

**Kent County Health Department  
2009 Communicable Disease Summary**

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# Introduction

## Historical perspective on infectious diseases

In 1900, the three leading causes of death were pneumonia, tuberculosis (TB), and diarrhea. From the 1930s to the 1950s, local health departments made substantial gains in disease control resulting from improvements in water treatment, food safety, housing, animal control, hygiene education, and solid waste and sewage disposal. The scientific discovery of human and animal vaccines and universal human vaccination programs further helped to control diseases. Vaccination programs almost completely eliminated common diseases in the U.S. such as diphtheria, tetanus, poliomyelitis, smallpox, measles, mumps, rubella, and *Haemophilus influenzae*. In the 1940s, the scientific discovery of antibiotics that treated staphylococcal, streptococcal, gonorrhea, syphilis, and other infections prevented death and prolonged life. More recent discoveries have included drugs that treat viral diseases, fungal diseases, and parasitic diseases.

By the 1970s and early 1980s, complacency led to the neglect of TB control efforts and the re-emergence of new TB cases between 1985 and 1992. When this resurgence led to focused attention and funding, TB began to decline after 1992. The appearance of AIDS during the 1980s and the increase in infectious disease mortality in the 1980s and 1990s made it apparent that as long as microbes continue to change, new diseases will appear.

## Emerging and Re-emerging Infections –Microbial Threats to Public Health

A decade ago, the National Institute of Medicine (NIM) released the report entitled, "Emerging Infections, Microbial Threats to Health in the United States." The report emphasized that infectious diseases were a threat to our national security, and new "wonder" drugs and vaccines had made us complacent about them. In 2003, the follow up report titled "Microbial Threats to Health" was released affirming that concerns about infectious diseases had only increased.

In the last decade, new pathogens (i.e. SARS, and H5N1 avian influenza) have been discovered, existing pathogens causing diseases thought to be eradicated (i.e. pertussis) have re-emerged, and existing pathogens have introduced new diseases to the U.S. (i.e. West Nile Virus, monkey pox and anthrax-associated bioterrorism). Former gains made in sexually transmitted diseases have slowed or reversed. In conjunction with these events, antimicrobial resistance has created new problems requiring new solutions.

The NIM explores thirteen factors that account for new and more serious microbial threats. A few of the factors are:

**Microbial Adaptation and Change.** Microbes can change rapidly and develop resistance to medications, making it more difficult to develop new drugs and vaccines.

➤ In Kent County, we have seen cases of methicillin resistant staphylococcus aureus and quinolone resistant gonorrhea.

**Human Vulnerability.** Humans have become more susceptible to infections because of the excessive use of antibiotics in the past. Additionally, impaired immune systems (i.e. from chronic conditions such as diabetes, cancer, AIDS, etc), inherited genetic makeup and malnutrition make humans more vulnerable to infections.

**Climate and Weather.** Organisms and vectors tend to replicate, move, and evolve during and after changes in the weather. This can have a direct effect on disease transmission.

➤ In Kent County, we have seen this with West Nile Virus. As temperatures increase and stagnant pools of water remain after rains, ideal conditions are created for mosquitoes to breed.

**Economic Development and Land Use.** With the population increasing, there is increased need for housing and meat, leading to deforestation and increased contact between humans and animals. This has been noticed in Asia where people who live in close proximity to animals have acquired SARS and Avian Influenza.

➤ Locally, Eastern Equine Encephalitis has appeared in the deer population, posing a threat to deer hunters.

**Technology and Industry.** Advances in medicine, such as blood transfusions, and organ transplants have led to the development of new ways for infections to be transmitted.

➤ Locally, West Nile Virus was found to be transmitted through blood transfusions as recently as 2002.

**Human Demographics and Behavior.** Exposure to infectious diseases can occur through an individual's own behavior or population increases that place individuals in closer contact to one another.

➤ Locally, individuals have been exposed to sexually transmitted quinolone resistant gonorrhea, requiring a different approach to treatment.

**International Travel and Commerce.** Increased ability to travel throughout the world has created the opportunity for humans, animals, and foods to circulate pathogens and their vectors around the world.

➤ Locally, the health department encountered this issue in response to a measles exposure on an airline flight to Grand Rapids. After the exposed individuals arrived here, communicable disease unit staff located them and provided prophylaxis to prevent illness and control the spread of the disease.

**War and Famine.** Individuals may suffer from malnutrition and diseases as a byproduct of war. Movement from their country to another country allows for disease transmission to occur.

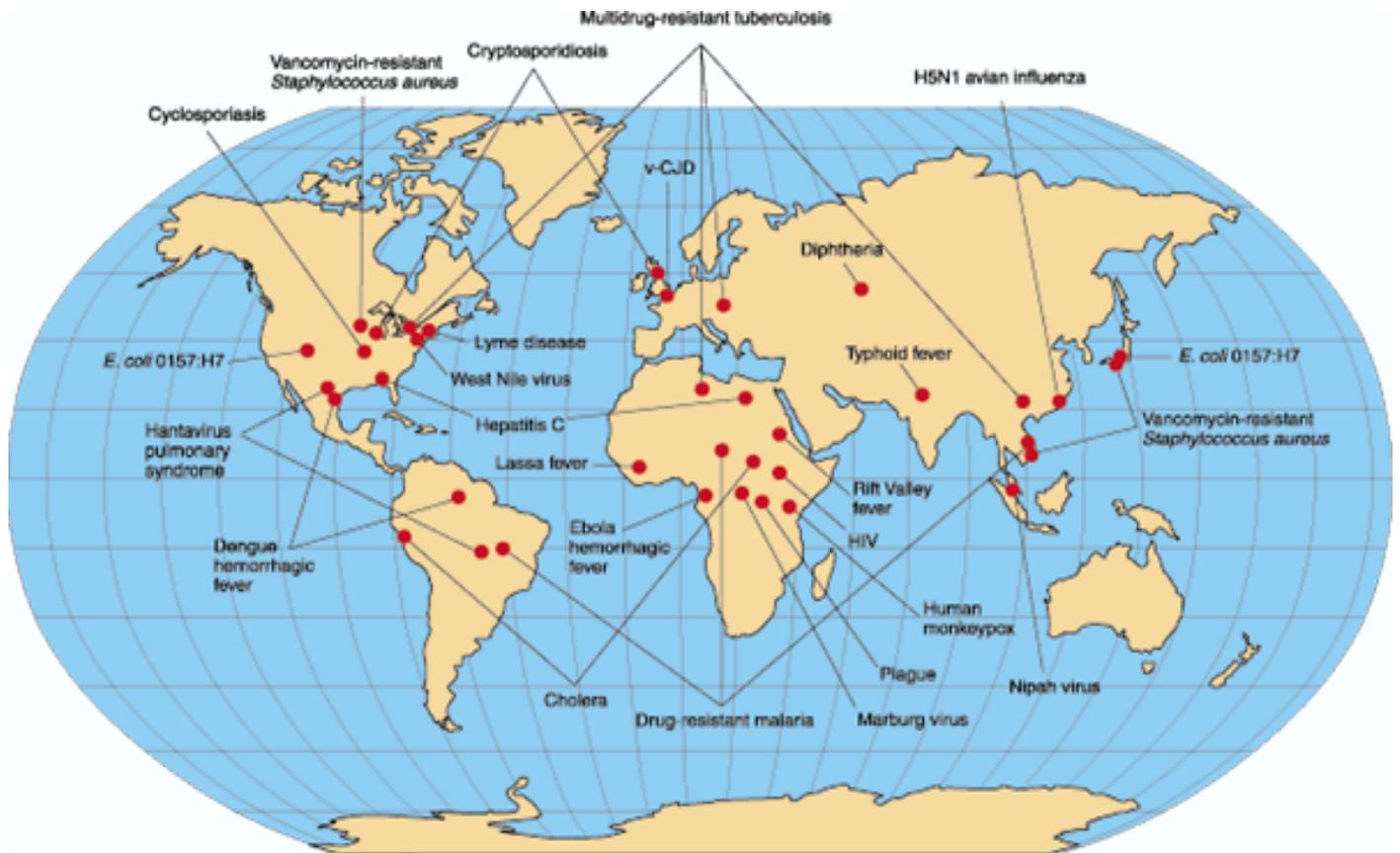
➤ Locally, the Kent County Health Department is responsible for screening refugees who come to our country to detect infections (i.e. giardiasis, HIV, etc.) that are endemic in their former country.

**Intent to Harm.** Since 9/11/2001, the U.S. has become more aware of the real danger of biological and chemical attacks posed by those who wish to harm American citizens.

➤ In 2003, the Health Department was faced with the grave reality that ground beef had been intentionally contaminated with a pesticide by a citizen at a local grocery store.

➤ **Breakdown of Public Health Measures.** In locations throughout the world (and in US states devastated by hurricanes), it is clearly apparent how infectious diseases can spread when basic public health measures such as drinkable water and sanitation are not in place.

## Examples of Emerging/Re-emerging Infectious Diseases



Source : National Institute of Allergy and Infectious Diseases, National Institutes of Health

## Communicable Disease/Epidemiology Unit at the Kent County Health Department

The Communicable Disease and Epidemiology (CD/Epi) Unit of the Kent County Health Department, under the leadership and guidance of the Kent County Medical Director, is staffed by an Epidemiology Supervisor, two Communicable Disease Nurses, two Epidemiologists, and one Clerical Staff. These professionals work together to monitor and control the spread of diseases in Kent County. This is accomplished through surveillance, contact tracing, provision of prophylaxis (antibiotics and antiviral medications), education, vaccinations, and the quarantine and isolation of patients when necessary. CD/Epi staff monitor communicable disease situations throughout the world that may have a potential impact on Kent County residents. Staff receive daily e-mails on emerging disease situations occurring locally, within the state, the nation and throughout the world. Kent County health care providers are updated on emerging disease situations by means of fax, phone, and e-mail messaging systems.

## What are reportable diseases ?

Reportable diseases are any disease, condition, infection or suspect occurrence of disease that is required under Michigan State Law (Section 5111 of Act. No. 368 of the Public Acts of 1978, as amended, being 333.511 of the Michigan Compiled laws) to be reported by physicians, labs, schools, daycares, and camps to the Kent County Health Department. Conditions should be reported without delay if the agent is identified by clinical diagnosis, direct examination, culture, serology, molecular techniques or by histopathology.

To report a communicable disease to the Kent County Health Department Communicable Disease Unit, call: (616) 632-7228 or fax : (616) 632-7085.

**The following are required by law to be reported by physicians without delay (updated 2010)  
This reporting is expressly allowed under HIPAA Communicable Disease Rules: R325.171, 172, 173**

Acquired Immunodeficiency Syndrome (AIDS)	HIV (Confirmed positive HIV serology and detection tests; CD4 counts/percents and all viral loads on people already known to be infected)
Anaplasma phagocytophilum ( <i>Anaplasmosis</i> )	Influenza virus (Weekly aggregate counts)
Bacillus anthracis ( <i>Anthrax</i> )	Individual cases of pediatric mortality
Blastomyces dermatitidis	Novel Influenza viruses
Bordetella pertussis ( <i>Pertussis</i> )	Kawasaki Disease
Borrelia burgdorferi ( <i>Lyme Disease</i> )	Leptospira species
Brucella species	Legionella species
Burkholderia pseudomallei & mallei species	Listeria monocytogenes
Calymmatobacterium granulomatis	Meningitis, viral & bacterial
Campylobacter jejuni	Measles virus ( <i>Rubeola</i> )
Chlamydia psittaci ( <i>Psittacosis</i> )	Mumps virus
Chlamydia trachomatis ( <i>Genital infections</i> ), (LGV)	Mycobacterium. leprae ( <i>Leprosy</i> )
Chlamydia trachomatis ( <i>Trachoma</i> )	Mycobacterium tuberculosis complex ( <i>Tuberculosis</i> )
Clostridium botulinum ( <i>Botulism</i> )	Neisseria meningitidis, sterile sites ( <i>Meningococcal Disease</i> )
Clostridium tetani ( <i>Tetanus</i> )	Orthopox viruses ( <i>Smallpox, Monkeypox</i> )
Coccidioides immitis ( <i>Coccidioidomycosis</i> )	Poliovirus
Corynebacterium diphtheriae ( <i>Diphtheria</i> )	Plasmodium species ( <i>Malaria</i> )
Coxiella burnetii ( <i>Q Fever</i> )	Rabies virus
Cryptococcus neoformans	Reye's Syndrome
Cryptosporidium species	Rheumatic fever
Cyclospora species	Rickettsia rickettsii ( <i>Rocky Mountain Spotted Fever</i> )
Dengue virus	Rickettsia species ( <i>Typhus Group</i> )
Ehrlichia species	Rubella virus
Encephalitis, viral	Salmonella species
California serogroup, Eastern & Western Equine,	Salmonella typhi ( <i>Typhoid Fever</i> )
Powassan, St. Louis, West Nile, Unspecified	Severe Acute Respiratory Syndrome (SARS)
Entamoeba histolytica ( <i>Amebiasis</i> )	Shigella species
Escherichia coli, O157:H7 and all other shiga toxin positive serotypes	Spongiform Encephalopathy ( <i>Includes CJD</i> )
Francisella tularensis ( <i>Tularemia</i> )	Staphylococcus aureus, vancomycin intermediate/resistant (VISA/VRSA)
Giardia lamblia	Staphylococcus aureus, (MRSA), outbreaks only
Guillain-Barre Syndrome	Streptococcus pyogenes, group A, sterile sites
Haemophilus ducreyi ( <i>Chancroid</i> )	Streptococcus pneumoniae, sterile sites, susceptible/resistant
Haemophilus influenzae, <15 years of age, sterile site	Toxic Shock Syndrome
Hantavirus	Treponema pallidum (Syphilis)
Hemolytic Uremic Syndrome (HUS)	Trichinella spiralis ( <i>Trichinosis</i> )
Hemorrhagic fever viruses	Varicella ( <i>Chickenpox</i> )
Hepatitis, viral	Vibrio species ( <i>Cholera</i> )
Hepatitis A virus, ( <i>Anti-HAV IgM</i> )	Yellow fever virus
Hepatitis B virus, ( <i>HBsAg</i> ), within 24 hours on pregnant women	Yersinia enterocolitica
Hepatitis C virus, ( <i>Anti-HCV</i> )	Yersinia pestis ( <i>Plague</i> )
Hepatitis D virus	Unusual occurrence, outbreak or epidemic of any disease or condition
Hepatitis E virus	
Histoplasma capsulatum	

## **How the report is organized**

This report was written for a broad audience. You will fall into one of the following categories:

**Expert-** You work in the health care field and you are familiar with communicable diseases, the organisms that cause them, their transmission cycle, symptoms etc. You may proceed directly to the disease subject heading and read about disease trends, who is affected, disease concerns, and new disease threats.

**Novice-** You may or may not work in the health care field but you need more background information on organisms that cause each disease, transmission cycles, symptoms etc. You will first want to look at the tables included in each disease subject heading titled "Diseases at a Glance."

**NA-** denotes data that is not available

# Gastrointestinal Illnesses

## Gastrointestinal Illnesses at a glance

### Organisms that cause the disease:

<i>Giardia</i>	<i>Campylobacter</i>	<i>Salmonella</i>	<i>Shigellosis</i>	<i>E Coli</i>	<i>Hepatitis A</i>
Parasite	Bacteria	Bacteria	Bacteria	Bacteria	Virus

### Reservoir for Disease (Animate or inanimate object where an organism lives, grows, and multiplies):

	<i>Giardia</i>	<i>Campylobacter</i>	<i>Salmonella</i>	<i>Shigellosis</i>	<i>E Coli</i>	<i>Hepatitis A</i>
<b>Animals</b>	Beavers	Birds & poultry	Reptiles	Primates	Cattle	
	Bears	Livestock	Livestock		Deer	
	Cats	Kittens	Poultry		Sheep	
	Dogs	Puppies			Rabbit	
		Rodents				
<b>Humans</b>	Small intestine		Intestine	Large intestine	Intestine	Intestine
<b>Food</b>	Contaminated, uncooked, or undercooked food.	Undercooked meat (especially poultry); unpasteurized milk	Contaminated, uncooked, or undercooked eggs, poultry, beef, fish; unpasteurized/ raw milk or other dairy products; contaminated fruits and vegetables	Contaminated salads, and vegetables	Contaminated, uncooked, or undercooked ground beef; contaminated sprouts, lettuce, salami; unpasteurized milk and juice; melons, coleslaw, apple cider	Contaminated food such as strawberries, lettuce, shellfish, raw produce
<b>Soil</b>	Found in soil				Found in soil after animal feces mixes with soil	
<b>Stool (human or animal)</b>	Found in stool	Found in stool	Found in stool	Found in stool	Found in stool	Found in stool
<b>Water</b>	Pools, tubs, Jacuzzis, lakes, rivers, springs, ponds, streams, fountains					

**Incubation Period:**

<i>Giardia</i>	<i>Campylobacter</i>	<i>Salmonella</i>	<i>Shigellosis</i>	<i>E Coli 0157</i>	<i>Hepatitis A</i>
1-4 weeks	2-5 days	12-72 hours	24-48 hours	2-10 days, usually 3-4 days	15-50 days, usually 25-30 days

**Symptoms:**

<i>Giardia</i>	<i>Campylobacter</i>	<i>Salmonella</i>	<i>Shigellosis</i>	<i>E Coli 0157</i>	<i>Hepatitis A</i>
Diarrhea (watery)	Diarrhea (frequent, may have mucus or blood)	Diarrhea	Diarrhea (may have blood, pus, mucus)	Diarrhea (watery with blood or mucus)	Diarrhea (sometimes pale stools)
Fever	Fever	Fever	Fever	Usually absence of fever	Fever
				Blood in urine	
Gas					
Greasy stools					
	Headache				Loss of appetite
					Jaundice
Stomach Cramps	Stomach Cramps	Stomach Cramps	Stomach Cramps	Stomach Cramps(severe)	
	Stomach Pain	Stomach Pain	Stomach Pain	Stomach Pain	Stomach Pain
Nausea	Nausea	Nausea			Nausea
	Vomiting	Vomiting	Vomiting		
Weight loss					

**Duration:**

<i>Giardia</i>	<i>Campylobacter</i>	<i>Salmonella</i>	<i>Shigellosis</i>	<i>E Coli 0157</i>	<i>Hepatitis A</i>
2-6 weeks	2-10 days	4-7 days	5-7 days	5-10 days	1-2 wks - months

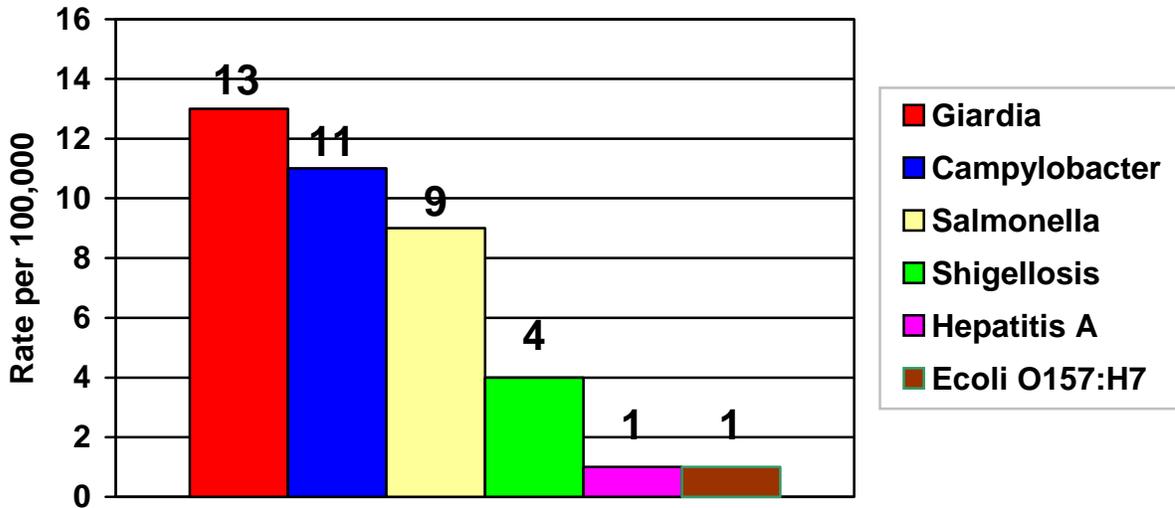
**How is it detected:**

<i>Giardia</i>	<i>Campylobacter</i>	<i>Salmonella</i>	<i>Shigellosis</i>	<i>E Coli</i>	<i>Hepatitis A</i>
Stool sample	Stool sample	Stool Sample	Stool Sample	Stool Sample	Serum, blood, stools

**How is it treated:**

<i>Giardia</i>	<i>Campylobacter</i>	<i>Salmonella</i>	<i>Shigellosis</i>	<i>E Coli</i>	<i>Hepatitis A</i>
Anti-parasitic medications	May resolve on own, or may require antibiotics	Usually resolves on own, or may require antibiotics	Antibiotics	Usually resolves on own	No specific treatment available

## Gastrointestinal Illnesses of Greatest Frequency, Kent County, Five Year Average (2005-2009)



Source: Michigan Disease Surveillance System

### What are gastrointestinal (G.I.) illnesses?

Gastrointestinal (G.I.) illnesses are a group of diseases that affect the stomach and intestines. The term gastroenteritis is often used when a person is acutely ill. Gastroenteritis is inflammation of the stomach and small and large intestines. Gastroenteritis is typically caused by a virus, bacteria, or parasite. Consuming contaminated food/water is a major mode of transmission. Person-to-person spread is another common mode of transmission. G.I. illness is often referred to as the “stomach flu,” however it is not caused by an influenza virus. Although G.I. illnesses differ in their incubation periods and duration of illness, they share various similarities. Not only do they share many of the same risk factors (see Table 1), some have similar presentations.

**Table 1: Risk Factors for Gastrointestinal Illness**

• food handler	• animal handler
• daycare worker	• daycare attendee
• contact of a confirmed case	• swimmer
• contact of a suspected case	• direct patient care worker
• international traveler	• drinking contaminated water (not boiled, filtered or treated with chemicals)
• resident of an institutional facility	

## **What does the Kent County Health Department do regarding G.I. illnesses?**

Each case of gastrointestinal illness is contacted by a member of the CD/Epi staff. If the cause of the disease is already known, the staff member interviews each case and asks questions about an individual's risk factors for the disease. The staff member works with each client to determine which factors may have put them at the greatest risk for disease. The information is then passed on to the epidemiologist who further analyzes the data, looks at trends, and also looks for the earliest warning signs of a potential outbreak.

When the illness is thought to be foodborne, a communicable disease nurse will interview a client to determine what foods the person ate and their incubation period (time between the meal and the onset of symptoms) for illness. The symptoms give the nurse clues as to the cause of the suspect illness. If more complaints are received about a particular restaurant or food, the nurse may collect stool samples. The stools specimens are either tested in Grand Rapids at the Health Department's laboratory or sent to the state laboratory.

## **What can health care providers do?**

Health care providers can help protect the public's health by:

- Informing the Health Department of cases of "reportable" gastrointestinal illness. All physicians are required by state law to report gastrointestinal illnesses identified by the Michigan Department of Community Health Communicable Disease Rules.
- Considering foodborne illnesses in the differential diagnosis of gastrointestinal disease. Doctors may be the first individuals with an opportunity to identify potential outbreaks of foodborne illness. Clues to identifying foodborne disease are the:
  - Incubation period
  - Duration of the illness
  - Primary clinical symptoms
  - Population involved in the outbreak
- In addition, questions regarding consumption of raw or undercooked foods, unpasteurized milk or juices, fresh fruits and vegetables, home canned goods, cheeses made from unpasteurized milk, picnics and other events where food is catered may be beneficial.

## **What can the community do regarding G.I. illness?**

- Report cases of foodborne illness to the Health Department.
- Prevent foodborne illness by:
  - cooking all meat thoroughly. Make sure that the meat is cooked throughout (no longer pink), juices run clear, and the inside is cooked to: 170°F for poultry breast meat; 180°F for poultry thigh meat; 145°F for steaks, roasts, and fish; and 160°F for ground beef and pork.
  - washing hands with soap before and after handling raw foods of animal origin.
  - using separate cutting boards for foods of animal origin and other foods.
  - carefully cleaning all cutting boards, countertops and utensils with soap and hot water after preparing raw food of animal origin.
  - avoiding unpasteurized milk and untreated surface water.
  - washing hands with soap after having contact with pet feces.

# Giardia

## Protozoan reservoirs

Contaminated water



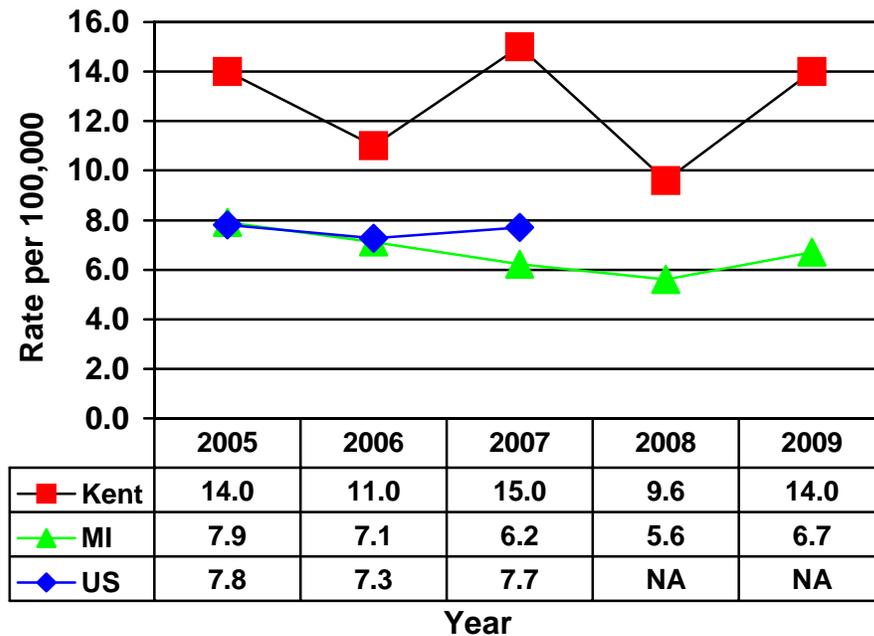
Cats and Dogs



Beavers



## Giardia



Source: Michigan Disease Surveillance System, and Summary of Notifiable Disease, US

*Giardia lamblia* cysts were the first eukaryotic cells (DNA enclosed in a nucleus) to ever have been seen under the microscope. Antony Van Leeuwenhoek, an amateur scientist, discovered Giardia in 1681, and called it "animalcules" because he thought they had a remarkable similarity to animals. Giardia has been called "beaver fever" because the illness can be acquired from water contaminated by beavers.

**Who is affected in Kent County?** This gastrointestinal illness affected 82 people in 2009. There was an average of 75 cases reported per year from 2005-09.

**Disease Trend** Although the giardia rate fluctuates yearly, the average five year rate is slightly lower than the previous five year rate. Michigan and U.S rates have also slightly declined. Giardia is found throughout the world and is one of the most common causes of waterborne illness (recreational water and drinking water). Studies at KCHD indicate that the higher incidence of Giardia in Kent County compared to Michigan and the U.S. appears to be from foreign-born individuals that have relocated to Kent County. Most of these individuals are refugees who are required to be screened for parasitic diseases. The majority of refugees testing positive for giardia are asymptomatic.

**Why is this a concern?** Symptoms can last over a month and result in weight loss. Individuals may also be asymptomatic. Chronic infections can last months to years and are difficult to treat. Arthritis and intestinal mucosal cell damage may occur in severe giardia.

**Important Facts** Chlorine used for water treatment does not kill giardia cysts. Disinfecting water is achieved by either boiling for 3-5 minutes or using a filter effective for removing giardia

**When does it occur?** Most frequently in the early summer through the early fall.

# Campylobacter

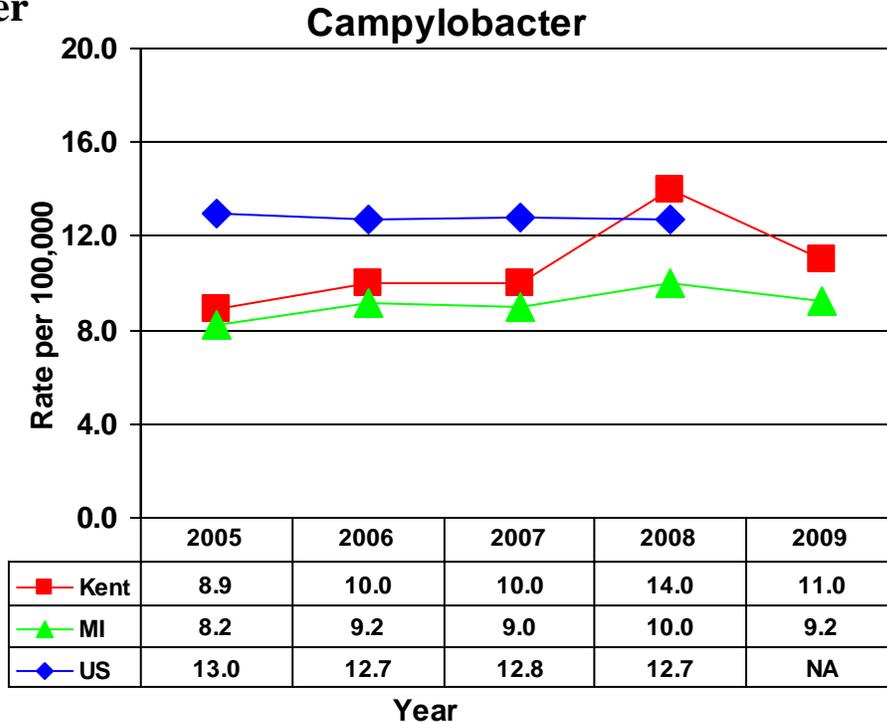
## Bacterial reservoirs



Poultry



Kittens and Puppies



Source: Michigan Disease Surveillance System, and U.S. Foodnet Data

**Who is affected in Kent County?** This gastrointestinal illness affected 65 people in 2009. There was an average of 63 cases reported per year from 2005-2009. Campylobacter typically affects infants and young adults more frequently than other age groups.

**Disease Trend** Despite a minor decline in the campylobacter rate in the U.S., Michigan and Kent County’s campylobacter rates have slightly increased. In a March of 2010 press release, the FDA reported that Campylobacter outbreaks in Michigan and other parts of the Midwest have been associated with drinking unpasteurized milk.

**Why is this a concern?** Symptoms may lead to weight loss and dehydration. Some people are asymptomatic. Although most people can recover in 2-10 days, some people can develop arthritis or Guillain-Barré syndrome (1 per 1,000), a disease that affects the nerves and can lead to paralysis for multiple weeks. Sometimes campylobacter reaches the bloodstream and causes an infection that can be fatal. No vaccine is available.

**When does it occur?** More frequently in the summer months than the winter months.

**Important Facts:** Campylobacter can be found in 50% of raw chicken in the U.S. It is contained in giblets, particularly the liver. Freezing decreases the number of bacteria on meat and adequate cooking will destroy the bacteria. A small dose can cause illness; one drop of raw chicken juice is enough to cause illness.

**New Threats** In 2000, 14% of human *Campylobacter* infections were due to organisms resistant to a group of antibiotics called Fluoroquinolones.

# Salmonella

## Bacterial Reservoirs



Internally contaminated eggs

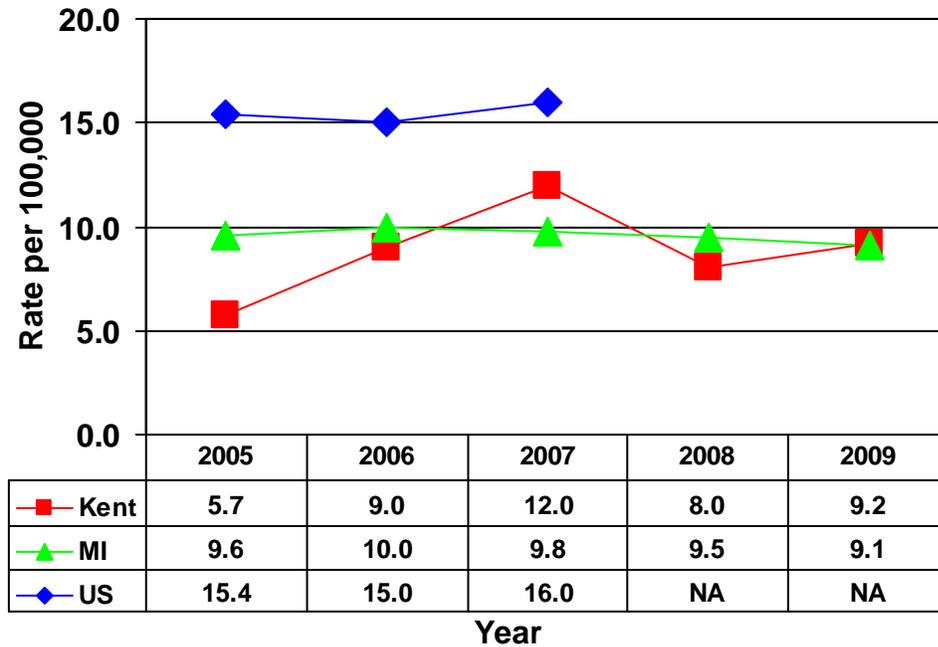


Reptiles



Livestock Products

## Salmonellosis



Source: Michigan Disease Surveillance System and Summary of Notifiable Disease, US

**Who is affected in Kent County?** This gastrointestinal illness affected 53 people in 2009. There was an average of 50 cases reported per year during 2005-09. Children, the elderly, and immunocompromised persons are the most likely to have severe infections.

**Disease Trend** Kent County has seen an increase in the rate of salmonella from 2005 to 2009, following the U.S. trend. Michigan salmonella rates have slightly declined. Two August of 2010 news releases indicated that increased rates of Salmonella may be associated with Taco Bell Consumption and small children ingesting Salmonella via dry dog food.

**Why is this a concern ?** Some people have a full recovery while others have joint pain, eye irritation, and pain while urinating. This condition is called Reiter’s Syndrome. It can last months to years and can progress to chronic arthritis. Antibiotics have no impact on whether a person develops arthritis. No vaccine is currently available for salmonellosis.

**When does it occur?** More frequently in the summer months than the winter months.

**Foodborne Precautions** Under the Michigan Food Code, food handlers are not allowed to work until they have medical documentation that they are “free of this infectious agent.”

**Important Facts:** Eggs were at one time thought safe to eat raw. It is now known that ovarian infections in chickens can lead to internal contamination of eggs, making raw eggs unsafe to eat. Although Salmonellosis is most commonly associated with water and foodborne illness, handling a reptile also puts an individual at risk for infection.

**New Threats** A large proportion of *S. enterica* serotype *Typhimurium* and *S. enterica* serotype *Newport* isolates are resistant to one or more drugs. *Salmonella Typhimurium* DT has been shown to be resistant to five or more drugs, has a greater hospitalization rate than other types of Salmonella, and a 3 % mortality rate. It is thought to have developed due to the use of antibiotics in animal feed.

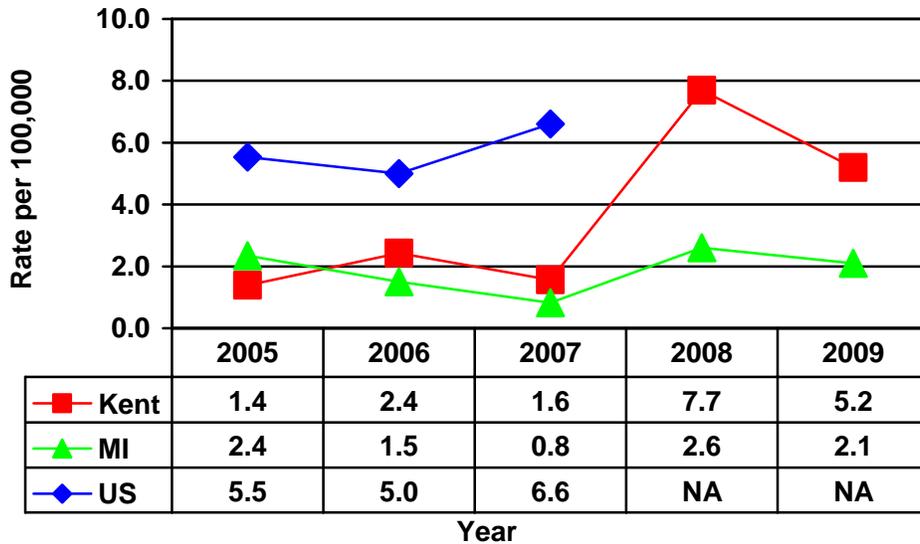
# Shigellosis

## Bacterial Reservoir

Human



## Shigellosis



Source: Michigan Disease Surveillance System and Summary of Notifiable Disease, US

**Who is affected in Kent County?** This gastrointestinal illness affected 30 people in 2009. There was an average of 21 cases reported per year from 2005-2009.

**Disease Trend** Following the U.S. trend, Kent County has seen an increase in the rate of shigellosis cases since 2005. Michigan’s shigellosis rates have remained about the same.

**Why is this a concern ?** A species of shigella, *Shigella flexneri*, can lead to pain in the joints, eye irritation, and painful urination, called Reiter’s syndrome. It can be a short or long term illness and can result in arthritis. There is no vaccine.

**When does it occur?** More frequently in the summer months than the winter months.

**Foodborne Precautions:** Under the Michigan Food Code, food handlers are not allowed to work until they have medical documentation that they are “free of the infectious agent.”

**New Threats** *Shigella boydii* is a food pathogen that was implicated in a 1999 foodborne outbreak involving contaminated bean salad that contained fresh parsley and cilantro. Biofilms formed in cilantro and parsley samples treated with produce wash and water. Cells in biofilms are known to be more resistant to antibiotics and disinfectants, and that may explain why the wash was not efficacious. (New and Reemerging Infectious Diseases, Roberto Docampo, vol.9, no.8, 2003). In 2005, a strain of *S. sonnei* caused outbreaks in day care centers in three states and was found to be resistant to ampicillin and trimethorprim-sulfamethoxazole.

# E.Coli O157:H7

## Bacterial Reservoir

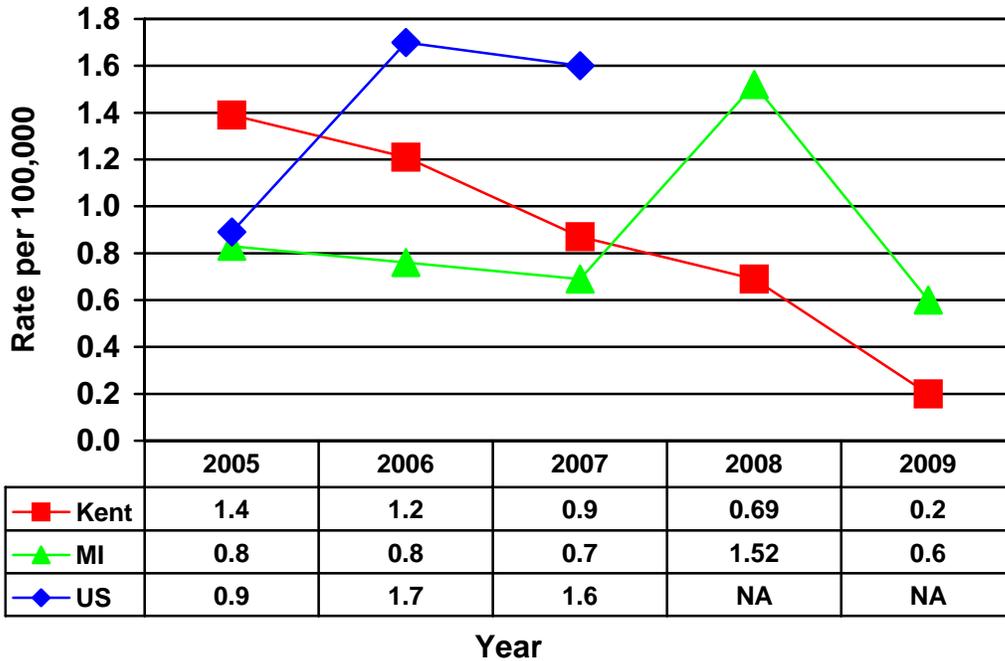


Deer



Sheep

## E Coli O157:H7



Source: Michigan Disease Surveillance System and Summary of Notifiable Disease, US

**Who is affected in Kent County?** This gastrointestinal illness affected 1 person in 2009. There was an average of 5 cases reported per year from 2005-2009.

**Disease Trend** Since 2005, the rate of *Escherichia coli* O157:H7 has decreased in Kent County and Michigan. The U.S. rate of E.Coli O157 increased from 2005-2007.

**Why is this a concern?** *E. Coli* O157:H7 produces a harmful toxin that can cause bloody diarrhea. In about 2%-7% of cases, a condition called hemolytic uremic syndrome (HUS) can develop which can lead to kidney failure. Approximately 33% with HUS have kidney dysfunction that may require dialysis. Another 8 % of persons with HUS have other long term issues such as seizures, blindness, paralysis, high blood pressure and partial bowel removal.

**Foodborne Precautions** Under the Michigan Food Code, food handlers are not allowed to work until they have medical documentation that they are “free of the infectious agent.”

**Important Facts** Although *E. Coli* was first identified in 1982, after 23 years, it is still not clear how cattle (the main reservoir) become infected and how humans can best be treated for the infection. Reasonable concern exists that some antimicrobial agents increase the risk of HUS. *E. Coli* has been shown to survive for up to 70 days in bovine feces.

**Outbreaks of Note** Outbreak of *E. Coli* in ground beef, Jack-In-The Box Restaurants, 1993.

**New Threats** None known at this time.

# Norovirus



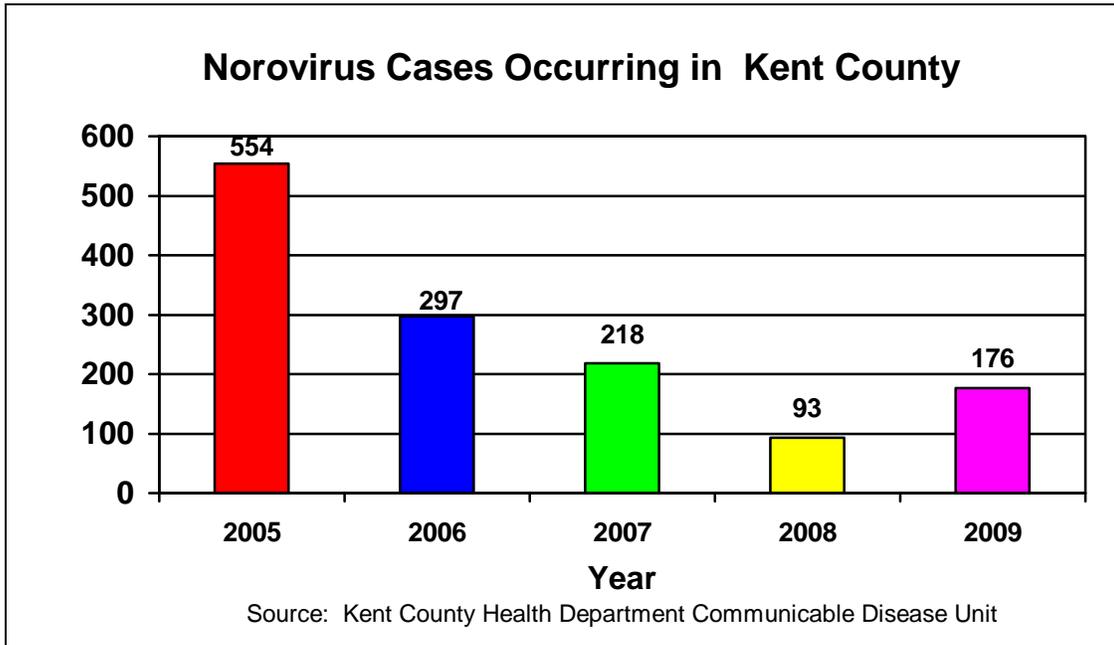
Contaminated water



Shellfish



Human Feces



**Who is affected in Kent County?** There were 176 people who became ill from norovirus in 2009. Three cases were laboratory confirmed and the remainder met the case definition for norovirus. The 2009 outbreak occurred at a local restaurant buffet.

**Disease Trend** The number of people affected by norovirus has varied over the last five years. This illness is only reportable if there is an outbreak, making surveillance more challenging. Testing is usually conducted on a small sample of cases from an outbreak. If the tests are positive, all other cases meeting case definition are presumed to be confirmed due to their epidemiological link. The number of cases recorded slightly increased in 2005, but since this is not an individually reportable illness (only outbreaks are reported) and because those infected rarely seek health-care, the surveillance data can be difficult to interpret.

**Why is this a concern ?** Noroviruses are the most common cause of infectious intestinal disease in North America. The ability of the virus to be transmitted through a variety of routes with a low infectious dose puts large human reservoir populations at great risk. Although norovirus infections are uncomfortable for a relatively short duration of time (approximately 12-60 hrs), they can have economic and legal implications. In the health care setting, unit closures, delayed admissions, delayed discharges or other delays in operations may occur. Closures of schools or restaurants may also result. Recently, there appears to be a new trend in the filing of foodborne lawsuits associated with norovirus.

**Important Facts** The revised 2005 FDA Food Code includes a norovirus containment recommendation stating that, “symptomatic food workers with sudden onset of vomiting and/or diarrhea, that cannot be attributed to a non-infectious condition, are to be excluded from work until they have been asymptomatic for at least 24 hours.”

**Prevention** Chlorine bleach works best for cleaning and disinfecting environmental surfaces containing norovirus. However, it is important to use an adequate concentration of bleach: 1000 ppm is recommended for non-porous surfaces (1/3 cup bleach in 1 gallon of water); 5000 ppm is recommended for porous surfaces (1 1/2 cup bleach in 1 gallon of water); and 200 ppm is recommended for stainless steel (1 Tablespoons of bleach in 1-gallon of water).

## Listeriosis

### Number of Kent County Cases:

2005	2006	2007	2008	2009
1	2	0	1	1

### Foods commonly found:



**Hot dogs**



**Cold Cuts**

Listeriosis is caused by the bacterium, *Listeria monocytogenes*. The bacterium is found in water and soil. Animals can carry it and contaminate food of animal origin. There are generally low levels of this infection every year. Individuals become ill when they consume food that has been contaminated with the bacterium. Listeria is often seen in the news as the culprit of foodborne outbreaks of disease. In the past, outbreaks have involved deli meats and hot dogs. Symptoms can include fever, muscle aches, and gastrointestinal symptoms. If the disease becomes invasive and spreads to the central nervous system, symptoms can include stiff neck, headache, confusion and loss of balance.

## Cryptosporidiosis

### Number of Kent County Cases :

2005	2006	2007	2008	2009
13	20	15	19	14

### Outbreaks associated with :



**Petting Zoos**

Cryptosporidiosis is a gastrointestinal disease caused by various species of the *Cryptosporidium* parasite. There are generally low levels of Cryptosporidiosis infections in Kent County every year. In the past decade, this parasite caused an outbreak of illness in visitors to a local petting zoo. The zoo has since made a habit of educating the public about the importance of hand washing and hasn't had an outbreak since that time. The parasite lives in the intestine of infected humans and animals until it is excreted in stool. It is also known as a common cause of waterborne illness. Symptoms generally begin 2-10 days after exposure and generally continue for 1-2 weeks. Because the parasite has a thick shell, disinfectants such as chlorine and iodine are not effective in destroying the parasite. In order to disinfect water, it should be boiled for at least 1 minute. Filters that are rated for cyst removal and have a pore size of at least one micron are also effective. Most people recover without treatment, however, a new drug, nitazoxanide, has been approved for treatment of diarrhea caused by *Cryptosporidium*.

# Sexually Transmitted Infections

## Sexually Transmitted Infections at a Glance

### Organisms that cause the disease:

<i>Chlamydia</i>	<i>Gonorrhea</i>	<i>Syphilis</i>	<i>Human Immunodeficiency Virus (HIV)</i>
Bacteria	Bacteria	Bacteria	Virus

### Incubation Period:

<i>Chlamydia</i>	<i>Gonorrhea</i>	<i>Syphilis</i>	<i>HIV</i>
1-3 wks	2-7 days.	10-90 days (avg.= 21)	Variable: Months to decades

### Transmission:

<i>Chlamydia</i>	<i>Gonorrhea</i>	<i>Syphilis</i>	<i>HIV</i>
Vaginal, anal, and oral sex	Contact with mucus membrane fluids from infected people, most commonly via vaginal, anal, and oral sex; child birth.	Contact with fluids from lesions of infected persons, most commonly via vaginal, anal, and oral sex; child birth.	Bloodborne transmission via sexual contact with an infected person, sharing needles or syringes with an infected person, blood transfusions, clotting factors (low risk), and childbirth.

### Symptoms:

<i>Chlamydia</i>	<i>Gonorrhea</i>	<i>Syphilis</i>	<i>HIV/AIDS</i>
<b>Women:</b> may be asymptomatic or have a abnormal vaginal discharge or burning feeling when urinating. <b>Men:</b> may have discharge from their penis or burning feeling while urinating.	<b>Women:</b> generally asymptomatic; may experience painful urination, vaginal discharge, or bleeding between periods <b>Men:</b> burning feeling when urinating; white, green, or yellow penile discharge; painful or swollen testicles.	Symptoms may not occur for years. Single or multiple sores appear where syphilis entered the body. Sores last 3-6 wks and occur on the external genitals, vagina, anus, in the rectum, in the mouth and on the lips	Symptoms are similar to many other illnesses such as mononucleosis, influenza and some gastrointestinal illnesses. A few of the more obvious symptoms are: rapid weight loss, white spots or unusual blemishes on the tongue, in the mouth, or in the throat; red, brown, pink, or purplish blotches on or under the skin or inside the mouth, nose, or eyelids; memory loss and other neurological disorders.

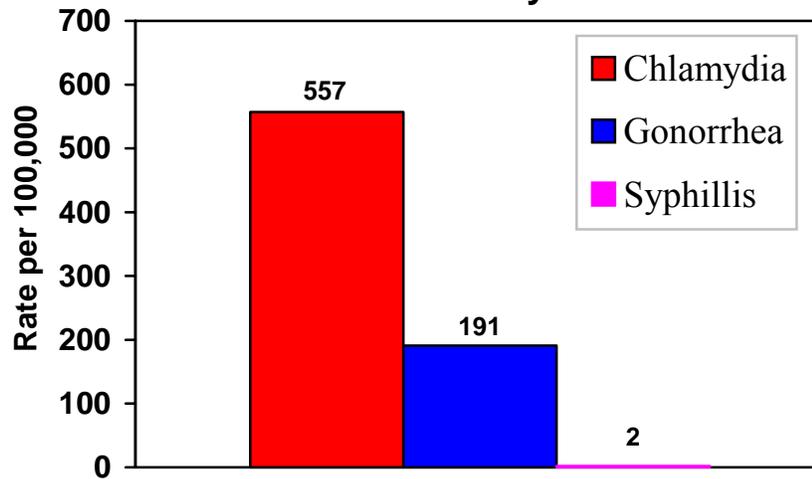
### Diagnosis:

<i>Chlamydia</i>	<i>Gonorrhea</i>	<i>Syphilis</i>	<i>HIV/AIDS</i>
Lab tests on specimens from urine, cervix, or penis	Lab tests on specimens from urethra, cervix, rectum, throat, or urine.	Lab test on specimen collected from a sore; blood test	Lab tests on blood. Follow-up tests may be required for confirmation. Rapid tests are now available. All HIV-infected persons with a CD4+ cell count of under 200/mm <sup>3</sup> or a CD4+ T-lymphocyte percentage of total lymphocytes fewer than 14%, regardless of clinical status are regarded as having AIDS.

### Treatment:

<i>Chlamydia</i>	<i>Gonorrhea</i>	<i>Syphilis</i>	<i>HIV/AIDS</i>
Antibiotics	Antibiotics	Antibiotics	Anti-retroviral therapy (ART)

## Reportable Sexually Transmitted Infections of Greatest Frequency, 5 year average (2005-09), Kent County



Source: Michigan Disease Surveillance System

### What are sexually transmitted infections?

Formerly called venereal diseases, sexually transmitted infections (STIs) are caused by microorganisms that survive on the skin or mucus membranes of the genital area or are transmitted via semen, vaginal secretions, or blood during sexual contact. Because the genital areas provide a moist, warm environment that is especially conducive to the proliferation of bacteria, viruses, and yeasts, a great many infections can be transmitted this way. They include HIV, chlamydia, gonorrhea, syphilis, genital herpes, genital warts, and some forms of hepatitis.

### What does the Kent County Health Department do about sexually transmitted infections?

The health department offers testing for chlamydia, gonorrhea, syphilis, and HIV. In addition to testing, the department also provides assistance in contacting partners of individuals that have been diagnosed with an STI. Treatment and counseling services are also provided.

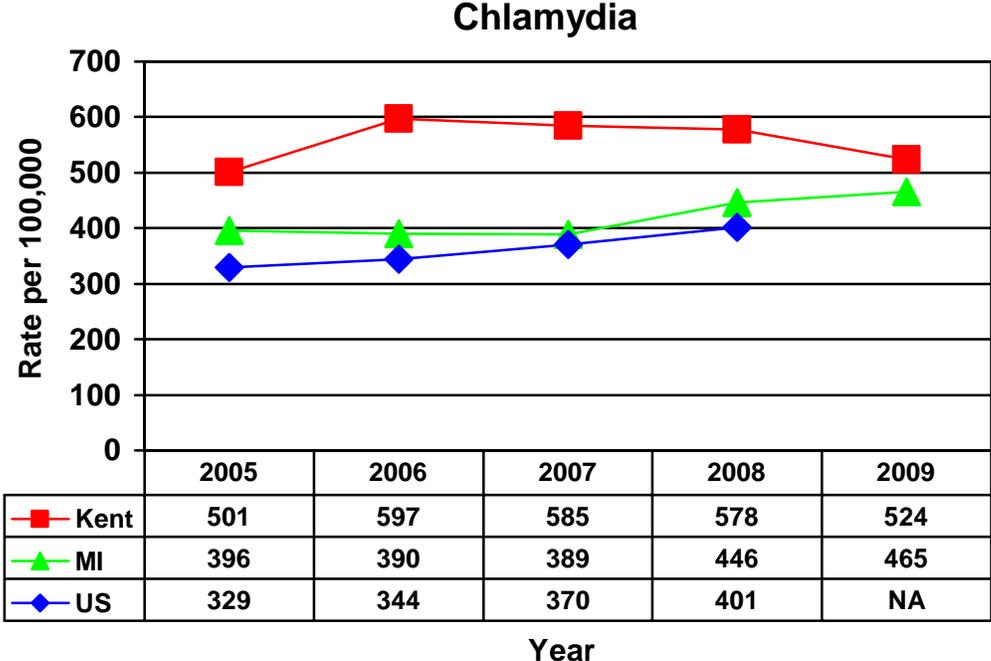
### What can health Care providers do about sexually transmitted infections?

- Obtain appropriate reporting forms from the health department
- Report all confirmed cases of chlamydia, gonorrhea, syphilis and HIV to the health department by mailing the completed forms.

### What can the community do about sexually transmitted infections?

- There are various ways to reduce the risk of acquiring an STI. Abstinence is the most effective way to prevent infections. For sexually active people, using latex condoms consistently and correctly at every sexual encounter will reduce the risk.
- Discuss testing options with personal physician or health department staff.

# Chlamydia



Source: Michigan Disease Surveillance System and Summary of Notifiable Disease, US

**Who is affected in Kent County?** 3010 cases of chlamydia were reported in 2009. There was an average of 3201 cases reported per year from 2005-2009.

**Disease Trend** Kent County chlamydia rates have shown yearly fluctuations but on average, have remained essentially the same. The five year average is slightly lower than the prior five year average. During 2003, U.S chlamydia rates were the greatest since voluntary reporting of the disease began in the mid-1980s and mandatory reporting began in 1995. U.S. increases have been reported to be associated with more screening programs, diagnostic tests that are more sensitive, better reporting from physicians and labs, better information systems, and possible true increases in disease.

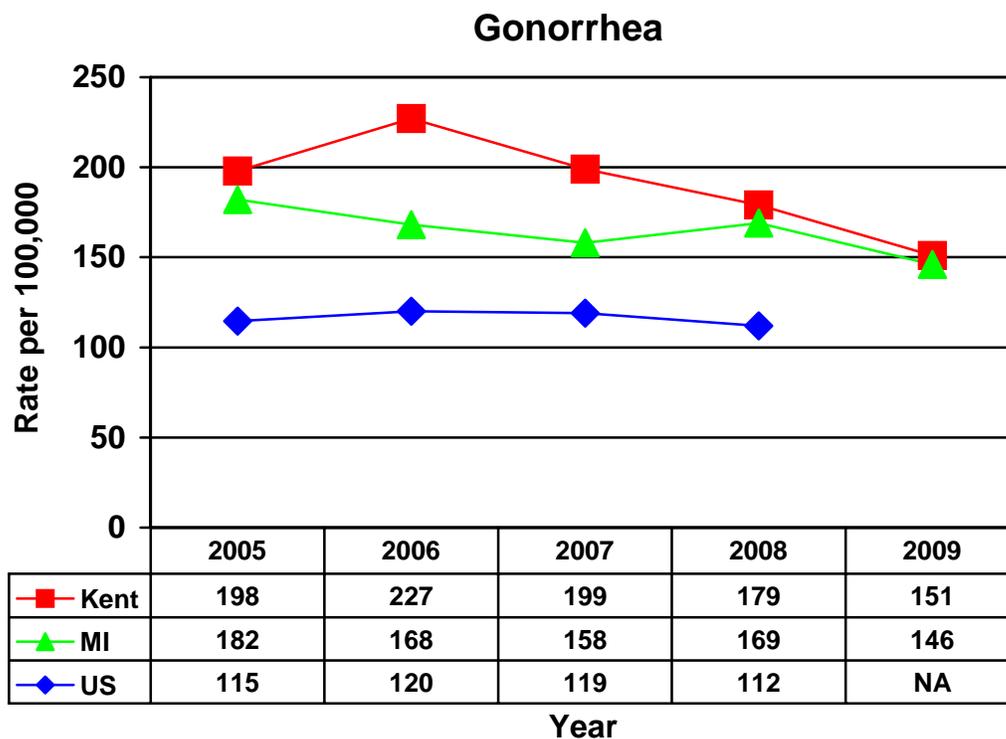
**Why is this a concern ?** In women, symptoms can be mild or nonexistent. If it spreads to the uterus or fallopian tubes it can cause pelvic inflammatory disease (PID). PID can lead to infertility and ectopic pregnancy (pregnancy outside the uterus). Although very rare, this infection has been known to cause arthritis, skin lesions, and inflammation of the eye and urethra (Reiter’s Syndrome). Chlamydia can be passed from an infected mother to her baby during vaginal childbirth and it can cause premature delivery. Infected newborns can get an infection in their eyes and respiratory tracts (such as pneumonia).

**Important Fact** Due to the fact there may be no symptoms with the infection, it is underreported.

**Prevention** Male latex condoms can reduce the risk of transmission. Annual screening is recommended for sexually active women age 25 years and younger, or older women with risk factors (new sex partner or multiple sex partners).

**New Threats** A disease called Lymphogranuloma venereum (LGV) is caused by a type of chlamydia. It has been seen in the population of men having sex with men (MSM) in the Netherlands and other European countries.

## Gonorrhea



Source: Michigan Disease Surveillance System and  
Summary of Notifiable Disease, US

**Who is affected in Kent County?** There were 869 cases of gonorrhea reported in 2009. There was an average of 1096 cases reported per year from 2005-2009.

**Disease Trend** There was a decrease in the gonorrhea rate in Kent County, Michigan, and the U.S. between 2005 and 2009. In the U.S., the greatest rates of infection occur among teenagers, young adults, and African Americans.

**Why is this a concern ?** Women can develop pelvic inflammatory disease (PID). PID can harm the fallopian tubes and lead to infertility and ectopic pregnancy. Infected pregnant women can cause their baby to develop blindness, joint infections, and blood infections if they do not receive treatment. Men can develop epididymitis, swollen/painful testicles that can lead to infertility. In both sexes, the infection can travel to the blood or joints and become serious.

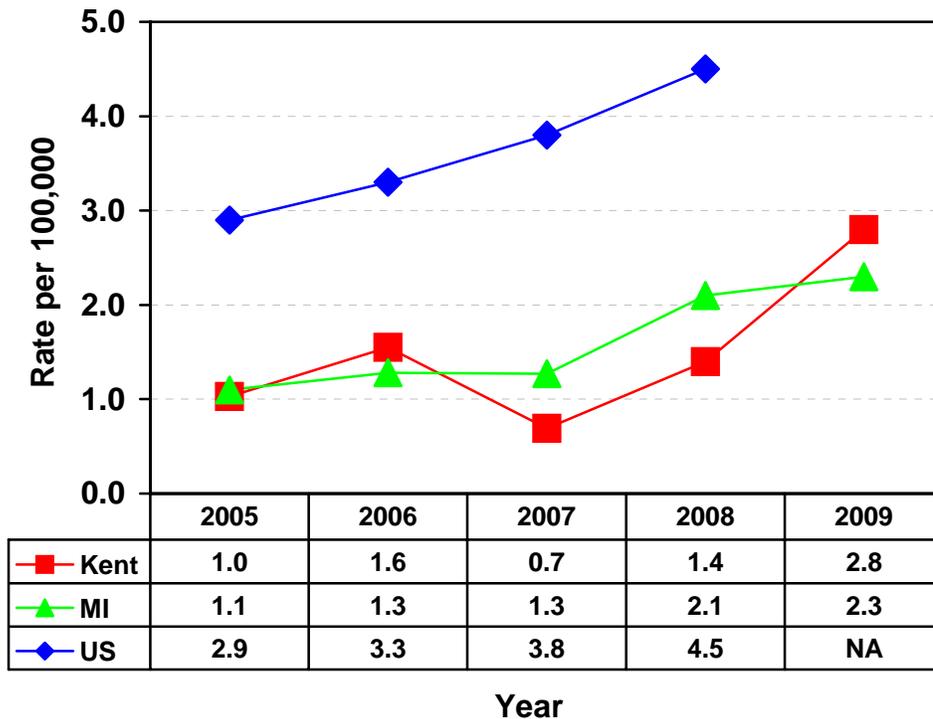
**Important Fact** Gonorrhea can also be found in the throat, mouth, eyes, and anus. Infections in the throat can cause it to be sore. People who have been treated for gonorrhea in the past can be reinfected if they have sex with a person infected with gonorrhea.

**Prevention** Latex condoms can decrease the risk of infection from gonorrhea.

**New Threats** In 1993, in response to an increasing number of antibiotic resistant infections, the CDC recommended that Fluoroquinolones be used to treat Gonorrhea. Since 1994, cases that are resistant to Fluoroquinolones have been emerging. The cases were initially seen in Hong Kong, the Philippines, and Thailand. Cases have now been seen in the United States, including Kent County. Increases in these resistant infections have been noted among the MSM population.

# Syphilis

## Syphilis-Primary and Secondary Infections



Source: Michigan Disease Surveillance System and Summary of Notifiable Disease, US

**Who is affected in Kent County?** There were 16 cases of syphilis (primary or secondary) reported in Kent County in 2009. On average, Kent County averaged 9 cases per year in the last five years. In addition to the primary and secondary infections, 11 cases of early latent syphilis were identified in 2009, bringing the total number of early/infectious cases to 27. This was a 170% increase from 2008, when 10 early/infectious cases were identified. The majority of the cases in 2009 were among white men who have sex with men (MSM). Over 75% of the MSM cases were over 40 years of age and over 40% were HIV infected. Most were involved in meeting new partners online, at bare backing parties, or at several MSM venues with Kent and Allegan Counties.

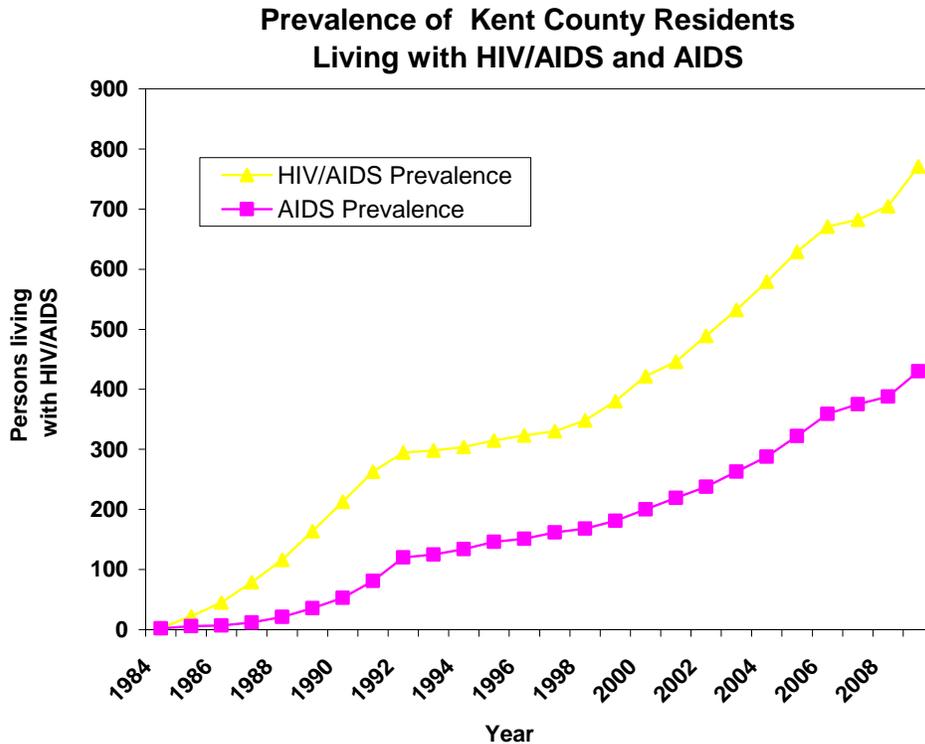
**Disease Trend** The rate of primary and secondary syphilis has increased since 2005 in Kent County, Michigan and the U.S.

**Why is this a concern ?** In the late stages, syphilis can harm the internal organs such as the nerves, eyes, brain, heart, blood vessels, bones, liver, and joints. Individuals in the late stage may have problems with their coordination, or have numbness, paralysis, blindness, and dementia. Untreated women can deliver stillborn babies or babies that die after birth.

**Important Fact** People who have been treated for syphilis can acquire it again if they are exposed to an infected sexual partner.

**Prevention** Consistent and correct use of latex condoms can reduce the risk of syphilis, however, it can occur in areas that are not protected by a condom. Persons who receive syphilis treatment should not have sex with new partners until sores have healed.

# HIV/AIDS



Source: HIV/STD & Bloodborne Infections Surveillance Section, Division of Communicable Disease, Bureau of Epid., MI Dept. of Community Health

**Who is affected in Kent County?** As of January 1, 2010, 771 people were reported to be living with HIV/AIDS and 430 people were reported to be living with AIDS in Kent County.

**Disease Trend** While the number of new HIV cases (incidence) has remained relatively level in Kent County, the number of existing cases (prevalence) is increasing. This is due to the fact that new cases of HIV are continually diagnosed and people with HIV and AIDS are living longer. Improved access to HIV treatment and better treatment (use of triple drug therapies) since the 1990s has decreased the number of people who have moved from HIV to AIDS status. Once seen as a disease primarily in MSM, the number of women acquiring HIV has increased over time. African Americans and Hispanics have been disproportionately affected by HIV compared to other racial and ethnic groups.

Getting an accurate count of people living with HIV/AIDS presents a unique challenge to public health. Historically, concerns about lack of confidentiality and the discrimination that could result from a positive test led to under-reporting of HIV disease. Until recently, AIDS cases were only required to be reported to MDCH by physicians. As of April 1, 2005, Michigan's Public Health Act 514 requires that clinical laboratories report HIV-related test results to local or state health departments. Because tracking HIV provides a more accurate and timely means of assessing both the incidence and prevalence of the disease, it is hoped these measures will help make key HIV baseline data available.

**Why is this a concern?** A variety of infections and cancers can develop in an individual infected with HIV. The number and severity is associated with an individual's level of immune system dysfunction. One of the more common co-infections is bacterial pneumonia. Other co-infections such as tuberculosis and hepatitis have been cause for public health concern. Without effective treatment, individuals with AIDS usually die within 3-5 years in most developed countries.

HIV transmission from mother to child is a major concern, but treatment is available to reduce this risk.

**Important Fact** An HIV-infected person with a CD4+ cell count of under 200/mm<sup>3</sup> or a CD4+ T-lymphocyte percentage of total lymphocytes under 14%, regardless of clinical status, is considered to have AIDS. These measures are used by physicians to determine the advancement of the illness and what kind of treatment should be provided.

**Prevention** Latex condoms should be used for vaginal, anal, or oral sex. HIV carriers are often asymptomatic.

**New Threats** There has been an increase in HIV among gay males using methamphetamines. The virus appears to develop resistance to drug therapies through viral mutations and the average regimen fails after two years.

# Vaccine-Preventable Diseases

## Vaccine-Preventable Diseases at a Glance

### Organisms that cause the disease:

<i>Influenza</i>	<i>Chicken Pox</i>	<i>Pertussis</i>	<i>Hepatitis B</i>	<i>Meningococcal Disease</i>	<i>Pneumococcal Disease</i>
Virus	Virus	Bacteria	Virus	Bacteria	Bacteria

### Incubation Period:

<i>Influenza</i>	<i>Chicken Pox</i>	<i>Pertussis</i>	<i>Hepatitis B</i>	<i>Meningococcal Disease</i>	<i>Pneumococcal Disease</i>
1-4 days	10-21 days	4-21 days (avg. 7-10 days)	6 wks to 6 mos (avg. 120 days)	3-4 days (avg. 2-10 days)	1-3 days

### Reservoir and Transmission:

<i>Influenza</i>	<i>Chicken Pox</i>	<i>Pertussis</i>	<i>Hepatitis B</i>	<i>Meningococcal Disease</i>	<i>Pneumococcal Disease</i>
<p><b>Type A</b>-Humans, pigs and birds  <b>Type B</b>-Humans</p> <p>Transmitted through aerosols or droplets from the respiratory tract of infected persons.</p>	<p>Humans</p> <p>Inhalation of airborne droplets, aerosols from vesicular fluids of pox, and respiratory tract secretions from infected person.</p>	<p>Humans</p> <p>Contact with respiratory droplets, or with airborne droplets of respiratory secretions. Can also be acquired from recently contaminated fomites.</p>	<p>Humans</p> <p>Injected or mucosal exposure to body fluids. Highest concentration is found in blood, and serous fluids. Lower concentrations can be found in saliva and semen.</p>	<p>Humans</p> <p>Direct contact to aerosolized droplets or secretions from the nasopharynx.</p>	<p>Humans</p> <p>Person-to person contact via respiratory droplets. Can also be acquired from recently contaminated fomites.</p>

**Symptoms :**

<i>Influenza</i>	<i>Chicken Pox</i>	<i>Pertussis</i>	<i>Hepatitis B</i>	<i>Meningococcal Disease</i>	<i>Pneumococcal Disease</i>
Abrupt onset of fever, myalgia, sore throat, nonproductive cough, runny nose, headache and eye pain.	1-2 days of fever and malaise prior to rash onset. Rash changes from macules to papules to vesicular lesions before crusting. Rash moves from scalp to trunk, then extremities.	Runny nose, sneezing, low grade fever, initial mild cough becoming more severe with more rapid coughs, and difficulty expelling thick mucous. After inhalation of air there is a high pitched whoop.	Children do not usually have symptoms. Adults may have anorexia, nausea, vomiting, rashes and dark urine for 1-2 days before jaundice appears with light/gray stools. During the final stages, an individual may feel ill for weeks or months.	Sudden fever, headache, and stiff neck. May also include nausea, vomiting, sensitivity to light, and altered mental status.	Pneumonia is the most common presentation with sudden onset of fever and chills, chest pain, productive cough, reddish-brown sputum, shortness of breath, rapid heart rate, malaise, and weakness. Meningitis and bacteremia may also develop as a result of infection. Meningitis symptoms include altered mental status, headache, exhaustion, vomiting, fever, seizures, and coma.

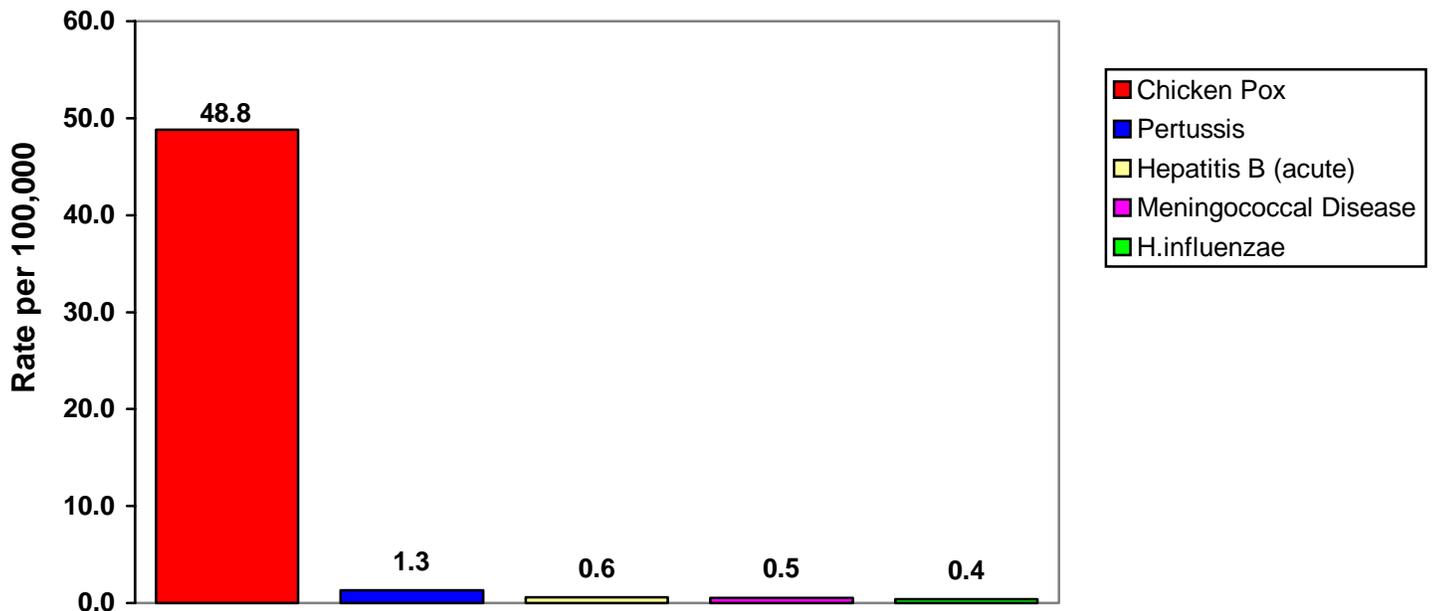
**Diagnosis:**

<i>Influenza</i>	<i>Chicken Pox</i>	<i>Pertussis</i>	<i>Hepatitis B</i>	<i>Meningococcal Disease</i>	<i>Pneumococcal Disease</i>
Specimen from throat and nasopharyngeal swabs within 3 days of onset of illness or acute and convalescent serologic specimen.	Specimen of vesicular fluid, or crusts from lesions.	Specimens from the nasopharynx by swab or aspirates. Isolation of <i>B.pertussis</i> by culture.	Serologic testing.	Specimen from sterile site	Specimen from sterile site

**Treatment:**

<i>Influenza</i>	<i>Chicken Pox</i>	<i>Pertussis</i>	<i>Hepatitis B</i>	<i>Meningococcal Disease</i>	<i>Pneumococcal Disease</i>
Oseltamivir or zanamivir started within 48 hours of onset reduces virus titers.	Several antiviral drugs are available.	Antibiotics	Antiviral drugs are available for chronic infections.	Antibiotics	Antibiotics

## Vaccine Preventable Diseases Kent County, 2005-2009 (5-year average)



### What are vaccine-preventable diseases?

Vaccine-preventable diseases are those that can be prevented if an individual receives a complete course of vaccine. Vaccines work with the body's immune system to protect it from disease without causing the symptoms or complications of the disease. Immunity is the ability of the human body to tolerate the presence of material familiar to the body and to eliminate foreign material, such as microbes that cause infectious diseases.

### What does the Kent County Health Department do about vaccine-preventable diseases?

The Kent County Health Department provides vaccines to protect people from chicken pox, diphtheria, *aemophilus influenzae* type b, hepatitis A & B, influenza, measles, meningococcal meningitis, mumps, pertussis, pneumococcal disease, polio, rubella, tetanus, and other diseases to which foreign travelers might be exposed.

- The National Center for Disease Control recommends that children receive most of their vaccinations by the time they are 18 months old, with additional vaccinations required before going to kindergarten, at 11 – 12 years of age, and when entering high school.
- When a child is not fully immunized, they are not protected from disease. If a child has missed a dose (or more) of vaccine, they can still receive the doses they need until they are up-to-date with their immunizations.
- Adults should be aware that they should receive a booster dose of Tetanus, Diphtheria, and acellular pertussis (Tdap) vaccine every 10 years, and may need additional vaccinations based on their age, disease risks and health
- Individuals who qualify can receive certain vaccines free of charge through special programs like the Vaccines for Children (VFC) program or the Michigan Vaccine Replacement Program (MI-VRP). However, a sliding scale vaccine administration fee

may be charged for each injection given. Many health insurance plans also cover routine vaccinations. For additional information go to [www.accesskent.com/health](http://www.accesskent.com/health).

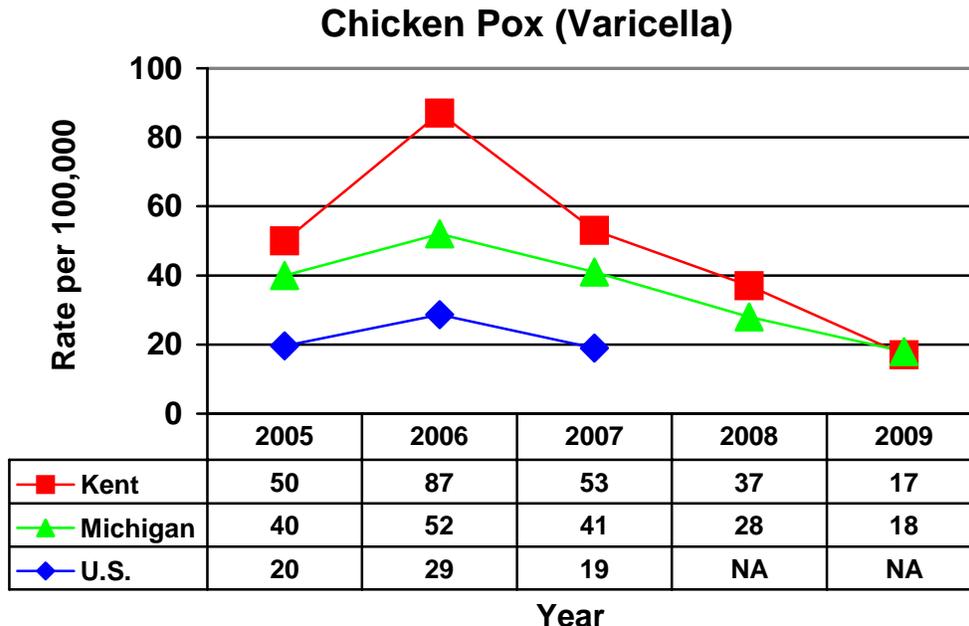
### **What can health care providers do about vaccine- preventable diseases?**

- Ensure that individuals have received all recommended vaccinations.
- Ensure that vaccinations are recorded in the Michigan Care Improvement Registry (MCIR)
- Test all pregnant women during every pregnancy for hepatitis B surface antigen (HBsAg) status at their initial visit.
- Re-test high-risk pregnant women who initially test HBsAg (-) initially in their last trimester.
- Report every positive HBsAg test result in a pregnant woman to KCHD within 24 hours.
- Send a copy of all HBsAg lab results (+ or -) to the labor/delivery manager of the delivering hospital along with the prenatal work-up information.
- Report cases of vaccine preventable diseases to the Health Department.

### **What can the community do about vaccine- preventable diseases?**

- Individuals should be vaccinated against these diseases.
- Parents should make sure their children are fully immunized against disease.
- If you have concerns that vaccines are not safe, consult your health care provider or the Health Department.

## Chicken Pox (Varicella)



Source: Michigan Disease Surveillance System and  
Summary of Notifiable Disease, US

**Who is affected in Kent County ?** There were 103 cases of chicken pox (varicella) reported in 2009. There was an average of 283 cases reported per year from 2005-2009.

**Disease Trend** The rate of chicken pox cases declined since the implementation of the chicken pox vaccine in 1995. Chicken pox officially became a reportable condition in Michigan starting with the 2005 school year.

**Why is this a concern ?** Along with fever and malaise, an unpleasant rash forms with approximately 200-500 lesions. Secondary bacterial infections can result. Although rare, chicken pox can cause aseptic meningitis, encephalitis, Reye syndrome, and Guillain-Barré syndrome. The chicken pox virus causes a lifetime latent (dormant) infection, but in some people the virus is reactivated and causes an illness called shingles (zoster). Shingles can be extremely painful and cause long-lasting pain after the lesions have resolved. There is currently no effective treatment available, however, a shingles vaccine became available in 2006.

**Vaccine** A vaccine is available and recommended for all children without contraindications at 12-18 months of age. It is also recommended for all susceptible adolescents and adults. The 2006 provisional recommendations state that a single dose of zoster vaccine is recommended for adults 60 years of age and older.

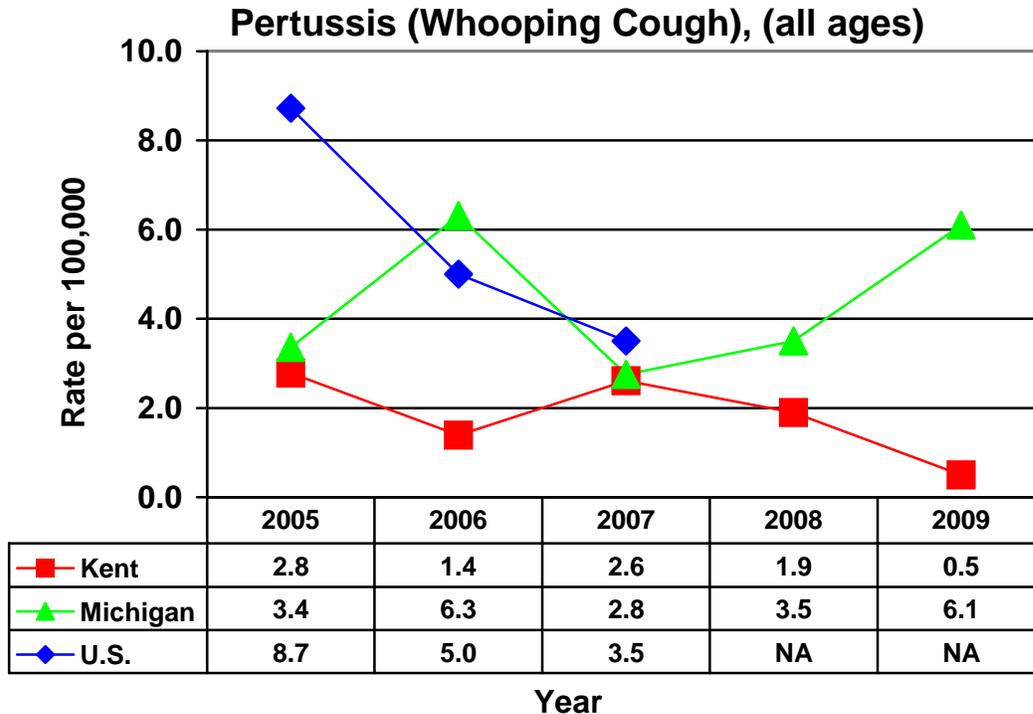
**Important Fact** Prior to the vaccine in 1995, approximately 11,000 people were hospitalized with varicella each year in the U.S. Complications were usually much worse for people greater than 15 years of age and infants less than 1 year of age. Maternal varicella 5 days to 2 days after delivery can cause fatality rates as high as 30%. Varicella in the first 20 weeks of gestation has been noted to cause a variety of birth abnormalities.

**Prevention** There is very low risk of transmitting the varicella virus after obtaining the vaccine. However, based on studies, it seems that transmission has occurred on occasion when the

vaccinee develops a rash. Contact with immunocompromised persons is not recommended until the rash disappears. There are several antiviral drugs that are helpful in controlling symptoms if given early.

**New Threats** Women who are pregnant or trying to become pregnant should not be vaccinated because the consequences to the unborn fetus are unknown. Persons who are immunosuppressed should not be vaccinated because they face a greater risk of complications.

## Pertussis



Source: Michigan Disease Surveillance System and  
Summary of Notifiable Disease, US

**Who is affected in Kent County?** There were 3 cases of pertussis reported in 2009. There was an average of 7 cases of pertussis reported per year from 2005-2009.

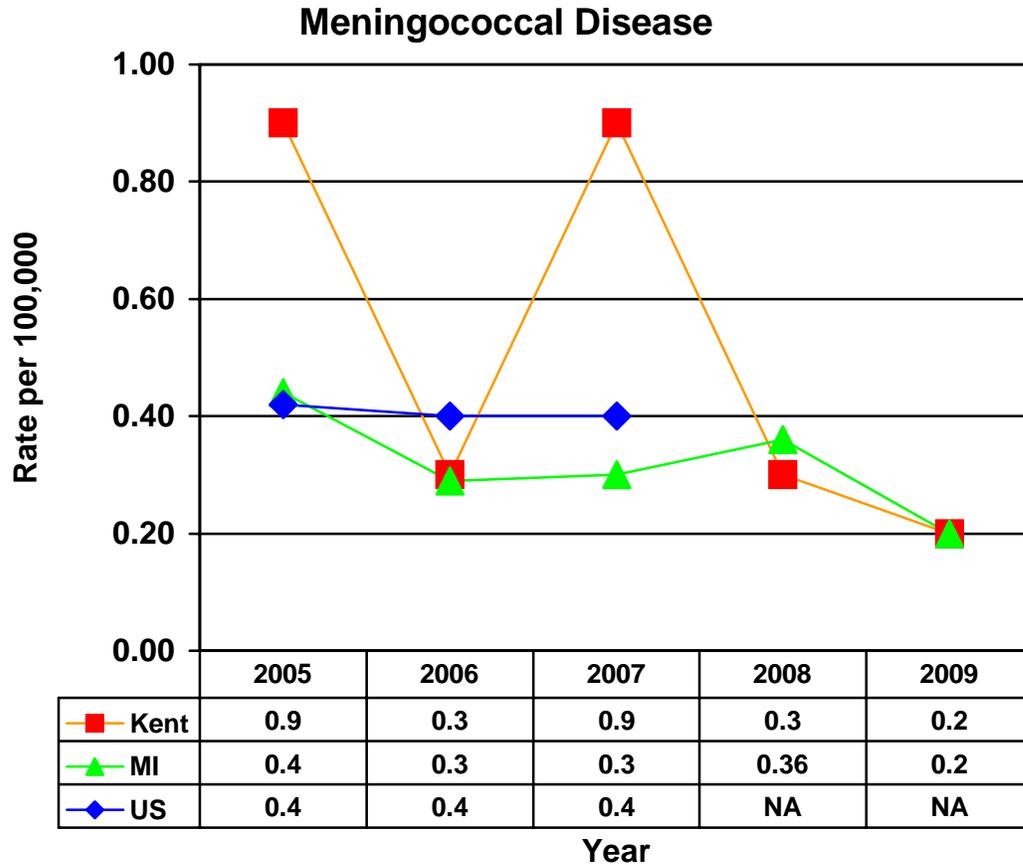
**Disease Trend** The rate of pertussis cases has declined in Kent County over the last five years. The rate in Michigan increased over the last five years due to sporadic community outbreaks across Michigan. Of the U.S. cases where age was reported, 17 % of cases were < 6 months old. These infants were too young to have received their required doses of vaccine. It is not clear if the increase has been due to better reporting.

**Why is this a concern?** Pertussis is highly contagious and can last 1-2 months or longer. This disease produces an inflammation of the respiratory tract making it difficult to expel thick pulmonary mucus. A rapid succession of coughs is followed by air that is inhaled with a high-pitched whoop. Coughing can cause vomiting and a lack of oxygen, leading an individual to turn blue (cyanotic). Neurological conditions such as seizures and encephalopathy can result. Deaths from pertussis usually involve a secondary bacterial pneumonia.

**Important Fact** Vaccine-induced immunity can diminish approximately 5-10 years after vaccination. Teens and adults are vulnerable to this illness when they are no longer immune from their vaccination.

**Prevention** Immunization is encouraged to prevent pertussis. For known cases, respiratory isolation is recommended. Suspected cases should not be in contact with young children and infants, in particular those who have not received their immunizations, until they receive part of a doctor recommended course of antibiotics (usually at least 5 days of a 7 day course). Suspected cases who do not take antibiotics should be isolated until their cough ceases. Inadequately immunized household contacts under 7 years of age should be excluded from schools, day care centers, and public gatherings for 21 days after last exposure or until cases and contacts have received 5 days of a minimum 7-day course of appropriate antibiotics.

# Meningococcal Disease



Source: Michigan Disease Surveillance System and  
Summary of Notifiable Disease, US

**Who is affected in Kent County?** There was 1 case of meningococcal disease reported to the health department in 2009. There was an average of 3 cases of meningococcal disease reported per year from 2005-2009.

**Disease Trend** Since 2005, rates of meningococcal disease in Kent County, Michigan and the U.S. have decreased.

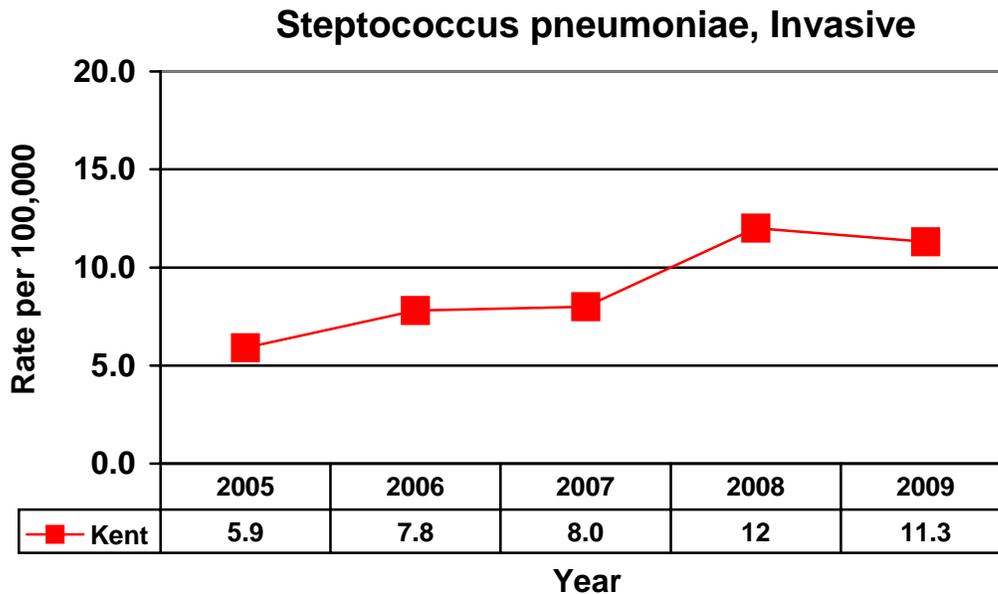
**Why is this a concern ?** Meningococcal disease is a sudden, potentially fatal illness caused by the bacteria *Neisseria meningitidis*. Along with *Streptococcus pneumoniae*, this bacteria is one of the leading causes of bacterial meningitis (inflammation of the membranes covering the brain), and bacterial blood infections (bacteremia). It can also cause arthritis and pneumonia. Even with antibiotic treatment, the fatality rate of meningococcal disease is 9-12%. The fatality rate is as high as 40% with meningococemia.

**Important Fact** Up to 10 % of adolescents and adults have no symptoms from the bacteria, but they carry it in their nasopharynx (colonized person). The bacteria multiply in the mucosal cells of the nasopharynx and are spread by secretions and droplet aerosol. In less than 1% of colonized persons, the pathogen moves through the mucosal cells into the bloodstream. The bacteria are carried via the bloodstream to many organs. In approximately 50% of patients with blood infections, the pathogen crosses the blood-brain barrier into the cerebrospinal fluid and causes meningitis. An upper respiratory infection may play a role in this type of serious progression.

**Prevention** There are two vaccines for *N. meningitidis* available in the U.S. Both vaccines can prevent 2 of the 3 most common types of the disease in the U.S. and a type that causes epidemics in Africa.

**Vaccine** The vaccine is recommended for all children at their routine preadolescent visit (11 to 12 years of age). For those who have never gotten the vaccine, a dose is recommended at high school entry. The vaccine is recommended for people at increased risk for the disease such as college freshmen living in dormitories, microbiologists who work with meningococcal bacteria, U.S. military recruits, anyone whose spleen has been removed or damaged, people with certain immune system disorders, anyone who is traveling to the countries where the disease is an epidemic, and those who might have been exposed to meningitis during a community outbreak. Antibiotics are available to individuals exposed to the bacteria.

## Streptococcus pneumoniae



Source: Michigan Disease Surveillance System

**Who is affected in Kent County?** There were 65 cases of *Streptococcus pneumoniae* reported in 2009 in Kent County. The five year average (2005-09) was 52 case reports per year.

**Disease Trend** Prior to 2005, only cases in children less than 5 years of age were reportable. In 2005, the reporting rule changed to include cases in patients of all ages. Since then, the rates of reported pneumococcal disease in Kent County and Michigan have increased. The rates in the U.S. have decreased (data not shown).

**Why is this a concern?** *S. pneumoniae* causes 13% to 19% of all cases of bacterial meningitis in the U.S. It has become the most frequently reported cause of bacterial meningitis in children < 5 years of age in the U.S. since the introduction of the *Haemophilus influenzae* type B (Hib) vaccine in 1985.

**Important Fact** The bacteria can also cause pneumonia, otitis media, or bacteremia. Bacteremia can occur without an identified infection site. These bacteria are frequently found in the respiratory tract, and can be found in the nasopharynx in 5-70% of normally health adults. Adults with children are more likely to be carriers of the bacteria. Large percentages of carriers are also found in schools, orphanages, and military settings.

**Vaccine** A pneumococcal polysaccharide vaccine was licensed in 1977; it contained antigens from 14 types of pneumococcal bacteria. In 1983, a 23-valent polysaccharide vaccine (PPV23) replaced the 14-valent vaccine. In 2000, a pneumococcal conjugate vaccine (PCV7) became available containing 7 serotypes of *S. pneumoniae*.

Pneumococcal polysaccharide vaccine is recommended for all adults aged 65 years and older. The vaccine is also indicated for persons aged  $\geq 2$  years with a chronic illness or a compromised immune system.

All children < 24 months of age and children age 24-59 months with a high risk medical condition should be routinely vaccinated with PCV7. Children aged 24-59 months at high risk

previously vaccinated with PPV23 should receive 2 doses of PCV7. Children at high risk who previously received PCV7 should receive PPV23 at  $\geq 2$  years. Antibodies can decline 5-10 years after vaccination with PPV23. A single revaccination dose is recommended  $\geq 5$  years after the first dose.

## Haemophilus influenzae Type b (Hib)

### Number of Kent County Cases :

2004	2005	2006	2007	2008	2009
5	4	1	3	3	2

Prior to the development of a vaccine in 1985, *Haemophilus Influenzae* type b (Hib) was the most frequently reported cause of bacterial meningitis and other invasive bacterial disease (infections of the blood, spinal fluid, pleural fluid, joint fluid, or middle ear aspirates) among children < 5 years of age. Similar to meningococcal disease, bacteria enter the nasopharynx where they can be carried but not cause symptoms. It is still not known how the bacteria enter the blood stream, however, like meningococcal disease, upper respiratory infections are thought to influence the disease progression. The bacteria may spread to other parts of the body and cause meningitis (swelling of the membrane covering the brain), epiglottitis (swelling of the epiglottis), cellulitis (skin infection), osteomyelitis (bone infection), pericarditis (infection of the sac covering the heart), pneumonia, and septic arthritis (joint infection).

## Mumps

Mumps is a viral infection of the salivary glands rarely seen due to the Measles, Mumps, and Rubella (MMR) vaccine. In Kent County, there was one probable case of mumps in 2008. In recent years there have been concerns about the MMR causing autism. Current scientific evidence does not support the hypothesis that the MMR vaccine, or any combination of vaccines, causes any form of autism. This issue has been studied thoroughly by independent panels of experts in the U.S. from the National Academy of Sciences, Institute of Medicine. Their study concluded that currently there is no epidemiologic evidence that supports a causal link between MMR vaccine and autism. In 2006, a large outbreak of mumps occurred in Iowa and Illinois. Many of the cases in the Iowa outbreak were vaccinated, suggesting the potential for waning immunity, ineffectiveness of the vaccine, or changes in the virus leading to increased pathogenicity.

# Vectorborne Diseases

## Lyme Disease

### Number of cases

2005	2006	2007	2008	2009
6	3	3	4	2

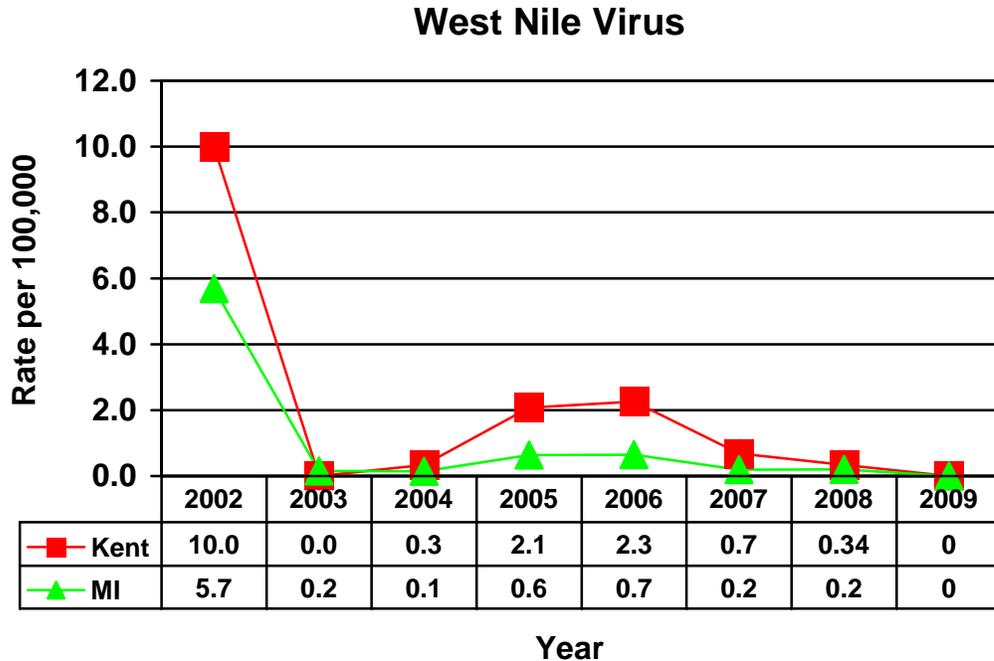
Lyme disease is an illness caused by a spirochete bacterium, *Borrelia burgdorferi*, which is transmitted to humans by infected black-legged ticks (*Ixodes scapularis*). It was first recognized in Lyme, Connecticut in 1975, when a cluster of children were thought to have developed juvenile rheumatoid arthritis. Patients reported a red “bulls-eye” lesion, identified as erythema migrans (EM) around the area thought to be an insect bite. The patients were followed and many developed arthritis. The majority of patients remembered being bitten by a tick approximately 12 days before symptom onset. Field surveys found a large number of ticks on white-footed mice and white-tailed deer. Today we know that typical symptoms of Lyme disease include fever, headache, fatigue, and an EM. If left untreated, infection can spread to joints, the heart, and the nervous system.

Since its discovery, Lyme disease has become the most commonly reported vector-borne disease in the United States. This increase in cases is due to many factors, including (but not limited to):

- Increased surveillance and understanding of the disease.
- The movement of people out of cities into more rural environments, bringing them into closer proximity with the preferred habitat of the black-legged tick
- Forest fragmentation and increasing deer populations
- Dispersal of the black-legged tick into new, receptive habitats (Michigan Department of Community Health, 2005)

In Michigan, the first human case of Lyme disease was detected in 1985. Cases that are thought to have acquired the disease locally have been reported in both the Upper Peninsula (Menominee County) and the southwest Lower Peninsula (Berrien, Cass, Van Buren, Allegan, and Ottawa Counties). However, the vast majority of cases appear to have acquired their infection while traveling out of state. It is likely that the number of cases reported will continue to increase as the public and health care providers are educated about the disease. It is recommended that people who are at risk of coming into contact with black-legged ticks wear products containing DEET or permethrins to prevent this disease.

## West Nile Virus



Source: Michigan Disease Surveillance System

**Who is affected in Kent County?** There were no cases of West Nile Virus reported in Kent County in 2009.

**Disease Trend** The disease trend has varied greatly and remains unpredictable since the first disease outbreak of West Nile in 2002.

**Occurrence** West Nile virus (WNV) occurs in late summer and early fall in Michigan. In southern states, it can occur all year around.

**Why is this a concern?** Although most people have mild or no symptoms, individuals can develop neuroinvasive disease such as encephalitis or meningitis. These illnesses may last several weeks and cause permanent neurological effects. Some individuals that experience inflammation of the spinal cord can develop “acute flaccid paralysis”- weakness in the limbs and/or breathing muscles. This is usually caused by the onset of a West Nile poliomyelitis, similar to the syndrome from the poliovirus. Facial paralysis and illness similar to Guillain-Barré syndrome, a disease of the peripheral nerves (not the spinal chord), can also occur. Recovery from WNV illness varies; some people have a full recovery, some have a partial recovery, and others may never fully recover.

**Important facts:**

- WNV is not transmitted by handling a dead bird. However, it is recommended that individuals handling dead birds use a shovel or gloves to avoid other infections associated with birds.
- Although it has been shown that WNV can be transmitted through breast milk, it is still recommended that mothers continue to breast feed their infants.
- Blood banks screen blood for WNV. If found, the blood is removed from the blood supply. The risk to the consumer is very low and the benefits of blood transfusions and organ transplants outweigh the risks.

- Individuals that have had WNV can give blood, but they must wait at least 28 days after the onset of symptoms or 14 days after they recover.

### **Prevention**

- When outdoors, use insect repellent containing an EPA-registered active ingredient. Follow the directions on the package.
- Many mosquitoes are most active at dusk and dawn. Be sure to use insect repellent and wear long sleeves and pants at these times or consider staying indoors during these hours.
- Make sure you have good screens on your windows and doors to keep mosquitoes out.
- Get rid of mosquito breeding sites by emptying standing water from flower pots, buckets and barrels. Change the water in pet dishes and replace the water in bird baths weekly. Drill holes in tire swings so water drains out. Keep children's wading pools empty and on their sides when they aren't being used.

## Comparison of Viral Meningitis to West Nile Virus Illness

<i><b>Viral Meningitis</b></i>	<i><b>West Nile Virus</b></i>
A variety of viruses.	Virus, no vaccine is available.

### **Incubation Period:**

<i><b>Viral Meningitis</b></i>	<i><b>West Nile Virus</b></i>
The incubation period for enteroviruses, the most common cause of viral meningitis, is 3-7 days . These viruses can be spread beginning about 3 days after an individual becomes infected until about 10 days after symptoms develop.	2-15 days

### **Reservoir and Transmission:**

<i><b>Viral Meningitis</b></i>	<i><b>West Nile Virus</b></i>
Humans, birds, mosquitoes, horses, cats, bats, chipmunks, skunks, squirrels, and rabbits. Enteroviruses are most often spread through direct contact with respiratory secretions (e.g., saliva, sputum, or nasal mucus) of an infected person.	Humans, birds, mosquitoes, horses, cats, bats, chipmunks, skunks, squirrels, and rabbits. Humans acquire WNV from being bitten by an infected mosquito. Mosquitoes become infected when they bite infected birds. Transmission can also occur through transplanted organs, blood transfusions, mother-to-baby (transplacental), and breast milk.

### **Symptoms :**

<i><b>Viral Meningitis</b></i>	<i><b>West Nile Virus</b></i>
Sudden onset of fever and symptoms such as severe headache, rash, stiff neck, bright lights hurting the eyes, drowsiness or confusion, nausea and vomiting. Some or all of the symptoms may occur. Infants may have a fever, act fretful or irritable, become difficult to wake up, or refuse to eat.	<ul style="list-style-type: none"> <li>● Approximately 20 % develop West Nile Fever - headache, fever, tiredness, body aches, rash, and swollen lymph glands.</li> <li>● Approximately 1% develop more serious disease-such as meningitis (swelling of the lining around the brain and spinal chord),encephalitis (swelling of the brain), or poliomyelitis (swelling of the spinal chord). Symptoms may include headache, neck ache, fever, altered mental status, tremors, convulsions, weakness, and paralysis.</li> </ul>

### **Diagnosis :**

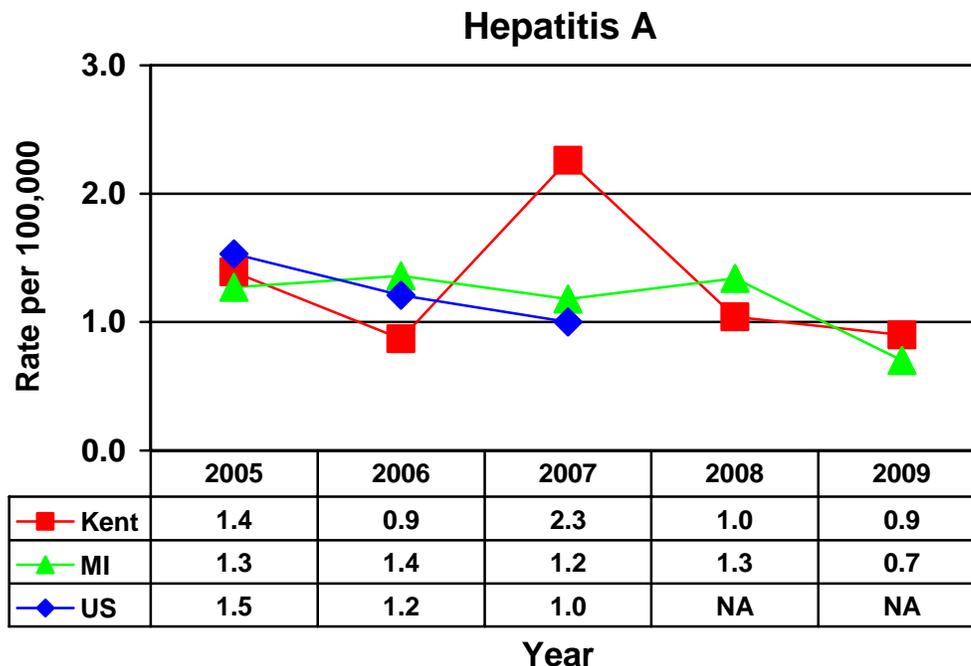
<i><b>Viral Meningitis</b></i>	<i><b>West Nile Virus</b></i>
Symptoms along with a specimen of cerebrospinal fluid (CSF).	Symptoms along with specimens of either CSF or blood are required for confirmation.

### **Treatment:**

<i><b>Viral Meningitis</b></i>	<i><b>West Nile Virus</b></i>
There is no specific treatment. Supportive treatment such as IV fluids, ventilator support for respiratory problems, and treatment for secondary symptoms may be required.	There is no treatment. Supportive treatment such as IV fluids, ventilator support for respiratory problems, and treatment for secondary symptoms may be required.

# Viral Hepatitis

## Hepatitis A



Source: Michigan Disease Surveillance System and  
Summary of Notifiable Disease, US

**Who is affected in Kent County?** This gastrointestinal illness affected 5 people in 2009. There was an average of 7 cases reported per year in the last five years. International travelers, men who have sex with men, and drug users are at increased risk of Hepatitis A. The disease is most common among school-aged children and young adults.

**Disease Trend** Since 2005, the rate of Hepatitis A in Kent County, Michigan, and the U.S. has slightly decreased. Routine childhood vaccination was recommended in 1996, and since that time Hepatitis A has declined. In 2004, Hepatitis A infections were at the lowest national rate ever recorded and they have continued to decline.

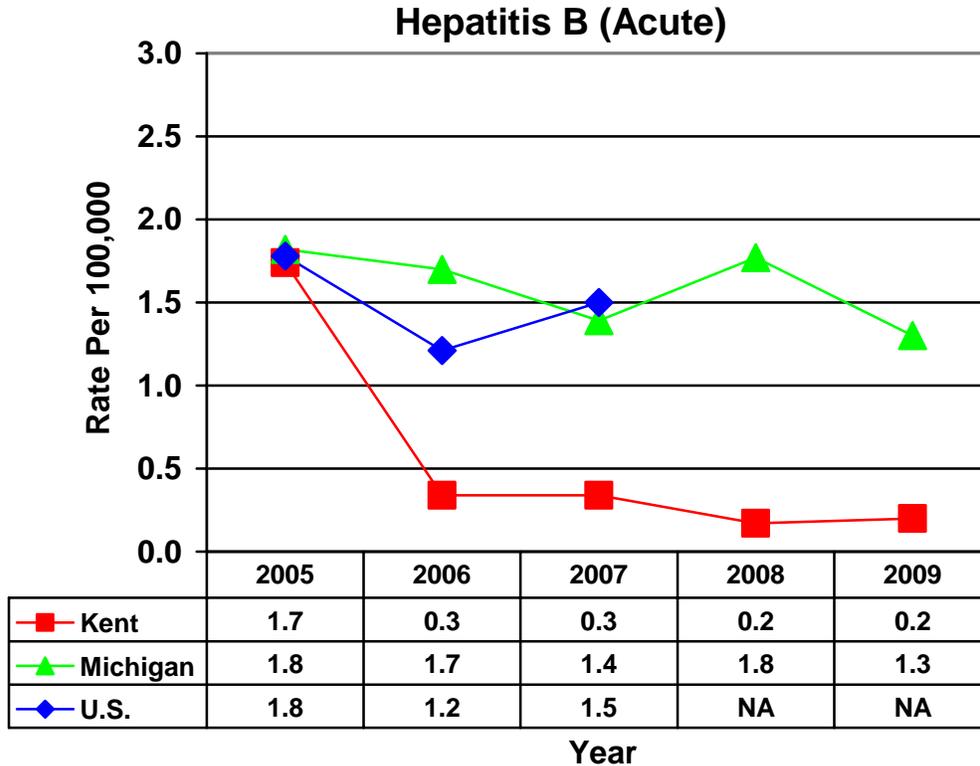
**Why is this a concern?** There is no treatment currently available. Some people are asymptomatic. Approximately 15 % of people infected will have prolonged or relapsing symptoms for 6-9 months. People with chronic liver disease have an increased risk of death.

**Foodborne Precautions** Under the Michigan Food Code, food handlers are not allowed to work until they have medical documentation that they are “free of the infectious agent.”

**Important Facts** Immunoglobulin (an injection of antibodies) can be given within 2 weeks of exposure to Hepatitis A. A vaccine is also available. Once you are infected with Hepatitis A, you can’t get it again.

**Outbreaks of Note** Outbreak of Hepatitis A in Michigan linked to Mexican strawberries, 1997; Hepatitis A outbreak associated with green onions in Monaca, Pennsylvania, 2003.

# Hepatitis B



Source: Michigan Disease Surveillance System and  
Summary of Notifiable Disease, US

**Who is affected in Kent County?** There was 1 case of acute Hepatitis B reported in 2009. There was an average of 3 cases reported per year from 2005-2009.

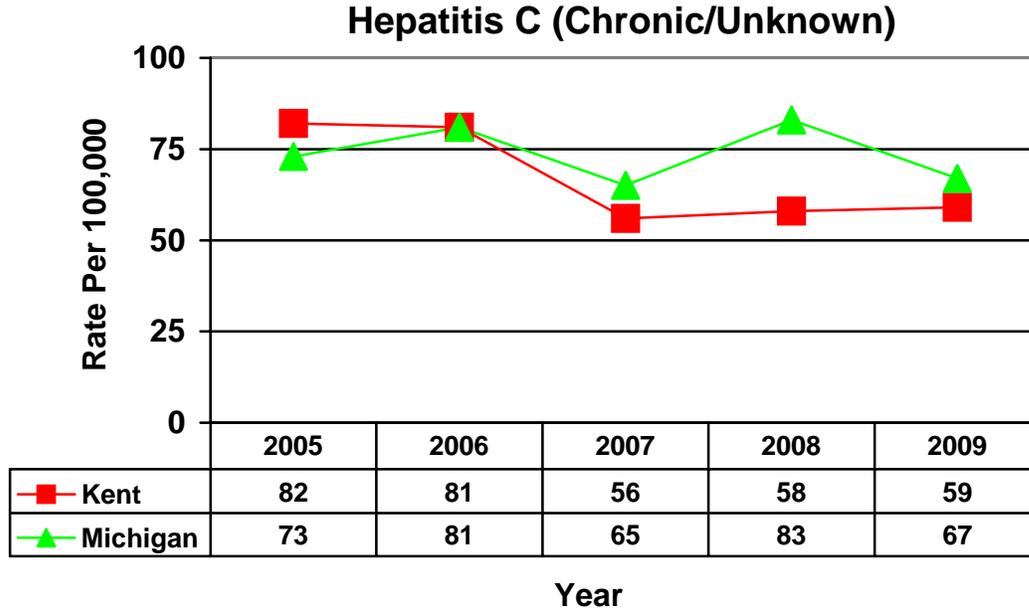
**Disease Trend** Kent County has seen a decrease in its rate of acute Hepatitis B cases since 2005. The State of Michigan and the U.S. saw decreases during the same time period. The decrease that began in 1990, is thought to be associated with the execution of a national plan to eliminate Hepatitis B. According to the plan, all pregnant women are to be screened for infection. All infants born to infected mothers are to be given post exposure prophylaxis. Additionally, vaccination is recommended for all infants and children <19 years, and for individuals who are high risk for hepatitis B (men who have sex with men, health-care workers, injection-drug users, and household and sexual contacts of persons with chronic HBV infection).

**Why is this a concern?** It is the cause of approximately 80% of liver cancers, and has been recognized as a cause of cirrhosis. It ranks second to tobacco as a human cancer-causing agent (carcinogen). There is no treatment for acute infection.

**Important Fact** About 10% of all acute infections become chronic infections. Of infants who acquire an infection at birth, about 90% become chronic carriers. The risk of becoming a carrier decreases with age. Persons with chronic infections may not have symptoms, may not know they are infected and could potentially infect others. Approximately 25% of carriers develop chronic active hepatitis.

**Prevention** The greatest concentrations of the virus are in blood and serum, it can be found in lower concentrations in saliva and semen. It is not found in tears, sweat, urine, stool or droplets. Individuals with acute infections should not share toothbrushes, razors, or donate blood.

# Hepatitis C



Source: Michigan Disease Surveillance System

**Who is affected in Kent County?** There were 339 cases of hepatitis C reported in 2009. There was an average of 312 cases reported per year from 2005-2009.

**Disease Trend** The rate in Kent County has decreased since 2005. The rate in Michigan remains somewhat stable. This is not a nationally Notifiable disease so national trends are difficult to ascertain.

**Why is this a concern?** Chronic infection can lead to cirrhosis or liver cancer. A small percentage of persons with chronic hepatitis C develop medical conditions outside the liver such as glomerulonephritis (kidney inflammation) and cryoglobulinemia (abnormal plasma proteins in the blood that cause restricted blood flow).

**Important Fact** HCV is not spread by sneezing, hugging, coughing, food or water, sharing eating utensils or drinking glasses, or casual contact. Individuals diagnosed with HCV should stop using alcohol, as it can lead to further liver damage. They also should get vaccinated against hepatitis A and B. Eating contaminated shellfish can put HCV- and HBV-infected persons at risk for fatal illness. Persons should not be excluded from work, school, play, child-care or other settings on the basis of their HCV infection status. Studies indicate that HCV may survive on environmental surfaces at room temperature a minimum of 16 hours, but no longer than 4 days. It is recommended that blood spills (including dried blood, which can still be infectious) be cleaned using a 1:100 dilution of household bleach for disinfecting the area. Use gloves when cleaning up any blood spills.

**Prevention** Individuals with HCV should not share items that might have their blood on them such as toothbrushes, dental appliances, nail-grooming equipment or razors. They also should not donate blood, body organs, other tissue, or semen. Individuals with HCV should cover their cuts and skin sores. Healthcare workers should practice routine barrier precautions and safely handle needles and other sharps.

## Hepatitis C: Clinical Summary

### Organism:

#### *Hepatitis C*

The Hepatitis C virus (HCV) is a bloodborne pathogen that attacks the liver.

### Incubation Period:

#### *Hepatitis C*

Virus can be detected within 1-2 weeks after being infected.

### Transmission:

#### *Hepatitis C*

In order to become infected, an individual must come into contact with blood from an infected person. Individuals who are at risk for HCV transmission:

- received a blood transfusion or solid organ transplant before July, 1992
- received clotting factor(s) made before 1987
- injected illegal drugs, even once, in their lifetime
- received long-term kidney dialysis and have liver disease
- are healthcare workers exposed to HCV-positive blood
- are children born to HCV-positive women.
- lived with someone who was infected with HCV and shared personal items such as razors or toothbrushes.
- had sex with a person infected with HCV. The likelihood of transmission is very low, but it is possible.
- received a tattoo at a facility where proper infection control was not practiced.

### Symptoms:

#### *Hepatitis C*

20% develop symptoms. Dark urine, jaundice, abdomen pain, fatigue, nausea, and/or loss of appetite. Severe outcomes include cirrhosis and liver cancer.

### Diagnosis:

#### *Hepatitis C*

Blood test

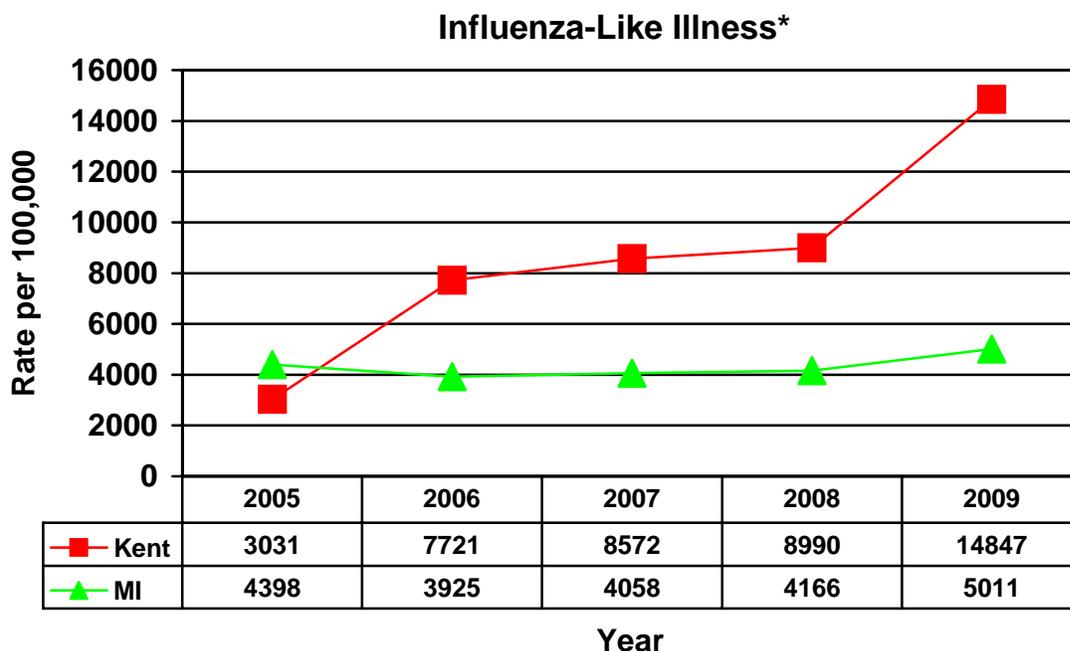
### Treatment:

#### *Hepatitis C*

Combination therapy with interferon and ribavirin has response rates of 40%-80%.

## Other Diseases

### Influenza Like Illness



Source: Michigan Disease Surveillance System

\*Influenza-Like Illness Case Definition: Fever AND one or more of the following: Cough or Sore Throat

**Who is affected in Kent County?** There were 85,214 cases of influenza-like illness (ILI) reported to the Kent County Health Department in 2009. There was an average of 49,582 cases reported per year from 2005-2009. Based on state and national laboratory surveillance data, it is presumed that most cases of influenza-like illness in 2009 were due to the new H1N1 influenza strain. Children and young adults were more likely than older adults to become infected with H1N1.

**Disease Trend** In the U.S., 5-20 % of the population has influenza annually. Kent County relies on disease reporting from schools and day cares as a major source of data for ILI, which is used as a marker of influenza activity in the community. The marked increase in the number of ILI cases in 2009 in Kent County is explained by the emergence of the novel 2009 H1N1 influenza strain that was declared a pandemic by the World Health Organization (WHO) in May 2009. The United States monitors influenza through a sampling of providers and therefore is not directly comparable to the state and county system.

**Why is this a concern?** Although most people have mild symptoms, symptoms can be severe and debilitating for others. Complications such as dehydration, bacterial pneumonia, and worsening of chronic medical conditions, such as asthma, diabetes, or congestive heart failure can accompany influenza. Children may get sinus problems and ear infections.

**Important Fact** Individuals become ill by the intake of respiratory droplets (from coughs and sneezes) from infected individuals. It can be passed a day before symptoms develop and up to 5 days after becoming sick. Individuals can also become infected by touching their mouth, nose, or eyes right after touching a surface contaminated with flu viruses.

**Vaccine** Each year, a new vaccine is developed to prevent influenza. The best time to get vaccinated is in October or November; however, getting vaccinated at any point in the flu season is recommended and may still provide protection. It takes about two weeks for antibodies to develop after vaccination. Influenza season begins as early as October and may continue as late as May.

**Prevention**

- Effective hand washing and covering coughs and sneezes with a tissue or sleeve (immediately followed by hand washing) are the most efficient means of reducing the transmission of the influenza virus.
- Influenza virus can be killed by heat (167-212°F [75-100°C]). Additionally, chlorine, hydrogen peroxide, detergents (soap), iodophors (iodine-based antiseptics), and alcohols are effective against influenza viruses if used in proper concentration for sufficient length of time. Alcohol based wipes or gels can be used to clean hands if soap and water are not practical. The gels should be rubbed in until dry.

**Treatment**

- Antiviral drugs (zanamavir and oseltamivir) are available for treatment of the flu. If taken within 2 days of becoming ill, these drugs can decrease the duration of illness by 1 or 2 days. They also can make an individual less contagious to others. These drugs must be prescribed by a doctor and must be taken for 5 days.

**Contraindications** - People who have a severe allergy to chicken eggs shouldn't get the vaccine. Individuals should not get vaccinated if they have had a serious reaction to the vaccine or developed Guillain-Barré syndrome from the vaccine. The vaccine is not approved for children < 6 months.

**New Threats**- In 2009, a novel H1N1 influenza strain infected humans world wide and the World Health Organization (WHO) declared the outbreak a pandemic. The infection caused a relatively mild disease and predominantly affected children and young adults. It is thought that older adults have some level of immunity against the 2009 H1N1 strain. The possibility for the virus to mutate to a more lethal strain still poses a significant threat, as does the highly-pathogenic avian influenza H5N1 virus.

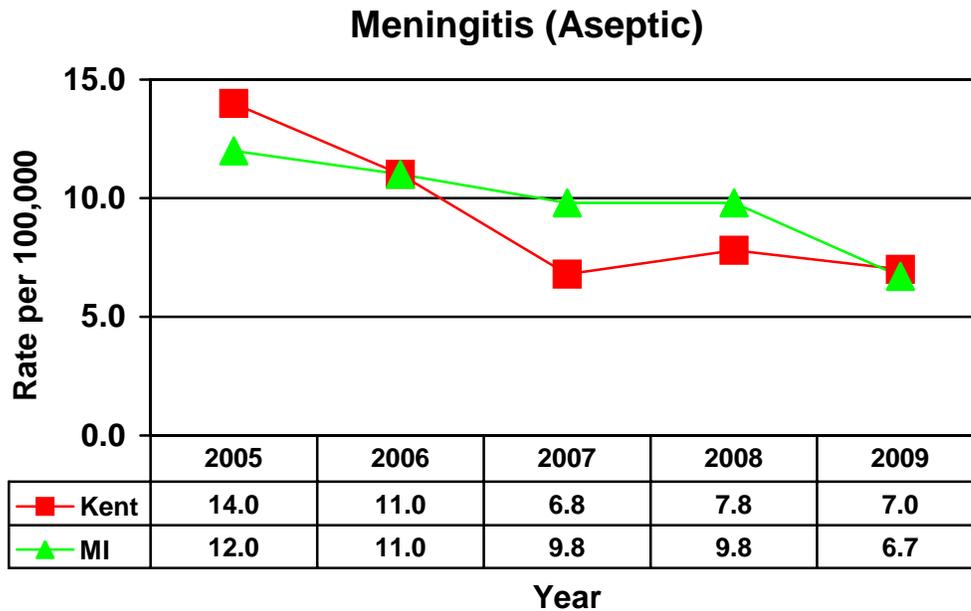
## Legionellosis

Number of cases of Legionellosis

2005	2006	2007	2008	2009
7	9	12	6	2

Legionellosis, a pneumonia-like lung infection, also known as Legionnaires' disease, is caused by a type of bacteria called *Legionella*. A milder infection caused by *Legionella* bacteria is called Pontiac Fever. This type of bacteria is found in the natural environment, primarily in water. The bacteria grows best in warm water and has been found in hot tubs, cooling towers, hot water tanks, large plumbing and air-conditioning systems. The bacteria have not been seen to grow in car or window air-conditioners. People become ill when they breathe in a mist or vapor with *Legionella* in it. Outbreaks usually occur with low attack rates (0.1%-5%).

## Meningitis, aseptic



Source: Michigan Disease Surveillance System

**Who is affected in Kent County?** There were 40 cases of aseptic meningitis reported in 2009. There was an average of 48 cases reported per year from 2005-2009.

**Disease Trend** The rate of aseptic meningitis has decreased in Kent County and in the State of Michigan since 2005. Aseptic meningitis is not nationally reportable.

**Why is this a concern?** Aseptic Meningitis can be caused by a multitude of viruses, making it difficult to identify a particular etiology. Even meningitis caused by some forms of bacteria appear to be viral based on their clinical symptoms. In rare cases, the meningitis progresses to encephalitis, or paralysis. In some cases, muscle weakness and spasm may last a year or more.

**Important Fact** A rubella-like rash is characteristic of infection with coxsackie and echoviruses. Gastrointestinal and respiratory symptoms may accompany enterovirus infections. In the USA, enteroviruses are identified most frequently followed by coxsackievirus, arboviruses, measles, herpes simplex, varicella viruses, lymphocytic choriomeningitis, adenovirus, and others.

**When does it occur?** Seasonal increases occur in the late summer and early fall and are usually associated with arboviruses (e.g. West Nile Virus) and enteroviruses.

**Prevention** There are no specific precautions recommended beyond routine sanitary practices.

## Meningitis, Bacterial Other\*

### Number of Cases

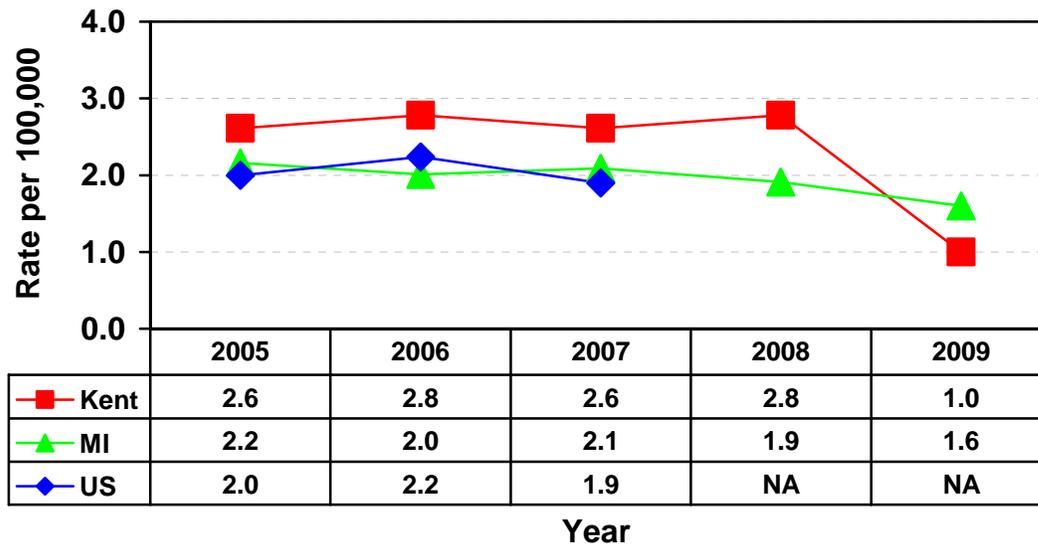
2005	2006	2007	2008	2009
11	6	9	11	14

\* Meningitis cases other than those caused by *N. meningitidis*, *S. pneumoniae*, and *H. influenzae*.

All bacterial meningitis cases are reportable. Any case caused by bacteria other than *N. meningitidis*, *S. pneumoniae*, and *H. influenzae* are counted as “Meningitis, bacterial other.” *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Streptococcus viridans* are examples of some other bacteria that cause meningitis.

## Streptococcal Infections, Group A (GAS)

### Invasive Group A Streptococcal Infections (GAS)



Source: Michigan Disease Surveillance System and Summary of Notifiable Disease, US

**Who is affected in Kent County?** There were 6 cases of invasive Group A Streptococcal infections (GAS) reported in 2009. On average, there were 13 cases reported per year from 2005-2009.

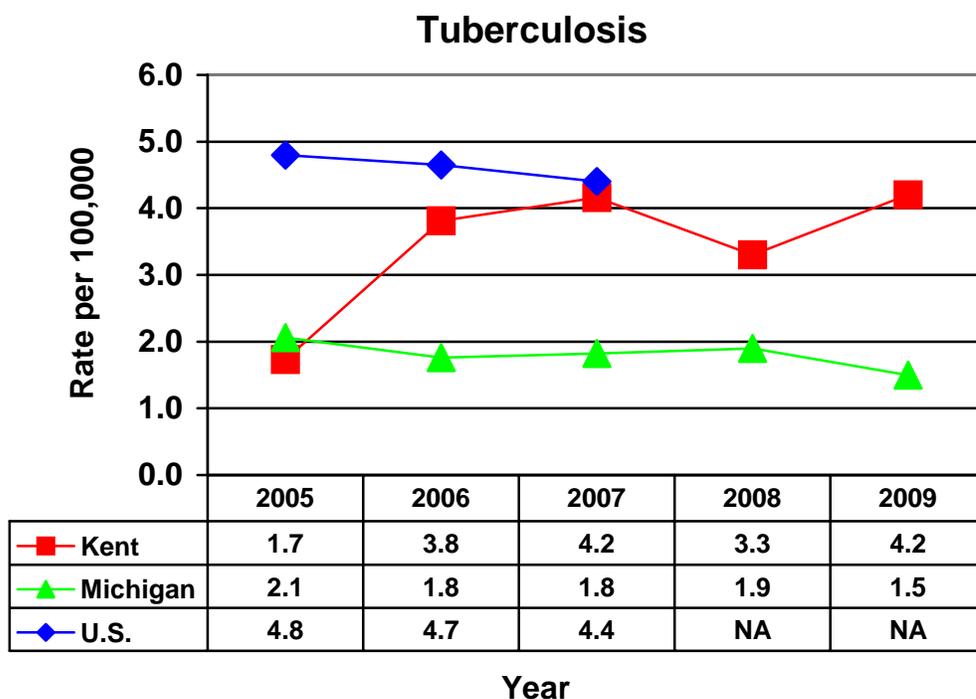
**Disease Trend** The overall rate of invasive GAS infections has decreased in Kent County, Michigan, and the U.S. since 2005.

**Why is this concern?** Although rare, these bacteria can cause other severe and fatal diseases. GAS disease may occur when bacteria get into parts of the body where bacteria usually are not found (invasive infections), such as the blood, muscle, or the lungs. Two of the most severe, but least common, forms of invasive GAS disease are necrotizing fasciitis and Streptococcal Toxic Shock Syndrome (STSS). Necrotizing fasciitis destroys muscle, fat, and skin tissue. STSS causes blood pressure to drop rapidly and organs (e.g., kidney, liver, lungs) to fail. GAS is spread through direct contact with mucus from the nose or throat of persons who are infected or through contact with infected wounds or sores on the skin. Ill persons, such as those who have strep throat or skin infections, are most likely to spread the infection.

**Important Fact** Group A streptococcus is commonly found on the skin and in the throat. People can carry GAS and have no symptoms of illness. Most GAS infections are irritating and painful but not serious (i.e. impetigo or “strep throat”).

**Prevention** The spread of all types of GAS infection can be reduced by good hand washing, especially after coughing and sneezing and before preparing foods or eating. Persons with sore throats should be seen by a doctor who can perform tests to find out whether the illness is strep throat. If the test result shows strep throat, the person should stay home from work, school, or day care until 24 hours after taking an antibiotic. All wounds should be kept clean and watched for possible signs of infection such as redness, swelling, drainage, and pain at the wound site. A person with signs of an infected wound, especially if fever occurs, should seek medical care.

# Tuberculosis



Source: Michigan Disease Surveillance System and  
US Summary of Notifiable Disease, US

**Who is affected in Kent County?** There were 24 new cases of Tuberculosis (TB) reported in 2009. There was an average of 20 cases reported per year from 2005-2009.

**Disease Trend** Overall, there has been an increase in the rate of reported tuberculosis infection in Kent County over the past five years. Nationally, foreign-born persons made up 53% of cases in 2003. This is an increase from 1993 when foreign-born individuals only represented 29% of the national case total.

**Why is this concern?** If TB is not treated, it can be fatal. Infected persons who are symptomatic with cough, weight loss, weakness, etc. can pass the disease through the air to others (active TB infection).

**Important Fact** Although most people think of TB as a disease of the lungs, TB can affect any part of the body, such as the throat, brain, spine, and kidney. People with TB can carry the bacteria but not have any symptoms or feel sick, and can't transmit the bacteria to others (latent TB infection).

**Prevention** People with active TB should stay home from school and/or work so they don't transmit the disease to others. There are several medications available that are effective against *Mycobacterium tuberculosis*, the bacteria that causes the illness. After a few weeks of treatment, a doctor can reassess the patient to see if they are well enough to return to work. While at home, it is important to cover a cough, sneeze, or laugh with a tissue. When finished with the tissue, put it in a bag that can be closed and thrown away. It is also helpful to air out rooms in a home frequently by opening a window and using a fan to move air out and bring in fresh air. It takes a minimum of 6 months of treatment to kill TB bacteria; therefore it is important to take all medicines everyday so the bacteria do not grow back. People with latent TB should be treated so that their TB does not become active.

## Tuberculosis: Clinical Summary

### Organism:

#### ***Tuberculosis***

Bacteria called *Mycobacterium tuberculosis*

### Incubation:

#### ***Tuberculosis***

2 to 10 weeks for the primary lesion; progression to active disease usually occurs within 2 years after infection.

### Reservoir and Transmission:

#### ***Tuberculosis***

Spread through the air by coughs and sneezes of persons with active TB. The bacteria are maintained in the lungs. If a person's immune system can't fend it off, the bacteria grow, kill tissue, and create a hole in the lungs.

### Symptoms:

#### ***Tuberculosis***

Severe cough lasting 3 weeks or more, chest pain, coughing up blood or phlegm (from inside the lungs), weakness, weight loss, lack of appetite, fever, night sweats and chills.

### Diagnosis:

#### ***Tuberculosis***

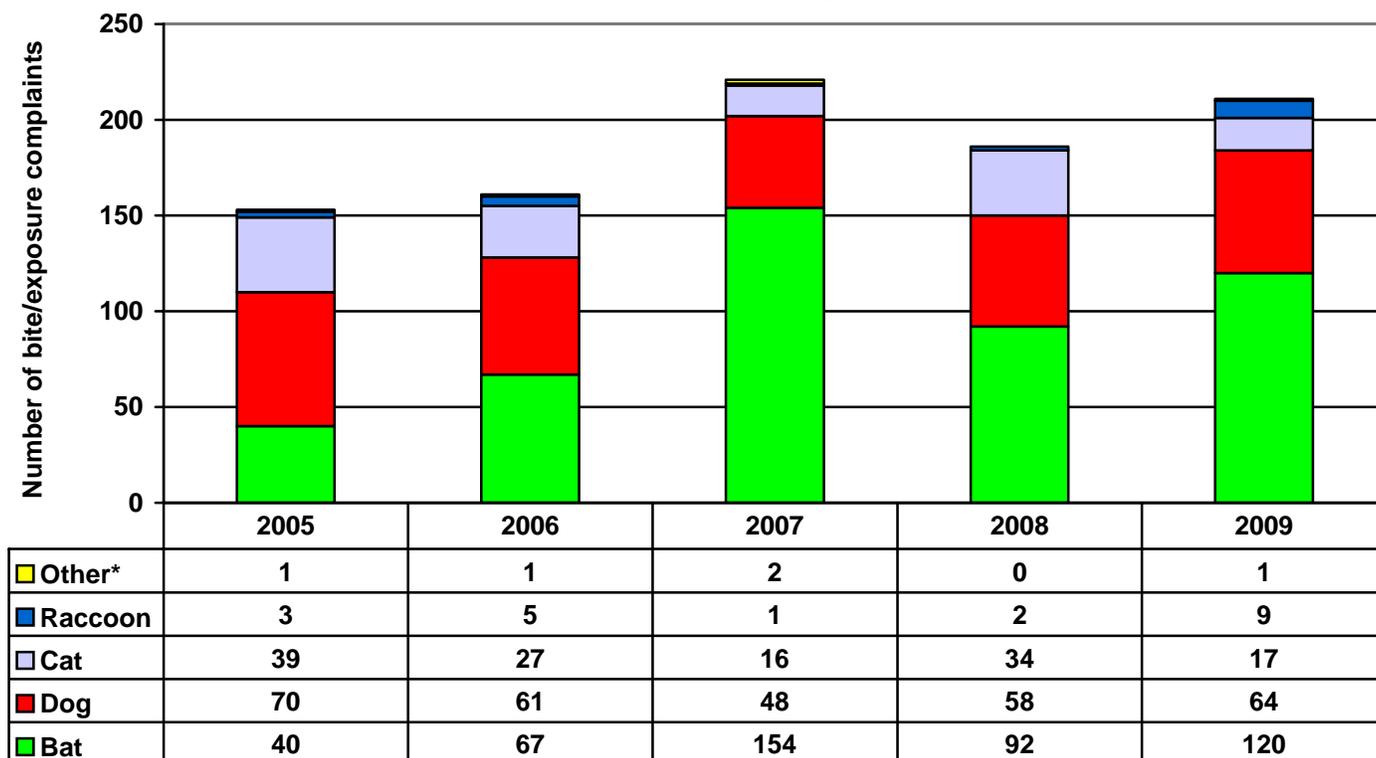
TB skin test, symptoms of TB, chest x-ray, and sputum (phlegm) test

### Treatment:

#### ***Tuberculosis***

People with active TB are treated with antibiotics. Standard initial treatment involves the use of 4 drugs to prevent multi-drug resistant TB. People who have latent TB usually take one or two antibiotics. Active TB is treated for a minimum of 6 months or longer. Treatment for latent TB usually lasts 9 months with isoniazid or 4 months with rifampin.

Animal Bite/Exposures, By Year, 2005-2009



Source: Kent County Health Department Communicable Disease Unit

\*Other: monkey (2005), fox (2006), opossum (2007), woodchuck (2007), skunk (2009)

## Animal Bites

A new system for monitoring animal bites was developed and implemented at the Kent County Health Department in July 2003. These data represent cases that were reported to the Kent County Health Department during the last five years. If exposure to an animal presents a risk for rabies, an individual is advised to seek rabies post-exposure prophylaxis (PEP) - a series of shots to prevent rabies. A public health nurse follows each case to determine if the series of shots is completed. The majority of dog and cat bites that are reported to the Health Department come from people that are bitten by animals that are not known to them and unleashed. This data under represents the true number of animal bites that occur in Kent County.

**Who is affected in Kent County?** Prior Kent County data analysis suggests that children and teenagers are at greatest risk for dog bites. Children  $\leq 9$  years were at greatest risk for dog bites to the head and neck, whereas adults  $\geq 20$  years of age had the greatest rate of bites to the arms and hands. Individuals of all age groups are at risk for bat bites.

**Disease Trend** In the past three years, bats have accounted for the majority of complaints reported to the health department. One theory for this phenomenon is urban sprawl. Historically, wildlife had enough open space to get away from humans. However, with new development moving into rural areas, individuals have more contact with wildlife (through feeding and other means), and the risk of rabies exposure has increased.

**Why is this concern?** Some animals can carry rabies. Rabies is a viral illness that is nearly 100% fatal if post exposure prophylaxis is not provided. Persons bitten by animals may face a risk of rabies, tetanus and other infections. Bite injuries may not only cause long lasting physical and emotional harm to the victim, they may even result in civil or criminal liability. Children are at a greater risk of injury and death from bites. Children's small stature and helplessness in warding off an attack may contribute to a greater frequency of injuries. For more information on rabies, post exposure prophylaxis, vaccine administration and frequently asked questions visit the Access Kent web site at [www.accesskent.com/Health/HealthDepartment/CD\\_Epid/](http://www.accesskent.com/Health/HealthDepartment/CD_Epid/)

**Important Fact** The last human case of rabies in Kent County occurred in 1983. In 2009, the only animals testing positive for rabies in Kent County were bats. Skunks, raccoons, woodchucks and foxes are also considered high risk. Chipmunks, gerbils, gophers, guinea pigs, hamsters, moles, mice, muskrats, prairie dogs, rabbits, rates, shrews, squirrels, and are not likely to carry rabies.

**Prevention** It may be helpful to review basic safety techniques with older children and never leave infants or children alone with a dog. Bat-proofing a home will help prevent exposure to bats. For information on bite prevention visit the Health Department website at [www.accesskent.com/Health/HealthDepartment/AnimalControl/kcas\\_bite.htm](http://www.accesskent.com/Health/HealthDepartment/AnimalControl/kcas_bite.htm)