

# Mississippi Morbidity Report

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## Annual Summary Selected Reportable Diseases Mississippi – 2012



MISSISSIPPI STATE DEPARTMENT OF HEALTH

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## Preface

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

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

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

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

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

Thomas Dobbs, MD, MPH  
State Epidemiologist

# Mississippi Public Health Districts & Health Officers

## Public Health Districts

Northwest Public Health

[District I](#)

Dr. Alfio Rausa  
662.563.5603

Northeast Public Health

[District II](#)

Dr. Crystal Tate  
662.841.9015

Delta/Hills Public Health

[District III](#)

Dr. Alfio Rausa  
662.453.4563

Tombigbee Public Health

[District IV](#)

Dr. Robert Curry  
662.323.7313

West Central Public Health

[District V](#)

Dr. Rebecca James  
601.978.7864

East Central Public Health

[District VI](#)

Dr. Rebecca James  
601.482.3171

Southwest Public Health

[District VII](#)

Dr. Leslie England  
601.684.9411

Southeast Public Health

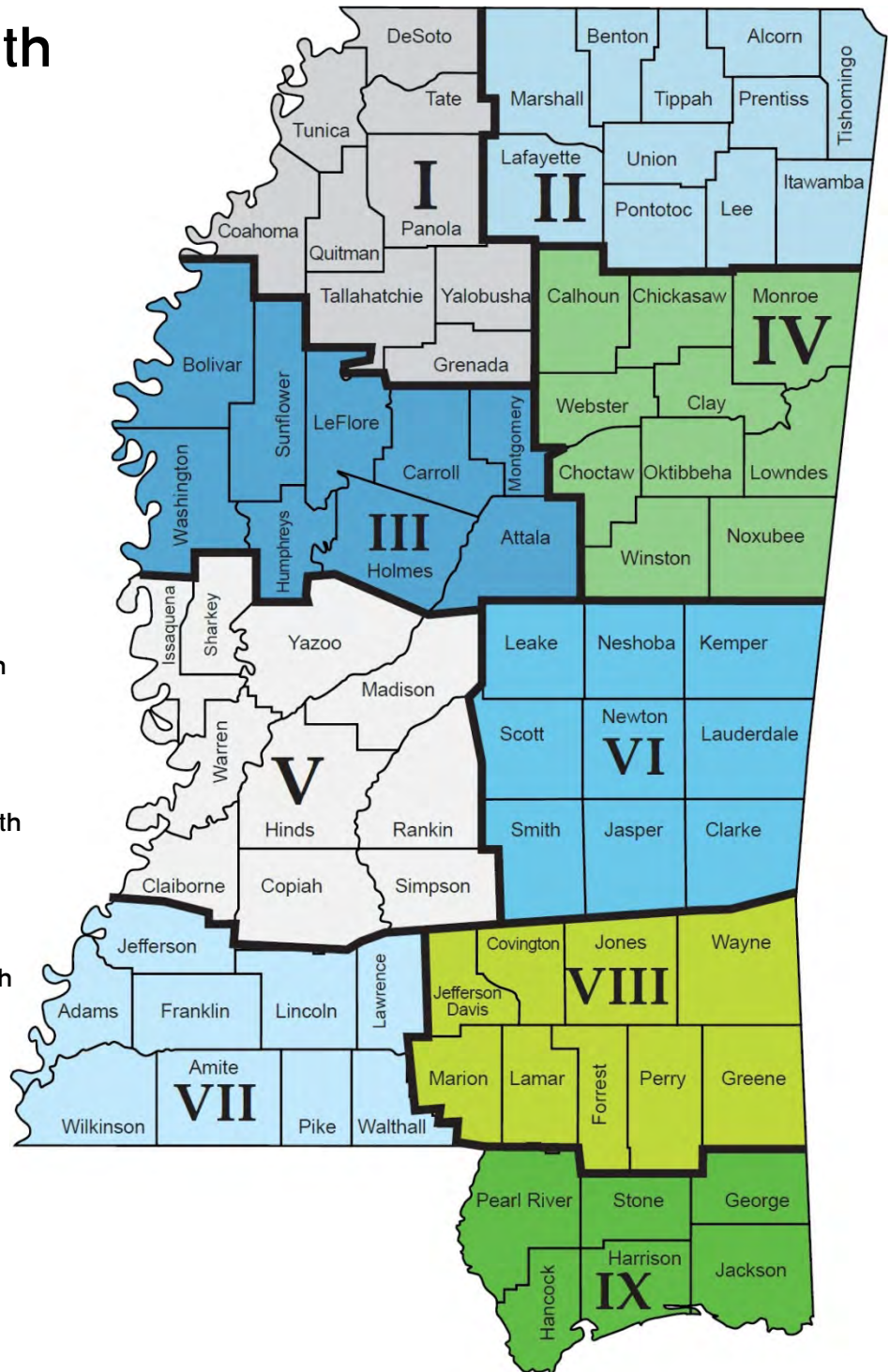
[District VIII](#)

Dr. Thomas Dobbs  
Deputy Dr. Quenyatta Echols-Williams  
601.271.6099

Coastal Plains Public Health

[District IX](#)

Dr. Paul Byers  
228.436.6770



## Reportable Disease List

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

Reporting Hotline: 1-800-556-0003

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

To report inside Jackson telephone area or for consultative services

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

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

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

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

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

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

<p><i>Chlamydia trachomatis</i>, genital infection  Dengue  Ehrlichiosis  <i>Enterococcus</i>, invasive infection<sup>†</sup>, vancomycin resistant  Gonorrhea  Hepatitis (acute, viral only) <b>Note</b> - Hepatitis A requires Class 1 Report  Hepatitis B infection in pregnancy  Legionellosis</p>	<p>Listeriosis  Lyme disease  Malaria  Meningitis other than meningococcal or <i>H. influenzae</i>  Mumps  <i>M. tuberculosis</i> infection (positive TST or positive IGRA<sup>***</sup>)  Noncholera vibrio disease  Poisonings* (including elevated blood lead levels<sup>**</sup>)  Rocky Mountain spotted fever</p>	<p>Rubella (including congenital)  Salmonellosis  Shigellosis  Spinal cord injuries  <i>Streptococcus pneumoniae</i>, invasive infection<sup>‡</sup>  Tetanus  Trichinosis  Viral encephalitis in horses and ratites</p>
<p><sup>†</sup> Usually presents as meningitis or septicemia, or less commonly as cellulitis, epiglottitis, osteomyelitis, pericarditis or septic arthritis.  <sup>‡</sup> Specimen obtained from a normally sterile site.  *Reports for poisonings shall be made to Mississippi Poison Control Center, UMMC 1-800-222-1222.  **Elevated blood lead levels should be reported to the MSDH Lead Program at (601) 576-7447.  Blood lead levels (venous) of <math>\geq 10 \mu\text{g/dL}</math>  ***TST- tuberculin skin test; IGRA- Interferon-Gamma Release Assay  Except for rabies, equine, and ratite encephalitis, diseases occurring in animals are not required to be reported to the MSDH.</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 Blastomycosis Campylobacteriosis CD4 count and HIV Viral Load*†	Chagas Disease (American Trypanosomiasis) Cryptosporidiosis Hansen disease (Leprosy)	Hepatitis C infection Histoplasmosis Nontuberculous mycobacterial disease
*HIV associated CD4 (T4) lymphocyte results of any value and HIV viral load results, both detectable and undetectable.		

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

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

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

## **Arboviral Infections (mosquito-borne)**

### **Background**

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

Infections do not always result in clinical disease. When illness occurs, symptoms can range from a mild febrile illness to more severe cases of neuroinvasive disease with 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 2012, 712 mosquito pools were submitted to MSDH PHL for WNV and SLE 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 2012, 1540 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.

<b>Eastern Equine Encephalitis (EEE)</b>
--

2012 Case Total	0	2012 rate/100,000	0.0
2011 Case Total	0	2011 rate/100,000	0.0

**Clinical Features**

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

**Infectious Agent**

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

**Reservoir**

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

**Transmission**

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

**Incubation**

3-10 days (generally within 7 days).

**Reporting Classification**

Class 1.

## **Epidemiology and Trends**

Human cases are relatively infrequent largely because primary transmission takes place in and around marshy areas where human populations are generally limited. There were no reported cases of EEE in Mississippi in 2012. 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 2012, 32 horses tested positive for EEE. This represents an increase in the number of EEE positive horses compared to only one positive horse in 2011. The 2012 EEE-positive horses were from the following counties: Alcorn (2), Clarke (1), George (3), Greene (1), Hancock (1), Harrison (1), Jackson (5), Jones (2), Lamar (5), Lauderdale (2), Leake (1), Leflore (1), Madison (2), Marion (1), Neshoba (1), Sunflower (1), Tate (1), and Tishomingo (1). Nineteen (59%) of the reported positive horses were in counties in the southern portion of the state (Districts IX and VIII).

## **LaCrosse Encephalitis**

<b>2012 Case Total</b>	<b>1</b>	<b>2012 rate/100,000</b>	<b>0.0</b>
<b>2011 Case Total</b>	<b>0</b>	<b>2011 rate/100,000</b>	<b>0.0</b>

## **Clinical Features**

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

## **Infectious Agent**

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

## **Reservoir**

Chipmunks and squirrels.

## **Transmission**

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

**Incubation**

7-14 days.

**Reporting Classification**

Class 1.

**Epidemiology and Trends**

Reported LaCrosse encephalitis remains relatively rare in Mississippi, with 15 reported cases since 1999. There was one reported cases of LaCrosse encephalitis in 2012.

Of the 16 total cases since 1999, 56% were in females. The ages ranged from 3 months to 78 years of age, with 94% of the cases under the age of 15.

Another *Bunyavirus* in the California group, Jamestown Canyon encephalitis virus, has also been seen in Mississippi, with one reported case in 1993, one in 2006, and one in 2008. There were no reported cases of Jamestown Canyon encephalitis virus in 2012.

<b>St. Louis Encephalitis</b>
-------------------------------

<b>2012 Case Total</b>	<b>0</b>	<b>2012 rate/100,000</b>	<b>0.0</b>
<b>2011 Case Total</b>	<b>1</b>	<b>2011 rate/100,000</b>	<b>0.0</b>

**Clinical Features**

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

**Infectious Agent**

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

**Reservoir**

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

**Transmission**

Through the bite of an infected mosquito generally belonging to genus *Culex* (*Culex quinquefasciatus*, *Culex pipiens*), the southern house mosquito. This mosquito breeds in

standing water high in organic materials, such as containers and septic ditches near homes.

### **Incubation**

5-15 days.

### **Reporting Classification**

Class 1.

### **Epidemiology and Trends**

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

Mississippi had no reported cases of SLE in 2012. No positive SLE mosquito pools were identified in 2012.

## **West Nile Virus**

<b>2012 Case Total</b>	<b>247</b>	<b>2012 rate/100,000</b>	<b>8.3</b>
<b>2011 Case Total</b>	<b>52</b>	<b>2011 rate/100,000</b>	<b>1.7</b>

### **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 and has been detected in more than 317 species of birds, particularly crows and jays.

## Transmission

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

## Incubation

3-15 days.

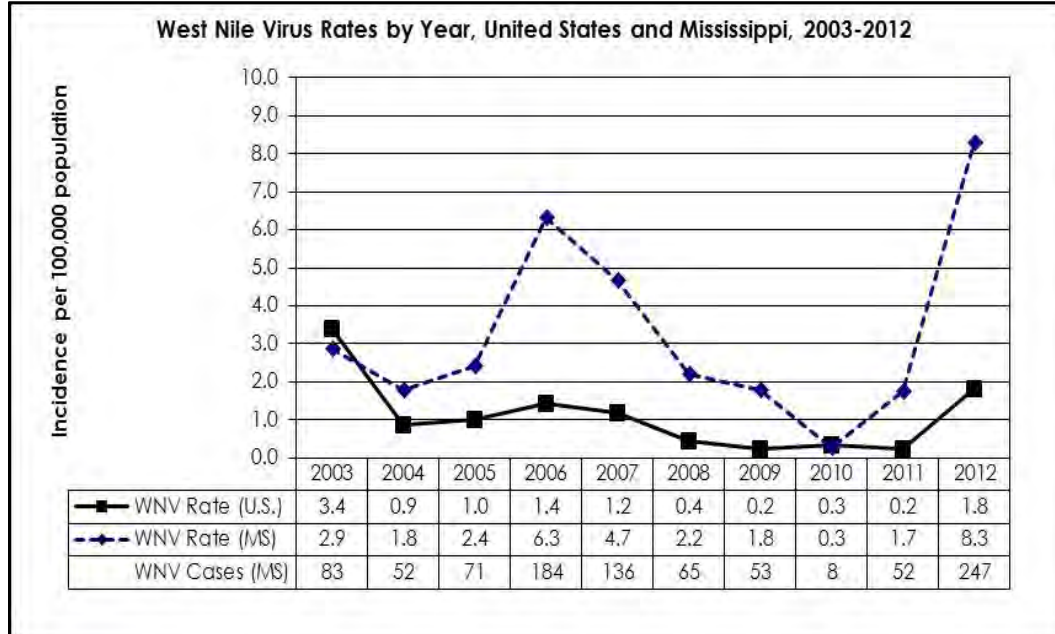
## Reporting Classification

Class 1.

## Epidemiology and Trends

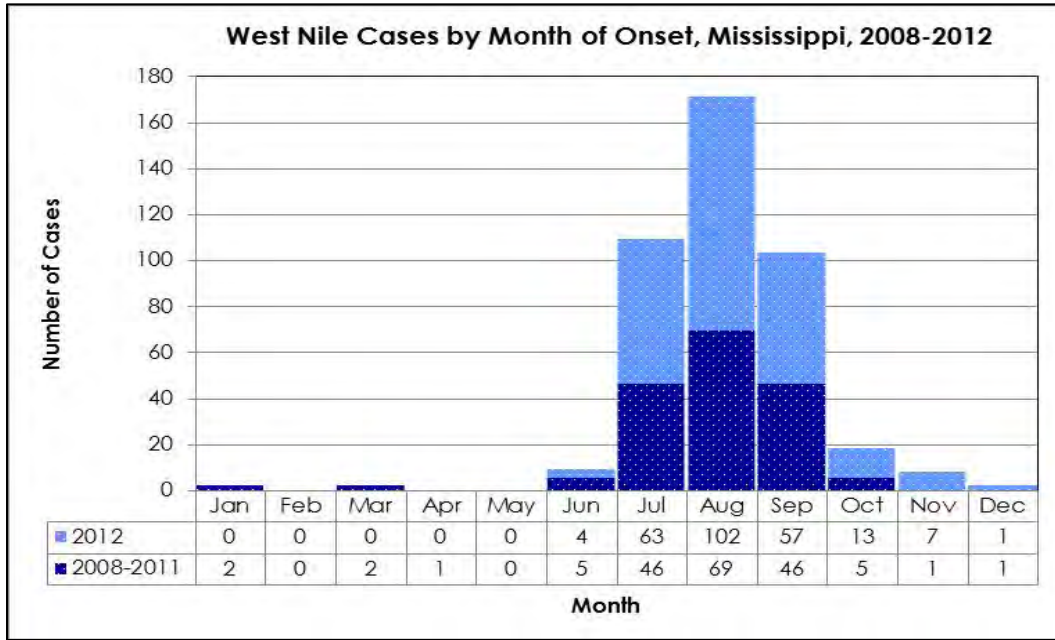
In Mississippi, West Nile virus was first isolated in horses in 2001 followed by human infections in 2002 with 192 cases reported. The years following saw a decrease in the number of reported infections; however in 2006, there was a resurgence of 184 cases (Figure 1). In 2012, the 247 cases represented a marked increase over the 2011 total, and were the most reported cases in any given year in Mississippi. There were five WNV associated deaths reported in 2012. Please see the "[Special Reports](#)" section for an expanded discussion of the 2012 season.

Figure 1



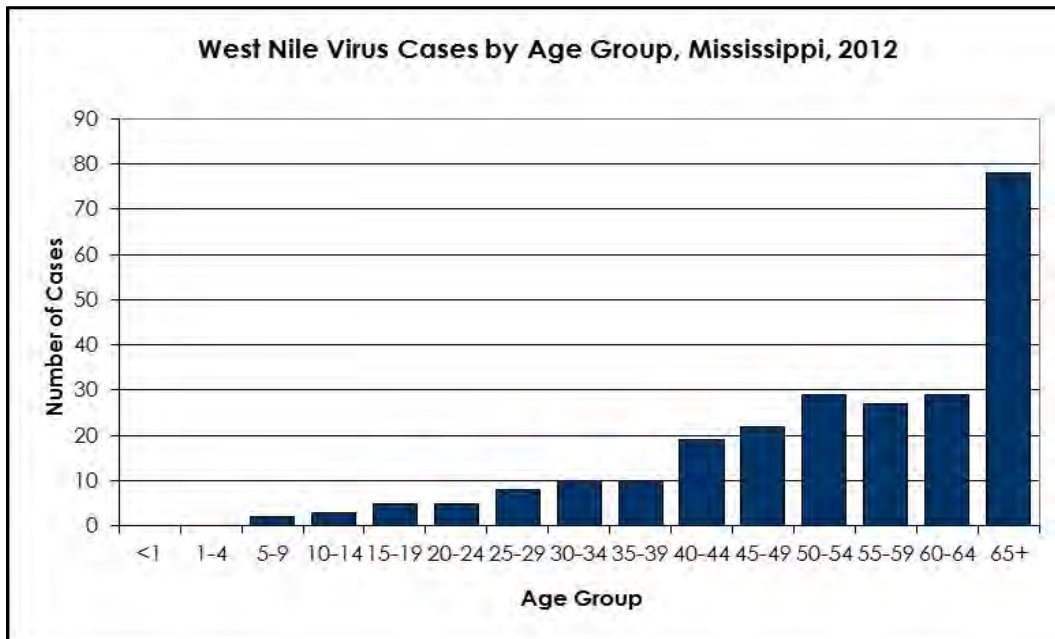
WNV is now thought to be endemic in Mississippi, and the mosquito vector is present the entire year. Human illness can occur year round, but is most prevalent from July to October. July, August, and September are usually the peak months and 90% of the cases over the past five years have occurred during these three months (Figure 2).

Figure 2



Of the 247 cases reported in 2012, 103 (42%) were classified as WNV fever and 144 (58%) were neuroinvasive. The cases ranged in age from 9 to 87 years, with a median age of 57 years (Figure 3). The five reported deaths occurred in individuals over the age of 50.

Figure 3



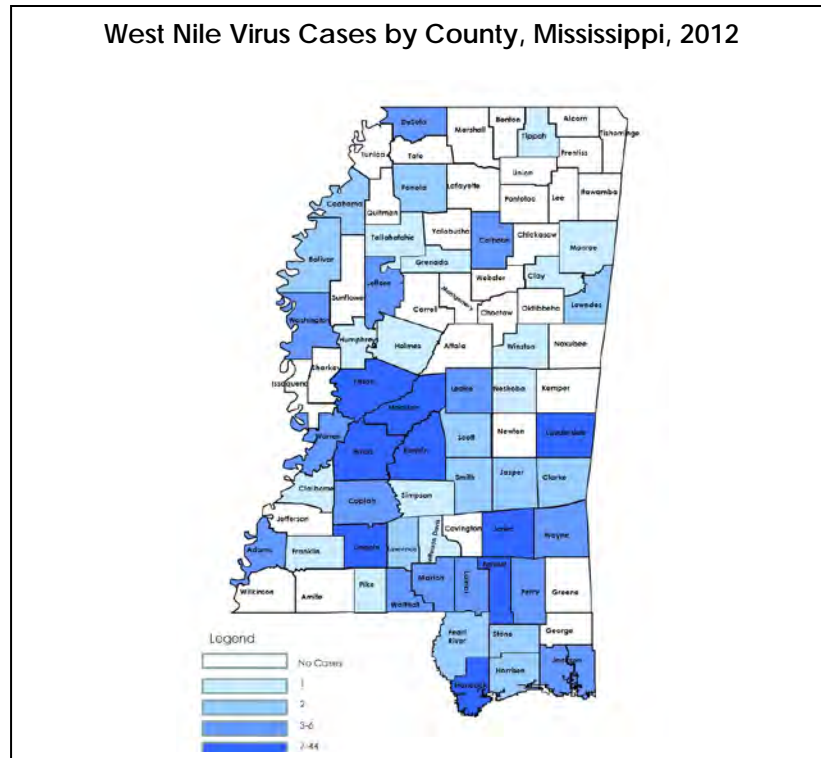
WNV infection can occur in any part of the state, and since 2001, activity (human cases, positive mosquito pools, horses or birds) has been reported in every Mississippi



County except Issaquena. The cases in 2012 were spread throughout the state with the most cases in any one county reported from Rankin County with 44 cases (Figure 4).

A total of 57 mosquito pools tested positive for WNV in 2012. Horses may also become infected with WNV and can act as sentinels for the presence of infected mosquitoes. The Mississippi Board of Animal Health reports equine infections to MSDH. In 2012, 36 horses tested positive for WNV throughout Mississippi.

Figure 4



## Campylobacteriosis

2012 Case Total	99	2012 rate/100,000	3.3
2011 Case Total	73	2011 rate/100,000	2.5

### Clinical Features

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

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

### **Infectious Agent**

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

### **Reservoir**

Commonly present in cattle and poultry.

### **Transmission**

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

### **Incubation**

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

### **Period of Communicability**

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

### **Methods of Control**

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

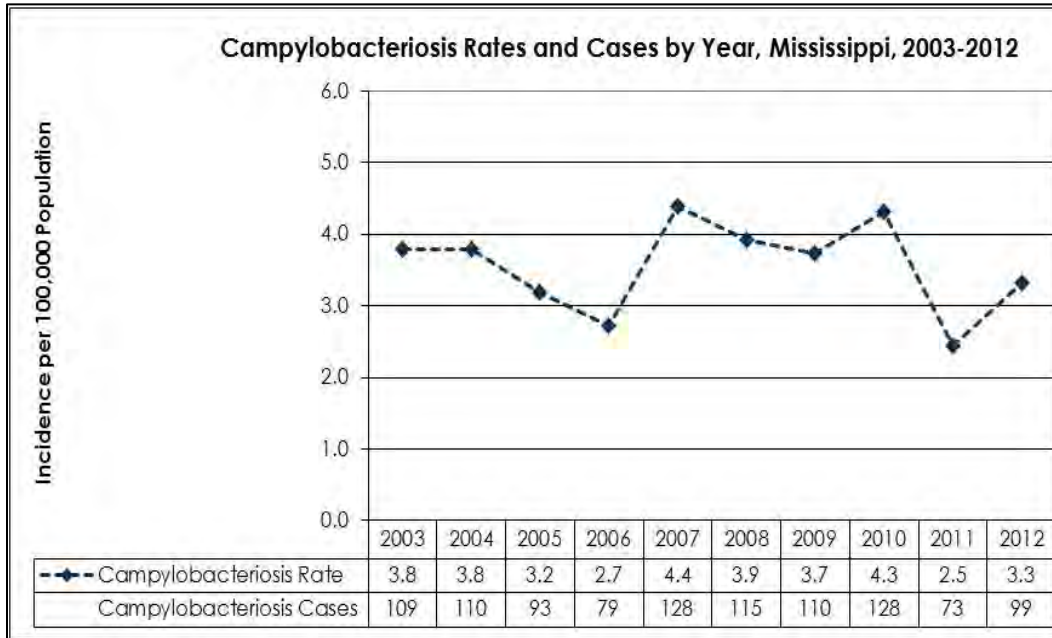
### **Reporting Classification**

Class 3.

### **Epidemiology and Trends**

In 2012, there were 99 reported cases of campylobacteriosis in Mississippi; this was an increase from the 73 cases reported in 2011, but lower than the three-year (2009-2011) average of 104 cases (Figure 5). Only culture-confirmed cases are included in analysis.

Figure 5



Campylobacter infections are typically more common in the warmer months, as are many enteric illnesses, with 49.5% of the total 2012 cases occurring between June and September; however cases are reported to MSDH year round (Figure 6). Children less than five years of age and adults 65 years of age and older accounted for nearly 40% of the overall cases in 2012 (Figure 7).

Figure 6

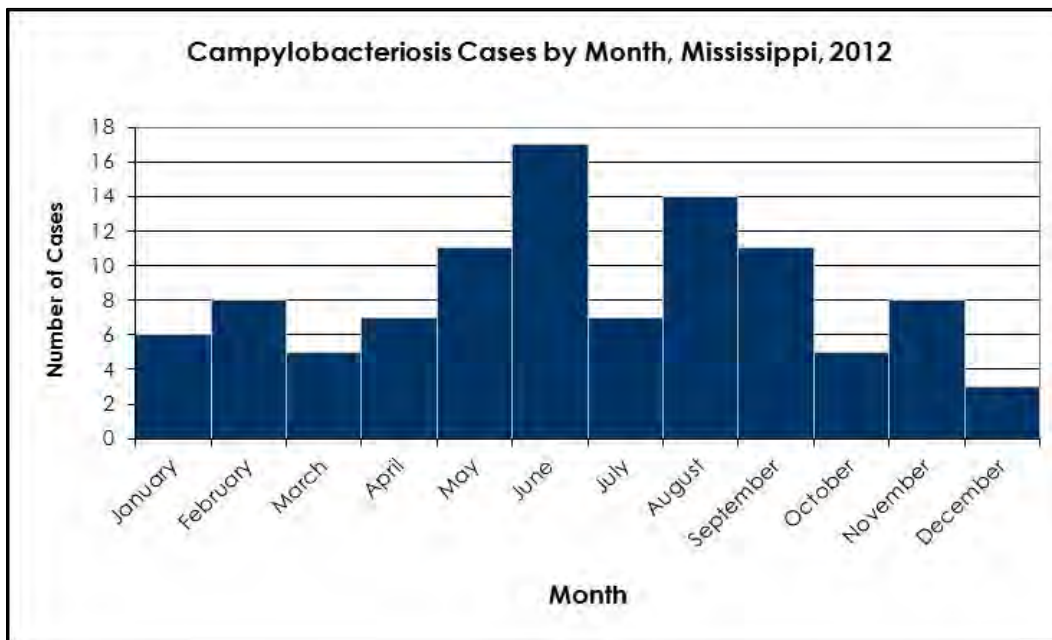
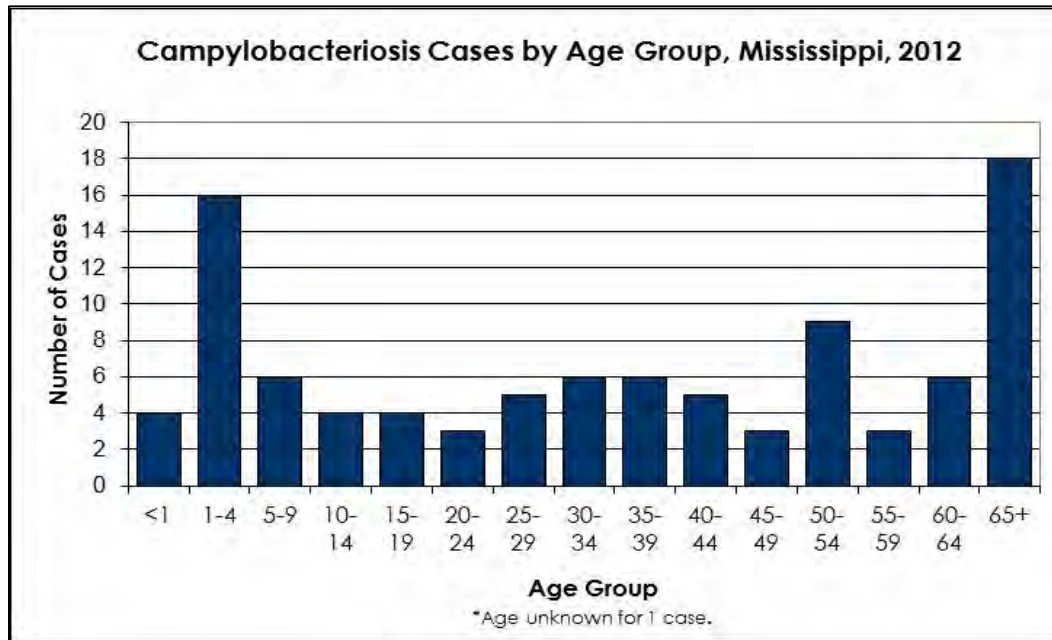


Figure 7



## Chlamydia

2012 Case Total	23,062	2012 rate/100,000	772.6
2011 Case Total	21,214	2011 rate/100,000	712.2

### Clinical Features

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

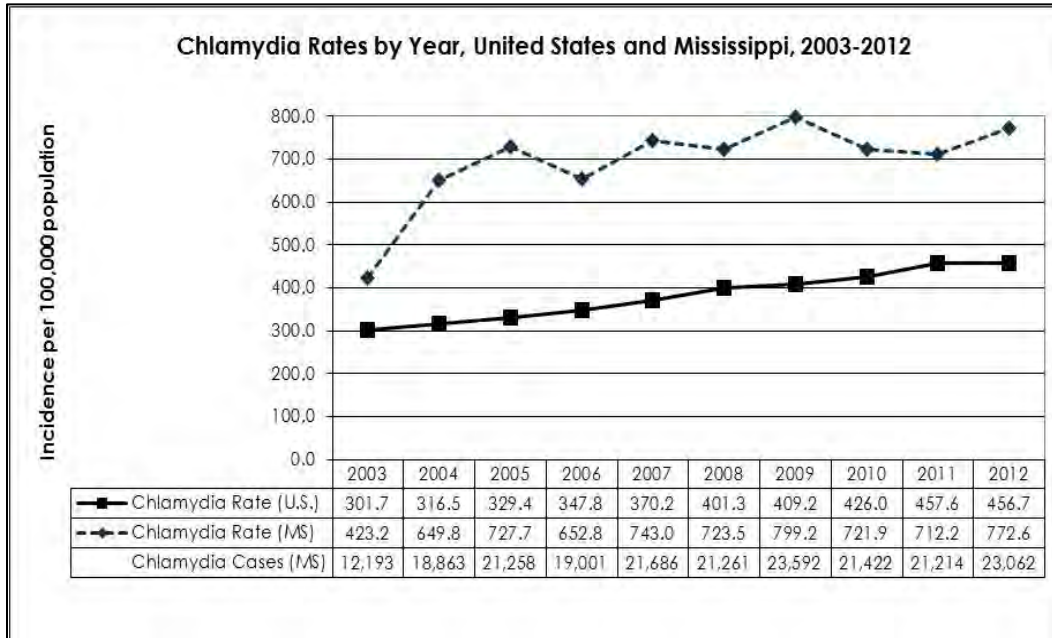
### **Reporting Classification**

Class 2.

### **Epidemiology and Trends**

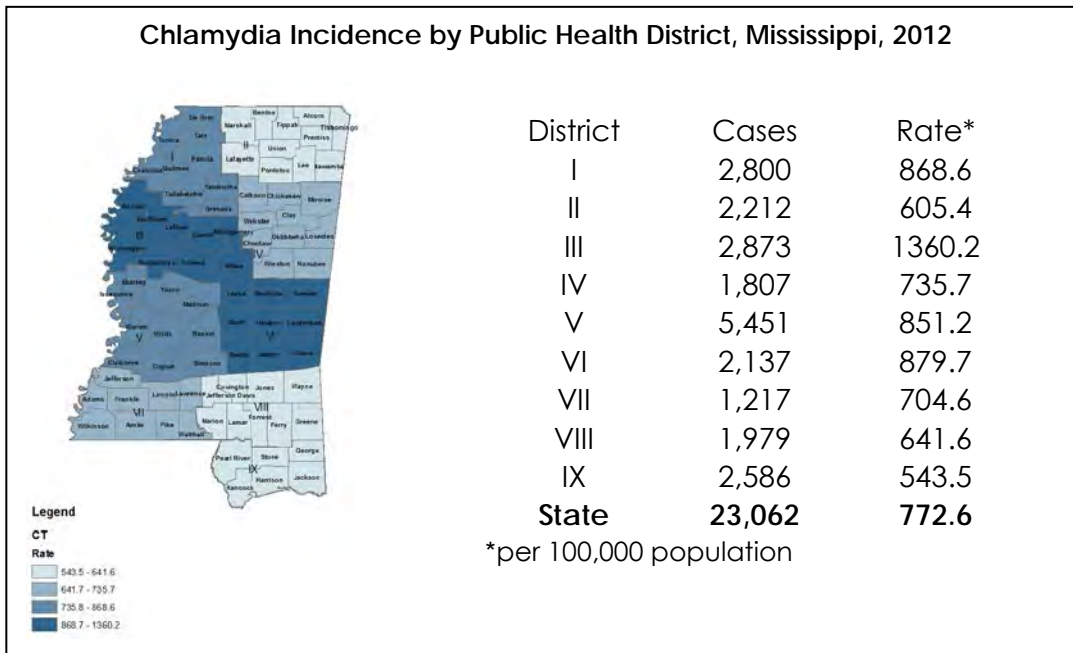
Chlamydia is the most frequently reported bacterial sexually transmitted disease in the United States and in Mississippi. In 2012, 23,062 cases of chlamydia were reported in Mississippi, resulting in the highest case rate in the United States. The Mississippi rate has been above the national rate for several years (Figure 8).

Figure 8



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

Figure 9



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

race was known (Figure 11). In 2012, the rate of chlamydia infections for African Americans (1322.7 per 100,000) was eight times the rate for whites (164.5 per 100,000).

Figure 10

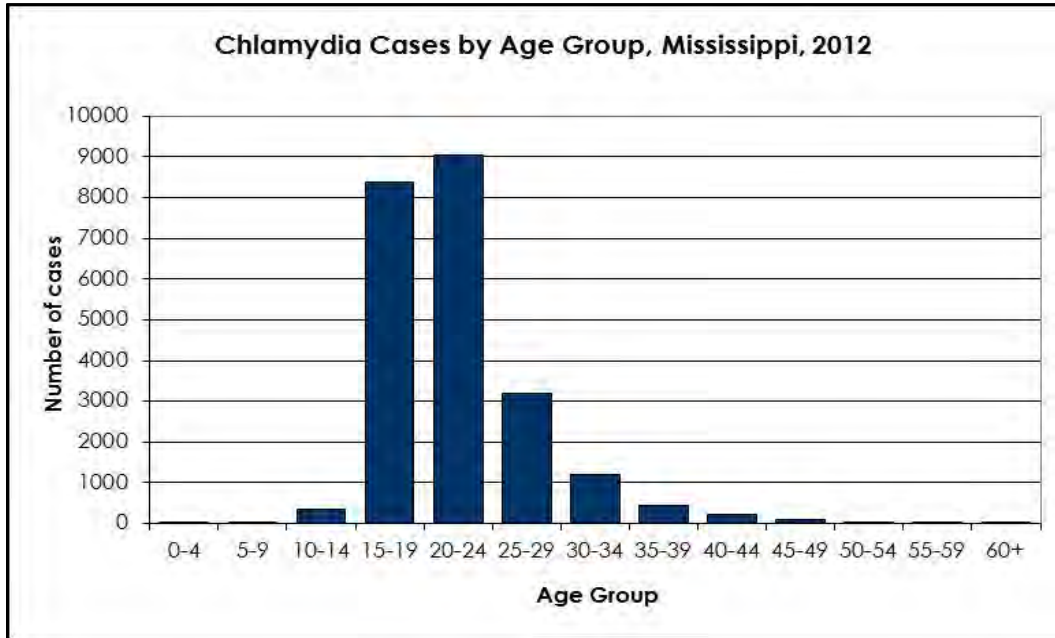
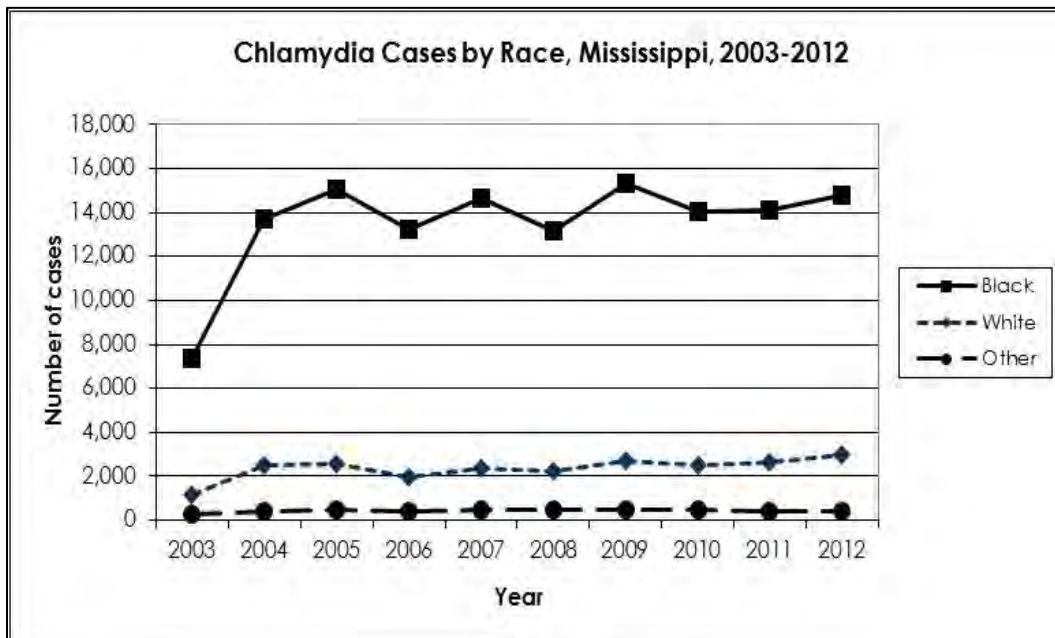


Figure 11



## Cryptosporidiosis

2012 Case Total	40	2012 rate/100,000	1.3
2011 Case Total	50	2011 rate/100,000	1.7

### Clinical Features

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

### Infectious Agent

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

### Reservoir

Humans, cattle and other domesticated animals.

### Transmission

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

### Incubation

1 to 12 days (average 7 days).

### Period of Communicability

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

### Methods of Control

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



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

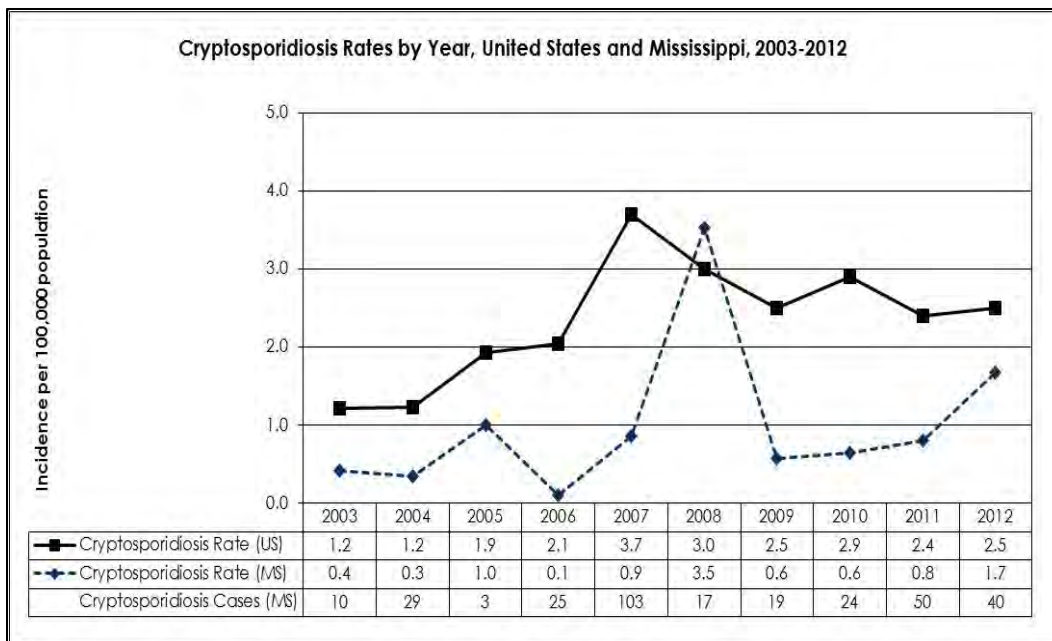
**Reporting Classification**

Class 3.

**Epidemiology and Trends**

There were 40 reported cases of cryptosporidiosis in 2012. This was lower than the 50 cases reported in 2011, and above the three year average of 31 cases from 2009 to 2011 (Figure 12).

Figure 12



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

2012 Case Total	31	2012 rate/100,000	1.0
2011 Case Total	38	2011 rate/100,000	1.3

**Clinical Features**

Shiga toxin-producing *Escherichia coli* (*E. coli*), known as STEC, are a group of pathogenic bacteria that cause diarrheal illness and hemolytic uremic syndrome (HUS) through the production of a toxin. These bacteria (also referred to as enterohemorrhagic *E. coli* (EHEC) or verocytotoxic *E. coli* (VTEC) are capable of producing two types of Shiga toxins; Shiga toxin 1 (Stx1) and Shiga toxin 2 (Stx2.) STEC can be further classified as either *E. coli* O157 or non-O157 serotypes.

*E. coli* O157:H7 is the most virulent serotype of STEC and is associated with acute, often bloody diarrhea, hemorrhagic colitis, hemolytic-uremic syndrome (HUS), and post-diarrheal thrombotic thrombocytopenic purpura (TTP). *E. coli* O157:H7 are capable of producing both Stx 1 and Stx 2. 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. Care should be supportive only as antibiotic use may increase the risk of progression to HUS.

Non-O157 STEC typically lead to a less severe clinical presentation, however infection may result in significant illness and resultant HUS. The virulence of non-O157 STEC is partly determined by the toxins they produce; non-O157 STEC strains that produce only Stx2 are more often associated with HUS than strains that produce only Stx1 or that produce both Stx1 and Stx2.

### **Infectious Agent**

*E. coli* are gram negative bacilli. *E. coli* O157:H7 is thought to cause more than 90% of all diarrhea-associated HUS. Approximately 36% of identified STEC are *E. coli* O157. 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 STEC infections and HUS. 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**

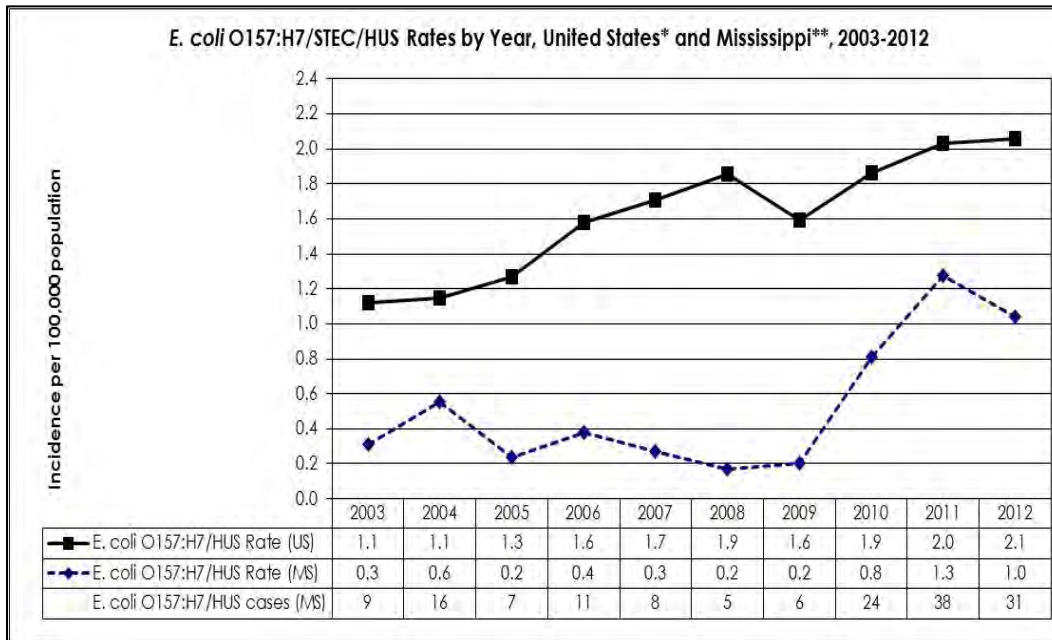
Class 1 (includes *E. coli* O157:H7, non O157:H7 STEC and post-diarrheal HUS).

## **Epidemiology and Trends**

In Mississippi, *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 2012 there were 31 cases reported; 15 *E. coli* O157:H7, 15 non O157:H7 STEC and one post-diarrheal HUS (Figure 13).

The 15 non O157:H7 STEC cases were due to serogroups O71 (5), O103 (4), O26 (2), O111 (1), and O145 (2). The serogroup of the remaining STEC case was unknown. Four of the *E. coli* O157:H7 cases also developed HUS, while one additional HUS case was culture negative but was linked epidemiologically to a confirmed O145 STEC case. There were no deaths reported in Mississippi in 2012.

Figure 13

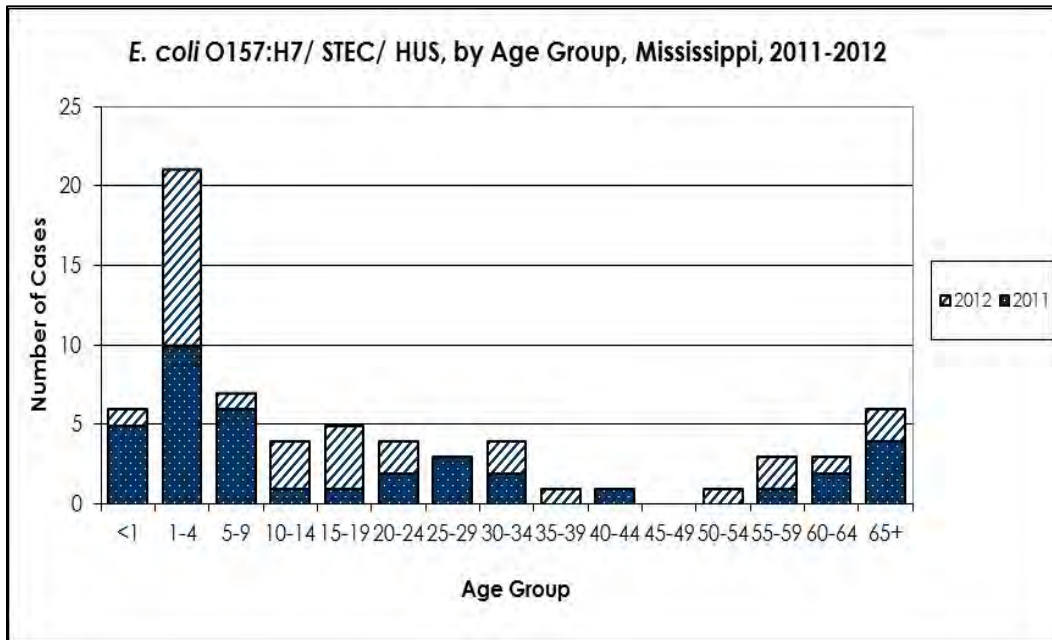


\*U.S. rate includes *E. coli* O157:H7; shiga toxin positive, serogroup non-O157; and shiga toxin positive, not serogrouped.

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

The 2012 O157:H7/STEC/HUS cases ranged in age from 9 months to 68 years with a median of 10 years of age. The 5 cases of HUS ranged in age from 23 months to 16 years, with a median age of 5 years of age. Of the 69 cases of *E. coli* O157:H7/STEC/HUS that were reported to MSDH in 2011 and 2012, 49% occurred in children less than 10 years of age (Figure 14). Children and the elderly are at higher risk for the development of severe illness and HUS as a result of infection.

Figure 14



There was one outbreak reported in Mississippi in December of 2012. This outbreak involved six cases of shiga toxin producing *E. coli* and occurred in Public Health district VI. Five of the cases were serogroup O71 (3 confirmed, 2 probable) and one was *E. coli* O157:H7. The cases ranged in age from 14 months to 30 years, with a median age of 20 months. The outbreak was limited to the extended family.

## Gonorrhea

2012 Case Total	6,877	2012 rate/100,000	230.4
2011 Case Total	5,816	2011 rate/100,000	195.3

### Clinical Features

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

Complications associated with gonorrhea infection in men include epididymitis, penile lymphangitis, penile edema, and urethral strictures. The primary complication associated with gonorrhea infection in women is pelvic inflammatory disease, which produces symptoms of lower abdominal pain, cervical discharge, and cervical motion pain. Asymptomatic infections do occur. Pregnant women infected with gonorrhea may transmit the infection to their infants during a vaginal delivery. Infected infants can

develop conjunctivitis leading to blindness if not rapidly and adequately treated. Septicemia can also occur in infected infants.

### **Infectious Agent**

*Neisseria gonorrhoeae*, an intracellular gram-negative diplococcus.

### **Reservoir**

Humans.

### **Transmission**

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

### **Incubation**

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

### **Period of Communicability**

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

### **Methods of Control**

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

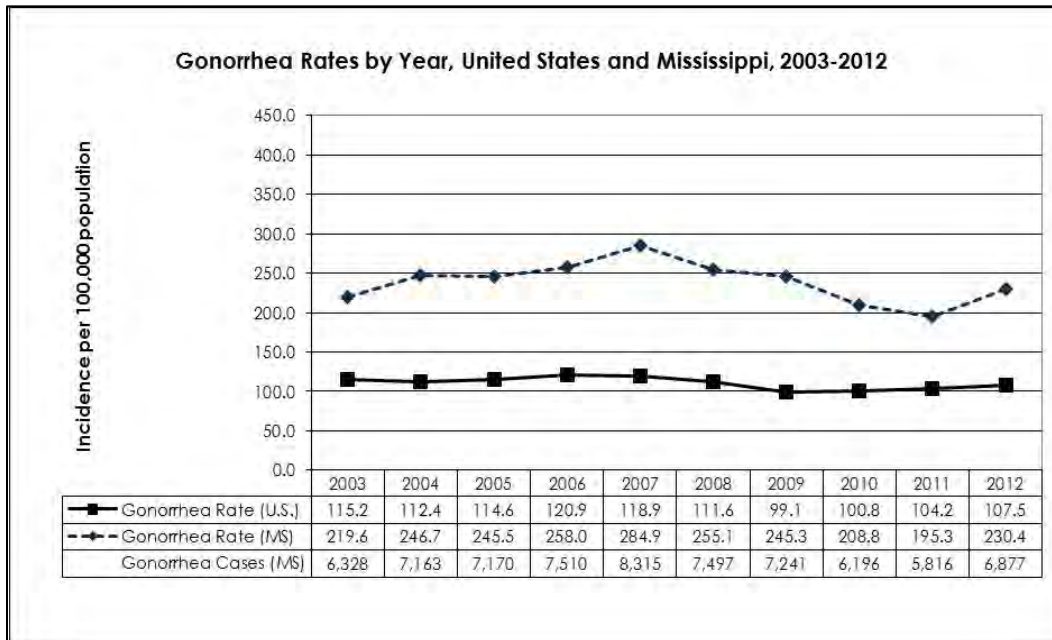
### **Reporting Classification**

Class 2.

### **Epidemiology and Trends**

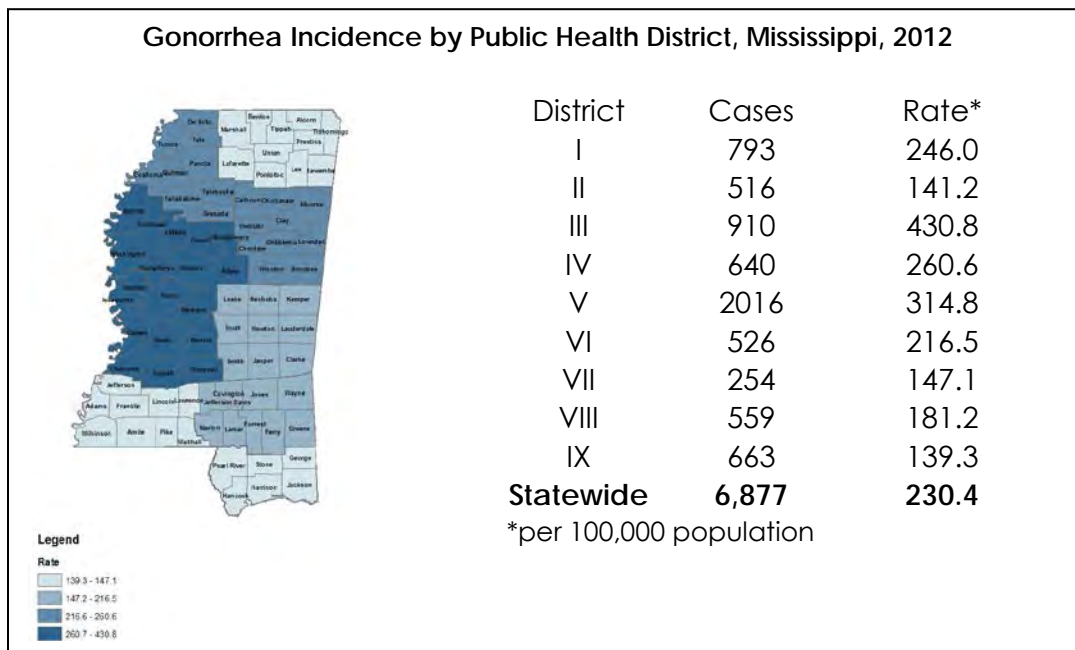
Gonorrhea is the second most commonly reported notifiable disease in the United States. From 2007 through 2011 there was a steady decline in the rate and number of cases of gonorrhea in Mississippi. The number of cases during that time period decreased from 8,315 cases in 2007 to 5,816 cases in 2011, representing a 30% decrease. However in 2012, reported cases increased to 6,877 representing an 18% increase from the previous year (Figure 15). Mississippi had the highest case rate of gonorrhea in the United States in 2012.

Figure 15



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

Figure 16



Although the disease impacted individuals across all age groups, 67% of reported cases were among 15-24 year olds (Figure 17). African Americans accounted for 90% of the reported cases in which race was known (Figure 18). In 2012, the rate of gonorrhea

infections for African Americans (456.7 per 100,000) was sixteen times the rate of whites (29.2 per 100,000).

Figure 17

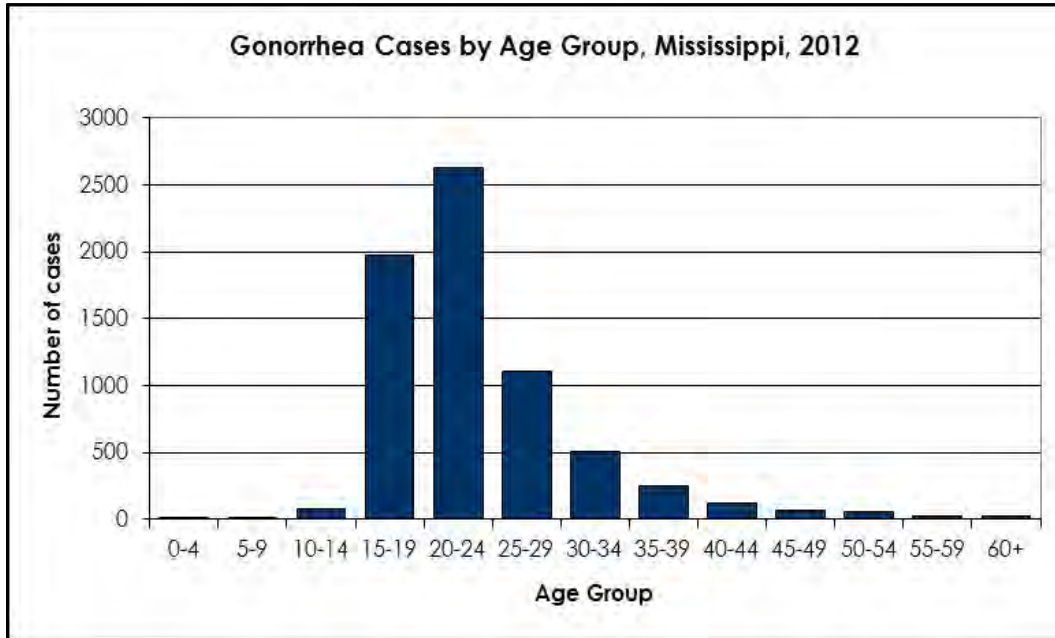
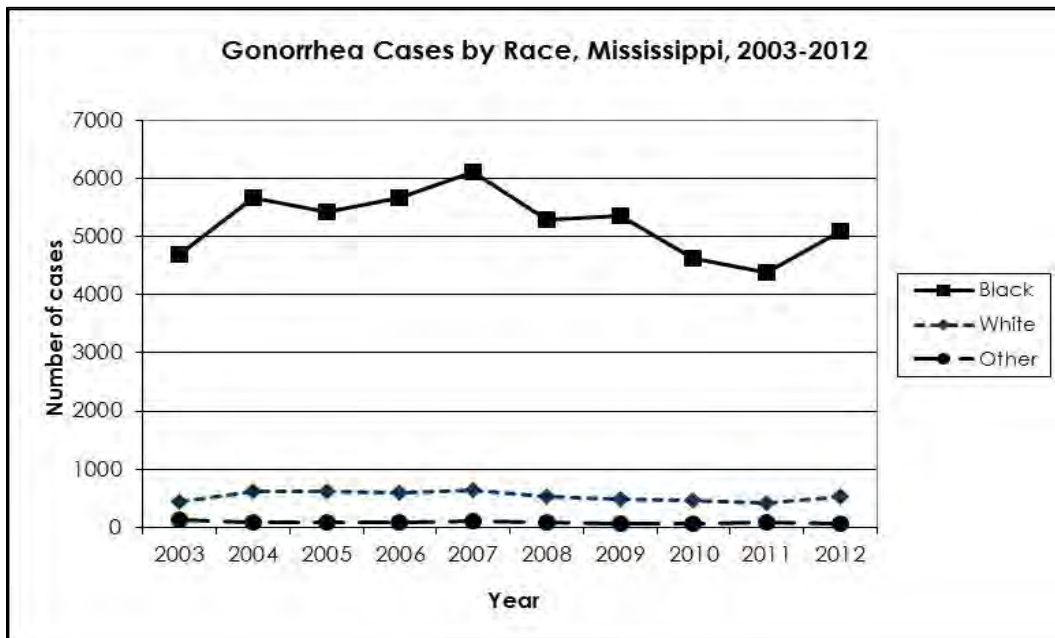


Figure 18





## ***Haemophilus influenzae*, type b**

2012 Case Total	0	2012 rate/100,000	0.0
2011 Case Total	3	2011 rate/100,000	0.1

### **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 in 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 1 (all *H. influenzae*, invasive disease).

### **Epidemiology and Trends**

Prior to the development and widespread use of Hib conjugate vaccines in the late 1980's and early 1990's, Hib was the most common cause of bacterial meningitis in children < 5 years of age. In Mississippi, conjugate vaccine was first offered to 18 month olds in 1989, to 15 month olds in 1990, and as a primary series, starting at 2 months of age, with a 12-15 month booster, in January 1991. With the institution of vaccination, the number of reported cases of invasive disease due to Hib dropped from 82 in 1989, to 5 by 1994. There have been fewer than 5 cases of Hib per year since 1995.

In 2012, there were 26 cases of invasive disease due to *H.influenzae* reported to MSDH; none of the reported cases were confirmed as type b. The invasive disease *H. influenzae* cases ranged in age from 0 days to 93 years, with a median age of 58 years. The cases presented as septicemias (88%) and meningitis (12%); none of the cases were epidemiologically linked. Two deaths were reported due to invasive *H. influenzae*; one death occurred in an infant less than one month and the other death occurred in a 61 year old. The 26 invasive disease *H. influenzae* cases were identified as type a (1), not type b (20), and unknown (5).

## **Hepatitis A**

2012 Case Total	11	2012 rate/100,000	0.4
2011 Case Total	7	2011 rate/100,000	0.2

### **Clinical Features**

Hepatitis A is a viral illness with an abrupt onset of fever, malaise, anorexia, nausea, vomiting, and abdominal pain, followed by jaundice in a few days. The disease varies

in intensity from a mild illness of 1-2 weeks, to a severe disease lasting several months. Most cases among children are asymptomatic and the severity of illness increases with age; the case fatality rate is low—0.1%-0.3%. No chronic infection occurs.

### **Infectious Agent**

Hepatitis A virus (HAV), an RNA virus.

### **Reservoir**

Humans, rarely chimpanzees and other primates.

### **Transmission**

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

### **Incubation**

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

### **Period of Communicability**

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

### **Methods of Control**

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

Post-exposure prophylaxis is recommended, within two weeks of exposure, for all susceptible individuals who are close personal contacts to the case or who attend daycare with infected individuals, or are exposed to hepatitis A virus through common source outbreaks. Hepatitis A vaccine (with completion of the series) is recommended for post-exposure prophylaxis for all healthy persons aged 12 months to 40 years. Immune globulin should be considered for children less than 12 months of age, adults over 40 years of age, and those in whom vaccination is contraindicated. Use of both

simultaneously can be considered with higher risk exposures. Post-exposure prophylaxis is not generally indicated for healthcare workers who care for patients infected with hepatitis A unless epidemiological investigation indicates ongoing transmission in the facility.

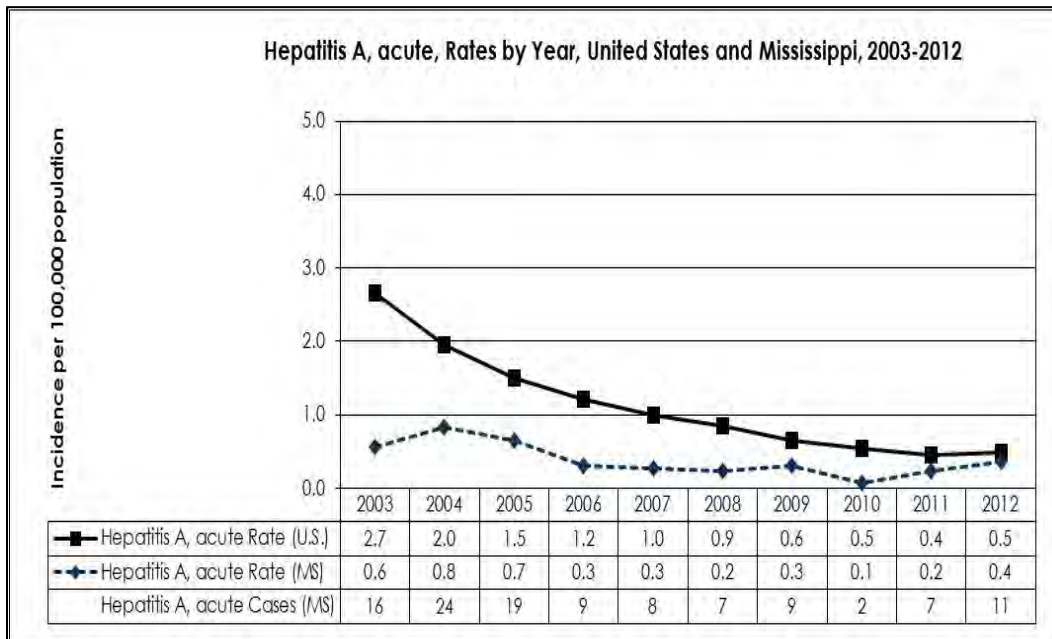
**Reporting Classification**

Class 1.

**Epidemiology and Trends**

There were eleven acute hepatitis A cases reported in Mississippi in 2012. This was more than the seven cases reported in 2011 and the three year (2009-2011) average of six annual cases (Figure 19). Seven (64%) of the 2012 cases were in adults over the age of 18. A common source outbreak was not identified in any of the 2012 cases. While no common source was identified in these cases, an epidemiology link was identified in two separate instances of familial transmission. These two, separate epidemiology links were associated with four additional hepatitis A cases.

Figure 19



## Hepatitis B, acute

2012 Case Total	78	2012 rate/100,000	2.6
2011 Case Total	58	2011 rate/100,000	1.9

### 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 injecting drug users.

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

Perinatal transmission is very efficient in the absence of post-exposure prophylaxis, with an infection rate of 70-90% if the mother is both HBsAg and hepatitis B e antigen (HBeAg) positive. The risk of perinatal transmission is about 10% if the mother is only HBsAg positive. Post-exposure prophylaxis, consisting of hepatitis B immune globulin and vaccine, is highly effective in preventing hepatitis B vertical transmission, therefore, testing of all pregnant women for HBsAg is recommended with each pregnancy. MSDH, through the Perinatal Hepatitis B Program, tracks HBsAg positive pregnant women, provides prenatal HBsAg testing information to the delivery hospitals when available, and monitors infants born to infected mothers to confirm completion of the vaccine series by 6 months of age, and then tests for post-vaccine response and for possible seroconversion at 9-15 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 2012, 78 cases of acute hepatitis B were reported. This was higher than the 58 cases reported in 2011 and the three year average (2009-2011) of 41 annual cases (Figure 20). Forty-eight (62%) of the 78 reported cases occurred in individuals aged 20-39 years. Overall, the cases ranged in age from 18 years to 69 years old, with a median age of 35.5 years (Figure 21).

Figure 20

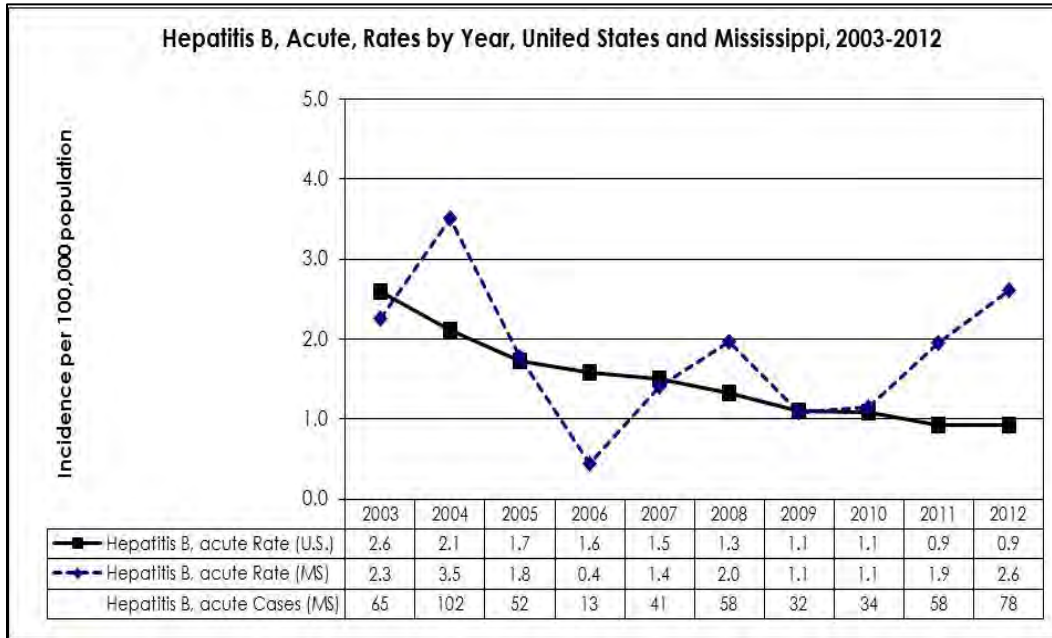
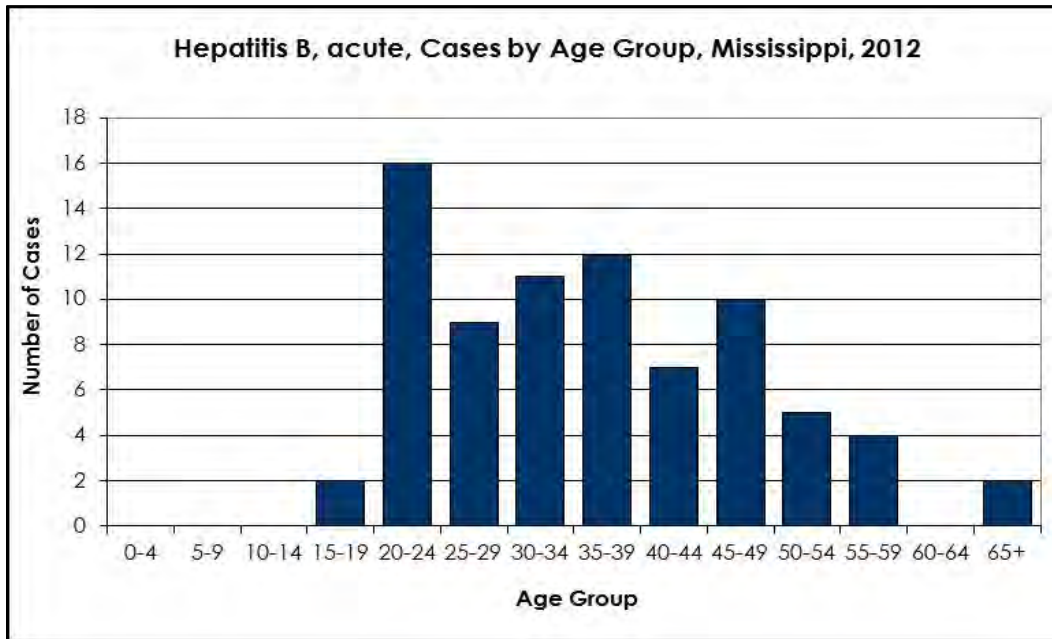


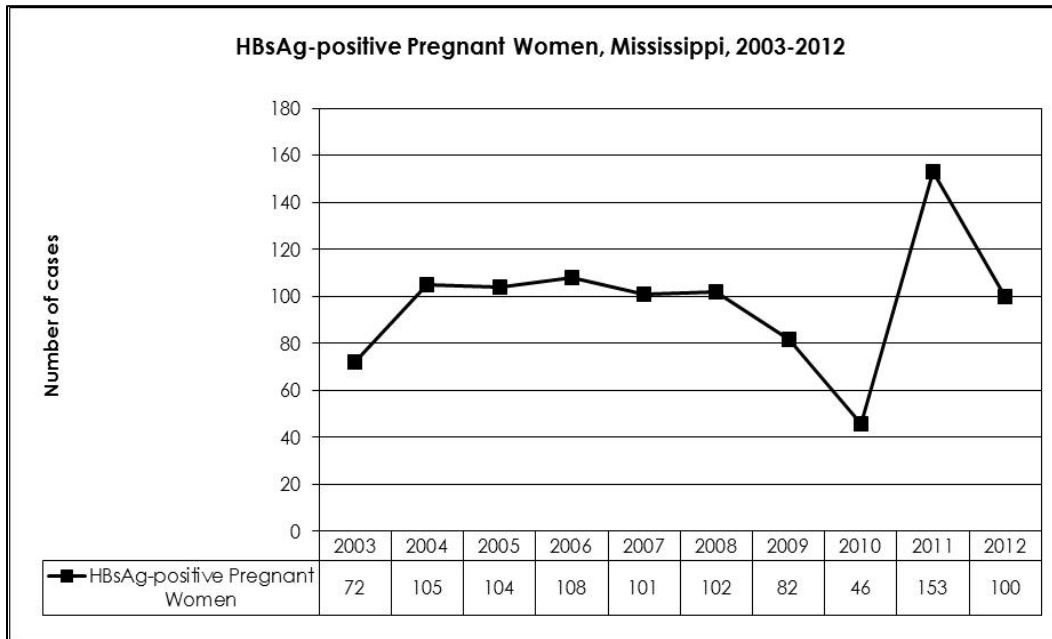
Figure 21



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

In 2012, 100 HBsAg positive pregnant women were reported to the Perinatal Hepatitis B Prevention Program (Figure 22). This is lower than the 153 reported in 2011, but was comparable to the three year average of 94. There were no reported cases of HBsAg positive infants born to HBsAg positive mothers in 2012. The last cases of perinatal transmission occurred in 2007, when two cases were reported.

Figure 22



## HIV Disease

2012 Case Total	547	2012 rate/100,000	18.3
2011 Case Total	573	2011 rate/100,000	19.2

### Clinical Features

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



## **Infectious Agent**

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

## **Reservoir**

Humans.

## **Transmission**

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

## **Incubation**

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

## **Period of Communicability**

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

## **Methods of Control**

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

**Reporting Classifications**

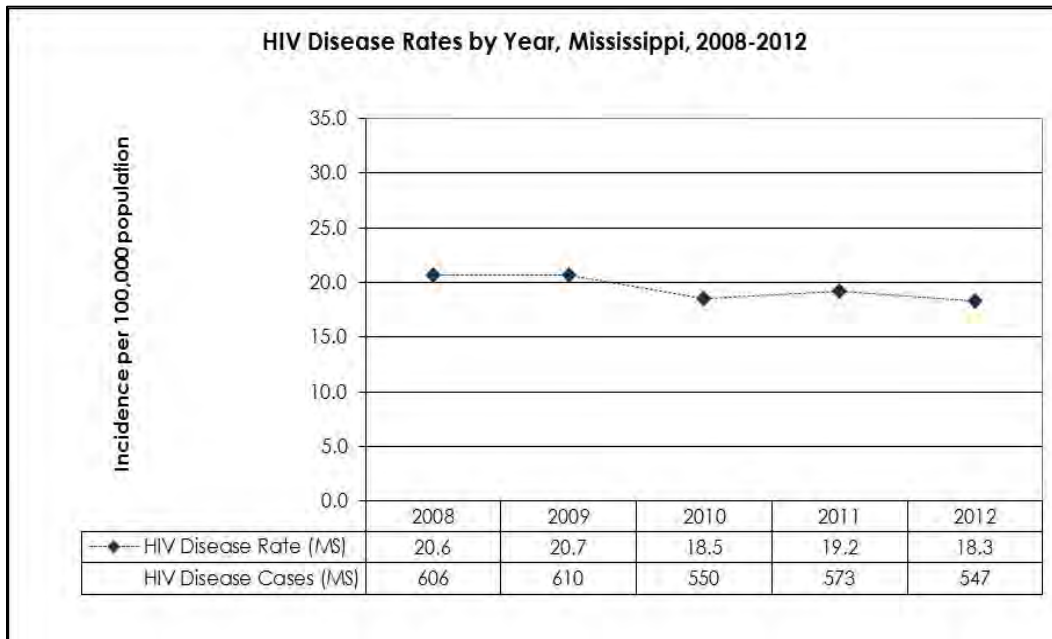
Class 1; HIV infection.

Class 3; CD4 count and HIV viral load.

**Epidemiology and Trends**

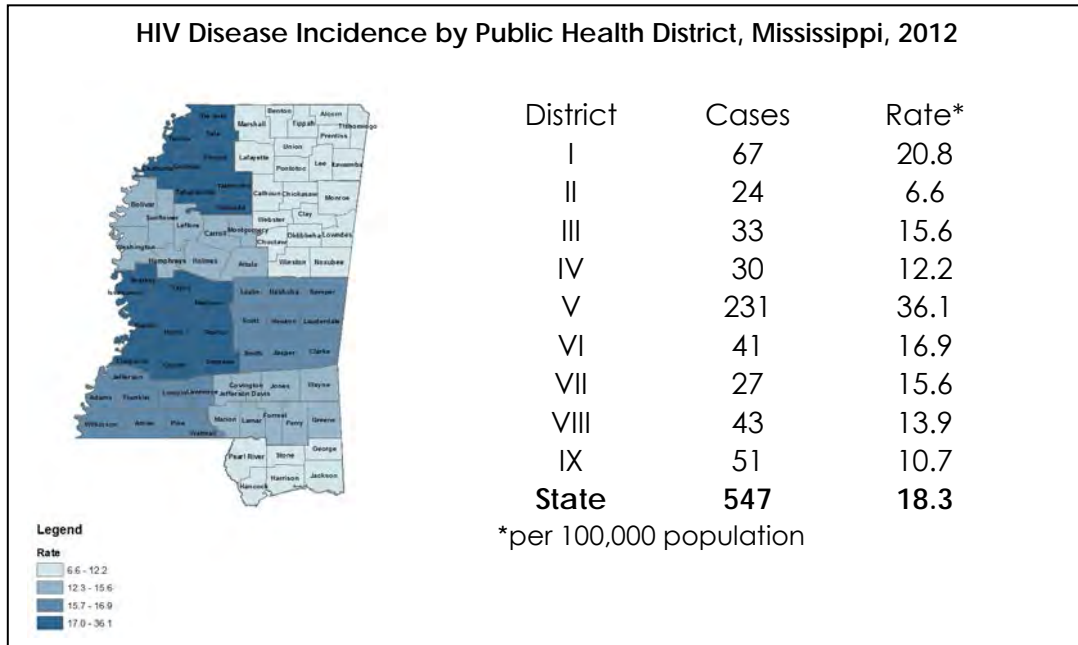
Both HIV infection and AIDS are reportable at the time of diagnosis, so many patients may be reported twice (once at first diagnosis of HIV infection, and again when developing an AIDS defining illness). The epidemiologic data that follows is regarding the initial report of HIV disease, whether first diagnosed as HIV infection or AIDS. Over the past few years, there has been little change in HIV disease trends. There were 547 cases of HIV disease reported in 2012 (Figure 23).

Figure 23



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

Figure 24



HIV disease was reported in all age groups, with 37% of the cases reported among 20-29 year olds and 22% among 30 to 39 year olds (Figure 25). African Americans were disproportionately impacted by HIV disease. In 2012, 78% of new cases were among African Americans in which race was known (Figure 26).

Figure 25

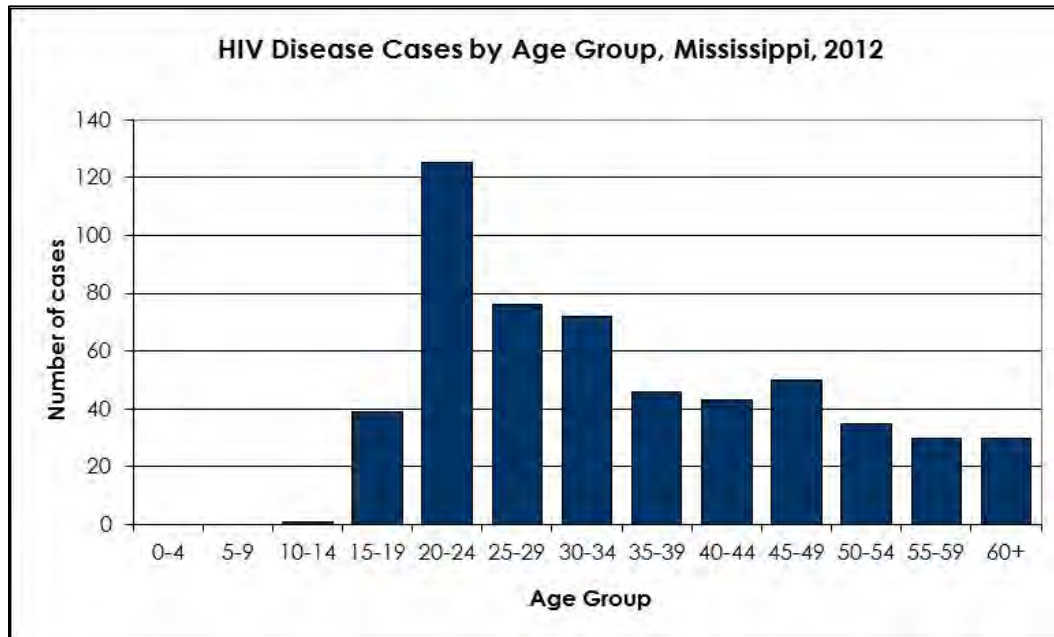
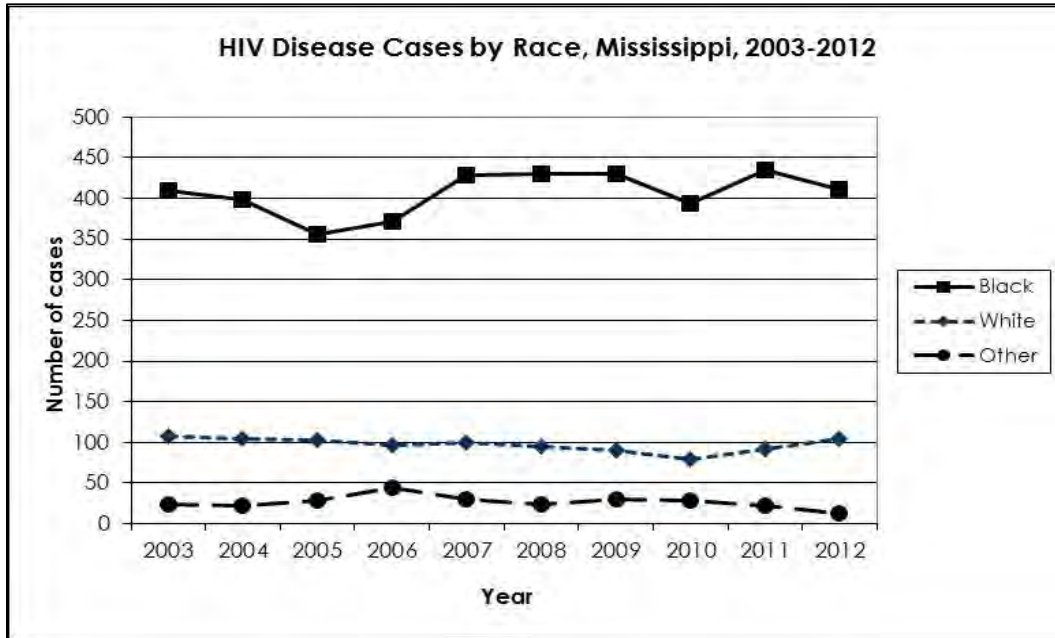
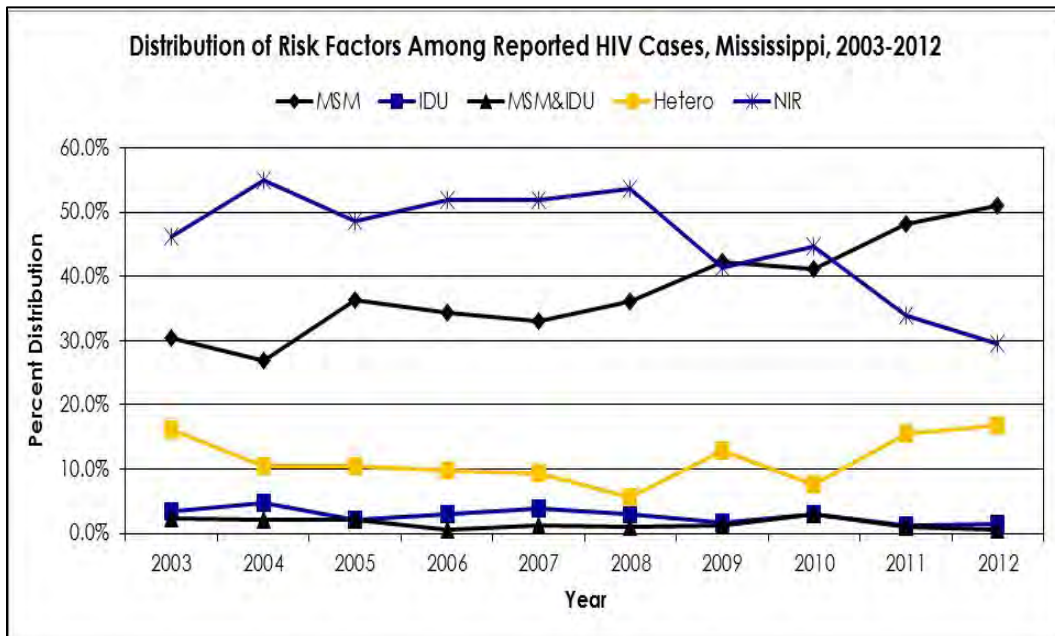


Figure 26



There are a number of identifiable risk factors associated with HIV infection, including male-to-male sexual contact (MSM), heterosexual contact (hetero), and injection drug use (IDU). Cases in persons with no reported exposure to HIV through any routes listed in the hierarchy of transmission categories are classified as “no risk factor reported or identified” or NIR. For the last several years, the percentage of cases among individuals identifying themselves as MSM has steadily increased, from 36% in 2008 to 51% in 2012 (Figure 27).

Figure 27



Additional References:

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

## Influenza – 2012 – 2013 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 3,349 to a high of 48,614 per year in the United States.

### Infectious Agent

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

### Reservoir

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

### Transmission

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

### Incubation

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

### **Period of Communicability**

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

### **Methods of Control**

Routine annual influenza vaccination is recommended for all persons aged  $\geq 6$  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 guidelines on influenza vaccination, please consult the Centers for Disease Control and Prevention (CDC), "Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices—United States, 2013-2014". MMWR 62(No. RR07); September 20, 2013, available online at [http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6207a1.htm?s\\_cid=rr6207a1\\_w](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6207a1.htm?s_cid=rr6207a1_w).

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

### **Epidemiology and Trends**

A typical influenza season usually peaks anywhere from December through March or April, 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 2012 – 2013 influenza season, 45 sentinel providers in 36 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 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).

In both the US and Mississippi the 2012 – 2013 influenza season was moderately severe when compared to the previous 2011 – 2012 season. Nationally, when compared to the previous season, there was a higher rate of outpatient visits due to ILI, more reported deaths due to influenza and pneumonia and a higher rate of hospitalizations, particularly in individuals  $\geq 65$  years of age. Persons in this age group accounted for approximately 50% of all hospitalizations. Influenza activity peaked in late December in the US and influenza A (H3N2) was the predominant virus, although influenza A (H1N1) viruses and influenza B viruses were also reported. Also of significance for the 2012-2013 influenza season were estimates showing that the vaccine was 56% effective in preventive medically attended respiratory illness. However, when stratified for age group and virus subtype, there was markedly reduced vaccine effectiveness against influenza A (H3N2) among adults  $\geq 65$  years of age.

In Mississippi, influenza activity also peaked in late December of 2012 at 11.2% (compared to a peak of 4.3% in late December of the previous season) (Figure 28). Early in the 2012 – 2013 season, the predominant virus identified in the PHL was influenza A (H3N2), although by early January 2013 most of the influenza isolates identified were influenza B (Figure 29). There was one influenza-associated pediatric death reported in Mississippi in the 2012 – 2013 season. The death occurred in a five-year old.

In the 2012-2013 season there were 33 influenza-associated outbreaks in long-term care (LTC) facilities reported to MSDH. Thirty-two were in skilled nursing facilities and one was in a chemical dependency unit. By comparison, in the 2011-2012 influenza season there were only two outbreaks reported in Mississippi LTC facilities. Please see the "[Special Reports](#)" section for a discussion of these outbreaks.

Figure 28

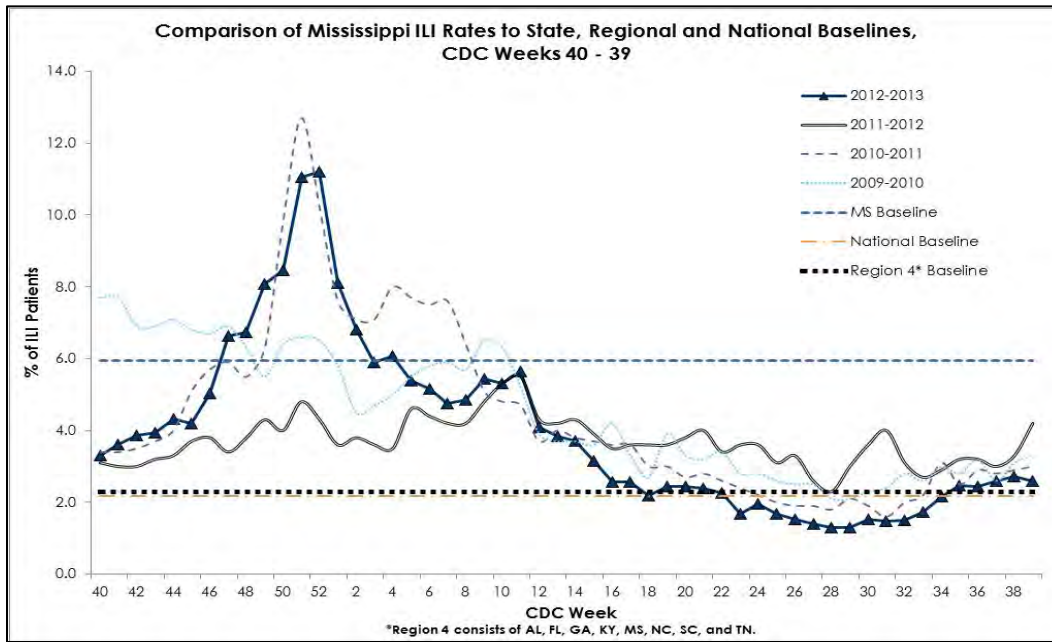
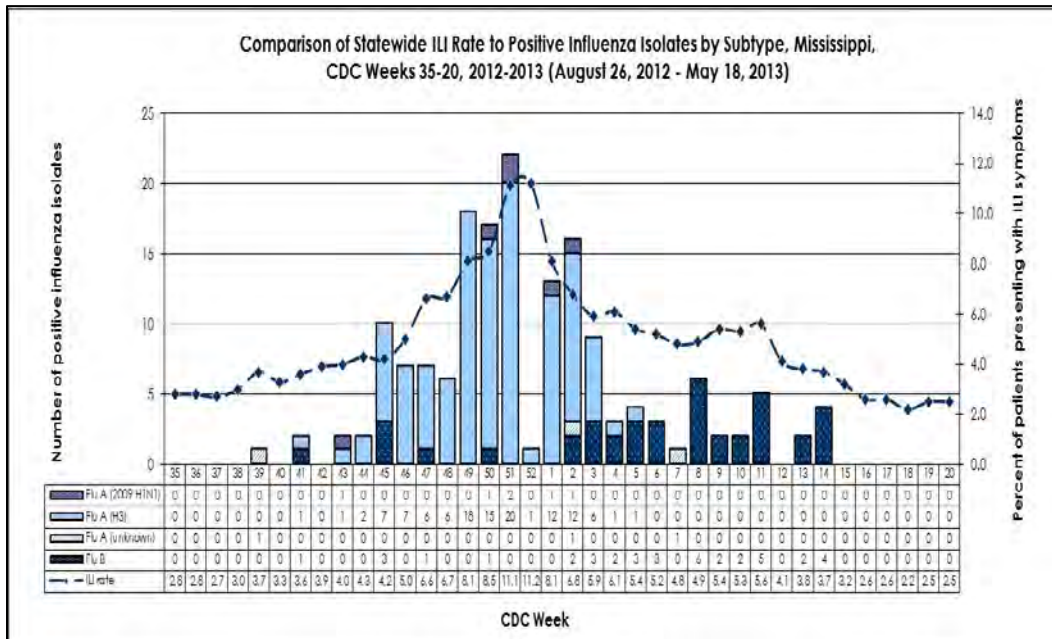


Figure 29





## Legionellosis

2012 Case Total	17	2012 rate/100,000	0.6
2011 Case Total	16	2011 rate/100,000	0.5

### Clinical Features

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

### Infectious Agent

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

### Reservoir

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

### Transmission

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

### Incubation

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

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

### Period of Communicability

Legionellosis is not transmitted person to person.

### Reporting Classification

Class 2.

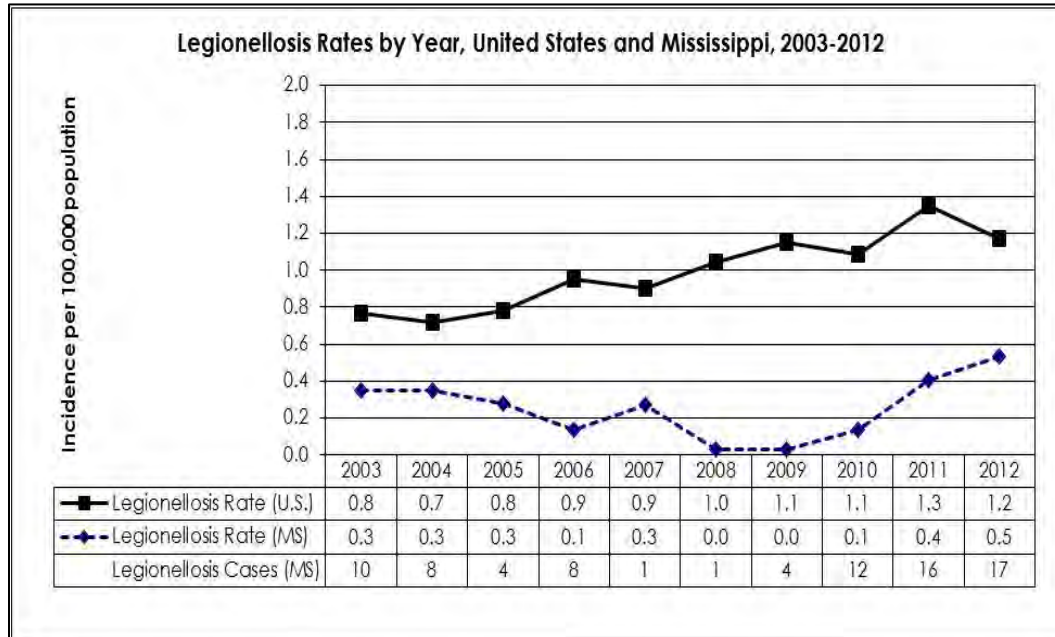
### Epidemiology and Trends

In 2012, there were 17 cases of Legionnaire's disease reported in Mississippi. The cases ranged in age from 37 to 82 years, with a median age of 59. There was one death

reported in 2012 in a 67 year old female. On average, eleven cases have been reported annually over the past three years (Figure 30).

None of the 2012 cases were epidemiologically linked.

Figure 30



## Listeriosis

<b>2012 Case Total</b>	<b>4</b>	<b>2012 rate/100,000</b>	<b>0.1</b>
<b>2011 Case Total</b>	<b>4</b>	<b>2011 rate/100,000</b>	<b>0.1</b>

### 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.

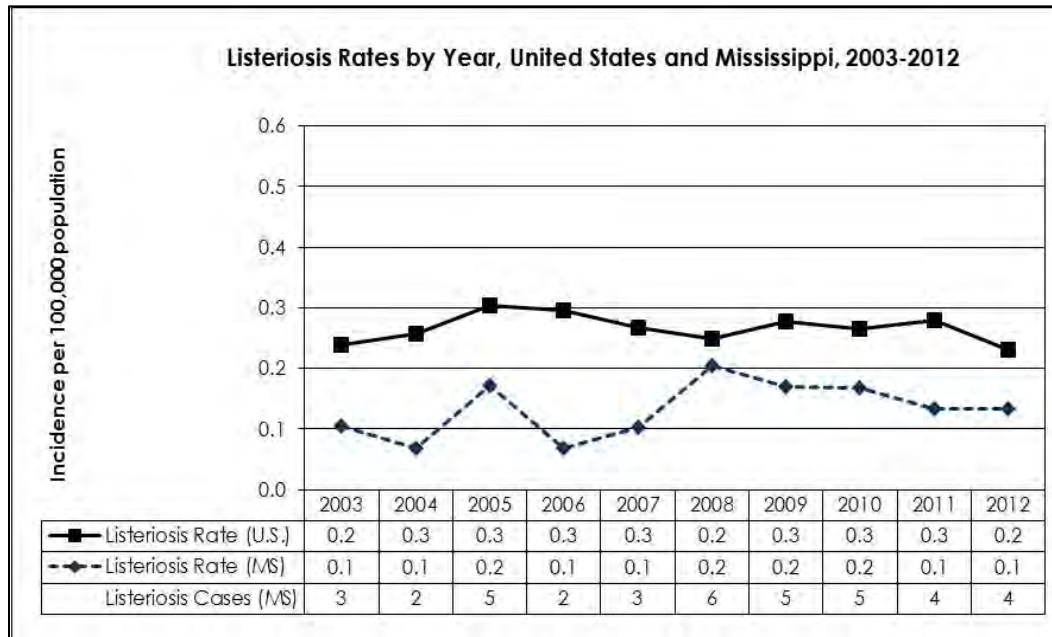
## **Reporting Classification**

Class 2.

## **Epidemiology and Trends**

There were four reported cases of listeriosis in Mississippi in 2012, which was comparable to the number reported in 2011 and to the average number of 5 cases reported annually from 2009 through 2011. The incidence in Mississippi has remained at or below national rates since *Listeria* was added to the National Notifiable Disease List in 2000 (Figure 31).

Figure 31



There were no neonatal infections reported in 2012. The four reported cases ranged in age from 23 to 74 years, with a median age of 66.5 years. No deaths were reported. None of the infections were epidemiologically linked or associated with common source outbreaks.

## Lyme Disease

2012 Case Total	1	2012 rate/100,000	0.0
2011 Case Total	5	2011 rate/100,000	0.2

### 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 was one case reported in 2012, compared to five cases in 2011. The confirmed case was in a 64 year old with an IgM positive Western Blot who denied any recent travel outside of Mississippi.

## Measles

2012 Case Total	0	2012 rate/100,000	0.0
2011 Case Total	0	2011 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 4 to 6 years of age).

### **Reporting Classification**

Class 1.

### **Epidemiology and Trends**

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

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

In 2012 there were 55 measles cases in the United States. Of the 55 cases, 21 (38%) were imported 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 imported by returning U.S. travelers aged 6—23 months, 2001-2011. MMWR. April 8, 2011 / 60(13); 397-400.
- CDC. Measles—United States, 2011. MMWR. April 20, 2012 / 61(15); 253-257.

## Meningococcal disease, invasive

<b>2012 Case Total</b>	<b>5</b>	<b>2012 rate/100,000</b>	<b>0.2</b>
<b>2011 Case Total</b>	<b>4</b>	<b>2011 rate/100,000</b>	<b>0.1</b>

### 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 1.

### **Epidemiology and Trends**

In 2012, there were five reported cases of invasive meningococcal disease. This is comparable to the number of reported cases in 2011. The annual number of reported cases has decreased over the last several years, from 20 to 24 cases per year in 2002 through 2004, to four to five cases per year in 2010 through 2012 (Figure 32). 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 2012 Mississippi cases ranged in age from 3 months to 103 years, with a median age of 24 months. From 2008 – 2012, 39% of the cases occurred in children less than five years of age (Figure 33).

MSDH requests the submission of all isolates to the PHL for typing. Two of the confirmed cases in 2012 were typed as serogroup B and another case was typed as serogroup C. The two remaining cases were not able to be subtyped.

In total, rifampin prophylaxis was provided for 54 contacts of meningococcal disease cases in 2012. There were no reported deaths in 2012.

Figure 32

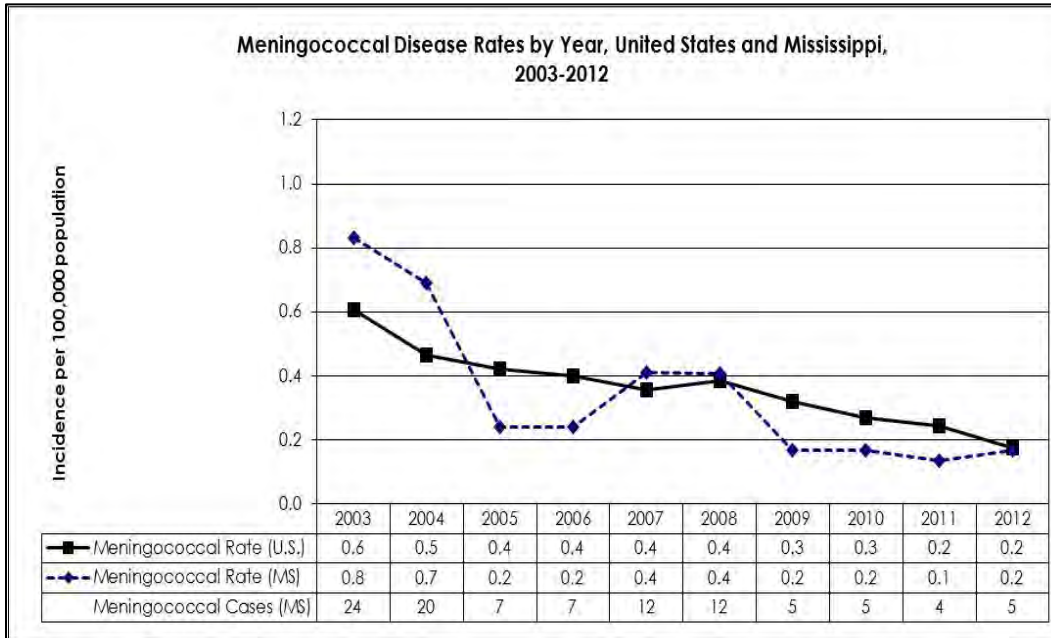
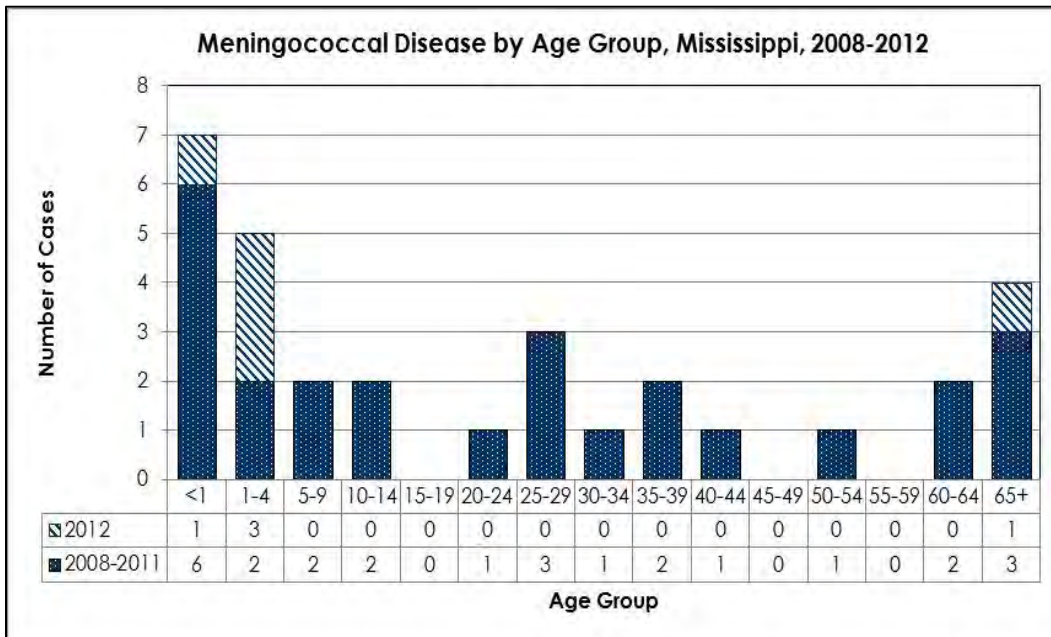


Figure 33



## Mumps

2012 Case Total	0	2012 rate/100,000	0.0
2011 Case Total	3	2011 rate/100,000	0.1

### Clinical Features

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

### Infectious Agent

Mumps virus, in the paramyxovirus family.

### Reservoir

Humans.

### Transmission

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

### Incubation

About 16 – 18 days (range 14 – 25).

### Period of Communicability

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

### Methods of Control

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

### Reporting Classification

Class 2.

### Epidemiology and Trends

In Mississippi, there are typically fewer than 5 cases reported annually. In 2012, there were no reported mumps cases, compared to three cases in 2011.

## Pertussis

2012 Case Total	77	2012 rate/100,000	2.6
2011 Case Total	49	2011 rate/100,000	1.6

### Clinical Features

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

### Infectious Agent

*Bordatella pertussis*, an aerobic gram negative rod.

### Reservoir

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

### Transmission

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

### Incubation

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

### Period of Communicability

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

### Methods of Control

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

Pertussis immunity wanes 5-10 years after the booster vaccine, leaving adolescents and adults more vulnerable to infection. ACIP recommends a single dose of Tdap (pertussis containing vaccine) for 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 1.

### **Epidemiology and Trends**

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

In 2012, there were 77 reported cases of pertussis infections. This was higher than the 49 cases which were reported in 2011, but was comparable to the three year average of 78 cases from 2009-2011 (Figure 34).

Thirty-nine (51%) of the cases in 2012 occurred among children less than 1 year of age (Figure 35). Twenty-two (56%) of these 39 cases occurred in one- to two-month old infants. One pertussis death, in a two month old infant, was reported in 2012. Prior to 2012 the last reported pertussis death was in a one month old infant in 2008.

MSDH instituted a Tdap requirement for 7<sup>th</sup> graders for the 2012-2013 school year. Please see the "[Special Reports](#)" section for a discussion of Tdap and the new school requirement.

Figure 34

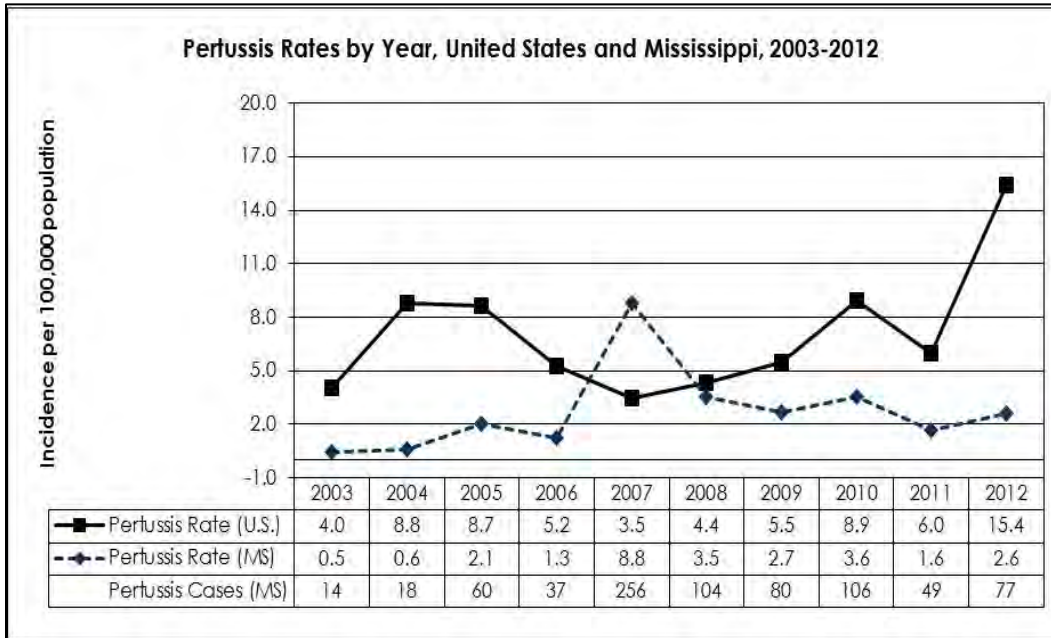
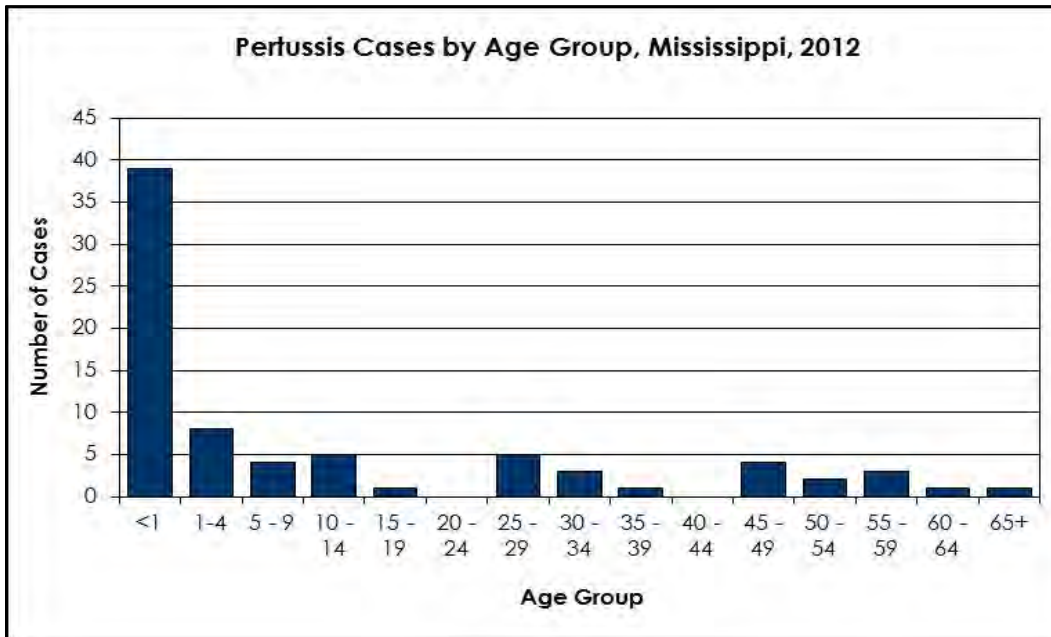


Figure 35



## Pneumococcal disease, invasive

2012 Case Total	25	2012 rate/100,000	0.8
2011 Case Total	14	2011 rate/100,000	0.5

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

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

### Reporting Classification

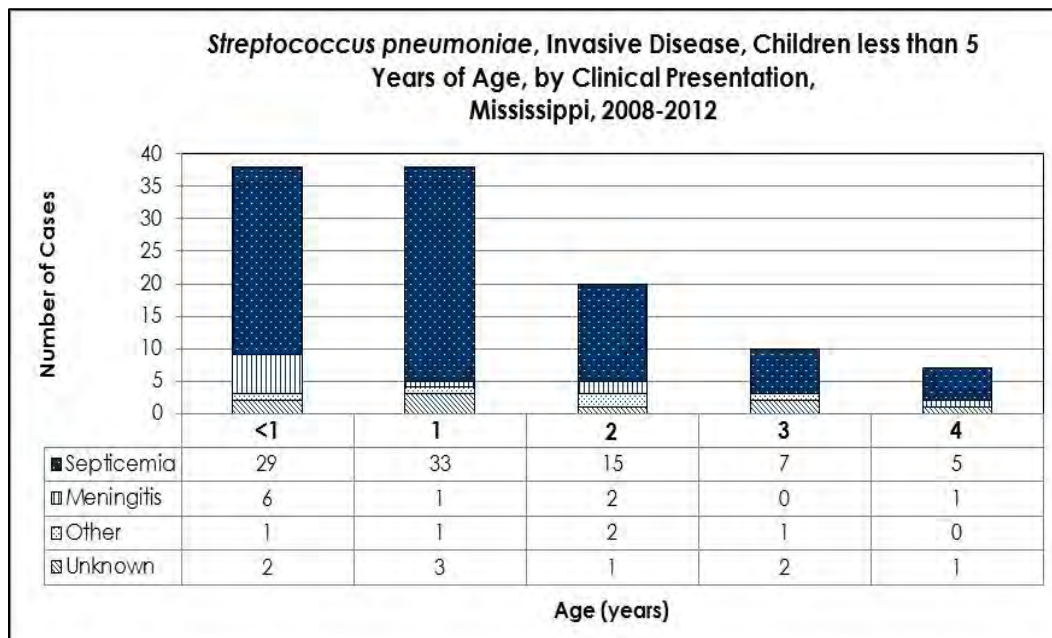
Class 2; invasive infection.

### Epidemiology and Trends

In late 2010 the reporting criteria for invasive *S. pneumoniae* was expanded to include all cases of invasive disease. The previous reporting criteria were limited to cases in children less than 5 years of age and any cases that demonstrated antibacterial resistance regardless of age. In 2012 there were a total of 189 reported cases of invasive *S. pneumoniae* infections. The reported cases ranged in age from 3 months to 93 years of age, with a median age of 58 years.

Twenty-five of the reported cases were in children less than 5 years of age. This was higher compared to the 14 reported cases in 2011. Of these 25 cases, 18 had septicemia, three had meningitis and four had *S. pneumoniae* isolated from an unspecified sterile site. Ages ranged from 3 months to 4 years of age. Over the past five years, the majority (79%) of *S. pneumoniae* invasive infections in children less than 5 years of age have presented as septicemia (Figure 36).

Figure 36





# Rabies

## Clinical Features

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

## Infectious Agent

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

## Reservoir

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

## Transmission

The most common mode of rabies virus transmission is through the bite of an infected host. All mammals are susceptible to varying degrees, 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://www.nasphv.org/Documents/RabiesCompendium.pdf>.

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

### **Reporting Classification**

Class 1 (human or animal).

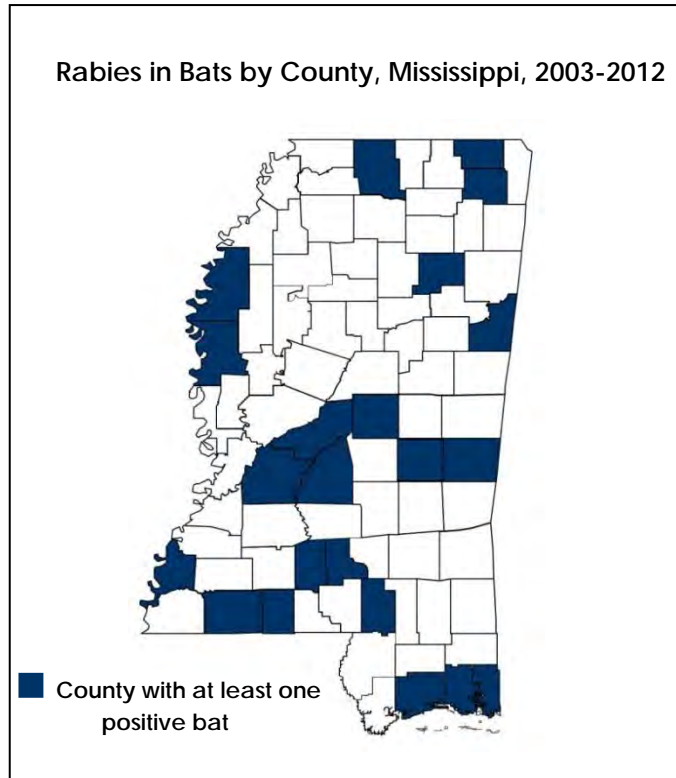
### **Epidemiology and Trends**

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

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 two positive bats out of 55 tested in the PHL in 2012. The positive bats were submitted from Harrison and Hinds counties. Since 2003, there has been a wide geographic distribution of positive bats, with 47 reported positives in 21 counties (Figure 37).

Figure 37



## Rocky Mountain spotted fever

2012 Case Total	25	2012 rate/100,000	0.8
2011 Case Total	24	2011 rate/100,000	0.8

### Clinical Features

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

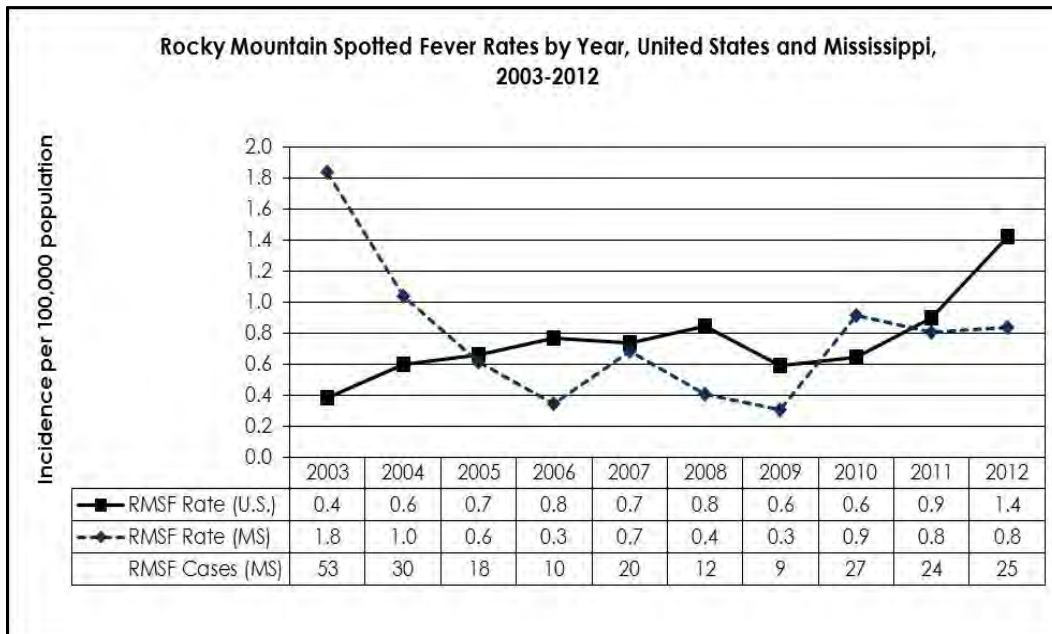
**Reporting Classification**

Class 2.

**Epidemiology and Trends**

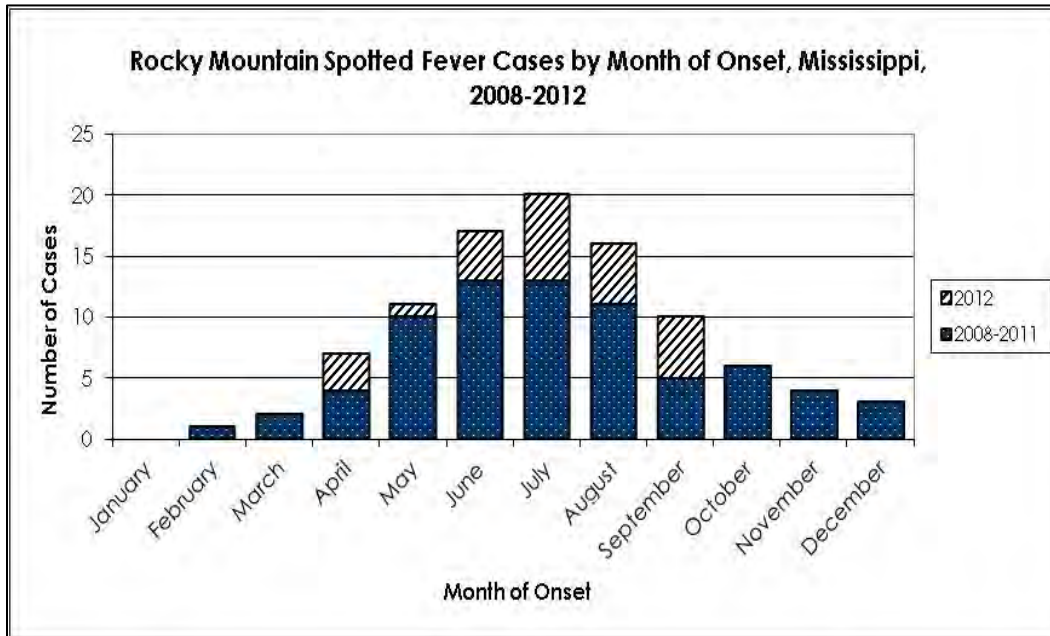
In 2012, there were 25 cases of RMSF reported in Mississippi. This is higher than the three year (2009-2011) average of 20 cases (Figure 38), but comparable to the number of reported cases in 2011 (24). The cases ranged in age from 2 to 87 years, with a median age of 55 years. There were no reported deaths.

Figure 38



Both in Mississippi and the U.S., the majority of Rocky Mountain spotted fever cases occur between April and September. In Mississippi over the past five years, 84% (81) of the reported cases have occurred during this time frame (Figure 39).

Figure 39



## Rubella

2012 Case Total	0	2012 rate/100,000	0.0
2011 Case Total	0	2011 rate/100,000	0.0

### Clinical Features

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

### Infectious Agent

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

**Reservoir**

Humans.

**Transmission**

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

**Incubation**

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

**Period of Communicability**

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

**Methods of Control**

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

**Reporting Classification**

Class 2.

**Epidemiology and Trends**

There were no reported cases of rubella in Mississippi in 2012. The last reported case in the state was in a 4 year old in 1986.

<b>Salmonellosis</b>
----------------------

<b>2012 Case Total</b>	<b>1248</b>	<b>2012 rate/100,000</b>	<b>41.8</b>
<b>2011 Case Total</b>	<b>1440</b>	<b>2011 rate/100,000</b>	<b>48.3</b>

**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 *Salmonella* serotype Enteritidis is not commonly seen in Mississippi, this serotype can be passed trans-ovarially from infected hens to their eggs and transmission can then occur when eggs are not fully cooked.

## **Incubation**

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

## **Period of Communicability**

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

## **Methods of Control**

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

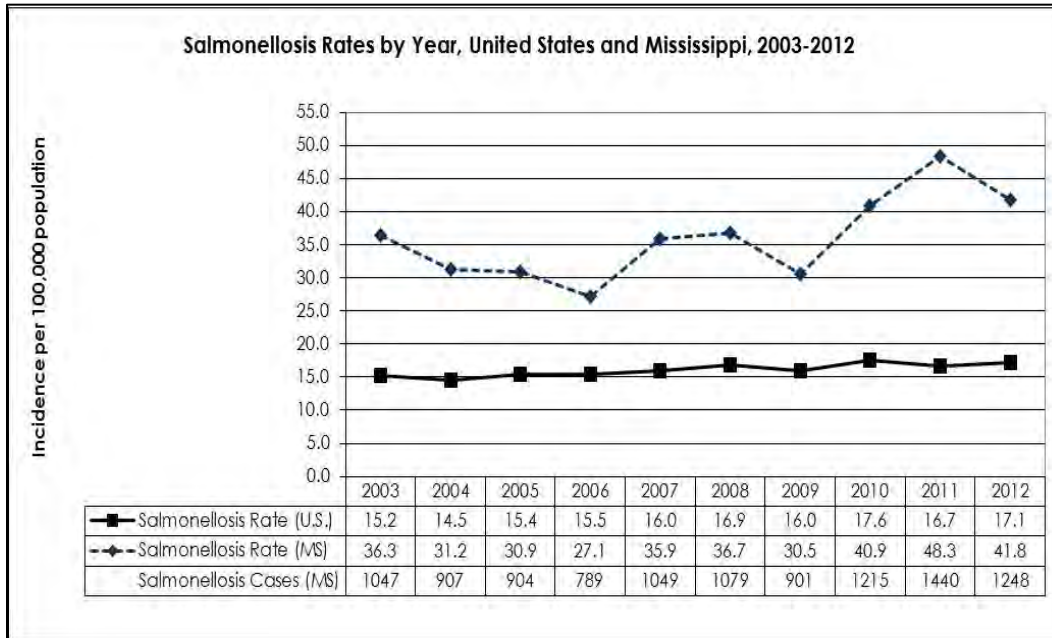
## **Reporting Classification**

Class 2.

## Epidemiology and Trends

In Mississippi, 1,248 cases of salmonellosis were reported to MSDH in 2012 (Figure 40). Four *Salmonella* serotypes accounted for 68% of the total isolates seen in Mississippi: Typhimurium (20%), Newport (19%), Javiana (16%), and Mississippi (13%).

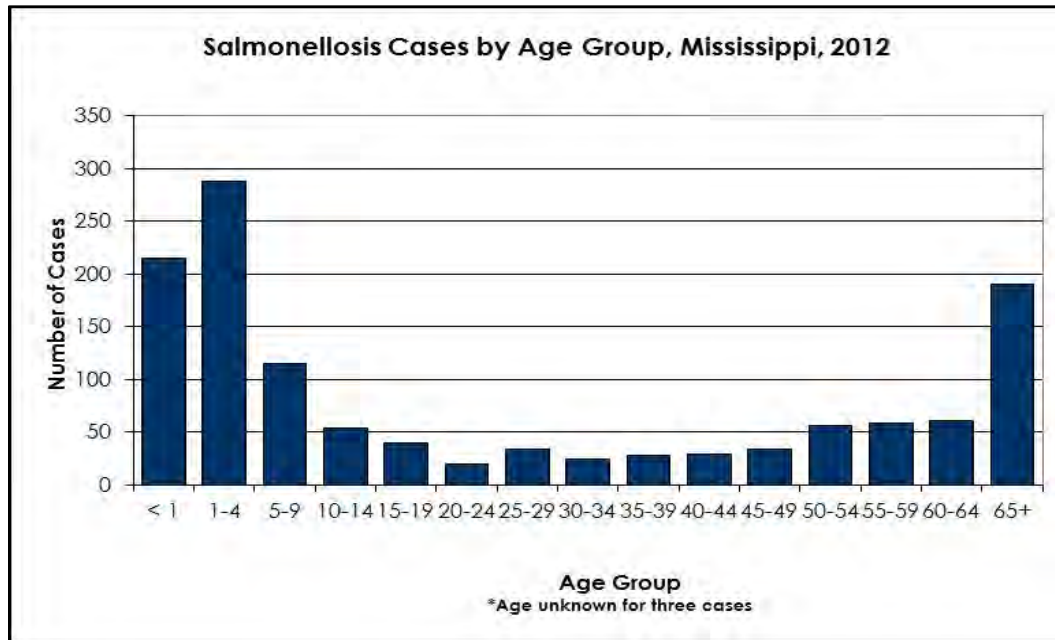
Figure 40



Infections occur in people of all ages, but there is higher incidence in infants and small children. In 2012, 503 (40%) of the cases were in children less than 5 years of age (Figure 41).



Figure 41



A number of multistate *Salmonella* outbreaks were identified through the CDC PulseNet system in 2012. Of those, Mississippi was involved in three of them. In January 2012, an outbreak of *Salmonella* Bareilly and *Salmonella* Nchanga was reported with 425 cases from 28 states; two cases (*Salmonella* Bareilly) were identified in Mississippi residents. Nakauchi Scrape (frozen raw yellowfin tuna) was identified as the source of this outbreak. In May 2012, an outbreak of *Salmonella* Sandiego, *Salmonella* Pomona, and *Salmonella* Poona was reported with 473 cases from 43 states; four cases were in Mississippi residents. Exposure to turtles or their environments (e.g., water from a turtle habitat) was the cause of these outbreaks. In July 2012, an outbreak of *Salmonella* Typhimurium and *Salmonella* Newport was reported with 261 cases from 24 states; seven cases were in Mississippi residents. Cantaloupe was identified as the source of this outbreak.

## Shigellosis

2012 Case Total	285	2012 rate/100,000	9.5
2011 Case Total	241	2011 rate/100,000	8.1

### Clinical Features

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

fatality rate of 20% among hospitalized patients. All age groups are susceptible, with the peak incidence in 1-4 year olds. Children in daycares, persons in institutions, and in facilities where adequate hand washing is difficult to maintain are at high risk for outbreaks of shigellosis.

### **Infectious Agent**

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

### **Reservoir**

Humans are the primary reservoir.

### **Transmission**

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

### **Incubation**

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

### **Period of Communicability**

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

### **Methods of Control**

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

### **Reporting Classification**

Class 2.

### **Epidemiology and Trends**

There were 285 cases of Shigellosis reported to MSDH during 2012 (Figure 42). There have been cyclic increases every 6-8 years since 1992, with a peak of 1426 cases in 2007 associated with a large outbreak that occurred in the Jackson metropolitan area and along the Gulf Coast. Although Shigellosis is usually a summer month illness, almost half (49%) of the 2012 cases occurred between August and December (Figure 43). The

reported cases ranged in age from 2 months to 93 years, with 74% occurring in children less than 10 years of age (Figure 44).

Figure 42

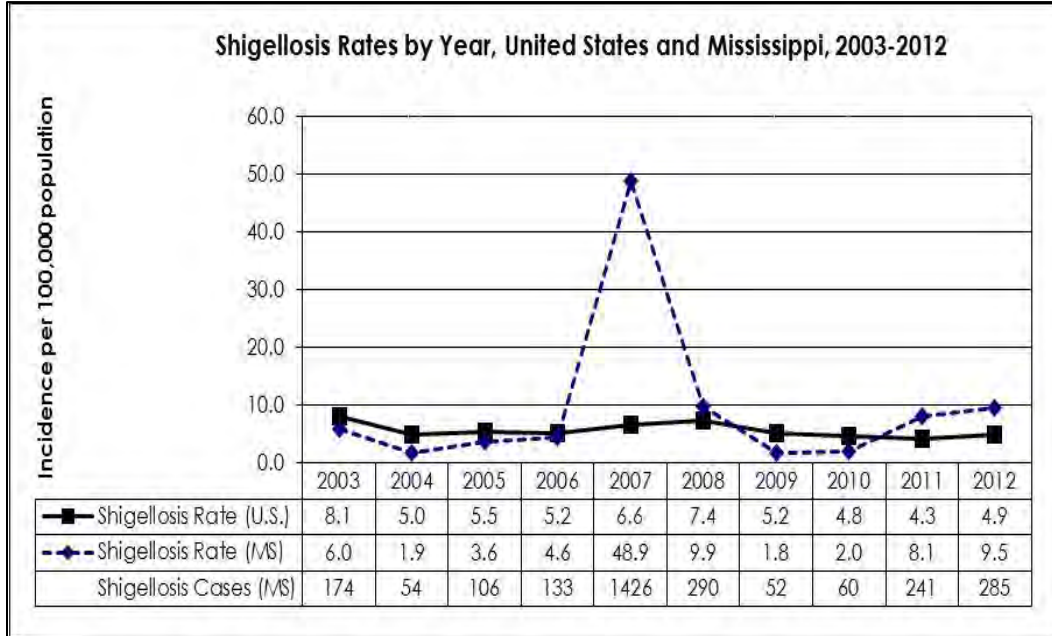


Figure 43

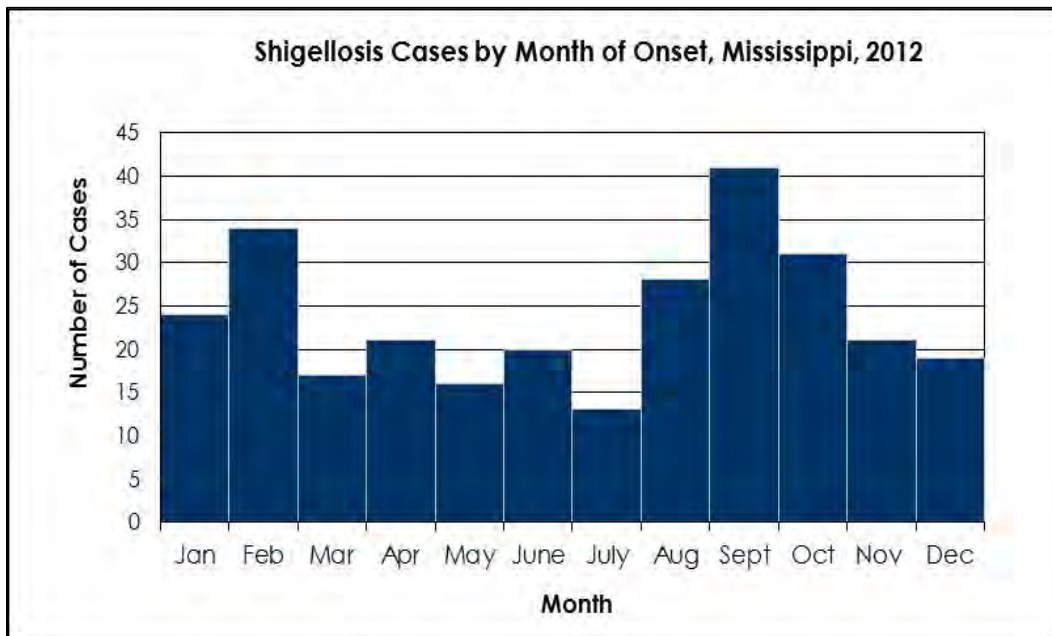
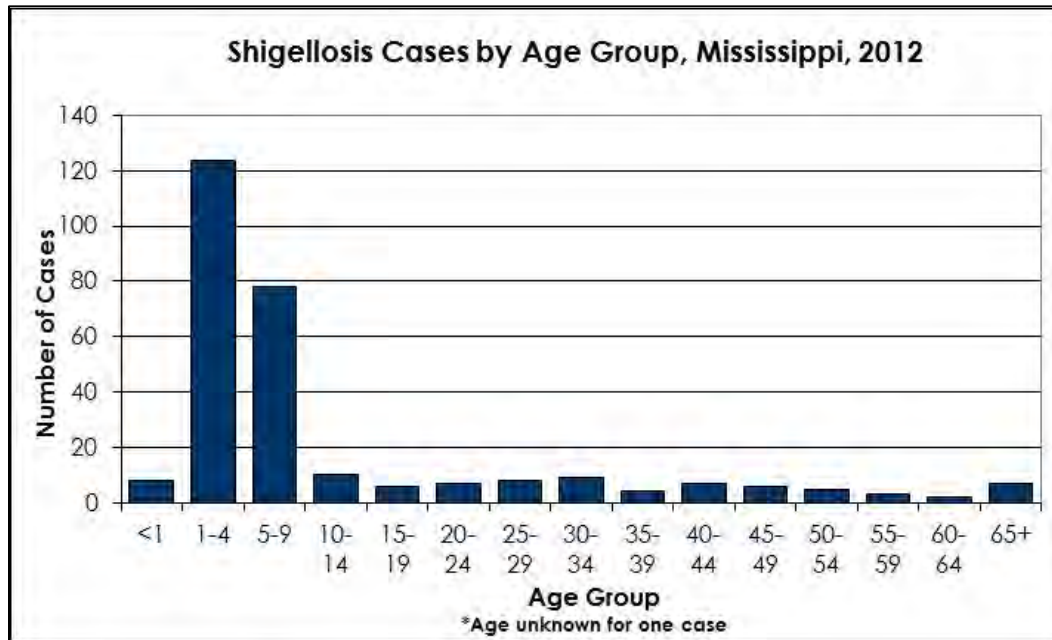


Figure 44



## Syphilis

### Primary and Secondary Syphilis

2012 Case Total	155	2012 rate/100,000	5.2
2011 Case Total	195	2011 rate/100,000	6.5

### Early Latent Syphilis

2012 Case Total	274	2012 rate/100,000	9.2
2011 Case Total	320	2011 rate/100,000	10.7

### 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 spirochaete.

### **Reservoir**

Humans.

### **Transmission**

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

### **Incubation**

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

### **Period of Communicability**

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

### **Methods of Control**

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

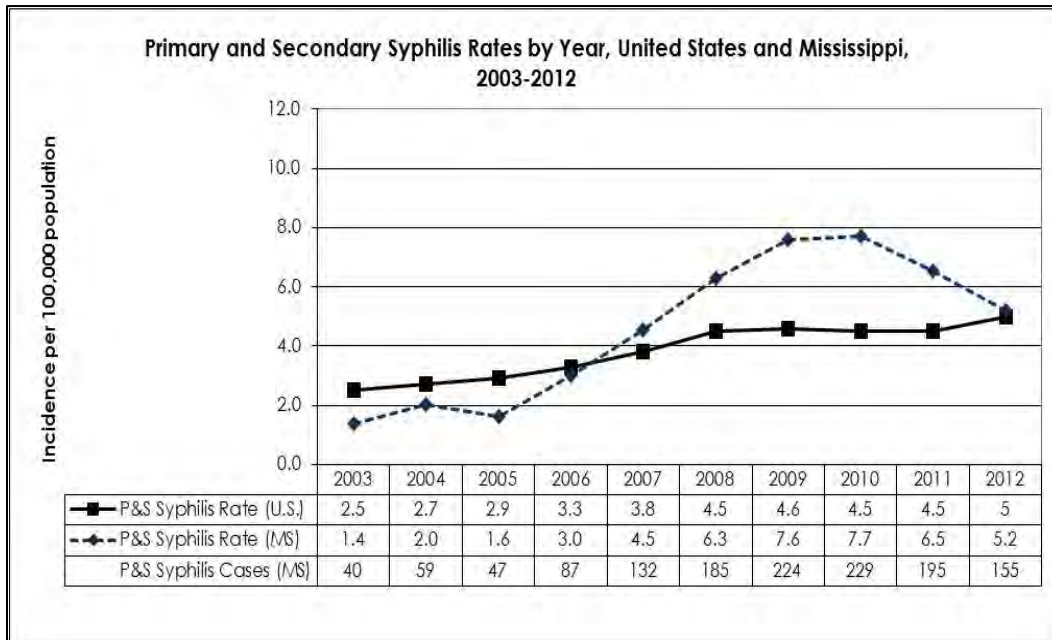
### **Reporting Classification**

Class 1.

## Epidemiology and Trends

Although Mississippi saw a nearly five-fold increase in primary and secondary (P&S) syphilis cases from 2005-2010 (from 47 to 229 cases), there was a 32% decrease during 2010-2012 (from 229 to 155 cases)(Figure 45). Since 2007, Mississippi has had rates higher than the national average, and in 2012, MS ranked eleventh nationally.

Figure 45



District V had the highest incidence of P&S syphilis (Figure 46). Fifty-four percent of P&S syphilis cases occurred among 20-29 year olds (Figure 47) and 88% of cases in which race was known were among African Americans (Figures 48).

Figure 46

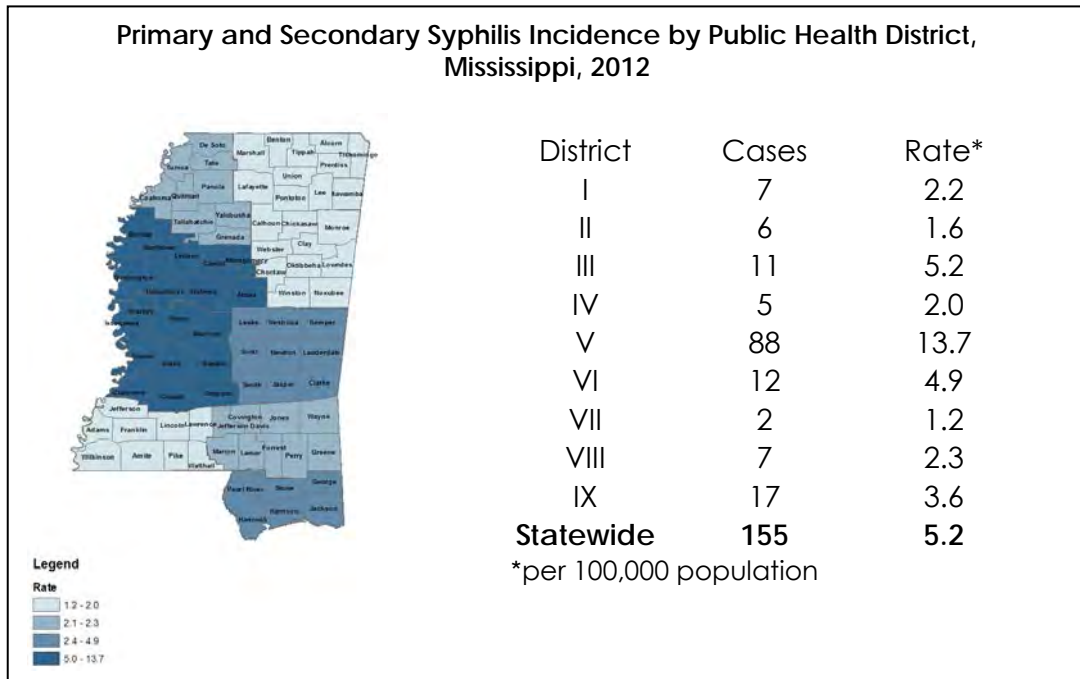


Figure 47

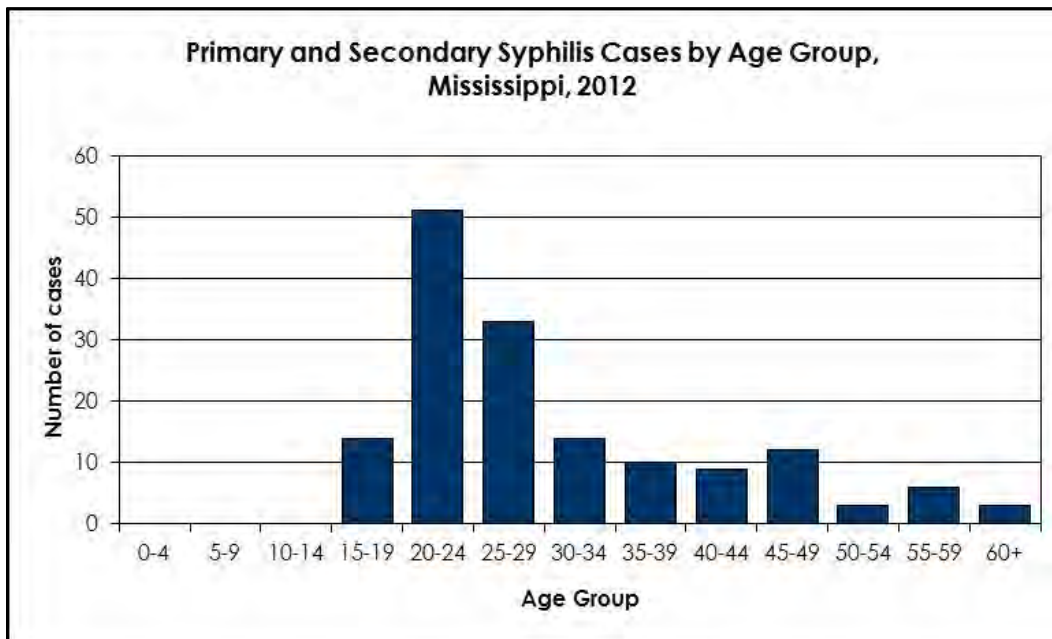
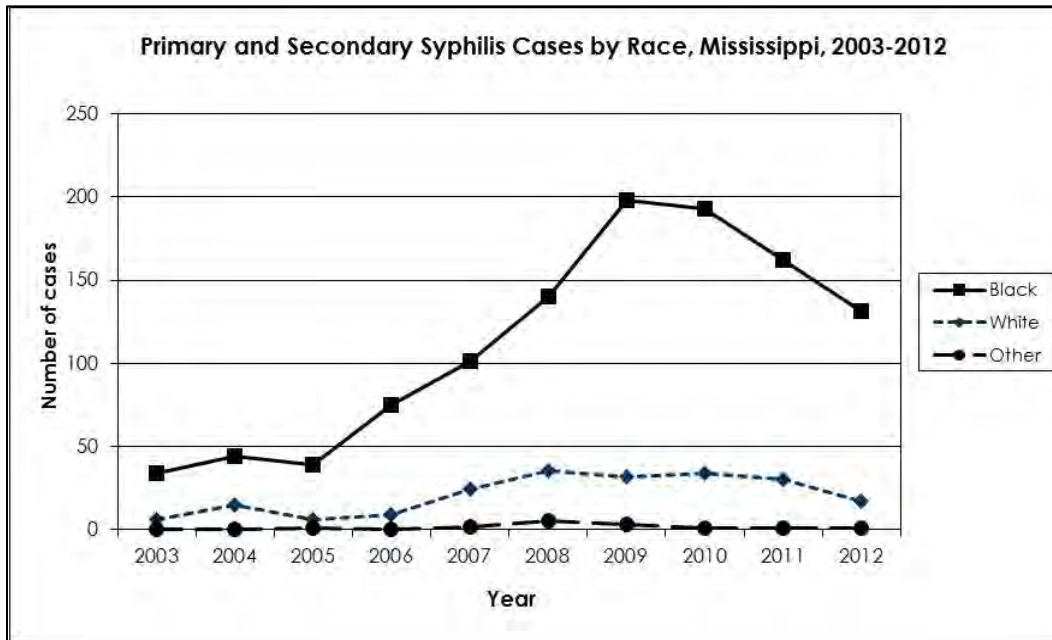
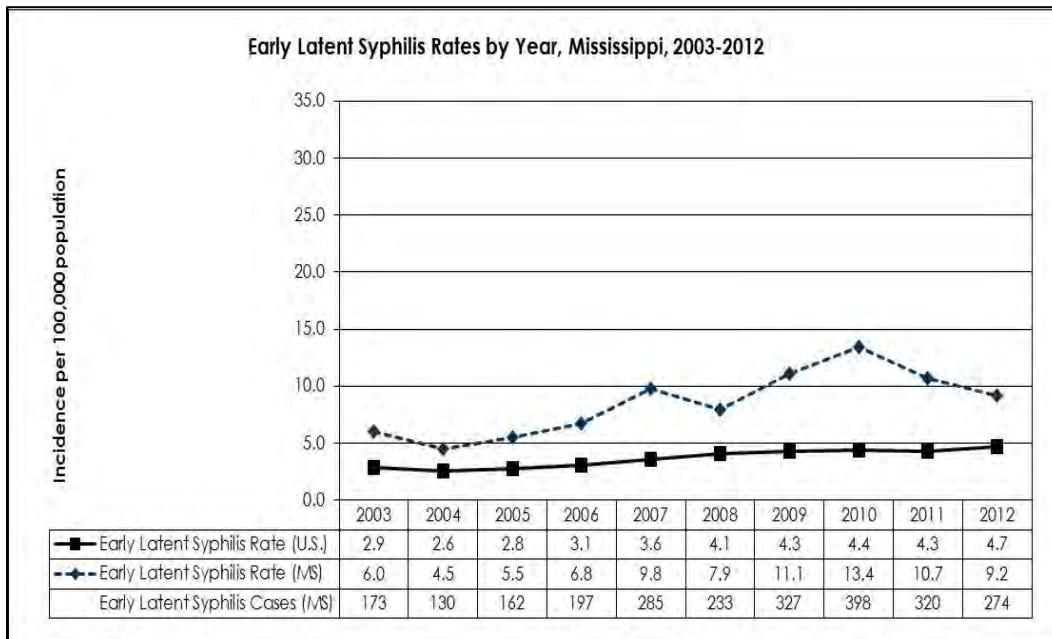


Figure 48



Over the past ten years, Mississippi has had rates higher than national average for early latent syphilis. Since 2010, there has been a 31% decrease in the number of cases (from 398 to 274 cases) (Figure 49).

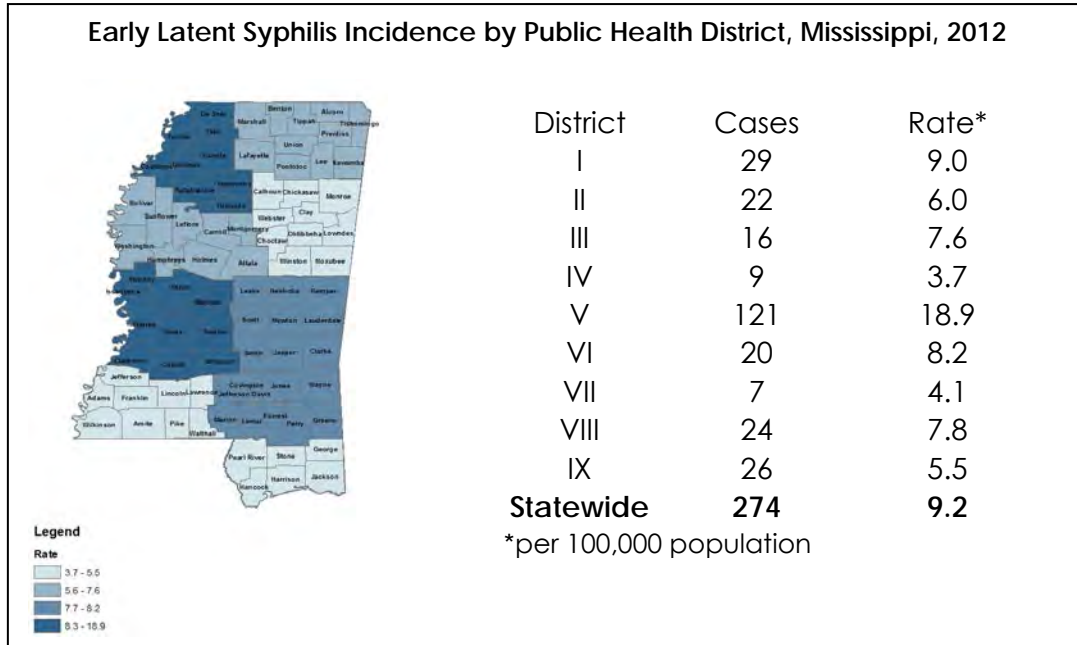
Figure 49



Early latent syphilis was reported in every district. District V had the highest case rates in the state (Figure 50).



Figure 50



Forty-three percent of reported cases were among 20-29 year olds (Figure 51). African Americans are disproportionately affected, accounting for 84% of cases for which race was known (Figure 52) and had rates that were almost nine times greater than the rate among whites.

Figure 51

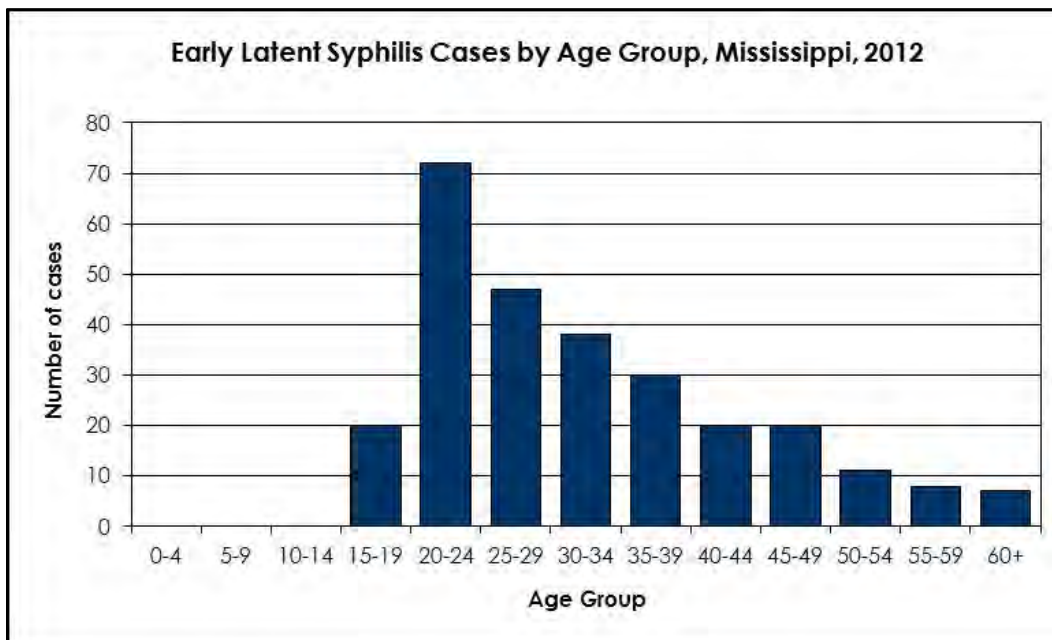
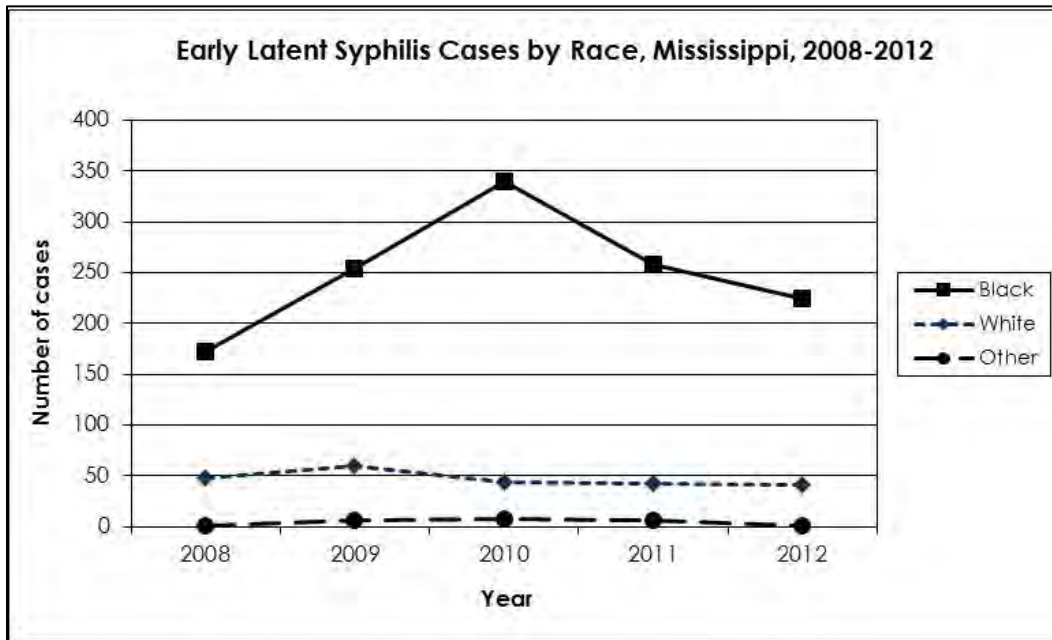


Figure 52



## Tuberculosis

2012 Case Total	81	2012 rate/100,000	2.7
2011 Case Total	91	2011 rate/100,000	3.1

### 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. Tuberculosis infection without disease (TBI) can occur and is asymptomatic.

### Infectious Agent

*Mycobacterium tuberculosis* complex, an acid-fast bacillus

### Reservoir

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

### Transmission

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

## **Incubation**

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 LTBI will develop clinically active disease, with the first 12-24 months after infection constituting the most hazardous period. HIV infection increases the risk and shortens the interval for development of active disease following infection with TB. In children, those under 5 years of age have the highest risk of developing disease. 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 and latent TB infections.

## **Current Initiatives**

MSDH has continued a targeted testing program for the homeless population in Jackson which was instituted in late 2008. An IGRA test, Quantiferon-TB Gold In-Tube, is provided to individuals seeking lodging/use of the homeless shelters in the mid-city area. Annual testing is provided and an identification card is issued that is required for access to the shelters' services. Over 700 persons have been tested annually and issued cards. The program has helped reduced the number of new cases developing in this population.

An intervention program using once-weekly doses of Isoniazid and Rifapentene (3HP) to treat TB infection was piloted in July 2010, and implemented statewide by 2012. The treatment period is for 12 weeks and requires direct observation of treatment. The initiative has resulted in significantly improved treatment completion rates and reduced patient cases loads for staff.

## **Reporting Classification**

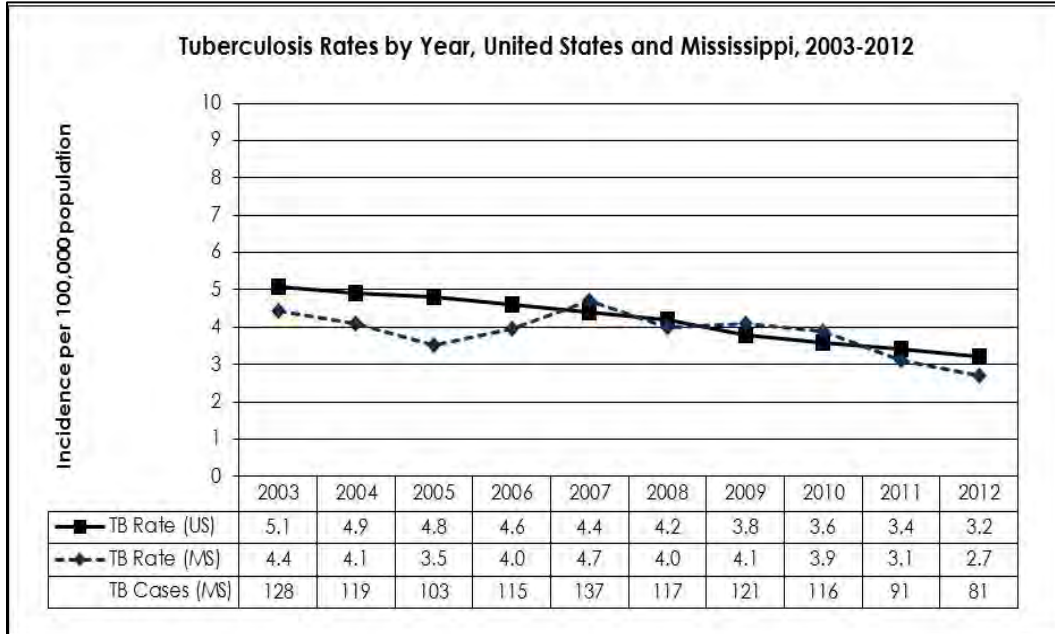
Class 1; Active Tuberculosis.

Class 2; Positive PPD or Interferon-Gamma Release Assay.

## Epidemiology and Trends

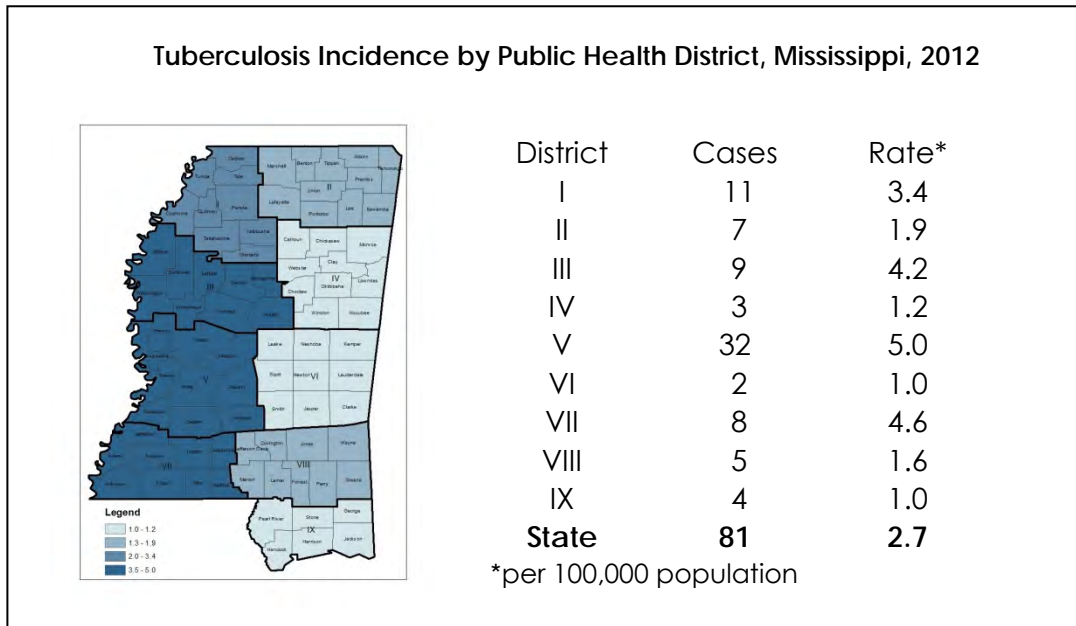
Mississippi had a consistent decline in TB morbidity from 1989 through 2005. However, after only 103 reported cases in 2005, the number of cases increased to a high of 137 cases in 2007. Since that time there has again been a gradual decline in active TB cases reported in Mississippi, with only 81 cases in 2012. TB rates were below the national average in each of the 2001-2006 reporting periods. In 2011 and 2012, the Mississippi case rate was again below the US case rate (Figure 53).

Figure 53



Geographically, TB was reported in every public health district, with the highest incidence noted in Public Health Districts V, VII and III (Figure 54).

Figure 54



Disease occurred across all age groups, with 69% of cases occurring in individuals  $\geq 45$  years (Figure 55). The number of cases in all racial groups has steadily decreased over the last several years, though the African American population is disproportionately affected. With declining numbers since 2009, disease in the African American population still routinely accounts for approximately about 60-70% of the yearly reported cases. In 2012, 60% of the cases were in this group (Figure 56). TB cases among patients co-infected with HIV have shown moderate decreases for several years from 15% of the cases in 2009 compared to 6% of the cases in 2012 (Figure 57).

Figure 55

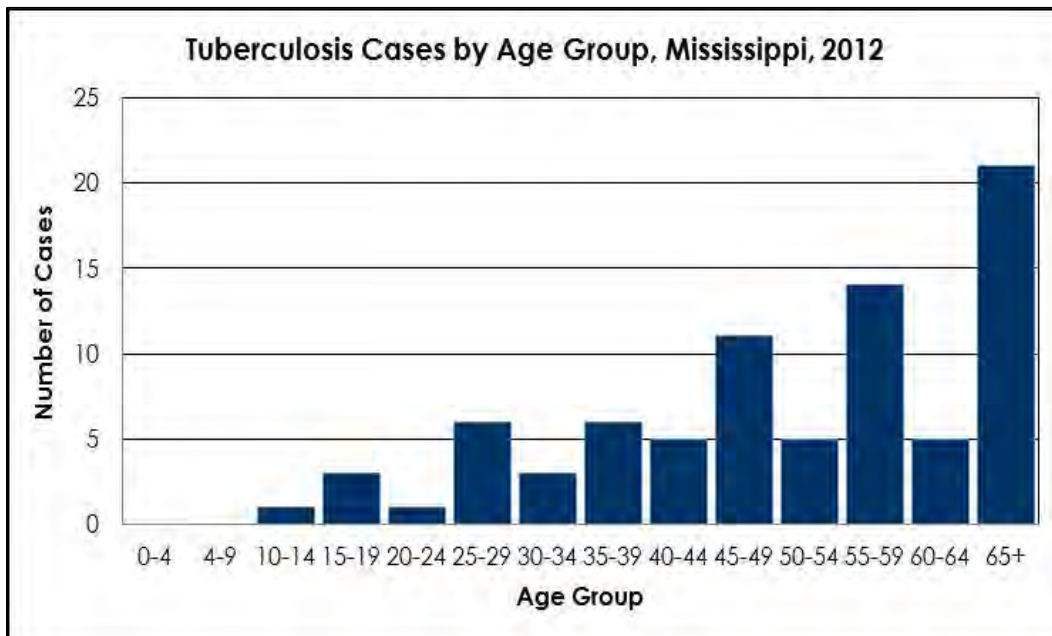


Figure 56

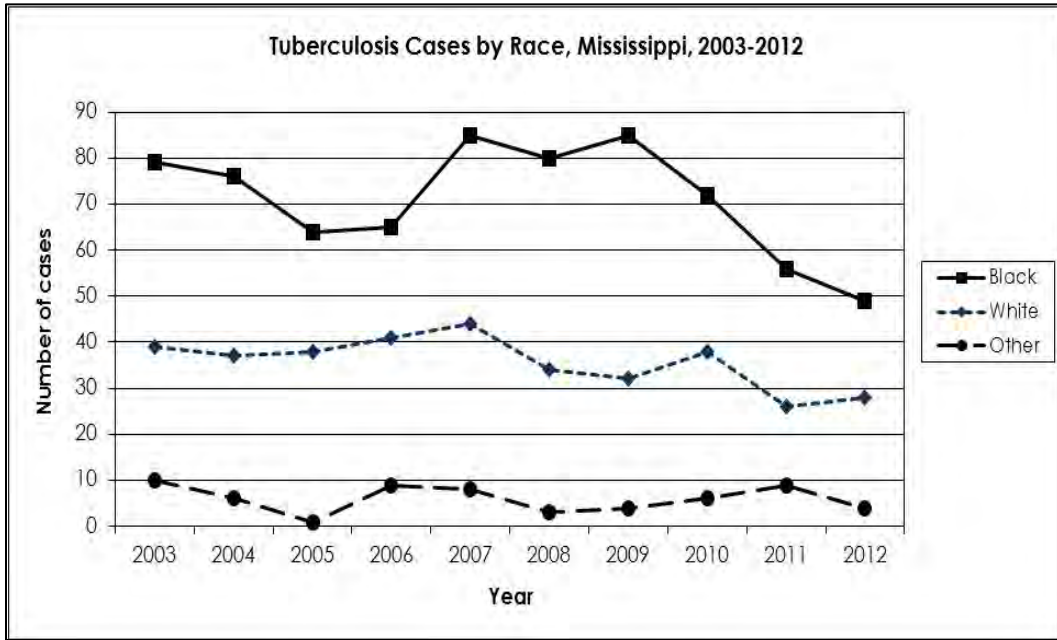
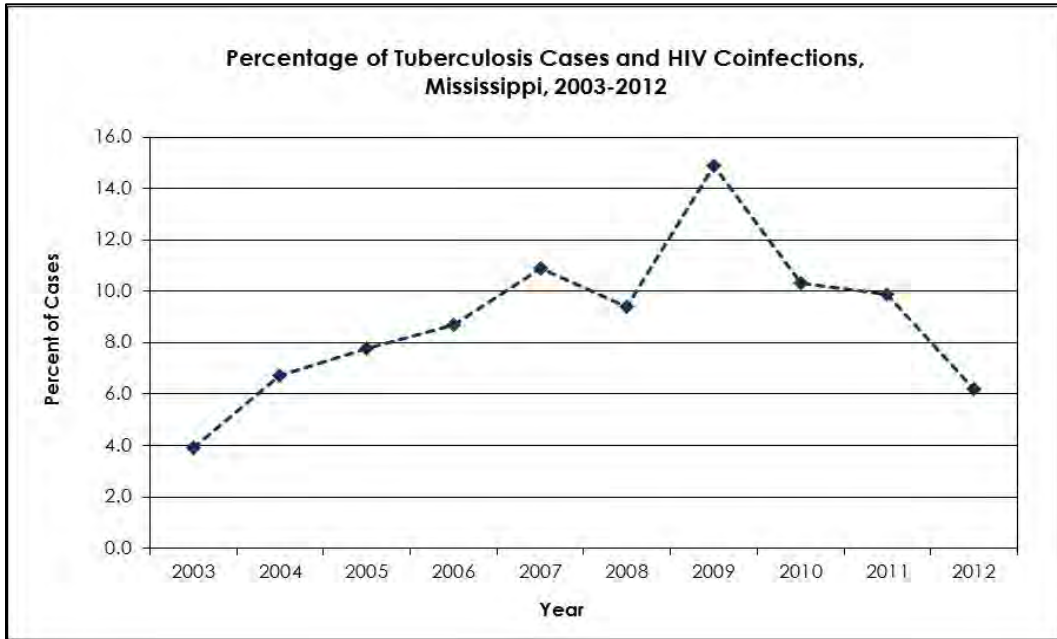


Figure 57



## Varicella

2012 Case Total	11	2012 rate/100,000	0.4
2011 Case Total	15	2011 rate/100,000	0.5

### 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  $\geq 60$  years (64% for adults 60-69 years and 38% for adults  $\geq 70$  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 1; varicella infection, primary, in patients >15 years of age.

## Epidemiology and Trends

In 2012, there were 11 reported cases of varicella infection in patients >15 years of age. The cases ranged in age from 16 to 46 years, with a median age of 31 years. One death due to varicella infection was reported in 2012, in a 26 year old who was HIV positive. The three year average from 2009 to 2011 was 11 cases of varicella per year.

In 2012, two of the reported cases were epidemiologically linked to an outbreak reported in late 2011. There were no reported outbreaks in 2012.

## **Vibrio disease**

2012 Case Total	16	2012 rate/100,000	0.5
2011 Case Total	13	2011 rate/100,000	0.4

## Clinical Features

There are several noncholera *Vibrio* species that can cause clinical illness in humans, primarily 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* causes sepsis 12 hours to 3 days after ingestion of contaminated seafood, usually raw oysters, especially among people with chronic liver disease, alcoholism, or immunosuppression. These same groups are at risk for severe wound infections from contact with coastal waters. *V. vulnificus* sepsis is characterized by fever, chills,



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

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

### **Infectious Agent**

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

### **Reservoir**

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

### **Transmission**

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

### **Incubation**

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

### **Period of Communicability**

Not typically transmitted person to person.

### **Methods of Control**

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

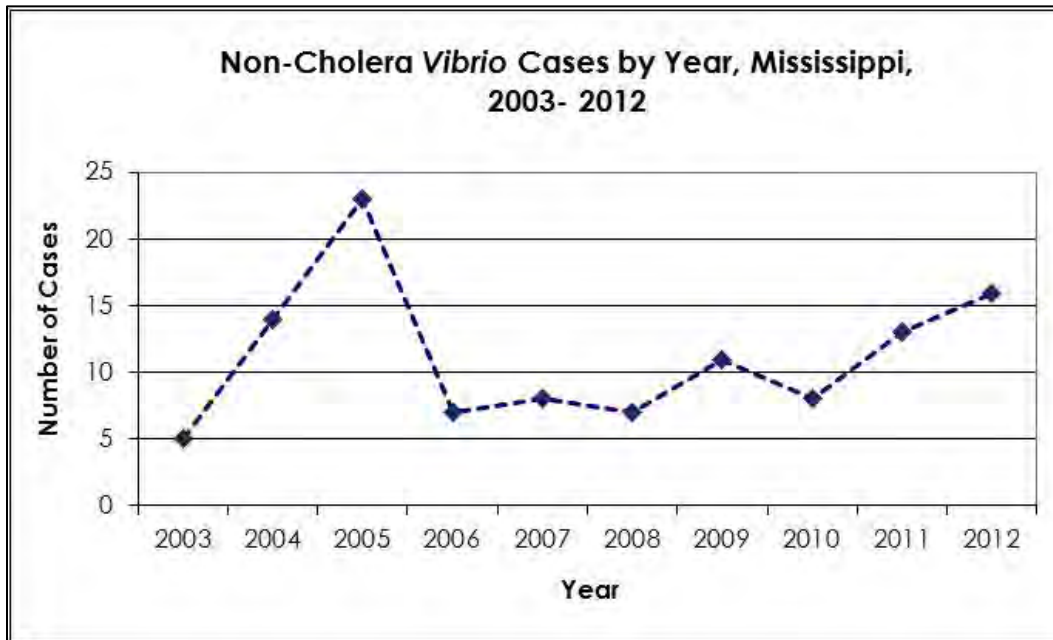
### **Reporting Classification**

Class 2.

### **Epidemiology and Trends**

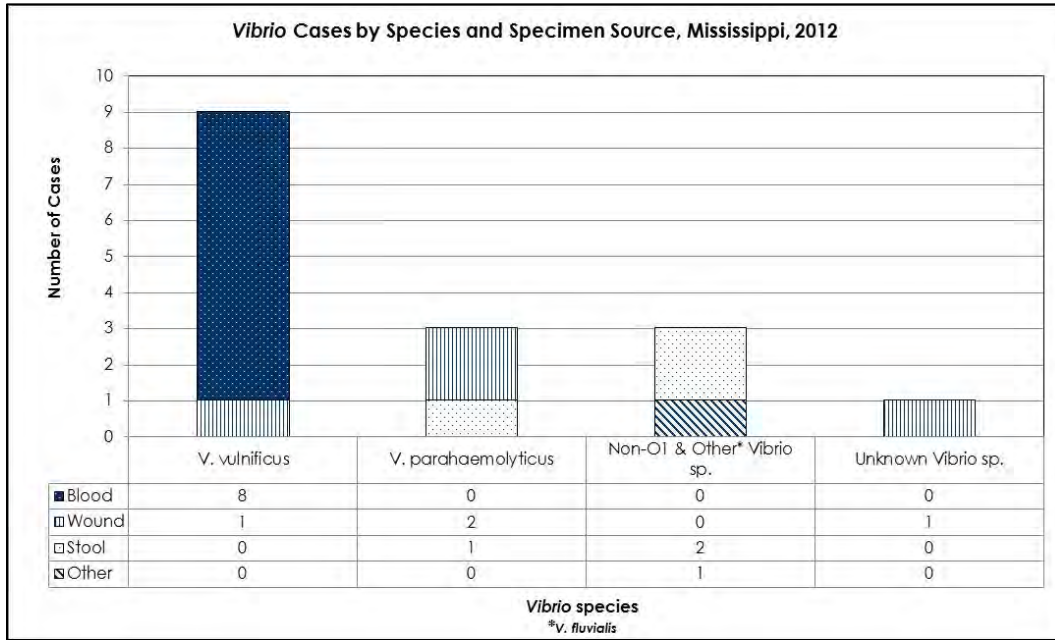
In 2012, there were sixteen reported *Vibrio* infections. This was an increase from the number of reported cases in 2011 (13) and higher than the three year average of 11 cases for 2009-2011 (Figure 58).

Figure 58



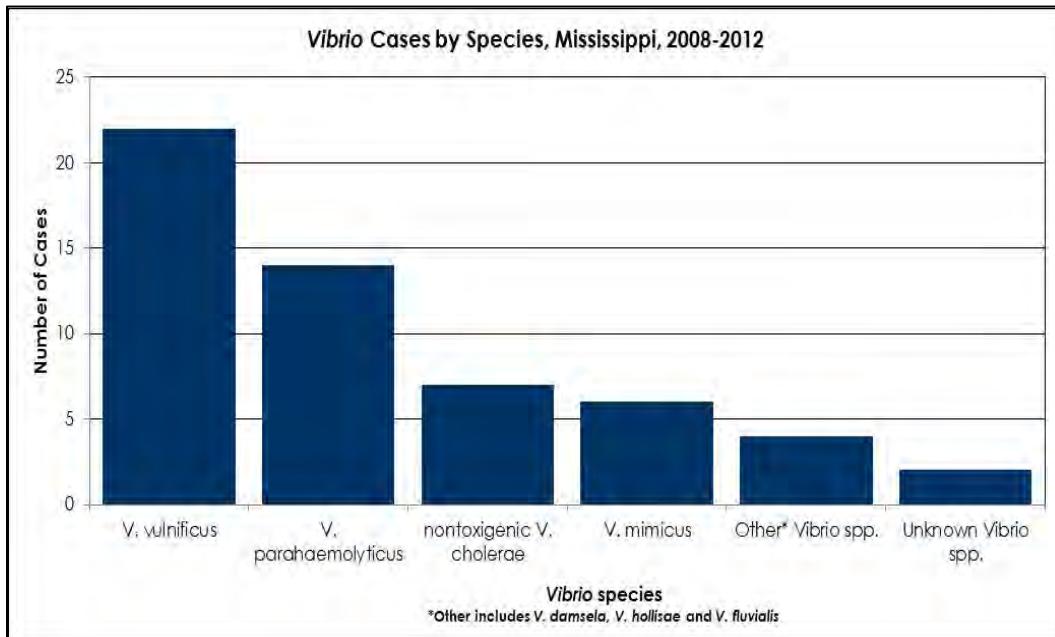
Of the sixteen reported cases, nine were due to *V. vulnificus* (eight isolated from blood cultures and one isolated from a wound culture); three were due to *V. parahaemolyticus* (two isolated from wound cultures and one isolated from a stool culture); two were due to *V. fluvialis* (one isolated from an abscess and one isolated from a stool culture); one was due to non-O1, non-139 *V. cholerae* (isolated from a stool culture); and one was due to an unknown *Vibrio* species (isolated from a wound culture) (Figure 59). There were two reported *Vibrio* deaths in 2012 both due to *V. vulnificus*. The deaths occurred in individuals under the age of 50 and presented as septicemia. Both deaths had a common underlying risk factor (alcoholism), while one death also had cirrhosis of the liver and hepatitis C.

Figure 59



Over the past five years there have been a total of 55 cases of non-cholera *Vibrio* infections reported in Mississippi. *V. vulnificus* (22) and *V. parahaemolyticus* (14) have accounted for 65% of the total reported cases, followed by nontoxicogenic *V. cholerae* (7) and *V. mimicus* (6) and (Figure 60).

Figure 60



## 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 2012.

### **Influenza Outbreaks in Institutional Settings, 2012-2013 Influenza Season**

**Introduction:** In Mississippi, any suspected outbreak (including influenza in long-term care facilities) is reportable to the Mississippi State Department of Health (MSDH) within 24 hours of first knowledge or suspicion. MSDH investigates each reported influenza outbreak and is able to assist with recommendations for infection control and antiviral treatment/prophylaxis and offer laboratory support to aid in the confirmation of influenza as the cause of the outbreak.

Over the last several influenza seasons occasional outbreaks of influenza have been reported in long-term care (LTC) facilities and other institutional settings, especially nursing homes. There were three reported outbreaks in the 2009-2010 season, two in the 2010-2011 season and three in the 2011-2012 season. That number significantly increased in the 2012-2013 season, with 33 confirmed influenza associated outbreaks in LTC facilities reported to the MSDH.

**Background:** In any given influenza season, persons  $\geq 65$  years of age (especially those with underlying health issues) are profoundly affected by influenza. Individuals in this age group are typically at higher risk for serious complications from influenza, have some of the highest rates of hospitalization and on average account for 90% of influenza associated deaths each year. Additionally, persons in this age group often have a suboptimal immune response to influenza vaccination.

In the US the  $\geq 65$  year old age group was particularly affected by influenza during the 2012-2013 season. This age group accounted for approximately 50% of all reported influenza associated hospitalizations. Individuals in this age group are often residents of LTC facilities or nursing homes placing them at risk for healthcare-associated influenza infections. Influenza can be introduced and spread by newly admitted residents, health care workers and by visitors.

The CDC has provided guidance on prevention measures and management of influenza outbreaks in LTC facilities. The guidelines, available at <http://www.cdc.gov/flu/professionals/infectioncontrol/ltc-facility-guidance.htm> call for a multi-faceted approach. **Among the most important recommendations are vaccination of healthcare workers and residents, and the prompt treatment of any resident with confirmed or suspected influenza with antivirals. Antiviral chemoprophylaxis of all residents in the entire LTC facility as soon as an influenza**

**outbreak is determined is also a key recommendation.** There are two vaccines currently available for people 65 years of age and older, the standard dose influenza vaccine and a “high-dose” vaccine, which contains four times the amount of antigen. Clinical trials indicate higher antibody levels among people aged 65 years and older after vaccination with the high dose. A large scale clinical trial conducted in the 2011-2012 and 2012-2013 influenza seasons revealed that high dose was 24.2% more effective in preventing influenza than the standard dose vaccine.

**2012-2013 Outbreaks:** In the 2012-2013 season there were 33 reported influenza outbreaks in LTC facilities; thirty-two occurred in skilled nursing facilities and one in a chemical dependency unit.

The outbreak dates ranged from November 6, 2012 to April 1, 2013. Sixty-five percent (21/32) of the outbreaks with known onsets occurred between early December, 2012 and late January 2013, coinciding with the peak time of influenza activity in the state. To better characterize the LTC facility outbreaks a questionnaire was developed to collect information regarding staff and resident influenza vaccination, antiviral use for treatment and prophylaxis, and resident hospitalizations and deaths, among other variables. Expanded information is available for 31 of the 33 outbreaks, with some of the pertinent information summarized in the table below.

<b>Average Resident Vaccination Rate (range)</b>	<b>76.4 %</b>	<b>(30.2%-100%)</b>
<b>Average Resident Attack Rate (range)</b>	<b>17.8%</b>	<b>(2.7%-39.3%)</b>
<b>Average Staff Vaccination Rate (range)</b>	<b>40.2%</b>	<b>(0%-90%)</b>
<b>Average Staff Attack Rate (range)</b>	<b>6%</b>	<b>(0%-25%)</b>
<b>Average Percent Residents Treated with Antivirals</b>	<b>82.7%</b>	<b>(12.5%-100%)</b>
<b>Average Percent of Residents Prophylaxed with Antivirals</b>	<b>59.9%</b>	<b>(0%-97.5%)</b>
<b>Number of Facilities Using “High Dose”</b>	<b>1</b>	

An average of 76.4% of LTC facility residents received influenza vaccine; however the majority of facilities were not aware of “high dose” vaccine recommendation for persons 65 and older. Overall staff vaccination rates were low (40%). Antivirals were underutilized for resident prophylaxis during the outbreaks. A total of 63 residents were hospitalized due to influenza, with 3 reported deaths. The predominant influenza virus identified in the outbreaks was influenza A H3N2, which was the predominant influenza virus seen this season in both the US and Mississippi. In several of the LTC facilities there were delays in reporting of the outbreaks to MSDH with an average of 5 days between recognition of the outbreak and reporting to MSDH, ranging from 1-15 days.

**Opportunities:** These data provide several opportunities with respect to LTC facility outbreaks for the 2013-2014 influenza season. Among the most important is working toward an improvement in both staff and resident vaccine rates, and offering high

dose vaccine when appropriate. High levels of vaccination of both employees and residents are associated with decreased pneumonia mortality and all cause death rates among elderly in institutional settings. Following CDC guidelines for use of prophylactic antivirals for well residents, and having an awareness of the need to report influenza-associated outbreaks to MSDH in a timely manner are also areas for potential improvement. In February 2013, the CDC released a report discussing the interim adjusted estimates of seasonal vaccine effectiveness for the 2012-2013 season (<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6207a2.htm>). The overall vaccine effectiveness against influenza A and B virus infections associated with medically attended acute respiratory illness was 56%. However, when analyzed by age group and type of influenza, the vaccine effectiveness against influenza A H3N2 (the predominant virus causing illness during the 2012-2013 season) for individuals 65 and older was *not significant*. This information reinforces the need for vaccination of staff around residents 65 and older to provide the best protection, and the use of high dose vaccine where appropriate, to give the residents the best chance of being protected.

### **Mandatory Influenza Vaccination Policy, Mississippi State Department of Health**

Influenza vaccination for health care personnel (HCP) has long been a recommendation of the Centers for Disease Control and Prevention (CDC) and the Advisory Committee on Immunization Practices (ACIP). In spite of this recommendation, vaccination coverage among HCP in the United States has increased slowly over the past decade. HCP have been recognized as a source of transmission of influenza to their patients, many of whom are at higher risk for influenza associated complications because of age, vaccine status and underlying health conditions. Influenza outbreaks in hospitals and long-term care facilities have been associated with low vaccination rates among HCP. Vaccination of HCP against influenza has been shown to reduce illness and absenteeism and to reduce transmission of influenza to HCP, their families, and their patients.

During the 2012-2013 influenza season the CDC conducted a study to estimate influenza vaccine coverage among HCP (CDC report available at [Influenza Vaccination Coverage Among Health-Care Personnel — United States, 2012–13 Influenza Season](#)). The study indicated that the overall vaccination rate among HCP was 72% for the 2012-2013 influenza season, compared to 66.9% for the 2011-2012 season and 63.5% for the 2010-2011 season. There were differences in the vaccination rate when compared by health care setting and whether influenza vaccination was mandated or promoted in the setting. By setting, the highest employee vaccination rates were seen in hospital settings where the rate was 83.1%, followed by ambulatory care/office settings with a rate of 72.9%. The lowest employee vaccination rates were seen in LTC facilities where only 58.9% of staff received influenza vaccination for the 2012-2013 season. In settings that have an influenza mandate or requirement for employee influenza vaccination, the estimated rate was 96.5%. Where vaccination

was promoted only (not required), the vaccination rate dropped to 76.9%. However, in facilities where employee influenza vaccination is neither required nor promoted, the vaccination rate dropped to 50.4%.

In a commitment to protect patients and employees from influenza transmission, the Mississippi State Department of Health (MSDH) implemented a mandatory influenza vaccination policy for all employees for the 2012-2013 season. The policy included all full and part time employees and contract workers. Influenza vaccine (both intramuscular and intradermal) was made available to all employees free of charge at all Health Districts offices and County Health Departments. Mass vaccination clinics were conducted for Central Office workers.

Both medical and nonmedical exemptions were allowed. Medical exemptions required documentation from the individual's primary care physician. Individuals requesting non-medical exemptions were required to complete a mandatory influenza training course for healthcare workers. The course provided an overview of influenza and its transmission, education on the impact of influenza and discussed the groups at higher risk of complication. Additionally, all unvaccinated employees (medical and non-medical exemptions) who worked in clinical settings with potential contact to the public were required to wear a surgical mask during the peak weeks of influenza activity in the state. The mask requirement was in effect from December 3, 2012 through to February 20, 2013, the peak times of influenza activity and transmission documented through MSDH surveillance.

Of the 2,948 MSDH employees at the end of 2012, 217 (7.4%) received exemptions for flu vaccination, eight of which were due to medical contraindications.

### **Tdap Requirement for 7th Graders, 2012-2013 School Year**

Pertussis immunity typically wanes 5-10 years after the childhood booster vaccination, leaving adolescents vulnerable to infection. Adolescents can then serve as a source of infection in children <1 year of age who have not yet been completely vaccinated against pertussis. Infants are typically at the greatest risk for severe disease and death from pertussis infections. In 2005 the Advisory Committee on Immunization Practices (ACIP) first recommended the Tdap booster (tetanus, diphtheria, and pertussis containing vaccine) for all adolescents aged 11-18 years.

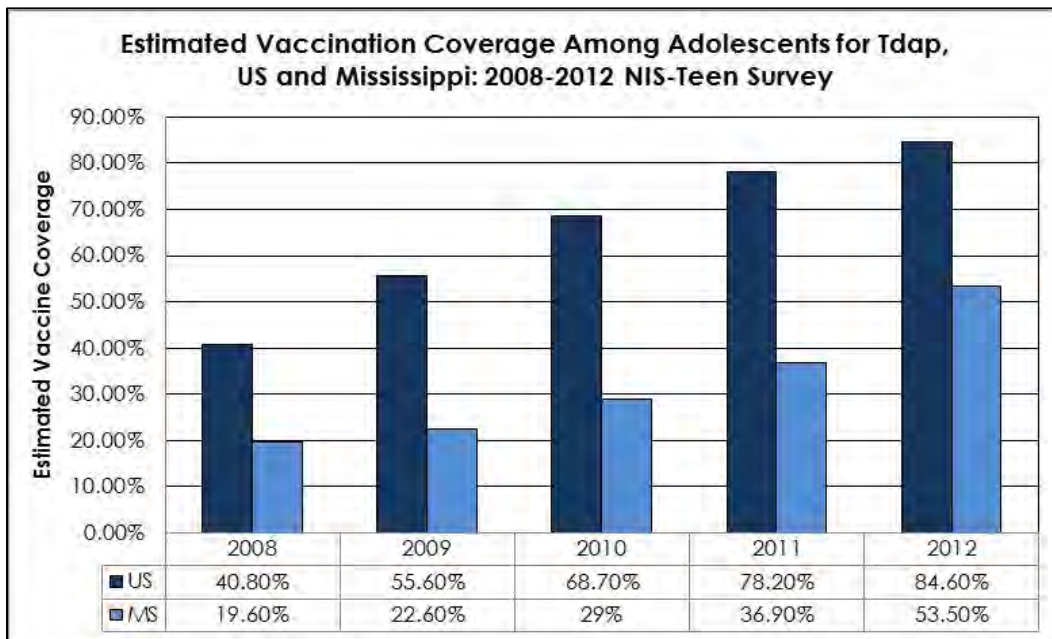
In the US the number of reported cases of pertussis has been increasing in the last several years. In 2011 there were over 18,000 cases with 13 deaths reported in the US; 11 of the deaths were in infants <1 year of age. In 2012 this number increased to 48,277 reported cases and 20 deaths; 16 of the deaths in infants <1 year of age. There were a number of pertussis outbreaks in the US in 2012, primarily in Washington, Minnesota, Wisconsin and Colorado. In these outbreaks children in early adolescence (10-14 years of age) consistently accounted for the highest number of cases. In the Wisconsin

outbreak, children 11-12 years of age who had not received Tdap were significantly more likely to have pertussis infection than those 11-12 year olds who had received Tdap.

In Mississippi, there was a large outbreak of pertussis in 2007, when 256 cases were reported. The number of cases trended down over the next several years with 49 reported cases of pertussis and no deaths in 2011. In 2012 the number increased to 77 reported cases with one pertussis-related death in a child <1 year of age.

Since 2006, the Centers for Disease Control and Prevention has conducted the National Immunization Survey—Teen (NIS-Teen) in order to estimate vaccine coverage for Tdap, and other recommended vaccinations (meningococcal and human papillomavirus) in adolescents aged 13-17 years. The estimated adolescent Tdap vaccination rate in Mississippi has steadily increased over the last several years but has continued to lag behind the US rate (Figure 61). In fact, Mississippi has had the lowest estimated rate in the US since 2009.

Figure 61



Mississippi joined 41 other states in instituting a requirement for Tdap among adolescents in the 2012-2013 school year. All students entering 7th grade are now required to have documentation verifying Tdap vaccination at seven years of age or older. This includes new, current and transfer students in both private and public schools.

In the 2012 NIS-Teen survey, the first since the requirement went into effect, the Mississippi Tdap rate increased modestly from 36.9% to 53.5%. With the new requirement there should be continued improvement in the adolescent Tdap rate resulting in

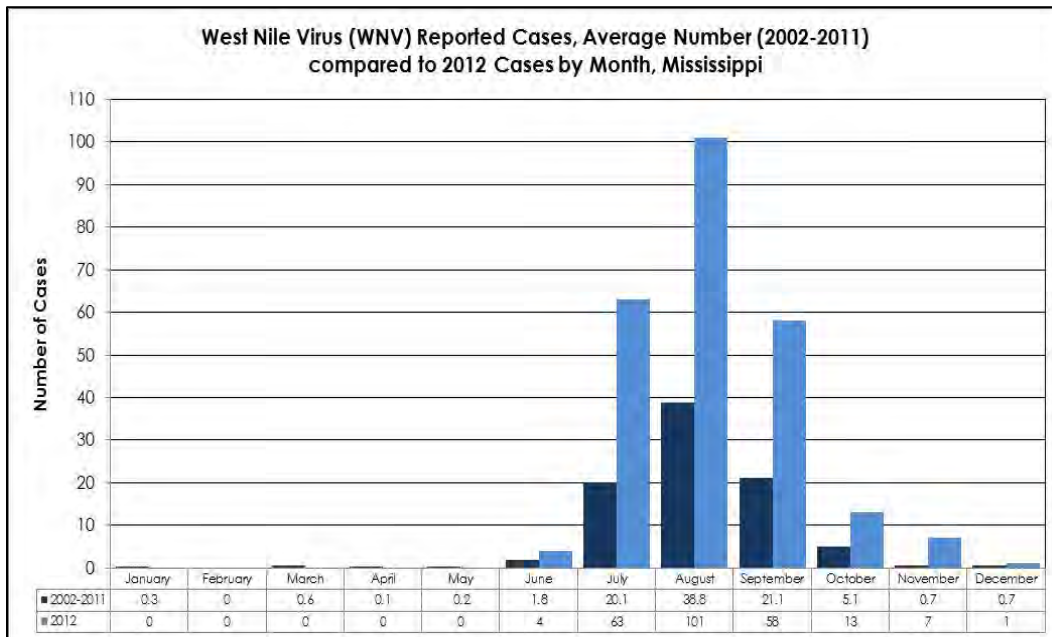


reduced disease burden among adolescents and improved protection of those children <1 year of age.

**West Nile Virus, 2012**

In Mississippi the 247 cases of West Nile virus (WNV) infections reported in 2012 were the most cases in a given year since human infections were first reported in the state in 2002. The 2012 total includes five reported deaths from WNV infection. Prior to 2012, the most active year was 2002, with 192 reported cases. There were 5,674 cases of WNV reported nationwide in 2012, with Mississippi ranking 5th for total number of cases and 2nd by case rate with 8.5 per 100,000 population. Only South Dakota had a higher case rate with 24.3 per 100,000 population. The majority of the 2012 Mississippi cases occurred in the months of July, August and September (Figure 62), consistent with the pattern seen in previous years.

Figure 62



Due to the increased WNV activity, MSDH initiated the following activities: enhanced public health messaging for communities and medical professionals, augmented community outreach, support of community vector control activities, and the establishment of an electronic vector surveillance system. Emergency funds were accessed through the MSDH Office of Emergency Preparedness and Response to supply larvicide to local mosquito control programs and to all local public health districts.

Mosquito control programs are operated at the local level, city or county, with activities and resources varying by location. To better gauge the depth and range of mosquito

control operations, MSDH conducted a survey of county and city governments. Inquiries were submitted to 295 municipalities and 82 counties. A total of 264 responses were received.

Seventy-one percent of respondents conducted some form of mosquito control, the majority of which (60%) were administered through Public Works department. Of available response methods 79% utilized spray trucks, 58% treated standing water, 52% actively addressed source reduction (such as clearing ditches) and 35% provided educational materials to the community. Based on the survey results, MSDH identified potential areas for enhanced control, using existing and additional resources as available. These activities included: revising mosquito control resource guidance in collaboration with the MSDH Entomology Program, developing a statewide vector surveillance database, conducting statewide vector control trainings for local mosquito control and mayors, and developing enhanced vector control specialization within all district public health offices.

# Reportable Disease Statistics

## Mississippi Reportable Disease Statistics

2012



		Public									State Total*
		Health District									
		I	II	III	IV	V	VI	VII	VIII	IX	
Sexually Transmitted Diseases	Primary & Secondary Syphilis	7	6	11	5	88	12	2	7	17	155
	Total Early Syphilis	29	22	16	9	121	20	7	24	26	274
	Gonorrhea	793	516	910	640	2016	526	254	559	663	6,877
	Chlamydia	2800	2212	2873	1807	5451	2137	1217	1979	2586	23,062
	HIV Disease	67	24	33	30	231	41	27	43	51	547
Mycobacterial Diseases	Pulmonary Tuberculosis (TB)	9	6	8	1	30	2	7	4	4	71
	Extrapulmonary TB	2	1	1	1	3	0	1	1	0	10
	Mycobacteria Other Than TB	20	58	31	23	135	40	30	24	40	401
Vaccine Preventable Diseases	Diphtheria	0	0	0	0	0	0	0	0	0	0
	Pertussis	0	4	4	2	27	15	0	5	17	77
	Tetanus	0	0	0	0	0	0	0	0	1	1
	Polio	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)	6	12	3	7	13	3	4	13	17	78
	Invasive <i>H. influenzae</i> disease	1	1	2	3	7	4	1	2	5	26
	Invasive Meningococcal disease	0	0	1	1	0	1	0	1	1	5
Enteric Diseases	Hepatitis A (acute)	1	3	0	0	3	1	0	3	0	11
	Salmonellosis	124	228	35	116	263	121	103	109	149	1248
	Shigellosis	12	14	12	9	167	7	3	7	53	285
	Campylobacteriosis	9	10	4	0	30	9	4	11	22	99
	<i>E. coli</i> O157:H7/HUS/STEC	2	3	0	0	8	11	0	7	0	31
Zoonotic Diseases	Animal Rabies (bats)	0	0	0	0	1	0	0	0	1	2
	Lyme disease	0	0	0	0	0	1	0	0	0	1
	Rocky Mountain spotted fever	3	3	3	2	9	1	0	2	2	25
	West Nile virus	9	1	19	11	111	19	24	35	18	247

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



## Mississippi

Provisional Reportable Disease Statistics  
January 2014

Figures for the current month are provisional

		Public Health District									State Totals*			
		I	II	III	IV	V	VI	VII	VIII	IX	Jan 2014	Jan 2013	YTD 2014	YTD 2013
Sexually Transmitted Diseases	Primary & Secondary Syphilis	0	0	0	0	2	0	0	1	1	4	2	4	2
	Total Early Syphilis	0	0	0	0	0	1	0	0	0	1	2	1	2
	Gonorrhea	26	16	34	12	53	21	5	19	20	206	545	206	545
	Chlamydia	90	62	90	63	202	78	43	76	93	797	1,736	797	1,736
	HIV Disease	9	2	2	1	11	3	2	4	2	36	36	36	36
Mycobacterial Diseases	Pulmonary Tuberculosis (TB)	0	1	0	0	1	1	0	0	0	3	3	3	3
	Extrapulmonary TB	0	0	0	1	0	0	0	0	1	2	0	2	0
	Mycobacteria Other Than TB	0	3	6	1	9	3	2	4	5	33	31	33	31
Vaccine Preventable Diseases	Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pertussis	1	1	0	0	0	0	0	0	0	2	6	2	6
	Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0
	Poliomyelitis	0	0	0	0	0	0	0	0	0	0	0	0	0
	Measles	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mumps	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hepatitis B (acute)	0	1	0	0	0	0	0	1	0	2	6	2	6
	Invasive <i>H. influenzae</i> disease	0	2	0	0	0	0	0	0	0	2	2	2	2
	Invasive Meningococcal disease	0	0	0	0	0	0	0	0	0	0	2	0	2
Enteric Diseases	Hepatitis A (acute)	0	0	0	0	0	0	0	1	0	1	1	1	1
	Salmonellosis	2	5	1	2	8	0	4	5	5	32	36	32	36
	Shigellosis	4	4	0	0	3	0	0	1	3	15	15	15	15
	Campylobacteriosis	1	1	1	0	0	0	0	0	2	5	4	5	4
	<i>E. coli</i> O157:H7/STEC/HUS	0	0	0	0	1	0	0	0	0	1	1	1	1
Zoonotic Diseases	Animal Rabies (bats)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lyme disease	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rocky Mountain spotted fever	0	0	0	0	0	0	0	0	0	0	0	0	0
	West Nile virus	0	0	0	0	1	0	0	0	0	1	0	1	0

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

## List of Contacts, Editors and Contributors

**Office of the State Health Officer** 601.576.7634  
Mary Currier, MD, MPH  
State Health Officer

**Office of Communicable Diseases/Epidemiology** 601.576.7725  
Thomas Dobbs, MD, MPH  
State Epidemiologist

Paul Byers, MD  
Deputy State Epidemiologist

Joy Sennett, MHS  
Director

**Immunization Program** 601.576.7751  
Joy Sennett, MHS  
Interim Director

**STD/HIV/AIDS Program** 601.576.7723  
Nicholas Mosca, DDS  
Director

**Tuberculosis Program** 601.576.7700  
J.M. Holcombe, MPPA  
Director

### Editors

Theresa Kittle, MPH  
Epidemiologist  
Office of Communicable Diseases/Epidemiology

Paul Byers, MD  
Deputy State Epidemiologist  
Office of Communicable Diseases/Epidemiology

### Contributors

Alisha Brinson, MS  
Monique Drake  
Jesse Ellis, MBA  
Sheryl Hand, RN

Carl Haydel, MS  
Michael Jacobson  
Kendra Johnson, MPH  
Wendy Varnado, MS

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MISSISSIPPI STATE DEPARTMENT OF HEALTH

570 East Woodrow Wilson  
Post Office Box 1700  
Jackson, Mississippi 39216-1700