

Mississippi Morbidity Report

Volume 32, Number 4

December 2016

Annual Summary Selected Reportable Diseases Mississippi – 2013



MISSISSIPPI STATE DEPARTMENT OF HEALTH

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Annual Summary Selected Reportable Diseases

Mississippi – 2013

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Preface

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

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

Mississippi law (Section 41-3-17, Mississippi Code of 1972 as amended) authorized the Mississippi State Board of Health, under which MSDH operates, to establish a list of diseases which are reportable. The reportable disease list and the Rules and Regulations Governing Reportable Diseases and Conditions may be found online at http://www.msdh.state.ms.us/msdhsite/_static/14,0,194.html. Class 1A diseases, reportable by telephone within 24 hours of first knowledge or suspicion, are those to which the MSDH responds immediately to an individual case. Class 1B diseases are those that require individual case investigation but do not require an immediate public health response and can therefore be reported by telephone within one business day of first knowledge or suspicion. Class 2 diseases are reportable within a week of diagnosis, and Class 3 diseases are reportable only by laboratories and do not necessitate an immediate response to an individual case.

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

Paul Byers, MD
State Epidemiologist

Mississippi Public Health Districts & Health Officers

Public Health Districts

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Northeast Public Health

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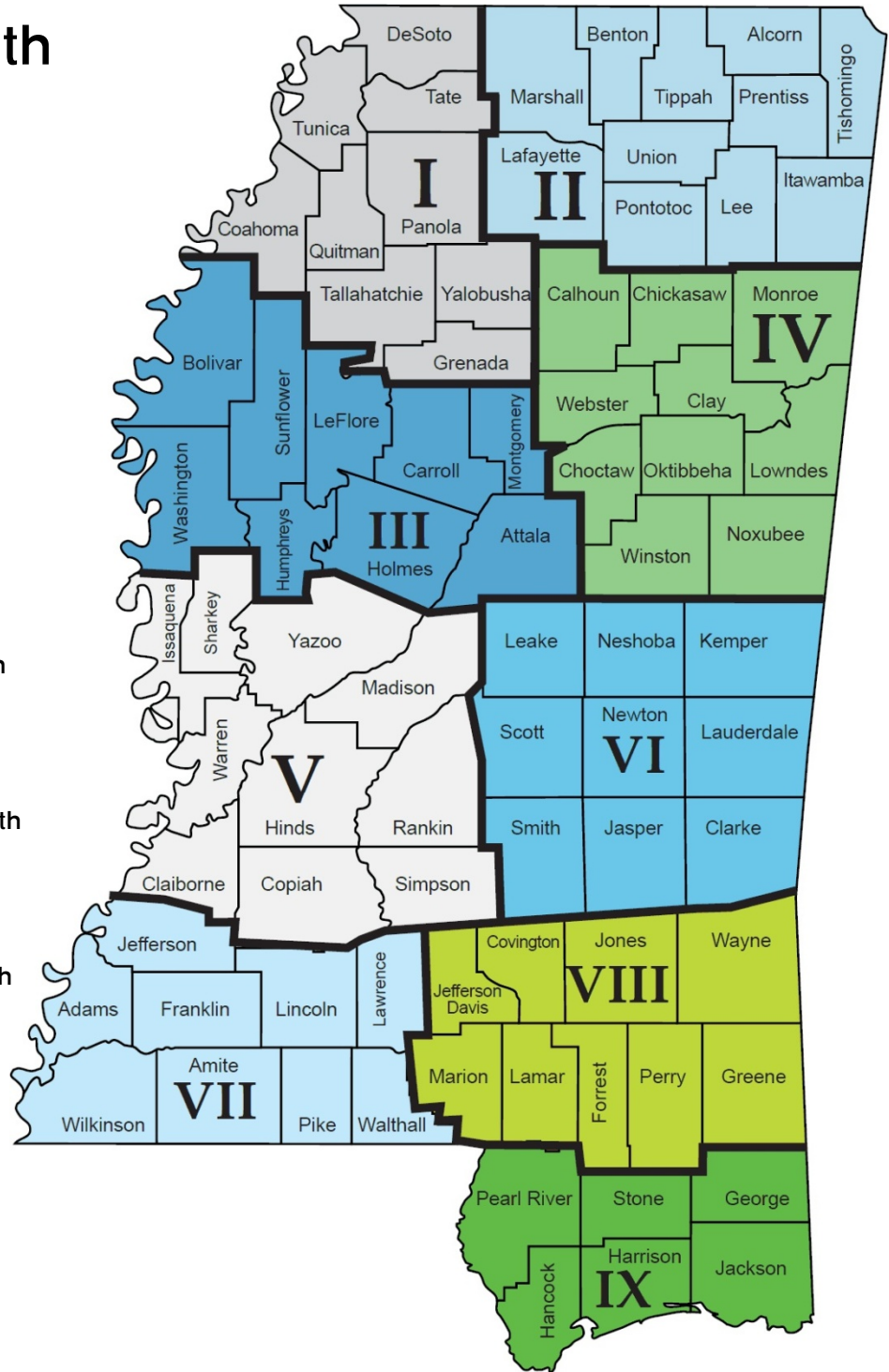
[District VIII](#)

Dr. Christy Barnett
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Coastal Plains Public Health

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Reportable Disease List

Mississippi State Department of Health
[List of Reportable Diseases and Conditions](#)

Reporting Hotline: 1-800-556-0003

Monday - Friday, 8:00 am - 5:00 pm

To report inside Jackson telephone area or for consultative services

Monday - Friday, 8:00 am - 5:00 pm: (601) 576-7725

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

Mail reports to: Office of Epidemiology, Mississippi State Department of Health, Post Office Box
 1700, Jackson, Mississippi 39215-1700

Class 1A Conditions should be reported within 24 hours (nights, weekends and holidays by calling: (601) 576-7400)

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

Any Suspected Outbreak (including foodborne and waterborne outbreaks)		
Anthrax	Hepatitis A	Rabies (human or animal)
Botulism (including foodborne, infant or wound)	Influenza-associated pediatric mortality (<18 years of age)	Ricin intoxication (castor beans)
Brucellosis	Measles	Smallpox
Diphtheria	Melioidosis	Tuberculosis
<i>Escherichia coli</i> O157:H7 and any shiga toxin-producing <i>E. coli</i> (STEC)	<i>Neisseria meningitidis</i> Invasive Disease ^{††}	Tularemia
Glanders	Pertussis	Typhus fever
<i>Haemophilus influenzae</i> Invasive Disease ^{††}	Plague	Viral hemorrhagic fevers (filoviruses [e.g. Ebola, Marburg] and
Hemolytic uremic syndrome (HUS), post-diarrheal	Poliomyelitis	arenaviruses [e.g., Lassa, Machupo])
	Psittacosis	
	Q fever	
Any unusual disease or manifestation of illness, including but not limited to the appearance of a novel or previously controlled or eradicated infectious agent, or biological or chemical toxin.		
[†] Usually presents as meningitis or septicemia, or less commonly as cellulitis, epiglottitis, osteomyelitis, pericarditis or septic arthritis.		
^{††} Specimen obtained from a normally sterile site.		

Class 1B Conditions should be reported within 24 hours (within one business day)

Class 1B: Diseases of major public health importance which shall be reported directly to the Department of Health by telephone within one business day after first knowledge or suspicion. Class 1B diseases and conditions require individual case investigation, but not 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).

<p>Arboviral infections including but not limited to:</p> <ul style="list-style-type: none"> California encephalitis virus Chikungunya virus Dengue Eastern equine encephalitis virus LaCrosse virus Western equine encephalitis virus St. Louis encephalitis virus West Nile virus 	<ul style="list-style-type: none"> Chancroid Cholera Encephalitis (human) HIV infection, including AIDS Legionellosis Non-cholera <i>Vibrio</i> disease <i>Staphylococcus aureus</i>, vancomycin resistant (VRSA) or vancomycin intermediate (VISA) 	<ul style="list-style-type: none"> Syphilis (including congenital) Typhoid fever Varicella infection, primary, in patients >15 years of age Yellow fever
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Class 2: Diseases or conditions of public health importance of which individual cases shall be reported by mail, telephone, fax or electronically, within 1 week of diagnosis. In outbreaks or other unusual circumstances they shall be reported the same as Class 1A. Class 2 diseases and conditions are those for which an immediate public health response is not needed for individual cases.

<i>Chlamydia trachomatis</i> , genital infection Creutzfeldt-Jakob Disease, including new variant Ehrlichiosis <i>Enterococcus</i> , invasive infection [†] , vancomycin resistant Gonorrhea Hepatitis (acute, viral only) Note - Hepatitis A requires Class 1A Report Hepatitis B infection in pregnancy	HIV infection in pregnancy Listeriosis Lyme disease Malaria Meningitis other than Meningococcal or <i>Haemophilus influenzae</i> Mumps <i>M. tuberculosis</i> infection (positive TST or IGRA*) Poisonings** (including elevated blood lead levels***)	Rocky Mountain spotted fever Rubella (including congenital) Spinal cord injuries <i>Streptococcus pneumoniae</i> , invasive infection [†] Tetanus Trichinosis Viral encephalitis in horses and ratites****
<p>[†] Specimen obtained from a normally sterile site.</p> <p>*TST- tuberculin skin test; IGRA- Interferon-Gamma Release Assay (to include size of TST in millimeters and numerical results of IGRA testing).</p> <p>**Reports for poisonings shall be made to Mississippi Poison Control Center, UMMC 1-800-222-1222.</p> <p>***Elevated blood lead levels (as designated below) should be reported to the MSDH Lead Program at (601) 576-7447.</p> <p>Blood lead levels (venous) ≥5µg/dL in patients less than or equal to 6 years of age.</p> <p>**** Except for rabies and equine encephalitis, diseases occurring in animals are not required to be reported to the MSDH.</p>		

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

All blood lead test results in patients ≤6 years of age Campylobacteriosis Carbapenam-resistant Enterobacteriaceae (CRE) <i>Enterobacter</i> species, <i>E.coli</i> or <i>Klebsiella</i> species only	CD4 count and HIV viral load* Chagas Disease (<i>American trypanosomiasis</i>) Cryptosporidiosis Hansen disease (Leprosy)	Hepatitis C infection Nontuberculous mycobacterial disease Salmonellosis Shigellosis
<p>*HIV associated CD4 (T4) lymphocyte results of any value and HIV viral load results, both detectable and undetectable.</p>		

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

The National Program of Cancer Registries at the Centers for Disease Control and Prevention requires the collection of certain diseases and conditions. A comprehensive reportable list including ICD9CM/ICD10CM codes is available on the Mississippi Cancer Registry website, https://www.umc.edu/Administration/Outreach_Services/Mississippi_Cancer_Registry/Reportable_Diseases.aspx.

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

Arboviral Infections (mosquito-borne)

Background

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

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

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

Methods of Control

The methods of controlling mosquito-borne infections are essentially the same for all the individual diseases. The best preventive strategy is to avoid contact with mosquitoes. Reduce time spent outdoors, particularly in early morning and early evening hours when mosquitoes are most active; wear light-colored long pants and long-sleeved shirts; and apply mosquito repellent to exposed skin areas. Reduce mosquito breeding areas around the home and workplace by eliminating standing or stagnant water. Larvicides 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 2013, 1044 mosquito pools were submitted to MSDH PHL for WNV testing.

Arboviral Testing

The Public Health Laboratory (PHL) performs an arboviral panel consisting of IgM testing for WNV and SLE, and, for patients less than 25 years of age, LAC IgM. Clinicians are encouraged to call MSDH Epidemiology or the PHL for specifics and indications for arboviral testing. In 2013, 1110 samples were submitted to the MSDH PHL for arboviral testing.

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

Eastern Equine Encephalitis (EEE)
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2013 Case Total	0	2013 rate/100,000	0.0
2012 Case Total	0	2012 rate/100,000	0.0

Clinical Features

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

Infectious Agent

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

Reservoir

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

Transmission

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

Incubation

3-10 days (generally within 7 days).

Reporting Classification

Class 1B.

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 2013. The last two reported cases of EEE occurred in October 2002.

Horses also become ill with EEE and are dead end hosts. Infected horses can serve as sentinels for the presence of EEE, and can indicate an increased risk to humans. The Mississippi Board of Animal Health (MBAH) reports equine infections to MSDH, and in 2013, 12 horses tested positive for EEE, which is a drastic decline from 32 in 2012. In 2013, the EEE positive horses were reported from the following counties: Clarke (2), George (1), Harrison (1), Jasper (1), Lamar (1), Lawrence (1), Madison (1), Neshoba (1), Pearl River (1), Perry (1), and Wayne (1). All twelve of the positive horses were located in the lower half of the state, with 50% (6) located in Districts VIII and IX.

LaCrosse Encephalitis

2013 Case Total	3	2013 rate/100,000	0.1
2012 Case Total	1	2012 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 1B.

Epidemiology and Trends

Reported LaCrosse encephalitis remains relatively rare in Mississippi, with 19 reported cases since 1999. There were three reported cases of LaCrosse encephalitis in 2013; all of the cases were 10 years old or younger.

Of the 19 total cases since 1999, 53% were in females. The ages ranged from 3 months to 78 years of age, with 95% of the cases under the age of 15 and a median age of 6 years.

Another *Bunyavirus* in the California group, Jamestown Canyon encephalitis virus, has also been seen in Mississippi, with one reported case in 1993, one in 2006, and one in 2008. There were no reported cases of Jamestown Canyon encephalitis virus in 2013.

St. Louis Encephalitis

2013 Case Total	0	2013 rate/100,000	0.0
2012 Case Total	0	2012 rate/100,000	0.0

Clinical Features

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

Infectious Agent

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

Reservoir

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

Transmission

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

Incubation

5-15 days.

Reporting Classification

Class 1B.

Epidemiology and Trends

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

Mississippi had no reported cases of SLE in 2013.

West Nile Virus

2013 Case Total	45	2013 rate/100,000	1.5
2012 Case Total	247	2012 rate/100,000	8.3

Clinical Features

Clinical illness occurs in approximately 20% of infected individuals. Most with clinical manifestations will develop the milder West Nile fever, which includes fever, headache, fatigue, and sometimes a transient rash. About 1 in 150 infected persons develop more severe West Nile neuroinvasive disease ranging from 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; it 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.

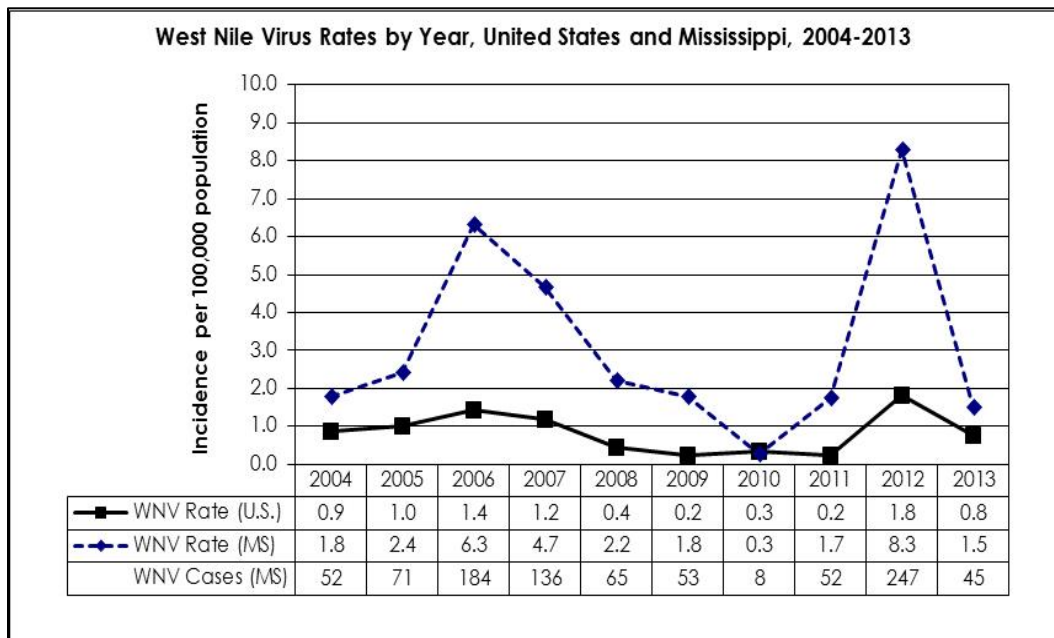
Reporting Classification

Class 1B.

Epidemiology and Trends

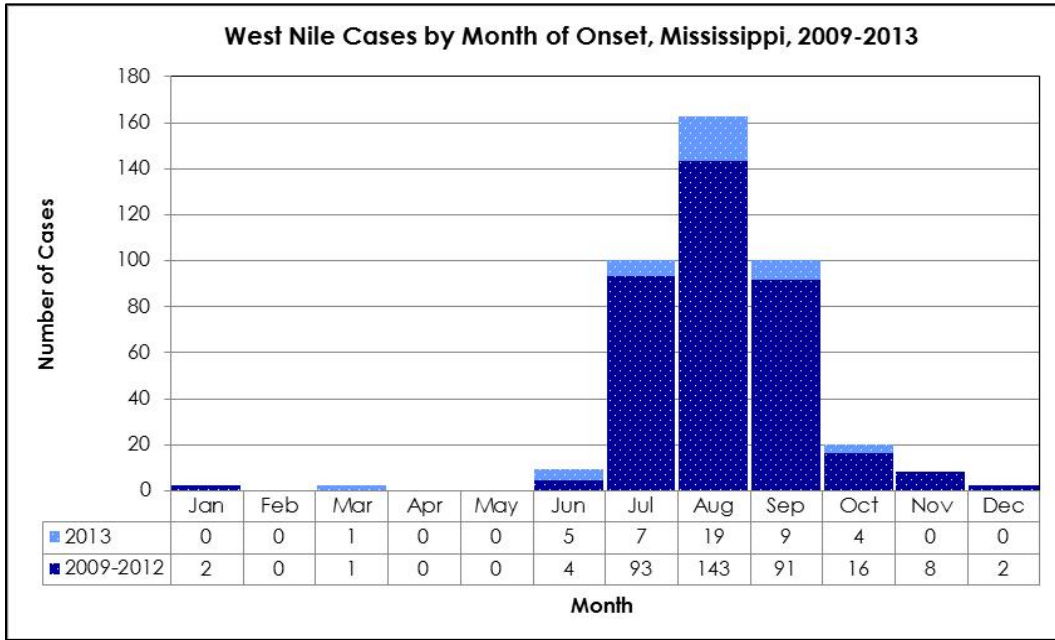
In Mississippi, West Nile virus was first isolated in horses in 2001 followed by human infections in 2002 with 192 cases reported. The years following saw a decrease in the number of reported infections; however in 2006, there was a resurgence of 184 cases (Figure 1). In 2013, there was a decrease in reported WNV cases from 247 cases in 2012 to 45 cases in 2013, leading to one of the lowest recorded rates in the past ten years. There were five deaths associated with WNV in 2013. Of the 45 cases in 2013 of WNV, 58% were males and 42% were females.

Figure 1



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 June to October. July, August, and September are usually the peak months and 89% of the cases over the past five years have occurred during these three months (Figure 2).

Figure 2



Of the 45 cases reported in 2013, 18 (40%) were classified as WNV fever and 27 (60%) were neuroinvasive. The cases ranged in age from 3 to 91 years, with a median age of 54 years (Figure 3). The five reported deaths occurred in individuals over the age of 65, with a median age of 84 years.

Figure 3

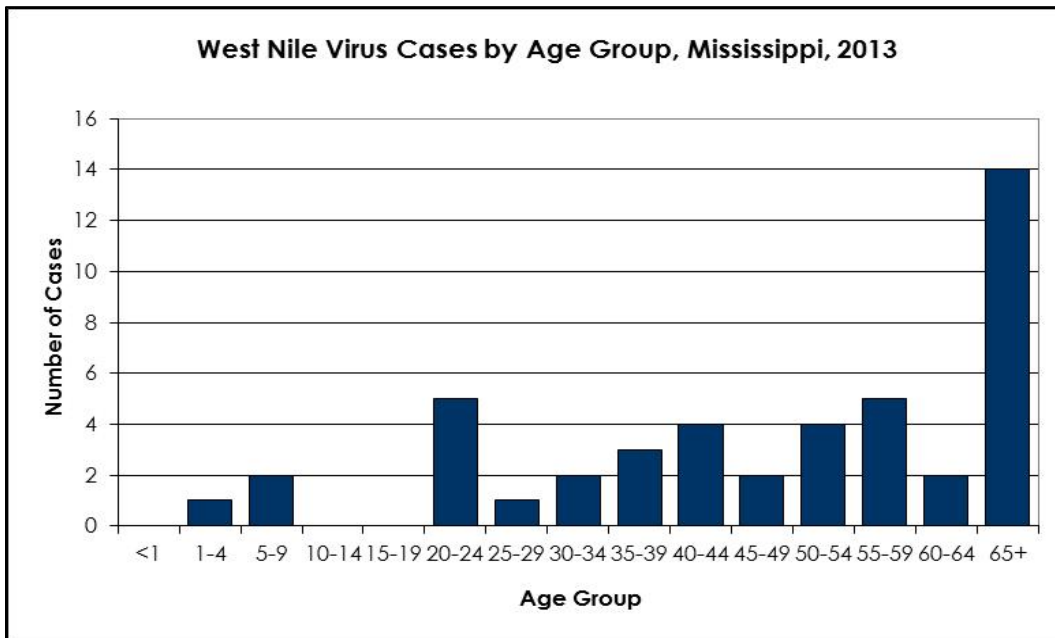
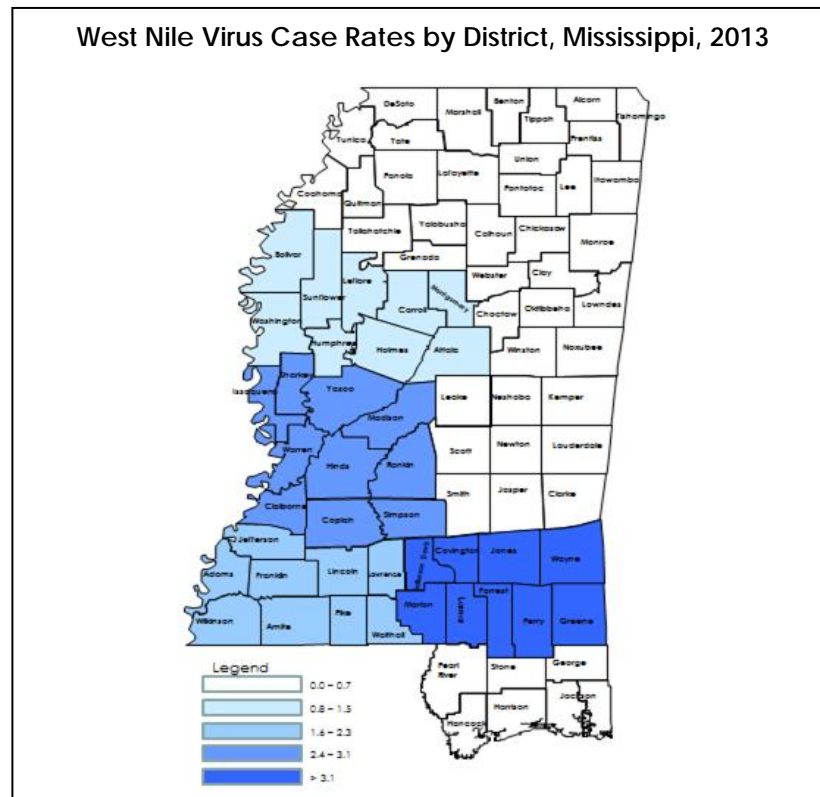


Figure 5



Campylobacteriosis

2013 Case Total	99	2013 rate/100,000	3.3
2012 Case Total	99	2012 rate/100,000	3.3

Clinical Features

Campylobacteriosis is a zoonotic bacterial disease of variable severity ranging from asymptomatic infections to clinical illness with fever, diarrhea (may be bloody), abdominal pain, and nausea and vomiting. Symptoms typically resolve after one week, but may persist for weeks if untreated. Rare post-infectious syndromes include reactive arthritis and Guillain-Barré syndrome (GBS).

Infectious Agent

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

Reservoir

Commonly present in cattle and poultry.

Transmission

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

Incubation

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

Period of Communicability

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

Methods of Control

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

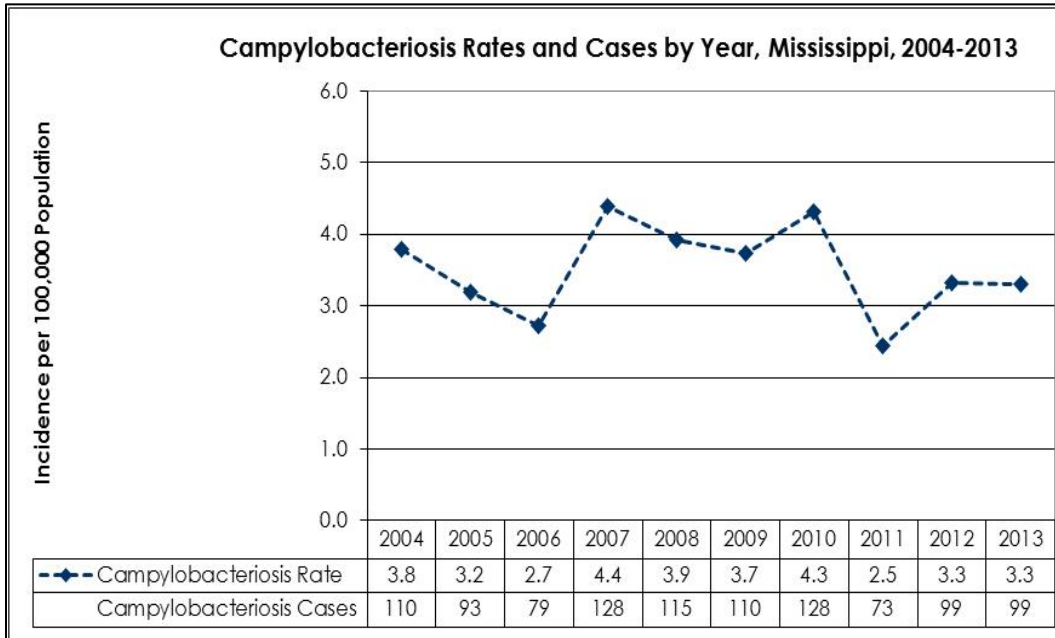
Reporting Classification

Class 3.

Epidemiology and Trends

In 2013, there were 99 reported cases of campylobacteriosis in Mississippi; this was comparable to the number of reported cases in 2012 and to the three-year average (2010-2012) of 100 cases (Figure 6). The 2013 cases were not associated with any reported outbreaks.

Figure 6



Campylobacter infections are typically more common in the warmer months, as are many enteric illnesses; however in 2013, the reported number of cases remained stable throughout the year (Figure 7). Children less than five years of age and adults 65 years of age and older accounted for 42% of the overall cases in 2013 (Figure 8).

Figure 7

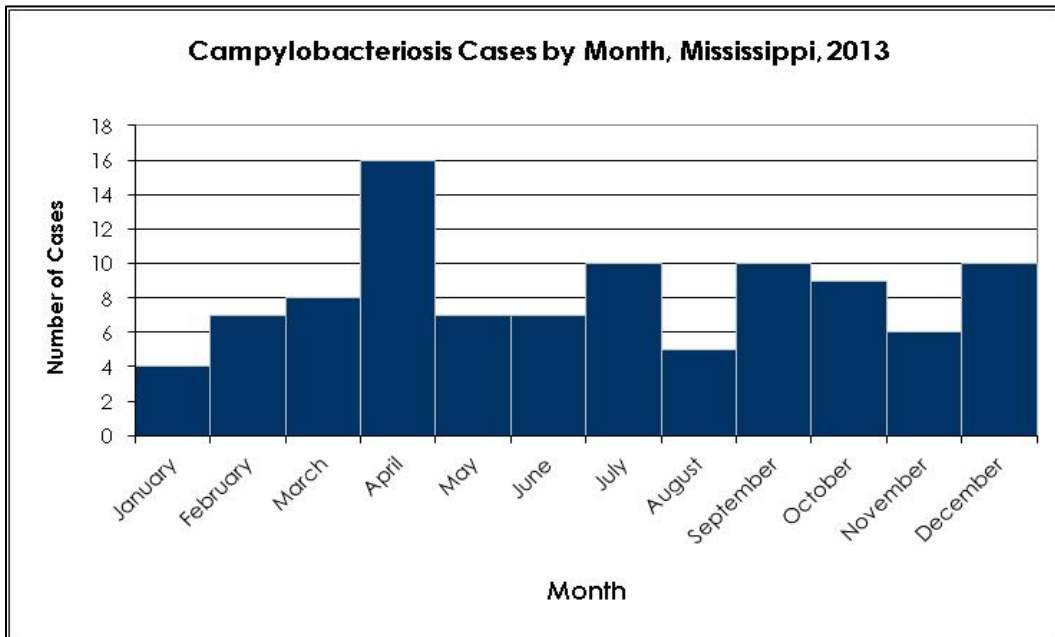
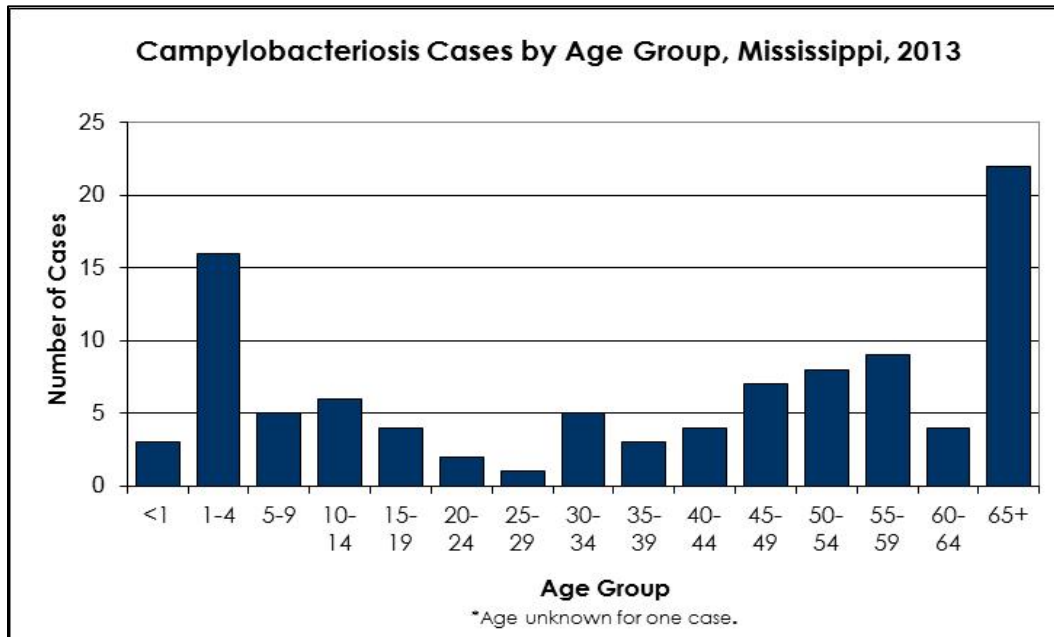


Figure 8



Chlamydia

2013 Case Total	17,355	2013 rate/100,000	580.2
2012 Case Total	22,992	2012 rate/100,000	770.3

Clinical Features

Chlamydia is a sexually transmitted bacterial infection causing urethritis in males and cervicitis in females. Urethritis in males 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 infections can occur in 1%-25% of sexually active men and up to 70% of sexually active women.

Infectious Agent

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

Reservoir

Humans.

Transmission

Transmitted primarily through sexual contact.

Incubation

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

Period of Communicability

Unknown.

Methods of Control

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

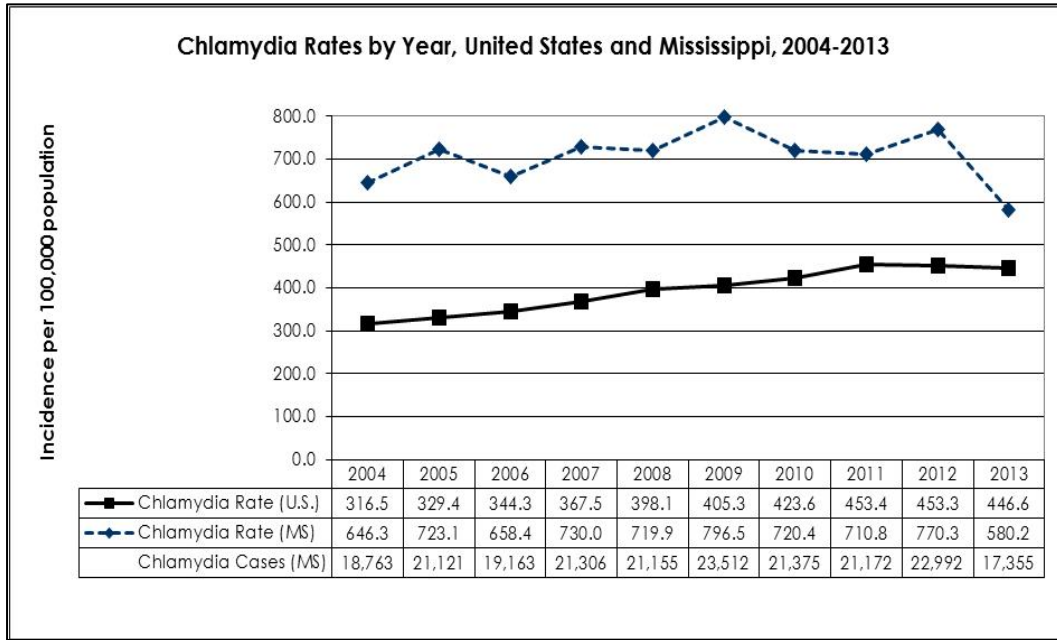
Reporting Classification

Class 2.

Epidemiology and Trends

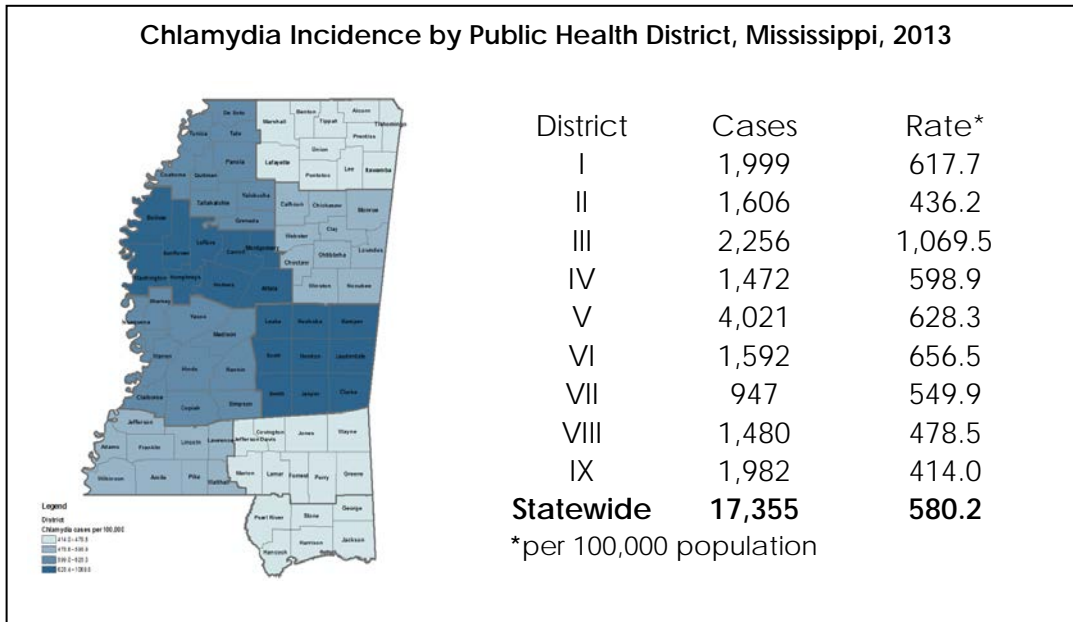
Chlamydia is the most frequently reported bacterial sexually transmitted disease in the United States and in Mississippi. In 2013, the number of chlamydia cases in Mississippi decreased 25% (from 22,992 to 17,355 cases), resulting in a case rate of 580.2 per 100,000 population (Figure 9). The 2013 case count and rate of chlamydia was the lowest in Mississippi since 2003. The Mississippi rate has been above the national rate for several years. In 2013, Mississippi had the fifth highest case rate of chlamydia in the United States.

Figure 9



Chlamydia was reported in every public health district, with the highest incidence noted in Public Health District III (Figure 10).

Figure 10



Chlamydia infections were reported over a range of age groups, but the largest proportion was reported among 15-24 year olds, accounting for 74% of the reported cases (Figure 11). African Americans accounted for 82% of the reported cases in which

race was known (Figure 12). In 2013, the rate of chlamydia infections for African Americans (1,029.5 per 100,000) was eight times the rate for whites (125.0 per 100,000).

Figure 11

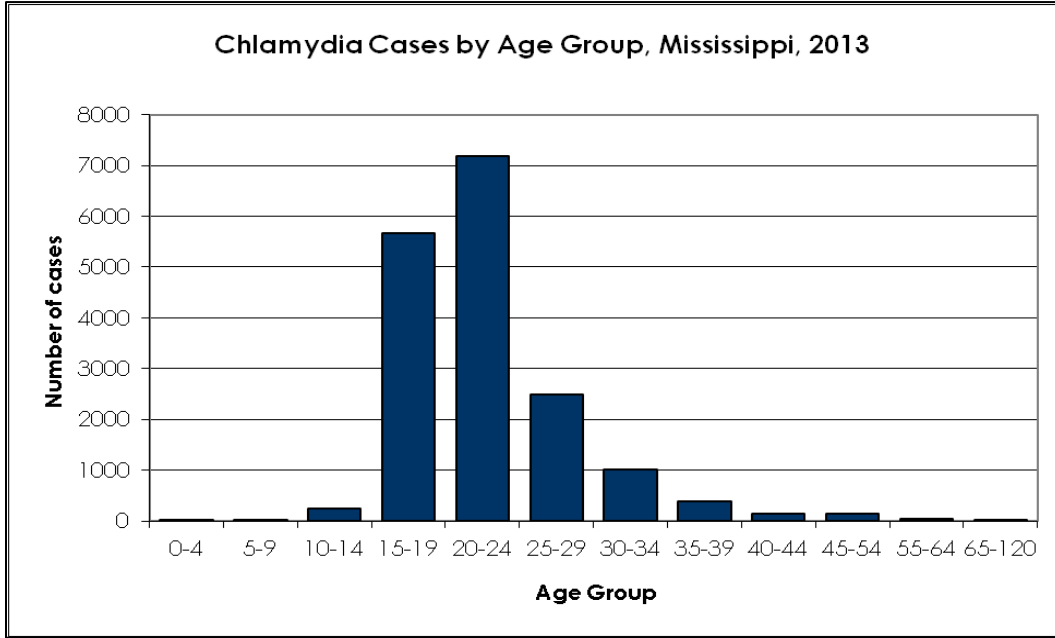
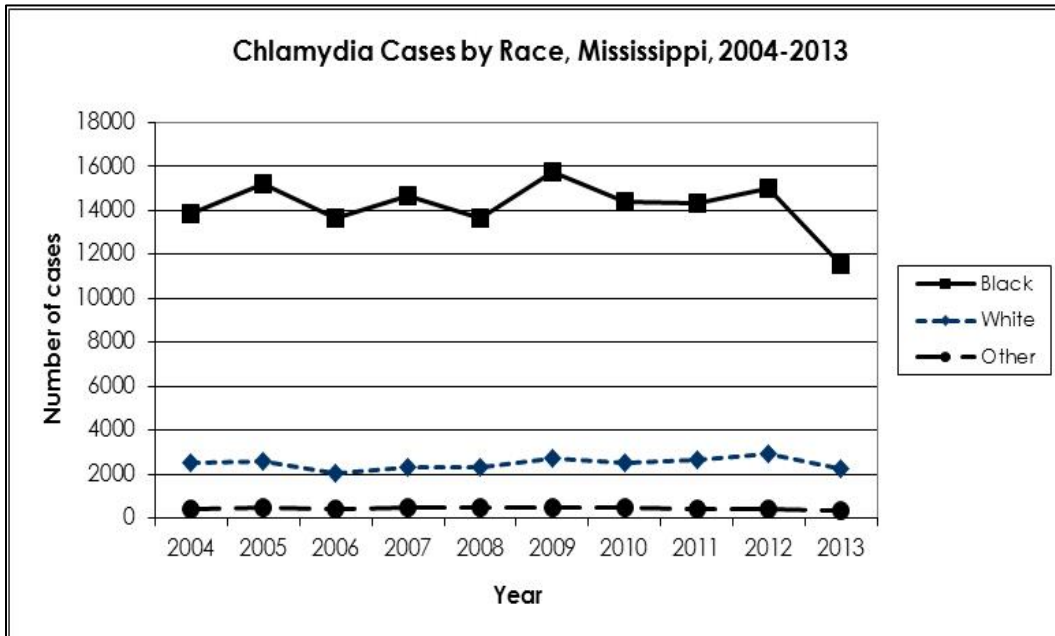


Figure 12



Cryptosporidiosis

2013 Case Total	48	2013 rate/100,000	1.6
2012 Case Total	40	2012 rate/100,000	1.3

Clinical Features

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

Infectious Agent

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

Reservoir

Humans, cattle and other domesticated animals.

Transmission

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

Incubation

1 to 12 days (average 7 days).

Period of Communicability

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

Methods of Control

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

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

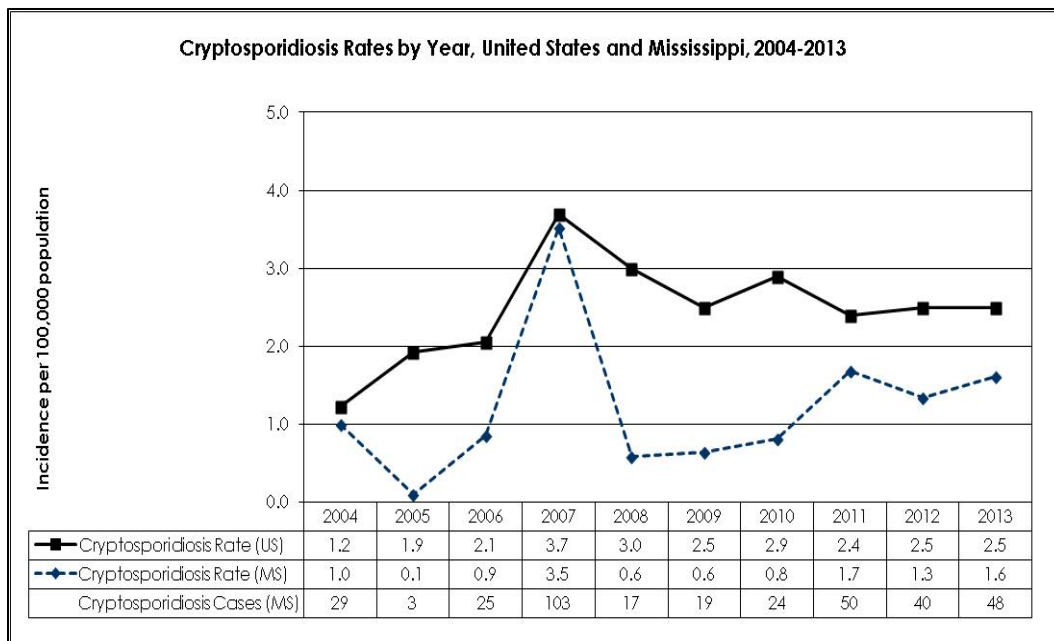
Reporting Classification

Class 3.

Epidemiology and Trends

There were 48 reported cases of cryptosporidiosis in 2013 (Figure 13). This is comparable to the 40 cases reported in 2012, but higher than the three year average of 38 cases from 2010 to 2012. There were no common source outbreaks identified in 2013.

Figure 13



***E. coli* O157:H7/ STEC / HUS**

2013 Case Total	30	2013 rate/100,000	1.0
2012 Case Total	31	2012 rate/100,000	1.0

Clinical Features

Escherichia coli (*E. coli*) O157:H7 is the most virulent serotype of the Shiga toxin-producing *E. coli* (STEC), and is associated with diarrhea, hemorrhagic colitis, hemolytic-uremic syndrome (HUS), and post-diarrheal thrombotic thrombocytopenic purpura (TTP). Symptoms often begin as nonbloody diarrhea but can progress to diarrhea with

occult or visible blood. Severe abdominal pain is typical, and fever is usually absent. The very young and the elderly are more likely to develop severe illness and HUS, defined as microangiopathic hemolytic anemia, thrombocytopenia, and acute renal dysfunction. HUS is a complication in about 8% of *E. coli* O157:H7 infections. Supportive care is recommended as antibiotic use may increase the risk of progression to HUS. Other serotypes of *E. coli* are capable of producing Shiga toxins (STEC) that can lead to illness and HUS.

Infectious Agent

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

Reservoir

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

Transmission

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

Incubation

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

Period of Communicability

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

Methods of Control

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

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

common source outbreaks, even if the affected persons are geographically far apart, and assists in rapidly identifying the source of outbreaks.

Reporting Classification

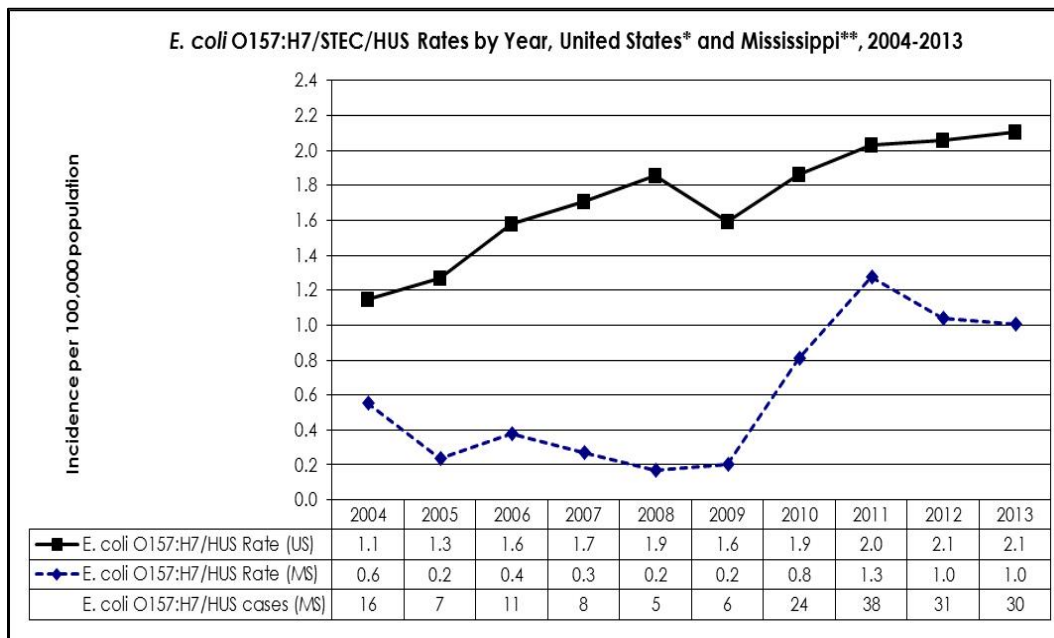
Class1A (includes *E. coli* O157:H7, non O157:H7 STEC and post-diarrheal HUS).

Epidemiology and Trends

In Mississippi, all *E. coli* O157:H7 infections, non O157:H7 STEC infections (added to the List of Reportable Diseases and conditions in late 2010) and cases of post-diarrheal HUS are reportable. In 2013 there were 30 cases reported to MSDH; 11 *E. coli* O157:H7 and 19 non O157:H7 STEC. This was comparable to the 31 reported cases in 2012 (Figure 14).

The 19 non O157:H7 STEC cases were due to serogroups O103 (3), O26 (4), O111 (4), and O121 (1). The serogroups of the remaining seven STEC cases were unknown. One of the *E. coli* O157:H7 cases also developed HUS. There were no deaths reported in Mississippi in 2013.

Figure 14



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

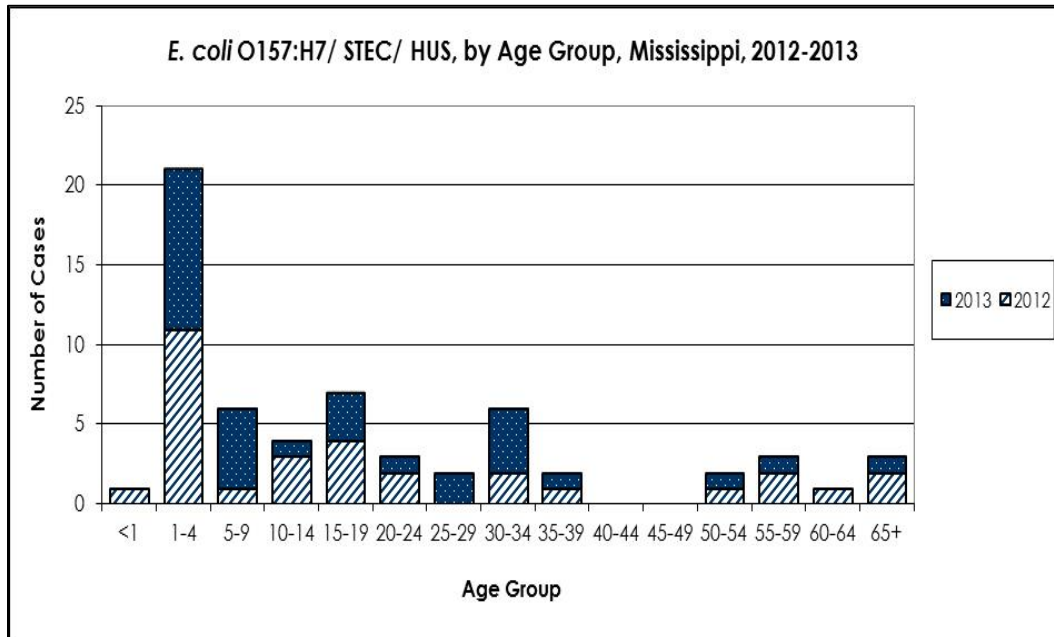
**Mississippi rate includes *E. coli* O157:H7; shiga toxin positive, serogroup non-O157; shiga toxin positive, not serogrouped, and post-diarrheal HUS.

The 2013 *E. coli* O157:H7/STEC/HUS cases ranged in age from 14 months to 73 years with a median of 10.5 years of age. Of the 61 cases of *E. coli* O157:H7/STEC/HUS that were reported to MSDH in 2012 and 2013, 46% occurred in children less than 10 years of age

(Figure 15). Children and the elderly are at higher risk for the development of severe illness and HUS as a result of infection.

Districts I, VIII, and IX experienced the highest rates of *E. coli* O157:H7 and non-O157:H7 STEC cases, with rates of 1.85, 2.26, and 1.46 cases per 100,000 residents, respectively.

Figure 15



There was one outbreak reported by the CDC in March 2013. This included 35 cases in 19 states, one case being in Mississippi. The STEC strain O121 was identified as the infectious agent and frozen food products were found to be the source of infection. There were two other outbreaks in Mississippi. In May 2013, an outbreak of *E. coli* O26 was identified with 23 cases across 11 states, with one in Mississippi. Another outbreak occurred in June 2013, when a child was infected with *E. coli* O111 while at a camp in Missouri.

Gonorrhea

2013 Case Total	5,090	2013 rate/100,000	170.2
2012 Case Total	6,860	2012 rate/100,000	229.8

Clinical Features

Gonorrhea is a sexually transmitted bacterial infection that primarily targets the urogenital tract leading to urethritis in males and cervicitis in females. Other less common sites of infection include the pharynx, rectum, conjunctiva, and blood.

Urethritis presents with mucopurulent discharge and dysuria, while cervicitis often presents with vaginal discharge and postcoital bleeding. Asymptomatic infections do occur.

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

Infectious Agent

Neisseria gonorrhoeae, an intracellular gram-negative diplococcus.

Reservoir

Humans.

Transmission

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

Incubation

In males the incubation period is primarily 2-5 days, but may be 10 days or longer. In females 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.

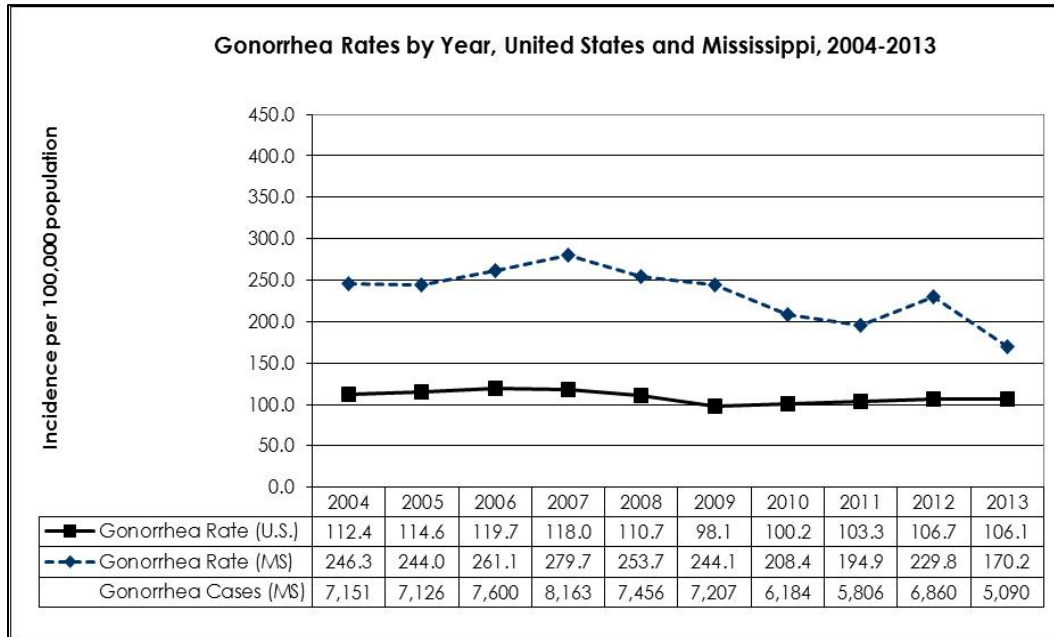
Reporting Classification

Class 2.

Epidemiology and Trends

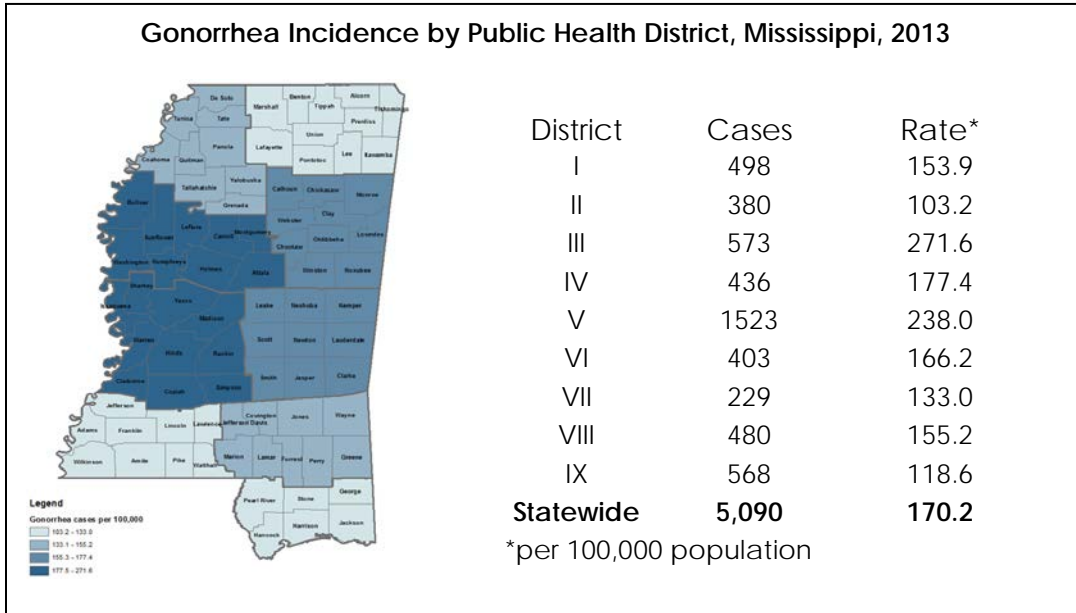
Gonorrhea is the second most commonly reported notifiable disease in the United States. From 2007 through 2011 there was a steady decline in the rate and number of cases of gonorrhea in Mississippi. The number of cases during that time period decreased from 8,163 cases in 2007 to 5,806 cases in 2011, representing a 29% decrease. From 2011 to 2012, reported cases of gonorrhea increased 18% (from 5,806 to 6,860 cases); however in 2013, reported cases decreased 26% to 5,090 cases (Figure 16). In 2013, Mississippi had the third highest case rate of gonorrhea in the United States.

Figure 16



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

Figure 17



Although the disease impacted individuals across all age groups, 66% of reported cases were among 15-24 year olds (Figure 18). African Americans accounted for 89% of the reported cases in which race was known (Figure 19). In 2013, the rate of gonorrhea infections for African Americans (343.1 per 100,000) was fifteen times the rate of whites (23.0 per 100,000).

Figure 18

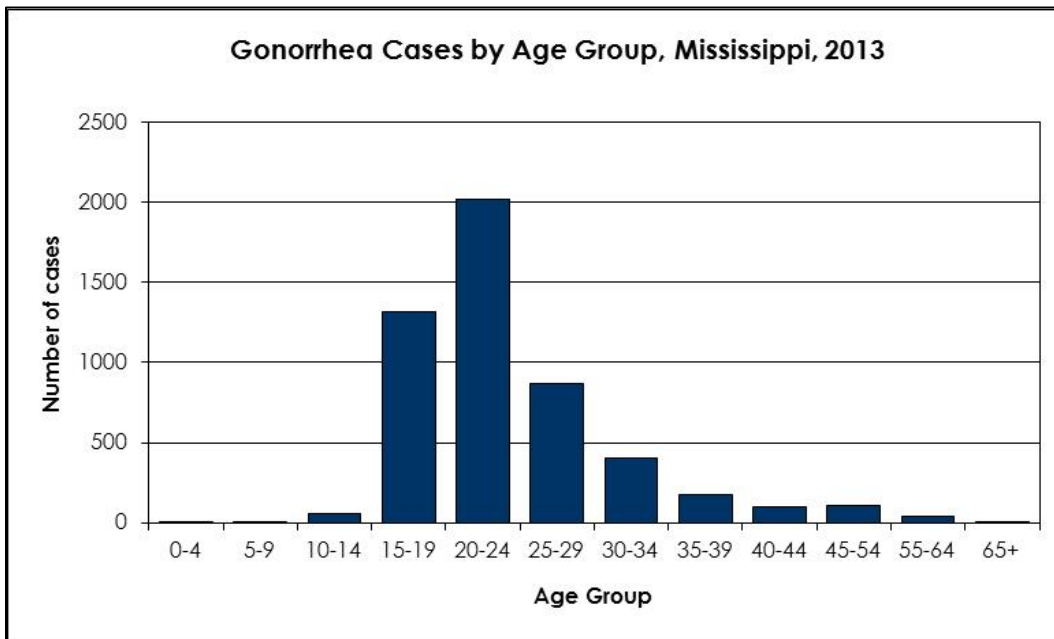
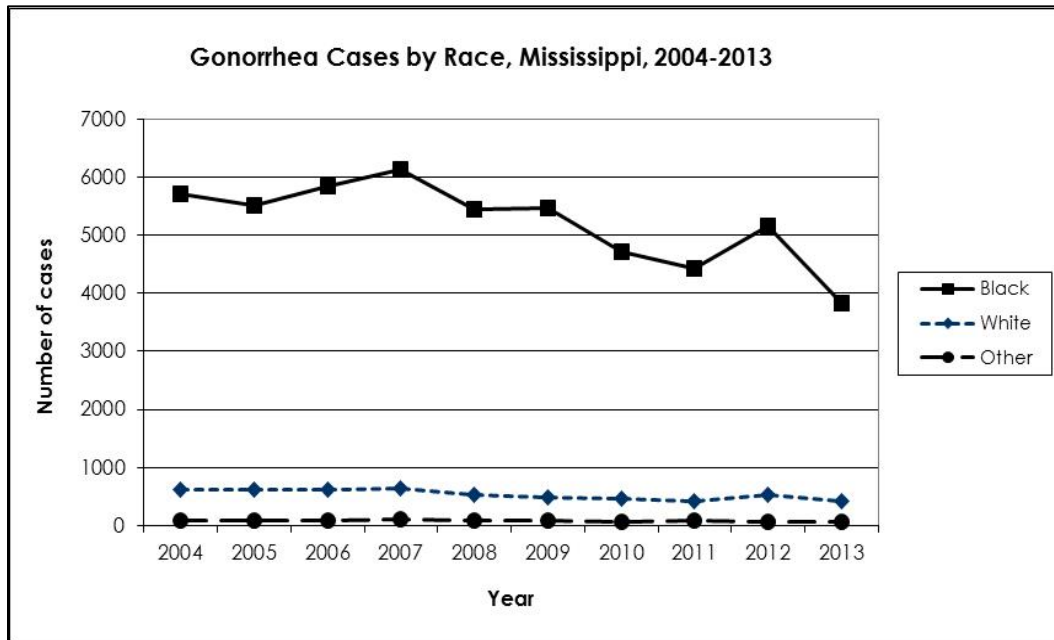


Figure 19



Haemophilus influenzae, type b

2013 Case Total	1	2013 rate/100,000	0.0
2012 Case Total	0	2012 rate/100,000	0.0

Clinical Features

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

Infectious Agent

Haemophilus influenzae (*H. influenzae*), a gram-negative encapsulated bacterium. Serotypes include a through f.

Reservoir

Humans, asymptomatic carriers.

Transmission

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

Incubation

Uncertain; probably short, 2-4 days.

Period of Communicability

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

Methods of Control

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

The Mississippi State Department of Health (MSDH) investigates all reports of suspected or confirmed invasive disease due to *H. influenzae* to determine serotype and the need for prophylactic antibiotics for contacts. For Hib cases MSDH provides prophylactic antibiotics (rifampin) for all household contacts with one or more children under one year of age or in households with children 1-3 years old who are inadequately immunized. Although the protection of contacts is only recommended after exposure to cases of Hib disease, contacts are often treated before the isolate's serotype is known in order to facilitate rapid provision of post-exposure prophylaxis. MSDH requests that all *H. influenzae* isolates be sent to the Public Health Laboratory (PHL) for serotyping.

Reporting Classification

Class 1A.

Epidemiology and Trends

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

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

There were 31 cases of *H. influenzae* reported in 2013, with only one case confirmed as type b. This case presented as septicemia in an 81 year old female. There were three deaths associated with invasive *H. influenzae* infection, all of which were over the age of 60. Districts I and V had the highest rates of *H. influenzae* infection of 1.85 and 1.72 per 100,000 residents, respectively. Of the overall cases, 26 presented as septicemia (84%), three presented as meningitis (10%) and two presented as other invasive infections (6%). Ages ranged from newborn to 88 years, with a median of 69 years. The invasive *H. influenzae* cases were identified as being type b (3%), type f (3%), not type b (71%), not typed (3%) and unknown (19%).

Hepatitis A

2013 Case Total	5	2013 rate/100,000	0.2
2012 Case Total	11	2012 rate/100,000	0.4

Clinical Features

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

Infectious Agent

Hepatitis A virus (HAV), an RNA virus.

Reservoir

Humans, rarely chimpanzees and other primates.

Transmission

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

Incubation

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

Period of Communicability

Infected persons are most likely to transmit HAV 1-2 weeks before the onset of symptoms and in the first few days after the onset of jaundice, when viral shedding in the stool is at its highest. The risk of transmission then decreases and becomes minimal after the first week of jaundice.

Methods of Control

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

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

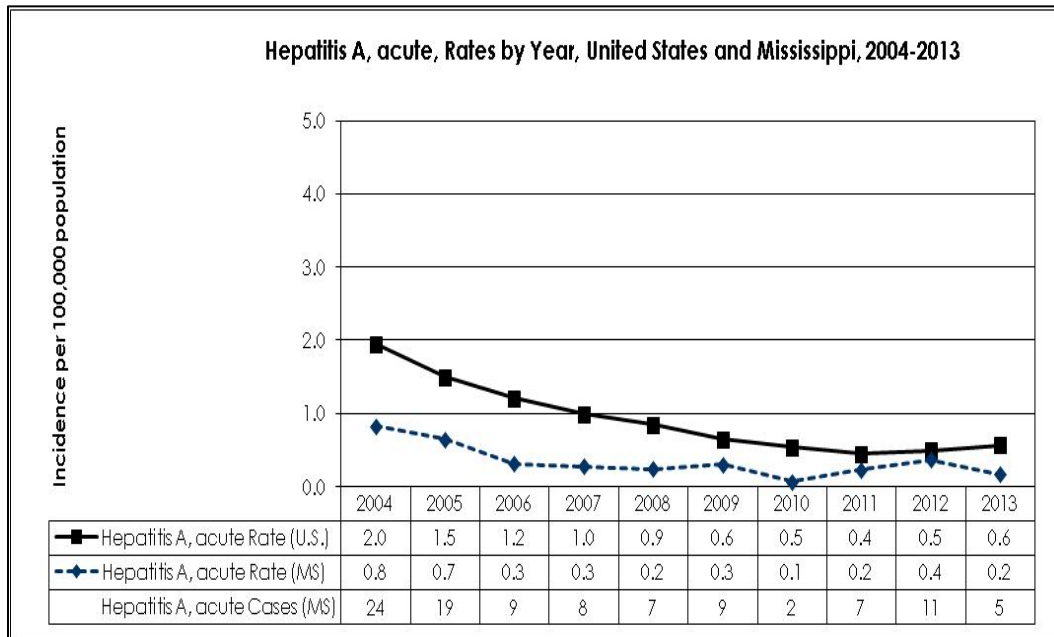
Reporting Classification

Class 1A.

Epidemiology and Trends

The rate of hepatitis A in Mississippi has been below the national average for more than a decade. In 2013, there were only five cases of acute hepatitis A reported in Mississippi; less than both the eleven cases reported in 2012 and the three year (2010-2012) average of six annual cases (Figure 20). No common source exposures or outbreaks of hepatitis A were reported in 2013.

Figure 20



Hepatitis B, acute

2013 Case Total	54	2013 rate/100,000	1.8
2012 Case Total	78	2012 rate/100,000	2.6

Clinical Features

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

Infectious Agent

Hepatitis B virus, a hepadnavirus.

Reservoir

Humans.

Transmission

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

Incubation

45-180 days, average 60-90 days.

Period of Communicability

As long as HBsAg is present in blood. In acute infections, surface Ag can be present 1-2 months after the 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 injection drug users.

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

Perinatal transmission is very efficient in the absence of post-exposure prophylaxis, with an infection rate of 70-90% if the mother is both HBsAg and hepatitis B e antigen (HBeAg) positive. The risk of perinatal transmission is about 10% if the mother is only HBsAg positive. Post-exposure prophylaxis, consisting of hepatitis B immune globulin and vaccine, is highly effective in preventing hepatitis B vertical transmission, therefore, testing of all pregnant women for HBsAg is recommended with each pregnancy. MSDH, through the Perinatal Hepatitis B Program, tracks HBsAg positive pregnant women, provides prenatal HBsAg testing information to the delivery hospitals when available, and monitors infants born to infected mothers to confirm completion of the vaccine series by 6 months of age, and then tests for post-vaccine response and for possible seroconversion at 9-12 months of age. As an addition to the existing reporting requirement of acute hepatitis B infection, in 2011 hepatitis B infection in pregnancy was added to the list of reportable diseases. This addition was made to facilitate

identification of hepatitis B infected women and ensure the provision of appropriate vaccination for the affected infant.

Reporting Classification

Class 2; any acute hepatitis B infection and any hepatitis B infection in pregnancy

Epidemiology and Trends

In 2013, 54 cases of acute hepatitis B were reported. This was lower than the 78 reported cases in 2012, but was comparable to the three year average (2010-2012) of 57 annual cases (Figure 21). Thirty-three (61%) of the 54 reported cases occurred in individuals aged 20-39 years. Overall, the cases ranged in age from 21 years to 74 years old, with a median age of 37 years (Figure 22).

Figure 21

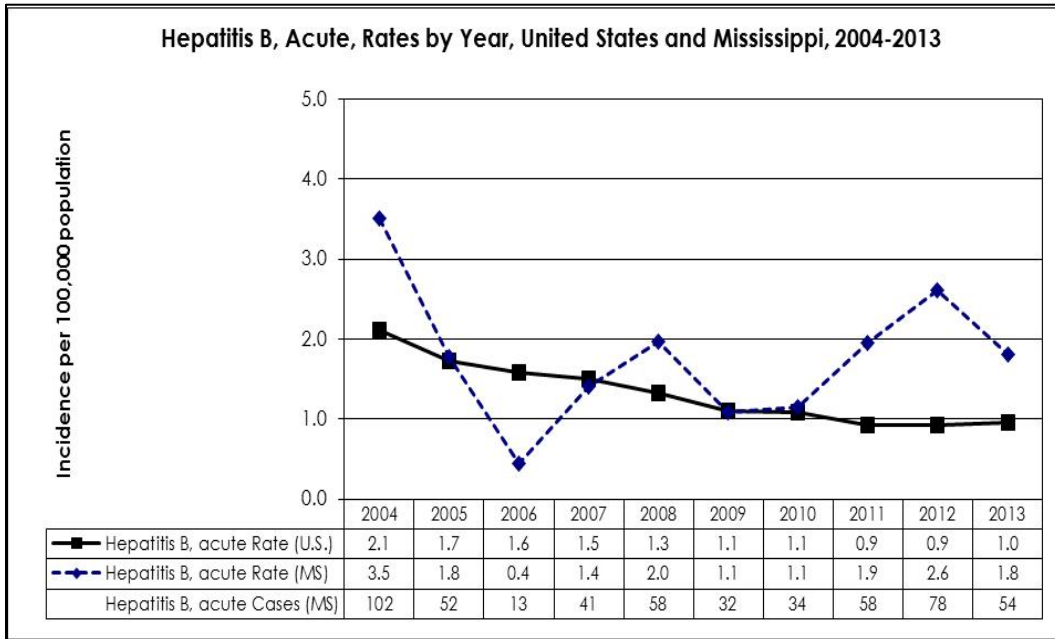
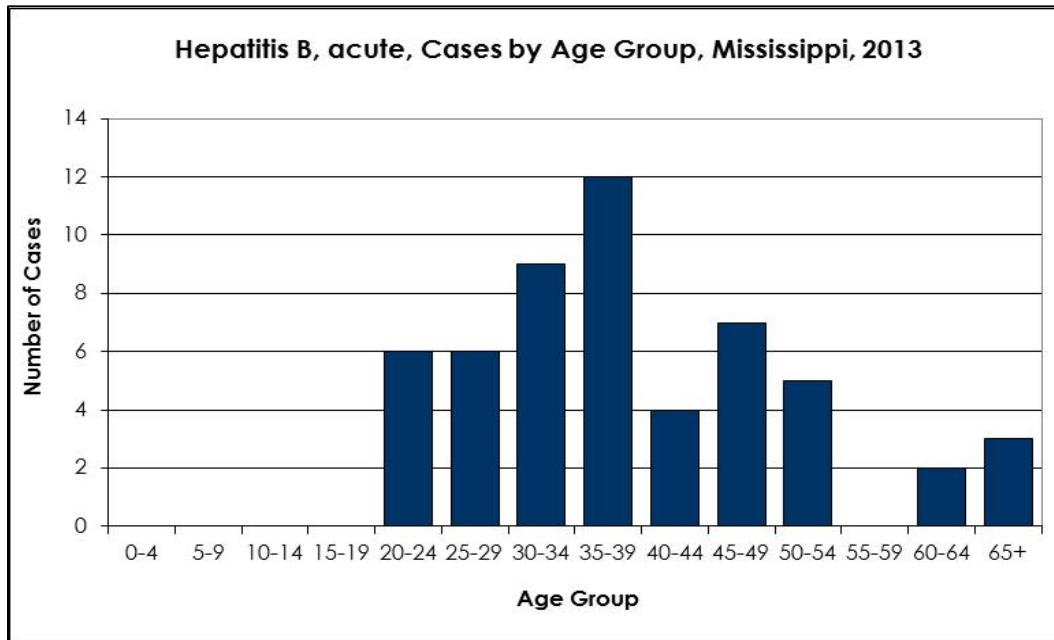


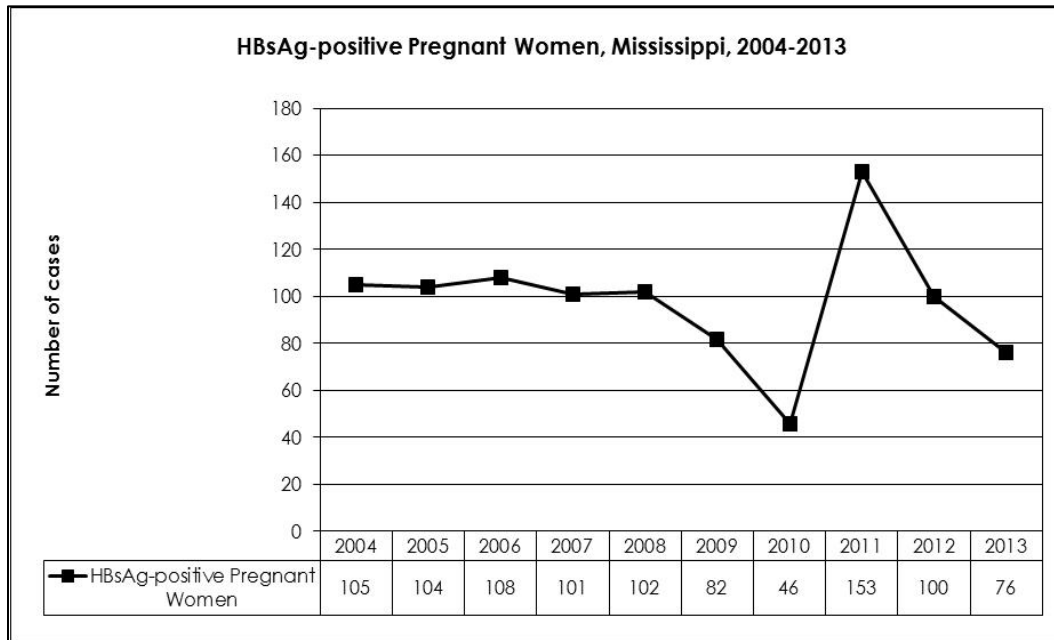
Figure 22



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

In 2013, 76 HBsAg positive pregnant women were reported to the Perinatal Hepatitis B Prevention Program (Figure 23). This is lower than both the 100 reported in 2012 and the three year average (2010 – 2012) of 100. There were no reported cases of HBsAg positive infants born to HBsAg positive mothers in 2013. The last cases of perinatal transmission occurred in 2007, when two cases were reported.

Figure 23



HIV Disease

2013 Case Total	556	2013 rate/100,000	18.6
2012 Case Total	547	2012 rate/100,000	18.3

Clinical Features

The clinical spectrum of human immunodeficiency virus (HIV) infection varies from asymptomatic infections to advanced immunodeficiency with opportunistic complications. One half to two thirds of recently infected individuals have manifestations of an infectious mononucleosis-like syndrome in the acute stage. Fever, sweats, malaise, myalgia, anorexia, nausea, diarrhea, and non-exudative pharyngitis are prominent symptoms in this stage. Constitutional symptoms of fatigue and wasting may occur in the early months or years before opportunistic disease is diagnosed. Over time, HIV can weaken the immune system, lowering the total CD4 count and leading to opportunistic infections and the diagnosis of Acquired Immunodeficiency syndrome (AIDS).

Infectious Agent

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

Reservoir

Humans.

Transmission

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

Incubation

The time from infection to the detection of antibodies to HIV is usually less than one month. The period from the time of infection to the development of AIDS ranges from 1 year up to 15 years or longer. The availability of effective anti-HIV therapy has greatly reduced the development of AIDS in the U.S.

Period of Communicability

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

Methods of Control

Abstinence is the only sure way to avoid sexual HIV transmission; otherwise mutual monogamy with partners known to be uninfected and the use of latex condoms are known to reduce the risk of infection. Confidential HIV testing and counseling and testing of contacts, prenatal prevention by counseling and testing all pregnant women, and early diagnosis and treatment with appropriate anti-retroviral therapy can reduce transmission. Post-exposure prophylaxis for health care workers exposed to blood or body fluids suspected to contain HIV is an important worksite preventive measure. In recent years, a number of biomedical interventions including male circumcision, pre-exposure, and post-exposure prophylaxis have proven to be effective in decreasing the rate of acquisition of HIV among high risk individuals. MSDH performs contact investigation, counseling and testing for each reported case of HIV infection in addition to facilitating linkage to care of infected individuals.

Pre-exposure prophylaxis, or PrEP, is a prevention option for those individuals at high risk for HIV infection. Taken consistently, PrEP has been shown to substantially reduce the risk of infection, especially if combined with condoms and other prevention methods.

Reporting Classifications

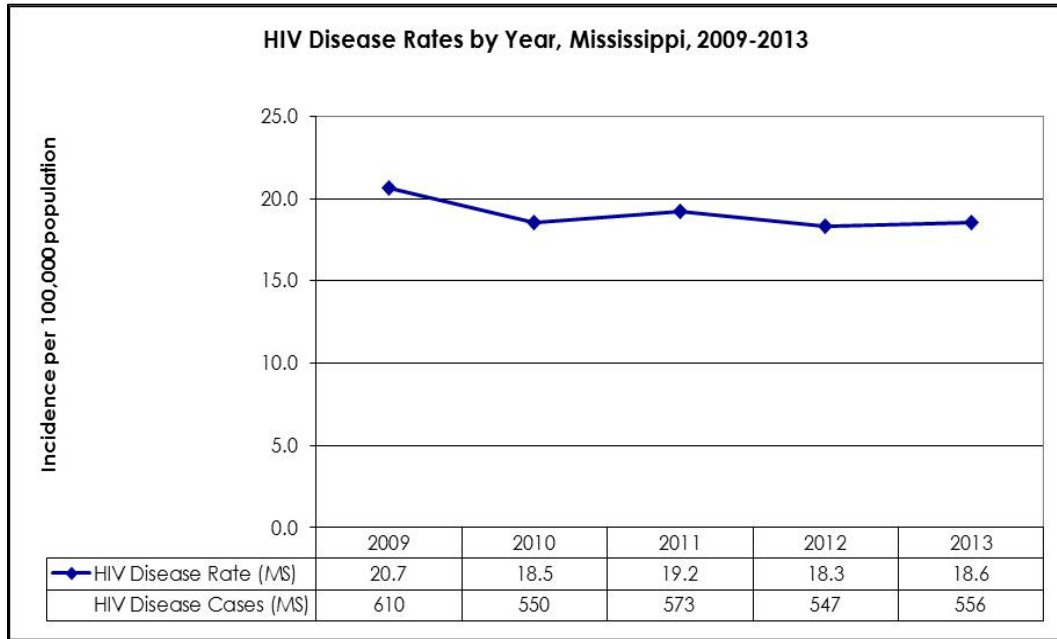
Class 1B; HIV infection-including AIDS

Class 3; CD4 count and HIV viral load.

Epidemiology and Trends

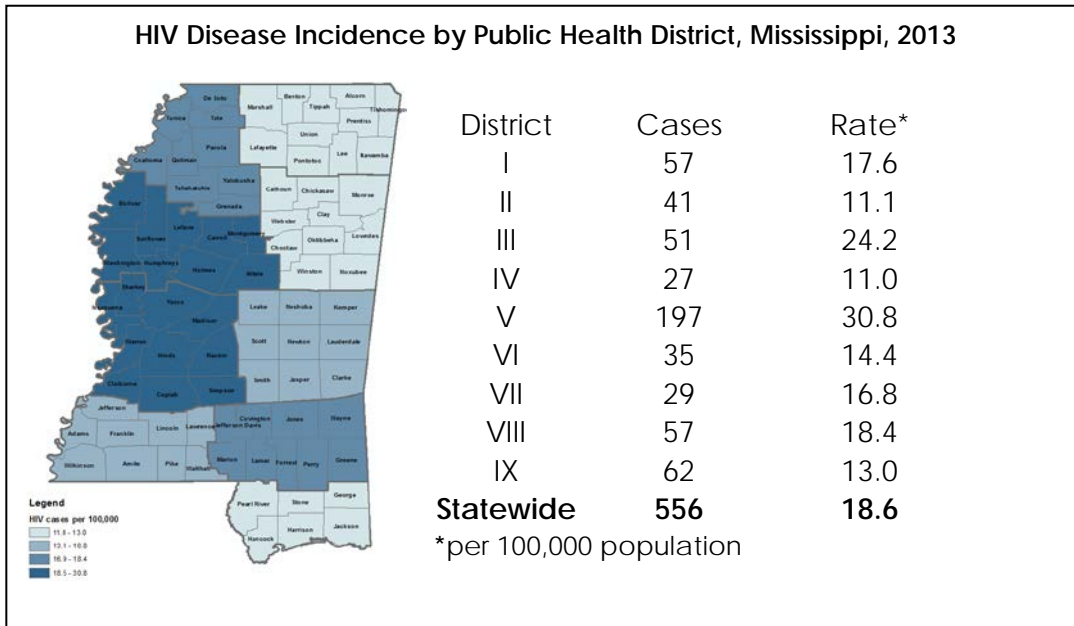
Both HIV infection and AIDS are reportable at the time of diagnosis, so many patients may be reported twice (once at first diagnosis of HIV infection, and again when developing an AIDS defining illness). The epidemiologic data that follows is regarding the initial report of HIV disease, whether first diagnosed as HIV infection or AIDS. Over the past few years, there has been little change in HIV disease trends. There were 556 cases of HIV disease reported in 2013 (Figure 24).

Figure 24



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

Figure 25



HIV disease was reported in all age groups, with 41% of the cases reported among 20-29 year olds and 23% among 30 to 39 year olds (Figure 26). African Americans were disproportionately impacted by HIV disease. In 2013, 78% of new cases were among African Americans in which race was known (Figure 27).

Figure 26

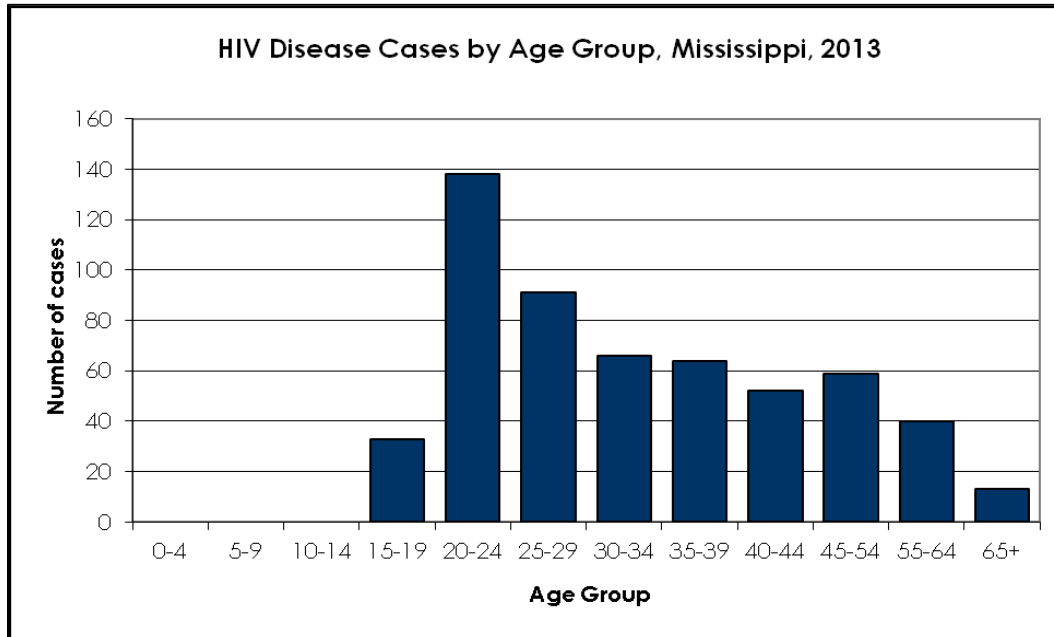
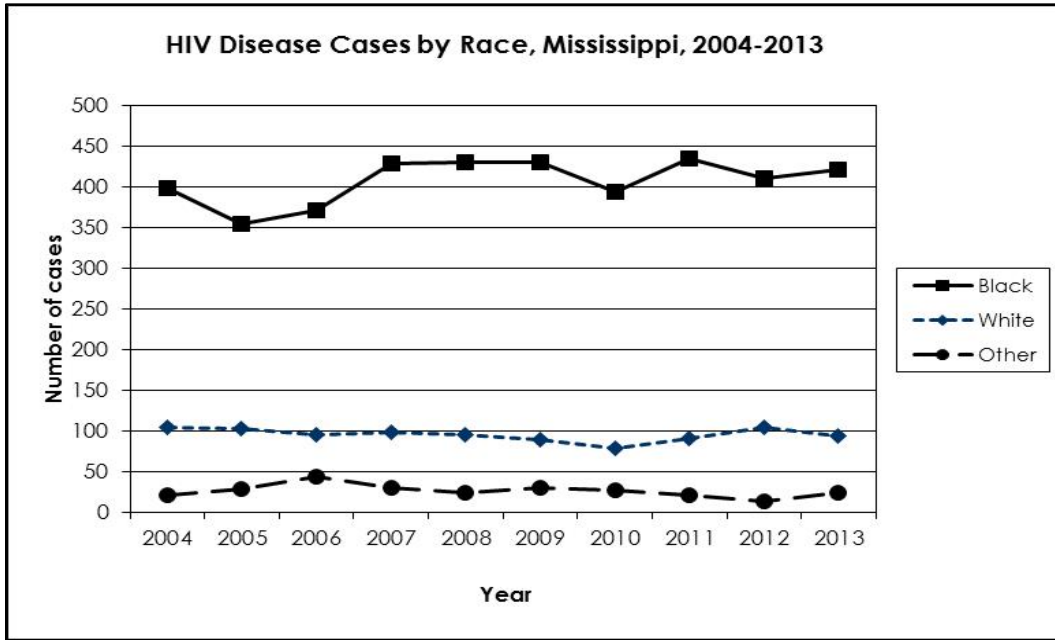
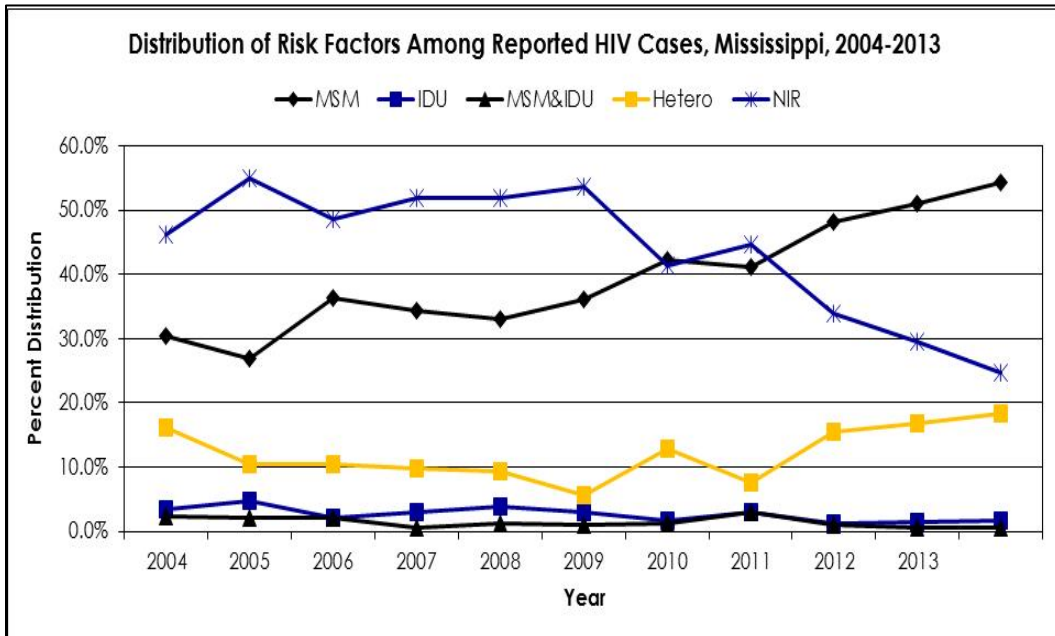


Figure 27



There are a number of identifiable risk factors associated with HIV infection, including male-to-male sexual contact (MSM), heterosexual contact (hetero), and injection drug use (IDU)(Figure 28). Cases in persons with no reported exposure to HIV through any routes listed in the hierarchy of transmission categories are classified as “no risk factor reported or identified” or NIR. For the last several years, the percentage of cases among individuals identifying themselves as MSM has steadily increased, from 36% in 2008 to 54% in 2013.

Figure 28



Additional References:

- Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the use of antiretroviral agents in HIV-1-infected adults and adolescents. Department of Health and Human Services. Available at <https://aidsinfo.nih.gov/contentfiles/lvguidelines/AdultandAdolescentGL.pdf>.
- Centers for Disease Control and Prevention. Guidelines for Prevention and Treatment of Opportunistic Infections in HIV-Infected Adults and Adolescents. MMWR 2009;58 (No. RR-4) April 10, 2009
- Centers for Disease Control and Prevention. Guidelines for the Prevention and Treatment of Opportunistic Infections Among HIV-Exposed and HIV-Infected Children. MMWR 2009; 58 (No. RR-11) September 4, 2009

Influenza – 2013 – 2014 Season

Clinical Features

An acute viral infection of the respiratory tract characterized by sudden onset of fever, often with chills, headache, malaise, diffuse myalgia, and nonproductive cough. The highest risks for complications from seasonal influenza are in persons aged 65 years and older, young children, pregnant and postpartum women, and persons at any age with chronic underlying illnesses. Pneumonia due to secondary bacterial infections is the most common complication of influenza. Estimated influenza deaths range from a low of 3,000 to a high of 49,000 per year in the United States.

Infectious Agent

Influenza is caused by an RNA virus. Each season both influenza A and B virus strains circulate and cause illness but there is usually one predominant type or subtype of influenza virus that causes the majority of infections.

Reservoir

Humans are the reservoir for seasonal influenza. Wild aquatic bird, domestic poultry and domestic pigs can serve as reservoirs for emerging variant influenza strains.

Transmission

Transmission occurs person to person by direct or indirect contact with virus laden droplets or respiratory secretions. Transmission of variant strains is usually the result of direct contact with an infected animal, such as pigs or domestic poultry.

Incubation

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

Period of Communicability

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

Methods of Control

Routine annual influenza vaccination is recommended for all persons aged ≥ 6 months, and is the single most effective method for the prevention of infection. Additionally, basic personal hygiene, including handwashing, and respiratory etiquette should be reinforced.

Antivirals can also be used to prevent and treat influenza. The neuraminidase inhibitors (oseltamivir and zanamivir) are effective against all forms of influenza. Sporadic resistance to oseltamivir has been identified in some influenza strains (influenza A H1N1), however neuraminidase inhibitors are still recommended for the treatment of influenza A (H1N1) and A (H3N2) and influenza B virus infections. Treatment with antivirals within the first 48 hours of can be effective in reducing the duration of illness, and is recommended for individuals who are hospitalized or at higher risk of severe complications from influenza infections. Adamantanes (amantadine and rimantadine) are not effective against influenza B viruses and are not recommended for influenza A viruses due to high levels of resistance.

For the most current guidelines available at the date of this publication, please see the Centers for Disease Control and Prevention (CDC) Recommendations and Reports, "Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices—United States, 2016-2017". MMWR 65(No. RR5); August 26, 2016, available online at <https://www.cdc.gov/mmwr/volumes/65/rr/pdfs/rr6505.pdf>

For guidelines on the use of antivirals see the CDC website at: <http://www.cdc.gov/flu/professionals/antivirals/antiviral-use-influenza.htm> and the CDC report "Antiviral Agents for the Treatment and Chemoprophylaxis of Influenza" available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6001a1.htm>

Reporting Classification

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

Epidemiology and Trends

A typical influenza season usually peaks anywhere from December through March but influenza activity can occur earlier or later. The risk of complications depends on many

factors, including age and underlying medical conditions. Vaccination status and the match of vaccine to circulating viruses affect both the susceptibility to infection and the possibility of complications. Outbreaks can occur in group settings, such as nursing homes.

MSDH monitors seasonal influenza activity statewide through an active syndromic surveillance program reported by sentinel providers. In the 2013 – 2014 influenza season, 47 sentinel providers in 37 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 non-trauma patient visits consistent with an influenza-like illness (ILI), defined as fever $\geq 100^{\circ}\text{F}$ 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).

Influenza activity peaked in late December in the US and influenza A (pH1N1) was the predominant virus in the US, although influenza B activity increased later in the influenza season. The 2013 – 2014 influenza season was the first pH1N1-predominant season since the 2009 pH1N1 pandemic. Also of significance for the 2013 – 2014 was the higher than expected hospitalization rates among those aged 50 to 64 years. This age group had the second highest hospitalization rate, just behind those aged 65 years and older. The CDC surmised that the increased hospitalization rates were likely due to several factors, including lack of cross-protective immunity to pH1N1 and lower influenza vaccination coverage in this age group.

In Mississippi, influenza activity also peaked in late December 2013 at 8.2%, which was comparable to when the peak occurred during the previous season. The 2013 – 2014 season followed the same seasonal pattern as the two previous influenza seasons (Figure 29). Early in the 2013 – 2014 season, the predominant virus identified in the PHL was influenza A (pH1N1), although both influenza A (subtyped not performed) and Influenza B isolates were identified later in the season (Figure 30). There was one influenza-associated pediatric death reported in Mississippi in the 2013 – 2014 season. The death occurred in a 17 month old.

During the 2013-2014 influenza season, MSDH began receiving reports of serious complications associated with influenza infection, including deaths, in individuals less than 65 years of age. In response to these reports, MSDH developed an enhanced

surveillance system to identify influenza deaths in hospitalized adults. Please see the Special Reports section for a discussion of this enhanced surveillance activity.

Figure 29

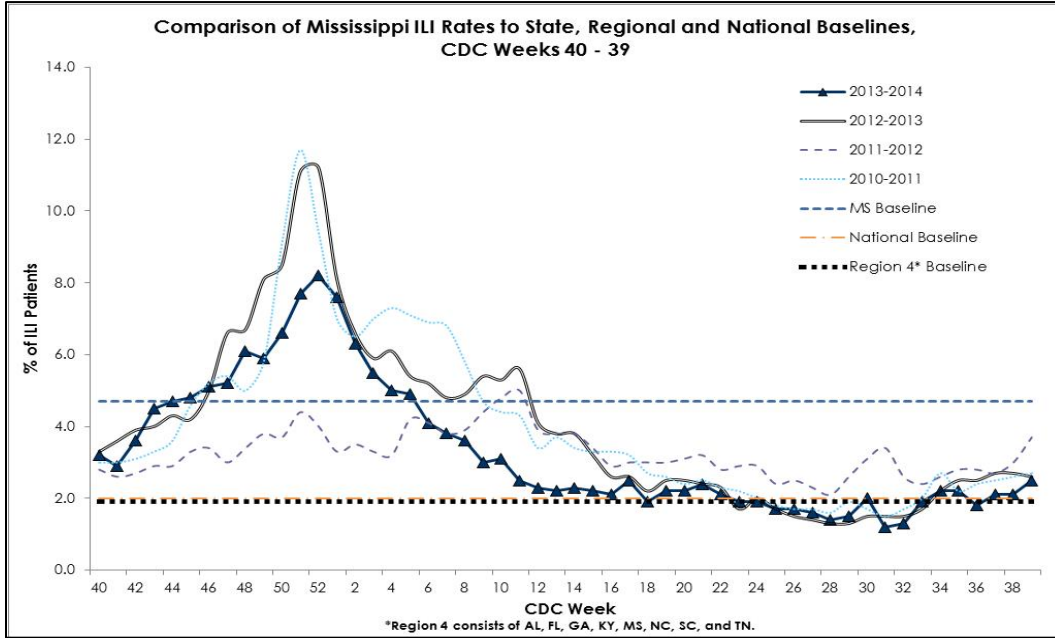
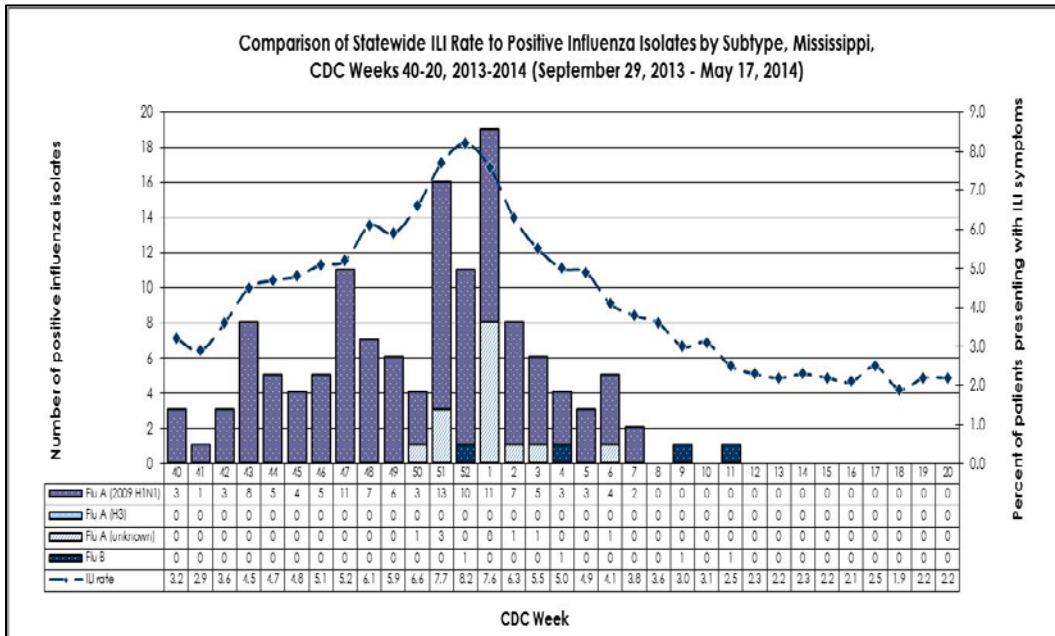


Figure 30



Legionellosis

2013 Case Total	18	2013 rate/100,000	0.6
2012 Case Total	17	2012 rate/100,000	0.6

Clinical Features

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

Infectious Agent

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

Reservoir

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

Transmission

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

Incubation

Legionnaires' disease — 2-10 days, most commonly 5-6 days.

Pontiac Fever — 5-72 hours, most commonly 24-48 hours.

Period of Communicability

Legionellosis is not transmitted person to person.

Reporting Classification

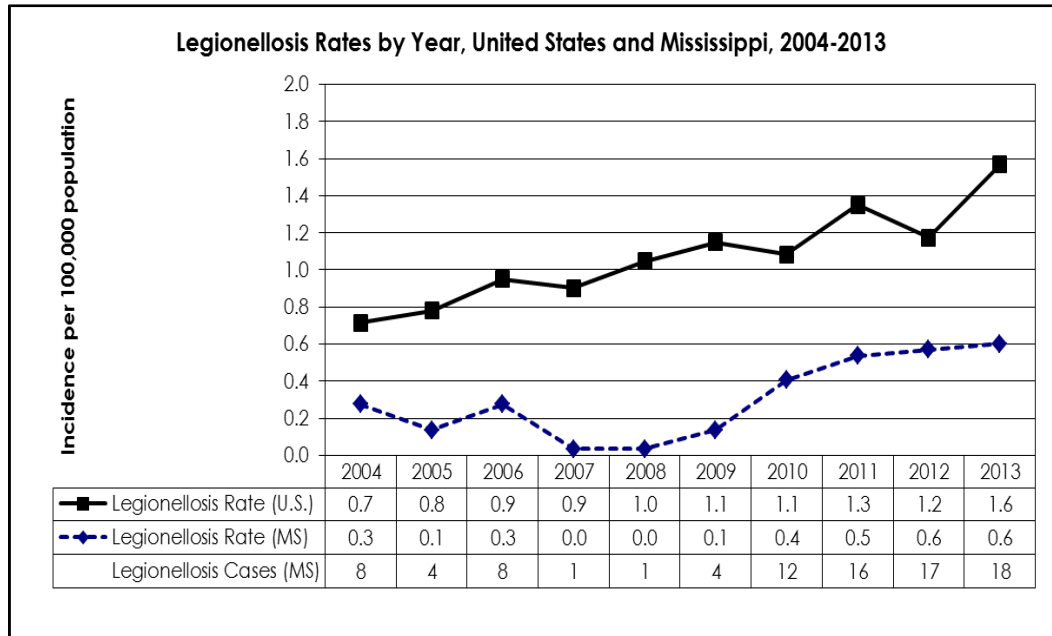
Class 1B.

Epidemiology and Trends

In 2013, there were 18 cases of legionellosis reported in Mississippi (Figure 31). The cases ranged in age from 2 to 88 years, with a median age of 61. There were two deaths

reported in 2013. These deaths occurred in individuals over the age of 80. On average, 15 cases have been reported annually over the past three years (2010-2012). The 2013 cases were not epidemiologically linked and no outbreaks were reported.

Figure 31



Listeriosis

2013 Case Total	4	2013 rate/100,000	0.1
2012 Case Total	4	2012 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.

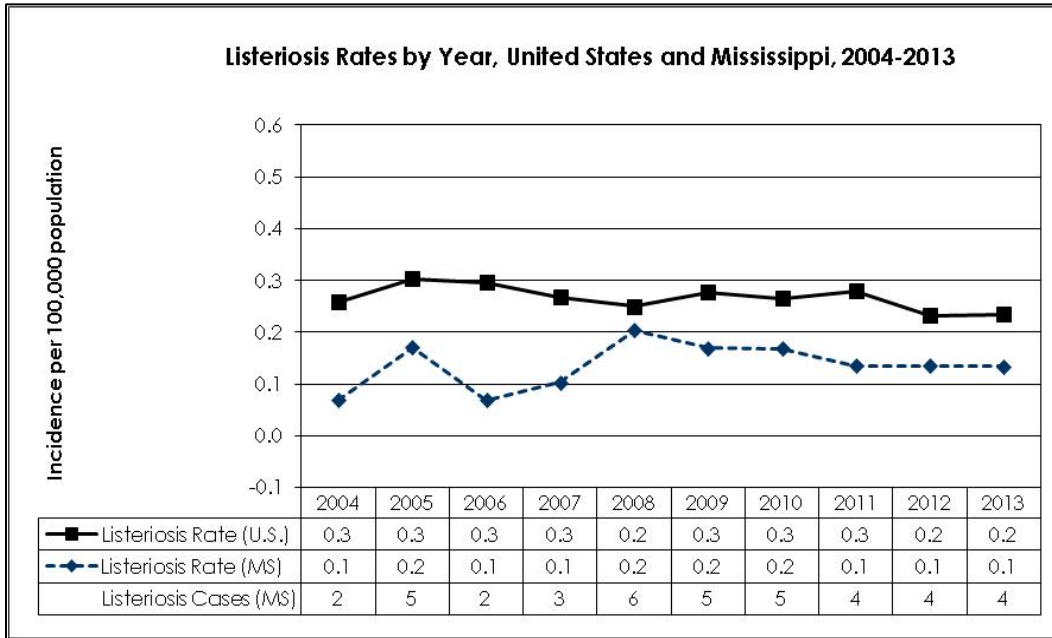
Reporting Classification

Class 2.

Epidemiology and Trends

There were four reported cases of listeriosis in Mississippi in 2013, which was comparable to the number reported in 2012 and to the average number of four cases reported annually from 2010 through 2012. The incidence in Mississippi has remained at or below national rates since *Listeria* was added to the National Notifiable Disease List in 2000 (Figure 32).

Figure 32



There were no neonatal infections reported in 2013. The four reported cases ranged in age from 34 to 96 years, with a median age of 68 years. No deaths were reported in 2013. None of the infections were epidemiologically linked or associated with common source outbreaks.

Lyme Disease

2013 Case Total	0	2013 rate/100,000	0.0
2012 Case Total	1	2012 rate/100,000	0.0

Clinical Features

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

Infectious Agent

Borrelia burgdorferi, a spirochete.

Reservoir

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

Transmission

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

Incubation

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

Methods of Control

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

Reporting Classification

Class 2.

Epidemiology and Trends

Most cases of Lyme disease occur in late spring and summer. Lyme disease is not considered endemic in Mississippi. Although the vector is present in the state, definitive transmission within the state of Mississippi has not been clearly demonstrated.

There were no cases of Lyme disease reported in 2013, compared to one case in 2012.

Measles

2013 Case Total	0	2013 rate/100,000	0.0
2012 Case Total	0	2012 rate/100,000	0.0

Clinical Features

Measles is a highly contagious viral illness characterized by cough, coryza, conjunctivitis (3 C's), fever, an erythematous maculopapular rash, and a pathognomonic

enanthema (Koplik spots). Complications are seen more frequently in children younger than 5 years of age and in adults 20 years of age and older. Diarrhea, pneumonia and encephalitis are the most common complications seen. The risk of death is higher in these age groups as well; the most common cause of death is pneumonia in children, and acute encephalitis in adults. Subacute sclerosing panencephalitis is a rare degenerative central nervous system disease that is thought to be due to persistent measles infection of the brain, and typically presents approximately 7 years after initial infection.

Infectious Agent

Measles virus, in the paramyxovirus family.

Reservoir

Humans.

Transmission

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

Incubation

Eight to ten days.

Period of Communicability

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

Methods of Control

Measles, mumps and rubella (MMR) vaccine is recommended for all children at 12 to 15 months of age with a second dose at school entry (4 to 6 years of age). Appropriate two dose vaccination induces immunity in 99% of individuals.

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

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

Reporting Classification

Class 1A.

Epidemiology and Trends

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

Measles occurs throughout the world with peak incidence usually in late winter and spring. In 2000 widespread measles immunization led to the interruption of endemic measles transmission in the United States. However, measles incidence has increased worldwide, with outbreaks and increased transmission in several countries, particularly in Europe, due in part to dropping immunization rates. Importation of measles to the U.S. has resulted in a number of cases and outbreaks, particularly in unvaccinated populations.

In 2013, a total of 187 cases were reported in the United States. There were 11 reported outbreaks, three of which had more than 20 cases, including one with 58 cases. In a CDC *Morbidity and Mortality Weekly Report* (MMWR) issued in September 2013, cases of measles occurring from January 1 through August 24, 2013 were evaluated. Of the 159 cases reported during that time frame, 131 (82%) occurred in unvaccinated persons, and 157 (99%) were import-associated cases.

Continued high vaccine rates in the U.S. and in Mississippi are important to provide appropriate population immunity and decrease the risk to those who are too young to receive vaccine or have medical contraindications to vaccination.

Additional References:

- CDC. Measles Cases and Outbreaks. Available online at <http://www.cdc.gov/measles/cases-outbreaks.html>.
- CDC. Measles—United States, January 1-August 24, 2013. MMWR. September 13, 2013/62(36); 741-743.

Meningococcal disease, invasive

2013 Case Total	4	2013 rate/100,000	0.1
2012 Case Total	5	2012 rate/100,000	0.2

Clinical Features

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

Infectious Agent

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

Reservoir

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

Transmission

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

Incubation

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

Period of Communicability

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

Methods of Control

Vaccination and post-exposure prophylaxis are effective in preventing invasive meningococcal disease. Routine vaccination with the quadrivalent meningococcal conjugate vaccine (MCV4) is recommended for all children aged 11-12 years (and children aged 13-18 years not previously vaccinated) with a booster dose at 16 years of age. Additionally, previously unvaccinated persons with persistent complement component deficiency or anatomic/functional asplenia should receive two doses at least eight weeks apart, with a booster dose every five years thereafter. MCV4 is also recommended for persons who travel to countries in which *N. meningitidis* is

hyperendemic or epidemic. Use of the meningococcal polysaccharide vaccine (MPSV) should be limited to persons older than 55 years of age, or used when MCV4 is not available. Both MCV4 and MPSV4 are recommended for use in the control of meningococcal outbreaks caused by vaccine-preventable serogroups (A, C, Y and W-135).

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

Reporting Classification

Class 1A.

Epidemiology and Trends

In 2013, there were four reported cases of invasive meningococcal disease. This was comparable to the number of reported cases in 2012. The annual number of reported cases has decreased over the last several years, from 24 cases in 2003, to four to five cases per year since 2009 (Figure 33). Nationally, infants less than 12 months of age have the highest incidence of invasive disease. In the U.S., rates of disease decline in early childhood, increase during adolescence and early adulthood, then decrease again in older adults. The 2013 Mississippi cases ranged in age from 17 to 75 years, with a median age of 36. From 2009 – 2013, 36% of the cases occurred in children less than five years of age (Figure 34).

MSDH requests the submission of all isolates to the PHL for typing. Three of the confirmed cases in 2013 were typed as serogroup Y and one case was not able to be subtyped.

There were no reported deaths in 2013.

Figure 33

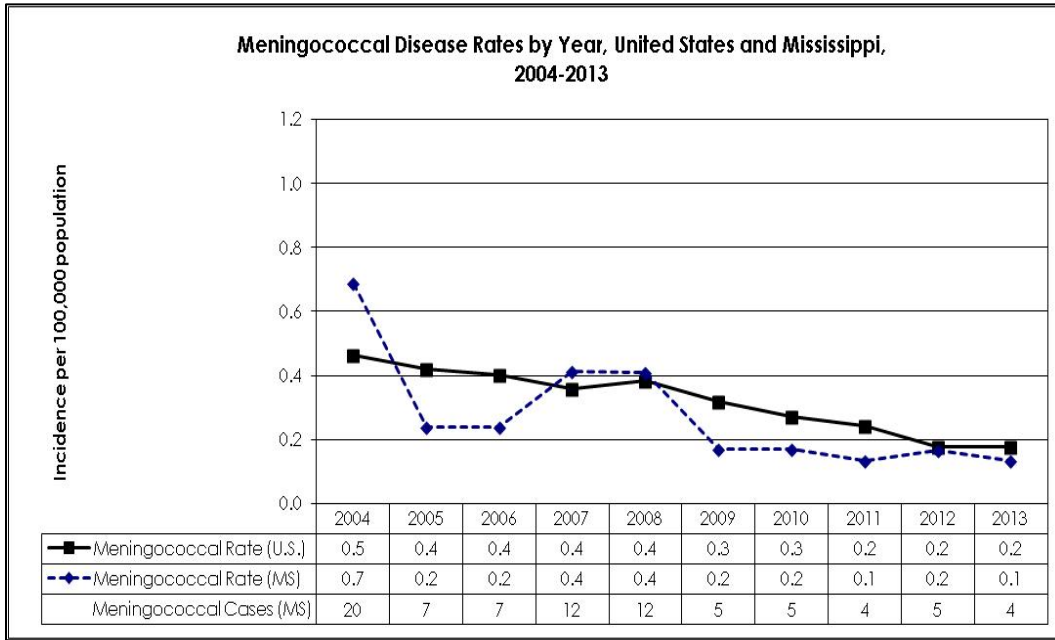
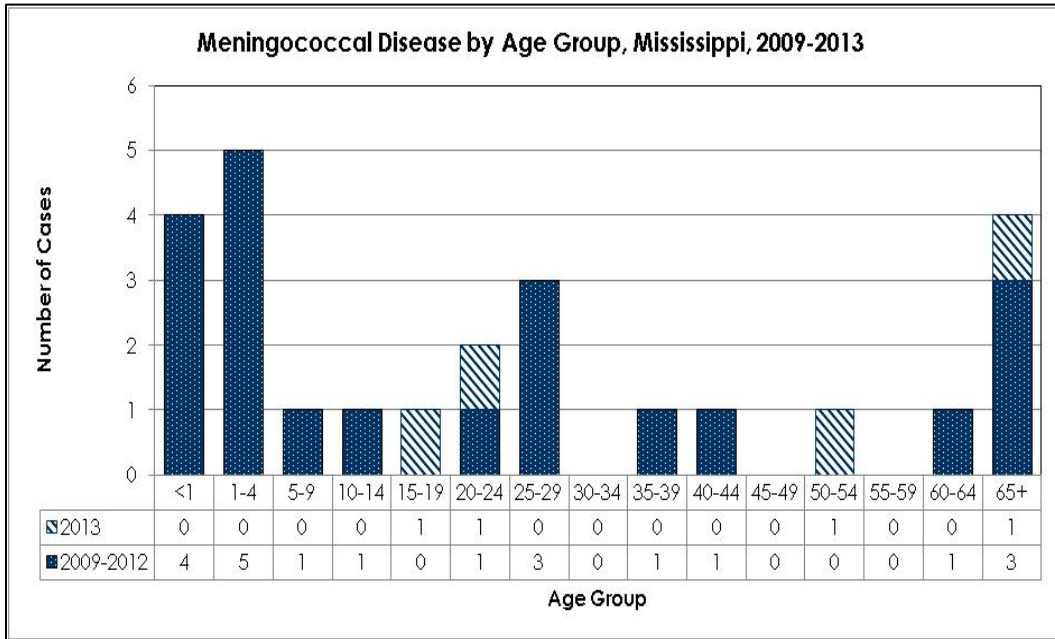


Figure 34



Mumps

2013 Case Total	0	2013 rate/100,000	0.0
2012 Case Total	3	2012 rate/100,000	0.1

Clinical Features

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

Infectious Agent

Mumps virus, in the paramyxovirus family.

Reservoir

Humans.

Transmission

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

Incubation

About 16 – 18 days (range 14 – 25).

Period of Communicability

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

Methods of Control

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

Reporting Classification

Class 2.

Epidemiology and Trends

Mumps is not common in Mississippi or in the US. There can be significant variability in the number of cases reported in the US each year; there were 2612 cases reported in 2010 versus only 229 in 2012. In 2013, there were 584 cases reported nationally.

In Mississippi, there are typically fewer than 5 cases reported annually. In 2013, there were no reported mumps cases, compared to three cases in 2012.

Pertussis

2013 Case Total	60	2013 rate/100,000	2.0
2012 Case Total	77	2012 rate/100,000	2.6

Clinical Features

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

Infectious Agent

Bordetella pertussis, an aerobic gram negative rod.

Reservoir

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

Transmission

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

Incubation

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

Period of Communicability

Most transmissible in the catarrhal stage (which lasts about 1 week) and then during the first 2 weeks after onset of paroxysmal cough, or a total of 21 days after symptom onset.

Communicability then gradually decreases and becomes negligible. Individuals are no longer considered contagious after 5 days of appropriate antibiotic treatment.

Methods of Control

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

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

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

Reporting Classification

Class 1A.

Epidemiology and Trends

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

In 2013, there were 60 reported cases of pertussis infections. This was lower than the 77 cases which were reported in 2012 and the three year average of 77 cases from 2010-2012 (Figure 35).

Twenty-seven (45%) of the cases in 2013 occurred among children less than 1 year of age (Figure 36), with fifteen (56%) of these cases occurring in one- to two-month old infants. No pertussis deaths were reported in 2013. The last reported death in Mississippi was a two month old infant in 2012.

Figure 35

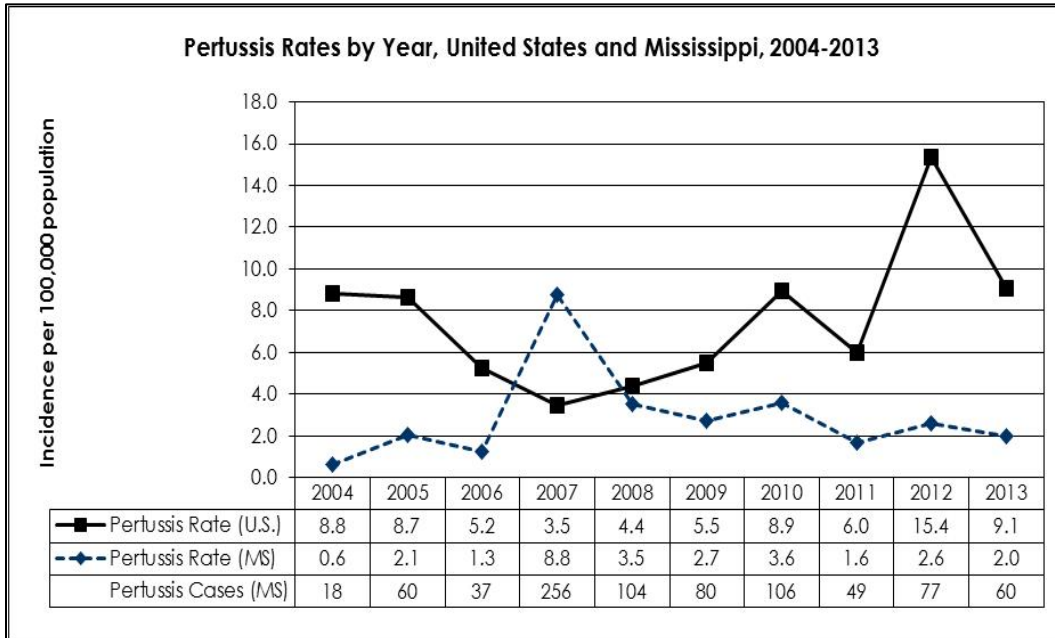
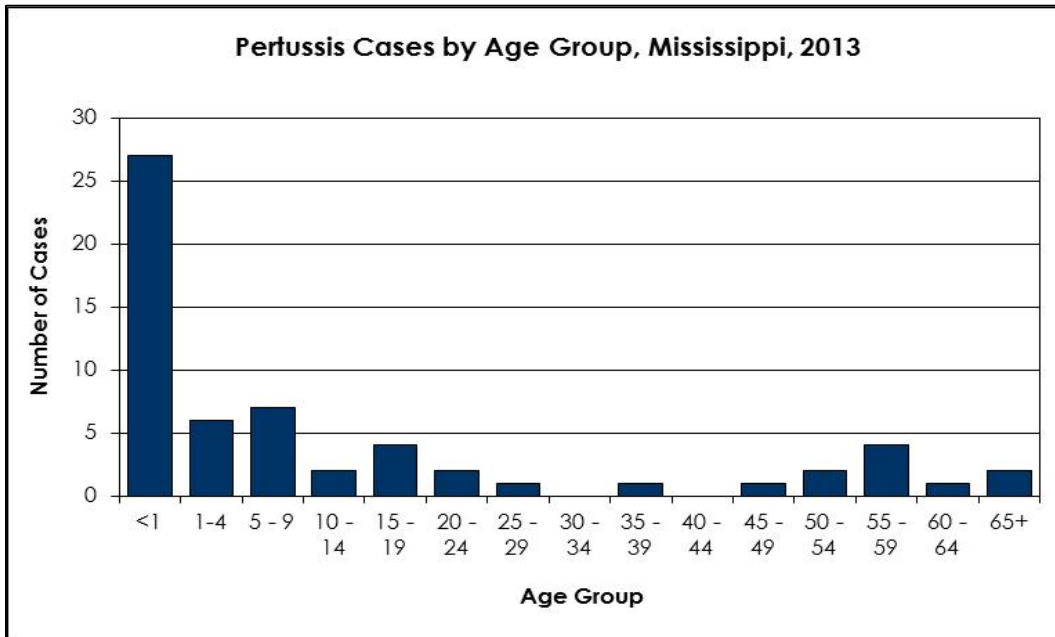


Figure 36



Pneumococcal disease, invasive

2013 Case Total (all ages)	239	2013 rate/100,000	8.0
2013 Case Total (under 5)	20	2013 rate/100,000	0.7
2012 Case Total (all ages)	189	2012 rate/100,000	6.3
2012 Case Total (under 5)	25	2012 rate/100,000	0.8

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 (*S. 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. Pneumococcal conjugate vaccine is recommended for all

children younger than two years of age, all adults 65 years or older, and persons two through 64 years old with certain medical conditions. Pneumococcal polysaccharide vaccine is recommended for all adults 65 years or older, persons two through 64 years old who are at increased risk for disease due to certain medical conditions, and adults 19 through 64 years old who smoke cigarettes.

Reporting Classification

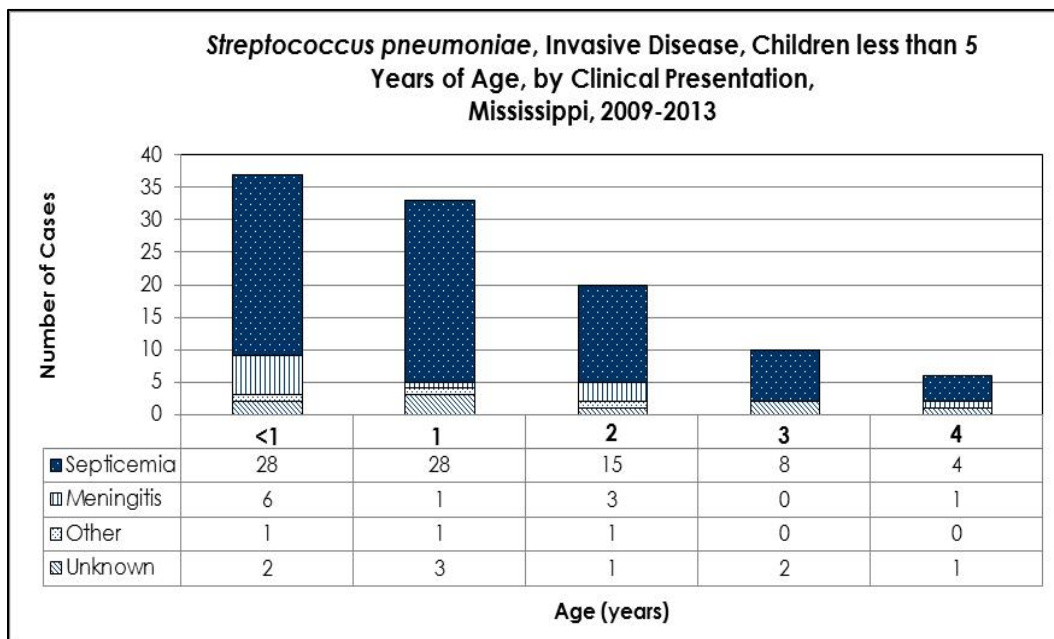
Class 2; invasive infection.

Epidemiology and Trends

In late 2010 the reporting criteria for invasive *S. pneumoniae* was expanded to include all cases of invasive disease. The previous reporting criteria were limited to cases in children less than 5 years of age and any cases that demonstrated antibacterial resistance regardless of age. In 2013 there were a total of 239 reported cases of invasive *S. pneumoniae* infections. The reported cases ranged in age from one month to 96 years of age, with a median age of 60 years.

Twenty of the reported cases were in children less than 5 years of age; about the same as the 25 cases reported in 2012. Of these 20 cases, 18 had septicemia and two had meningitis. Ages ranged from one month to four years of age. Over the past five years, the majority (78%) of *S. pneumoniae* invasive infections in children less than 5 years of age have presented as septicemia (Figure 37).

Figure 37



Rabies

Clinical Features

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

Infectious Agent

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

Reservoir

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

Transmission

The most common mode of rabies virus transmission is through the bite of an infected host. All mammals are susceptible to varying degrees, but not all mammals efficiently transmit infection. Since the 1990's virtually 100% of human rabies cases in the US have been due to exposure to infected bats. 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://avmajournals.avma.org/doi/pdf/10.2460/javma.248.5.505>

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

Reporting Classification

Class 1A (human or animal).

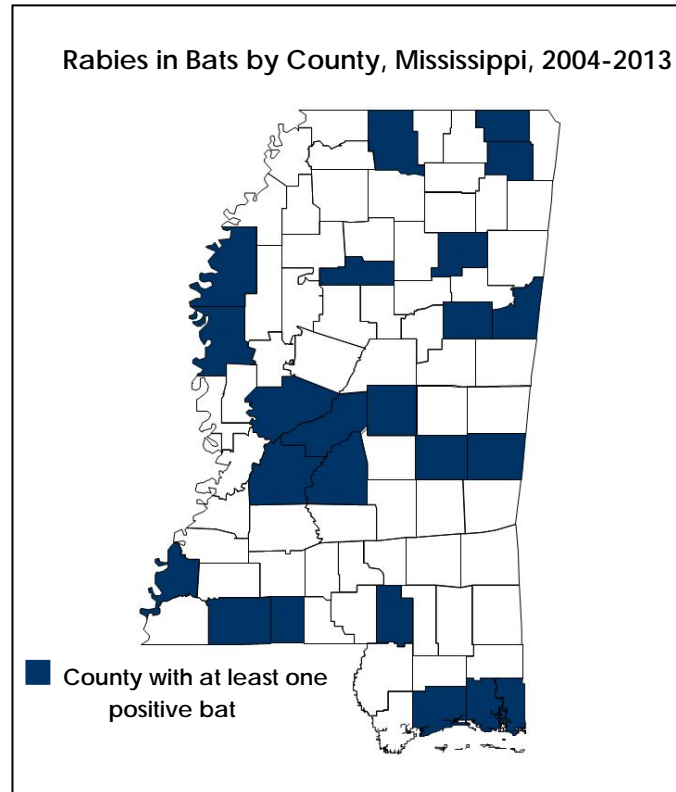
Epidemiology and Trends

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.

As of 2013, there has not been an indigenous terrestrial animal (land) rabies case reported in Mississippi since 1961, however, rabid raccoons, skunks and foxes are routinely identified in states contiguous to Mississippi. Mississippi reported a human case of rabies due to a bat strain in a 10 year old boy in 2005. Prior to this 2005 human case, the last reported human rabies case in Mississippi was in 1953 and this was transmitted by a terrestrial animal.

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, several bats test positive each year. There were five positive bats out of 70 tested in the PHL in 2013. The positive bats were submitted from Grenada, Lowndes, Oktibbeha, Rankin and Yazoo counties. In the past ten years, there has been a wide geographic distribution of positive bats, with 47 reported positives in 22 counties (Figure 38).

Figure 38



Rocky Mountain spotted fever

2013 Case Total	39	2013 rate/100,000	1.3
2012 Case Total	25	2012 rate/100,000	0.8

Clinical Features

Rocky Mountain spotted fever (RMSF) is a tickborne rickettsial illness with an acute onset of fever, severe headache, malaise, myalgia, nausea, vomiting, and may include a macular or maculopapular rash on the extremities, including the palms and soles, which usually spreads over the entire body. A petechial rash often follows. Prompt recognition and treatment are paramount; if RMSF is suspected based on clinical presentation and/or a history of tick exposure, treatment with appropriate antibiotics (doxycycline) should not be delayed for laboratory confirmation. Doxycycline is the treatment of choice for any age. In untreated cases the case fatality is between 20 to 80%. Risk factors associated with severe disease and death include delayed treatment and age over 40. Early stages of RMSF are often confused with ehrlichiosis and meningococemia.

Infectious Agent

Rickettsia rickettsii, a gram-negative coccobacillus.

Reservoir

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

Transmission

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

Incubation

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

Period of Communicability

No evidence of person to person transmission.

Methods of Control

Avoid tick infested areas when possible. When unavoidable, use tick repellent 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.

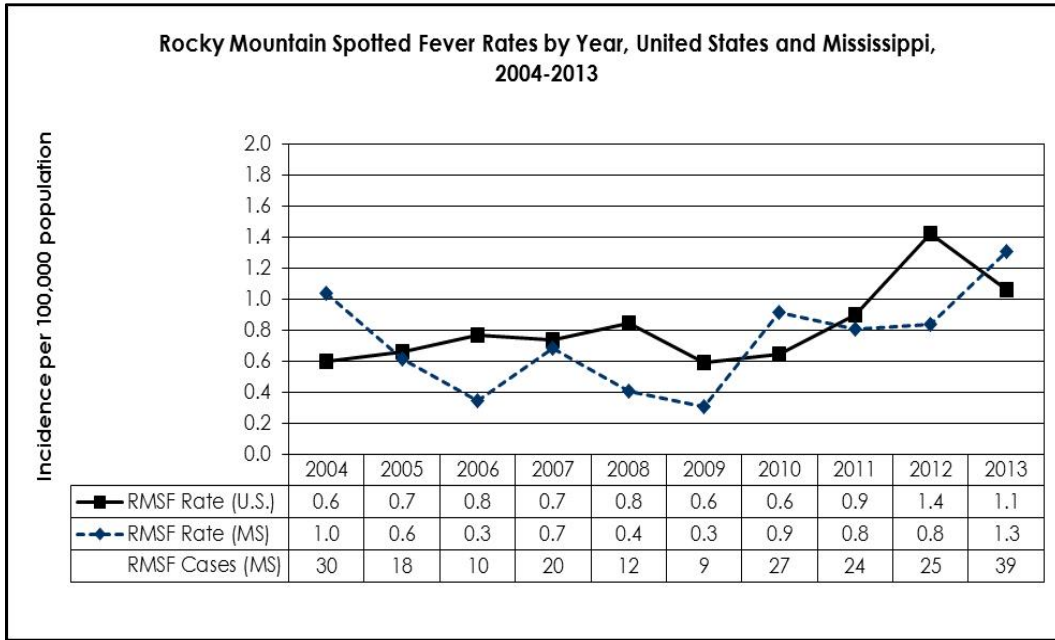
Reporting Classification

Class 2.

Epidemiology and Trends

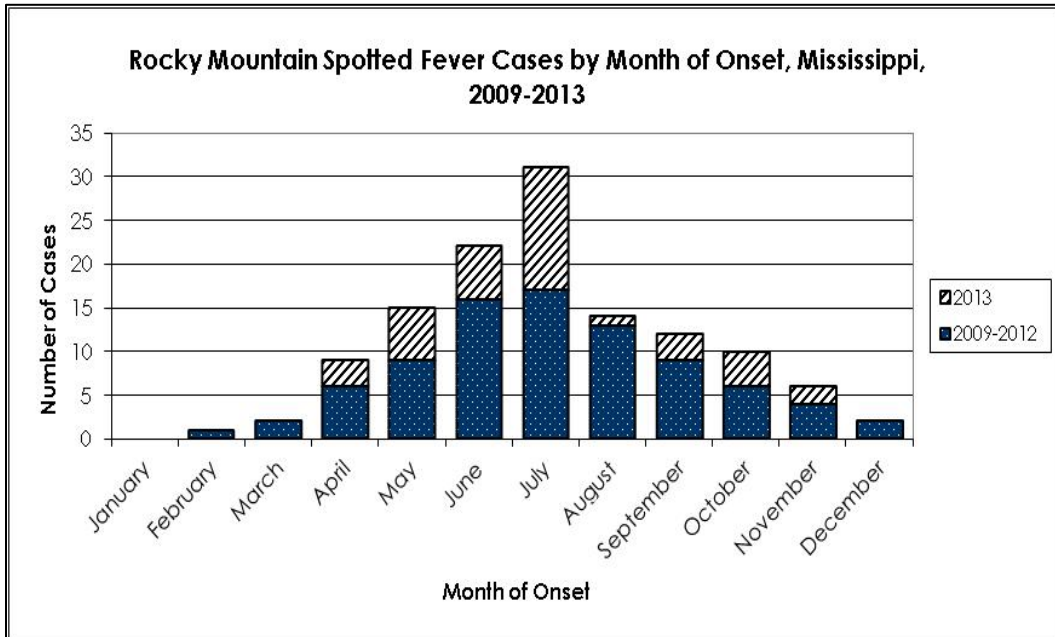
In 2013, there were 39 cases of RMSF reported in Mississippi. This is higher than both the three year (2010-2012) average of 25 cases (Figure 39) and the number of reported cases in 2012 (25). The cases ranged in age from 5 to 80 years, with a median age of 51 years. There were no reported deaths due to RMSF in Mississippi in 2013.

Figure 39



Both in Mississippi and the U.S., the majority of Rocky Mountain spotted fever cases occurred between April and September. In Mississippi over the past five years, 83% of the reported cases have occurred during this time frame (Figure 40).

Figure 40



Rubella

2013 Case Total	0	2013 rate/100,000	0.0
2012 Case Total	0	2012 rate/100,000	0.0

Clinical Features

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

Infectious Agent

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

Reservoir

Humans.

Transmission

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

Incubation

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

Period of Communicability

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

Methods of Control

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

Reporting Classification

Class 2.

Epidemiology and Trends

In the last major rubella epidemic in the United States, during 1964–1965, an estimated 12.5 million rubella virus infections resulted in 11,250 therapeutic or spontaneous abortions, 2,100 neonatal deaths, and 20,000 infants born with CRS. In 2004, after implementation of a universal vaccination program, elimination of endemic rubella virus transmission was documented in the United States. However, rubella virus continues to circulate elsewhere in the world, especially in regions where rubella vaccination programs have not been established (e.g., the African Region), placing the United States at risk for imported cases of rubella and CRS.

During 2004–2012, 79 cases of rubella and six cases of CRS were reported in the United States (see the CDC MMWR referenced below which highlights CRS in three states). In 2013, there were 9 cases of rubella and 1 case of CRS in the US. There were no reported cases of rubella in Mississippi in 2013. The last reported case in the state was in a 4 year old in 1986.

- CDC. Three cases of congenital rubella syndrome in the post elimination era—Maryland, Alabama, Illinois, 2012. MMWR. March 29, 2013/62(12); 226-229.

Salmonellosis

2013 Case Total	919	2013 rate/100,000	30.7
2012 Case Total	1248	2012 rate/100,000	41.8

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 Javiana, Mississippi, Newport and Typhimurium.

Reservoir

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

Transmission

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

Incubation

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

Period of Communicability

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

Methods of Control

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

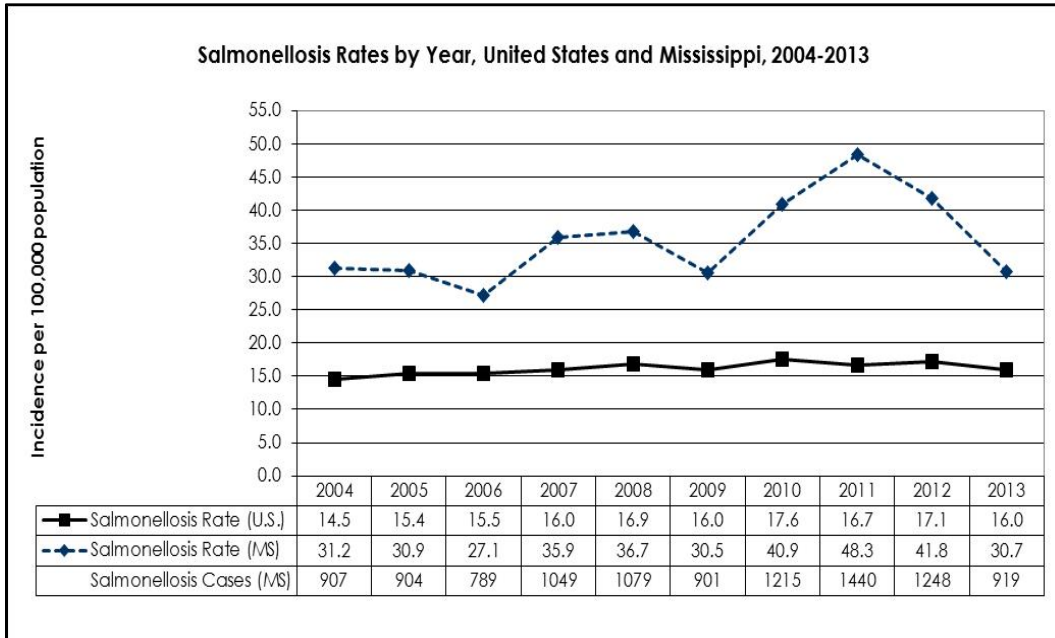
Reporting Classification

Class 3.

Epidemiology and Trends

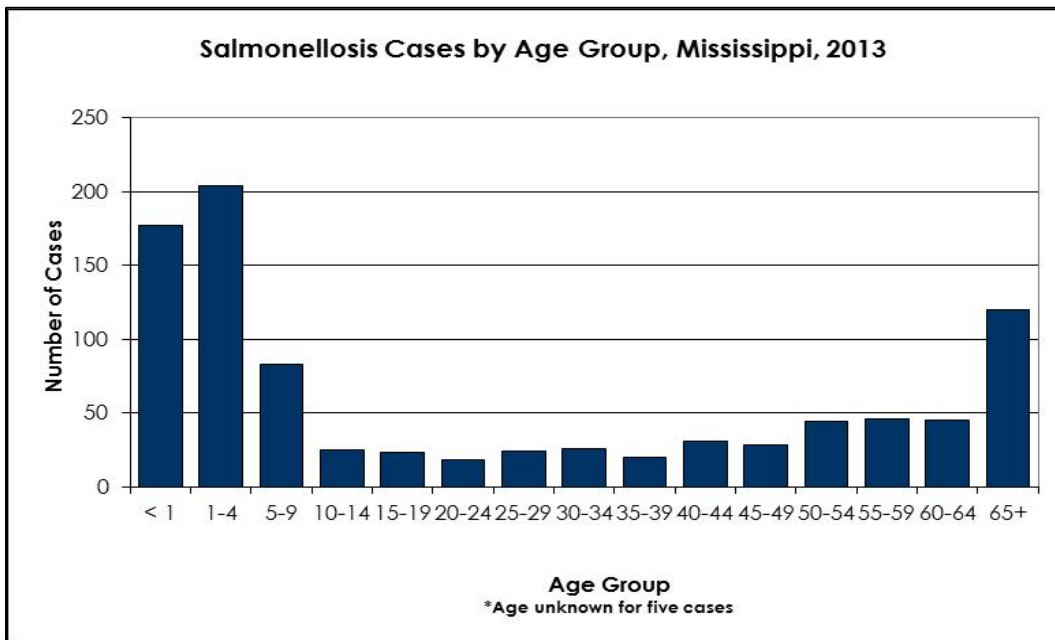
In Mississippi, 919 cases of salmonellosis were reported to MSDH in 2013 (Figure 41). Five *Salmonella* serotypes accounted for 77% of the total serotyped isolates seen in Mississippi: Mississippi (18%), Typhimurium (17%), Newport (16%), Javiana (15%), and Enteritidis (11%).

Figure 41



Infections occur in people of all ages, but there is higher incidence in infants and small children. In 2013, 381 (42%) of the cases were in children less than 5 years of age (Figure 42) in which age was known.

Figure 42



In 2013, eight multistate outbreaks were reported through the CDC PulseNet system, three of which affected Mississippi. In March 2013, two cases of *Salmonella* were

reported in Mississippi that were associated with a May 2012 outbreak of *Salmonella* Sandiego, *Salmonella* Pomona, and *Salmonella* Pona. This outbreak had a total of 473 cases from 43 states, with a total of four cases in Mississippi residents. This outbreak was caused by exposure to turtles or their environments (e.g., water from a turtle habitat). In April 2013, two outbreaks were reported that were both caused by contact with live baby poultry. The first outbreak involved 356 cases from 39 states, including six cases in Mississippi. It was caused by *Salmonella* Typhimurium. The second outbreak of *Salmonella* Infantis, *Salmonella* Lille, *Salmonella* Newport, and *Salmonella* Mbandaka involved 158 cases across 30 states. Both cases reported in Mississippi were *Salmonella* Infantis.

Shigellosis

2013 Case Total	226	2013 rate/100,000	7.6
2012 Case Total	285	2012 rate/100,000	9.5

Clinical Features

Shigellosis is an acute bacterial illness characterized by loose, often bloody stools (dysentery), fever, nausea and vomiting, abdominal cramping and tenesmus. Asymptomatic infections do occur. The illness is usually self-limited, lasting an average of 4-7 days; however infection with *Shigella dysenteriae* (*S. dysenteriae*) can lead to a 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*. In Mississippi, Group D, *S. sonnei* are the predominant isolates.

Reservoir

Humans are the primary reservoir.

Transmission

Primarily person to person by direct or indirect fecal oral contact. Infection may also occur after ingestion of contaminated food or water. *Shigella* is highly infectious with an infective dose as low as 100-200 organisms.

Incubation

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

Period of Communicability

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

Methods of Control

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

Reporting Classification

Class 3.

Epidemiology and Trends

There were 226 cases of Shigellosis reported to MSDH during 2013 (Figure 43). There is variability in the number of yearly reported cases, with a peak of 1,426 cases in 2007 associated with a large outbreak that occurred in the Jackson metropolitan area and along the Gulf Coast. Although Shigellosis is usually a summer month illness, over half (59%) of the 2013 cases occurred between August and December (Figure 44).

Figure 43

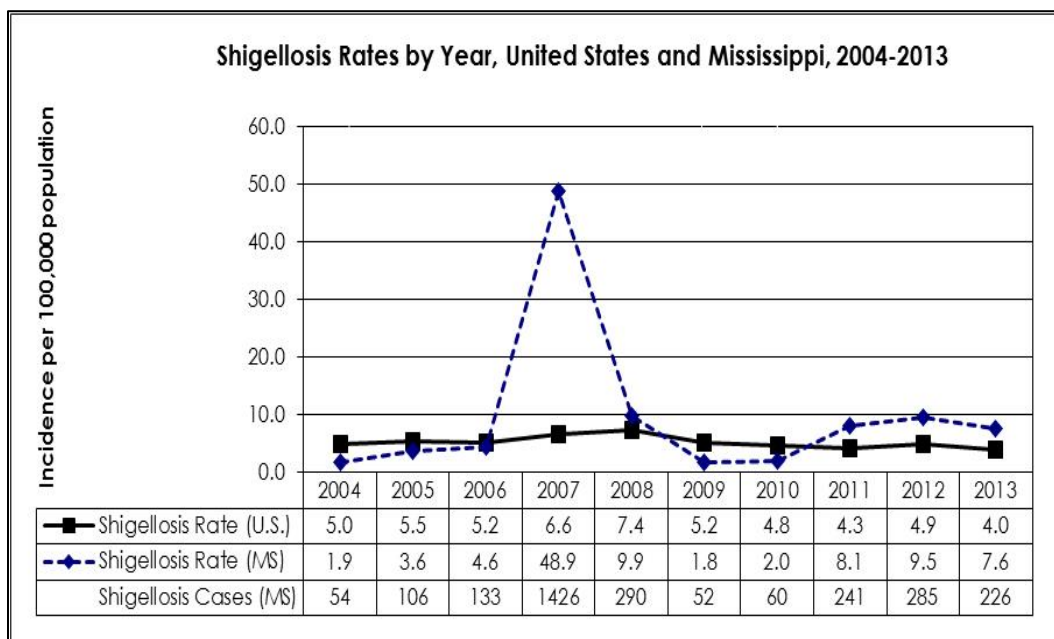
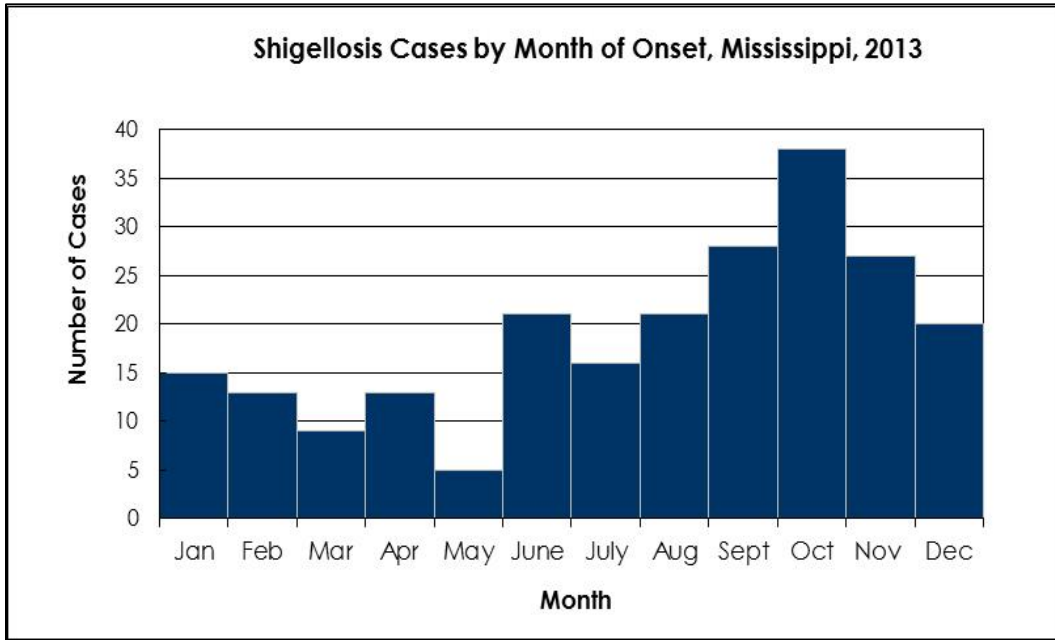
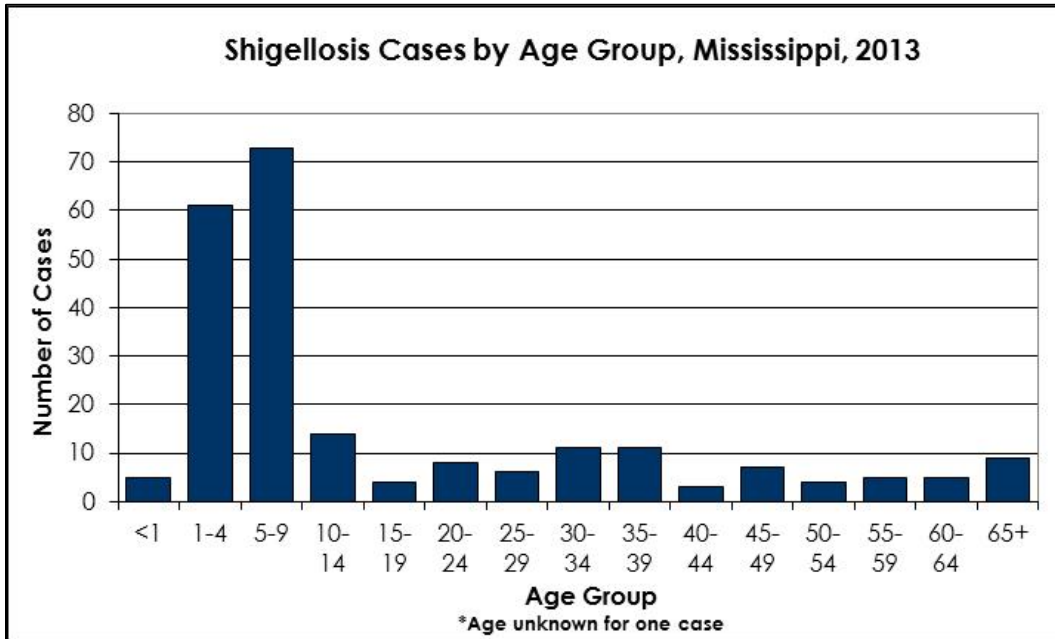


Figure 44



Shigella typically impacts children disproportionately. In 2013, the reported cases ranged in age from 1 month to 92 years, with 62% occurring in children less than 10 years of age (Figure 45).

Figure 45



Syphilis

Primary and Secondary Syphilis

2013 Case Total	78	2013 rate/100,000	2.6
2012 Case Total	155	2012 rate/100,000	5.2

Early Latent Syphilis

2013 Case Total	185	2013 rate/100,000	6.2
2012 Case Total	259	2012 rate/100,000	8.7

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, the primary 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 arthralgia. Clinical manifestations of secondary syphilis usually resolve without treatment in weeks to months. Tertiary syphilis will develop years later in 15-40% if untreated, primarily as cardiovascular or neurosyphilis, or as skin, bone, visceral or mucosal surface gummas. Latent syphilis, a period of seroreactivity without clinical disease, is classified as early (infection acquired within the preceding year) or late (infection of more than a year's duration).

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

Infectious Agent

Treponema pallidum, a spirochete.

Reservoir

Humans.

Transmission

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

Incubation

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

Period of Communicability

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

Methods of Control

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

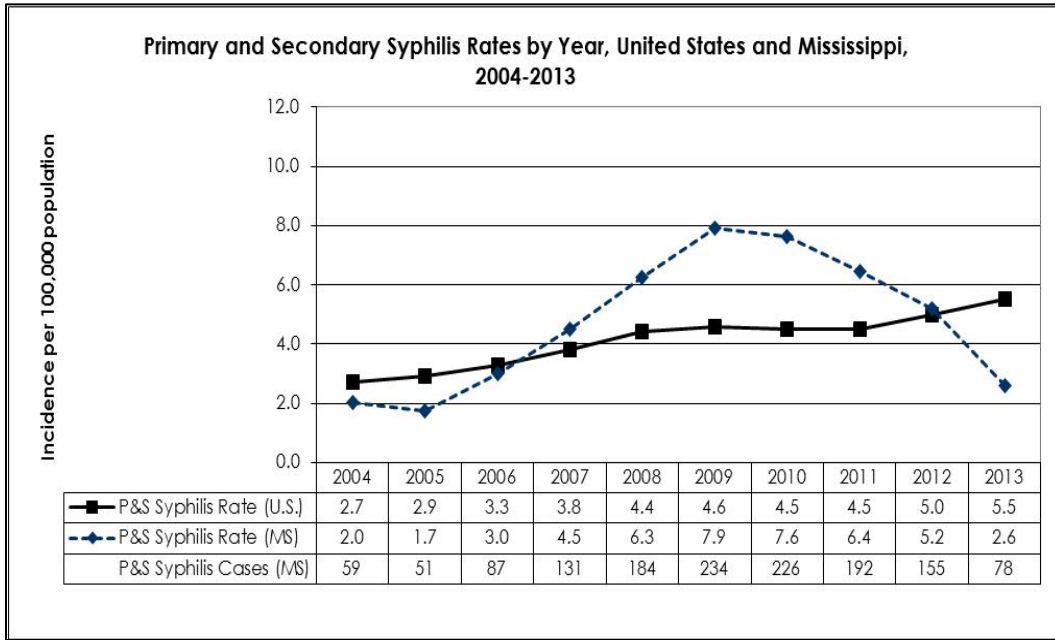
Reporting Classification

Class 1B.

Epidemiology and Trends

Although Mississippi saw a nearly five-fold increase in primary and secondary (P&S) syphilis cases from 2005-2010 (from 51 to 226 cases), there was a 65% decrease from 2010 to 2013 (from 226 to 78 cases) (Figure 46). In 2013, for the first time since 2006, the rate of P&S syphilis cases in Mississippi was lower than the national average. In 2013, MS ranked thirty-seventh nationally.

Figure 46



District V had the highest incidence of P&S syphilis (Figure 47). Fifty-one percent of P&S syphilis cases occurred among 20-29 year olds (Figure 48) and 96% of cases in which race was known were among African Americans (Figure 49). In 2013, the rate of P& S syphilis infections for African Americans (6.5 per 100,000) was fifty-nine times the rate of whites (0.11 per 100,000).

Figure 47

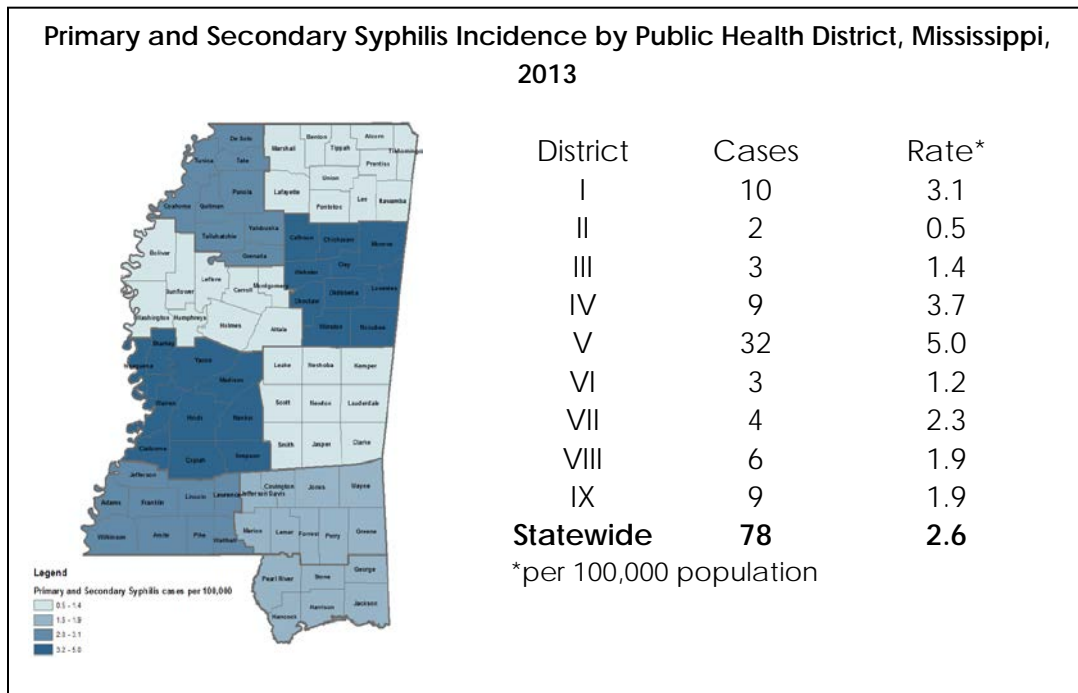


Figure 48

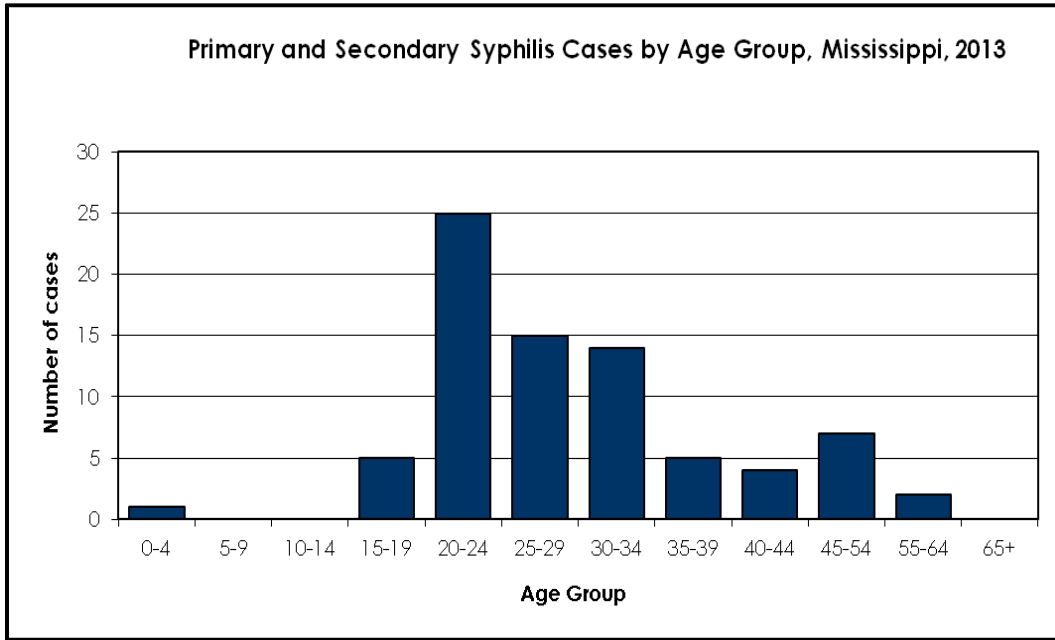
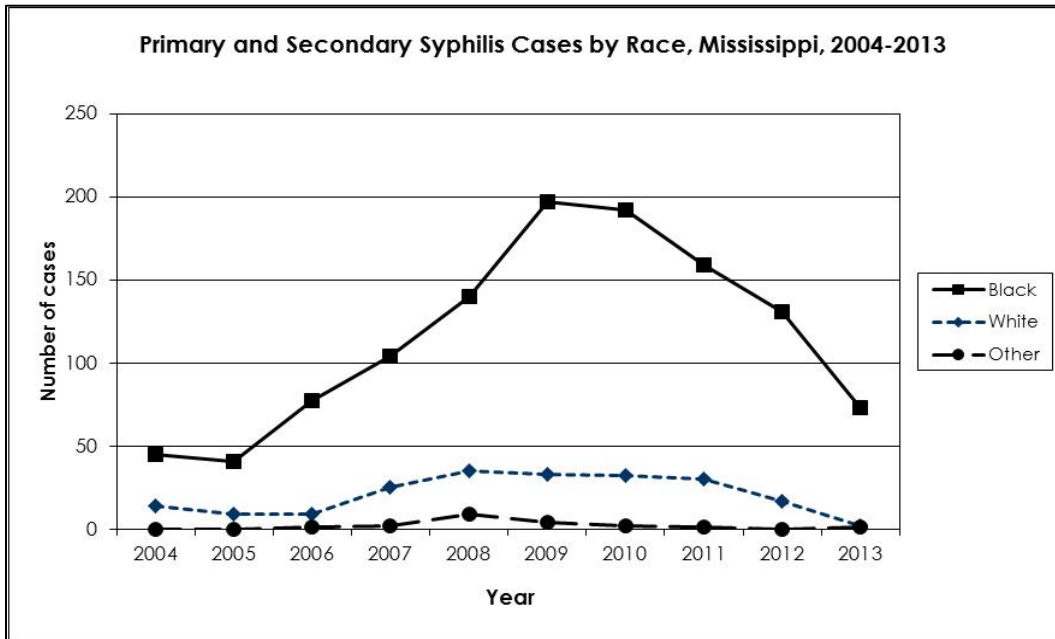
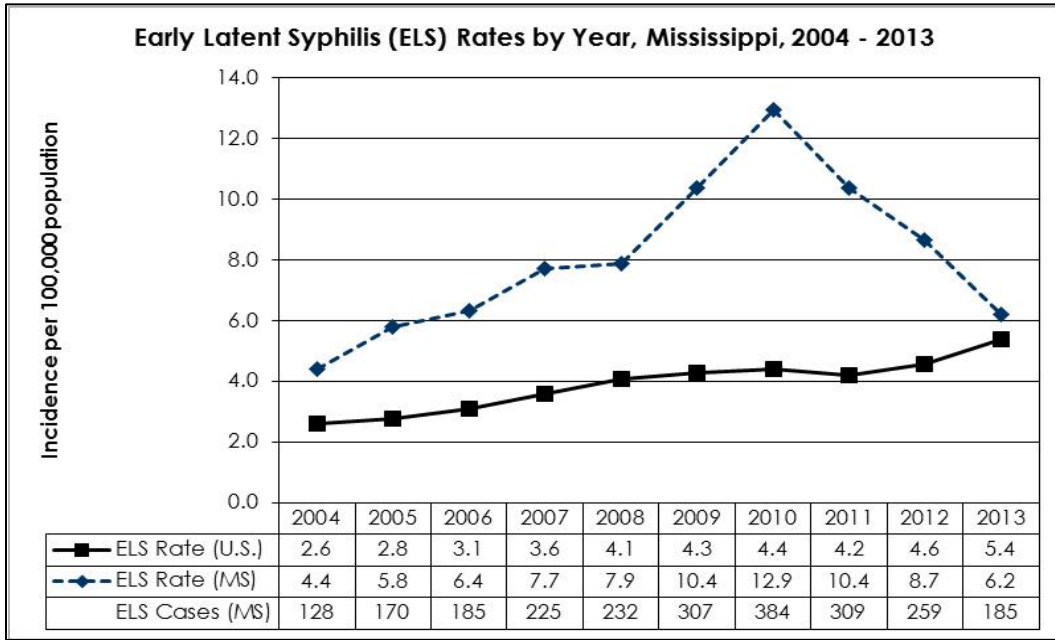


Figure 49



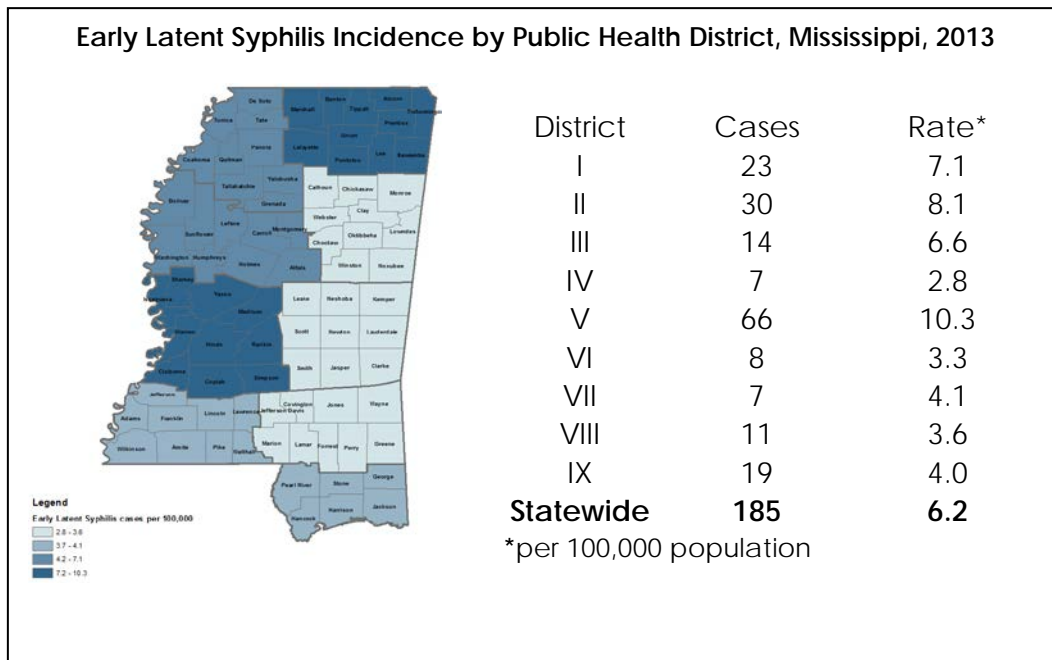
Over the past ten years, Mississippi has had rates higher than national average for early latent syphilis (acquired within the previous 12 months). Since 2010, there has been a 52% decrease in the number of cases (from 384 to 185 cases) (Figure 50).

Figure 50



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

Figure 51



Nearly half (48%) of reported cases were among 20-29 year olds (Figure 52). African Americans are disproportionately affected, accounting for 83% of cases for which race

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

Figure 52

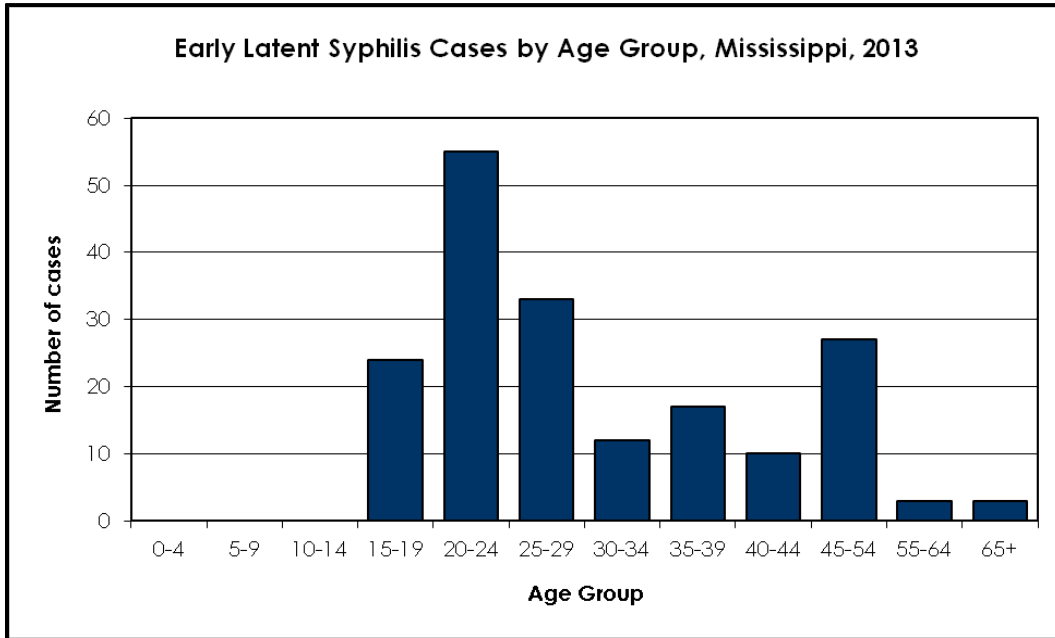
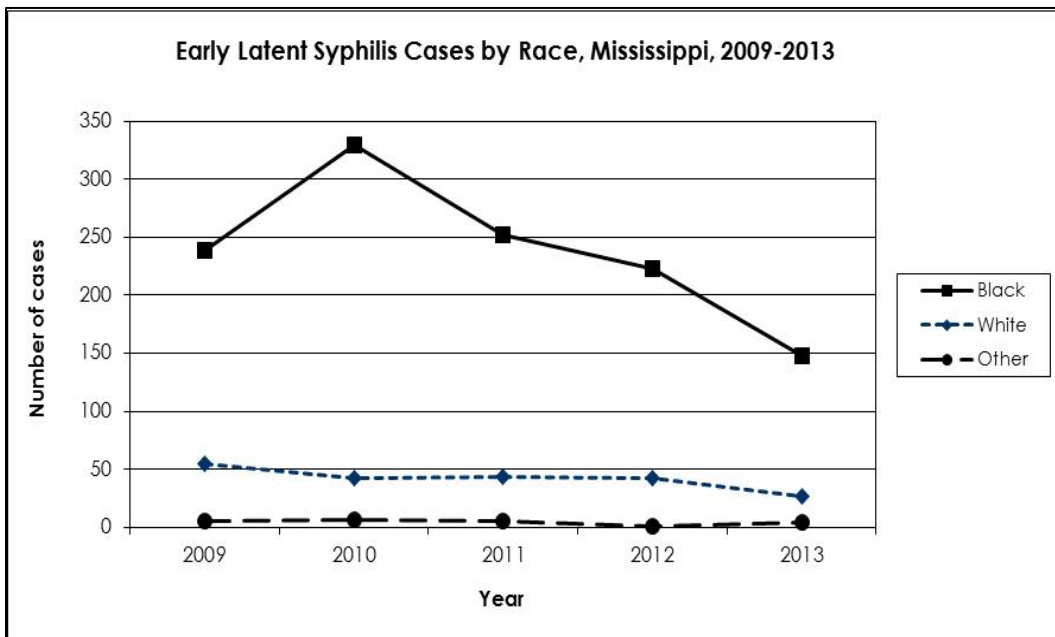


Figure 53



Tuberculosis

2013 Case Total	65	2013 rate/100,000	2.2
2012 Case Total	81	2012 rate/100,000	2.7

Clinical Features

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

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

TB interferon gamma release assay (IGRA) or TB skin test conversion, indicating TBI, occur 2-10 weeks after exposure to active TB disease, if infected. Ten percent of persons with TBI will develop 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. Smokers, diabetics, persons taking immunosuppressive drugs or TnF inhibitors, and persons with certain other chronic diseases have a higher risk of progression to active TB disease.

Period of Communicability

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

Methods of Control

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

Reporting Classification

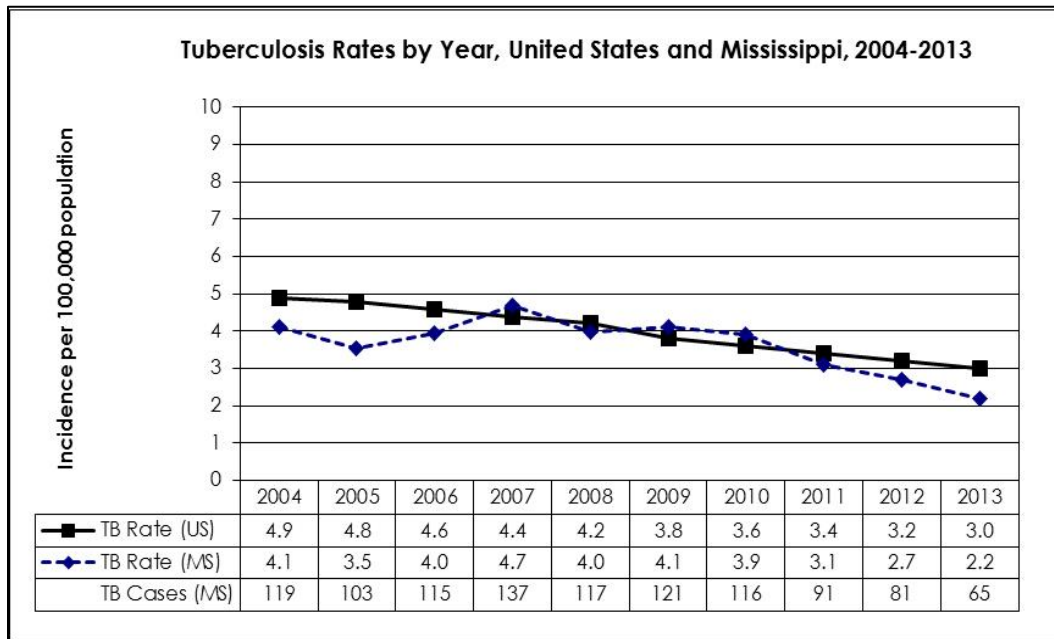
Class 1A; Tuberculosis

Class 2; *M. tuberculosis* infection (positive TST or Interferon-Gamma Release Assay)

Epidemiology and Trends

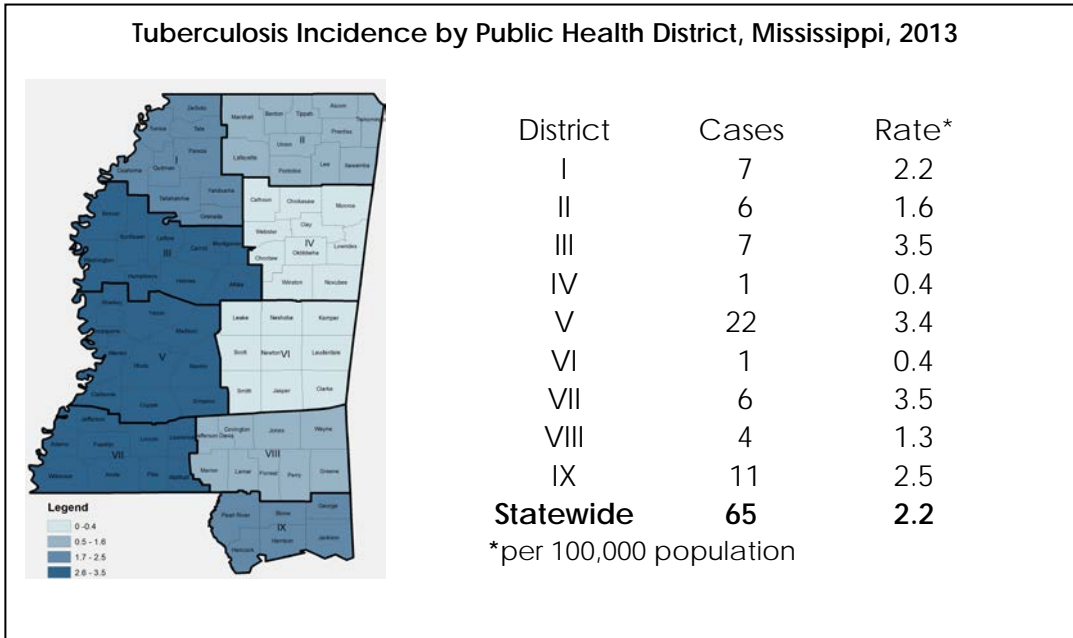
Since 2007 there has again been a gradual decline in active TB cases reported in Mississippi, with only 65 cases in 2013. Since 2011, the Mississippi case rate has been below the US case rate (Figure 54).

Figure 54



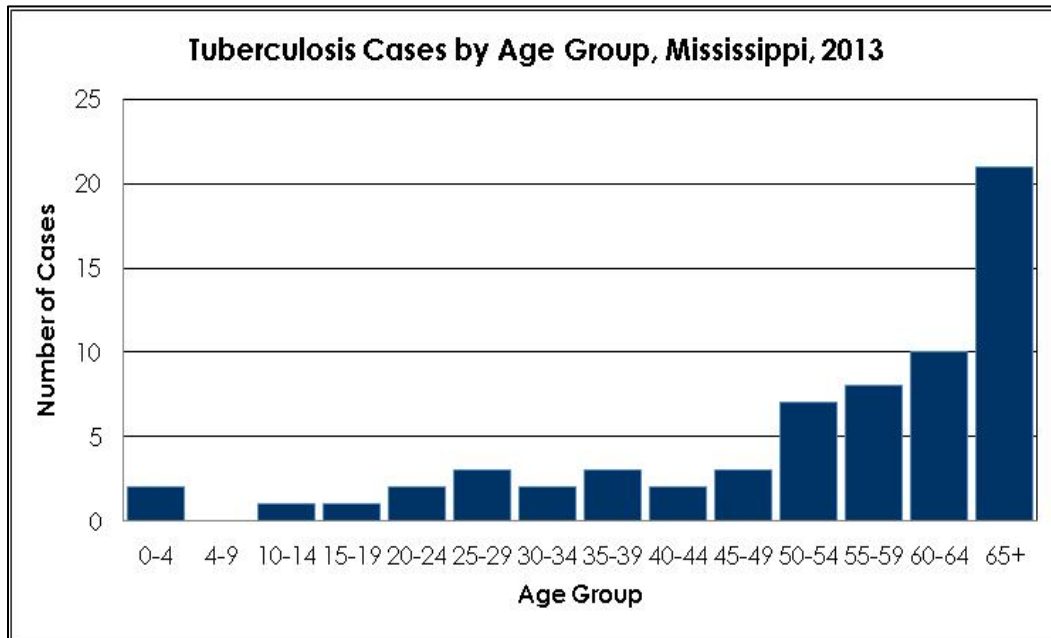
Geographically, TB was reported in every public health district, with the highest incidence noted in Public Health Districts III, V and VII (Figure 55).

Figure 55



Disease occurred across all age groups, with 75% of cases (49/65) occurring in individuals ≥ 45 years (Figure 56).

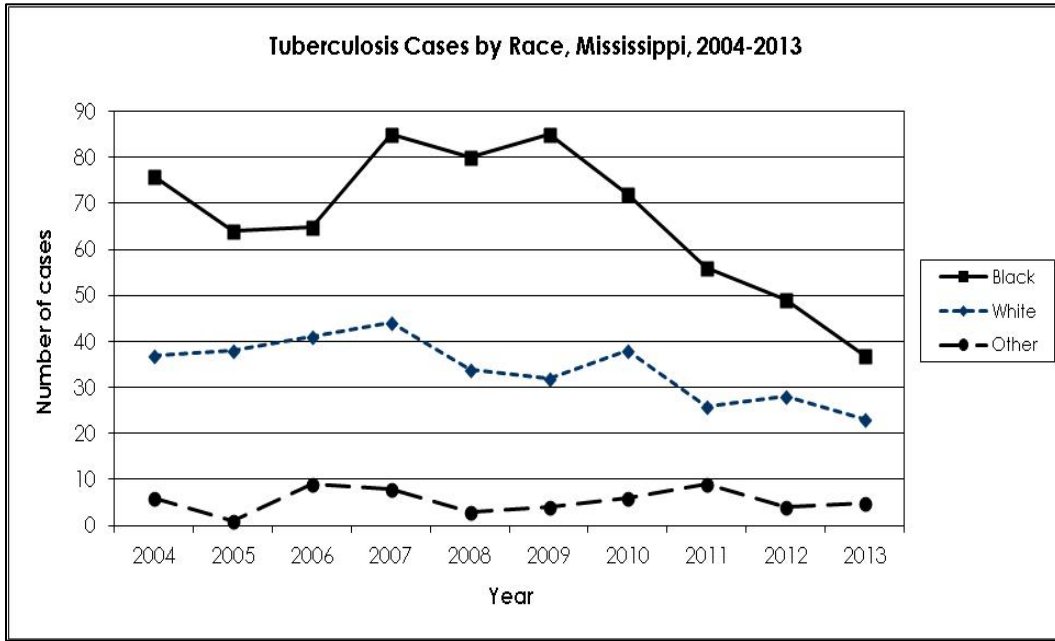
Figure 56



The number of cases in all racial groups has steadily decreased over the last several years, though the African American population is disproportionately affected. While the total number of cases has been declining in the last several years, disease in the African

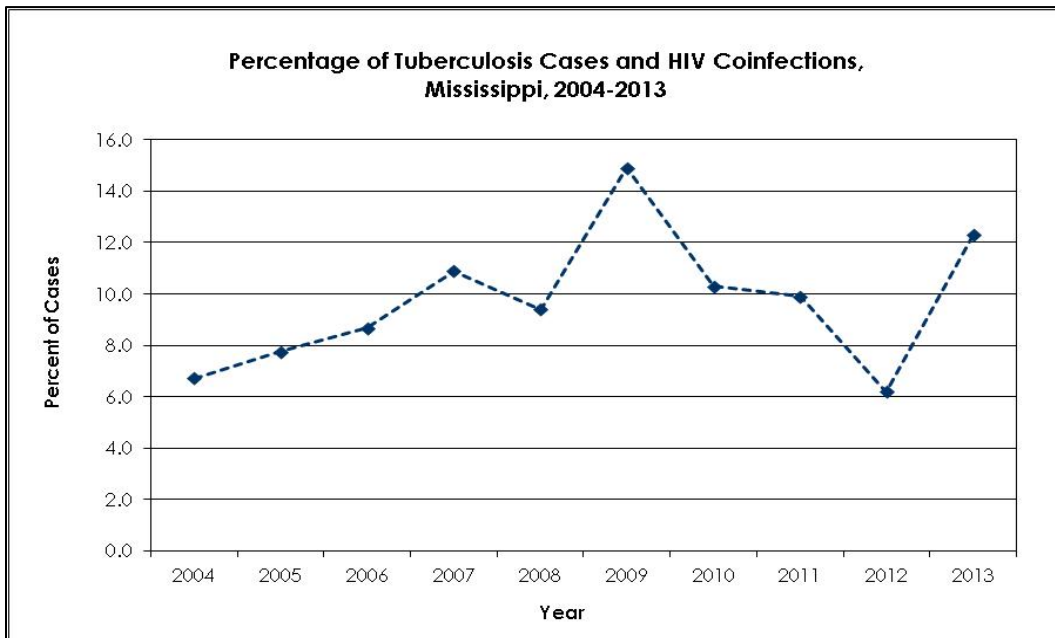
American population still routinely accounts for approximately 60% of the yearly reported cases. In 2013, 57% (37/65) of the cases were in this group (Figure 57).

Figure 57



Following a peak in 2009, the percentage of TB cases among patients co-infected with HIV showed moderate decreases from 2010 through 2012. However, in 2013, this percentage rose to 12.3%, which is nearly twice the percentage of TB patients co-infected in 2012 (6.2%), but less than 2009 (14.9%) (Figure 58).

Figure 58



Varicella

2013 Case Total	5	2013 rate/100,000	0.2
2012 Case Total	11	2012 rate/100,000	0.4

Clinical Features

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

Infectious Agent

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

Reservoir

Humans.

Transmission

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

Incubation

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

Period of Communicability

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

Methods of Control

The live attenuated varicella vaccine is effective in preventing chickenpox. Routine vaccination is recommended at 12 months with a second dose at 4-6 years of age. Two doses of vaccine are also recommended for all susceptible healthcare personnel.

In 2006, FDA approved herpes zoster vaccine for persons 60 years of age and older. Clinical trials indicate the vaccine reduces the overall incidence of shingles by 51% in adults ≥ 60 years (64% for adults 60-69 years and 38% for adults ≥ 70 years) and reduces the incidence of postherpetic neuralgia by 67%.

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

Epidemiology and Trends

In 2013, there were five reported cases of varicella infection in patients >15 years of age. The cases ranged in age from 16 to 61 years, with a median age of 28 years. No deaths were reported in 2013. The three year average from 2010 to 2012 was 11 cases of varicella per year. There were no reported outbreaks in 2013.

***Vibrio* disease**

2013 Case Total	11	2013 rate/100,000	0.4
2012 Case Total	16	2012 rate/100,000	0.5

Clinical Features

There are several noncholera *Vibrio* species that can cause clinical illness in humans, primarily through wound infections, septicemia or gastroenteritis. *Vibrio vulnificus* and *Vibrio parahaemolyticus* are the two most frequently reported species leading to human infections in Mississippi.

V. vulnificus infection leads to the rapid development of sepsis 12 hours to 3 days after ingestion of contaminated seafood, usually raw oysters, or after exposure of a wound to coastal waters where *Vibrio* bacteria thrive. Individuals with chronic liver disease, alcoholism, or immunosuppression are at high risk for sepsis and death. *V. vulnificus* sepsis is characterized by the rapid onset of fever, chills, blistering skin lesions, shock and death. The case fatality rate is over 50% when septicemia occurs.

V. parahaemolyticus infection typically causes gastroenteritis accompanied by watery diarrhea with abdominal cramps, nausea, vomiting and fever, and less commonly, wound infections. Infections with *V. parahaemolyticus* can also lead to sepsis and death.

Infectious Agent

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

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, and should avoid seawater exposure to wounds. MSDH investigates all reported cases to determine the source of infection and possible risk factors of the case.

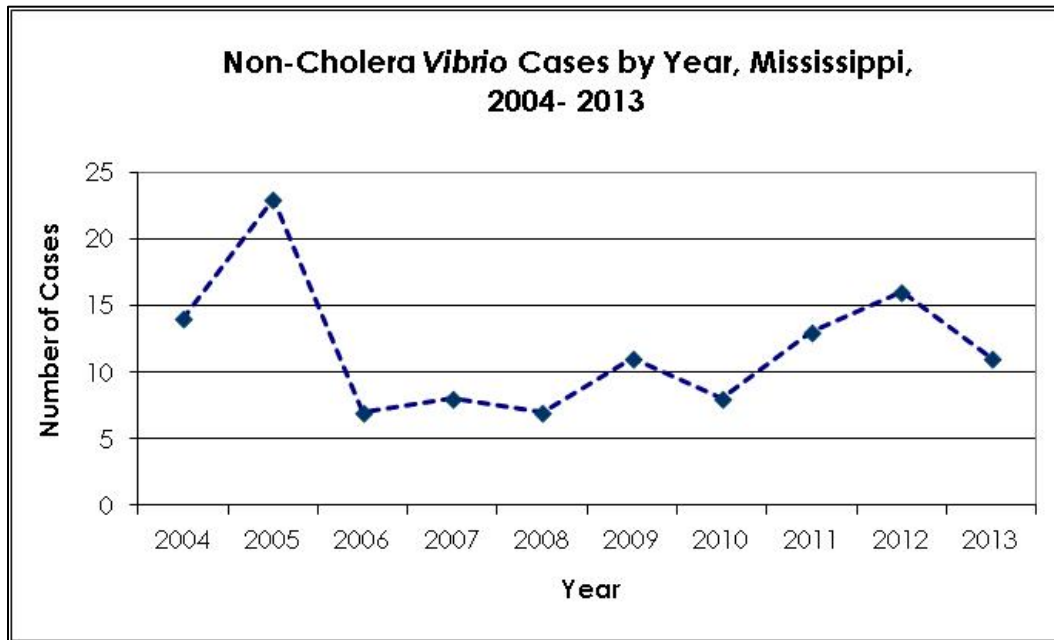
Reporting Classification

Class 1B.

Epidemiology and Trends

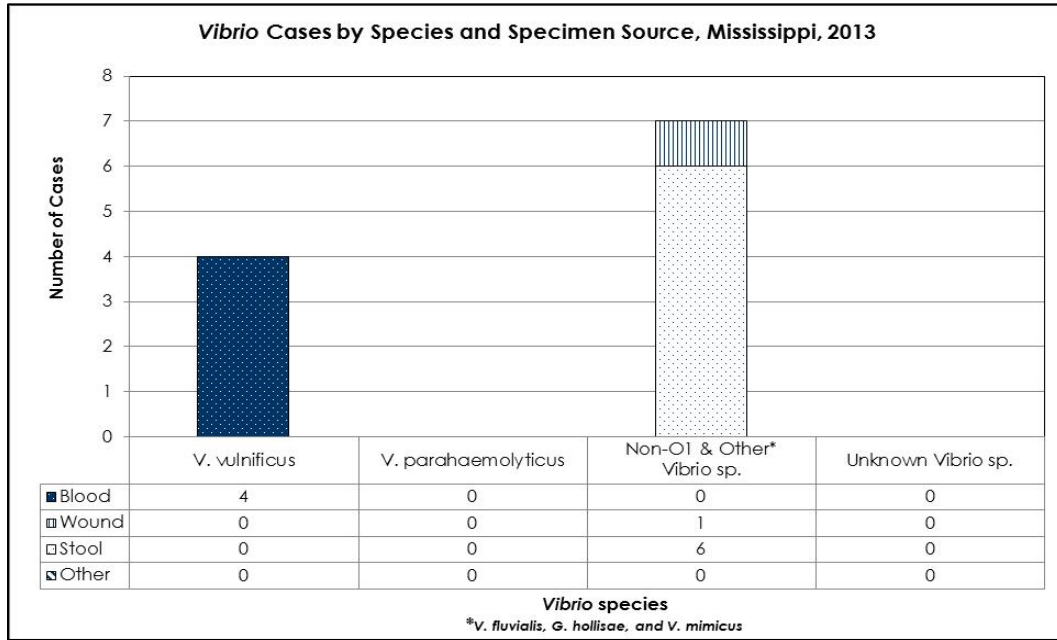
In 2013, there were eleven reported *Vibrio* infections. While lower than the reported number of cases in 2012 (16), the number of reported cases in 2013 is comparable to the three year average of 12 cases for 2010 – 2012 (Figure 59).

Figure 59



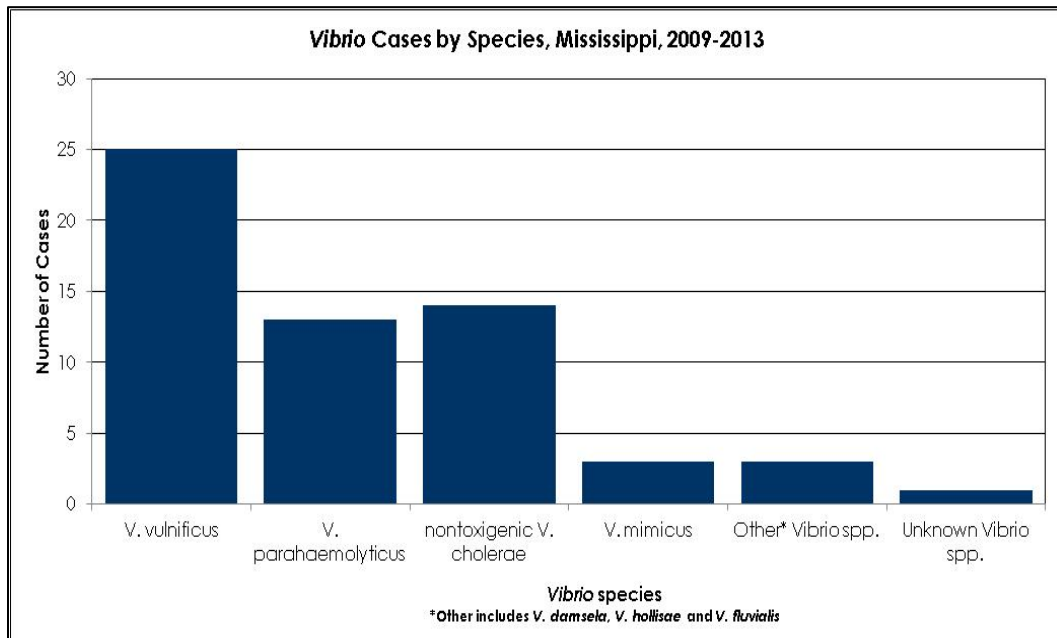
Of the eleven reported cases, four were due to *V. vulnificus* (all isolated from blood cultures); three were due to non-O1, non-139 *V. cholerae* (two isolated from stool cultures and one isolated from a wound culture); two were due to *V. mimicus* (both isolated from stool cultures); one was due to *G. hollisae* (isolated from a stool culture); and one was due to *V. fluvialis* (isolated from a stool culture) (Figure 60). There was one reported death in 2012 due to *V. vulnificus*. The death occurred in an individual over the age of 50 who had a history of alcoholism, and presented as septicemia.

Figure 60



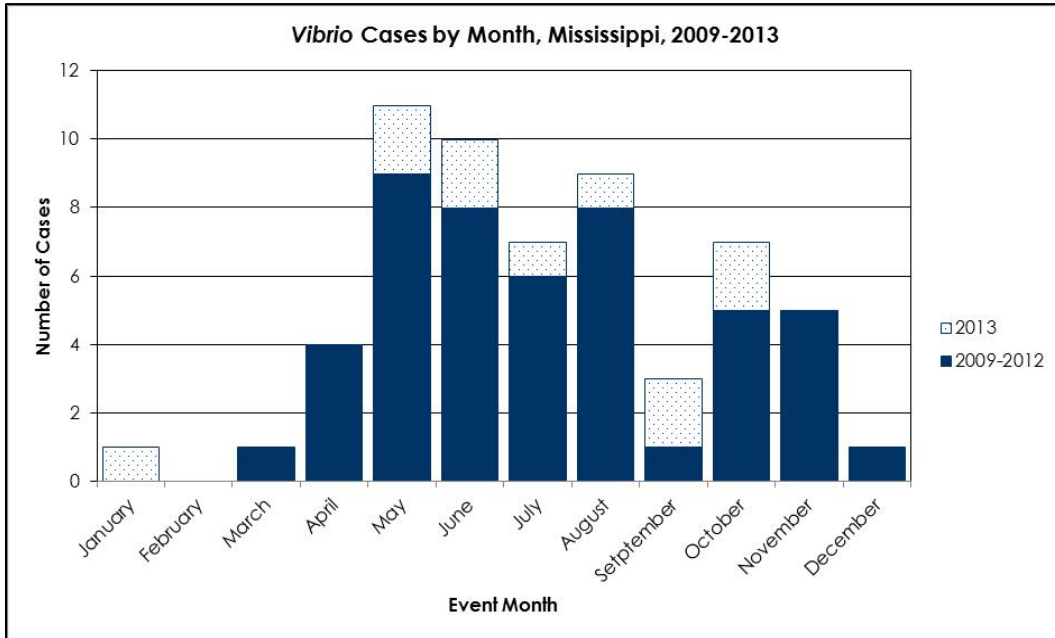
Over the past five years there have been a total of 59 cases of non-cholera *Vibrio* infections reported in Mississippi. *V. vulnificus* (25) and *V. parahaemolyticus* (13) have accounted for 64% of the total reported cases, followed by nontoxicogenic *V. cholerae* (10), *V. mimicus* (5), other *Vibrio* spp (5), and an unknown *Vibrio* spp (1) (Figure 61).

Figure 61



From 2009 through 2013, 63% of the reported *Vibrio* cases occurred between May and August (Figure 62).

Figure 62



Special Reports

This section of the *Annual Summary of Selected Reportable Diseases* provides reports on selected events of public health significance, including significant outbreak investigations conducted by MSDH in 2013.

Enhanced Surveillance of Adult Influenza Mortality, 2013-2014 Influenza Season

Introduction: In December 2013, during the 2013-2014 influenza season, the Mississippi State Department of Health (MSDH) began receiving reports of serious complications associated with influenza infection, including deaths. It was recognized that the most affected individuals were persons <65 years of age with underlying medical conditions; a younger age cohort than expected for complications and deaths due to influenza. The predominant subtype of influenza causing illness in Mississippi was the 2009 influenza A H1N1, the influenza virus that led to the 2009 pandemic and known to lead to higher complications and deaths in people younger than 65 years of age. As the season progressed, the number, frequency and geographic range of the reports of deaths in younger adults increased. Additional reports indicated some facilities had decreased ICU bed capacity as a result of the severity of illness in younger individuals.

While influenza associated pediatric deaths (death in a child <18 years of age) are reportable in Mississippi, there was no established surveillance system for confirmed influenza associated deaths in adults. In order to better characterize the influenza deaths in adults (≥ 18 years of age), and to provide guidance on risk factors and treatment, MSDH developed an enhanced surveillance system to identify influenza deaths in hospitalized adults.

Enhanced Surveillance: The enhanced surveillance extended from December 1, 2013 through February 24, 2014. A case definition and standardized worksheet were developed for hospital staff to provide weekly updates of influenza associated deaths among hospitalized adults. A case report was developed to capture complete demographic information, influenza vaccination status, influenza laboratory results, onset date/date of death, underlying co-morbidities and the use of antivirals (oseltamavir and zanamavir) for each of the confirmed influenza associated deaths in adults. Eighty-three percent (74/89) of the targeted hospitals participated in the enhanced surveillance efforts.

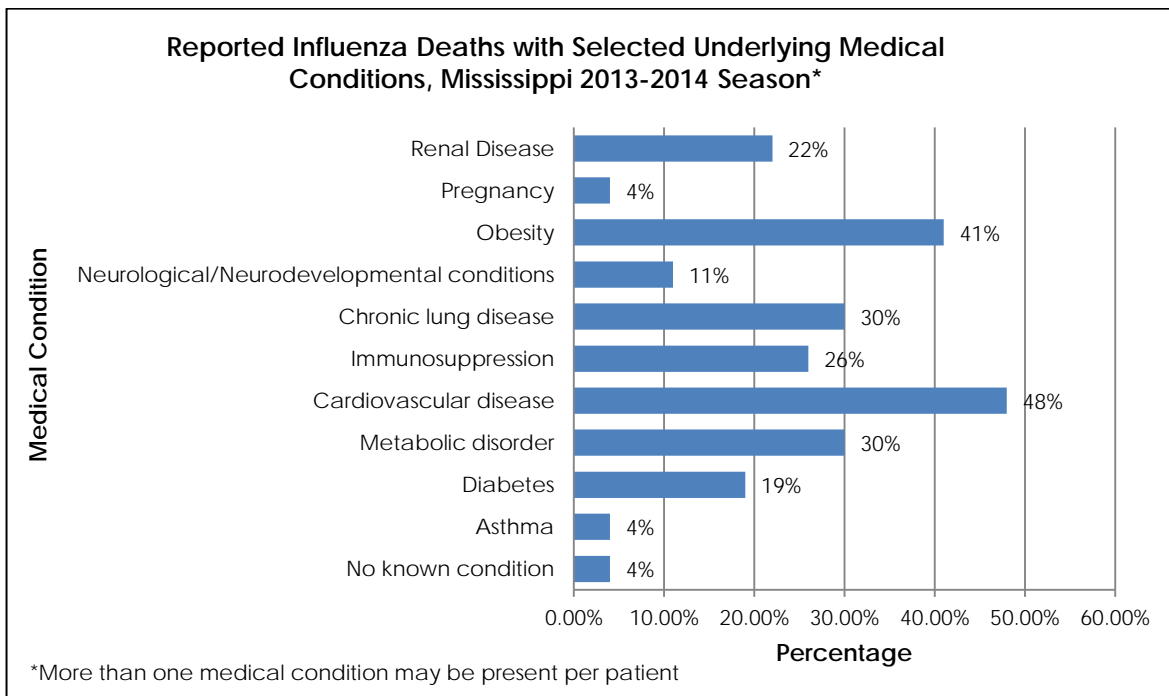
Case Definition: For the purposes of the enhanced surveillance the following case definition for influenza-associated mortality in adults (≥ 18 years of age) was used:

Death in a hospitalized adult resulting from a clinically compatible illness that is laboratory confirmed (either rapid influenza diagnostic test, RT-PCR or other diagnostic method) as influenza.

Findings: At the close of the enhanced surveillance, 27 influenza associated deaths in adults were reported by the participating hospitals. The dates of reported deaths ranged from early December 2013 to early February 2014. The median age for the deaths was 54 years (age range 19 to 80 years), much younger than the age groups typically affected per national data. **In those in whom vaccine status was known, 69% had not been vaccinated against influenza.**

A number of underlying medical conditions placing individuals at high risk for complications from influenza infection were identified. The most frequently reported condition was heart disease, noted in 48% of the deaths, followed by obesity in 41% (BMI ≥ 30); metabolic disorders (30%), lung disease (30%) and diabetes (19%), among other reported conditions (Figure 63).

Figure 63



Seventy-four percent of the reported deaths were treated with antivirals during the course of their illness; however delays in starting antiviral treatment were noted. There was an average of seven days between the onset of illness and the start date of antivirals overall; the length of time lowered slightly to an average of five days when calculated from hospital admission date to start date of antivirals.

Opportunities: The surveillance system highlights two areas that can potentially impact the severity of illness due to influenza: influenza vaccination among persons <65 years, especially with underlying health problems, and earlier use of antivirals in high risk persons.

Fewer than half of all adults in the US aged 18–64 are vaccinated each season despite a recommendation for universal influenza vaccination for persons aged ≥ 6 months. In the US during the 2013-2014 season, only 36.7% of this age group were vaccinated; by comparison 58.9% of children aged 6 months to 17 years, and 65% of adults aged 65 years and older were vaccinated. Rates of hospitalization for adults aged 18-64 were significantly higher than in previous seasons, with persons in this age group accounting for 57% of all influenza- associated hospitalizations in the US, compared to 35-40% in previous seasons.

Early antiviral treatment can reduce the risk of complications from influenza (e.g., pneumonia, respiratory failure, and death). When indicated, antiviral treatment should be started as soon as possible after the onset of symptoms, ideally within 48 hours. However, antiviral treatment after 48 hours may have some benefit to patients with who are: hospitalized; have severe, complicated, or progressive illness; or are at higher risk for influenza complications due to age, a history of underlying chronic medical conditions or pregnancy. The initiation of treatment should not be delayed for laboratory confirmation.

Haff Disease Identified in Three Mississippi Residents, July 2013

On the morning of July 3, 2013 two family members, a 56 year old female (patient A) and her 26 year old nephew (patient B), presented to a central Mississippi Emergency Department complaining of an acute onset of severe myalgia. Physical examinations of the two were unremarkable but both had markedly elevated creatine phosphokinase (CPK), 1390 U/L and 1189 U/L respectively. During the evaluation of patients A and B, a third family member (patient C-the 57 year old husband of patient A) developed similar symptoms with an elevated CPK of 494. All three were admitted for additional evaluation and intravenous fluid replacement. In the course of the hospitalizations patient A had a peak CPK of 9038, patient B 25,681 and patient C 992. Elevated aspartate aminotransaminase (AST) and alanine aminotransaminase (ALT) were also observed for patients A (AST 95 and ALT 61) and B (AST 582 and ALT 169). All three were discharged after brief hospitalizations with the complete resolution of symptoms and laboratory abnormalities.

The astute provider at the hospital diagnosed the three family members with Haff disease rhabdomyolysis after obtaining a history of consumption of pan-fried buffalo fish the evening prior to hospitalization. Haff Disease is a rare illness characterized by rhabdomyolysis after the consumption of certain types of freshwater fish. The disease, primarily associated with the consumption of buffalo fish, is caused by an as yet unidentified toxin contained in the fish. Buffalo fish are a bottom feeding species found in the Mississippi River and its tributaries.

The first cases of Haff disease were identified in the Baltic Sea area in 1924 and since that time have occurred both sporadically and in large seasonal outbreaks in Europe. There have been approximately 30 cases reported in the US with the first reported in 1984. Most instances of reported Haff disease in the US since 2004 have been limited to isolated cases or clusters of 2-3 cases. Nearly all US cases have been associated with buffalo fish consumption and most occur in the summer months.

Haff disease presents with a rapid onset of symptoms within 12 hours after eating fish. Initial symptoms may be nonspecific and include myalgia and muscle stiffness, chest pain and painful breathing and nausea or vomiting. Over the course of the next several hours, severe muscle weakness, dark urine and rhabdomyolysis may develop. The most profound clinical feature is an elevation of CPK which has been reported as 10-1500 times normal. Liver function tests including serum transaminase levels are often elevated. Complications have included renal failure and disseminated intra-vascular coagulation. Treatment is supportive with intravenous fluid hydration to prevent myoglobin toxicity to the renal tubules. Symptoms usually resolve within two to three days. The case fatality rate has been reported as approximately 1.0%; no deaths have been reported in the US.

Reportable Disease Statistics

Mississippi Reportable Disease Statistics

2013



		Public Health District									State Total*
		I	II	III	IV	V	VI	VII	VIII	IX	
Sexually Transmitted Diseases	Primary & Secondary Syphilis	10	2	3	9	32	3	4	6	9	78
	Early Latent Syphilis	23	30	14	7	66	8	7	11	19	185
	Gonorrhea	498	380	573	436	1,523	403	229	480	568	5,090
	Chlamydia	1,999	1,606	2,256	1,472	4,021	1,592	947	1,480	1,982	17,355
	HIV Disease	57	41	51	27	197	35	29	57	62	556
Mycobacterial Diseases	Pulmonary Tuberculosis (TB)	4	5	6	0	20	1	6	3	11	56
	Extrapulmonary TB	3	1	1	1	2	0	0	1	0	9
	Mycobacteria Other Than TB	24	43	22	27	138	40	30	25	69	418
Vaccine Preventable Diseases	Diphtheria	0	0	0	0	0	0	0	0	0	0
	Pertussis	3	2	1	3	16	8	2	7	18	60
	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)	2	6	2	4	6	1	1	13	19	54
	Invasive <i>H. influenzae</i> disease	6	5	1	3	11	1	0	2	2	31
	Invasive Meningococcal disease	0	0	0	0	1	1	1	0	1	4
Enteric Diseases	Hepatitis A (acute)	1	0	0	1	1	1	0	0	1	5
	Salmonellosis	90	144	35	77	251	78	51	83	100	919
	Shigellosis	31	31	10	1	49	18	9	22	54	226
	Campylobacteriosis	7	10	10	3	27	2	5	20	15	99
	<i>E. coli</i> O157:H7/HUS/STEC	6	3	1	2	2	1	1	7	7	30
Zoonotic Diseases	Animal Rabies (bats)	1	0	0	2	2	0	0	0	0	5
	Lyme disease	0	0	0	0	0	0	0	0	0	0
	Rocky Mountain spotted fever	2	6	1	12	6	0	3	5	4	39
	West Nile virus	1	0	3	1	20	0	3	16	1	45

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



Mississippi

Provisional Reportable Disease Statistics

November 2016

Figures for the current month are provisional

		Public Health District									State Totals*			
		I	II	III	IV	V	VI	VII	VIII	IX	Nov 2016	Nov 2015	YTD 2016	YTD 2015
Sexually Transmitted Diseases	Primary & Secondary Syphilis	2	0	2	0	6	0	0	2	3	15	17	290	198
	Total Early Syphilis	3	0	3	0	5	2	0	1	2	16	38	431	377
	Gonorrhea	41	37	57	40	122	32	20	33	67	449	498	5,966	5,098
	Chlamydia	164	132	122	120	332	106	59	113	133	1,281	1,548	16,411	15,391
	HIV Disease	1	2	1	0	16	3	1	3	3	30	24	404	501
Myco- bacterial Diseases	Pulmonary Tuberculosis (TB)	1	1	0	0	1	0	0	0	1	4	8	40	53
	Extrapulmonary TB	1	0	0	0	0	0	0	0	0	1	1	10	8
	Mycobacteria Other Than TB	4	5	1	2	19	0	0	6	2	39	35	369	398
Vaccine Preventable Diseases	Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pertussis	0	0	0	0	0	0	0	0	0	0	1	3	11
	Tetanus	0	0	0	0	0	0	0	0	0	0	0	1	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	1	0	0	0	0	0	1	5	25	50
	Invasive <i>H. influenzae</i> disease	1	0	0	0	2	0	0	2	1	6	6	54	41
	Invasive Meningococcal disease	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteric Diseases	Hepatitis A (acute)	0	0	0	0	0	0	0	0	0	0	0	3	1
	Salmonellosis	4	13	2	3	20	4	3	6	15	73	66	1,142	1,018
	Shigellosis	0	0	1	0	0	0	5	0	1	7	6	66	94
	Campylobacteriosis	1	2	5	0	5	1	1	0	6	22	19	232	182
	<i>E. coli</i> O157:H7/STEC/HUS	0	1	0	0	0	0	0	0	0	1	1	23	21
Zoonotic Diseases	Animal Rabies (bats)	0	0	0	0	0	0	0	0	0	0	1	2	4
	Lyme disease	0	0	0	0	1	0	0	0	0	1	0	1	3
	Rocky Mountain spotted fever	0	0	0	0	1	0	0	0	0	1	5	90	97
	West Nile virus	0	0	0	0	1	0	1	0	0	2	1	42	38

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

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