.3
20-24 Years	646.1	690.2
25-29 Years	312.6	379.4
30-34 Years	158.6	183.3
35-39 Years	73.3	78.0
40-44 Years	56.4	53.3
45-49 Years	26.2	41.1
Greater than 49 Years	7.1	9.4

Total Early Syphilis

2005 Case Total 122	**2005 Rate 3.5 per 100,000**
2004 Case Total 88	**2004 Rate 2.6 per 100,000**

Syphilis caused by Treponema Pallidium, is a genital ulcerative disease. Syphilis is transmitted from person to person through direct contact with a syphilis lesion. Lesions occur mainly on the external genitalia, vagina, anus and rectum, but may also occur in the mouth and on the lips. Syphilis infection may occur during vaginal, anal, or oral sex. In addition, a pregnant woman with syphilis can pass it on to her unborn child. Symptoms of syphilis differ according to the disease stage, and many people have no symptoms for years, yet remain at risk for complications if not treated. Overall in the U.S., the rates in men are higher than that in women. The overall rates, in conjunction with reports of syphilis outbreaks in MSM, suggest that rates of syphilis in MSM are increasing. In addition, syphilis infection facilitates transmission of HIV.

Early syphilis includes the primary, secondary, and early latent stages. The primary stage of syphilis is usually marked by the appearance of a painless single lesion (called a chancre), but there may be multiple lesions. This lesion lasts from three to six weeks and heals without treatment. If adequate treatment is not administered, the infection progresses to the secondary stage.

Skin rash and mucous membrane lesions characterize the secondary stage. This stage typically starts with the development of a rash on one or more areas of the body. Sometimes the rash is so faint as to be unnoticed. In addition to a rash, symptoms of secondary syphilis may include fever, swollen lymph glands, sore throat, patchy hair loss, headaches, weight loss, muscle aches, and fatigue. The signs and symptoms of secondary syphilis may resolve with or without treatment. However, the infection progresses to the later stages of the disease without treatment.

Latent syphilis includes three stages. The latent (hidden) stage of syphilis begins when secondary symptoms disappear, yet no treatment occurs so the infection remains in the body. In the late stages of syphilis, there may be damage to internal organs, including the brain, nerves, eyes, heart, blood vessels, liver, bones, and joints. This internal damage may appear many years later resulting in paralysis, muscle coordination problems, numbness, gradual blindness, and dementia. The damage may be fatal.

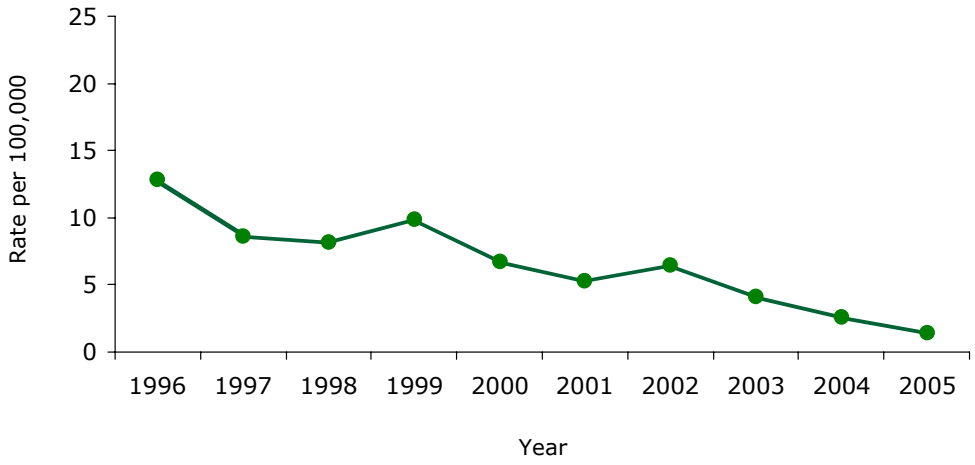
During 2005, Oklahoma reported 122 infections of early syphilis, an increase of 39% over the 2004 reported infections (88 cases). In 2004, there were 88 early syphilis cases reported, a 37.6% decrease from 2003. Of the 122 infections reported in 2005, 69 (57%) infections were diagnosed in blacks while 43 (35%) were diagnosed in whites. A review of cases for the past ten years indicates that the majority of infections were diagnosed among persons who reported their race as black, with a median of 61% and a range of 31% to 78%.

Comparison of Oklahoma reported cases among black males versus white males in 2005, by sex and race shows a rate ratio of 53:3 per 100,000 compared to a rate ratio of 37:3 per 100,000 among black males versus white males in 2004. The overall racial disparity seen in a rate ratio of infection in blacks versus whites (16:1) was also highly disproportionate in the female population – with a rate ratio among black females versus white females of 52:1 per 100,000 in 2005 compared to a rate ratio of 68:4 per 100,000 in 2004 respectively.

The male to female infection ratio in Oklahoma was about 3:2 in 2004 but increased in men to 8:5 in 2005. This higher ratio in men may be attributed to an increase in transmission in MSM which has been observed in many other states and cities across the U.S. Of the total cases of early syphilis reported in 2004, 49% were reported in persons between 20-34 years of age. The high morbidity counties for early syphilis were Oklahoma (62), Comanche (21), and Tulsa (20). The three counties accounted for 84.4% of the total early syphilis infections. About 14 of the 20 early syphilis infections in Tulsa County were diagnosed in MSM. One case of congenital syphilis was reported for each year 2005 and 2004.

Most cases of syphilis in Oklahoma primarily occur in the Oklahoma City metropolitan statistical area (MSA). Which includes (Canadian, Cleveland, Grady, Lincoln, Logan, McClain, and Oklahoma counties). In 1998, Oklahoma County became one of 28 high morbidity areas (HMA) for syphilis in the U.S. These 28 counties were targeted to spearhead a "syphilis elimination" campaign because they collectively accounted for over 50% of all syphilis cases diagnosed and reported in the U.S. in 1997. The Centers for Disease Control and Prevention set the Healthy People 2010 prevalence goal for syphilis to 0.4 per 100,00 population. A national ranking for all stages of syphilis in 2003 listed Oklahoma as 18th in the nation with a rate of 10.1 infections per 100,000 population. In 2004, Oklahoma improved to 29th in the nation with 4.8 infections per 100,000 population. The national average in 2004 was 11.5 infections per 100,000 population.

Rate of Reported Total Early Syphilis Cases by Year, Oklahoma, 1996 - 2005

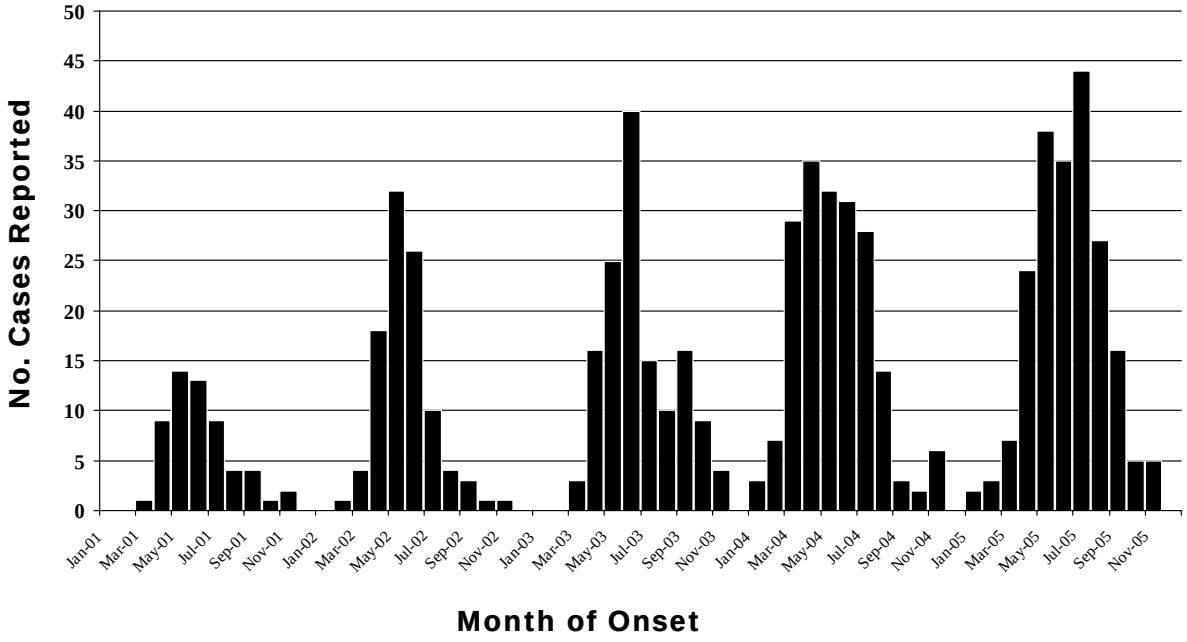


Rate of Diagnosed Early Syphilis by Age Group, Oklahoma, 2004 - 2005

Age Group	2004, Rate per 100,000	2005, Rate per 100,000
Less than 10 Years	0.0	0.0
10-14 Years	0.0	0.0
15-19 Years	1.5	1.5
20-24 Years	6.9	8.1
25-29 Years	4.8	7.4
30-34 Years	5.8	8.5
35-39 Years	6.2	6.6
40-44 Years	3.4	7.6
45-49 Years	3.7	3.3
Greater than 49 Years	0.9	1.7

Vectorborne Diseases

Number of Reported Rocky Mountain Spotted Fever Cases by Month of Onset, Oklahoma, 2001–2005



Ehrlichiosis

2005 Case Total 96 **2005 Rate 2.78 per 100,000**
2004 Case Total 49 **2004 Rate 1.42 per 100,000**

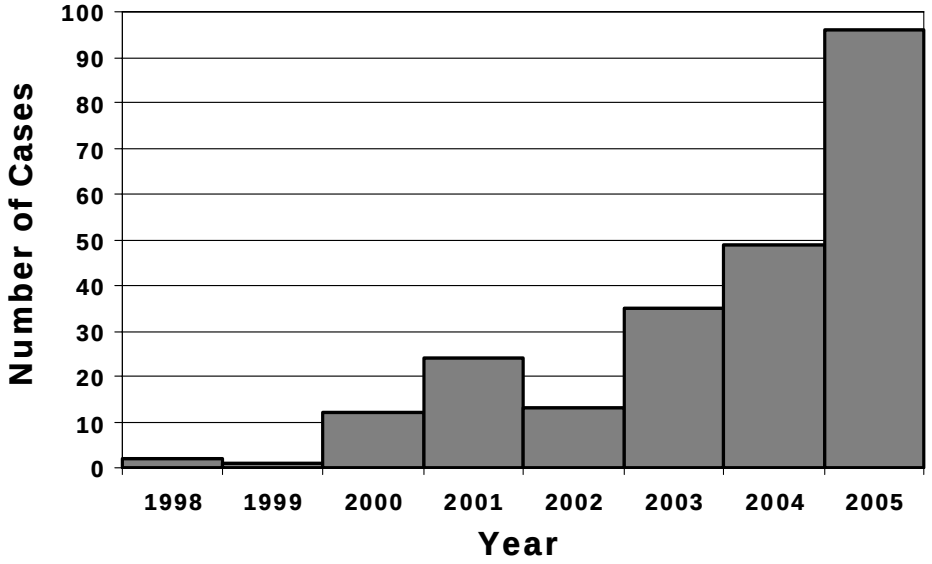
Ehrlichia was first recognized as a human pathogen in the U.S. in 1987. Ninety-six cases of ehrlichiosis were reported to the OSDH-CDD in 2005, an incidence rate of 2.78 per 100,000 population. This is an increase of 96% compared to 2004 (N=49). The continued annual increase in the incidence of ehrlichiosis reported in Oklahoma is not fully understood, however, several factors may contribute to the increase including: a heightened awareness of tickborne illness among physicians resulting in increased testing, enhanced surveillance efforts, and an actual increase in the incidence of the disease.

Cases of ehrlichiosis were reported among residents of 36 (47%) counties in Oklahoma. The highest number of cases from any county was 22 in Tulsa County, followed by Pittsburg County with eight cases. No case clusters of ehrlichiosis were identified in 2005. The age of ehrlichiosis cases ranged from 2 to 69 years with a median age of 38 years. The age groups with the highest incidence rate were adults aged 60-69 years (6.25 per 100,000) and 0-9 years (4.16 per 100,000 population), with the lowest incidence among adults 30-39 years (1.87 per 100,000 population). Fifty-two cases (54%) were male and 44 (46%) were female. Racial background was provided by 92 of 96 (96%) of cases. Sixty-four cases (67%) reported their racial background as white, 23 cases (24%) were Native American, and five cases (5%) were black. Race-specific population rates revealed Native Americans (8.42 per 100,000 population) had an ehrlichiosis rate 3.5-times greater than whites (2.43 per 100,000 population).

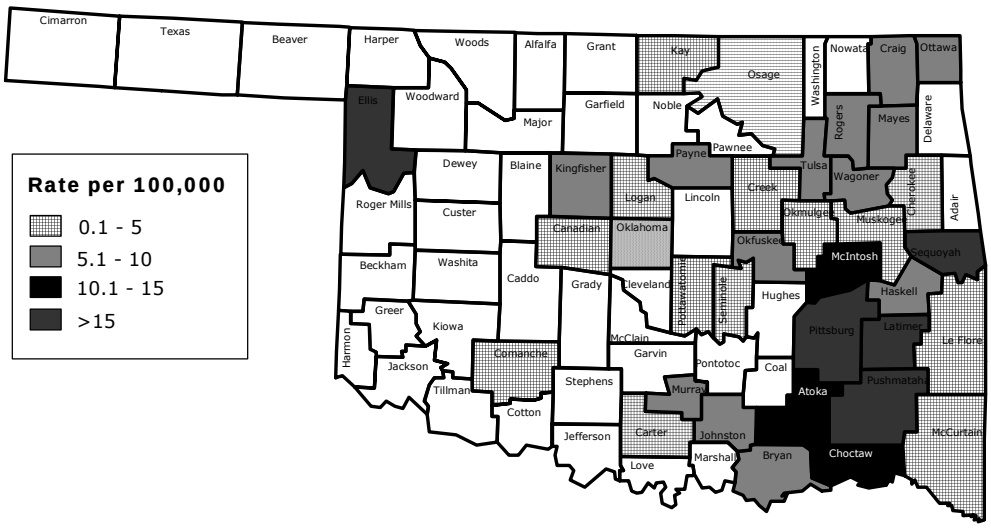
Ehrlichiosis cases reported an onset of symptoms throughout the year however, 88% of cases reported symptoms onset during the months of May through August. These months coincide with the active feeding period of the Lone star tick, the primary tick vector of ehrlichiosis in Oklahoma. Symptom and exposure information was available for 75 (78%) of the cases. Symptoms of reported included fever (97%), headache (61%), muscle aches (59%), and rash (36%). A total of 45 (47%) of cases were hospitalized and no deaths were reported. Forty-four cases (59%) reported exposure to a wooded or tick-infested area during the month prior to illness onset and 60% of cases (N = 32) reported a tick bite during the 14 days prior to onset of symptoms.

Ehrlichiosis is confirmed by noting a four-fold rise in antibody titers to specific antigens in acute and convalescent sera drawn at least four weeks apart. A single specimen is generally not diagnostic of acute infection since it may indicate past exposure. Treatment for ehrlichiosis (usually doxycycline) is effective at reducing the severity of the disease and should be started without delay when ehrlichiosis is suspected.

Reported Number of Ehrlichiosis Cases by Year, Oklahoma, 1998-2005



Rate of Reported Ehrlichiosis Cases by County of Residence, Oklahoma, 2005



Rocky Mountain Spotted Fever

2005 Case Total 206 **2005 Rate 6.0 per 100,000**
2004 Case Total 190 **2004 Rate 5.5 per 100,000**

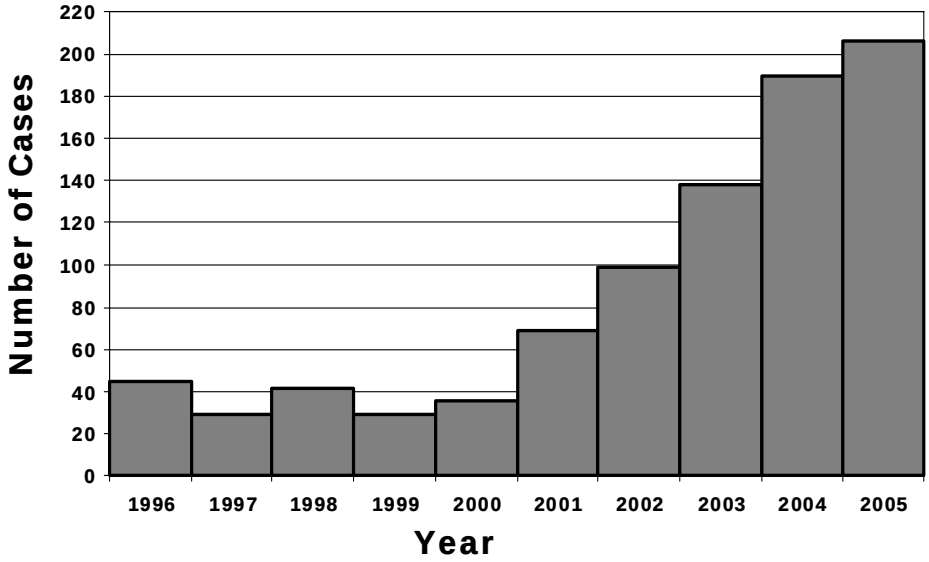
The incidence of Rocky Mountain spotted fever (RMSF) continued to increase in 2005, as it has in the previous four years. Two hundred six cases of RMSF were reported to the OSDH-CDD, an incidence rate of 6.0 per 100,000 population. This is an increase of 8% compared to 2004 (N = 190). The continued annual increase in the incidence of RMSF reported in Oklahoma is not fully understood. Several factors may have attributed to the continued increase including a heightened awareness of tickborne illness among physicians in Oklahoma resulting in increased testing, enhanced surveillance efforts, and an actual increase in the incidence of the disease.

The counties with the highest incidence rates of RMSF were Latimer with a rate of 37.4 per 100,000 (N = 4), Pushmataha with a rate of 34.3 per 100,000 (N = 4), Adair with a rate of 33.3 per 100,000 (N = 7), and Cherokee with a rate of 30.6 per 100,000 (N = 13). The highest number of cases reported from any county was 22 in Oklahoma County, followed by 13 cases reported from Cherokee County, and 12 cases from Le Flore and Pittsburg counties. The incidence of RMSF is typically higher in the eastern half of the state, which is consistent with the geographic distribution of the American dog tick, the primary tick vector of RMSF.

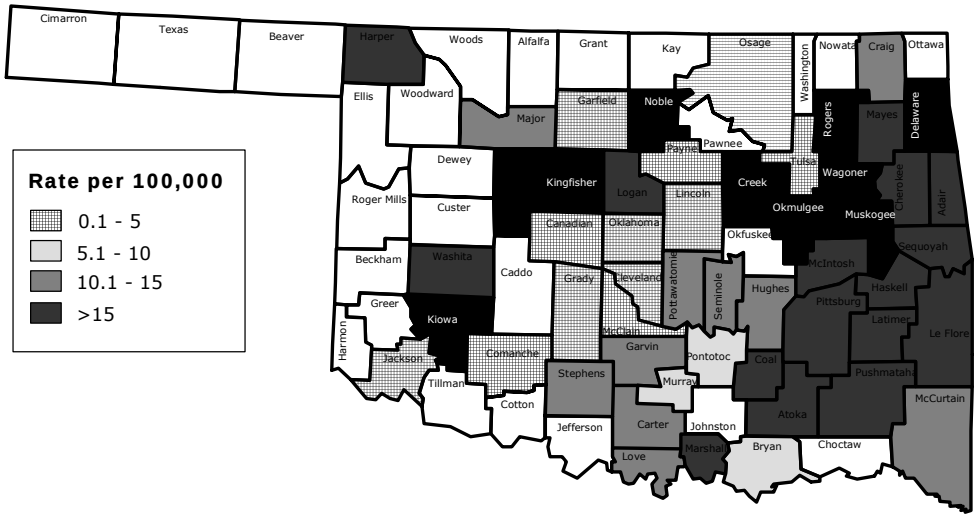
The age of RMSF cases ranged from 1 to 85 years with a median age of 38 years. The age groups with the highest incidence rates were adults aged 70-79 years (7.2 per 100,000) and 50-59 years (7.0 per 100,000 population). One hundred twenty-two cases (59%) were male and 84 (41%) were female. Racial background was provided by 191 of 206 (93%) cases. One hundred seven cases (56%) reported their racial background as white, 77 cases (37%) were Native American, five cases (2%) were black, and two cases (1%) were Asian. Race-specific population rates revealed Native Americans (28.2 per 100,000 population) had a RMSF rate 7-times greater than whites (4.1 per 100,000 population).

Eighty-nine percent of cases reported an onset of symptoms during the months of April through September. The most common symptoms reported were fever (98%), headache (69%), muscle aches (60%), and rash (37%). Twenty percent of cases were hospitalized and no deaths were reported. Exposure information was available for 164 (80%) of cases. A total of 90 (56%) of the cases reported a tick attached to their skin during the two weeks prior to symptom onset, and 104 (63%) reported being exposed to a wooded or tick-infested area during the month prior to symptom onset. Diagnosis of RMSF is confirmed by noting a four-fold rise in antibody titers to specific antigens in acute and convalescent sera drawn at least four weeks apart. A single specimen is generally not diagnostic of acute infection since it may indicate past exposure. Treatment for RMSF (usually doxycycline) is effective at reducing the severity of the disease and should be started without delay when RMSF is suspected.

Reported Number of Rocky Mountain Spotted Fever Cases by Year, Oklahoma, 1996-2005



Rate of Reported RMSF Cases by County of Residence, Oklahoma, 2005



Tularemia

2005 Case Total 20	**2005 Rate 0.58 per 100,000**
2004 Case Total 19	**2004 Rate 0.55 per 100,000**

In 2005, 20 cases (0.58 per 100,000 population) of tularemia were reported to the OSDH-CDD. From 1996 through 2005, the average number of cases reported was 9.5 cases per year. Cases were reported between the months of February through December in 2005. Sixty percent of cases reported an onset of symptoms during the months of May through July. The increase in the incidence of tularemia reported in Oklahoma is not fully understood, however, several factors may contribute to the increase including: a heightened awareness of tickborne illness among physicians resulting in increased testing, enhanced surveillance efforts, and an actual increase in the incidence of the disease.

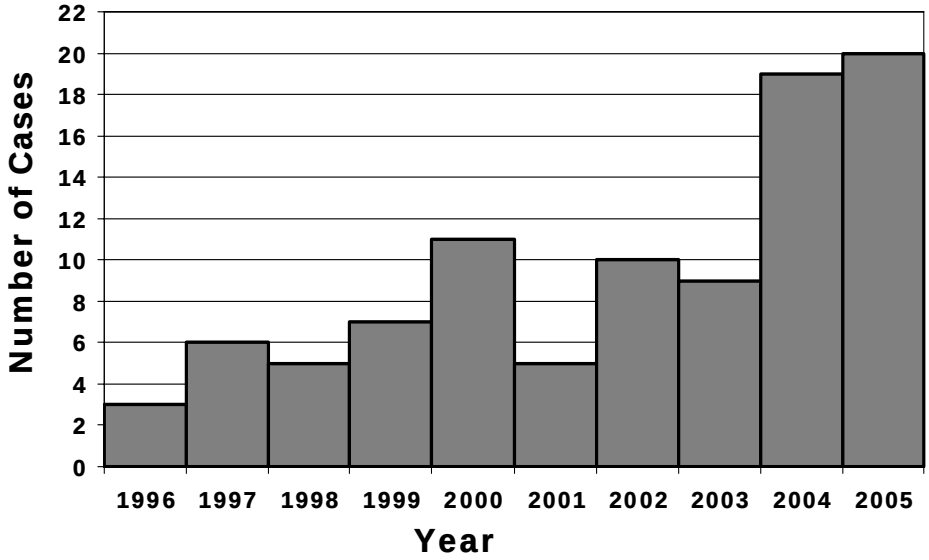
Cases of tularemia were reported among residents of 12 counties in Oklahoma. The highest number of cases from any county was four in LeFlore, followed by two cases in Kay, Noble, Pushmataha, Sequoyah, and Tulsa counties. Counties reporting a single case include: Adair, Haskell, Latimer, Nowata, Payne, and Pottawatomie. No case clusters of tularemia were identified in 2005.

The age of tularemia cases ranged from 2 to 86 years old with a median age of 54 years. Thirteen cases (65%) were male and 7 (35%) were female. Racial background was provided by 16 of 20 (80%) cases. Thirteen cases (81%) reported their racial background as white and 3 cases (19%) reported their racial background as Native American. Race-specific population rates revealed Native Americans (1.10 per 100,000 population) had a tularemia rate two times greater than whites (0.49 per 100,000 population).

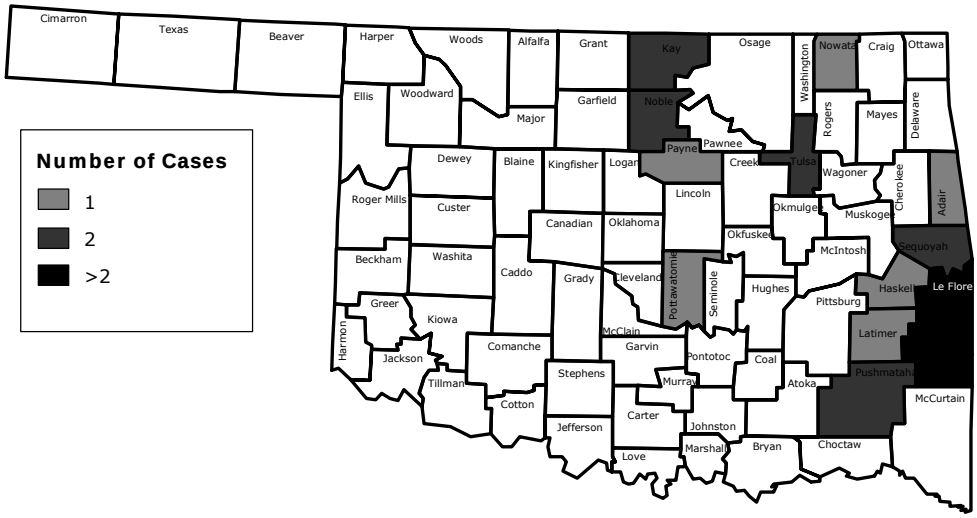
In 2005, six different forms of illness associated with tularemia were reported from the 20 cases. The type and case frequency of illnesses reported were: glandular (7), ulceroglandular (5), typhoidal (3), pneumonic (2), intestinal (1), and oropharyngeal (1). The form of illness for one of the cases was unknown. The most common symptoms reported were fever (95%), fatigue (65%), myalgia (65%), chills (60%), headache (55%), painful adenopathy (40%), sore or ulcer (25%), and vomiting (25%). Thirty-five percent of cases were hospitalized and no deaths were reported.

The natural reservoir for *Francisella tularensis* includes rabbits, hares, voles, various hard ticks, and some domestic animals. Fifty-five percent of cases reported exposures to ticks and exposure to a wooded or tick-infested area was reported by 65% of cases. Other exposures reported by cases included handling or skinning rabbits (20%) and being bitten by a cat (5%). Exposure information was not known for 2 (10%) of the cases. Epidemiologic information collected from investigations of reported cases of tularemia underscores the importance of practicing tick bite prevention activities and safe handling of animals, particularly rabbits.

Reported Number of Tularemia Cases by Year, Oklahoma, 1996-2005



Reported Tularemia Cases by County of Residence, Oklahoma, 2005



West Nile Virus

2005 Case Total 31	**2005 Rate 0.9 per 100,000**
2004 Case Total 22	**2004 Rate 0.6 per 100,000**

2005 marked the fourth season of West Nile (WN) virus transmission in Oklahoma and the seventh year of national tracking since its identification in the New York City area in 1999. After making a steady and progressive continental advance, WN virus infections in animals or people have now been documented in all 48 contiguous states, Canada and Mexico. In 2005, a total of 2,997 human cases of WN disease and 113 associated deaths were reported to the CDC by 42 states representing a 16% increase from 2004. Nationally, most of the WN activity was seen in California, the southwest, and the central mountain states with the highest number of cases being reported from California (880), Illinois (252), and South Dakota (229).

Consistent with the national trend, Oklahoma also had an increase of WN activity compared to 2004. The state's 2005 incidence of human WN virus disease was 31 cases of WN Fever or WN neuroinvasive disease resulting in a 42% increase over the previous season. These cases were distributed across 23 counties with geographic clustering in the panhandle, north central and south central parts of the state. Counties with the highest incidence rates per 100,000 population included Grant (38.9), Beaver (34.2), Woods (11.0), Noble (8.76), and Haskell (8.48). Symptom onsets ranged from July 10 to November 7, 2005. Sixty-one percent of the case patients were male; median age of all patients was 48.5 years (range 17-82). Seventeen of the cases (54.8%) had WN meningoencephalitis or meningitis. There was one WN-associated death in a Beaver County resident following complications from primary encephalitis for an overall case fatality rate of 3.2%. Prominent symptoms reported for all cases included fever (93.5%), muscle weakness (83.3%), vomiting (46.7%), photophobia (44%), rash (41.9%), vertigo (40%), and confusion (36.7%). The number of patients that exhibited a rash (erythematous maculo-papular) was disproportionately high compared to 9.5% in 2004. Other common complaints of case patients included a stiff neck, disorientation, tremors, altered mental status or anorexia. Tracking of WN cases for chronic disabilities is not standardized or available for all cases, but 3 case patients were reported to suffer hearing loss. Thirty-three percent of case patients (5/15) were treated in rehabilitation facilities after an initial hospitalization. Most cases (15/27, 55.6%) reported exposure to mosquitoes within two weeks of symptom onset. Two cases had probable travel exposure in Louisiana; one while performing hurricane relief work.

The 2005 WN season proved to be epidemiologically distinctive in comparison to previous years regarding clinical presentation of rash, seasonality of risk, and blood donor surveillance findings. From 2002 through 2004, human WN cases were first observed in July with peak activity occurring during mid-August. In 2005, the first human case of WN disease was reported in mid-July as expected, but the epidemic curve was prolonged, escalated in August and then peaked in late September with the last case reported during the second week of November. The prolonged season

with peak activity observed five to six weeks later than previous seasons may be attributed to the relatively hot and dry fall that Oklahoma experienced. These ecological factors are favorable to increasing populations of *Culex spp* mosquitoes.

Another unique feature to the 2005 season was the high proportion of viremic blood donors that developed symptoms of WN disease. Universal blood donor screening for WN viremia became mandatory in July 2003 after transfusion-associated transmission was documented in several cases in 2002. Blood collection facilities perform a nucleic acid amplification test (NAT). All donations from NAT-positive donors are excluded and follow-up testing and interviewing occurs to document WN infection and to determine if WN-associated symptoms develop. In 2005, seventeen Oklahoma blood donors tested NAT-positive for WN viremia by routine blood screening. Strikingly, 53% of those individuals developed symptoms of WN disease in 2005 compared to less than 15% in 2003 and 2004. While human WN activity was not wholly consistent with past seasons, equine activity trends were consistent with surveillance findings in 2004. The first 2005 equine WN case was reported from Comanche County and had illness onset on June 12. Peak activity occurred in late September and early October. Thirty-two horses were diagnosed with WN disease in the state by laboratory confirmation in both 2004 and 2005.

Prevention

WN virus will remain a consistent mosquito-borne threat to Oklahomans in the years to come. Although there is some seasonal variation, four years of surveillance activities have consistently shown that the WN season in Oklahoma begins in May and ends in November with July through October being the period of greatest risk for human illness. Horse owners should be encouraged to include WN vaccination in their routine equine herd health programs. In the absence of a licensed vaccine for human use, personal prevention messages must continue urging routine use of insect repellents that contain an effective ingredient such as DEET, picaridin, or oil of lemon eucalyptus while participating in outdoor activities. The OSDH continues to support community mosquito control programs with supplemental funding from the CDC Epidemiologic and Laboratory Capacity grant.

2006 Surveillance and Laboratory Testing

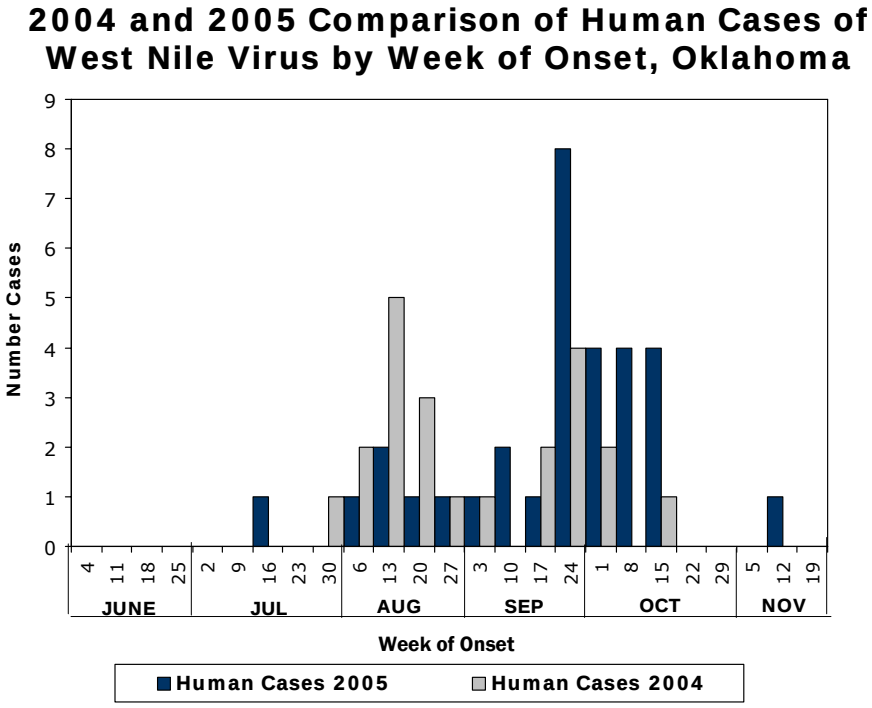
Throughout the mosquito season, Oklahoma physicians are urged to consider the diagnosis of WN in patients with compatible clinical presentations for either WN Fever or WN neuroinvasive disease and to submit specimens to the OSDH-PHL for testing. Recent medical studies have shown that even patients who have WN Fever may experience lasting and prolonged sequelae. In a study of long-term functional outcomes of WN Fever cases, many patients commonly reported persistent problems such as fatigue (96%), headaches (71%), and concentration problems (53%).[1]

In 2006, the OSDH will continue to offer human WN testing free of charge at the PHL. The PHL performs IgM-capture ELISA, the most sensitive screening test for acute infections, on cerebrospinal fluid (CSF) and serum. PCR testing is also available for CSF. Physicians who submit a CSF specimen should also submit a serum specimen (for IgM ELISA) from the case patient due to the lower sensitivity

of the PCR test. WNV resources and testing information can be accessed on-line at <<http://www.health.ok.gov/program/cdd/wnv/index.html>>.

[1]Watson et al. Annals of Internal Medicine, 141; 2004

Figure 1



Avian, Equine, and Human WN Surveillance; Oklahoma, 2002-2005

Case Number				NAT Positive Blood Donors	
Year	Avian	Equine	Human	Blood Donor	Symptomatic
2002	441	965	21	N/A[3]	N/A[3]
2003	401	169	79	26	1 (4%)
2004	388	32	22	7	1 (14%)
2005	N/A[2]	32	31	17	9 (53%)

Summary of Symptoms Reported by WN Cases, 2005

2005		Counties with Highest West Nile Disease Incidence Rates[1]; 2002-2005	
County	Rate	County	2002-2005 Rate
Grant	38.88	Texas	124.33
Beaver	34.20	Beaver	85.37
Woods	11.00	Cimarron	63.53
Noble	8.76	Grant	58.32
Haskell	8.48	Ellis	24.54
Kingfisher	7.18	Woods	22.00
Texas	4.97	Haskell	16.96
Custer	3.83	Greer	16.50
Jackson	3.52	Okmulgee	15.12
Caddo	3.32	Kingfisher	14.36
Lincoln	3.12	Woodward	10.82
Logan	2.95	Jackson	10.55
Bryan	2.74	Kiowa	9.78
Sequoyah	2.57	Nowata	9.46
Stephens	2.32	Carter	8.77
Pittsburg	2.28	Noble	8.76
Wagoner	1.74	Washita	8.69
Garfield	1.73	Garfield	8.65
Muskogee	1.44	Pushmataha	8.57
Canadian	1.14	Custer	7.65
Oklahoma	0.91	Caddo	6.63
State Total	0.9	State Total	4.40

[1]Incidence rates per 100,000 poplulation were calculated based on U.S. Census 2000.

[2]Collection and testing of wild birds was discontinued.

[3]Routine blood donor screening began on July 1, 2003.

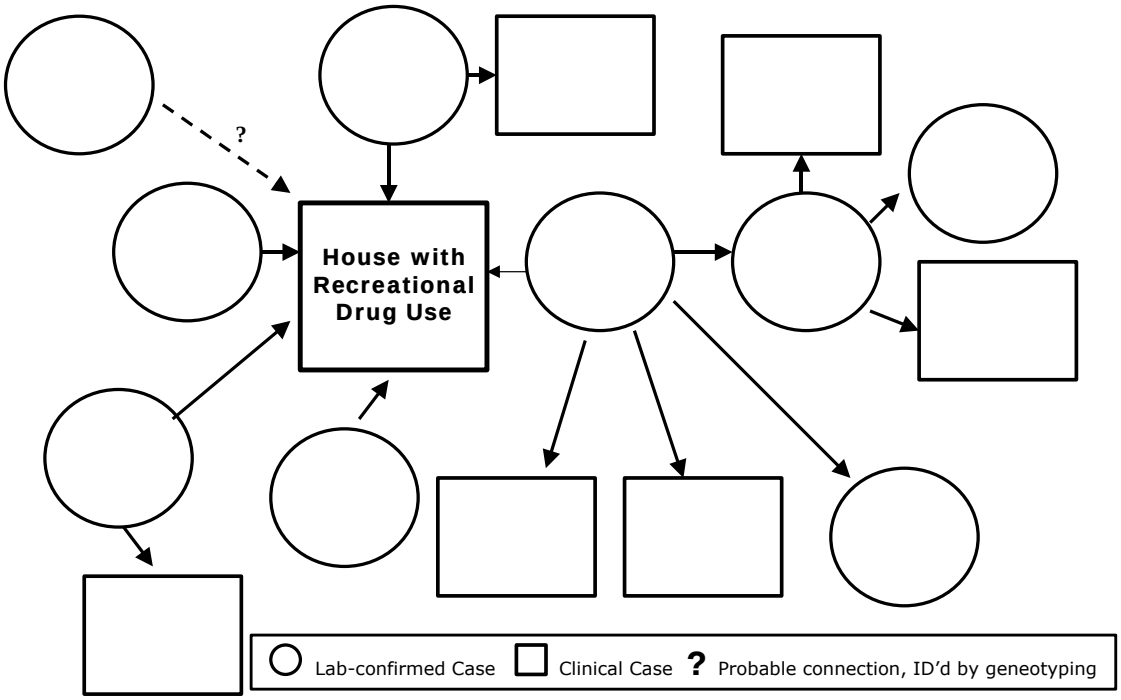
Geographic Distribution of Human WN Cases*

Symptoms	Number*	%
Fever	29/31	93.5
Muscle Weakness	25/30	83.3
Headache	22/30	73.3
Vomiting	14/30	46.7
Photophobia	11/24	44
Rash	13/31	41.9
Vertigo	10/25	40
Confusion	11/30	36.7
Myalgia	10/30	33.3
Stiffneck	8/28	28.5
Disorientation	6/28	21.4
Tremor	5/24	20.8
Altered Mental Status	6/31	19.4
Anorexia	6/31	19.4
Hearing Loss	3/21	14.2

Outcome	Number	%
Died	1/31	3.2
Hospitalized	15/31	48.4

Special Investigations / Outbreak Investigations

Social Network of Cluster of TB Cases – Pottawatomie County, August 2004



A Cluster of TB Cases Identified Through Social Network Analysis- Pottawatomie County, August 2004

Prepared by Catherine Diffin, RN; Jon Tillinghast, M.D., M.P.H.; and Sara Russell Rodriguez, M.S.N., M.P.H., RN

Tuberculosis (TB), an airborne infectious respiratory disease, is one of the most deadly and common major infectious diseases globally, infecting two billion people, or approximately one-third of the world's population. The incidence of TB in the U.S. has decreased by 44% during the years of 1993-2003. During this same time period, the incidence of disease has declined by 21% in Oklahoma. Even with this decline, TB continues to pose a substantial social, public health and economic burden.[1]

As the incidence of TB drops, the risk for delayed diagnosis increases as practitioners have less experience in diagnosis and treating TB. The declining incidence of TB has changed the disease's epidemiology, including high morbidity rates in isolated pockets of the population (i.e., homeless, substance abusers, and recent immigrants).

When someone with TB is identified it is important to find all persons potentially exposed to active TB disease. The traditional method of finding persons exposed to TB is the concentric circle approach. The person with active TB disease identifies all his/her contacts and the investigator divides the patient's environment into high, medium, and low priority circles (i.e., household, work/school, social/leisure) to prioritize testing of contacts for TB.[2]

Another approach to TB contact tracing is social network analysis. Social network analysis is the mapping of relationships between individuals and places. Social networking is beneficial in situations where the index case may only know their contacts by street names or are reluctant to name contacts in cases of homelessness, substance abuse or illegal activity.[3]

Another tool in contact investigations is TB genotyping, a method to ascertain the specific genetic code of the organism. Identifying specimens with the same genotype may help us link TB cases that were missed during traditional contact investigations. All three of these public health tools can identify contacts exposed to TB and prevent further transmission.

In August 2004, while delivering medication to an active TB case, a public health nurse encountered another known TB case at the residence, a local gathering place for recreational drug use. In the traditional concentric circle approach, neither case had named the other as a contact. At this same time, a local physician referred another case to the county health department who admitted to frequently going to the same house. This person did not name either of the two previous cases as contacts. In response to this information OSDH and the local public health nurse investigated this cluster of TB cases further.

The traditional method of contact investigation using the concentric circle approach was used with all cases. After identifying the house as a common location among the cases, social network analysis was used to identify additional contacts connected to the house. Sputum specimens positive for TB were sent for genotyping.

In our investigation, a laboratory confirmed case of TB was defined as a person with isolation of *Mycobacterium tuberculosis* in sputum, body tissue or fluid culture. A clinical case of TB was defined as a person with a positive tuberculin skin test and other signs and symptoms compatible with TB (i.e., an abnormal chest x-ray that improves with treatment specific for TB). Latent Tuberculosis infection (LTBI) was defined as a person with a reactive tuberculin skin test and no clinical, bacteriologic, or radiographic evidence of active TB disease.[1]

Graphic 1 represents the relationships or social networks of both laboratory confirmed and clinical cases identified in this outbreak. Overall we identified 9 laboratory confirmed cases and 6 clinical cases. Investigation of these 15 cases revealed a total of 28 persons with LTBI. Of the laboratory cases that were able to be genotyped, 88% (n=7) were identified as the same genotype; 1 laboratory confirmed case had a different genotype.

Of cases, 60% (n=9) were male and 40% (n=6) were female. Sixty percent (n=9) identified themselves as African-American, 33% (n=5) as Native American and one person identified herself as both Native American and African-American. Fifty-three percent (n=8) were 18 or older and classified as adults; 47% (n=7) were classified as children. Of adults, 88% (n=7) had a history of incarceration and all were incarcerated at the same county jail, although at different times. One hundred percent of adults admitted to a history of drug abuse. The concentric circle approach identified 7 cases and 21 persons with LTBI. Social network analysis yielded an additional 7 cases and 7 persons with LTBI. One case was identified through genotyping data and is suspected to have contact to the common house.

Social network analysis was crucial to the understanding and identification of the cluster. A traditional concentric circle contact investigation by itself would have yielded an incomplete understanding of the cluster epidemiology and demonstrates that earlier identification of the social network may have prevented transmission of TB infection and disease development.

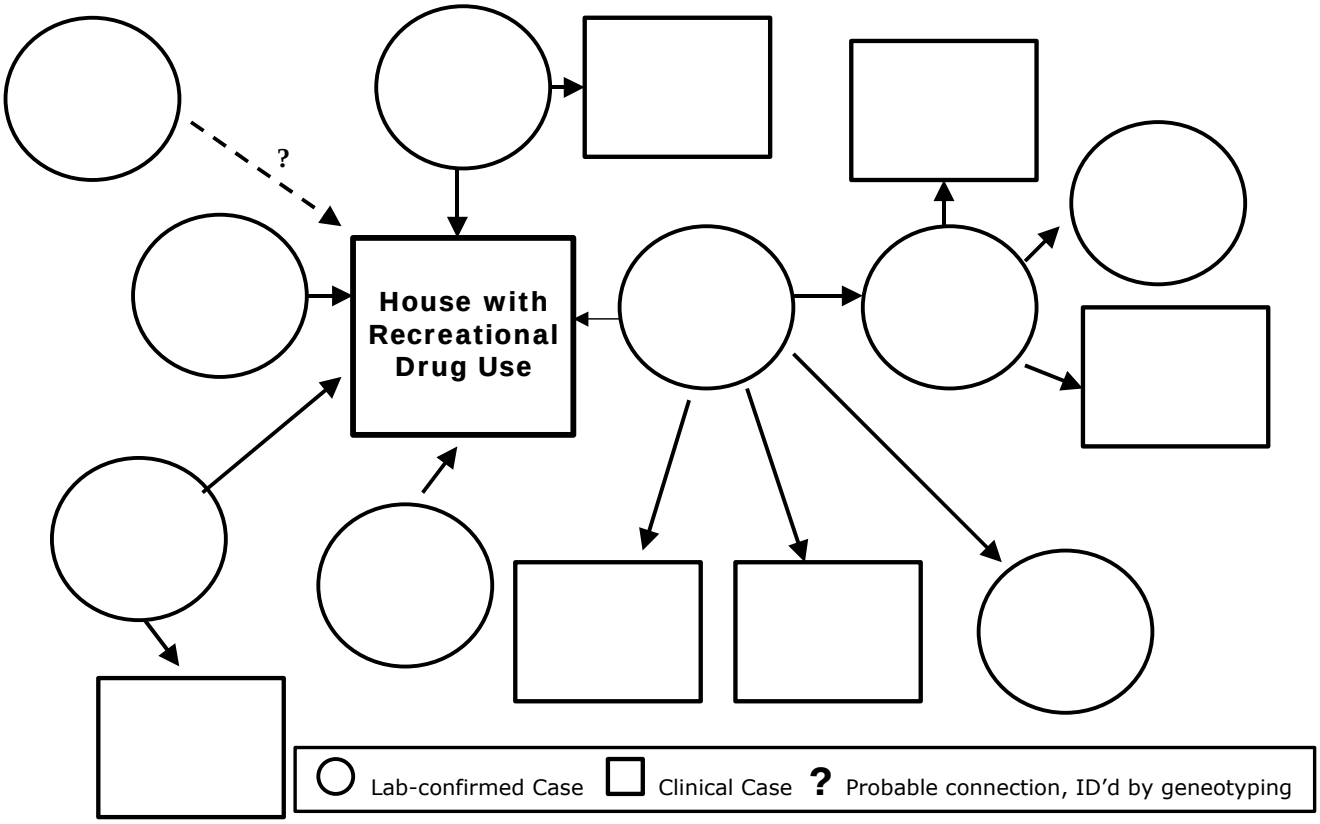
Recommendations

- Include TB in a differential diagnosis for respiratory disease, especially for high-risk populations (i.e., history of incarceration, drug abusers, homeless, and foreign-born).
- Consider screening (tuberculin skin test) high risk populations.
- Consider social network analysis in addition to the concentric circle approach when investigating TB cases.
- Continue to use genotyping data to connect active TB cases in a community.

References:

[1]Centers for Disease Control and Prevention. Controlling Tuberculosis in the United States. MMWR 2005; 54 (No. RR-12)
[2]Centers for Disease Control and Prevention. Guidelines for the investigation of contacts of person with infectious tuberculosis. MMWR 2005; 54: 1-47
[3]Klovdahl AS, et al. Networks and tuberculosis: an undetected community outbreak involving public places. Soc Sci & Med 2001; 52:681-694

Social Network of Cluster of TB Cases – Pottawatomie County, August 2004



A Holiday Public Health Response: Potential Rabies Exposure to Unpasteurized Milk.

Prepared by John Bos, M.P.H.

The OSDH confirms and investigates an average of 99 cases of animal rabies in wild and domestic species each year. Over the past ten years, a total of 75 rabid bovine were identified, including eight cases in 2005. On Tuesday, December 20, 2005 the OSDH-PHL reported a positive rabies test in a Holstein cow belonging to a dairy farm in Claremore, Oklahoma that is permitted to sell unpasteurized "raw" milk to the general public. The OSDH in collaboration with the Oklahoma Department of Agriculture, Food and Forestry conducted an epidemiologic investigation to assess food safety risk. The cow's clinical presentation was classic for rabies, including ataxia, knuckling, and abdominal straining. Milk from the rabid cow was comingled with the milk of 71 other cows in the herd before bottling as raw milk or cream products for sale. Several gallons of raw milk during the potential infectious period (December 4-14, 2005) were used for the production of 660 pounds of cheese, however, the potentially contaminated cheese was still being aged and had not been sold.

Rabies transmission is most likely to occur by a bite from a rabid mammal. Non-bite exposures resulting from inoculation of saliva, cerebrospinal fluid or neurologic tissue onto mucous membranes or breaks in the skin are considered lower risk exposures. Oral transmission of rabies virus has been achieved in laboratory animals; yet, the virus dose required for oral infection was determined to be relatively high.[1] When rabies disease occurs following oral administration, infection is associated with prolonged contact with the buccal mucosa or accidental contact with nasal mucosa. Published studies are lacking but rabies virus has not been demonstrated in infectious doses in milk. The dilemma we faced was that although the risk of rabies virus contamination of milk was theoretical, a relatively large number of persons drank the raw milk several times during the period when the bulk milk may have contained a few rabies virions. Human rabies has nearly a 100% case fatality rate and a very effective PEP regimen exists. When faced with similar potential mass exposures to unpasteurized milk, other state health departments have yielded to the conservative approach of advising rabies PEP for <u>all</u> persons who consumed the milk.[2] Following consultation with the CDC Rabies Branch, the consensus opinion was that all reasonably healthy individuals are not at risk. However, persons with immunosuppressive conditions, oral/esophageal ulcers or erosions, or anatomical defects that could allow for reflux of milk into the nasal cavity may be at potential risk of exposure. On December 22, 2005, a press release was broadcasted directing persons who consumed the raw milk purchased between December 4 and 19 to contact the OSDH for medical screening of at-risk conditions. A phone bank was activated at OSDH to process a high volume of calls, and public health nursing staff and CDD epidemiologists were deployed to the Rogers County Health Department (RCHD) to respond to a concerned public.

The RCHD and OSDH screened an estimated 850 persons over a one week period and provided recommendations for rabies PEP. A total of 125 persons (~15% of

those medically triaged) started the rabies PEP series resulting in greater than 600 patient visits to complete the vaccinations. Ninety-three percent of the patient visits were processed at the RCHD, including clinics held on the days before and after Christmas and New Year's Day. Customarily, the OSDH refers persons recommended to receive rabies PEP to their health care provider or hospital emergency department for medical supervision and administration of the rabies immune globulin and vaccine series. Due to the high demand for PEP, timing over the holidays and other unique characteristics of this situation, clinic services and rabies PEP were provided through the county health department. The RCHD and OSDH logged over 1,211 personnel hours for this public health response. The costs of the rabies biologics, approximately $1,500.00 per person, were reimbursed by the dairy farm's insurance company.

Any potential risk of rabies in milk can be eliminated by pasteurization. Pasteurization is also beneficial in preventing the transmission of milk-borne pathogens such as *Salmonella*, *Campylobacter*, *Listeria* and *E. coli* O157:H7. Oklahoma is one of 23 states that allow raw milk sales with permitting, inspection and sampling. Oklahoma also allows limited sales of goats milk without inspection if the volume of raw milk sales is less than 100 gallons per month.

As future public health policies are explored, the OSDH is encouraging the following:

1) Incorporate rabies vaccination in the dairy herd health program of all cows milked for incidental or permitted sales of raw milk;
2) Collect samples of milk and mammary gland tissue in any lactating animals suspected as rabid and freeze these specimens pending rabies test results on brain tissue; OSDH will assist with shipping specimens to CDC if rabies is confirmed.
3) Physicians should counsel patients about health risks associated with unpasteurized milk, especially those patients with HIV/AIDS, undergoing cancer treatment, or other immunosuppressive medical conditions.

Information about rabies risk assessments and PEP administration can be accessed online at http://www.health.state.ok.us/program/cdd/RabiesGuide06.pdf or by calling the OSDH CDD at (405) 271-4060. Consultations regarding rabies are available to health care providers 24/7 by contacting the epidemiologist on-call.

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Campylobacter jejuni Outbreak Associated with a Dairy Farm, Comanche County, Oklahoma, April 2005

Prepared by Jolianne Stone, M.P.H.

On April 19, 2005, the OSDH-CDD received a report regarding three children currently hospitalized with campylobacteriosis in Comanche County. All were members of a Cub Scout troop who had attended a field trip on April 11 to a dairy and goat farm. Further investigation revealed ten out of the eleven persons attending the field trip became ill. Six of the attendees were males aged 6 to 7 years. Two adult males and three adult females also attended. On April 12, attendees started becoming ill with symptoms including diarrhea, nausea, vomiting, abdominal pain, malaise, fever and muscle aches. By April 15, all but one person whom had attended the field trip were ill. Nine of the ten persons presented to a healthcare facility.

A questionnaire was developed and administered to farm workers, family members, and ill persons regarding potential exposures and whether they participated in certain activities. A total of eleven attendees, three owners, and fourteen employees and family members were interviewed. Stool samples were obtained on 7 of the 10 symptomatic persons that attended the trip. Three samples came back positive for the organism *Campylobacter jejuni*. A stool culture was obtained on one of the workers. It was also culture positive for *Campylobacter jejuni.*

Questionnaire results included consuming raw goat and cow's milk, feeding the animals, and assisting with milking the animals. No hand washing facilities were available at either farm. Statistical analysis was performed on the results of the questionnaire. Due to a small sample size, no significant results were found for any exposures. Eighty-two percent of attendees reported drinking raw goat milk. All persons attending the field trip reported drinking the raw cow's milk. Dose-response relationships were unable to be obtained due to inability to compare different amounts of raw goat and cow milk consumed. Other risk factors for exposure to *Campylobacter jejuni* identified during interviews included touching railings at the facilities, picking up items off the ground and hand washing techniques.

Environmental samples were obtained from both farms for bacterial culture. Pooled raw milk samples were forwarded to the Department of Agriculture for sampling. Two environmental samples cultured positive for *Campylobacter jejuni*, both from cow manure. PFGE was performed on the cow manure, the worker's clinical sample, and two of the attendees. All patterns were indistinguishable from each other.

This outbreak of campylobacteriosis demonstrates the importance of educating persons regarding the risk of developing disease from consuming raw animal milk, and severity of disease from these infections on children. It is also important to emphasize the importance of hand washing after interacting with animals.

Campylobacter Outbreak Associated with a Catered Lunch

Prepared by Lisa Littrell, RN, M.P.H.

In May 2005, epidemiologists with the Oklahoma City-County Health Department (OCCHD) were notified of two laboratory-confirmed cases of *Campylobacter* who reported eating a catered luncheon at two different locations (Location A and Location B) in Oklahoma County on the same day, which were catered by the same restaurant. OCCHD epidemiologists obtained lists of individuals from Locations A and B, which had ordered the catered meals. Each individual at Location A and B who were present the day of the catered meal were interviewed to obtain information about foods consumed, time of food consumption, presence of illness with time of onset and symptoms. A list of other meals catered on the same day was obtained from the restaurant. The persons ordering these meals were contacted and questioned about illness occurring in their groups after consuming the catered meal; none reported illness among their group after the catered meal.

Both Locations A and B were served a fajita lunch on the same day. The standard catered fajita lunch menu consists of a combination of chicken and beef fajita meat served in the same pan with green peppers and onions; soft flour tortillas; rice; beans; pico de gallo; hot pickled vegetable relish; sour cream; guacamole; grated cheese; chips; salsa; atomic salsa; cheese sauce; and bunuelos (cinnamon and sugar coated fried tortilla strips). No other restaurants identified during interviews accounted for a significant number of persons who became ill.

A total of 55 persons from both locations ate the catered fajita lunch (25 persons from Location A and 30 persons from Location B). Forty-two persons (76% of total) who ate the lunch were interviewed, 28 of whom reported illness. Based on these interviews, a case was defined as any person who reported onset of diarrhea or abdominal cramping with fever, nausea or vomiting within 10 days after eating the catered lunch. Twenty-three of the persons reporting illness met the case definition, resulting in an attack rate of 42% (23 ill persons per 55 persons at risk).

Of the 28 persons reporting illness, 24 (86%) reported abdominal cramps, 16 (57%) reported diarrhea, 14 (50%) reported fever, 14 (50%) reported nausea, 3 (11%) reported vomiting, and 5 (18%) reported bloody stools. The time from potential exposure at the catered lunch to onset of symptoms ranged from 7.5 hours to 6 days with an average incubation period of 2.25 days. A median duration of illness was 2 days (range 1-4 days) after onset of the first symptom. Six ill persons reported seeking medical attention; one was hospitalized.

Analysis of the food consumption data obtained from the interviews found no single food item to be significantly associated with illness. However, analysis of several food items showed that consumption of food items served, particularly meat items, were associated with a greater risk of developing illness. These food items accounted for an attack rate of 42% overall, with location-specific attack rates of 50% for Location A and 82% for Location B. Location-specific odds ratios showed an increased risk for development of illness after consumption of specific food

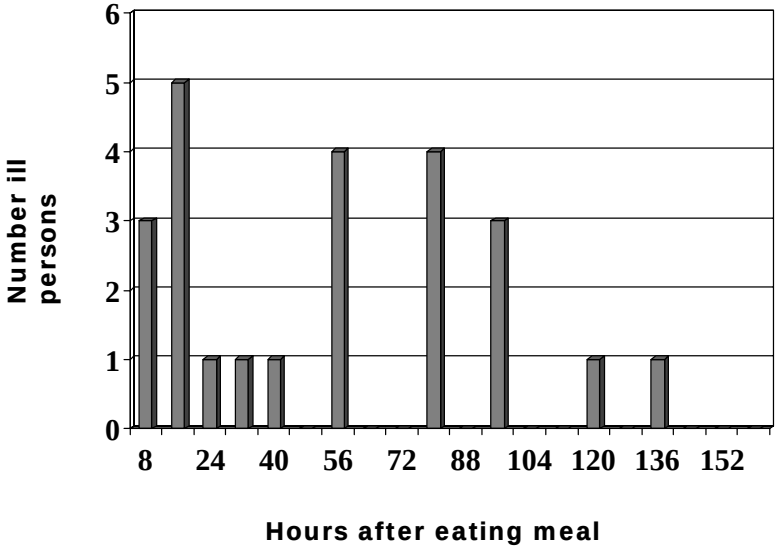
items, but none were statistically significant. The odds of becoming ill after consumption of fajita chicken or fajita beef were 1.25 times and 1.34 times, respectively.

For Location A, the food item whose consumption might have increased the risk of developing illness was fajitas, including beef, chicken, or vegetables (OR=1.15, accounting for 50% of those ill). Similarly, analysis of food items for Location B revealed consumption of fajita vegetables (OR = 1.25, accounting for 36% of ill), fajita chicken meat (OR=1.25, accounting for 59% of ill) and fajita beef (OR=1.34, accounting for 50% of ill) were associated with an increased risk of developing illness, but also were not statistically significant.

A Hazard Analysis and Critical Control Point (HACCP) study was performed at the catering restaurant by OCCHD sanitarians. The HACCP study revealed many instances of potential cross-contamination, questionable cooking practices for meat items, lack of proper sanitation, and lack of proper handwashing procedures. Meats were not properly temperature checked to insure they exceeded critical control points. Employees did not use proper hand hygiene techniques after they touched soiled items, products or areas. Equipment was not properly washed, rinsed and sanitized between raw and partially-cooked meat products. Any one or a combination of the observations could contribute to a food borne illness occurrence.

Based upon the observed potential for cross-contamination, questionable cooking practices for meat items, lack of proper sanitation, and lack of proper handwashing procedures and the relatively high attack rates for consumption of the catered meals, an increased risk for illness was found to be likely in association with the catered lunches.

Onset of Illness by Hour After Eating Catered Meal, Oklahoma, May 2005



Case Report of *Brucella canis*:
Incidental Finding During Routine Surgical Procedure

Prepared by Kristy Bradley, D.V.M., M.P.H.

On December 6, 2005, the OSDH-CDD was notified by the Arkansas Department of Health and Human Services of a positive *Brucella canis* culture obtained from an Oklahoma resident during routine replacement of an automatic defibrillator device (ACID) at an Arkansas hospital. The patient, a 55 year-old male, had no symptoms of a febrile illness or evidence of infection at the ACID site. He had a history of two "heart attacks", the first event in 1988 and the second in 1993. The first ACID was placed in November 2001. Upon replacement of the ACID in November 2005, a swab of the ACID pocket was obtained and submitted for culture as part of routine protocols. The Arkansas hospital preliminarily identified culture growth as a *Brucella* species. The specimen was forwarded to the Arkansas PHL where a PCR test was positive for *Brucella spp*. An isolate was received by the CDC on December 14, 2005 and later confirmed as *Brucella canis*.
Due to concerns about possible laboratory exposure, the CDC recommended a three-week prophylaxis course of doxycycline and rifampin for four hospital laboratory personnel. The attending cardiologist also prescribed an empiric treatment course of doxycycline and rifampin for the Oklahoma patient for a period of six weeks.

Upon interview, the case-patient reported owning three dogs. He also reported hunting fox and coyotes for several years, and frequently shot and killed stray dogs as part of his law enforcement work. He had always owned dogs and during his young adult years raised Labrador retrievers, frequently assisting with whelping (delivery of puppies). One of the current canine pets, a four-year old intact male Labrador retriever that was rescued as an adult stray, was presented to a veterinarian for brucellosis testing and had a positive *B. canis* antibody test. Although a family dog had evidence of prior exposure to *B. canis*, the source of exposure for the case-patient could not be ascertained. Furthermore, since the case had no compatible symptoms, long term (20 – 30 years) colonization or subclinical infection with *B. canis* was considered feasible.

Brucellosis is a zoonosis, and virtually all infections derive from animals or food products. *B. abortus* is mainly associated with cattle. *B. melitensis* occurs primarily in sheep and goats while *B. suis* is principally associated with domestic and feral swine. *B. canis* is found in dogs and wild canines and is the least common cause of human brucellosis. Brucellae are classified microbiologically into two categories: rough or smooth strains. *B. canis* is a rough strain which is quite reduced in virulence compared to smooth strains of *Brucella* like *B. suis*. Despite its lower virulence index, laboratory-acquired infections of *B. canis* have been reported. Diagnosis of *B. canis* is dependent upon bacterial culture because the antibodies directed to *B. canis* do not cross react with the usual *Brucella* serologic tests that use *B. abortus* antigen. Although there is a *B. canis* serologic test for dogs, there is no commercially available serologic test for human testing. Brucella is considered a potential bioterrorism agent, so Laboratory Response Network (LRN) member laboratories are equipped to perform PCR to screen for all *Brucella* species in appropriate clinical specimens.

Cluster of Syphilis Cases Identified in Tulsa County

Prepared by Mark Turner, M.P.H.

Syphilis is a sexually transmitted disease affecting ~32,000 Americans annually. It most commonly affects heterosexual men and women, especially from minority groups. The disease spreads from person to person through direct contact with an ulcer-like lesion called a chancre that typically occurs on the external genitals, vagina, anus, or rectum but can also occur on the lips and in the mouth. Syphilis infection is also an additional risk factor for exposure to HIV.

In August 2005, a Tulsa physician noted a cluster of syphilis cases among her MSM and notified the health department. An investigation of this cluster was initiated through a review of all syphilis surveillance data for Oklahoma from January 1, 1999 to August 30, 2005. For the purpose of analysis, all cases meeting the definition of primary, secondary, or early latent syphilis were grouped into acute syphilis.

Through this investigation, it was identified that in Tulsa County, there has been a steady decrease in cases of acute syphilis from 71 cases in 1999 to 23 cases in 2004. However, in the first eight months of 2005 there were 20 cases. Of the 2005 cases, 77% were male, had an average age of 38 (range 16-66), 42% were non-Hispanic white, 42% of cases were diagnosed by a private physician, and nine (45%) occurred in MSM. In comparison, Oklahoma County syphilis cases during this time were less commonly male (56%), younger (36 years, range 11-100), less commonly non-Hispanic white (13%), less commonly diagnosed by a private physician (11%), and less commonly MSM (12%).

This investigation identified an increase in syphilis cases in Tulsa in the first eight months of 2005, and the increase was attributable to an increase among the MSM population while the number of cases among traditional at risk populations continues to decline. This increase in MSM syphilis cases is comparable to what is being seen nationally and signifies an important shift in the populations most at risk for syphilis in Oklahoma.

Increases in Fluoroquinolone-resistant *Neisseria gonorrhoeae* in Oklahoma

Prepared by Mark Turner, M.P.H.

In the U.S., an estimated 700,000 – 800,000 persons are infected with *Neisseria gonorrhoeae* each year. Since 1993, the CDC has recommended the use of fluoroquinolones for gonorrhea treatment because it is an inexpensive one dose oral therapy. However, in 2002, CDC changed its' recommendation to alternate therapies due to an increase of fluoroquinole-resistant *N. gonorrhoeae* (QRNG) in Asia, Pacific Islands (including Hawaii), and California.

The Gonococcal Isolate Surveillance Project (GISP) was established in 1986 to monitor trends in antimicrobial susceptibilities of strains of *N. gonorrhoeae* in the U.S. in order to establish a rational basis for the selection of gonococcal therapies. GISP is a collaborative project between 25 selected STD clinics, five regional laboratories, and the CDC.

Data collected nationally from these GISP sites during 2004 indicate a QRNG prevalence of 7.6%, which is much higher when compared to 5.0% in 2003, 2.2% in 2002 and 0.7% in 2001. When examining national QRNG data by risk behavior, the prevalence of fluoroquinolone resistance in the MSM population increased from 7.2% in 2002, to 15% in 2003, and finally 23.8% in 2004.

In response to an increased incidence of QRNG in Dallas and Denver, OCCHD, in concert with the OSDH, started a GISP screening project at the OCCHD STD Clinic in May 2003. Participants in this screening project are the first 25 urethral gonorrhea positive males seen at the STD Clinic each month. There were no positives identified in 2003, three (3) positives in 2004, and seven (7) positives in 2005.

Due to the increase in resistance, the OSDH instituted the following screening and treatment protocol for all county health departments in 2005:

Health department staff treating a male patient for gonorrhea should:

1. Evaluate if the patient has had sex with persons within the last 60 days from the following increased prevalence countries: Australia, Asia (China, Japan, Korea, Philippines, Singapore, and Vietnam), and the Pacific Islands including Hawaii, California, England, and/or Wales.
2. Inquire of all male patients if they have had sex with men in the last 60 days.

Any gonorrhea positive male patient who responds with a **Yes** to either question should be treated with ceftriaxone and not ciprofloxacin. Sexual partners of these populations should also be treated with ceftriaxone. When well-documented penicillin allergy or other contraindications preclude treatment with a cephalosporin, patients can be treated with a single-dose azithromycin 2.0g orally once or ciprofloxacin 500mg (or other floroqinolone can be given) followed by a test of cure.

Two Fatal Cases of PAM in Tulsa County, August 2005

Prepared by John Bos, M.P.H.

Primary amebic meningoencephalitis (PAM) is an acute fulminating meningoencephalitis, caused by the small free-living ameba *Naegleria fowleri* (*N. fowleri*).[1] PAM is rare, but nearly always fatal as approximately 200 cases have been reported worldwide and only a few have survived.[2] The disease most commonly occurs in previously healthy children and young adults following contact with fresh water 3 to 10 (range 1-14) days prior to onset of symptoms. PAM occurs when the ameba invades the brain via the cribriform plate leading to destruction of the olfactory bulbs and the cerebral cortex.[2]

The symptoms of PAM are indistinguishable from fulminate bacterial meningitis, characterized by severe frontal headache, high fever, stiff neck, photophobia, nausea, and vomiting.[3] As the disease rapidly progresses symptoms often include confusion, hallucinations, seizures, and coma. Death typically occurs within 3 to 10 days following onset of symptoms.[1-3] Cerebrospinal fluid (CSF) findings mimic those of bacterial meningitis, with a predominantly polymorphonuclear leukocytosis and increased protein and decreased glucose concentration.[3] Treatment of patients with PAM requires intensive supportive care. Although rare, recovery has followed intravenous and intrathecal administration of amphotericin B and miconazole in conjunction with oral rifampicin.[1]

N. fowleri are ubiquitous worldwide and are commonly found in fresh bodies of water including lakes, ponds, rivers, and hot springs.[2] In addition, the ameba has also been isolated from soil, sewage, sludge, minimally chlorinated pools and dust in the air.[2,4,5] The organisms are thermophilic, thriving in warm waters $\geq$ 80°F while feeding on a variety of bacteria.[2] Therefore, the majority of PAM cases occur during the summer months as water temperatures rise and water depths in natural bodies of water decline.[5] Although the majority of PAM cases are thought to result from submersion of the head in waters contaminated with N. fowleri, cases whose only water exposure was to mud puddles a few inches deep have been reported.[6] *N. fowleri* are sensitive to chlorine and recreational waters containing $\geq$ 1 parts per million (ppm) of free chlorine are considered safe.[1] No known infections due to *N. fowleri* have resulted from exposure to a properly chlorinated swimming pool.[1]

On August 2, 2005, two previously healthy Tulsa residents ages seven and nine years presented to Tulsa hospitals with a two and three-day history of fever, nausea, vomiting, and altered mental status. Symptoms rapidly progressed until the patients' deaths on August 5. Cultures of the CSF and blood were negative for bacterial growth, and no organisms were observed on a Gram-stained smear of the CSF collected from each patient. A wet-mount preparation of the CSF from each patient revealed a motile, unicellular organism consistent with *N. fowleri*. Subsequent culture and PCR of brain tissue collected at autopsy confirmed the presence of *N. fowleri*. Microscopic evaluation of multiple sections of brain at autopsy showed necrosis over most of the base of the brain of each patient.

The Tulsa City-County Health Department (TCCHD) in conjunction with the OSDH-CDD initiated an investigation to determine the source of the infections and institute control measures to prevent additional cases. The team conducted interviews with family and friends of each patient to identify potential water exposures. Clinical information for each patient was obtained through a review of the medical records. An environmental investigation into the possible water exposures was also conducted. Water specimen collection and testing was conducted on potential water sources common to both patients.

The investigation revealed that both patients visited a local park splash pad (an area with several water fountains spraying water) within their incubation period. In addition, one of the patients was reported to have several other water exposures including a small creek behind his home that he played in daily. This same creek also runs 1/4-mile from the second patient's home and though he had a history of playing near the creek no water exposure was reported. No other common water exposures were reported.

The environmental investigation of the splash pad revealed several deficiencies. The facility was being opened when the free chlorine levels were below the required limits of 1.0–5.0 ppm. If *N. fowleri* were present in dirt and debris introduced to the splash pad that had settled in the water reservoirs, free chlorine levels below 1 ppm may not be sufficient to eliminate the organism. The water temperatures at the splash pad ranged from 80° F to 99° F on the days the patients visited the park. The water in the small creek was observed to be shallow, 1-3 ft deep at locations nearest the homes of each case. The water flow was slow and trash and other debris were observed in the water. The temperature of the creek water where one of the patients played was 98° F. The high water temperatures at the splash pad and creek created an environment favorable for the proliferation of the organism. However, despite the favorable conditions, water samples obtained from the splash pad and the creek were negative for *N. fowleri*.

The geographical and temporal clustering of the two cases suggests a point source for the infections. The splash pad was identified as the only reported water exposure common to each case. However, one of the patients had multiple water exposure including the small creek that cannot be excluded as potential sources of infection. Although the more traditional source of exposure to *N. fowleri* would be a natural water source, given the deficiencies identified, the splash pad also cannot be excluded as a potential source of the infections. The fact *N. fowleri* was not isolated from the splash pad or the creek does not exclude either location as a potential source. In conclusion, the source of the *N. fowleri* infections resulting in the two PAM cases could not be conclusively identified.

A total of five cases of PAM have been reported in Oklahoma. Prior to this year, the last known case of PAM in Oklahoma occurred in an 11-year-old from Cleveland County who was most likely exposed at Lake Konawa in 2001. Two cases of PAM were also reported in 1998; a 9-year-old from Cotton County who was most likely exposed at a lake south of Fort Worth, Texas, and a 3-year-old from Tulsa County

who was most likely exposed at Kaw Lake and Fort Gibson Lake. None of the Oklahoma cases have survived.

The majority of PAM cases occur during the summer months as water temperatures rise and water depths decline in natural bodies of water. PAM may be prevented by keeping water from entering the nose or mouth when swimming, jumping, or diving into natural bodies of warm water. This may be accomplished by holding the nose shut or wearing a nose clip. Chlorine rapidly kills the ameba; therefore people swimming in well maintained swimming pools are not at risk of developing PAM. It is important to remember PAM is extremely rare. Every year many more deaths and injuries result from diving into shallow waters that hide rocks and debris, from using alcohol and or drugs while boating or swimming, and from leaving children unattended in water even for short periods of time.

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2005 Multi-state Outbreak Investigations

During 2005, the OSDH-CDD collaborated with other state public health officials to investigate outbreaks where a common exposure was identified among persons from multiple states. Outbreak investigations are conducted to (1) determine the magnitude of the outbreak; (2) identify the source(s) of transmission; (3) institute measures to prevent further transmission. The following summaries describe multi-state outbreak investigations conducted during 2005 where cases were identified among Oklahoma residents.

Multi-state Outbreak of *Salmonella* montevideo Associated with Contact to Baby Poultry

Between January and June 2005, 25 matching PFGE patterns of *Salmonella* serotype montevideo from 14 states were uploaded into Pulsenet. PFGE is a method that detects closely related or identical strains of bacteria, which may indicate the occurrence of a common exposure to a contaminated food, animal, or other source. Seventeen, or 68%, of these cases were available and willing to be interviewed using a detailed standardized questionnaire. Of the 17 cases available for re-interview, 13 reported exposure to baby turkeys, ducklings or chicks. Exposure types included having a pet baby bird in the home (11/13), interacting with a baby bird at someone else's home (1/13), or interacting with baby birds at a farm store (3/13).

Hatchery records were available for baby birds to which 11 of the human cases were exposed. One hatchery, located in New Mexico, was ultimately found to be the source of all implicated baby poultry. *Salmonella* outbreaks from chicks and ducklings often occur during the spring, as the demand for baby birds for Easter and for backyard use to raise for meat and eggs rises. Children are particularly at risk of illness because they are less likely to wash their hands and have more frequent hand-to-mouth contact than adults. Other individuals at high risk of severe illness include the elderly and people with weakened immune systems.

Multi-state Outbreak of *Salmonella* typhimurium Associated with Unpasteurized Orange Juice

An outbreak of 126 cases of *Salmonella* typhimurium in 22 states was found using PFGE between April and August of 2005. When indistinguishable patterns are detected, epidemiologists at state health departments investigate to determine if any common link exists between the persons who submitted the matching specimens. In this cluster, it was noted that 14 of these cases occurred in Michigan in late June to early July. As part of its routine investigations of cases of salmonellosis, the Michigan Department of Community Health noted that of the 13 cases with this PFGE pattern they were able to interview, 11 reported consumption of "fresh-squeezed" orange juice from upscale market retailers located in southeast Michigan.

To test the association between salmonellosis and fresh-squeezed orange juice, cases were questioned regarding their consumption of fresh-squeezed orange juice during the five days prior to illness onset. One matching case occurred in Oklahoma. This case and his family reported travel to Florida during his incubation period. An interview of the case's family revealed he had consumed the implicated fresh-squeezed orange juice while in Florida. After tracing the juice named by respondents through points of purchase, a single producer in Florida was implicated as the source of infection.

Investigation of Nosocomial *Ralstonia spp.* Associated with Vapotherm Oxygen Delivery Device

Ralstonia spp. are water-borne, gram-negative bacilli that have been implicated in nosocomial outbreaks involving contaminated solutions used for patient care. The Vapotherm™ 2000i delivers highly concentrated oxygen via nasal cannula to patients. In August 2005, a Philadelphia hospital notified the CDC of a possible *Ralstonia* outbreak associated with Vapotherm. Active surveillance conducted by state health departments identified 40 patients with *Ralstonia* colonization from 24 hospitals in 16 states, including one case identified in Oklahoma. All patients were < 18 years old, and were exposed to Vapotherm prior to recovery of *Ralstonia*.

Oklahoma submitted eight environmental cultures isolated from Vapotherm machines and one patient isolate. Forty-four isolates from 13 hospitals grew *Ralstonia* species. PFGE showed strains in six different states that displayed greater than 90% genetic relatedness using Dice coefficients. PFGE of the Oklahoma specimens revealed five samples positive for *Ralstonia*, but were only 69% related to the outbreak strain so they were not included in the analysis. After the initial reports, the manufacturer recommended a higher-level disinfection protocol for Vapotherm units. Cultures obtained from three contaminated machines subjected to the higher-level protocol showed no growth immediately following cleaning. Within 7 days of operation, however, cultures from the machines again grew *Ralstonia.* Two hospitals reported recovery of *Ralstonia* from unopened Vapotherm cartridges. On December 20, 2005, the FDA issued a Public Health Notification encouraging the use of alternative devices until the source of contamination was found. Contamination of Vapotherm™ 2000i devices led to recovery of a common strain of *Ralstonia mannitolytica* from patients in several states. Current cleaning protocols may not result in sustained eradication of the organism from some machines; new cleaning protocols are currently being developed to address this issue.

Investigation of Nosocomial *Burkholderia cepacia* Infections Associated with Contaminated Alcohol-Free Mouthwash

In August 2005, the CDD was notified by the CDC of a cluster of infections involving mechanically ventilated hospital patients. An association between alcohol-free mouthwash and intubated patients with positive cultures for *Burkholderia cepacia*

was found at a hospital in Texas when *B. cepacia* was also recovered from unopened bottles of the mouthwash used in the oral care of these patients. Following this discovery, the manufacturer voluntarily withdrew the product. Company records showed the implicated product had been shipped to hospitals in Oklahoma as part of a "care package." In an effort to ensure that all implicated lots of product were removed from use, as well as to identify associated cases, a Health Alert Network Update was issued to all hospitals in Oklahoma. Because of the potential for "care packages" to be brought into nursing homes following patient discharge, a second update was later sent to all nursing homes in Oklahoma.

Over the course of several weeks, 114 cases from hospitals in nine states (FL, MI, OK, SC, TN, VA, GA, KY, and TX) were linked to the product. One death was attributed to this infection. Of these cases, nine were Oklahoma residents, all of whom were receiving mechanical ventilation. Two Oklahoma hospitals reported cases. The death did not occur in Oklahoma. In addition to sending *B. cepacia* isolates from human specimens, CDC requested that unopened bottles of product from the implicated lot numbers be sent. When compared to the outbreak strain cultured from the mouthwash, 74 of 88 (84%) human isolates had indistinguishable PFGE patterns, suggesting that the majority of cases had infection or colonization with *B. cepacia* originating from the mouthwash.

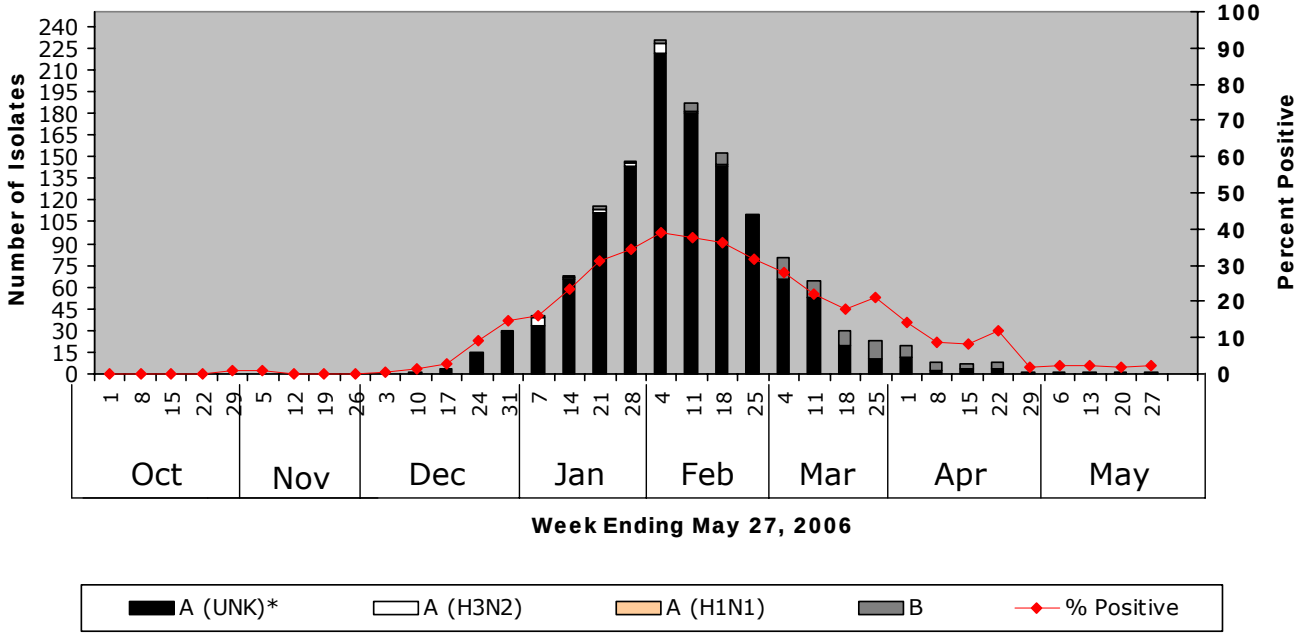
Burkholderia cepacia is a bacterium commonly found in soil and water that does not cause infections in healthy people. In persons with underlying lung diseases, particularly cystic fibrosis, *B. cepacia* causes opportunistic infections. Mechanically ventilated patients are vulnerable to *B. cepacia* pneumonia because of their inability to maintain the mucociliary and cough mechanisms that normally protect the lower respiratory tract. CDC estimates the organism is responsible for 0.6% of ventilator-related pneumonias.[1]

This is the third documented outbreak since 1994 involving *B. cepacia* infections in alcohol-free mouthwash in ventilated patients. Because the product does not make therapeutic claims, it is regulated as a cosmetic, rather than a drug, by the FDA. As such, it is not required to be sterile, nor does the product contain the alcohol that would kill bacteria in other mouthwashes. Healthcare workers who detect ventilator-associated *B. cepacia* infections associated with alcohol-free mouthwash should contact OSDH-CDD.

[1]MMWR 1998 47(43); 926-928.

Surveillance Projects

Culture Positive Influenza Isolates† and Percent of Positive Influenza Tests from Sentinel Laboratories by Specimen Collection Date, Oklahoma 2005-2006



† Oklahoma sentinel physicians and laboratories submit a sample of specimens to the Oklahoma Public Health Laboratory during influenza season for viral identification.

*Influenza type A (UNK) - Sub-typing not performed or results pending

Oklahoma Influenza and Respiratory Virus Surveillance Summary, 2005-2006

Prepared by Renee Powell, M.P.H.

The objectives of the State's respiratory virus surveillance system are to detect influenza 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 publicize the circulating types and subtypes. During the 2005-2006 season, influenza and respiratory virus surveillance was conducted from October through May. Eighteen physicians from fourteen Oklahoma counties reported the number and age distribution of patients with influenza-like illness (ILI). ILI is defined as a fever (100°F[37.8°C], oral or equivalent) and cough with or without a sore throat in the absence of a known cause other than influenza. Ten geographically distributed laboratories in the state also reported results of respiratory virus testing on a weekly basis during influenza season.

Nationally, influenza activity remained at low levels from October through early January, increased during February, and then peaked in early March. Peak activity was less intense compared to the previous three seasons, but activity remained elevated for a relatively longer period of time. In Oklahoma, the first culture-confirmed case of influenza detected by sentinel surveillance was reported during the week ending December 10, 2005. Testing of referred islates and respiratory specimens at the OSDH-PHL confirmed the predominant influenza strain as Type A (H3N2) California (66.7%,26/39). Type B Shanghai-like influenza comprised 33.3% (13/39) of the positive influenza isolates.

Similar to national trends, influenza activity in Oklahoma was fairly low through the end of December with ILI staying below 1%. In January, influenza activity started to climb with 4.6% ILI and 15.9% test-positivity for influenza recorded for the week ending January 7, 2006. The geographical areas with earliest influenza activity were the Tulsa, northeast, and central regions of the state. In February, influenza activity peaked during the week ending February 4, 2006, with 2.5% ILI and 39.2% influenza test-positivity involving six of eight surveillance regions within the state. Peak activity continued through the middle of March when an increasing prevalence of Type B influenza was observed. For the week ending March 25, 2006, the percent test-positivity of influenza B viruses reported from sentinel laboratories was 56.5% (13/23) which exceeded that of influenza type A viruses. Sporadic influenza activity continued through the end of May with approximately 2% influenza test-positivity rates persisting during the latter part of the season.

With respect to other respiratory viruses, respiratory syncytial virus (RSV) activity was significant during the 2005-06 season and began escalating in late October (week ending October 22, 2005) when the threshold level of 10% test-positivity was surpassed. RSV activity reached a seasonal high of 44.2% of respiratory specimens testing positive for RSV during the week ending January 22, 2006. The RSV percent positivity continued above the 10% threshold until the end of April 2006.

HIV Incidence Surveillance

Prepared by Christie McDonald, M.P.H., and Terrainia Harris, M.P.H.

In late 2004, the CDC developed a new tool to estimate the number of new (incident) HIV infections in the United States. The goal of HIV incidence surveillance (HIS) is to provide national and regional population-based estimations of the number of new HIV infections per year. The OSDH was selected to expand the national HIV/AIDS surveillance system to measure the number of new HIV infections nationally and regionally each year. Currently, 34 jurisdictions, covering 85% of persons infected with HIV, are funded for implementation of HIV incidence surveillance.

In the past, HIV surveillance has been limited to monitoring prevalence, which is the proportion of persons with HIV/AIDS in a given population at a designated time. Recent advances in technology have resulted in the development of assays that are able to identify recent infections, i.e., infections within the past six months. Using this technology, HIV incidence data can provide a window into the epidemic at an earlier stage of disease than was previously possible. HIV incidence surveillance data will allow public health officials to monitor the epidemic more completely, to allocate resources, plan, implement, and evaluate prevention programs more effectively.

There are two components of estimating population-based HIV Incidence. First is the Serologic Testing Algorithm for Recent HIV Seroconversion (STARHS). This method uses a Less Sensitive HIV Enzyme-Linked Immunosorbent Assay to determine persons who have been infected in the last six months. STARHS is applied to remnant diagnostic HIV positive serum on individuals who are newly reported to the state. Laboratories send all remnant HIV-positive serum specimens for STARHS testing. HIV Surveillance determines whether the specimen represents the person's first reported positive HIV test result. Eligible specimens are then tested at the CDC's designated (STARHS) testing site.

The second component in the estimate is testing history information. Testing patterns, medical history, testing motivation, and demographic information are collected by Oklahoma disease intervention specialists during routine partner, counsel, and referral services for HIV/AIDS. The testing history information is weighted with the STARHS testing results. A statistical model will be applied to make population based estimates on recent HIV infections. The information will be used to provide regional and national HIV incidence data to assist local HIV prevention program planning and evaluation.

Program Activities

Public Health Investigation and Disease Detection of Oklahoma (PHIDDO) Annual Update

Prepared by Anthony Lee, M.P.H.

The Public Health Investigation and Disease Detection of Oklahoma (PHIDDO) System is a secure real-time web-based system to electronically submit cases of reportable diseases and conditions. PHIDDO is currently used by hospital infection control practitioners, laboratorians, physicians' offices, and county health department personnel.

Three hundred and fifteen new users were added to PHIDDO in 2005. To educate health care providers about PHIDDO and to enroll additional users, the CDD promoted the PHIDDO system at the annual conferences of the PA, Oklahoma State Medical Association, the Oklahoma Osteopathic Association, and the Oklahoma Academy of Physician Assistants.

Occupation	**Approx. # of Users**
Public Health Nurses	216
Infection Control Practitioners	174
Laboratorians	226
Physicians/Clinic Users	45
State Health Department Users	35
Total Number of PHIDDO Users	696

Two major clinical laboratories securely transmit multiple reports electronically through electronic laboratory reporting (ELR) to the OSDH. This eliminates the need for a laboratory technician to report manually by using the PHIDDO secure web site or by completing the Laboratory Reportable Pathogen Card. In 2005, the system received over 9,000 reports from users via the secure web site and over 28,000 reports from the two laboratories using ELR. PHIDDO users report that the system is easy to use.

An e-mailed newsletter, PHIDDO Bytes, was sent out periodically to provide users with information on new features in PHIDDO and helpful hints about using the system.

For additional information or to obtain access to PHIDDO, please contact Anthony Lee AnthonyL@health.ok.gov or Kim Rayno KimR@health.ok.gov at (405) 271-4060.

Reportable Health Information and Notification in Oklahoma (RHINO) Annual Update

Prepared by Kim Mitchell, B.S.

The Reportable Health Information and Notification in Oklahoma (RHINO) System is a Health Alert Network (HAN) used to provide emergent public health information to health care providers and public health partners. The RHINO secure web site provides registered users the ability to view and share information in a secure format.

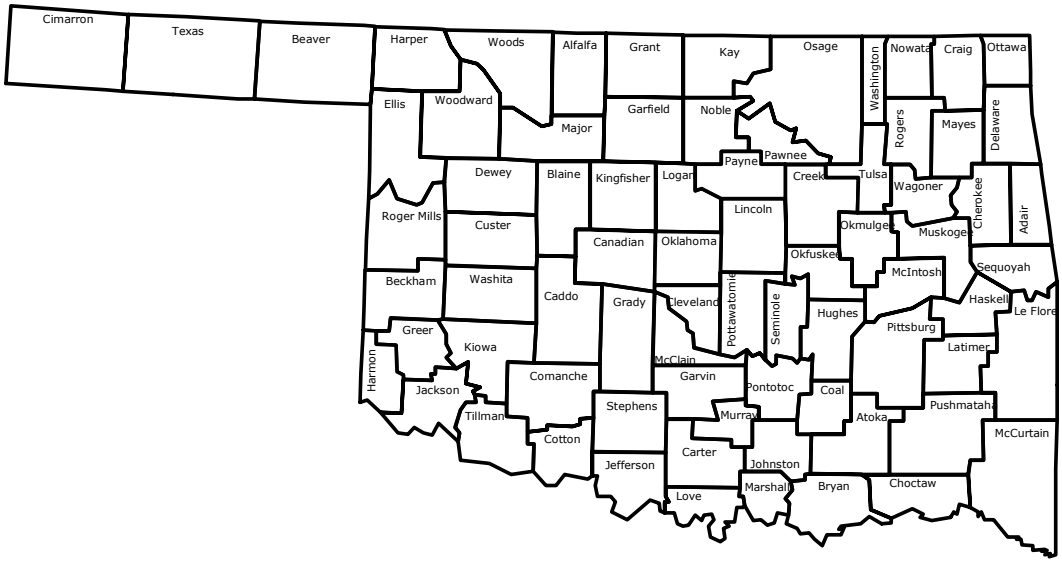
RHINO membership has grown in all areas over the past year. The current focus for RHINO membership is Physicians, Physician Assistants, and Nurse Practitioners. In the fall of 2005, the OSDH created a partnership with the Oklahoma State Board of Medical Licensure and Supervision (OSBMLS). The OSBMLS created a Health Emergency Notification database to provide the RHINO system with up-to-date physician emergency contact information. To further familiarize health care providers with RHINO and encourage membership, the CDD promoted the RHINO system at the Annual PA Conference, Oklahoma State Medical Association Conference, and the Annual Oklahoma Osteopathic Association Conference.

Occupation	**Approx. # of Users**
Public Health Nurses	244
Sanitarian/Environmental Specialists	22
Infection Control Practitioners	153
Laboratorians	89
Physicians	4
Total Number of RHINO Users	819

In the past year, more than 40 RHINO messages have been distributed. In the weeks and months following Hurricane Katrina, the RHINO system was used to distribute messages that alerted health care professionals of persons with possible unmet medical needs and possible illnesses in hurricane evacuees. Messages were also distributed detailing instructions for identifying displaced children and immunization recommendations for displaced individuals.

The RHINO System was utilized in two outbreak situations in which notifications were distributed alerting health care professionals of a possible illness and requesting suspected cases to be reported to the CDD. In August and September of 2005, notifications were sent out advising hospitals and nursing home facilities of possible nosocomial *Burkholderia cepacia* colonization or infection due to contaminated alcohol-free mouthwash. In December an advisory was distributed to hospitals providing information on positive *Ralstonia* cultures associated with the use of a type of respiratory gas administration device. In December, two RHINO advisories were targeted toward physicians and hospitals notifying them of possible rabies exposure to those who consumed unpasteurized milk from a dairy farm in Claremore, OK along with information on obtaining rabies vaccine.

Contact Information for County Health Departments



County Health Department	Address	City	Zip	Phone
ADAIR COUNTY HEALTH DEPARTMENT	600 West Hickory	Stilwell	74960	(918) 696-7292
ALFALFA COUNTY C/O GARFIELD COUNTY	P.O. Box 3266	Enid	73701	
ATOKA COUNTY HEALTH DEPARTMENT	1006 West 13th Street	Atoka	74525	(580) 889-2116
BEAVER COUNTY HEALTH DEPARTMENT	PO Box 520	Beaver	73932	(580) 625-3693
BECKHAM COUNTY HEALTH DEPARTMENT	115 South 4th	Sayre	73662	(580) 928-5551
	400 East Third	Elk City	73644	(580) 225-1173
BLAINE COUNTY HEALTH DEPARTMENT	521 West 4th	Watonga	73772	(580) 623-7977
BRYAN COUNTY HEALTH DEPARTMENT	P.O. Box 598	Durant	74702-0589	(580) 924-4285
CADDO COUNTY HEALTH DEPARTMENT	P.O. Box 236	Anadarko	73005	(405) 247-2507
CANADIAN COUNTY HEALTH DEPARTMENT	100 S. Rock Island	El Reno	73036	(405) 262-0042
	1023 East Vandament	Yukon	73099	(405) 354-4872
CARTER COUNTY HEALTH DEPARTMENT	405 South Washington	Ardmore	73401	(580) 223-9705
	PO Box 298	Healdton	73438	(580) 229-1291
CHEROKEE COUNTY HEALTH DEPARTMENT	912 South College	Tahlequah	74464	(918) 456-8826
CHOCTAW COUNTY HEALTH DEPARTMENT	103 South Fourth Street	Hugo	74743	(580) 326-8821
CIMMARON COUNTY HEALTH DEPARTMENT				Call Texas CHD
CLEVELAND COUNTY HEALTH DEPARTMENT	250 12th Ave. N.E.	Norman	73071	(405) 321-4048
	224 South Chestnut	Moore	73160	(405) 794-1591
COAL COUNTY HEALTH DEPARTMENT	P.O. Box 365	Coalgate	74538-0365	(580) 927-2367
COMANCHE COUNTY HEALTH DEPARTMENT	P.O. Box 87	Lawton	73501	(580) 248-5890
COTTON COUNTY HEALTH DEPARTMENT	1501-A South 7th	Walters	73572	(580) 875-6121
CRAIG COUNTY HEALTH DEPARTMENT	115 East Delaware	Vinita	74301	(918) 256-7531
CREEK COUNTY HEALTH DEPARTMENT	1808 South Hickory	Sapulpa	74066	(918) 224-5531
	P.O. Box 848	Drumright	74030	(918) 352-9581
	408 West 4th	Bristow	74010	(918) 367-3341
CUSTER COUNTY HEALTH DEPARTMENT	P.O. Box 698	Clinton	73601	(580) 323-2100
	220 North Bradley	Weatherford	73096	(580) 772-6417
DELAWARE COUNTY HEALTH DEPARTMENT	P.O. Drawer 370	Jay	74346	(918) 253-4511
DEWEY COUNTY HEALTH DEPARTMENT				Call Blaine CHD
ELLIS COUNTY HEALTH DEPARTMENT				Call Woodward CHD
GARFIELD COUNTY HEALTH DEPARTMENT	P.O. Box 3266	Enid	73701	(580) 233-0650
GARVIN COUNTY HEALTH DEPARTMENT	1809 South Chickasaw	Pauls Valley	73075	(405) 238-7346
	707 West Comanche	Lindsay	73052	(405) 756-2928

County Health Department	Address	City	Zip	Phone
GRADY COUNTY HEALTH DEPARTMENT	2116 Iowa Street	Chickasha	73018	(405) 224-2022
GRANT COUNTY HEALTH DEPARTMENT	115 North Main	Medford	73759	(580) 395-2906
GREER COUNTY HEALTH DEPARTMENT	PO Box 1	Mangum	73554	(580) 782-5531
HARMON COUNTY HEALTH DEPARTMENT	1104 N. 7th	Hollis	73550	(580) 688-3348
HARPER COUNTY HEALTH DEPARTMENT	P.O. Box 290	Laverne	73848	(580) 921-2029
	P.O. Box 290	Laverne	73848	(580) 735-6100
HASKELL COUNTY HEALTH DEPARTMENT	1407 N.E. D St.	Stigler	74462	(918) 967-3304
HUGHES COUNTY HEALTH DEPARTMENT	200 McDougal Drive	Holdenville	74848-2811	(405) 379-3313
JACKSON COUNTY HEALTH DEPARTMENT	401 W. Tamarack Road	Altus	73521-1599	(580) 482-7308
JEFFERSON COUNTY HEALTH DEPARTMENT	107 East Anderson Avenue	Waurika	73573-3029	(580) 228-2313
JOHNSTON COUNTY HEALTH DEPARTMENT	P.O. Box 486	Tishomingo	73460	(580) 371-2470
KAY COUNTY HEALTH DEPARTMENT	433 Fairview	Ponca City	74601	(580) 762-1641
	1706 South Main	Blackwell	74631	(580) 363-5520
KINGFISHER COUNTY HEALTH DEPARTMENT	124 East Sheridan Courthouse Annex Rm.# 101	Kingfisher	73750-3224	(405) 375-3008
KIOWA COUNTY HEALTH DEPARTMENT	431 W. Elm	Hobart	73651	(580) 726-3316
LATIMER COUNTY HEALTH DEPARTMENT	201 West Main	Wilburton	74578	(918) 465-5673
LeFLORE COUNTY HEALTH DEPARTMENT	P.O. Box 37	Poteau	74953	(918) 647-8601
	P.O. Box 964	Talihina	74571	(918) 567-2141
LINCOLN COUNTY HEALTH DEPARTMENT	101 Meadow Lane	Chandler	74834	(405) 258-2640
LOGAN COUNTY HEALTH DEPARTMENT	215 Fairgrounds Road, Suite A	Guthrie	73044	(405) 282-3485
LOVE COUNTY HEALTH DEPARTMENT	200 C.E. Colston Drive	Marietta	73448	(580) 276-2531
McCLAIN COUNTY HEALTH DEPARTMENT	919 North Ninth Street	Purcell	73080	(405) 527-6541
	P.O. Box 130	Blanchard	73010	(405) 485-3319
McCURTAIN COUNTY HEALTH DEPARTMENT	1400 Lynn Lane	Idabel	74745	(580) 286-6620
McINTOSH COUNTY HEALTH DEPARTMENT	P.O. Box 71	Eufaula	74432	(918) 689-7774
	211 W. Gentry	Checotah	74426	(918) 473-5416
MAJOR COUNTY HEALTH DEPARTMENT	501 East Broadway	Fairview	73737	(580) 227-3362
MARSHALL COUNTY HEALTH DEPARTMENT	P.O. Box 476	Madill	73446	(580) 795-3705
MAYES COUNTY HEALTH DEPARTMENT	111 Northeast First	Pryor	74361	(918) 825-4224
MURRAY COUNTY HEALTH DEPARTMENT	730 Cambridge Drive	Sulphur	73086	(580) 622-3716
MUSKOGEE COUNTY HEALTH DEPARTMENT	530 South 34th Street	Muskogee	74401	(918) 683-0321
NOBLE COUNTY HEALTH DEPARTMENT	300 East Fir Street	Perry	73077-4902	(580) 336-2257

County Health Department	Address	City	Zip	Phone
NOWATA COUNTY HEALTH DEPARTMENT				Call Rogers CHD
OKFUSKEE COUNTY HEALTH DEPARTMENT	125 North Second	Okemah	74859	(918) 623-1800
CITY-CO HEALTH DEPT OF OKLAHOMA CO	921 Northeast 23rd Street	Oklahoma City	73105	(405) 427-8651
OKMULGEE COUNTY HEALTH DEPARTMENT	1304 R.D. Miller Drive	Okmulgee	74447	(918) 756-1883
	404 East Broadway	Henryetta	74437-0078	(918) 652-8250
	P.O. Box 989	Beggs	74421	(918) 267-3606
OTTAWA COUNTY HEALTH DEPARTMENT	1930 North Elm	Miami	74354	(918) 540-2481
PAWNEE COUNTY HEALTH DEPARTMENT	639 Seventh Street	Pawnee	74058	(918) 762-3643
	1390 West Cherokee	Cleveland	74020	(918) 358-2546
PAYNE COUNTY HEALTH DEPARTMENT	1321 West 7th Avenue	Stillwater	74074	(405) 372-8200
	P.O. Box 168	Cushing	74023	(918) 225-3377
PITTSBURG COUNTY HEALTH DEPARTMENT	620 South Third	McAlester	74501	(918) 423-1267
PONTOTOC COUNTY HEALTH DEPARTMENT	1630 East Beverly - Suite 101	Ada	74820	(580) 332-2011
POTTAWATOMIE COUNTY HEALTH DEPARTMENT	1904 Gordon Cooper Drive	Shawnee	74801-8698	(405) 273-2157
PUSHMATAHA COUNTY HEALTH DEPARTMENT	318 West Main	Antlers	74523	(580) 298-6624
	P.O. Box 118	Clayton	74536	(918) 569-7973
ROGER MILLS COUNTY HEALTH DEPARTMENT				Call Beckham CHD
ROGERS COUNTY HEALTH DEPARTMENT	2664 N. Highway 88, Unit A	Claremore	74017	(918) 341-3166
SEMINOLE COUNTY HEALTH DEPARTMENT	200 South Brown	Wewoka	74884	(405) 257-5401
	1900 Boren Blvd.	Seminole	74868	(405) 382-4369
SEQUOYAH COUNTY HEALTH DEPARTMENT	612 North Oak Street	Sallisaw	74955	(918) 775-6201
STEPHENS COUNTY HEALTH DEPARTMENT	1401 Bois D'Arc	Duncan	73533	(580) 252-0270
TEXAS COUNTY HEALTH DEPARTMENT	1410 North East Street	Guymon	73942	(580) 338-8544
TILLMAN COUNTY HEALTH DEPARTMENT	1500 N. Main Street	Frederick	73542	(580) 335-2163
TULSA CITY-COUNTY HEALTH DEPARTMENT	5051 S. 129th East Avenue	Tulsa	74134	(918) 582-9355
WAGONER COUNTY HEALTH DEPARTMENT	212 North Pierce	Wagoner	74467	(918) 485-3022
	P.O. Box 962	Coweta	74429	(918) 486-2845
WASHINGTON COUNTY HEALTH DEPARTMENT	3838 State Street	Bartlesville	74006	(918) 335-3005
WASHITA COUNTY HEALTH DEPARTMENT				Call Beckham CHD
WOODS COUNTY HEALTH DEPARTMENT	901 - 14th Street	Alva	73717	(580) 327-3192
WOODWARD COUNTY HEALTH DEPARTMENT	1631 Texas Avenue	Woodward	73801	(580) 256-6416

NOTES