



SHELBY COUNTY HEALTH DEPARTMENT

OFFICE OF EPIDEMIOLOGY AND INFECTIOUS DISEASES



Public Health
Prevent. Promote. Protect.
Shelby County Health Department

2014 ANNUAL REPORT

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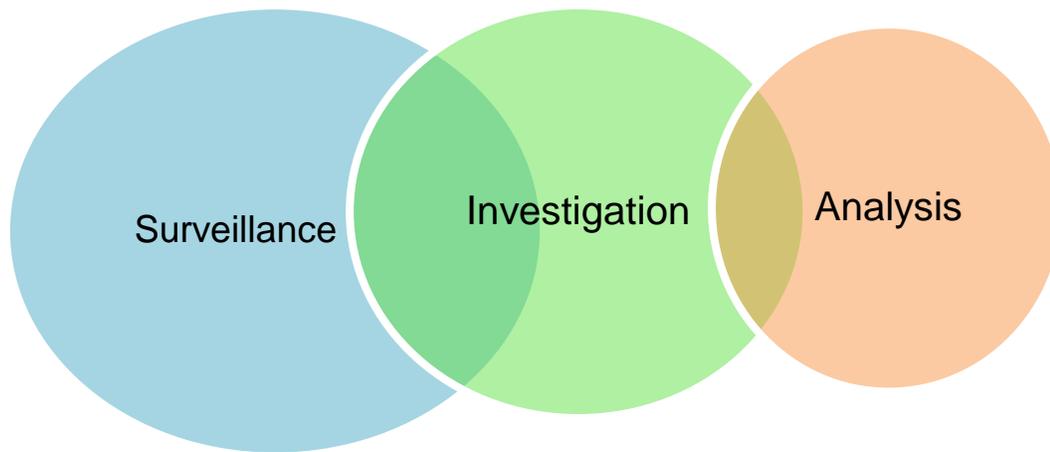
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INTRODUCTION 3|THREE

The Office of Epidemiology and Infectious Disease at the Shelby County Health Department (SCHD) is responsible for many aspects of ensuring and protecting the health of Shelby County residents. This group investigates and implements control measures for all reportable diseases including Tuberculosis, HIV infection and the majority of sexually transmitted infections. Some of these diseases have specific dedicated programs and staff that monitor and control them, but all of these diseases are monitored and have public health importance.

A reportable disease is one that state, federal or international public health authorities have identified as being critical to collect information on and report about in order to monitor disease trends or implement control measures. It is required by law that all physicians, hospitals, laboratories or anyone knowing of a suspected case must report all cases to the SCHD. There are categories of reportable diseases that signify severity and level of public health threat to the community. The categories are ordered as 1 through 5:

Category 1A- must be reported immediately (within 24 hours) over the phone to the SCHD Epidemiology Section.

Category 1B- Must be reported the next business day over the phone.

Category 2- Must be reported within 1 week of being suspected or diagnosed.

Category 3- Must be reported within 1 week of diagnosis but require special confidential reporting methods due to the nature of the disease (e.g. sexually transmitted infections and HIV/AIDS).

Category 4- Must be reported monthly and no later than 15 days following the end of the month.

Category 5- Must be reported monthly and no later than 30 days following the end of the month through the National Healthcare Safety Network.

The Epidemiology Section routinely monitors and investigates Categories 1 and 2 reportable diseases. Categories 3 and 4 diseases are managed by different sections of the Shelby County Health Department. Category 5 diseases, which are hospital acquired infections (HAI), are reported directly from hospitals to the State Department of Health's HAI division.

The Epidemiology Section investigates Category 1 and 2 diseases in order to ensure the public's health through proper identification and follow-up of those who are ill. The public health nurses within the section ensure that people who are ill receive the proper treatment for their disease. They investigate the contacts of the sick person in order to make sure that those who have come in contact with a sick person receive the appropriate vaccine, treatment, quarantine, and education necessary for the particular disease.

The Epidemiology Section also provides educational information to the public and other agencies on the nature, cause, spread, and control of both reportable and non-reportable infectious diseases as needed. Educational materials may include fact sheets and web updates about specific diseases; brochures or presentations regarding safe food handling, proper hand washing procedures and other disease prevention measures.

Foodborne and waterborne illnesses that are investigated by the SCHD Epidemiology Section include *Salmonella*, *E. coli* O157:H7, *Legionella*, *Listeria*, *Shigella*, *Yersinia*, *Vibrio* infections, *Cryptosporidiosis* and *Campylobacter* infections. Cases of these illnesses are usually identified through physicians' offices or other health care facilities, reports from individual institutions, reports from sick individuals, laboratory reports and other health departments. Reports of foodborne illness may involve restaurants, schools, churches, long-term care facilities or day care centers. During an investigation of a foodborne or waterborne illness, the Epidemiology section works closely with the Environmental Sanitation and Laboratory sections of the Health Department to ensure correction of any problems involving food handling procedures and sanitation. Together with these sections, the Epidemiology section monitors, investigates and responds to reports of foodborne and waterborne illness in the county.

Along with diseases, the Epidemiology section also monitors environmental health including carbon monoxide and lead poisoning. The temporal and geographic distributions of cases are analyzed to see if any commonalities are found. Educational information is distributed to physicians and the public to prevent future cases. During an investigation of an environmental issue, the Epidemiology section works closely with the Environmental and Laboratory sections of the Health Department and the Environmental Epidemiology section of the Tennessee Department of Health.

The following represents highlights from 2014 in Shelby County:

- The number of Group A strep, Group B strep, Haemophilus Influenza, Legionellosis, Pertussis, and Salmonella infections increased from 2013 to 2014.
 - The number of Pertussis infections increased 122% from 2013 to 2014.
- The number of cryptosporidium and VRE cases decreased from 2013 to 2014.
- There were no cases of mumps, measles, rubella, or diphtheria in 2014.
- HP2020 goals- program launched by the Department of Health and Human Services with goals to attain high-quality, longer lives free of preventable diseases, achieve health equity, eliminate disparities, create social and physical environments that promote good health for all, and to promote quality of life across all life stages.
 - The number of campylobacter infections in 2014 succeeded in reaching the HP2020 goal.
- Outbreaks
 - Ebola monitoring of travelers from West Africa.

Acknowledgments

The Epidemiology Section acknowledges and appreciates the support of our partners in finding cases of reportable diseases and their assistance with implementing appropriate control and response measures. The physicians, laboratorians, nurses, infection control practitioners, and other allied health professionals in Shelby County who report these cases to us are vital for alerting us about emerging outbreaks or changing disease patterns. Our public health partners in the Tennessee Department of Health and the other county and local health departments in the state, as well as our partners in neighboring states and federal agencies like the U.S. Centers for Disease Control and Prevention, help us understand disease patterns and trends affecting our region and the country as a whole.

Finally, we wish to acknowledge our internal partners within the Shelby County Health Department, particularly our partners in the Tuberculosis Elimination Program, the Infectious Diseases Section, and the Bureau of Environmental Health Services. These partners provide vital response efforts and control measures on a wide variety of health issues affecting the citizens of Shelby County and often assist us when the Epidemiology Section notices trends or emerging issues as we monitor data streams and case reports. Protecting the public health of our community is always a team effort requiring the collaboration of multiple disciplines and the expertise of many people.

Data Interpretation

The data used in this report are gathered through investigations of disease occurrences in Shelby County, which are reported to SCHD's Epidemiology section by health-care providers, laboratories, and other public health personnel. The data are managed and stored in the National Electronic Disease Surveillance System (NEDSS).

In the United States, requirements for reporting diseases are mandated by state laws or regulations, and the list of reportable diseases in each state differs. The Centers for Disease Control and Prevention (CDC), in collaboration with the Council of State and Territorial Epidemiologists published case definitions for public health surveillance in October of 1999 and update them regularly with new information. This document provided uniform criteria for reporting cases throughout the State and nation. The document is updated periodically based on emerging infections around the country.

The case definitions vary by disease. All disease reports are assigned one of the following statuses based on the disease clinical presentation and laboratory testing conducted. A tiered system with the following level is used:

- Suspect/possible case: indicative clinical picture without being confirmed or probable case.
- Probable case: in this tier, there is a clear clinical picture, or an epidemiological link to a confirmed case. An epidemiological link is a case that either has been exposed to a confirmed case, or has had the same exposure as a confirmed case, such as eating or drinking the same food or water, having the same sexual contacts, attending the same daycare, etc.
- Confirmed case: A confirmed case has the appropriate clinical characteristics and is verified by laboratory analysis.
- Not a case: This status is assigned when none of the above criteria is met.

Unless specifically stated, only symptomatic cases are to be reported. Asymptomatic infections are to be regarded as cases, however, if the infections have therapeutic or public health implications.

The case definitions are important to assist in properly investigating and classifying diseases. Moreover, the case definitions facilitate interpretation of data of these diseases.

Data presented in this report are limited to number and rate of all reported and confirmed cases. All reported cases include confirmed, probable, suspect and not a case reports.

The number of reports is simply the counts of reportable diseases received over the period of time. The incidence rate is the frequency of reports per every one hundred thousand population.

Tennessee disease data was provided by the Communicable and Environmental Diseases and Emergency Preparedness Program at the Tennessee Department of Health and the Tennessee Department of Health Communicable Disease Interactive Data website, located at <http://health.state.tn.us/Ceds/WebAim/>. Population estimates were gathered from US Census data. Disease descriptions were collected from the Tennessee Department of Health Reportable Disease website and the CDC website. Lead poisoning data was provided by the Shelby County Childhood Lead Poisoning Prevention Program.

LIST OF REPORTABLE DISEASES AND CONDITIONS IN TENNESSEE, 2014

Category 1A: Requires immediate telephonic notification (24 hours a day, 7 days a week), followed by a written report using the PH-1600 within 1 week.

- [002] Anthrax (*Bacillus anthracis*)^B
- [005] Botulism-Foodborne (*Clostridium botulinum*)^B
- [004] Botulism-Wound (*Clostridium botulinum*)
- [505] Disease Outbreaks (e.g., foodborne, waterborne, healthcare, etc.)
- [023] Hantavirus Disease
- [096] Measles-Imported
- [026] Measles-Indigenous
- [095] Meningococcal Disease (*Neisseria meningitidis*)
- [530] Middle East Respiratory Syndrome (MERS)
- [516] Novel Influenza A
- [032] Pertussis (Whooping Cough)
- [037] Rabies: Human
- [112] Ricin Poisoning^B
- [132] Severe Acute Respiratory Syndrome (SARS)
- [107] Smallpox^B
- [110] Staphylococcal Enterotoxin^B (SE^B) Pulmonary Poisoning^B
- [111] Viral Hemorrhagic Fever^B

Category 1B: Requires immediate telephonic notification (next business day), followed by a written report using the PH-1600 within 1 week.

- [006] Brucellosis (*Brucella* species)^B
- [502] *Burkholderia mallei* infection^B
- [010] Congenital Rubella Syndrome
- [011] Diphtheria (*Corynebacterium diphtheriae*)
- [123] Encephalitis, Arboviral: Eastern Equine
- [507] *Francisella* species infection (other than *F. tularensis*)^B
- [053] Group A Streptococcal Invasive Disease (*Streptococcus pyogenes*)
- [047] Group B Streptococcal Invasive Disease (*Streptococcus agalactiae*)
- [054] *Haemophilus influenzae* Invasive Disease
- [016] Hepatitis, Viral-Type A acute
- [513] Influenza-associated deaths, age <18 years
- [520] Influenza-associated deaths, pregnancy-associated
- [515] Melioidosis (*Burkholderia pseudomallei*)
- [102] Meningitis-Other Bacterial
- [031] Mumps
- [033] Plague (*Yersinia pestis*)^B
- [035] Poliomyelitis-Nonparalytic
- [034] Poliomyelitis-Paralytic
- [119] Prion disease-variant Creutzfeldt Jakob Disease
- [109] Q Fever (*Coxiella burnetii*)^B
- [040] Rubella
- [041] Salmonellosis: Typhoid Fever (*Salmonella typhi*)
- [131] *Staphylococcus aureus*: Vancomycin non-sensitive – all forms
- [075] Syphilis (*Treponema pallidum*): Congenital
- [519] Tuberculosis, confirmed and suspect cases of active disease (*Mycobacterium tuberculosis* complex)
- [113] Tularemia (*Francisella tularensis*)^B
- [108] Venezuelan Equine Encephalitis Virus Infection^B

Category 2: Requires written report using form PH-1600 within 1 week.

- [501] Babesiosis
- [003] Botulism-Infant (*Clostridium botulinum*)
- [121] California/LaCrosse Serogroup Virus Infection
- [007] Campylobacteriosis (including EIA or PCR positive stools)

[503] Chagas Disease
 [069] Chancroid
 [055] *Chlamydia trachomatis*-Genital
 [057] *Chlamydia trachomatis*-Other
 [009] Cholera (*Vibrio cholerae*)
 [001] Cryptosporidiosis (*Cryptosporidium* species)
 [106] Cyclosporiasis (*Cyclospora* species)
 [504] Dengue Fever
 [522] Ehrlichiosis/Anaplasmosis- Any
 [506] Enterobacteriaceae, Carbapenem-resistant
 [060] Gonorrhea-Genital (*Neisseria gonorrhoeae*)
 [064] Gonorrhea-Ophthalmic (*Neisseria gonorrhoeae*)
 [061] Gonorrhea-Oral (*Neisseria gonorrhoeae*)
 [062] Gonorrhea-Rectal (*Neisseria gonorrhoeae*)
 [133] Guillain-Barré syndrome
 [022] Hansen's Disease [Leprosy] (*Mycobacterium leprae*)
 [058] Hemolytic Uremic Syndrome (HUS)
 [480] Hepatitis, Viral-HbsAg positive infant
 [048] Hepatitis, Viral-HbsAg positive pregnant female
 [017] Hepatitis, Viral-Type B acute
 [018] Hepatitis, Viral-Type C acute
 [021] Legionellosis (*Legionella* species)
 [094] Listeriosis (*Listeria* species)
 [024] Lyme Disease (*Borrelia burgdorferi*)
 [025] Malaria (*Plasmodium* species)
 [521] Powassan virus infection
 [118] Prion disease-Creutzfeldt Jakob Disease
 [036] Psittacosis (*Chlamydia psittaci*)
 [105] Rabies: Animal
 [122] St. Louis Encephalitis Virus Infection
 [042] Salmonellosis: Other than S. Typhi (*Salmonella* species)
 [517] Shiga-toxin producing *Escherichia coli*
 (including Shiga-like toxin positive stools, *E. coli* O157 and *E. coli* non-O157)
 [043] Shigellosis (*Shigella* species)
 [039] Spotted Fever Rickettsiosis (*Rickettsia* species including Rocky Mountain Spotted Fever)
 [518] *Streptococcus pneumoniae* Invasive Disease (IPD)
 [074] Syphilis (*Treponema pallidum*): Cardiovascular
 [072] Syphilis (*Treponema pallidum*): Early Latent
 [073] Syphilis (*Treponema pallidum*): Late Latent
 [077] Syphilis (*Treponema pallidum*): Late Other
 [076] Syphilis (*Treponema pallidum*): Neurological
 [070] Syphilis (*Treponema pallidum*): Primary
 [071] Syphilis (*Treponema pallidum*): Secondary
 [078] Syphilis (*Treponema pallidum*): Unknown Latent
 [044] Tetanus (*Clostridium tetani*)
 [045] Toxic Shock Syndrome: Staphylococcal
 [097] Toxic Shock Syndrome: Streptococcal
 [046] Trichinosis
 [101] Vancomycin resistant enterococci (VRE) Invasive Disease
 [114] *Varicella* deaths
 [104] Vibriosis (*Vibrio* species)
 [125] West Nile virus Infections-Encephalitis
 [126] West Nile virus Infections-Fever
 [124] Western Equine Encephalitis Virus Infection
 [098] Yellow Fever
 [103] Yersiniosis (*Yersinia* species)

Category 3: Requires special confidential reporting to designated health department personnel within 1 week.

[500] Acquired Immunodeficiency Syndrome (AIDS)

[512] Human Immunodeficiency Virus (HIV)

[525] All CD4+ T-cell and HIV-1 Viral Load testing results from those laboratories performing these tests

Category 4: Laboratories and physicians are required to report all blood lead tests. Levels $\geq 5\mu\text{g/dl}$ should be reported within 1 week. Levels $<5\mu\text{g/dl}$ should be reported within 1 month.

[514] Lead Levels (blood)

Category 5: Events will be reported monthly (no later than 30 days following the end of the month) via the National Healthcare Safety Network (NHSN - see <http://health.state.tn.us/ceds/hai/index.htm> for more details); *Clostridium difficile* infections (Davidson County residents only) will also be reported monthly to the Emerging Infections Program (EIP).

[523] Healthcare Associated Infections, Catheter Associated Urinary Tract Infections

[508] Healthcare Associated Infections, Central Line Associated Bloodstream Infections

[509] Healthcare Associated Infections, *Clostridium difficile*

[524] Healthcare Associated Infections, Dialysis Events

[529] Healthcare Associated Infections, Healthcare Personnel Influenza Vaccination

[510] Healthcare Associated Infections, Methicillin resistant *Staphylococcus aureus* positive blood cultures

[511] Healthcare Associated Infections, Surgical Site Infections

[527] Neonatal Abstinence Syndrome

^B Possible Bioterrorism Indicators





Table 1 Shelby County and Tennessee Population Estimates, 2000-2014

Year	Shelby County	Tennessee
2000	898,279	5,703,243
2001	899,543	5,755,443
2002	902,605	5,803,306
2003	906,280	5,856,522
2004	908,922	5,916,762
2005	912,418	5,995,748
2006	919,179	6,089,453
2007	919,964	6,172,862
2008	919,137	6,240,456
2009	920,232	6,296,254
2010	928,786	6,356,628
2011	933,756	6,398,389
2012	939,942	6,455,177
2013	939,365	6,497,269
2014	938,803	6,549,352

Source: <http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>

Table 2 Shelby County Population by Age Group, Gender, Race, 2014

Shelby County Population by Age Group, Gender, Race, 2014			
Age Group	0 to 4	68,019	
	5 to 9	66,197	
	10 to 14	65,066	
	15 to 19	64,932	
	20 to 24	71,420	
	25 to 29	68,920	
	30 to 34	64,892	
	35 to 39	59,222	
	40 to 44	61,468	
	45 to 49	59,574	
	50 to 54	64,450	
	55 to 59	62,446	
	60 to 64	53,150	
	65 to 69	39,209	
	70 to 74	25,348	
	75 to 79	17,639	
	80 to 84	12,939	
	85+	13,912	
Gender	Female	Male	
	491,679	447,124	
Race	White	Black	Other
	396,905	500,383	41,515

Source: <http://www.census.gov/popest/data/counties/asrh/2014/CC-EST2014-ALLDATA.html>

Table 3 Confirmed Cases of Reportable Diseases in Shelby County, 2004-2014

Condition	Year											Total
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Campylobacteriosis	36	26	65	60	57	56	51	57	76	61	56	601
Cryptosporidiosis	4	8	6	2	10	8	2	2	1	7	3	53
Group A Streptococcal Invasive Disease (Streptococcus pyogenes)	18	21	25	26	29	32	41	30	28	26	39	315
Group B Streptococcal Invasive Disease (Streptococcus agalactiae)	66	104	115	68	71	84	71	76	59	68	79	861
Haemophilus Influenza Invasive Disease	7	14	13	15	20	26	14	18	16	17	19	179
Hepatitis, Viral-Type A acute	8	5	8	7	4	3	1	1	4	3	1	45
Hepatitis, Viral-Type B acute	39	41	24	31	19	38	31	18	18	22	21	302
Hepatitis, Viral-Type C acute	0	1	0	0	0	2	0	0	0	0	0	3
Legionellosis	1	0	4	5	6	10	17	23	12	32	56	166
Listeriosis	0	2	4	1	2	3	3	0	1	1	1	18
Lyme Disease	2	1	1	6	1	2	2	0	0	0	0	15
Malaria	3	1	2	2	1	3	2	4	1	3	3	25
Neisseria Meningitis	3	4	2	3	4	1	3	0	2	0	3	25
Mumps	0	0	1	0	0	1	0	0	0	0	0	2
Pertussis	3	14	6	9	12	13	29	3	14	18	40	161
Rocky Mountain Spotted Fever	0	0	1	1	1	0	0	0	0	0	0	3
Salmonellosis: Other than S. Typhi	105	170	143	134	146	137	214	194	178	126	155	1702
Shiga toxin-producing Escherichia coli (STEC)	0	0	6	13	2	3	8	5	6	6	8	57
Shigellosis	29	9	127	44	100	55	154	132	97	81	80	908
Streptococcus Pneumoniae Invasive Disease (IPD)	0	0	0	0	0	0	89	86	115	97	92	479
Vancomycin resistant enterococci (VRE) Invasive Disease	86	122	210	121	93	72	58	29	23	39	25	878
Vibriosis	0	0	0	0	1	1	1	1	1	2	1	8
West Nile virus neuroinvasive disease*	11	10	11	3	8	1	2	9	8	7	7	77
West Nile virus non-neuroinvasive disease*	1	3	3	2	2	4	0	2	7	2	3	29
Yersiniosis	13	7	9	1	4	2	7	4	4	1	3	55
Total	435	563	786	554	593	557	800	694	671	619	695	

*Includes confirmed and probable cases per CDC definition

Table 4 Confirmed/Probable Cases of Reportable Diseases in Shelby County by Age Group, 2014

	Age Group												Total
	<1	1-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Unk	
Campylobacteriosis	0	1	3	1	6	5	7	6	9	11	7	0	56
Cryptosporidiosis	0	0	0	1	0	2	0	1	0	0	0	0	4
Group A Streptococcal Invasive Disease (Streptococcus pyogenes)	1	1	1	2	0	1	4	2	10	7	10	0	39
Group B Streptococcal Invasive Disease (Streptococcus agalactiae)	12	0	0	0	1	2	1	9	13	8	32	1	79
Haemophilus Influenza Invasive Disease	1	2	1	0	0	1	1	0	2	3	8	0	19
Hepatitis, Viral-Type A acute	0	0	0	0	1	0	1	0	0	0	0	0	2
Hepatitis, Viral-Type B acute	0	0	0	0	0	1	3	7	5	4	1	0	21
Hepatitis, Viral-Type C acute	0	0	0	0	0	0	0	0	0	0	0	0	0
Legionellosis	0	0	0	0	0	2	5	10	14	12	13	0	56
Listeriosis	0	0	0	0	0	0	0	0	0	0	1	0	1
Malaria	0	1	0	0	0	0	2	0	0	0	0	0	3
Meningitis Neisseria	1	0	0	0	0	0	0	0	0	1	1	0	3
Pertussis	27	5	2	6	4	0	0	4	4	3	4	0	59
Shiga toxin-producing Escherichia coli (STEC)	0	2	1	1	0	1	0	0	0	1	2	0	8
Salmonellosis	26	31	13	8	1	10	9	7	10	18	22	0	155
Shigellosis	3	35	10	2	8	1	8	7	3	0	3	0	80
Streptococcus Pneumoniae Invasive Disease (IPD)	5	6	1	2	5	1	7	9	13	17	26	0	92
Vancomycin resistant enterococci (VRE) Invasive Disease	2	0	0	0	0	1	0	3	4	2	13	0	25
Vibriosis (non-cholera Vibrio species infections)	0	1	0	0	0	1	0	1	1	1	3	0	8
West Nile Virus, Neuro Invasive*	0	0	0	0	1	1	0	0	1	0	4	0	7
West Nile Virus, non-Neuro Invasive*	0	0	0	0	0	0	0	1	0	2	0	0	3
Yersiniosis	1	1	0	0	0	0	0	0	0	0	1	0	3
Total	79	86	32	23	27	30	48	67	89	90	151	1	723

*Includes confirmed and probable cases per CDC definition

Vaccine-preventable diseases are infectious diseases for which effective vaccines exist. Examples of vaccine preventable diseases include: Hepatitis B, Tetanus, Pertussis, Diphtheria, Polio, Measles, Mumps, Rubella, Rotavirus, and Meningitis. A complete list of vaccine-preventable diseases is published on the Centers for Disease Control and Prevention website (<http://www.cdc.gov/vaccines/vpd-vac/vpd-list.htm>). The Advisory Committee on Immunization Practices (ACIP) publishes immunization schedules for persons from birth through 18 years of age.

It is important for parents to adhere to immunization recommendations for their children from birth to adulthood. This ensures that a large proportion of individuals are immune or less susceptible if they come in contact with an infectious individual. Vaccines have proven effective in preventing epidemics and outbreaks of diseases by reducing unnecessary illnesses, disabilities, and deaths among the population. Within the last two decades, the decline in the number of children being vaccinated has made the general population more susceptible to diseases such as Measles and Pertussis, which previously had been eliminated (Measles) in the United States except for imported cases.

Fortunately, most parents do vaccinate their children, and for many of these diseases, it is rare that any actual cases are diagnosed and reported to the Shelby County Health Department. In this section we will present information about Mumps and Pertussis, the most common vaccine preventable disease. Information about Meningitis, Hepatitis B and Influenza, all of which are vaccine preventable diseases, will be discussed in other sections of the annual report.

In 2014, there were 59 confirmed and probable cases of Pertussis reported in Shelby County (Table 4) with an incidence rate of 4.26 confirmed cases per 100,000 persons. There were two probable cases of mumps reported in 2014. There were no confirmed or probable cases of Measles, Rubella or Diphtheria reported in 2014 and there have been no reported cases for the past 10 years.

MUMPS

Summary of the Disease

Mumps is a viral infection that is caused by the mumps virus, affecting the parotid glands (salivary glands). Up to half of people with mumps have very mild or no symptoms. Common symptoms include fever, headache, muscle aches, tiredness, and loss of appetite. There is no specific treatment; however it can be prevented with the MMWR vaccine. Before the vaccine, mumps was a common illness in infants and children. Now, however, it has become a rare disease in the United States.

It is transmitted from person to person by droplets of saliva or mucus from the mouth, nose, or throat of an infected person who coughs, sneezes, or talks. Symptomatic aseptic meningitis can occur in up to 10% of Mumps cases. Cases peak during the winter and spring seasons. The incubation period ranges from 12-25, days with an average of about 16-18 days. *Highlights*

A total of two confirmed Mumps cases were reported in Shelby County from 2004 to 2014, with one case in 2006 and one case in 2009. There were two probable Mumps cases reported in 2014.

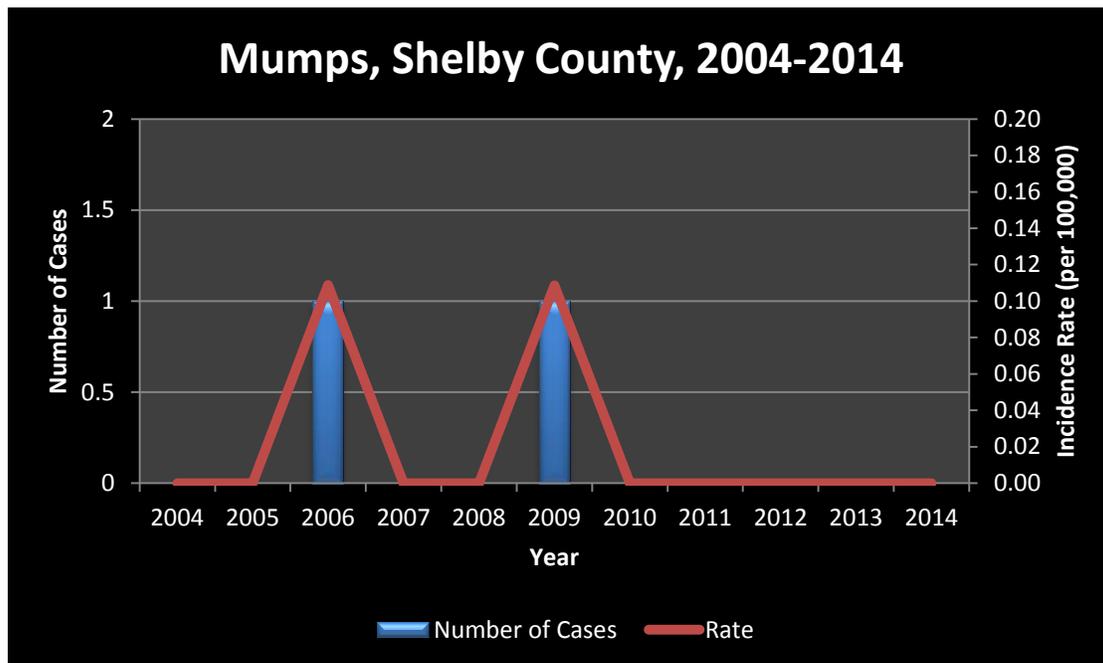


Figure 1 Number of Confirmed Cases and Incidence Rate of Mumps, Shelby County, TN, 2004-2014

PERTUSSIS

Summary of the Disease

Pertussis, also known as whooping cough, is a respiratory disease caused by a type of bacteria called *Bordetella pertussis*. It is highly contagious and can cause serious illness, especially in infants who are young and not fully vaccinated. The vaccine is recommended for children beginning at 2 months of age, teens, and adults. The vaccine effectiveness decreases over time. Teens and adults should be revaccinated, even if fully vaccinated as a child. It is one of the most common vaccine-preventable diseases that occur in the United States.

Commonly known as “Whooping Cough”, Pertussis starts similar to a common cold, with runny nose or congestion, sneezing, and sometimes mild cough or fever. After 1–2 weeks, severe coughing can begin. Unlike the common cold, Pertussis can become a series of coughing fits that continues for weeks. Pertussis can cause violent and rapid coughing, over and over, until the air is gone from the lungs, and you are forced to inhale with a loud "whooping" sound. In infants, the cough can be minimal or not there at all. They may instead have life-threatening pauses in breathing (apnea).

The incubation period has a range of 5-21 days, with an average of 7-10 days. Pertussis is spread from person to person while in close contact with others who breathe in the airborne pertussis bacteria. Many infants who get Pertussis are infected by parents, older siblings, or other caregivers who might not even know they have the disease. In 30-40% of infant infections, the infant is infected by the mother. Pertussis is more severe in infants less than one year old. Infants typically have pneumonia (lung infection) and slowed or stopped breathing.

The CDC defines a confirmed pertussis case as a cough illness lasting at least 2 weeks with one of the following: paroxysm (severe rapid cough stage) of coughing, inspiratory “whoop” or post-tussive vomiting, and without other apparent cause (as reported by a healthcare professional). In addition, a laboratory criterion for diagnosis is the isolation of *B. pertussis* from a clinical specimen, or Positive polymerase chain (PCR) reaction assay for *B. pertussis*.

Table 5 Incidence of Pertussis, Shelby County, TN, 2014

Number of Confirmed Cases for 2014	40
2014 incidence rate per 100,000	4.26
Age (yrs)	
Mean	1.1 years
Median	3.5 months
Min. - Max.	19 days - 17 years

Highlights

In 2014, there were 40 confirmed cases of Pertussis reported in Shelby County (Table 5) and an incidence rate of 4.26 confirmed cases per 100,000 persons. This is a substantial increase from previous incidence rates of 1.49 in 2012 and 1.92 in 2013. The age range of cases was 19 days to 17 years. Persons most affected were infants, with a median age of 3.5 months.

Figure 2 depicts the number of confirmed cases and incidence rate of Pertussis from 2004 to 2014 in Shelby County. A total of 161 cases were reported over this time period and incidence has fluctuated. In 2014, there were two times as many cases as there were in each of the past three years. From 2013 to 2014, the number of confirmed pertussis cases increased by 122%.

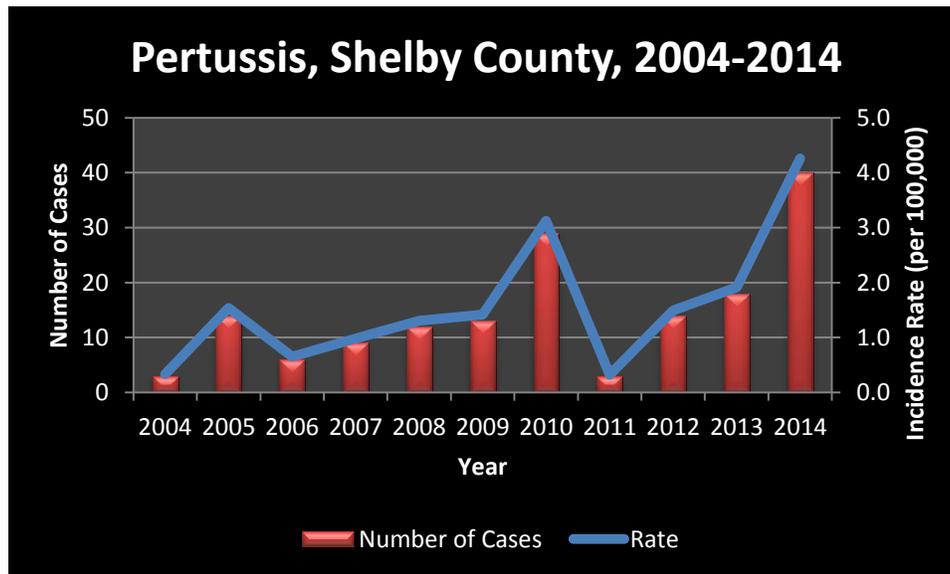


Figure 2 Number of Cases and Incidence Rate of Pertussis, Shelby County, TN, 2004-2014

Figure 3 shows the five-year average incidence rate of confirmed Pertussis cases for 2004-2008 and 2009-2013 in Shelby County and Tennessee, as well as the single-year 2014 incidence rate for Shelby County. The five-year average incidence rate increased in Shelby County (from 0.96 per 100,000 in 2004-2008 to 1.65 per 100,000 in 2009-2013) and at the state level (from 2.52 per 100,000 in 2004-2008 to 3.45 per 100,000 in 2009-2013). However, for both data points, the rate is less in Shelby County than it is statewide.

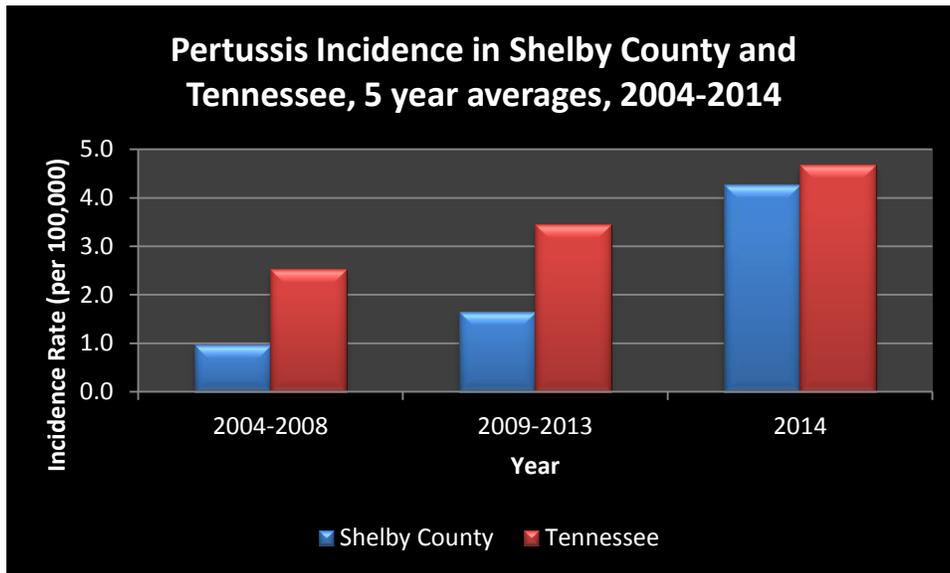


Figure 3 Pertussis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

Figure 4 shows the percentage of confirmed and probable Pertussis cases by age group in 2014. Based on the data, 46% occurred among children less than 1 year old. 19% of cases were diagnosed in adults > 45 years old. The best way for families to protect infants and small children from Pertussis is to ensure that the adults around the children are current on their vaccinations, particularly the Diphtheria, Tetanus and Pertussis (DTaP) vaccine.

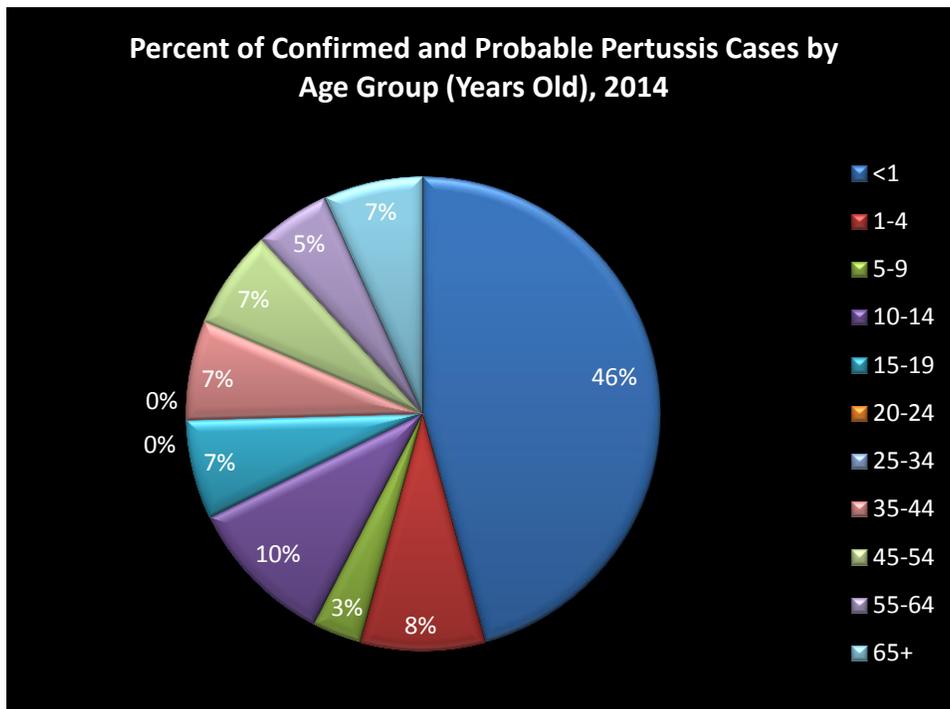
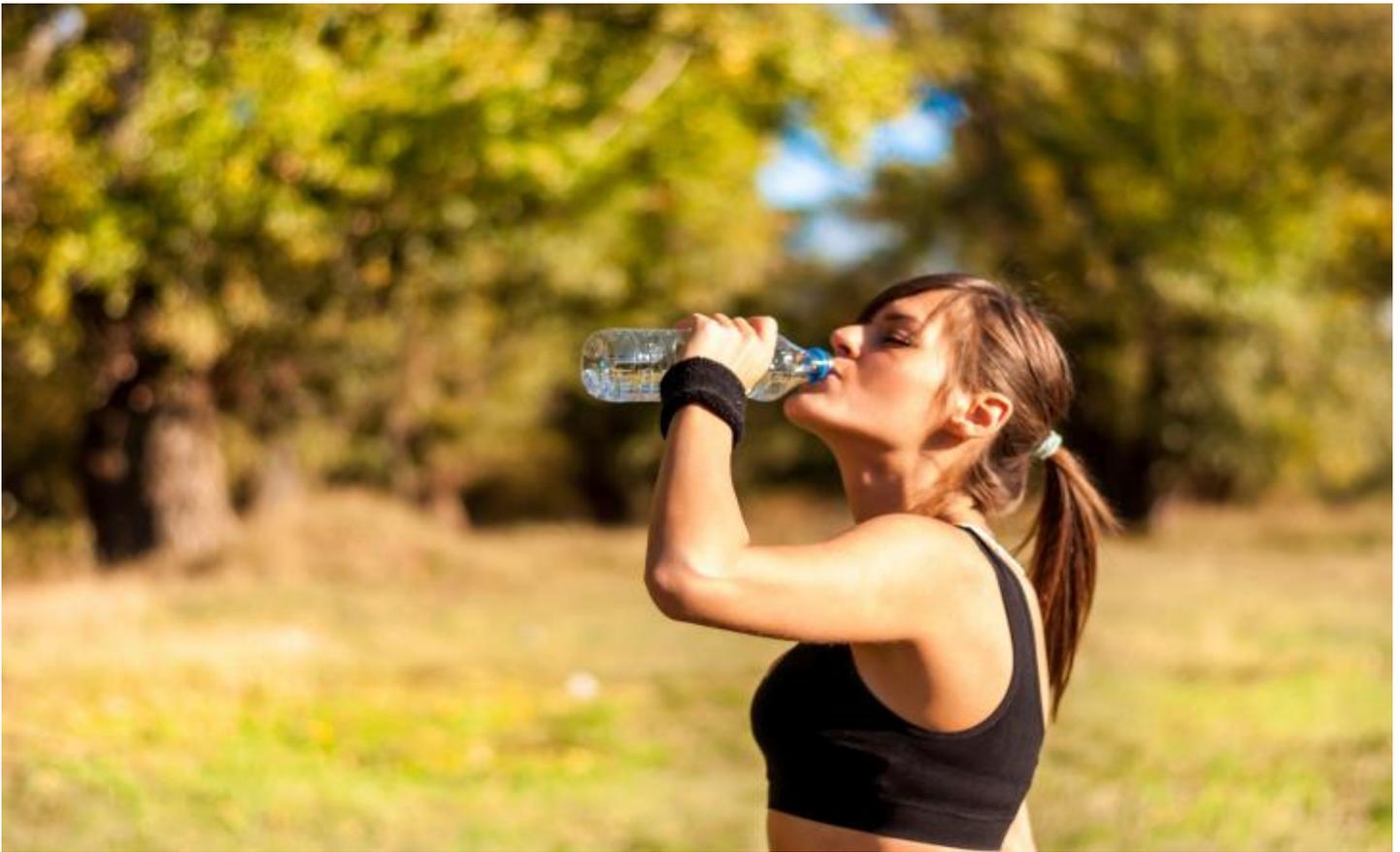


Figure 4 Percent of Pertussis Cases by Age Group, Shelby County, TN, 2014



HEPATITIS 5|FIVE

The Hepatitis diseases reported in Shelby County in 2014 include the following: Hepatitis A acute, Hepatitis B acute and chronic, Hepatitis C acute and chronic and Hepatitis E acute. Hepatitis B chronic infection and Hepatitis C chronic infection are not reportable conditions so they are not included in this report. In 2014, there were 22 confirmed cases of acute Hepatitis diseases reported in Shelby County (table 6). Confirmed hepatitis diseases accounted for 3% of all reportable diseases in Shelby County for 2014, with Hepatitis B acute contributing the greatest numbers of confirmed cases.

Table 6 Incidence of Hepatitis in Shelby County, 2014

Reportable Disease	Case Status				
	Confirmed case	Not a case	Probable	Suspect	Total
Hepatitis A, acute	1	33	1	1	36
Hepatitis B, acute	21	0	0	2	23
Hepatitis C, acute	0	0	0	0	0
Hepatitis E, acute	0	0	0	0	0
Total	22	33	1	3	59

Frequency Missing = 1

HEPATITIS

Summary of the Disease

Hepatitis A is a contagious liver disease that results from infection with the Hepatitis A virus. It ranges in severity from a mild illness to a severe illness that can last several months. It is usually spread when a person unintentionally ingests fecal-contaminated objects, food, or drinks. It most often occurs in countries where personal hygiene or sanitary conditions are poor. According to the CDC, Hepatitis A still occurs in the US, though there has been a 90% decrease in Hepatitis A cases over the past 20 years. This is possible due to the introduction of the Hepatitis A vaccine. It is recommended for all children, some international travelers, and people with certain risk factors. It is given as two doses, 6 months apart. Both shots are needed for long-term protection.

Anyone can get Hepatitis A, but some people are at greater risk, including travelers to Hepatitis A endemic countries, people who engage in sexual contact with someone who has Hepatitis A, men who have sex with men, recreational drug users and house members of a person with Hepatitis A. Although not everyone develops symptoms, common symptoms include fever, fatigue, vomiting, loss of appetite, nausea and abdominal pain. Symptoms are more likely to occur in adults and usually last less than 2 months. The incubation period ranges from 15 to 50 days, with an average of 28 days.

Highlights

In 2014 in Shelby County, there was only 1 confirmed case of Hepatitis A. This case was most likely imported as they reported having travelled outside of the US in the 2 to 6 weeks prior to symptom onset.

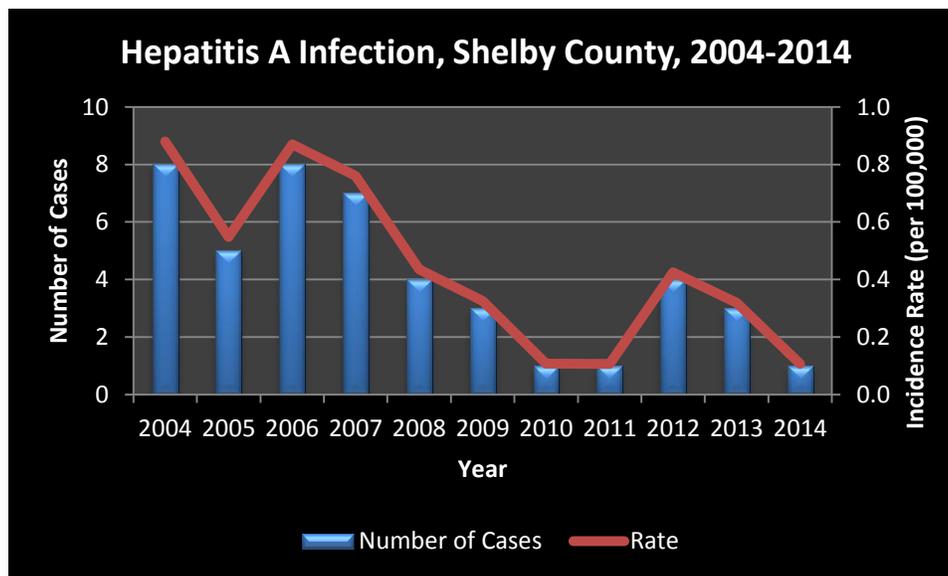


Figure 5 Number of Cases and Incidence Rate of Hepatitis A Infection, Shelby County, TN, 2004-2014

HEPATITIS B

Summary of the Disease

Hepatitis B is a contagious liver disease that results from infection with the Hepatitis B virus. When first infected, a person can develop an “acute” infection, which refers to the first 6 months after someone is exposed. Acute Hepatitis B can range in severity from a very mild illness with no or few symptoms to a serious condition requiring hospitalization. Some people fight off the infection and clear the virus while others develop “chronic” Hepatitis B, which is a lifelong infection. Fortunately, according to the CDC, the number of Hepatitis B acute cases has decreased more than 80% in the United States over the past 20 years, possibly due to widespread vaccination of children.

Hepatitis B is usually spread through blood, semen, or other body fluids. This can occur through sexual contact, sharing needles, or from an infected mother to her baby at birth. It is most commonly spread through sexual contact and is much more infectious than HIV, approximately 50-100 times more. The incubation period for acute Hepatitis B ranges from 45 to 160 days, with an average of 90 days. Not everyone exhibits symptoms with acute Hepatitis B, but most adults have symptoms that appear within 3 months of first exposure. Symptoms can include fever, fatigue, loss of appetite, nausea, abdominal pain and vomiting.

Fortunately, Hepatitis B can be prevented through vaccination. All infants should be vaccinated at birth. Other people who should be vaccinated include men who have sex with men, injection drug users, travelers to countries where Hepatitis B is endemic, people with HIV infection and anyone else who wants protection. The vaccination includes 3 intramuscular injections over 6 months.

Table 7 Incidence of Hepatitis B acute infection, Shelby County, TN, 2014

Number of Confirmed Cases for 2014	21
2014 incidence rate per 100,000	2.24
Age (yrs)	
Mean	44.6 years
Median	43 years
Min. - Max.	22 years- 66 years

Highlights

Only Hepatitis B acute infection is reportable in Tennessee. Hepatitis B acute infection incidence rates have decreased by 46% in Shelby County from 2004 to 2014 (figure 6).

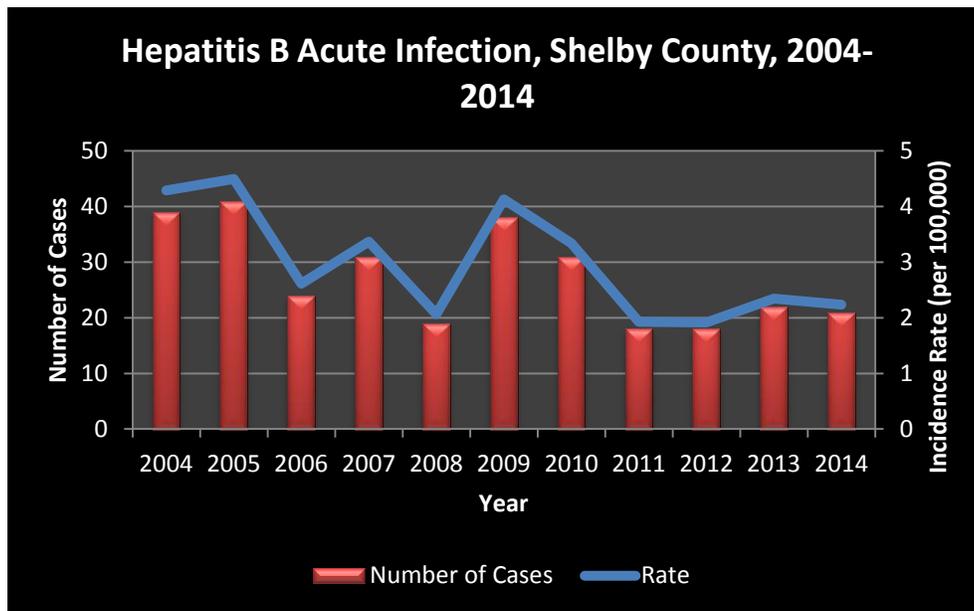


Figure 6 Number of Cases and Incidence Rate of Hepatitis B Acute Infection, Shelby County, TN, 2004-2014

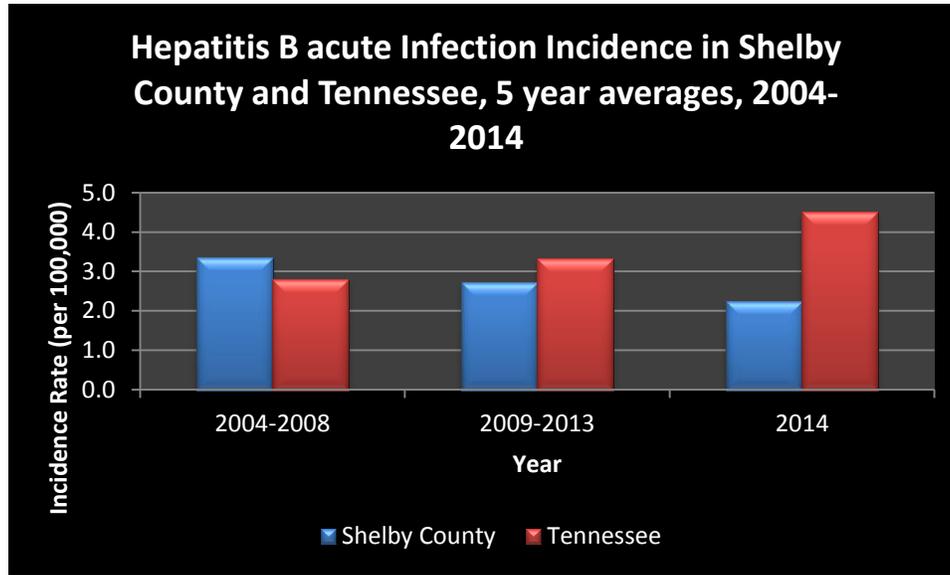


Figure 7 Hepatitis B acute Infection incidence in Shelby County and Tennessee, 5 year averages, 2004-2014

Since 2004, acute hepatitis B infections have been decreasing in Shelby County but increasing across the state of Tennessee (figure 7). The Healthy People 2020 goal is to reduce new Hepatitis B cases among persons aged 2 to 18 years to 0.0 cases per 100,000 persons in that age range. Shelby County is on track to meet that goal.

HEPATITIS C

Summary of the Disease

Hepatitis C is a contagious liver disease that results from infection with the Hepatitis C virus. It is primarily spread through contact with the blood of an infected person through sharing needles to inject drugs, needle stick injuries in health care settings, being born to a mother with Hepatitis C or having sexual contact with someone infected with Hepatitis C. Acute Hepatitis C infection is a short-term illness that occurs within the first 6 months after someone is exposed. For most people, infection with Hepatitis C leads to chronic infection.

Around 70%- 80% of people with acute Hepatitis C do not show symptoms. Common symptoms include fever, fatigue, nausea, vomiting, abdominal pain and dark urine. The incubation period usually occurs 6-7 weeks after exposure but can range from 2 weeks to 6 months. Acute Hepatitis C can be treated though infections can clear on their own without treatment in about 25% of people. There is no vaccine to prevent Hepatitis C.

Highlights

In 2014, there were no confirmed cases of Hepatitis C acute infections in Shelby County. The 2020 Healthy People goal is to reduce new Hepatitis C infections to 0.25 new cases per 100,000. In 2014, Shelby County succeeded in reaching that goal with no new infections.

BACTERIAL INVASIVE DISEASES 6|SIX

The bacterial invasive diseases reported in Shelby County in 2014 include the following: *Haemophilus Influenza* (Invasive Disease), Meningococcal (*Neisseria meningitides*) Infection, Streptococcal Disease (Invasive Group A), Streptococcal Disease (Invasive Group B) and *Strep pneumoniae* Drug-Resistant (Invasive Disease). In 2014, there were 233 confirmed cases of bacterial invasive diseases reported in Shelby County (table 8). Confirmed bacterial invasive diseases accounted for 32% of all reportable diseases in Shelby County for 2014, with Group B strep and *Streptococcus pneumoniae* infections contributing the greatest numbers of cases.

Table 8 Incidence of Bacterial Invasive Diseases in Shelby County, 2014

Reportable Disease	Case Status			
	Confirmed case	Not a case	Suspect	Total
Group A Streptococcus	39	4	1	44
Group B Streptococcus	80	22	0	102
Haemophilus Influenza	19	1	0	20
Meningococcal (<i>Neisseria meningitidis</i>) Infection	3	3	0	6
Streptococcus Pneumoniae Invasive Disease (IPD)	92	5	0	97
Total	233	35	1	269

Frequency Missing = 1

HAEMOPHILUS INFLUENZA (INVASIVE DISEASE)

Summary of Disease

Haemophilus influenzae is a severe bacterial infection that primarily affects infants. This infection is caused by six serotypes of *Haemophilus influenzae* with type b (Hib) being the most significant for public health purposes. The invasive disease can cause various clinical syndromes such as meningitis, bacteremia or sepsis, epiglottitis, pneumonia, septic arthritis, osteomyelitis, empyema, and abscesses. The non-invasive Hib can produce mucosal infections such as bronchitis, sinusitis, and otitis. Symptom onset is often abrupt, and may include fever, headache, lethargy, anorexia, vomiting, nausea, and irritability. This infection is transmitted through direct contact with respiratory droplets from an infected person however the incubation period is unknown. Children less than 4 years old who have had prolonged household, daycare, or other close contact with an infected person are at increased risk of contracting the disease. The risk of secondary disease among household contacts is age dependent, with the youngest children being at greatest risk.

Table 9 Incidence of Haemophilus Influenza in Shelby County, 2014

Number of Confirmed Cases for 2014	19
2014 incidence rate per 100,000	2.02
Age (yrs)	
Mean	51 years
Median	57 years
Min. - Max.	4 days-94 years

Highlights

In 2014, there were 19 confirmed cases of *Haemophilus influenzae* in Shelby County (table 9). This is a slight increase from the previous year’s total of 17 cases (figure 8). The number of cases in Shelby County has mostly exhibited an upwards trend since 2004.

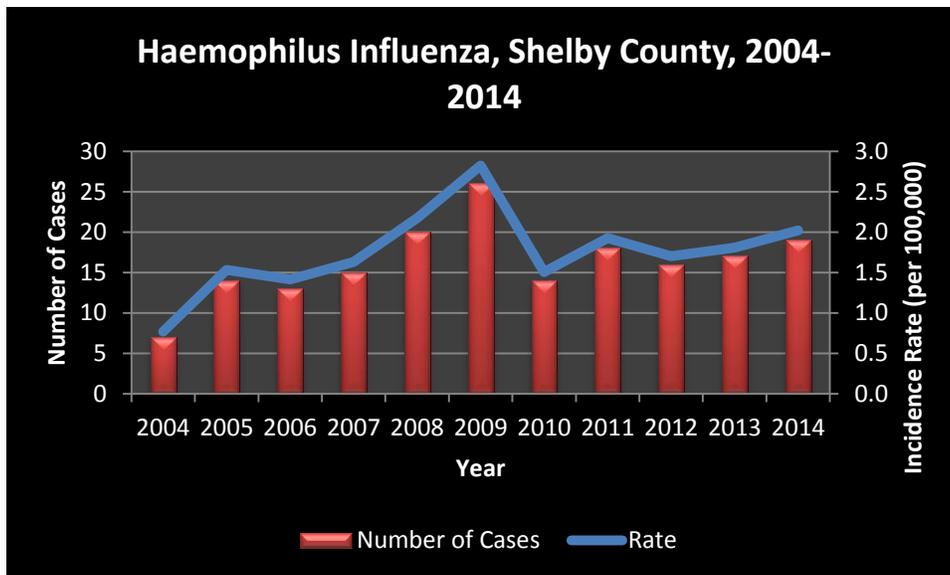


Figure 8 Number of Cases and Incidence Rate of Haemophilus Influenza, Shelby County, TN, 2004-2014

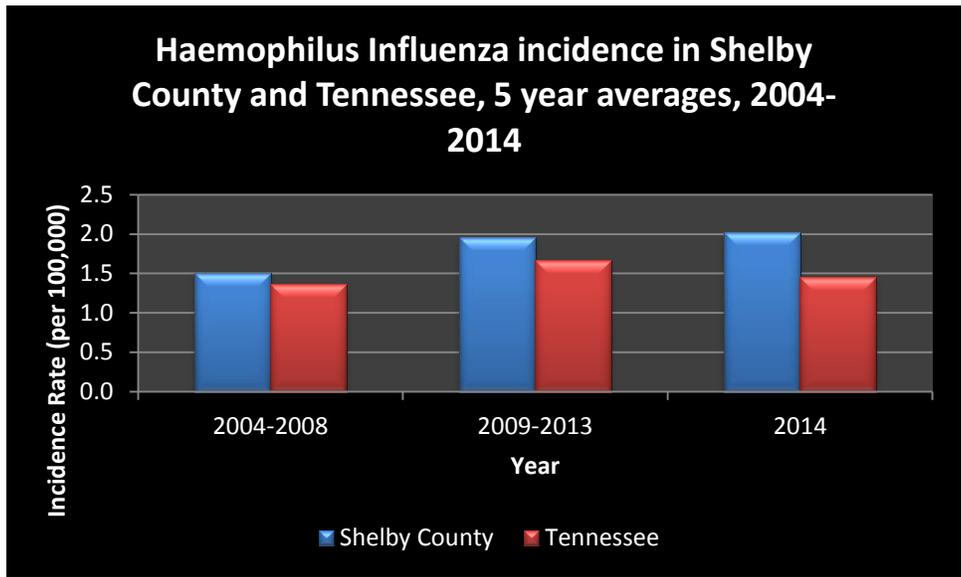


Figure 9 Haemophilus Influenza Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

Since 2004, *Haemophilus influenzae* cases have been slowly increasing in Shelby County while the number of cases in Tennessee has been decreasing since 2009-2013.

MENINGOCOCCAL (*NEISSERIA MENINGITIDIS*) INFECTION

Summary of Disease

This infection is characterized by sudden onset of fever, intense headache, nausea, and often vomiting, stiff neck and frequently, a petechial rash. Delirium and coma are often associated with *Neisseria meningitidis*, otherwise known as bacterial meningitis. Bacterial meningitis has a high case fatality rate (50% or higher) when left untreated. With early diagnosis and treatment, the case fatality rate can be lowered to 5-15%. The infection is transmitted by direct contact with an infected person, including respiratory droplets from the nose and throat. The incubation period ranges from 1 to 10 days, with an average of less than 4 days. Meningococci usually disappear from the nasopharynx within 24 hours after treatment with antibiotics. Approximately 25% of people in the general population are colonized with the bacteria, without causing illness or infection. There were three confirmed cases of *Neisseria meningitidis* in Shelby County in 2014 (figure 10).

Number of Confirmed Cases for 2014	3
2014 incidence rate per 100,000	0.32
Age (yrs)	
Mean	44.78 years
Median	59 years
Min. - Max.	4 months- 75 years

Highlights

Since 2004, the number of meningococcal infections per year in Shelby County has remained below 5 (figure 10).

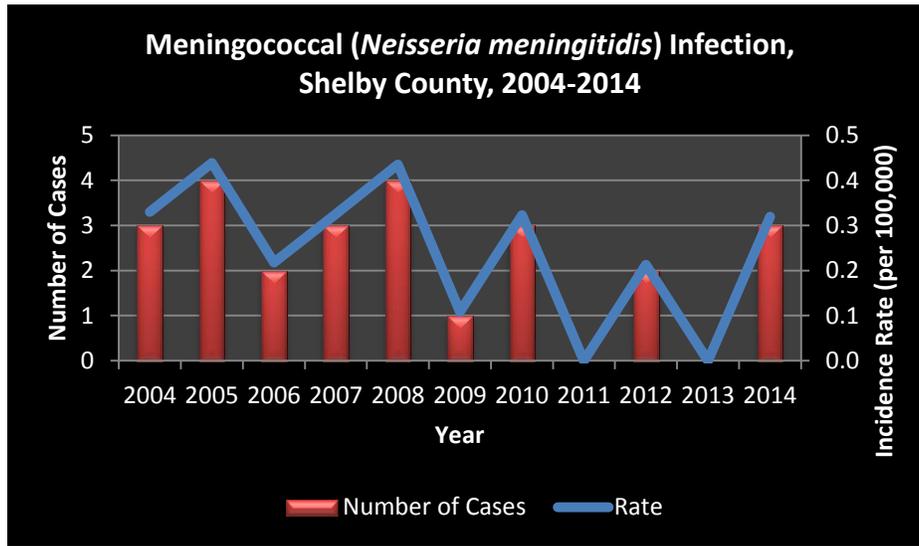


Figure 10 Number of Cases and Incidence Rate of *Neisseria meningitidis*, Shelby County, TN, 2004-2014

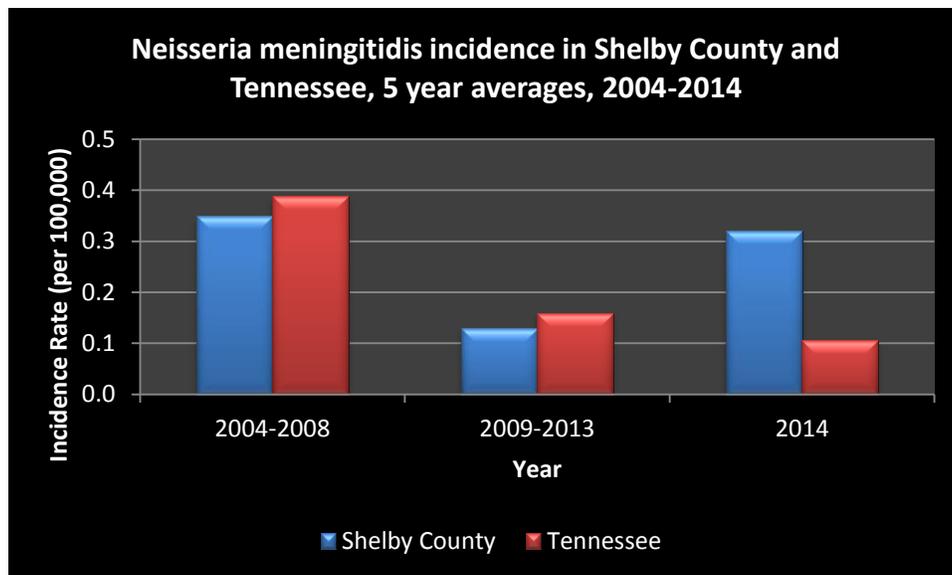


Figure 11 *Neisseria meningitidis* Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

Since 2004, cases of *Neisseria meningitidis* have been decreasing in Tennessee. The number of new cases decreased from 2004 through 2013 in Shelby County and then increased in 2014.

STREPTOCOCCAL DISEASE (INVASIVE GROUP A)

Summary of Disease

Group A *Streptococcus* infections commonly cause non-invasive illnesses such as strep throat or impetigo. Invasive group A *Streptococcus* manifests in several clinical symptoms such as pneumonia, bacterial cutaneous infection, meningitis, peritonitis, osteomyelitis, septic arthritis, postpartum sepsis, neonatal sepsis and nonfocal bacteremia. Two of the most severe, but least common, forms of invasive group A *Streptococcus* diseases are called necrotizing fasciitis (NF) and streptococcal toxic shock syndrome (STSS). According to the CDC, 10%-15% of those with invasive group A streptococci die from the infection, and approximately 25% of patients with NF and more than 35% with STSS die from the infection. Depending on the type of infection, the incubation period ranges from 2 to 10 days.

Group A *Streptococcus* is spread from person to person by contact with infectious secretions. The bacteria can be carried asymptomatically in the pharyngeal passage by all age groups, though it is commonly observed in children. Those who are nasal carriers of the infection are highly likely to spread the infections to others through direct contacts. Antibiotics can limit the spread of infection. If left untreated, the infection is communicable for 10 to 21 days. The elderly, immunosuppressed persons, those with chronic cardiac or respiratory disease, diabetics and people with skin lesions are at high risk of contracting invasive group A *Streptococcus*. African Americans and American Indians are also high risk groups for invasive group A *Streptococcus*. In 2014, there were 39 confirmed cases of Invasive Group A strep in Shelby County (table 10).

Table 10 Incidence of Invasive Group A Streptococcal Infection in Shelby County, 2014

Number of Confirmed Cases for 2014	
	39
2014 incidence rate per 100,000	
	4.15
Age (yrs)	
Mean	49.3 years
Median	53 years
Min. - Max.	8 months- 94 years

Highlights

The number of Group A strep infections have been steadily increasing since 2004 in Shelby County (figure 12).

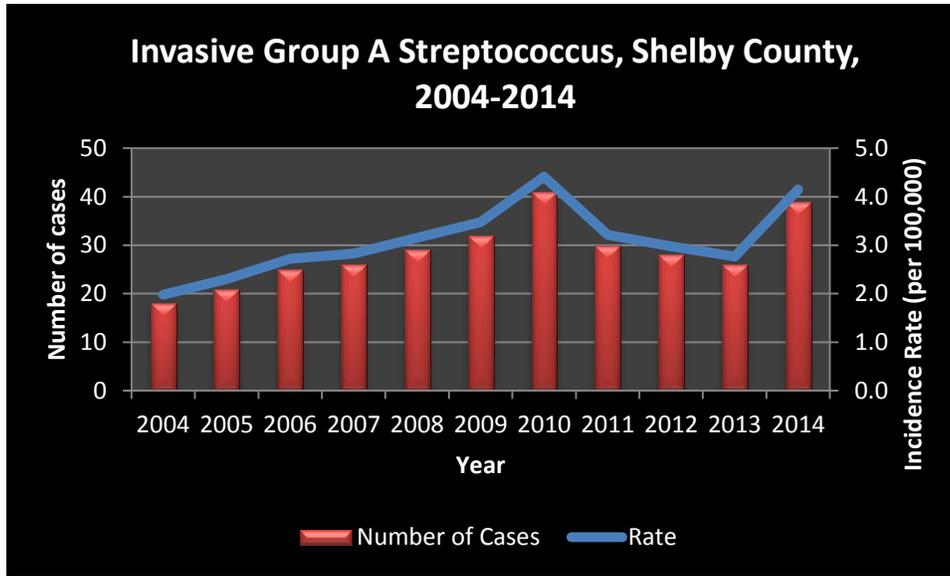


Figure 12 Number of Cases and Incidence Rate of Invasive Group A Strep, Shelby County, TN, 2004-2014

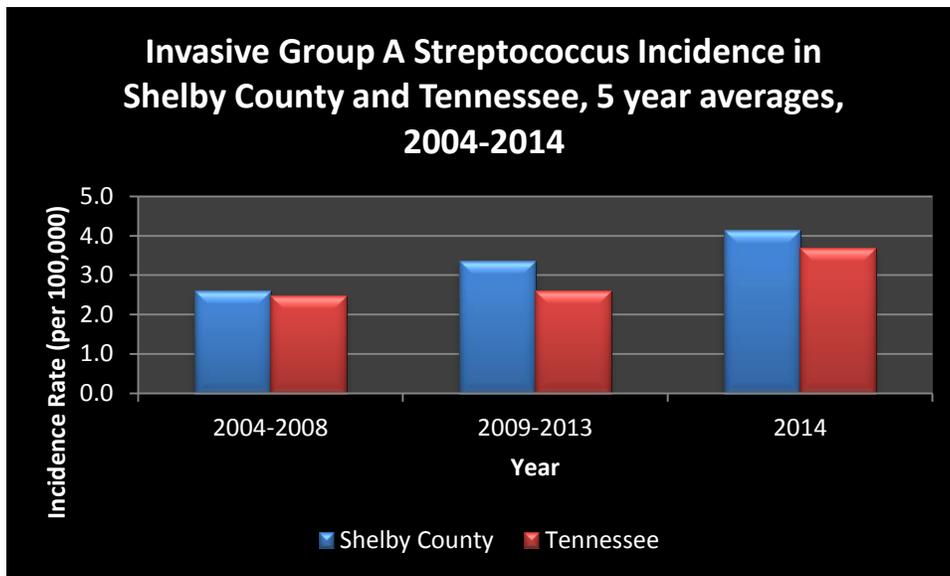


Figure 13 Invasive Group A Strep Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

Since 2004, the number of Group A strep infections has increased in Shelby County and Tennessee (figure 13).

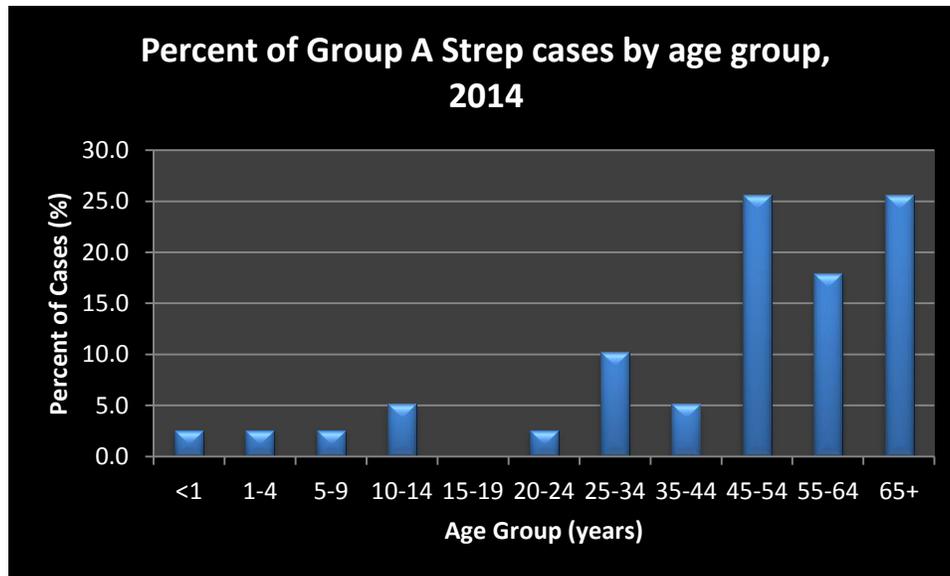


Figure 14 Percent of Group A strep cases by age, Shelby County, 2014

Group A strep is one of the diseases monitored by the Active Bacterial Core Surveillance group at the CDC. In 2014, people 65 years and older had the highest rates of disease around the United States. The cases in Shelby County presented a similar pattern in 2014, with the highest rates of disease occurring in people 45 years and older (Figure 14).

STREPTOCOCCAL DISEASE (INVASIVE GROUP B)

Summary of Disease

According to the CDC, Group B *Streptococcus* is the most common cause of meningitis and pneumonia in newborns and blood infections. It is also a chief cause of perinatal bacterial infections in women about to deliver. Furthermore, group B *Streptococcus* is known to cause focal and systemic infections in infants from birth to over 3 months old. This disease can be invasive or non-invasive, depending on the age of the infant. The early onset invasive type of group B strep often occurs in the first 24 hours of life, and the incubation period ranges from 0-6 days. This stage is characterized by systemic infection, respiratory distress, shock, pneumonia, apnea, and meningitis. Late onset types of group B strep infections normally happen at 3 to 4 weeks old and ranges from 7 days to 3 months. This stage is characterized by focal infections such as osteomyelitis, septic arthritis, adenitis and cellulitis. The incubation periods for late-onset disease and late, late-onset disease are unknown. Also, meningitis or occult bacteremia might occur. Systemic infections in non-pregnant adults who have chronic diseases, such as diabetes, chronic liver or renal disease, or cancer are also common. In 2014, there were 79 confirmed cases of Invasive Group B strep in Shelby County (one was excluded because there was no age data) (table 11).

Table 11 Incidence of Invasive Group B Streptococcal Infection in Shelby County, 2014

Number of Confirmed Cases for 2014	79
2014 incidence rate per 100,000	8.41
Age (yrs)	
Mean	51.1 years
Median	55 years
Min. - Max.	2 days-94 years

Highlights

Since 2007, the number of new Group B strep infections per year has remained relatively stable between 60 and 75 (figure 15).

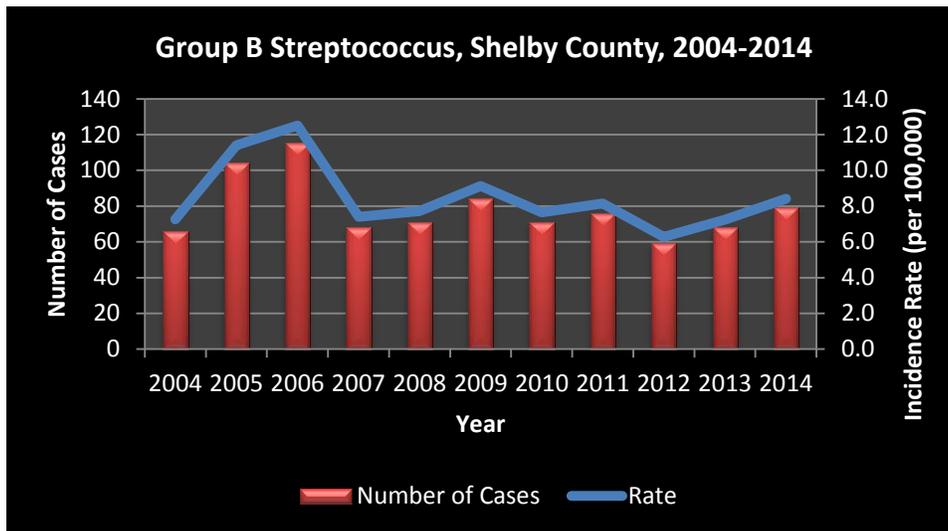


Figure 15 Number of Cases and Incidence Rate of Invasive Group B Strep, Shelby County, TN, 2004-2014

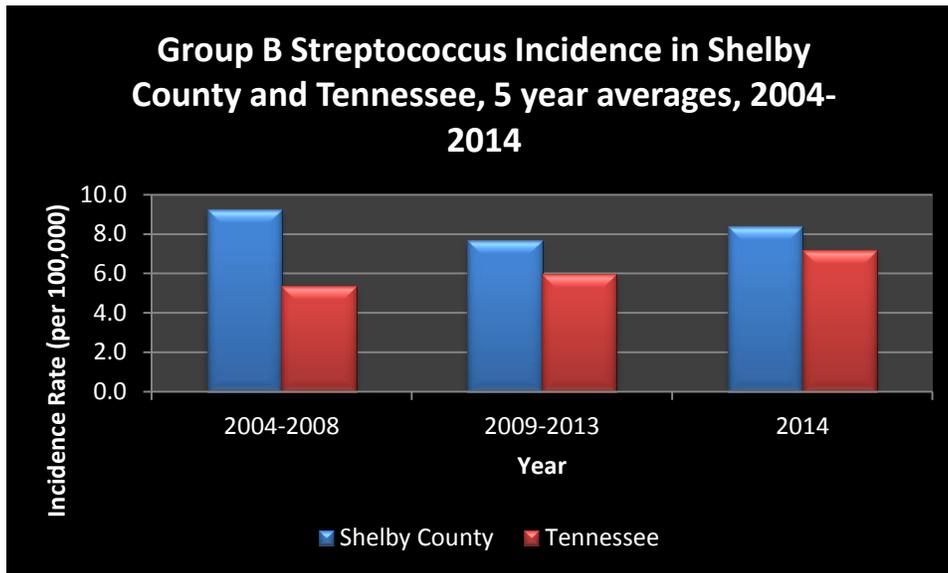


Figure 16 Invasive Group B Strep Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

The number of new Group B strep infections around Tennessee has increased since 2004, while the number of new infections in Shelby County decreased from 2004-2013, and then increased in 2014 (figure 16).

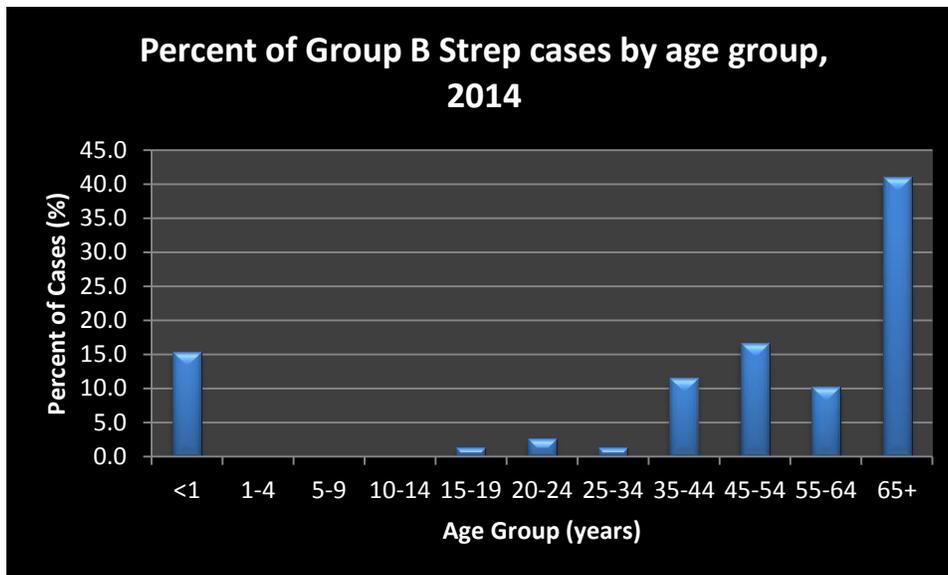


Figure 17 Percent of Group B Strep cases by age group, Shelby County, 2014

Group B strep is one of the diseases monitored by the Active Bacterial Core Surveillance group at the CDC. In 2014, infants less than 1 year of age had the highest rates of infection, followed by people 75-84, and older than 85 years around the US. In Shelby County, adults older than 65 years contributed to the majority of the cases, followed by people aged 45-54 and infants less than 1 year old (Figure 17). This is a positive sign because it means that Group B pregnancy screenings are occurring in pregnant mothers to reduce the incidence of Group B strep infections among newborns.

STREPTOCOCCUS PNEUMONIAE INVASIVE DISEASE (IPD)

Summary of Disease

Streptococcus pneumoniae is a bacterial infection that affects different parts of the body and may either be invasive or non-invasive. The invasive infection is commonly found in early childhood years, though the number of cases is changing due to the new conjugate vaccine that was recently introduced. The signs and symptoms of invasive *Streptococcus pneumoniae* include bacteremia and meningitis. *Streptococcus pneumoniae* is now the predominant cause of meningitis in children, since the decline of *Haemophilus influenzae* type b infections, and became reportable in Tennessee in 2010. *Streptococcus pneumoniae* is also the most common cause of community acquired pneumonia, sinusitis, and conjunctivitis. Infection is transmitted from person to person presumably through respiratory droplet contact. The incubation period varies by the type of infection but can be as short as 1-3 days. Those at increased risk for this infection include the elderly, children less than 2 years, children in child care facilities, African Americans, American Indians, and Alaskan Natives, and persons with underlying medical conditions. In 2014, there were 92 confirmed cases of *Streptococcus Pneumoniae* Invasive Disease in Shelby County (table 12).

Table 12 Incidence of *Streptococcus Pneumoniae* Invasive Disease in Shelby County, 2014

Number of Confirmed Cases for 2014		92
2014 incidence rate per 100,000		9.80
Age (yrs)		
Mean		47.3 years
Median		53 years
Min. - Max.		10 days-94 years

Highlights

The number of new Strep pneumoniae cases per year in Shelby County has decreased since 2012 (figure 18).

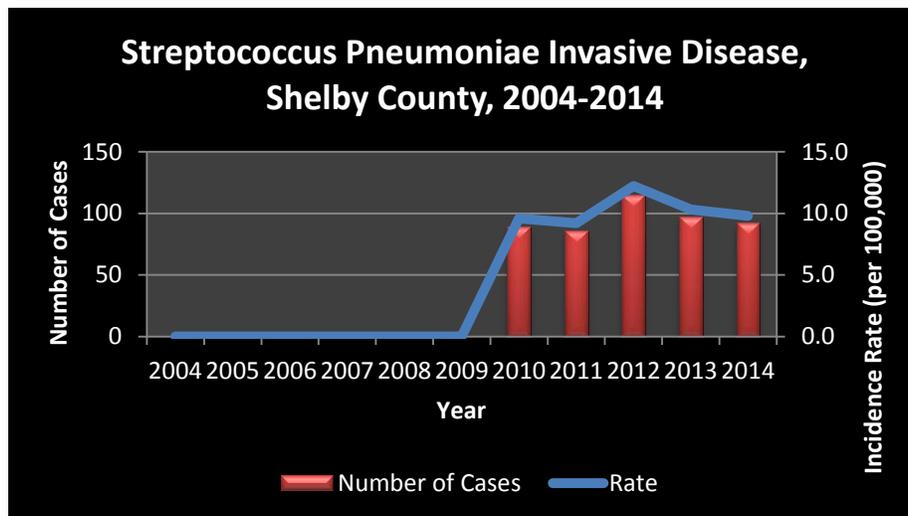


Figure 18 Number of Cases and Incidence Rate of Strep Pneumoniae Invasive Disease, Shelby County, TN, 2004-2014

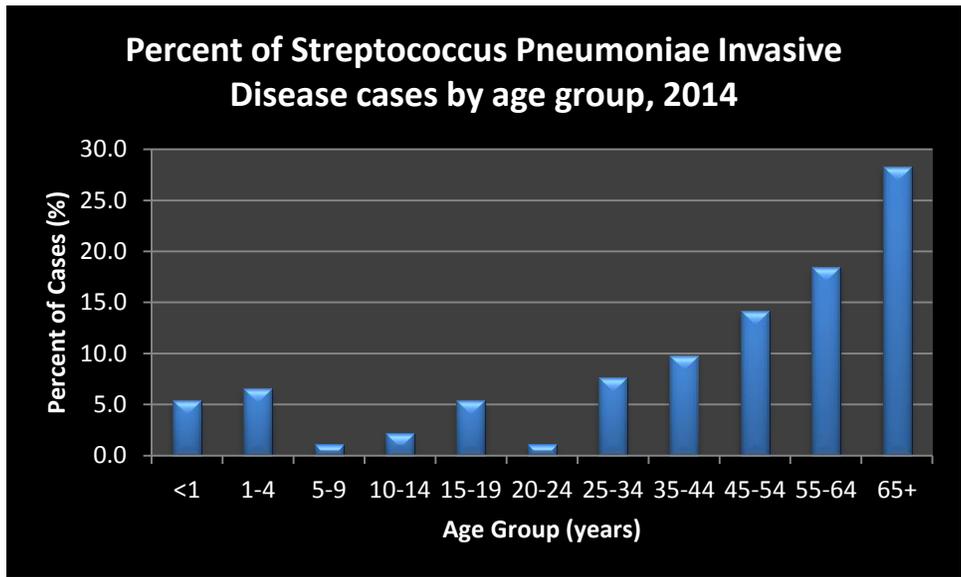


Figure 19 Percent of Strep IPD cases by age group, Shelby County, 2014

Strep IPD is one of the diseases monitored by the Active Bacterial Core Surveillance group at the CDC. In 2014, data showed a slight U shape to the age distribution of cases. The majority of cases occurred in people aged 50 and older with an increase in children aged 1 and younger as well. The age distribution of Strep IPD cases in Shelby County in 2014 show a similar shape (Figure 19).

Healthcare-Associated infections (HAIs) are infections people get while receiving medical treatment. They are among the leading causes of preventable deaths in the United States. HAIs can occur in all types of care settings including acute care hospitals, hospices, surgical centers and outpatient clinics. HAIs can lead to extended hospital stays and increased medical costs. Risk factors for HAIs can be grouped into three categories: medical procedures and antibiotic use, organizational factors, and patient characteristics. Many HAIs are the result of poor basic infection control practices.

In Tennessee, only CRE and VRE are reportable to local health departments. MRSA was a reportable condition until 2014 when it was made reportable directly to the state through the National Healthcare Safety Network. Other HAIs reportable through the National Healthcare safety Network include Clostridium difficile, Catheter associated infections, and Central line associated bloodstream infections. Since those conditions are not reportable to Shelby County Health Department, they will not be discussed in this report. In 2014, there were 48 reports of these diseases in Shelby County, 43 of which were considered confirmed cases (table 13). HAIs accounted for about 5.9% of all reportable diseases in Shelby County for 2014.

Confirmed and suspect cases accounted for 92% of the HAIs reported in 2014.



Table 13 Incidence of HAI in Shelby County, 2014

Reportable Disease	Case Status			
	Confirmed case	Not a case	Suspect	Total
CRE	18	3	0	21
VRE	25	1	1	27
Total	43	4	1	48

CARBAPENEM-RESISTANT ENTEROBACTERIACEAE (CRE)

Summary of Disease

Carbapenem-resistant Enterobacteriaceae (CRE) are a family of bacteria that are difficult to treat because they have high levels of antibiotic resistance. CRE infections usually happen to patients in hospitals, nursing homes and other healthcare settings. Some CRE

have become resistant to most antibiotics used to treat it leading to approximately 1 death in 50% of patients who are infected. CRE are usually spread person to person through contact with infected or colonized people, particularly contact with wounds or stool.

CRE infections can be prevented by following infection-control precautions provided by the CDC, including washing hands with soap or water or an alcohol-based hand sanitizer before and after caring for a patient, cleaning and disinfecting rooms and medical equipment and only prescribing antibiotics when necessary. In 2014, there were only 18 confirmed reported cases of CRE in Shelby County though due to inconsistencies in reporting, this is an underestimation of the actual burden of disease (table 14).

Table 14 Incidence of CRE in Shelby County, 2014

Number of Confirmed Cases for 2014	18
2014 incidence rate per 100,000	1.92
Age (yrs)	
Mean	64.61 years
Median	67.5 years
Min. - Max.	30- 91 years

VANCOMYCIN-RESISTANT ENTEROCOCCI (VRE) INVASIVE DISEASE

Summary of Disease

Vancomycin-resistant Enterococci (VRE) are specific types of antimicrobial-resistant bacteria that are resistant to vancomycin; the drug often used to treat infections caused by enterococci. Enterococci are bacteria that are normally present in the human intestines and in the female genital tract and are often found in the environment. These bacteria can sometimes cause infections. The incubation period is variable. Most vancomycin-resistant Enterococci infections occur in hospitals. In 2014, there were 25 confirmed cases of VRE in Shelby County (table 15).

Table 15 Incidence of Vancomycin resistant enterococci (VRE) Invasive Disease in Shelby County, 2014

Number of Confirmed Cases for 2014	25
2014 incidence rate per 100,000	2.66
Age (yrs)	
Mean	55.88 years
Median	66 years
Min. - Max.	5 days-78 years

Highlights

The number of VRE infections reported to the Shelby County Health Department has steadily declined each year since 2006, though they did slightly increase in 2013 (figure 20).

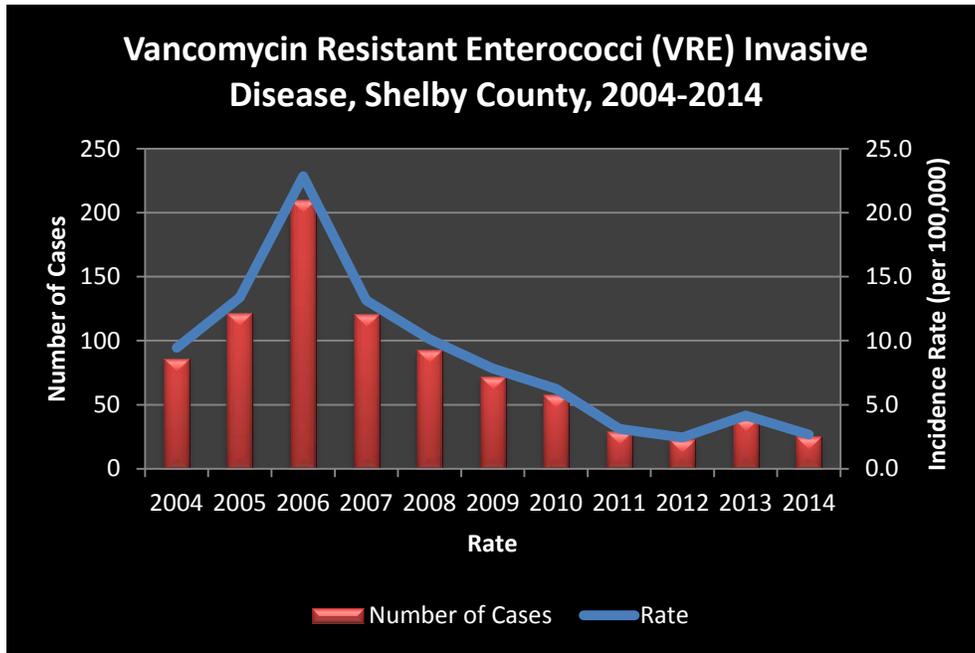


Figure 20 Number of Cases and Incidence Rate of VRE Invasive Disease, Shelby County, TN, 2004-2014

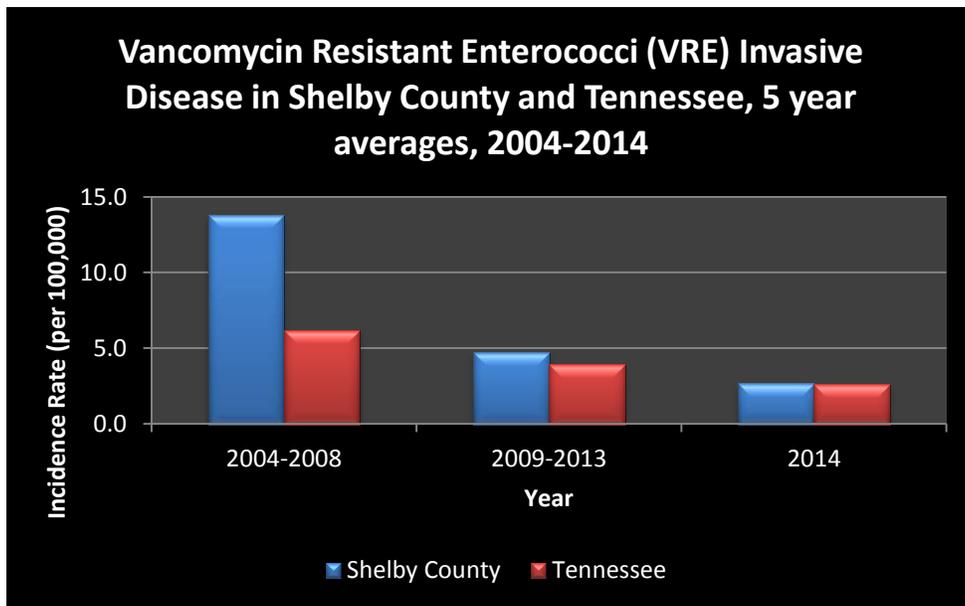


Figure 21 Invasive VRE Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

The number of VRE infections in Shelby County and Tennessee have steadily declined in the past 10 years (figure 21). It is difficult to know precisely why the number of infections and infection rates are declining, but public health campaigns targeting improvements in infection control methods used in health care settings and efforts to ensure antibiotic treatments are appropriately prescribed by doctors and taken by patients may be part of the success story.

ENTERIC DISEASES 8|EIGHT

Enteric diseases usually are introduced into the body through the mouth and intestinal tracts. They are often spread through contaminated foods and water or through contact with the vomit or feces of an infected person or animal. Many of these enteric diseases are caused by bacteria, but viruses and parasites also cause illness as well. Enteric diseases include campylobacteriosis, cryptosporidiosis, cyclosporiasis, giardiasis, salmonellosis, and shigellosis. In Tennessee, all those except giardiasis are reportable and they are notifiable in the United States. In 2014, over 320 reports of these enteric diseases were made to the Shelby County Health Department, 302 of which were considered confirmed cases (table 16). Confirmed enteric diseases accounted for about 42% of all reportable diseases in Shelby County for 2014.

Confirmed and suspect cases accounted for 96% of the enteric diseases reported in 2014. Salmonellosis was the most commonly reported enteric disease in Shelby County with 155 confirmed cases and an incidence rate of 16.5 cases per 100,000. This marks a 23% increase in the number of cases for salmonellosis from 2013 (table 16). It is also the most commonly reported enteric disease in the United States (table 17). The enteric disease with the second highest number of reports was shigellosis followed by campylobacteriosis.

Table 16 Incidence of Enteric Diseases in Shelby County, 2014

Reportable Disease	Case Status				
	Confirmed case	Probable case	Suspect case	Not a case	Total Investigated
Campylobacteriosis	56	0	2	1	59
Cryptosporidiosis	3	1	0	0	4
Shiga Toxin Producing E-Coli	8	0	5	0	13
Salmonellosis	155	0	4	9	168
Shigellosis	80	0	3	2	85
Total	302	1	14	12	329

Table 17 Incidence* of laboratory-confirmed bacterial and parasitic infections, and post diarrheal hemolytic uremic syndrome (HUS), by year and pathogen, Foodborne Diseases Active Surveillance Network (FoodNet), United States, 2003–2014†

Pathogen/Syndrome	Year												2010 National health objective [§]	2020 National health objective [¶]
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		
Surveillance population (millions) ^{†††}	41.75	44.34	44.77	45.32	45.84	46.33	46.76	47.15	47.52	47.90	47.90	48.24		
<i>Campylobacter</i>	12.63	12.82	12.71	12.73	12.81	12.64	12.96	13.52	14.28	14.22	13.82	13.45	12.3	8.50
<i>Listeria</i> **	0.31	0.26	0.29	0.28	0.26	0.26	0.32	0.27	0.28	0.26	0.26	0.24	0.24	0.20
<i>Salmonella</i>	14.46	14.65	14.53	14.76	14.89	16.09	15.02	17.55	16.44	16.37	15.19	15.45	6.8	11.40
<i>Shigella</i>	7.28	5.07	4.68	6.10	6.26	6.57	3.96	3.77	3.24	4.47	4.82	5.81	N/A ^{††}	N/A
STEC ^{§§} O157	1.06	0.91	1.06	1.30	1.20	1.12	0.99	0.95	0.97	1.11	1.15	0.92	1.0	0.60
STEC non-O157	0.17	0.25	0.30	0.53	0.62	0.53	0.61	0.96	1.10	1.16	1.17	1.43	N/A	N/A
<i>Vibrio</i>	0.26	0.28	0.27	0.34	0.24	0.29	0.34	0.41	0.33	0.41	0.51	0.45	N/A	0.20
<i>Yersinia</i>	0.39	0.39	0.36	0.36	0.36	0.36	0.33	0.34	0.34	0.33	0.36	0.28	N/A	0.30
<i>Cryptosporidium</i>	1.09	1.44	2.96	1.94	2.67	2.27	2.88	2.75	2.86	2.63	2.48	2.44	N/A	N/A
<i>Cyclospora</i>	0.03	0.03	0.15	0.09	0.03	0.04	0.07	0.06	0.05	0.03	0.03	0.05	N/A	N/A
HUS***	1.33	1.05	1.48	2.21	2.05	1.71	1.45	1.88	1.23	1.27	--	1.55	N/A	0.90

Source: Centers for Disease Control and Prevention. National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) Division of Foodborne, Waterborne, and Environmental Diseases (DFWED)

*Per 100,000 population

†Data are preliminary

§Healthy People 2010 objective targets for incidence of *Campylobacter*, *Listeria*, *Salmonella*, and Shiga toxin-producing *Escherichia coli* O157

¶Healthy People 2020 objective targets for incidence of *Campylobacter*, *Listeria*, *Salmonella*, Shiga toxin-producing *Escherichia coli* O157, *Vibrio*, and *Yersinia* infections, and HUS

***Listeria* cases defined as isolation of *L. monocytogenes* from a normally sterile site or, in the setting of miscarriage or stillbirth, isolation of *L. monocytogenes* from placental or fetal tissue

††No national health objective exists for these pathogens

§§Shiga toxin-producing *Escherichia coli*

¶¶Surveillance not conducted for this pathogen in this year

***Incidence of postdiarrheal HUS in children aged <5 years; denominator is surveillance population aged <5 years

†††U.S. Census Bureau population estimates for the surveillance area for 2013. Final incidence rates will be reported when population estimates for 2014 are available.

CAMPYLOBACTERIOSIS

Summary of the disease

Campylobacteriosis is one of the most common bacterial infectious diseases in the United States. Illness is usually caused by the *Campylobacter jejuni* species. Most infections are associated with handling raw poultry or eating raw or undercooked poultry such as chicken and turkey. Symptoms include diarrhea, cramping, abdominal pain and fever within 2 to 5 days of being exposed to the bacteria. Some cases also involve nausea and vomiting. Symptoms can last for about one week.

Most cases of Campylobacteriosis do not occur as part of a large outbreak but are isolated cases with no epidemiological links. Illness occurs most frequently during the summer months and typically affects infants and young adults more often than other age groups. Also, males are affected more than females. In 2014, there were 56 confirmed cases of Campylobacteriosis in Shelby County (table 18).

Table 18 Incidence of Campylobacteriosis in Shelby County, 2014

Number of Confirmed Cases for 2014		56
2014 incidence rate per 100,000		5.97
Age (yrs)		
Mean		40.9 years
Median		43 years
Min. - Max.		1 year- 79 years

Highlights

The mean age of the 2014 cases was 40.9 years, with the youngest affected being around a year old. There has been a general increase in campylobacter incidence since 2005, likely due to a new and simpler laboratory test being introduced, making it easier for doctors to test for this illness. In the decade of data represented, the highest incidence of disease was reported in 2012. The pattern of data trend is an upward pattern for cases in Shelby County since 2003. Over the past 10 years, the number of campylobacter cases has grown considerably. Between 2003 and 2004, the average number of reports was about 40 cases. Then there was a considerable decrease in 2005, but in the following year, there was a significant increase in the number of cases in 2006 compared to the previous years. Since 2012, the number of new cases has decreased every year (figure 22).

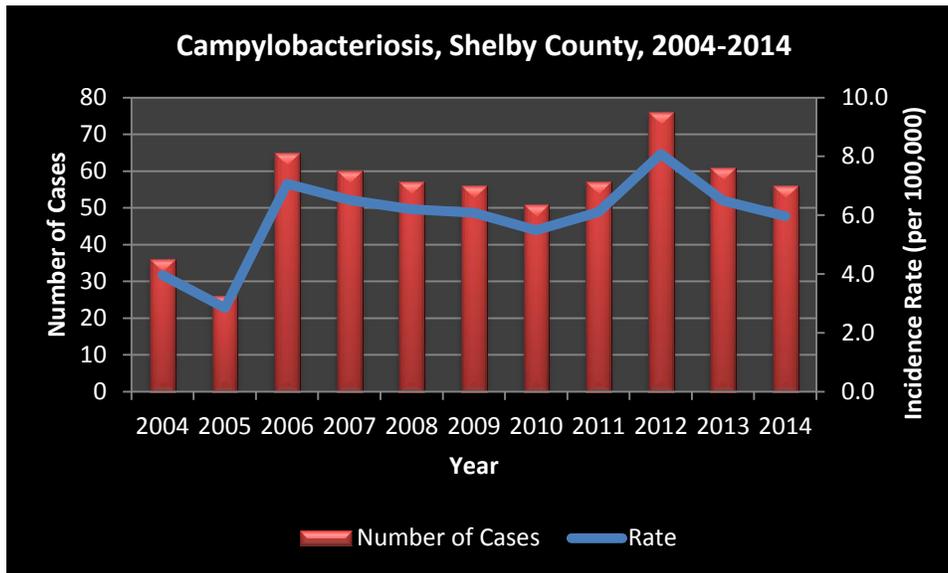


Figure 22 Number of Cases and Incidence Rate of Campylobacteriosis, Shelby County, TN, 2004-2014

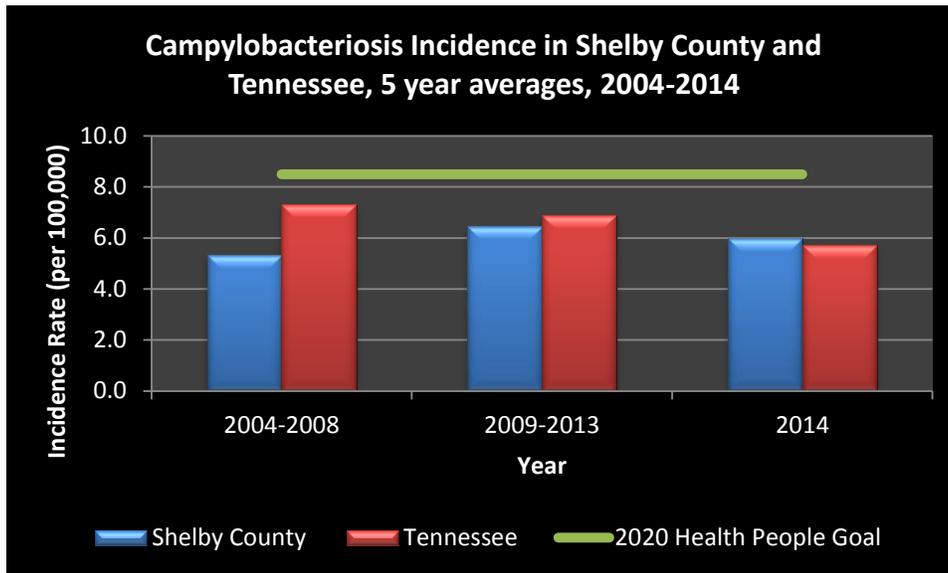


Figure 23 Campylobacteriosis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

The average incidence of campylobacteriosis in Tennessee as a whole is higher compared to the incidence in Shelby County for 2004-2013. As shown in Figure 23 the incidence of campylobacter has increased over the past years for both Shelby County and Tennessee but is starting to decrease now. The increase could have been a result of new, available, and quick testing methods. There is an increase in the use of culture independent methods as the sole method of isolating campylobacter from stools, which has in turn increased the number of reports and cases of campylobacter infections.

Both Shelby County and Tennessee have met the 2020 National Health Objective Campylobacter goal for 2014, which is 8.5 cases/100,000 population,

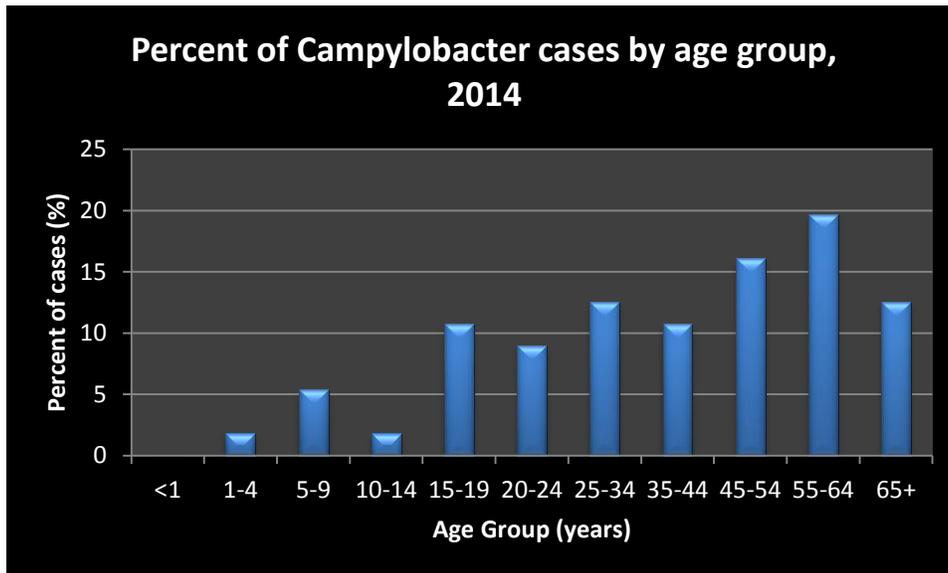


Figure 24 Percent of Campy cases by age group, Shelby County, 2014

According to the CDC, the Campylobacter organism is isolated from infants and young adults more frequently than from persons in other age groups. The age distribution of Campylobacter cases in Shelby County shows the opposite (figure 24). However, it is known that positive fecal cultures are higher in adults than in infants.

CRYPTOSPORIDIOSIS

Summary of the disease

Cryptosporidiosis (Crypto) is an illness caused by the protozoan *Cryptosporidium parvum* and is characterized by diarrhea, abdominal cramps, loss of appetite, low-grade fever and nausea and vomiting. It is possible that persons infected with the disease will not show any symptoms. The illness may be life threatening to those with compromised immune systems. Those most likely to be infected include children less than 2 years of age, animal handlers, international travelers, men who have sex with men (MSM) and anyone in close personal contact with someone who is infected. The exact duration of the incubation period is unknown, however the range is likely 1-12 days, with an average of about 7 days. Outbreaks have occurred in day care centers and have been associated with drinking water, recreational use of water and consumption of contaminated beverages.

Cryptosporidiosis has become the most common waterborne disease in the United States over the past two decades. Cryptosporidiosis can be spread from person to person, animal to person, or through foodborne and waterborne transmission.

Table 19 Incidence of Cryptosporidiosis in Shelby County, 2014

Number of Confirmed Cases for 2014	3
2014 incidence rate per 100,000	0.32
Age (yrs)	
Mean	23.67 years
Median	24 years
Min. - Max.	10 years- 37 years

Highlights

In 2014, there were three cases of cryptosporidiosis reported in Shelby County (table 19). There has been a steady and significant decline in the number of cases reported in Shelby County since 2008 until 2013. The highest number of cases reported occurred in 2008 (figure 25). Many of the cases reported in that year reported a common risk factor associated with the incidence of this disease: contact with recreational water.

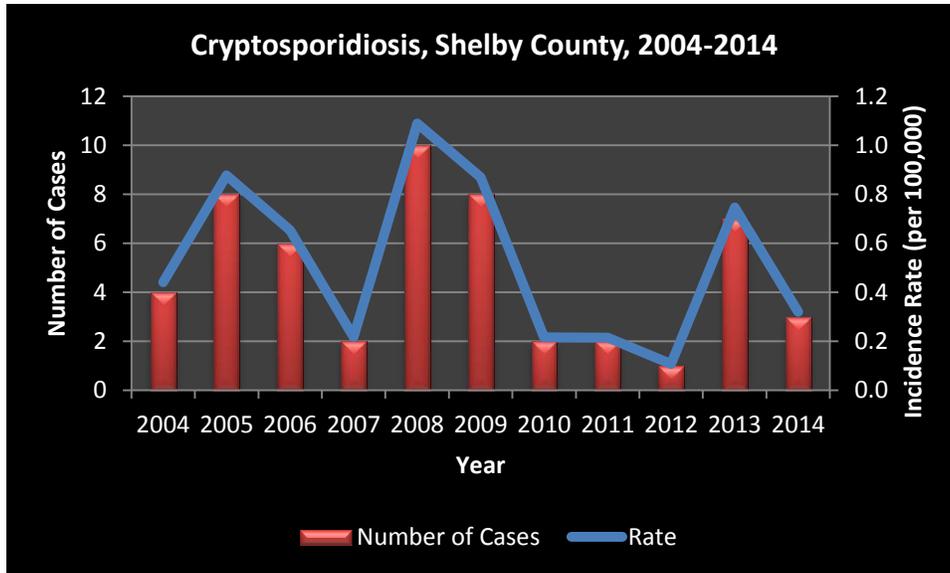


Figure 25 Number of Cases and Incidence Rate of Cryptosporidiosis, Shelby County, TN, 2004-2014

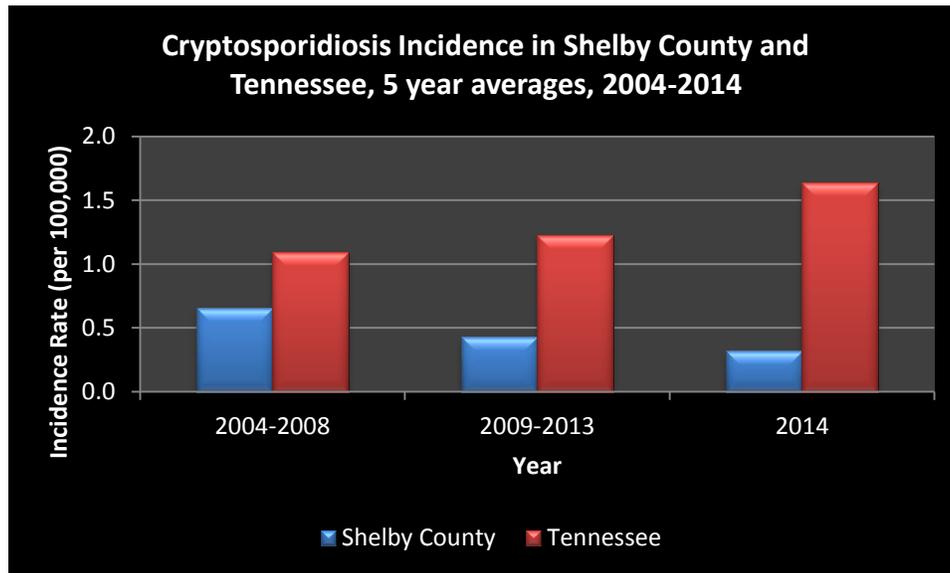


Figure 26 Cryptosporidiosis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

The burden of cryptosporidiosis has been insignificant in both Shelby County and Tennessee as whole over the years compared to other communicable diseases. On average, there is less than one case of cryptosporidiosis per every 100,000 population in Shelby County.

ESCHERICHIA COLI, SHIGA TOXIN-PRODUCING (STEC)

Summary of the disease

Shiga toxin-producing *Escherichia coli* (also known as STEC) is an infection characterized by diarrhea and abdominal cramps. Illness may become complicated by a condition called hemolytic uremic syndrome (HUS). Those infected by the organisms that cause STEC do not always show symptoms; and the organisms may cause extra-intestinal infections. The incubation period ranges from 2-10 days, with an average of 3-4 days. There are many different serotypes of STEC, but there is one serotype (*E. coli* O157:H7) that is known to be cause of most outbreaks and most cases of HUS in the United States. The number of laboratory confirmed STEC infections have increased exponentially between 2008 and 2012 since all STEC infections (not just those caused by serotype O157:H7) became nationally notifiable in 2000.

The isolation of Shiga toxin-producing *Escherichia coli* from clinical specimens using an appropriate laboratory test is required to determine the presence of STEC. To be considered as suspect case, a report of post diarrheal HUS or thrombotic thrombocytopenic purpura (TTP) or demonstration of Shiga toxin in a specimen from a clinically compatible case without isolation of the organism is required. A report is classified as a probable case if isolation of *E. coli* O157 from a clinical specimen, without confirmation of H antigen or Shiga toxin production is made, or a clinically compatible case that is epidemiologically linked to a confirmed or probable case or identification of an elevated antibody titer to a known Shiga toxin-producing *E. coli* serotype from a clinically compatible case. In 2014, there were only 8 confirmed cases of STEC in Shelby County (table 20).

Table 20 Incidence of Shiga toxin-Producing E. coli (STEC) Infection in Shelby County, 2014

Number of Confirmed Cases for 2014	8
2014 incidence rate per 100,000	0.85
Age (yrs)	
Mean	32.5 years
Median	17 years
Min. - Max.	1 year- 84 years

Highlights

There were no confirmed cases of STEC between 2003 and 2005 in Shelby County. There was a significant jump in the reports of STEC from 2005 to 2006. As shown in Figure 27 below, the trend of STEC cases shows an upward and downward pattern since 2006 with the highest number of cases reported in 2007. Since 2011 however, the number of cases are increasing steadily.

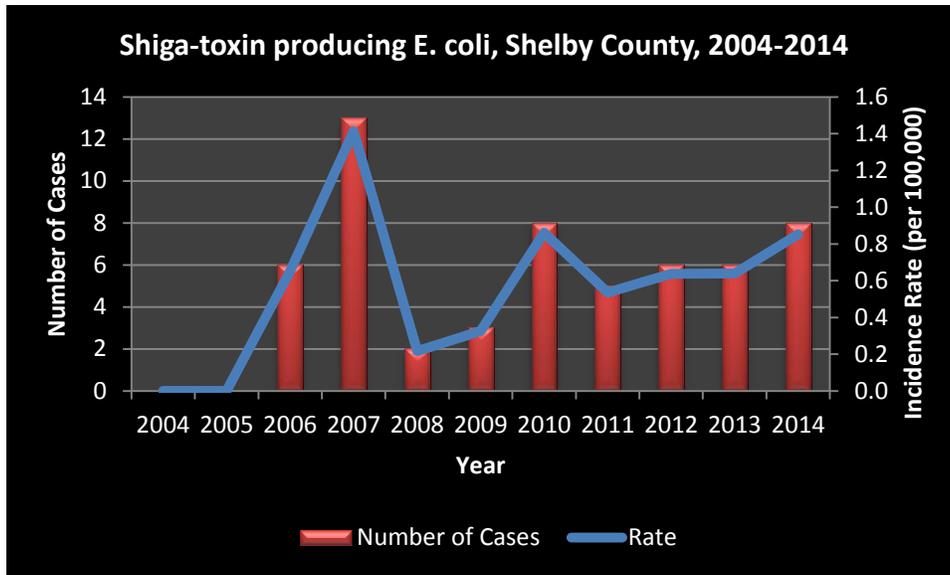


Figure 27 Number of Cases and Incidence Rate of Shiga toxin E. coli, Shelby County, TN, 2004-2014

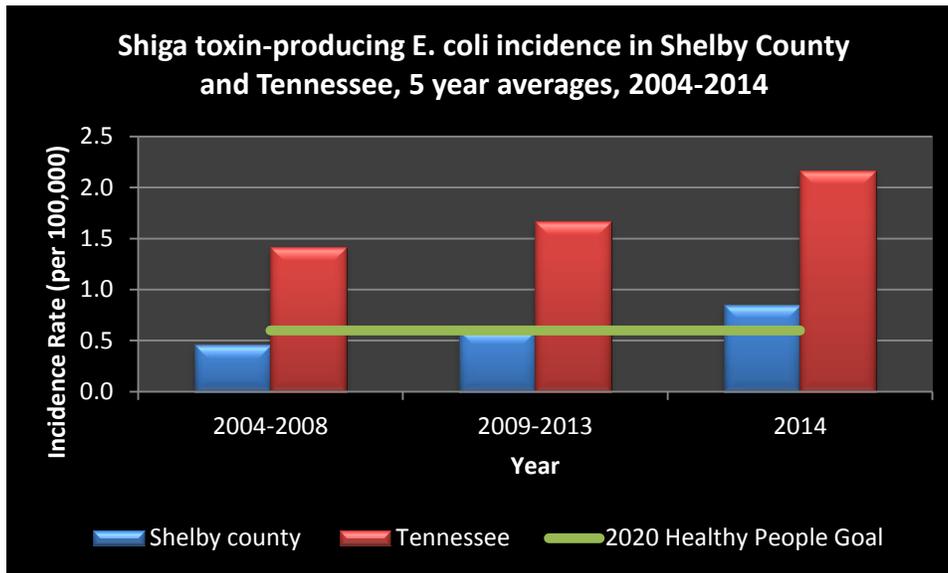


Figure 28 Shiga toxin-producing E. coli Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

Incidence of STEC has been rising in both Shelby County and Tennessee since 2002 (Figure 28). However, the incidence rate of STEC is higher in Tennessee as a whole when compared to Shelby County.

The burden of STEC in Shelby County has been considerably lower than Tennessee over the years. On average, there is often less than one case of STEC per every 100,000 population in Shelby County compared to the average 1 to 2 cases per every 100,000 people in Tennessee. The 2020 national health objective is targeting a much lower incidence of STEC; 0.6 cases per every 100,000 people. As of 2014, Shelby County and Tennessee both exceed the national 2020 target for the incidence of STEC.

SALMONELLOSIS

Summary of the disease

The bacterium *Salmonella* causes an illness called Salmonellosis. *Salmonella* species come in many different types; the most common types in the United States are *Typhimurium* and *Enteritidis*. The symptoms of infection with the bacteria include diarrhea, fever and abdominal cramps. Those infected with *Salmonella* begin to feel sick within 12 to 72 hours of exposure to the bacteria (usually 12-36 hours) and symptoms usually resolve without treatment within 4 to 7 days. Severe dehydration requiring hospitalization may develop in some cases.

Salmonella is usually transmitted through ingestion of contaminated food. This includes contaminated or undercooked beef, poultry, unpasteurized milk and raw or undercooked eggs, although fresh fruits and vegetables are increasingly recognized as vehicles associated with transmission in outbreaks. There were 155 cases of Salmonella in Shelby County in 2014 (table 21).

Table 21 Incidence of Salmonellosis in Shelby County, 2014

Number of Confirmed Cases for 2014	155
2014 incidence rate per 100,000	16.51
Age (yrs)	
Mean	27.6 years
Median	14 years
Min. - Max.	1 month- 92 years

Highlights

Salmonellosis is one of the most commonly reported bacterial infections in Shelby County over the past 10 years. The bacteria infection affects people of all ages as is represented in the above table. The youngest case of salmonellosis in 2014 was reported among a one-month old child; the oldest case was 92 years old. There were 16.51 cases per every 100,000 people in Shelby County for 2014 (table 21). The trend of salmonellosis cases in Shelby County over the past 10 years shows an upward and downward pattern. The highest number of cases in the 10 year period was reported in 2010 (214 cases), and lowest number of cases was reported in 2004 (105 cases). The number of salmonella cases reported in Shelby County has decreased since 2010 until 2014 when it started to increase again (figure 29).

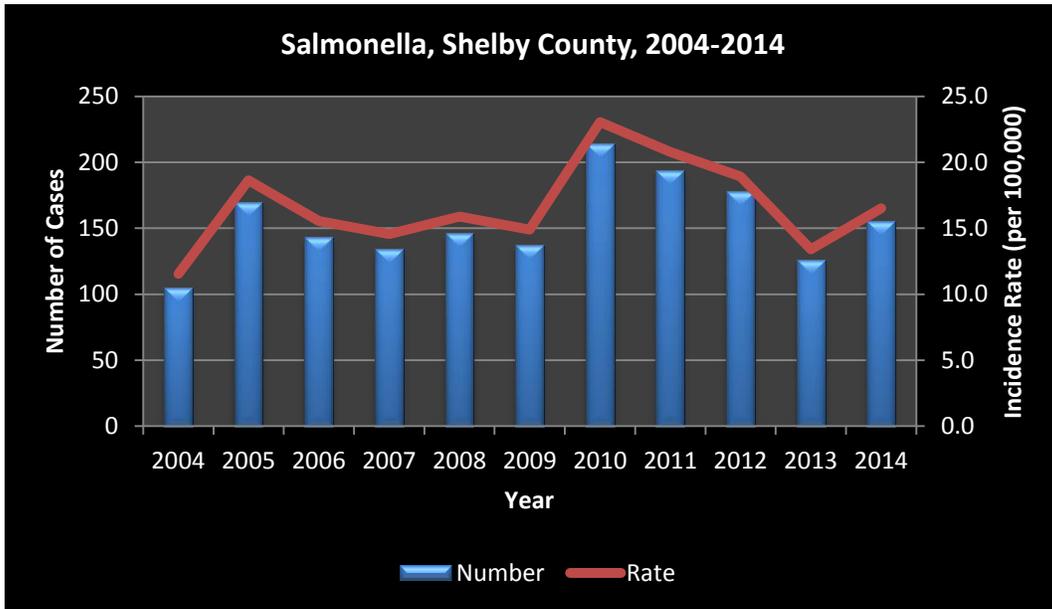


Figure 29 Number of Cases and Incidence Rate of Salmonella, Shelby County, TN, 2004-2014

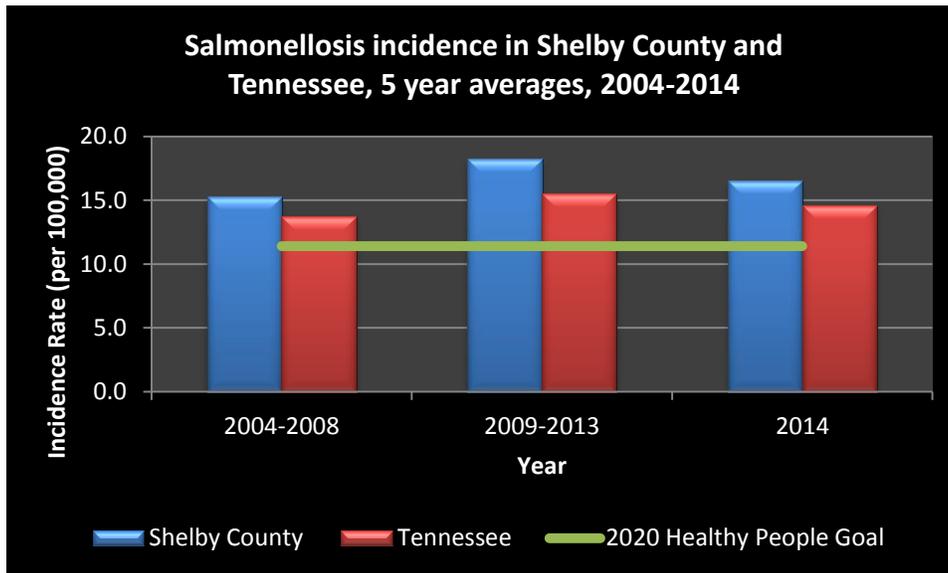


Figure 30 Salmonellosis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

On average, the incidence rate of salmonellosis has been higher in Shelby County compared with Tennessee since 2004; however, in 2013 the incidence in Shelby County was just lower than Tennessee (figure 30). The trend of salmonellosis incidence over the past 10 years shows an upward pattern for both Shelby County and Tennessee. As of 2014, neither Shelby County nor Tennessee had achieved the 2020 national health objective for the incidence of salmonellosis per year, which is 11.4 cases per every 100,000 population.

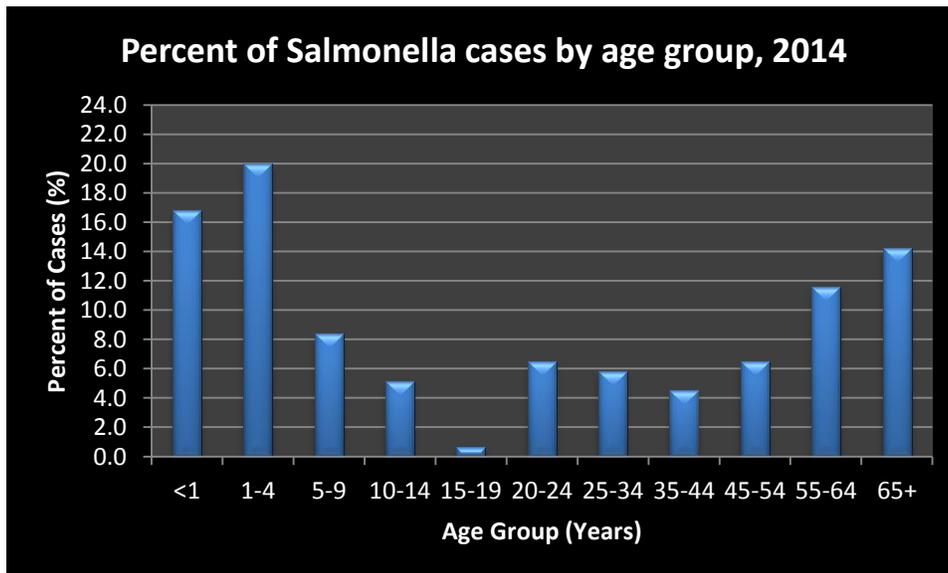


Figure 31 Percent of Salmonella cases by age group, Shelby County, 2014

About 37% of the salmonellosis infections reported for 2014 in Shelby County were reported among children under the age of 5 years old (figure 31). As reported by the Centers for Disease Control and Prevention, children are the most likely to be infected with *Salmonella* species. The rate of diagnosed infections in children between the ages of 0 and 4 years old is about five times higher than the rate in all other age groups. Severe cases of salmonellosis are usually reported among young children, the elderly and immune-compromised people.

SHIGELLOSIS

Summary of the disease

Shigellosis is an infectious disease caused by bacteria from *Shigella* species. Symptoms of infection with this bacterium include diarrhea (often bloody diarrhea), fever and stomach cramps beginning a day or two after exposure. The incubation period ranges from 1-7 days, with an average of 1-3 days. The illness usually resolves without treatment in 5 to 7 days. Young children and older adults may develop severe diarrhea requiring hospitalization. In children under 2 years of age, *Shigella* infection can cause high fever leading to seizures. Some infected individuals do not show symptoms but can still spread the disease to others.

Shigellosis can be passed from one person to the next. The bacteria are present in the stool of infected persons while they are sick and for up to two weeks after symptoms resolve. It is common among children who are not fully toilet trained and among family members and playmates of these children. Infection may be acquired from eating contaminated foods or by drinking or swimming in contaminated water. There have been several reports of isolated cases and outbreaks of shigellosis among men who have sex with men. In order to control and prevent cases of *Shigella*, health education and promotion of vigorous hand/toilet hygiene practices are necessary. In 2014, there were 80 confirmed cases of Shigellosis in Shelby County (table 22).

Table 22 Incidence of Shigellosis in Shelby County, 2014

Number of Confirmed Cases for 2013	80
2013 incidence rate per 100,000	8.52
Age (yrs)	
Mean	14.7 years
Median	5 years
Min. - Max.	7 months- 78 years

Highlights

Shigellosis, like salmonellosis is a commonly reported bacterial infection in Shelby County and has one of the highest incidences of all the enteric diseases. Like salmonellosis, the trend of shigellosis cases in Shelby County over the past 10 years shows an upward and downward pattern (figure 32). There was a significant decrease in cases reported in 2004 and 2005 compared to the previous year of 2003. The number of cases increased significantly again in 2006 and decreased yet again in 2007. This pattern of decrease and increase in Shigellosis cases continued for the next couple years. In 2010, the number of Shigellosis cases increased from the previous year's number of cases. The number of cases of shigellosis has declined steadily since 2010.

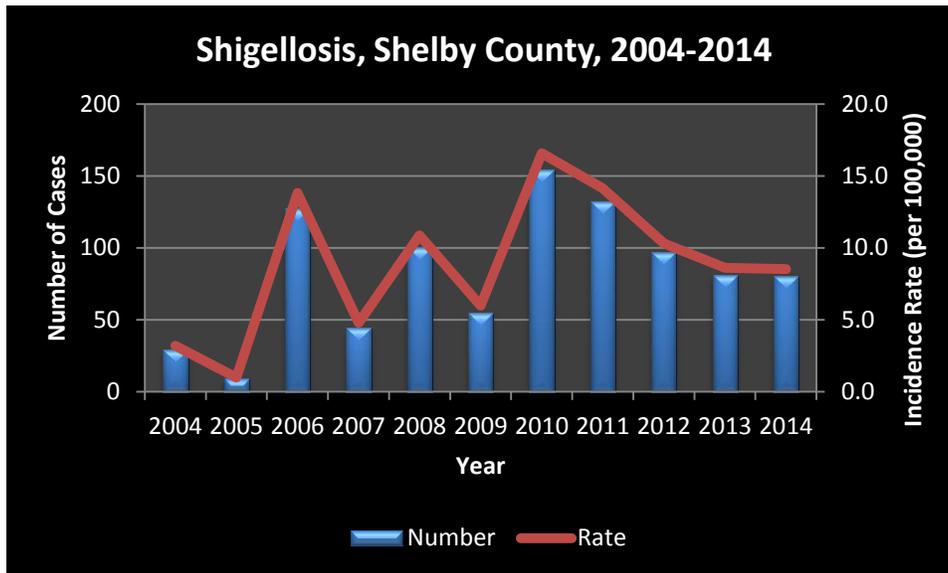


Figure 32 Number of Cases and Incidence Rate of Shigella, Shelby County, TN, 2004-2014

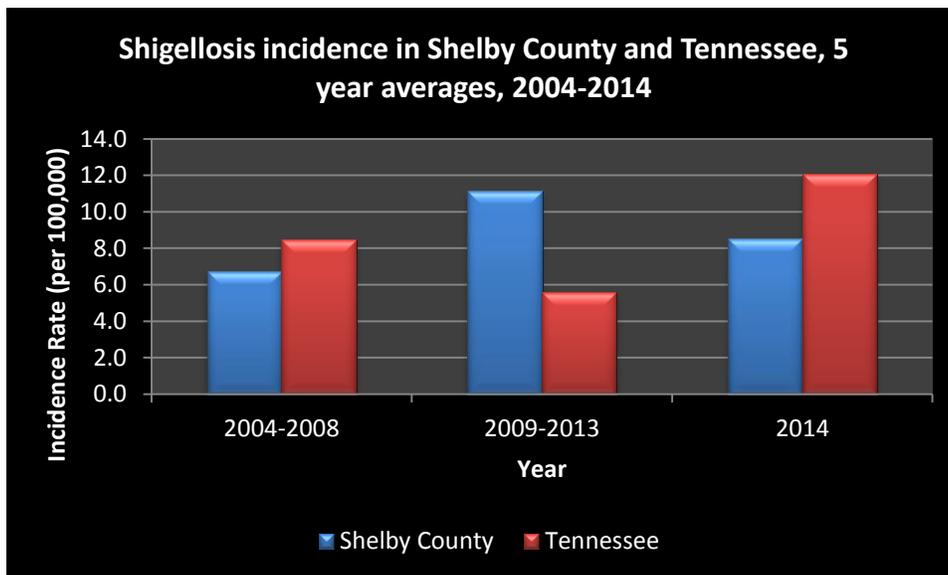


Figure 33 Shigellosis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

On average, for 2004 through 2013, the incidence of shigellosis in Shelby County has been higher compared to incidence of shigellosis in Tennessee (figure 33). There was an increase in the incidence rate for the averaged years of 2004-2008 and 2009-2013 in Shelby County, however, the incidence rate decreased the following year in 2014. In Tennessee, the incidence rate for the averaged years of 2004-2008 and 2009-2013 decreased slightly and then increased considerably in 2014.

There are no national health objectives for the *Shigella* pathogen.

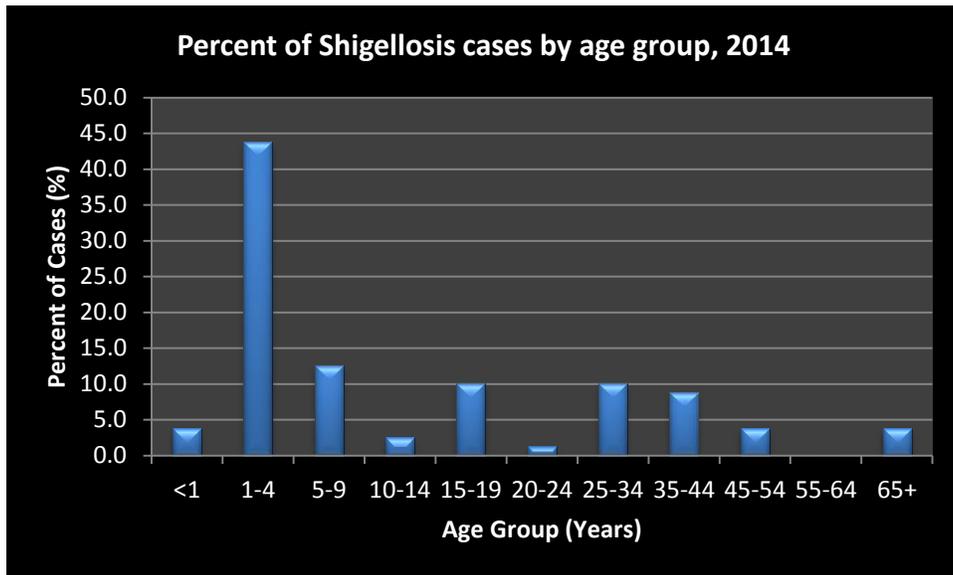


Figure 34 Percent of Shigella cases by age group, Shelby County, 2014

Children under the age of 5 years are often more likely to be affected by this infection compared to other age groups (Figure 34). In the figure below, almost 45% of the shigellosis cases in Shelby County for 2014 were among children between the ages of 1 and 4 years. Not only is shigellosis widespread among children, it is known to be widespread in families with small children also. Many shigellosis cases are related to the spread of illness in child-care settings.



Sexually transmitted diseases are infections that are spread primarily through sexual contact. The diseases include chlamydia, gonorrhea, human papillomavirus (HPV), HIV/AIDS and syphilis, among others. HPV is the most common STD in the US and infection by some of the strains can be prevented by vaccines, though it is not reportable. All STDs are preventable and some can be cured by simple treatment if caught early enough. In 2013, the rate of chlamydia infection in young people aged 15-24 in the US was 2160 cases per 100,000 population and the gonorrhea rate was 421cases per 100,000 population. In Tennessee, the rates exceeded the US at 2465 for Chlamydia and 525 for Gonorrhea.

In 2014, almost 11,000 cases of STDs were reported to the Shelby County Health Department. This constitutes almost a 7% decrease in the number of cases reported in 2013. Chlamydia contributed the greatest burden with 74% of the reported cases (table 23). The STD with the second highest number of reports was gonorrhea followed by syphilis (all stages).

Table 23 Incidence of HIV/STDs in Shelby County, 2014

	Number of Confirmed Cases 2013	Number of Confirmed Cases 2014	Percent change from 2013 to 2014
HIV	310	290	-6.45
Chlamydia	8504	8105	-4.69
Gonorrhea	2515	2164	-13.96
Syphilis (ALL)	461	422	-8.46
Total	11790	10981	-6.86

CHLAMYDIA

Summary of the disease

Chlamydia is a common sexually transmitted disease that can infect both men and women. It is caused by an infection with *Chlamydia trachomatis*. In 2014, over 1 million cases were reported to the CDC in the United States but it is estimated that the true incidence is closer to 3 million. Many cases are asymptomatic and so people do not know they are infected. In the United States, two-thirds of new infections occur in people aged 15-24 years old.

It can be transmitted through vaginal, anal or oral sex. If a pregnant female is infected, it can also be spread to the baby through childbirth. Any sexually active person is at risk for Chlamydia. Barriers to accessing STD prevention services, such as condoms, can increase risk of infection. As stated before, most infected people are asymptomatic. In women, symptoms can range from cervical bleeding to pelvic inflammatory disease. In men, symptoms usually present as urethritis.

If left untreated, chlamydia can cause pelvic inflammatory disease in women which can cause permanent damage to the reproductive tract. Untreated chlamydia can also increase a person’s change of acquiring HIV. Proper and consistent condom use can reduce the risk of getting or transmitting chlamydia. The only way to avoid chlamydia is to abstain from sex or be in a monogamous long-term relationship with someone who has tested negative. In 2014, there were 8105 confirmed cases of Chlamydia in Shelby County (table 24).

Table 24 Incidence of Chlamydia in Shelby County, 2014

Number of Confirmed Cases for 2014	8105
2014 incidence rate per 100,000	863.33
Age (yrs)	
Mean	23.3 years
Median	21.8 years
Min. - Max.	3.2- 76.8 years

Highlights

Chlamydia is a commonly reported STD in Shelby County and has the highest incidence of all the STDs. The trend of chlamydia cases in Shelby County over the past 10 years has shown a downward trend since 2009 (figure 35). There has been a significant decrease in cases reported since 2012. Just like at the national level, around two-thirds of new cases occurred in the 15-24 age range in Shelby County.

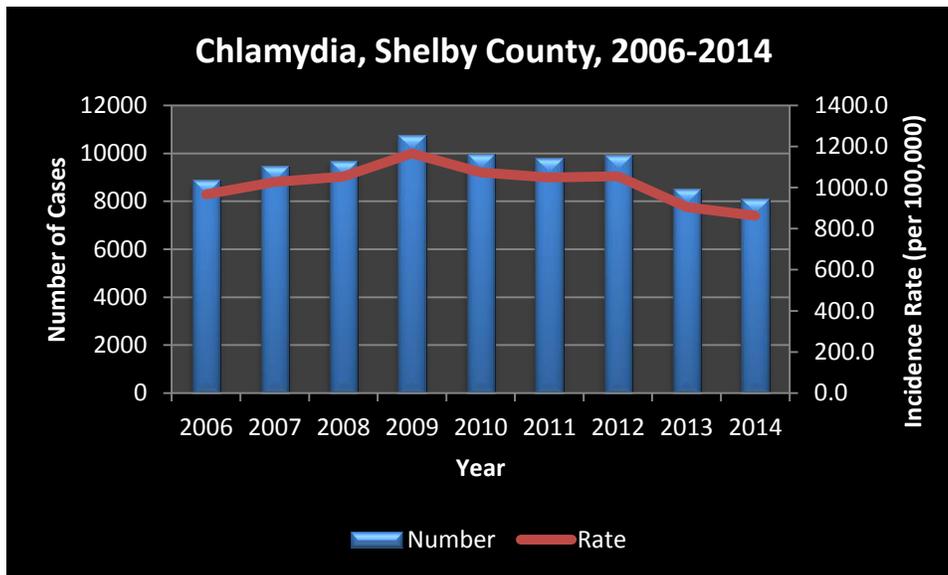


Figure 35 Number of Cases and Incidence Rate of Chlamydia, Shelby County, TN, 2006-2014

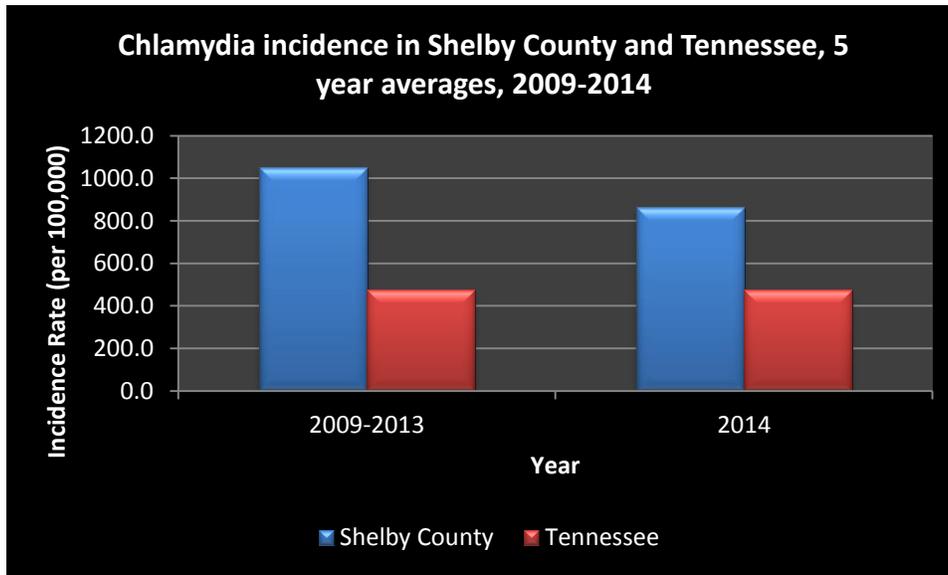


Figure 36 Chlamydia Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2009-2014

Since 2009, the incidence of chlamydia in Shelby County has been significantly higher compared to incidence of chlamydia in Tennessee (figure 36). Both rates are steadily decreasing.

GONORRHEA

Gonorrhea is a common sexually transmitted disease that can infect both men and women. It is caused by an infection with *the Neisseria gonorrhoeae* bacterium. In 2014, 350,000 cases were reported to the CDC in the United States but it is estimated that the true incidence is closer to 800,000. Many cases are asymptomatic and so people do not know they are infected. In the United States, over half of new infections occur in people aged 15-24 years old.

It can be transmitted through vaginal, anal or oral sex. If a pregnant female is infected, it can also be spread to the baby through childbirth. Any sexually active person is at risk for gonorrhea. Barriers to accessing STD prevention services, such as condoms, can increase risk of infection. As stated before, most infected people are asymptomatic. In women, symptoms can range from dysuria, increased vaginal discharge or vaginal bleeding. In men, symptoms usually present as urethritis.

If left untreated, gonorrhea can cause pelvic inflammatory disease in women which can cause permanent damage to the reproductive tract. Untreated gonorrhea can also increase a person's change of acquiring HIV. It can also spread to the blood and cause a life-threatening disease called disseminated gonococcal infection. Proper and consistent condom use can reduce the risk of getting or transmitting gonorrhea. The only way to avoid gonorrhea is to abstain from sex or be in a monogamous long-term relationship with someone who has tested negative. In 2014, there were 2164 confirmed cases of gonorrhea in Shelby County (table 25).

Table 25 Incidence of Gonorrhea in Shelby County, 2014

Number of Confirmed Cases for 2014	2164
2014 incidence rate per 100,000	230.51
Age (yrs)	
Mean	24.8 years
Median	22.4 years
Min. - Max.	12.9- 69.1 years

Highlights

Gonorrhea is a commonly reported STD in Shelby County and has the second highest incidence of all the STDs. The trend of gonorrhea cases in Shelby County over the past 10 years has shown a mostly downward trend since 2006 (figure 37). There has been a significant decrease in cases reported since 2012. Over 60% of new cases in Shelby County in 2014 occurred in the 15-24 age range.

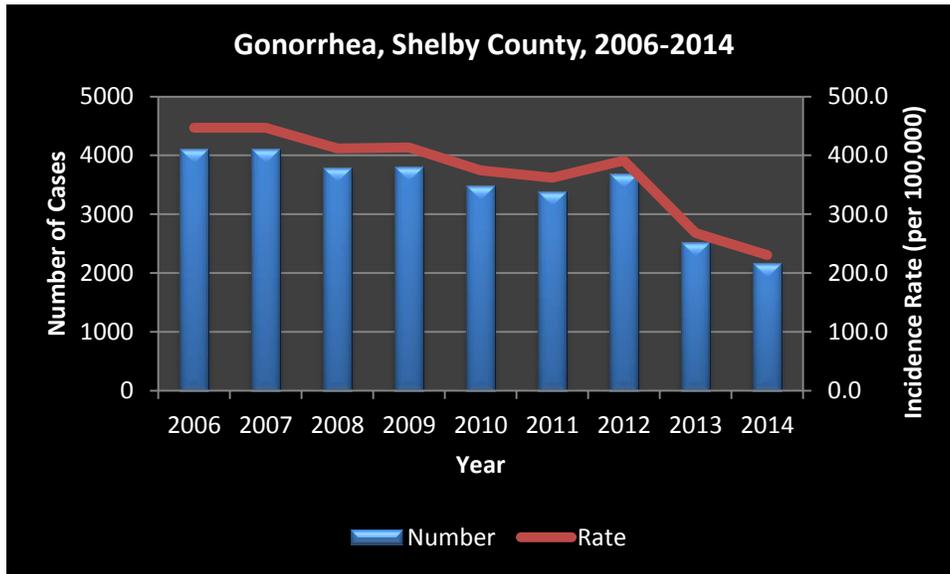


Figure 37 Number of Cases and Incidence Rate of Gonorrhea, Shelby County, TN, 2006-2014

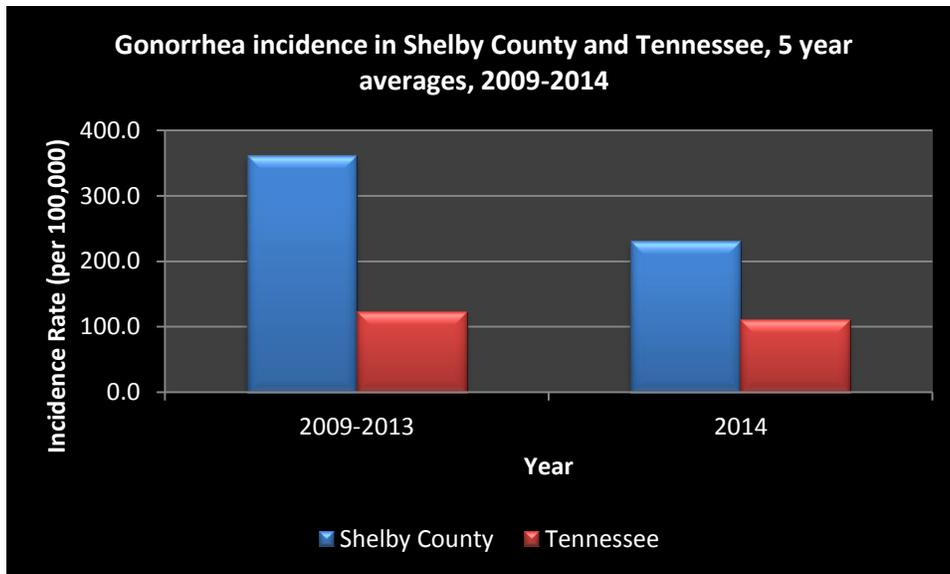


Figure 38 Gonorrhea Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2009-2014

Since 2009, the incidence of gonorrhea in Shelby County has been significantly higher compared to incidence of gonorrhea in Tennessee (figure 38). Both rates are steadily decreasing.

SYPHILIS

Syphilis is a sexually transmitted disease that can infect both men and women. It is caused by an infection with the bacterium *Treponema pallidum*. There are multiple stages and typically follows a progression that can last for weeks, months or even years. It can be transmitted through vaginal, anal or oral sex as well as through childbirth. The primary and secondary stages are the most transmissible stages. During the primary stage, a single chancre (a sore) appears at the location where syphilis entered the body. It is painless and can be hard to find. It heals whether or not the person is treated. During the secondary stage, skin rashes and mucous membrane lesions occur. This can occur when the sore is healing or weeks after it has healed. The symptoms go away with or without treatment. The latent stages begin when the symptoms disappear. Early latent is where infection occurred within the past twelve months and late latent is when the infection occurred more than twelve months ago. Latent syphilis can last for years. The late stages can develop in about 15% of people who have not been treated. During this stage, the disease can damage internal organs including the brain, eyes, bones and joints. Symptoms of late stage include paralysis, blindness and dementia. It may even cause death. Congenital syphilis can occur when a woman with syphilis infection gives birth. Untreated syphilis in pregnant women results in infant death in up to 40% of cases. Untreated babies can develop serious problems within a few weeks including seizures and death.

In 2014, over 60,000 new cases were reported to the CDC. Less than half of them were primary and secondary syphilis, the earliest and most transmissible stages. The vast majority of cases occurred in men who have sex with men (MSM).

Untreated syphilis can also increase a person's chance of acquiring HIV. The primary, secondary and early latent stages can be treated with a single intramuscular injection of penicillin. The only way to avoid syphilis is to abstain from sex or be in a monogamous long-term relationship with someone who has tested negative. In 2014, there were 422 confirmed cases of gonorrhea in Shelby County, most of which were in the late latent stage (tables 26 and 27).

Table 26 Percent Change of Syphilis Stages, 2013-2014

Disease	Number of Cases 2013	Number of Cases 2014	Percent Change from 2013 to 2014
Primary Syphilis	13	13	0
Secondary Syphilis	76	66	-13.16
Early Latent Syphilis	154	110	-28.57
Late Latent Syphilis	216	231	6.94
Syphilis (Late with symptoms)	0	0	0
Congenital Syphilis	**	**	**

** Cases not reported due to small numbers

Table 27 Incidence of Syphilis in Shelby County, 2014

Number of Total Confirmed Cases for 2014	422
2014 incidence rate per 100,000	44.95
Age (yrs)	
Mean	29.7 years
Median	26.4 years
Min. - Max.	16.2- 70.3 years

Highlights

Syphilis has the second highest incidence of all the STDs in Shelby County. The trend of syphilis cases in Shelby County over the past 10 years has shown a mostly downward trend since 2010 (figure 39). Over 60% of new primary and secondary cases in Shelby County in 2014 occurred in the 20-34 age range.

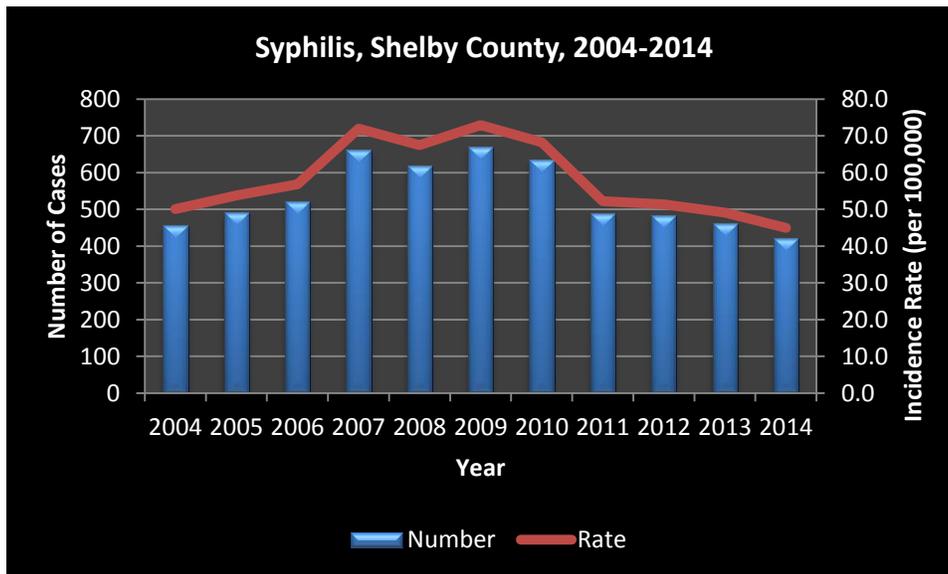


Figure 39 Number of Cases and Incidence Rate of Syphilis, Shelby County, TN, 2004-2014

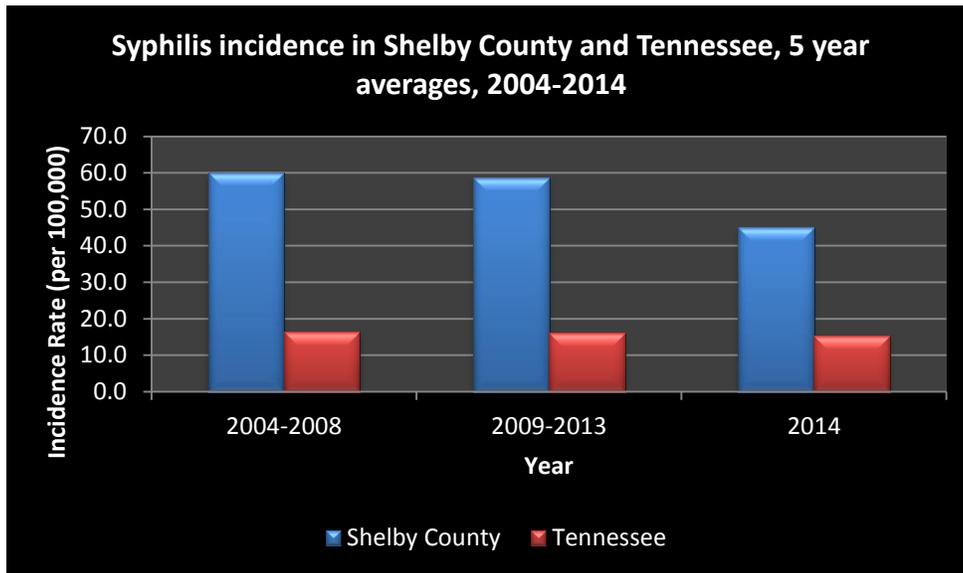


Figure 40 Syphilis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

Since 2004, the incidence of syphilis in Shelby County has been significantly higher compared to incidence of syphilis in Tennessee (figure 40). Both rates are steadily decreasing.

HIV

Human Immunodeficiency Virus (HIV) is a sexually transmitted disease that can infect both men and women. No cure exists, but it can be controlled with proper medical care. HIV weakens a person's immune system by attacking the CD4 cells so the body can't fight off infections. When people with HIV don't receive treatment, the infection usually progresses through three stages. The first stage is acute HIV infection which occurs within 2 to 4 weeks after infection. Some people may experience a flu-like illness. People are very contagious during this stage because their viral load is very high. Most people are unaware they are infected however because the symptoms are very similar to lots of other diseases. The second stage is called clinical latency, or HIV inactivity. This is sometimes called asymptomatic HIV infection. During this stage, HIV is reproducing at very low levels so people may not have any symptoms at all. If someone starts taking medicine during this stage, it may last for a decade or longer. People can still transmit HIV to others during this stage but the risk is decreased if someone is taking their medication properly. The third stage, and most severe, is called acquired immunodeficiency syndrome (AIDS). People with AIDS get infections very easily, called opportunistic infections, because their immune system is so damaged. With no treatment, people with AIDS usually survive about 3 years. People are diagnosed with AIDS when their CD4 cell count drops below 200.

According to the CDC, about 50,000 people are infected with HIV every year. The majority of infections occur in African Americans and men who have sex with men (MSM).

The only way to avoid HIV is to abstain from sex or be in a monogamous long-term relationship with someone who has tested negative. In 2014, there were 290 confirmed new cases of HIV in Shelby County (table 28).

Table 28 Incidence of HIV in Shelby County, 2014

Number of Total Confirmed Cases for 2014	290
2014 incidence rate per 100,000	30.89
Age (yrs)	
Mean	34.2 years
Median	30 years
Min. - Max.	0- 74 years

Highlights

The trend of HIV infections in Shelby County over the past 10 years has shown a mostly downward trend since 2007 (figure 41). In 2007, Memphis was awarded the Ryan White Part A and Minority AIDS Initiative funding. This is a federally funded program which provides services to people with HIV who are low income and/or uninsured/underinsured. For more information, please visit www.hivmemphis.org.

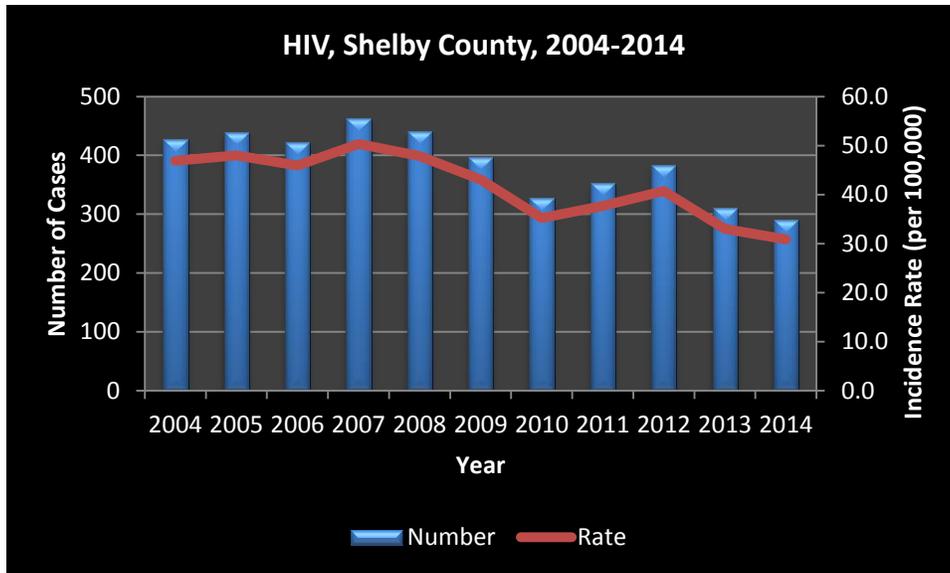


Figure 41 Number of Cases and Incidence Rate of HIV, Shelby County, TN, 2004-2014

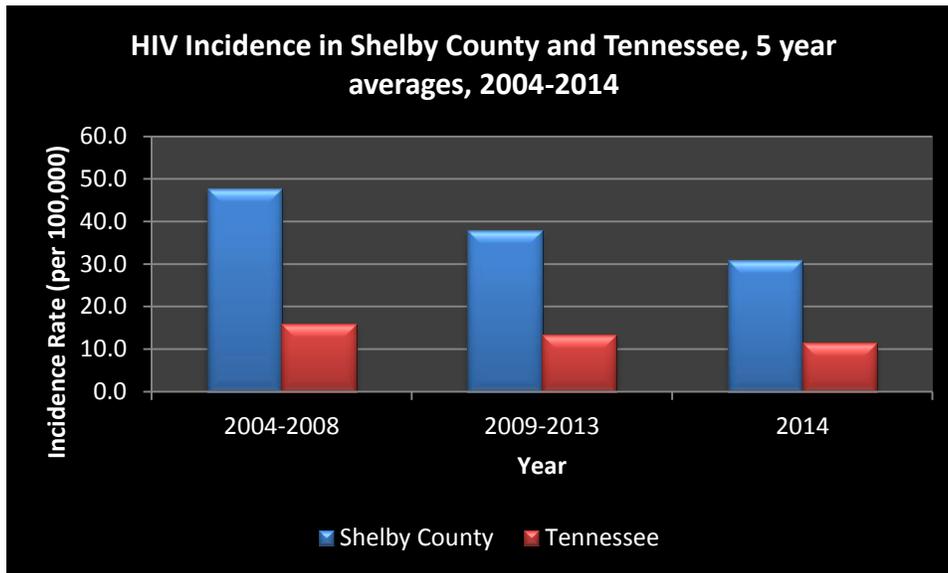


Figure 42 HIV Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2004-2014

Since 2004, the incidence of HIV in Shelby County has been significantly higher compared to incidence of HIV in Tennessee (figure 42). Both rates are steadily decreasing.

For additional information on HIV and STDs, please refer to the HIV Disease and STD Annual Surveillance Summary 2014 at <http://shelbycountyttn.gov/DocumentCenter/View/22479>.

RESPIRATORY AND AIRBORNE DISEASES 10|TEN

The respiratory diseases reported in Shelby County include the novel influenza A or the pandemic strain of H1N1 in 2009, influenza associated pediatric deaths and Legionellosis (Legionnaire's Disease). Influenza associated pediatric deaths are reportable; fortunately there were no influenza associated pediatric deaths or novel influenza virus cases reported in Shelby County in 2014 (table 29).

Table 29 Incidence of Respiratory Diseases in Shelby County, 2014

Reportable Disease	Case Status				
	Confirmed case	Not a case	Probable case	Suspect case	Total
Novel Influenza A	--	--	--	--	--
Influenza Associated Pediatric Deaths	--	--	--	--	--
Legionellosis	56	2	0	1	59
Tuberculosis	52	--	--	--	52
Total	108	2	0	1	111



Influenza is an acute viral disease caused by multiple strains of respiratory viruses, primarily characterized by fever, body aches, sore throat and a cough. Although influenza infections are not routinely reportable, they do contribute significantly to disease morbidity and mortality, particularly for infants, elderly persons and those with compromised immune systems. Annual vaccinations can protect people from infection or reduce symptoms for those who get infected. However, vaccination rates remain low. During the 2014-2015 influenza season, Influenza A (H3N2) viruses predominated. The season was moderately severe with overall high levels of outpatient illness and influenza-associated hospitalizations. The majority of the H3N2 viruses in circulation had drifted from the vaccine strain and resulted in reduced vaccine effectiveness. Influenza vaccination coverage among children in the United States increased by 0.4% compared to the 2013-2014 season (59.3% versus 58.9%). Flu vaccination coverage among adults increased by 0.7% compared to the 2013-2014 season (43.6% versus 42.2%). Flu vaccination rates in Tennessee decreased from 52.7% in the 2012-2013 season to 48.8% in the 2013-2014 season.

Influenza season in Tennessee began in mid-October 2014 and continued until early May 2015, with the peak months of disease transmission and intensity of reported cases occurring from November 23, 2014- February 7, 2015 (figure 43). The predominant virus circulating was Influenza A (H3N2), although Influenza B viruses were also circulating towards the end of the season. The annual epidemic in Tennessee mirrored what was being reported nationally.

**Influenza Positive Tests Submitted to TN Dept. of Health Laboratory Services
Tennessee, 2014-2015**

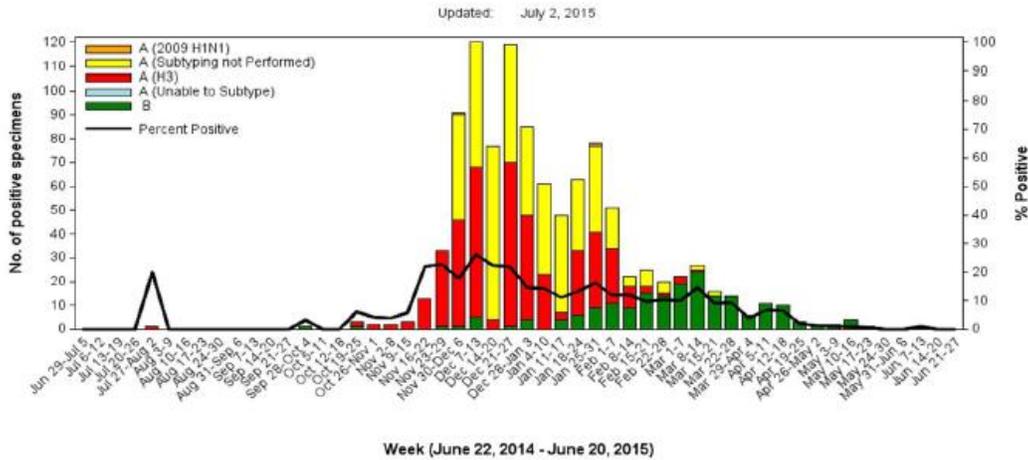


Figure 43 Distribution of influenza positive tests over the 2014-2015 influenza season

LEGIONELLOSIS

Summary of Disease

Legionellosis is a respiratory disease caused by strains of bacteria from the *Legionella* species. Many of these bacteria can cause illness, but most cases of Legionellosis are caused by *Legionella pneumophila* serotypes 1-6. *Legionella* species are bacteria that live primarily in warm moist environments, including soil and warm water that is 75-125 ° F in temperature. Symptoms of Legionellosis include cough, fever, fatigue, difficulty breathing and pneumonia. The incubation period ranges from 2 to 10 days, with an average of 5-6 days. Most cases of Legionellosis are sporadic cases that cannot be associated with a particular source or exposure, but outbreaks have been associated with decorative fountains, air conditioning systems, hot tubs and hot water systems in hotels or hospitals. People with a history of smoking or other conditions and exposures that damage the lungs and people older than 55 years old are at increased risk to become infected and develop the disease. In 2014, there were 56 confirmed cases of Legionellosis (table 30).

Table 30 Incidence of Legionellosis in Shelby County, 2014

Number of Confirmed Cases for 2014	56
2014 incidence rate per 100,000	5.97
Age (yrs)	
Mean	52.9 years
Median	52.5 years
Min. - Max.	20 years- 92 years

Highlights

The trend of legionella cases in Shelby County over the past 10 years has shown a mostly upward trend since 2004. There was a 75% increase in the number of cases reported to Shelby County Health Department from 2013 to 2014 (figure 44).

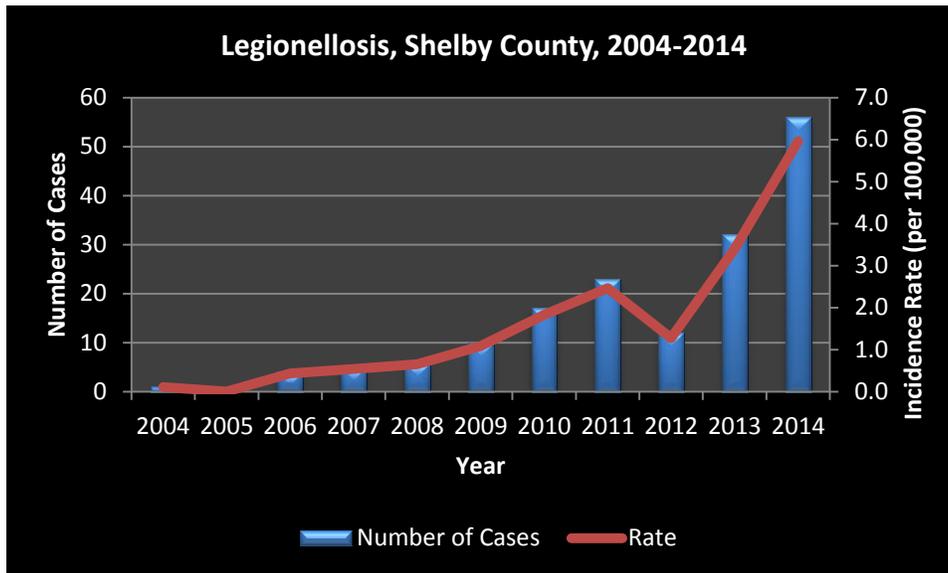


Figure 44 Number of Cases and Incidence Rate of Legionellosis, Shelby County, TN, 2004-2014

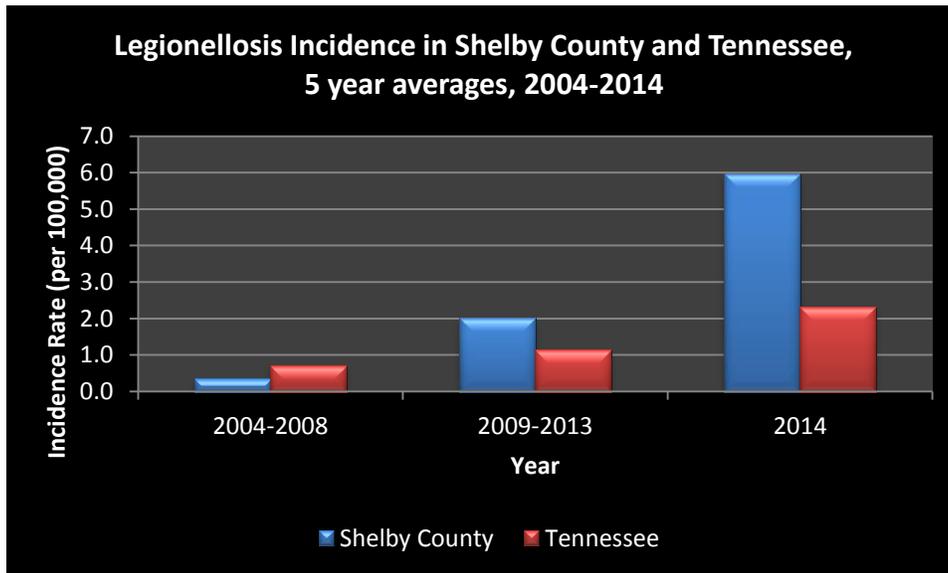


Figure 45 Legionellosis Incidence Rate by 5 Year-Averages, Shelby County and Tennessee, 2004-2014

Since 2004, the number of legionella cases has steadily increased in Shelby County and Tennessee as a whole (figure 45). It is unknown why the number of cases are increasing though it could be due to better awareness of the disease and more testing.

TUBERCULOSIS

Tuberculosis (TB) is caused by the bacterium *Mycobacterium tuberculosis*. It is spread through the air from one person to another when a person infected with TB disease coughs, sneezes, speaks, or sings. There are two types of Tuberculosis; latent TB infection and TB disease. In most people who breathe in TB bacteria and become infected, the body can fight off the bacteria. This is called

latent TB infection. People who have latent TB infection do not feel sick and do not have symptoms. People with latent TB infection are not infectious. If the TB bacteria start to grow and multiply, the person will become sick with TB disease. This occurs when the body's immune system cannot fight off the bacteria. People with TB disease are infectious and can easily spread the disease to others. Symptoms of TB disease include a bad cough that lasts for 3 weeks or longer, coughing up blood or sputum, weakness, weight loss, fever, chills and night sweats.

Some people have a higher risk of developing TB disease than others, including people living with HIV, people who have been recently infected with TB, people with other health issues, people who abuse alcohol or illegal substances or people who were not treated properly for TB in the past.

Treatment exists for TB infection and disease. Treatment of latent TB infection reduces the risk that it will progress to TB disease. TB disease can be treated by taking several drugs, usually for 6 to 9 months. If the full course of treatment is not completed correctly, the bacteria still left in the body can become resistant to those drugs. TB that is resistant to certain drugs is harder and more expensive to treat.

In 2014, there were 52 cases of TB in Shelby County (table 31).



Table 31 Incidence of Tuberculosis in Shelby County, 2014

Number of Confirmed Cases for 2014	52
2014 incidence rate per 100,000	5.54
Age (yrs)	
Mean	38.8 years
Median	42 years
Min. - Max.	1- 68 years

Highlights

The trend of TB infections in Shelby County over the past 6 years has shown an upward downward trend (figure 46). The number of new cases has remained stable at approximately 50 new cases per year.

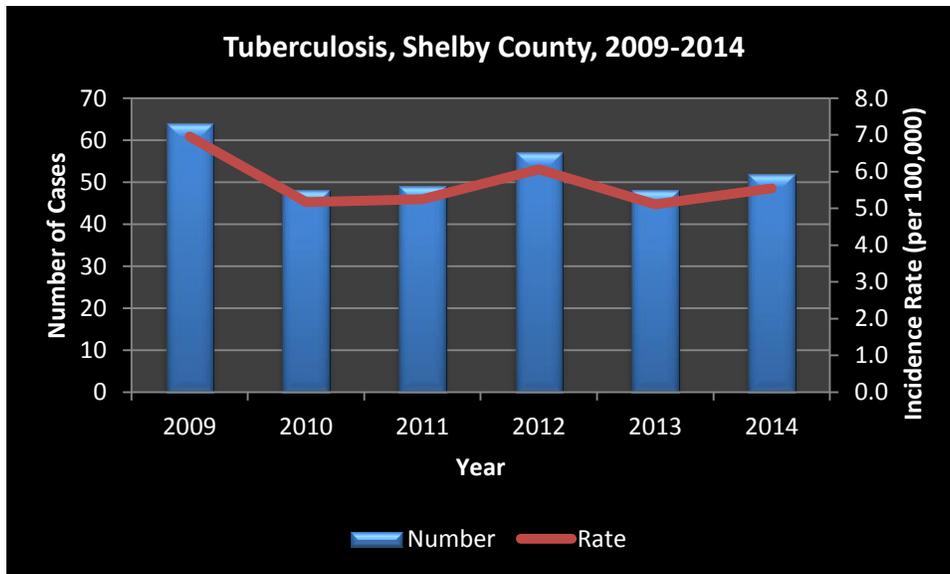


Figure 46 Number of Cases and Incidence Rate of Tuberculosis, Shelby County, TN, 2009-2014

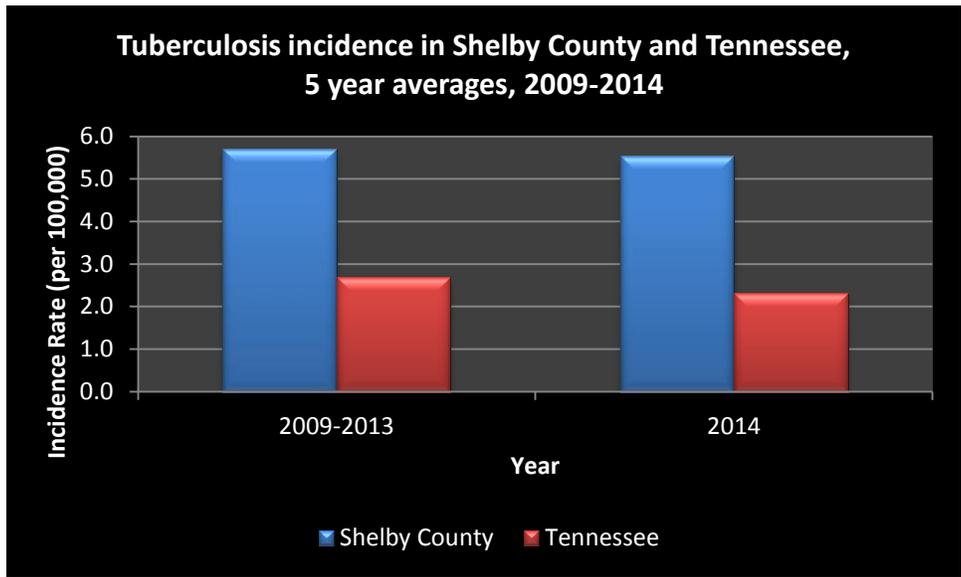


Figure 47 Tuberculosis Incidence Rate by 5 Year-Averages, Shelby County and Tennessee, 2009-2014

Since 2004, the incidence of TB in Shelby County has been significantly higher compared to incidence of TB in Tennessee (figure 47). Both rates are slowly decreasing.

DISEASE OUTBREAKS 11|ELEVEN

Every year, the Epidemiology Department investigates reports of disease outbreaks. In 2014, the Epidemiology Department conducted 10 outbreak investigations; 9 of them (90%) were caused by gastrointestinal diseases.

Table 32 Description of outbreaks in Shelby County, 2011-2014

	2011	2012	2013	2014
Total number of outbreaks	2	3	7	10
Number of outbreaks by type				
Gastrointestinal	2 (100%)	2 (66%)	6 (86%)	9 (90%)
Rash	0	0	0	0
Influenza-like illness	0	0	0	0
Other	0	1 (33%)	1 (14%)	1 (10%)
Number of outbreaks by facility				
Restaurant/catering	1 (50%)	0	1 (14%)	1 (10%)
Senior living	0	1 (33%)	3 (43%)	7 (70%)
Hotel/resort	0	0	0	0
School/childcare	1 (50%)	2 (66%)	1 (14%)	2 (2%)
Hospital/HC facility	0	0	1 (14%)	0
Other	0	0	1 (14%)	0

Ebola Hemorrhagic fever, otherwise known as Ebola, was first discovered in 1976 in Zaire. Since then, outbreaks have sporadically appeared in Africa. It is caused by the Ebola virus. There are 5 species; Zaire, Sudan, Bundibugyo, Tai Forest, and Reston. The Reston virus has caused disease in nonhuman primates, but not humans.

The natural reservoir for Ebola remains unknown. Some researchers believe that bats are the most likely reservoir based on the nature of similar viruses, including Marburg, Ebola's sister virus. Transmission occurs through direct contact with blood, secretions, organs or other bodily fluids of infected animals such as chimpanzees, gorillas, fruit bats, antelopes and porcupines found dead in the forest. It then spreads through human-to-human transmission via direct contact with blood, secretions, organs or other bodily fluids of infected people. Healthcare workers have frequently been infected while treating patients with suspected or confirmed Ebola without wearing proper personal protective equipment. Burial ceremonies in which mourners have direct contact with the body of the deceased person can also play a role in the transmission of Ebola. Recently, it was discovered that sexual transmission from patients who have recovered from Ebola can't be ruled out. There is now evidence that live Ebola virus can be isolated in seminal fluids (semen) of men who have recovered from Ebola virus infection for almost 3 months after onset of symptoms.

Symptoms include a fever, fatigue, muscle pain, sore throat, vomiting, diarrhea, rash, internal/external bleeding, hiccups, and eventually death in 30-90% of cases, depending on the strain. There is no treatment for Ebola, only supportive therapy.

In December 2013, a child in Guinea passed away from an undiagnosed hemorrhagic fever. It would later be recognized that this was the start of the largest Ebola epidemic in history. Ebola quickly spread from Guinea to Liberia and Sierra Leone. In August 2014, the WHO declared the Ebola epidemic an "international health emergency". Also in August, Ebola had spread to Nigeria and Senegal. However, due to quick control measures the outbreaks in those countries were contained. In October 2014, the United States, and other countries around the world, started conducting enhanced Ebola screenings at airports and put in place strategies to prevent Ebola from spreading further.

These strategies included the following: Travelers from Sierra Leone, Guinea, and Liberia could only fly into one of 5 airports around the United States. After passport review, the travelers from Guinea, Liberia, and Sierra Leone would be escorted by Customs and Border Protection officials to an area of the airport set aside for screening. The trained CBP staff would then observe the travelers for signs of illness, ask them a series of health and exposure questions and provide health information for Ebola and reminders to monitor themselves for symptoms. Trained medical staff then would take their temperature with a non-contact thermometer. If the travelers exhibited a fever, symptoms or the health questionnaire revealed possible Ebola exposure, they would then be evaluated by a CDC quarantine station public health officer. The public health officer would take their temperature again and make a public health assessment. Travelers who were deemed to require further evaluation or monitoring would be referred to the appropriate public health authority. Travelers from these countries who had neither symptoms/fever nor a known history of exposure would be able to continue on to their final destinations.

The CDC employees would then contact the Department of Health in the receiving state. If a traveler was coming to Memphis, the Tennessee Department of Health would contact the Epidemiologists at Shelby County Health Department. Once the Epidemiologists had been notified, they would then contact the traveler to set up an in-person meeting to conduct an initial assessment. During the initial assessment, the traveler's demographic, risk factor and health information would be collected. The travelers temperatures would be again taken during the initial assessment and the travelers would be contacted once a day for the next 21 days in order to monitor their temperatures.

Meetings would be conducted with the travelers chosen hospital to inform them of the situation. During the meeting, infection control and procedures would be discussed should a traveler become ill during their monitoring period.

Liberia and Sierra Leone were declared free from Ebola transmission on May 9 and November 7, respectively. Guinea was declared free from Ebola on December 29, 2015. The West African Ebola outbreak took two full years to control. There were a total of 11,315 deaths and 15,249 laboratory-confirmed cases.

VECTOR-BORNE DISEASES 13 | THIRTEEN

The vector-borne diseases reported in Shelby County in 2014 included the following: Lyme Disease, Malaria, Spotted Fever Rickettsiosis, West Nile Virus, Ehrlichiosis, Q Fever, and Dengue. In 2014, there were 194 cases of vector-borne diseases reported in Shelby County (table 33). Confirmed vector-borne diseases accounted for 1.1% of all reportable diseases (8/723) in Shelby County for 2014.

Confirmed, probable and suspect cases accounted for 32% (62/194 cases) of vector-borne diseases for 2014 (table 33). The most clinically significant vector-borne disease in Shelby County which receives the most attention and prevention efforts is West Nile Virus. In 2014, there were a total of 10 cases of West Nile Virus in Shelby County. 3 of these cases were confirmed cases and 7 were probable cases.

There was one Vector-borne disease in Shelby County that is not endemic to the region and was acquired as a result of international travel in 2014; Malaria.

Malaria is caused by a parasite that infects the Anopheles mosquito, which feeds on humans. Malaria can be a very serious and sometimes fatal disease. The symptoms of malaria usually include fever and a flu-like illness, including chills, headache, muscle aches, tiredness and occasionally nausea, vomiting, and diarrhea. Most people begin to feel sick 10 days to 4 weeks after infection although some people may feel ill as early as 7 days or as late as 1 year later. Malaria is not spread from person to person, only through the bite of an infected mosquito. Prompt and effective treatment of all cases is essential to reduce the risk of severe disease and prevent death. Any traveler outside of the United States, Canada and Western Europe may be at risk for malaria. Large areas of Central and South America, Africa, South and Southeast Asia, the Middle East and Oceania are considered malaria-risk areas. The CDC provides information about precautions that travelers should take if visiting an area with a malaria risk. A healthcare provider can decide on the best antimalarial drugs depending on a traveler's plans, medical history, age, drug allergies and other health factors. Travelers should visit a healthcare provider at least 4 to 6 weeks prior to traveling to allow time for the medication to become effective.

Table 33 Incidence of Vector-Borne Diseases in Shelby County, 2014

Reportable Disease	Case Status				Total Investigated
	Confirmed case	Probable Case	Suspect case	Not a case	
Dengue Fever	0	0	0	2	2
Lyme Disease	0	0	19	38	57
Malaria	3	0	0	0	3
Spotted Fever Rickettsiosis	0	10	12	52	74
‡West Nile Virus	3	7	0	32	42
Ehrlichiosis	2	5	1	5	13
Q Fever	0	0	0	3	3
Total	8	22	32	132	194

‡West Nile Virus cases include neuroinvasive and non-neuroinvasive cases



LYME DISEASE

Summary of Disease

Lyme disease is caused by a bacterium called *Borrelia burgdorferi*. This bacterium is transmitted to humans by the bite of an infected blacklegged tick. White-tailed deer ticks (*Ixodes Scapularis*) are the most likely type of tick that transmits Lyme disease in the eastern U.S.

In approximately 80% of those with Lyme disease, the first symptom is a characteristic “bull’s-eye” rash called erythema migrans. This rash usually develops 3 to 32 days after infection. Other early symptoms of Lyme disease include fever, headache, fatigue, malaise, stiff neck, muscle pain, joint pain, or swollen lymph nodes. These symptoms may last several weeks if untreated. Neurological symptoms such as aseptic meningitis and cranial neuritis may develop within weeks or months after the rash develops. Cardiac abnormalities may occur within weeks after rash onset. Weeks to years after illness onset, intermittent episodes of swelling and pain in large joints may develop and recur for several years, ultimately leading to chronic arthritis. Infection with Lyme disease usually occurs in summer, peaking in June and July. Prevention measures include insect repellent, avoiding areas with lots of ticks, checking your skin and clothes for ticks every day, removing the ticks promptly, and landscaping and integrating pest management. Patients with Lyme Disease are not infectious. There is no evidence that Lyme disease can be transmitted from air, food, water, sexual contact, insects such as mosquitoes, flies, or directly from wild or domestic animals.

Treatment normally includes oral antibiotics administered over a few weeks. Doxycycline, amoxicillin, or cefuroxime are the most common antibiotics prescribed. If patients have some neurological or cardiac forms of the illness they may take ceftriaxone or penicillin intravenously. If the patient was diagnosed at a later stage of the disease and the symptoms continue to reoccur, they may need a second four week course of therapy.

Table 34 Incidence of Suspect Lyme Disease in Shelby County, 2014

Number of Suspect Cases for 2014	19
2014 incidence rate per 100,000	2.02
Age (yrs)	
Mean	33.2 years
Median	37 years
Min. - Max.	7 years- 63 years

Highlights

There were no confirmed or probable cases of Lyme disease in Shelby County in 2014 (figure 48). There were 19 cases that were suspected to have an exposure, typically while traveling to areas of the country where Lyme disease is endemic (table 34). This is an increase from the 14 suspected cases in 2013.

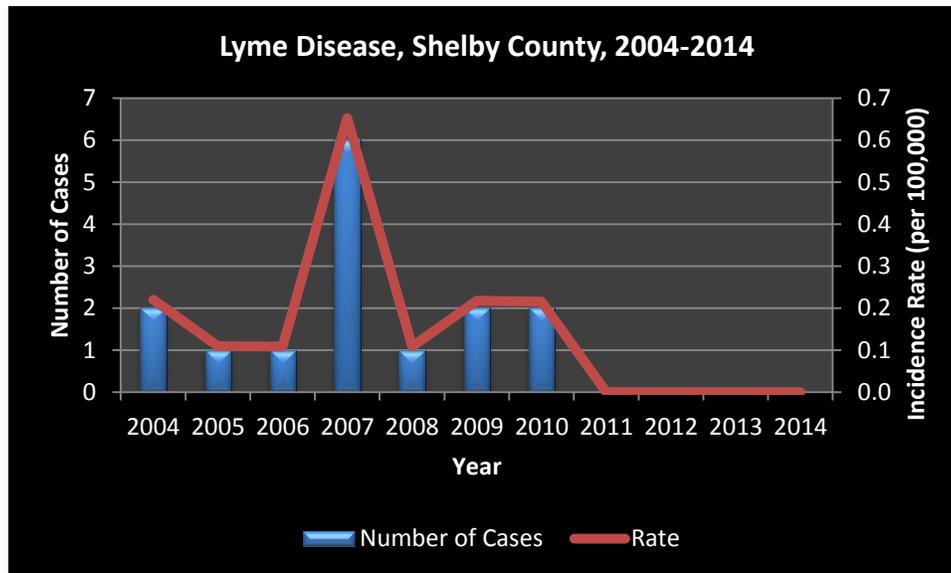


Figure 48 Number of Cases and Incidence Rate of Confirmed Lyme Disease, Shelby County, TN, 2004-2014

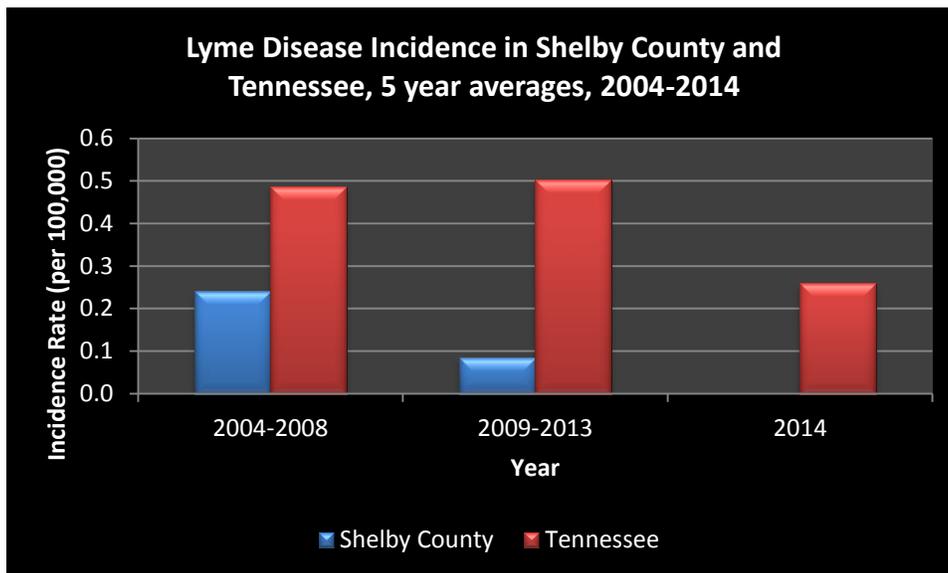


Figure 49 Lyme Disease Incidence Rate by 5 Year-Averages, Shelby County and Tennessee, 2004-2014

Since 2004, the number of new Lyme Disease cases has decreased to zero in Shelby County. In Tennessee, the number of cases increased in 2009-2013 and then drastically decreased in 2014 (figure 49).

SPOTTED FEVER RICKETTSIOSIS

Summary of Disease

Spotted Fever Rickettsiosis is a tick-borne illness caused by *Rickettsia rickettsii*, a bacterial pathogen transmitted to humans through contact with ticks. Illness is characterized by acute onset of fever, and may be accompanied by headache, malaise, myalgia, nausea/vomiting, or neurologic signs; a macular or maculopapular rash appears 4-7 days following onset in many (~80%) patients, often present on the palms and soles. RMSF may be fatal in as many as 20% of untreated cases, and severe, fulminant disease can occur.

Rickettsia rickettsii can be transmitted to humans by ticks of the genera *Dermacentor*, *Amblyomma*, *Rhipicephalus*, and *Haemaphysalis*. The American dog tick (*Dermacentor variabilis*) and Rocky Mountain wood tick (*Dermacentor andersoni*) are the primary vectors and can live on small mammals, dogs, rabbits, and birds as hosts. Like other large mammals, humans are dead-end hosts. Transmission of the disease to humans typically requires that the tick be attached for at least 24-36 hours. Humans do not transmit the disease to other humans

Because ticks transmit RMSF, limiting exposure to tick habitats is the best way to prevent the disease. Personal protection in tick habitats is also effective. Prompt removal of crawling or attached ticks is an important method of preventing disease.

To remove an attached tick:

1. Grasp the tick near the mouthparts with fine-tipped tweezers.
2. Remove gently to avoid leaving mouthparts embedded in skin.
3. Disinfect the bite site and wash hands with soap and water

Table 35 Incidence of probable/suspect Spotted Fever Rickettsiosis in Shelby County, 2014

Number of Probable/Suspect Cases for 2014	22
2014 incidence rate per 100,000	2.34
Age (yrs)	
Mean	44 years
Median	42.5 years
Min. - Max.	13 years- 82 years

Highlights

Although there were no confirmed cases of Rocky Mountain Spotted Fever in Shelby County in 2014, there were 10 probable cases and 12 cases that were suspected to have an exposure (table 35). In this instance, we will report on those cases.

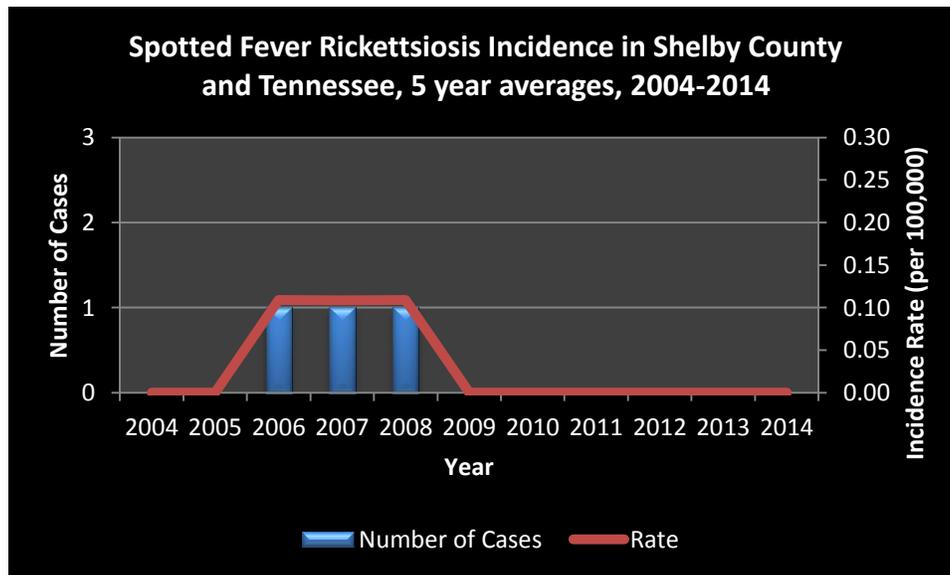


Figure 50 Number of Cases and Incidence Rate of Confirmed Spotted Fever Rickettsiosis, Shelby County, TN, 2004-2014

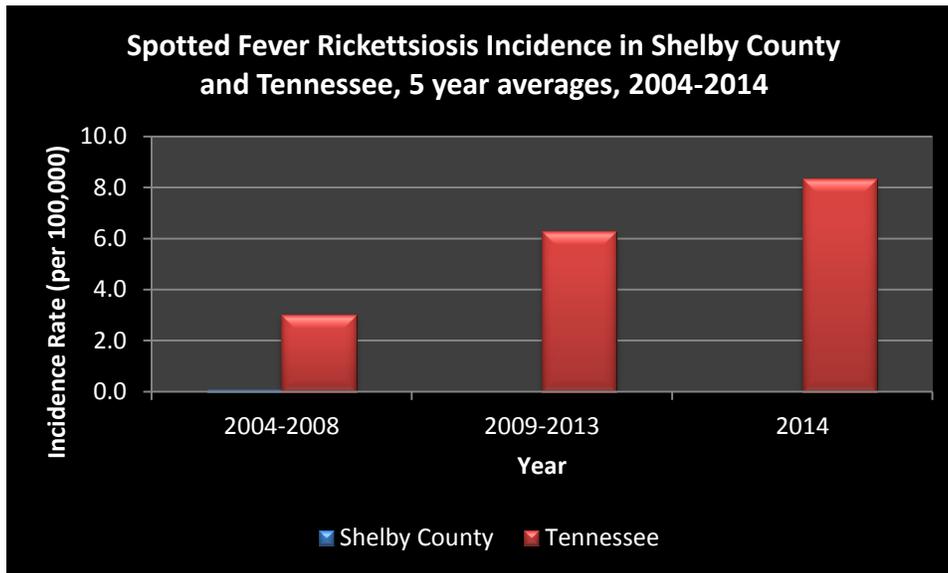


Figure 51 Spotted Fever Rickettsiosis Incidence Rate by 5 Year-Averages, Shelby County and Tennessee, 2004-2014

Since 2004, there has been a significant increase in the number of spotted fever rickettsiosis cases in Tennessee, while there have been negligible amounts in Shelby County (figure 51).

WEST NILE VIRUS

Summary of Disease

West Nile Virus (WNV) is a potentially serious illness that is transmitted by mosquitoes. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes can then transmit the virus to humans and animals while biting to take a blood meal. The virus may be injected into the animal or human while the mosquito is feeding, possibly causing illness. Although extremely rare, WNV also has been spread through blood transfusions, organ transplants, breastfeeding, and from mother to baby during pregnancy.

WNV does not cause any symptoms in approximately 80% of those infected. Of the 20% that develop symptoms, illness can include fever, headache, body aches, nausea, vomiting and sometimes swollen lymph nodes or a skin rash on the chest. These symptoms may last as short as a few days and long as several weeks. Less than 1% of persons infected with WNV will develop severe illness. Severe symptoms may include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. These symptoms may last several weeks, and neurological symptoms could be permanent.

People who do become ill usually develop symptoms between 3 and 14 days after being bitten by an infected mosquito. There is no specific treatment for WNV infection. In milder cases, symptoms usually pass without treatment, although illness may last weeks to months. In more severe cases, people usually need to go to the hospital to receive supportive care such as intravenous fluids, help with breathing and nursing care.

Highlights

West Nile Virus was first detected in the bird population of Shelby County, Tennessee late in the season of 2001. The first human case occurred in September 2002, and there have been a total of 157 cases of WNV and 13 deaths through 2014. The majority of human cases of West Nile Virus within the state of Tennessee since 2002 have occurred in Shelby County.

Table 36 Human Cases of West Nile Virus and Deaths, Shelby County, 2002-2014

Year	Total Number of Cases*	Fatalities
2002	40	7
2003	10	0
2004	12	0
2005	13	0
2006	14	0
2007	5	0
2008	10	1
2009	5	1
2010	2	0
2011	12	2
2012	15	0
2013	9	**1
2014	10	1
Total	157	13

*Case Counts include both confirmed and probable cases as determined by the case definitions established by the Centers for Disease Control and Prevention.

**Case Diagnosed in 2013 but died in 2014

The 2014 season had a similar level of activity for West Nile Virus in Shelby County compared to the previous season. For the entire season, there were a total of 10 cases (See Table 37 and 38) that were determined by the most recent standard criteria set forth by the Centers for Disease Control and Prevention (CDC). Of these 10 cases, three were confirmed and seven were probable. In 2014, there was one human fatality due to West Nile.

Table 37 Incidence of West Nile Virus neuroinvasive disease in Shelby County, 2014

Number of Probable/Confirmed Cases for 2014	7
2014 incidence rate per 100,000	0.75
Age (yrs)	
Mean	54.6 years
Median	67 years
Min. - Max.	18 years- 80 years

Table 38 Incidence of West Nile Virus non-neuroinvasive disease in Shelby County, 2014

Number of Probable/Confirmed Cases for 2014	3
2014 incidence rate per 100,000	0.32
Age (yrs)	
Mean	52 years
Median	57 years
Min. - Max.	41 years- 58 years

For additional information, please refer to the 2014 Shelby County West Nile Virus Report at <http://www.shelbycountyttn.gov/DocumentCenter/View/20283>

CARBON MONOXIDE POISONING

Summary

Carbon monoxide (CO) is an odorless, colorless, and poisonous gas. CO poisoning occurs when unsafe amounts of CO gas is inhaled. Certain groups that are more easily affected by carbon monoxide poisoning include unborn babies, infants, children, pregnant women, people with chronic health conditions and smokers. Males are more likely to die from CO poisoning than females, which is attributed to high-risk behaviors such as working in enclosed spaces with combustion-engine-driven tools. The CO poisoning death rate is highest among persons ≥ 65 years of age. CO poisoning often causes dizziness, headache, nausea, and shortness of breath. CO poisoning can cause death within minutes inside enclosed, semi-enclosed, or poorly ventilated areas. About 50% of all carbon monoxide poisonings occur inside the home, 40% are automobile-related, and 10% occur at work. It is produced by incomplete combustion of fuel. Operating or burning the following may produce CO:

- Gas furnaces and water heaters
- Cars, trucks, boats, and other vehicles
- Small gasoline-powered equipment like generators, weed trimmers, and chain saws
- Gas stoves, cooktops, and ovens
- Gas lanterns
- Wood and gas fireplaces
- Charcoal and wood stoves
- Any heating system or appliance that burns gas, oil, wood, gasoline, propane, or kerosene

A thorough medical history may provide clues that a patient has CO poisoning. Providers should ask specifically about home appliances used for heating, cooking and electrical generation and whether there has been any recent work to home heating or hot water systems. People who live or work together and present with similar, nonspecific symptoms increase the index of suspicion. Common symptoms of CO exposure include headache, dizziness, flushing, fatigue, nausea, vomiting, weakness and confusion.

Highlights

Carbon Monoxide poisoning has only recently been listed as a reportable disease in the state of Tennessee. Shelby County started collecting Carbon Monoxide poisoning data in 2013. In 2014, there were 8 confirmed cases of Carbon Monoxide poisoning.

LEAD POISONING

Summary

Lead affects the central nervous system and can interfere with the production of hemoglobin (which is needed to carry oxygen to cells) and with the body's ability to use calcium. The most common symptom of acute lead poisoning is colicky abdominal pain evolving over days to weeks. Constipation, diarrhea, and nonspecific complaints of irritability, fatigue, weakness and muscle pain may also occur. Lifelong effects, such as lowered IQ, learning disabilities and behavioral problems, can result from lead exposure. At very high levels, seizures, coma, and even death have also been reported.

Routes of exposure to lead include contaminated air, water, soil, food, and consumer products. Occupational exposure is a common cause of lead poisoning in adults. One of the largest threats to children is lead paint that exists in many homes, especially older ones; thus children in older housing with chipping paint are at greater risk. Over the long term, lead poisoning in children can lead to learning disabilities, behavior problems, and mental retardation. At very high levels, lead poisoning can cause seizures, coma, and even death. Lead is ingested or inhaled. The most common source of lead exposure is **inhalation** of lead containing dust.

A blood lead test is the **only** way to know if a child has been exposed to lead. There is no natural level of lead in the blood. The CDC defines lead poisoning as a blood lead level ≥ 5 $\mu\text{g/dL}$ from a venous specimen.

Highlights

Shelby County Childhood Lead Poisoning Prevention Program (CLPPP) conducts a variety of activities including screening children in high-risk areas at Head Start centers and local health fairs and identifying and providing case management of lead-poisoned children.

Table 39 CLPPP Childhood Lead Screenings 2004-2014

Year	Total Number of Initial BLL Screening Tests	Initial BLL > 10	Initial BLL 5 - 9
2004	16,486	254	2,762
2005	16,091	174	1,961
2006	15,139	134	1,124
2007	16,244	100	1,415
2008	18,497	101	1,999
2009	17,780	101	1,347
2010	18,344	127	946
2011	21,017	178	831
2012	18,246	66	721
2013	19,027	99	537
2014	13,682	100	351

Data from: [srch_blood_2013_2014_Shelby_LT78mo](#)



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