Mississippi Morbidity Report

Volume 24, Number 12 December 2009

Annual Summary
Selected Reportable Diseases
Mississippi – 2008

Mississippi State Department of Health

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This Annual Summary issue is dedicated to the memory of Dr. Ed Thompson, State Health Officer from 1993 to 2002, and again from 2007 to 2009.

Dr. Thompson encouraged the Epidemiology Staff to produce the first summary issue. Each year, with a smile, he reminded us to get working on the next issue.

We will miss him.

Ed Thompson, MD, MPH
1947-2009

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 intentional spread of disease.

Statistics incorporated into tables, graphs and maps reflect data reported from health care providers in the state of Mississippi, or who care for Mississippi residents. Disease 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 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, those reportable within a week of diagnosis, and Class 3 diseases, reportable only by laboratories, 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.

Mary Currier, MD, MPH

State Epidemiologist

Map Mississippi Public Health Districts

Public Health Districts

Northwest Public Health District I
Dr. Alfio Rausa*
662-563-5603

Northeast Public Health District II
Dr. Paul Byers*, Interim
662-841-9015

Delta/Hills Public Health District III
Dr. Alfio Rausa*
662-453-4563

Tombigbee Public Health District IV
Dr. Rebecca James*
662-323-7313

West Central Public Health District V
Dr. Mary Gayle Armstrong*
601-978-7864

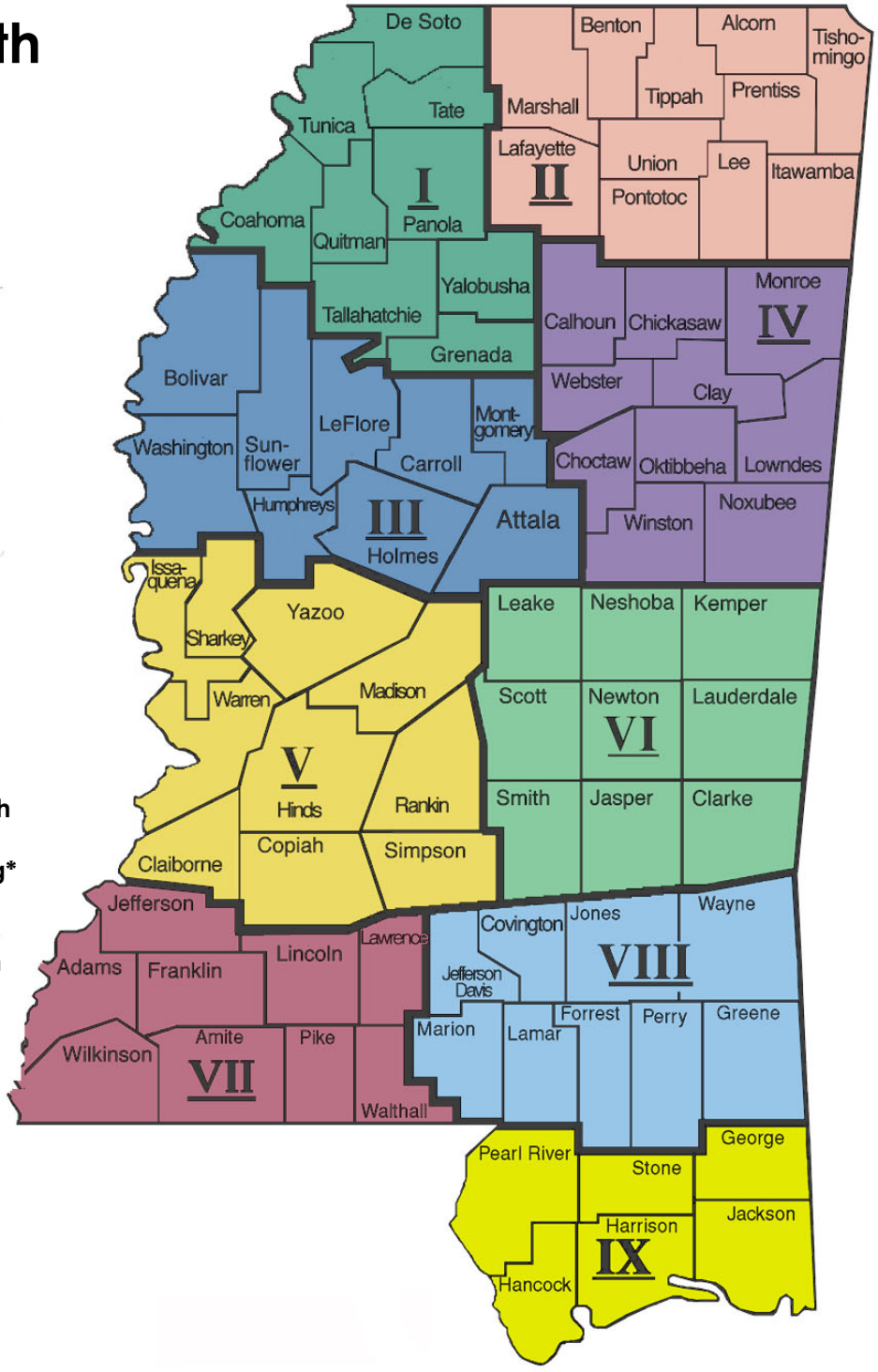
East Central Public Health District VI
Dr. Rebecca James*
601-482-3171

Southwest Public Health District VII
Dr. Thomas Dobbs*
601-684-9411

Southeast Public Health District VIII
Dr. Thomas Dobbs*
601-544-6766

Coastal Plains Public Health District IX
Dr. Robert Travnicek*
228-831-5151

***District Health Officer**



Reportable Diseases Classification

Refer to the 2008 List of Reportable Diseases and Conditions for specific diseases in each reporting class

Class 1:

Diseases of major public health importance which shall be reported directly to the Mississippi State Department of Health (MSDH) by telephone within 24 hours of first knowledge or suspicion. 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).

Class 2:

Diseases or conditions of public health importance of which individual cases shall be reported by mail, telephone 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.

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, or electronically within one week of completion of laboratory tests (refer to Appendix B of the Rules and Regulations Governing Reportable Diseases and Conditions).

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.

For further information, please refer to the Mississippi State Department of Health's website at www.msdh.state.ms.us.

Effective: May 10, 2008

Vaccine Preventable Diseases

Haemophilus influenzae type b (Hib), invasive

2008 Case Total	**4**	**2008 rate/100,000**	**0.1**
2007 Case Total	**0**	**2007 rate/100,000**	**0.0**

Clinical Features

Haemophilus influenzae, type b, (Hib) is an invasive bacterial disease, particularly among infants, that can affect many organ systems. Invasive disease usually begins as a bloodstream infection, with bacteria spreading to distant sites. Meningitis is the most common manifestation, accounting for 50-60% of all cases in the prevaccine era. Epiglottis, pneumonia, septic arthritis, and septicemia are other forms of invasive disease. The common presentation of Hib meningitis is fever, decreased mental status and nuchal rigidity. Neurologic sequelae can occur in 15-30% of survivors, with hearing impairment 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. 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 type b, a gram-negative encapsulated bacterium.

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 and 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. 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 dropped from 82 in 1989, to 5 by 1994. There have been < 5 cases per year since 1995.

In 2008, there were four reported cases, ranging in age from nine months to 78 years. The nine month old had not completed the primary Hib series. The other two cases were in a fully vaccinated five year old and 67 year old. All of the cases presented as septicemias; none of the cases were epidemiologically linked.

A shortage of Hib-containing vaccines, which began in December 2007, led to CDC recommendations to defer the 12-15 month booster dose during 2008, while emphasizing the importance of completion of the primary series. A CDC report released January 2009 discussed an increase in invasive Hib disease in one U.S. state in 2008. Given the prolonged booster dose deferral, and reduced primary vaccine series coverage in that state, the report indicated that the increased number of cases likely reflected increased carriage and transmission affecting those with suboptimal primary series vaccination coverage, or a weakening in population immunity. The full report may be accessed at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5803a4.htm .

Additional References:

- CDC. Invasive *Haemophilus influenzae* type b disease in five young children—Minnesota, 2008. MMWR 2009; 58(03):58-60.

- CDC. Continued shortage of *Haemophilus influenzae* type b (Hib) conjugate vaccines and potential implications for Hib surveillance---United States, 2008. MMWR 2008; 57(46):1252-1255.

- CDC. Interim recommendations for the use of *Haemophilus influenzae* type b (Hib) conjugate vaccines related to the recall of certain lots of Hib-containing vaccines (PedvaxHIB® and Comvax®). MMWR 2007;56:1318-1320.

Hepatitis B, acute

2008 Case Total	**58**	**2008 rate/100,000**	**2.0**
2007 Case Total	**41**	**2007 rate/100,000**	**1.4**

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 fewer 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 perinatal exposure, through contact with contaminated needles, or through 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. 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. Post-exposure prophylaxis is highly effective in preventing hepatitis B transmission from mother to infant, therefore, testing of all pregnant women for HBsAg is recommended with each pregnancy.

Reporting Classification

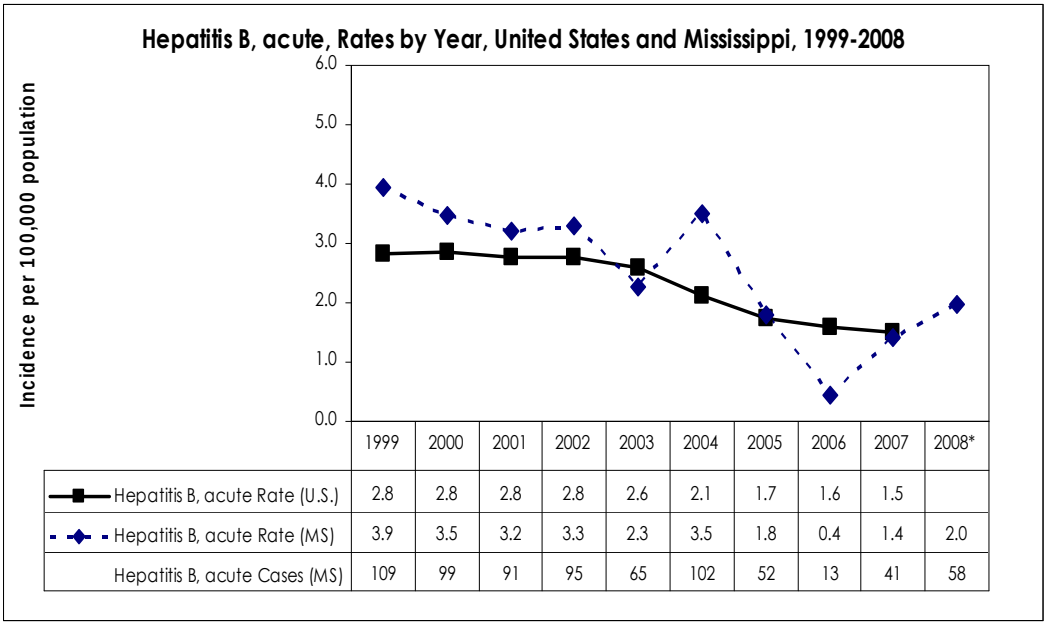
Class 2

Epidemiology and Trends

In 2008, 58 cases of acute hepatitis B were reported. This was higher than the 41 cases reported in 2007, and the three year average (2005-2007) of 35 cases reported annually (Figure 1).

In Mississippi, 25 (43%) of the 58 reported cases occurred in individuals aged 20-29 years. Overall, the cases ranged in age from 16 to 78 years old (Figure 2).

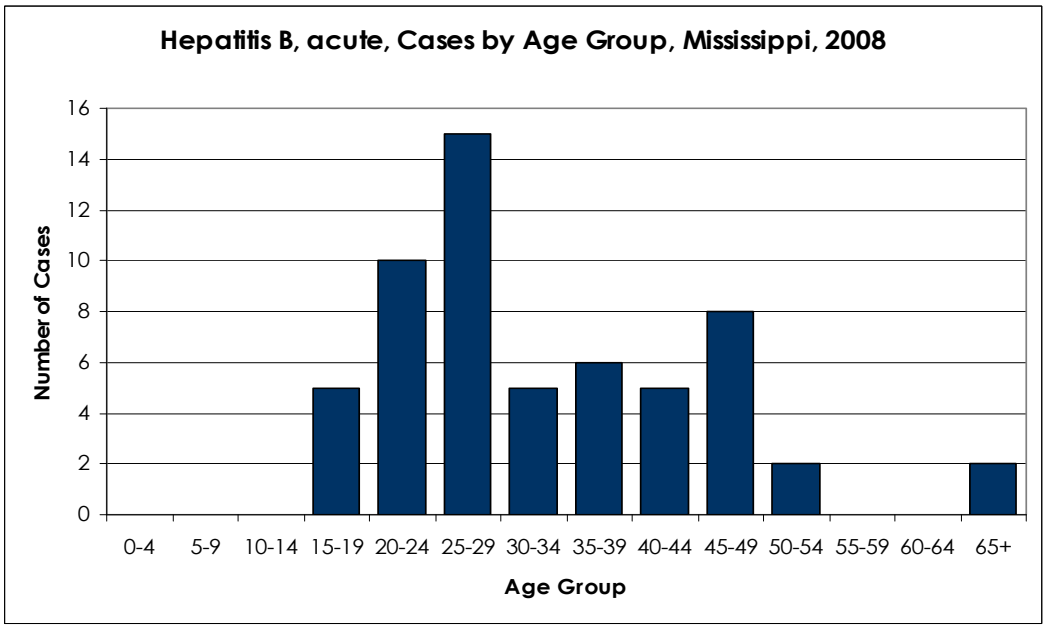
Figure 1



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008*
Hepatitis B, acute Rate (U.S.)	2.8	2.8	2.8	2.8	2.6	2.1	1.7	1.6	1.5	
Hepatitis B, acute Rate (MS)	3.9	3.5	3.2	3.3	2.3	3.5	1.8	0.4	1.4	2.0
Hepatitis B, acute Cases (MS)	109	99	91	95	65	102	52	13	41	58

*2008 U.S. data not available.

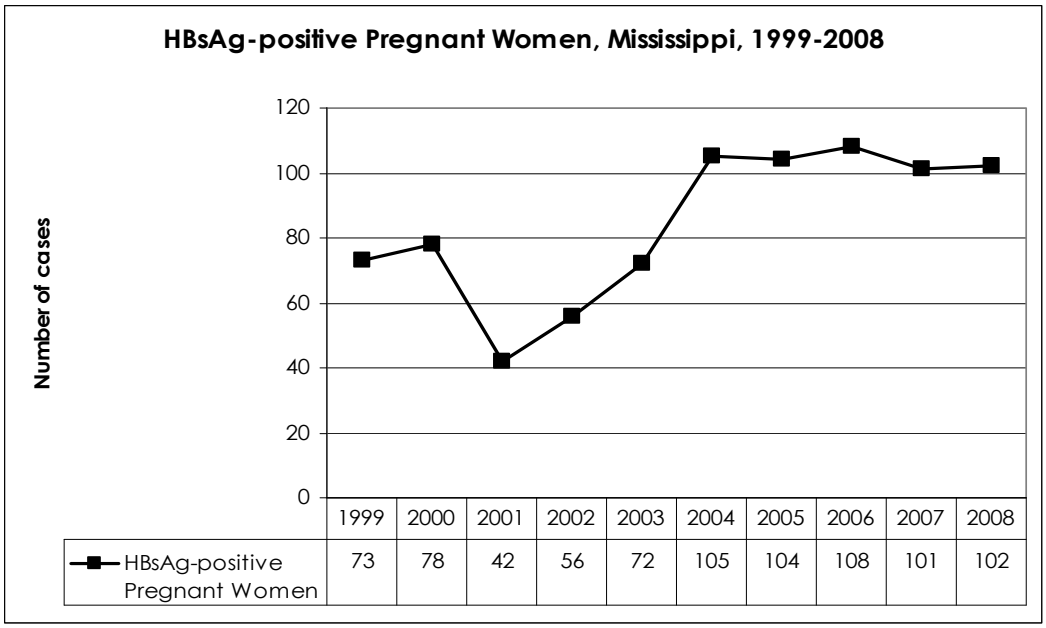
Figure 2



In 2008, 102 HBsAg positive pregnant women were reported to the Perinatal Hepatitis B Program. This is comparable to 101 in 2007 and the three year average of 104 (Figure 3).

Ninety-eight infants were born to HBsAg positive mothers in 2008, however, none of the infants were found to be HBsAg-positive. This is a decrease from 2007 when there were two cases of perinatal transmission.

Figure 3



Influenza

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 and persons at any age with chronic underlying illnesses. The highest risks of complications from Pandemic Influenza A (2009 H1N1) are in pregnant women, young children and persons of any age with chronic underlying illnesses. Persons aged 65 and older at less likely to become infected with Pandemic Influenza A (2009 H1N1) than are younger individuals. However, when infected with Pandemic Influenza A (2009 H1N1) they are at high risk of complications. Pneumonia due to secondary bacterial infections is the most common complication of both types of influenza. CDC estimates there are, on average, 36,000 influenza deaths each year in the United States.

Infectious Agent

Influenza is caused by an RNA virus. There is usually one predominant influenza virus subtype that causes the majority of infection each influenza season, however both influenza A (H1N1-seasonal, and H3N2) and influenza B circulate each season. October 2008 through September, 2009 was unusual in that the usual influenza season was followed by a pandemic of influenza A (2009 H1N1).

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

3-5 days from clinical onset in adults; and up to 7-10 days in young children.

Methods of Control

Yearly vaccination is recommended with either trivalent inactivated vaccine (TIV) or live attenuated influenza vaccine (LAIV). A separate vaccine was under development for Pandemic Influenza A (2009 H1N1), but was not available for distribution to the general public during the period covered by this report. Education of 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, adamantanes (amantadine and rimantadine) and neuraminidase inhibitors (oseltamivir and zanamivir), can also be used to prevent and treat influenza. This year a complex pattern of resistance to these antivirals emerged, with resistance patterns differing among different viral subtypes. Please see antiviral resistance, below, for details. Please consult the Centers for Disease Control and Prevention (CDC) MMWR August 8, 2008, Vol. 57, No. RR—7, "Prevention and Control of Influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2008" for vaccine recommendations and guidelines.

Reporting Classification

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

Epidemiology and Trends

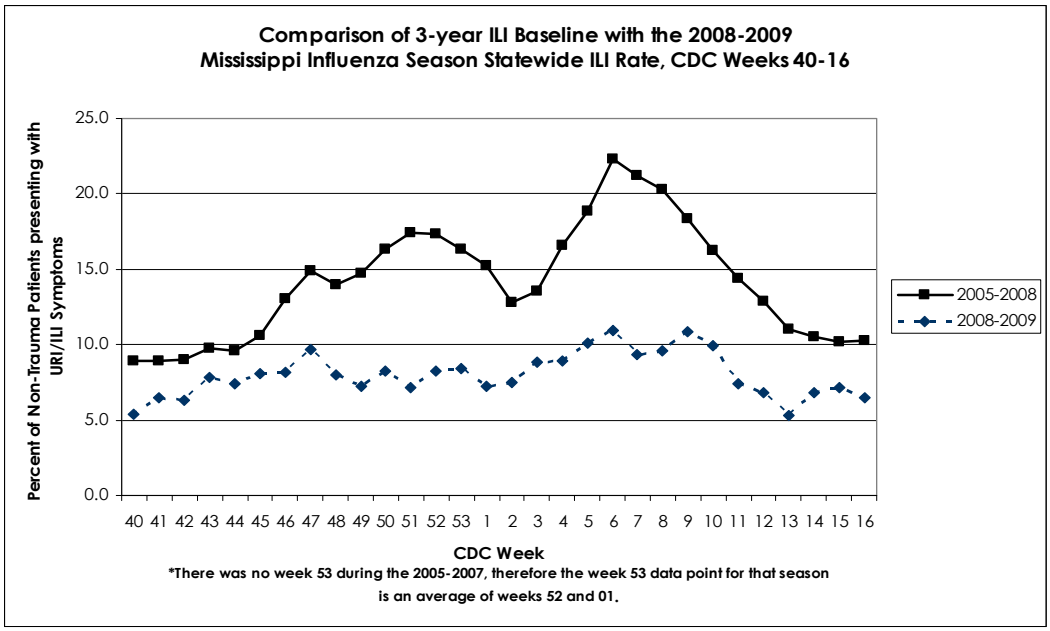
Influenza activity usually occurs from December through March or April, but can occur earlier or later. Peak activity typically occurs anywhere from late January through early March. The risk of complications depends on many factors, including age and underlying medical conditions. Vaccination status 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 comprised of sentinel providers. In the 2008-2009 influenza season, 46 sentinel providers in 32 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 > 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).

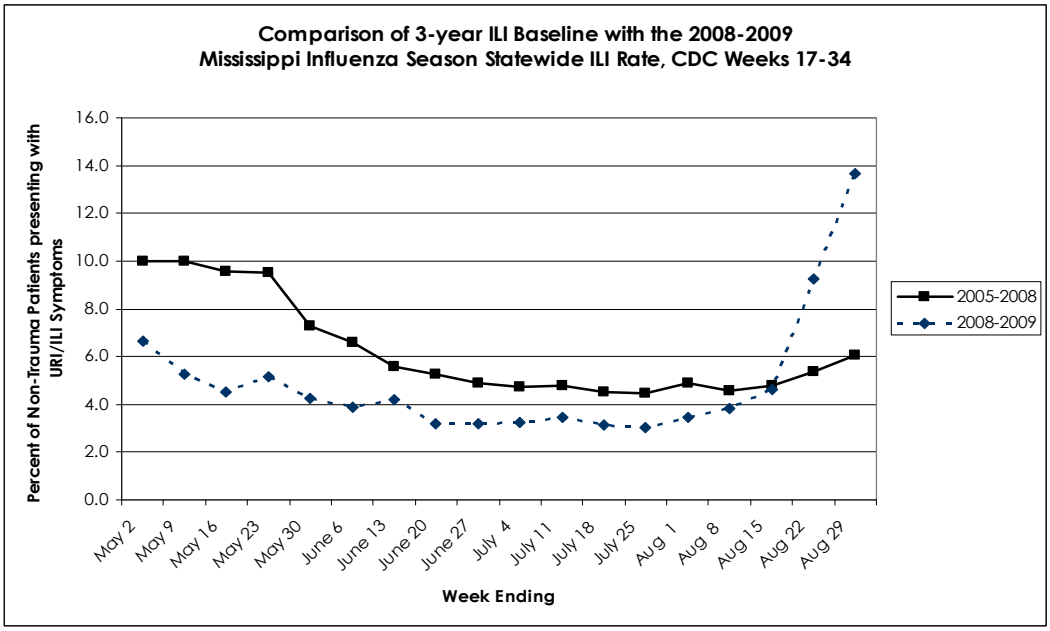
Seasonal influenza was mild in 2008-2009 compared to previous seasons (Figure 4). ILI activity showed a small but significant increase in activity in CDC week 6 (week ending 2/14/09) through CDC week 10 (week ending 3/14/09). Activity then steadily declined until the appearance of Pandemic Influenza A (2009 H1N1).

Figure 4



The first confirmed case of Pandemic Influenza A (2009 H1N1) in Mississippi had an onset of May 5, 2009, however, influenza activity remained low in Mississippi until CDC week 33 (week ending 8/22/2009), approximately one week after the opening of schools in most parts of the state. Then ILI activity increased and continued to remain high during the remainder of the period covered by this report (Figure 5).

Figure 5



Positive PCR samples were reported throughout the state, with a mixture of influenza A (H1N1-seasonal), influenza A (H3N2) and influenza B occurring through May 2009 (Figure 6). Beginning in May 2009, Pandemic Influenza A (2009 H1N1) appeared with increasing frequency and became the dominant subtype by June (Figure 7). During July and August 2009, greater than 98% of subtypeable virus specimens were Pandemic Influenza A (2009 H1N1).

Figure 6

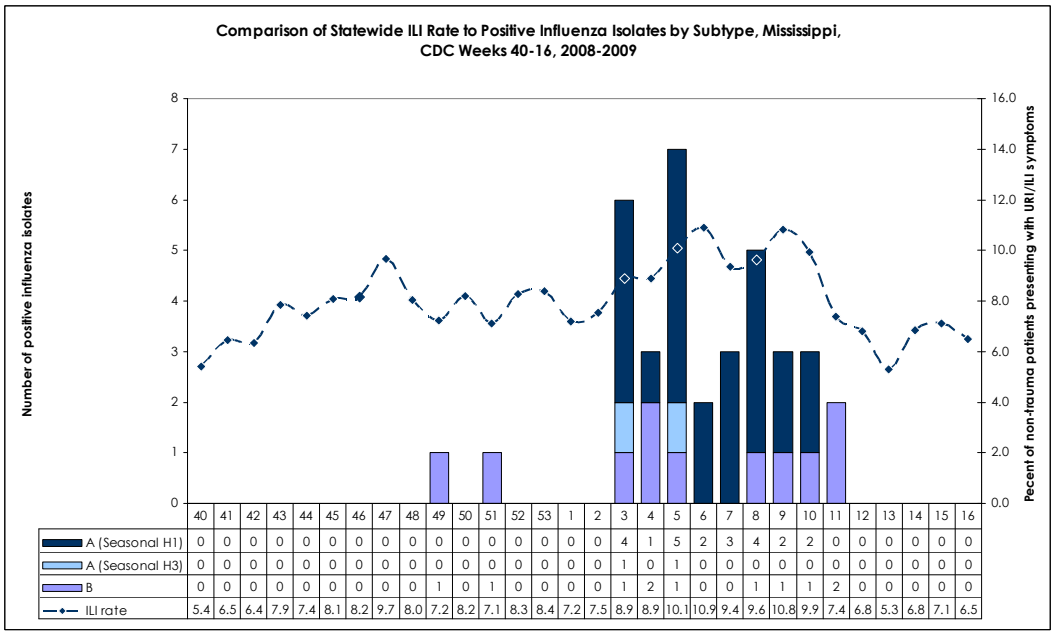
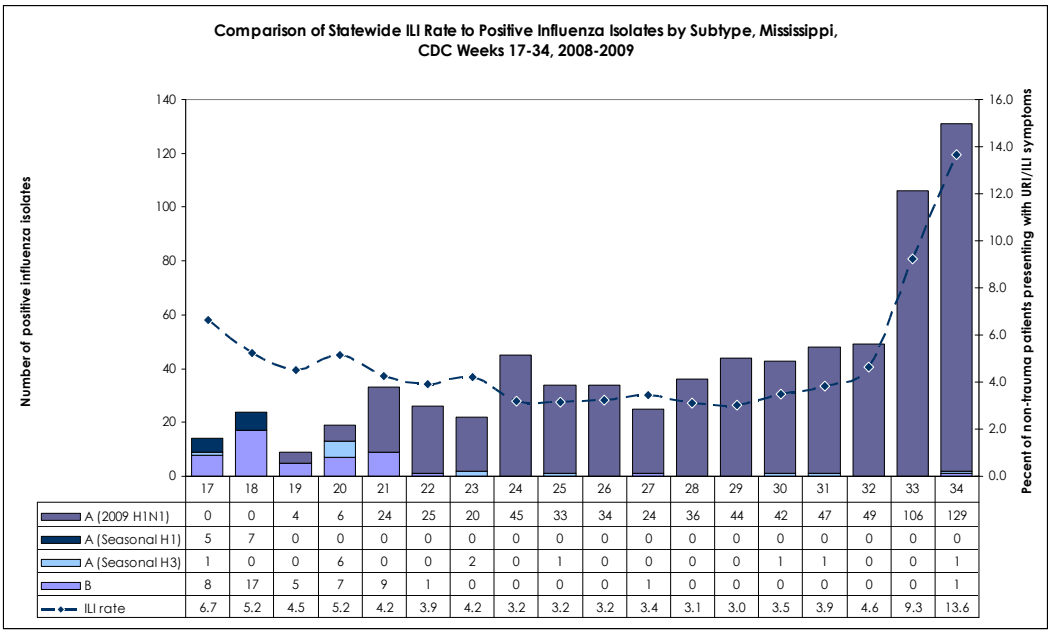
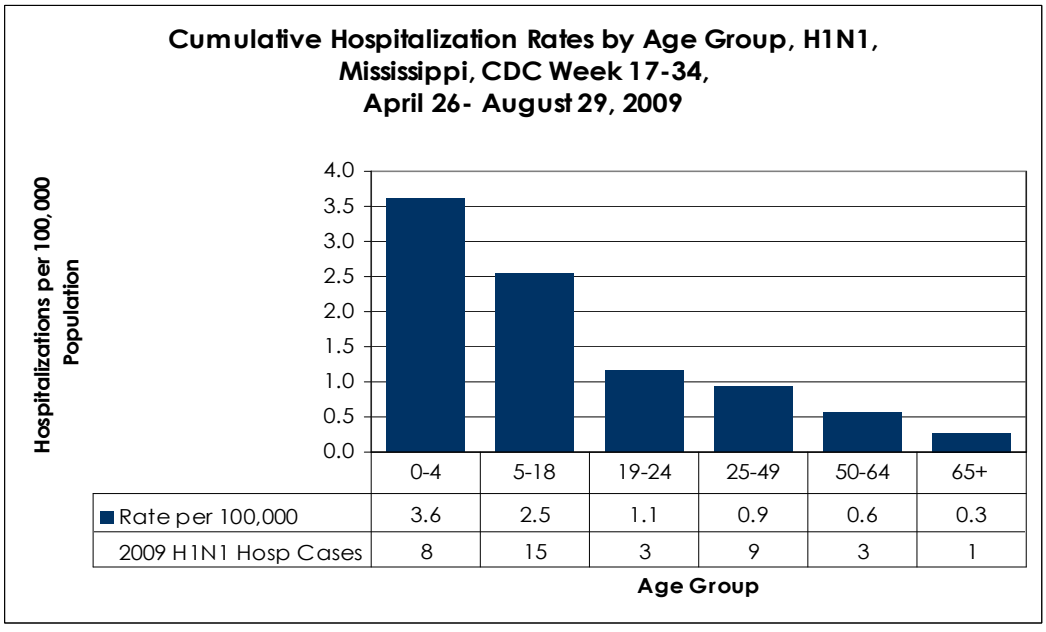


Figure 7



The age groups most affected by Pandemic Influenza A (2009 H1N1) differed from those seen with seasonal influenza. Seasonal influenza has its greatest impact in those aver age 65 and in children under age 4. However, persons over age 65 appeared to be less susceptible to infection with 2009 Pandemic Influenza A (H1N1), so that rates of hospitalization with Pandemic Influenza A (2009 H1N1) were greatest in young people (Figure 8).

Figure 8



Antiviral Resistance

A complex pattern of resistance to antiviral medication emerged in the 2008-2009 influenza season, with different resistance patterns in the different virus subtypes. The data below are from national surveillance data provided by CDC.

The H3N2 influenza A virus continued to be 100% resistant to the adamantane antivirals (amantadine and rimantadine). However, H3N2 did not develop any resistance to the neuraminidase inhibitors (oseltamivir and zanamivir).

The seasonal H1N1 influenza A virus exhibited a rapid emergence of resistance to oseltamivir, with 98% of tested virus isolates being resistant by CDC week 49 (week ending 12/6/08). Tested isolates showed no resistance to zanamivir or to the adamantanes.

Influenza B viruses are inherently resistant to the adamantanes. No resistance to either neuraminidase inhibitor was found among tested isolates.

Almost all (99.8%) of the Pandemic influenza A (2009 H1N1) isolates tested were resistant to adamantanes. During the period covered by this report, only a few (<1%) of isolates showed resistance to oseltamivir and these were in unrelated cases where the individuals had been on oseltamivir for prophylaxis, with no evidence of the transmission of these resistant viruses. None of the isolates exhibited resistance to zanamivir.

Measles

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 degenarative 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.

Reporting Classification

Class 1

Epidemiology and Trends

Measles occurs throughout the world with peak incidence usually in late winter and spring. 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.

Widespread measles immunization has led to the interruption of endemic transmission of measles in the United States and Mississippi. However, measles continues to be endemic or has become endemic again in several countries, particulary in Europe, due in part to dropping immunization rates. Sporadic outbreaks are reported in the U.S. and are largely due to imported cases. Transmission from these cases easily occurs in communities with high numbers of 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.

Meningococcal disease, invasive

2008 Case Total	**12**	**2008 rate/100,000**	**0.4**
2007 Case Total	**12**	**2007 rate/100,000**	**0.4**

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. *Neisseria meningitidis* (*N. meningitidis*) is a leading cause of bacterial meningitis and sepsis in the United States. 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 and mental retardation.

Infectious Agent

N. meningitidis, a gram negative aerobic 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 until 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, children aged 13-18 years not previously vaccinated, and any person aged 2-55 years with increased risk for meningococcal disease (terminal complement deficiencies, functional or anatomic asplenia, college freshman living in dormitories, and travelers 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.

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

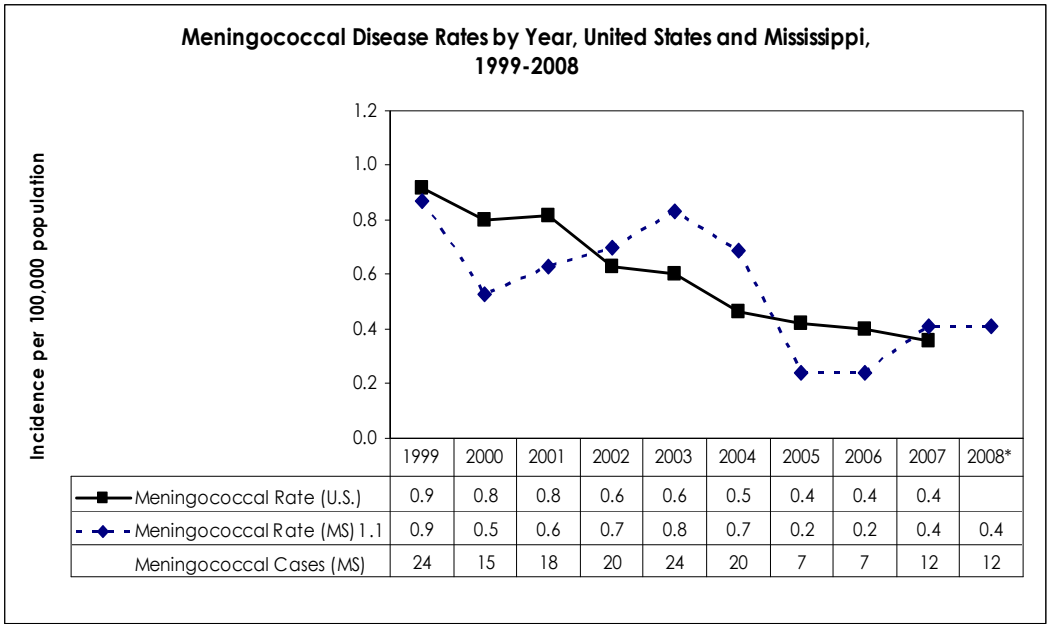
Epidemiology and Trends

In 2008 there were 12 reported cases of invasive meningococcal disease, the same as 2007. Typically, 7-24 cases are reported annually in Mississippi (Figure 9).

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. In 2008, reported cases ranged in age from one month to 88 years, with 25% of cases in infants less than one year of age (Figure 10). MSDH requests that all isolates be submitted to the PHL for typing. Six (50%) of the confirmed cases in 2008 were typed as serogroup Y; one B; and one C. The serogroups for the other four cases were unknown.

In total, rifampin prophylaxis was provided for 111 contacts of meningococcal disease cases in 2008. There were no deaths reported in 2008 from meningococcal disease.

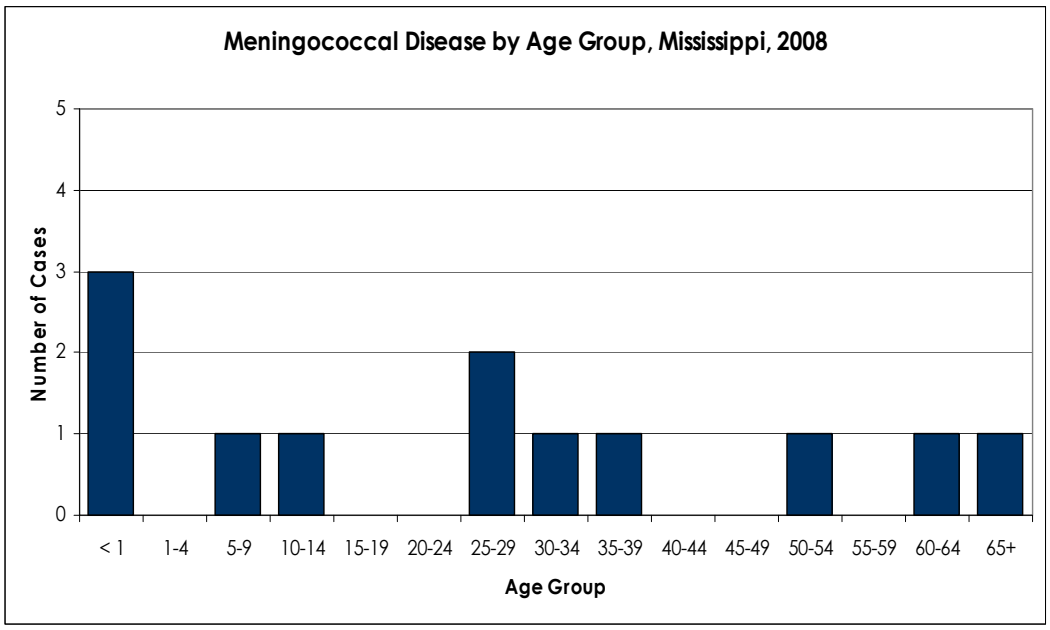
Figure 9



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008*
Meningococcal Rate (U.S.)	0.9	0.8	0.8	0.6	0.6	0.5	0.4	0.4	0.4	
Meningococcal Rate (MS) 1.1	0.9	0.5	0.6	0.7	0.8	0.7	0.2	0.2	0.4	0.4
Meningococcal Cases (MS)	24	15	18	20	24	20	7	7	12	12

*2008 U.S. data not available.

Figure 10



Mumps

Clinical Features:

A viral illness with 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.

Method 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 1-2 cases reported annually. In 2008 there were no reported mumps cases, compared to 2 cases in 2007.

Pertussis

2008 Case Total	**104**	**2008 rate/100,000**	**3.5**
2007 Case Total	**256**	**2007 rate/100,000**	**8.8**

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 serves 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 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. A pertussis containing vaccine (Tdap) was recently approved for the vaccination of adolescents and adults. Adolescents and adults should receive a single dose of Tdap to replace a single dose of tetanus (Td).

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 in the home.

Reporting Classification

Class 1

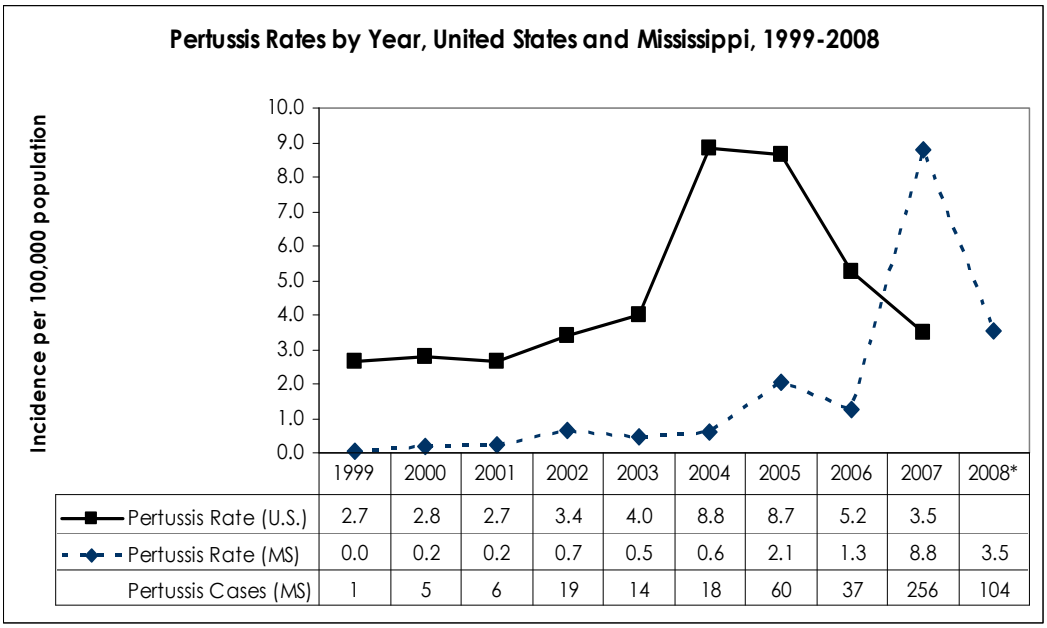
Epidemiology and Trends

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 nonimmunized persons is universal.

In 2008, there were 104 reported cases of pertussis infection. This is a sharp decrease from 2007, with 256 reported cases due to an outbreak that was mainly concentrated in Public Health District VI. The three year average for 2005-2007 was 118 cases (Figure 11).

The majority of the cases in 2008 were among children less than 10 years of age, with children under 12 months of age comprising 49% of the total cases (Figure 12). One death occurred in an infant who was less than one month of age.

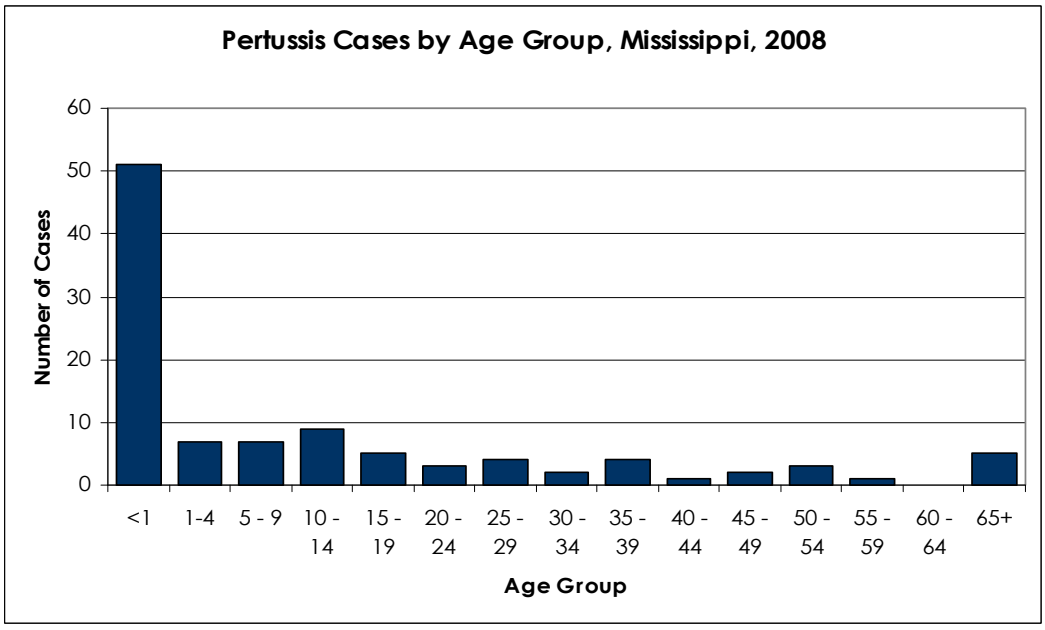
Figure 11



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008*
Pertussis Rate (U.S.)	2.7	2.8	2.7	3.4	4.0	8.8	8.7	5.2	3.5	
Pertussis Rate (MS)	0.0	0.2	0.2	0.7	0.5	0.6	2.1	1.3	8.8	3.5
Pertussis Cases (MS)	1	5	6	19	14	18	60	37	256	104

*2008 U.S. data not available.

Figure 12



Pneumococcal disease, invasive

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 (PCV7) is approved for children younger than 24 months of age and children 24-59 months of age at risk for invasive disease. PCV7 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 disease in children less than 5 years of age and all antibiotic resistant invasive disease.

Epidemiology and Trends

In 2008 there were 27 reported cases of invasive disease caused by *S. pneumoniae* in children less than 5 years of age, compared to 13 cases in 2007 (Figure 13). Of these 27 cases, 24 manifested as septicemia, two had *S. pneumoniae* isolated from pleural fluid, and one had meningitis. Ages ranged from 1 month to 4 years of age. The antibiotic resistance patterns were known for 14 of the 27 invasive *S. pneumoniae* cases in this age group. Of those 14 cases, 8 of the invasive infections were infected with organisms that exhibited resistance to one or more antibiotics.

A total of 29 cases of antibiotic resistant invasive *S. pneumoniae* infections were reported in 2008, compared to 52 cases reported in 2007. This total includes those less than 5 years of age with drug resistant invasive disease. Of the 29 cases in 2008, 25 (86%) were septic, two (7%) had *S. pneumoniae* isolated from pleural fluid, and one case (3%) had meningitis, and in one the site was not reported. Reported cases of antibiotic resistant invasive disease ranged in age from 9 months to 87 years, with 16 cases (55%) occurring in individuals age 40 or older (Figure 14). Antibiotic resistance to penicillin was documented in 62%; resistance to trimethoprim/sulfamethoxazole and erythromycin resistance (41% of isolates each) were also noted. One *S. pneumoniae* meningitis death was reported in a 57 year old female. The antibiotic resistance pattern of this case was unknown.

Figure 13

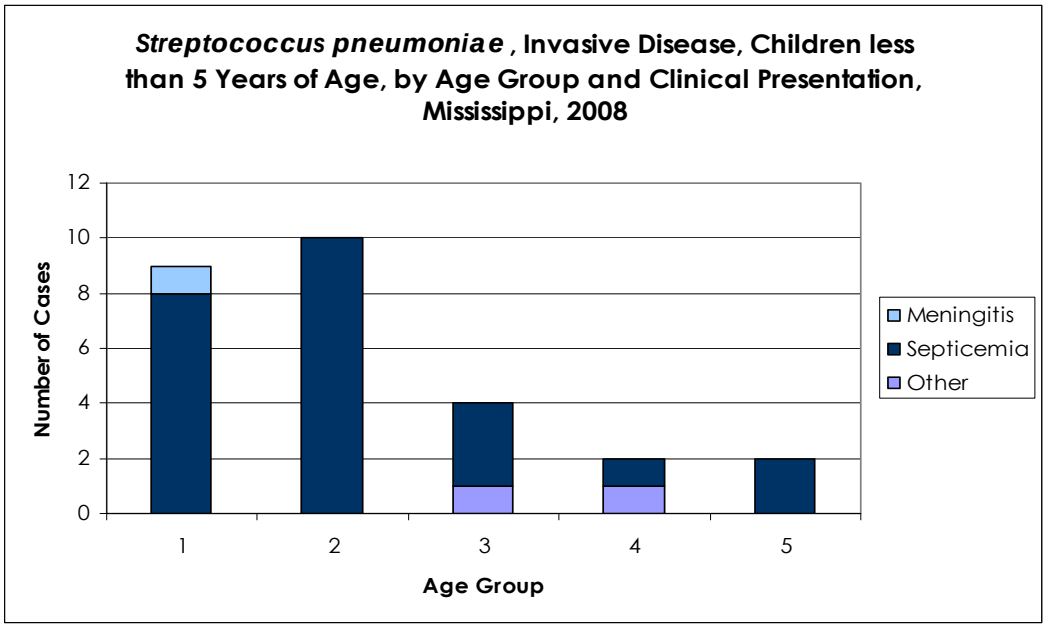
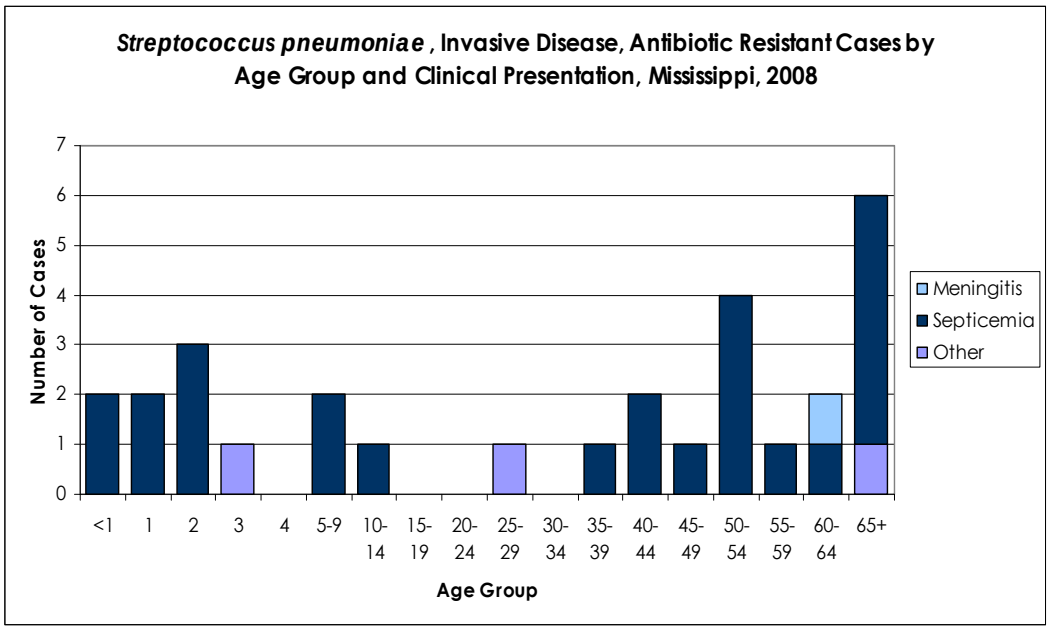


Figure 14



Rubella

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, 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 congenital rubella syndrome.

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 2008. The last reported case in the state, in a 4 year old, was in 1986.

Varicella

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, usually appears first on the head, and is 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 herpes zoster may develop chickenpox by direct respiratory 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

Between 2005-2007, 0-3 cases were reported annually, with three cases reported in 2007. In 2008 there were 14 cases reported ranging in age from 16 to 86 years. Three of these cases were epidemiologically linked.

Sexually Transmitted Diseases

Chlamydia

2008 Case Total	**21,261**	**2008 rate/100,000**	**723.5**
2007 Case Total	**21,686**	**2007 rate/100,000**	**745.1**

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

Virtually all *C. trachomatis* infections are sexually transmitted.

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.

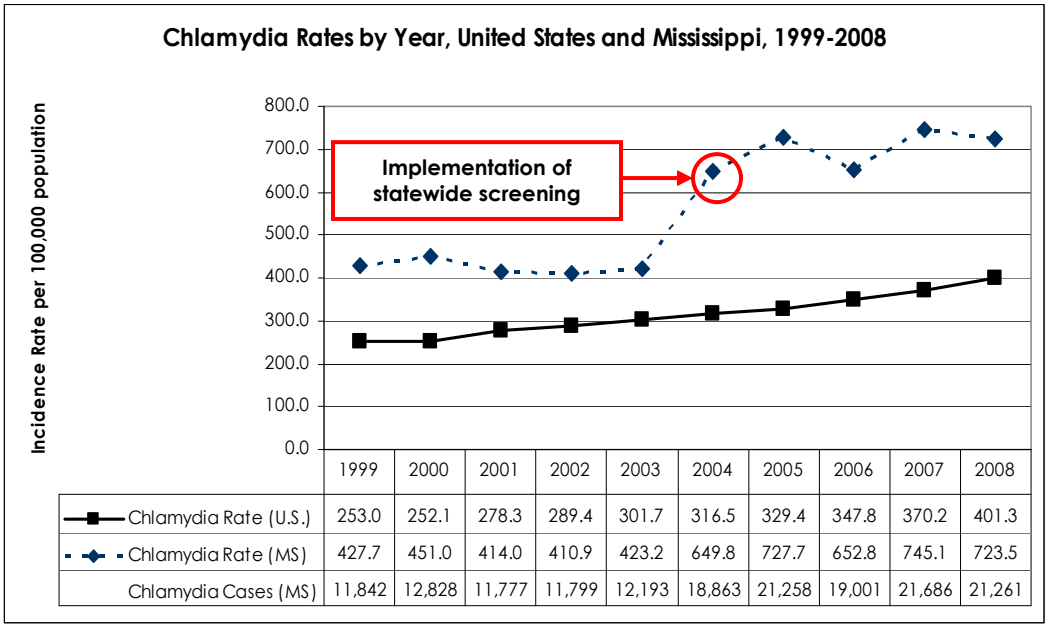
Reporting Classification

Class 2

Epidemiology and Trends

Chlamydia is the most frequently reported bacterial sexually transmitted disease in the United States and in Mississippi. In 2008, 21,261 cases of chlamydia were reported in Mississippi, a decrease of 2% from 2007 (21,686). Mississippi has reported case rates higher than the United States average (Figure 15) for several years, and when compared to other states, Mississippi has the country's highest rate. The overall increase in cases can be partially attributed to aggressive statewide screening for chlamydia in all MSDH STD, family planning, and prenatal clinics beginning April 2004.

Figure 15

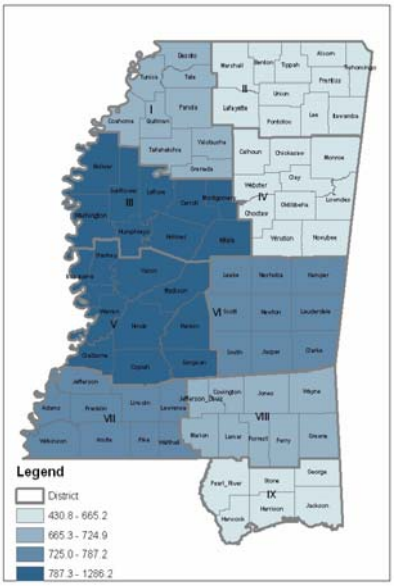


	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Chlamydia Rate (U.S.)	253.0	252.1	278.3	289.4	301.7	316.5	329.4	347.8	370.2	401.3
Chlamydia Rate (MS)	427.7	451.0	414.0	410.9	423.2	649.8	727.7	652.8	745.1	723.5
Chlamydia Cases (MS)	11,842	12,828	11,777	11,799	12,193	18,863	21,258	19,001	21,686	21,261

Chlamydia was reported in every public health district, with the highest incidence noted in Public Health District III (Figure 16).

Figure 16

Chlamydia Incidence by Public Health District, Mississippi, 2008



District	Cases	Rate*
I	2,274	724.9
II	1,606	457.3
III	2,960	1,286.2
IV	1,630	665.2
V	5,554	878.9
VI	1,922	787.2
VII	1,370	779.7
VIII	2,027	672.2
IX	1,918	430.8
State	**21,261**	**723.5**

***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 17). African Americans accounted for a disproportionate number of the reported cases in which race was known (Figure 18). In 2008, the rate of chlamydia infections for African Americans was nine times the rate for whites.

Figure 17

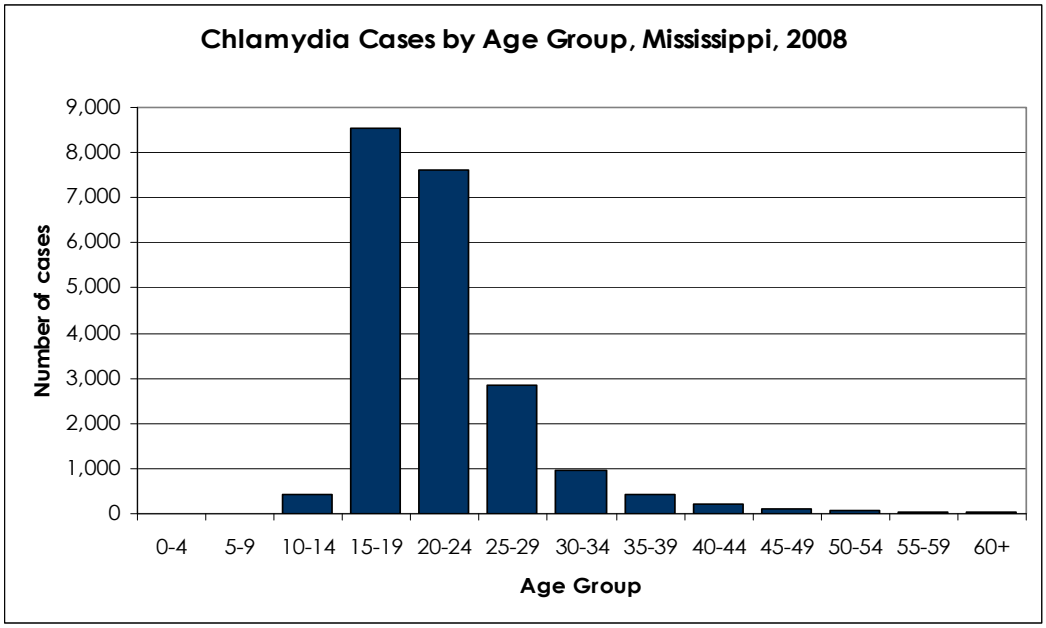
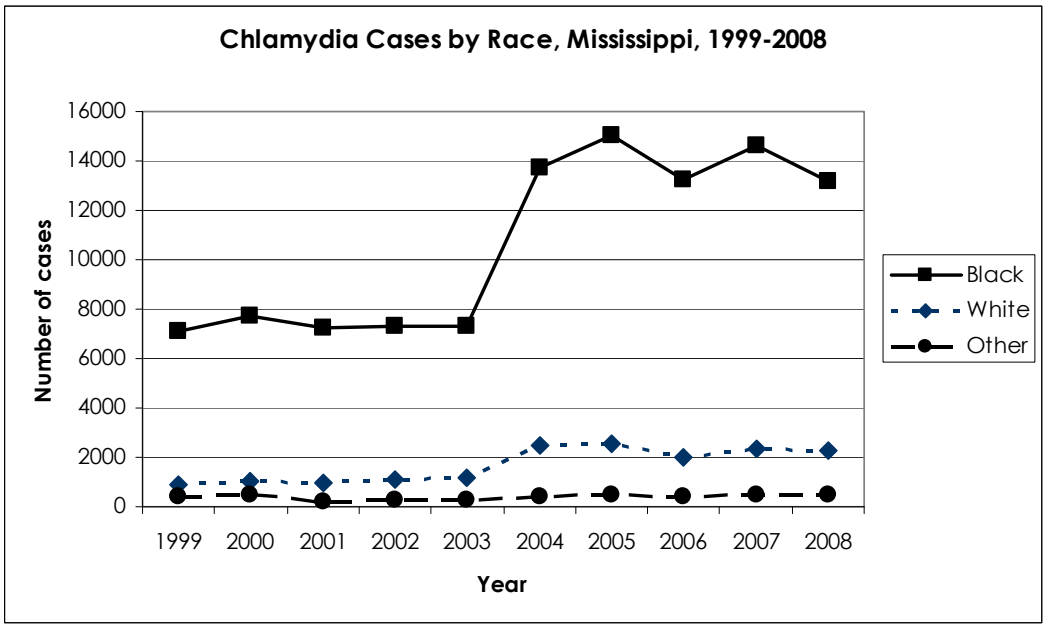


Figure 18



Gonorrhea

2008 Case Total	**7,497**	**2008 rate/100,000**	**255.1**
2007 Case Total	**8,315**	**2007 rate/100,000**	**285.7**

Clinical Features

A bacterial infection associated primarily with infection of 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 consist of 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 can pass 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 from the infected cervix to an infant during birth 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

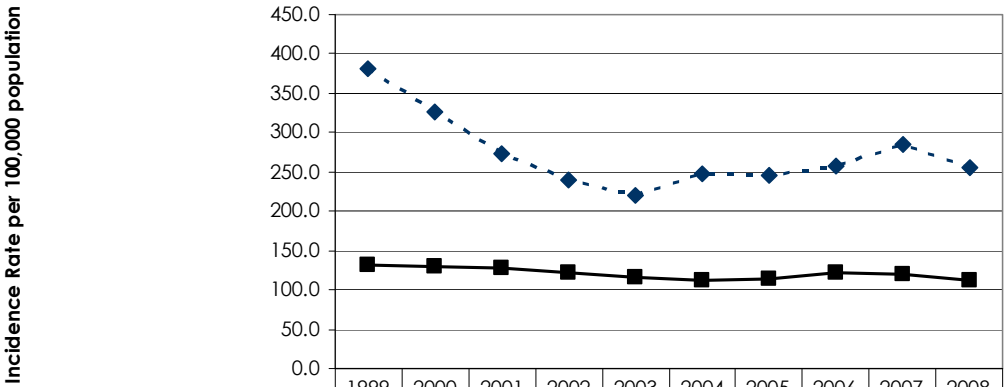
Gonorrhea is the second most commonly reported notifiable disease in the United States. From 2003-2007, the number of gonorrhea cases increased 31.4%, from 6,328 to 8,315 cases (Figure 19). Although there was a slight decrease in cases in 2008, Mississippi had the highest case rate of gonorrhea in the United States.

Gonorrhea was reported in every public health district, with the highest incidence noted in Public Health District III (Figure 20).

Although the burden of disease impacted individuals of all age groups, 67% of reported cases were among 15-24 year olds (Figure 21). African Americans accounted for a majority of the reported cases in which race was known (Figure 22). In 2008, the rate of gonorrhea infections for African Americans was nearly seventeen times the rate of whites.

Figure 19

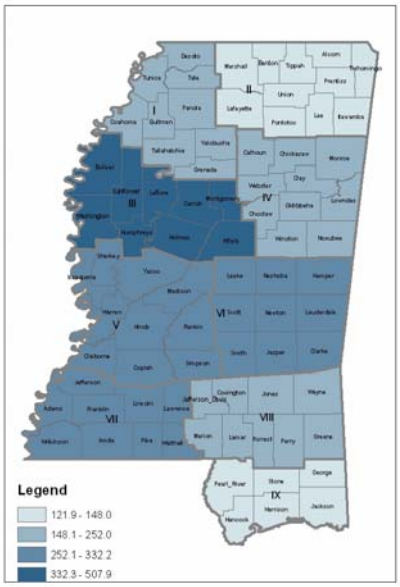
Gonorrhea Rates by Year, United States and Mississippi, 1999-2008



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Gonorrhea Rate (U.S.)	132.3	129.0	128.5	122.0	115.2	112.4	114.6	120.9	118.9	111.6
Gonorrhea Rate (MS)	381.5	326.5	272.7	239.4	219.6	246.7	245.5	258.0	285.7	255.1
Gonorrhea Cases (MS)	10,561	9,287	7,756	6,875	6,328	7,163	7,170	7,510	8,315	7,497

Figure 20

Gonorrhea Incidence by Public Health District, Mississippi, 2008



District	Cases	Rate*
I	626	199.6
II	428	121.9
III	1,169	507.9
IV	543	221.6
V	2,016	319.0
VI	811	332.2
VII	485	276.0
VIII	760	252.0
IX	659	148.0
State	**7,497**	**255.1**

*per 100,000 population

Figure 21

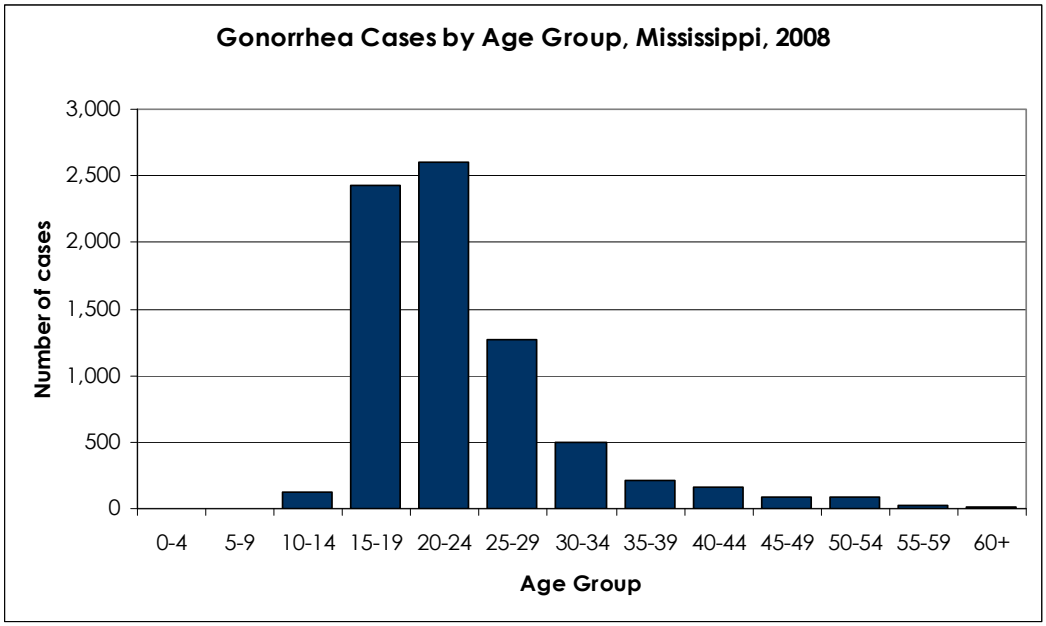
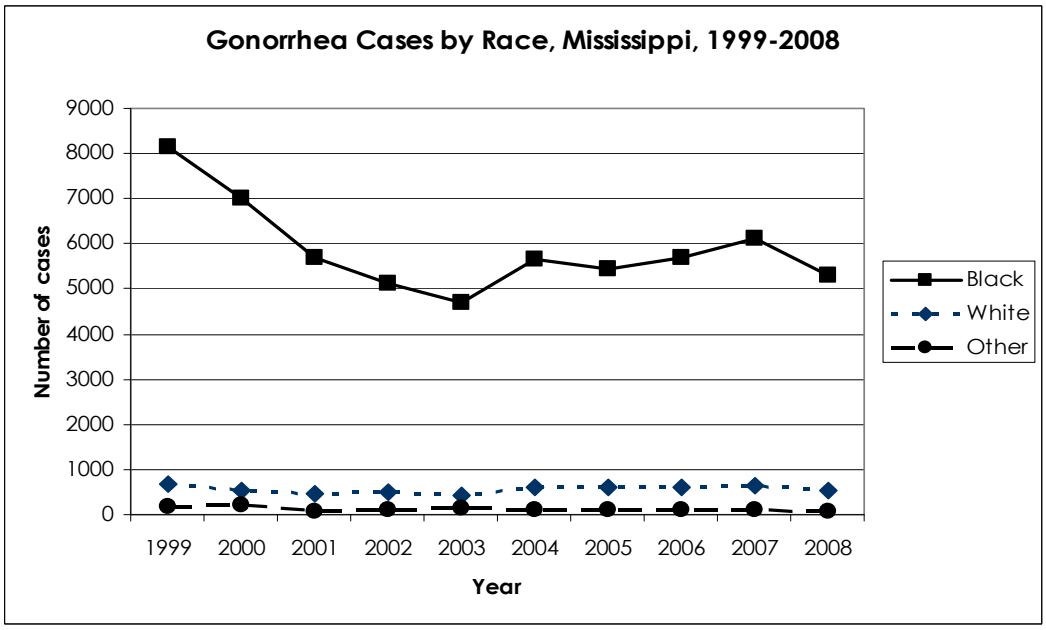


Figure 22



HIV Disease

2008 Case Total	**606**	**2008 rate/100,000**	**20.6**
2007 Case Total	**611**	**2007 rate/100,000**	**21.0**

Clinical Features

The clinical spectrum of human immunodeficiency virus (HIV) infection varies from an asymptomatic infection 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 cause 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

Humans become infectious shortly after infection and remain infectious throughout the course of their lives.

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. MSDH performs contact investigation, counseling and testing for each reported case of HIV infection.

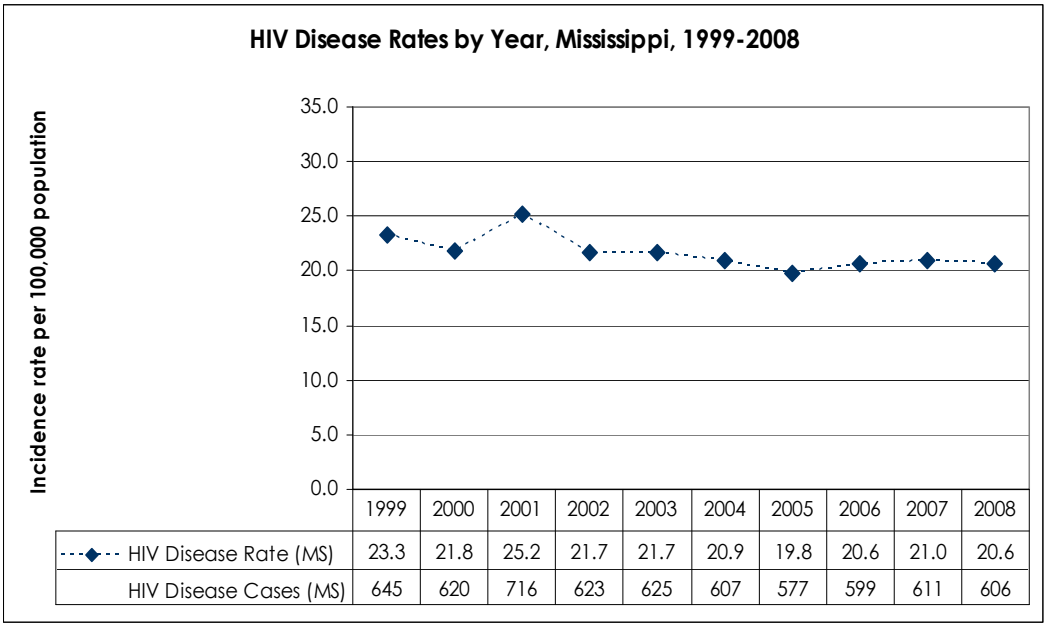
Reporting Classification

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 606 cases of HIV disease reported in 2008, a 1% decrease from 2007 (611)(Figure 23).

Figure 23

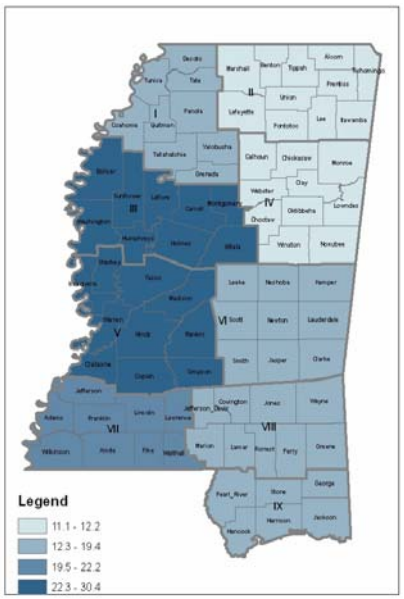


	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
HIV Disease Rate (MS)	23.3	21.8	25.2	21.7	21.7	20.9	19.8	20.6	21.0	20.6
HIV Disease Cases (MS)	645	620	716	623	625	607	577	599	611	606

Individuals from every Public Health District were impacted by this disease. Public Health District III reported the highest case rate, statewide, followed by District V (Figure 24).

Figure 24

HIV Incidence by Public Health District, Mississippi, 2008



District	Cases	Rate*
I	61	19.4
II	39	11.1
III	70	30.4
IV	30	12.2
V	189	29.9
VI	42	17.2
VII	39	22.2
VIII	52	17.2
IX	84	18.9
State	**606**	**20.6**

*per 100,000 population

HIV disease was reported in all age groups, with the majority of cases reported among young and middle aged adults (Figure 25). African Americans were disproportionately impacted by HIV disease. In 2008, 79% of new cases were among African Americans (Figure 26).

Figure 25

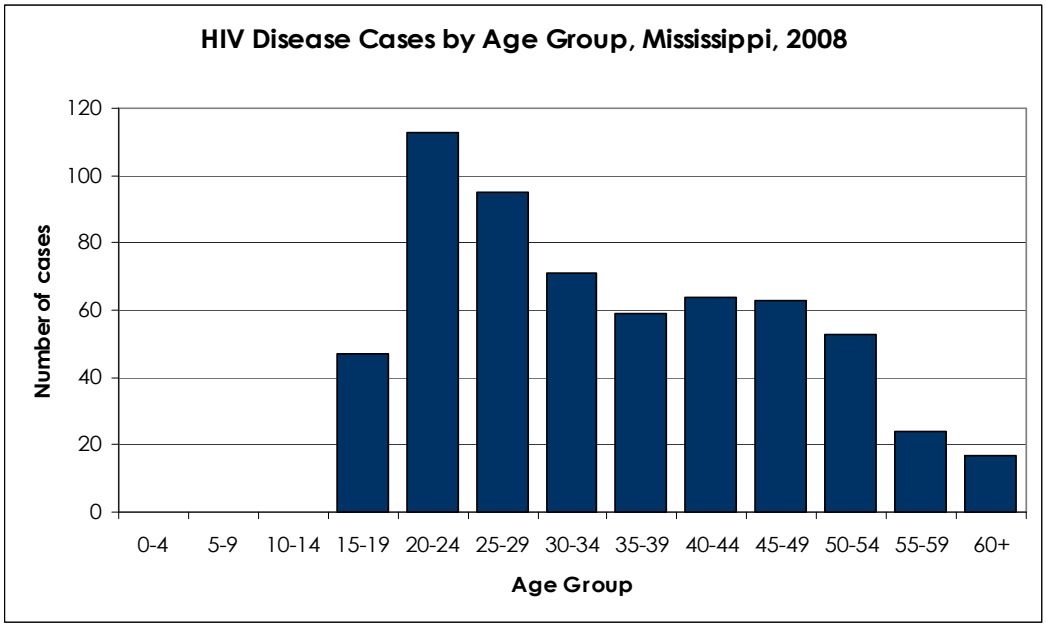
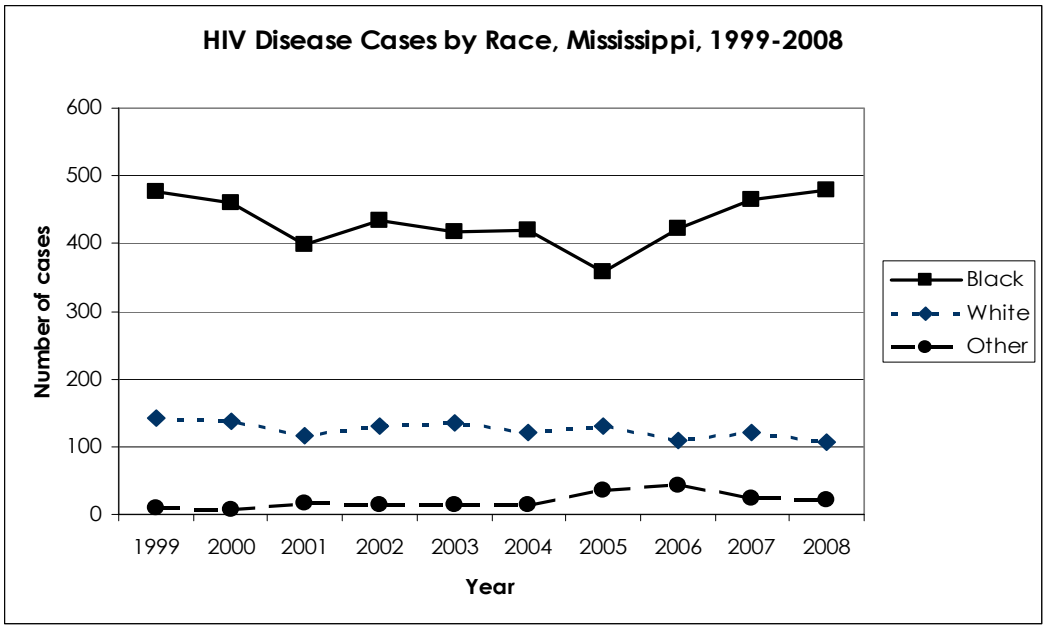


Figure 26



Additional References:

- CDC. Guidelines for national immunodeficiency virus case surveillance, including monitoring for human immunodeficiency virus infection and acquired immunodeficiency syndrome. MMWR 1999/48(RR13;1-28.

- Sterling, T. R. & Chaisson, R. E. (2005). General Manifestations of Human Immunodeficiency Virus. In G. L. Mandell, J. E. Bennett, and R. Dolin (Eds.), *Mandell, Douglas, and Bennet's Principles and Practice of Infectious Diseases* (6th ed.). (Vols.1-2). (pp. 1548-1549). Philadelphia, PA: Elsevier Churchill Livingstone.

Syphilis

Primary and Secondary Syphilis

2008 Case Total	**185**	**2008 rate/100,000**	**6.3**
2007 Case Total	**132**	**2007 rate/100,000**	**4.5**

Total Early Syphilis

2008 Case Total	**418**	**2008 rate/100,000**	**14.2**
2007 Case Total	**417**	**2007 rate/100,000**	**14.3**

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).

Syphilis can be transmitted to the fetus through the placenta in untreated women with early syphilis, resulting in congenital syphilis. Congenital syphilis can cause 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 result 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.

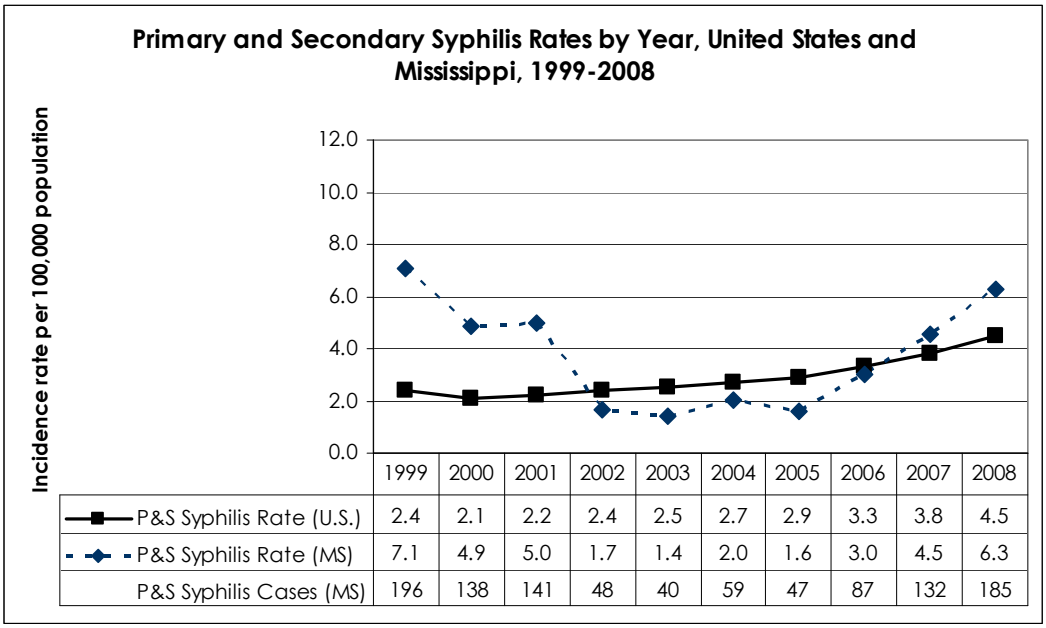
Reporting Classification

Class 1

Epidemiology and Trends

Mississippi had a decline in primary and secondary (P&S) syphilis from 1997 through 2003, and since then, has had an increase in rates (Figure 27). Although P&S syphilis rates remained below the national average from 2002 through 2006, in 2008, MS ranked eighth nationally (Figure 27).

Figure 27

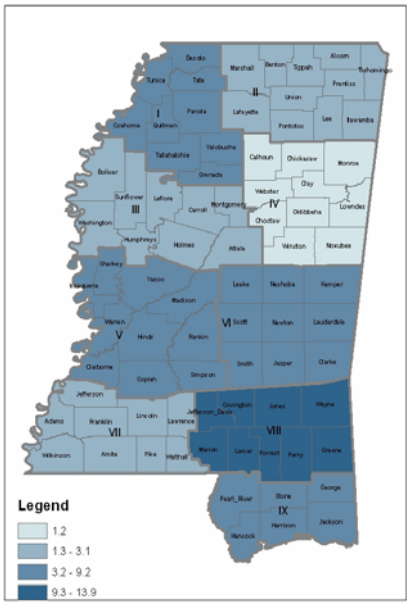


	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
P&S Syphilis Rate (U.S.)	2.4	2.1	2.2	2.4	2.5	2.7	2.9	3.3	3.8	4.5
P&S Syphilis Rate (MS)	7.1	4.9	5.0	1.7	1.4	2.0	1.6	3.0	4.5	6.3
P&S Syphilis Cases (MS)	196	138	141	48	40	59	47	87	132	185

Districts VIII and IX had the highest incidence of P&S syphilis (Figure 28). Seventy-one percent of P&S syphilis cases occurred among 15-39 year olds (Figure 29) and 76% were among African Americans (Figure 30).

Figure 28

Primary and Secondary Syphilis Incidence by Public Health District, Mississippi, 2008



District	Cases	Rate*
I	21	6.7
II	11	3.1
III	7	3.0
IV	3	1.2
V	41	6.5
VI	14	5.7
VII	5	2.8
VIII	42	13.9
IX	41	9.2
State	**185**	**6.3**

*per 100,000 population

Figure 29

Primary and Secondary Syphilis Cases by Age Group, Mississippi, 2008

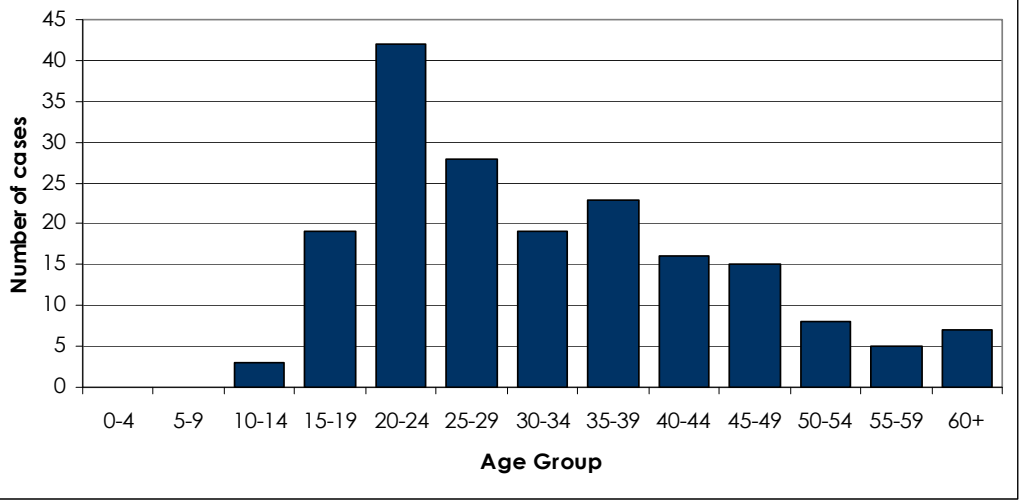
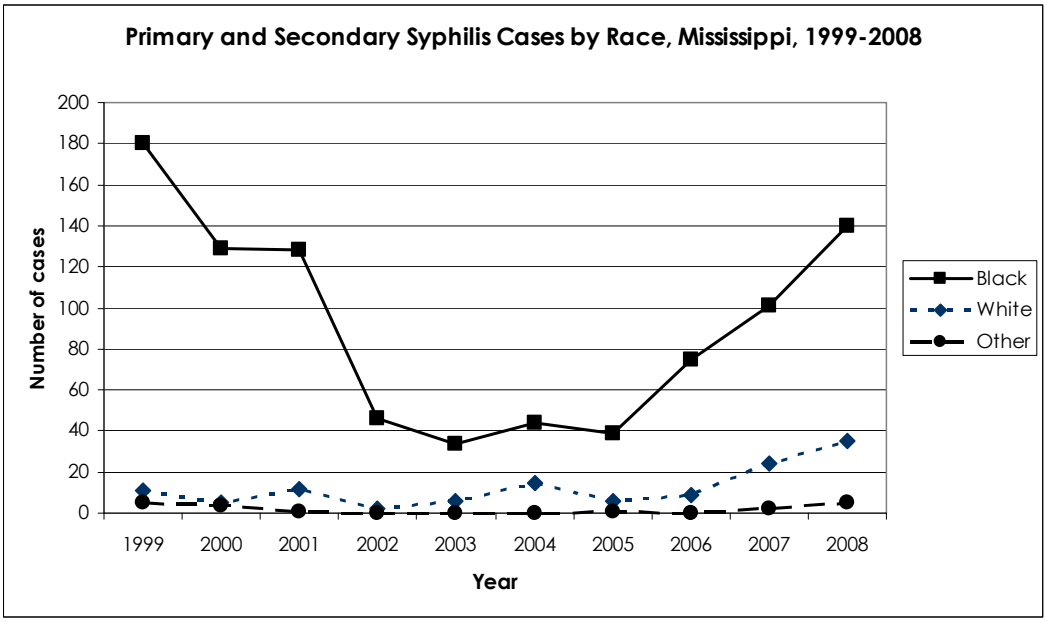
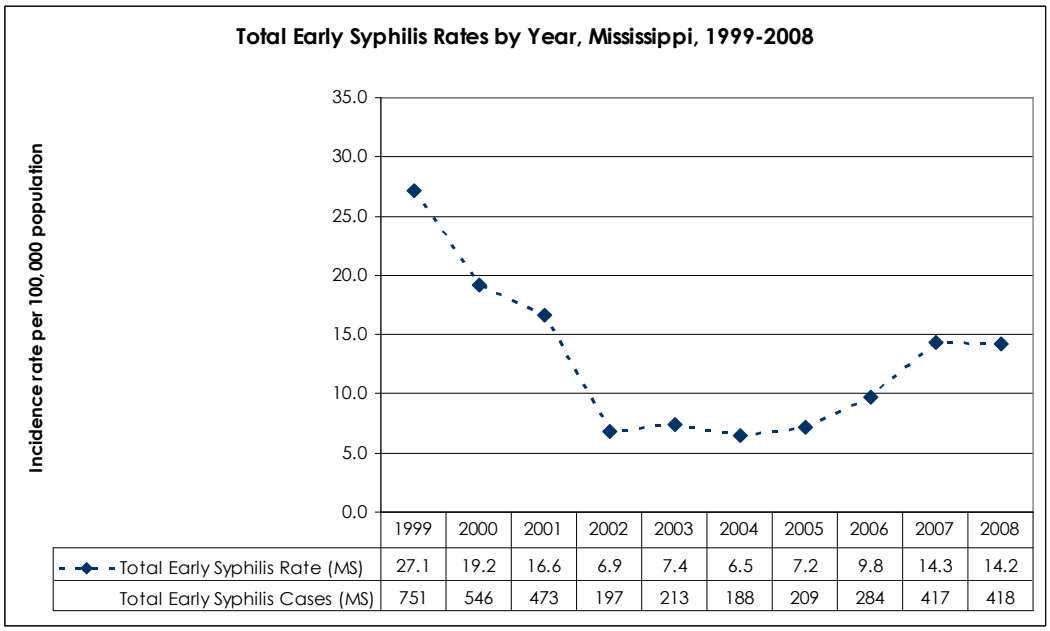


Figure 30



In 2008, Mississippi reported 418 cases of total early syphilis (first year of infection). There has been an increase in cases reported since 2005 (Figure 31).

Figure 31

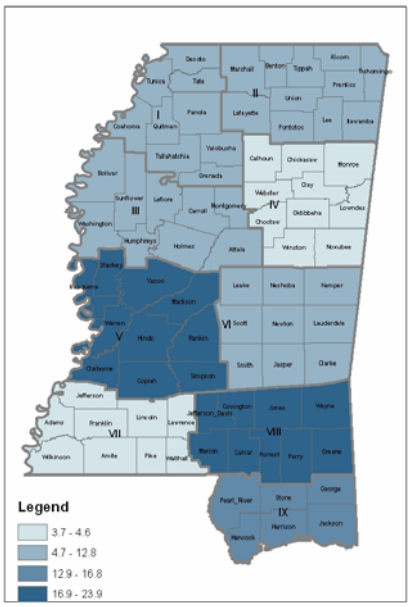


	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Early Syphilis Rate (MS)	27.1	19.2	16.6	6.9	7.4	6.5	7.2	9.8	14.3	14.2
Total Early Syphilis Cases (MS)	751	546	473	197	213	188	209	284	417	418

Total early syphilis was reported in every district. District VIII had the highest case rate in the state (Figure 32).

Figure 32

Total Early Syphilis Incidence by Public Health District, Mississippi, 2008

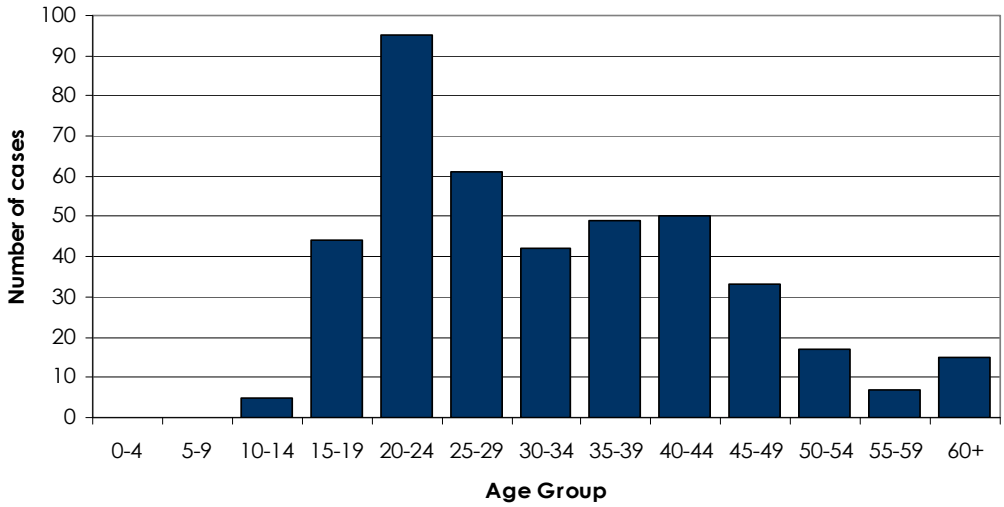


District	Cases	Rate*
I	40	12.8
II	39	11.1
III	19	8.3
IV	9	3.7
V	131	20.7
VI	25	10.2
VII	8	4.6
VIII	72	23.9
IX	75	16.8
State	**418**	**14.2**

*per 100,000 population

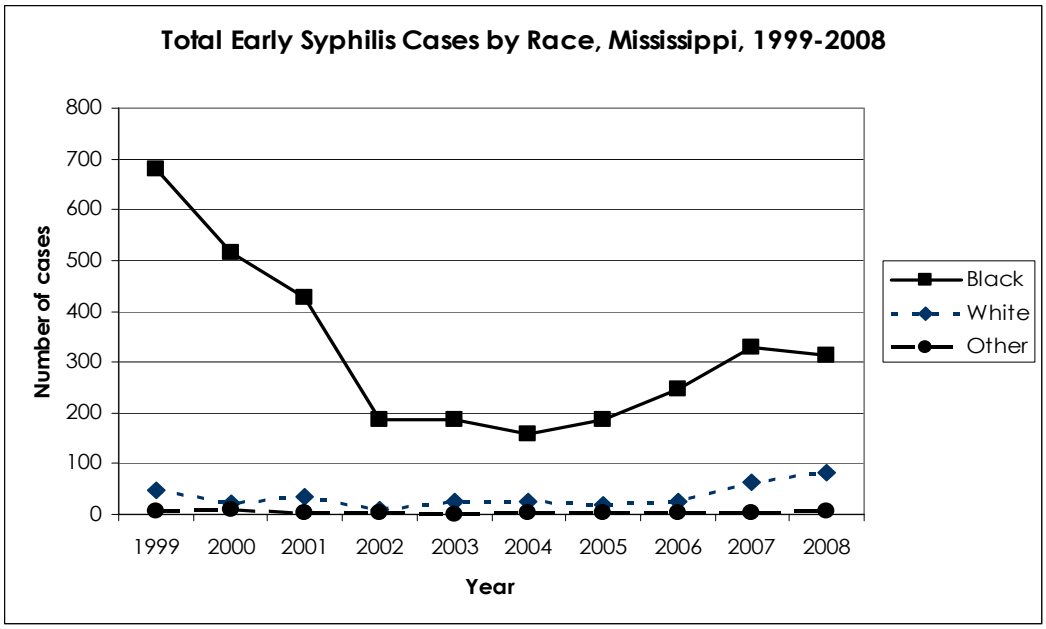
Figure 33

Total Early Syphilis Cases by Age Group, Mississippi, 2008



Twenty-three percent of reported cases were among 20-24 year olds, followed by 15% among 25-29 year olds (Figure 33). African Americans are disproportionately affected, accounting for 75% of cases (Figure 34).

Figure 34


Total Early Syphilis Cases by Race, Mississippi, 1999-2008
Number of cases
800
700
600
500
400
300
200
100
0
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
Year
Black
White
Other

Tuberculosis

Tuberculosis

2008 Case Total	**117**	**2008 rate/100,000**	**4.0**
2007 Case Total	**137**	**2007 rate/100,000**	**4.7**

Clinical Features

Pulmonary tuberculosis (TB) is the most common form of active TB disease, but disease can be extrapulmonary, involving many organ systems. Symptoms are dependent on the site of infection, but 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 infections (LTBI) occur and are 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

Tuberculin skin test conversion, indicating LTBI, occurs 2-10 weeks after exposure to active TB disease. 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. Children with primary tuberculosis are generally not infectious. LTBI is not infectious.

Methods of Control

Prompt identification, diagnosis and treatment of potentially infectious patients with TB disease. MSDH performs contact investigation, TB screenings in high risk areas, and provides treatment for all active and latent TB infections.

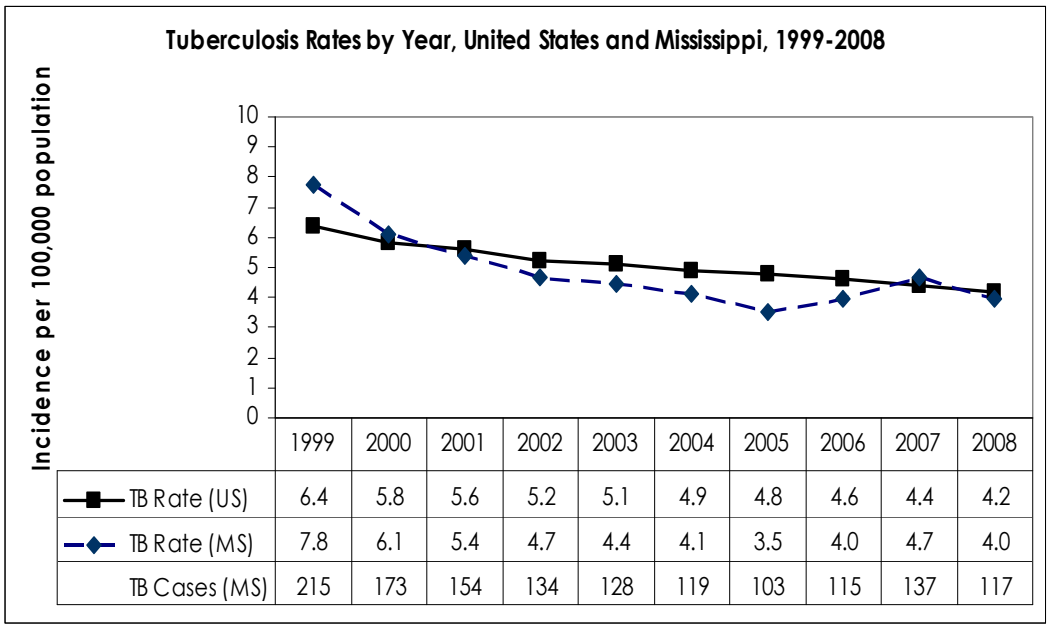
Reporting Classification

Class 1

Epidemiology and Trends

Mississippi had a consistent decline in TB morbidity from 1989 through 2005. TB rates were below the national average in each of the 2001-2006 reporting periods. However, from a low of 103 cases in 2005, reported cases were elevated in both 2006 (115), 2007 (137) and 2008 (118). In 2007, the case rate was above the national average for the first time since 2000 and was just below it in 2008 (Figure 35).

Figure 35

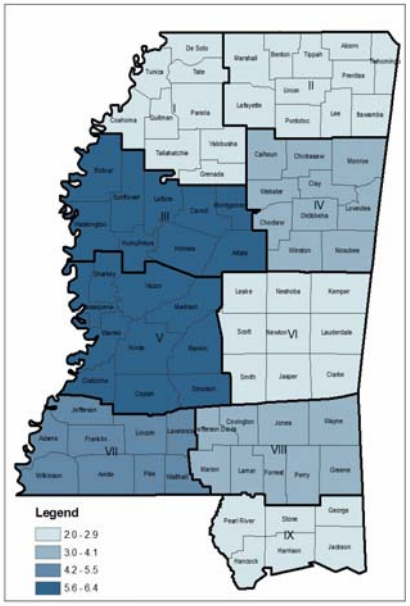


	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
TB Rate (US)	6.4	5.8	5.6	5.2	5.1	4.9	4.8	4.6	4.4	4.2
TB Rate (MS)	7.8	6.1	5.4	4.7	4.4	4.1	3.5	4.0	4.7	4.0
TB Cases (MS)	215	173	154	134	128	119	103	115	137	117

Geographically, TB was reported in every public health district, with the highest incidence noted in Public Health Districts III and V (Figure 36).

Figure 36

Tuberculosis Incidence by Public Health District, Mississippi, 2008



District	Cases	Rate*
I	9	2.9
II	7	2.0
III	13	5.6
IV	10	4.1
V	40	6.4
VI	7	2.9
VII	8	4.6
VIII	11	3.7
IX	12	2.7
State	**117**	**4.0**

***per 100,000 population**

Disease occurred across all age groups, with the majority in individuals 25 years old and above (Figure 37). Disease in the African American population routinely accounts for approximately two-thirds of morbidity (Figure 38). There has also been a rise in TB cases among patients co-infected with HIV over the past few years (Figure 39).

Figure 37

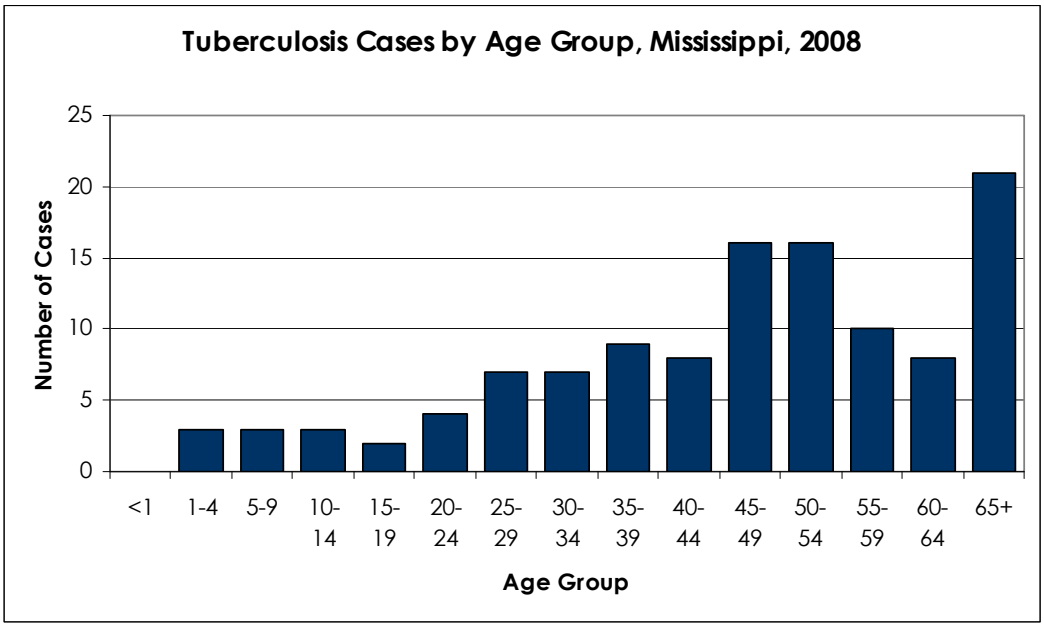


Figure 38

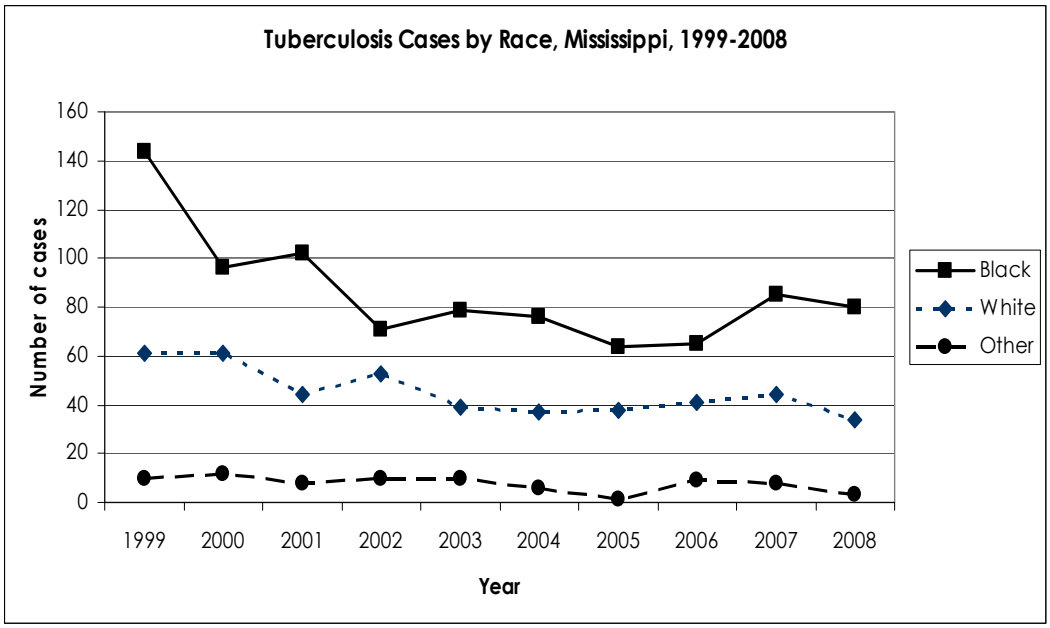
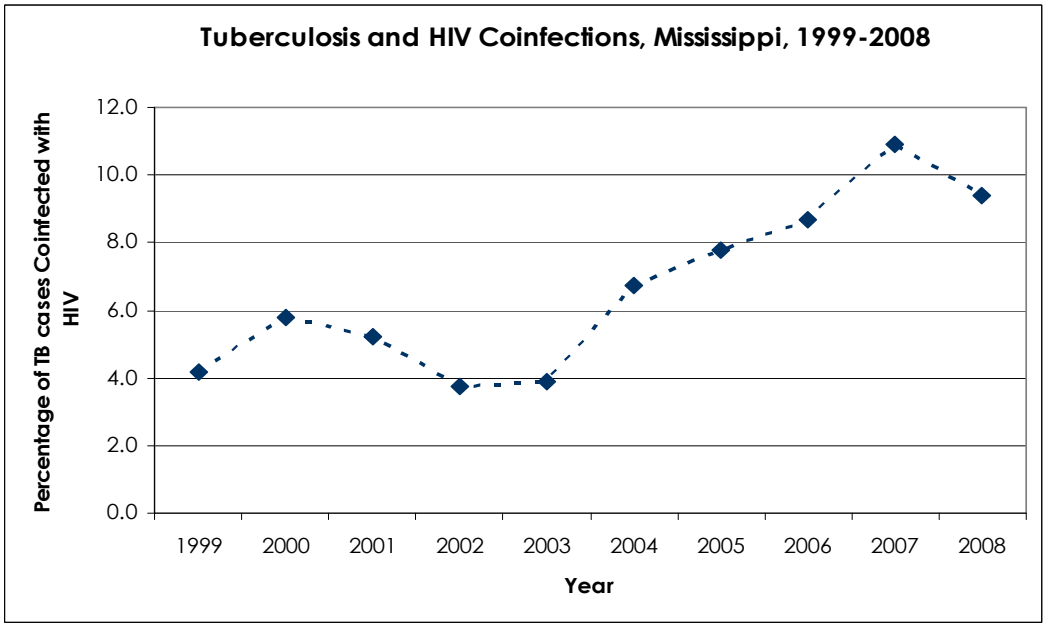


Figure 39



Enteric Diseases

Campylobacteriosis

2008 Case Total	**115**	**2008 rate/100,000**	**3.9**
2007 Case Total	**128**	**2007 rate/100,000**	**4.4**

Clinical Features

Campylobacteriosis is a 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-Barre syndrome (GBS).

Infectious Agent

Campylobacter jejuni (C. jejuni) and less commolny *C. coli*, cause most cases of diarrheal illness in humans.

Reservoir

A zoonotic bacteria 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.

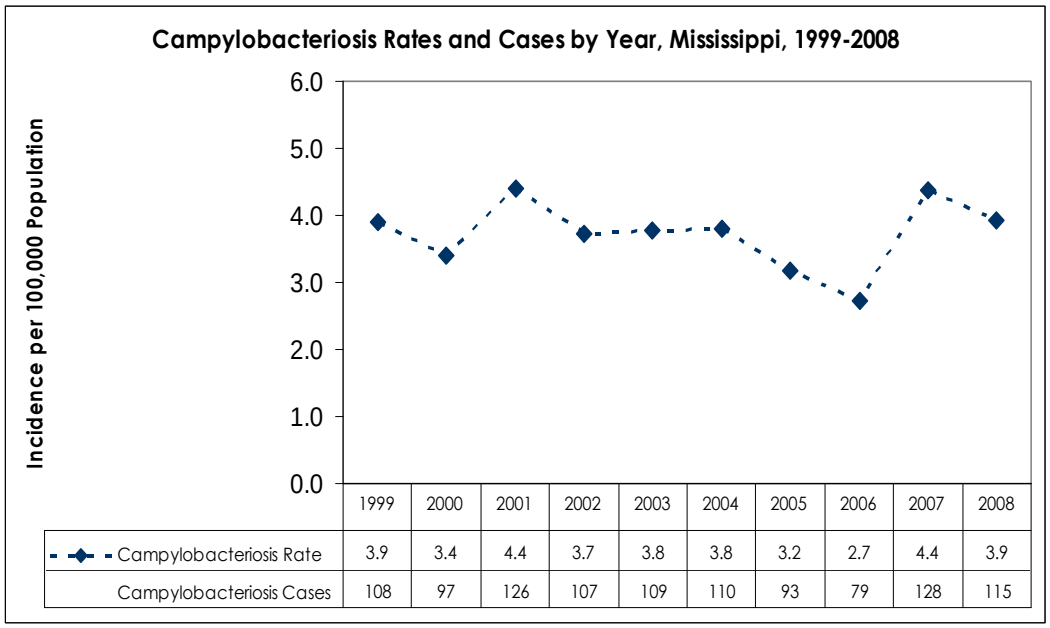
Reporting Classification

Class 3

Epidemiology and Trends

In 2008, there were 115 reported cases of campylobacteriosis in Mississippi; comparable to 128 cases reported in 2007 and the three-year (2005-2007) average of 100 cases (Figure 40).

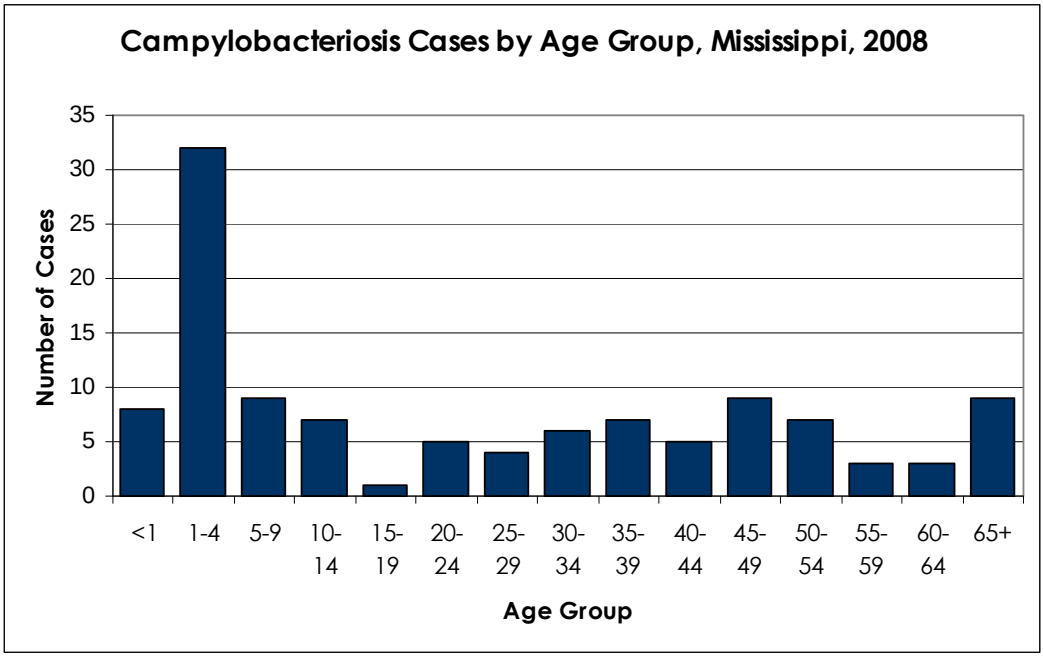
Figure 40



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Campylobacteriosis Rate	3.9	3.4	4.4	3.7	3.8	3.8	3.2	2.7	4.4	3.9
Campylobacteriosis Cases	108	97	126	107	109	110	93	79	128	115

Campylobacter infections are typically more common in the warmer months, as are many enteric illnesses, with 34% of the total cases occurring in June and July. The highest rates of infection are in children less than five years of age. In 2008, 35% of all reported cases were in children younger than five years (Figure 41).

Figure 41



Cryptosporidiosis

2008 Case Total	**17**	**2008 rate/100,000**	**0.6**
2007 Case Total	**103**	**2007 rate/100,000**	**3.5**

Clinical Features

A parasitic infection characterized by profuse, watery diarrhea associated with abdominal pain. Symptoms include anorexia, weight loss, fever, and nausea and vomiting less frequently. 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.

Infectious Agent

Cryptosporidium parvum, a coccidian protozoan, is the species 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, waterparks). 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 (eg, 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

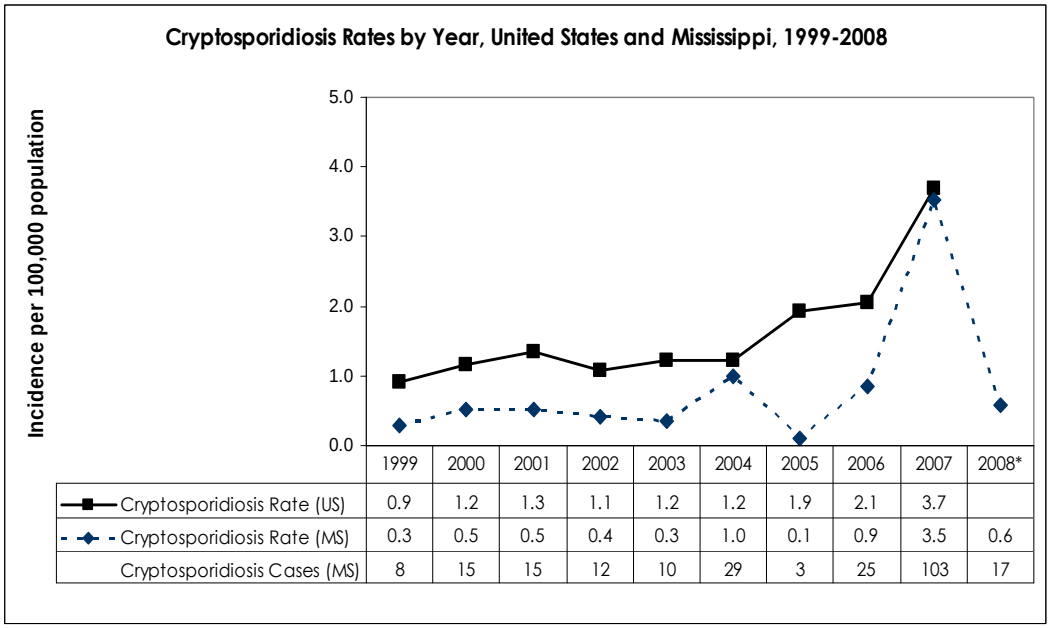
Class 3

Epidemiology and Trends

Children under 2, animal handlers, travelers, men who have sex with men and close personal contacts of infected individuals are more prone to infection. Immunocompetent people may have asymptomatic or self-limited symptomatic infections. Immunodeficient individuals generally clear their infections when factors of immunosuppression are removed.

There were 17 reported cases of cryptosporidiosis in 2008, a return to typical case totals after a ten-year high of 103 cases in 2007. Many of the cases reported in 2007 were associated with an outbreak centered around the Jackson metropolitan area (45) and an outbreak along the Gulf Coast (28). In a typical year, usually between 3-29 cases are reported annually (Figure 42).

Figure 42

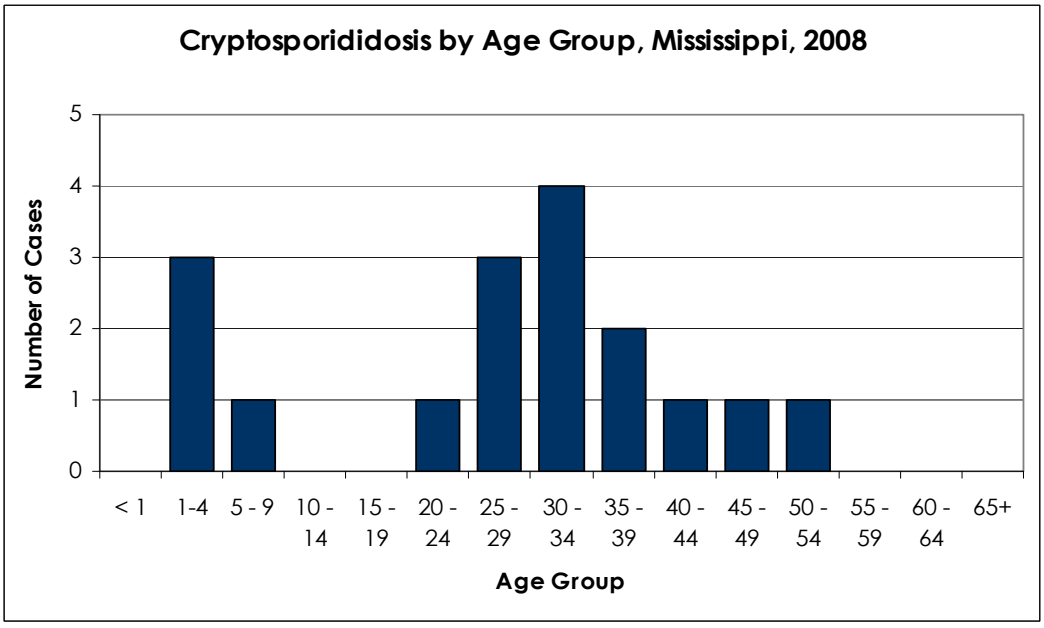


	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008*
Cryptosporidiosis Rate (US)	0.9	1.2	1.3	1.1	1.2	1.2	1.9	2.1	3.7	
Cryptosporidiosis Rate (MS)	0.3	0.5	0.5	0.4	0.3	1.0	0.1	0.9	3.5	0.6
Cryptosporidiosis Cases (MS)	8	15	15	12	10	29	3	25	103	17

*2008 U.S. data not available.

In 2008, a few cases were reported in many age groups, with the highest number of cases occurred in adults aged 30-34 years old with 4 cases (23.5%) (Figure 43).

Figure 43



E. coli O157:H7/ HUS

2008 Case Total	**5**	**2008 rate/100,000**	**0.2**
2007 Case Total	**7**	**2007 rate/100,000**	**0.2**

Clinical Features

Escherichia coli (E. coli) O157:H7 is the most virulent serotype of the Shiga toxin-producing E. coli, 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.

Infectious Agent

E. coli are gram negative bacilli. *E. coli* O157:H7 is thought to cause more than 90% of all diarrhea-associated HUS.

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.

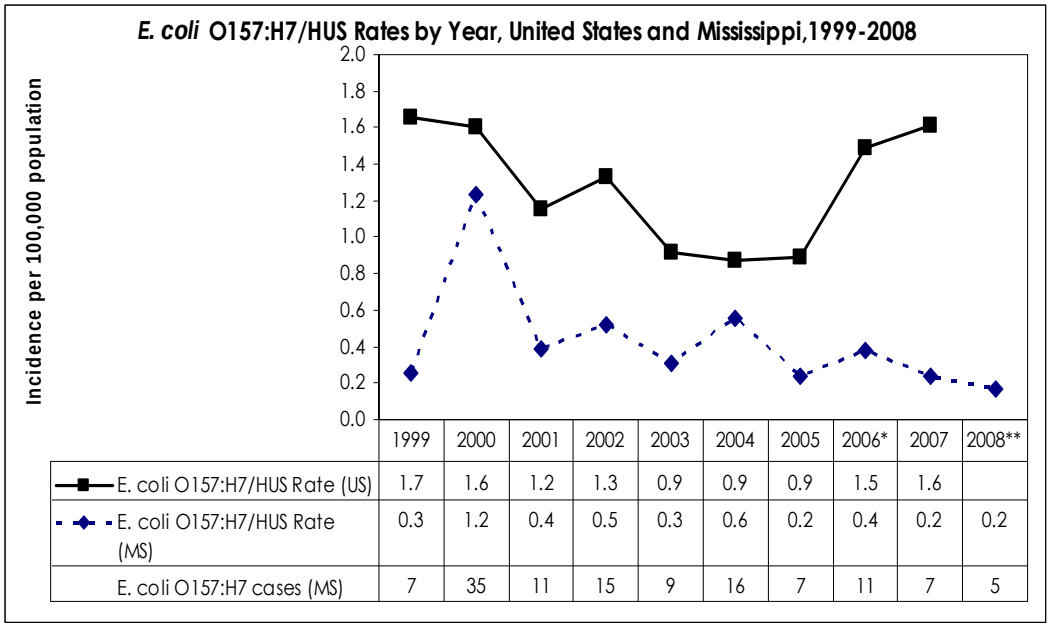
Reporting Classification

Class1

Epidemiology and Trends

In 2008, five *E. coli* O157:H7 infections were reported to MSDH; none with HUS. On average over the past three years, eight infections have been reported annually (Figure 44). The five cases in 2008 were not related to any outbreaks and were not epidemiologically linked. There were no deaths reported in Mississippi in 2008. Of the 30 cases of *E. coli* O157:H7/HUS that were reported to MSDH between 2005 and 2008, 20% occurred in children less than 5 years of age (Figure 45).

Figure 44

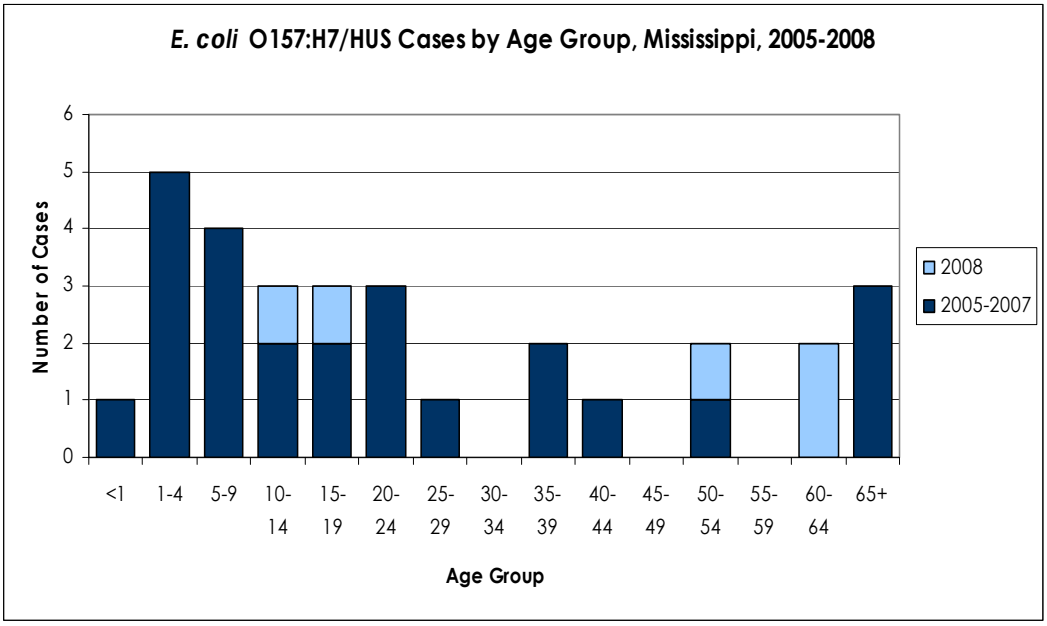


	1999	2000	2001	2002	2003	2004	2005	2006*	2007	2008**
E. coli O157:H7/HUS Rate (US)	1.7	1.6	1.2	1.3	0.9	0.9	0.9	1.5	1.6	
E. coli O157:H7/HUS Rate (MS)	0.3	1.2	0.4	0.5	0.3	0.6	0.2	0.4	0.2	0.2
E. coli O157:H7 cases (MS)	7	35	11	15	9	16	7	11	7	5

* 2006 U.S. rate includes *E. coli* O157:H7; shiga toxin positive, serogroup non-O157; and shiga toxin positive, not serogrouped.

**2008 U.S. data not available.

Figure 45



Hepatitis A

2008 Case Total	**7**	**2008 rate/100,000**	**0.2**
2007 Case Total	**8**	**2007 rate/100,000**	**0.3**

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 of, or attend daycare with infected individuals, or are exposed to hepatitis A virus through common source outbreaks. The recommendations for use of immune globulin and hepatitis A vaccine for post-exposure prophylaxis were updated in a CDC MMWR released October 2007. Under the new guidelines, hepatitis A vaccine (with completion of the series) is now preferred over immune globulin for 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 unless epidemiological investigation indicates ongoing hepatitis A transmission in the facility.

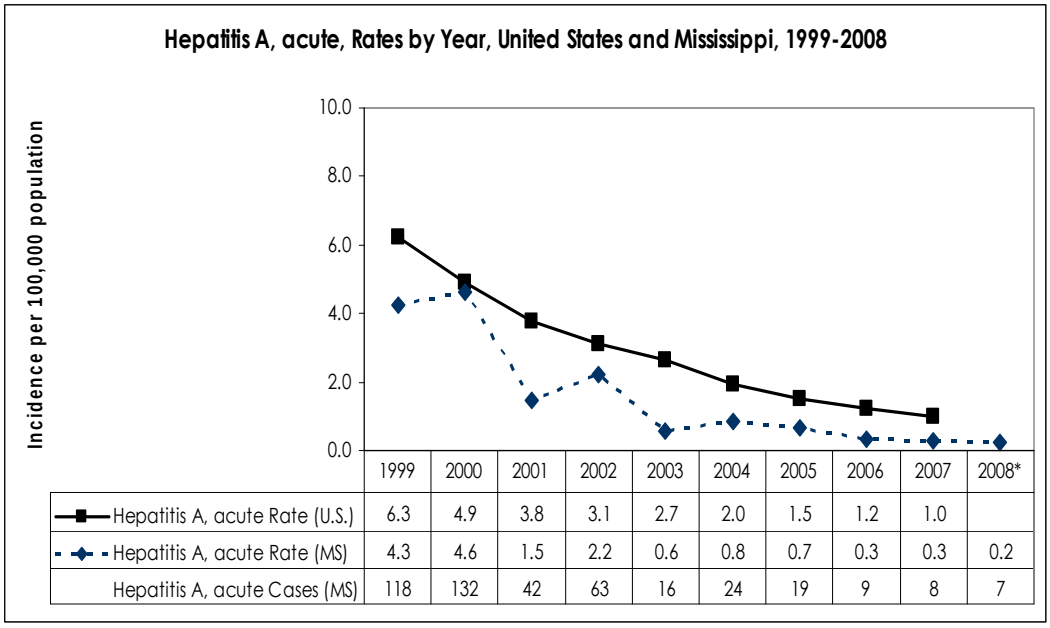
Reporting Classification

Class 1

Epidemiology and Trends

There were seven hepatitis A cases reported in Mississippi in 2008. This is comparable to the eight total cases reported in 2007, but lower than the 2005-2007 average of 12 annual cases (Figure 46). The 2008 cases ranged in age from 23 years to 76 years; none were related to a common source outbreak.

Figure 46



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008*
Hepatitis A, acute Rate (U.S.)	6.3	4.9	3.8	3.1	2.7	2.0	1.5	1.2	1.0	
Hepatitis A, acute Rate (MS)	4.3	4.6	1.5	2.2	0.6	0.8	0.7	0.3	0.3	0.2
Hepatitis A, acute Cases (MS)	118	132	42	63	16	24	19	9	8	7

*2008 U.S. data not available.

Listeriosis

2008 Case Total	**6**	**2008 rate/100,000**	**0.2**
2007 Case Total	**3**	**2007 rate/100,000**	**0.1**

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.

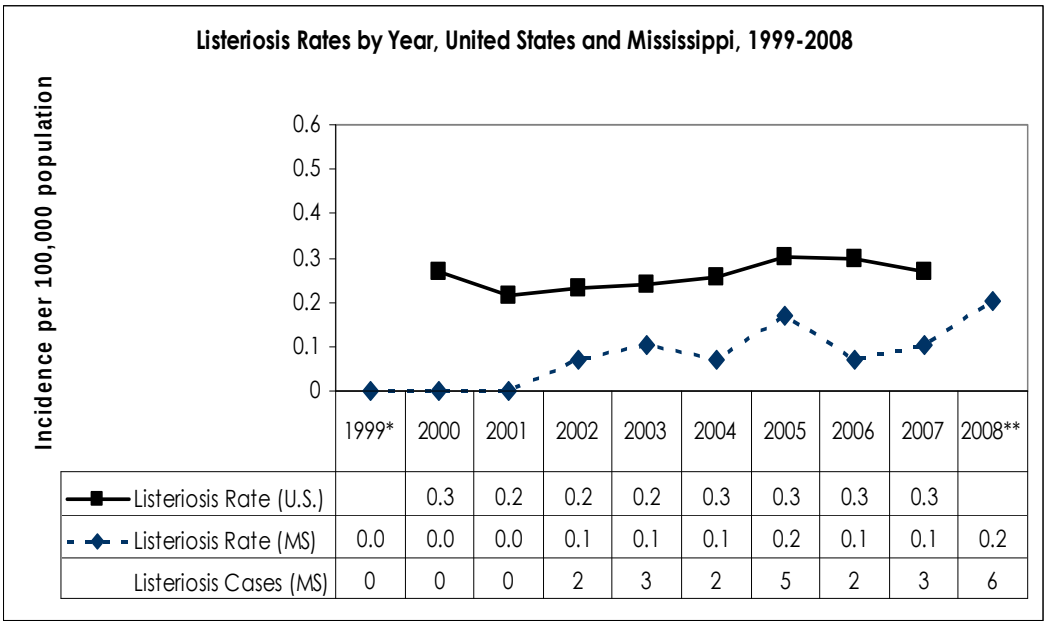
Reporting Classification

Class 2

Epidemiology and Trends

There were six reported cases of listeriosis in Mississippi in 2008, which is comparable to 2007, but higher than the average number of cases reported for the past three years (Figure 47). Three neonatal infections (0-16 days old) were reported, with one stillborn in which the neonate's cord blood tested positive for *Listeria*. The three additional cases were reported in a 55 year old, 74 year old, and a 68 year old who died. None of the infections were epidemiologically linked or associated with common source outbreaks.

Figure 47



	1999*	2000	2001	2002	2003	2004	2005	2006	2007	2008**
Listeriosis Rate (U.S.)		0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	
Listeriosis Rate (MS)	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.2
Listeriosis Cases (MS)	0	0	0	2	3	2	5	2	3	6

*Added to National Notifiable Disease List in 2000.

**2008 U.S. data not available.

Salmonellosis

2008 Case Total	**1079**	**2008 rate/100,000**	**36.7**
2007 Case Total	**1049**	**2007 rate/100,000**	**35.9**

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 reported cases in children < 5 years old and 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.

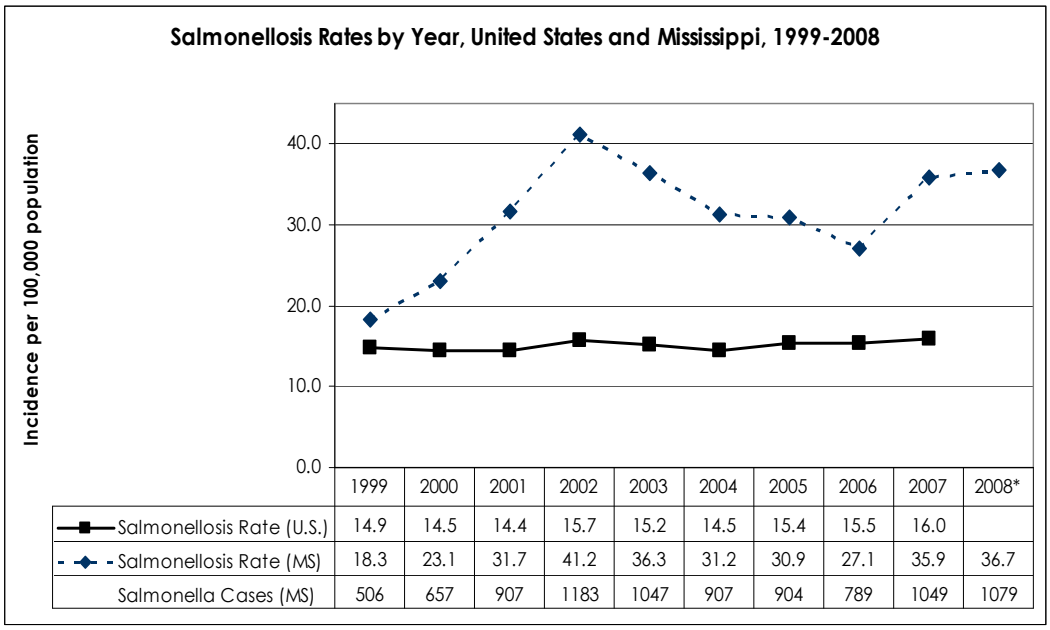
Reporting Classification

Class 2

Epidemiology and Trend:

In Mississippi, 1079 cases of salmonellosis were reported to MSDH in 2008. This is comparable to the previous year when there were 1049 cases reported (Figure 48). In 2008 *Salmonella* serotypes Newport, Mississippi, Javiana and Typhimurium accounted for over 43% of the isolates seen in Mississippi.

Figure 48



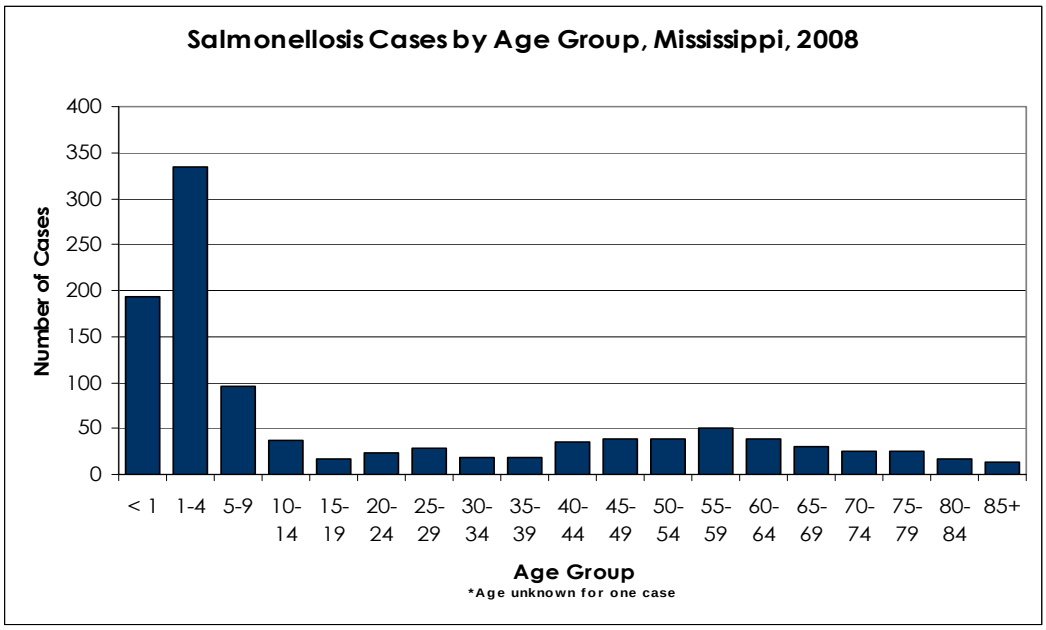
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008*
Salmonellosis Rate (U.S.)	14.9	14.5	14.4	15.7	15.2	14.5	15.4	15.5	16.0	
Salmonellosis Rate (MS)	18.3	23.1	31.7	41.2	36.3	31.2	30.9	27.1	35.9	36.7
Salmonella Cases (MS)	506	657	907	1183	1047	907	904	789	1049	1079

*2008 U.S. data not available.

Infections occur in people of all ages, but there is higher incidence in infants and small children. In 2008, 528 (49%) of the cases were in children less than 5 years of age (Figure 49).

There were two national outbreaks of interest that occurred in 2008 that were identified through the PulseNet system. From late April to late August 2008, a multistate outbreak of *Salmonella* serotype Saintpaul occurred that was traced back to the consumption multiple raw produce items, specifically jalapeño and serrano peppers. Most persons became ill in May or June, with more than 1400 reported cases associated with the outbreak strain leading to 286 hospitalizations and two deaths. Two cases were reported in Mississippi residents during the outbreak period. A smaller outbreak of *Salmonella* serotype Typhimurium was first identified in November 2008, and extended through the end of March 2009. More than 700 cases matching the outbreak strain were identified; seven were Mississippi residents. The source of the outbreak was traced back to peanut butter and peanut butter paste distributed through a facility in Georgia. The peanut butter and paste were used in many foods, and led to a national recall of dozens of peanut butter containing items.

Figure 49



Additional References:

- CDC. Outbreak of *Salmonella* serotype Saintpaul infections associated with multiple raw produce items---United States, 2008. MMWR, August 29, 2009/57;929-934.
- CDC. Multistate outbreak of *Salmonella* infections associated with peanut butter and peanut butter-containing products---United States, 2008-2009. MMWR, January 29, 2009/58;85-90.

Shigellosis

2008 Case Total	**290**	**2008 rate/100,000**	**9.9**
2007 Case Total	**1426**	**2007 rate/100,000**	**48.9**

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* 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.

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.

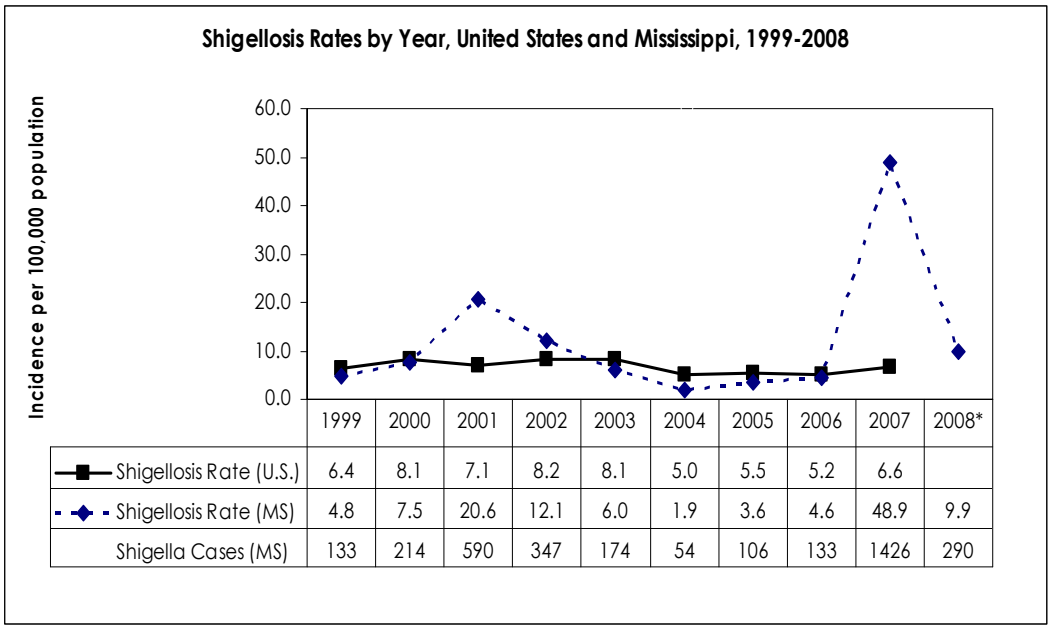
Reporting Classification

Class 2

Epidemiology and Trends

In 2008, there were 290 reported cases of Shigellosis, a marked decrease from 2007 (Figure 50). 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 usually a summer month illness, the 2007 outbreak peaked in October and led to higher than typically expected cases in the early months of 2008 (Figure 51). Seventy-nine percent of the 2008 cases occurred in children less than 5 years of age (Figure 52).

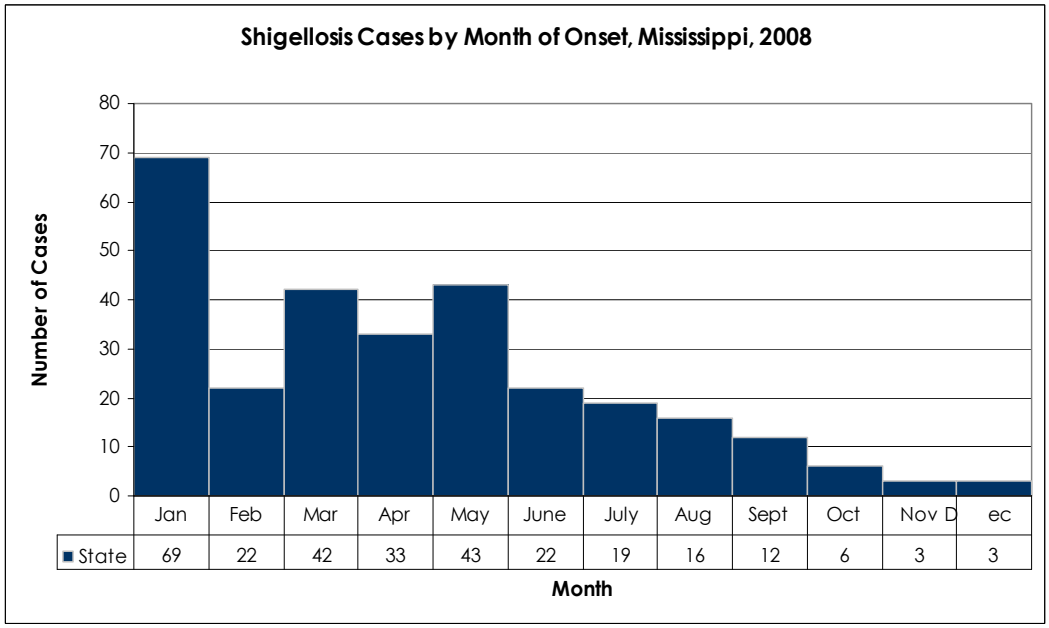
Figure 50



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008*
Shigellosis Rate (U.S.)	6.4	8.1	7.1	8.2	8.1	5.0	5.5	5.2	6.6	
Shigellosis Rate (MS)	4.8	7.5	20.6	12.1	6.0	1.9	3.6	4.6	48.9	9.9
Shigella Cases (MS)	133	214	590	347	174	54	106	133	1426	290

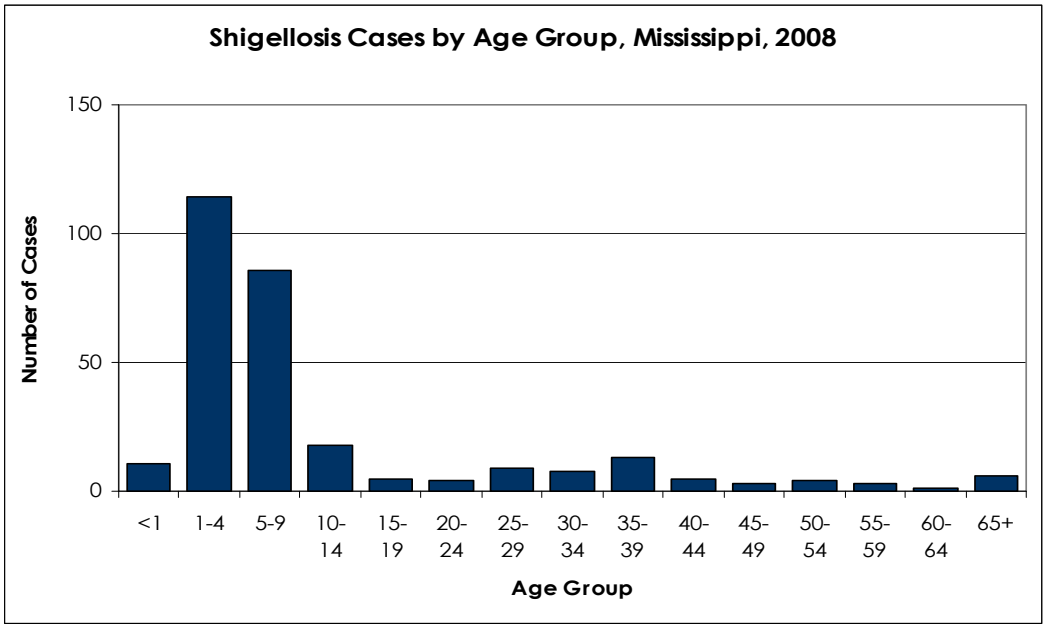
*2008 U.S. data not available.

Figure 51



	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
State	69	22	42	33	43	22	19	16	12	6	3	3

Figure 52



Vibrio disease

2008 Case Total	**7**	**2008 rate/100,000**	**0.2**
2007 Case Total	**8**	**2007 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. mimicus*, *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:

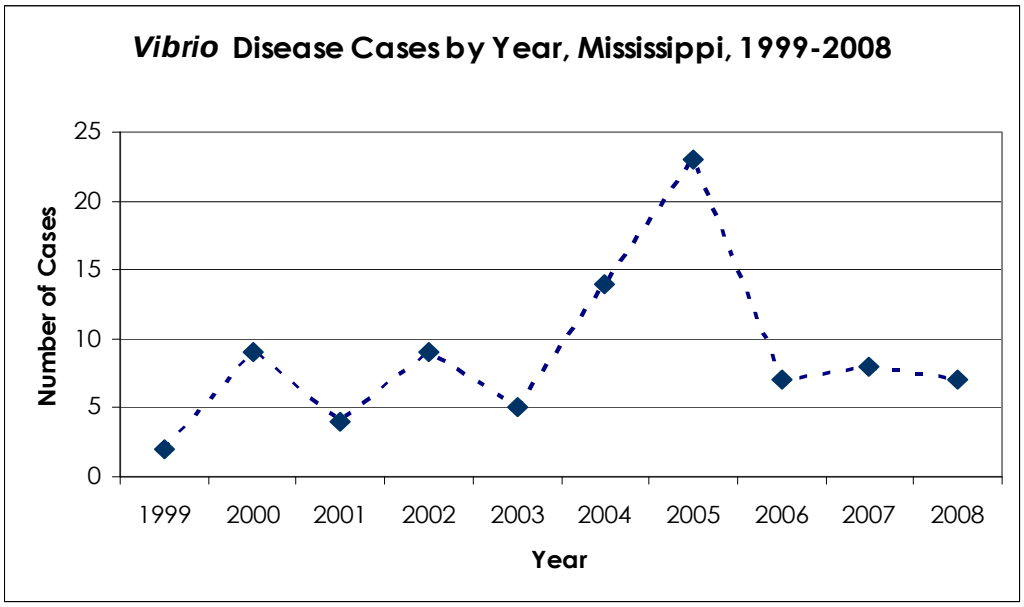
Class 2

Epidemiology and Trends:

In 2008, there were seven reported *Vibrio* infections. This is comparable to 2007 when there were eight reported cases. The three year mean for 2005-2007 is 13 cases (Figure 53).

Of the seven reported cases, one was due to *V. vulnificus* (isolated from both wound and blood cultures), one was due to *V. parahaemolyticus* (isolated from a wound infection), three were due to *V. mimicus* (two isolated from stool cultures and one from a urine culture), one due to *V. damsela* (isolated from a wound infection) and one unknown species (isolated from a wound infection). There was one reported death in 2008 attributed to *V. vulnificus*.

Figure 53


Vibrio Disease Cases by Year, Mississippi, 1999-2008
Number of Cases
25
20
15
10
5
0
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
Year

Zoonotic Diseases

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.

These 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 2008, 532 mosquito pools were submitted to MSDH PHL for WNV, SLE, and EEE testing.

Arboviral Testing

Available at MSDH through the Public Health Laboratory (PHL) as an arboviral panel consisting of IgM testing for WNV and SLE, and, for patients under 25 years of age, LAC IgM. Clinicians are encouraged to call MSDH Epidemiology or the PHL for specifics and indications for arboviral testing.

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

Eastern Equine Encephalitis (EEE)

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*.

Reservoi:

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 2008. 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 reports equine infections to MSDH, and in 2008, eight

horses tested positive for EEE. All eight horses were located in the southeastern and coastal areas of the state. There were no reported EEE positive mosquito pools in 2008.

LaCrosse Encephalitis

2008 Case Total	**3**	**2008 rate/100,000**	**0.1**
2007 Case Total	**0**	**2007 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 three reported cases of LaCrosse encephalitis in 2008. The cases ranged in age from 4 to 9 years of age and occurred in Amite, Madison, and Yazoo counties. There were no deaths associated with these cases.

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.

St. Louis Encephalitis

2008 Case Total	**0**	**2008 rate/100,000**	**0.0**
2007 Case Total	**2**	**2007 rate/100,000**	**0.1**

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 or 2006, but there were nine cases with one death reported in 2005 and two reported cases in 2007. There were no deaths due to SLE in 2007.

Mississippi did not have any reported cases of SLE in 2008. No positive mosquito pools were reported in 2008.

West Nile Virus

2008 Case Total	**65**	**2008 rate/100,000**	**2.2**
2007 Case Total	**136**	**2007 rate/100,000**	**4.7**

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 54). In 2008, there were 65 reported cases with 3 deaths.

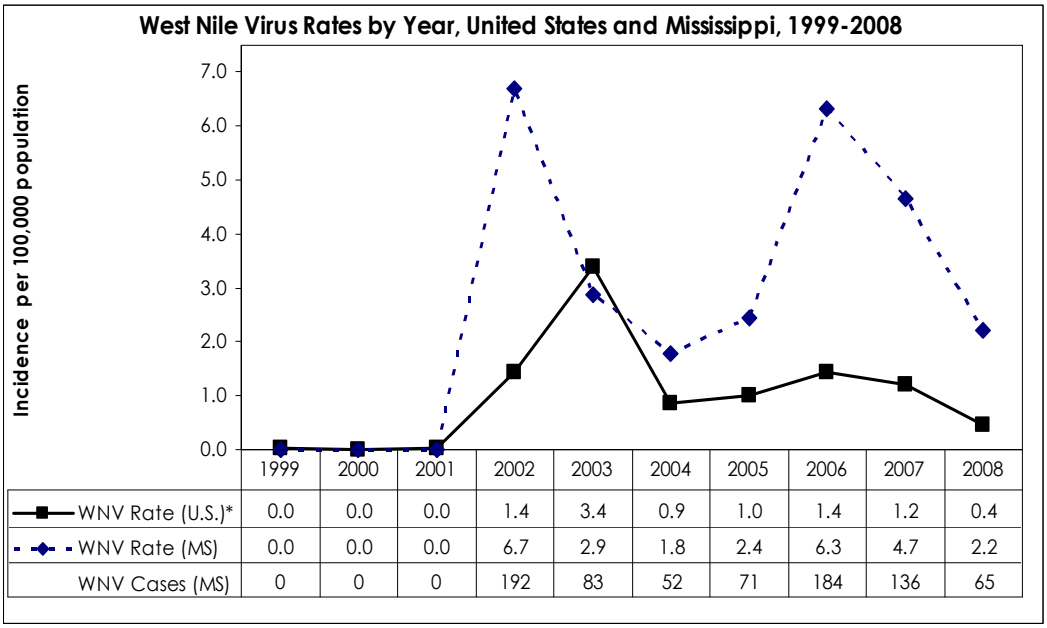
On October 14, 2008, the Centers for Disease Control and Prevention (CDC) released an advisory regarding an increase in the rate of false positive West Nile virus (WNV) test results associated with a specific lot of the PanBio WNV IgM capture ELISA test kit. Labcorp used this lot at its Viromed facility in Minnetonka, MN from July 18, 2008 to

August 31, 2008. The manufacturer voluntarily recalled this testing kit due to the high levels of false-positive results associated with this specific lot.

In Mississippi, during this time frame, 65 specimens tested positive at Viromed with the recalled lot of the PanBio kit. Because these results may have been false-positives, a follow up investigation was initiated to obtain repeat samples for confirmatory testing with a different WNV IgM assay. These tests were performed at both the CDC and the MSDH Public Health Laboratory.

As a result of follow up investigations, 36 of the previously reported 101 WNV cases were deleted from the 2008 surveillance case count. Cases were deleted if additional testing failed to confirm the diagnosis, or if a second sample was not available for confirmatory testing.

Figure 54

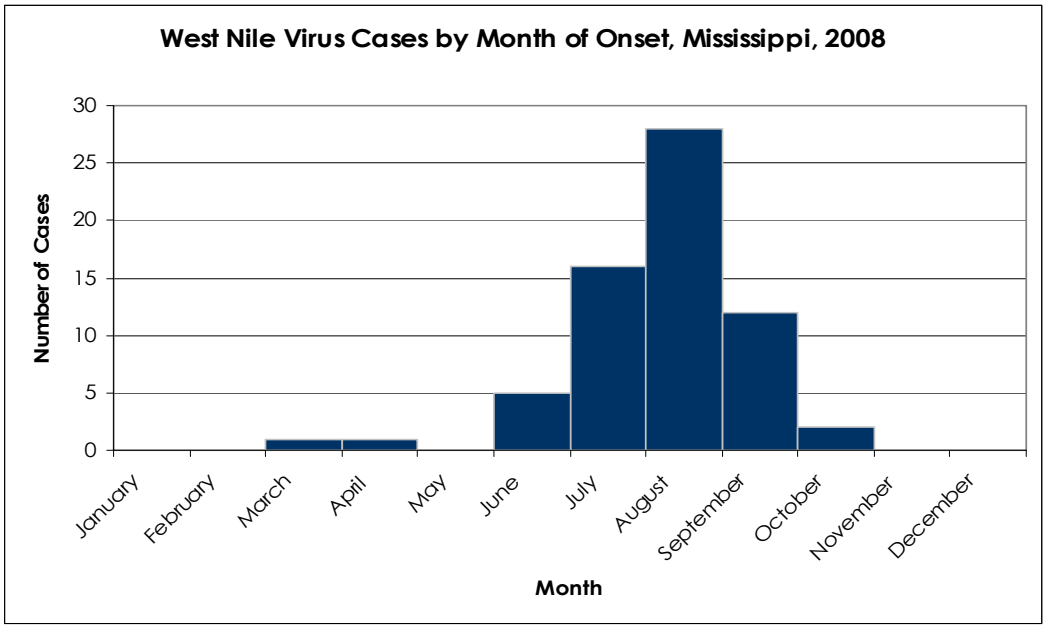


	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
WNV Rate (U.S.)*	0.0	0.0	0.0	1.4	3.4	0.9	1.0	1.4	1.2	0.4
WNV Rate (MS)	0.0	0.0	0.0	6.7	2.9	1.8	2.4	6.3	4.7	2.2
WNV Cases (MS)	0	0	0	192	83	52	71	184	136	65

*U.S. data: 62 cases in 1999; 21 cases in 2000; 66 cases in 2001.

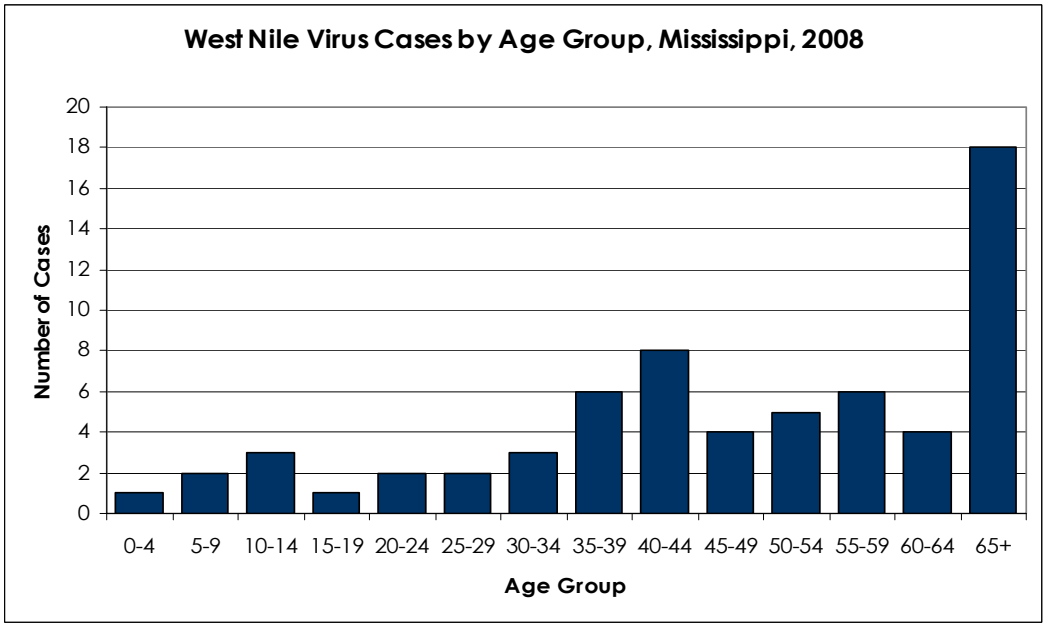
WNV is now thought to be endemic in Mississippi, and the mosquito vector is present the entire year. Human illness can occur year round, but is most prevalent from July to October. August and September are usually the peak months (Figure 55).

Figure 55



Of these 2008 cases, 66% were classified as WNV fever and 34% were encephalitis. The percentage of infections that are symptomatic increases with age, with a mean age of reported cases of approximately 49 years. The cases ranged in age from 1 to 87 years. Fifty-one percent were 50 years or older (Figure 56).

Figure 56



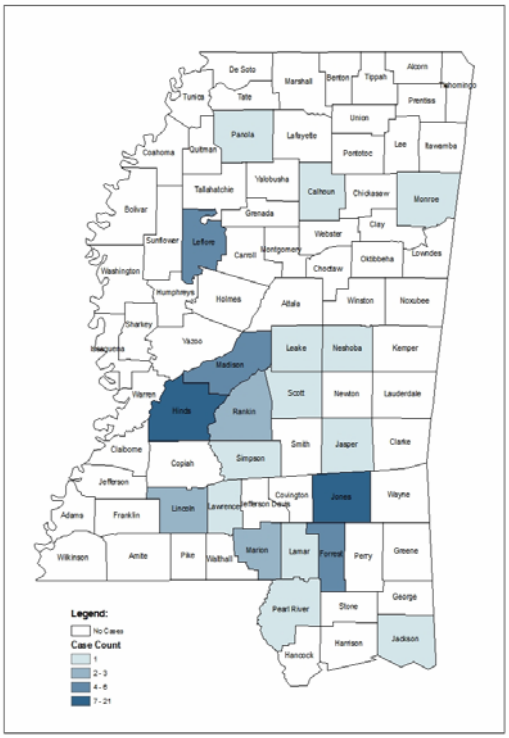
WNV infection can occur in any part of the state, and activity (human cases, positive mosquito pools, horses or birds) has been reported in every Mississippi County except

Issaquena. Forty-eight percent of the 2008 cases occurred in Hinds and Jones counties (Figure 57).

Of the 532 mosquito pools tested, a total of three tested positive for WNV. 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 2008, five horses tested positive for WNV with no predominant geographical location.

Figure 57

West Nile Virus Cases by County, Mississippi, 2008



Lyme Disease

2008 Case Total	**0**	**2008 rate/100,000**	**0.0**
2007 Case Total	**2**	**2007 rate/100,000**	**0.1**

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 inapparent 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 occur in late spring and summer. Lyme disease is not considered endemic in Mississippi, although the vector is present in the state. Since 2004 the number of annual reported cases has ranged from 0-3. There were no confirmed cases reported in 2008, but there were two cases in 2007.

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 raccons 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 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. Currently, only bats maintain the cycle in Mississippi.

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.

Recommendations for prevention of rabies in humans can be found in the document by the Advisory Committee on Immunization Practices entitled Human Rabies Prevention—United States, 2008 http://www.cdc.gov/mmwr/pdf/rr/rr57e507.pdf.

Reporting Classification

Class 1 (human or animal)

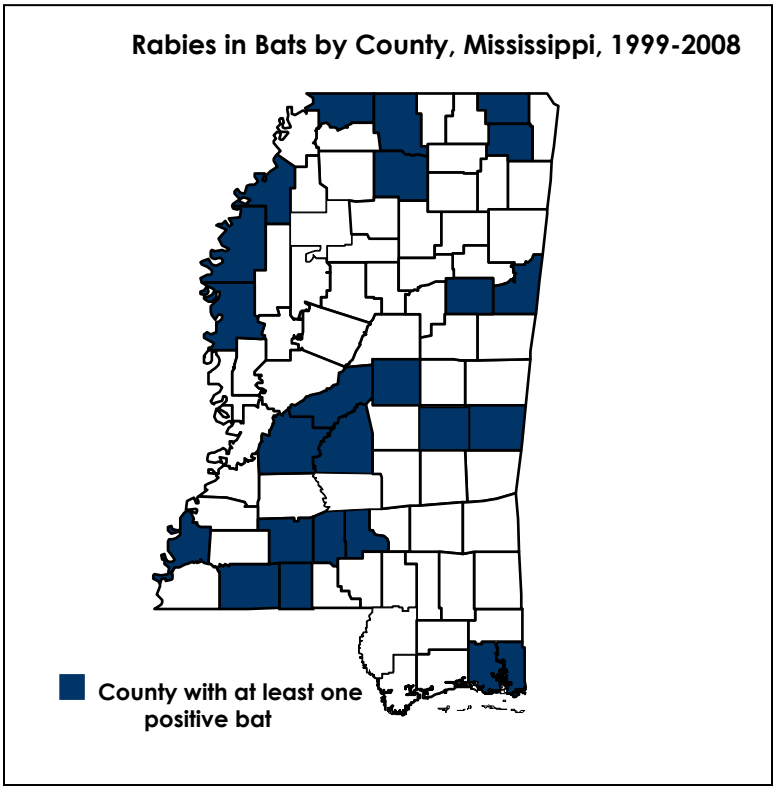
Epidemiology and Trends

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 2-11 bats test positive each year. There were 7 positive bats out of 77 tested in the PHL in 2008. Since 1999, there has been a wide geographic distribution of positive bats, with 50 reported positives in 24 counties (Figure 58). There has not been an indigenous terrestrial (land) rabies case reported in Mississippi since 1961, however, rabies occurs in terrestrial animals annually in states that border Mississippi (Arkansas, Alabama, Louisiana, and Tennessee).

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 58



Rocky Mountain spotted fever

2008 Case Total	**12**	**2008 rate/100,000**	**0.4**
2007 Case Total	**20**	**2007 rate/100,000**	**0.7**

Clinical Features

A rickettsial illness with 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 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.

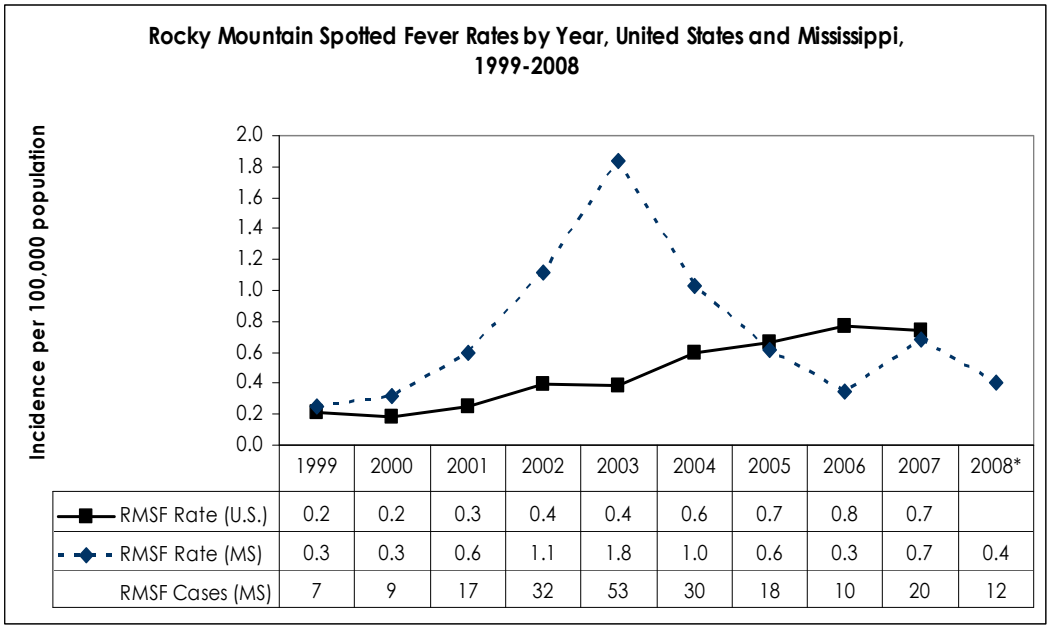
Reporting Classification

Class 2

Epidemiology and Trends

In 2008, there were 12 cases of Rocky Mountain spotted fever reported in Mississippi. This is lower than the three year average of 16 cases reported annually (Figure 59). The cases ranged in age from 6 to 72 years of age. There were no reported deaths.

Figure 59



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008*
RMSF Rate (U.S.)	0.2	0.2	0.3	0.4	0.4	0.6	0.7	0.8	0.7	
RMSF Rate (MS)	0.3	0.3	0.6	1.1	1.8	1.0	0.6	0.3	0.7	0.4
RMSF Cases (MS)	7	9	17	32	53	30	18	10	20	12

*2008 U.S. data not available.

Reportable Disease Statistics

Mississippi Reportable Disease Statistics
2008

		Public Health District									
		I	II	III	IV	V	VI	VII	VIII	IX	State Total
Sexually Transmitted Diseases	**Primary & Secondary Syphilis**	21	11	7	3	41	14	5	42	41	**185**
	Total Early Syphilis	40	39	19	9	131	25	8	72	75	**418**
	Gonorrhea	626	428	1169	543	2016	811	485	760	659	**7497**
	Chlamydia	2274	1606	2960	1630	5554	1922	1370	2027	1918	**21261**
	HIV Disease	61	39	70	30	189	42	39	52	84	**606**
Myco-bacterial Diseases	**Pulmonary Tuberculosis (TB)**	9	6	8	7	39	8	4	10	9	**100**
	Extrapulmonary TB	0	1	5	2	2	0	4	1	2	**17**
	Mycobacteria Other Than TB	32	19	13	20	95	26	12	32	58	**307**
Vaccine Preventable Diseases	**Diphtheria**	0	0	0	0	0	0	0	0	0	**0**
	Pertussis	5	25	3	2	33	11	8	7	10	**104**
	Tetanus	0	0	0	0	0	0	0	0	0	**0**
	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	0	0	0	0	0	0	**0**
	Hepatitis B (acute)	5	12	4	2	15	2	1	5	12	**58**
	Invasive *H. influenzae* b disease	0	0	0	0	3	0	0	1	0	**4**
	Invasive Meningococcal disease	0	1	2	1	2	1	1	1	3	**12**
Enteric Diseases	**Hepatitis A (acute)**	1	0	0	1	1	0	1	3	0	**7**
	Salmonellosis	68	152	38	93	308	117	64	115	124	**1079**
	Shigellosis	29	26	9	19	119	31	25	14	18	**290**
	Campylobacteriosis	13	13	6	4	24	23	7	14	11	**115**
	***E. coli* O157:H7/HUS**	0	2	0	1	1	0	0	0	1	**5**
Zoonotic Diseases	**Animal Rabies (bats)**	0	1	1	0	3	1	1	0	0	**7**
	Lyme disease	0	0	0	0	0	0	0	0	0	**0**
	Rocky Mountain spotted fever	1	0	0	3	0	3	2	2	1	**12**
	West Nile virus	1	0	4	2	30	4	4	18	2	**65**

Mississippi
Provisional Reportable Disease Statistics
November 2009

Figures for the current month are provisional

		Public Health District									State Totals*			
		I	II	III	IV	V	VI	VII	VIII	IX	Nov 2009	Nov 2008	YTD 2009	YTD 2008
Sexually Transmitted Diseases	**Primary & Secondary Syphilis**	2	0	1	1	2	0	0	3	3	12	10	197	156
	Total Early Syphilis	4	0	2	2	13	0	1	6	8	36	21	485	343
	Gonorrhea	59	36	80	44	145	49	32	54	57	556	627	6,774	6,838
	Chlamydia	223	130	238	135	475	179	121	183	188	1,872	2,054	21,826	19,371
	HIV Disease	4	1	4	6	20	4	7	6	6	58	39	540	528
Myco-bacterial Diseases	**Pulmonary Tuberculosis (TB)**	0	0	2	0	4	1	0	0	0	7	6	91	80
	Extrapulmonary TB	0	0	0	0	0	0	1	0	0	1	0	19	13
	Mycobacteria Other Than TB	4	3	0	1	6	1	2	3	5	25	25	264	274
Vaccine Preventable Diseases	**Diphtheria**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pertussis	0	0	0	0	0	1	0	1	0	2	3	60	98
	Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0
	Poliomyelitis	0	0	0	0	0	0	0	0	0	0	0	0	0
	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	0
	Hepatitis B (acute)	0	0	0	0	1	0	0	0	0	1	5	29	54
	Invasive *H. influenzae* b disease	0	0	0	0	0	0	0	0	0	0	0	0	2
	Invasive Meningococcal disease	0	0	0	0	0	0	0	0	0	0	0	3	11
Enteric Diseases	**Hepatitis A (acute)**	0	0	0	0	0	0	0	0	0	0	1	10	5
	Salmonellosis	3	5	1	0	20	5	5	2	3	44	65	864	1029
	Shigellosis	0	1	0	1	0	0	0	0	0	2	3	46	287
	Campylobacteriosis	0	2	0	0	0	0	0	0	1	3	3	94	104
	***E. coli* O157:H7/HUS**	0	0	0	0	0	0	0	0	0	0	1	6	5
Zoonotic Diseases	**Animal Rabies (bats)**	0	0	0	0	0	0	0	0	0	0	0	4	7
	Lyme disease	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rocky Mountain spotted fever	0	0	0	0	0	0	0	0	0	0	0	6	11
	West Nile virus	0	0	0	0	0	0	0	0	0	0	0	52	65

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

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