REPORTABLE INFECTIOUS DISEASES IN MICHIGAN

2002-2006 Summary

July 2007

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NOTICE

As a cost-cutting measure this document is only available in an electronic form.

Please visit at:

Thanks to Melissa Gallego, Steve Cali, Muhammad Younus and the Communicable Disease Division Staff for your great effort to organize and present this information.

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INTRODUCTION

Purpose

The purpose of this report is to provide trend information for the 53 notifiable conditions in Michigan between 2002 and 2006. This report includes:

- Table of notifiable conditions 2002-2006 (counts and rates)
- Select notifiable condition summaries

Surveillance of Communicable Diseases in Michigan

Health care providers, laboratories and hospitals are required by Michigan law (Communicable Disease Rule, R 325.171,172,173) to report select conditions to health authorities. Local health departments throughout Michigan investigate reported cases of notifiable diseases and collect patient demographics and other relevant data and report to the Michigan Department of Community Health (MDCH) through the Michigan Disease Surveillance System (MDSS). MDSS is a centralized, statewide, electronic, web-based database of reportable diseases in Michigan. It can be accessed internally and remotely/on-line by authorized public health officials. To protect restricted, confidential health and clinical data of individuals, internal security structures are in place. The system allows immediate communication among disease reporting authorities regarding investigations into possible cases of communicable disease. MDSS contains information on suspect, probable, or confirmed cases of disease. MDSS also generates summary statistics and reports to assist users in evaluating public health efforts. The list of reportable diseases in Michigan is regularly revised to include emerging and reemerging conditions that require monitoring and investigation. Please refer to (http://www.michigan.gov/documents/Reportable_Disease_Chart_2005_122678_7.pdf) for a complete list of reportable conditions in Michigan.

Technical Notes

Completeness of reporting varies by disease and health jurisdiction, and is dependant on reports from health care providers.

Select Notifiable Condition Summaries

Diseases were selected for summaries based on frequency of occurrence and their public health importance. Surveillance case definitions for each condition can be found at (http://www.cdc.gov/epo/dphsi/phs/infdis2005.htm), unless otherwise indicated. Each disease summary includes the following:

- Introduction
- Causative agent
- Clinical features
- Mode of transmission
- Period of communicability
- Incubation period
- Prevention
- Demographic characteristics of reported cases between 2002 and 2006
- Graphs of case counts reported by year
- Map of incidence of disease by county

Disease rates (wherever included) were calculated using population estimates provided by the US Bureau of Census. The Michigan population size was relatively stable from 2002 to 2006. Please refer to (http://www.mdch.state.mi.us/pha/osr/Index.asp?Id=17) for more information regarding population estimates in Michigan.

Only confirmed and probable cases of disease were included in the demographic statistics. Therefore, the total number of cases of disease reported during the 5-year period in the "Table of notifiable conditions 2002-2006" may not match the total number of cases reported during same period as seen in the demographic table of the select notifiable condition summaries. Demographic data tables include age, sex, race and ethnicity. Data presentation may vary slightly for each disease depending on the format of the information collected. For additional information, please contact the Michigan Department of Community Health, Bureau of Epidemiology, Division of Communicable Disease at (517) 335-8165.

NOTIFIABLE DISEASE COUNTS AND RATES BY YEAR

TABLE OF NOTIFIABLE CONDITIONS 2002-2006

Diseases	2006		2005		2004		2003		2002		Total	Mean 5 year	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	5 year cases	Cases	Rate
AIDS	822	-0.16	983	1.46	399	-0.30	570	0.01	564	0.00	3,338	668	0.20
Amebiasis	58	0.18	49	-0.06	52	0.33	39	0.08	36	-0.40	234	47	0.03
Anthrax	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Blastomycosis	20	1.00	10	-0.23	13	-0.19	16	0.07	15	-0.25	74	15	0.08
Botulism	0	-1.00	1	0.00	0	0.00	0	-1.00	1	0.00	2	0	-0.40
Brucellosis	3	2.00	1	-0.67	3	-0.40	5	-0.29	7	1.33	19	4	0.40
Campylobacter	908	0.11	817	-0.07	875	0.04	840	-0.03	867	-0.02	4,307	861	0.01
Chancroid	2	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	0	0.00
Chickenpox (Varicella)	5,237	0.31	4,008	-0.05	4,240	0.02	4,171	-0.22	5,352	-0.20	23,008	4,602	-0.03
Chlamydia (Genital)	38,513	-0.02	39,415	0.04	37,906	0.16	32,547	0.01	32,272	0.04	180,653	36,131	0.05
Cholera	0	-1.00	2	0.00	0	0.00	0	0.00	0	0.00	2	0	-0.20
Coccidioidomycosis	46	2.07	15	0.15	13	0.63	8	-0.62	21	2.00	103	21	0.85
Creutzfeldt-Jakob Disease	9	-0.18	11	1.75	4	0.00	0	0.00	0	0.00	24	5	0.31
Cryptococcosis	50	-0.07	54	0.17	46	0.10	42	-0.31	61	0.45	253	51	0.07
Cryptosporidiosis	149	0.33	112	-0.28	156	0.02	153	0.13	136	-0.27	706	141	-0.02
Cyclosporiasis	0	-1.00	2	-0.33	3	2.00	1	-0.50	2	-0.50	8	2	-0.07
Dengue Fever	9	0.29	7	0.17	6	1.00	3	-0.40	5	0.25	30	6	0.26
Diphtheria	0	0.00	0	0.00	0	0.00	0	0.00	0	-1.00	0	0	-0.20
Ehrlichiosis species	0	0.00	0	-1.00	2	1.00	1	0.00	1	0.00	4	1	0.00
Encephalitis, Primary	3	0.50	2	-0.94	33	-0.30	47	0.38	34	0.42	119	24	0.01
Encephalitis, California	1	0.00	0	-1.00	1	0.00	1	-0.91	11	0.00	14	3	-0.38
Encephalitis, Eastern Equine	0	0.00	0	0.00	0	0.00	0	-1.00	5	1.50	5	1	0.10
Encephalitis, Powassan	0	0.00	0	0.00	0	0.00	0	-1.00	1	0.00	1	0	-0.20
Encephalitis, St. Louis	0	0.00	0	-1.00	3	-0.50	6	1.00	3	0.00	12	2	-0.10
Encephalitis, Western Equine	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Encephalitis others	0	0.00	0	-1.00	10	0.67	6	-0.45	11	-0.31	27	5	-0.22
Escherichia coli 0157:H7	76	-0.08	83	-0.01	84	-0.12	95	-0.30	135	0.32	473	95	-0.04
Giardiasis	708	-0.10	788	0.07	737	-0.04	768	-0.17	920	-0.09	3,921	784	-0.06
Gonorrhea	16,758	-0.08	18,122	0.13	16,027	0.15	13,965	-0.05	14,770	-0.14	79,642	15,928	0.00
Granuloma Inguinale	1	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0	0.00

Diseases	2006		2005		2004		2003		2002		Total	Mean 5 year	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rates	Cases	Rate	5 year cases	Cases	Rate
Guillain-Barre Syndrome	54	-0.13	62	0.05	59	0.11	53	-0.05	56	0.08	284	57	0.01
H. influenzae Disease - Inv.	32	0.33	24	0.14	21	-0.25	28	0.56	18	0.29	123	25	0.21
Hantavirus	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Hemolytic Uremic Syndrome	5	0.00	5	0.00	5	0.25	4	-0.20	5	1.50	24	5	0.31
Hemorrhagic Fever	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Hepatitis A	136	0.07	127	-0.16	151	-0.26	203	-0.08	221	-0.31	838	168	-0.15
Hepatitis B	169	-0.07	181	-0.29	255	0.15	221	-0.31	321	-0.49	1,147	229	-0.20
Hepatitis C	300	1.73	110	0.28	86	0.09	79	0.00	79	-0.23	654	131	0.37
Hepatitis viral, non A, B and C	5	0.67	3	2.00	1	-0.94	17	0.42	12	-0.64	38	8	0.30
Histoplasmosis	114	0.70	67	0.20	56	-0.21	71	0.16	61	0.33	369	74	0.24
HIV		0.00		-1.00	688	-0.19	852	0.09	782	-0.12	2,322	774	-0.24
Kawasaki	0	0.00	0	-1.00	85	0.10	77	0.17	66	-0.15	228	46	-0.18
Legionellosis	173	0.41	123	-0.10	137	0.05	130	0.55	84	-0.03	647	129	0.17
Leprosy	0	-1.00	1	0.00	1	0.00	1	0.00	0	-1.00	3	1	-0.40
Leptospirosis	1	0.00	1	0.00	0	0.00	0	0.00	0	0.00	2	0	0.00
Listeriosis	20	-0.26	27	-0.10	30	0.43	21	-0.05	22	-0.08	120	26	-0.01
Lyme Disease	58	-0.08	63	1.25	28	1.33	12	-0.54	26	0.30	187	22	0.45
Lymphogranuloma venereum	0	-1.00	1	0.00	0	0.00	0	0.00	0	0.00	1	0	-0.20
Malaria	22	-0.08	24	0.14	21	-0.19	26	-0.42	45	0.10	138	33	-0.09
Measles	1	0.00	1	0.00	0	-1.00	2	0.00	0	0.00	4	1	-0.20
Meningitis - Aseptic	1,131	-0.08	1,228	0.09	1,130	-0.15	1,322	0.11	1,186	-0.54	5,997	1,394	-0.11
Meningitis - Bacterial Other	120	-0.16	143	0.04	138	0.38	100	-0.04	104	-0.19	605	129	0.01
Meningococcal Disease	29	-0.34	44	-0.12	50	-0.02	51	0.13	45	-0.44	219	68	-0.16
Mumps	85	2.70	23	6.67	3	-0.63	8	0.14	7	0.40	126	6	1.86
Pertussis	626	0.87	334	0.05	317	1.26	140	1.26	62	-0.57	1,479	159	0.58
Plague	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Polio	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Psittacosis	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Q Fever	3	0.00	3	0.00	0	-1.00	1	0.00	1	0.00	8	1	-0.20
Rabies Animal	49	0.20	41	0.00	41	-0.21	52	0.13	46	-0.02	229		0.02
Rabies Human	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Reye Syndrome	1	0.00	0	-1.00	1	0.00	0	-1.00	2	0.00	4	1	-0.40

Diseases	2006		2005		2004		2003		2002		Total	Mean 5 year	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rates	Cases	Rate	5 year cases	Cases	Rate
Rheumatic Fever	1	0.00	1	0.00	0	-1.00	6	0.00	0	-1.00	8	2	-0.40
Rocky Mt Spotted Fever	7	0.40	5	1.50	2	-0.67	6	1.00	3	2.00	23	3	0.85
Rubella	1	0.00	1	0.00	0	0.00	0	-1.00	1	0.00	3	0	-0.20
Salmonellosis	988	0.04	951	0.11	855	0.07	797	-0.08	870	-0.02	4,461	861	0.02
Shigellosis	149	-0.36	234	-0.08	255	0.11	230	0.14	202	-0.33	1,070	333	-0.11
Streptococcus pneumoniae, Invasive	594	0.42	418	1.88	145	0.32	110	0.18	93	0.41	1,360	83	0.64
Streptococcal Group A	200	-0.07	215	-0.26	292	-0.18	356	0.13	316	0.55	1,379	288	0.03
Syphilis	397	-0.18	485	1.35	206	-0.27	283	-0.45	512	0.18	1,883	358	0.13
Tetanus	3	2.00	1	0.00	0	0.00	0	-1.00	2	0.00	6	1	0.20
Toxic Shock	7	-0.30	10	-0.23	13	-0.07	14	0.40	10	0.00	54	13	-0.04
Trachoma	4	3.00	1	0.00	0	-1.00	1	0.00	0	0.00	6	0	0.40
Trichinosis	0	-1.00	4	0.00	0	0.00	0	0.00	0	0.00	4	0	-0.20
Tuberculosis	175	-0.15	205	-0.25	272	0.12	243	-0.23	315	-0.05	1,181	284	-0.12
Tularemia	0	-1.00	2	0.00	0	0.00	0	0.00	0	-1.00	2	1	-0.40
Typhoid Fever	7	0.17	6	-0.33	9	0.00	9	0.80	5	0.00	36	7	0.13
Typhus	0	-1.00	2	0.00	0	0.00	0	-1.00	1	0.00	3	0	-0.40
West Nile Virus	65	0.02	64	3.57	14	-0.07	15	-0.97	566	0.00	724	119	0.51
Yellow Fever	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Yersinia enteritis	24	0.14	21	0.00	21	0.00	21	-0.40	35	0.21	122	26	-0.01

SELECTED DISEASE SUMMARIES

AMEBIASIS (AMOEBIASIS)

Causative agent:
Amebiasis is caused by a single-cell protozoan parasite, *Entamoeba histolytica.*

Clinical features:
Most cases of amebiasis cause no symptoms. About one in 10 individuals infected with *E. histolytica* become sick and develop disease symptoms. The usual symptoms are often mild and can include loose stools, abdominal pain and cramping. Amebic dysentery is a severe form of amebiasis associated with abdominal pain, bloody stool, and fever. In rare situations, *E. histolytica* may invade the liver, lungs or brain.

Mode of transmission:
Infection is acquired via the fecal-oral route either by person-to-person contact or by eating or drinking contaminated food or water. Amebiasis is commonly reported in people who live in poor sanitary conditions. In the U.S., a higher rate of infection has been observed in immigrants from developing countries and in people who have traveled to developing countries. Institutionalized individuals with poor sanitary conditions and men who have sex with men are also at increased risk.

Period of communicability:
Disease transmission can occur as long as amebic cysts are present in the stool. Fecal shedding of amebic cysts may continue for years.

Incubation period:
Usually 2-4 weeks

Prevention of amebiasis
Frequent hand washing, especially after using restrooms and before preparing or eating food, helps to prevent amebiasis. Travelers to countries where sanitary standards are poor can reduce their chances of acquiring amebiasis by 1) not drinking water of questionable purity (e.g., drink bottled water or boiled water only) and 2) avoiding foods that are not cleaned or properly cooked.

Summary
Age-stratified analysis showed that about 45% of reported cases occurred in the 30-49 age groups. Among cases with reported gender, more female than male cases were observed.

Table 1. Demographic characteristics of amebiasis cases, Michigan 2002-2006

*N= 234	Number of Cases	Percent Total
Sex		
Male	101	43%
Female	120	51%
Race		
African American	15	6%
American Indian or Alaska Native	1	<1%
Asian	10	4%
Caucasian	100	43%
Other	36	15%
Ethnicity		
Hispanic or Latino	43	18%
Age groups (years)		
0-9	27	12%
10-19	38	16%
20-29	35	15%
30-39	52	22%
40-49	52	22%
50-59	14	6%
60-69	8	3%
≥70	8	3%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of amebiasis cases in Michigan, 2002-2006

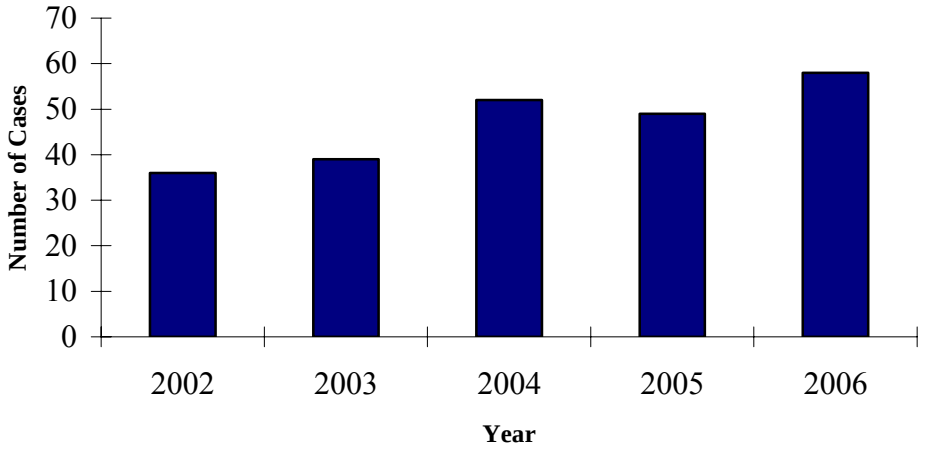
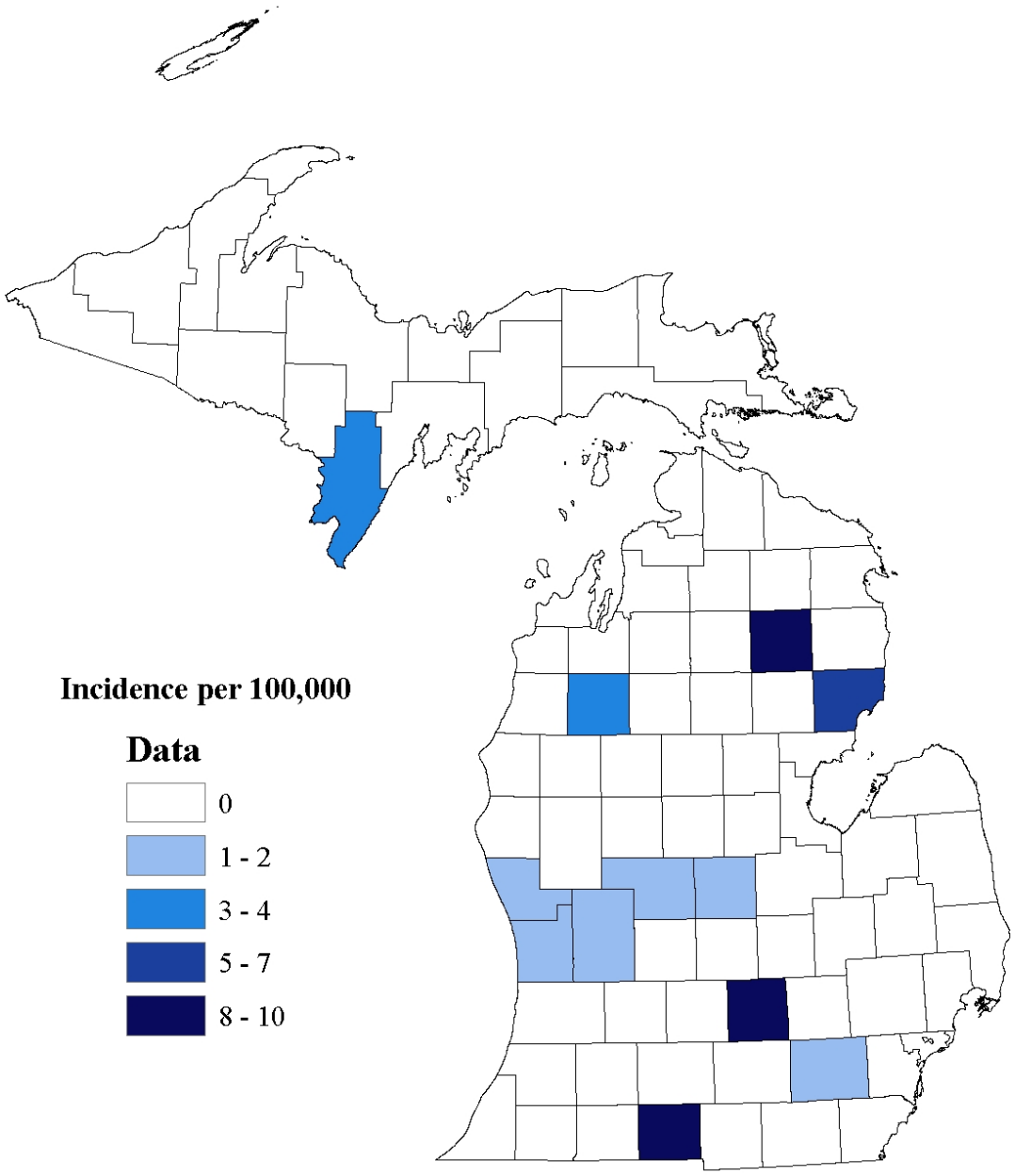


Figure 2. Incidence of amebiasis by county, Michigan 2006



ANTHRAX

Causative agent:
Anthrax is an acute infectious disease caused by the spore-forming bacteria *Bacillus anthracis*. Anthrax has been classified as a Bioterrorism agent.

Clinical features:
Anthrax infection occurs in three different forms: cutaneous (skin), inhalation (pulmonary), and gastrointestinal.

Cutaneous: Most anthrax infections occur when the bacteria enter a cut or abrasion on the skin. Skin infection begins as a raised itchy bump that resembles an insect bite. Within 1-2 days a vesicle develops which later turns into a painless ulcer, usually 1-3 cm in diameter, with a characteristic black necrotic (dying) area in the center. Lymph glands in the adjacent area may swell. About 20% of untreated cases of cutaneous anthrax result in death.

Inhalational: Initial symptoms may resemble a cold. After several days, the symptoms progress to severe breathing problems and shock. Inhalational anthrax usually results in death in 1-2 days after onset of the severe symptoms.

Gastrointestinal: The intestinal form of anthrax follows the consumption of contaminated food, often meat, and is characterized by an acute inflammation of the intestinal tract. Initial signs of nausea, loss of appetite, vomiting, and/or fever are followed by abdominal pain, vomiting of blood, and severe diarrhea. Intestinal anthrax results in death in 25% to 60% of cases.

Mode of transmission:
Bacillus anthracis spores can live in the soil for many years and humans can become infected with anthrax by handling or inhaling anthrax spores from contaminated animal products. Anthrax can also be spread by eating undercooked meat from infected animals. Direct person-to-person spread of anthrax is unlikely.

Period of communicability:
Person-to-person transmission is rare. Articles and soil contaminated with spores may remain infective for several years.

Incubation period:
Symptoms of disease vary depending on how the disease was contracted, but symptoms usually occur within seven days. However, incubation period can be up to 60 days.

High-risk groups:
Although anthrax among humans is extremely rare in the US, anyone can become infected with anthrax if they are exposed to contaminated wool, hides, leather or hair products (especially goat hair), or if they eat undercooked meat from an infected animal. Workers who are exposed to dead animals and animal products from countries where anthrax is more common are at the highest risk.

Prevention of anthrax:
There is a vaccine for anthrax. The Advisory Committee for Immunization Practices (ACIP) currently recommends the vaccine for individuals who come in contact in the workplace with imported animal hides, furs, wool, animal hair (especially goat hair), and bristles; for individuals engaged in diagnostic or investigational activities which may bring them into contact with anthrax spores and military personnel deployed to areas with high risk for exposure to the organism.

Note:
No cases of anthrax have been reported in Michigan in the last 5 years.

AVIAN INFLUENZA

Causative agent:
Avian influenza is an infectious disease of birds caused by type A strains of the influenza virus. Although avian influenza viruses do not usually infect humans, several instances of human infections have been reported. Current concerns about avian influenza focus on the H5N1 strain.

Clinical features:
Symptoms of avian influenza in humans have ranged from typical influenza-like symptoms (fever, cough, sore throat, and muscle aches) to eye infections (conjunctivitis), pneumonia, acute respiratory distress, viral pneumonia, and other severe, life-threatening complications.

Mode of transmission:
Certain water birds act as hosts to influenza viruses by carrying the virus in their intestines and shedding it in bodily fluids, such as saliva, nasal secretions, and feces. Other birds are then infected when they come in contact with these fluids. Humans can become infected through contact with infected poultry or these contaminated materials.

Period of communicability:
3 to 5 days from clinical onset in adults; up to 7 days in young children.

Incubation period:
The incubation period is usually 3 to 7 days, depending upon the isolate, the dose of inoculums, the species, and age of the bird.

High-risk groups:
The risk from avian influenza is generally low for humans. However, during an outbreak of avian influenza among poultry (domesticated chickens, ducks, turkeys), there is a possible risk to people who have contact with infected birds or surfaces that have been contaminated with their excretions. The outbreaks of avian influenza A (H5N1) among poultry in Asia is an example of one avian influenza outbreak that has caused human infections and deaths.

Prevention of avian influenza:

- Practice good hygiene, especially frequent hand washing. To prevent the transmission between people, cover mouth when coughing or sneezing.

- The CDC advises that if you are planning to travel to countries in Asia with known outbreaks of avian influenza, avoid poultry farms, contact with 19 animals in live food markets, and any surfaces that appear to be contaminated with feces from poultry or other animals.

Note:
No cases of avian influenza in humans have been reported in Michigan in the last 5 years.

BRUCELLOSIS

Causative agent:
Brucellosis is an infectious disease caused by bacteria of the genus *Brucella*. These bacteria primarily cause disease among animals but humans can also become infected. Various *Brucella* species affect sheep, goats, cattle, deer, elk, pigs, dogs, and other animals.

Clinical features:
Brucellosis is characterized by a fever, which may be continuous, intermittent or irregular. Other symptoms may include headache, weakness, sweating, chills, arthralgia (pain in the joints), depression, weight loss and generalized aching. This disease may last for days, months, or as long as a year if untreated.

Mode of transmission:
Brucellosis is spread to humans through contact with tissues or bodily fluids of animals infected with *Brucella* bacteria.

Period of communicability:
No person-to-person transmission.

Incubation period:
Variable, 1-2 months after exposure is common, occasionally several months.

High-risk groups:
Persons at highest risk for brucellosis are those who work with animals that are infected, such as veterinarians and ranchers, and persons who consume raw milk or dairy products made with raw milk such as cheese or ice cream. Brucellosis may also be transmitted to humans if they are inadvertently exposed to live brucellosis vaccine by a needle stick or other accident.

Prevention of brucellosis:
The most successful way of preventing brucellosis in humans is to control brucellosis in animals. The Brucellosis Eradication Program was established to eradicate the disease from cattle in the United States. From 1956 to 1998, the number of known brucellosis-affected herds decreased from 124,000 to 15. Individuals should avoid consuming raw milk or dairy products made with raw milk.

Note:
Only 19 cases of brucellosis have been reported in the past 5 years.

Table 1. Demographic characteristics of brucellosis cases, Michigan 2002-2006

*N= 19	Number of Cases	Percent Total
Sex		
Male	11	58%
Female	7	37%
Race		
African American	1	5%
Caucasian	7	37%
Other	2	11%
Ethnicity		
Hispanic or Latino	3	16%
Age groups (years)		
10-19	1	5%
20-29	4	21%
30-39	3	16%
40-49	3	16%
50-59	4	21%
60-69	3	16%
≥70	1	5%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of brucellosis cases in Michigan, 2002-2006

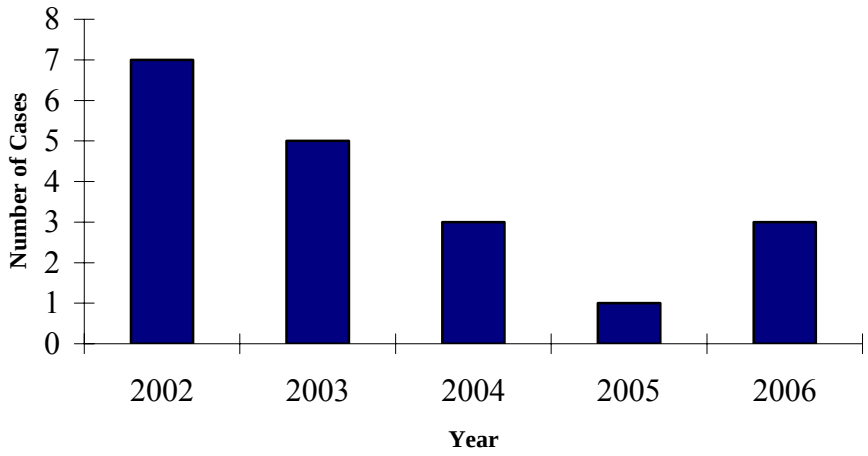
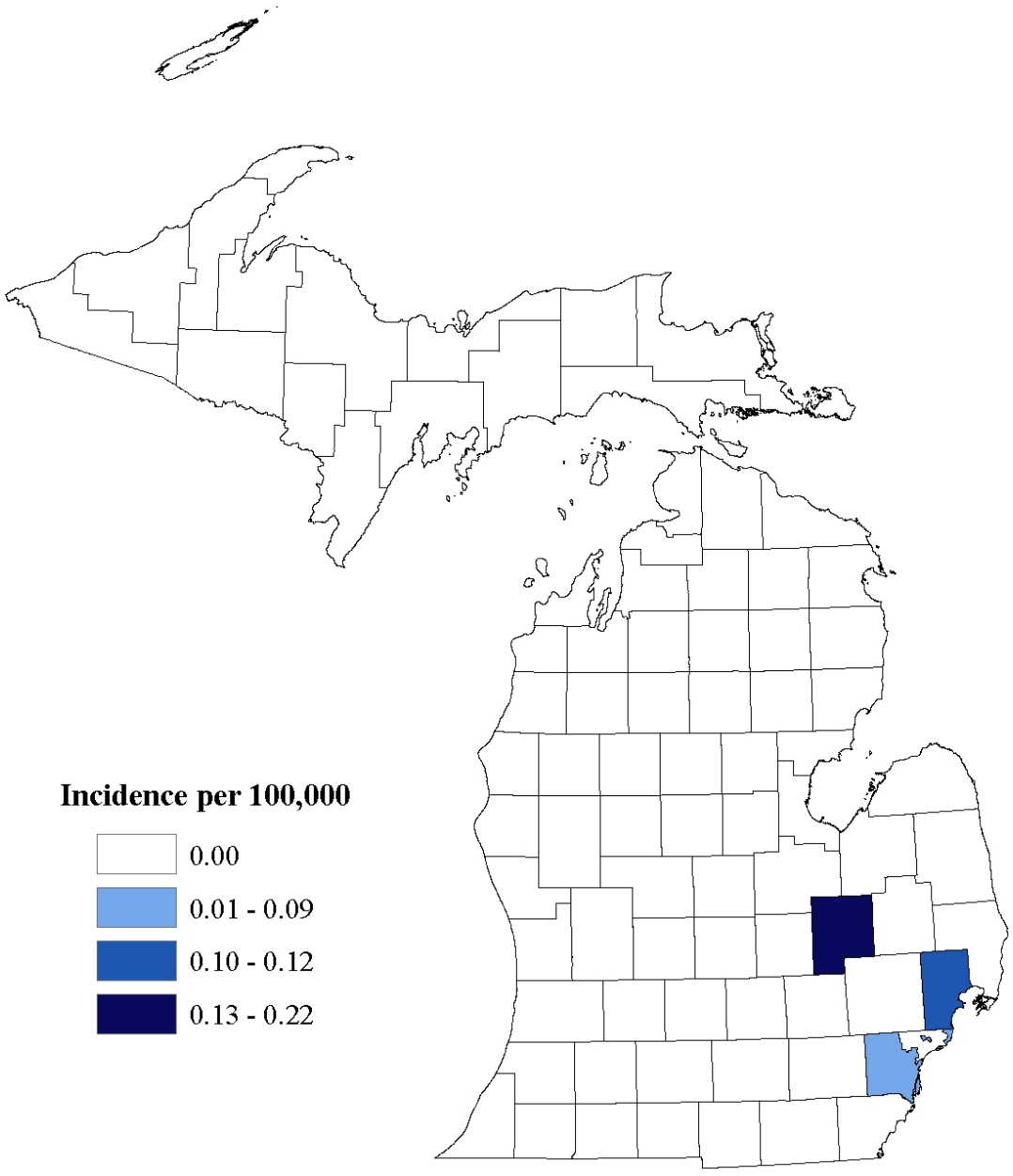


Figure 2. Incidence of brucellosis by county, Michigan 2006



CAMPYLOBACTERIOSIS

Causative agent:
Campylobacteriosis is caused by bacteria of the genus *Campylobacter.* Most human campylobacter infections are caused by the species *Campylobacter jejuni.*

Clinical features:
Most people with campylobacteriosis experience diarrhea, cramping, abdominal pain, and fever. The diarrhea may be bloody and can be accompanied by nausea and vomiting. The illness typically lasts 1 week. Some individuals infected with *Campylobacter* do not develop any signs or symptoms of the disease.

Mode of transmission:
The bacteria are spread by eating or drinking food or water that is contaminated by the feces of an infected person or from contact with an infected pet. Improperly cooked poultry, untreated water, and unpasteurized milk are the main sources of infection.

Period of communicability:
People can spread the disease for several days to several weeks after they are infected.

Incubation period:
2 to 5 days.

High-risk groups:
The organism is isolated from infants and young adults more frequently than from other age groups and from more males than females.

Prevention of campylobacteriosis:
Cook all poultry products thoroughly; making sure that the meat is cooked throughout. Wash hands with soap before and after handling raw foods of animal origin. Use separate cutting boards for foods of animal origin and other foods. Avoid consuming unpasteurized milk and untreated surface water

Table 1. Demographic characteristics of campylobacteriosis cases, Michigan 2002-2006

*N= 4304		Number of Cases	Percent Total
Sex			
	Male	2,352	55%
	Female	1,941	45%
Race			
	African American	152	4%
	American Indian or Alaska Native	6	<1%
	Asian	51	1%
	Caucasian	2,611	61%
	Hawaiian or Pacific Islander	3	0%
	Other	148	3%
Ethnicity			
	Hispanic or Latino	104	2%
Age groups (years)			
	0-9	767	18%
	10-19	364	8%
	20-29	510	12%
	30-39	640	15%
	40-49	743	17%
	50-59	576	13%
	60-69	357	8%
	≥70	347	8%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of campylobacteriosis cases in Michigan, 2002-2006

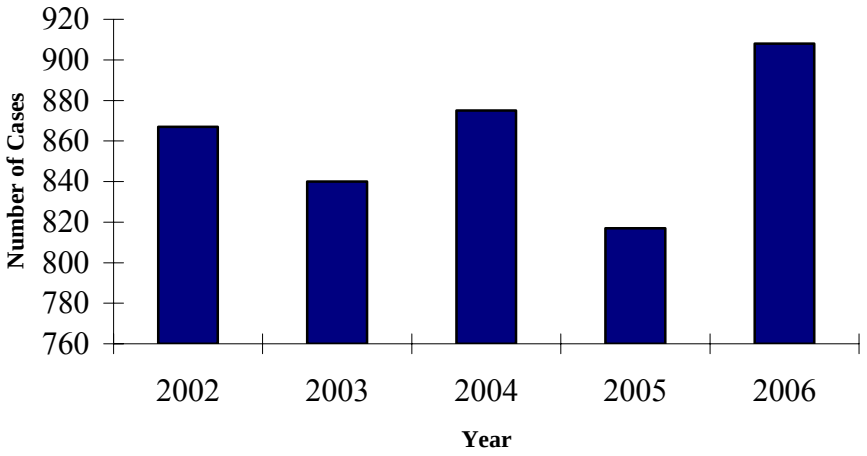
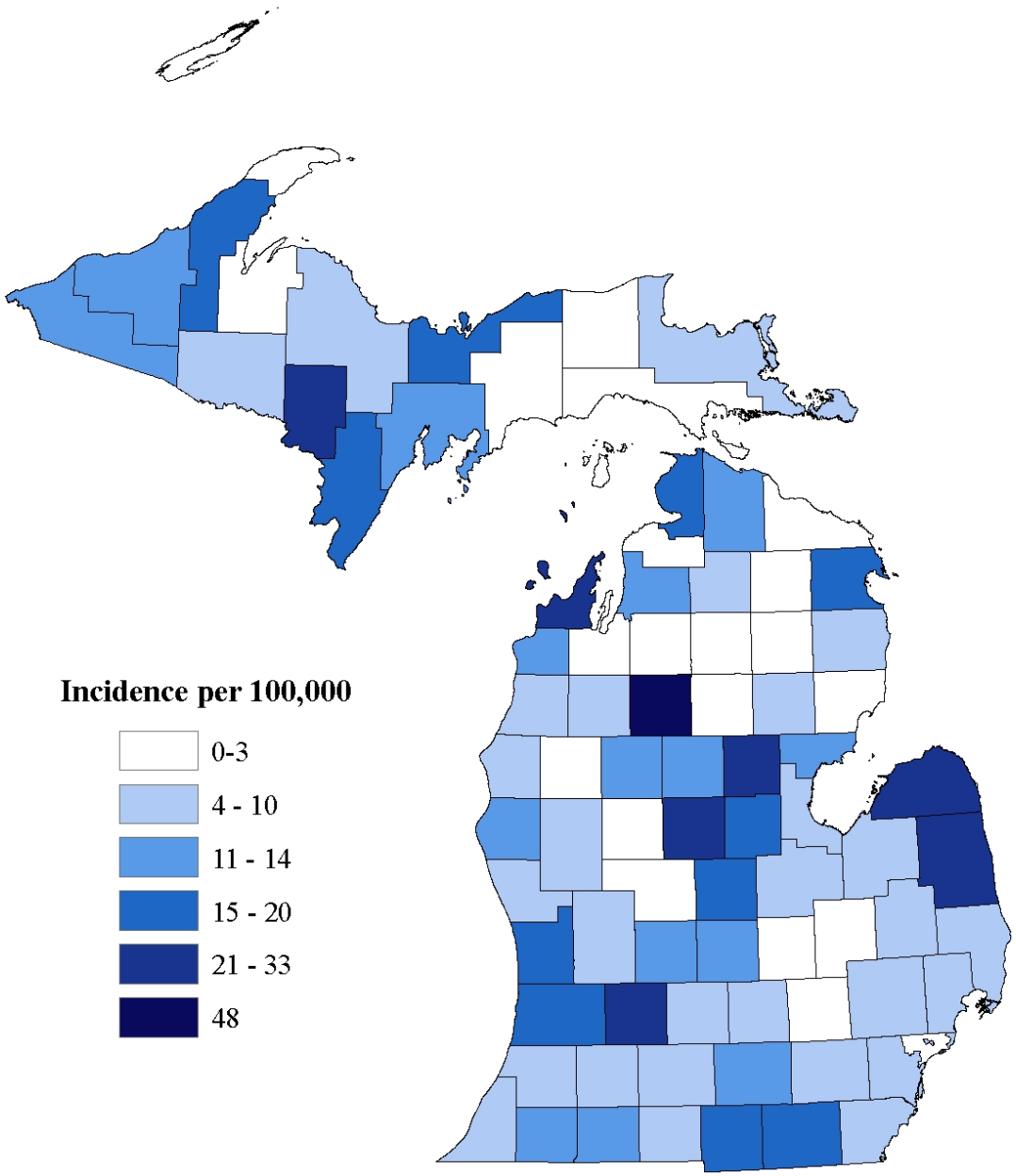


Figure 2. Incidence of campylobacteriosis by county, Michigan 2006



CHICKENPOX (VARICELLA)

Causative Agent:
Chickenpox is caused by the varicella-zoster virus (VZV), which is part of the herpes virus family.

Clinical features:
Chickenpox is a viral infection that causes a red, itchy rash on the skin. The chickenpox rash usually appears first on the abdomen or back and face, and then spreads to almost everywhere on the body, including the scalp, mouth, nose, ears, and genitals. The rash begins as multiple small, red bumps that look like pimples or insect bites. They develop into thin-walled blisters filled with clear fluid, which then becomes cloudy. The blister wall breaks, leaving open sores, which finally crust over to become dry, brown scabs. One of the most characteristic features of the chickenpox rash is that all stages of the lesions can be present at the same time. Some children have a fever, abdominal pain, or a vague sick feeling a day or 2 before the rash appears. The duration of illness usually lasts 7 to 10 days in children, but typically lasts longer in adults.

Mode of transmission:
Chickenpox is spread by direct contact. The virus may be transmitted through airborne spread of secretions from the respiratory tract of an infected person. Also, indirectly by contact with articles freshly soiled with the discharges from blisters or vesicles of an infected person.

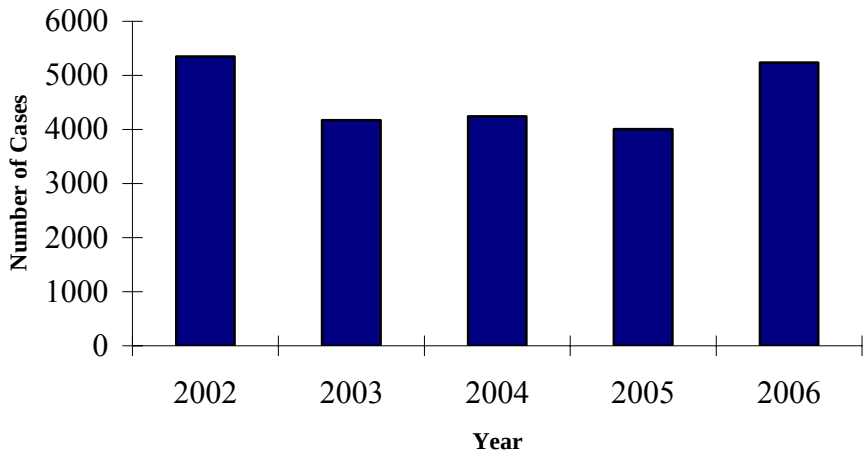
Period of communicability:
The contagious period for chickenpox begins about 2 days before the rash appears and lasts until all the blisters are crusted over.

Incubation period:
The incubation period for chickenpox is 10 to 21 days; most cases appear in 14 to 17 days.

High-risk groups:
Although it's more common in children under the age of 15, anyone can get chickenpox. A person usually has only one episode of chickenpox in his or her lifetime.

Prevention of chickenpox:
Chickenpox vaccine is recommended at 12-18 months of age and is required for kindergarten school entry. It is recommended that children younger than thirteen years of age without disease history should receive one dose of vaccine. Adolescents and adults without disease history should receive two doses of vaccine four to six weeks apart. Healthy children who have had chickenpox do not need the vaccine - they usually have lifelong protection against the illness.

Figure 1. Number of chickenpox cases in Michigan, 2002-2006



Note:
Surveillance for chickenpox in Michigan depends mostly on school-based reporting. School reports an aggregate number of cases on a weekly basis. Actual chickenpox incidence is believed to be substantially greater than reflected in reported figures due to under-reporting. MDCH estimates that approximately 26% of cases are reported.

CHLAMYDIA

Causative Agent:
Chlamydia is a sexually transmitted infection caused by the bacteria *Chlamydia trachomatis*. The bacteria target the cells of the mucous membranes. In the United States, chlamydia is the most common bacterial sexually transmitted disease (STD), particularly among sexually active adolescents and young adults.

Clinical features:
About 75% of women and 50% of men with chlamydia do not experience signs or symptoms of infection.

In women, symptoms of chlamydia may include:

- An unusual vaginal discharge
- Bleeding after intercourse
- Bleeding between menstrual periods
- Abdominal or pelvic pain

In men, symptoms of chlamydia may include:

- Discharge from the penis
- Burning with urination
- Swollen or painful testicles

Mode of transmission:
Chlamydia is transmitted through sexual contacts primarily vaginal or anal with an infected person. It can be transmitted when the mucous membrane of an uninfected individual comes into contact with secretions of an infected person. Infected mothers can transmit infection to their newborn children during childbirth. The primary risk factors for chlamydia include:

- Engaging in unsafe sex
- Having sex with more than one partner
- Having a sexual relationship with someone who has multiple sex partners

Period of communicability:
The period of communicability is not known.

Incubation period:
Poorly defined. Probably 7-14 days or longer.

High-risk groups:
Individuals with high-risk sexual behavior (unprotected sex, multiple sex partners, sexual intercourse with an infected person).

Prevention of chlamydia:
To avoid chlamydia avoid high-risk sexual behavior and practice protected sex such as use of latex condoms during sexual intercourse. Regular examinations for sexually transmitted diseases are advised when unprotected sex is practiced.

Table 1. Demographic characteristics of chlamydia cases, Michigan 2006

*N=	38,513	Number of Cases	Percent Total
Sex			
	Male	9016	23%
	Female	29019	75%
Race			
	African American	10673	28%
	American Indian or Alaska Native	77	0%
	Asian	168	0%
	Caucasian	7901	21%
	Hawaiian or Pacific Islander	8	0%
	Other	650	2%
Ethnicity			
	Hispanic or Latino	903	2%
Age groups (years)			
	<1	64	0%
	1-9	16	0%
	10-19	15,520	40%
	20-29	18,208	47%
	30-39	3,259	8%
	40-49	794	2%
	50-59	164	0%
	60-69	40	0%
	≥70	66	0%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of chlamydia cases in Michigan, 2002-2006

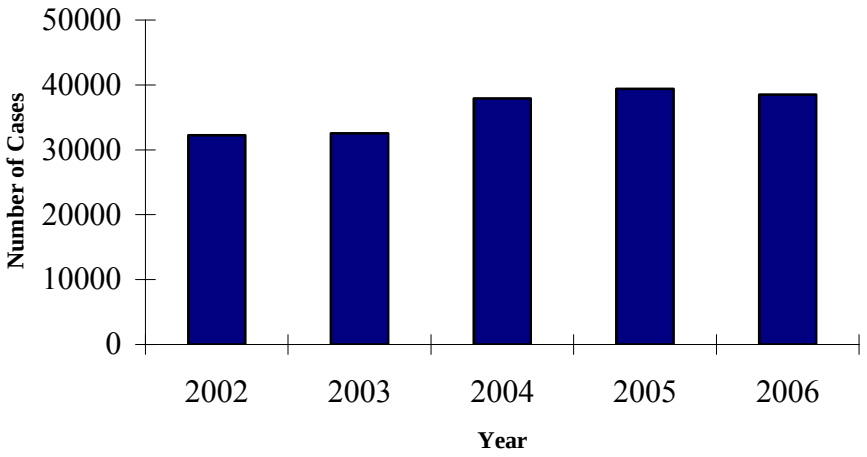
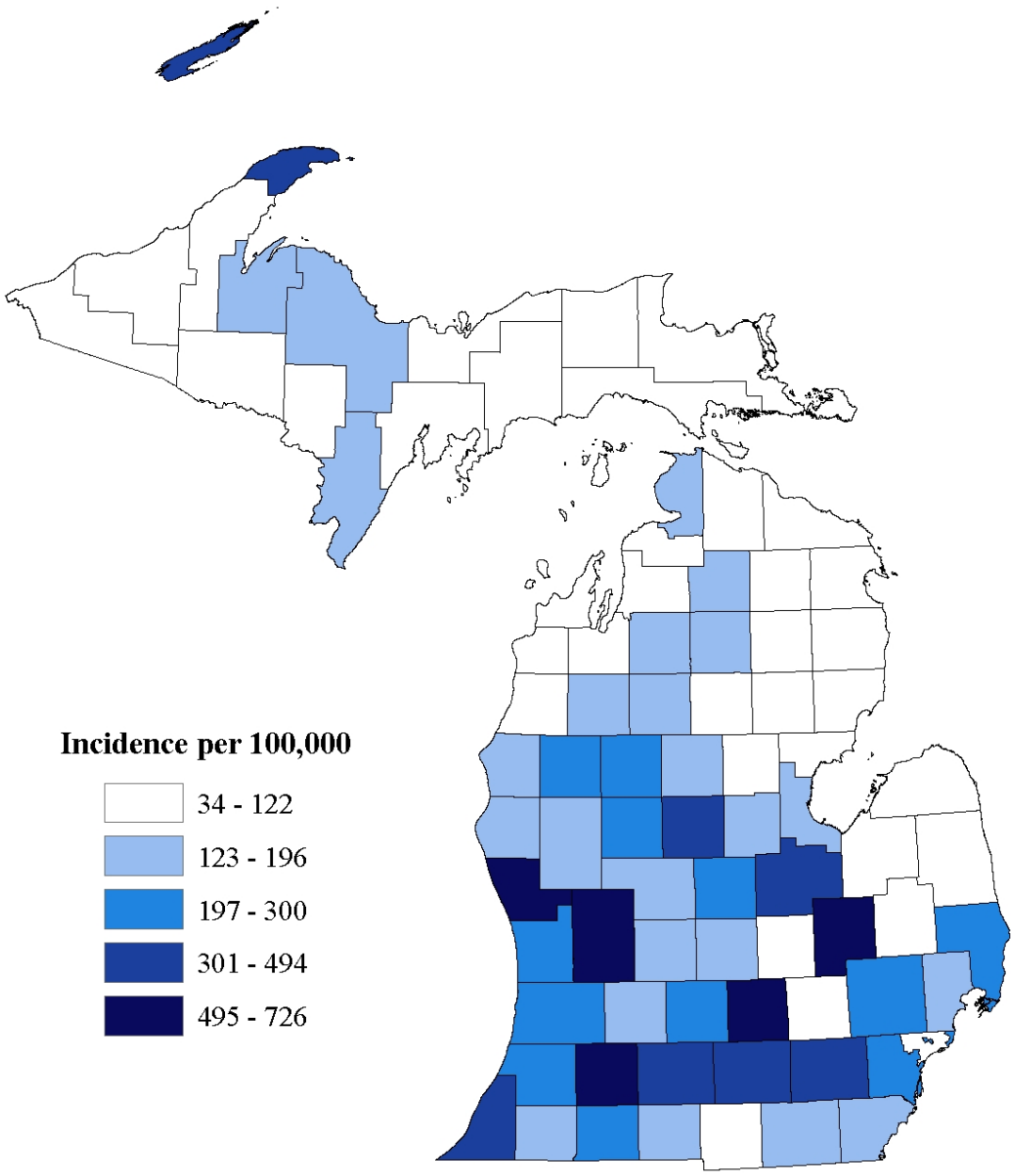


Figure 2. Incidence of chlamydia by county, Michigan 2006



CRYPTOSPORIDIOSIS

Causative agent:
Cryptosporidiosis, a gastrointestinal illness, is caused by a single-cell parasite called *Cryptosporidium parvum*. It can survive very long in the environment.

Clinical features:
The usual symptoms of cryptosporidiosis are diarrhea, abdominal cramps, headache, nausea, vomiting, and a low-grade fever. These symptoms can last for weeks and often result in weight loss and dehydration.

Mode of transmission:
Cryptosporidia have been found in many hosts, including man, cattle and other domestic mammals. Routes of transmission include fecal-oral and through contaminated food or water. Individuals may acquire cryptosporidiosis from other infected humans or animals.

Period of communicability:
Communicability lasts throughout an acute infection and as long as the organism persists in the stool, which may be as long as 2-5 weeks after symptoms have ceased.

Incubation period:
Incubation period varies from 2 to 12 days with an average of 7 days.

High-risk groups:
Anyone can get cryptosporidiosis. Persons more likely to become infected include:

- Children who attend daycare centers, especially diaper-aged children
- Childcare workers
- Parents of infected children
- International travelers
- Backpackers, hikers, and campers who drink unfiltered, untreated water
- Swimmers who swallow water while swimming in lakes, rivers, ponds, and streams
- People who drink from shallow wells

Prevention of cryptosporidiosis:
Practice good hygiene:

- Wash hands thoroughly with soap and water.
- Wash hands after using the toilet and before handling or eating food (especially important for persons with diarrhea)
- Do not drink untreated water from shallow wells, lakes, rivers, springs, ponds, or streams.

Table 1. Demographic characteristics of cryptosporidiosis cases, Michigan 2002-2006

*N= 706	Number of Cases	Percent Total
Sex		
Male	342	48%
Female	363	51%
Race		
African American	31	4%
American Indian or Alaska Native	3	<1%
Asian	7	1%
Caucasian	456	65%
Other	4	1%
Ethnicity		
Hispanic or Latino	11	2%
Age groups (years)		
0-9	154	22%
10-19	107	15%
20-29	105	15%
30-39	90	13%
40-49	99	14%
50-59	62	9%
60-69	35	5%
≥70	53	8%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of cryptosporidiosis cases in Michigan, 2002-2006

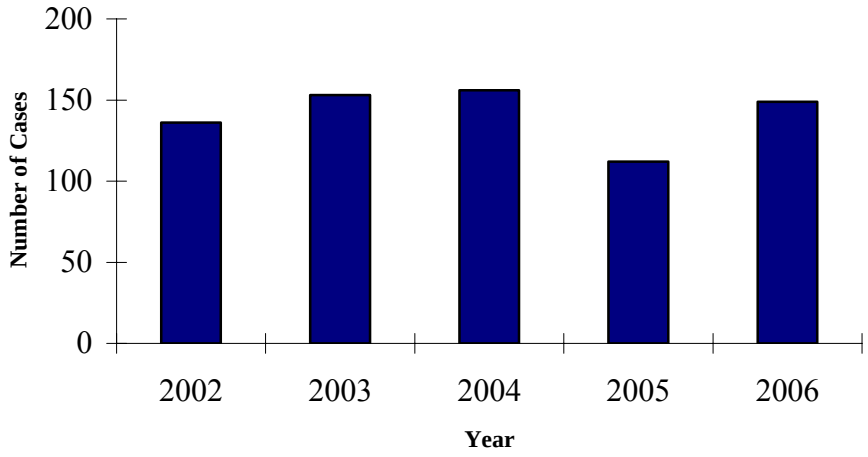
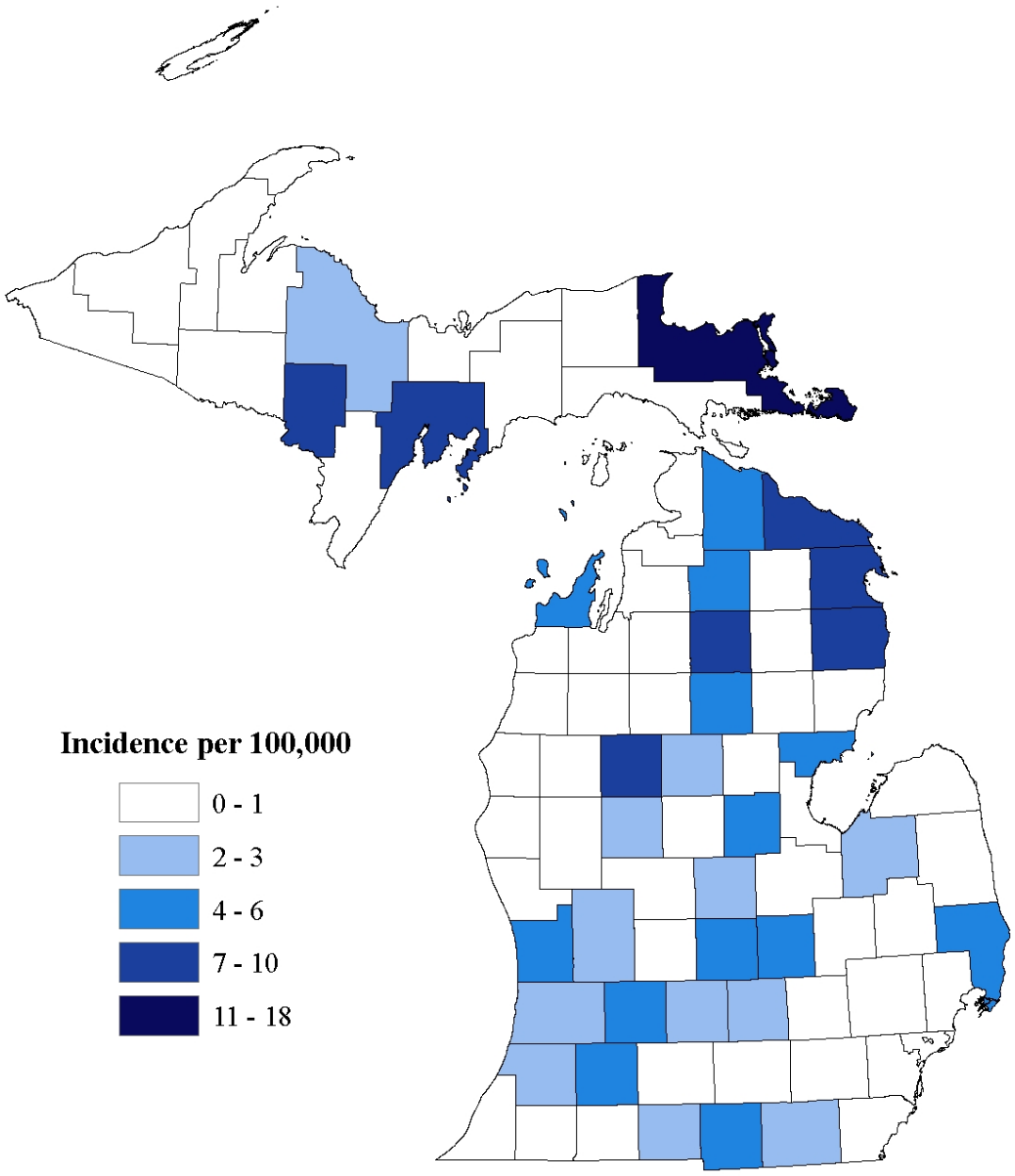


Figure 2. Incidence of cryptosporidiosis by county, Michigan 2006



DENGUE FEVER

Causative agent:
Dengue is a mosquito-borne infection caused by four distinct but closely related viruses: DEN-1, DEN-2, DEN-3 and DEN-4.

Clinical features:
Dengue fever is a severe, flu-like illness that affects individuals of all age groups. The clinical features of dengue fever vary according to the age of the patient. Infants and young children may have a non-specific febrile illness with rash. Older children and adults may have either a mild febrile syndrome or the classical incapacitating disease with abrupt onset and high fever, severe headache, pain behind the eyes, muscle and joint pains, and rash. Dengue hemorrhagic fever is a potentially deadly complication that is characterized by high fever, hemorrhagic phenomena--often with enlargement of the liver—and in severe cases, circulatory failure. The illness commonly begins with a sudden rise in temperature accompanied by facial flush and other non-specific symptoms of dengue fever. The fever usually continues for 2-7 days and can be as high as 40-41°C, possibly with febrile convulsions and hemorrhagic phenomena.

Mode of transmission:
Dengue viruses are transmitted to humans through the bites of infective female *Aedes* mosquitoes. Mosquitoes generally acquire the virus while feeding on the blood of an infected person. After virus incubation for 8-10 days, an infected mosquito is capable, during probing and blood feeding, of transmitting the virus to susceptible individuals for the rest of its life. Infected female mosquitoes may also transmit the virus to their offspring by transovarial (via the eggs) transmission, but the role of this in sustaining transmission of virus to humans has not yet been explained.

Period of communicability:
No person-to-person transmission. Patients are infective for mosquitoes from shortly before the febrile period to the end, usually 3-5 days. The mosquito becomes infective 8-12 days after the viremic blood meal and remains so for life.

Incubation period:
From 3-14 days, commonly 4-7 days.

High-risk groups:
Anyone who is bitten by an infected mosquito can get dengue fever. Risk factors for dengue hemorrhagic fever include a person's age and immune status, as well as the type of infecting virus. Persons who were previously infected with one or more types of dengue virus are thought to be at greater risk for developing dengue hemorrhagic fever if infected again.

Prevention of dengue fever:
There is no vaccine to prevent dengue. Avoiding mosquito bites by using mosquito repellent and protective clothes when traveling to areas where dengue occurs may decrease the likelihood of transmission.

Table 1. Demographic characteristics of dengue fever cases, Michigan 2002-2006

*N= 30	Number of Cases	Percent Total
Sex		
Male	17	57%
Female	13	43%
Race		
African American	1	3%
American Indian or Alaska Native	1	3%
Asian	2	7%
Caucasian	11	37%
Other	3	10%
Age groups (years)		
0-9	1	3%
10-19	4	13%
20-29	3	10%
30-39	9	30%
40-49	5	17%
50-59	4	13%
60-69	3	10%
≥70	1	3%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of dengue fever cases in Michigan, 2002-2006

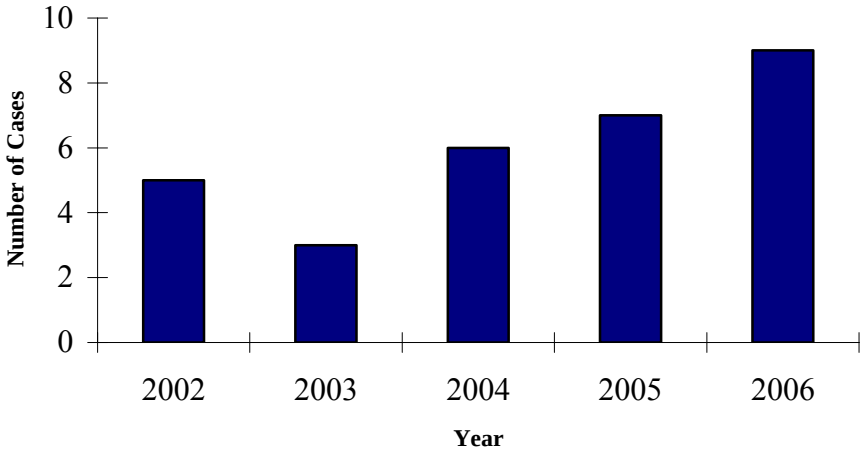
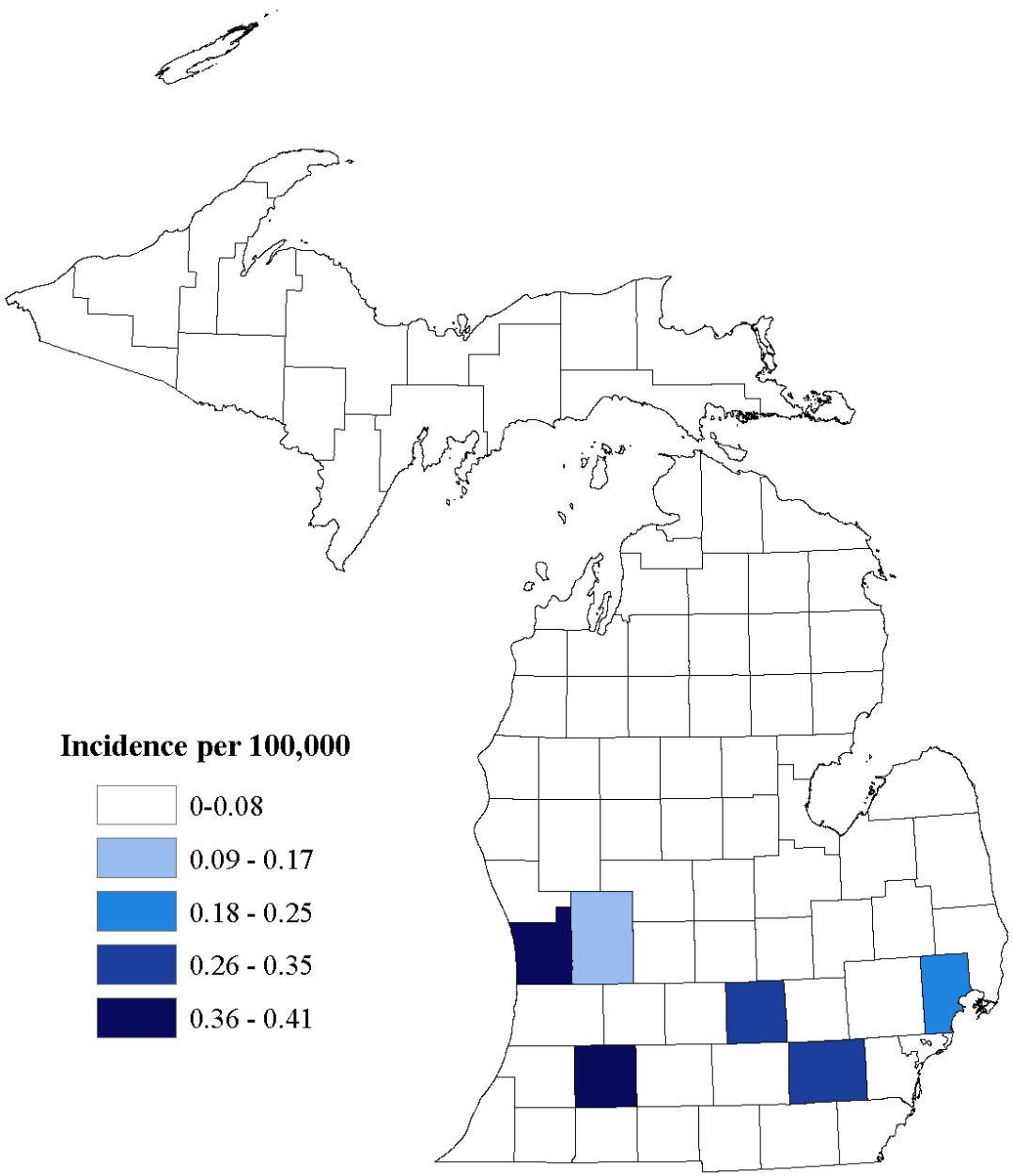


Figure 2. Incidence of dengue fever by county, Michigan 2006



ESCHERICHIA COLI O157: H7 (E. COLI)

Causative agent:
Escherichia coli (*E. coli)* O157:H7 is one of hundreds of strains of *E.coli*. Although most strains do not cause diseases and may live in the intestines of healthy humans and animals, *E. coli* O157:H7 strain produces a powerful toxin and can cause severe gastrointestinal illness.

Clinical features:
E. coli O157:H7 infection often results in severe bloody diarrhea and abdominal cramps, but sometimes *E. coli* infection has no symptoms. Usually it causes non-bloody diarrhea. In some cases, particularly children under 5 years of age and the elderly, the infection can cause a complication called hemolytic uremic syndrome (HUS), where severe anemia and kidney failure can occur. About 2%-7% of infections lead to this complication. In the United States, HUS is the principal cause of acute kidney failure in children, and most cases are due to *E. coli* O157:H7 infection.

Mode of transmission:
The organism may be found in the intestines of healthy cattle and meat can become contaminated during slaughter. Eating undercooked meat, especially ground beef, can cause infection. Bacteria present on the cow's udders or on equipment may get into raw milk. Among other known sources of infection are consumption of sprouts, lettuce, salami, un-pasteurized milk and juice, and swimming in or drinking sewage-contaminated water. Bacteria in diarrheal stools of infected persons can be passed from one person to another if hygiene or hand washing habits are inadequate.

Period of communicability:
The duration of excretion of the pathogen is typically one week or less in adults, but 3 weeks is common. Prolonged carriage is uncommon.

Incubation period:
The incubation period is usually 3-4 days, but can be as short as 12 hours or as long as 8 days.

High-risk groups:
- The elderly
- Children under 5 years of age
- Immunocompromised individuals

Prevention of *E. coli* O157:H7:
- Cook all ground beef and hamburger thoroughly.
- Keep raw meat separate from ready-to-eat foods.
- Wash hands, counters, and utensils with hot soapy water after they touch raw meat.
- Drink only pasteurized milk.
- Wash fruits and vegetables thoroughly before consumption.
- Persons with diarrhea should avoid swimming in public pools or lakes, sharing baths, and preparing food for others.

Table 1. Demographic characteristics of *Escherchia coli* O157:H7 cases, Michigan 2002-2006

*N= 473	Number of Cases	Percent Total
Sex		
Male	210	44%
Female	261	55%
Race		
African American	16	3%
American Indian or Alaska Native	2	<1%
Asian	3	1%
Caucasian	312	66%
Other	5	1%
Ethnicity		
Hispanic or Latino	5	1%
Age groups (years)		
0-9	95	20%
10-19	110	23%
20-29	69	15%
30-39	48	10%
40-49	32	7%
50-59	53	11%
60-69	33	7%
≥70	33	7%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of *Escherchia coli* O157:H7 cases in Michigan, 2002-2006

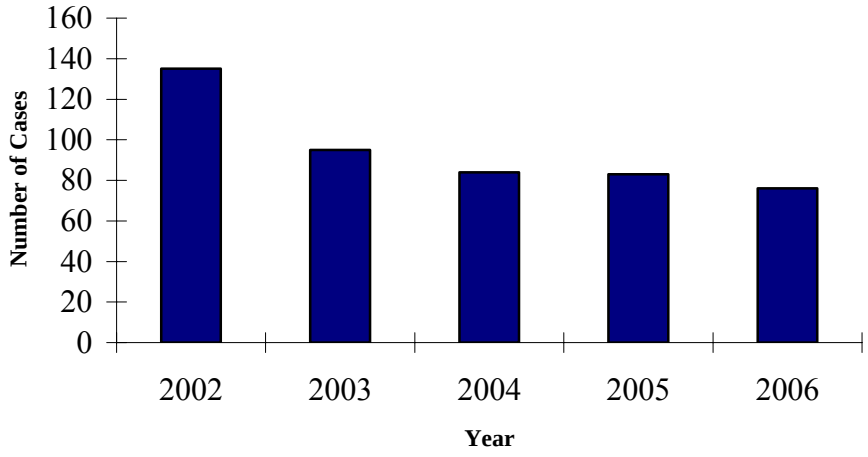
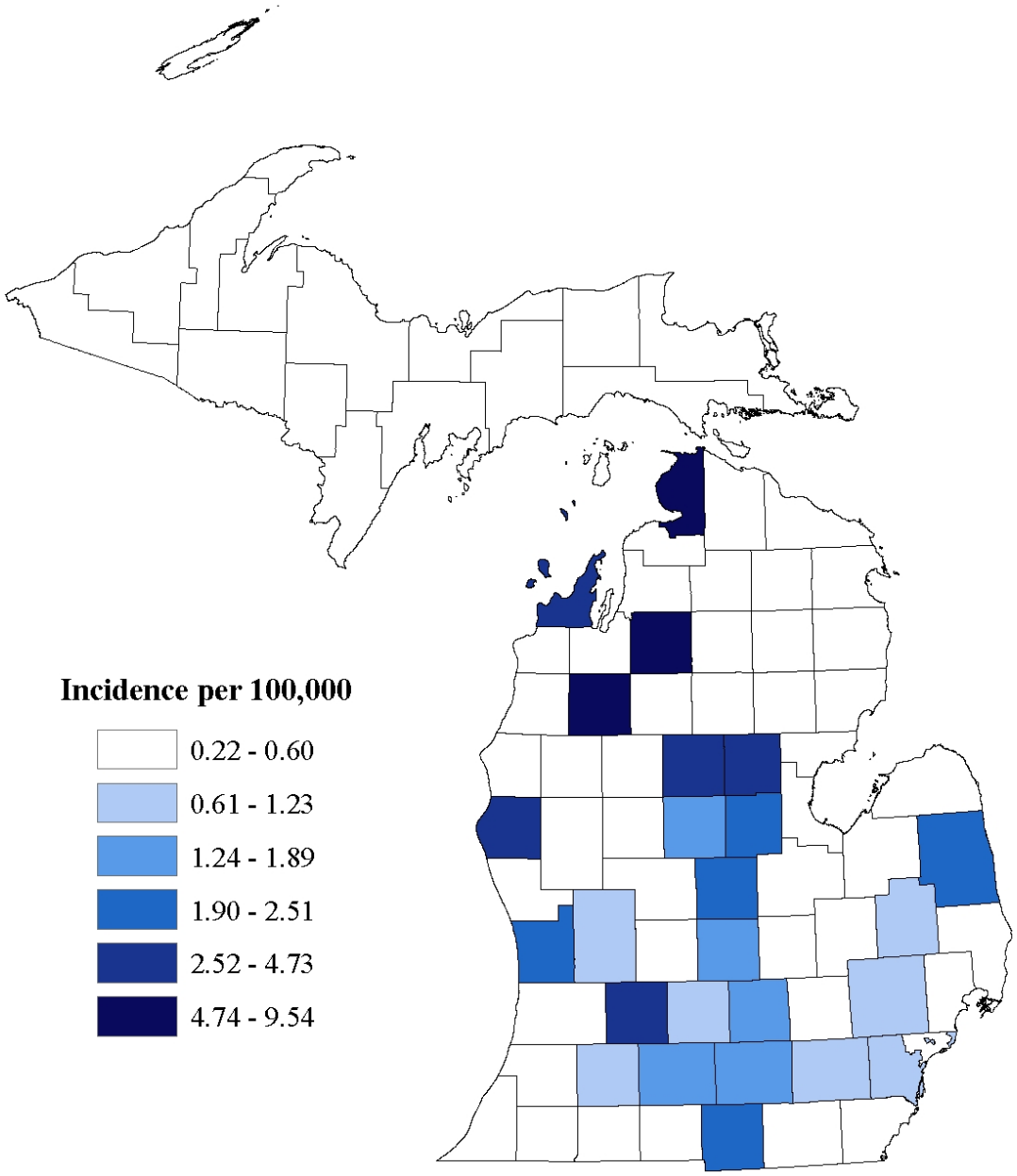


Figure 2. Incidence of *Escherchia coli* O157:H7 by county, Michigan 2006



GIARDIASIS

Causative agent:
Giardiasis is a diarrheal illness caused by a microscopic parasite called *Giardia*. Humans are the main host of *Giardia,* but *Giardia* cysts can also be found in domestic and wild animals including dogs and beavers.

Clinical Features:
Giardia infection can cause a variety of intestinal symptoms:

- Diarrhea
- Gas or flatulence
- Greasy stools that tend to float
- Stomach cramps
- Upset stomach
- Nausea

These symptoms may lead to weight loss and dehydration. Some people with giardiasis do not develop any symptoms.

Mode of transmission:
Giardia is passed in the feces of an infected person or animal. The disease can spread by either the ingestion of contaminated food or water or from an infected person by the fecal-oral route.

Period of communicability:
The infection can be transmitted for as long as the person is shedding the organism in the feces.

Incubation period:
Usually 1 to 2 weeks (average 7 days) after becoming infected.

Susceptibility:
Anyone can get giardiasis. Persons more likely to become infected include:

- Children who attend daycare centers, especially diaper-aged children
- Child care workers
- Parents of infected children
- International travelers
- Backpackers, hikers, and campers who drink unfiltered or untreated water
- Swimmers who swallow water while swimming in lakes, rivers, ponds, and streams
- People who drink from shallow wells

Prevention of giardiasis:
Practice good hygiene:

- Frequent hand washing.
- Wash hands after using the toilet and before handling or eating food.
- Wash hands after every diaper change, especially if you work with diaperaged children, and even if you are wearing gloves.
- Do not drink untreated water from shallow wells, lakes, rivers, springs, ponds, or streams.
- Wash all raw vegetables and fruits before consuming.

Table 1. Demographic characteristics of NAME cases, Michigan 2002-2006

*N= 3921		Number of Cases	Percent Total
Sex			
	Male	2,083	53%
	Female	1,791	46%
Race			
	African American	276	7%
	American Indian or Alaska Native	7	<1%
	Asian	113	3%
	Caucasian	2037	52%
	Other	210	5%
Ethnicity			
	Hispanic or Latino	138	4%
Age groups (years)			
	0-9	1233	31%
	10-19	358	9%
	20-29	422	11%
	30-39	635	16%
	40-49	538	14%
	50-59	374	10%
	60-69	201	5%
	≥70	150	4%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of giardiasis cases in Michigan, 2002-2006

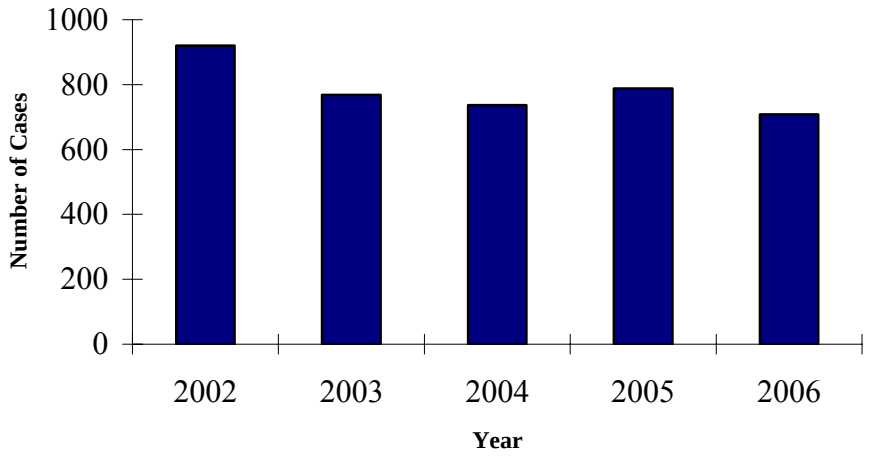
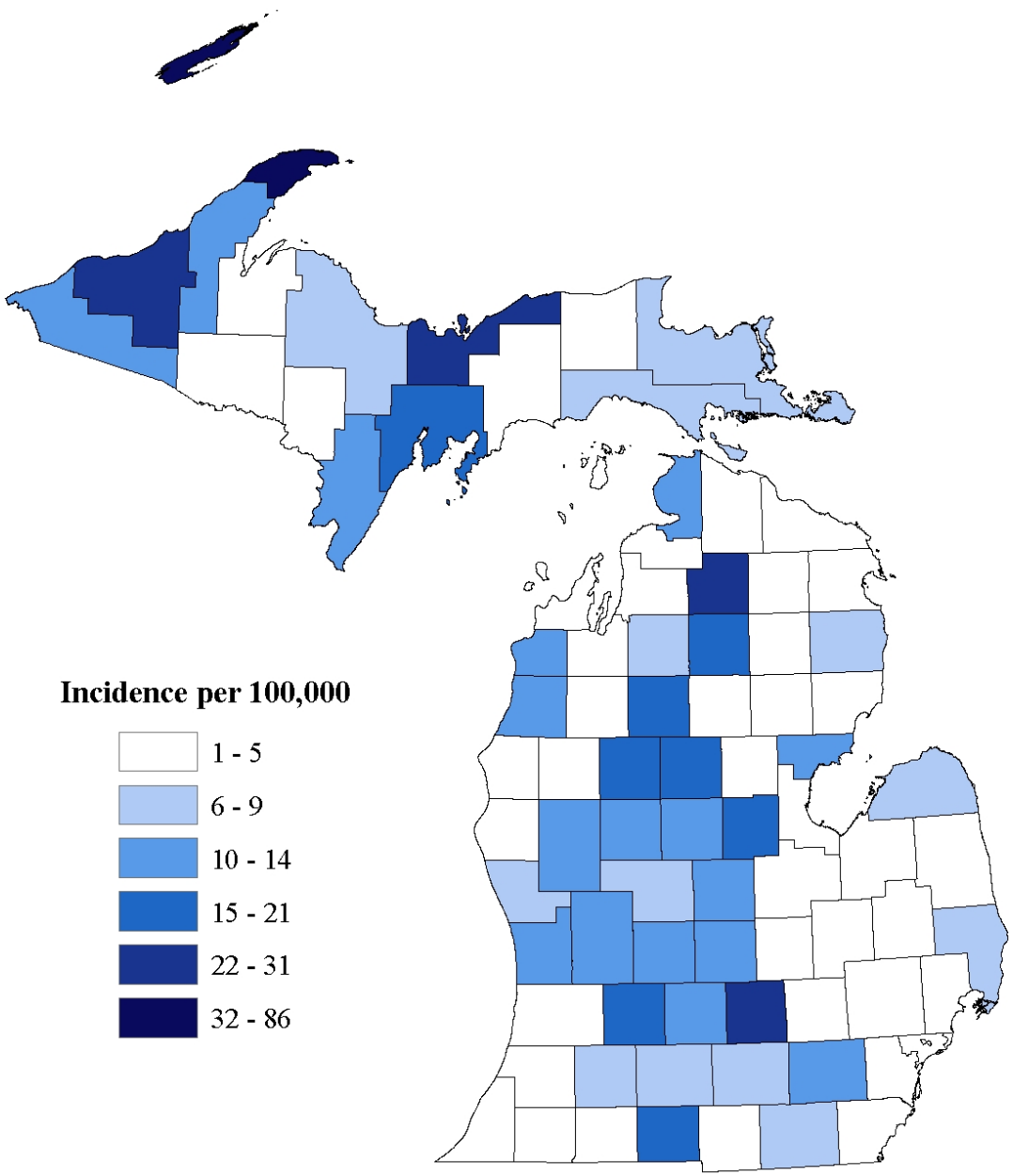


Figure 2. Incidence of giardiasis by county, Michigan 2006



GONORRHEA

Causative Agent:
Gonorrhea is a sexually transmitted disease caused by the bacteria *Neisseria gonorrhoeae.*

Clinical features:
In women, the most common manifestations include vaginal discharge, dysuria (pain or burning upon urination), and inter-menstrual uterine bleeding. Coexisting infections with chlamydia, trichomoniasis, candidiasis, or other organisms are common. In men, symptoms may include a profuse penile discharge and painful, frequent urination. The head of the penis may become swollen and sore. Both men and women may experience asymptomatic (without symptoms) infections.

Mode of transmission:
Gonorrhea is usually transmitted by direct contact with an infected person during vaginal, anal, or oral sex. Infected pregnant women can pass the disease to newborns where it can cause conjunctivitis and blindness due to corneal scarring.

Period of communicability:
Infectious period may extend for months in untreated individuals. Effective treatment ends communicability within hours.

Incubation period:
The average incubation period is 2 to 7 days, but may range from 0-30 days.

Susceptibility:
Any sexually active person can be infected with gonorrhea. In the United States, the highest reported rates of infection are among sexually active teenagers, young adults, and African Americans.

Prevention of gonorrhea:
Avoidance of high-risk sexual behavior. Practice of protected sex such as use of latex condoms. Regular examinations for sexually transmitted diseases are advised when unprotected sex is practiced

Table 1. Demographic characteristics of gonorrhea cases, Michigan 2006

*N= 16758		Number of Cases	Percent Total
Sex			
	Male	7,084	42%
	Female	9,472	57%
Race			
	African American	6,537	39%
	American Indian or Alaska Native	21	<1%
	Asian	33	<1%
	Caucasian	1,780	11%
	Hawaiian or Pacific Islander	4	<1%
	Other	210	1%
Ethnicity			
	Hispanic or Latino	311	2%
Age groups (years)			
	0-9	27	<1%
	10-19	5,263	31%
	20-29	7,613	45%
	30-39	2,403	14%
	40-49	921	5%
	50-59	269	2%
	60-69	51	<1%
	≥70	31	<1%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of gonorrhea cases in Michigan, 2002-2006

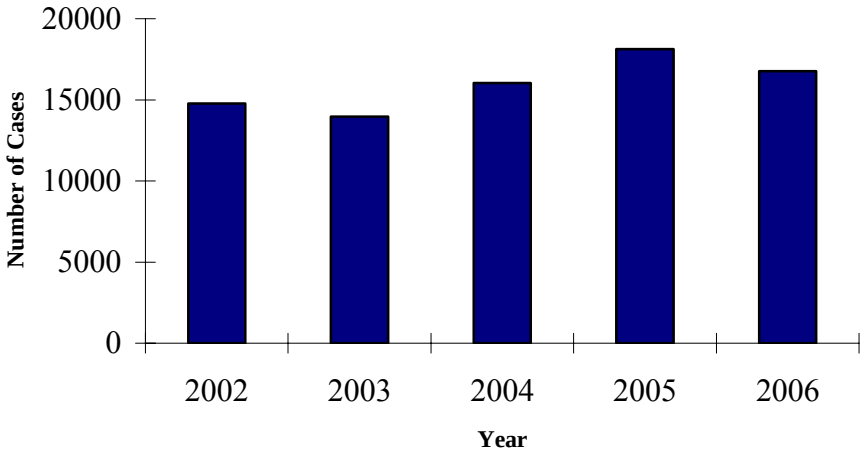
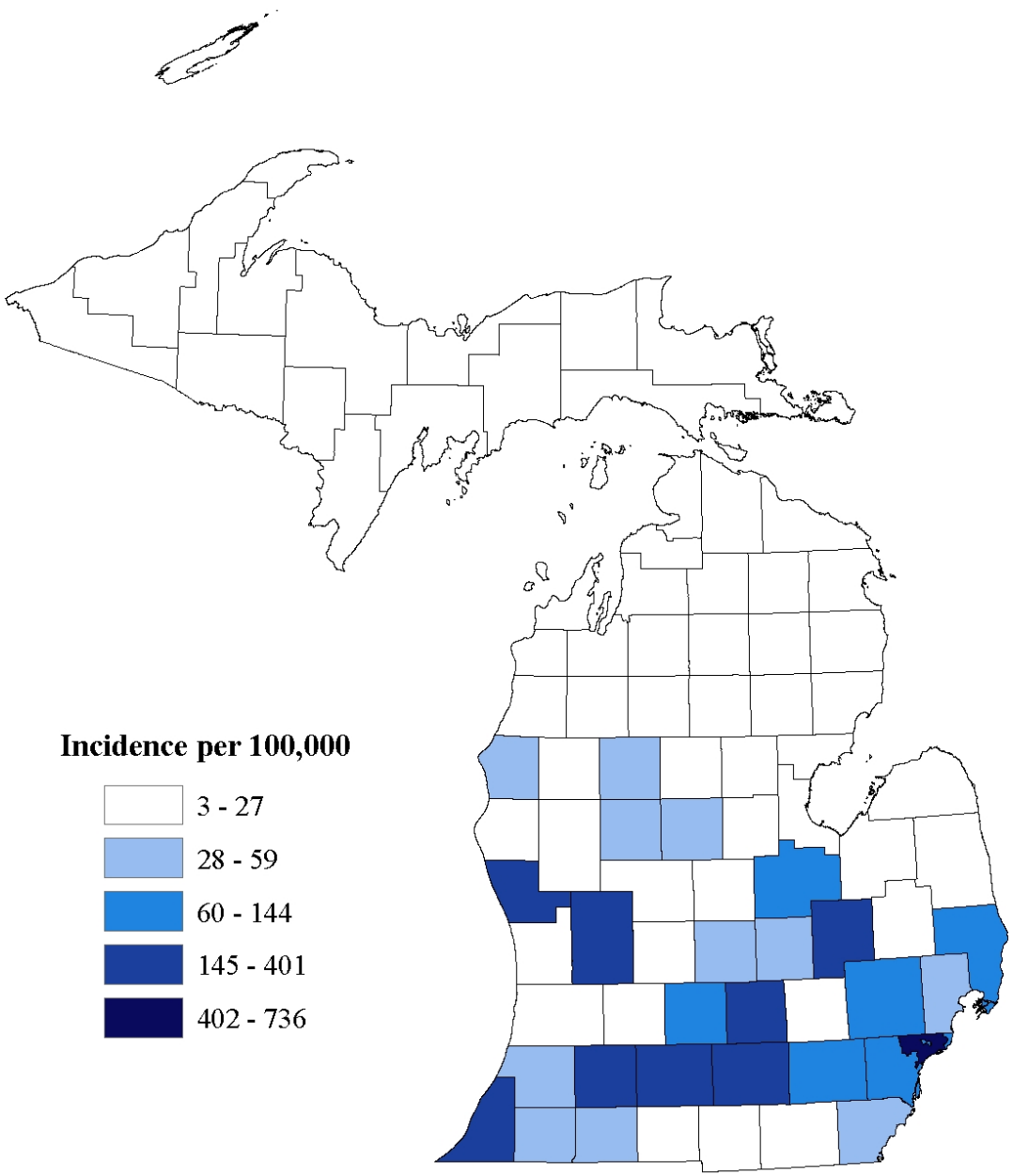


Figure 2. Incidence of gonorrhea by county, Michigan 2006



HAEMOPHILUS INFLUENZAE

Causative agent:
Haemophilus influenzae (H. influenzae), a gram-negative bacterium, represents a group of bacteria with serotypes a - f that may cause various types of infections in humans. Among all *H. influenzae* serotypes, strain *b* is the most invasive and is associated with significant morbidity and mortality.

Clinical features:
The early signs and symptoms of *H. influenzae* infection include fever, headache, nausea vomiting and irritability. More serious complications are meningitis, bacteremia, osteomyelitis and septic arthritis. The case fatality rate among those who develop meningitis is about 5%. Severe neurologic sequelae occur in 10-15% of cases and 15-20% result in deafness. In the United States, conjugate vaccine against *H. influenzae* type B (Hib) was introduced in 1987 and has resulted in a dramatic decrease in infection. Before the availability of vaccine, more than one-half of *H. influenzae* cases presented as meningitis with fever, headache, and stiff neck. In developing countries, *H. influenzae* type B is still a leading cause of bacterial pneumonia in children under 5 years of age.

Mode of transmission:
Humans are the only natural host for *H influenzae*. Therefore, maintenance of the organism in the human population depends on person-to-person transmission. *H. influenzae* colonizes the upper respiratory tract and can be transmitted by close contact with an infected individual. Droplets in the air from a sneeze may also infect individuals.

Period of communicability:
Although the period of communicability of *H. influenzae* is unknown, a diagnosed case is considered contagious until 24 hours after the start of antibiotics treatment.

Incubation period:
Usually 2-4 days.

Susceptibility:
Young children, especially daycare children and classmates, institutionalized individuals (e.g nursing home residents) and immunocompromised individuals are at high risk of contracting *H. influenzae*.

Prevention of *H. influenzae*:
The most effective preventive measure against *H. influenzae* is routine childhood immunization. Immunization against type B is routinely administered in a four dose series. The first vaccine is received at 2 months of age and the two subsequent doses are given at about 4 and 6 months. Finally, a booster is given between 12 and 15 months of age. Generally, avoiding close contact with an infected person and frequent hand washing help to prevent *H. influenzae*.

Table 1. Demographic characteristics of *Haemophilus influenzae* cases, Michigan 2002-2006

*N= 123	Number of Cases	Percent Total
Sex		
Male	51	41%
Female	72	59%
Race		
African American	24	20%
Asian	1	1%
Caucasian	62	50%
Other	3	2%
Ethnicity		
Hispanic or Latino	3	2%
Age groups (years)		
<1	11	9%
0-9	25	20%
10-19	21	17%
20-29	1	1%
30-39	5	4%
40-49	13	11%
50-59	20	16%
60-69	18	15%
≥70	20	16%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of *Haemophilus influenzae* cases in Michigan, 2002-2006

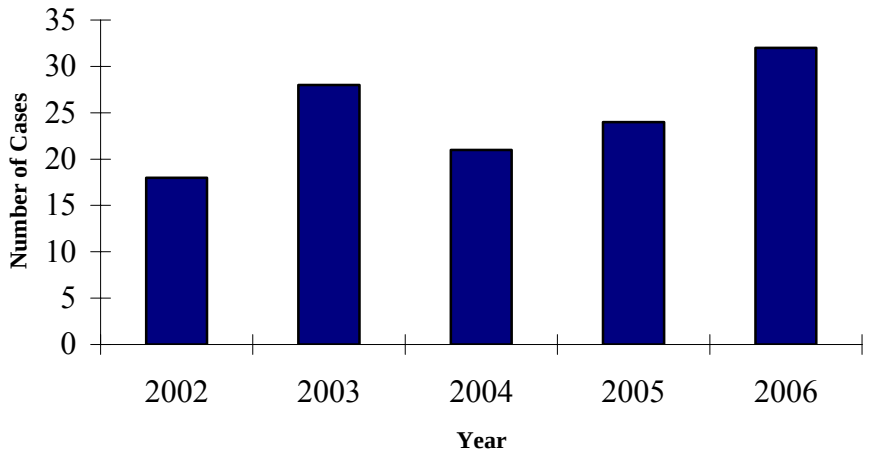
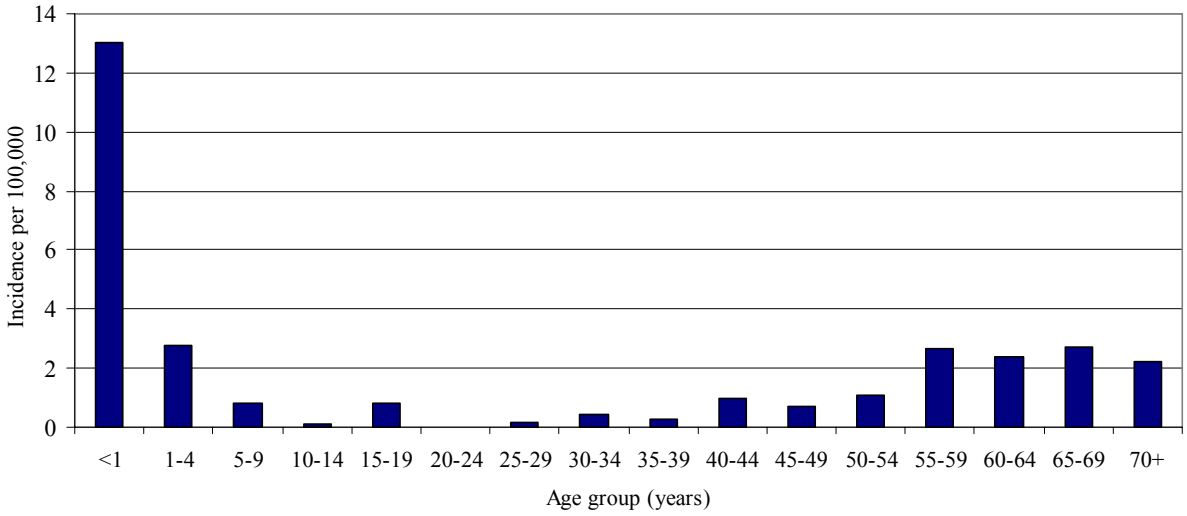


Figure 2. Incidence of *Haemophilus influenzae* cases by age group, Michigan 2002-2006

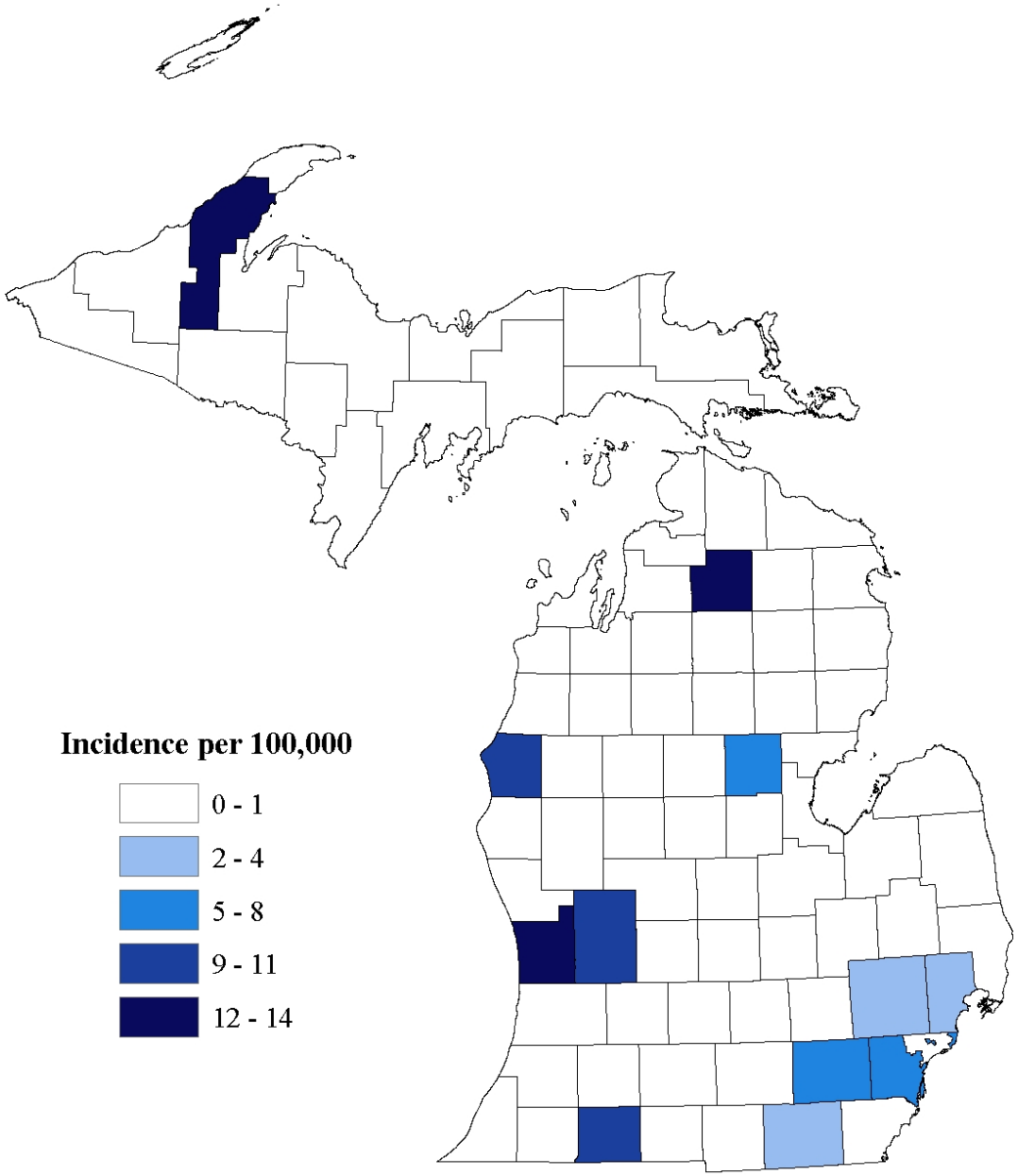


Note of interest:

The five-year median of *H. influenzae* cases for 2002 to 2006 is 24. About 32% of reported cases are < 10 years of age and among them, 46% are children age ≤ 1 year. 31% of reported cases are > 60 years of age.

According to national immunization survey 2003, Michigan estimated coverage rate for *H. infuenzae* type b (Hib) vaccine is 91.3 %.

Figure 3. Incidence of *H. influenzae* by county, Michigan 2006



HEPATITIS A

Causative agent:
Hepatitis A is an infection caused by the hepatitis A virus that leads to inflammation of the liver.

Clinical features:
The initial symptoms are usually fever, loss of appetite, nausea, vomiting, and malaise. This is usually followed by dark-colored urine and jaundice (yellow coloration of skin). Most people feel better after one to two weeks, but may continue to feel tired for a few more weeks.

Mode of transmission:
The hepatitis A virus is found in the feces of infected persons and is usually spread person-to-person through the fecal-oral route. Hepatitis A may also be transmitted through food or water contaminated with human feces.

Period of communicability:
People are most infectious in the two weeks before their symptoms appear and remain somewhat infectious about one week after jaundice.

Incubation period:
The incubation period is usually 28-30 days with a range of 15-50 days.

Susceptibility:
Anyone can get hepatitis A, but it occurs more often in children.

Prevention of hepatitis A:
Good personal hygiene and proper sanitation can help prevent hepatitis A. Vaccines are also available for long-term prevention of hepatitis A virus infection. Immune globulin may be used for short-term prevention of hepatitis A virus infection in individuals of all ages.

Table 1. Demographic characteristics of hepatitis A cases, Michigan 2002-2006

*N=	838	Number of Cases	Percent Total
Sex			
	Male	386	46%
	Female	448	53%
Race			
	African American	102	12%
	Asian	20	2%
	Caucasian	414	49%
	Other	56	7%
Ethnicity			
	Hispanic or Latino	33	4%
Age groups (years)			
	0-9	93	11%
	10-19	75	9%
	20-29	78	9%
	30-39	107	13%
	40-49	127	15%
	50-59	118	14%
	60-69	92	11%
	≥70	148	18%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of hepatitis A cases in Michigan, 2002-2006

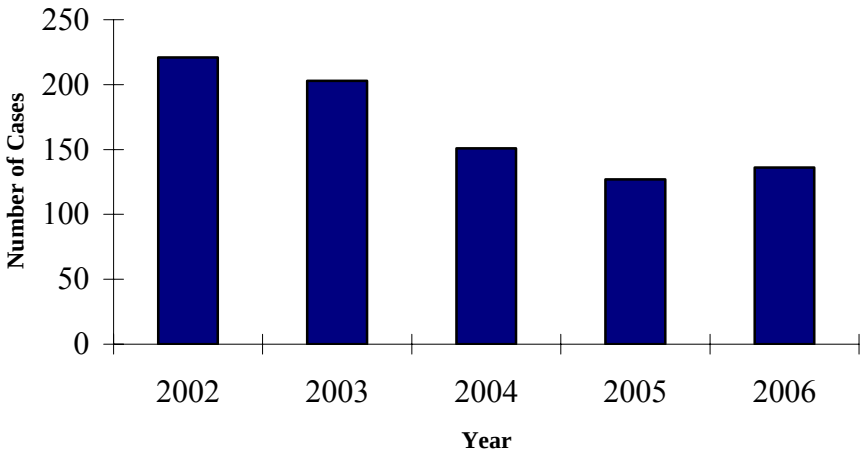
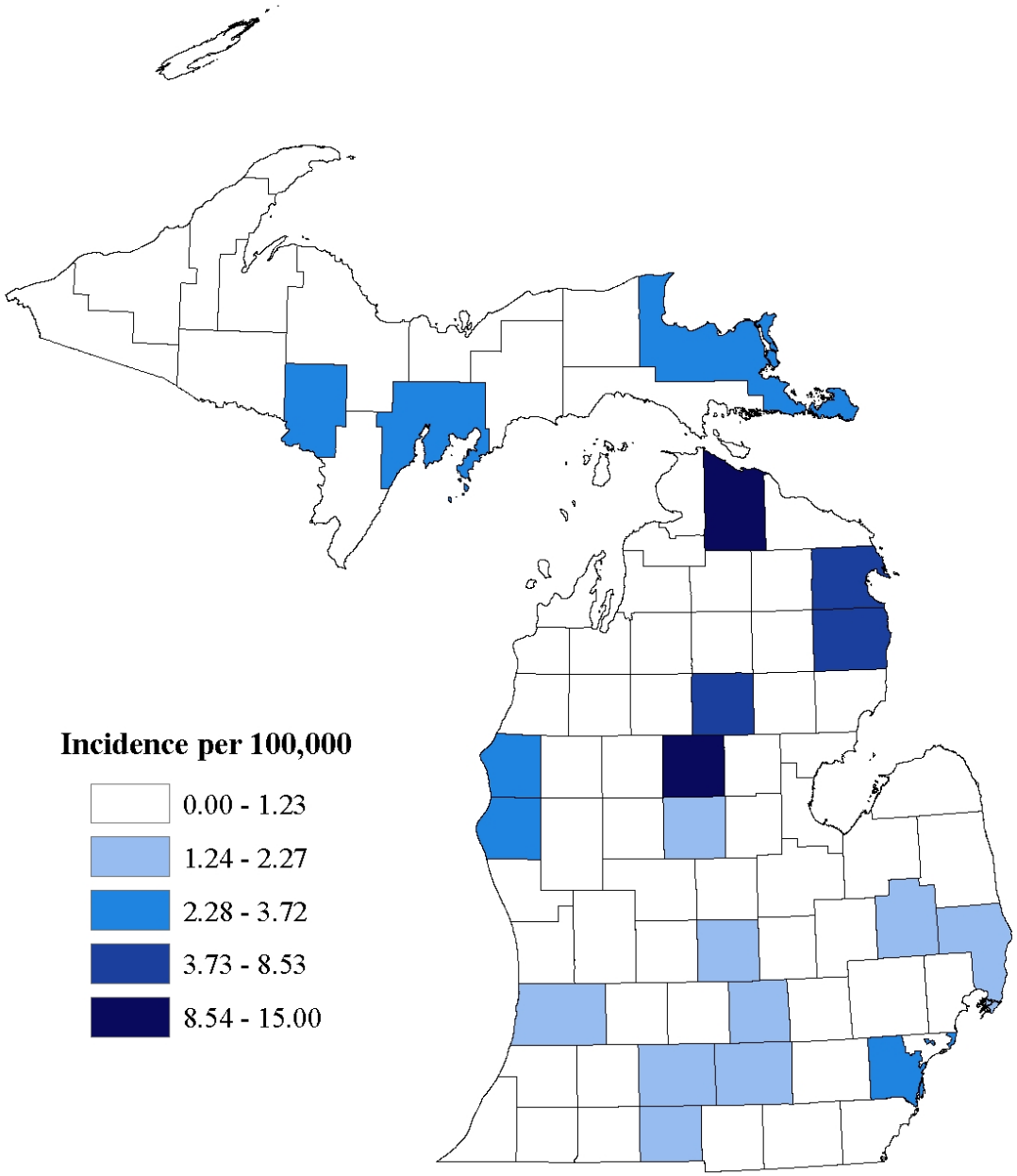


Figure 23. Incidence of hepatitis A by county, Michigan 2006



HEPATITIS C

Causative agent:
Hepatitis C is a disease caused by the hepatitis C virus that results in infection of the liver.

Clinical features:
Persons with HCV infection typically are either asymptomatic or have a mild clinical illness; 80% have no discernible symptoms. In individuals who are symptomatic, signs and symptoms may include: jaundice, fatigue, dark urine, abdominal pain, loss of appetite, and nausea. Fifteen to 25 percent of people infected with the hepatitis C virus will clear the virus from their body. Seventy five to 85 percent will go on to develop chronic infection.

Mode of transmission:
The hepatitis C virus is mainly spread by direct contact with HCV-infected blood/blood products, or injury with HCV-contaminated needles or syringes. Hepatitis C virus is not spread through casual contact or in typical school, office, or food service settings. It is not spread by coughing or sneezing.

Period of communicability:
Infected people may spread the virus indefinitely.

Incubation period:
2 weeks to 6 months, commonly 6-9 weeks. Chronic infection may persist for up to 20 years before onset of cirrhosis.

Susceptibility:
The following groups of people are at higher risk than the general population due to their higher likelihood of exposure:

- Injection drug users
- High-risk sexual contacts of infected persons
- Health care professionals: physicians, nurses and lab personnel
- Infants born to HCV infected mothers
- Hemodialysis patients

Prevention of hepatitis C:

- There is no vaccine to prevent hepatitis C.
- Do not use injecting drug use.
- Do not share personal care items that might have blood on them (razors, toothbrushes).
- Health care workers always follow routine precautions and safely handle needles and other sharps.
- HCV can be spread by sex, but this is rare. If you are having sex with more than one steady sex partner, use latex condoms* correctly and every time to prevent the spread of sexually transmitted diseases. You should also get vaccinated against hepatitis B.
- If you are HCV positive, do not donate blood, organs, or tissue.

*The efficacy of latex condoms in preventing infection with HCV is unknown, but their proper use may reduce transmission.

Table 1. Demographic characteristics of hepatitis C cases, Michigan 2002-2006

*N= 654		Number of Cases	Percent Total
Sex			
	Male	378	58%
	Female	275	42%
Race			
	African American	81	12%
	American Indian or Alaska Native	6	1%
	Asian	6	1%
	Caucasian	263	40%
	Other	9	1%
Ethnicity			
	Hispanic or Latino	14	2%
Age groups (years)			
	0-9	3	<1%
	10-19	17	3%
	20-29	75	11%
	30-39	93	14%
	40-49	229	35%
	50-59	185	28%
	60-69	33	5%
	≥70	19	3%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of hepatitis C cases in Michigan, 2002-2006

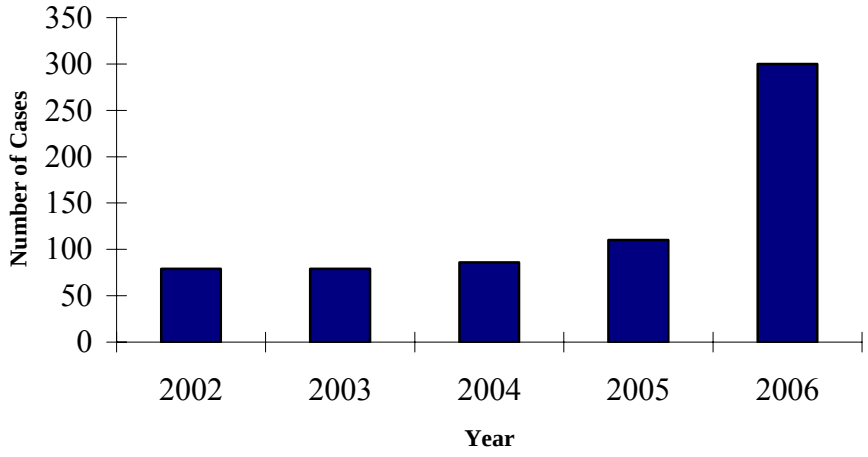
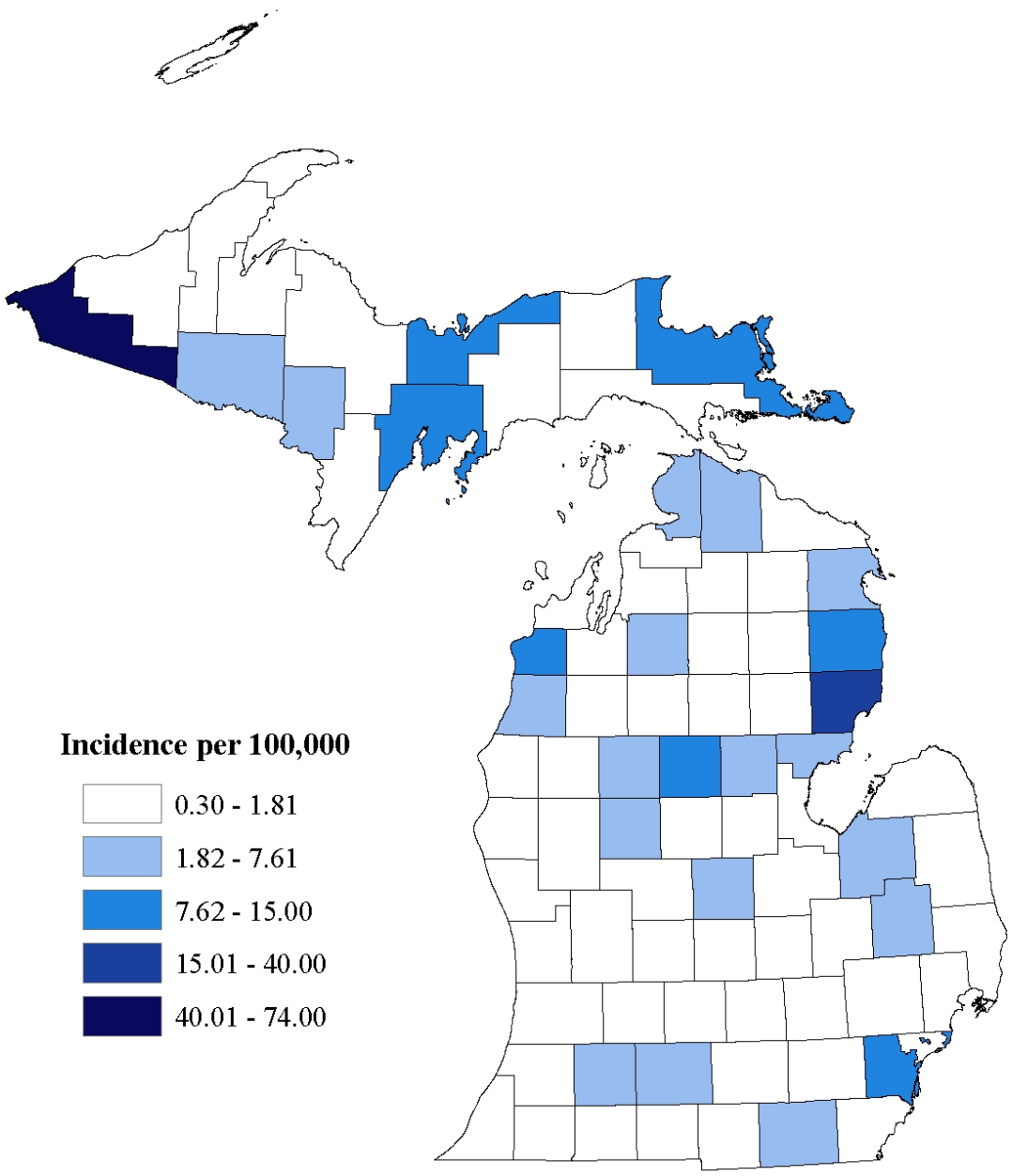


Figure 2. Incidence of hepatitis C by county, Michigan 2006



HIV/AIDS

(HUMAN IMMUNODEFICIENCY VIRUS/ACQUIRED IMMUNODEFICIENCY SYNDROME)

Causative agent:
Acquired Immunodeficiency Syndrome (AIDS) is caused by the Human Immunodeficiency Virus (HIV). Two types of HIV have been identified: HIV-1 and HIV–2. These viruses have different serologic and geographic characteristics, but have similar epidemiological characteristics. HIV-1 is the predominant strain in the U.S.

Clinical Features:
AIDS is a severe, life threatening condition. HIV damages the body's immune system. With a weakened immune system, other pathogens may easily invade the body, allowing opportunistic diseases to develop. Most people infected with HIV develop detectable antibodies within 1-3 months after infection, but may remain free of signs or symptoms for several months to years. Clinical illness may include lymphadenopathy, chronic diarrhea, weight loss, fever, and fatigue. The severity of HIV related illness is, in general, directly related to the degree of immune dysfunction**.**

Mode of Transmission:
HIV is spread through contact with infected blood. The main behaviors associated with HIV infection are male-male sex, injection drug use, and high risk heterosexual sex. Transfusion of infected blood or its components and transplantation of HIV-infected tissues or organs can also transmit the infection, although this is very rare. HIV does not spread through coughs or sneezes or by casual contact with an infected person.

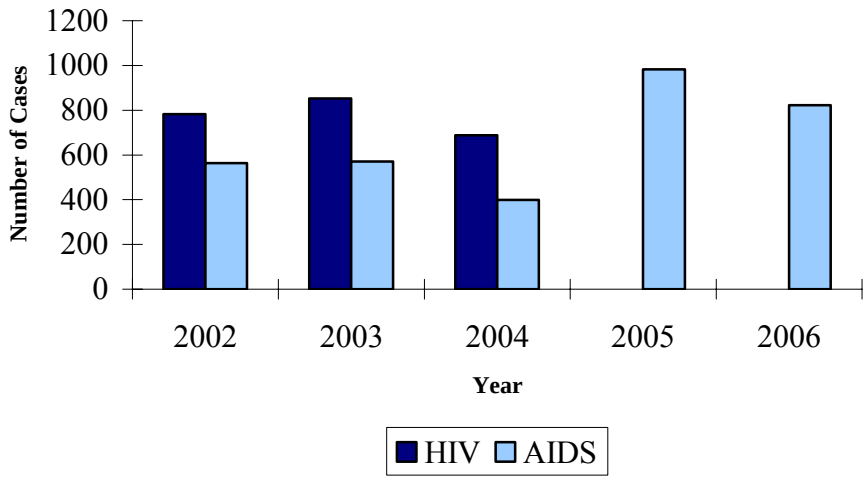
Period of communicability:
Not known precisely, begins early after onset of HIV infection and presumably extends throughout life. Infectivity during the first months is considered to be high, increasing with viral load, worsening clinical status, or concurrent sexually transmitted infections.

Incubation period:
The time from HIV infection to diagnosis of AIDS has been observed to range from less than one year to 15 years or longer.

Prevention of AIDS/HIV:
- Avoid high-risk sexual behavior
- Use latex condoms during sexual intercourse
- Avoid needle sharing for injecting drug use

Table 1. Demographic characteristics of HIV/AIDS cases, Michigan 2002-2006

Figure 1. Number of HIV[1] and AIDS[2] cases in Michigan, 2002-2006



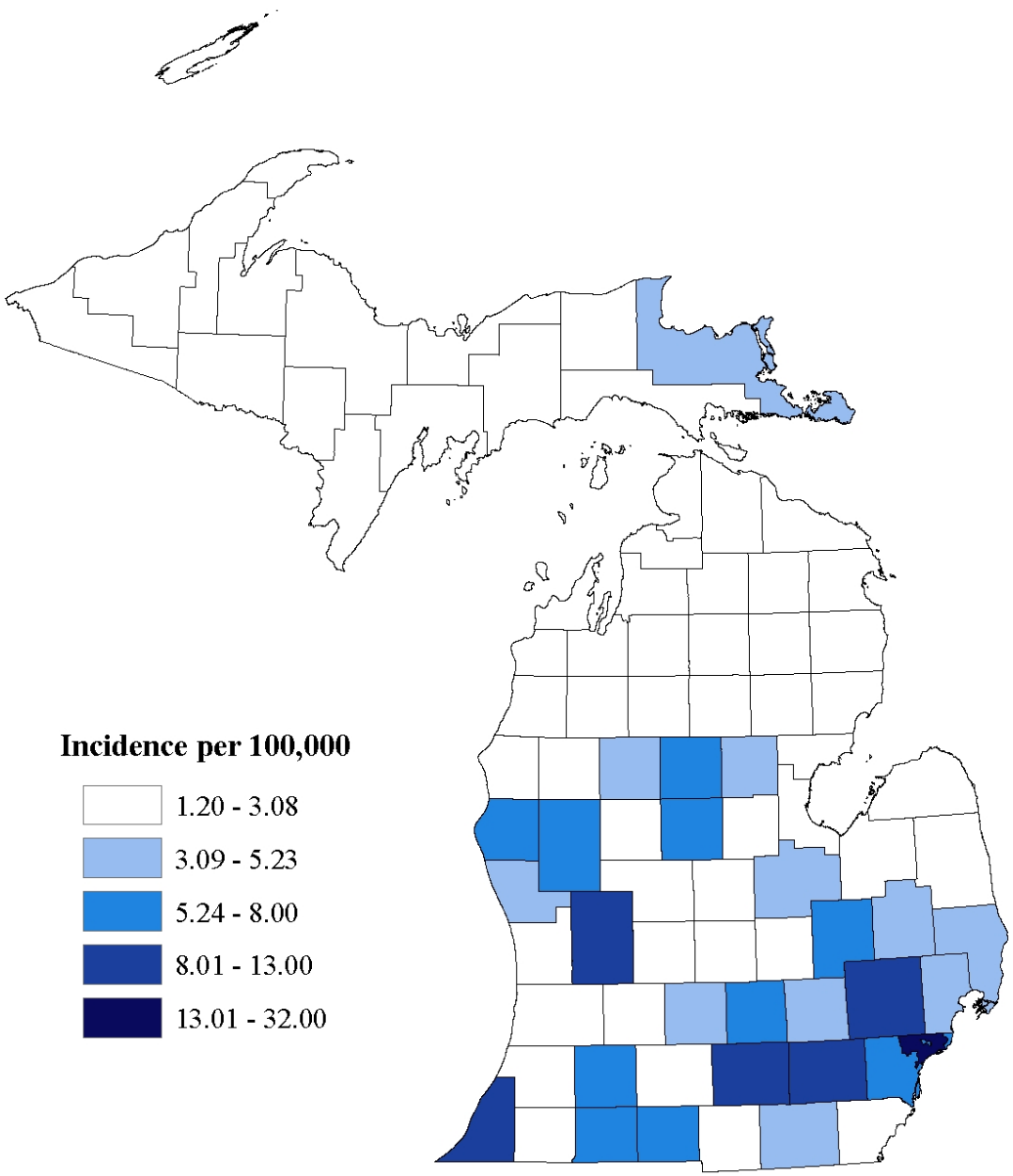
[1]Includes all new HIV cases, including those diagnosed with AIDS at the same time as HIV diagnosis, based on date of HIV diagnosis

[2]Includes all new AIDS cases, including those diagnosed with AIDS at the same time as HIV diagnosis, based on date of AIDS diagnosis

Summary:

Compared to the entire U.S., Michigan has moderate HIV/AIDS morbidity, with 70% of infections in the Detroit area. While HIV-related deaths have been declining in all sex/race groups since 1995, new diagnoses of HIV have remained stable at around 860 cases per year. This is creating an increase in the total number of people living with HIV/AIDS in Michigan, currently estimated at 16,200.

Figure 2. Incidence of HIV/AIDS by county, Michigan 2006



INFLUENZA

Causative agent:
Influenza is an acute viral infection of the respiratory tract. Three types of influenza viruses are recognized: A, B and C.

Clinical features:
Typical symptoms of influenza include fever, chills, muscle aches, headache, stuffy or runny nose, cough, sore throat and general weakness.

Mode of transmission:
Influenza is spread through contact with droplets from the nose and throat of an infected person during coughing and sneezing.

Period of communicability:
The contagious period varies, it begins the day before symptoms appear and lasts for about a week.

Incubation period:
Symptoms usually appear 1 to 3 days after a person is exposed to the virus.

Prevention of influenza:

- Covering mouth and nose with a disposable tissue during coughing or sneezing.
- Washing hands often with soap and water for at least 20 seconds.
- In addition, getting a flu shot is an excellent way to prevent influenza. Because the types and strains of viruses that cause influenza change often, an influenza vaccination should be received every year. Some people who have been exposed to influenza may be prescribed an anti-viral medication to prevent or reduce the severity of illness.

Note:
Surveillance for influenza in Michigan depends mostly on sentinel physician reporting and weekly aggregate reporting from schools and extended care facilities. Actual incidence of influenza like illness is believed to be substantially greater than reflected in reported figures due to under-reporting.

LEGIONELLOSIS

Causative agent:
Legionellosis is a bacterial infection caused by the bacterium *Legionella pneumophila*. Legionellosis is associated with 2 distinct illnesses: Legionnaires' disease and Pontiac fever. Both Pontiac fever and Legionnaires' disease may include influenza-like illness followed by high fever, chills, muscle aches, and headache. Legionnaires' disease is the more severe illness, causing mild to severe pneumonia

Clinical features:
The early symptoms of legionellosis may be influenza like with muscle aches, headache, tiredness and dry cough followed by high fever, chills and occasionally diarrhea. Body temperatures usually reach 102-105 degrees Fahrenheit and chest X-rays often show pneumonia.

Mode of transmission:
People get legionellosis when they inhale aerosols (water mist) that carry *Legionella* bacteria. People can be exposed to aerosols from mist-producing devices (especially water heaters and air-conditioning systems) in their homes and workplaces, hospitals, or other public places. Because *Legionella* bacteria live in the environment, groups of persons who are exposed to a common source of water mist can be exposed to the bacteria at the same time. When this happens, a legionellosis "outbreak" occurs among some members of the group. Legionellosis outbreaks have been traced to whirlpools, showers, room humidifiers, decorative spraying fountains, and large air-conditioning cooling towers. For most cases not associated with outbreaks, the water source responsible for infection is not known.

Period of communicability:
Person-to-person transmission has not been documented

Incubation period:
Usually 2 to 10 days. For Pontiac fever, it is shorter, usually a few hours to 2 days.

At risk groups:
People of any age can get legionellosis but the disease most often affects the elderly persons. People with underlying illnesses such as cancer or those with lowered immune system resistance to disease are also at higher risk. It rarely occurs in otherwise healthy people.

Prevention of legionellosis:
Cooling towers should be drained when not in use, and they should be mechanically cleaned periodically to remove scale and sediment. Appropriate biocides should be used to limit the growth of slime forming organisms. Tap water should not be used in respiratory therapy devices. Cost-effective preventive guidelines for domestic water systems have not been established; maintaining hot water system temperatures at 50ºC (122ºF) or higher may reduce the risk of transmission.

Table 1. Demographic characteristics of legionellosis cases, Michigan 2002-2006

*N= 647		Number of Cases	Percent Total
Sex			
	Male	416	64%
	Female	229	35%
Race			
	African American	119	18%
	American Indian or Alaska Native	3	<1%
	Asian	1	<1%
	Caucasian	348	54%
	Other	7	1%
Ethnicity			
	Hispanic or Latino	5	1%
Age groups (years)			
	0-9	1	<1%
	10-19	6	1%
	20-29	17	3%
	30-39	52	8%
	40-49	133	21%
	50-59	182	28%
	60-69	124	19%
	≥70	132	20%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of legionellosis cases in Michigan, 2002-2006

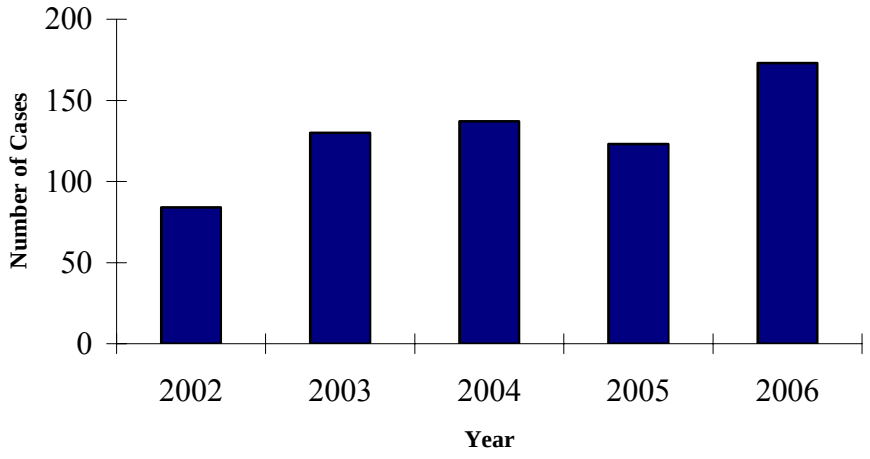
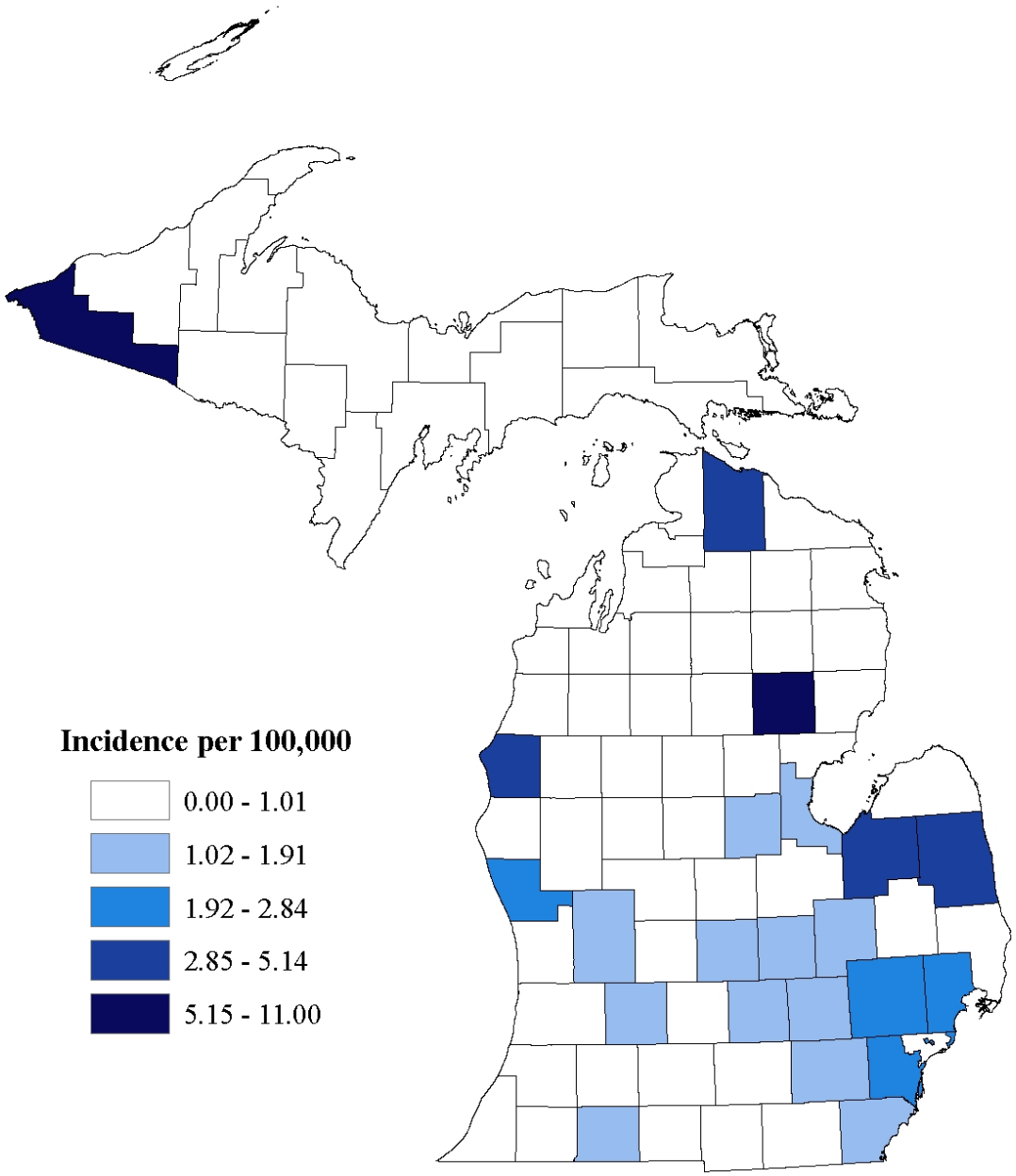


Figure 2. Incidence of legionellosis by county, Michigan 2006



LISTERIOSIS

Causative agent:
Listeria is caused by a bacterium known as *Listeria monocytogenes*.

Clinical features:
Listeriosis causes fever and flu-like symptoms such as fever, muscle aches, and gastrointestinal symptoms such as nausea, vomiting and diarrhea. Symptoms of headache, stiff neck, confusion, loss of balance or convulsions can occur if the infection has spread to the brain or spinal column (meningitis). *Listeria* can cause infection of the uterus and cervix, which can result in miscarriages or fetal death especially when the infection has occurred late in pregnancy.

Mode of transmission:
The main route of transmission is oral, through ingestion of contaminated food. Other routes include vertical transmission from infected mother to new born.

Period of communicability:
Infected individuals can shed the organisms in stools for several months. Mothers of infected newborns may shed the infectious agent in vaginal discharges and urine for seven to 10 days.

Incubation period:
Symptoms have been noted to occur within as few as 3 to as many as 70 days after consumption of a contaminated food, and most commonly within 3 weeks.

Susceptibility:
Although listeriosis is uncommon in the United States, anyone can get listeriosis if they eat food contaminated with *Listeria* bacteria. Although healthy persons may consume contaminated food without becoming ill, certain persons at high risk for infection may get listeriosis after eating food contaminated with even a few bacteria.

Persons at high risk for infection include:

- Pregnant women. About one third of listeriosis cases happen during pregnancy.
- Newborns. Newborns are very likely to suffer the serious effects of infection during their mother's pregnancy. Infants may be stillborn, born with septicemia (bacteria in their blood), or develop meningitis (inflammation of the covering of the brain or spinal cord) very early in life, even if the mother is asymptomatic.
- Persons with weakened immune systems. This may include persons with cancer, diabetes, kidney disease, AIDS, persons who are taking glucocorticoids, or the elderly.

Prevention of listeriosis:
The risk of listeriosis can be reduced by following guidelines similar to those used to help prevent other foodborne illnesses:

- Thoroughly cook all raw animals products, such as beef, pork, or poultry.
- Thoroughly wash raw vegetables before eating.
- Keep uncooked meats separate from vegetables, cooked foods and ready-to-eat foods.
- Avoid raw (unpasteurized) milk or foods made from raw milk.

- Wash hands, knives, and cutting boards after handling uncooked foods.

Table 1. Demographic characteristics of listeriosis cases, Michigan 2002-2006

*N=	120	Number of Cases	Percent Total
Sex			
	Male	58	48%
	Female	62	52%
Race			
	African American	16	13%
	Asian	1	1%
	Caucasian	67	56%
	Other	3	3%
Ethnicity			
	Hispanic or Latino	8	7%
Age groups (years)			
	0-9	6	5%
	10-19	2	2%
	20-29	7	6%
	30-39	6	5%
	40-49	7	6%
	50-59	19	16%
	60-69	25	21%
	≥70	48	40%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of listeriosis cases in Michigan, 2002-2006

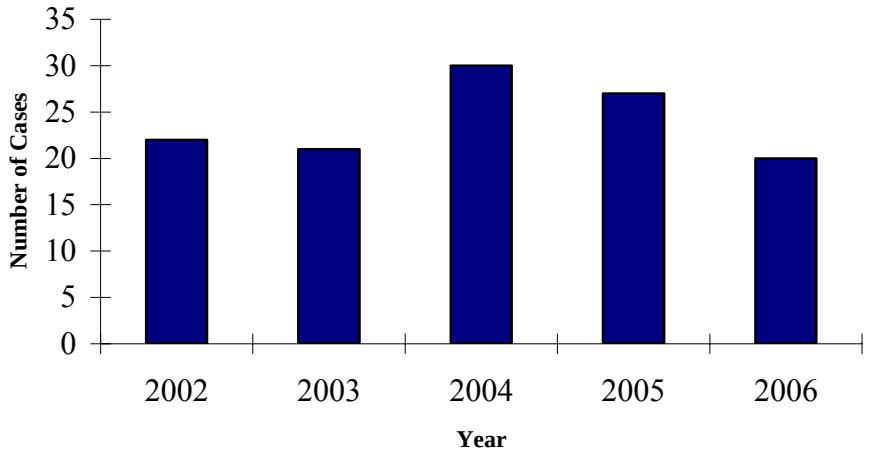
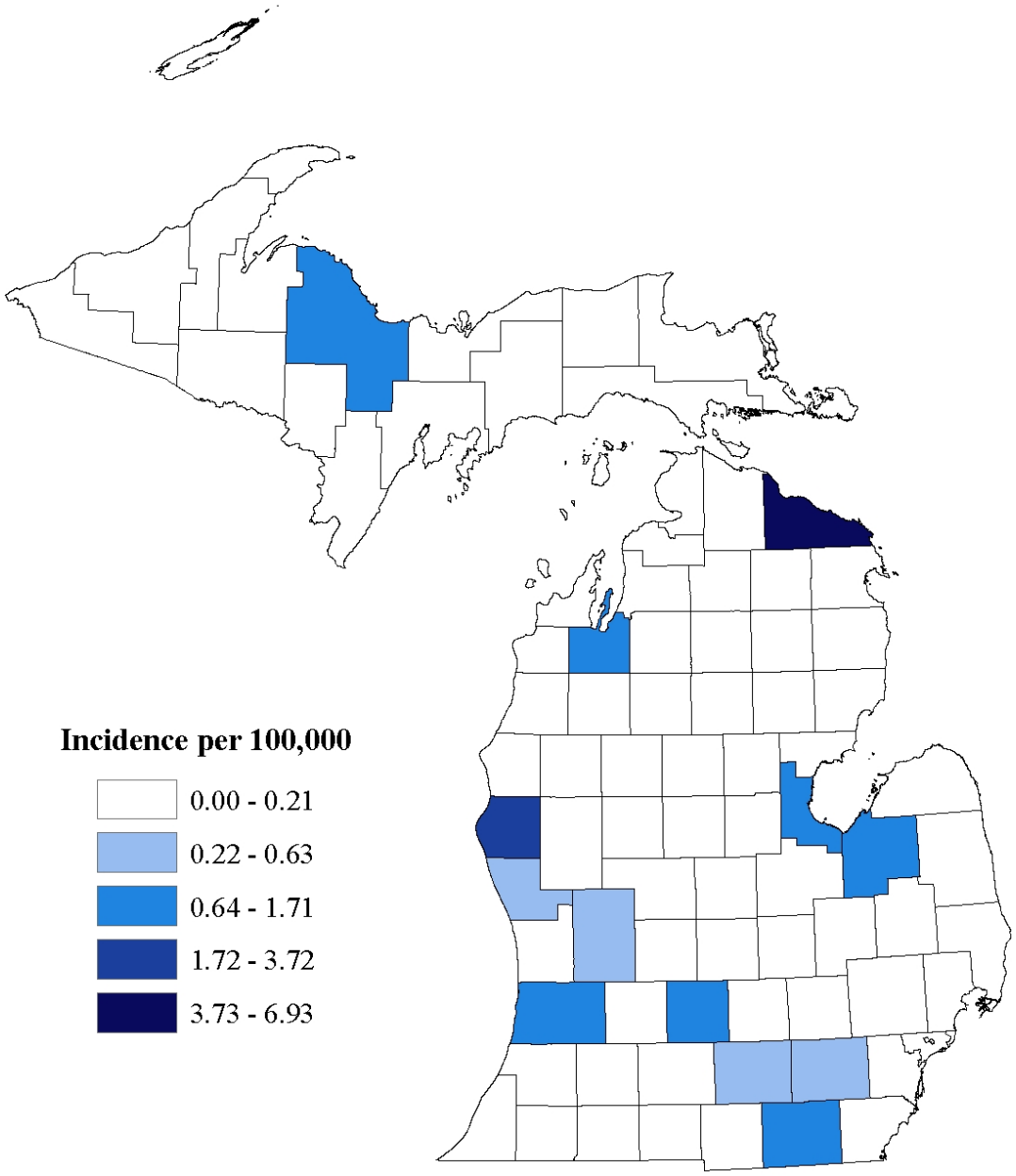


Figure 2. Incidence of listeriosis by county, Michigan 2006



LYME DISEASE

Causative agent:
Lyme disease is an illness caused by the bacteria, *Borrelia burgdorferi.*

Clinical features:
Lyme disease is difficult to recognize because the symptoms mimic those of other diseases. The illness usually starts with a circular red rash, at or near the site of the tick bite. The rash may expand to a large size. Often there may be a clearing in the center of the rash that makes it look like a target. Along with the rash, other "influenza-like" symptoms may appear such as fever, headache, fatigue, stiff neck, muscle and joint pain. The joints, nervous system, and heart may be affected weeks to months after the initial tick bite. A small number of people with Lyme disease may develop symptoms during later stages of the disease without having had the earlier skin rash.

Mode of transmission:
These bacteria are spread to humans from the bite of an infected tick. Usually, the bacteria that cause Lyme disease will only be transferred from an infected tick if it is attached to skin for at least 24 hours. Persons who do not remove the tick immediately have a higher chance of getting Lyme disease. Some people become ill after crushing a tick with their hands because the tick's body fluids get into cuts or scratches in the skin.

Period of communicability:
No evidence of natural transmission from person-to-person.

Incubation period:
The rash or "influenza-like" symptoms usually begin within a month after a tick bite.

High-risk groups:
Anyone can get Lyme disease, especially campers, hikers, and others who frequent wooded, brushy, and grassy places where ticks are found.

Prevention of lyme disease:
- Avoid tick-infested areas, especially during the months of May, June, and July.
- Walk in the center of trail to avoid overhanging grass and brush.
- Immediately remove any attached tick on your body gently with tweezers

Table 1. Demographic characteristics of Lyme disease cases, Michigan 2002-2006

*N= 187	Number of Cases	Percent Total
Sex		
Male	102	55%
Female	84	45%
Race		
African American	1	1%
American Indian or Alaska Native	1	1%
Asian	2	1%
Caucasian	142	76%
Other	1	1%
Ethnicity		
Hispanic or Latino	4	2%
Age groups (years)		
0-9	20	11%
10-19	28	15%
20-29	26	14%
30-39	14	7%
40-49	29	16%
50-59	34	18%
60-69	23	12%
≥70	13	7%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of Lyme disease cases in Michigan, 2002-2006

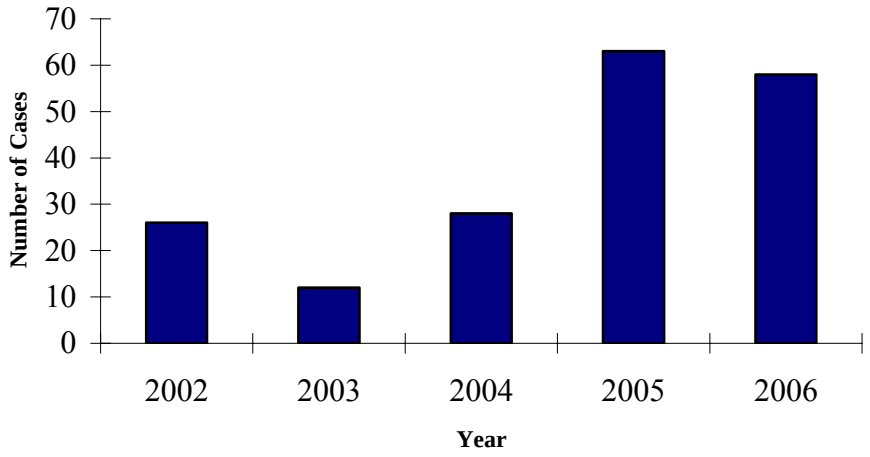
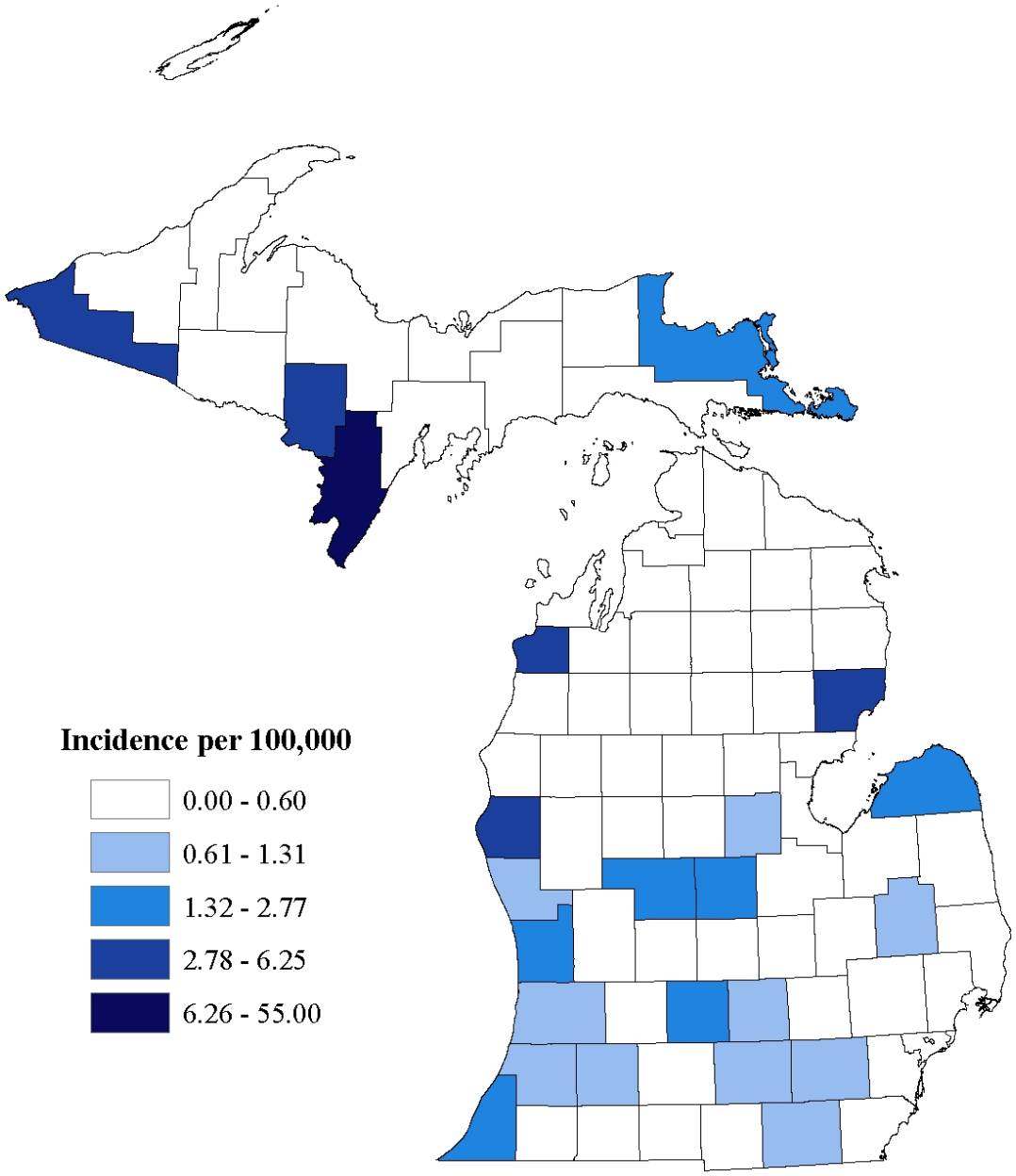


Figure 2. Incidence of Lyme disease by county, Michigan 2006



Note:
Lyme disease case incidence by county is based on cases reported in citizens of that county. This does not necessary reflects a local exposure to the vector or disease agent. Approximately half of Lyme disease cases reported to local and state health authorities are from travel exposures.

MALARIA

Causative agent:
Malaria is a disease caused by a family of parasites called *Plasmodium*. Malaria is transmitted by certain types of mosquitoes.

Clinical features:
The symptoms of malaria include fever, chills, headache, muscle aches, and malaise. Sometimes malaria causes fluid in the lungs, liver and kidney failure, swelling of the brain, coma, and even death can happen. Symptoms can appear months after an infected bite with some types of malaria.

Mode of transmission:
The female Anopheles mosquito acquires or even becomes infected with the parasite when it bites a person who is infected with the malaria parasite. The mosquito then spreads malaria when biting other people. Malaria occurs primarily in tropical and subtropical parts of the world such as Central and South America, Southeast Asia, sub-Saharan Africa, the Caribbean, and the South Pacific Islands.

Period of communicability:
Feeding mosquitoes can become infected with the parasite (or acquire the parasite) as long as infective gametocytes are present in the human's blood. Gametocytes usually appear within three days of parasitemia (parasite in the blood) with *P. vivax* and *P. ovale*, and after 12 to 14 days with *P. falciparum*. Untreated or inadequately treated patients may be a source of mosquito infection for more than three years with *P. malariae*, one to two years with *P. vivax*, and generally not more than one year with *P. falciparum*. Infected mosquitoes remain infective for life.

Incubation period:
The time between the infective bite and the appearance of clinical symptoms is approximately 9-14 days for *P. falciparum*, 12-18 days for *P. vivax* and *P. ovale* and 18-40 days for *P. malariae*. Some strains of *P.vivax*, mostly from temperate areas, may have incubation period of 8-10 months and longer. With infection through blood transfusion, incubation period depends upon the number of parasite infused.

Susceptibility:
Frequent travelers to endemic zones of malaria (South America, Southeast Asia, sub-Saharan Africa, the Caribbean, South Pacific Islands) are at risk of acquiring malaria.

Prevention of malaria:
Malaria is no longer endemic in the U.S.; thus, the risk of acquiring malaria is very low. The risk depends on the destination, activities and duration of travel. If personal protection measures are utilized (for example, mosquito netting and insect repellents), the risk is reduced significantly. *Anopheles* mosquitoes feed during the nighttime hours, from dusk to dawn, so caution is especially recommended during these hours.

Table 1. Demographic characteristics of malaria cases, Michigan 2002-2006

*N= 138		Number of Cases	Percent Total
Sex			
	Male	100	72%
	Female	38	28%
Race			
	African American	49	36%
	American Indian or Alaska Native	0	0%
	Asian	6	4%
	Caucasian	48	35%
	Other	10	7%
Ethnicity			
	Hispanic or Latino	1	1%
Age groups (years)			
	0-9	12	9%
	10-19	15	11%
	20-29	37	27%
	30-39	21	15%
	40-49	25	18%
	50-59	15	11%
	60-69	8	6%
	≥70	4	3%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of malaria cases in Michigan, 2002-2006

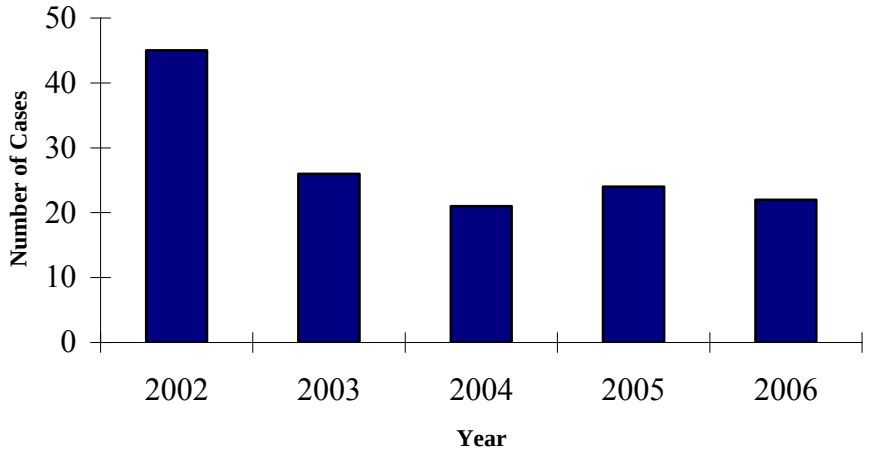
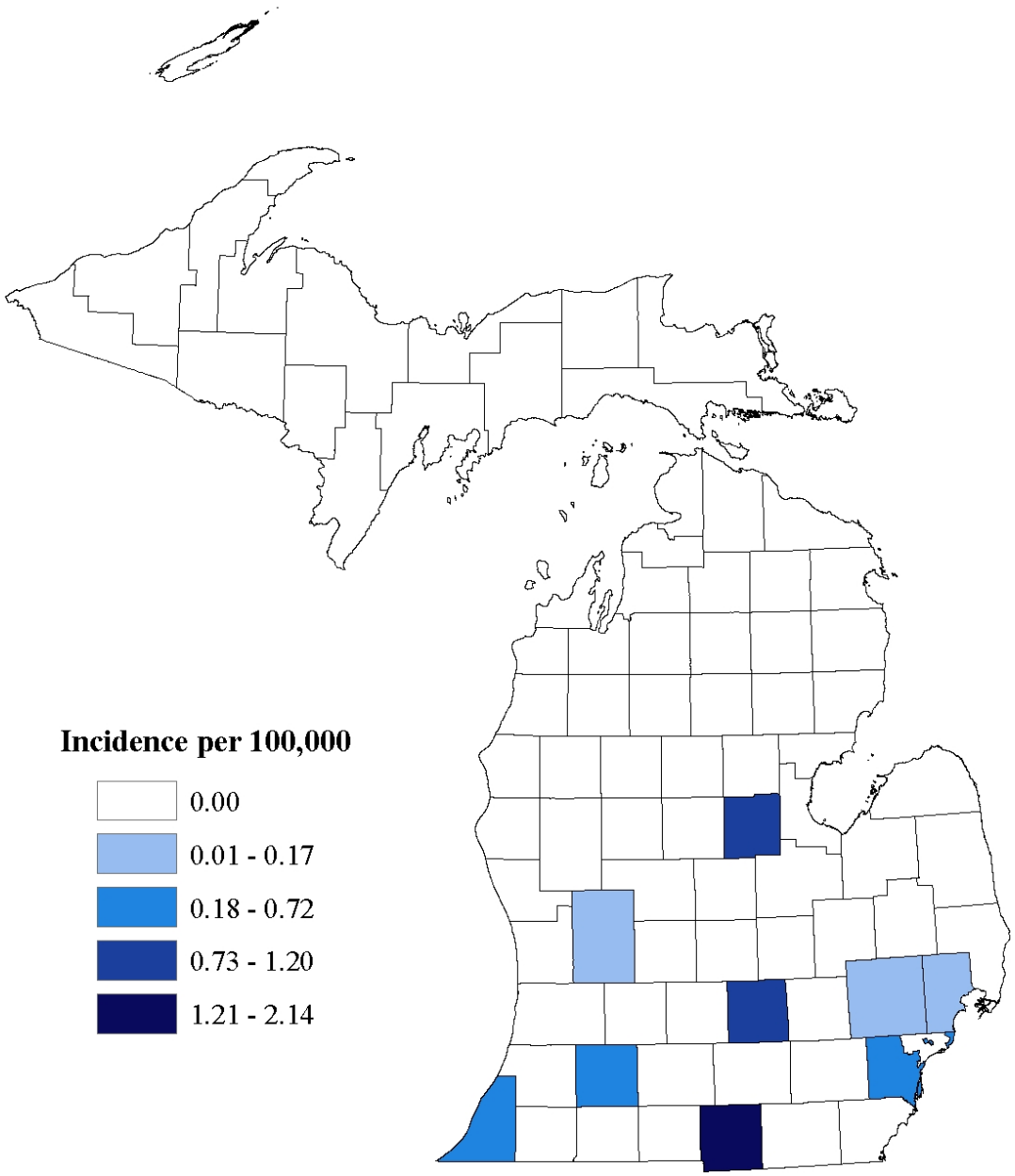


Figure 2. Incidence of malaria by county, Michigan 2006



PERTUSSIS (WHOOPING COUGH)

Causative agent:
Pertussis is a contagious respiratory disease caused by bacterium *Bordetella pertussis*.

Clinical features:
The symptoms of pertussis usually occur in two stages. The first stage begins like a cold, with a runny nose, sneezing, and possibly a low-grade fever. The second stage of pertussis includes uncontrolled coughing spells. When a child breathes in, they give a whooping noise. The second stage can last for 6 – 10 weeks. Infants under 6 months sometime exhibit different symptoms. Small infants may stop breathing for a period of time. Also, they may not have a whoop. Infants that are not fully immunized have the most severe disease and many will require hospitalization. In adults and older children, pertussis starts like a cold, with a runny nose, sneezing, low-grade fever, and cough. The infection may develop into bronchitis, which is raspy, hoarse coughing. This can last for weeks. The coughing spells may be so bad that the person cannot sleep and may vomit.

Mode of transmission:
Bordetella pertussis is found in the mouths, noses, and throats of infected people. The bacteria are spread in the air by droplets produced during sneezing or coughing. Pertussis is very contagious and most unvaccinated people living in a household will get the disease.

Period of communicability:
Pertussis is highly communicable in the initial stage (first 2 weeks). Thereafter, communicability gradually decreases and becomes negligible in about 3 week, despite persisting spasmodic cough with whoop.

Incubation period:
Average 9-10 days (range 6-20 days).

High-risk groups:
Anyone can get pertussis. Infants and young children usually get the disease from an infected family member who may have a coughing illness.

Prevention of pertussis:
Effective pertussis vaccine is available. Pertussis vaccine is given at two, four, six, and 15 months of age, and again when a child enters school. At least 3-4 doses are necessary to protect a child from pertussis. Prompt use of antibiotics is helpful in limiting other cases. Antibiotics should be given to all household contacts and other close contacts, such as those in daycare.

Table 1. Demographic characteristics of pertussis cases, Michigan 2002-2006

*N= 1479		Number of Cases	Percent Total
Sex			
	Male	643	43%
	Female	834	56%
Race			
	African American	111	8%
	American Indian or Alaska Native	2	<1%
	Asian	13	1%
	Caucasian	1,035	70%
	Hawaiian or Pacific Islander	1	<1%
	Other	42	3%
Ethnicity			
	Hispanic or Latino	47	3%
Age groups (years)			
	<1	342	
	1-9	354	24%
	10-19	658	44%
	20-29	72	5%
	30-39	127	9%
	40-49	123	8%
	50-59	79	5%
	60-69	34	2%
	≥70	32	2%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of pertussis cases in Michigan, 2002-2006

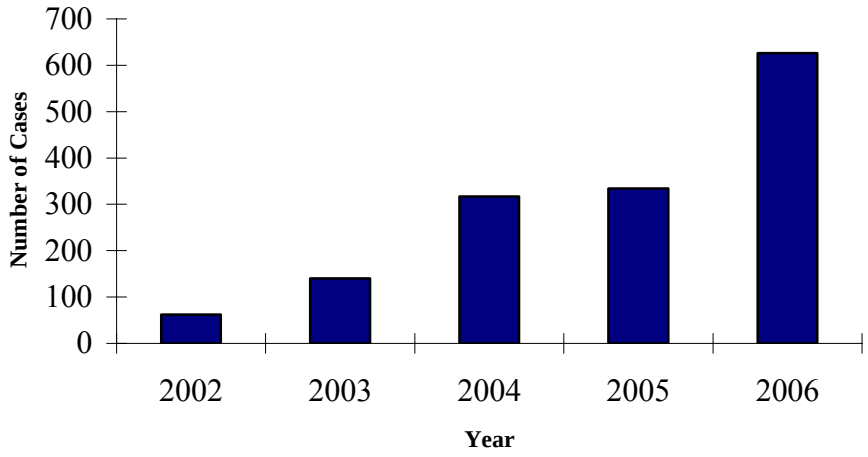
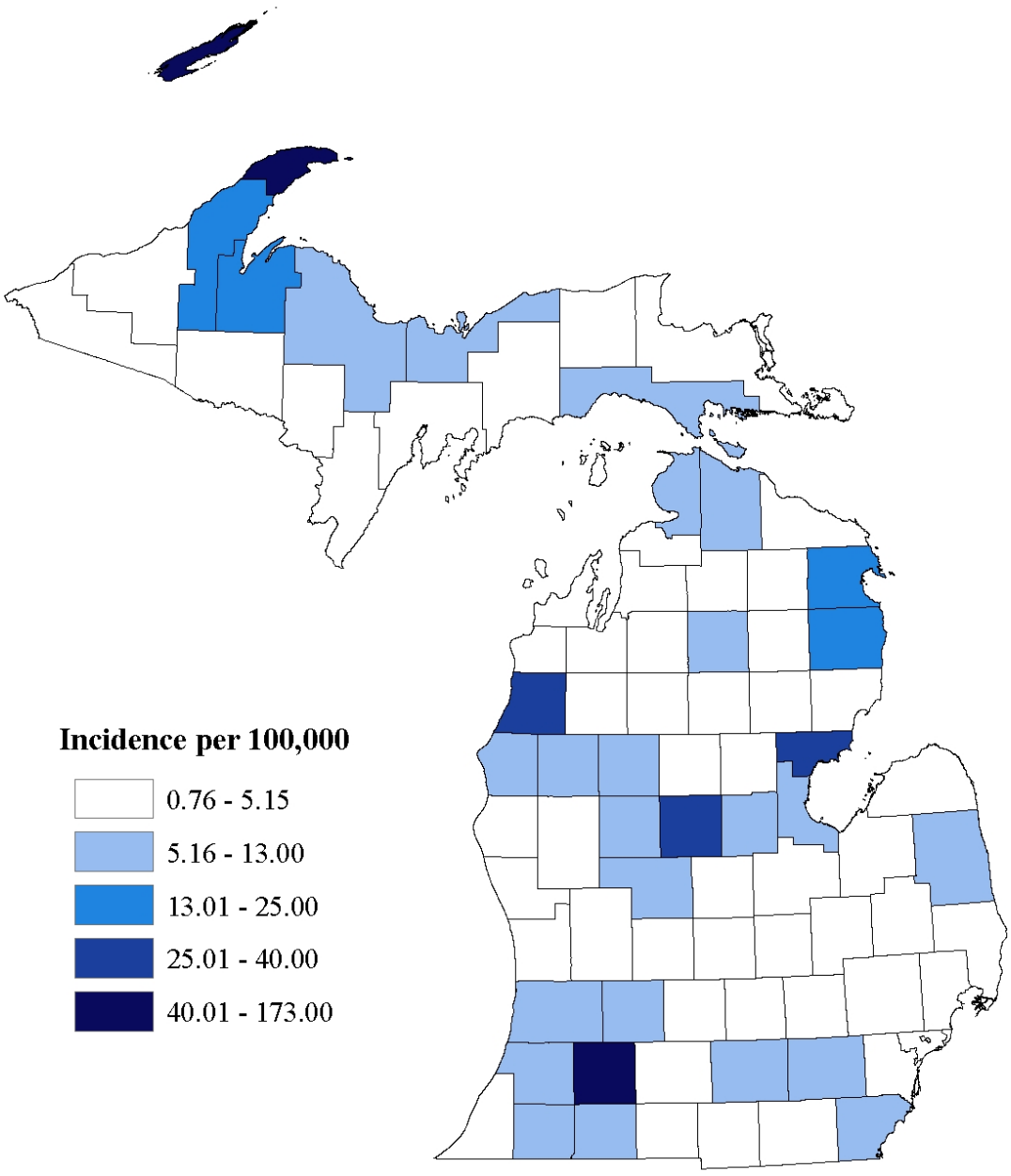


Figure 2. Incidence of pertussis by county, Michigan 2006



PLAGUE

Causative agent:
Plague is caused by the bacterium *Yersinia pestis*, which is carried by fleas that feed on infected rodents. Human plague is very rare.

Clinical features:
Plague appears in humans in one of three forms. Bubonic plague is the most common. Septicemic plague is the second form and occurs when the bacterium enters the blood stream. The third form is pneumonic plague, which occurs when infection moves to the lungs. Symptoms of bubonic plague include high fever, chills, severe malaise, headaches, delirium, nausea, vomiting, diarrhea, coma, and death, if not diagnosed. The most distinctive symptom is swelling of the lymph nodes in the groin, armpits, or neck. The swollen lymph nodes are called buboes. These become painful, pus-filled, and may rupture and ooze fluid. Symptoms of septicemic plague are similar to bubonic, only without an increase in the size of the lymph nodes. This form can be serious because it can be difficult to diagnose. Symptoms of pneumonic plague include cough, bloody sputum, high fever, and chills. Any form of plague can be fatal if not treated. Septicemic and pneumonic plagues are more often fatal than bubonic because they are more difficult to recognize.

Mode of transmission:
The most common source of plague in humans has been the bite of infected fleas. Other sources include the handling of tissues of infected animals, especially rodents and rabbits. Domestic pets, particularly house cats, may carry plague-infected fleas into homes and occasionally transmit infection by their bites or scratches. Occasionally, cats or humans infected with plague pharyngitis or pneumonia may spread plague in airborne droplets.

Period of communicability:
Symptoms usually start two to six days after exposure for bubonic plague and two to four days after exposure for pneumonic plague.

Incubation period:
Usually from 1-7 days, for primary plague pneumonia, 1-4 days.

High-risk groups:
Anyone can get plague. However, people in occupations such as laboratory work, geology, or biology may have more contact with infected rodents and fleas.

Prevention of plague:
When traveling to areas where plague is common, it is important to avoid exposures to animals that may carry fleas infected with plague bacteria. Prevent rodent access to food and shelter by ensuring appropriate storage and disposal of food and garbage. People with pneumonic plague should be isolated until 3 full days of antibiotic treatment have been given.

Note:
No case of plague has been reported in Michigan in the last 5 years.

Q FEVER

Causative agent:
Q fever is an infection caused by a bacterium known as *Coxiella burnetii*.

Clinical features:
Q fever is characterized by a sudden onset of fever, with other symptoms that include chills, headache, weakness, malaise, and severe sweats. Other complications may occur, including pneumonitis, abnormal liver function tests, chronic endocarditis, and neurologic problems.

Mode of transmission:
Q fever is spread to humans primarily through airborne dissemination of contaminated dust. Dust becomes contaminated with *C. burnetii* bacteria that are present in the tissues or bodily fluids of infected animals. Direct contact with infected animals or materials that they have contaminated (such as straw or other bedding materials) may also cause an infection. Raw or unpasteurized milk from infected cows or goats may be capable of spreading *C. burnetii*.

Period of communicability:
Direct transmission from person to person occurs rarely. However, contaminated clothing may be a source of infection.

Incubation period:
Incubation period is variable, but 2-3 weeks after exposure is the most common.

Susceptibility:
Q fever is a rare disease, but anyone can get it if they are infected with *C. burnetii* bacteria. Persons at highest risk for Q fever are those who work with animals that are infected, including veterinarians, meat workers, sheep workers and farmers. *C. burnetii* may be found in sheep, cattle, goats, cats, dogs, some wild animals (including bandicoots and many wild rodents), birds and ticks.

Prevention of Q fever:
People who work with animals who may be infected need to know the signs and symptoms of Q fever and seek treatment if they feel they could be infected. There is a Q fever vaccine that is currently not available for general use, but may be available through the Department of Defense for persons who are known to be at high risk of exposure.

Note:
Only 8 cases of Q fever have been reported in Michigan during the last 5 years.

SALMONELLOSIS

Causative agent:
Salmonellosis is caused by a bacterium *Salmonella*. Over 2400 *Salmonella* serotypes have been identified, however most human salmonellosis is caused by serotypes: typhimurium, enteritidis, newport and heidelberg.

Clinical features:
Individuals infected with *Salmonella* usually develop diarrhea, fever, and abdominal cramps. The illness usually lasts 4 to 7 days, and most persons recover without treatment. However, in some cases the diarrhea may be so severe that the patient needs to be hospitalized. In these patients, the *Salmonella* infection may spread from the intestines to the blood stream, and then to other body sites and can cause death.

Mode of transmission:
Salmonella are usually transmitted to humans by eating contaminated foods. Contaminated foods are often of animal origin, such as beef, poultry, milk, or eggs, but all foods, including vegetables may become contaminated. Food may also become contaminated during preparation and handling.

Period of communicability:
Period of communicability is extremely variable from several days to weeks. Depending on the serotypes, approximately 1% of infected adults and 5% of children under 5 years may excrete the organism for > 1 year.

Incubation period:
From 6-72 hours, usually about 12-36 hours.

Susceptibility
The elderly, infants, and those with impaired immune systems are at higher risk of getting salmonellosis than the general population.

Prevention of salmonellosis:
Since foods of animal origin may be contaminated with *Salmonella*, eating raw or undercooked eggs, poultry, or meat should be avoided. Poultry and meat, including hamburgers, should be well cooked. Food handlers should wash their hands, kitchen utensils thoroughly after handling uncooked foods. People should wash their hands after contacting with animals. There is no vaccine to prevent salmonellosis.

Table 1. Demographic characteristics of salmonellosis cases, Michigan 2002-2006

*N= 4461		Number of Cases	Percent Total
Sex			
	Male	1,992	45%
	Female	2,402	54%
Race			
	African American	419	9%
	American Indian or Alaska Native	11	<1%
	Asian	45	1%
	Caucasian	2493	56%
	Other	97	2%
Ethnicity			
	Hispanic or Latino	106	2%
Age groups (years)			
	1<	411	9%
	0-9	759	17%
	10-19	870	20%
	20-29	581	13%
	30-39	487	11%
	40-49	561	13%
	50-59	445	10%
	60-69	294	7%
	≥70	464	10%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of salmonellosis cases in Michigan, 2002-2006

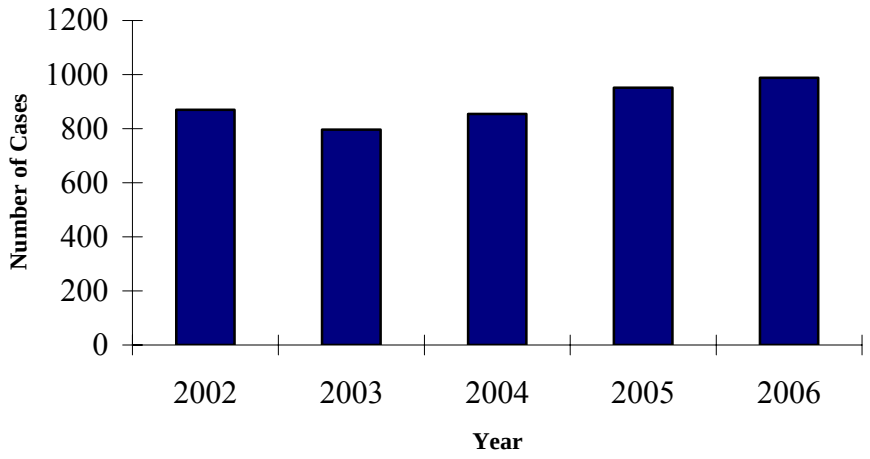
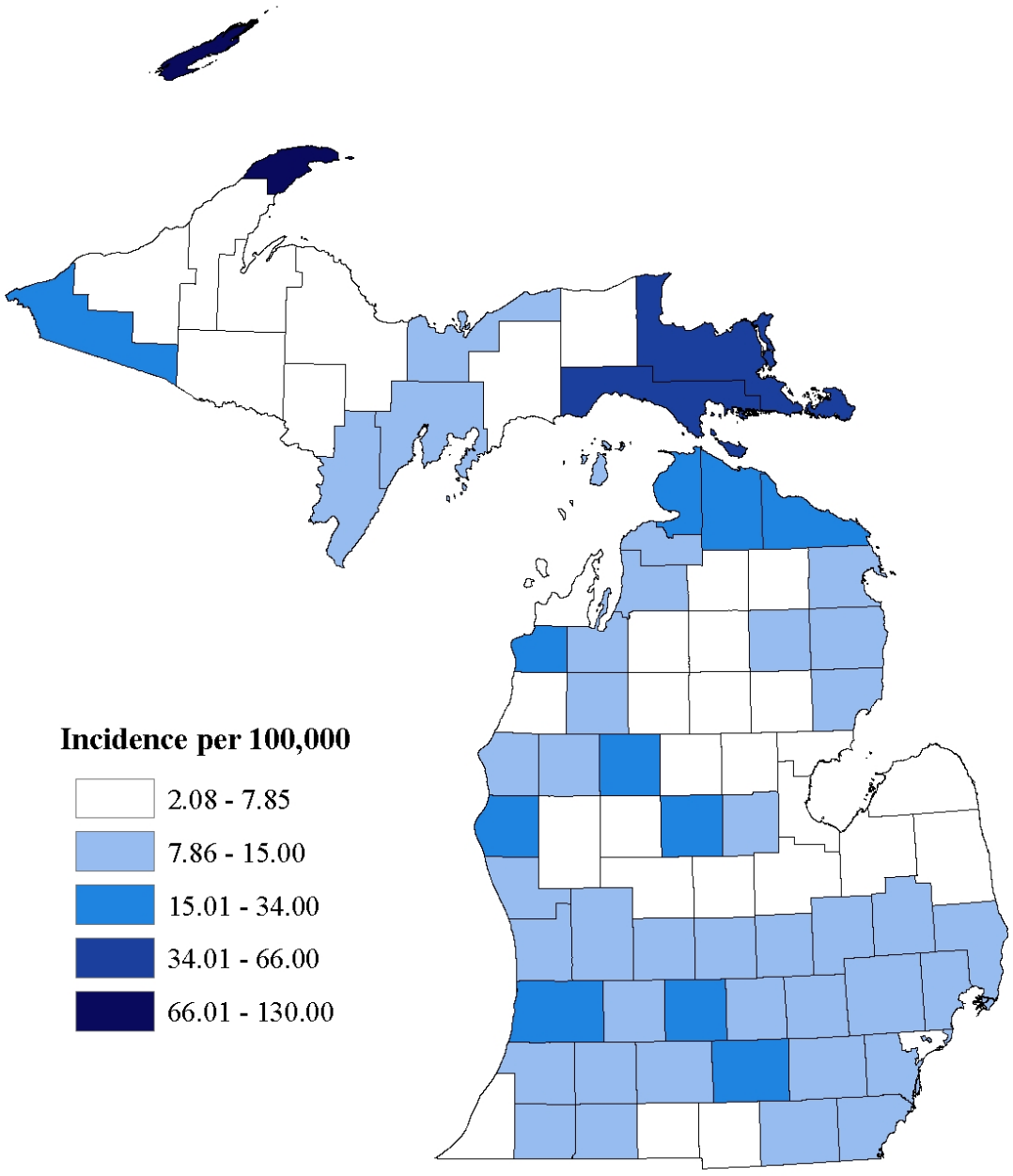


Figure 2. Incidence of salmonellosis by county, Michigan 2006



SHIGELLOSIS

Causative agent:
Shigellosis is a bacterial infection of the large and small intestines caused by the bacterium *Shigella*.

Clinical features:
Shigellosis is characterized by diarrhea, fever, nausea, vomiting and abdominal cramps. Typically the stools contain blood, mucus and pus, although some cases may present with watery diarrhea. Asymptomatic infections also occur. The illness is usually self-limited, and lasts from several days to weeks with an average of four to seven days. The severity of the infection depends on the age and state of nutrition of the patient and the serotype of *Shigella*.

Mode of transmission:
Shigellosis is transmitted by:

- Fecal-oral route from patients or carriers
- Contaminated food, water and milk

Period of communicability:
It is communicable during acute infection and while the infectious agent is present in feces (usually no longer than four weeks). Asymptomatic carriers may transmit infection.

Incubation period:
From 12 hours to four days (usually one to three days).

High-risk groups:
Anyone can get shigellosis. However, individuals with immunocompromised host (elderly and children) are at higher risk.

Prevention of shigellosis:
Hand washing is the most important way to prevent shigellosis. Wash hands with soap and water:

- After using the toilet
- After changing diapers
- After touching any stool-soiled material
- Before handling food or drink
- Before eating

Table 1. Demographic characteristics of shigellosis cases, Michigan 2002-2006

*N= 1070		Number of Cases	Percent Total
Sex			
	Male	477	45%
	Female	576	54%
Race			
	African American	169	16%
	American Indian or Alaska Native	20	2%
	Asian	17	2%
	Caucasian	392	37%
	Other	46	4%
Ethnicity			
	Hispanic or Latino	82	8%
Age groups (years)			
	1<	31	3%
	0-9	465	43%
	10-19	144	13%
	20-29	149	14%
	30-39	111	10%
	40-49	85	8%
	50-59	53	5%
	60-69	27	3%
	≥70	36	3%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of shigellosis cases in Michigan, 2002-2006

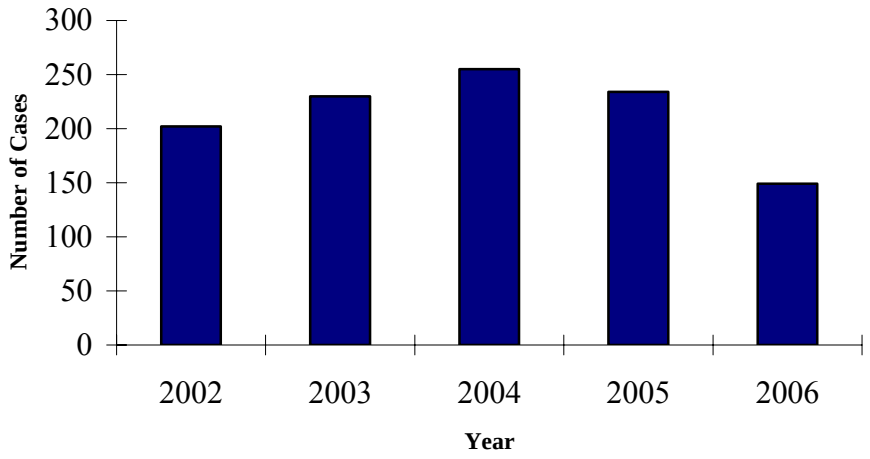
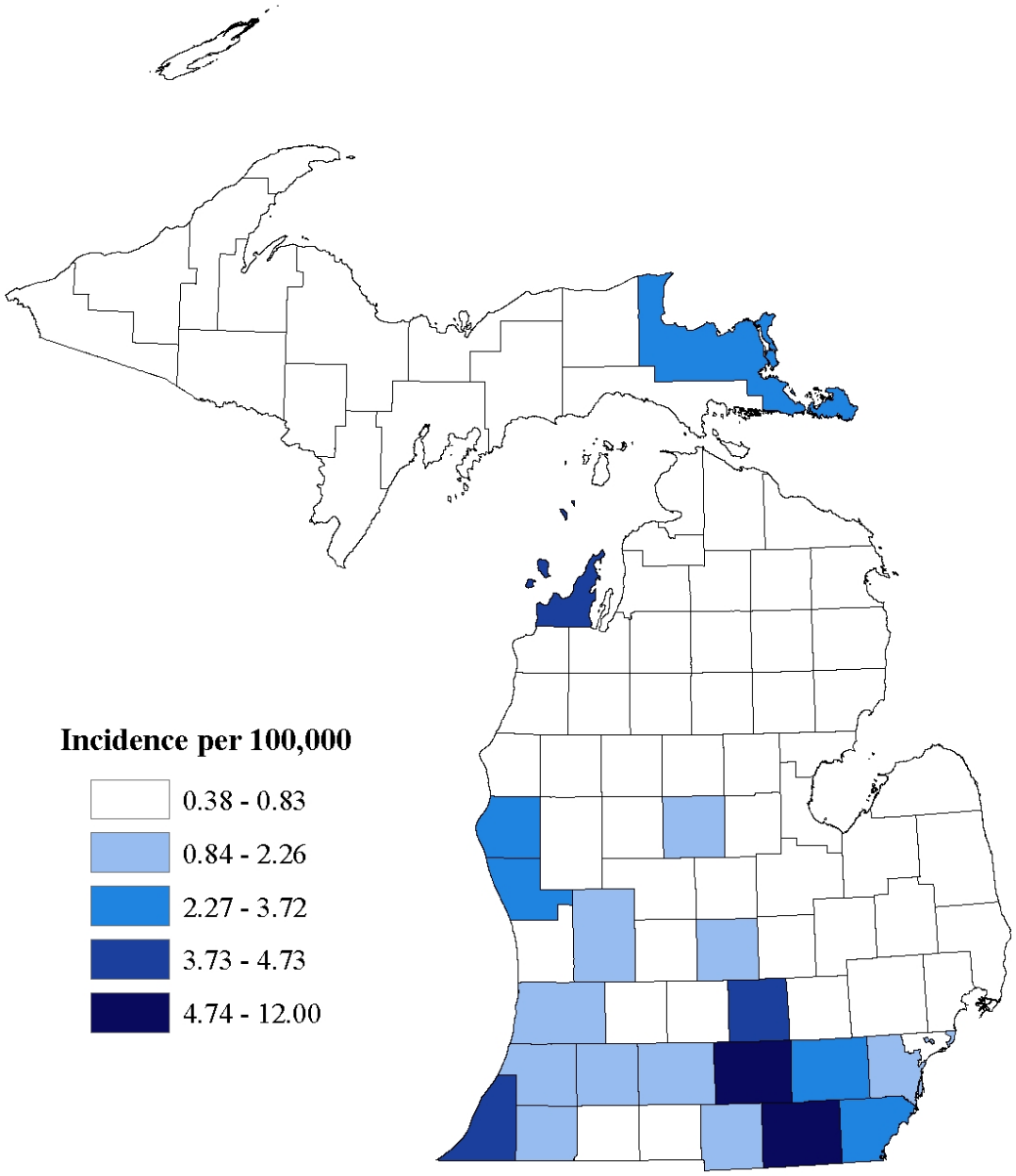


Figure 2. Incidence of shigellosis by county, Michigan 2006



Note:
Reported shigellosis cases were decreased by 26% from 202cases in 2002 to 149 in 2006 in Michigan. 46% of the reported cases were aged <10 years.

SMALLPOX

Causative agent:
Smallpox is an acute infection caused by a virus. No one has naturally contracted smallpox since 1977. Smallpox was declared eradicated worldwide in 1980. There are two types of smallpox: variola major and variola minor. Variola major is the more severe form and has a 30-50% fatality rate.

Clinical features:
The initial symptoms of smallpox, include the acute onset of fever, chills, headache, nausea, vomiting and severe muscle aches. This stage generally lasts for two to four days and can be accompanied by flushing of the skin. By the fourth day of illness, the fever drops and the characteristic smallpox rash appears. The rash starts out flat or slightly thickened spots (known as macules) and quickly progresses to raised spots (known as papules). These papules continue to enlarge and become filled with a clear fluid, then referred to as vesicles. The fluid in the vesicles gradually changes from clear to pus-like, and the lesions are then referred to as pustules. During the pustule stage, a fever is common and the pustules start to form into scabs. Over time, the dried scab material falls off of the skin. This entire process takes three to four weeks, and the areas affected by the rash can be permanently scarred.

Mode of transmission:
Smallpox is most often spread by the respiratory secretions of an infected person. Less often it is spread through direct contact with smallpox lesions of the skin and mucous membranes, or through contact with materials (e.g., bedding, clothing) contaminated by such lesions or scabs. Rarely, it is spread through airborne means. Humans are the only known hosts; animals or insects do not spread the virus.

Period of communicability:
From the time of development of the earliest lesions to disappearance of all scabs; about 3 weeks. The risk of transmission appears to be highest at the appearance of the earliest lesions, through droplet spread from the oropharyngeal enanthem.

Incubation period:
Seven to nineteen days after exposure, commonly 10-14 days.

Prevention of Smallpox:
There is a vaccine to prevent smallpox that was routinely administered in the United States until the early 1970s. Routine vaccination of the civilian population for this disease is not currently recommended. Avoid close contact with an infected individual.

Note:
In 1980, the World Health Organization declared that smallpox had been eradicated worldwide. The last naturally occurring case of smallpox occurred in 1977 in Somalia and only one laboratory-associated death (which occurred in England in 1978) has been identified since then.

STREPTOCOCCUS PYOGENES, INVASIVE, GROUP A

Causative agent:
Group A streptococcus (GAS) is a bacterium that is commonly found in the throat and on the skin. The letter "A" refers to a classification of bacteria in the genus *Streptococcus* according to the makeup of the organism's cell wall.

Clinical features:
Signs and symptoms depend on the type of illness caused by group A strep. Strep throat causes fever, sore throat, and swollen lymph glands. Strep skin infection causes red, weeping skin sores. Scarlet fever causes all the symptoms of strep throat plus a characteristic rash on the neck, chest, skin folds, and inner thighs. Early signs and symptoms of streptococcal toxic shock syndrome often include fever, dizziness, and confusion. Streptococcal toxic shock syndrome has no sign or symptom that distinguishes it from other illnesses.

Mode of transmission:
Group A streptococcal bacteria are spread by direct person-to-person contact. The bacteria are carried in discharges from the nose or throat of an infected person and in infected wounds or sores on the skin. The bacteria are usually spread when infected secretions come in contact with the mouth, nose, or eyes of an uninfected person. They can also enter the body through a cut or scrape.

Period of communicability:
The risk of spreading the infection is highest when an infected person has symptoms or has an infected wound. Infected persons who have no symptoms are much less contagious. With adequate penicillin therapy, it is communicable for 24-48 hours; in untreated cases, for 10-21 days. Patients with untreated streptococcal infection with purulent discharges may spread the infection for weeks or months. Household objects like plates, cups, and toys do not play a major role in the spread of group A strep.

Incubation period:
Symptoms appear quickly after infection, usually within 1 - 3 days.

Susceptibility:
Anyone can become infected with group A strep. However, people with long-term illnesses like cancer, diabetes, and kidney disease, and those who use medications such as steroids, are at higher risk for invasive disease. Breaks in the skin, like cuts, surgical wounds, or chickenpox blisters, can also provide an opportunity for the bacteria to enter the body.

Prevention of streptococcal group A disease:
The spread of all types of strep group A 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 daycare 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.

Table 1. Demographic characteristics of *Streptococcus* Group A cases, Michigan 2002-2006

*N= 1379		Number of Cases	Percent Total
Sex			
	Male	702	51%
	Female	673	49%
Race			
	African American	378	27%
	American Indian or Alaska Native	2	<1%
	Asian	7	1%
	Caucasian	659	48%
	Other	22	2%
Ethnicity			
	Hispanic or Latino	19	1%
Age groups (years)			
	1<	45	3%
	0-9	184	13%
	10-19	139	10%
	20-29	102	7%
	30-39	177	13%
	40-49	234	17%
	50-59	169	12%
	60-69	125	9%
	≥70	249	18%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of *Streptococcus* Group A (invasive) cases in Michigan, 2002-2006

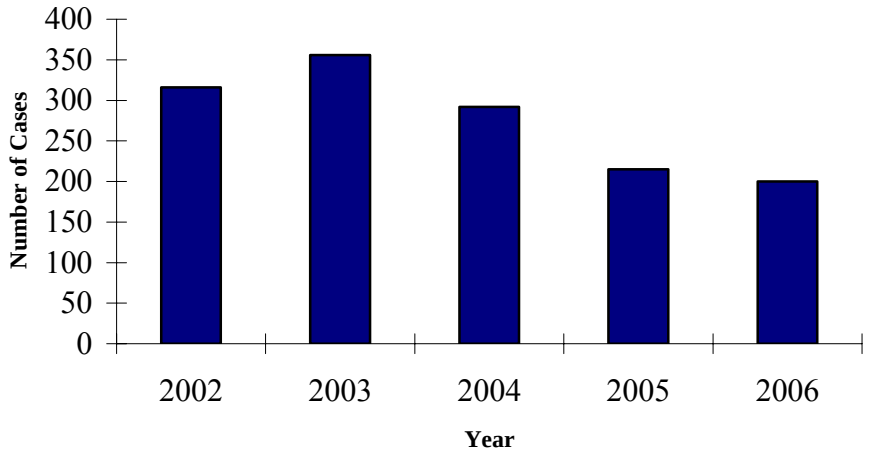
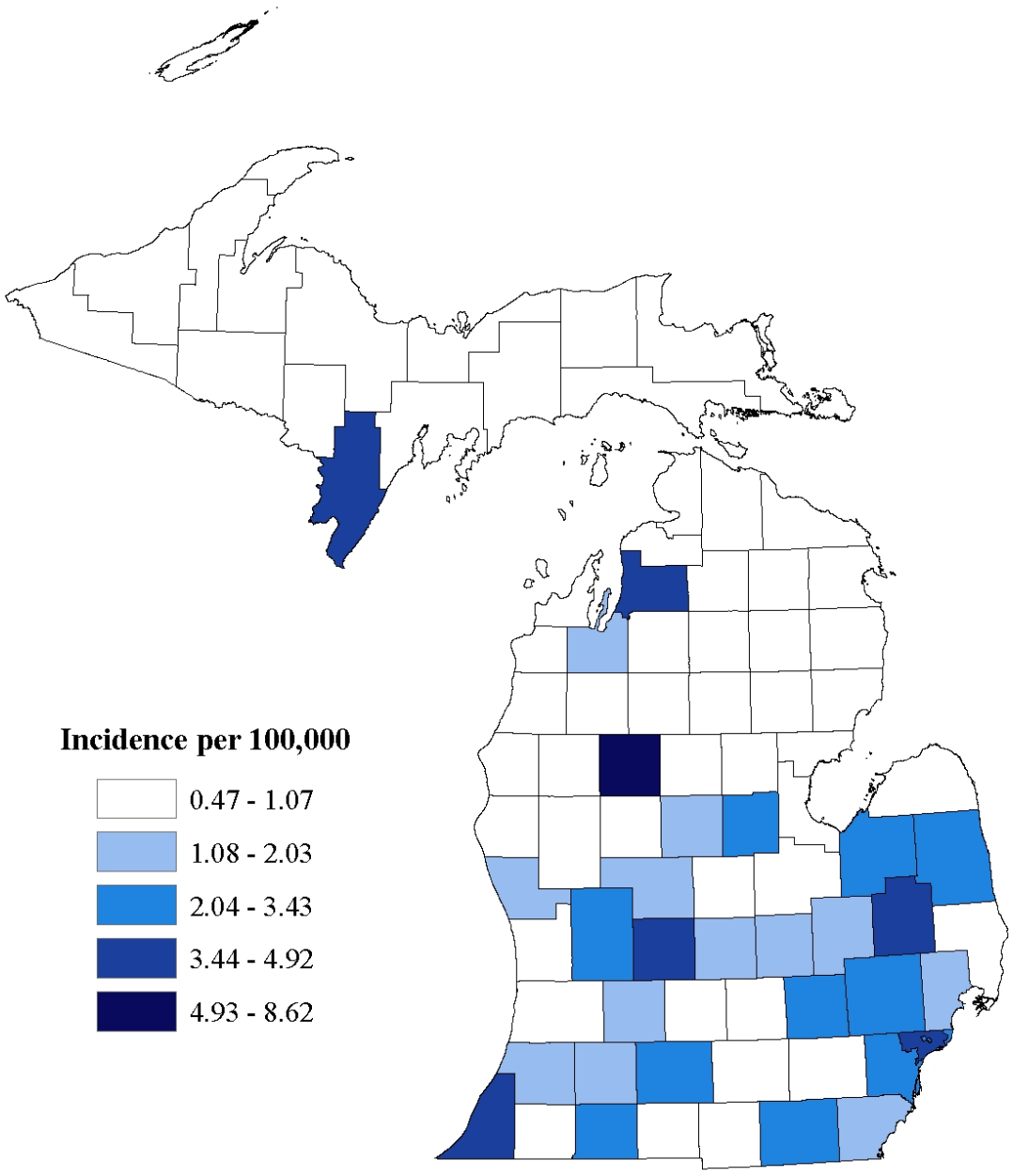


Figure 2. Incidence of *Streptococcus* Group A (invasive) cases by county, Michigan 2006



SYPHILIS

Causative agent:
Syphilis is a sexually transmitted disease caused by the bacterium *Treponema pallidum*.

Clinical features:
The symptoms of Syphilis are characterized by progressive stages. Most people with syphilis are treated early and do not progress to the later stages.

Primary Syphilis: The typical sore (chancre) of primary syphilis is solitary, almost always painless, and covered by a scab. It may also look like an area of erosion or an ulcer with a raised border, like a blister. It disappears in three to five weeks, but if the disease is untreated, the person is still infected and contagious.

Secondary Syphilis: Individuals who progress to secondary syphilis may have a painless rash anywhere on the body, especially the palms of the hands or the soles of the feet. This type of rash is almost diagnostic as very few other conditions cause rashes on the palms and soles. The person may have hair loss from the scalp, eyebrows, or pubic area. Other symptoms include headache, nausea, weight loss, mild fever and general malaise. Syphilis can still be spread at this stage.

Latent Syphilis: This stage of syphilis has been divided into early latency and late latency. An individual who has had syphilis for a year or less is considered to have early latent syphilis. An individual who has had syphilis for one year or more is considered to have late latent syphilis. Although no symptoms occur in the latent stages, the organism is still present in the body.

Tertiary (Late) Syphilis: During this stage, an individual is no longer contagious. However, heart problems, central nervous system damage, blindness, and even death may take place during this stage. Many people infected with syphilis do not have any symptoms for years, yet remain at risk for complications that are associated with tertiary disease if they are not treated.

Mode of transmission:
Syphilis is spread from person to person through direct contact with a syphilis sore. Syphilis sores occur mainly on the genitals, vagina, anus, or in the rectum and can appear on the lips and in the mouth. Transmission of the organism often occurs during vaginal, anal, or oral sex. Pregnant women with the disease can pass infection to their babies. Syphilis cannot be spread through contact with toilet seats, door knobs, swimming pools, hot tubs, bathtubs, shared clothing, or eating utensils.

Period of communicability:
Transmission is most likely to occur during the first year of infection. An infection that has persisted for more than four years is rarely communicable. The exception is an untreated pregnant woman who may transmit syphilis to the fetus regardless of the duration of her disease.

Incubation period:
The incubation period varies from 9 to 90 days but usually 2-4 weeks.

Susceptibility:
The following groups of people are at higher risk of contracting syphilis than the general population due to higher likelihood of exposure:

- Commercial sex workers
- Men who have sex with men
- Individuals having unprotected sex with people infected with syphilis
- Fetus of an infected pregnant mother

Prevention of syphilis:

- Avoidance of unprotected sexual intercourse with person infected with syphilis.
- Regular examinations for sexually transmitted diseases are advised when unprotected sex is practiced.
- Infected individuals should avoid sexual intercourse until therapy is completed by both themselves and their sexual partners to minimize the risk of re-infection.

Table 1. Demographic characteristics of syphilis cases, Michigan 2006

*N= 397		Number of Cases	Percent Total
Sex			
	Male	240	60%
	Female	157	40%
Race			
	African American	263	66%
	American Indian or Alaska Native	3	1%
	Asian	5	1%
	Caucasian	98	25%
	Hawaiian or Pacific Islander	1	<1%
	Other	3	<1%
Ethnicity			
	Hispanic or Latino	15	4%
Age groups (years)			
	0-9	9	2%
	10-19	30	8%
	20-29	78	20%
	30-39	105	26%
	40-49	103	26%
	50-59	62	16%
	60-69	14	4%
	≥70	3	1%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of primary and secondary syphilis cases in Michigan, 2002-2006

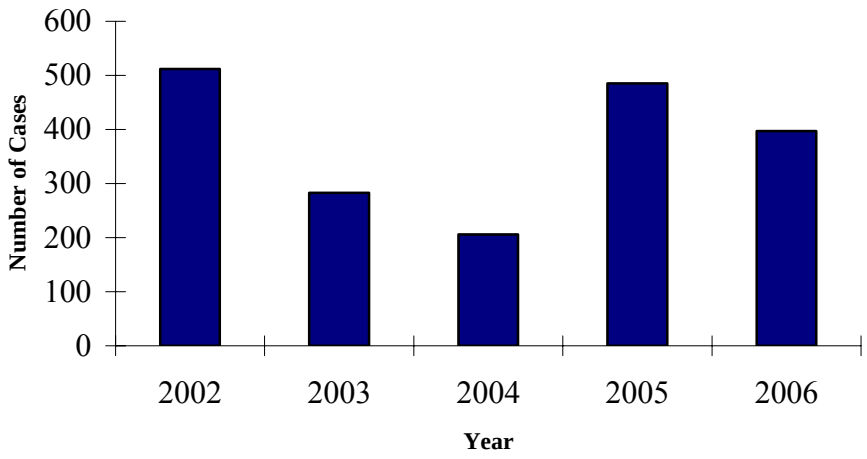
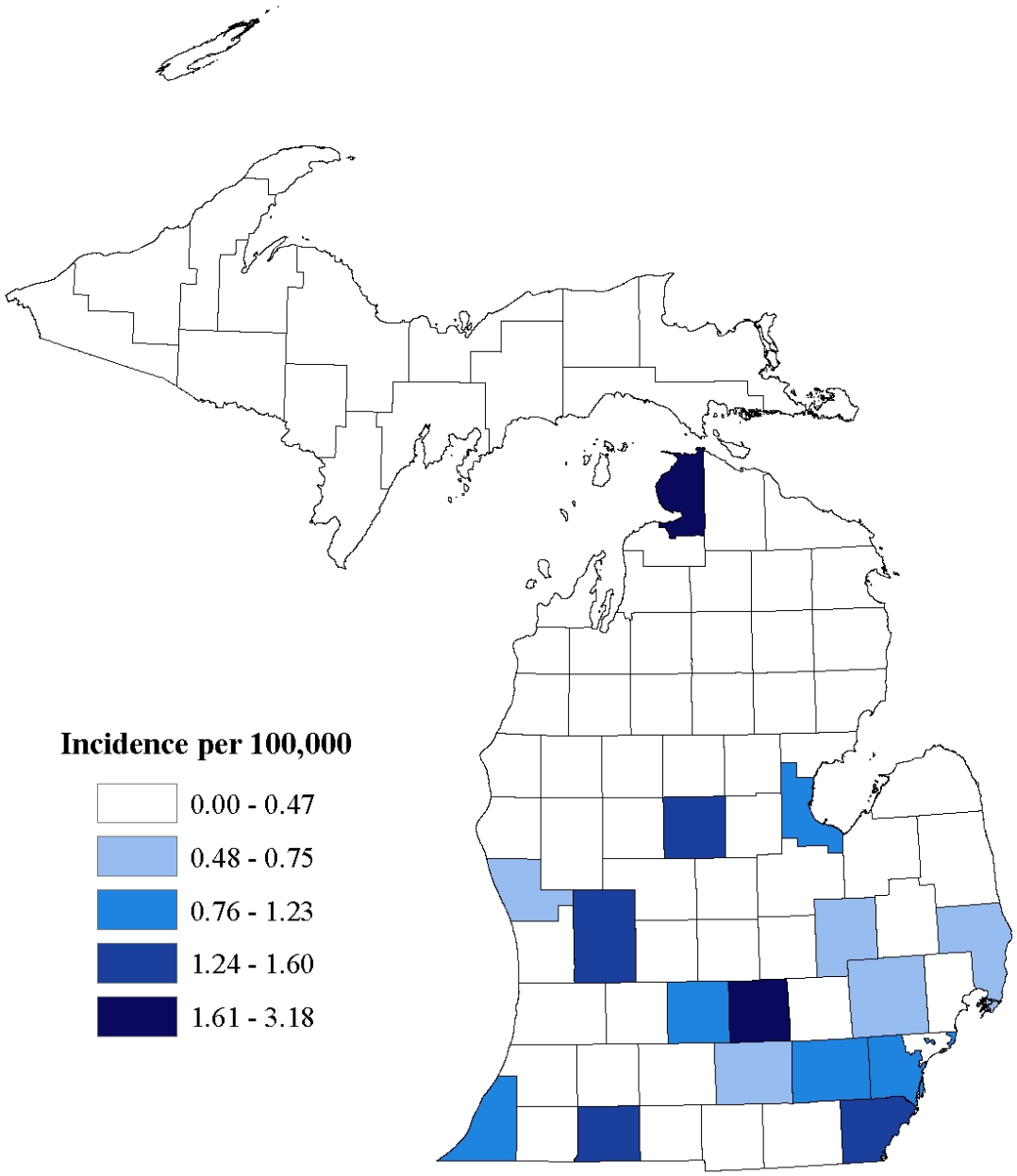


Figure 2. Incidence of primary and secondary syphilis by county, Michigan 2006



TUBERCULOSIS

Causative agent:
Tuberculosis (TB) is an infectious disease caused by the bacteria *Mycobacterium tuberculosis*. It generally affects the lungs, but can sometimes cause infections in the lymph nodes, the kidneys, the brain or the spine.

Clinical features:
The general symptoms of TB disease include generalized weakness, weight loss, fever, and night sweats. The symptoms of TB of the lungs (pulmonary tuberculosis) include coughing, chest pain, and coughing up blood. Other symptoms depend on the part of the body that is affected.

Mode of transmission:
TB is primarily an airborne disease. The disease is spread from person to person in tiny microscopic droplets when a TB sufferer coughs, sneezes, speaks, sings, or laughs. Only people with active disease are contagious. One in ten people that are infected with *M. tuberculosis* may develop active TB at some time in their lives. The risk of developing active disease is greatest in the first year after infection, but active disease often does not occur until many years later.

Period of communicability:
Patients with active pulmonary or laryngeal TB can transmit the bacteria to others as long as they are discharging tubercle bacilli in their sputum. Generally, when TB patients start adequate and appropriate treatment, their sputum becomes free of bacilli within a few weeks.

Incubation period:
Most people who are exposed to TB germs will develop a positive tuberculin skin test approximately 2-10 weeks after exposure. People who develop a positive tuberculin skin test are infected with TB germs. Ninety percent of these people will never develop TB disease. The risk for developing active TB disease is highest in the first two years after someone develops a positive tuberculin skin test.

Susceptibility:
Anyone can get TB, but some people are at higher risk than the general population, including:

- Infants and small children
- People who share the same breathing space (such as family members, friends, coworkers) with someone who has TB disease
- People with low income who live in crowded conditions, have poor nutrition, have poor health care and homeless people
- People living in countries where TB is endemic
- Nursing home residents and prisoners
- Alcoholics and injection drug users
- People with medical conditions such as diabetes, kidney failure, and those with weakened immune systems (such as HIV or AIDS)

Prevention of tuberculosis:
A vaccine for TB, the Bacille Calmette-Guerin (BCG) vaccine is available; however, it is not used widely in the United States. BCG vaccination does not completely prevent people from getting TB. Individuals tested positive for TB without exhibiting any symptoms can be treated with medication to greatly reduce their risk of developing full-blown TB. People who have not tested positive but who are at higher risk of contracting the infection, people in contact with an infected person and those with compromised immune systems, can also be given the same medication as a preventative measure.

Bovine tuberculosis:
Bovine Tuberculosis is endemic in Northern Lower Michigan's wild white-tailed deer herd at a prevalence rate of 1.2% and has been documented in 40 cattle herds in the same area. The Michigan Department of Community Health encourages any hunter that has been in contact with a TB positive deer to have a TB skin test. Each local Health Department contacts farm families with TB positive animals and offers TB skin tests to determine if there has been exposure. To date, two individuals have contracted the same strain of bovine TB that is unique and endemic in Michigan wildlife and livestock. One individual, who died from unrelated causes, had bovine TB in the lungs. Another individual, who was successfully treated and has recovered, contracted bovine TB while field dressing a TB positive deer. Treatment for bovine TB is specialized and can be anywhere from nine to 12 months in duration. Local Health Departments should contact the Michigan Department of Community Health to determine the proper course of treatment for individuals who are bovine TB culture positive.

Table 1. Demographic characteristics of tuberculosis cases, Michigan 2002-2006

*N= 1296		Number of Cases	Percent Total
Sex			
	Male	714	55%
	Female	582	45%
Race			
	African American	548	42%
	American Indian or Alaska Native	2	<1%
	Asian	266	21%
	Caucasian	471	36%
	Other	6	<1%
Ethnicity			
	Hispanic or Latino	123	9%
Age groups (years)			
	0-9	56	4%
	10-19	63	5%
	20-29	199	15%
	30-39	223	17%
	40-49	213	16%
	50-59	180	14%
	60-69	135	10%
	≥70	227	18%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of tuberculosis cases in Michigan, 2002-2006

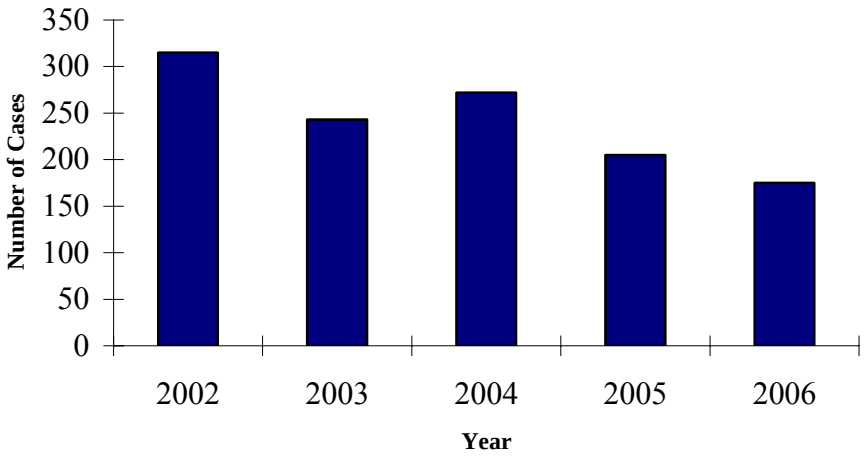
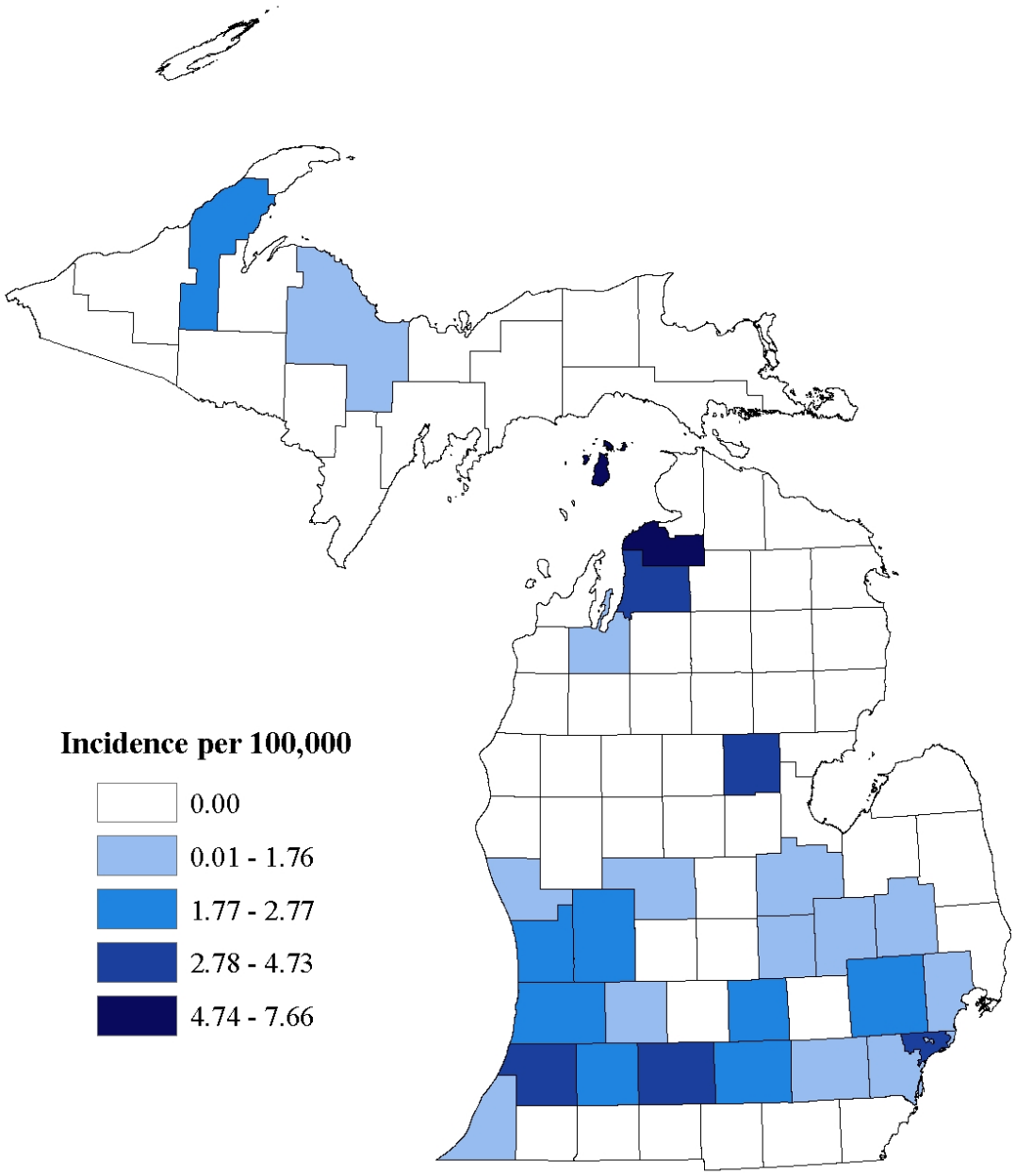


Figure 2. Incidence of tuberculosis by county, Michigan 2006



WEST NILE VIRUS

Causative agent:
West Nile Virus (WNV) is a single-stranded RNA virus of the Flaviviridae family (flavivirus). It is carried by mosquitoes and can be transmitted across various species including humans, birds, horses and some other mammals.

Clinical features:
The vast majority of people that become infected with the West Nile virus have no illness or experience only a mild flu-like illness that includes fever, headache and body aches lasting only a few days. Some persons may also have mild rash or swollen lymph glands. Less than one percent of those infected may develop meningitis or encephalitis, the most severe forms of the disease, which occurs primarily in persons over 50 years of age. Symptoms of encephalitis or meningitis may include severe headache, high fever, neck stiffness, stupor, disorientation, tremors, convulsions, paralysis, coma and sometimes death.

Mode of transmission:
West Nile virus is spread to humans by the bite of an adult infected mosquito. A mosquito is infected by biting a bird that carries the virus. In areas where WNV is actively circulating, much less than 1 in 100 mosquitoes will be found to be infected. The virus is not spread by person-to-person contact such as touching or caring for someone who is infected.

Period of communicability:
Mosquitoes remain infective for life, and viremic birds are the source of infection for mosquitoes. After infection, a transient viremia occurs, but this is not reliably detectable in the blood or CSF of humans after onset of symptoms. Horses develop active disease, but viremia is not present in high titer or for long periods. Therefore, humans and horses are not sources of mosquito infection.

Incubation period:
The symptoms generally appear about 3 to 6 days after exposure, but may appear as early as 1 day after exposure or as late as 15 days.

High-risk groups:
Anyone who is bitten by an infected mosquito can get the disease. Persons over the age of 50 or those with poor immune systems are more likely to develop a serious illness if they are infected.

Prevention of West Nile virus:
- Avoid exposure to mosquitoes, especially those active during dusk and dawn.
- Wear long sleeve shirts and long pants to avoid mosquito exposure.
- Use DEET containing mosquito repellent when needed.
- Eliminate breeding places for mosquitoes.
- Screen doors and windows of sleeping and living quarters.

Table 1. Demographic characteristics of West Nile Virus cases, Michigan 2002-2006

*N= 724		Number of Cases	Percent Total
Sex			
	Male	402	56%
	Female	318	44%
Race			
	African American	86	12%
	American Indian or Alaska Native	4	1%
	Asian	1	<1%
	Caucasian	296	41%
	Other	1	<1%
Ethnicity			
	Hispanic or Latino	8	1%
Age groups (years)			
	0-9	11	2%
	10-19	11	2%
	20-29	42	6%
	30-39	78	11%
	40-49	115	16%
	50-59	111	15%
	60-69	115	16%
	≥70	241	33%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of West Nile Virus cases in Michigan, 2002-2006

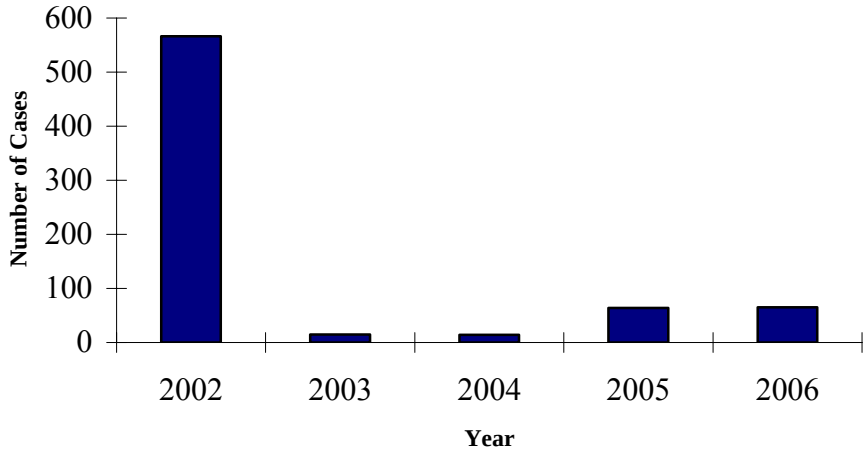
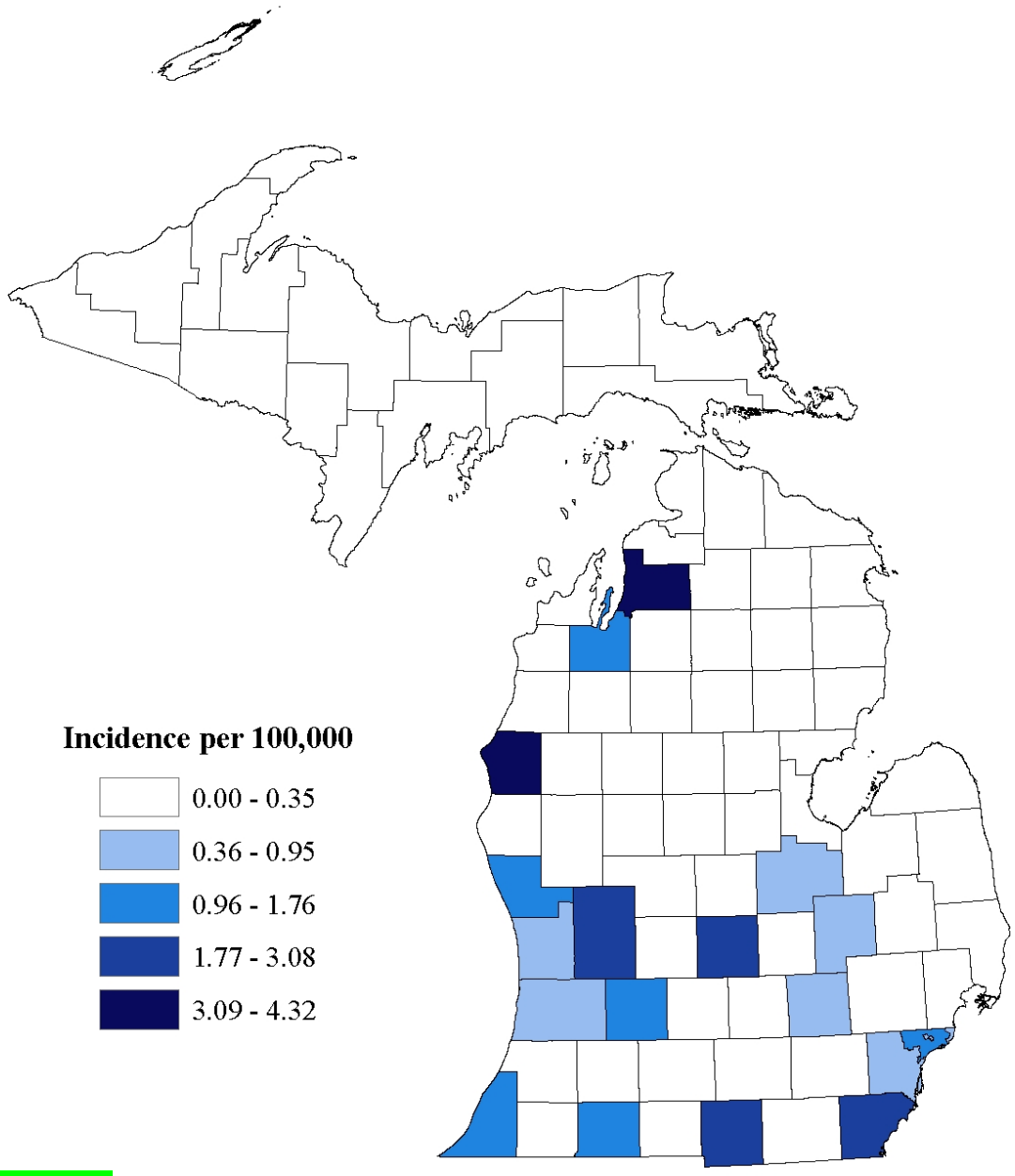


Figure 2. Incidence of West Nile Virus by county, Michigan 2006



Note of interest:
Michigan had its first encounter with West Nile Virus in 2001 after WNV-infected crows were discovered. Then in 2002, Michigan, as well as other Great Lakes states, experienced the first documented cases of WNV in humans in this region. West Nile Virus reached epidemic levels in 2002 when Michigan suffered the second highest number of human cases in the nation with 644 human cases, including 51 deaths, detected that year. Since that time, WNV has swept westward and encompassed the entire contiguous United States. Due to many biologic and human influences, WNV has since become endemic in Michigan, which much lower human disease incidence.

The Michigan Department of Community Health's Bureau of Epidemiology and Bureau of Laboratories in partnership with the Michigan Departments of Agriculture and Natural Resources and Michigan State University continue to conduct comprehensive surveillance for WNV in order to give communities early warning of potential outbreaks.

YERSINIOSIS

Causative agent:
Yersiniosis is a diarrheal illness caused by a bacterium known as *Yersinia enteritis*.

Clinical features:
Symptoms include:

- Watery diarrhea
- Abdominal pain (sometimes like appendicitis)
- Fever
- A variety of other symptoms such as nausea or vomiting.

Sometimes people have no symptoms, yet carry the bacteria in their stool. People who have not taken an antibiotic treatment may have the bacteria in their stool for 2 to 3 months, even if they have no symptoms.

Mode of transmission:

- Person-to-person transmission: Infected people who do not wash their hands well after using the bathroom can spread the infection to other people.
- Food or water contaminated by feces or urine from infected animals or pets (they may have no symptoms)
- Eating raw pork or pork products
- Infected blood transfusion

Period of communicability:
Fecal shedding occurs for as long as symptoms persist (about two to three weeks). If untreated, shedding may occur for two to three months.

Incubation period:
Incubation period is 3-7 days, generally under 10 days.

Susceptibility:
Immunocompromised individuals and elderly people are at higher risk of developing yersiniosis than the general population.

Prevention of yersiniosis:
Preventive measures that can be taken to avoid the illness include:

- Hand washing ~ hands should be washed after going to the toilet, handling raw meat, farm animals and pets, after changing diapers and before eating.
- Thorough cooking of meat, especially pork. Also, leftover foods should be completely heated not just warmed.
- Storing raw meat on the lowest shelf of the fridge, to keep the juices from dripping onto other foods.
- Storing cold foods below 33°F.
- Thorough cleaning of knives, cutting boards and other surfaces after contact with raw meat and before contact with other foods.

- Not drinking untreated water supplies or unpasteurized milk.
- Thoroughly washing fruit and vegetables with water of drinking quality to remove bacteria before eating raw.

Table 1. Demographic characteristics of yersiniosis cases, Michigan 2002-2006

*N= 122	Number of Cases	Percent Total
Sex		
Male	54	44%
Female	67	55%
Race		
African American	31	25%
Asian	2	2%
Caucasian	50	41%
Other	3	2%
Ethnicity		
Hispanic or Latino	2	2%
Age groups (years)		
1<	42	34%
0-9	9	7%
10-19	50	41%
20-29	5	4%
30-39	7	6%
40-49	6	5%
50-59	18	15%
60-69	9	7%
≥70	18	15%

* totals for each demographic variable may not equal to total number of cases because of information missing from the case report form.

Figure 1. Number of yersiniosis cases in Michigan, 2002-2006

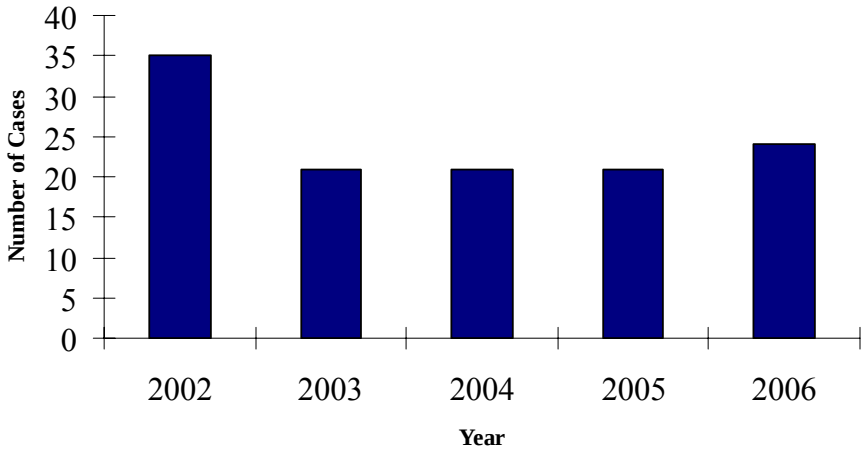
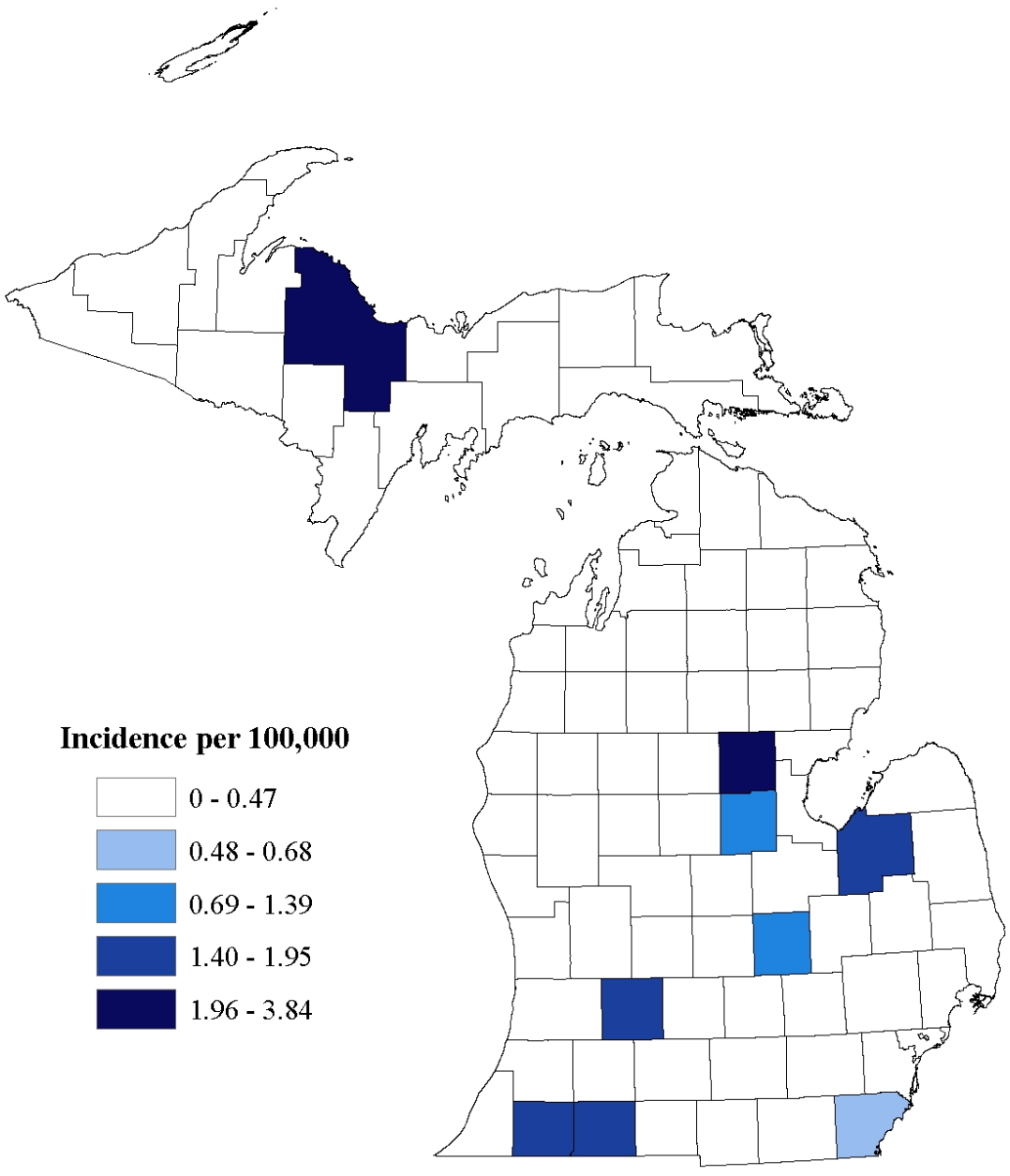


Figure 2. Incidence of yersiniosis by county, Michigan 2006



APPENDIX A

GLOSSARY

Asymptomatic Infection: The presence of infection in a host without recognizable clinical signs or symptoms.

Carrier: A person or animal that harbors a specific infectious agent without discernible clinical disease and serves as a potential source of infection.

Communicable Disease: An illness due to a specific infectious agent or its toxic products that arises through transmission of that agent or its products from an infected person, animal or inanimate reservoir to a susceptible host.

Period of Communicability: The time during which an infectious agent may be transferred from an infected person to another person, from an infected animal to humans, or from an infected person to animals, including arthropods.

Contamination: The presence of an infectious agent on a body surface, in clothes, bedding, toys, surgical instruments or dressings, or other inanimate articles or substances including water and food.

Endemic: The constant presence of a disease or infectious agent within a given geographic area; it may also refer to the usual prevalence of a given disease within such area.

Epidemic: The occurrence in a community or region of cases of an illness (or an outbreak) with a frequency clearly in excess of normal expectancy.

Host: A person or other living animal, including birds and arthropods, that affords subsistence or lodgment to an infectious agent under natural (as opposed to experimental) conditions.

Immune individual: A person or animal that has specific protective antibodies and/or cellular immunity as a result of previous infection or immunization, or is so conditioned by such previous specific experience as to respond in such a way that prevents the development of infection and/or clinical illness following re-exposure to the specific infectious agent.

Incidence rate: The number of new cases of a specified disease diagnosed or reported during a defined period of time, divided by the number of persons in a stated population in which the cases occurred. This is usually expressed as cases per 1,000 or 100,000 per annum.

Incubation period: The time interval between initial contact with an infectious agent and the first appearance of symptoms associated with the infection.

Infected Individual: A person or animal that harbors an infectious agent and who has either manifest disease or unapparent infection.

Infectious agent: An organism (virus, rickettsia, bacteria, fungus, protozoan or helminth) that is capable of producing infection or infectious disease.

Infectious disease: A clinically manifest disease of humans or animals resulting from an infection.

Isolation: Isolation represents separation, for the period of communicability, of infected persons or animals from others in such places and under such conditions as to prevent or limit the direct or indirect transmission of the infectious agent from those infected to those who are susceptible to infection or who may spread the agent to others.

Morbidity rate: An incidence rate used to include all persons in the population under consideration who become clinically ill during the period of time stated.

Mortality rate: A rate calculated in the same way as an incidence rate, by dividing the number of deaths occurring in the population during the stated period of time, usually a year, by the number of persons at risk of dying during the period.

Nosocomial infection: An infection occurring in a patient in a hospital or other healthcare facility in whom it was not present or incubating at the time of admission; or the residual of an infection acquired during a previous admission.

Pathogenicity: The property of an infectious agent that determines the extent to which overt disease is produced in an infected population, or the power of an organism to produce disease.

Prevalence rate: The total number of persons sick or portraying a certain condition in a stated population at a particular time (point prevalence), or during a stated period of time (period prevalence), regardless of when that illness or condition began, divided by the population at risk of having the disease or condition at the point in time or midway through the period in which they occurred.

Quarantine: Restriction of the activities of well persons or animals who have been exposed to a case of communicable disease during its period of communicability (i.e., contacts) to prevent disease transmission during the incubation period if infection should occur.

Reservoir (of infectious agents)**:** Any person, animal, arthropod, plant, soil or substance (or combination of these) in which an infectious agent normally lives and multiplies, on which it depends primarily for survival, and where it reproduces itself in such manner that it can be transmitted to a susceptible host.

Sterilization: Involves destruction of all forms of life by heat, irradiation, gas (ethylene oxide or formaldehyde) or chemical treatment.

Susceptible: A person, animal or other organism not possessing sufficient resistance against a particular pathogenic agent to prevent contracting infection or disease when exposed to the agent. Susceptibility also refers to the ability of bacteria to survive in the presence of antibiotics.

Transmission of infectious agents: Any mechanism by which an infectious agent is spread from a source or reservoir to a person.

APPENDIX B

MICHIGAN COUNTIES AND PUBLIC HEALTH PREPAREDNESS REGIONS