Mississippi Morbidity Report

Volume 28, Number 6 December 2012

Annual Summary Selected Reportable Diseases

Mississippi – 2011

Mississippi State Department of Health

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Annual Summary
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Preface

Public health surveillance involves the systematic collection, analysis and dissemination of data regarding adverse health conditions. The data are used to monitor trends and identify outbreaks in order to assess risk factors, target disease control activities, establish resource allocation priorities and provide feedback to the medical community and the public. These data support public health interventions for both naturally occurring and intentionally spread disease.

Statistics incorporated into tables, graphs and maps reflect data reported from health care providers who care for Mississippi residents. Cases counted have met the surveillance case definitions of the CDC and the Council of State and Territorial Epidemiologists (CSTE). Unless otherwise noted all rates are per 100,000 population. Data are based on "event" date of the case with the exception of TB in which the case confirmation date is used. The "event" date is defined as the earliest known date concerning a case and is hierarchical (onset, diagnosis, laboratory date or date of report to the health department).

Mississippi law (Section 41-3-17, Mississippi Code of 1972 as amended) authorized the Mississippi State Board of Health, under which MSDH operates, to establish a list of diseases which are reportable. The reportable disease list and the Rules and Regulations Governing Reportable Diseases and Conditions may be found online at http://www.msdh.state.ms.us/msdhsite/_static/14,0,194.html. Class 1 diseases, reportable by telephone at first knowledge or suspicion, are those to which the MSDH responds immediately to an individual case. Class 2 diseases are reportable within a week of diagnosis, and Class 3 diseases are reportable only by laboratories and do not necessitate an immediate response to an individual case.

To report a case of any reportable disease or any outbreak, please call 601-576-7725 during working hours in the Jackson area, or 1-800-556-0003 outside the Jackson area. For reporting tuberculosis, you also may call 601-576-7700, and for reporting STD's or HIV/AIDS, you may call 601-576-7723. For emergency consultation or reporting Class 1 diseases or outbreaks nights and weekends please call 601-576-7400.

The data included in the following document have come from physicians, nurses, clinical laboratory directors, office workers and other health care providers across the state who called or sent in reports. Without these individuals, public health surveillance and response would be incapacitated. For your dedication to this important part of public health information, we thank you.

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State Epidemiologist

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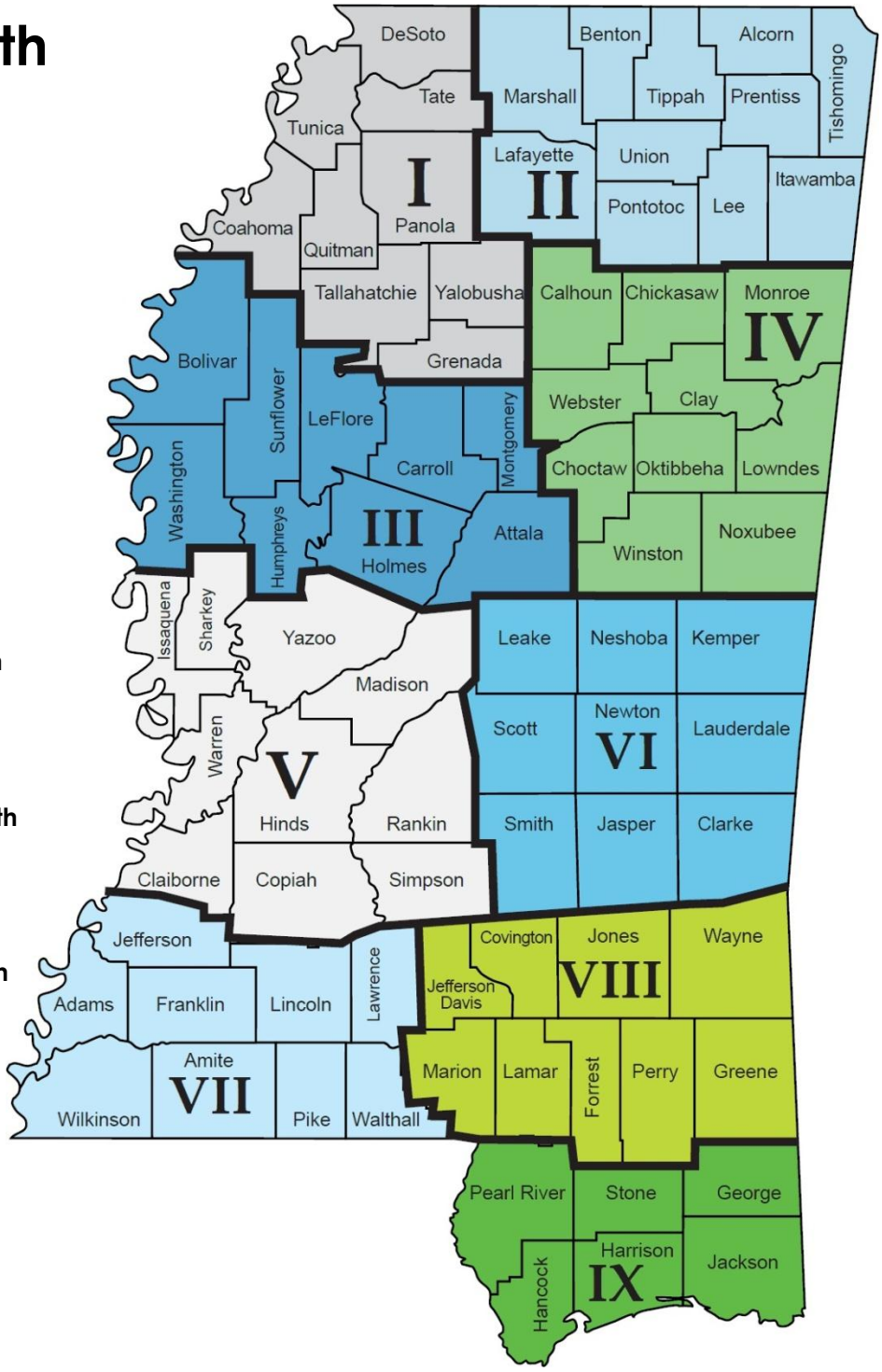


Reportable Disease List

Mississippi State Department of Health
List of Reportable Diseases and Conditions
Reporting Hotline: 1-800-556-0003
Monday - Friday, 8:00 am - 5:00 pm
To report inside Jackson telephone area or for consultative services
Monday - Friday, 8:00 am - 5:00 pm: (601) 576-7725

	Phone	Fax
Epidemiology	**(601) 576-7725**	**(601) 576-7497**
STD/HIV	**(601) 576-7723**	
TB	**(601) 576-7700**	

Class 1 Conditions may be reported nights, weekends and holidays by calling: (601) 576-7400

Class 1: Diseases of major public health importance which shall be reported directly to the Mississippi State Department of Health (MSDH) by telephone <u>within 24 hours of first knowledge or suspicion</u>. Class 1 diseases and conditions are dictated by requiring an immediate public health response. Laboratory directors have an obligation to report laboratory findings for selected diseases (refer to Appendix B of the Rules and Regulations Governing Reportable Diseases and Conditions).

Any Suspected Outbreak (including foodborne and waterborne outbreaks)
(Possible biological weapon agents appear in ***bold italics***)

Anthrax	Encephalitis (human)	***Ricin intoxication (castor beans)***
Arboviral infections including but not limited to those due to:	***Glanders***	***Smallpox***
California encephalitis virus	*Haemophilus influenzae* Invasive Disease†‡	*Staphylococcus aureus*, vancomycin resistant (VRSA) or vancomycin intermediate (VISA)
Eastern equine encephalitis virus	Hemolytic uremic syndrome (HUS), post-diarrheal	Syphilis (including congenital)
LaCrosse virus	Hepatitis A	Tuberculosis
Western equine encephalitis virus	HIV infection, including AIDS	***Tularemia***
St. Louis encephalitis virus	Influenza-associated pediatric mortality (<18 years of age)	Typhoid fever
West Nile virus	Measles	***Typhus fever***
Botulism (including foodborne, infant or wound)	***Melioidosis***	Varicella infection, primary, in patients >15 years of age
Brucellosis	*Neisseria meningitidis* Invasive Disease†‡	***Viral hemorrhagic fevers*** (filoviruses [e.g., Ebola, Marburg] and, arenaviruses [e.g.,Lassa, Machupo])
Chancroid	Pertussis	Yellow fever
Cholera	***Plague***	
Creutzfeldt-Jakob disease, including new variant	Poliomyelitis	
Diphtheria	***Psittacosis***	
Escherichia coli O157:H7 and any shiga toxin-producing *E. coli* (STEC)	***Q fever***	
	Rabies (human or animal)	

Any unusual disease or manifestation of illness, including but not limited to the appearance of a novel or previously controlled or eradicated infectious agent, or biological or chemical toxin.

Class 2: Diseases or conditions of public health importance of which individual cases shall be reported by mail, telephone, fax or electronically, within 1 week of diagnosis. In outbreaks or other unusual circumstances they shall be reported the same as Class 1. Class 2 diseases and conditions are those for which an immediate public health response is not needed for individual cases.

Chlamydia trachomatis, genital infection	Listeriosis	Rubella (including congenital)
Dengue	Lyme disease	Salmonellosis
Ehrlichiosis	Malaria	Shigellosis
Enterococcus, invasive infection‡, vancomycin resistant	Meningitis other than meningococcal or *H. influenzae*	Spinal cord injuries
Gonorrhea	Mumps	*Streptococcus pneumoniae*, invasive infection‡
Hepatitis (acute, viral only) **Note** - Hepatitis A requires Class 1 Report	*M. tuberculosis* infection (positive TST or positive IGRA***)	Tetanus
Hepatitis B infection in pregnancy	Noncholera vibrio disease	Trichinosis
Legionellosis	Poisonings* (including elevated blood lead levels**)	Viral encephalitis in horses and ratites
	Rocky Mountain spotted fever	

† Usually presents as meningitis or septicemia, or less commonly as cellulitis, epiglottitis, osteomyelitis, pericarditis or septic arthritis.

‡ Specimen obtained from a normally sterile site.

*Reports for poisonings shall be made to Mississippi Poison Control Center, UMMC 1-800-222-1222.

**Elevated blood lead levels should be reported to the MSDH Lead Program at (601) 576-7447.
Blood lead levels (venous) of $\geq$10 µg/dL

***TST- tuberculin skin test; IGRA- Interferon-Gamma Release Assay

Except for rabies, equine, and ratite encephalitis, diseases occurring in animals are not required to be reported to the MSDH.

Class 3: Laboratory based surveillance. To be reported by laboratories only. Diseases or conditions of public health importance of which individual laboratory findings shall be reported by mail, telephone, fax or electronically within one week of completion of laboratory tests (refer to Appendix B of the Rules and Regulations Governing Reportable Diseases and Conditions).

All blood lead test results	Chagas Disease (American Trypanosomiasis)	Hepatitis C infection
Blastomycosis	Cryptosporidiosis	Histoplasmosis
Campylobacteriosis	Hansen disease (Leprosy)	Nontuberculous mycobacterial disease
CD4 count and HIV Viral Load*†		
*HIV associated CD4 (T4) lymphocyte results of any value and HIV viral load results, both detectable and undetectable. †CD4 count and HIV Viral Load will be reportable as a Class 3 report effective 2/11/13.		

Class 4: Diseases of public health importance for which immediate reporting is not necessary for surveillance or control efforts. Diseases and conditions in this category shall be reported to the Mississippi Cancer Registry within six months of the date of first contact for the reportable condition.

The National Program of Cancer Registries at the Centers for Disease Control and Prevention requires the collection of certain diseases and conditions. A comprehensive reportable list including ICD9CM codes is available on the Mississippi Cancer Registry website, http://mcr.umc.edu/documents/ReportableCases10-09andlater.pdf.

Each record shall provide a minimum set of data items which meets the uniform standards required by the National Program of Cancer Registries and documented in the North American Association of Central Cancer Registries (NAACCR).

Arboviral Infections (mosquito-borne)

Background

Arthropod-borne viral (arboviral) diseases in Mississippi are limited to a few types transmitted by mosquitoes. In this state, there are four main types of arboviral infections that have been reported: West Nile virus (WNV), St. Louis encephalitis (SLE), eastern equine encephalitis (EEE), and LaCrosse encephalitis (LAC). WNV and SLE are members of the *Flavivirus* genus, while EEE is an *Alphavirus*, and LAC is in the California virus group of *Bunyaviruses*.

Infections do not always result in clinical disease. When illness occurs, symptoms can range from a mild febrile illness to more severe cases of neuroinvasive disease with symptoms of encephalitis and/or meningitis. Neuroinvasive disease can result in long term residual neurological deficits or death. The proportion of infected persons who develop symptoms depends largely on the age of the persons and the particular virus involved.

Mosquito borne arboviral infections are typically more common in the warmer months when mosquitoes are most active, but WNV cases have been reported year round. All are transmitted by the bite of an infected mosquito, but the mosquito vectors and their habitats differ. Infections are not transmitted by contact with an infected animal or other person; humans and horses are "dead end" or incidental hosts. Rare instances of WNV transmission have occurred through transplanted organs, blood transfusions, and transplacentally.

Methods of Control

The methods of controlling mosquito-borne infections are essentially the same for all the individual diseases. The best preventive strategy is to avoid contact with mosquitoes. Reduce time spent outdoors, particularly in early morning and early evening hours when mosquitoes are most active; wear light-colored long pants and long-sleeved shirts; and apply mosquito repellant to exposed skin areas. Reduce mosquito breeding areas around the home and workplace by eliminating standing or stagnant water. Larvacides are effective when water cannot be easily drained.

Mosquito Surveillance

Mosquitoes are collected throughout the state for West Nile and other arboviral testing to provide information regarding the burden and geographic distribution of infected vectors. Mosquitoes are collected by local mosquito programs and MSDH personnel and submitted as pools of 5-50 mosquitoes for testing. In 2011, 602 mosquito pools were submitted to MSDH PHL for WNV, SLE, and EEE testing.

Arboviral Testing

The Public Health Laboratory (PHL) performs an arboviral panel consisting of IgM testing for WNV and SLE, and, for patients less than 25 years of age, LAC IgM. Clinicians are encouraged to call MSDH Epidemiology or the PHL for specifics and indications for arboviral testing. In 2011, 753 samples were submitted to the MSDH PHL for arboviral testing.

Please refer to the individual disease summaries for information on and epidemiology of each specific arbovirus.

Eastern Equine Encephalitis

2011 Case Total	**0**	**2011 rate/100,000**	**0.0**
2010 Case Total	**0**	**2010 rate/100,000**	**0.0**

Clinical Features

Clinical illness is associated with symptoms that can range from a mild flu-like illness (fever, headache, muscle aches) to seizures and encephalitis progressing to coma and death. The case fatality rate is 30-50%. Fifty percent of those persons who recover from severe illness will have permanent mild to severe neurological damage. Disease is more common in young children and in persons over the age of 55.

Infectious Agent

Eastern equine encephalitis virus, a member of the genus *Alphavirus*.

Reservoir

Maintained in a bird-mosquito cycle. Humans and horses are incidental hosts.

Transmission

Through the bite of an infected mosquito, usually *Coquilletidia perturbans*. This mosquito, known as the salt and pepper or freshwater marsh mosquito, breeds mainly in marshy areas.

Incubation

3-10 days (generally within 7 days).

Reporting Classification

Class 1.

Epidemiology and Trends

Human cases are relatively infrequent largely because primary transmission takes place in and around marshy areas where human populations are generally limited. There were no reported cases of EEE in Mississippi in 2011. The last two reported cases of EEE occurred in October 2002.

Horses also become ill with EEE and are dead end hosts. Infected horses can serve as sentinels for the presence of EEE, and can indicate an increased risk to humans. The Mississippi Board of Animal Health (MBAH) reports equine infections to MSDH, and in 2011, one horse tested positive for EEE. The EEE-positive horse was located in Lauderdale County. This was a drastic decrease in the number of horses that tested positive for EEE in 2010 when 19 EEE-positive horses were reported from MBAH. There were no identified EEE-positive mosquito pools in 2011.

LaCrosse Encephalitis

2011 Case Total	**0**	**2011 rate/100,000**	**0.0**
2010 Case Total	**0**	**2010 rate/100,000**	**0.0**

Clinical Features

Clinical illness occurs in about 15% of infections. Initial symptoms of LaCrosse encephalitis infection include fever, headache, nausea, vomiting and lethargy. More severe symptoms usually occur in children under 16 and include seizures, coma, and paralysis. The case fatality rate for clinical cases of LaCrosse encephalitis is about 1%.

Infectious Agent

LaCrosse encephalitis virus, in the California serogroup of *Bunyaviruses*.

Reservoir

Chipmunks and squirrels.

Transmission

Through the bite of an infected *Ochlerotatus triseriatus* mosquito (commonly known as the tree-hole mosquito). This mosquito is commonly associated with tree holes and most transmission tends to occur in rural wooded areas. However, this species will also breed in standing water in containers or tires around the home.

Incubation

7-14 days.

Reporting Classification

Class 1.

Epidemiology and Trends

Reported LaCrosse encephalitis remains relatively rare in Mississippi, with 15 reported cases since 1999. There were no reported cases of LaCrosse encephalitis in 2011.

Of the 15 total cases since 1999, 53% were in females. The ages ranged from 3 months to 78 years of age, with 93% of the cases being under the age of 15.

Another *Bunyavirus* in the California group, Jamestown Canyon encephalitis virus, has also been seen in Mississippi, with one reported case in 1993, one in 2006, and one in 2008. There were no reported cases of Jamestown Canyon encephalitis virus in 2011.

St. Louis Encephalitis

2011 Case Total	**1**	**2011 rate/100,000**	**0.0**
2010 Case Total	**0**	**2010 rate/100,000**	**0.0**

Clinical Features

Less than 1% of infections result in clinical illness. Individuals with mild illness often have only a headache and fever. The more severe illness, meningoencephalitis, is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions (especially in infants) and spastic (but rarely flaccid) paralysis. The mortality rate from St. Louis encephalitis (SLE) ranges from 5 to 30%, with higher rates among the elderly.

Infectious Agent

St. Louis encephalitis virus, a member of the genus *Flavivirus*.

Reservoir

Maintained in a bird-mosquito cycle. Infection does not cause a high mortality in birds.

Transmission

Through the bite of an infected mosquito generally belonging to genus *Culex (Culex quinquefasciatus, Culex pipiens)*, the southern house mosquito. This mosquito breeds in standing water high in organic materials, such as containers and septic ditches near homes.

Incubation

5-15 days.

Reporting Classification

Class 1.

Epidemiology and Trends

The number of reported SLE cases fluctuates annually. There were no cases reported in 2004, 2006, 2008 or 2010, but there were nine cases with one death reported in 2005, and two reported cases in both 2007 and 2009. There were no deaths due to SLE in 2007 or 2009.

Mississippi had one reported case of SLE in 2011. No positive SLE mosquito pools were identified in 2011.

West Nile Virus

2011 Case Total	**52**	**2011 rate/100,000**	**1.7**
2010 Case Total	**8**	**2010 rate/100,000**	**0.3**

Clinical Features

Clinical illness occurs in approximately 20% of infected individuals. Most with clinical manifestations will develop the milder West Nile fever, which includes fever, headache, fatigue, and sometimes a transient rash. About 1 in 150 infected persons develop more severe West Nile neuroinvasive disease ranging from symptoms compatible with meningitis to encephalitis. Encephalitis is the most common form of severe illness and is usually associated with altered consciousness that may progress to coma. Focal neurological deficits and movement disorders may also occur. West Nile poliomyelitis, a flaccid paralysis syndrome, is seen less frequently. The elderly and immunocompromised are at highest risk of severe disease.

Infectious Agent

West Nile virus, a member of the genus *Flavivirus*.

Reservoir

WNV is maintained in a bird mosquito cycle, has been detected in more than 317 species of birds, particularly crows and jays.

Transmission

Primarily through the bite of an infected southern house mosquito *(Culex quinquefasciatus)*. This mosquito breeds in standing water with heavy organic matter.

Incubation

3-15 days.

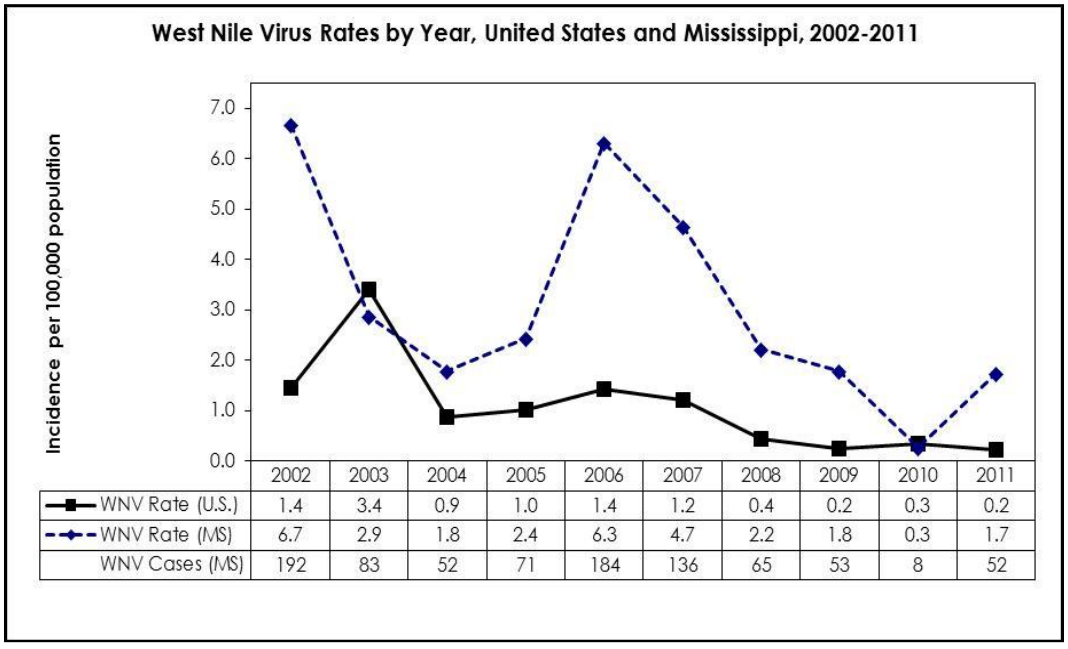
Reporting Classification

Class 1.

Epidemiology and Trends

In Mississippi, West Nile virus was first isolated in horses in 2001 followed by human infections in 2002 with 192 cases reported. The years following saw a decrease in the number of reported infections; however in 2006, there was a resurgence of 184 cases (Figure 1). In 2011, there were 52 reported cases with six deaths.

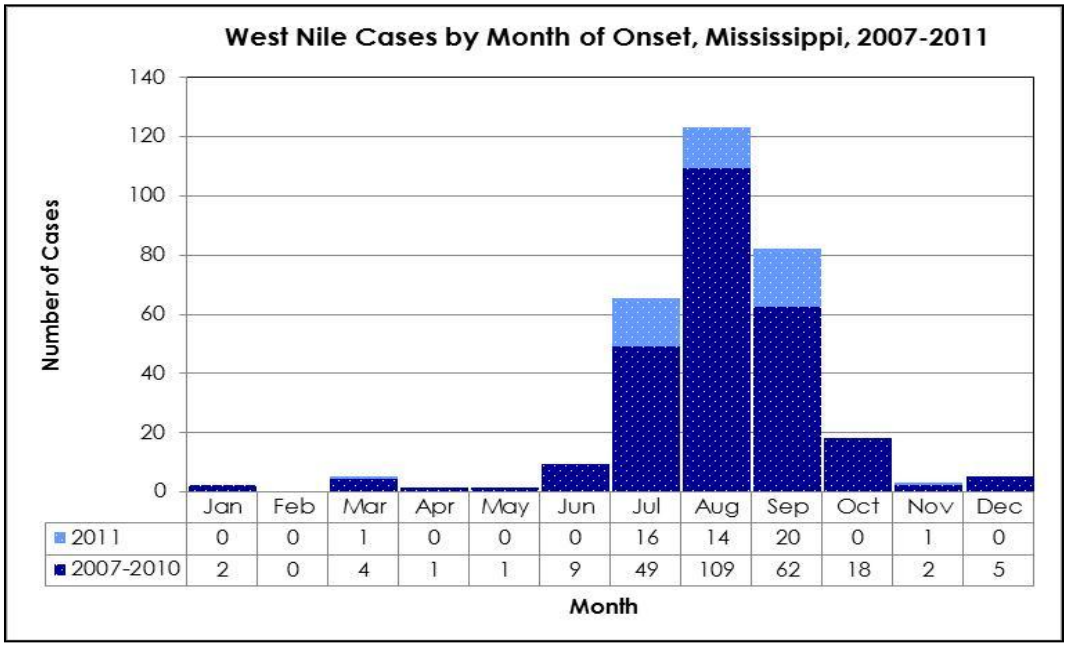
Figure 1



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
WNV Rate (U.S.)	1.4	3.4	0.9	1.0	1.4	1.2	0.4	0.2	0.3	0.2
WNV Rate (MS)	6.7	2.9	1.8	2.4	6.3	4.7	2.2	1.8	0.3	1.7
WNV Cases (MS)	192	83	52	71	184	136	65	53	8	52

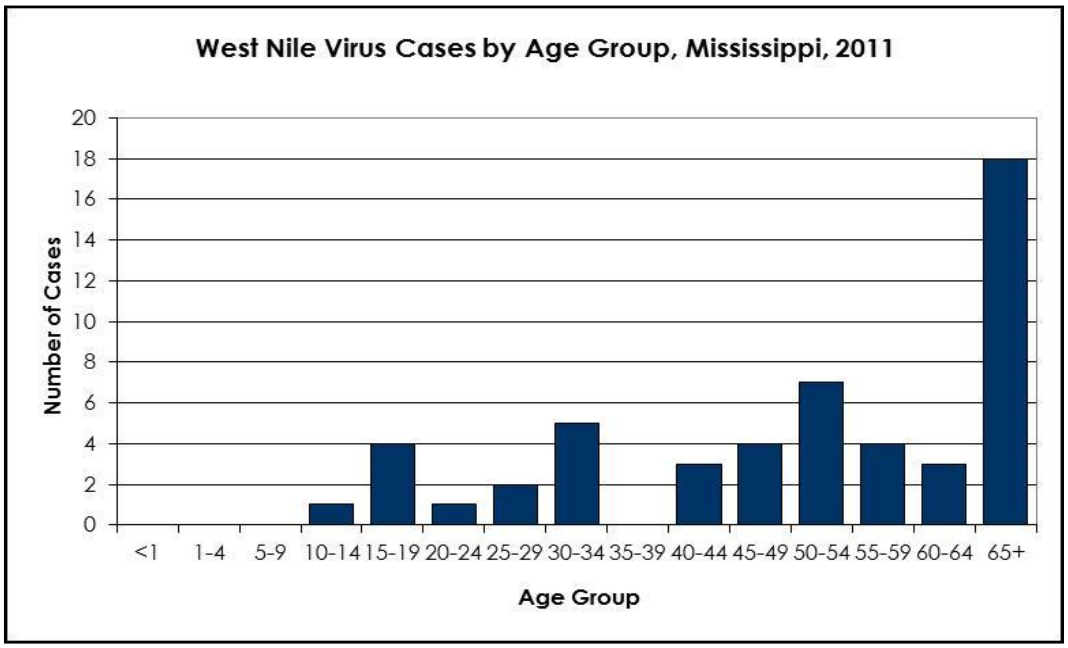
WNV is now thought to be endemic in Mississippi, and the mosquito vector is present the entire year. Human illness can occur year round, but is most prevalent from July to October. August and September are usually the peak months and 65% of the cases over the past five years have occurred during these two months (Figure 2).

Figure 2



Of the 52 cases reported in 2011, 20 (38%) were classified as WNV fever and 32 (62%) were neuroinvasive. The cases ranged in age from 12 to 93 years, with a median age of 54 years (Figure 3). Of the six reported deaths, all occurred in individuals over the age of 65.

Figure 3

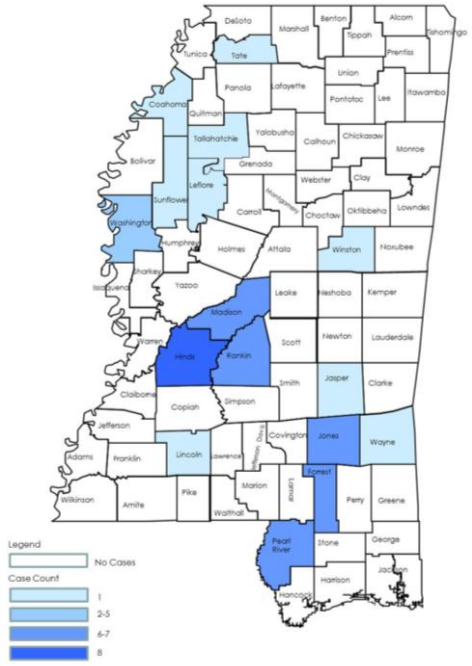


WNV infection can occur in any part of the state, and since 2001, activity (human cases, positive mosquito pools, horses or birds) has been reported in every Mississippi County except Issaquena. The cases in 2011 were spread throughout the state with the most cases in any one county reported from Hinds County with 8 cases (Figure 4).

A total of thirty-five mosquito pools tested positive for WNV in 2011. Horses may also become ill with WNV and can act as sentinels for the presence of infected mosquitoes. The Mississippi Board of Animal Health reports equine infections to MSDH. In 2011, one horse tested positive for WNV in Pearl River County.

Figure 4

West Nile Virus Cases by County, Mississippi, 2011



Campylobacteriosis

2011 Case Total	**73**	**2011 rate/100,000**	**2.5**
2010 Case Total	**128**	**2010 rate/100,000**	**4.3**

Clinical Features

Campylobacteriosis is a zoonotic bacterial disease of variable severity ranging from asymptomatic infections to clinical illness presenting with diarrhea, abdominal pain, fever, and nausea and vomiting. Symptoms typically resolve after one week, but may

persist for weeks if untreated. Rare post-infectious syndromes include reactive arthritis and Guillain-Barré syndrome (GBS).

Infectious Agent

Campylobacter jejuni (C. jejuni) causes most cases of diarrheal illness in humans.

Reservoir

Commonly present in cattle and poultry.

Transmission

Transmission mainly occurs through ingestion of undercooked meat, usually poultry, but occasionally contaminated food or water or raw milk. The number of organisms required to cause infection is low.

Incubation

Average incubation is 2-5 days, with a range from 1-10 days.

Period of Communicability

Person to person transmission does not typically occur, though the infected individual may shed organisms for up to 7 weeks without treatment.

Methods of Control

Disease prevention includes promotion of proper food handling, good hand washing, particularly after handling raw meats, and after contact with feces of dogs and cats. Pasteurizing milk and chlorinating water are also important. Symptomatic individuals should be excluded from food handling or care of patients in hospitals or long term care facilities.

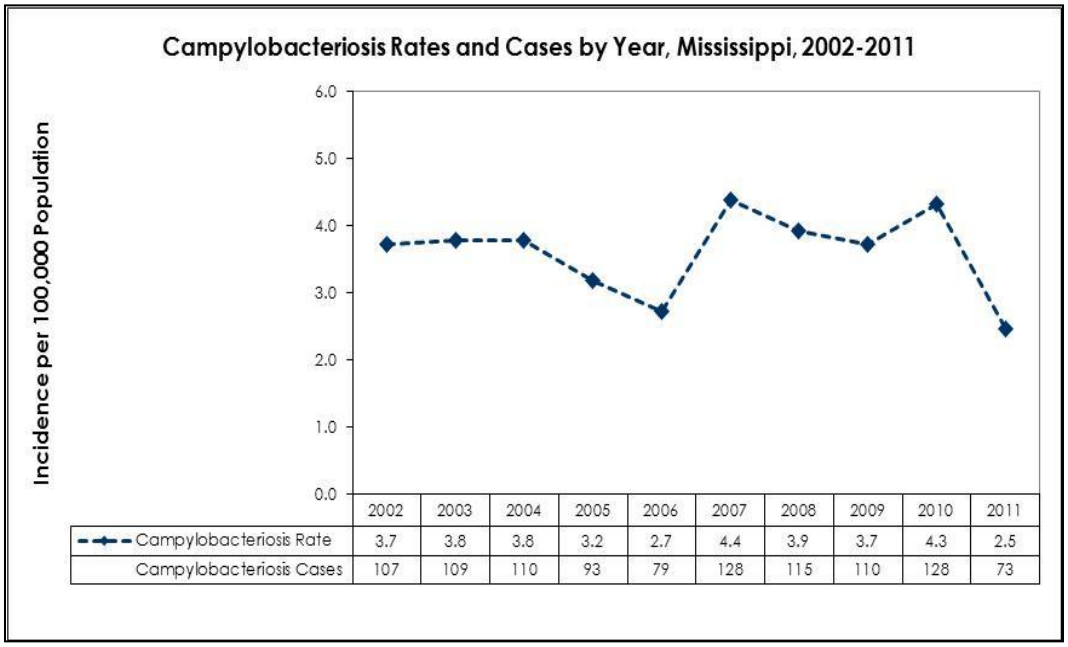
Reporting Classification

Class 3.

Epidemiology and Trends

In 2011, there were 73 reported cases of campylobacteriosis in Mississippi; this was a marked decrease to the 128 cases reported in 2010 and the three-year (2008-2010) average of 118 cases (Figure 5). Only culture-confirmed cases are included in analysis.

Figure 5



Campylobacter infections are typically more common in the warmer months, as are many enteric illnesses, with 45% of the total 2011 cases occurring between June and September; however cases are reported to MSDH year round (Figure 6). The highest rates of infection are in children less than five years of age. In 2011, 32% of all reported cases were in children younger than five years of age (Figure 7).

Figure 6

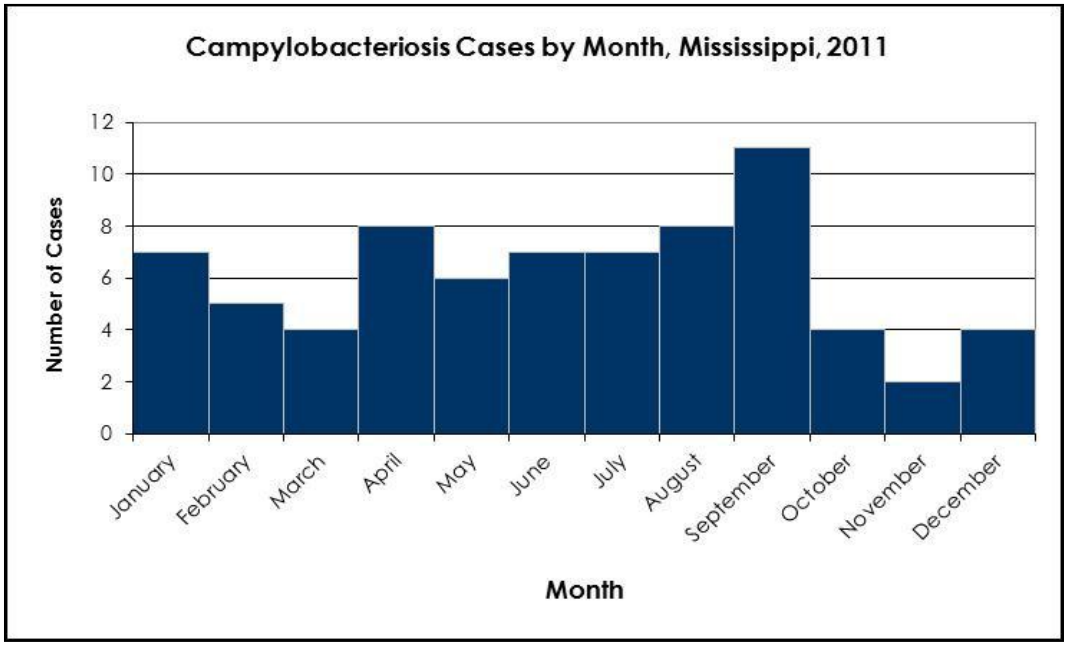
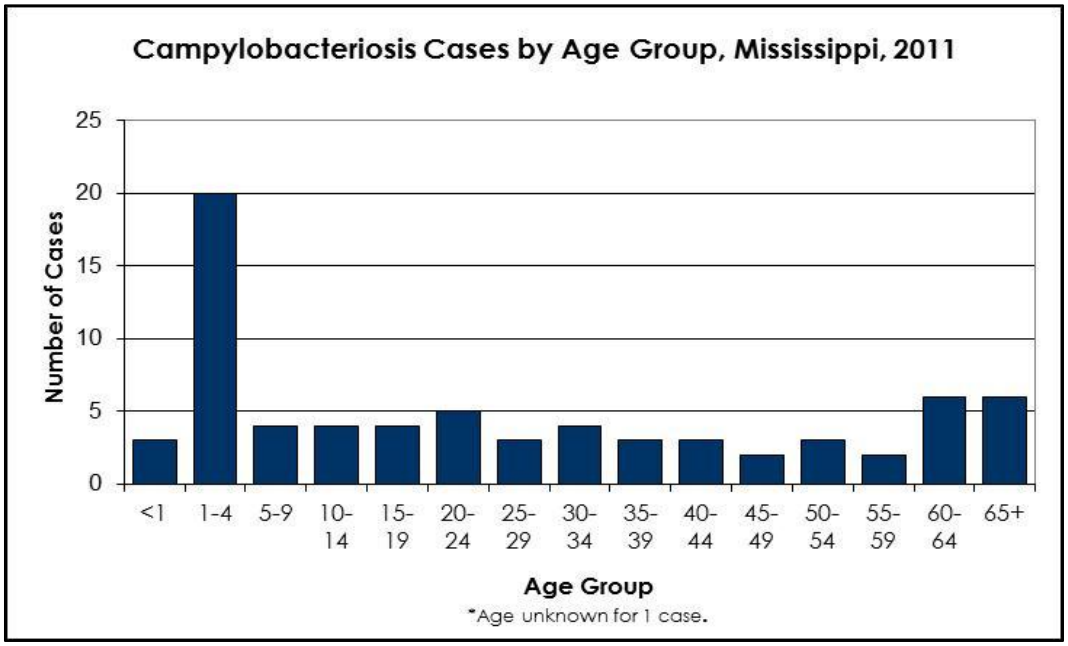


Figure 7



Chlamydia

2011 Case Total	**21,214**	**2011 rate/100,000**	**712.2**
2010 Case Total	**21,422**	**2010 rate/100,000**	**721.9**

Clinical Features

A sexually transmitted bacterial infection causing urethritis in males and cervicitis in females. Urethritis in men presents with scant to moderate mucopurulent urethral discharge, urethral itching, and dysuria. Cervicitis presents as a mucopurulent endocervical discharge, often with endocervical bleeding. The most significant complications in women are pelvic inflammatory disease and chronic infections, both of which increase the risk of ectopic pregnancy and infertility. Perinatal transmission of chlamydia occurs when an infant is exposed to the infected cervix during birth resulting in chlamydial pneumonia or conjunctivitis. Asymptomatic infection may be found in 1%-25% of sexually active men. Up to 70% of sexually active women with chlamydial infections may also be asymptomatic.

Infectious Agent

Chlamydia trachomatis, an obligate intracellular bacteria. Immunotypes D through K have been identified in 35-50% of nongonococcal urethritis.

Reservoir

Humans.

Transmission

Transmitted primarily through sexual contact.

Incubation

Incubation period is poorly defined, ranging from 7 to 14 days or longer.

Period of Communicability

Unknown.

Methods of Control

Prevention and control of chlamydia are based on behavior change, effective treatment, and mechanical barriers. Condoms and diaphragms provide some degree of protection from transmission or acquisition of chlamydia. Effective treatment of the infected patient and their partners, from 60 days prior to the onset of symptoms, is recommended.

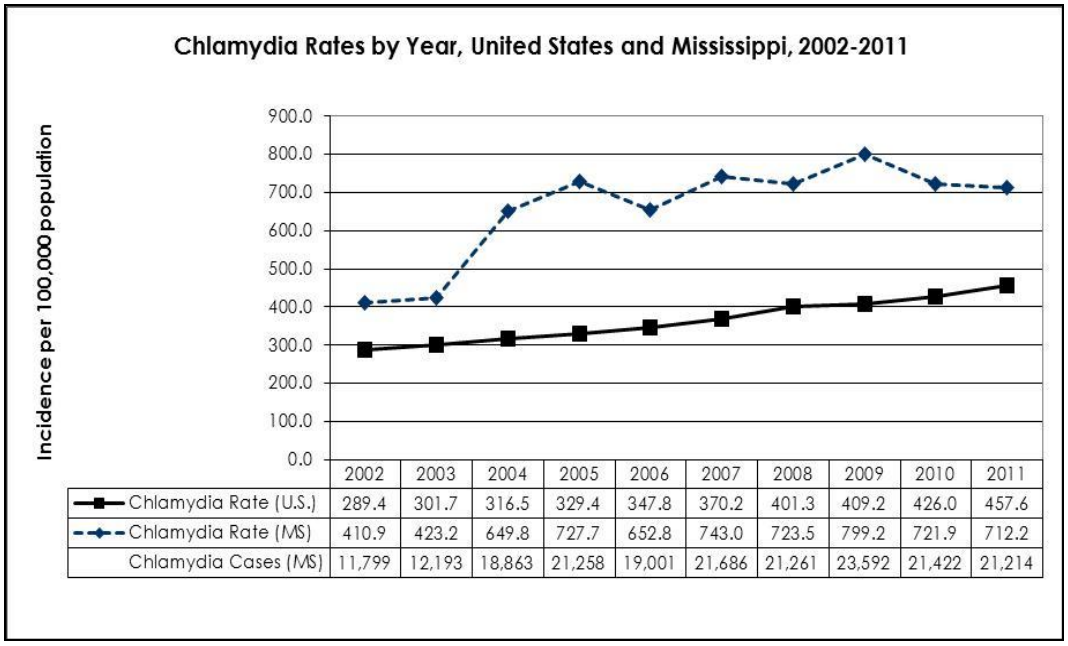
Reporting Classification

Class 2.

Epidemiology and Trends

Chlamydia is the most frequently reported bacterial sexually transmitted disease in the United States and in Mississippi. In 2011, 21,214 cases of chlamydia were reported in Mississippi. Mississippi has reported case rates higher than the United States rates (Figure 8) for several years, and when compared to other states, Mississippi had the country's second highest rate in 2011. The overall increase in cases may be partially attributed to aggressive statewide screening for chlamydia in all MSDH STD, family planning, and prenatal clinics beginning April 2004.

Figure 8

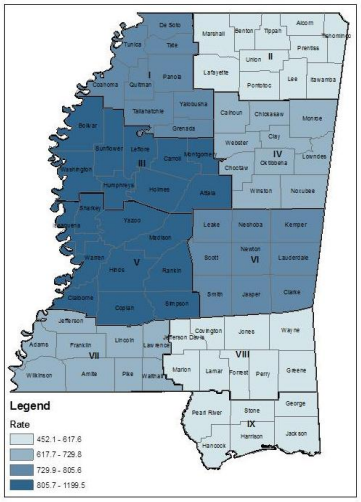


	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Chlamydia Rate (U.S.)	289.4	301.7	316.5	329.4	347.8	370.2	401.3	409.2	426.0	457.6
Chlamydia Rate (MS)	410.9	423.2	649.8	727.7	652.8	743.0	723.5	799.2	721.9	712.2
Chlamydia Cases (MS)	11,799	12,193	18,863	21,258	19,001	21,686	21,261	23,592	21,422	21,214

Chlamydia was reported in every public health district, with the highest incidence noted in Public Health District III (Figure 9).

Figure 9

Chlamydia Incidence by Public Health District, Mississippi, 2011



District	Cases	Rate*
I	2,591	805.6
II	1,957	539.3
III	2,569	1199.5
IV	1,793	729.8
V	5,194	814.8
VI	1,895	777.1
VII	1,185	681.7
VIII	1,896	617.6
IX	2,134	452.1
State	**21,214**	**712.2**

***per 100,000 population**

Chlamydia infections were reported over a range of age groups, but the largest proportion was reported among 15-24 year olds, accounting for 76% of the reported cases (Figure 10). African Americans accounted for 82% of the reported cases in which race was known (Figure 11). In 2011, the rate of chlamydia infections for African

Americans (1270.6 per 100,000) was nearly nine times the rate for whites (149.3 per 100,000).

Figure 10

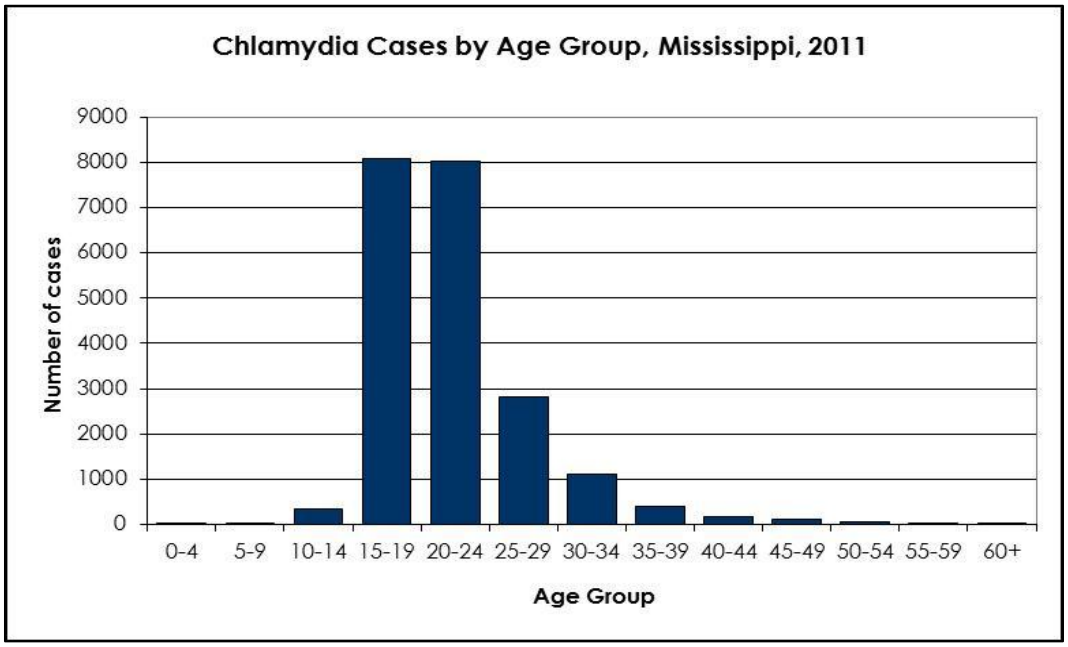
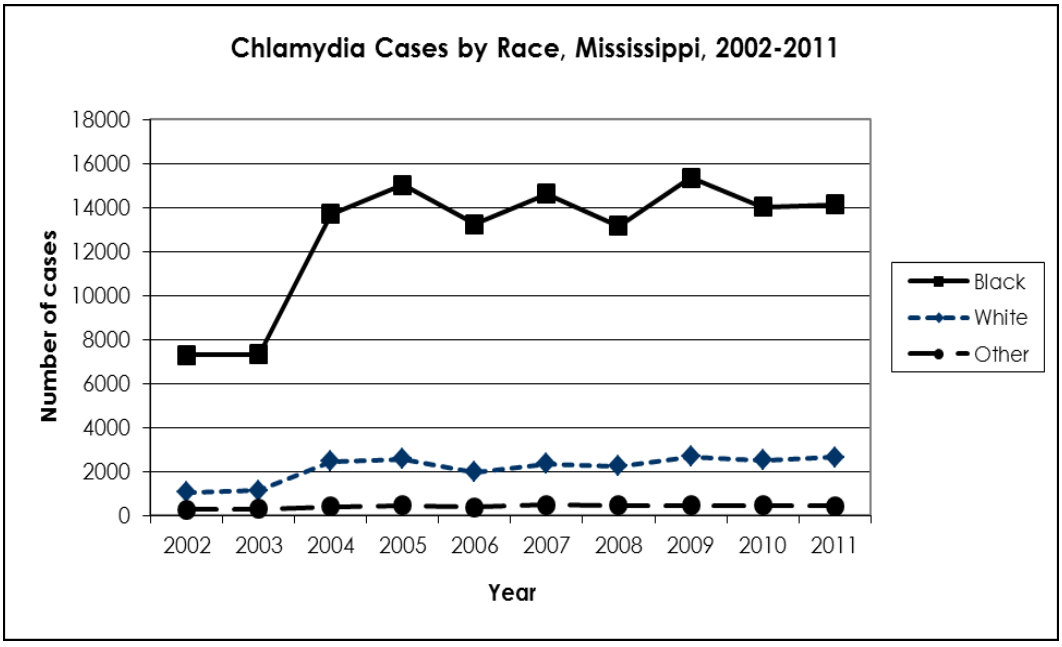


Figure 11



Cryptosporidiosis

2011 Case Total	**50**	**2011 rate/100,000**	**1.7**
2010 Case Total	**24**	**2010 rate/100,000**	**0.8**

Clinical Features

A parasitic infection characterized by profuse, watery diarrhea associated with abdominal pain. Less frequent symptoms include anorexia, weight loss, fever, and nausea and vomiting. Symptoms often wax and wane and but generally disappear in 30 days or less in healthy people. Asymptomatic infections do occur. The disease may be prolonged and fulminant in immunodeficient individuals unable to clear the parasite. Children under 2, animal handlers, travelers, men who have sex with men, and close personal contacts of infected individuals are more prone to infection.

Infectious Agent

Cryptosporidium parvum, a coccidian protozoan, is associated with human infection.

Reservoir

Humans, cattle and other domesticated animals.

Transmission

Fecal-oral, which includes person-to-person, animal-to-person, waterborne (including recreational use of water) and foodborne transmission. Oocysts are highly resistant to chemicals used to purify drinking water and recreational water (swimming pools, water parks). The infectious dose can be as low as 10 organisms.

Incubation

1 to 12 days (average 7 days).

Period of Communicability

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

Methods of Control

Education of the public regarding appropriate personal hygiene, including handwashing. Symptomatic individuals with a diagnosis of cryptosporidiosis should not use public recreational water (e.g., swimming pools, lakes, ponds) while they have diarrhea and for at least 2 weeks after symptoms resolve. It is recommended that infected individuals be restricted from handling food, and symptomatic children be

restricted from attending daycare until free of diarrhea. Prompt investigation of common food or waterborne outbreaks is important for disease control and prevention.

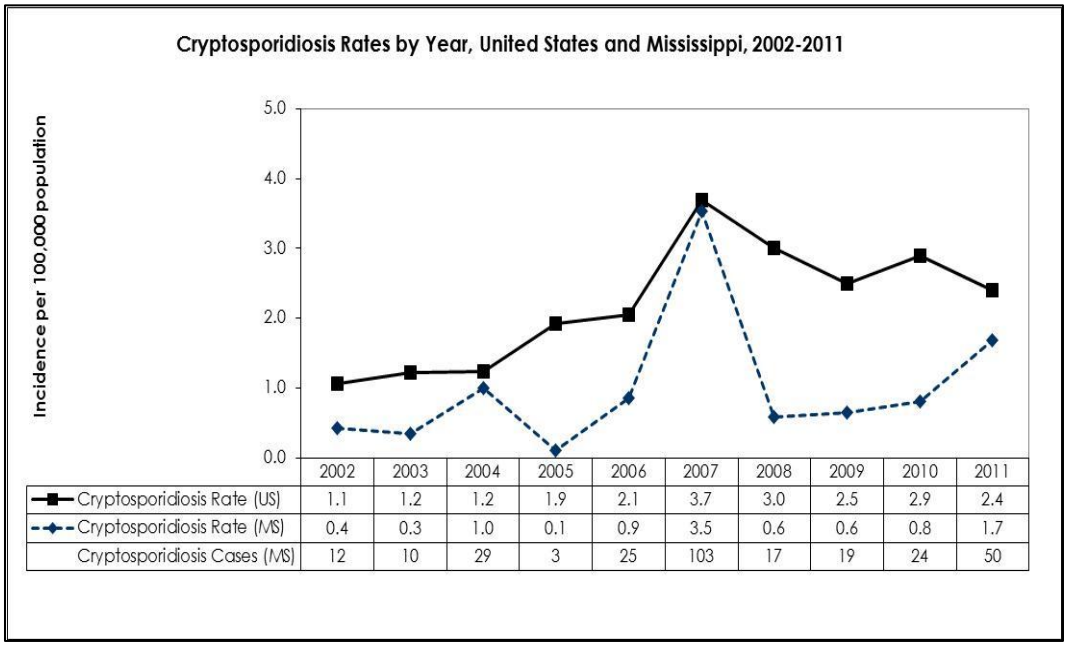
Reporting Classification

Class 3.

Epidemiology and Trends

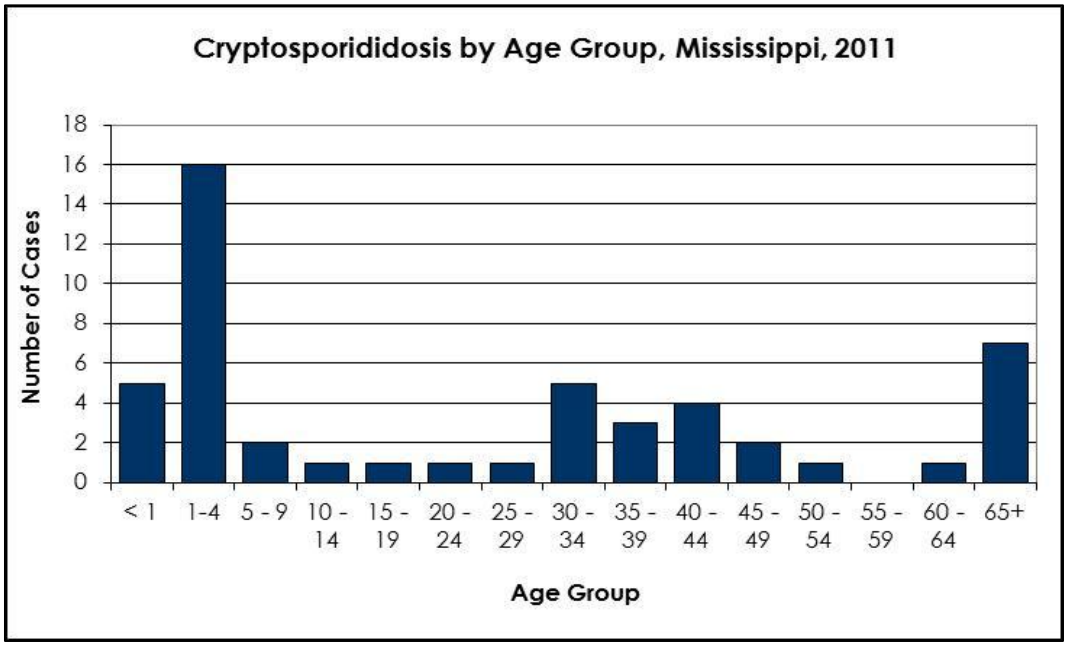
There were 50 reported cases of cryptosporidiosis in 2011. This was higher than the 24 cases reported in 2010, and above the three year average of 20 cases from 2008 to 2010 (Figure 12). The reported cases ranged in age from 3 months to 83 years (Figure 13).

Figure 12



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Cryptosporidiosis Rate (US)	1.1	1.2	1.2	1.9	2.1	3.7	3.0	2.5	2.9	2.4
Cryptosporidiosis Rate (MS)	0.4	0.3	1.0	0.1	0.9	3.5	0.6	0.6	0.8	1.7
Cryptosporidiosis Cases (MS)	12	10	29	3	25	103	17	19	24	50

Figure 13



E. coli O157:H7/ HUS

2011 Case Total	**15**	**2011 rate/100,000**	**0.5**
2010 Case Total	**24**	**2010 rate/100,000**	**0.8**

Clinical Features

Escherichia coli (E. coli) O157:H7 is the most virulent serotype of the Shiga toxin-producing *E. coli* (STEC), and is associated with diarrhea, hemorrhagic colitis, hemolytic-uremic syndrome (HUS), and postdiarrheal thrombotic thrombocytopenic purpura (TTP). Symptoms often begin as nonbloody diarrhea but can progress to diarrhea with occult or visible blood. Severe abdominal pain is typical, and fever is usually absent. The very young and the elderly are more likely to develop severe illness and HUS, defined as microangiopathic hemolytic anemia, thrombocytopenia, and acute renal dysfunction. HUS is a complication in about 8% of *E. coli* O157:H7 infections. Supportive care is recommended as antibiotic use may increase the risk of progression to HUS. Other serotypes of *E. coli* are capable of producing Shiga toxins (STEC) that can lead to illness and HUS.

Infectious Agent

E. coli are gram negative bacilli. *E. coli* O157:H7 is thought to cause more than 90% of all diarrhea-associated HUS. Other non-O157 STEC serogroups include O26, O111, and O103.

Reservoir

Cattle, to a lesser extent other animals, including sheep, deer, and other ruminants. Humans may also serve as a reservoir for person-to-person transmission.

Transmission

Mainly through ingestion of food contaminated with ruminant feces, usually inadequately cooked hamburgers; also contaminated produce or unpasteurized milk. Direct person-to-person transmission can occur in group settings. Waterborne transmission occurs both from contaminated drinking water and from recreational waters.

Incubation

2-10 days, with a median of 3-4 days.

Period of Communicability

Duration of excretion is typically 1 week or less in adults but can be up to 3 weeks in one-third of children. Prolonged carriage is uncommon.

Methods of Control

Education regarding proper food preparation and handling and good hand hygiene is essential in prevention and control. Pasteurization of milk and juice is important.

MSDH investigates all reported cases of HUS and *E. coli* O157:H7 infections. All isolates should be submitted to the Public Health Laboratory (PHL) for molecular subtyping, or DNA "fingerprinting", with pulsed-field gel electrophoresis (PFGE). Isolate information is submitted to a national tracking system (PulseNet), a network of public health and food regulatory agencies coordinated by the CDC. This system facilitates early detection of common source outbreaks, even if the affected persons are geographically far apart, and assists in rapidly identifying the source of outbreaks.

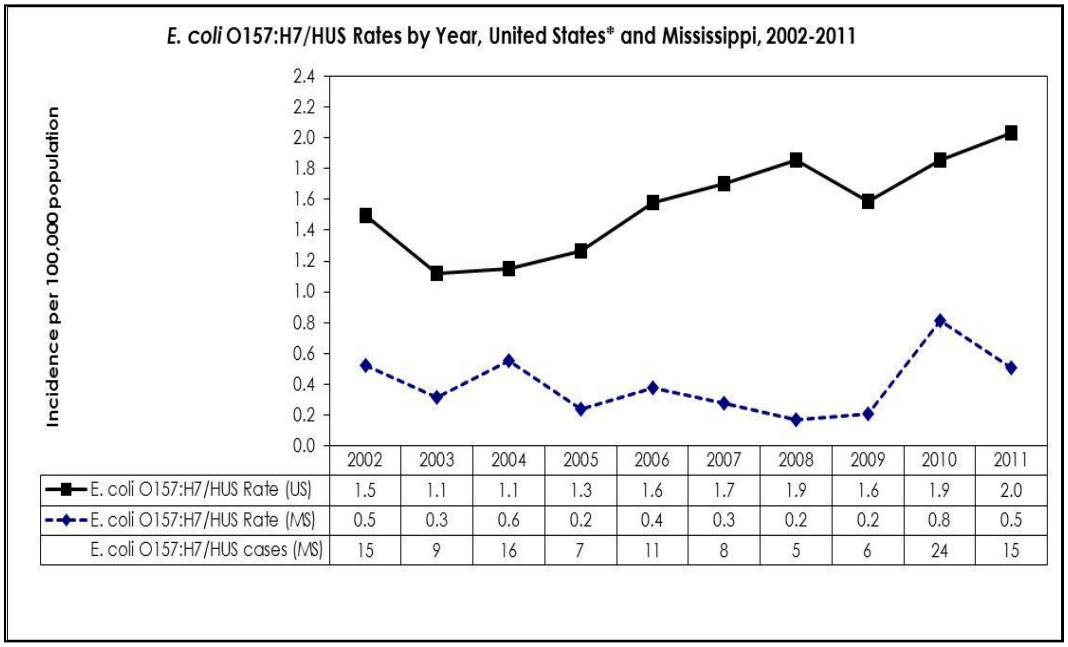
Reporting Classification

Class1.

Epidemiology and Trends

In 2011, fourteen *E. coli* O157:H7 infections were reported to MSDH; one of which resulted in HUS. On average, 12 infections have been reported annually over the past three years (2008-2010) (Figure 14). There were no outbreaks or deaths reported in Mississippi in 2011. Of the 50 cases of *E. coli* O157:H7/HUS that were reported to MSDH between 2008 and 2011, 62% occurred in children less than 10 years of age (Figure 15).

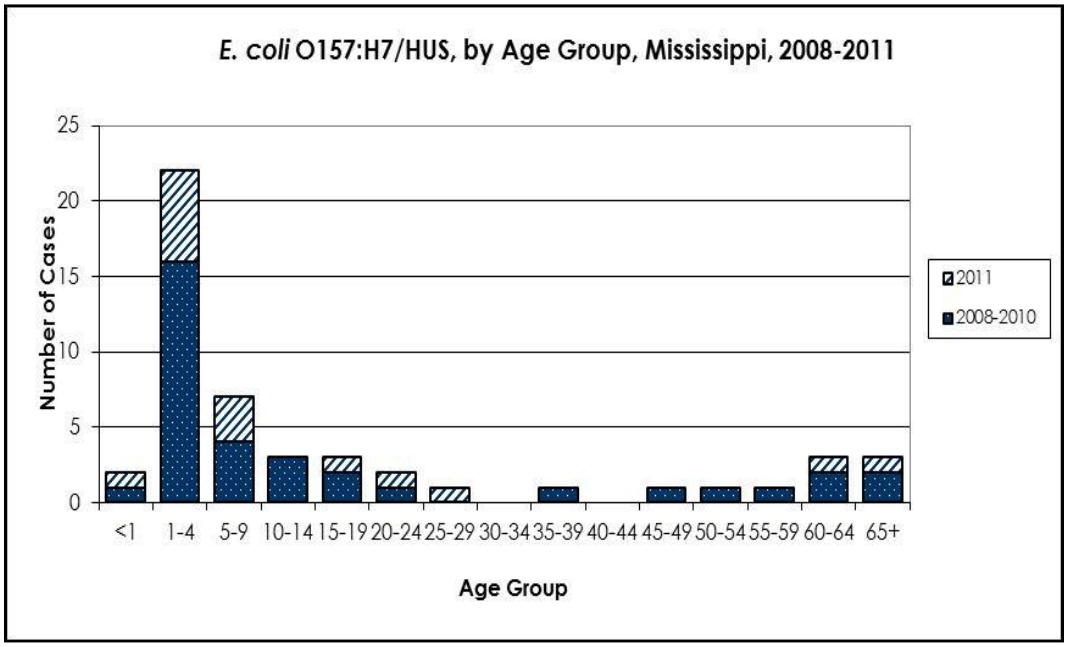
Figure 14



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
E. coli O157:H7/HUS Rate (US)	1.5	1.1	1.1	1.3	1.6	1.7	1.9	1.6	1.9	2.0
E. coli O157:H7/HUS Rate (MS)	0.5	0.3	0.6	0.2	0.4	0.3	0.2	0.2	0.8	0.5
E. coli O157:H7/HUS cases (MS)	15	9	16	7	11	8	5	6	24	15

*U.S. rate includes *E. coli* O157:H7; shiga toxin positive, serogroup non-O157; and shiga toxin positive, not serogrouped.

Figure 15



In late 2010, all shiga toxin producing *E. coli* were added to the List of Reportable Diseases and Conditions. In 2011 there were 23 non-O157 STEC cases reported. The 23 cases were due to serogroups O111 (4), O103 (3), O145 (2), and O79. The serogroups of the remaining 13 STEC cases was unknown.

Gonorrhea

2011 Case Total	**5,816**	**2011 rate/100,000**	**195.3**
2010 Case Total	**6,196**	**2010 rate/100,000**	**208.8**

Clinical Features

A bacterial infection that primarily targets the urogenital tract producing symptoms of discharge and dysuria. Other less common sites of infection include: pharynx, rectum, conjunctiva, and blood.

Complications associated with gonorrhea infection in men include epididymitis, penile lymphangitis, penile edema, and urethral strictures. The primary complication associated with gonorrhea infection in women is pelvic inflammatory disease, which produces symptoms of lower abdominal pain, cervical discharge, and cervical motion pain. Asymptomatic infections do occur. Pregnant women infected with gonorrhea may transmit the infection to their infants during a vaginal delivery. Infected infants can develop conjunctivitis leading to blindness if not rapidly and adequately treated. Septicemia can also occur in infected infants.

Infectious Agent

Neisseria gonorrhoeae, an intracellular gram-negative diplococcus.

Reservoir

Humans.

Transmission

Gonorrhea is transmitted primarily by sexual contact, but transmission to an infant delivered through an infected cervical canal also occurs.

Incubation

In men the incubation period is primarily 2-5 days, but may be 10 days or longer. In women it is more unpredictable, but most develop symptoms less than 10 days after exposure.

Period of Communicability

In untreated individuals, communicability can last for months; but if an effective treatment is provided communicability ends within hours.

Methods of Control

Prevention and control of gonorrhea are based on education, effective treatment, and mechanical barriers. Condoms and diaphragms provide some degree of protection from transmission or acquisition of gonorrhea. Effective treatment of the infected patient and their partners from 60 days prior to the onset of symptoms is recommended.

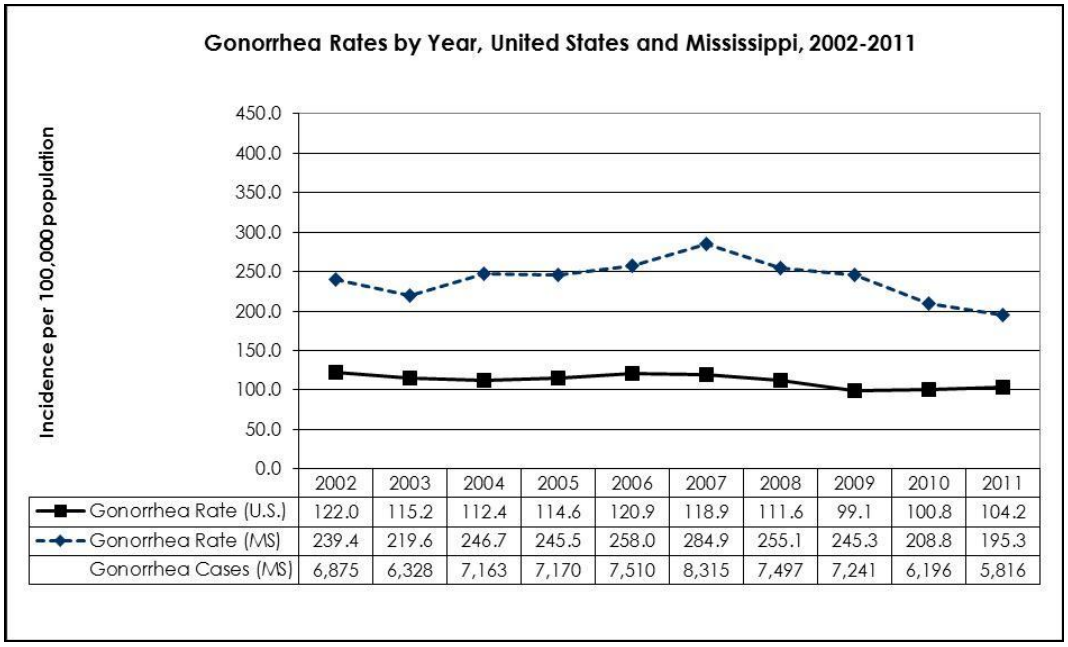
Reporting Classification

Class 2.

Epidemiology and Trends

Gonorrhea is the second most commonly reported notifiable disease in the United States. In Mississippi, from 2007-2011, the number of gonorrhea cases decreased 30.1%, from 8,315 to 5,816 cases (Figure 16). Although there has been a decrease in cases over the past five years, Mississippi had the second highest case rate of gonorrhea in the United States in 2011.

Figure 16

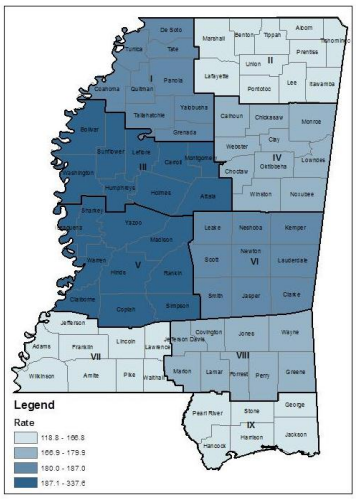


	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Gonorrhea Rate (U.S.)	122.0	115.2	112.4	114.6	120.9	118.9	111.6	99.1	100.8	104.2
Gonorrhea Rate (MS)	239.4	219.6	246.7	245.5	258.0	284.9	255.1	245.3	208.8	195.3
Gonorrhea Cases (MS)	6,875	6,328	7,163	7,170	7,510	8,315	7,497	7,241	6,196	5,816

Gonorrhea was reported in every public health district, with the highest incidence noted in Public Health District III (Figure 17).

Figure 17

Gonorrhea Incidence by Public Health District, Mississippi, 2011



District	Cases	Rate*
I	583	181.3
II	431	118.8
III	723	337.6
IV	442	179.9
V	1701	266.8
VI	456	187.0
VII	290	166.8
VIII	551	179.5
IX	639	135.4
State	**5,816**	**195.3**

***per 100,000 population**

Although the disease impacted individuals in most of the age groups, 69% of reported cases were among 15-24 year olds (Figure 18). African Americans accounted for 89% of the reported cases in which race was known (Figure 19). In 2011, the rate of gonorrhea infections for African Americans (393.4 per 100,000) was seventeen times the rate of whites (23.8 per 100,000).

Figure 18

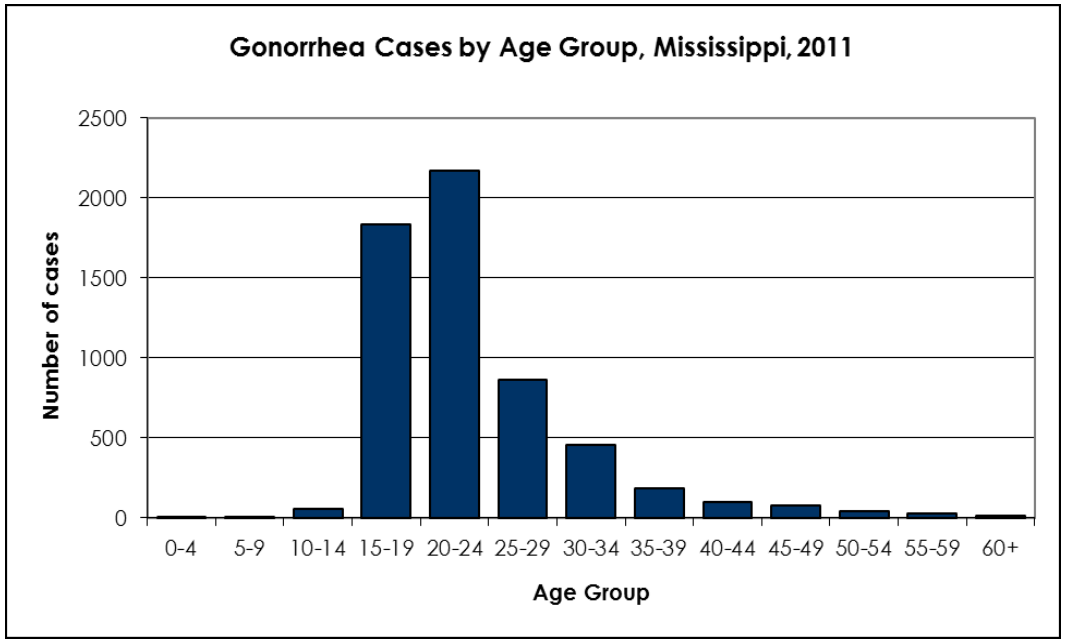
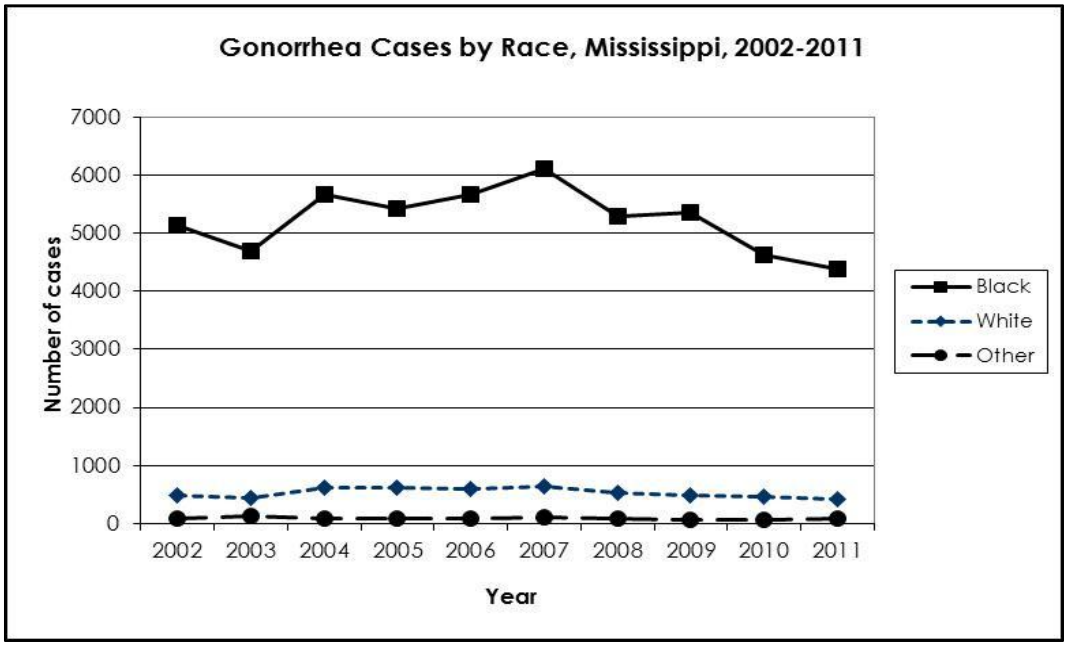


Figure 19



Haemophilus influenzae, type b

2011 Case Total	**3**	**2011 rate/100,000**	**0.1**
2010 Case Total	**0**	**2010 rate/100,000**	**0.0**

Clinical Features

Haemophilus influenzae is an invasive bacterial disease, particularly among infants, that can affect many organ systems. There are six identifiable types of *H. influenzae* bacteria (a through f) with type b (Hib) responsible for the majority of invasive infections. Invasive disease usually begins as a bloodstream infection, with bacteria spreading to distant sites. Epiglottitis, pneumonia, septic arthritis, and septicemia are other forms of invasive disease. Hib meningitis presents with fever, decreased mental status and nuchal rigidity. Neurologic sequelae can occur in 15-30% of survivors, with hearing impairment as the most common. Case fatality rate is 2-5% even with antimicrobial therapy. Peak incidence is usually in infants 6-12 months of age; Hib disease rarely occurs beyond 5 years of age. In the prevaccine era, meningitis accounted for 50-60% of all cases of invasive disease. Since the late 1980's, with the licensure of Hib conjugate vaccines, Hib meningitis has essentially disappeared in the U.S.

Infectious Agent

Haemophilus influenzae, a gram-negative encapsulated bacterium. Serotypes include a through f; *H. influenzae* serotype b (Hib) is the most pathogenic.

Reservoir

Humans, asymptomatic carriers.

Transmission

Respiratory droplets and contact with nasopharyngeal secretions during the infectious period.

Incubation

Uncertain; probably short, 2-4 days.

Period of Communicability

As long as organisms are present; up to 24-48 hours after starting antimicrobial therapy.

Methods of Control

Two Hib conjugate vaccines are licensed for routine childhood vaccination. The number of doses in the primary series is dependent on the type of vaccine used. A primary series of PRP-OMP (PedvaxHIB®) vaccine is two total doses, at 2 and 4 months of age; the primary series with PRP-T (ActHIB®) requires three total doses, given at 2, 4 and 6 months of age. A booster dose at 12-15 months of age is recommended regardless of which vaccine is used for the primary series. Vaccination with Hib containing vaccines may decrease the carriage rate, decreasing the chances of infection in unvaccinated in children. Immunization is not recommended for children over 5 years of age.

The Mississippi State Department of Health (MSDH) investigates all reported suspected Hib cases and provides prophylactic antibiotics (rifampin) for all household contacts with one or more children under one year old or in households with children 1-3 years old who are inadequately immunized. During investigation, contacts are often treated before the isolate's serotype is known. The protection of contacts is recommended Hib but not for other serotypes. MSDH requests that all *Haemophilus influenzae* isolates be sent to the Public Health Laboratory (PHL) for serotyping.

Reporting Classification

Class 1.

Epidemiology and Trends

Prior to the development and widespread use of Hib conjugate vaccines in the late 1980's and early 1990's, Hib was the most common cause of bacterial meningitis in children < 5 years of age. In Mississippi, conjugate vaccine was first offered to 18 month olds in 1989, to 15 month olds in 1990, and as a primary series, starting at 2 months of age, with a 12-15 month booster, in January 1991. With the institution of vaccination, the

number of reported cases of invasive disease due to Hib dropped from 82 in 1989, to 5 by 1994. There have been fewer than 5 cases of Hib per year since 1995.

In 2011, there were 19 cases of invasive disease due to *Haemophilus influenzae* reported to MSDH, however only three of the reported cases of *H. influenzae* were confirmed as type b. The cases ranged in age from 2 to 90 years. All of the Hib cases presented as septicemias; none of the cases were epidemiologically linked and no deaths were reported. The remaining 16 invasive disease *H. influenzae* cases were identified as type f (1), not type b (13), and unknown (2).

Hepatitis A

2011 Case Total	**7**	**2011 rate/100,000**	**0.2**
2010 Case Total	**2**	**2010 rate/100,000**	**0.1**

Clinical Features

Hepatitis A is a viral illness with an abrupt onset of fever, malaise, anorexia, nausea, vomiting, and abdominal pain, followed by jaundice in a few days. The disease varies in intensity from a mild illness of 1-2 weeks, to a severe disease lasting several months. Most cases among children are asymptomatic and the severity of illness increases with age; the case fatality rate is low—0.1%-0.3%. No chronic infection occurs.

Infectious Agent

Hepatitis A virus (HAV), an RNA virus.

Reservoir

Humans, rarely chimpanzees and other primates.

Transmission

Transmission occurs through the fecal-oral route either by person to person contact or ingestion of contaminated food or water. Common source outbreaks may be related to infected food handlers. Many younger children are asymptomatic, but shed virus and are often sources of additional cases.

Incubation

Average 28-30 days, (range 15-50 days).

Period of Communicability

Infected persons are most likely to transmit HAV 1-2 weeks before the onset of symptoms and in the first few days after the onset of jaundice, when viral shedding in

the stool is at its highest. The risk of transmission then decreases and becomes minimal after the first week of jaundice.

Methods of Control

In the prevaccine era, hygienic measures and post-exposure immune globulin were the primary means of preventing infection. Vaccine was first introduced in 1995, and following successful vaccination programs in high incidence areas, the Advisory Committee on Immunization Practices (ACIP) recommended routine vaccination for all children in 2005. Children aged 12-23 months of age should receive one dose of hepatitis A vaccine followed by a booster 6-18 months later, with catch up vaccination for children not vaccinated by 2 years of age.

Post-exposure prophylaxis is recommended, within two weeks of exposure, for all susceptible individuals who are close personal contacts to the case or who attend daycare with infected individuals, or are exposed to hepatitis A virus through common source outbreaks. Hepatitis A vaccine (with completion of the series) is recommended for post-exposure prophylaxis for all healthy persons aged 12 months to 40 years. Immune globulin should be considered for children less than 12 months of age, adults over 40 years of age, and those in whom vaccination is contraindicated. Use of both simultaneously can be considered with higher risk exposures. Post-exposure prophylaxis is not generally indicated for healthcare workers who care for patients infected with hepatitis A unless epidemiological investigation indicates ongoing transmission in the facility.

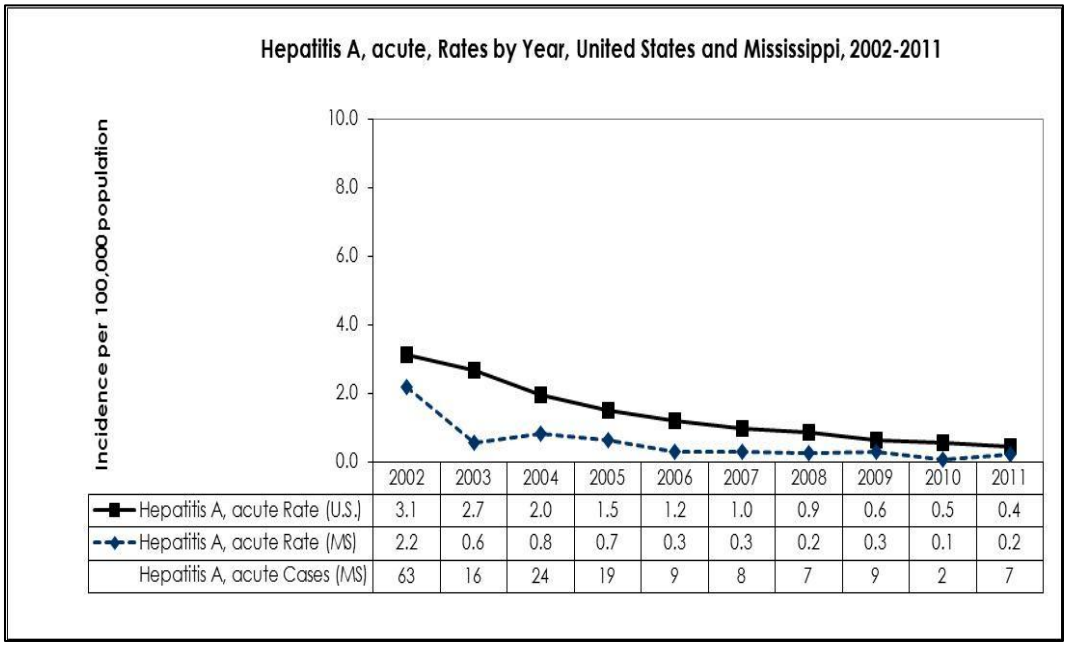
Reporting Classification

Class 1.

Epidemiology and Trends

There were seven acute hepatitis A cases reported in Mississippi in 2011. This was significantly more than the two cases reported in 2010, but was comparable to the three year (2008-2010) average of six annual cases (Figure 20). Six of the 2011 cases were in adults over the age of 18. A common source outbreak was not identified in any of the 2011 cases.

Figure 20



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Hepatitis A, acute Rate (U.S.)	3.1	2.7	2.0	1.5	1.2	1.0	0.9	0.6	0.5	0.4
Hepatitis A, acute Rate (MS)	2.2	0.6	0.8	0.7	0.3	0.3	0.2	0.3	0.1	0.2
Hepatitis A, acute Cases (MS)	63	16	24	19	9	8	7	9	2	7

Hepatitis B, acute

2011 Case Total	**58**	**2011 rate/100,000**	**1.9**
2010 Case Total	**34**	**2010 rate/100,000**	**1.1**

Clinical Features

An acute viral illness characterized by the insidious onset of anorexia, abdominal discomfort, nausea and vomiting. Clinical illness is often unrecognized because jaundice occurs in only 30-50% of adults and less than 10% of children. Approximately 5% of all acute cases progress to chronic infection. Younger age at infection is a risk factor for becoming a chronic carrier with 90% of perinatally infected infants becoming chronic carriers. Chronic cases may have no evidence of liver disease, or may develop clinical illness ranging from chronic hepatitis, to cirrhosis, liver failure or liver cancer. Hepatitis B infections are the cause of up to 80% of hepatocellular carcinomas worldwide.

Infectious Agent

Hepatitis B virus, a hepadnavirus.

Reservoir

Humans.

Transmission

Transmission occurs through parenteral or mucosal exposure to body fluids of hepatitis B surface antigen (HBsAg) positive persons, such as through perinatal exposure, contact with contaminated needles, or sexual contact. Blood and blood products, saliva, semen and vaginal secretions are known to be infectious. The three main groups at risk for hepatitis B infection are heterosexuals with infected or multiple partners, injection-drug users, and men who have sex with men.

Incubation

45-180 days, average 60-90 days.

Period of Communicability

As long as HBsAg is present in blood. In acute infections, surface Ag can be present 1-2 months after onset of symptoms.

Methods of Control

Routine hepatitis B vaccination series is recommended for all children beginning at birth, with catch-up at 11-12 years of age if not previously vaccinated. The usual three dose schedule is 0, 1-2, and 6-18 months. Vaccination is also recommended for high risk groups, including those with occupational exposure, household and sexual contacts of HBsAg positive individuals (both acute and chronic infections), and injecting drug users.

Transmission of hepatitis B can be interrupted by identification of susceptible contacts and HBsAg positive pregnancies, and the timely use of post-exposure prophylaxis with vaccine and/or immune globulin.

Perinatal transmission is very efficient in the absence of post-exposure prophylaxis, with an infection rate of 70-90% if the mother is both HBsAg and hepatitis B *e* antigen (HBeAg) positive. The risk of perinatal transmission is about 10% if the mother is only HBsAg positive. Post-exposure prophylaxis, consisting of hepatitis B immune globulin and vaccine, is highly effective in preventing hepatitis B vertical transmission, therefore, testing of all pregnant women for HBsAg is recommended with each pregnancy. MSDH, through the Perinatal Hepatitis B Program, tracks HBsAg positive pregnant women, provides prenatal HBsAg testing information to the delivery hospitals when available, and monitors infants born to infected mothers to confirm completion of the vaccine series by 6 months of age, and then tests for post-vaccine response and for possible seroconversion at 9-12 months of age.

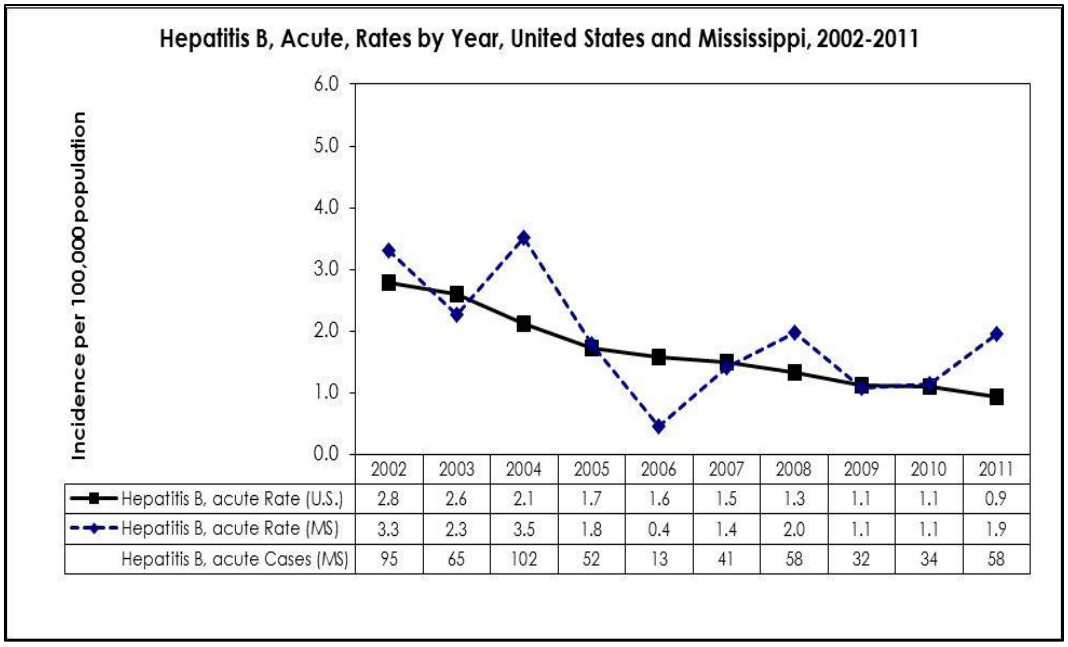
Reporting Classification

Class 2.

Epidemiology and Trends

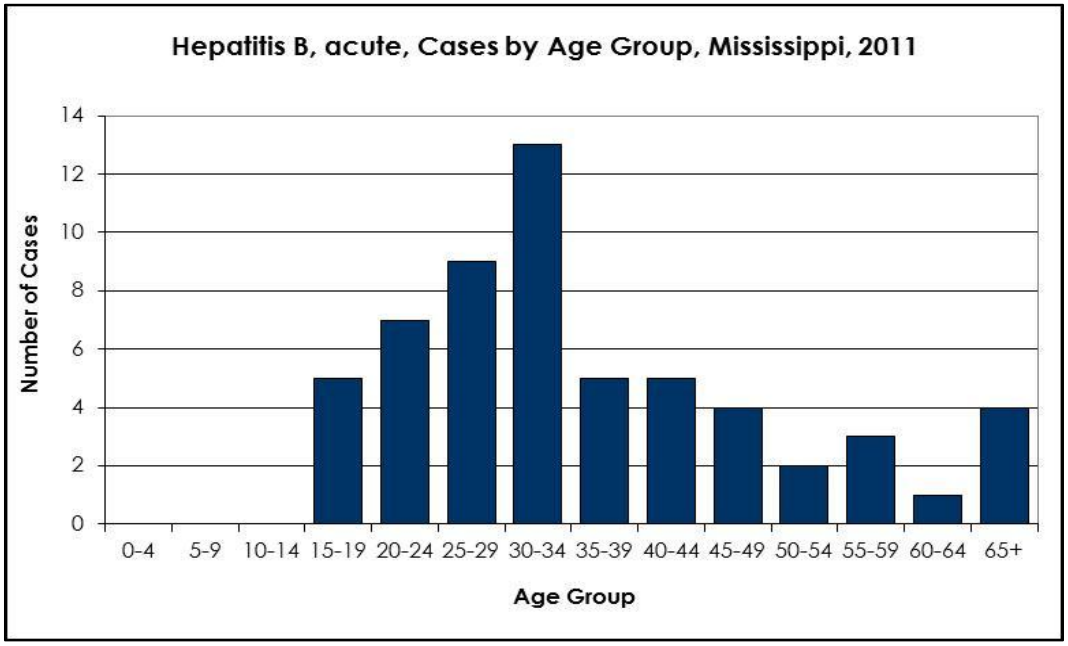
In 2011, 58 cases of acute hepatitis B were reported. This was higher than the 34 cases reported in 2010 and the three year average (2008-2010) of 41 annual cases (Figure 21). Thirty-four (59%) of the 58 reported cases occurred in individuals aged 15-34 years. Overall, the cases ranged in age from 17 to 85 years old (Figure 22).

Figure 21



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Hepatitis B, acute Rate (U.S.)	2.8	2.6	2.1	1.7	1.6	1.5	1.3	1.1	1.1	0.9
Hepatitis B, acute Rate (MS)	3.3	2.3	3.5	1.8	0.4	1.4	2.0	1.1	1.1	1.9
Hepatitis B, acute Cases (MS)	95	65	102	52	13	41	58	32	34	58

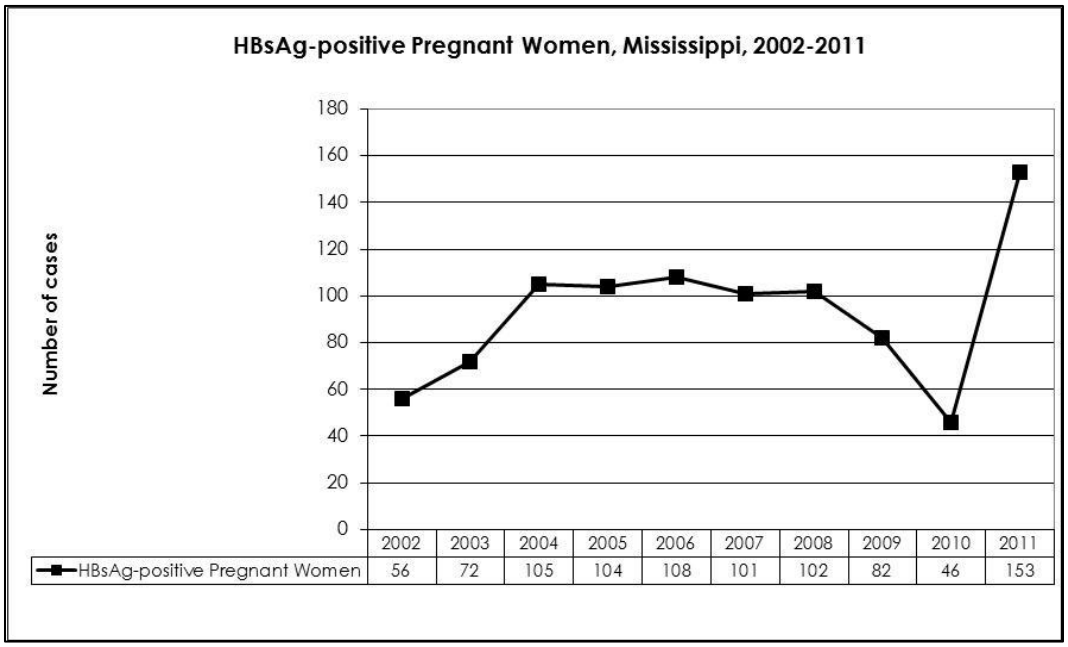
Figure 22



A comprehensive strategy to eliminate hepatitis B virus transmission was recommended in 1991. It includes prenatal testing of pregnant women for HBsAg to identify newborns that require immunoprophylaxis for prevention of perinatal infection, identifying household contacts who should be vaccinated, the routine vaccination of infants, the vaccination of adolescents, and the vaccination of adults at high risk for infection.

In 2011, 153 HBsAg positive pregnant women were reported to the Perinatal Hepatitis B Prevention Program (Figure 23). This is higher than the 46 reported in 2010 and the three year average of 77. There were no reported cases of HBsAg positive infants born to HBsAg positive mothers in 2011. The last cases of perinatal transmission occurred in 2007, when two cases were reported.

Figure 23



HIV Disease

2011 Case Total	**573**	**2011 rate/100,000**	**19.2**
2010 Case Total	**550**	**2010 rate/100,000**	**18.5**

Clinical Features

The clinical spectrum of human immunodeficiency virus (HIV) infection varies from asymptomatic infections to advanced immunodeficiency with opportunistic complications. One half to two thirds of recently infected individuals have manifestations of an infectious mononucleosis-like syndrome in the acute stage. Fever, sweats, malaise, myalgia, anorexia, nausea, diarrhea, and non-exudative pharyngitis

are prominent symptoms in this stage. Constitutional symptoms of fatigue and wasting may occur in the early months or years before opportunistic disease is diagnosed. Over time, HIV can weaken the immune system, lowering the total CD4 count and leading to opportunistic infections and the diagnosis of Acquired Immunodeficiency syndrome (AIDS).

Infectious Agent

Human immunodeficiency virus is a retrovirus with two known types, HIV-1 and HIV-2. These two types are serologically distinct and have a different geographical distribution, with HIV-1 being primarily responsible for the global pandemic and the more pathogenic of the two.

Reservoir

Humans.

Transmission

HIV infection can be transmitted from person to person during sexual contact, by blood product transfusion, sharing contaminated needles or infected tissue or organ transplant. Transmission by contact with body secretions like urine, saliva, tears or bronchial secretions has not been recorded. Without appropriate prenatal treatment, 15-30% of infants born to HIV positive mothers are infected. Breast feeding is also a known vehicle of mother to infant transmission of HIV.

Incubation

The period from the time of infection to the development of AIDS ranges from 1 year up to 15 years or longer. The availability of effective anti-HIV therapy has greatly reduced the development of AIDS in the U.S.

Period of Communicability

Individuals become infectious shortly after infection and remain infectious throughout the course of their lives, however, successful therapy with antiretroviral drugs can lower the viral load in blood, semen and vaginal secretions to undetectable levels, substantially decreasing the transmission probability of HIV.

Methods of Control

Abstinence is the only sure way to avoid sexual HIV transmission; otherwise mutual monogamy with partners known to be uninfected and the use of latex condoms are known to reduce the risk of infection. Confidential HIV testing and counseling and testing of contacts, prenatal prevention by counseling and testing all pregnant women, and early diagnosis and treatment with appropriate anti-retroviral therapy can reduce transmission. Post-exposure prophylaxis for health care workers exposed to blood or

body fluids suspected to contain HIV is an important worksite preventive measure. In recent years, a number of biomedical interventions including male circumcision, pre-exposure and post-exposure prophylaxis, and vaginal microbicides have proven to be effective in decreasing the rate of acquisition of HIV among high risk individuals. MSDH performs contact investigation, counseling and testing for each reported case of HIV infection in addition to facilitating linkage to care of infected individuals.

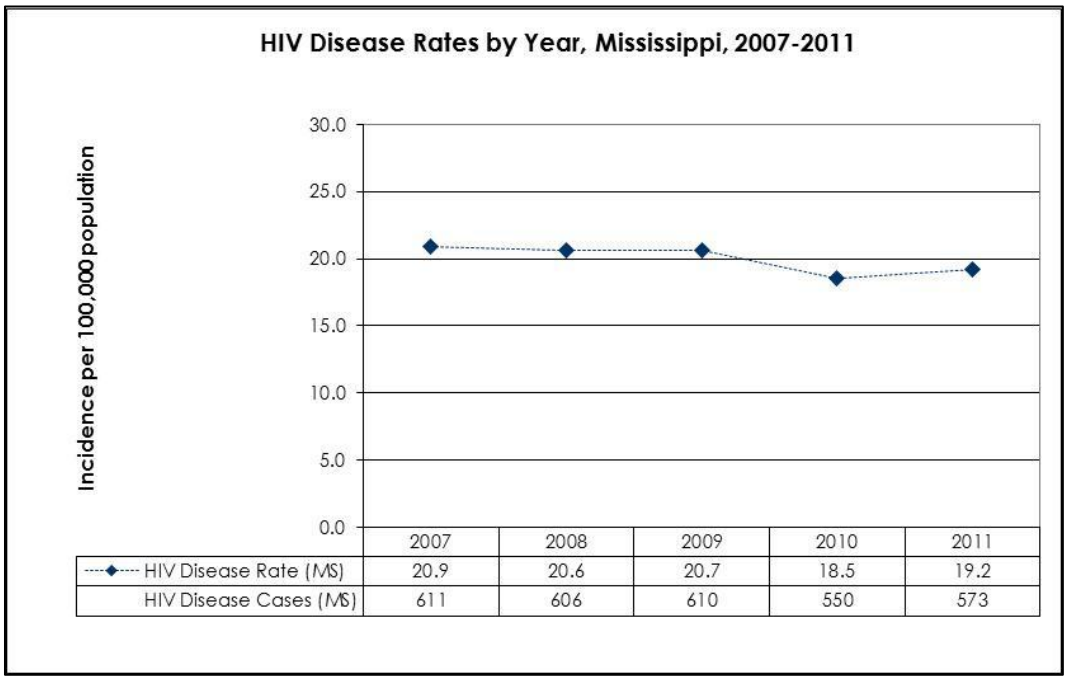
Reporting Classification

Class 1.

Epidemiology and Trends

Both HIV infection and AIDS are reportable at the time of diagnosis, so many patients will be reported twice (once at first diagnosis of HIV infection, and again when developing an AIDS defining illness). The epidemiologic data that follows is regarding the initial report of HIV disease, whether first diagnosed as HIV infection or AIDS. Over the past few years, there has been little change in HIV disease trends. There were 573 cases of HIV disease reported in 2011 (Figure 24).

Figure 24

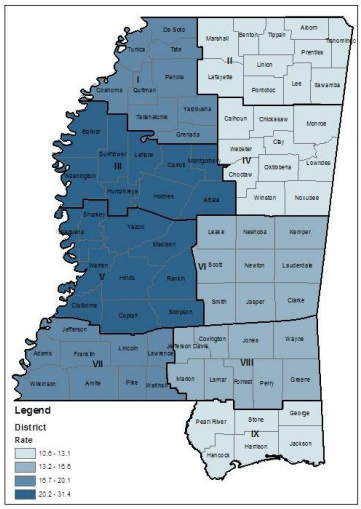


	2007	2008	2009	2010	2011
HIV Disease Rate (MS)	20.9	20.6	20.7	18.5	19.2
HIV Disease Cases (MS)	611	606	610	550	573

Individuals from every Public Health District were impacted by this disease. Public Health District V reported the highest case rate statewide, followed by District III (Figure 25).

Figure 25

HIV Disease Incidence by Public Health District, Mississippi, 2011



District	Cases	Rate*
I	59	18.3
II	44	12.1
III	56	26.1
IV	26	10.6
V	200	31.4
VI	40	16.4
VII	35	20.1
VIII	51	16.6
IX	62	13.1
State	**573**	**19.2**

***per 100,000 population**

HIV disease was reported in all age groups, with 59% of the cases reported among 20-39 year olds (Figure 26). African Americans were disproportionately impacted by HIV disease. In 2011, 79% of new cases were among African Americans in which race was known (Figure 27).

Figure 26

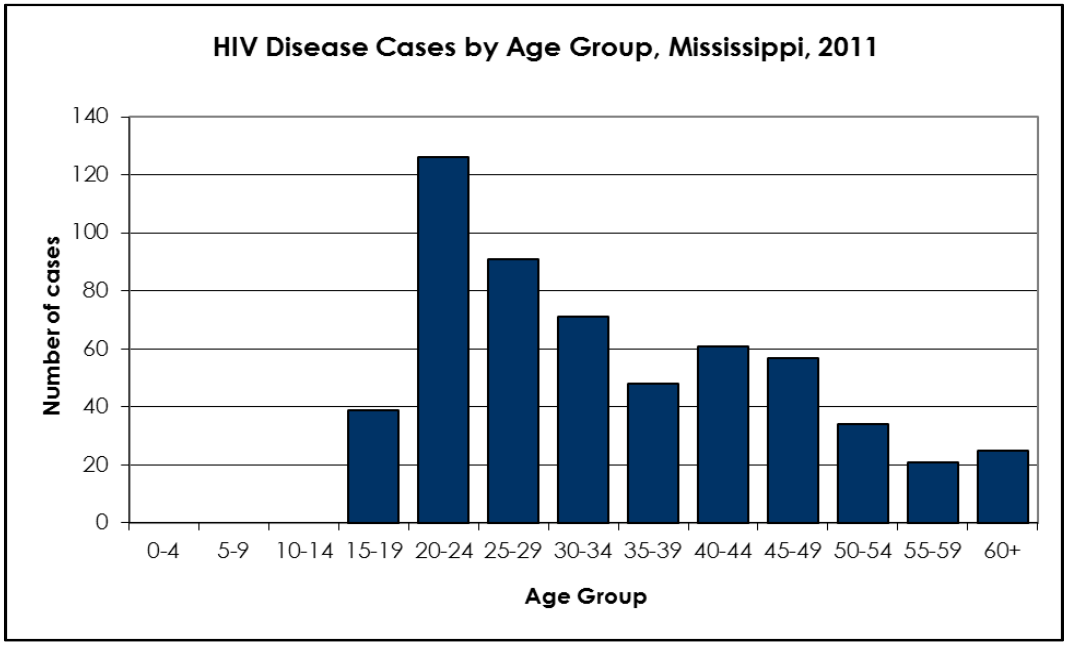
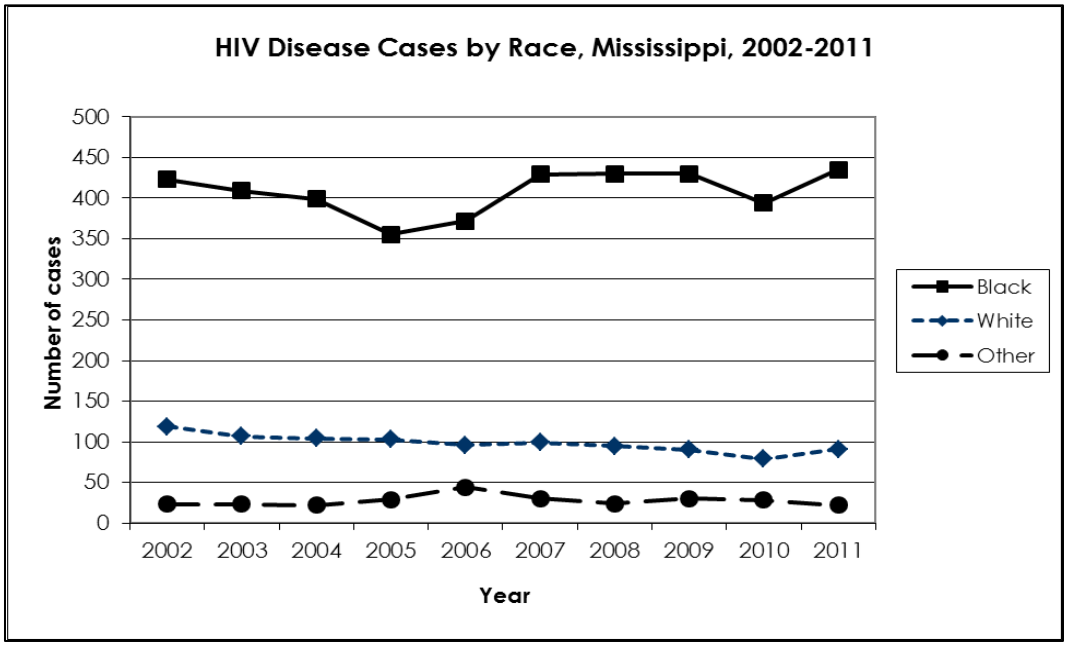
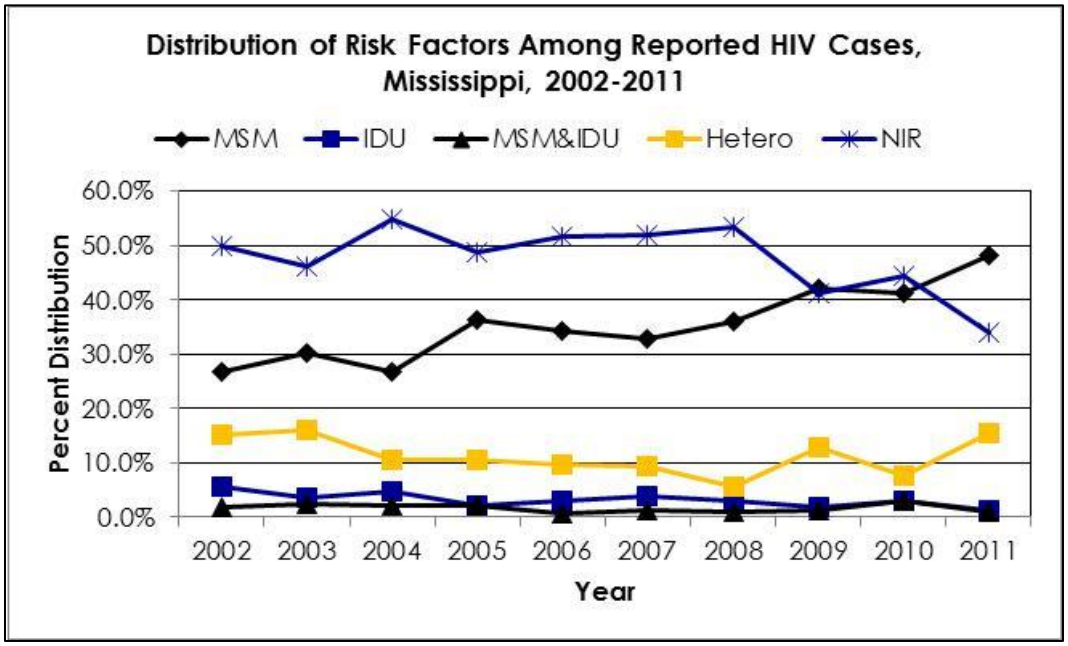


Figure 27



There are a number of identifiable risk factors associated with HIV infection, including male-to-male sexual contact (MSM), heterosexual contact (hetero), and injection drug use (IDU). Cases in persons with no reported exposure to HIV through any routes listed in the hierarchy of transmission categories are classified as "no risk factor reported or identified" or NIR. For the last several years, the percentage of cases among individuals identifying themselves as MSM has steadily increased, from 33% in 2007 to 48% in 2011 (Figure 28).

Figure 28



Additional References:

- Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the use of antiretroviral agents in HIV-1-infected adults and adolescents. Department of Health and Human Services. Available at http://aidsinfo.nih.gov/contentfiles/lvguidelines/AdultandAdolescentGL.pdf.

- Centers for Disease Control and Prevention. Guidelines for Prevention and Treatment of Opportunistic Infections in HIV-Infected Adults and Adolescents. MMWR 2009; 58 (No. RR-4) April 10, 2009

- Centers for Disease Control and Prevention. Guidelines for the Prevention and Treatment of Opportunistic Infections Among HIV-Exposed and HIV-Infected Children. MMWR 2009; 58 (No. RR-11) September 4, 2009

Influenza – 2011 – 2012 Season

Clinical Features

An acute viral infection of the respiratory tract characterized by sudden onset of fever, often with chills, headache, malaise, diffuse myalgia, and nonproductive cough. The highest risks for complications from seasonal influenza are in persons aged 65 years and older, young children, pregnant and postpartum women, and persons at any age with chronic underlying illnesses. Pneumonia due to secondary bacterial infections is the most common complication of influenza. During the period 1976—2007, estimated

influenza deaths ranged from a low of 3,349 to a high of 48,614 per year in the United States.

Infectious Agent

Influenza is caused by an RNA virus. Illness may be caused by both influenza A and influenza B strains, but each influenza season there is usually one predominant subtype of influenza virus causing the majority of infections.

Reservoir

Humans.

Transmission

Transmission occurs person to person by direct or indirect contact with virus laden droplets or respiratory secretions.

Incubation

The incubation period usually is 1 to 4 days, with a mean of 2 days.

Period of Communicability

From 1 day before clinical onset through 3-5 days from clinical onset in adults; and up to 7-10 days from clinical onset in young children.

Methods of Control

Yearly vaccination is recommended with either trivalent inactivated vaccine (TIV) or live attenuated influenza vaccine (LAIV). Education on basic personal hygiene, specifically transmission from unprotected coughs and sneezes and from hand to mucous membrane is highly important in preventing or slowing transmission of influenza. Antivirals can also be used to prevent and treat influenza. The neuraminidase inhibitors (oseltamivir and zanamivir) continue to be effective against all forms of influenza. Though sporadic resistance to oseltamivir has been identified in some influenza A strains over the past several years, neuraminidase inhibitors are still recommended for the treatment of influenza A (H1N1) and A (H3N2) and influenza B virus infections. High levels of resistance to the adamantanes (amantadine and rimantadine) persist among influenza A (H1N1) and A (H3N2) viruses circulating globally. The adamantanes are not effective against influenza B viruses.

Please consult the Centers for Disease Control and Prevention (CDC), Prevention and Control of Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2010. MMWR 59(No. RR-8); August 6, 2010. http://www.cdc.gov/mmwr/pdf/rr/rr5908.pdf and the brief update Prevention and Control of Influenza with Vaccines: Recommendations of the Advisory Committee on

Immunization Practices (ACIP), 2011. MMWR 60(33); 1128-1132; August 26, 2011. http://www.cdc.gov/mmwr/PDF/wk/mm6033.pdf

Reporting Classification

Class 1: Influenza associated pediatric deaths (<18 years of age).

Epidemiology and Trends

Influenza activity usually occurs from December through March or April, but can occur earlier or later. Peak activity typically occurs in February or March. The risk of complications depends on many factors, including age and underlying medical conditions. Vaccination status and the match of vaccine to circulating viruses affect both the susceptibility to infection and the possibility of complications. Outbreaks can occur in group settings, such as nursing homes.

MSDH monitors seasonal influenza activity statewide through an active syndromic surveillance program reported by sentinel providers. In the 2011 – 2012 influenza season, 43 sentinel providers in 34 counties were enrolled in this system, representing hospital emergency departments, urgent care and primary care clinics, and college and university student health centers. These providers reported weekly numbers of nontrauma patient visits consistent with an influenza-like illness (ILI), defined as fever $\geq$100°F and cough and/or sore throat in the absence of a known cause other than influenza. MSDH uses this information to estimate the magnitude of the state's weekly influenza activity. These data are also used to estimate the geographic spread of influenza within the state, ranging from no activity to widespread activity. This terminology represents a geographic estimate rather than an indication of severity of the season. ILI providers are also supplied with kits for PCR influenza testing at the Public Health Laboratory (PHL).

The 2011 – 2012 influenza season was one of the mildest and latest seasons Mississippi had previously experienced. ILI activity remained relatively low throughout the season and did not reach a peak until mid-March of 2012, at 5.5% (compared to a peak of 12.7% in mid-December of the previous 2010-2011 season) (Figure 29). Overall for the 2011 – 2012 season, the predominant virus identified in the PHL was influenza A (H3N2), although some cases of Influenza A (2009 H1N1) and Influenza B were also identified (Figure 30). There were no influenza-associated pediatric deaths reported in Mississippi in the 2011 – 2012 season.

Figure 29

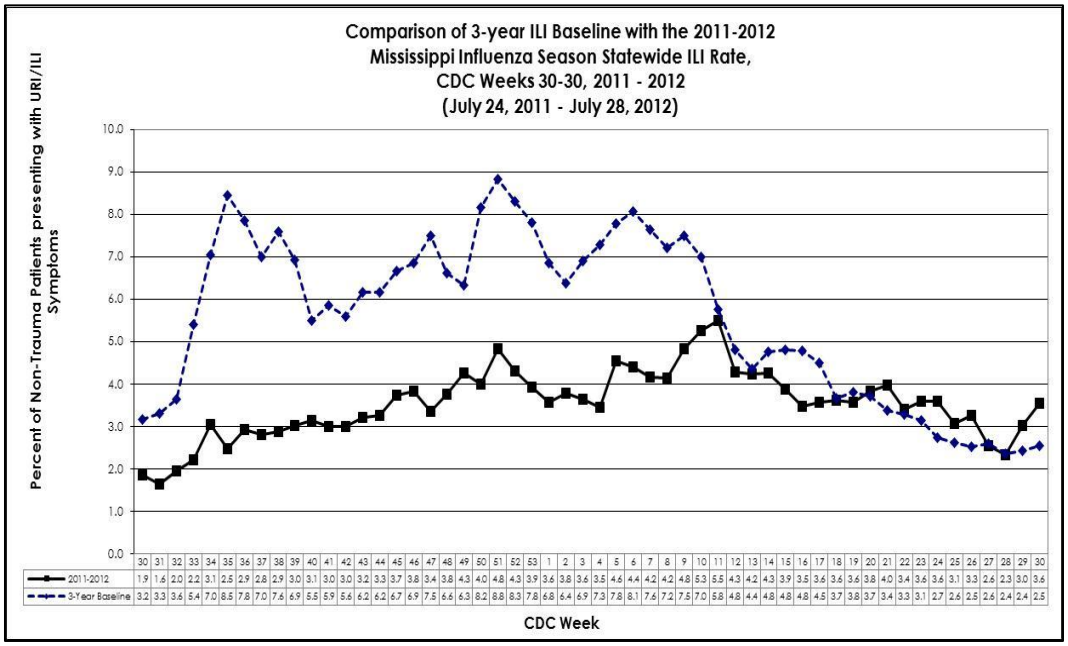
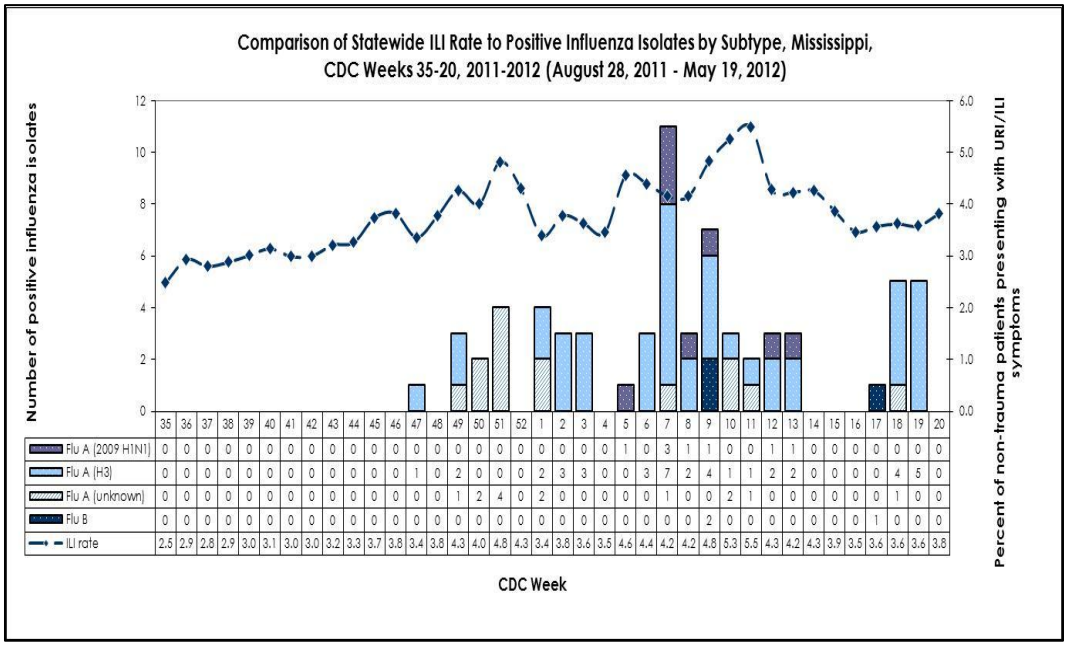


Figure 30



Legionellosis

2011 Case Total	**16**	**2011 rate/100,000**	**0.5**
2010 Case Total	**12**	**2010 rate/100,000**	**0.4**

Clinical Features

Legionellosis is an acute bacterial infection that has two clinical syndromes; Legionnaires' disease and Pontiac fever. Both syndromes can present with fever, headache, diarrhea and generalized myalgias. Those with Legionnaires' disease develop a non-productive cough and pneumonia that can be severe and progress to respiratory failure. Even with improved diagnosis and treatment, case fatalities rates are approximately 15%. Pontiac fever is a self-limited illness that does not progress to pneumonia or death.

Infectious Agent

Legionella pneumophila (L. pneumophila), a gram negative bacillus with 18 serogroups. *L. pneumophila* serogroup 1 is the most common serogroup associated with illness.

Reservoir

Legionellosis is a waterborne disease. The best conditions for growth of the bacteria are warm water temperatures, stagnation, sediment and low levels of biocide.

Transmission

Airborne transmission occurs when water sources contaminated with *L. pneumophila* are aerosolized. Common sources of outbreaks are potable water systems, whirlpools/spas and cooling towers.

Incubation

Legionnaires' disease — 2-10 days, most commonly 5-6 days.
Pontiac Fever — 5-72 hours, most commonly 24-48 hours.

Period of Communicability

Legionellosis is not transmitted person to person.

Reporting Classification

Class 2.

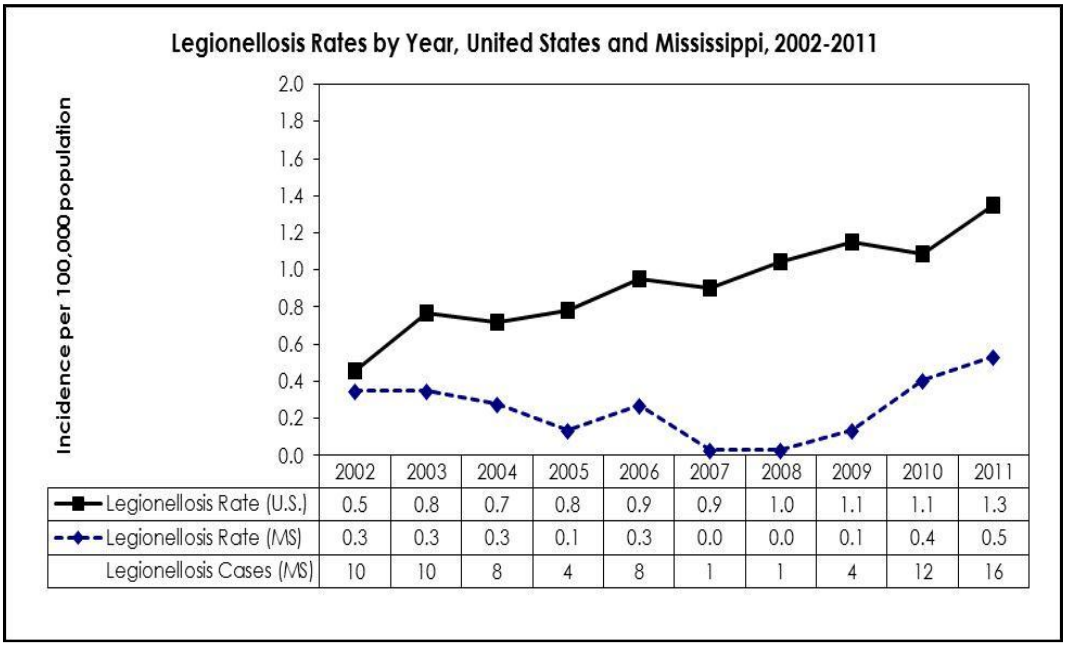
Epidemiology and Trends

In 2011, there were 16 cases of Legionnaire's disease reported in Mississippi. The cases ranged in age from 33 to 74 years, with a median age of 56. There were no deaths of

Mississippi residents reported. On average, six infections have been reported annually over the past three years (Figure 31).

None of the 2011 cases were epidemiologically linked to each other. However, one case with an onset of illness in October 2011 was ultimately linked to a *Legionella* outbreak that occurred in June 2010.

Figure 31



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Legionellosis Rate (U.S.)	0.5	0.8	0.7	0.8	0.9	0.9	1.0	1.1	1.1	1.3
Legionellosis Rate (MS)	0.3	0.3	0.3	0.1	0.3	0.0	0.0	0.1	0.4	0.5
Legionellosis Cases (MS)	10	10	8	4	8	1	1	4	12	16

Listeriosis

2011 Case Total	**4**	**2011 rate/100,000**	**0.1**
2010 Case Total	**5**	**2010 rate/100,000**	**0.2**

Clinical Features

A bacterial illness that in immunocompetent adults may present as an acute, mild febrile illness. In the elderly, immunocompromised persons, diabetics, alcoholics and in newborns, illness may present as meningoencephalitis and/or septicemia. The onset of meningoencephalitis can be sudden with fever, intense headache, nausea, vomiting and signs of meningeal irritation. Infected pregnant women may be asymptomatic or experience only a mild febrile illness; however, infection during pregnancy can lead to miscarriage or stillbirth, premature delivery, or infection of the newborn. The case fatality rate is as high as 30-50% in newborns.

Infectious Agent

Listeria monocytogenes, a gram-positive, rod-shaped bacterium.

Reservoir

Mainly occurs in soil, forage, water, mud and silage. Animal reservoirs include domestic and wild mammals, fowl and people. Asymptomatic fecal carriage is as high as 10% in humans.

Transmission

Ingestion of unpasteurized or contaminated milk and soft cheeses, as well as vegetables and ready-to-eat meats, such as deli meats or hot dogs. Unlike most other foodborne pathogens, *Listeria* tends to multiply in contaminated foods that are refrigerated. In neonates, infection can be transmitted in utero or by passage through the infected birth canal.

Incubation

Variable, estimated median incubation is 3 weeks (range 3-70 days)

Period of Communicability

Mothers of infected newborns can shed the bacterium in vaginal discharges and urine for 7-10 days post delivery. Infected individuals can shed the bacteria in their stools for several months.

Methods of Control

Education for proper food handling and preparation. Avoid unpasteurized (raw) milk or foods made from unpasteurized milk, such as soft cheeses, which can support the growth of organisms during ripening. Consume perishable and ready-to-eat foods as soon as possible after purchase, and cook hot dogs thoroughly before consumption. These recommendations are especially important during pregnancy. MSDH investigates all reported cases for rapid identification of common source outbreaks.

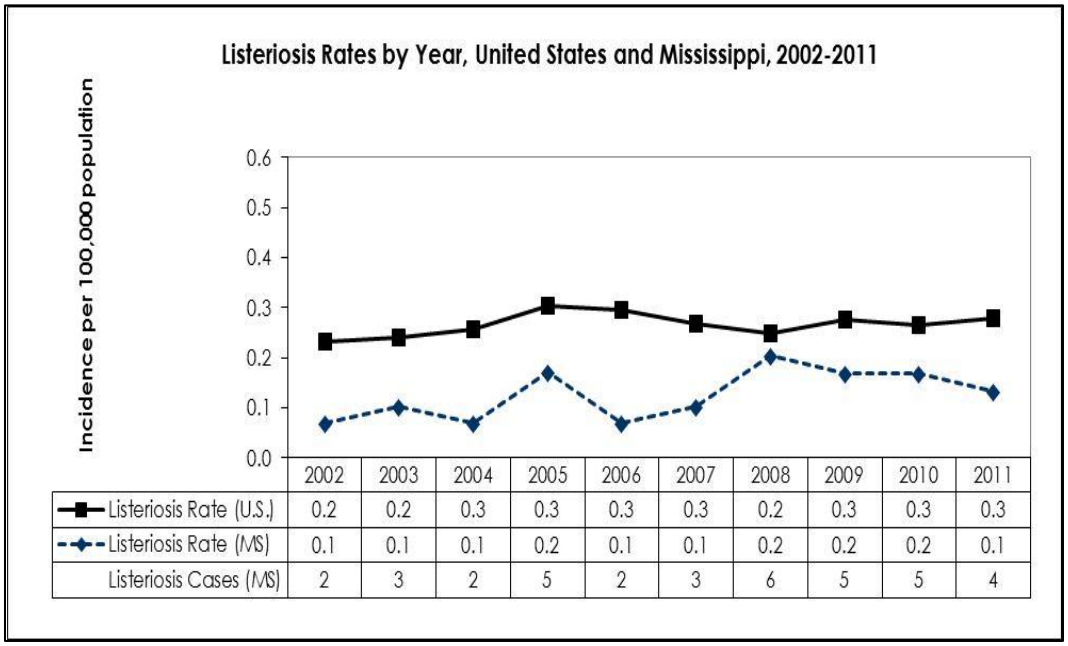
Reporting Classification

Class 2.

Epidemiology and Trends

There were four reported cases of listeriosis in Mississippi in 2011, which was comparable to the number reported in 2010 (5) and to the average number of 5 cases reported annually from 2008 through 2010. The incidence in Mississippi has remained at or below national rates since *Listeria* was added to the National Notifiable Disease List in 2000 (Figure 32).

Figure 32



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Listeriosis Rate (U.S.)	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3
Listeriosis Rate (MS)	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.1
Listeriosis Cases (MS)	2	3	2	5	2	3	6	5	5	4

There were no neonatal infections reported in 2011. The four reported cases ranged in age from 30 to 77 years. No deaths were reported. None of the infections were epidemiologically linked or associated with common source outbreaks.

Lyme Disease

2011 Case Total	**5**	**2011 rate/100,000**	**0.2**
2010 Case Total	**0**	**2010 rate/100,000**	**0.0**

Clinical Features

A tick-borne bacterial disease characterized primarily by a distinct "bull's-eye" rash (erythema migrans) in the early stage of the infection. The rash is present in up to 60%-80% of patients. Accompanying symptoms may include malaise, fever, headache, stiff neck, myalgias, migratory arthralgias and/or lymphadenopathy. In untreated patients, chronic or late manifestations may include musculoskeletal symptoms (joint swelling or chronic arthritis), neurological manifestations (aseptic meningitis, cranial neuritis, facial palsy, rarely encephalomyelitis), and cardiac abnormalities (specifically 2nd or 3rd degree atrioventricular conduction defects).

Infectious Agent

Borrelia burgdorferi, a spirochete.

Reservoir

Small mammals, mainly mice. Deer are efficient maintenance hosts and play an important role in transporting ticks.

Transmission

Transmission occurs through the bite of an infected *Ixodes scapularis* tick (black-legged tick). Nymphs are more likely to transmit disease, and they feed primarily on small mammals. Studies indicate the tick usually must be attached 24 hours or longer to efficiently transmit the bacteria. No person to person transmission or maternal fetal transmission has been confirmed.

Incubation

2-30 days after tick exposure for erythema migrans, however, early infection may be unapparent and patients may present weeks to months after exposure with late manifestations.

Methods of Control

Avoid tick infested areas when possible. When unavoidable, use tick repellant and measures to decrease tick exposure. After leaving tick prone areas examine body well and remove any ticks. It is important to promptly remove any attached ticks; it is not necessary to remove the head.

Reporting Classification

Class 2.

Epidemiology and Trends

Most cases of Lyme disease occur in late spring and summer. Lyme disease is not considered endemic in Mississippi, although the vector is present in the state and a few confirmed cases are reported on an annual basis.

There were five cases reported in 2011, compared to no cases in 2010. The cases ranged in age from 25 to 57 years, with a median age of 34 years. No deaths were reported. One case had a documented travel history to the northeastern U.S. where Lyme disease is endemic, while another case had no history of travel outside of Mississippi. The travel history of the remaining three cases was unknown.

Measles

2011 Case Total	**0**	**2011 rate/100,000**	**0.0**
2010 Case Total	**0**	**2010 rate/100,000**	**0.0**

Clinical Features

Measles is a highly contagious viral illness characterized by cough, coryza, conjunctivitis (3 C's), fever, an erythematous maculopapular rash, and a pathognomonic enanthema (Koplik spots). Complications are seen more frequently in children younger than 5 years of age and in adults 20 years of age and older. Diarrhea, pneumonia and encephalitis are the most common complications seen. The risk of death is higher in these age groups as well; the most common cause of death is pneumonia in children, and acute encephalitis in adults. Subacute sclerosing panencephalitis is a rare degenerative central nervous system disease that is thought to be due to persistent measles infection of the brain, and typically presents approximately 7 years after initial infection.

Infectious Agent

Measles virus, in the paramyxovirus family.

Reservoir

Humans.

Transmission

Transmitted by direct contact with large infectious droplets or, less commonly, by airborne spread. Measles is highly contagious, and all persons without previous disease or vaccination are susceptible.

Incubation

Eight to ten days.

Period of Communicability

Three to five days before to four days after rash onset.

Methods of Control

Measles, mumps and rubella (MMR) vaccine is recommended for all children at 12 to15 months of age with a second dose at school entry (4 to 6 years of age). Appropriate two dose vaccination induces immunity in 99% of individuals.

MSDH investigates all reported cases and provides prophylaxis for all contacts as appropriate. Measles vaccine administered within 72 hours of exposure may provide protection in some cases. Immunoglobulin, given within six days of exposure, can prevent or modify measles in susceptible persons who are at high risk for complications.

Because measles remains endemic in much of the world, international travelers should be up-to-date on vaccinations. Most international travelers should receive 1 to 2 doses of measles containing vaccine, including infants aged 6 months through 11 months of age who should receive a single dose of MMR when traveling internationally (still require routine doses at 12 months 4 to 6 years of age).

Reporting Classification

Class 1.

Epidemiology and Trends

There have been no reported cases of measles in Mississippi since 1992, when there were 17 reported cases. Fifteen of those cases were associated with an outbreak at the University of Mississippi and the index case's infection in that outbreak was traced to an exposure in Europe. Following this outbreak, a history of 2 doses of MMR was required to attend public universities in Mississippi.

Measles occurs throughout the world with peak incidence usually in late winter and spring. In 2000 widespread measles immunization led to the interruption of endemic measles transmission in the United States. However, measles incidence has increased worldwide, with outbreaks and increased transmission in several countries, particularly in Europe, due in part to dropping immunization rates. Importation of measles to the U.S. has resulted in a number of cases and outbreaks, particularly in unvaccinated populations. From 2001 through 2010, there were a total of 692 measles cases reported to CDC; 159 in U.S. residents returning from abroad.

In 2011 there were 220 measles cases and 17 measles outbreaks reported to CDC nationwide. Of the 220 cases, 200 (91%) were associated with importations from other countries, including 52 (24%) cases in U.S. residents returning from abroad. Eighty-six percent of the total 2011 cases occurred in among unvaccinated persons. Continued high vaccine rates in the U.S. and in Mississippi are important to provide appropriate population immunity and decrease the risk to those who are too young to receive vaccine or have medical contraindications to vaccination.

Additional References:

- CDC. Measles imported by returning U.S. travelers aged 6—23 months, 2001-2011. MMWR. April 8, 2011/ 60(13); 397-400.
- CDC. Measles—United States, 2011. MMWR. April 20, 2012 / 61(15); 253-257.

Meningococcal disease, invasive

2011 Case Total	**4**	**2011 rate/100,000**	**0.1**
2010 Case Total	**5**	**2010 rate/100,000**	**0.2**

Clinical Features

Invasive meningococcal disease is an acute bacterial illness characterized by meningitis and/or meningococcemia that may rapidly progress to purpura fulminans, shock and death. Symptoms include rapid onset of fever, severe headache, stiff neck, nausea and vomiting, and possibly a petechial rash. The case fatality rate, even with the use of antibiotics and improved supportive measures, remains high at 8-15%. Long term sequelae occur in 10-20% of survivors and include hearing loss, mental retardation and the loss of the use of a limb.

Infectious Agent

Neisseria meningitidis (*N. meningitidis*), an aerobic gram negative diplococcus. The most common serogroups in the United States are B, C, W-135, and Y. Licensed vaccines are not protective against serogroup B.

Reservoir

Humans. Up to 5-10% of the population may be asymptomatic carriers.

Transmission

Transmission of *N. meningitidis* is person to person by direct contact with respiratory droplets from the nose and throat of infected individuals or carriers. Less than 1% of colonized individuals will progress to invasive disease.

Incubation

The incubation period is 2-10 days, commonly 3-4 days.

Period of Communicability

Individuals remain contagious until meningococci are no longer present in nasal or throat secretions, usually 24 hours after antibiotic treatment has begun.

Methods of Control

Vaccination and post-exposure prophylaxis are effective in preventing invasive meningococcal disease. Routine vaccination with the quadrivalent meningococcal conjugate vaccine (MCV4) is recommended for all children aged 11-12 years (and children aged 13-18 years not previously vaccinated) with a booster dose at 16 years of age. Additionally, previously unvaccinated persons with persistent complement

component deficiency or anatomic/functional asplenia should receive two doses at least eight weeks apart, with a booster dose every five years thereafter. MCV4 is also recommended for persons who travel to countries in which *N. meningitidis is* hyperendemic or epidemic. Use of the meningococcal polysaccharide vaccine (MPSV) should be limited to persons older than 55 years of age, or used when MCV4 is not available. Both MCV4 and MPSV4 are recommended for use in the control of meningococcal outbreaks caused by vaccine-preventable serogroups (A, C, Y and W-135).

MSDH investigates each reported case and provides prophylactic antibiotics (rifampin) for household contacts and other appropriate close contacts. Health care workers are not usually at risk unless there is direct contact with nasopharyngeal secretions (mouth-to-mouth resuscitation).

Reporting Classification

Class 1.

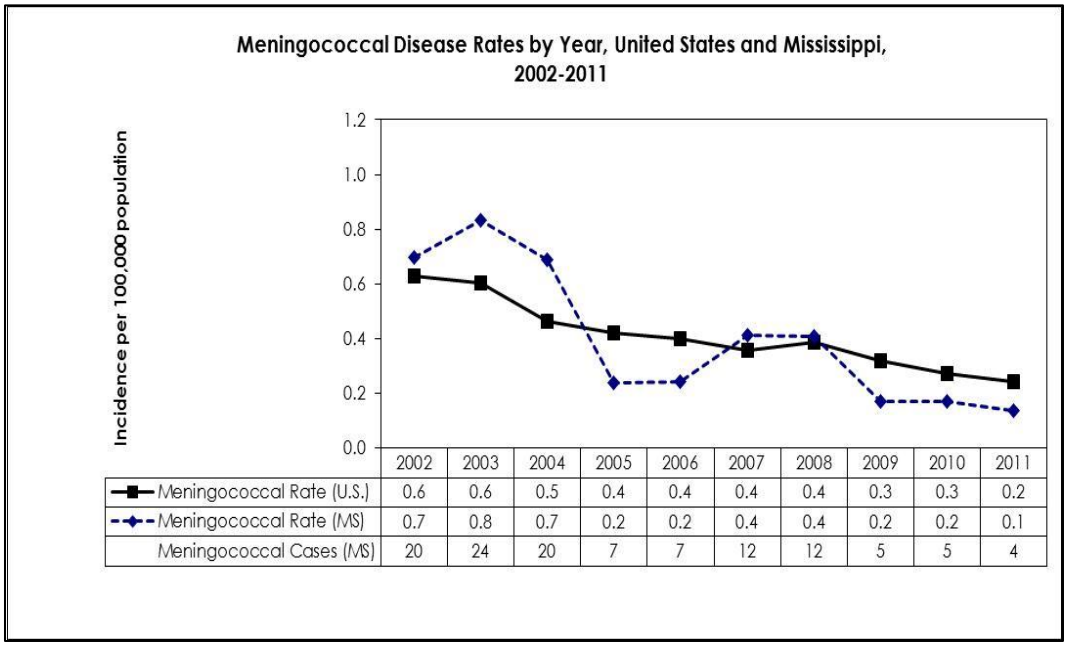
Epidemiology and Trends

In 2011, there were four reported cases of invasive meningococcal disease. This is comparable to the number of reported cases in 2010. The annual number of reported cases has decreased over the last several years, from 20 to 24 cases per year in 2002 through 2004, to four to five cases per year in 2009 through 2011 (Figure 33). Nationally, infants less than 12 months of age have the highest incidence of invasive disease. In the U.S., rates of disease decline in early childhood, increase during adolescence and early adulthood, then decrease again in older adults. The 2011 Mississippi cases ranged in age from 12 days to 69 years. From 2007 – 2011, 32% of the cases occurred in children less than five years of age (Figure 34).

MSDH requests the submission of all isolates to the PHL for typing. One of the confirmed cases in 2011 was typed as serogroup B, another case was typed as serogroup Y, while the third case was A/Y latex positive. The remaining case was not able to be subtyped.

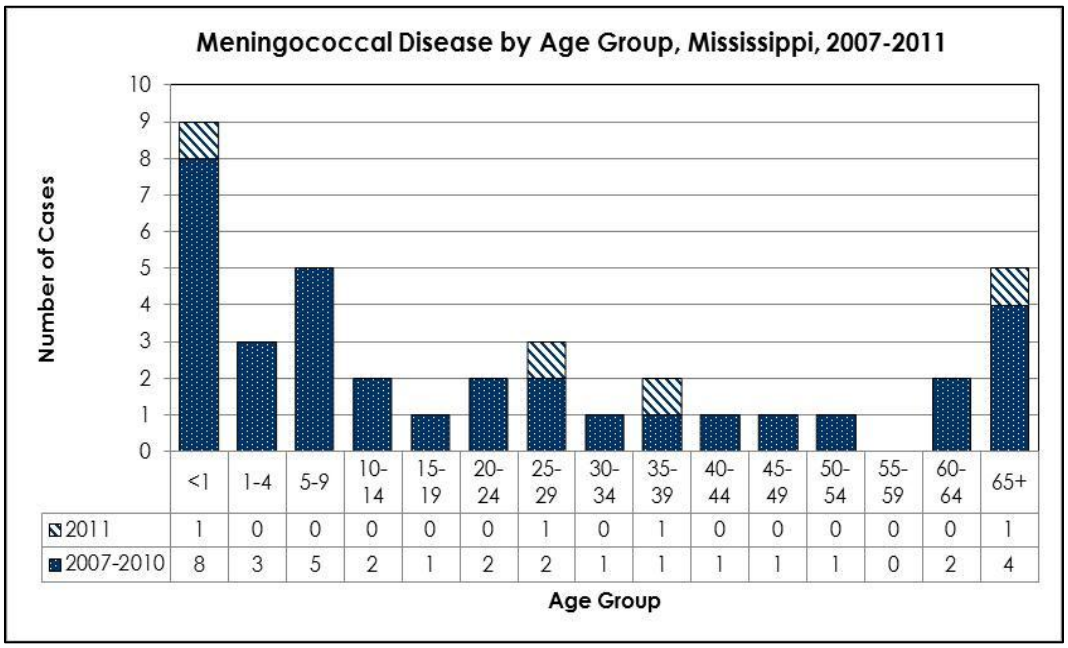
In total, rifampin prophylaxis was provided for 14 contacts of meningococcal disease cases in 2011. There was one death reported in 2011 from meningococcal disease in an individual over 65 years of age.

Figure 33



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Meningococcal Rate (U.S.)	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.2
Meningococcal Rate (MS)	0.7	0.8	0.7	0.2	0.2	0.4	0.4	0.2	0.2	0.1
Meningococcal Cases (MS)	20	24	20	7	7	12	12	5	5	4

Figure 34



	<1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
2011	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1
2007-2010	8	3	5	2	1	2	2	1	1	1	1	1	0	2	4

Mumps

2011 Case Total	**3**	**2011 rate/100,000**	**0.1**
2010 Case Total	**0**	**2010 rate/100,000**	**0.0**

Clinical Features

Mumps is a viral illness characterized by an acute onset of fever, tenderness and swelling in one or more of the salivary glands. Parotitis is the most common presentation, but asymptomatic infections do occur. Symptoms typically resolve within 7-10 days. Orchitis in postpubertal males and oophoritis in postpubertal females are the most frequent complications.

Infectious Agent

Mumps virus, in the paramyxovirus family.

Reservoir

Humans.

Transmission

Spread through airborne transmission or by direct contact with infected droplet nuclei or saliva.

Incubation

About 16 – 18 days (range 14 – 25).

Period of Communicability

Three days before to four days after onset of symptomatic disease. Virus has been isolated from saliva up to 7 days before and 9 days after onset of parotitis.

Methods of Control

Measles, mumps and rubella (MMR) vaccine routinely given at 12 – 15 months of age with a second dose at 4 – 6 years. Immunization of susceptible contacts may be helpful in prevention of infection.

Reporting Classification

Class 2.

Epidemiology and Trends

In Mississippi, there are typically fewer than 5 cases reported annually. In 2011, there were three reported mumps cases, compared to no cases in 2010.

Pertussis

2011 Case Total	**49**	**2011 rate/100,000**	**1.6**
2010 Case Total	**106**	**2010 rate/100,000**	**3.6**

Clinical Features

An acute bacterial disease of the respiratory tract distinguished by prolonged paroxysmal coughing with a characteristic inspiratory "whoop." There are three clinical stages: catarrhal stage, paroxysmal cough stage, and a convalescent stage. Post-tussive vomiting is common in the paroxysmal stage. Infants under 6 months of age, vaccinated children, adolescents and adults often do not have whoop or paroxysms. Pneumonia is the most frequent complication; the majority of fatalities occur in children under 6 months of age. Adults and adolescents may have a mild illness which often is undiagnosed, but serve as a source of infection for unvaccinated or incompletely vaccinated children.

Infectious Agent

Bordatella pertussis, an aerobic gram negative rod.

Reservoir

Humans. Adolescents and adults are reservoirs for *B. pertussis* and are often the source of infection in infants.

Transmission

Direct contact with respiratory secretions by airborne route, probably via droplets.

Incubation

Average 9-10 days. (Range 6-20 days).

Period of Communicability

Most transmissible in the catarrhal stage (which lasts about 1 week) and then during the first 2 weeks after onset of paroxysmal cough, or a total of 21 days after symptom onset. Communicability then gradually decreases and becomes negligible. Individuals are no longer considered contagious after 5 days of appropriate antibiotic treatment.

Methods of Control

Vaccination and post-exposure prophylaxis are effective in preventing pertussis. Pertussis vaccine is combined with diphtheria and tetanus toxoids (DTaP); the primary series consists of four doses given between the ages of 2 months and 18 months, with a booster at 4-6 years of age.

Pertussis immunity wanes 5-10 years after the booster vaccine, leaving adolescents and adults more vulnerable to infection. ACIP recommends a single dose of Tdap (pertussis containing vaccine for use in those >11 years of age) for all adolescents aged 11 through 18 years. Additionally, one dose of Tdap is recommended for all persons up to age 64, and for adults 65 years of age and older who have close contact with infants less than 12 months of age (for example, grandparents, child care providers and healthcare workers).

MSDH investigates each reported case and provides prophylactic antibiotics (erythromycin, azithromycin) for all household contacts where there is a child less than one year of age or a pregnant woman in the last three weeks of her pregnancy in the home.

Reporting Classification

Class 1.

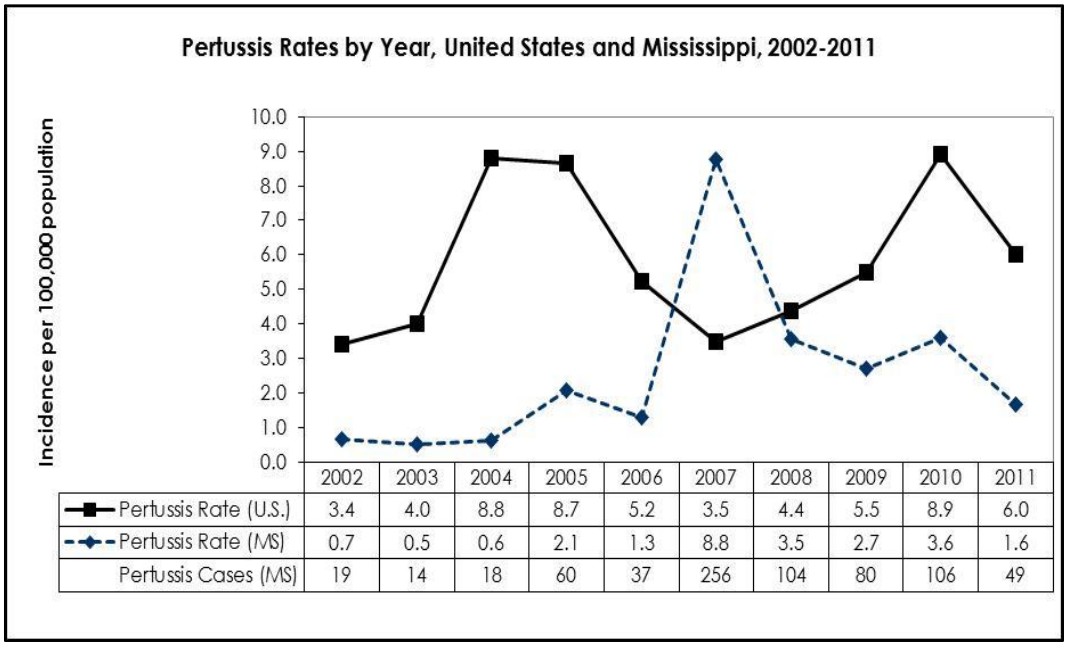
Epidemiology and Trends

Among the diseases for which universal childhood vaccination is recommended, pertussis is consistently the one that has the highest number of cases annually. Susceptibility of unimmunized persons is universal. Infants less than 1 year of age, who are at greatest risk for severe disease and death, continue to have the highest reported rate of pertussis.

In 2011, there were 49 reported cases of pertussis infections. This was lower than the 106 cases which were reported in 2010 and the three year average of 97 cases from 2008-2010 (Figure 35).

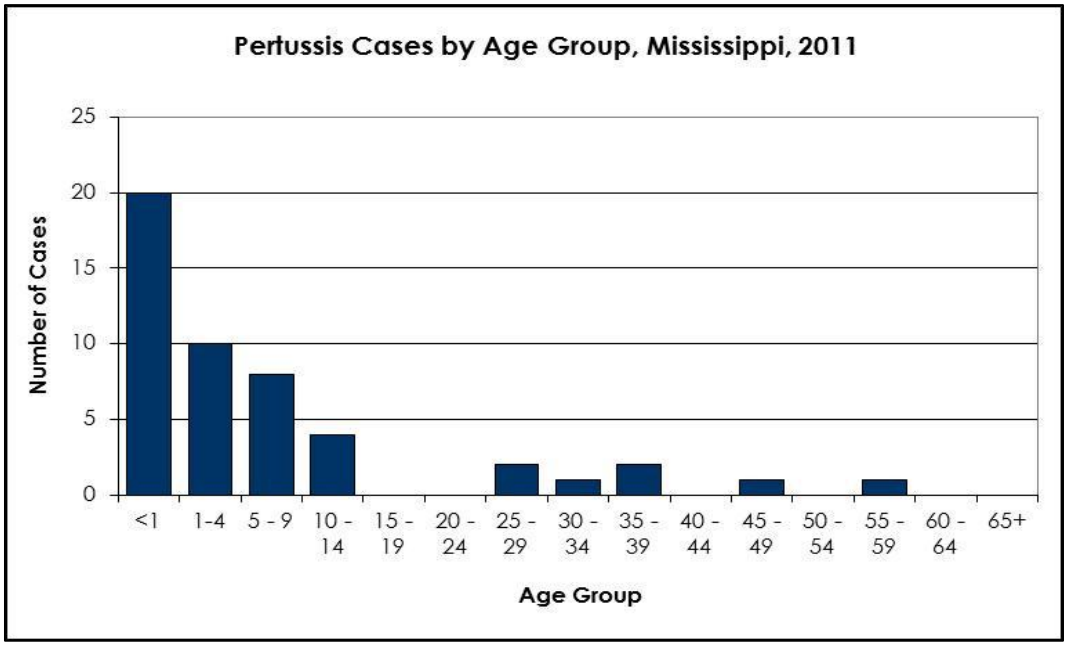
Seventeen (35%) of the cases in 2011were among children less than 1 year of age (Figure 36). No pertussis deaths were reported in 2011.

Figure 35



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Pertussis Rate (U.S.)	3.4	4.0	8.8	8.7	5.2	3.5	4.4	5.5	8.9	6.0
Pertussis Rate (MS)	0.7	0.5	0.6	2.1	1.3	8.8	3.5	2.7	3.6	1.6
Pertussis Cases (MS)	19	14	18	60	37	256	104	80	106	49

Figure 36



Pneumococcal disease, invasive

2011 Case Total	**14**	**2011 rate/100,000**	**0.5**
2010 Case Total	**19**	**2010 rate/100,000**	**0.7**

Clinical Features

An acute bacterial infection with two clinical invasive syndromes: septicemia and meningitis. Septicemia is the most common clinical presentation, with a case fatality rate as high as 60% among the elderly. Pneumococcal meningitis has a case-fatality rate of 30%, but may be as high as 80% in elderly persons. Symptoms of meningitis include abrupt onset of high fever, headache, lethargy, vomiting, irritability, and nuchal rigidity. It is the leading cause of bacterial meningitis in children less than 5 years of age. Neurologic sequelae are common among meningitis survivors.

Infectious Agent

Streptococcus pneumoniae, a gram-positive diplococcus. Most strains causing severe forms of disease are encapsulated; there are 90 known capsular serotypes.

Reservoir

The nasopharynx of asymptomatic human carriers. Carriage is more common in children than adults.

Transmission

Droplet spread and contact with respiratory secretions.

Incubation

Unknown; probably short, 1-4 days.

Period of Communicability

Period of communicability is unknown, but it is presumed that transmission can occur as long as *S. pneumoniae* occurs in respiratory secretions.

Methods of Control

Conjugate and polysaccharide vaccines are available for the prevention of pneumococcal disease. The conjugate vaccine (PCV13) is approved for children younger than 24 months of age and children 24-59 months of age at risk for invasive disease. PCV13 is administered at 2, 4, 6, and 12-15 months of age. The polysaccharide vaccine (PPV23) is recommended for all adults 65 years of age and older and any person 2 years of age or older at high risk for invasive pneumococcal

disease (chronic disease such as cardiovascular disease, pulmonary disease or diabetes, and individuals with cochlear implants).

Reporting Classification

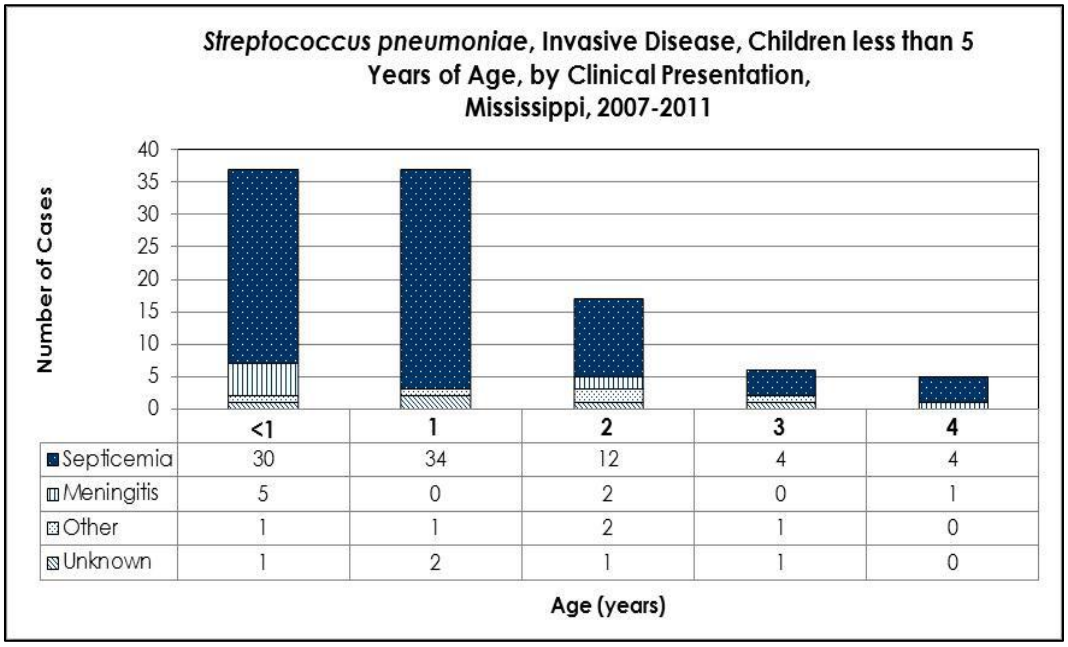
Class 2; invasive infection.

Epidemiology and Trends

In late 2010 the reporting criteria for invasive *S. pneumoniae* was expanded to include all cases of invasive disease. The previous reporting criteria were limited to cases in children less than 5 years of age and any cases that demonstrated antibacterial resistance regardless of age. In 2011 there were a total of 147 reported cases of invasive *S. pneumoniae* infections. The reported cases ranged in age from 5 months to 97 years of age, with a median age of 59.

Fourteen of the reported cases were in children less than 5 years of age. This was comparable to the 19 reported cases in 2010. Of these14 cases, 11 manifested as septicemia, one had *S. pneumoniae* isolated from pleural fluid and two had *S. pneumoniae* isolated from an unspecified sterile site. Ages ranged from 5 months to 2 years of age. Over the past five years, the majority (82%) of *S. pneumoniae* invasive infections in children less than 5 years of age have presented as septicemia (Figure 37).

Figure 37



	<1	1	2	3	4
Septicemia	30	34	12	4	4
Meningitis	5	0	2	0	1
Other	1	1	2	1	0
Unknown	1	2	1	1	0

Rabies

Clinical Features

Rabies is an acute fatal progressive disease that affects the central nervous system. Early signs include anxiety, discomfort or paresthesia at the site of the bite of an infected animal, primarily raccoons and bats in the U.S. Progression to symptoms of cerebral dysfunction such as confusion, agitation, delirium, hallucinations, and insomnia occurs within a few days of symptom onset. This is followed by generalized paralysis, coma and death within 2 to 10 days.

Infectious Agent

Lyssavirus, family Rhabdoviridae; an RNA virus. Variants occur among animal species and geographic location, but all of the members of the genus are antigenically related.

Reservoir

Rabies has both an urban and a wild cycle. The urban cycle (maintained by rabid dogs) has been reduced greatly in the U.S., but carnivores (primarily raccoons, wild canids, and skunks) and several species of insectivorous bats maintain the wild cycle in areas of the U.S. **The only reservoir identified in Mississippi over the last several decades is bats.**

Transmission

The most common mode of rabies virus transmission is through the bite of an infected host. All mammals are susceptible to varying degrees. Transmission has also been documented through organ transplantation, specifically corneal transplants, from a donor dying of undiagnosed rabies.

Incubation

The incubation period can be up to six months or longer. The incubation period is longer the farther away the bite is from the CNS.

Period of Communicability

Rabies is transmissible once it reaches the CNS and can be found in the salivary glands. The animal is usually exhibiting abnormal behavior and other clinical signs by this time.

Methods of Control

The best method of control is prevention. Domestic animal rabies vaccination programs, as well as pre- and post-exposure rabies vaccination in humans have significantly decreased the human risk and deaths from rabies in the United States.

People who are bitten by animals that are known reservoirs of rabies exhibiting abnormal behavior, such as unprovoked aggressiveness, increased drooling or paralysis should be considered at higher risk, and consideration should be given to the use of post-exposure vaccination.

Recommendations for preventing and controlling rabies in animals can be found in the Compendium of Animal Rabies Prevention and Control, at http://www.nasphv.org/Documents/RabiesCompendium.pdf.

Rabies can be prevented with the initiation of appropriate medical intervention following high risk animal exposures (primarily bats in Mississippi, but wild animal species such as raccoons, skunks, coyotes and foxes should also be considered higher risk exposures). Prompt wound care and post-exposure prophylaxis consisting of rabies immune globulin(RIG) and rabies vaccine are highly effective in preventing rabies following high risk animal exposures. Recommendations for prevention of rabies in humans can be found in the document by the Advisory Committee on Immunization Practices (ACIP) entitled Human Rabies Prevention—United States, 2008, at http://www.cdc.gov/mmwr/pdf/rr/rr57e507.pdf. Updated vaccine dosing recommendations are available at http://www.cdc.gov/mmwr/PDF/rr/rr5902.pdf .

Reporting Classification

Class 1 (human or animal).

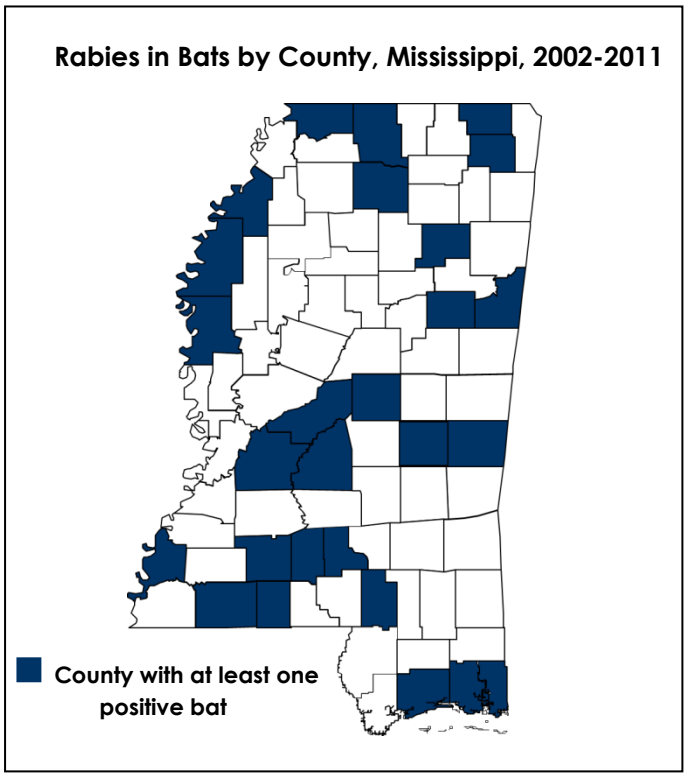
Epidemiology and Trends

In the U.S. in the 1940s and 1950s, canines were the predominant reservoir and cause of human rabies. By 2006, however, approximately 92% of animal rabies cases were in wildlife, and only 8% were in domestic animals. This change is attributed to concerted, targeted rabies vaccination campaigns and stray animal control that have reduced the number of canine rabies cases from 6,947 in 1947 to 79 in 2006. Currently, most human cases in the United States are caused by bat strains of rabies. In the U.S., bats are now the second most reported rabid animal behind raccoons.

The MSDH PHL is the only laboratory in Mississippi that tests for rabies in animals. Since 1962, bats are the only animals that have tested positive for rabies in Mississippi. Usually, between 2 to11 bats test positive each year. There were two positive bats out of 44 tested in the PHL in 2011. The positive bats were submitted from Lamar and Lowndes counties. Since 2002, there has been a wide geographic distribution of positive bats, with 49 reported positives in 27 counties (Figure 38). There has not been an indigenous terrestrial animal (land) rabies case reported in Mississippi since 1961, however, rabid raccoons, skunks and foxes are routinely identified in states contiguous to Mississippi. Mississippi reported a human case of rabies due to a bat strain in a 10 year old boy in

2005. Prior to this 2005 human case, the last reported human rabies case in Mississippi was in 1953 and this was transmitted by a terrestrial animal.

Figure 38



Rocky Mountain spotted fever

2011 Case Total	**24**	**2011 rate/100,000**	**0.8**
2010 Case Total	**27**	**2010 rate/100,000**	**0.9**

Clinical Features

A rickettsial illness with an acute onset of fever, severe headache, malaise, myalgia, nausea, vomiting, and may include a macular or maculopapular rash on the extremities, including the palms and soles, which usually spreads over the entire body. A petechial rash often follows. In untreated cases and those with delayed recognition, fatality occurs in 13-25% of the cases. Early stages of Rocky Mountain spotted fever (RMSF) are often confused with ehrlichiosis and meningococcemia.

Infectious Agent

Rickettsia rickettsii, a gram-negative coccobacillus.

Reservoir

Small rodents (chipmunks, squirrels, white-footed mice).

Transmission

Through the bite of an infected *Dermacentor variabilis* tick (American dog tick). A 4-6 hour attachment is required for transmission.

Incubation

3-14 days (most occurring between 5-7 days).

Period of Communicability

No evidence of person to person transmission.

Methods of Control

Avoid tick infested areas when possible. When unavoidable, use tick repellant and measures to decrease tick exposure. After leaving tick prone areas, examine body well and remove any ticks; removing the embedded head of the tick is not necessary.

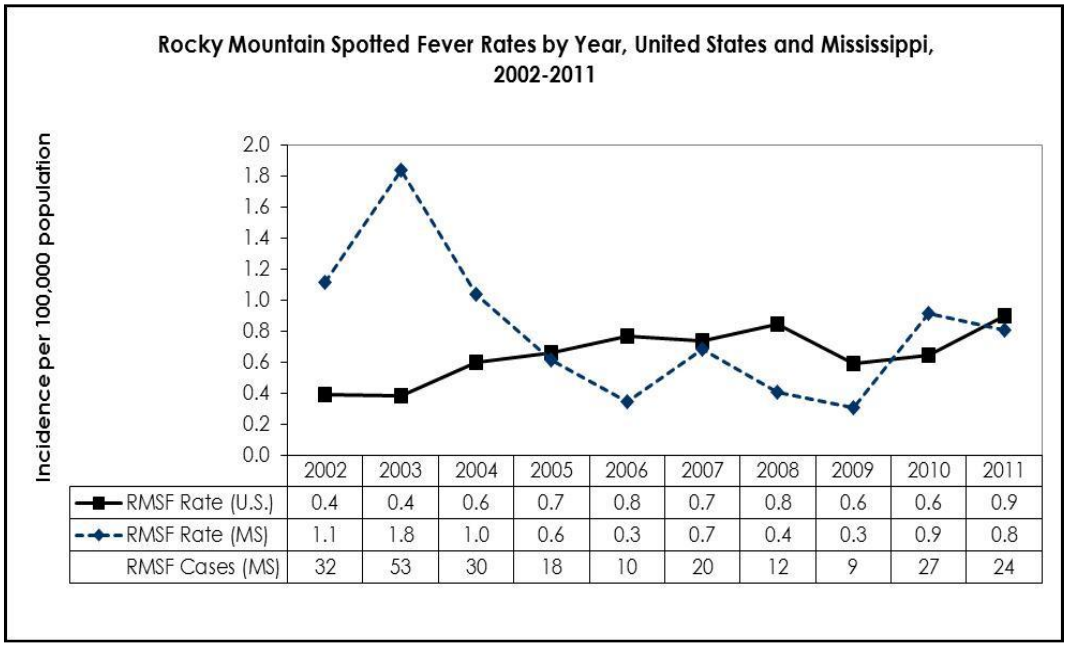
Reporting Classification

Class 2.

Epidemiology and Trends

In 2011, there were 24 cases of RMSF reported in Mississippi. This is higher than the three year (2008-2010) average of 16 cases (Figure 39). The cases ranged in age from 18 to 85 years, with a median age of 46. There were no reported deaths.

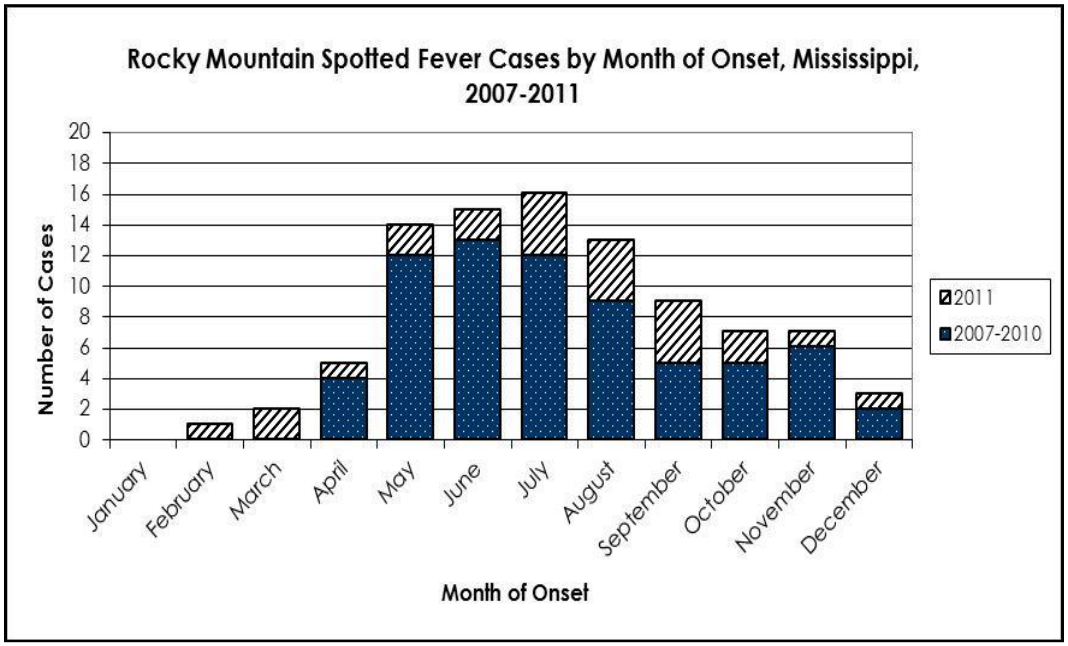
Figure 39



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
RMSF Rate (U.S.)	0.4	0.4	0.6	0.7	0.8	0.7	0.8	0.6	0.6	0.9
RMSF Rate (MS)	1.1	1.8	1.0	0.6	0.3	0.7	0.4	0.3	0.9	0.8
RMSF Cases (MS)	32	53	30	18	10	20	12	9	27	24

Nationally, the majority of Rocky Mountain spotted fever cases occur between April and September. In Mississippi over the past five years, 78% (72) of the reported cases occurred during these months (Figure 40).

Figure 40



Rubella

2011 Case Total	**0**	**2011 rate/100,000**	**0.0**
2010 Case Total	**0**	**2010 rate/100,000**	**0.0**

Clinical Features

A mild, febrile viral disease characterized by a 3 day maculopapular rash. Children often have few signs or symptoms other than the rash. The rash, typically fainter than a measles rash, appears on the face initially and progresses distally. Adults may have a febrile prodrome and lymphadenopathy. Up to 50% of all rubella infections are subclinical or asymptomatic. Complications occur most often in adults and include arthritis and encephalitis. Infection during pregnancy, especially in the first trimester, may result in congenital rubella syndrome (CRS), causing fetal death, prematurity or birth defects.

Infectious Agent

Rubella virus is classified as a togavirus, genus *Rubivirus.*

Reservoir

Humans.

Transmission

Direct contact with nasopharyngeal secretions of infected persons or by droplet spread. Rubella is moderately contagious. Maternal-fetal transmission causes CRS.

Incubation

Usually 14 days, with a range of 12-23 days.

Period of Communicability

The period of communicability is about 1 week before and up to 5-7 days after onset of the rash. Infants with congenital rubella syndrome may shed the virus for months after birth.

Methods of Control

Vaccination is the most effective method in preventing rubella. Rubella vaccine is available combined with measles and mumps vaccines as MMR. The first dose of MMR is recommended at 12-15 months, followed by a second dose at 4-6 years. All susceptible adolescents and adults, especially women of child bearing age, should be vaccinated with MMR vaccine.

Reporting Classification

Class 2.

Epidemiology and Trends

There were no reported cases of rubella in Mississippi in 2011. The last reported case in the state was in a 4 year old in 1986.

Salmonellosis

2011 Case Total	**1,440**	**2011 rate/100,000**	**48.3**
2010 Case Total	**1,215**	**2010 rate/100,000**	**40.9**

Clinical Features

Salmonellosis is a bacterial disease that commonly presents as acute enterocolitis, with sudden onset of headache, abdominal pain, diarrhea, nausea and sometimes vomiting. Fever is almost always present. Dehydration may occur in infants and the elderly, and septicemia occasionally results from infection.

Infectious Agent

Salmonella organisms are gram negative bacilli. The genus *Salmonella* is divided into two species: *S. enterica* (divided into six subspecies) and *S. bongori*. Subspecies are further divided into multiple serotypes. Almost all of the serotypes pathogenic for humans are in one subspecies of *S. enterica*. Currently, there are more than 2460 identified *Salmonella* serotypes. The predominant isolates in Mississippi are *Salmonella* serotypes *Javianna*, *Mississippi*, *Newport* and *Typhimurium*.

Reservoir

Domestic and wild animals, including poultry, swine, cattle, and rodents, and many reptiles. Humans are also reservoirs, especially in mild and unrecognized cases. Chronic carriers are prevalent in animals and birds.

Transmission

Salmonella is transmitted through ingestion of organisms in food derived from infected animals or food or water contaminated by feces from an infected animal. Person to person transmission by fecal oral route also occurs. Although *S*. serotype *Enteritidis* is not commonly seen in Mississippi, this serotype can be passed trans-ovarially from infected hens to their eggs and transmission can then occur when eggs are not fully cooked.

Incubation

From 6 to 72 hours, usually about 12-36 hours.

Period of Communicability

Throughout the course of infection; extremely variable, several days to several weeks. A temporary carrier state occasionally continues for months, especially in infants.

Methods of Control

Transmission of *Salmonella* can be controlled with proper food preparation and sanitary measures for food processing, proper hand hygiene, and clean water supplies. MSDH investigates all possible common source food or waterborne outbreaks. The Public Health Laboratory (PHL) requests isolate submission for molecular subtyping with pulsed-field gel electrophoresis (PFGE). The DNA pattern, or "fingerprint", is submitted to PulseNet, a national tracking network coordinated by the CDC. This system facilitates early detection of common source outbreaks, even if the affected persons are geographically far apart, often allowing the source to be more rapidly identified.

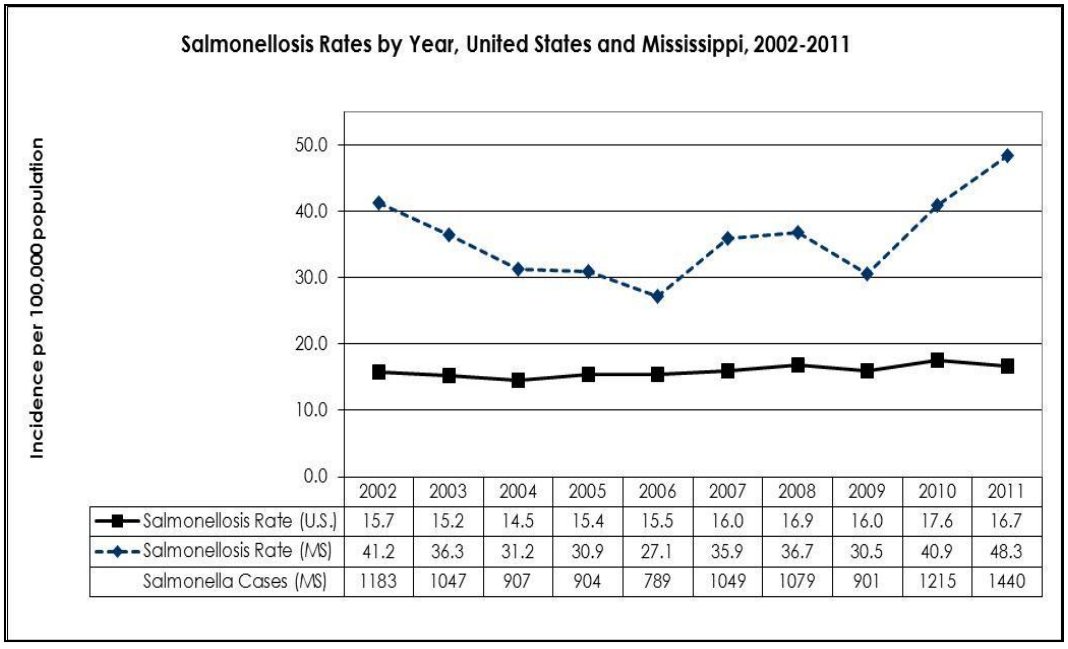
Reporting Classification

Class 2.

Epidemiology and Trends

In Mississippi, 1,440 cases of salmonellosis were reported to MSDH in 2011. This marked a continued increase in the rate and number of reported cases in Mississippi since 2009(Figure 41). In 2011, four *Salmonella* serotypes accounted for 75% of the total isolates serotyped seen in Mississippi: Typhimurium (26%), Newport (20%), Javiana (15%), and Mississippi (14%).

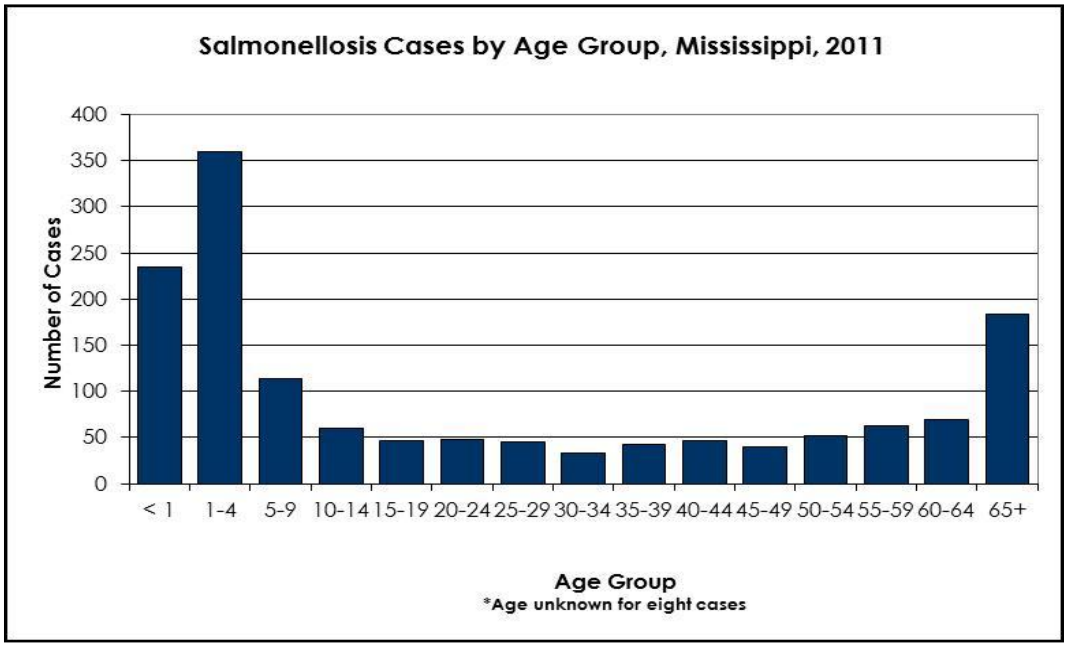
Figure 41



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Salmonellosis Rate (U.S.)	15.7	15.2	14.5	15.4	15.5	16.0	16.9	16.0	17.6	16.7
Salmonellosis Rate (MS)	41.2	36.3	31.2	30.9	27.1	35.9	36.7	30.5	40.9	48.3
Salmonella Cases (MS)	1183	1047	907	904	789	1049	1079	901	1215	1440

Infections occur in people of all ages, but there is higher incidence in infants and small children. In 2011, 593 (41%) of the cases were in children less than 5 years of age (Figure 42).

Figure 42



A number of multistate *Salmonella* outbreaks were identified through the CDC PulseNet system in 2011. In February 2011, a large multistate outbreak of *Salmonella* Heidelberg was reported with 136 cases from 34 states; 2 cases were in Mississippi residents. Ground turkey was identified as the source of the outbreak.

A foodborne outbreak of *Salmonella* Typhimurium was identified in December 2011; for a report please refer to the "Events of Public Health Significance" section on page 94.

Shigellosis

2011 Case Total	**241**	**2011 rate/100,000**	**8.1**
2010 Case Total	**60**	**2010 rate/100,000**	**2.0**

Clinical Features

An acute bacterial illness characterized by loose, often bloody stools (dysentery), fever, and nausea with vomiting, cramps and tenesmus. Asymptomatic infections occur. Illness is usually self-limited, lasting an average of 4-7 days; however infection with *Shigella dysenteriae (S. dysenteriae)* is often associated with severe illness with a case fatality rate of 20% among hospitalized patients. All age groups are susceptible, with

the peak incidence in 1-4 year olds. Children in daycares, persons in institutions, and in facilities where adequate hand washing is difficult to maintain are at high risk for outbreaks of shigellosis.

Infectious Agent

Genus *Shigella*, a gram negative bacterium comprising four serogroups: Group A, *S. dysenteriae*; Group B, *S. flexneri*; Group C, *S. boydii*; and Group D, *S. sonnei*. Predominant isolates in Mississippi are Group D, *S. sonnei*.

Reservoir

Humans are the primary reservoir.

Transmission

Primarily person to person by direct and indirect fecal oral contact. Infection may also occur after ingestion of contaminated food or water. The infective dose can be as low as 100-200 organisms.

Incubation

Ranges from 12 hours to 7 days, with an average of 2-4 days.

Period of Communicability

Until the agent is no longer present in feces. This is usually 4 weeks after cessation of symptoms, but asymptomatic carriers may transmit infection for months or longer.

Methods of Control

Disease prevention includes promotion of good hand washing, exclusion from work for food handlers or from school or daycare for children until symptom free for at least 24 hours. MSDH performs prompt investigation of common source food or waterborne outbreaks, and investigates all reported infections in children less than 5 years of age.

Reporting Classification

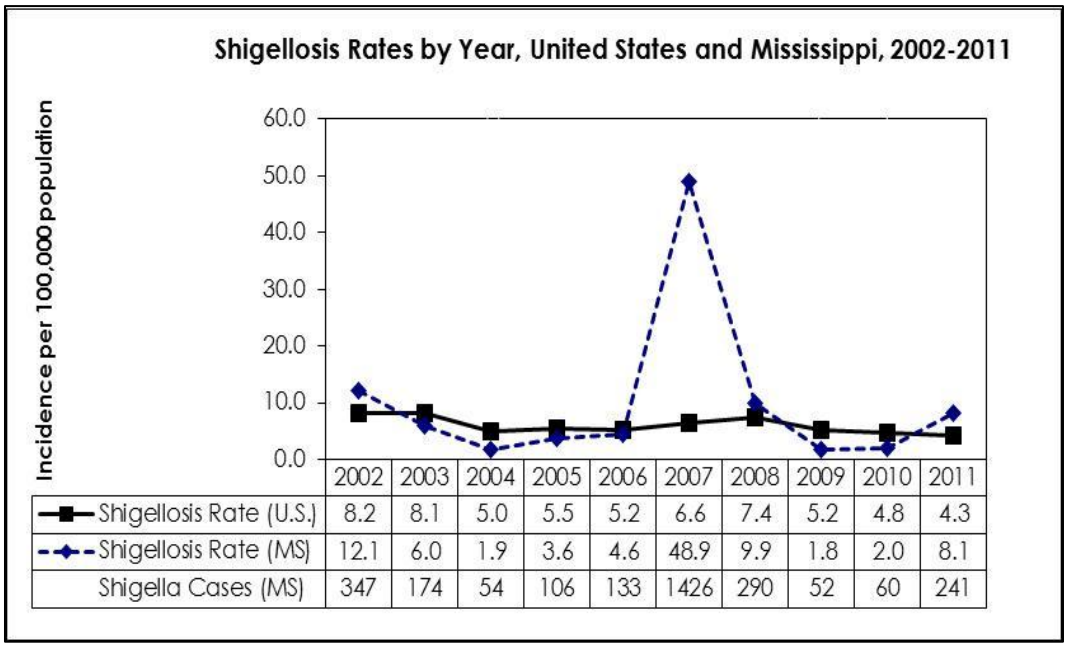
Class 2.

Epidemiology and Trends

There were 241 cases of Shigellosis reported to MSDH during 2011(Figure 43). There have been cyclic increases every 6-8 years since 1992, with a peak of 1426 cases in 2007 associated with a large outbreak that occurred in the Jackson metropolitan area and along the Gulf Coast. Although Shigellosis is usually a summer month illness, the majority (56%) of the 2011 cases occurred between September and December (Figure 44). The reported cases ranged in age from 6 days to 92 years, with 67% occurring in children less than 10 years of age (Figure 45).

For information related to a *Shigella* outbreak of interest, please see the "Events of Public Health Significance" section on page 92.

Figure 43



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Shigellosis Rate (U.S.)	8.2	8.1	5.0	5.5	5.2	6.6	7.4	5.2	4.8	4.3
Shigellosis Rate (MS)	12.1	6.0	1.9	3.6	4.6	48.9	9.9	1.8	2.0	8.1
Shigella Cases (MS)	347	174	54	106	133	1426	290	52	60	241

Figure 44

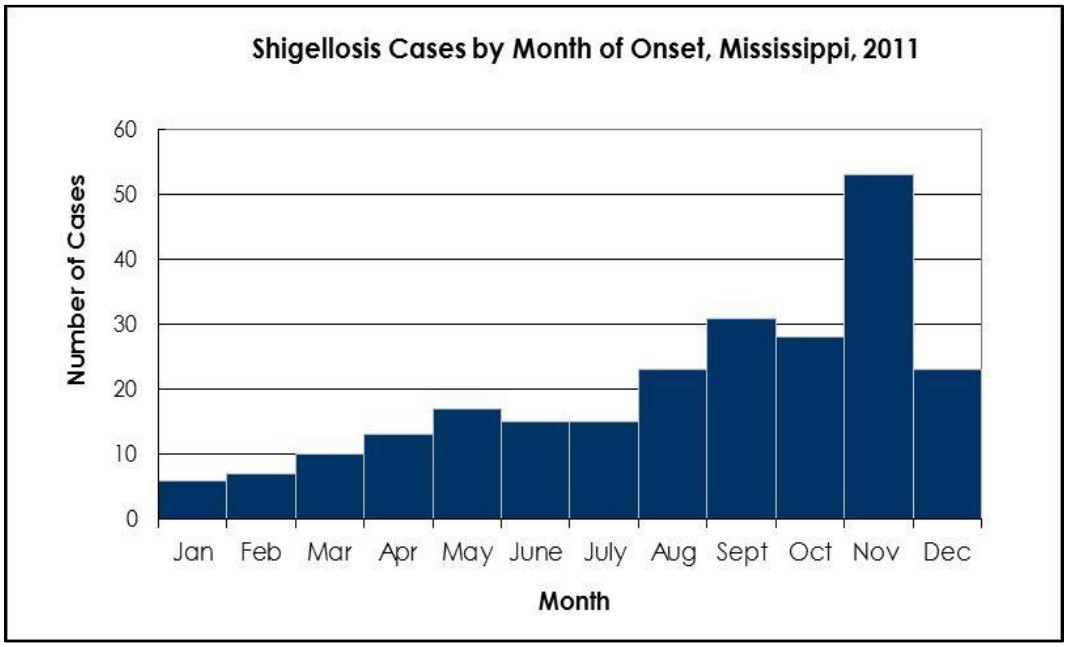
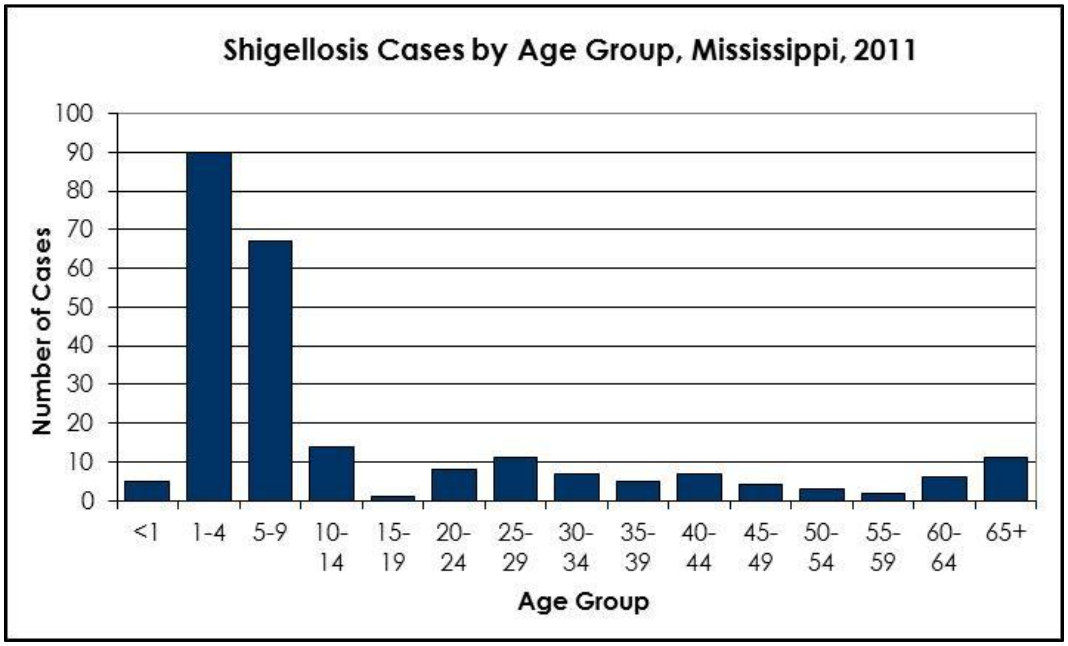


Figure 45



Syphilis

Primary and Secondary Syphilis

2011 Case Total	**195**	**2011 rate/100,000**	**6.5**
2010 Case Total	**229**	**2010 rate/100,000**	**7.7**

Early Latent Syphilis

2011 Case Total	**320**	**2011 rate/100,000**	**10.7**
2010 Case Total	**398**	**2010 rate/100,000**	**13.4**

Clinical Features

Syphilis is a bacterial infection that has three stages: primary, secondary, and tertiary. The primary lesion (chancre) is a painless indurated ulcer that develops at the sight of initial infection, usually on the external genitalia. Even without treatment, this lesion resolves in 4-6 weeks. Secondary syphilis may then develop and is characterized by a generalized symmetrical maculopapular rash that often involves the soles and palms. It may be accompanied by generalized lymphadenopathy, fever, malaise, sore throat, headache and arthalgia. Clinical manifestations of secondary syphilis usually resolve without treatment in weeks to months. Tertiary syphilis will develop years later in 15-40% if untreated, primarily as cardiovascular or neurosyphilis, or as skin, bone, visceral or mucosal surface gummas. Latent syphilis, a period of seroreactivity without clinical

disease, is classified as early (infection acquired within the preceding year) or late (infection of more than a year's duration).

Fetal transmission occurs through the placenta in untreated women with early syphilis, resulting in congenital syphilis. Congenital syphilis can lead to abortions, stillbirths or death shortly after birth. An infected infant may be asymptomatic for the first few weeks of life; however, late manifestations may occur resulting in CNS involvement or other conditions such as Hutchinson teeth, saddlenose, periostitis, interstitial keratitis or deafness.

Infectious Agent

Treponema pallidum, a spirochaete.

Reservoir

Humans.

Transmission

Syphilis is transmitted primarily by sexual contact with an infected individual with early syphilis (the first year of infection), especially during primary and secondary syphilis. Transplacental infection of the fetus occurs during the pregnancy of an infected woman, resulting in congenital syphilis. Transmission can also occur from a blood transfusion if the donor is in the early stages of infection.

Incubation

The average incubation period for syphilis before clinical manifestations is 3 weeks but ranges from 3 – 90 days.

Period of Communicability

In untreated individuals, communicability can last for up to two years. Syphilis is most communicable during the primary and secondary stages. Maternal-fetal transmission is more likely in early syphilis, but may occur at any stage.

Methods of Control

Mechanical barriers, early detection, and effective treatment of the patient and their partners are effective methods in prevention and control of syphilis. MSDH performs contact investigation and treatment for each reported case of syphilis.

Reporting Classification

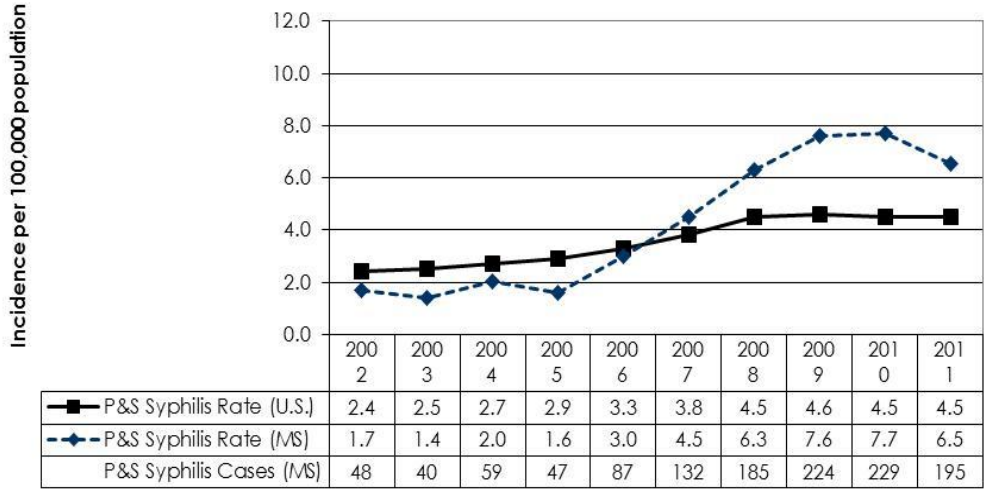
Class 1.

Epidemiology and Trends

Although Mississippi saw a nearly five-fold increase in primary and secondary syphilis cases from 2005-2010 (from 47 to 229 cases), there was a 15% decrease during 2010-2011(from 229 to 195 cases) (Figure 46). Since 2007, Mississippi has had rates higher than the national average, and in 2011, MS ranked seventh nationally.

Figure 46

Primary and Secondary Syphilis Rates by Year, United States and Mississippi, 2002-2011

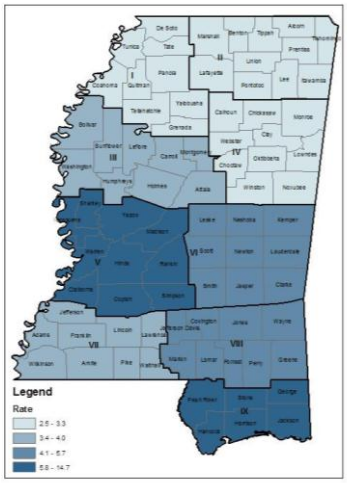


	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P&S Syphilis Rate (U.S.)	2.4	2.5	2.7	2.9	3.3	3.8	4.5	4.6	4.5	4.5
P&S Syphilis Rate (MS)	1.7	1.4	2.0	1.6	3.0	4.5	6.3	7.6	7.7	6.5
P&S Syphilis Cases (MS)	48	40	59	47	87	132	185	224	229	195

District V had the highest incidence of P&S syphilis (Figure 47). Fifty-one percent of P&S syphilis cases occurred among 20-29 year olds (Figure 48) and 84% of cases in which race was known were among African Americans (Figure 49).

Figure 47

Primary and Secondary Syphilis Incidence by Public Health District, Mississippi, 2011



District	Cases	Rate*
I	8	2.5
II	11	3.0
III	8	3.7
IV	8	3.3
V	94	14.7
VI	14	5.7
VII	7	4.0
VIII	13	4.2
IX	32	6.8
State	**195**	**6.5**

*per 100,000 population

Figure 48

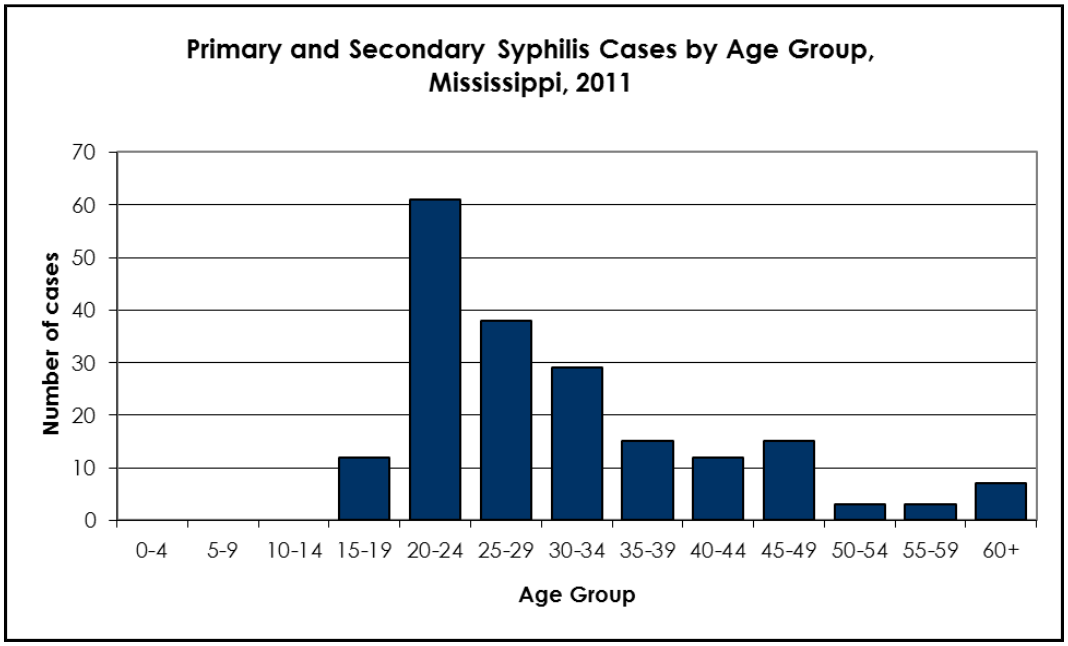
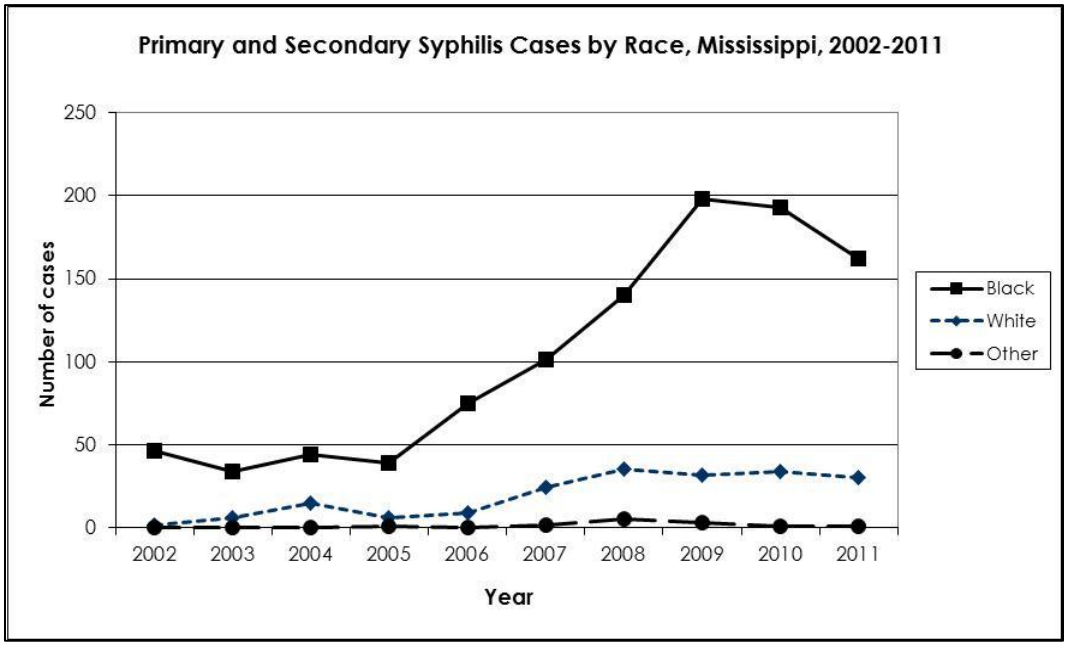
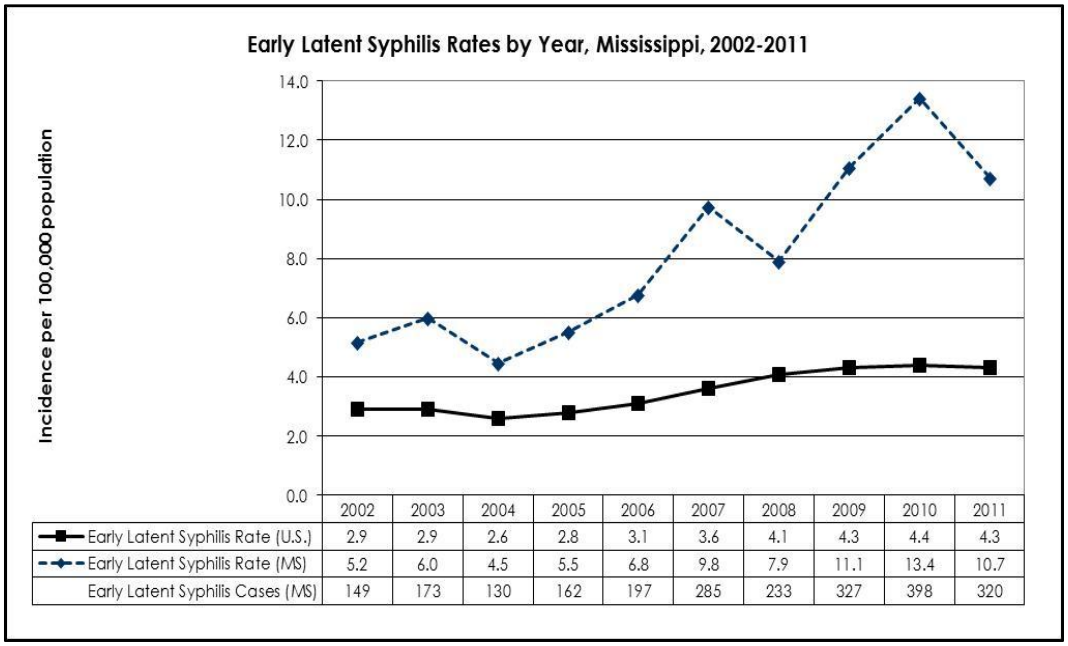


Figure 49



Over the past ten years, Mississippi has had rates higher than national average for early latent syphilis. Since 2007, there has been a 12% increase in the number of cases (from 285 to 320 cases), with a peak in the number of cases reported in 2010 (Figure 50).

Figure 50

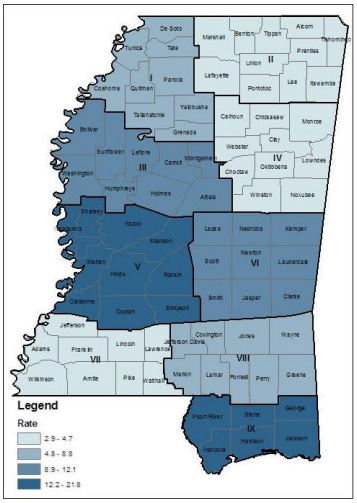


	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Early Latent Syphilis Rate (U.S.)	2.9	2.9	2.6	2.8	3.1	3.6	4.1	4.3	4.4	4.3
Early Latent Syphilis Rate (MS)	5.2	6.0	4.5	5.5	6.8	9.8	7.9	11.1	13.4	10.7
Early Latent Syphilis Cases (MS)	149	173	130	162	197	285	233	327	398	320

Early latent syphilis was reported in every district. District V had the highest case rates in the state (Figure 51).

Figure 51

Early Latent Syphilis Incidence by Public Health District, Mississippi, 2011



District	Cases	Rate*
I	16	5.0
II	17	4.7
III	26	12.1
IV	8	3.3
V	139	21.8
VI	23	9.4
VII	5	2.9
VIII	27	8.8
IX	59	12.5
State	**320**	**10.7**

***per 100,000 population**

Forty-seven percent of reported cases were among 20-29 year olds (Figure 52). African Americans are disproportionately affected, accounting for 84% of cases for which race

was known (Figure 53) and had rates that were over ten times greater than the rate among whites.

Figure 52

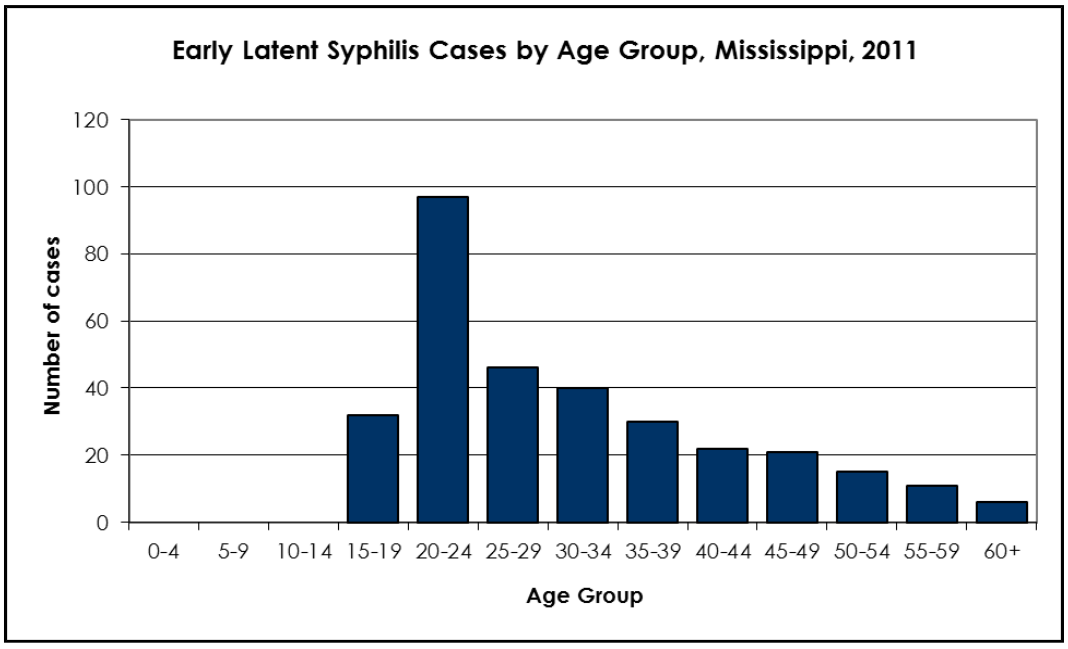
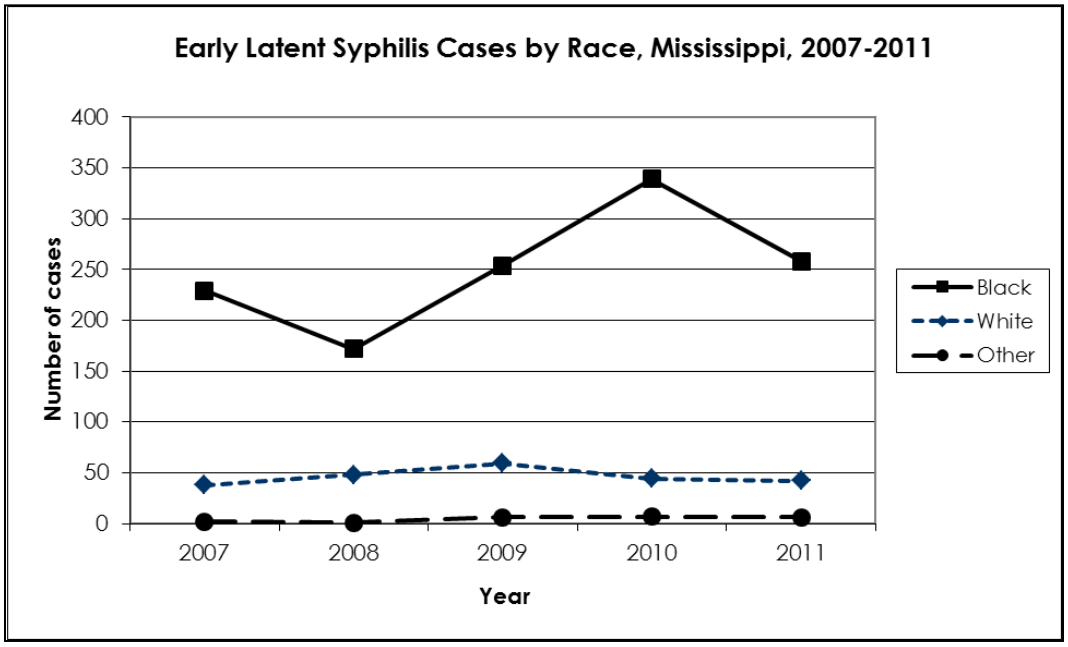


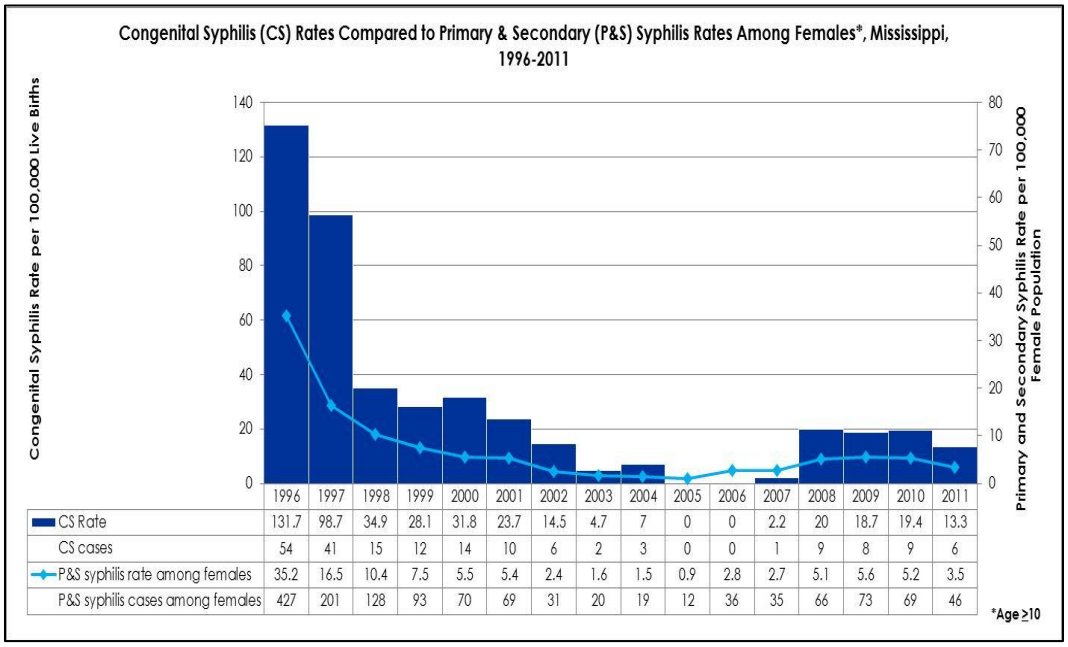
Figure 53



Congenital Syphilis

Mississippi saw a decline in congenital syphilis cases reported from 1995 to 2004 and in 2005 and 2006, there were no cases reported. Congenital syphilis has reemerged since 2007 and there were 6 cases reported in 2011from three public health districts (V, VIII, and IX). During this same time frame, there was a corresponding increase of P&S syphilis cases among females (from 35 to 46 cases) (Figure 54).

Figure 54



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
CS Rate	131.7	98.7	34.9	28.1	31.8	23.7	14.5	4.7	7	0	0	2.2	20	18.7	19.4	13.3
CS cases	54	41	15	12	14	10	6	2	3	0	0	1	9	8	9	6
P&S syphilis rate among females	35.2	16.5	10.4	7.5	5.5	5.4	2.4	1.6	1.5	0.9	2.8	2.7	5.1	5.6	5.2	3.5
P&S syphilis cases among females	427	201	128	93	70	69	31	20	19	12	36	35	66	73	69	46

Tuberculosis

2011 Case Total	**91**	**2011 rate/100,000**	**3.1**
2010 Case Total	**116**	**2010 rate/100,000**	**3.9**

Clinical Features

The most common form of active tuberculosis (TB) is pulmonary disease, but active disease can also be extrapulmonary and involve many organ systems. Symptoms are dependent on the site of infection. Pulmonary TB generally presents with cough (dry and later productive), pleuritic chest pains, hemoptysis, shortness of breath, fever, malaise, weakness, night sweats, and anorexia and weight loss. Latent tuberculosis infection without disease (LTBI) is asymptomatic.

Infectious Agent

Mycobacterium tuberculosis complex, an acid-fast bacillus

Reservoir

Primarily humans, rarely primates; in some areas, diseased cattle, badgers, swine and other mammals are infected.

Transmission

Exposure to tubercle bacilli in airborne droplet nuclei, 1 to 5 microns in diameter; the risk -of infection with the tubercle bacillus is directly related to the degree of exposure.

Incubation

Positive TB interferon gamma release assay (IGRA) or TB skin test conversion occur 2-10 weeks after exposure to active TB disease, if infected. Ten percent of persons with LTBI will develop clinically active disease, with the first 12-24 months after infection constituting the most hazardous period. HIV infection increases the risk and shortens the interval for development of active disease following infection with TB. In children, those under 5 years of age have the highest risk of developing disease.

Period of Communicability

The degree of communicability depends on the number of bacilli discharged, virulence of the bacilli, adequacy of ventilation, exposure of bacilli to sun or UV light, and opportunities for aerosolization. Antimicrobial chemotherapy usually eliminates communicability within 2-4 weeks. Young children with primary tuberculosis are generally not infectious. LTBI is not infectious.

Methods of Control

Prompt identification, diagnosis, follow-up and treatment of potentially infectious patients with TB disease are necessary to interrupt continued transmission. MSDH performs contact investigations, targeted TB testing in high risk areas and provides treatment for all active and latent TB infections.

Current Initiatives

A targeted testing program for the homeless population in Jackson was begun in late 2008. An IGRA test, Quantiferon-TB Gold In-Tube, is provided to individuals seeking lodging/use of the homeless shelters in the mid-city area. Annual testing is provided and an identification card is issued and needed to access the shelters' services. Over 1,000 persons have been tested and issued cards.

A pilot program for selected groups of latent TB patients using once-weekly doses of Isoniazid and Rifapentene (3HP) was started in Hinds County and health districts 2, 8 and 9 in July 2010, and is now statewide. The treatment period is for 12 weeks and requires direct observation of treatment.

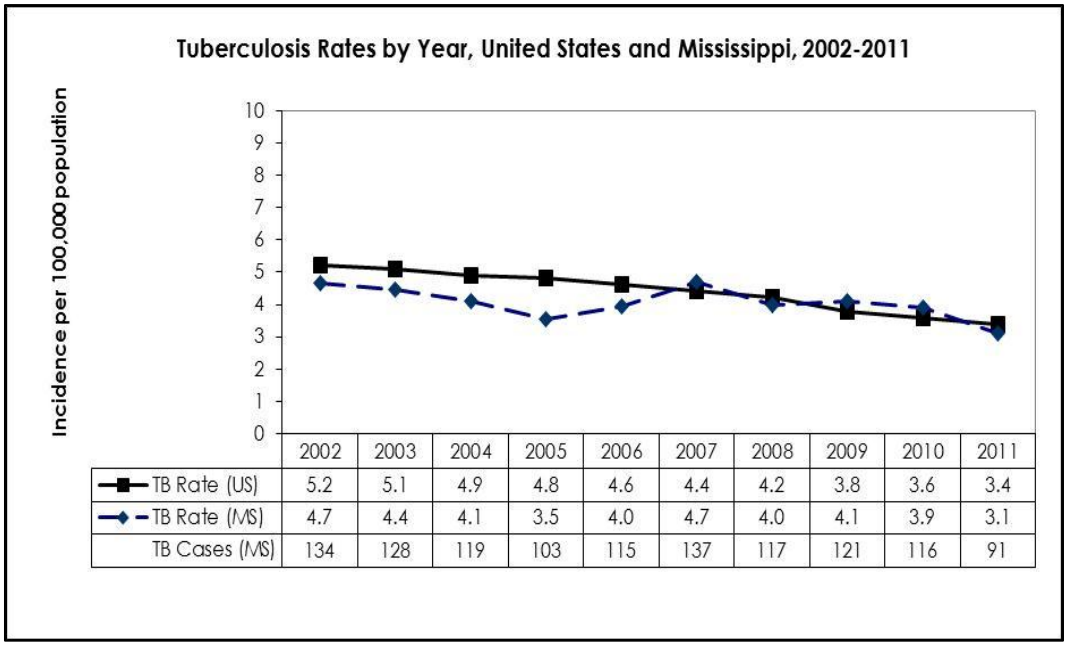
Reporting Classification

Class 1.

Epidemiology and Trends

Mississippi had a consistent decline in TB morbidity from 1989 through 2005. TB rates were below the national rate in each of the 2001-2006 reporting periods. There was resurgence in the number of cases in 2007. In that year, 137 cases were reported, with a rate of 4.7, which topped the national case rate of 4.4. Since then, the number of reported cases per year has been trending down; however, the case rate remained above the US rate in both 2009 and 2010. In 2011, 91 cases were reported in Mississippi, representing a 22 percent decline in morbidity. The 2011 Mississippi case rate of 3.1 is again below the US case rate of 3.4 (Figure 55).

Figure 55

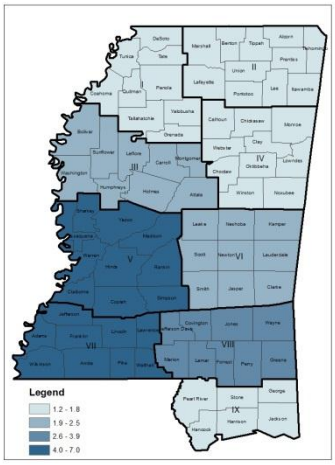


	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
TB Rate (US)	5.2	5.1	4.9	4.8	4.6	4.4	4.2	3.8	3.6	3.4
TB Rate (MS)	4.7	4.4	4.1	3.5	4.0	4.7	4.0	4.1	3.9	3.1
TB Cases (MS)	134	128	119	103	115	137	117	121	116	91

Geographically, TB was reported in every public health district, with the highest incidence noted in Public Health Districts V and VII (Figure 56).

Figure 56

Tuberculosis Incidence by Public Health District, Mississippi, 2011



District	Cases	Rate*
I	5	1.6
II	6	1.7
III	5	2.3
IV	3	1.2
V	44	7.0
VI	6	2.5
VII	7	4.0
VIII	8	2.6
IX	7	1.5
State	**91**	**3.1**

***per 100,000 population**

Disease occurred across all age groups, with the majority in individuals 40 years old and above (Figure 57). Disease in the African American population routinely accounts for approximately two-thirds of morbidity (Figure 58). TB cases among patients co-infected with HIV have increased since the beginning of the decade (Figure 59).

Figure 57

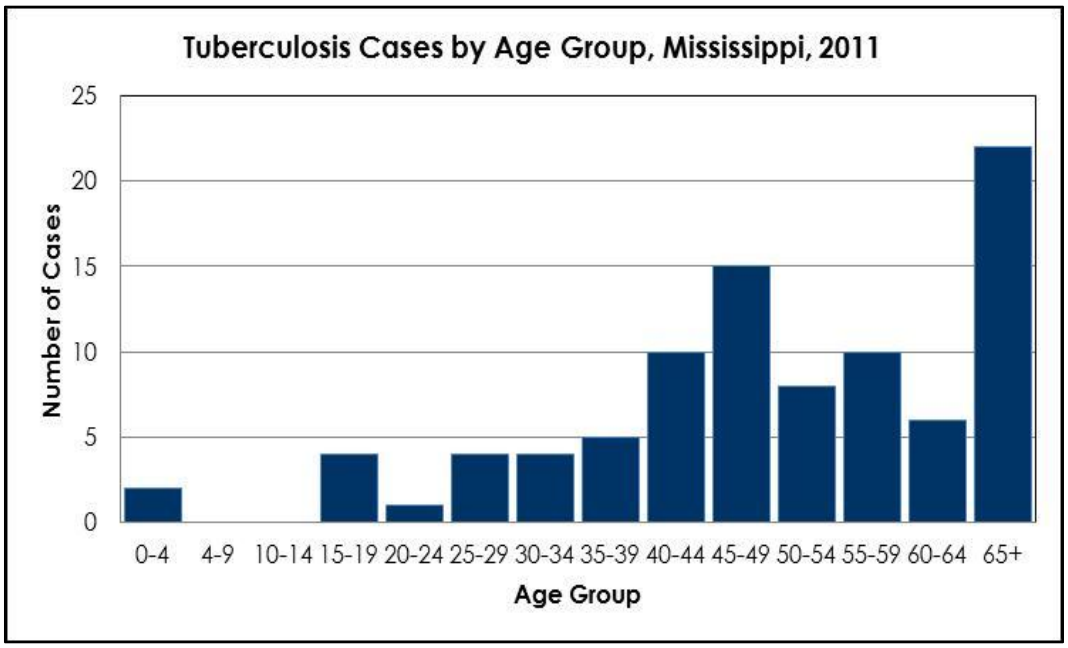


Figure 58

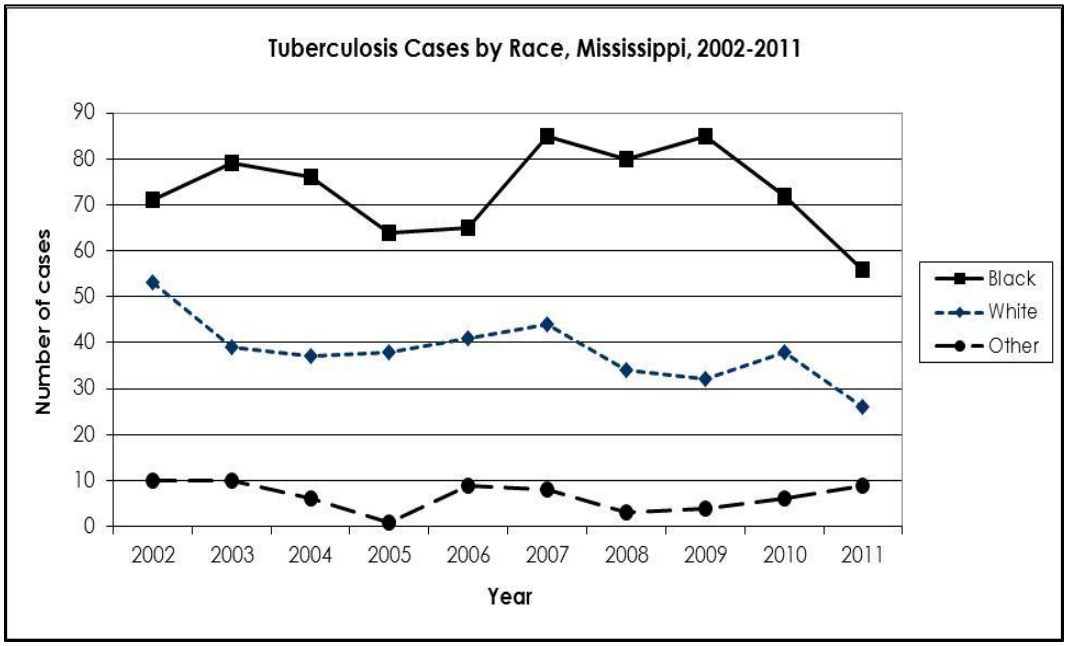
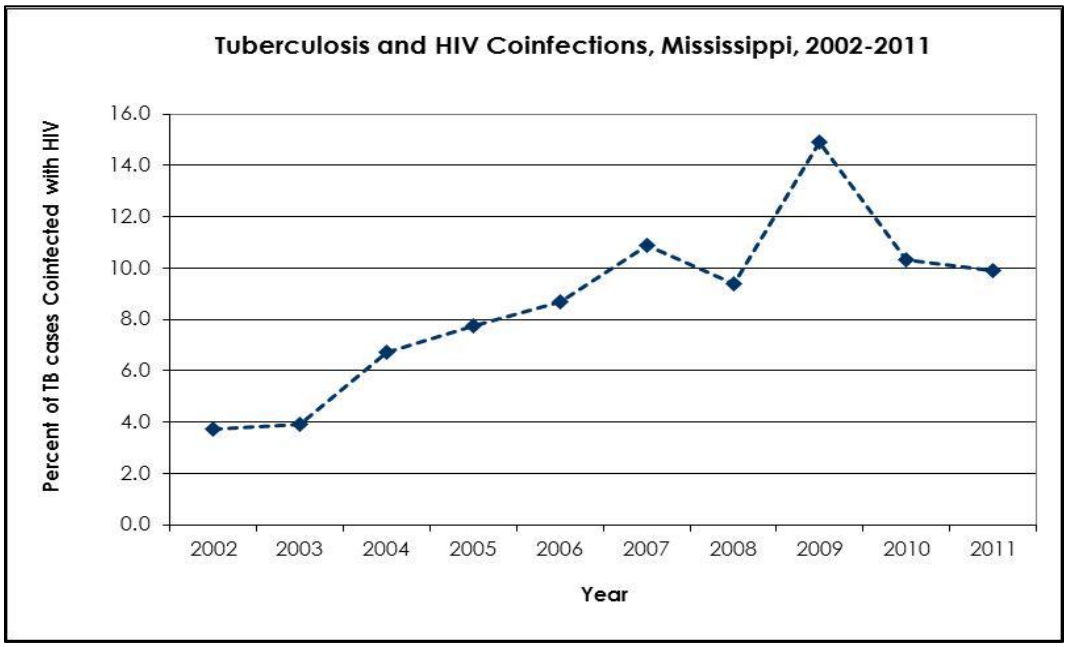


Figure 59



Varicella

2011 Case Total	**15**	**2011 rate/100,000**	**0.5**
2010 Case Total	**12**	**2010 rate/100,000**	**0.4**

Clinical Features

An acute viral disease with primary infection (chickenpox) characterized by a generalized pruritic rash that progresses rapidly from macules to papules to vesicular lesions before crusting. The rash will be seen in various stages of development at any given time, usually appearing first on the head and more highly concentrated on the trunk rather than extremities. Adults may have 1-2 days of fever and discomfort prior to rash onset, but the rash is frequently the first sign of disease in children. Adults may have more severe disease and have a higher incidence of complications (secondary bacterial infections, pneumonia, aseptic meningitis and encephalitis). Herpes zoster is a localized manifestation of latent varicella infection, with incidence increasing with age. Lesions usually follow unilateral dermatomal patterns, but can be widespread or disseminated. Postherpetic neuralgia occurs in up to 15% of zoster patients.

Infectious Agent

Varicella zoster virus, a member of the herpes virus group.

Reservoir

Humans.

Transmission

Person to person transmission by airborne droplet or direct contact with the lesions. Indirect spread can occur through contact with articles freshly soiled by vesicular or respiratory secretions. Maternal-fetal transmission also occurs. Susceptible contacts to localized herpes zoster may develop chickenpox by direct contact with fluid from the lesions, but respiratory transmission can occur in disseminated zoster.

Incubation

The incubation period is 14-16 days with a range of 10-21 days.

Period of Communicability

The period of communicability can be up to 5 days before onset of the rash (usually 2 days) and continues until all lesions are crusted (about 5 days).

Methods of Control

The live attenuated varicella vaccine is effective in preventing chickenpox. Routine vaccination is recommended at 12 months with a second dose at 4-6 years of age. Two doses of vaccine are recommended for all susceptible healthcare workers. The vaccine can also be used to prevent disease, or at least modify severity of illness, in susceptible persons if give within 3 days of exposure to an infected individual.

In 2006, FDA approved herpes zoster vaccine for persons 60 years of age and older. Clinical trials indicate vaccine efficacy of 64%, with less severe disease in those who developed zoster, and 66% less postherpetic neuralgia.

MSDH investigates outbreaks of varicella and vaccine is recommended after exposure if there is no evidence of prior disease or vaccination. The vaccine is 70% - 100% effective in preventing or attenuating disease if given within 72 hours of exposure.

Reporting Classification

Class 1; varicella infection, primary, in patients >15 years of age.

Epidemiology and Trends

In 2011, there were 15 reported cases of varicella infection in patients >15 years of age. The cases ranged in age from 16 to 49 years, with a median age of 28 years. Six of these 15 cases were epidemiologically linked to three separate outbreaks. The three year average from 2008 to 2010 was 10 cases of varicella per year.

In 2011, MSDH continued to investigate cases related to two varicella outbreaks reported in 2010. There was one varicella outbreak investigated in 2011.

Vibrio disease

2011 Case Total	**13**	**2011 rate/100,000**	**0.4**
2010 Case Total	**8**	**2010 rate/100,000**	**0.3**

Clinical Features

Several noncholera *Vibrio* species can cause illness in humans, usually wound infections, septicemia or gastroenteritis. *Vibrio vulnificus* and *Vibrio parahaemolyticus* are the two most frequently reported species in Mississippi.

V. vulnificus causes sepsis 12 hours to 3 days after ingestion of contaminated seafood, usually raw oysters, especially among people with chronic liver disease, alcoholism, or immunosuppression. These same groups are at risk for severe wound infections from contact with coastal waters. *V. vulnificus* sepsis is characterized by fever, chills,

blistering skin lesions, shock and death. The case fatality rate is over 50% when septicemia occurs.

V. parahaemolyticus infection typically causes gastroenteritis with watery diarrhea with abdominal cramps, nausea, vomiting and fever; less commonly wound infections.

Infectious Agent

Anaerobic, gram-negative halophilic (salt requiring) bacteria found naturally in marine and estuarine environments. *Vibrio vulnificus* and *Vibrio parahaemolyticus* are the two most frequently reported species in Mississippi. Other species common to Mississippi are *V. mimics*, *V. hollisae*, and *V. fluvialis*. Nontoxigenic *Vibrio cholerae* serogroups (non-O1/non-O139) are also reported.

Reservoir

Found free living in warm coastal waters and in fish and shellfish, particularly oysters.

Transmission

Ingestion of the organisms in raw, undercooked, or contaminated fish and shellfish, or any food or water contaminated with raw seafood. Wound infections with *V. vulnificus* occur when wounds are exposed to estuarine waters.

Incubation

Median incubation period of 23 hours, with a range of 5-92 hours.

Period of Communicability

Not typically transmitted person to person.

Methods of Control

Seafood should be cooked adequately. Wounds exposed to seawater (either occupational or accidental) should be rinsed with clean fresh water. All children and immunocompromised individuals, especially alcoholics or individuals with liver disease, should avoid eating raw seafood, especially oysters. MSDH investigates all reported cases to determine the source of infection and possible risk factors of the case.

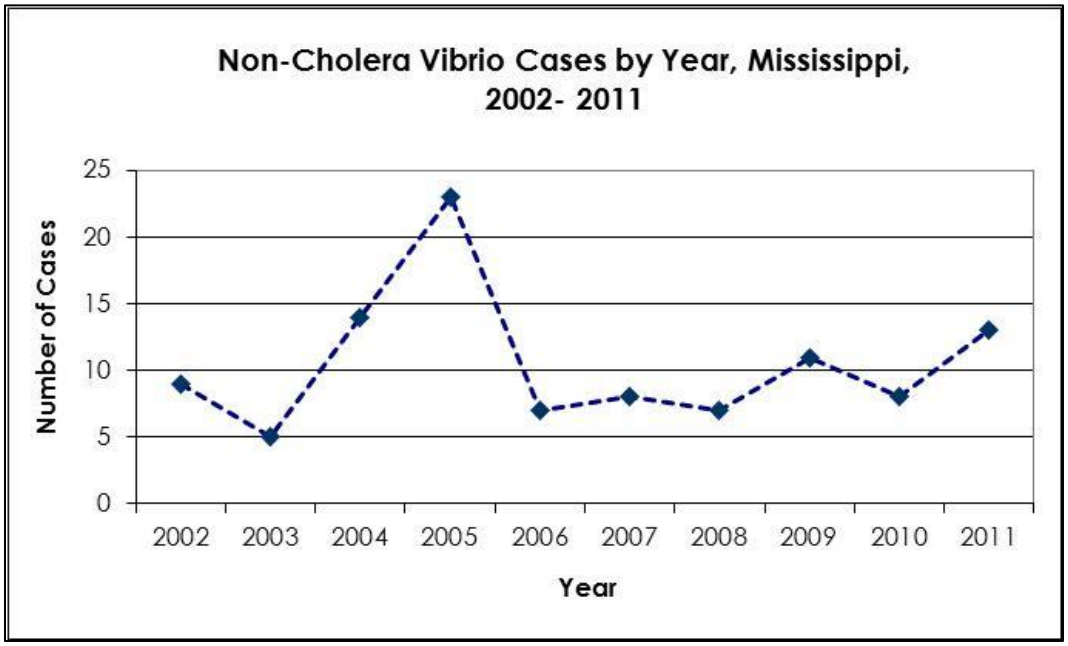
Reporting Classification

Class 2.

Epidemiology and Trends

In 2011, there were thirteen reported *Vibrio* infections. This was an increase from the number of reported cases in 2010 (8) and higher than the three year average of 9 cases for 2008-2010 (Figure 60).

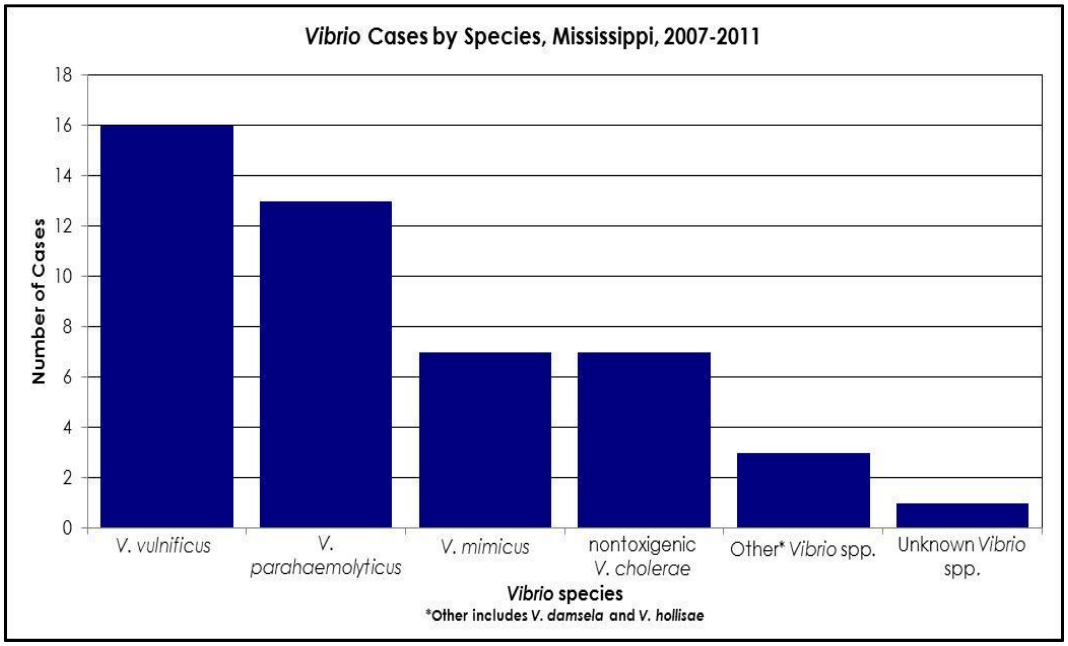
Figure 60



Of the thirteen reported cases, five were due to *V. parahaemolyticus* (three isolated from stool cultures, one isolated from a blood culture and one isolated from a wound culture), four were due to *V. vulnificus* (three isolated from blood cultures and the other isolated from a wound culture), one was due to non-O1, non-139 *V. cholerae* (isolated from a stool culture), one was due to nontoxigenic *V. cholerae* O1 serotype Inaba (isolated from a blood culture), one was due to *V. damsela* (isolated from a wound culture) and one was due to *V. mimicus* (isolated from a stool culture). There were three reported *Vibrio* deaths in 2011. Two were attributed to *V. vulnificus* and one was attributed to *V. parahaemolyticus*. All of the deaths occurred in individuals over the age of 50 with septicemia.

Over the past five years there have been a total of 47 cases of non-cholera *Vibrio* infections reported in Mississippi. *V. vulnificus* (16) and V. *parahaemolyticus* (13) have accounted for 62% of the total reported cases, followed by *V. mimicus* (7) and nontoxigenic *V. cholerae* (7) (Figure 61).

Figure 61


Vibrio Cases by Species, Mississippi, 2007-2011
Number of Cases
18
16
14
12
10
8
6
4
2
0
V. vulnificus
V. parahaemolyticus
V. mimicus
nontoxigenic V. cholerae
Other* Vibrio spp.
Unknown Vibrio spp.
Vibrio species
*Other includes V. damsela and V. hollisae

Events of Public Health Significance

This section of the *Annual Summary of Selected Reportable Diseases* provides reports on selected events of public significance that occurred during 2011, including significant outbreak investigations conducted by the Mississippi State Department of Health (MSDH).

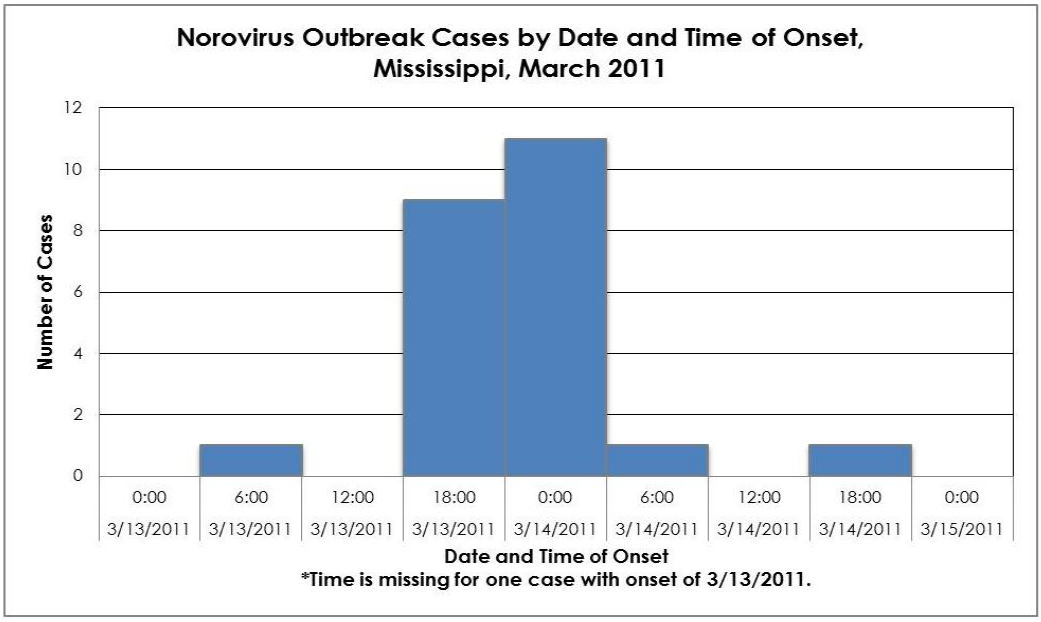
Norovirus Outbreak

On March 15, 2011 MSDH received notification that approximately 40 individuals were ill with vomiting and diarrhea after attending a wedding reception in Pascagoula, Mississippi (Public Health District IX) on March 12, 2011. A complete epidemiological investigation was conducted.

The reception was held at a banquet hall on March 12 at approximately 6:30pm with about 155 guests in attendance. A partial guest list was obtained and 57 attendees were interviewed with a questionnaire that listed all possible food items served at the reception. Ill individuals were identified as anyone who ate or drank at the reception and had symptoms of vomiting or diarrhea. Twenty-four of the interviewed reception attendees met the case definition as ill, with onsets of illness ranging from 9:30 am March 13 to 9:00 pm March 14 and a mean incubation period of 28 hours after the reception (Figure 62). The duration of illness ranged from 8 to 72 hours with a mean of 26 hours. The predominant symptoms were nausea (96%), cramps (92%), diarrhea (88%) and vomiting (79%). Stool samples from two ill attendees were positive for norovirus GII by RT-PCR testing at the PHL. No ill food handlers were identified at the time of the reception; however one employee did become ill on March 14 with nausea, vomiting and diarrhea. No food items prepared by this employee showed a statistical association with the illness. Additionally, no other food items served at the reception showed a statistical association with illness. The investigation did reveal that one individual vomited at the reception, possibly serving as the source of infection for the other attendees. However, no stool sample was obtained from this person and the illness was not confirmed as norovirus.

The most likely explanation of the outbreak was a common source exposure to norovirus at the reception. It is not always possible to obtain laboratory confirmation of the etiologic agent of enteric outbreaks.

Figure 62



In those instances, the Kaplan Criteria for suspected outbreaks can be utilized (available on the CDC website at http://www.cdc.gov/norovirus/php/responding.html) to assist in the determining the causative agent as norovirus. The criteria are as follows:

- A mean (or median) illness duration of 12 to 60 hours,
- A mean (or median) incubation period of 24 to 48 hours,
- More than 50% of people with vomiting, and
- No bacterial agent found.

In the outbreak discussed, the mean duration of illness (26 hours), mean incubation period (28 hours), and percent of ill persons with vomiting (79%) are consistent with these criteria.

***Shigella* Outbreak**

On June 1, 2011 MSDH was notified that there were several ill persons, primarily with diarrhea, among attendees at a family gathering in Jones County, Mississippi (Public Health District VIII) on Saturday, May 28, 2011. The initial report indicated there were 9 ill family members. MSDH and the local District Health Department conducted an investigation.

The family gathering, held over Memorial Day Weekend, was attended by 23 individuals. The family engaged in several activities throughout the day, including a shared meal. Twenty-two of the family members were interviewed with a questionnaire

that included a list of all the items served at the meal and a list of symptoms. Ill individuals were defined as those who attended the family gathering and developed symptoms of diarrhea with cramping. Eleven of the attendees met the case definition of ill. The onsets of illness ranged from Monday evening May 30, 2011to Tuesday morning May 31, 2011; an incubation period of 2-3 days. Symptoms included diarrhea, fever, abdominal cramps and nausea. Stool samples from six ill individuals were positive for *Shigella sonnei* at the PHL. No specific food items were statistically associated with illness. Additionally, several food items served at the gathering were collected and evaluated at the PHL; all testing negative for bacterial pathogens.

While it was determined that the illnesses were not directly associated with a food item, the range of illness onsets were consistent with a common source exposure related to attendance at the family gathering.

Outbreak of Healthcare Acquired *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* Bloodstream Infections

On July 18, 2011, MSDH was notified that four individuals, all receiving care at an outpatient chemotherapy infusion center in Summit, Mississippi (Public Health District VII), were hospitalized with *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* central line-associated bloodstream infections. An MSDH investigation ultimately identified a total of 16 individuals with bloodstream infections (*P. aeruginosa, K. pneumoniae*, or both), among patients receiving care at the center. The center was closed as an imminent public health threat on July 20, 2011. Six clinical isolates of *K. pneumoniae* and six clinical isolates of *P. aeruginosa* were available from seven patients for PFGE analysis and revealed 100% concordance for all *P. aeruginosa* and *K. pneumoniae* isolates. Several potential infection control lapses were identified that could have contributed to the outbreak, including the use of a common source heparin flush bag, a common source saline flush bag, and the reuse of syringes to access infusion tubing between patients.

Based on these unsafe injection practices and concerns over the potential transmission of viral bloodborne pathogens, 623 patients seen from September 8, 2006 to July 20, 2011 were identified for testing for hepatitis B, C and HIV. Of these, 331 presented to local health departments for testing. Twenty-seven patients tested positive for resolved hepatitis B infection (core antibody positive and surface antigen negative), one for chronic hepatitis B infection (surface antigen positive) and none were positive for HIV. Four tested positive for active hepatitis C infection by RNA but additional genotype analysis did not indicate a common source exposure. No evidence of viral pathogen transmission was identified.

***Salmonella* Outbreak**

In December 2011 a large salmonellosis outbreak occurred and was traced to a restaurant in Corinth, Mississippi (Public Health District II). At least 160 known cases, including numerous food handlers, were known to have occurred. An environmental investigation of the suspect facility and case finding activities began on Monday, December 2, 2011 within an hour of the local health department receiving the first complaint and confirming a case. Once additional cases were found and initially linked to the facility, the restaurant voluntarily closed on Friday, December 5 while a full investigation was conducted to identify any specific risks. No facilities served by the same food supply distributors and wholesalers were found to have associated cases. The restaurant involved was one of several managed by the same group and none of the other outlets had associated cases. Based on initial findings, the possible source(s) could have been within the one facility and stool samples were requested on all employees. A number of food samples were also collected for culture. *S*. Typhimurium was identified in a number of cases and employees while all food samples were negative. PFGE conducted by the Mississippi Public Health Laboratory (PHL) confirmed that isolates from diners and workers were identical. Sixty percent of the employees had positive cultures.

The menu from the restaurant was obtained and a food specific questionnaire developed. Names from credit or debit card receipts were used in case finding and to locate persons who had eaten in the restaurant but did not become ill, to serve as controls. The questionnaire was administered to 200 individuals (144 cases and 56 controls) who had eaten at the restaurant during the specified time period of concern. Only one food item showed a statistical association with illness but this may have been a spurious result as 84% of all diners, ill and not ill, had eaten the item. The most likely factor contributing to illnesses was the numerous infected food handlers. Prior to returning to work, all food workers were required to have two negative stool cultures. The restaurant cooperated fully with the MSDH investigation. After additional training and cleaning, it was allowed to reopen on Wednesday, December 14, 2011 and no additional problems have been reported.

Reportable Disease Statistics

Mississippi Reportable Disease Statistics
2011

		Public Health District									
		I	II	III	IV	V	VI	VII	VIII	IX	State Total
Sexually Transmitted Diseases	Primary & Secondary Syphilis	8	11	8	8	94	14	7	13	32	**195**
	Total Early Syphilis	16	17	26	8	139	23	5	27	59	**320**
	Gonorrhea	583	431	723	442	1701	456	290	551	639	**5,816**
	Chlamydia	2591	1957	2569	1793	5194	1895	1185	1896	2134	**21,214**
	HIV Disease	59	44	56	26	200	40	35	51	62	**573**
Myco-bacterial Diseases	Pulmonary Tuberculosis (TB)	2	6	5	2	38	5	7	5	6	**76**
	Extrapulmonary TB	3	0	0	1	6	1	0	3	1	**15**
	Mycobacteria Other Than TB	24	28	23	16	137	20	22	17	44	**331**
Vaccine Preventable Diseases	Diphtheria	0	0	0	0	0	0	0	0	0	**0**
	Pertussis	2	2	2	3	17	11	0	4	8	**49**
	Tetanus	0	0	0	0	0	0	0	0	1	**1**
	Poliomyelitis	0	0	0	0	0	0	0	0	0	**0**
	Measles	0	0	0	0	0	0	0	0	0	**0**
	Mumps	0	0	0	2	0	0	0	1	0	**3**
	Hepatitis B (acute)	3	13	5	1	8	4	2	10	12	**58**
	Invasive *H. influenzae* disease	2	1	0	2	7	1	0	3	3	**19**
	Invasive Meningococcal disease	0	0	0	0	2	1	0	1	0	**4**
Enteric Diseases	Hepatitis A (acute)	1	1	1	1	2	0	1	0	0	**7**
	Salmonellosis	133	381	47	148	308	108	94	106	115	**1,440**
	Shigellosis	8	12	1	3	120	48	1	19	29	**241**
	Campylobacteriosis	8	13	5	3	20	5	4	8	7	**73**
	E. coli O157:H7/HUS/STEC	3	5	0	4	8	8	0	5	5	**38**
Zoonotic Diseases	Animal Rabies (bats)	0	0	0	1	0	0	0	1	0	**2**
	Lyme disease	0	0	0	2	1	0	0	2	0	**5**
	Rocky Mountain spotted fever	1	7	0	5	5	1	0	2	3	**24**
	West Nile virus	3	0	4	1	21	1	1	14	7	**52**

Mississippi

Provisional Reportable Disease Statistics
November 2012

Figures for the current month are provisional

		Public Health District									State Totals*			
		I	II	III	IV	V	VI	VII	VIII	IX	Nov 2012	Nov 2011	YTD 2012	YTD 2011
Sexually Transmitted Diseases	**Primary & Secondary Syphilis**	1	0	0	0	3	0	0	0	1	**5**	†	144	†
	Total Early Syphilis	2	0	1	0	13	3	0	0	3	**22**	†	242	†
	Gonorrhea	57	39	64	52	156	27	19	41	49	**504**	†	6375	†
	Chlamydia	176	149	221	163	412	157	85	116	164	**1643**	†	21521	†
	HIV Disease	2	0	0	2	25	2	0	1	4	**36**	†	509	†
Myco-bacterial Diseases	**Pulmonary Tuberculosis (TB)**	1	0	0	1	3	0	0	0	0	**5**	5	61	63
	Extrapulmonary TB	0	0	0	0	0	0	0	0	0	**0**	2	9	13
	Mycobacteria Other Than TB	1	2	3	1	12	2	4	1	1	**27**	22	292	308
Vaccine Preventable Diseases	**Diphtheria**	0	0	0	0	0	0	0	0	0	**0**	0	0	0
	Pertussis	0	0	0	0	0	2	0	0	0	**2**	6	72	46
	Tetanus	0	0	0	0	0	0	0	0	0	**0**	1	1	1
	Poliomyelitis	0	0	0	0	0	0	0	0	0	**0**	0	0	0
	Measles	0	0	0	0	0	0	0	0	0	**0**	0	0	0
	Mumps	0	0	0	0	0	0	0	0	0	**0**	0	1	3
	Hepatitis B (acute)	0	0	0	0	1	0	1	0	0	**2**	4	70	53
	Invasive *H. influenzae* disease	0	1	0	0	0	0	0	0	0	**1**	2	18	18
	Invasive Meningococcal disease	0	0	0	0	0	0	0	0	0	**0**	0	4	4
Enteric Diseases	**Hepatitis A (acute)**	0	0	0	0	0	1	0	0	0	**1**	0	8	7
	Salmonellosis	8	9	1	6	9	4	6	5	4	**52**	95	1206	1298
	Shigellosis	1	1	2	0	10	1	0	0	2	**17**	53	262	218
	Campylobacteriosis	0	1	0	0	1	0	0	3	2	**7**	2	96	69
	***E. coli* O157:H7/STEC/HUS**	1	0	0	0	1	1	0	0	0	**3**	2	22	33
Zoonotic Diseases	**Animal Rabies (bats)**	0	0	0	0	0	0	0	0	1	**1**	0	2	2
	Lyme disease	0	0	0	0	0	0	0	0	0	**0**	1	1	5
	Rocky Mountain spotted fever	0	0	0	0	0	0	0	0	0	**0**	1	21	23
	West Nile virus	0	0	1	0	1	1	1	2	1	**7**	1	249	52

*Totals include reports from Department of Corrections and those not reported from a specific District.

†Data not available.

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