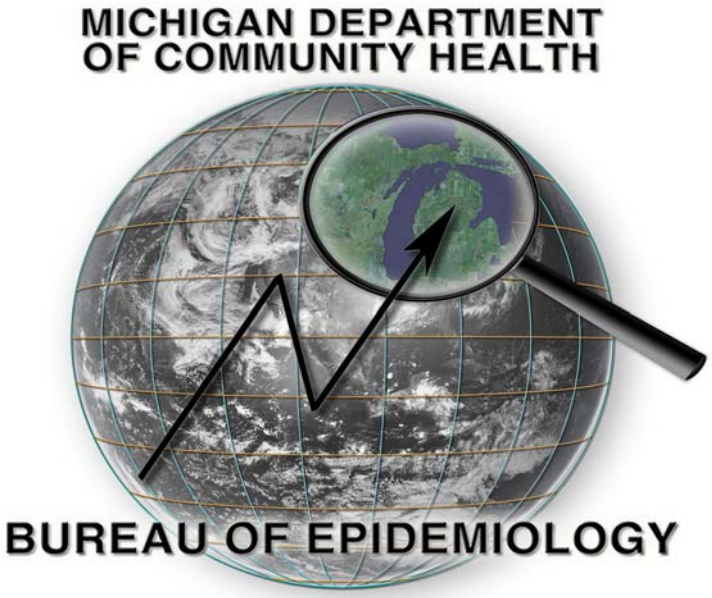
REPORTABLE INFECTIOUS DISEASES IN MICHIGAN

2005 - 2009 Summary



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NOTICE

As a cost-cutting measure, this document is only available in an electronic form on the Michigan Department of Community Health, Bureau of Epidemiology website. The *"Reportable Infectious Diseases in Michigan 2005 – 2009 Summary"* can be found at:

http://www.michigan.gov/mdch/0,1607,7-132-2945_5104_53072_53075---,00.html

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INTRODUCTION

Purpose

The purpose of this report is to provide trend information for over 80 reportable diseases and pathogens in the State of Michigan between 2005 and 2009. This report includes:

- Table of notifiable conditions 2005-2009 (counts and rates of yearly change)
- Select notifiable condition summaries

Surveillance of Communicable Diseases in Michigan

Health care providers, laboratories and hospitals are required by the Michigan Complied Laws (Communicable Disease Rule, R 325.171 - 325.199) to report select infectious diseases and pathogens to health authorities. All Michigan local health departments are required to investigate cases of notifiable diseases and pathogens. Patient demographics, laboratory results and other relevant data are reported to the Michigan Department of Community Health (MDCH) through the Michigan Disease Surveillance System (MDSS). MDSS is a centralized, statewide, web-based database utilized for reporting diseases in Michigan. It can be accessed internally and remotely/on-line by authorized public health officials. Internal security measures are in place to protect patient confidentiality. MDSS allows immediate communication among public health authorities regarding communicable disease investigations. Statistical summaries and reports can be generated to assist users with evaluating public health prevention and control measures. 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 current list of reportable diseases in Michigan.

Technical Notes

Prompt reporting by physicians, laboratories and other health care professionals allows for timely and comprehensive investigations by local and state public health officials.

Select Notifiable Condition Summaries

Diseases were selected for summaries based on frequency of occurrence and their public health importance. Case definitions for each condition can be found at (http://www.cdc.gov/ncphi/disss/nndss/phs/infdis2010.htm), unless otherwise indicated. Summaries of selected diseases include the following:

- Causative agent
- Clinical features
- Mode of transmission
- Period of communicability
- Incubation period
- Prevention
- Demographic characteristics of reported cases between 2005 and 2009
- Graphs of case counts reported by year
- Map of disease incidence by county

Disease rates were calculated with population estimates (from year 2000) provided by the US Bureau of Census (http://factfinder.census.gov). Michigan population size was relatively stable from 1997 to 2006 with an estimated change in population (all ages) of 2.92%. Please refer to

(http://www.mdch.state.mi.us/pha/osr/CHI/POP/PO06TOTY.ASP) for more information regarding population estimates in Michigan.

Unless otherwise noted, only confirmed and probable cases of disease were included in the demographic statistics. Therefore, the total number of cases reported during the 5-year period in the *"Table of Reportable Conditions 2005-2009"* may not match the total number of cases reported during the same period as seen in the demographic table of the select reportable disease summaries. Demographic data tables include age, sex, race, and ethnicity. 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 PERCENT CHANGE FROM PREVIOUS YEAR

2005 – 2009

TABLE OF NOTIFIABLE CONDITIONS 2005 - 2009

Diseases	2009		2008		2007		2006		2005		Total 5	Mean 5 year	
	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	year cases	Cases	(% Δ)
AIDS	314	-0.13	360	0.03	349	0.12	313	-0.03	324	0.09	1,660	332	0.01
Amebiasis	26	-0.48	50	0.16	43	-0.26	58	0.18	49	-0.04	226	45	-0.09
Anthrax	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Blastomycosis	16	-0.38	26	0.63	16	-0.20	20	0.82	11	-0.15	89	18	0.14
Botulism	1	0.00	0	0.00	0	0.00	0	-1.00	1	0.00	2	0	-0.20
Brucellosis	10	9.00	1	-0.80	5	0.67	3	2.00	1	-0.67	20	4	2.04
Campylobacter	936	-0.10	1,037	0.17	890	-0.02	912	0.12	817	-0.07	4,592	918	0.02
Chancroid	0	0.00	0	0.00	0	0.00	1	0.00	0	0.00	1	0	0.00
Chickenpox (Varicella) [1]	1,889	-0.38	3,048	-0.27	4,191	-0.19	5,200	0.30	4,004	-0.06	18,332	3,666	-0.12
Chlamydia (Genital)	46,381	0.00	46,555	0.13	41,291	0.08	38,142	-0.02	38,729	-0.06	211,098	42,220	0.03
Cholera	1	0.00	0	-1.00	1	0.00	0	-1.00	2	0.00	4	1	-0.40
Coccidioidomycosis	23	-0.41	39	0.44	27	-0.41	46	2.07	15	0.15	150	30	0.37
Creutzfeldt-Jakob	13	-0.13	15	0.07	14	1.00	7	-0.36	11	1.75	60	12	0.46

Diseases	2009		2008		2007		2006		2005		Total 5	Mean 5 year	
	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	year cases	Cases	(% Δ)
Cryptococcosis	56	-0.19	69	0.41	49	-0.02	50	-0.07	54	0.17	278	56	0.06
Cryptosporidiosis	291	0.04	281	0.33	211	0.41	150	0.34	112	-0.28	1,045	209	0.17
Cyclosporiasis	3	2.00	1	0.00	1	0.00	0	-1.00	2	-0.33	7	1	0.13
Dengue Fever	6	-0.45	11	-0.15	13	0.44	9	0.29	7	0.17	46	9	0.06
Diphtheria	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Ehrlichiosis species	6	0.00	0	0.00	0	0.00	0	0.00	0	-1.00	6	1	-0.20
Encephalitis, Primary	10	-0.60	25	-0.19	31	-0.03	32	0.14	28	-0.15	126	25	-0.17
Encephalitis, California	0	0.00	0	0.00	0	0.00	2	0.00	0	-1.00	2	0	-0.20
Encephalitis, Eastern Equine	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Encephalitis, Powassan	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Encephalitis, St. Louis	0	0.00	0	0.00	0	0.00	0	0.00	0	-1.00	0	0	-0.20
Encephalitis, Western Equine	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Encephalitis others	13	0.30	10	0.00	16	0.00	19	0.00	12	0.33	70	14	0.13
Escherichia coli 0157:H7	61	-0.60	153	1.19	70	-0.08	76	-0.08	83	-0.01	443	89	0.08
Giardiasis	673	0.13	594	-0.04	619	-0.13	712	-0.10	788	0.07	3,386	677	-0.01

Diseases	2009		2008		2007		2006		2005		Total 5	Mean 5 year	
	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	year cases	Cases	(% Δ)
Gonorrhea	14,612	-0.18	17,905	0.03	17,327	0.04	16,591	-0.06	17,684	0.02	84,119	16,824	-0.03
Granuloma Inguinale	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Guillain-Barre Syndrome	75	0.39	54	0.02	53	-0.02	54	-0.13	62	0.05	298	60	0.06
H. influenzae Disease - Inv. [2]	7	-0.13	8	-0.38	13	1.17	6	0.50	4	-0.43	38	8	0.15
Hantavirus	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Hemolytic Uremic Syndrome	8	0.33	6	0.00	6	0.20	5	0.00	5	0.00	30	6	0.11
Hemorrhagic Fever	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Hepatitis A	91	-0.32	134	0.14	118	-0.13	136	0.06	128	-0.15	607	121	-0.08
Hepatitis B[3]	133	-0.08	145	0.28	113	-0.19	140	-0.15	165	-0.01	696	139	-0.03
Hepatitis C[3]	35	-0.73	129	0.43	90	-1.91	99	-0.06	105	-0.38	458	92	-0.53
Hepatitis D	0	-1.00	1	0.00	1	-0.75	4	3.00	1	0.00	7	1	0.25
Hepatitis E	8	-0.20	10	0.00	0	-1.00	1	-0.50	2	0.00	21	4	-0.34
Hepatitis viral, non A non B	0	0.00	0	0.00	0	0.00	0	0.00	0	-1.00	0	0	-0.20
Histoplasmosis	58	-0.38	93	-0.26	126	0.09	116	0.73	67	0.20	460	92	0.08
HIV	815	0.02	800	0.00	802	-0.02	821	-0.09	904	0.01	4,142	828	-0.02

Diseases	2009		2008		2007		2006		2005		Total 5	Mean 5 year	
	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	year cases	Cases	(% Δ)
Kawasaki	73	0.01	72	0.00	70	-0.29	98	0.00	75	-0.12	388	78	-0.08
Legionellosis	178	-0.02	181	-0.04	189	0.09	174	0.41	123	-0.10	845	169	0.07
Leprosy	1	0.00	0	-1.00	2	0.00	0	-1.00	1	0.00	4	1	-0.40
Leptospirosis	0	-1.00	1	-0.67	3	2.00	1	0.00	1	0.00	6	1	0.07
Listeriosis	28	0.40	20	-0.13	23	0.15	20	-0.26	27	-0.10	118	24	0.01
Lyme Disease	103	0.12	92	0.77	52	-0.07	56	-0.13	64	1.37	367	73	0.41
Lymphogranuloma venereum	0	0.00	0	0.00	0	0.00	0	-1.00	1	0.00	1	0	-0.20
Malaria	31	0.82	17	-0.26	23	0.05	22	-0.08	24	0.14	117	23	0.13
Measles	0	-1.00	4	0.33	3	2.00	1	0.00	1	0.00	9	2	0.27
Meningitis - Aseptic	832	-0.14	971	0.00	975	-0.14	1,131	-0.08	1,228	0.09	5,137	1,027	-0.06
Meningitis - Bacterial Other	343	0.25	274	0.84	149	0.24	120	-0.16	143	0.04	1,029	206	0.24
Meningococcal Disease	21	-0.46	39	0.30	30	0.03	29	-0.34	44	-0.12	163	33	-0.12
Mumps [4]	22	-0.44	39	0.34	29	-0.65	84	2.50	24	11.00	198	40	2.55
Pertussis	902	1.86	315	0.08	292	-0.54	632	0.97	321	0.06	2,462	492	0.49
Plague	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00

Diseases	2009		2008		2007		2006		2005		Total 5	Mean 5 year	
	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	year cases	Cases	(% Δ)
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	2	0.00	0	0.00	0	0.00	2	0	0.00
Q Fever	1	-0.50	2	0.00	2	-0.33	3	0.00	3	0.00	11	2	-0.17
Rabies Animal	66	-0.16	79	-0.61	202	3.12	49	0.20	41	0.00	437	87	0.51
Rabies Human	1	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0	0.00
Reye Syndrome	0	0.00	0	0.00	0	0.00	1	0.00	0	-1.00	1	0	-0.20
Rheumatic Fever	2	-0.50	4	1.00	2	1.00	1	0.00	1	0.00	10	2	0.30
Rocky Mt Spotted Fever	5	0.67	3	0.00	3	-0.40	5	0.00	5	1.50	21	4	0.35
Rubella	0	0.00	0	-1.00	3	2.00	1	0.00	0	0.00	4	1	0.20
Salmonellosis	951	0.01	945	-0.03	973	-0.02	993	0.04	951	0.11	4,813	963	0.02
Shiga toxin, E. coli, Non O157	31	0.07	29	0.12	26	3.33	6	2.00	2	-0.82	94	19	0.94
Shiga toxin, E. coli, Unspecified	48	0.41	34	-0.03	35	1.50	14	0.75	8	0.33	139	28	0.59
Shigellosis	216	-0.17	260	2.17	82	-0.45	150	-0.36	234	-0.08	942	188	0.22
Streptococcus pneumoniae, Inv [5]	81	-0.07	87	-0.87	649	0.09	594	0.42	418	1.88	1,829	366	0.29
Streptococcal Group A, Inv	160	-0.17	192	-0.08	209	0.05	199	-0.07	215	-0.26	975	195	-0.11

Diseases	2009		2008		2007		2006		2005		Total 5	Mean 5 year	
	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	Cases	(% Δ)	year cases	Cases	(% Δ)
Syphilis (Primary and Secondary)	232	0.07	216	0.58	137	0.10	125	0.19	105	-0.45	815	163	0.10
Tetanus	0	-1.00	1	0.00	0	-1.00	3	2.00	1	0.00	5	1	0.00
Toxic Shock	6	-0.40	10	0.25	8	0.14	7	-0.30	10	-0.23	41	8	-0.11
Trachoma	1	-0.50	2	-0.33	3	-0.25	4	3.00	1	0.00	11	2	0.38
Trichinosis	1	0.00	0	0.00	0	0.00	0	-1.00	4	0.00	5	1	-0.20
Tuberculosis	144	-0.23	188	-0.16	225	0.02	221	-0.10	245	-0.10	1,023	205	-0.12
Tularemia	0	0.00	0	0.00	0	0.00	0	-1.00	2	0.00	2	0	-0.20
Typhoid Fever	11	0.22	9	0.29	7	0.00	7	0.17	6	-0.33	40	8	0.07
Typhus	0	0.00	0	0.00	0	0.00	0	-1.00	2	0.00	2	0	-0.20
Vancomycin Intermediate Staphylococcus Aureus (VISA) [6]	4	-0.33	6	2.00	2	-0.75	8	0.00	0	-1.00	20	4	-0.02
Vancomycin Resistant Staphylococcus Aureus (VRSA) [7]	1	0.00	0	0.00	2	0.00	1	-0.67	3	0.00	7	1	-0.13
West Nile Virus	1	-0.94	17	0.00	17	-0.69	55	-0.11	62	2.88	152	30	0.23
Yellow Fever	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0.00
Yersinia enteritis	22	-0.04	23	0.00	23	-0.04	24	0.14	21	0.00	113	23	0.01

[1] Varicella case counts are mostly based on an aggregate number of cases reported weekly by schools.

[2] Only confirmed cases of invasive Haemophilus influenzae in children less than the age of 5 years was analyzed.

[3] Only confirmed acute cases of hepatitis B and C were analyzed.

[4] Confirmed, probable and suspect cases of Mumps were analyzed. "Suspect" is a new classification for mumps in the 2009 revision of the Council for State and Territorial Epidemiologists (CSTE) and Centers for Disease Control and Prevention (CDC) case definition.

[5] In 2007, the case definition of invasive Streptococcus pneumoniae was modified. Only confirmed cases in children less than the age of 5 are required to be reported to the CDC.

[6] Only confirmed cases of VISA was analyzed.

[7] Only confirmed cases of VRSA was analyzed.

SELECTED DISEASE SUMMARIES

AMEBIASIS (AMOEBIASIS)

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

Clinical features:
About 10 – 20% of individuals infected with *E. histolytica* become sick and develop disease symptoms, which are often mild. Symptoms include loose stools, abdominal pain and cramping. Amebic dysentery is a severe form of amebiasis associated with abdominal pain, bloody or mucoid stool, diarrhea, and fever. Rarely, *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.

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:
Incubation can last from days to months or years; however, the average period is 2 – 4 weeks.

High-risk groups:
In the U.S., a higher rate of infection has been observed in immigrants from developing countries and in people who have traveled to endemic areas. Institutionalized individuals with poor sanitary conditions and men who have sex with men are also at increased risk.

Prevention of amebiasis:
The risk of infection is low if the affected person is treated with antibiotics. Transmission can be reduced via good personal hygiene practices. Hygiene practices include thorough hand washing after using restrooms, changing diapers, before preparing food, and/or eating food. High-risk groups, such as men who have sex with men, should be educated in methods to prevent fecal-oral transmission. Travelers to countries where sanitary standards are poor can reduce their chances of acquiring amebiasis by:

- Drinking only bottled or boiled (at lease one minute) water or carbonated beverages in cans or bottles. Do not drink fountain drinks or any drinks that contain ice cubes.
- Dissolving iodine tablets in filtered water (1 tablet per Liter, allow water to stand for 10 minutes). Water should be filtered with an "absolute 1 micron" pore filter.
- Do not eat fresh fruit and vegetables that you don't peel yourself.
- Do not consume unpasteurized milk, cheese or dairy products.
- Do not eat anything sold by street vendors.

References:
http://www.cdc.gov/ncidod/dpd/parasites/amebiasis/factsht_amebiasis.htm)

American Public Health Association. Amebiasis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 11-15.

Michigan statistics:
Reported amebiasis during 2005 – 2009 totaled 226 cases. Cases were primarily men (56%). Age analysis of amebiasis showed that over three-fourths of reported cases were found to be in persons 10 – 49 years of age (19% age 10 – 19, 20% age 20 – 29, 18% age 30 – 39, and 16% age 40 – 49). Caucasians (42%) and Asians (13%) had the highest incidence of disease. Almost one-fifth of reported cases were Hispanic or Latino (18%).

Table I. Demographic characteristics of amebiasis cases, Michigan 2005-2009

*N=	226	Number of Cases	Percent Total
	Sex		
	Male	126	56%
	Female	95	42%
	Race		
	African American	20	9%
	American Indian or Alaska Native	0	<1%
	Asian	29	13%
	Caucasian	94	42%
	Hawaiian or Pacific Islander	0	0%
	Other	35	15%
	Ethnicity		
	Hispanic or Latino	40	18%
	Age groups (years)		
	0-9	23	10%
	10-19	42	19%
	20-29	45	20%
	30-39	40	18%
	40-49	36	16%
	50-59	20	9%
	60-69	12	5%
	≥70	9	4%

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

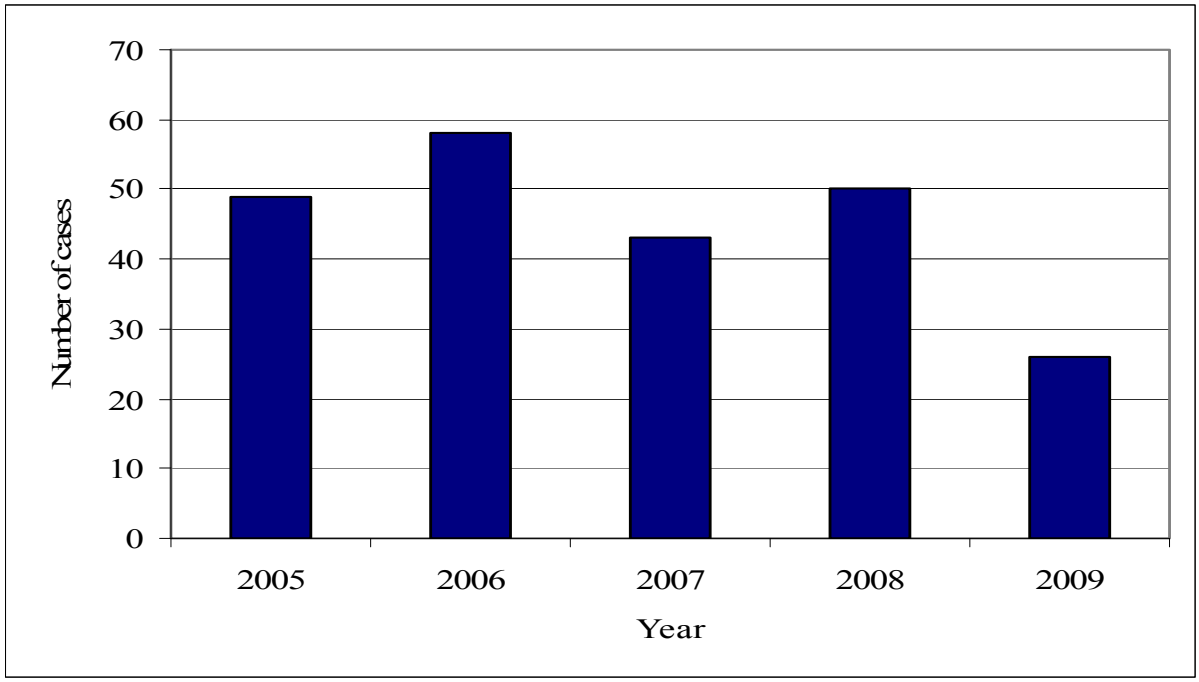

Figure I. Number of amebiasis cases by year, Michigan 2005–2009

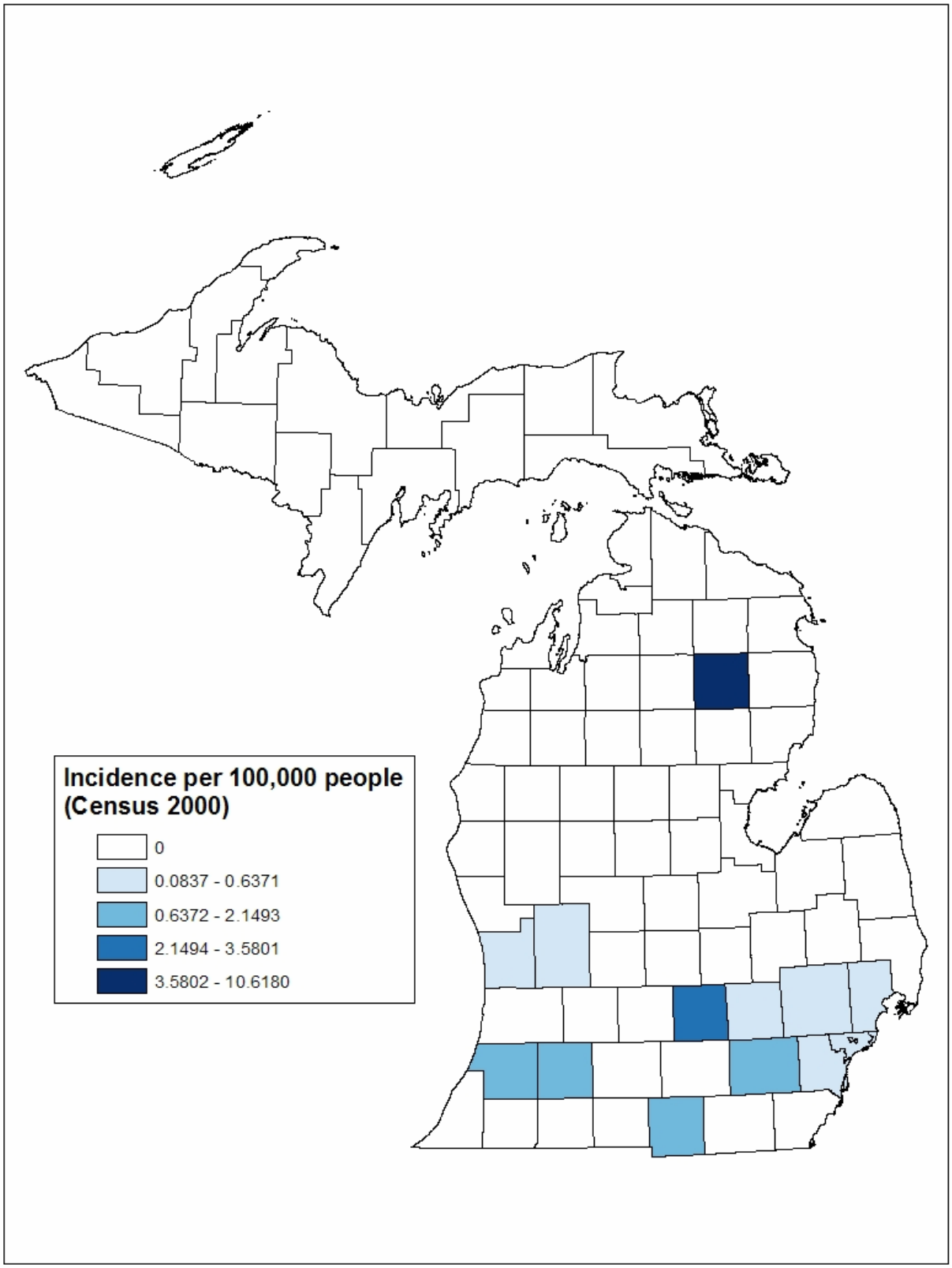

Figure 2. Incidence of amebiasis by county, Michigan 2009

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. The vesicle is typically 1 – 3 cm in diameter and usually develops a black necrotic (dying) area in the center. Lymph glands in adjacent areas may swell. About 5 - 20% of untreated cases of cutaneous anthrax result in death.

Inhalational: Initial symptoms may resemble a cold or the flu including sore throat, mild fever and muscle aches. After several days, the symptoms progress to severe breathing problems and shock. Inhalational anthrax usually results in death in 2 – 5 days after onset of 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 or oropharyngeal area. 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. Handling or inhaling anthrax spores from contaminated animal products can infect humans. Eating undercooked meat from infected animals can also spread anthrax. Anthrax has been identified as a potential weapon of bioterrorism. 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 usually occur within seven days depending on the form of clinical manifestation. However, incubation periods can be up to 60 days.

High-risk groups:
High-risk groups include persons exposed to contaminated wool, hides, leather, 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 high-risk individuals who have repeated exposure to infected animal products or for individuals engaged in diagnostic or investigational activities. In addition, military personnel deployed to hostile locations where anthrax may be used as a bioterrorism agent are recommended for vaccination. Antibiotics have been successful in treating individuals exposed to anthrax.

References:
http://emergency.cdc.gov/agent/anthrax/index.asp

American Public Health Association. Anthrax. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 22 – 31.

Michigan statistics:
No cases of anthrax have been reported in Michigan for 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. Current concerns about avian influenza focus on the H5N1 strain.

Clinical features:
Initial symptoms of avian influenza in humans include a high fever (>100.4° F or 38° C) and influenza-like symptoms (fever, cough, sore throat, and muscle aches). Diarrhea, vomiting, abdominal pain, chest pain, and bleeding from the nose and gums have been reported. Lower respiratory disease (e.g. pneumonia, difficulty breathing) occurs early in the course of illness (5 days after first symptoms) and patients deteriorate rapidly.

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 (e.g. 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 their bodily fluids.

Period of communicability:
Adults can be infectious from 3 – 5 days from symptom onset. Young children can transmit disease up to seven days after symptom development.

Incubation period:
The incubation period in humans of H5N1 is thought to be longer then seasonal influenza. The World Health Organization reports incubation periods from 2 to 17 days, with 7 days thought to be the average.

High-risk groups:
The risk from avian influenza is generally low for humans. However, during an outbreak of avian influenza among poultry (e.g. 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:
Hygiene practices such as frequent and thorough hand washing is recommended. Mouths should be covered with a tissue or sleeve when coughing or sneezing. The CDC advises persons traveling to known areas of outbreaks to avoid poultry farms, contact with animals in live food markets and any surfaces that appear to be contaminated with feces from poultry or other animals. All foods from poultry and poultry products (including eggs and poultry blood) should be cooked thoroughly. The influenza virus is destroyed by heat. Meat should be cooked to an internal temperature of 165° F.

References:
http://www.who.int/mediacentre/factsheets/avian_influenza/en/index.html

http://www.cdc.gov/flu/avian/

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

Please visit www.michigan.gov/flu for additional information regarding avian influenza.

BRUCELLOSIS

Causative agent:
Brucellosis is an infectious disease caused by bacteria of the genus *Brucella*. These bacteria primarily cause disease among animals, however, 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 continuous, intermittent or irregular fever. Other symptoms may include headache, weakness, sweating, chills, joint pain, depression, weight loss, and generalized aching. Infection may last for days to years if left untreated.

Mode of transmission:
Brucellosis is spread to humans through contact or handling tissues (including placenta) and body fluids from infected animals. Person-to-person transmission is rare. Breast-feeding and sexual transmission has been reported. In the United States, consumption of unpasteurized milk or dairy products is a frequent means of transmission. The bacteria are highly infectious via aerosolization. Therefore, specialized handling in the laboratory is necessary. Brucellosis may be transmitted to humans if exposed to live brucellosis vaccine

Period of communicability:
Period of communicability is uncertain due to rarity of human-to-human transmission.

Incubation period:
Incubation is typically 5 – 60 days, however, symptoms may take months to develop once exposure has occurred. For both sexual and breast-feeding transmission, if the infant or person exposed is treated for brucellosis, their risk of becoming infected will probably be eliminated within 3 days.

High-risk groups:
Persons at highest risk for brucellosis are those who work with infected animals such as veterinarians, farmers, butchers, and ranchers. Persons who consume raw dairy products made with unpasteurized milk are also at high-risk.

Prevention of brucellosis:
The most successful way of preventing brucellosis in humans is to control disease 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. Hunters and herdsman should wear gloves when handling viscera of animals. Risk of infection will be reduced if exposed persons or infants are immediately treated with antibiotics.

References:
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/brucellosis_g.htm#faqgeneral

American Public Health Association. Brucellosis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 87 – 90.

Michigan statistics:

Reported brucellosis during 2005 – 2009 totaled 20 cases. Cases were primarily men (55%). Age analysis of brucellosis showed that over half of reported cases were found to be in children under 19 and persons 70 years and older (35% age 0 – 19, 25% age 70+). Caucasians (40%) and Asians (5%) had the highest incidence of disease. Nearly one-half of reported cases were Hispanic or Latino (45%).

The majority of cases were detected in 2009 (50%) and were clustered in southwest Michigan.

Table 1. Demographic characteristics of brucellosis cases, Michigan 2005-2009

*N=	20	Number of Cases	Percent Total
	Sex		
	Male	11	55%
	Female	9	45%
	Race		
	African American	0	0%
	American Indian or Alaska Native	0	0%
	Asian	1	5%
	Caucasian	8	40%
	Hawaiian or Pacific Islander	0	0%
	Other	5	25%
	Unknown	6	30%
	Ethnicity		
	Hispanic or Latino	9	45%
	Age groups (years)		
	0-19	7	35%
	20-29	2	10%
	30-39	3	15%
	40-49	1	5%
	50-59	0	0%
	60-69	2	10%
	≥70	5	25%

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

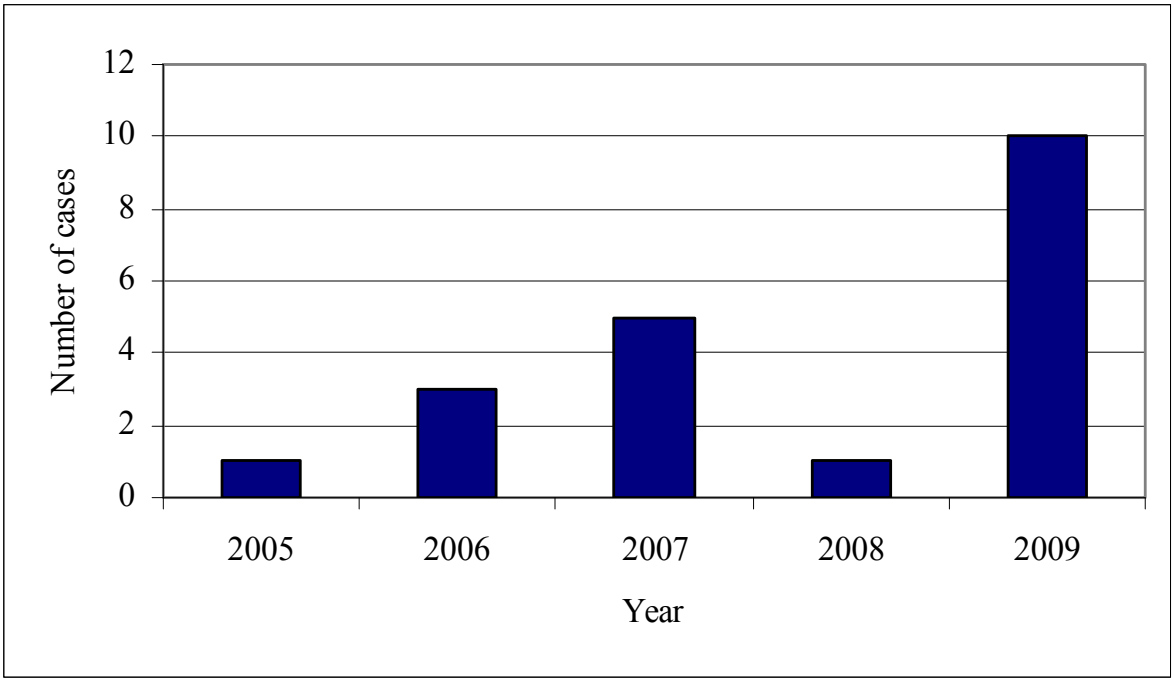

Figure 1. Number of brucellosis cases in Michigan, 2005-2009

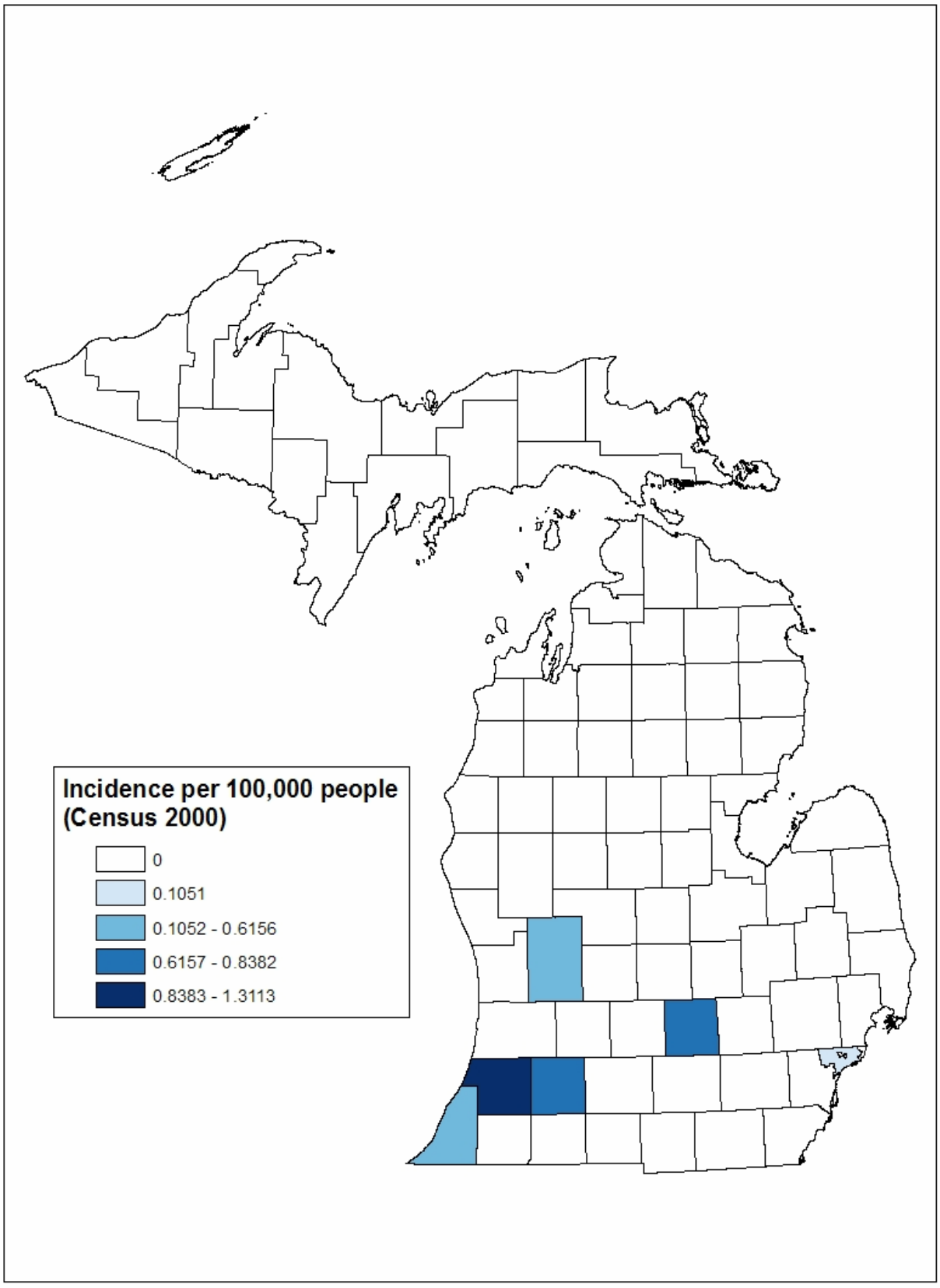

Figure 2. Incidence of brucellosis by county, Michigan 2009

CAMPYLOBACTERIOSIS

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

Clinical features:
Most people with campylobacteriosis experience diarrhea (blood is often present), cramping, abdominal pain, nausea, vomiting, and fever. Illness typically lasts 1 week but relapse can occur. Some individuals infected with *Campylobacter* do not develop any signs or symptoms of the disease.

Mode of transmission:
Consuming food or water that is contaminated by the feces of an infected person or animal spreads the bacteria. Most cases of campylobacteriosis are associated with eating raw or undercooked poultry meat or from cross-contamination of other foods by these items. Infants may get the infection by contact with poultry packages in shopping carts. Untreated water, unpasteurized dairy products and contaminated poultry items are the main sources of infection.

Period of communicability:
Infected persons can spread *Campylobacter* throughout their infection. Typical periods of communicability can range from 2 – 7 weeks.

Incubation period:
Symptoms typically develop in 2 to 5 days after exposure.

High-risk groups:
Infants and young adults are diagnosed more frequently than any other age groups. Males are more likely to have identified infections than females. Travelers to endemic areas are at high-risk for exposure, as well as, persons who are immunocompromised.

Prevention of campylobacteriosis:
All poultry product should be cooked to an internal temperature of 165°F. Meat thermometers should be used since meat color isn't a reliable indicator of "doneness". Separate cutting boards for meat preparation should be utilized while cooking. All cutting boards, utensils and countertops should be washed with soap and hot water after use. Thorough hand washing before and after handling raw meat products, dirty diapers and pet waste is essential to prevention. Persons with diarrhea should wash their hands thoroughly and frequently with hot water and soap. Avoid consuming unpasteurized milk and untreated surface water.

References:
http://www.cdc.gov/nczved/dfbmd/disease_listing/campylobacter_gi.html

American Public Health Association. Campylobacter enteritis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 94 – 98.

Michigan statistics:
Campylobacteriosis has been isolated in many counties throughout Michigan. For the past five years, 4,592 cases have been detected. The majority of cases are male (53%). Two-thirds of Michigan cases were Caucasian (67%). Three percent of cases were Hispanic or Latino. Persons age 40 – 49 make up the majority of cases (16%). The second and third largest age group infected is infants to 9 years of age (15%) and persons 50 – 59 years of age (15%).

Table 1. Demographic characteristics of campylobacteriosis cases, Michigan 2005-2009

*N=	4,592	Number of Cases	Percent Total
Sex			
	Male	2441	53%
	Female	2133	46%
Race			
	African American	163	4%
	American Indian or Alaska Native	11	0%
	Asian	81	2%
	Caucasian	3068	67%
	Hawaiian or Pacific Islander	2	0%
	Other	244	5%
Ethnicity			
	Hispanic or Latino	132	3%
Age groups (years)			
	0-9	670	15%
	10-19	598	13%
	20-29	518	11%
	30-39	507	11%
	40-49	725	16%
	50-59	703	15%
	60-69	454	10%
	70+	412	9%

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

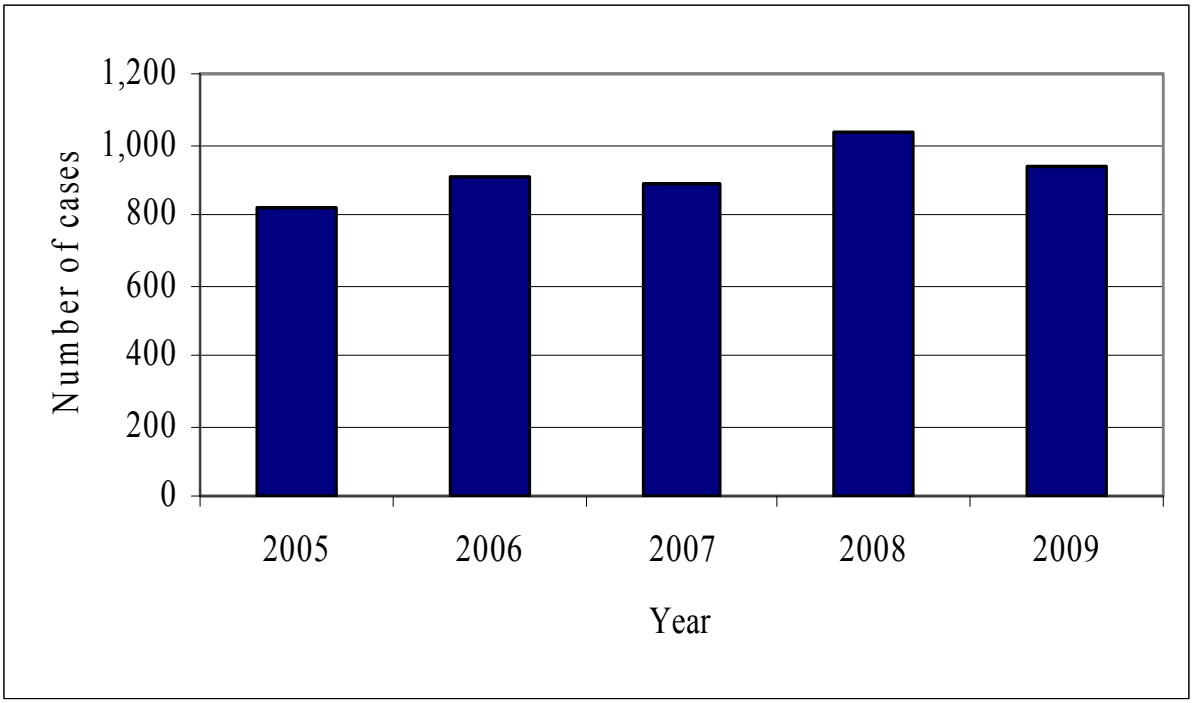

Figure 1. Number of campylobacteriosis cases in Michigan, 2005-2009

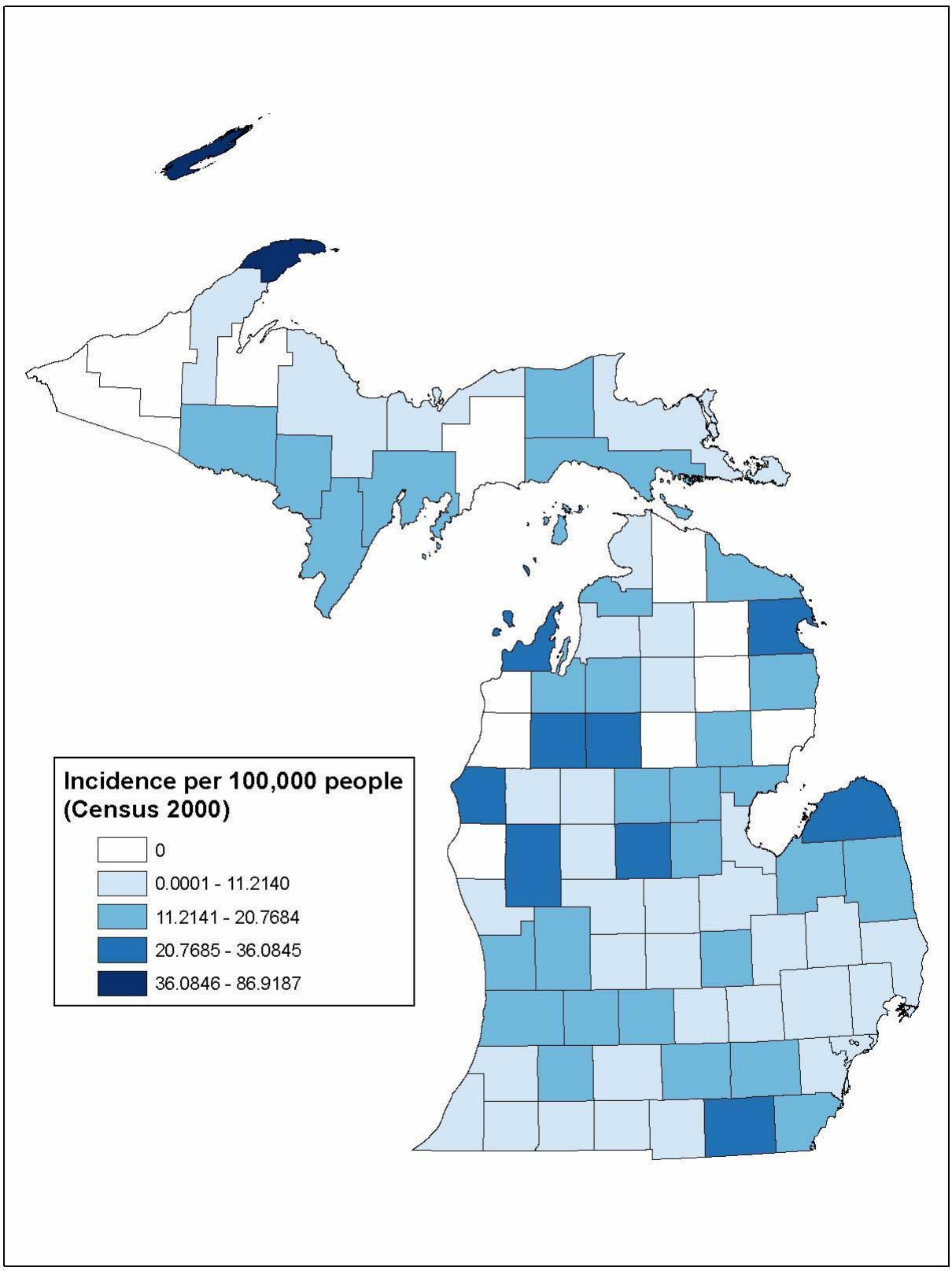

Figure 2. Incidence of campylobacteriosis by county, Michigan 2009

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, back and/or face. The rash then spreads to the rest of the body, including the scalp, mouth, nose, ears, and genitals. Multiple small, red bumps that look like pimples or insect bites appear first. Thin-walled blisters filled with clear fluid arise from the bumps. The clear fluid can become 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 two 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, indirect contact with articles freshly soiled with the discharges from blisters or vesicles of an infected person can transmit disease.

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

Incubation period:
The incubation period for chickenpox is 10 - 21 days. Most symptoms appear in 14 - 17 days.

High-risk groups:
Although it's more common in children under the age of 15, anyone can get chickenpox. Adults, infants, adolescents, and those with a weakened immune system are more likely to have complications or serious illness if infected with VZV. 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.

References:
http://www.cdc.gov/vaccines/vpd-vac/varicella/default.htm

http://www.michigan.gov/documents/_1Chickenpox_153512_7.pdf

American Public Health Association. Chickenpox/herpes zoster. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 109 – 116.

Michigan statistics:

There were 1,889 cases of varicella (chickenpox) reported to MDCH in 2009, representing a 38% decline from the 3,048 cases reported in 2008. Gender was reported for 1,848 (97.8%), and was evenly split between females and males. Age was reported for 1877 (99.4%), ranging from 1 month to 78 years, with a median age of 9 years (mean age 9.9 years). The greatest proportion of cases was reported in the 5-9 year age group (821, 34.5%). Overall, 1,074 (56.9%) indicated prior receipt of at least 1 dose of varicella vaccine.

In 2008, there were 3,048 cases of varicella (chickenpox) reported to MDCH; this represents a 27% decline from the number reported in 2007. Gender was reported for 2,989 (98.1%), cases were evenly split between males and females. Age was reported for 3,009 (97.7%); the median age was 8 years (mean 9.5), with cases ranging from 19 days to 93 years. The largest number of cases was reported in the 5-9 year-old age group (1,481, 48.1% of cases), followed by the 10-19 year-old age group (967, 31.4% of cases). Overall, 1,737 (57%) cases indicated prior receipt of varicella vaccine.

In 2007, a total of 4,191 cases of chickenpox were reported, a decline of 19% from the previous year. Gender was reported for 4,073 (97%); there were slightly more males (male-to-female ratio 1.03:1). Age was reported for 4,157 (99%), and ranged from 2 months to 107 years, with a median of 8 years. The largest number of cases was reported in the 5-9 year-old age group (2,292, 55% of cases), followed by the 10-19 year-old age group (1,242, 30% of cases). Severity of illness was approximated by estimates of the number of lesions as reported in one of four categories: less than 50, 50 – 249, 250 – 500, and more than 500. Such categorical estimates of number of lesions were reported for 3,336 (79.6%) cases. Of these, 3,216 (96%) had information on prior vaccination history. Previous receipt of varicella vaccination was associated with milder illness (risk ratio 0.2383, 95% confidence limits 0.2057;0.2762, $p<0.005$; for purposes of this analysis, cases with fewer than 50 lesions were considered mild, and cases with 50 or more were considered moderate-to-severe). This was similar to a finding from 2006 Michigan data and supports conclusions from various studies suggesting that breakthrough varicella disease occurs in some vaccinated persons but tends to be a milder illness than cases in unvaccinated persons.

In September of 2005 Michigan implemented individual case reporting for varicella. Previously, surveillance was based on aggregate weekly case counts from schools, day-care centers, and providers. Thus 2006 provided the first complete year of individual case-based varicella data. Although overall the reported incidence of varicella in Michigan has declined by approximately 85% since the introduction of varicella vaccine in 1995, the level of reported disease continues to be on the order of several thousand cases each year. In an effort to minimize the burden on public health resources, data collection efforts are focused on the collection of basic demographic variables and three additional key data elements: age, varicella vaccination history, and severity of illness.

In 2006, a total of 5,200 cases of varicella (confirmed or probable) were reported; this represents a 30% increase over the 4,004 cases reported in 2005. It is unclear if this reflects a true increase in occurrence or an improvement in the reporting of cases. Of the 5,200 cases, age was reported for 5,172 (99.5%) and gender was reported for 5,133 (98.7%). The largest number of cases was

reported in the 5-9 year-old age group (3,229, 62% of cases), followed by the 10-19 year-old age group (1,206, 23% of cases). The median age was 7 years (mean age 8.1), with a range of 1 month to 86 years.

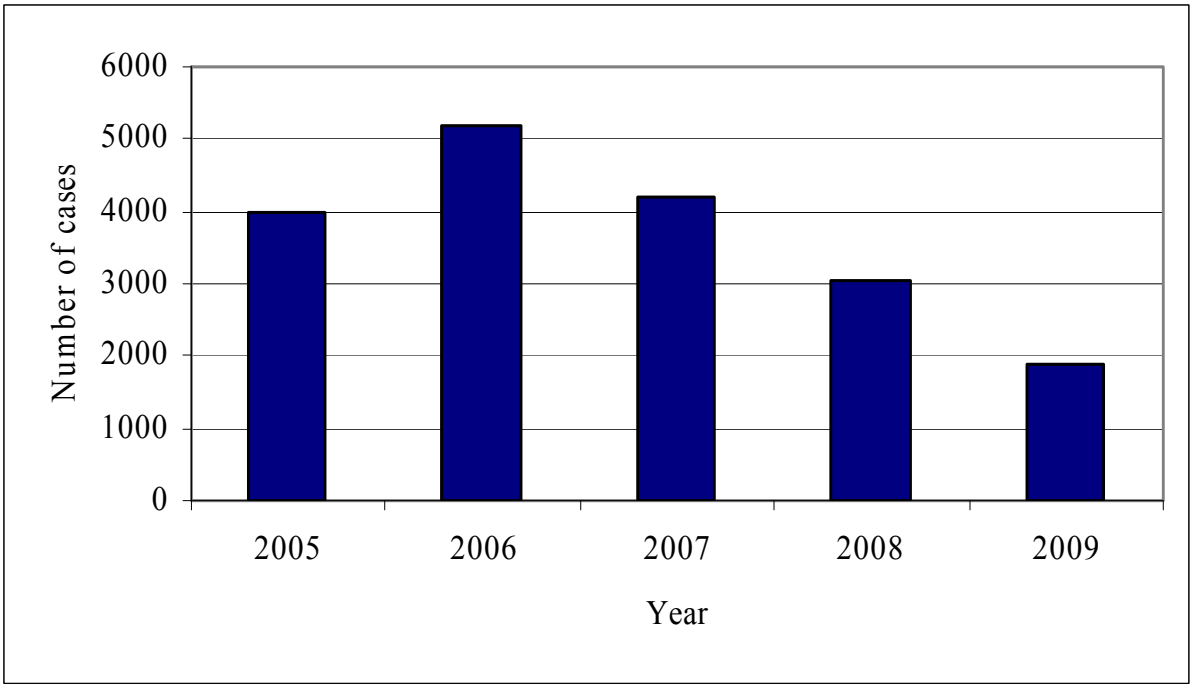

Figure 1. Number of chickenpox cases in Michigan, 2005-2009*

* Surveillance for chickenpox in Michigan depends mostly on school-based reporting. Schools report 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 genital tract. 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:

- 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 can be transmitted during vaginal, anal or oral sex. Chlamydia can also be passed from an infected mother to her baby during vaginal childbirth. Transmission occurs when the mucous membrane of an uninfected individual comes into contact with secretions of an infected person.

Period of communicability:
The period of communicability is not known and re-infection frequently occurs.

Incubation period:
If symptoms do occur, they usually appear within 1 to 3 weeks after exposure.

High-risk groups:
Individuals who have unprotected sex, multiple sex partners and sexual intercourse with an infected person are at high-risk for infection.

Prevention of chlamydia:
High-risk sexual behavior should be avoided. Protected sex with the use of latex condoms during sexual intercourse can prevent infection. Regular screenings for sexually transmitted diseases are advised when unprotected sex is practiced, especially for those under the age of 25.

References:
http://www.cdc.gov/std/chlamydia/default.htm

American Public Health Association. Chlamydial infections. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 116 – 119.

Michigan statistics:
Chlamydial infections during 2009 totaled 46,381 cases. Cases were primarily female (74%). Age analysis of chlamydia demonstrated that 89% of reported cases were found to be in persons 10 – 19 years of age (43%) and 20 – 29 years (46%). African Americans (38%) and Caucasians (20%) had the highest incidence of disease. Two percent of cases were Hispanic or Latino. In 2009, the majority of chlamydial infections were found in the southern part of Michigan, concentrated in highly populated areas. The geographical distribution of chlamydia was similar to the pattern of gonorrhea, however, chlamydia infections are more evenly distributed statewide, even in rural counties.

Table 1. Demographic characteristics of chlamydia cases, Michigan 2009

*N=	46,381	Number of Cases	Percent Total
Sex			
	Male	11,909	26%
	Female	34,315	74%
Race			
	African American	17,533	38%
	American Indian or Alaska Native	132	0%
	Asian	148	0%
	Caucasian	9,461	20%
	Hawaiian or Pacific Islander	15	0%
	Other	893	2%
Ethnicity			
	Hispanic or Latino	1029	2%
Age groups (years)			
	<1	23	0%
	1-9	30	0%
	10-19	20,071	43%
	20-29	21,469	46%
	30-39	3,522	8%
	40-49	872	2%
	50-59	234	1%
	60-69	45	0%
	≥70	57	0%

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

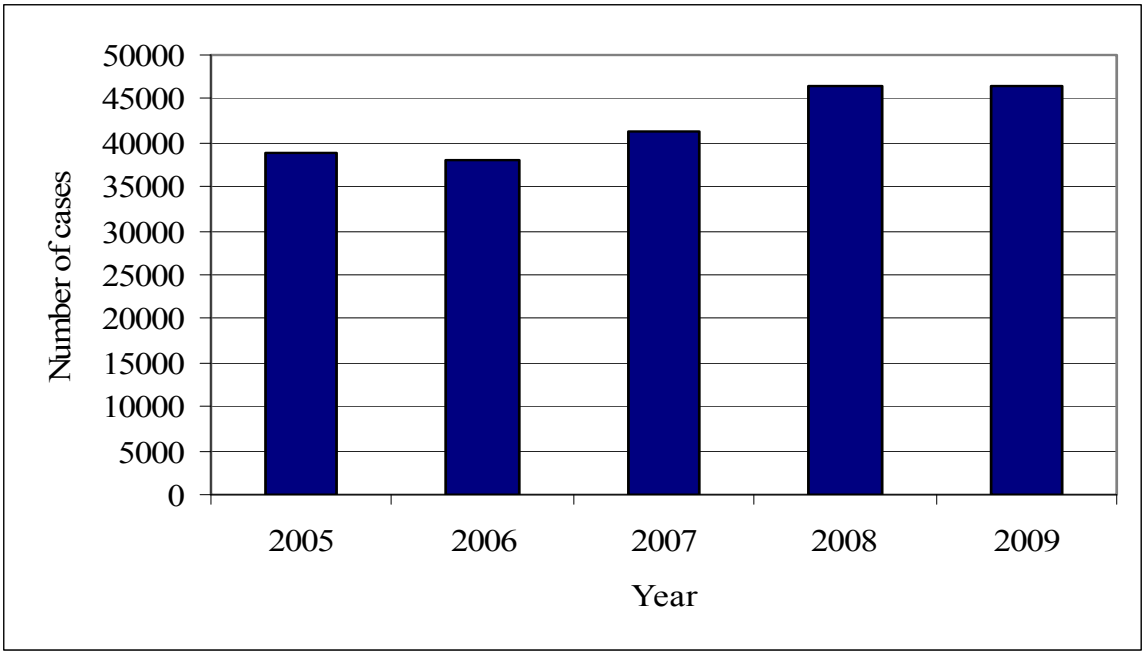

Figure 1. Number of chlamydia cases in Michigan, 2005-2009

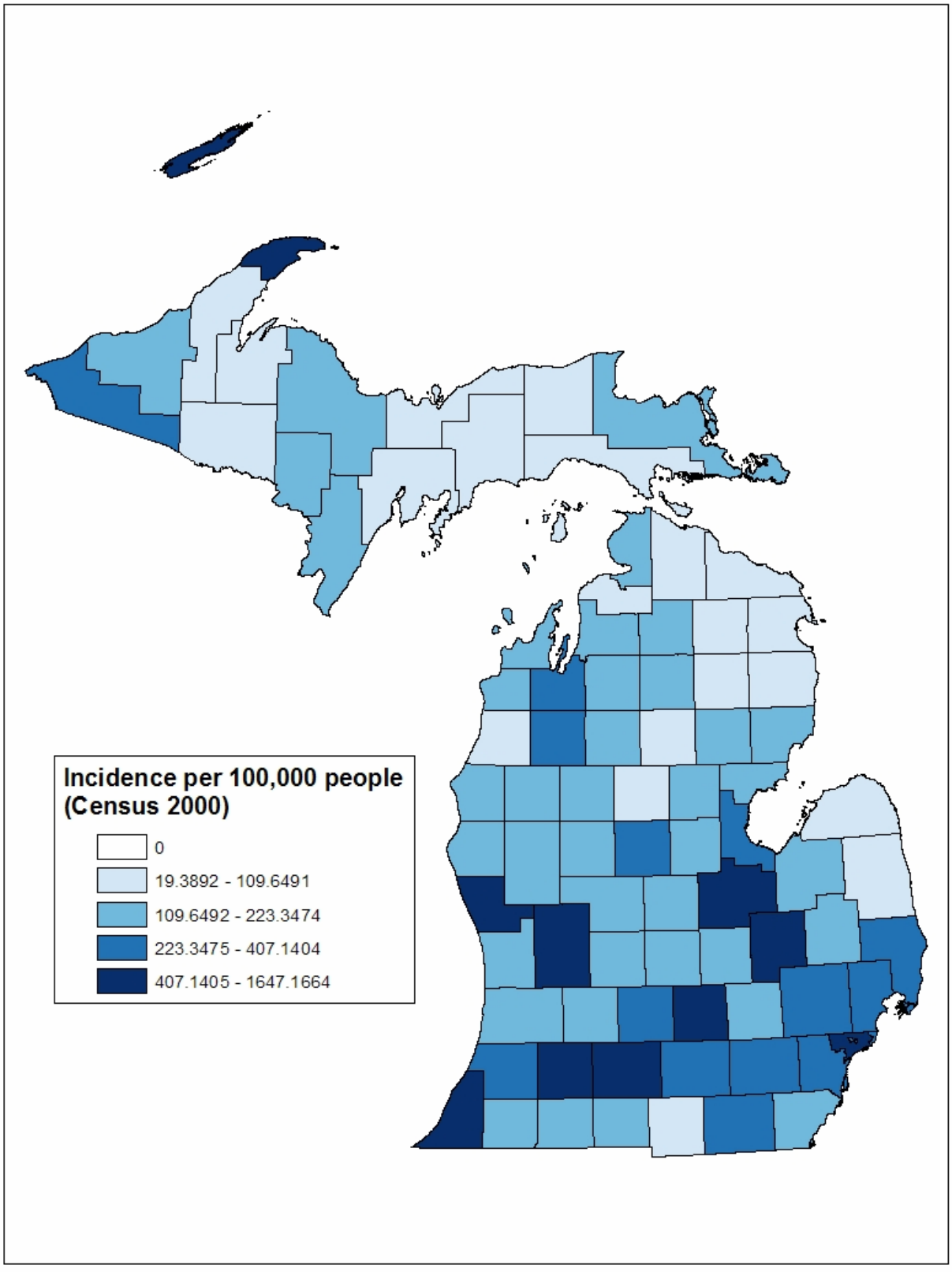

Figure 2. Incidence of chlamydia by county, Michigan 2009

CRYPTOSPORIDIOSIS

Causative agent:
Cryptosporidiosis is a diarrheal illness caused by a single-cell parasite called *Cryptosporidium.* The parasite has a protective outer shell that enables it to persist in the environment and be resistant to chlorine bleach.

Clinical features:
The usual symptoms of cryptosporidiosis are diarrhea, abdominal cramps, headache, nausea, vomiting, and a low-grade fever. Symptoms can last for days to four or more weeks and can be intermittent. Weight loss and dehydration is a common side effect of infection.

Mode of transmission:
Cryptosporidia have been found in humans, cattle and other domestic mammals. In addition, *Cryptosporidai* may be found in soil, food, water, or surfaces that have been contaminated with the feces from infected humans or animals. Spreading occurs by:

- Putting something in your mouth or accidentally swallowing something that has come in contact with the stool of an infected person or animal.
- Swallowing recreational water contaminated with *Cryptosporidia*. Recreational water can be contaminated with sewage or feces from humans or animals.
- Swallowing water or beverages contaminated by stool from infected humans or animals.
- Eating uncooked food contaminated with *Cryptosporidia*. All fruits and vegetables should be thoroughly washed with uncontaminated water.

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 weeks after symptoms have ceased. *Cryptosporidia* can survive in a moist environment for 2 – 6 months.

Incubation period:
Incubation period varies from 1 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:
Hands should be thoroughly washed with soap and water after using the toilet or after changing diapers and before handling or eating food (especially important for persons with diarrhea). Persons with diarrhea should not swim until two weeks after diarrhea has stopped (especially

important for children wearing diapers). Do not drink or swallow untreated water from shallow wells, lakes, rivers, springs, ponds, or streams. Do not drink water or use ice cubes made during community-wide outbreaks of disease caused by contaminated drinking water.

References:

http://www.cdc.gov/crypto/

American Public Health Association. Cryptosporidiosis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 157 – 160.

Michigan statistics:

Cryptosporidiosis has been isolated in many counties throughout Michigan. However, the majority of cases were detected in the Northern portion of the Lower Peninsula. A total of 1,045 cases were reported during 2005 – 2009. Males and females were similarly infected (48%, 52% respectively). Three-fourths of the cases were Caucasian (75%). Children between the ages of 1 month to 9 years were reported most often (25%). Two percent of the cases were Hispanic or Latino.

Table 1. Demographic characteristics of cryptosporidiosis cases, Michigan 2005-2009

*N= 1,045		Number of Cases	Percent Total
Sex			
	Male	505	48%
	Female	539	52%
Race			
	African American	60	6%
	American Indian or Alaska Native	8	<1%
	Asian	9	1%
	Caucasian	788	75%
	Hawaiian or Pacific Islander	0	0%
	Other	16	2%
Ethnicity			
	Hispanic or Latino	21	2%
Age groups (years)			
	0-9	258	25%
	10-19	140	13%
	20-29	144	14%
	30-39	139	13%
	40-49	126	12%
	50-59	93	9%
	60-69	59	6%
	≥70	84	8%

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

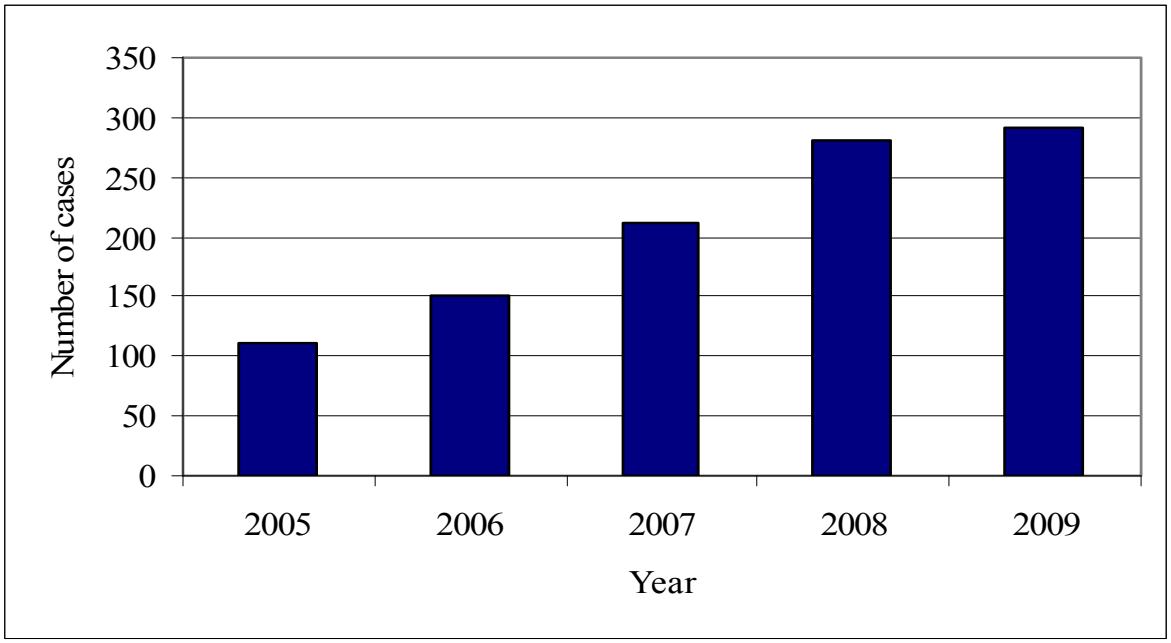

Figure 1. Number of cryptosporidiosis cases in Michigan, 2005-2009

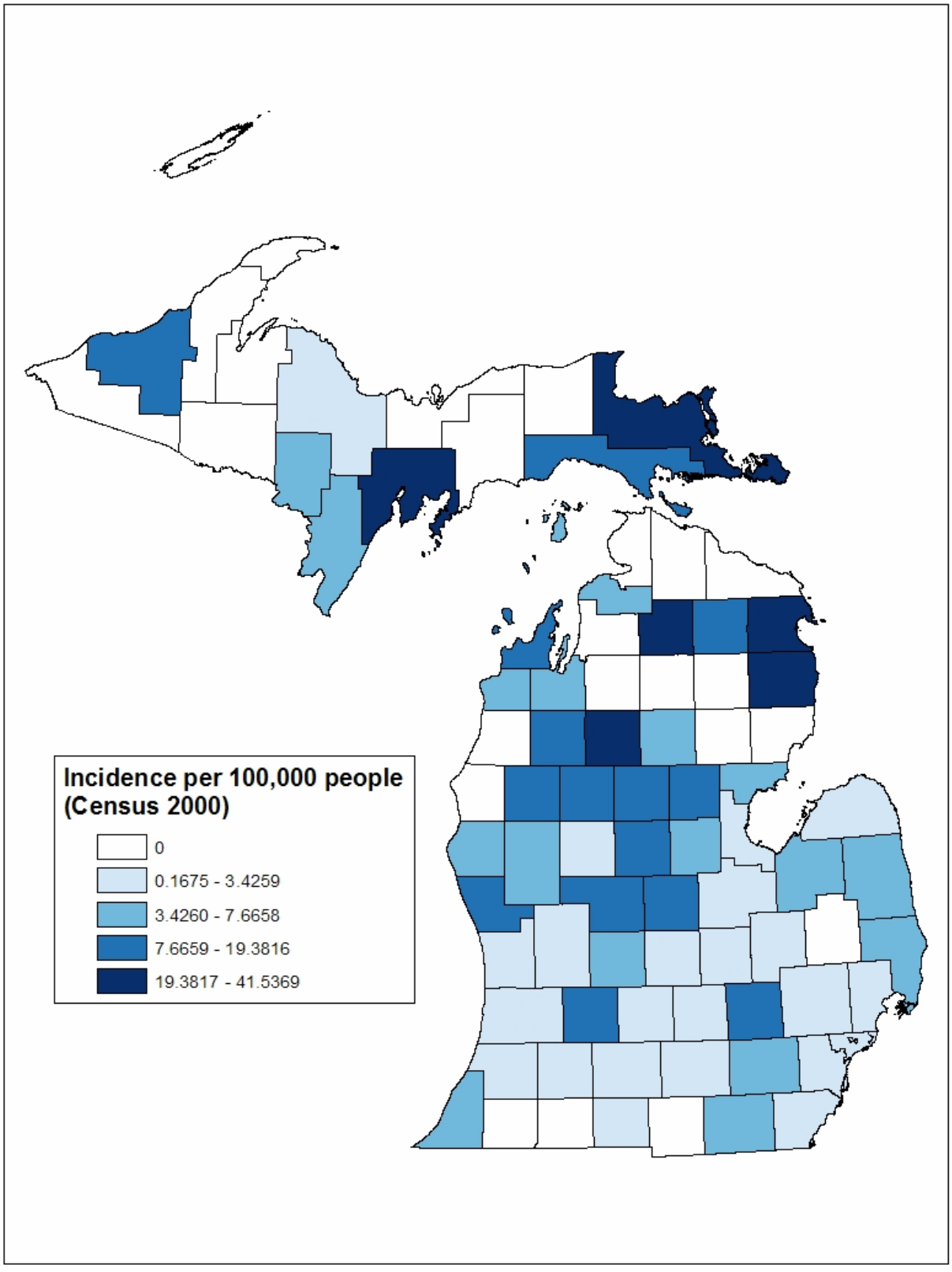

Figure 2. Incidence of cryptosporidiosis by county, Michigan 2009

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 which lasts 2 to 7 days, often liver enlargement, hemorrhagic phenomena (such as bruising easily, bleeding from the nose or gums, and blood in vomit or feces), 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.

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. However, the role of this in sustaining transmission of virus to humans has not yet been explained.

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

Incubation period:
Incubation last from 3 -14 days, with an average of 4 – 7 days.

High-risk groups:
Anyone who is bitten by an infected *Aedes* 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 type of dengue virus will have immunity to that specific type for life. However, they will have no immunity to the 3 other types of virus. Therefore, a person can be infected up to 4 times (once with each serotype).

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.

References:

http://www.cdc.gov/ncidod/dvbid/dengue/dengue-qa.htm

American Public Health Association. Dengue fever. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 164 – 171.

Michigan statistics:

Forty-six cases of dengue fever have been reported during 2005 – 2009. None of the cases have been acquired domestically. The majority of cases have occurred in Caucasians (46%) and Asians (13%). Three cases were Hispanic or Latino. Over one-fourth of cases were persons between the ages of 30 – 39 years (28%).

Table 1. Demographic characteristics of dengue fever cases, Michigan 2005-2009

*N= 46	Number of Cases	Percent Total
Sex		
Male	27	59%
Female	19	41%
Race		
African American	1	2%
American Indian or Alaska Native	1	2%
Asian	6	13%
Caucasian	21	46%
Hawaiian or Pacific Islander	0	0%
Other	5	11%
Ethnicity		
Hispanic or Latino	3	7%
Age groups (years)		
0-9	1	2%
10-19	6	13%
20-29	4	9%
30-39	13	28%
40-49	7	15%
50-59	7	15%
60-69	6	13%
≥70	2	4%

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

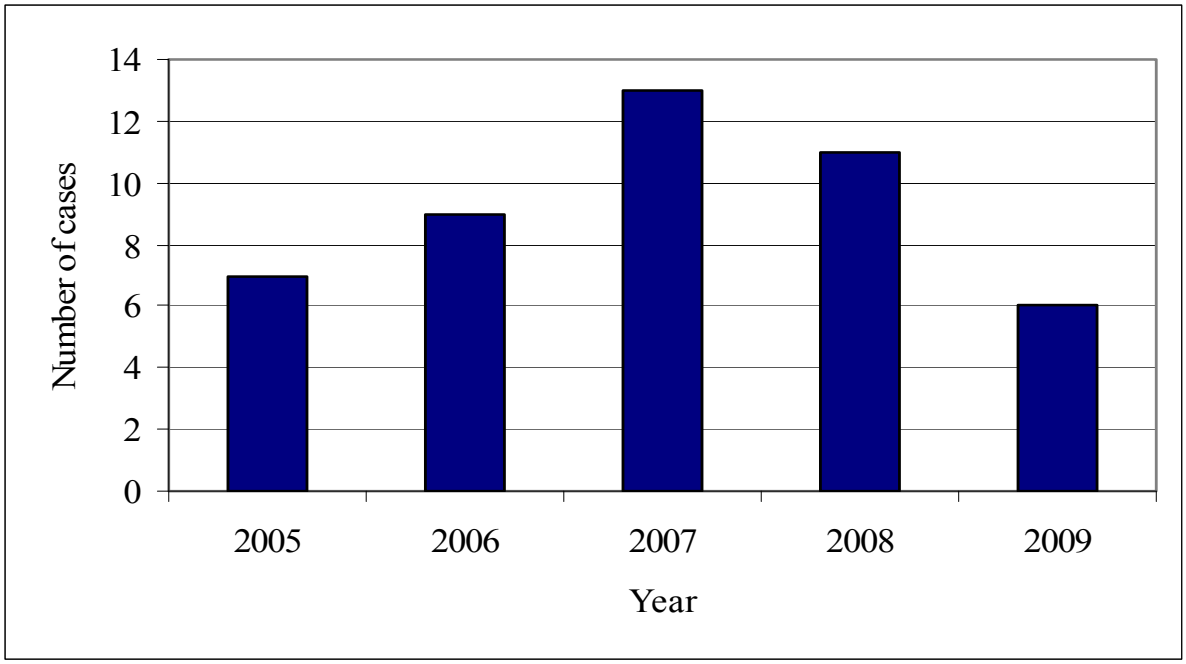

Figure 1. Number of dengue fever cases in Michigan, 2005-2009

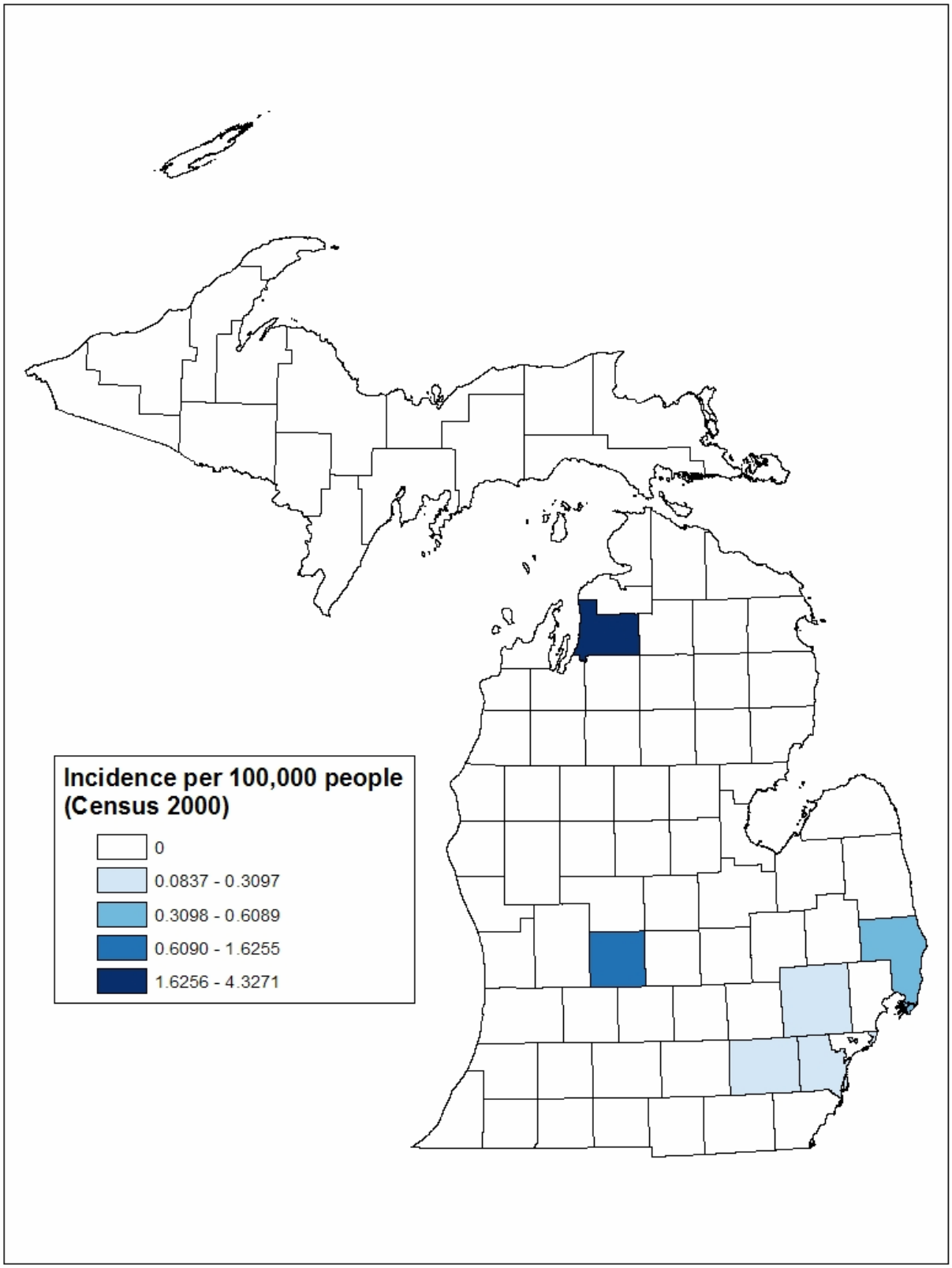

Figure 2. Incidence of dengue fever by county, Michigan 2009

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 disease 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. However, some *E. coli* infections will have no symptoms. 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 5%-10% of infections lead to HUS. 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. Consumption of undercooked meat (especially ground beef), unpasteurized milk, unpasteurized apple cider, soft cheeses made from raw milk, or other contaminated food or water can cause infection. Other known sources of infection are contact with cattle or coming into contact with the feces of infected people. Swallowing contaminated lake water while swimming, touching the environment in petting zoos and other animal exhibits, and by eating food prepared by people who did not thoroughly wash their hands after using the toilet have been documented.

Period of communicability:
The duration of excretion of the pathogen is typically one week or less in adults. One-third of children may excrete the pathogen for up to 3 weeks. Prolonged carriage is uncommon, although young children can shed the bacteria longer than adults.

Incubation period:
The incubation period is usually 3 - 4 days but can be as short as 12 hours or as long as 10 days.

High-risk groups:
Anyone can have *E.coli* O157:H7 infection. The elderly, children under the age of 5 and the immunocompromised are more susceptible and vulnerable to infection.

Prevention of *E. coli* O157:H7

- Hand washing thoroughly after using the bathroom, changing diapers or after contact with animals or their environment (e.g. farms, petting zoos and your backyard) and before preparing food or eating is critical to prevention.
- Cook meats thoroughly. Ground beef and meat that has been needle tenderized should be cooked to an internal temperature of 160°F/70°C. Meat thermometers should be used since meat color isn't a reliable indicator of "doneness".
- Avoid raw milk, unpasteurized dairy products and unpasteurized juices (like fresh apple cider).
- Avoid swallowing water when swimming or playing in lakes, ponds, streams, swimming pools, and backyard "kiddie" pools.

- Prevent cross contamination in food preparation areas by thoroughly washing hands, counters, cutting boards, and utensils after they touch raw meat.

References:

http://www.cdc.gov/nczved/dfbmd/disease_listing/stec_gi.html

American Public Health Association. Diarrhea caused by *Escherichia coli*. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 181 – 195.

Michigan statistics:

Reported *E. coli* O157:H7 infection totaled 443 cases during 2005 – 2009. Cases were primarily female (56%). Age analysis of *E. coli* O157:H7 showed that almost two-thirds of reported cases were found to be in persons 0 – 29 years old (24% age 10 – 19, 19% age 0-9, 19% age 20 – 29). Caucasians (66%) had the highest incidence of disease. One percent of cases were Hispanic.

In early June 2009, Michigan and Wisconsin collaborated on an investigation of a small cluster of PFGE-matching cases. Ultimately, the investigation let to a trace back and recall of ground beef.

In mid-September 2008, an intensive and multi-faceted investigation of what would become the largest *E. coli* O157:H7 outbreak to affect Michigan in at least 5 years began. Clusters of suspect shiga toxin-producing *E. coli* (STEC) cases at a jail in the southern border of the state and a large university in the south central region of Michigan were detected. When PFGE typing became available, it linked the two clusters as well as unclustered cases from other parts of the state.

Between September 2006 and August 2007, Michigan investigated two multi-state outbreaks of *E. coli* O157:H7. One outbreak was associated with ground beef consumption. The second outbreak affected 26 states and was associated with fresh pre-packaged spinach.

Table I. Demographic characteristics *Escherichia coli* cases, Michigan 2005-2009

*N=	443	Number of Cases	Percent Total
Sex			
	Male	189	43%
	Female	247	56%
Race			
	African American	25	6%
	American Indian or Alaska Native	3	<1%
	Asian	6	1%
	Caucasian	293	66%
	Hawaiian or Pacific Islander	0	0%
	Other	9	2%
Ethnicity			
	Hispanic or Latino	6	1%
Age groups (years)			
	0-9	84	19%
	10-19	107	24%
	20-29	84	19%
	30-39	33	7%
	40-49	22	5%
	50-59	41	9%
	60-69	36	8%
	≥70	34	8%

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

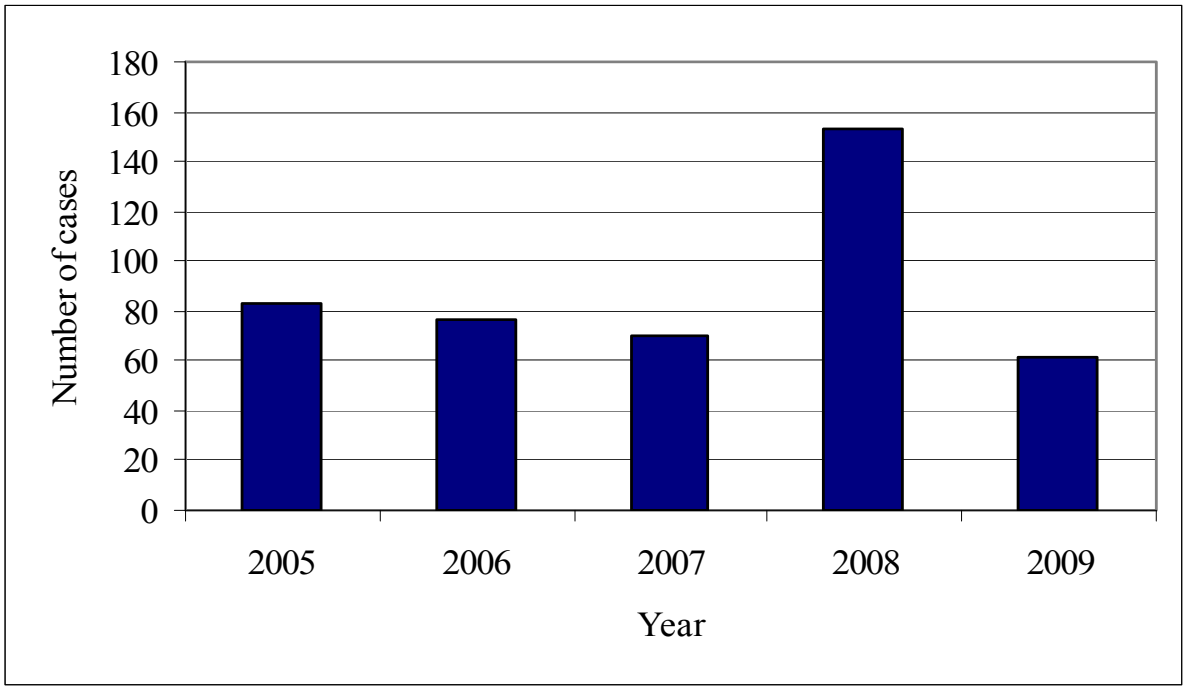

Figure I. Number of *Escherichia coli* cases by year, Michigan 2005 – 2009

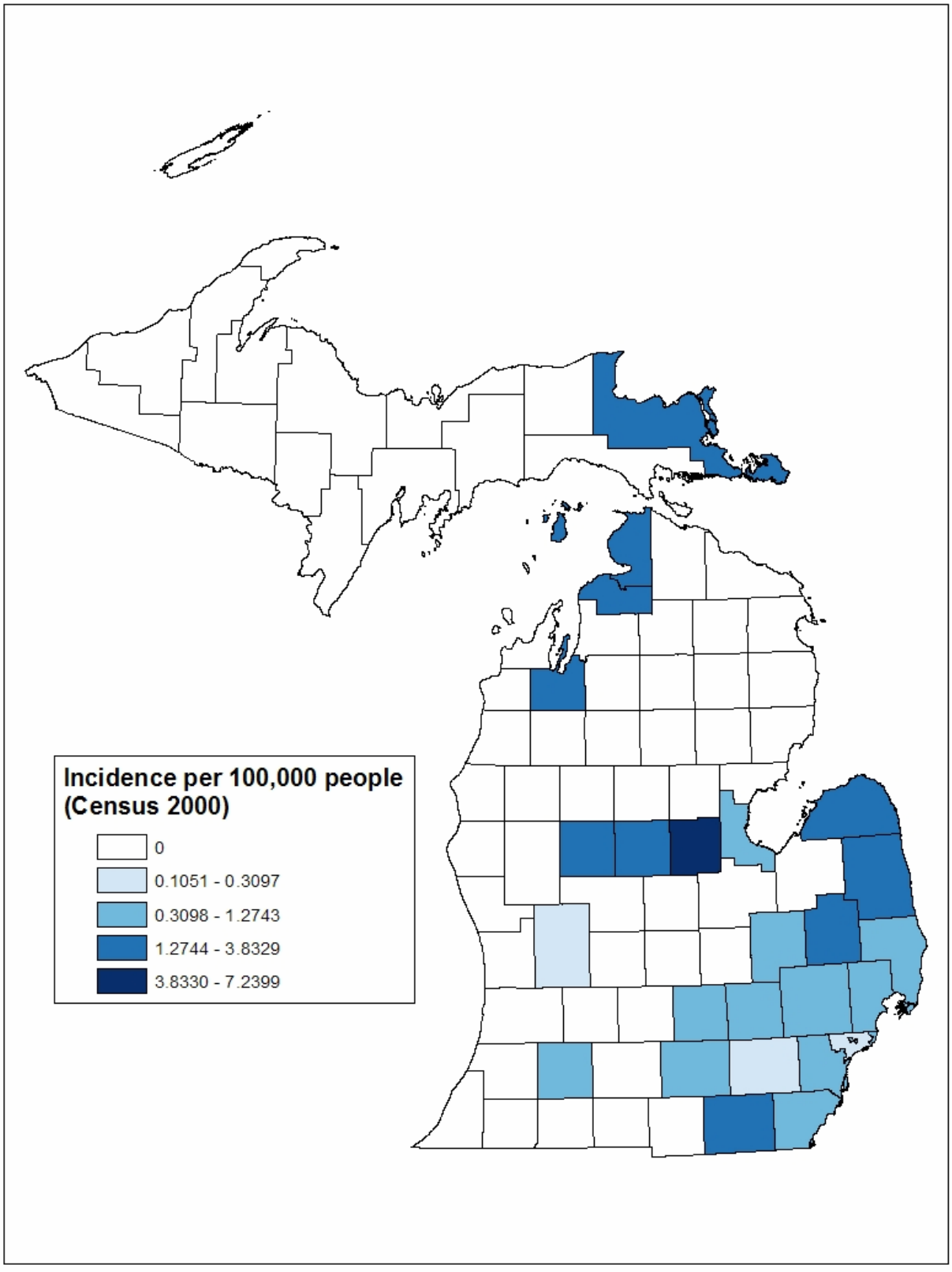

Figure 2. Incidence of *Escherchia coli* O157:H7 by county, Michigan 2009

GIARDIASIS

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

Clinical features:
Giardia infection can cause a variety of intestinal symptoms including diarrhea, gas or flatulence, greasy stools that tend to float, stomach cramps, upset stomach, and 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 from an infected person by the fecal-oral route or from the accidental swallowing of giardia picked up from surfaces (e.g. changing tables, diaper pails or toys) contaminated with feces from an infected person.

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

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

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

- Children who attend daycare centers, especially diaper-aged children
- Child care workers or 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:

- Hand washing after using the toilet and after every diaper change and before handling or eating food is critical to prevention.
- Persons with diarrhea should not swim (essential for children).
- Do not drink untreated water from shallow wells, lakes, rivers, springs, ponds, or streams.
- Do not drink untreated water or use ice cubes when traveling in countries where the water supply might be unsafe or if there is a community-wide outbreak of disease caused by contaminated drinking water.
- Wash all raw vegetables and fruits with uncontaminated water before consuming.
- Avoid fecal exposure during sexual activity.

References:
http://www.cdc.gov/ncidod/dpd/parasites/giardiasis/factsht_giardia.htm

American Public Health Association. Giardiasis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 258 – 260.

Michigan statistics:
A total of 3,386 cases were reported during 2005 - 2009. Nearly one-third (31%) of all giardiasis was reported in persons aged 0 to 9 years of age. Fifty-five percent of cases were male while 45% were female. Five percent of cases were Hispanic or Latino.

Table 1. Demographic characteristics of giadiasis cases, Michigan 2005-2009

*N=	3,386	Number of Cases	Percent Total
Sex			
	Male	1,860	55%
	Female	1,515	45%
Race			
	African American	308	9%
	American Indian or Alaska Native	11	0%
	Asian	167	5%
	Caucasian	1,771	52%
	Hawaiian or Pacific Islander	1	0%
	Other	298	9%
Ethnicity			
	Hispanic or Latino	157	5%
Age groups (years)			
	0-9	1,035	31%
	10-19	351	10%
	20-29	369	11%
	30-39	475	14%
	40-49	443	13%
	50-59	341	10%
	60-69	200	6%
	≥70	168	5%

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

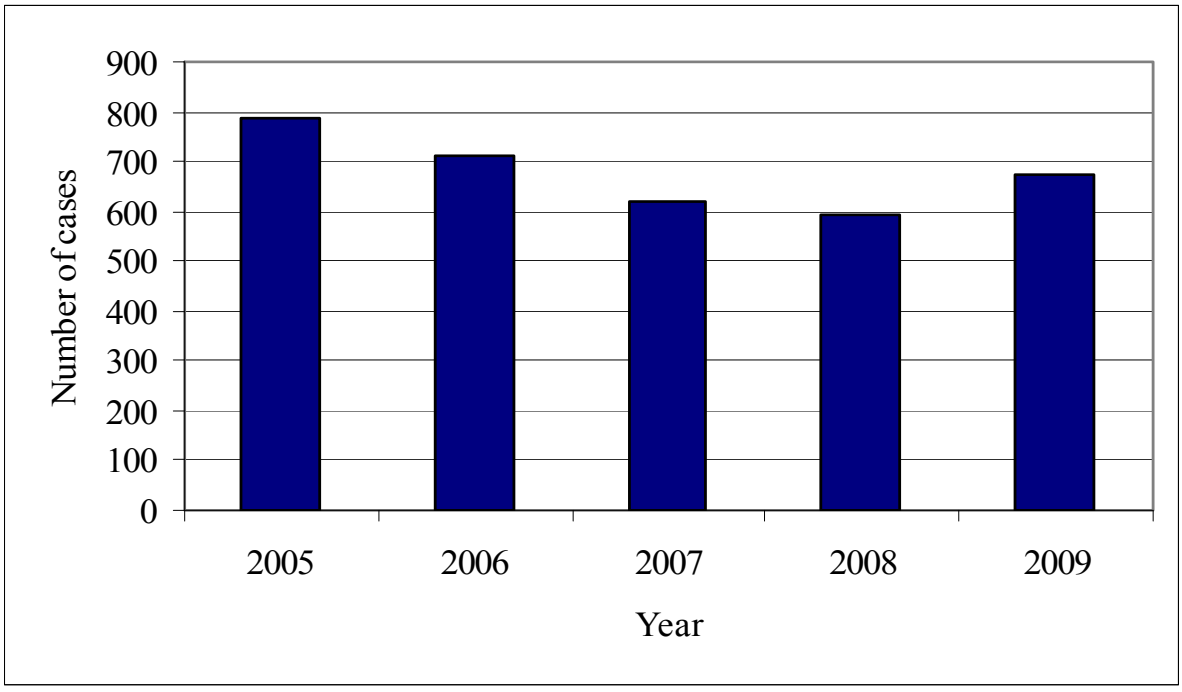

Figure 1. Number of giardiasis cases in Michigan, 2005-2009

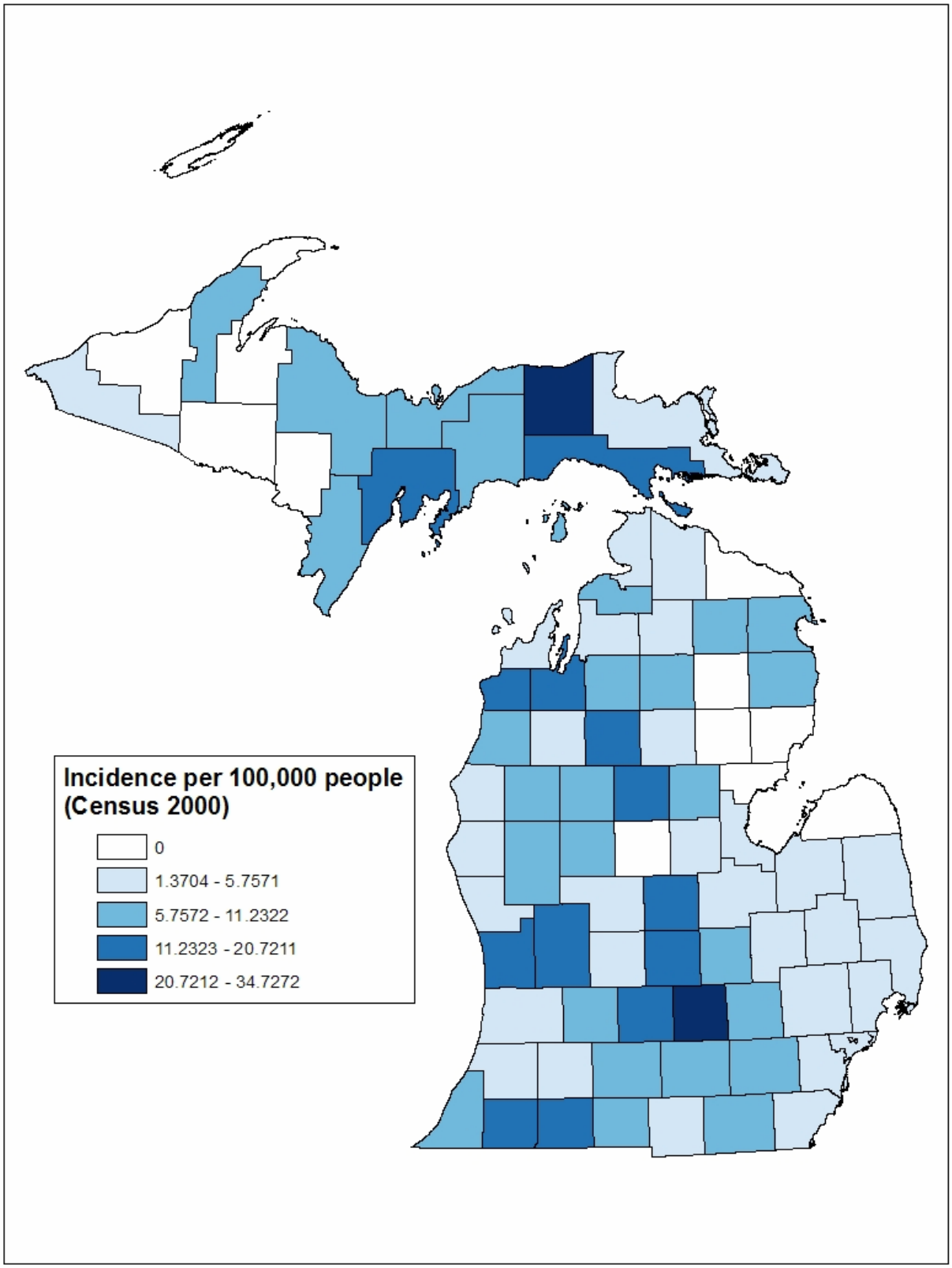

Figure 2. Incidence of giardiasis by county, Michigan 2009

GONORRHEA

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

Clinical features:
Most women have no symptoms or mild symptoms that can be mistaken for a bladder or vaginal infection. The most common manifestations include increased vaginal discharge, dysuria (pain or burning upon urination) and vaginal bleeding between periods. Women with gonorrhea are at risk for developing serious complications regardless of the severity of the symptoms. Coexisting infections with chlamydia, trichomoniasis, candidiasis, or other organisms are common. Some men may have no symptoms while some may have a profuse penile discharge and painful, frequent urination. The head of the penis may become swollen and sore. Rectal infections in both men and women are characterized by discharge, anal itching, bleeding, painful bowel movements, or no symptoms at all. Infections in the throat may cause a mild sore throat but often will cause no symptoms.

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 last 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.

High-risk groups:
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:
Avoid high-risk sexual behavior by practicing protected sex with the use of latex condoms. Regular screenings for sexually transmitted diseases are advised when unprotected sex is practiced, especially for those under the age of 25.

References:
http://www.cdc.gov/std/Gonorrhea/

American Public Health Association. Gonococcal infections. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 261 – 265.

Michigan statistics:

Michigan reported 14,612 cases of gonorrhea in 2009. The majority of cases were in women (58%) and young adults (age 10 – 19 years 35%; age 20 – 29 years 45%). Over one-half of cases were African American (53%). The majority of gonococcal infections were found in the southern part of Michigan, concentrated in highly populated areas. The City of Detroit had the highest rate of infection. The geographical distribution of gonorrhea was similar to the pattern of chlamydia, except many northern counties and Upper Peninsula counties report very low numbers of gonorrhea.

Table 1. Demographic characteristics of gonorrhea cases, Michigan 2009

*N=	14,612	Number of Cases	Percent Total
Sex			
	Male	5,949	41%
	Female	8,455	58%
Race			
	African American	7,697	53%
	American Indian or Alaska Native	38	<1%
	Asian	23	<1%
	Caucasian	1,634	11%
	Hawaiian or Pacific Islander	8	<1%
	Other	208	1%
Ethnicity			
	Hispanic or Latino	204	1%
Age groups (years)			
	0-9	19	0%
	10-19	5,135	35%
	20-29	6,623	45%
	30-39	1,833	13%
	40-49	631	4%
	50-59	217	1%
	60-69	50	0%
	≥70	27	0%

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

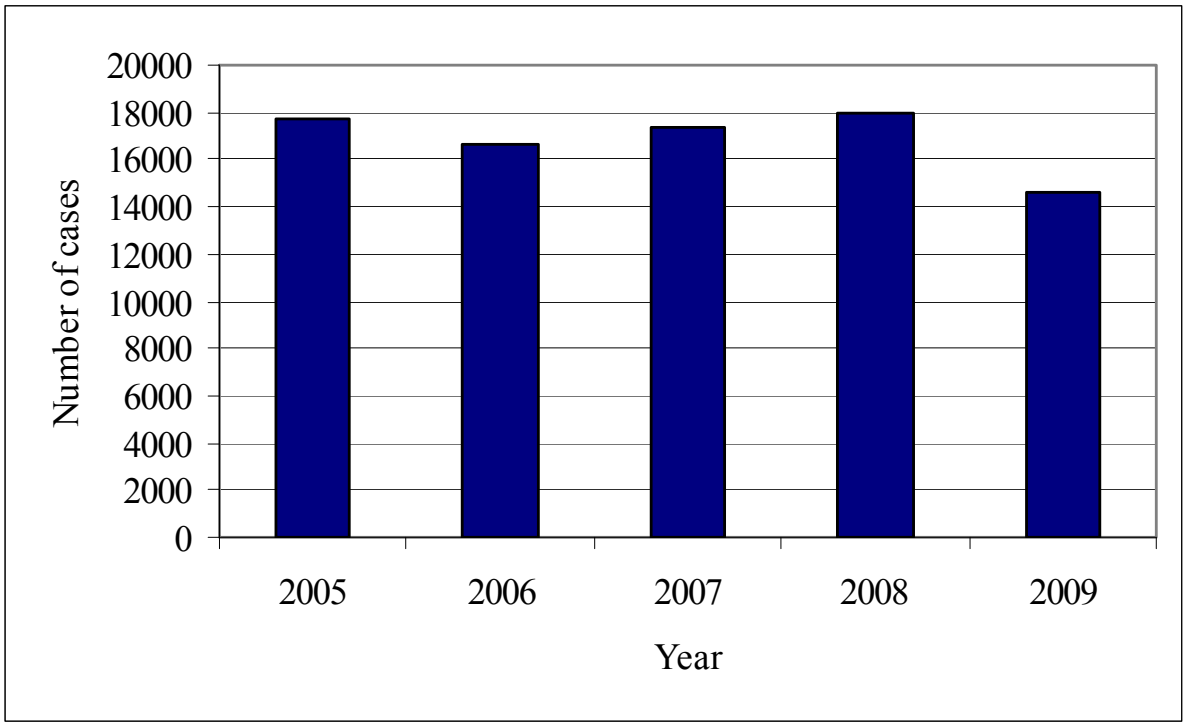

Figure 1. Number of gonorrhea cases in Michigan, 2005-2009

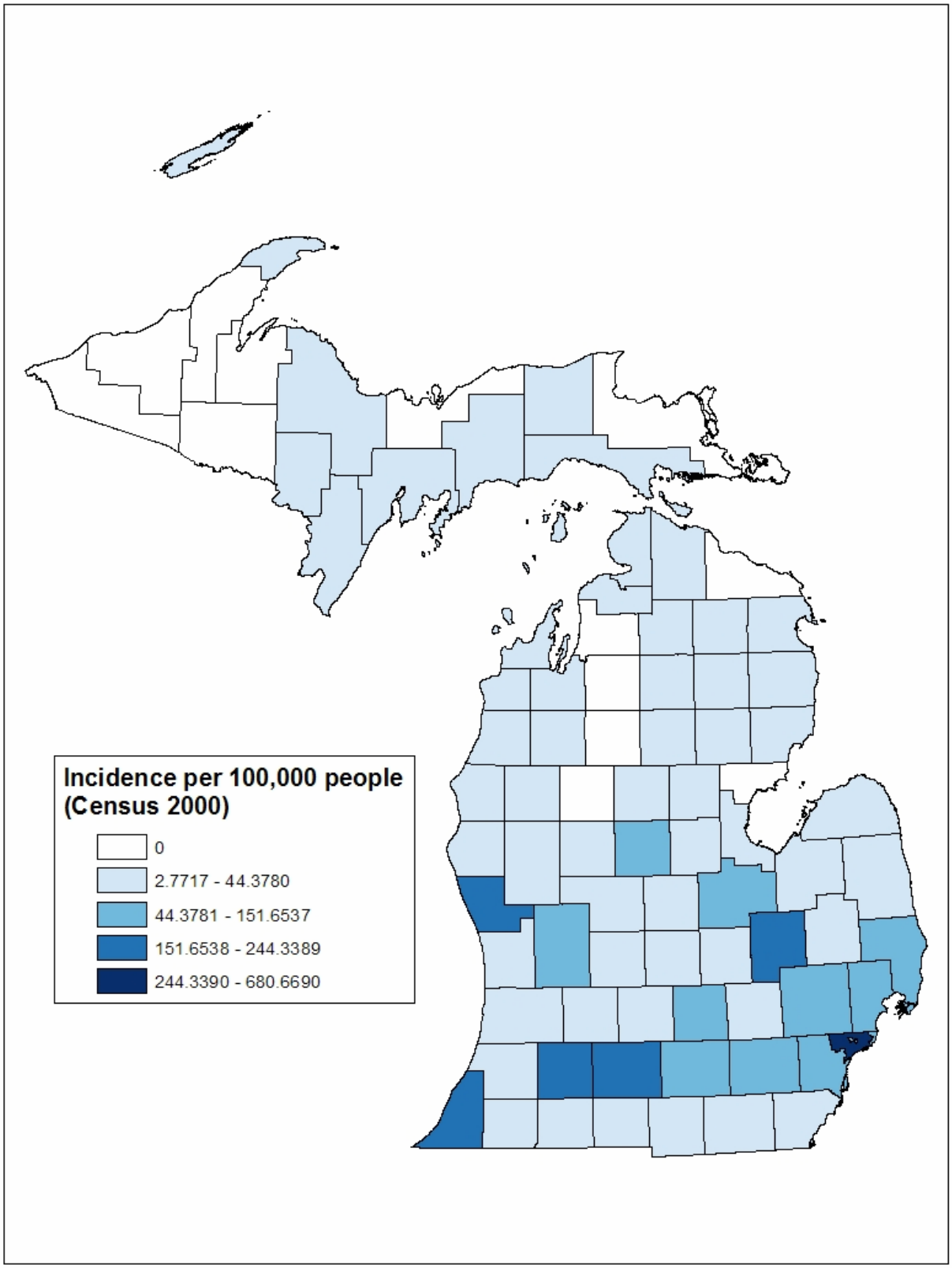

Figure 2. Incidence of gonorrhea by county, Michigan 2009

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:
Incubation is typically 2 – 4 days.

High-risk groups:
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. 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*.

References:
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/haeminfluserob_t.htm

American Public Health Association. B. Hemophilus meningitis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 421 – 423.

Michigan statistics:
Seven cases of invasive *H.influenzae* were reported in 2009. All 7 in this age group were serotyped; one was determined to be due to serotype b (of the others, 1 was serotype f and the remaining 5 cases were untypeable serotypes of biotypes that rule out serotype b). The serotype b case occurred in a 6 month old infant who had received 2 doses of Hib vaccine. (There were another 2 reported invasive cases in persons between 5 years and 15 years of age, both were typed and neither were serotype b). All isolates grew from blood; 2 were additionally cultured from CSF. Cases were primarily male (57%). Age analysis of *H. influenzae* demonstrated 100% of cases were less than one year old. Race analysis showed that over two-thirds of cases were Caucasian (71%) and African American (14%). No cases were Hispanic or Latino.

Reported *H. influenzae* (all serotypes) amongst children younger than age 5 years during 2004 – 2008 totaled 38 cases. Cases were primarily male (53%). Age analysis of *H. influenzae* demonstrated that over three-fourths of cases were less than one year old (76%). Race analysis showed that two-thirds of cases were Caucasian (47%) and African American (18%). Five percent of reported cases were Hispanic or Latino. The Counties of Presque Isle, Emmet and Clare had the highest incidence of diseases in 2009.

Thirty cases of invasive *H. influenzae* disease were reported to the Michigan Department of Community Health (MDCH) in 2008. Eight were in persons 5 years of age or younger (ten in persons 15 years of age or younger), and all were serotyped. Of these eight, 2 were determined to be type b. One was an 8 month old male infant who had not received any doses of Hib vaccine. He was diagnosed with primary bacteremia and hospitalized for 7 days; blood cultures grew *H. influenzae* type b. The other type b case was a 31 month old female who had received 3 doses of Hib vaccine (at 2 months, 4 months, and 12 months of age) but no booster dose. She was admitted to intensive care with epiglottitis; blood culture grew *H. influenzae* type b.

In persons less than five years of age in 2007, *H. influenzae* was isolated from blood in 8 cases (61.5%), from CSF in 3 cases (23.1%) and from both blood and CSF in 2 cases (15.4%). Of these, 11 were serotyped, with one identified as being serotype b (an 8 month old unvaccinated child with meningitis and sequelae including deafness). The distribution of the remaining 10 serotypes in this group was: type f (3 cases), type e (1 case), and non-typeable (6 cases). Both of the 2 cases whose isolates were not serotyped were premature infants (28 weeks and 29 weeks gestation) whose infections were diagnosed on the date of birth.

During 2006, six cases were reported to MDCH in persons less than 5 years of age. None of the cases were identified as being serotype b (5 were tested but not typeable, 1 was serotype f).

Table 1. Demographic characteristics of *Haemophilus influenzae* cases (less than 5 years of age), Michigan 2009

*N= 7		Number of Cases	Percent Total
Sex			
	Male	4	57%
	Female	3	43%
Race			
	African American	1	14%
	American Indian or Alaska Native	0	0%
	Asian	0	0%
	Caucasian	5	71%
	Hawaiian or Pacific Islander	0	0%
	Other	0	0%
Ethnicity			
	Hispanic or Latino	0	0%
Age groups (years)			
	<1	7	100%
	1-5	0	0%

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

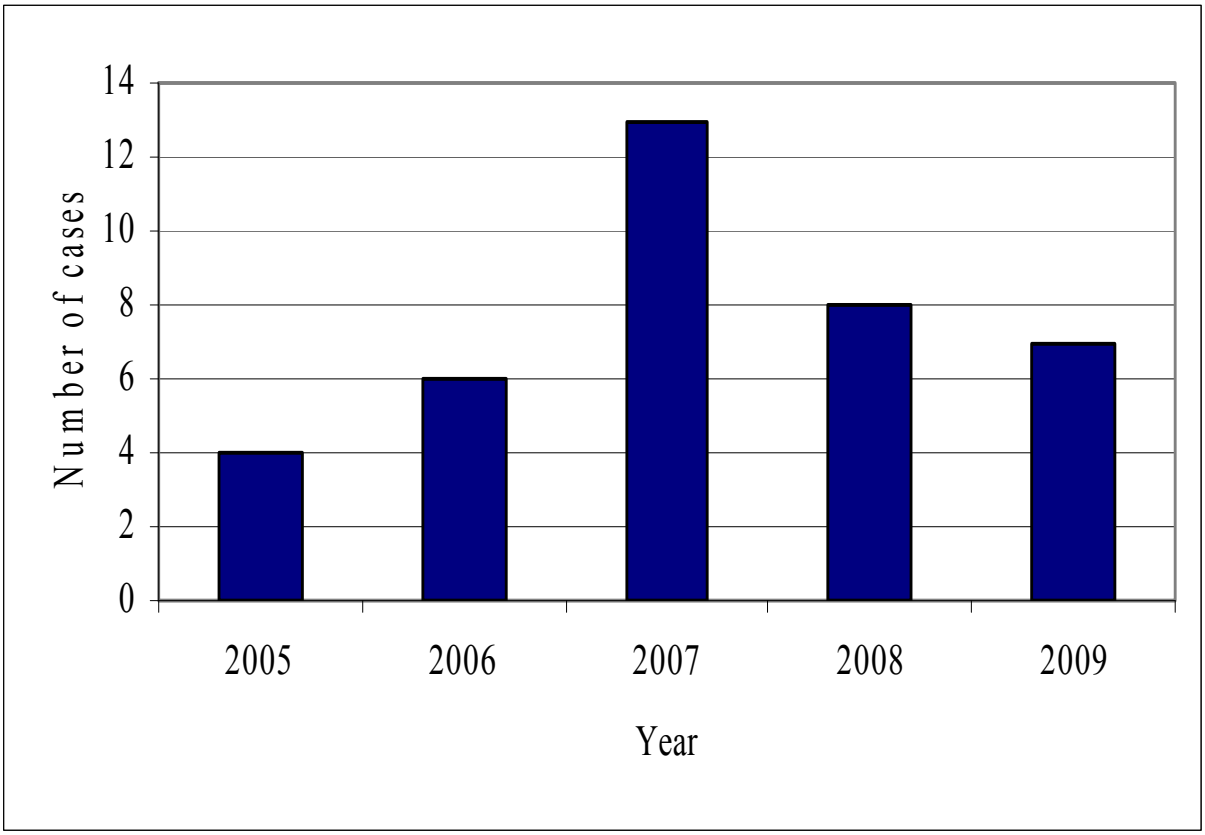

Figure 1. Number of *Haemophilus influenzae* cases (less than 5 years of age) in Michigan, 2005-2009

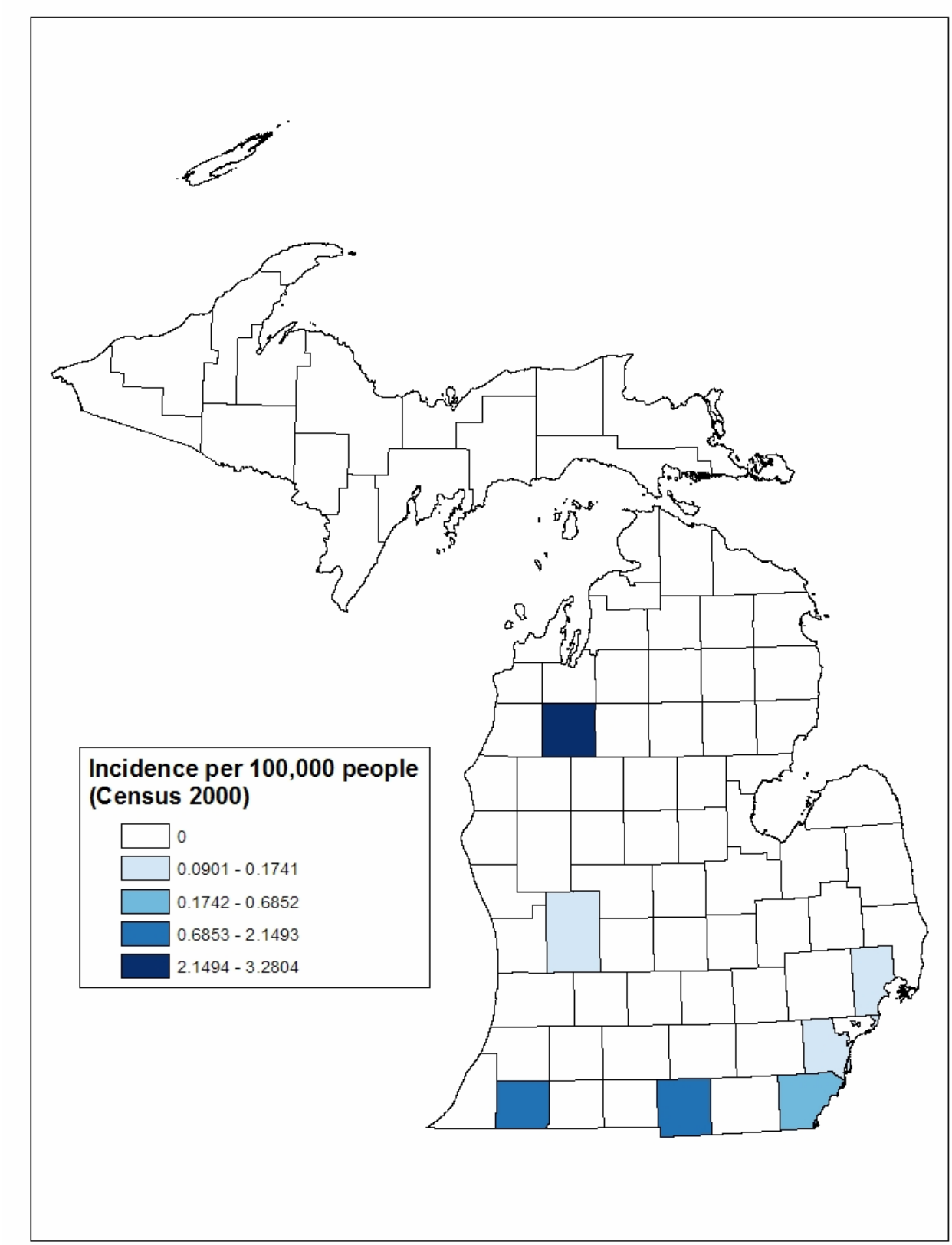

Figure 3. Incidence of *H. influenzae* (<5 years of age) by county, Michigan 2009

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). Symptoms typically resolve after one to two weeks, however, fatigue may continue.

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.

High-risk groups:
Anyone can contract hepatitis A. Children are typically more affected by infection.

Prevention of hepatitis A:
Hand washing after bathroom use, changing of diapers and before food preparation and consumption is critical to prevention. Vaccines are also available for long-term prevention. Immune globulin (Ig) may be used for short-term prevention of hepatitis A virus infection in individuals of all ages. Ig can be given before or within 2 weeks of exposure to hepatitis A.

References:
http://www.cdc.gov/hepatitis/index.htm

American Public Health Association. Viral hepatitis A. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 278 – 284.

Michigan statistics:
Hepatitis A cases reported during 2005 to 2009 totaled 607. Fifty-two percent of cases were female. Over half of the cases were Caucasian (52%). Distribution of cases amongst age groups was similar (range 8% - 18). Four percent of cases were Hispanic or Latino.

Table I. Demographic characteristics of hepatitis A cases by year, Michigan 2005 – 2009

*N=	607	Number of Cases	Percent Total
	Sex		
	Male	285	47%
	Female	316	52%
	Race		
	African American	67	11%
	American Indian or Alaska Native	0	0%
	Asian	19	3%
	Caucasian	316	52%
	Hawaiian or Pacific Islander	0	0%
	Other	61	10%
	Ethnicity		
	Hispanic or Latino	24	4%
	Age groups (years)		
	0-9	71	12%
	10-19	47	8%
	20-29	51	8%
	30-39	67	11%
	40-49	78	13%
	50-59	99	16%
	60-69	79	13%
	≥70	112	18%

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

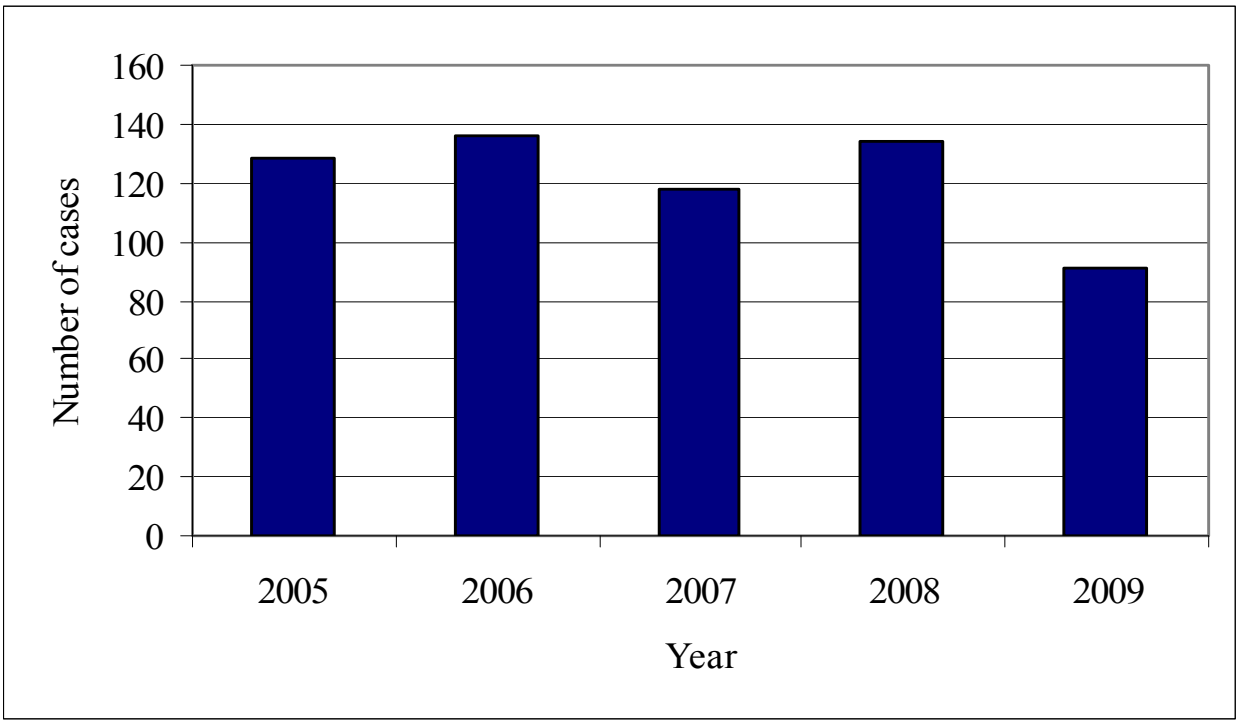

Figure 1. Number of hepatitis A cases in Michigan, 2005-2009

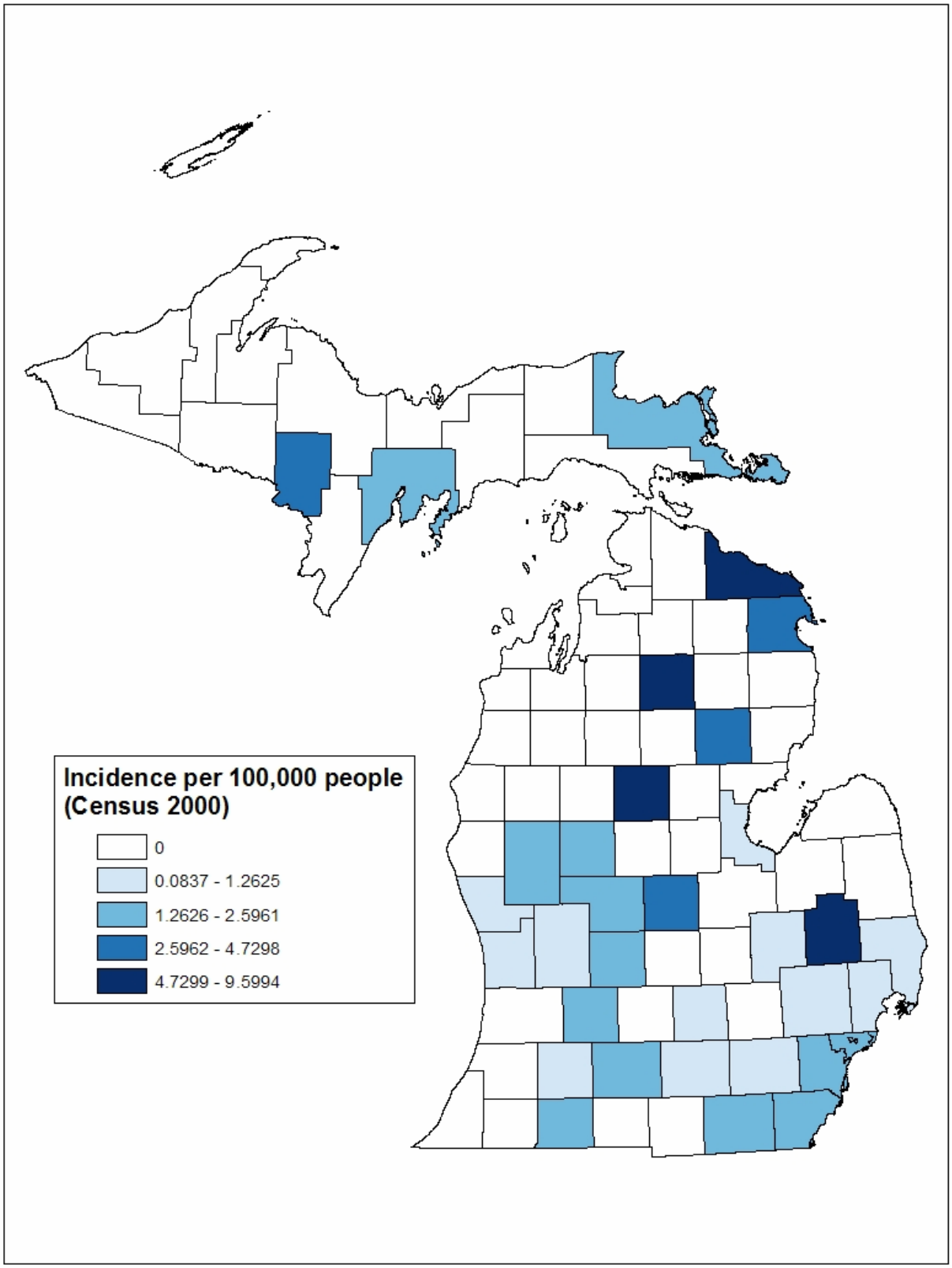

Figure 2. Incidence of hepatitis A by county, Michigan 2009

HEPATITIS C

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

Clinical features:
Persons with HCV infection typically are either asymptomatic or have a mild clinical illness. Eighty percent of infected persons 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, injury with HCV-contaminated needles or syringes or from an infected mother to her baby during birth. 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:
Incubation can be as short as 2 weeks to as long as 6 months. The average incubation period is 6 - 9 weeks. Chronic infection may persist for up to 20 years before onset of liver cirrhosis.

High-risk groups:
The following groups of people are at higher risk of infection than the general population due to their greater likelihood of exposure:

- Injecting drug users
- Recipients of clotting factors made before 1987.
- Recipients of blood and/or solid organs before 1992.
- Health care professionals, physicians, nurses, and lab personnel
- Infants born to HCV infected mothers
- Hemodialysis patients
- Persons that use razors or toothbrushes that were used by a person with HCV
- Persons that have sex with a person infected with HCV

Prevention of hepatitis C:

- There is no vaccine to prevent hepatitis C.
- Do not inject drugs; get into a treatment program and stop. If you can't stop never share needles, syringes, water or 'works' with others and get vaccinated for hepatitis A and B.
- Do not share personal care items that might have blood on them (e.g. razors, toothbrushes).
- Health care workers must always follow routine precautions and safely handle needles and other sharps. Get vaccinated against hepatitis B.
- 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.
- Do not donate blood, organs or tissue if you are HCV positive.

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

References:

http://www.cdc.gov/ncidod/diseases/hepatitis/c/faq.htm

American Public Health Association. Viral hepatitis C. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 293 – 295.

Michigan statistics:

Persons with acute, confirmed hepatitis C infections totaled 448 cases during 2005 to 2009. The majority of cases were male (56%). Over one-half of cases were Caucasians (56%) followed by African American (13%). Approximately half of the reported acute cases were between the ages of 40 – 59 years (32% age 40-49 years, 21% age 50-59 years). Two percent of cases were Hispanic or Latino.

Table 1. Demographic characteristics of confirmed acute hepatitis C cases, Michigan 2005-2009

*N= 448	Number of Cases	Percent Total
Sex		
Male	251	56%
Female	183	41%
Race		
African American	58	13%
American Indian or Alaska Native	9	2%
Asian	1	0%
Caucasian	249	56%
Hawaiian or Pacific Islander	0	0%
Other	6	1%
Ethnicity		
Hispanic or Latino	11	2%
Age groups (years)		
0-9	1	0%
10-19	21	5%
20-29	91	20%
30-39	71	16%
40-49	142	32%
50-59	95	21%
60-69	23	5%
≥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.

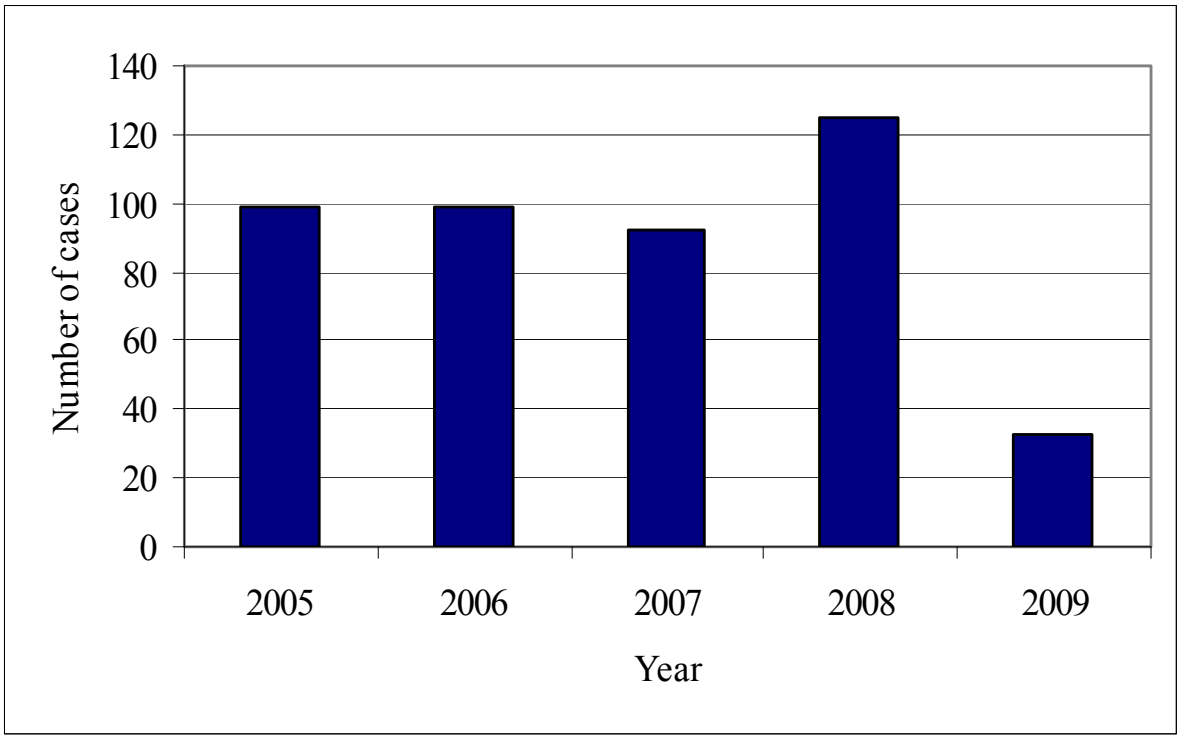

Figure 1. Number of confirmed acute hepatitis C cases in Michigan, 2005-2009

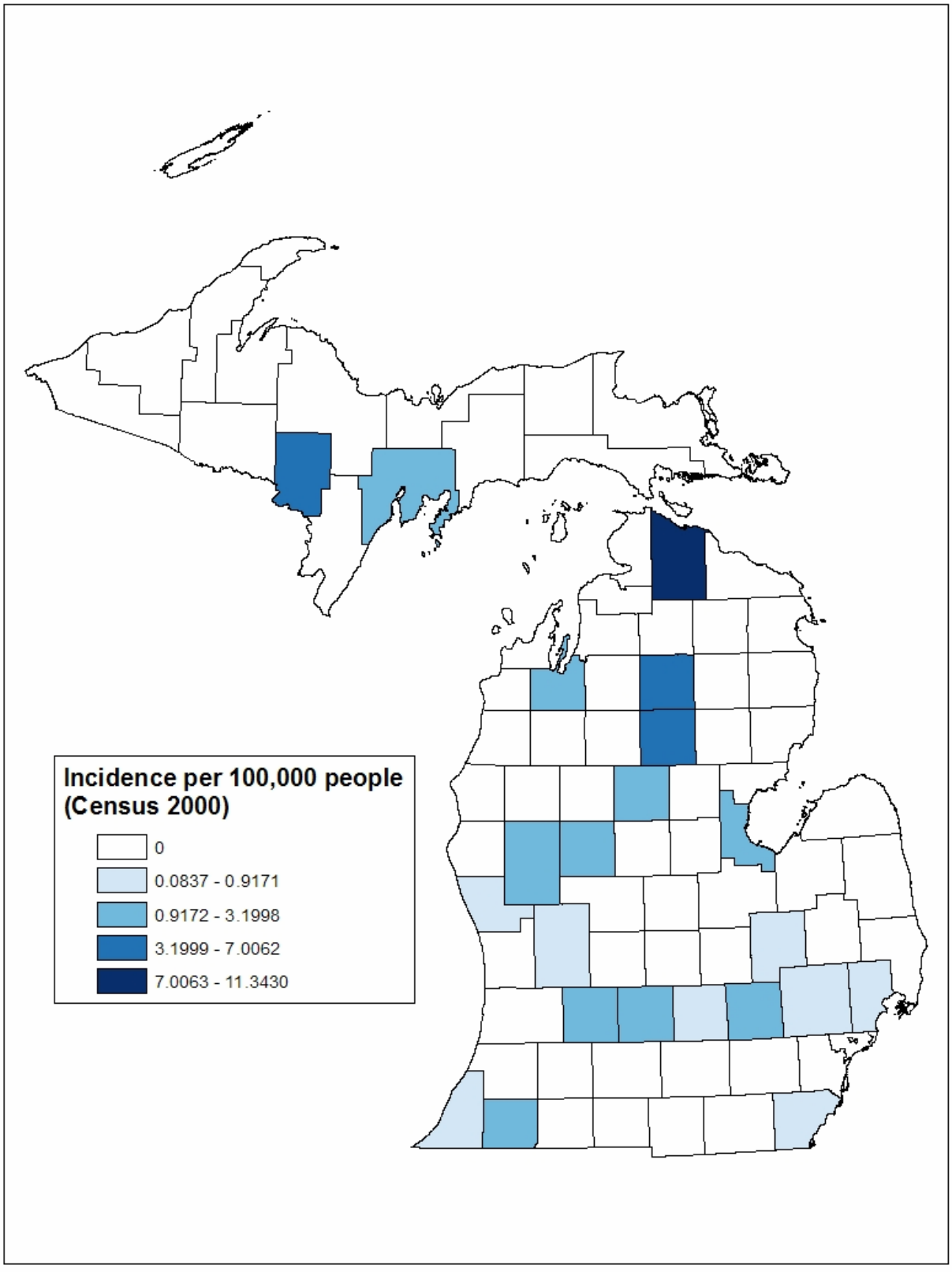

Figure 2. Incidence of acute hepatitis C by county, Michigan 2009

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. Additional pathogens may easily invade the body with a weakened immune system. This allows for opportunistic diseases to develop. Most people infected with HIV develop detectable antibodies within 1-3 months after infection. However, infected persons may remain free of signs or symptoms for several months to years. Clinical illness may include lymphadenopathy (swollen lymph nodes), chronic diarrhea, weight loss, fever, and fatigue. The severity of HIV related illness is related to the degree of immune dysfunction**.**

Mode of Transmission:
HIV is found in blood, semen and vaginal fluid of an infected person. HIV transmission occurs via sexual contact (e.g. anal, vaginal or oral) with someone infected, sharing needles or syringes contaminated with HIV, being exposed to the virus before or during birth, or through breastfeeding. The main risk behaviors associated with HIV infection are males having sex with males, 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 casual day-to-day contact, such as shaking hands, hugging, touching door knobs, sitting on toilet seats, using drinking fountains, sharing dishes, having pets, or eating food. Mosquitoes do not transmit the virus.

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

High-risk groups:
Persons at higher risk for infection include those who have:

- Injected drugs or steroids, during which equipment (such as needles, syringes, cotton, water) and blood were shared with others
- Had unprotected (sex without using condoms) vaginal, anal or oral sex with men who have sex with men, person of multiple partners or anonymous partners
- Exchanged sex for drugs or money

- Been given a diagnosis of, or been treated for, hepatitis, tuberculosis (TB) or a sexually transmitted disease (STD) such as syphilis
- Received a blood transfusion or clotting factor during 1978–1985
- Had unprotected sex with someone who has any of the risk factors listed above

Prevention of AIDS/HIV:
High-risk sexual behavior should be avoided at all times. Latex condoms used consistently and correctly are highly effective in preventing transmission of HIV. Cessation of injection drug use or not sharing needles, syringes or other works is important to preventing AIDS/HIV. High-risk individuals should get tested for HIV once yearly.

References:
http://www.cdc.gov/hiv/topics/basic/index.htm

American Public Health Association. Acquired immunodeficiency syndrome. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 1 – 9.

Michigan statistics:
Compared to the entire U.S., Michigan has moderate HIV/AIDS morbidity, with 70% of infections occurring in residents of the Detroit area. Nationally racial and ethnic minorities have been disproportionately affected by HIV/AIDS since the beginning of the epidemic. In Michigan, for the years 2005-2009 62% of new HIV diagnoses occurred in African Americans, who make up only14% of Michigan's population. The prevalence of HIV in Michigan has increased as those with HIV are living longer; largely due to improved treatment. Currently an estimated 18,200 Michigan residents are living with HIV. Over 4,000 of these cases were diagnosed between 2005 and 2009. Five percent of new diagnoses were Hispanic or Latino. Over three-fourths of diagnoses occurred in persons between the ages of 20 – 49 years (28% age 20-29 years, 26% age 30-39 years, 24% age 40-49 years).

Table 1. Demographic characteristics of HIV/AIDS diagnosis, Michigan 2005-2009

*N= 4,142	Number of HIV Diagnosis	Percent Total
Sex		
Male	3,198	77%
Female	944	23%
Race		
African American	2,584	62%
American Indian or Alaska Native	10	0%
Asian, Hawaiian or Pacific Islander	29	1%
Caucasian	1,244	30%
Other	85	2%
****Ethnicity**		
Hispanic or Latino	190	5%
Age groups (years) at HIV Diagnosis		
0-9	18	0%
10-19	325	8%
20-29	1,153	28%
30-39	1,060	26%
40-49	1,007	24%
50-59	454	11%
60-69	108	3%
≥70	17	0%

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

** In this report, persons described as white, black, Asian/Pacific Islander (PI), or American Indian/Alaska Native (AN) are all non-Hispanic; persons described as Hispanic might be of any race.

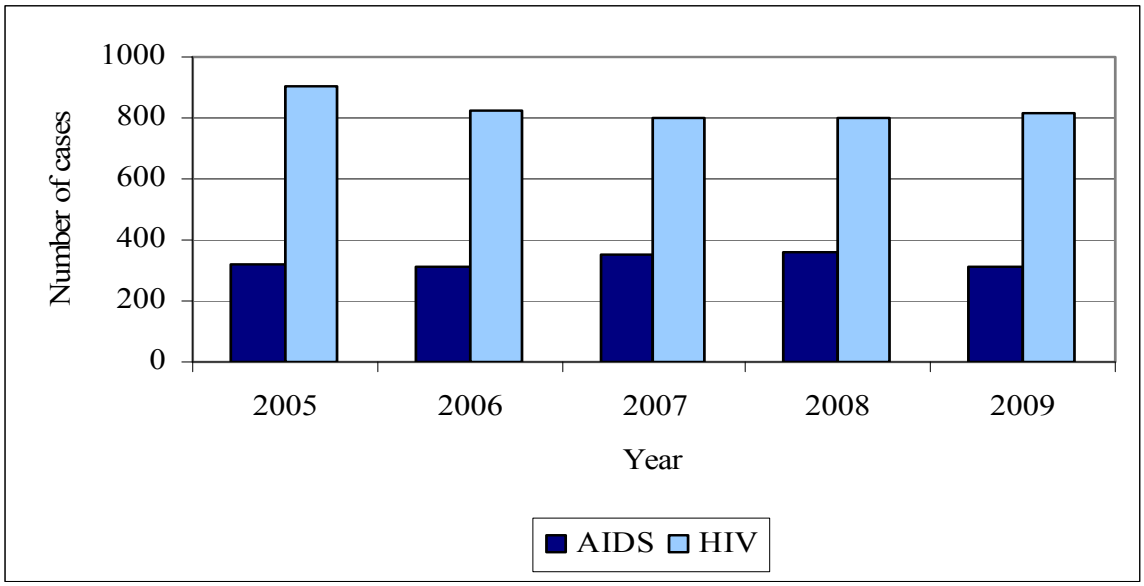

Figure 1. Number of HIV[1] and AIDS[2] cases[3] in Michigan, 2005-2009

[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

[3] Note: HIV cases include all persons diagnosed with HIV or AIDS (including deceased cases). Therefore, the AIDS section is a subset of the HIV section

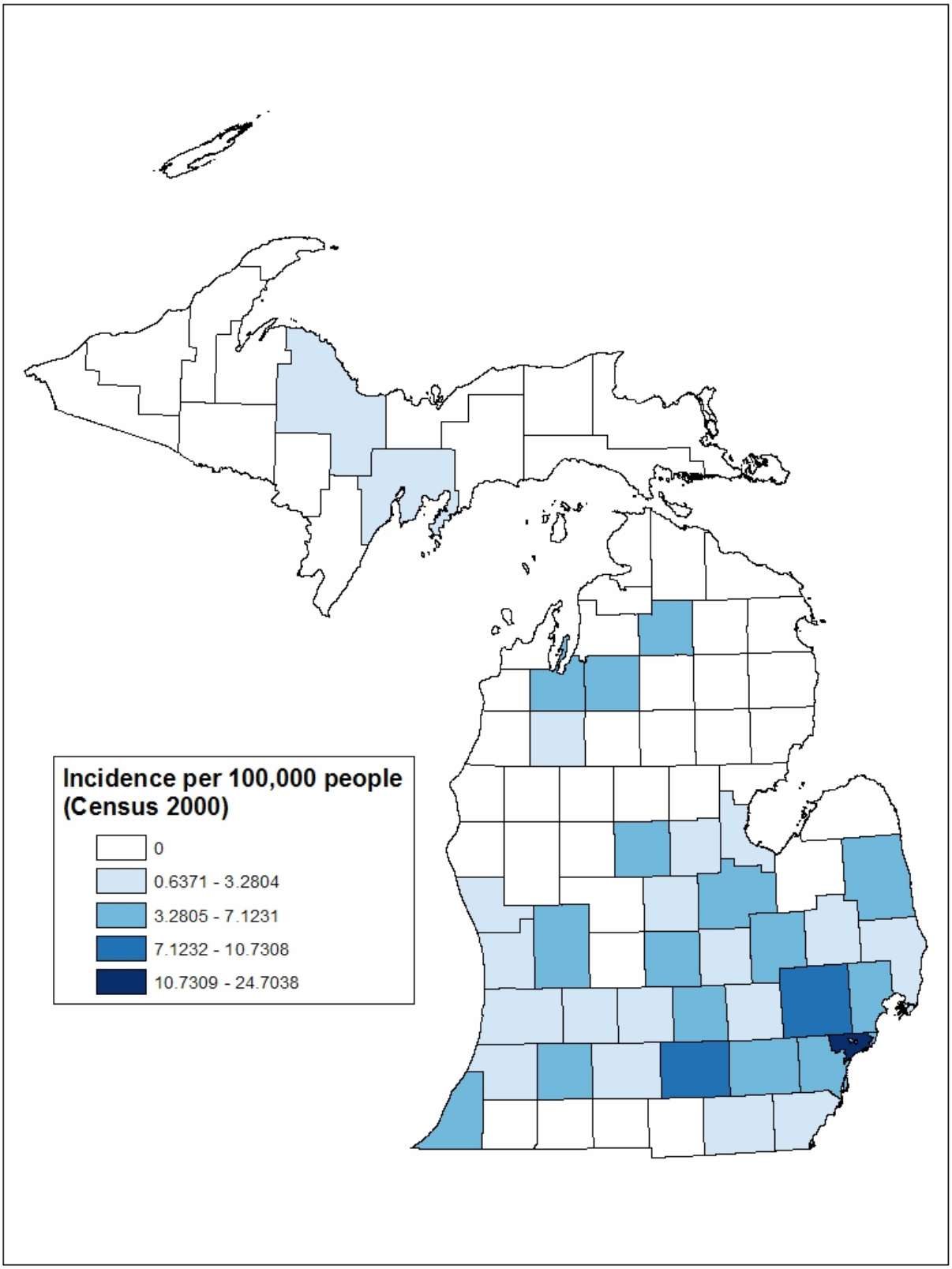

Figure 2. Incidence of HIV/AIDS by county, Michigan 2009

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. Stomach symptoms such as nausea, vomiting and diarrhea can also occur. Children are more likely than adults to display gastrointestinal symptoms.

Mode of transmission:
Influenza is spread through contact with droplets from the nose and throat of an infected person during coughing and sneezing. People may become infected after touching something with the flu virus on it and then touching their mouth or nose.

Period of communicability:
The contagious period varies. It usually begins the day before symptoms appear and lasts approximately one week.

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

High-risks groups:
Some people are more susceptible to influenza complications. Young children, the elderly, those with certain health conditions (e.g. asthma, heart disease, diabetes, or immune-compromised) have higher susceptibility to complications.

Prevention of influenza:
The mouth and nose should be covered with a disposable tissue during coughing or sneezing. Frequent hand washing with soap and water for at least 20 seconds is critical to prevention. 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.

References:
http://www.flu.gov

www.michigan.gov/flu

American Public Health Association. Influenza. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 315 - 331.

Michigan statistics:
Surveillance for influenza in Michigan depends mostly on sentinel physician reporting (Figure 1 and 2) 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. For the most current information regarding influenza, please visit www.michigan.gov/flu.

The 2009-2010 influenza season (defined as April 26, 2009 to May 29, 2010) saw the emergence and progression of a worldwide pandemic due to an influenza A (H1N1) virus. This virus was originally labeled as swine origin, but it is a human-adapted triple reassortant virus, consisting of swine, avian and human influenza genes. The 2009 influenza A (H1N1) pandemic was the first influenza pandemic in 40 years.

The 2009-2010 influenza season had a markedly elevated level of activity compared to not only the 2008-2009 influenza season, but any previous influenza seasons in which similar surveillance methods were in place. The first pandemic influenza A (H1N1) virus isolated at the Michigan Department of Community Health (MDCH) Bureau of Laboratories was announced on April 27, 2009. While a small peak of pandemic influenza A (H1N1) activity was seen at the end of May during the first pandemic wave, the true peak of the season occurred in late October during the second pandemic wave. Pandemic influenza A (H1N1) viruses predominated during this season; other influenza virus subtypes were virtually nonexistent. Michigan reported "widespread" statewide influenza activity (the highest level of reporting to the Centers for Disease Control and Prevention) for seven straight weeks: from the week ending October 17, 2009 through the week ending November 28, 2009. Peak activity in Michigan during fall 2009 occurred slightly later than most other states.

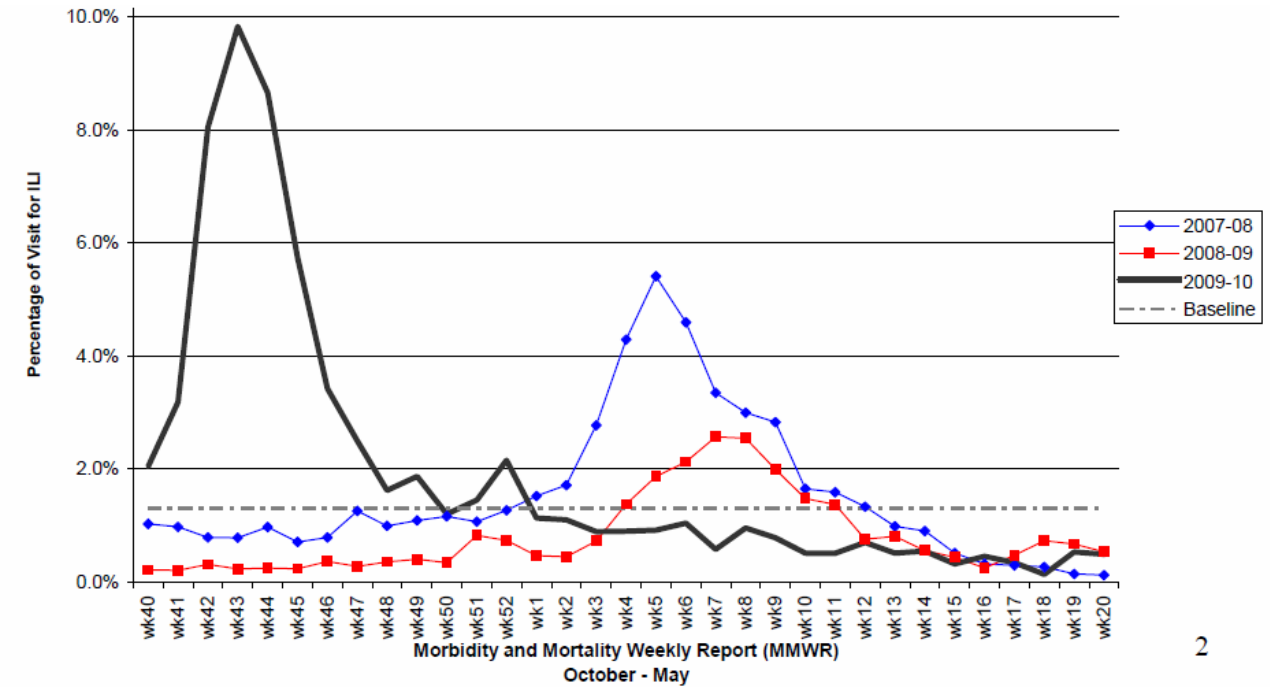

Figure 1. Percentage of ILI visits reported by Michigan sentinel physicians, 2007 – 2010

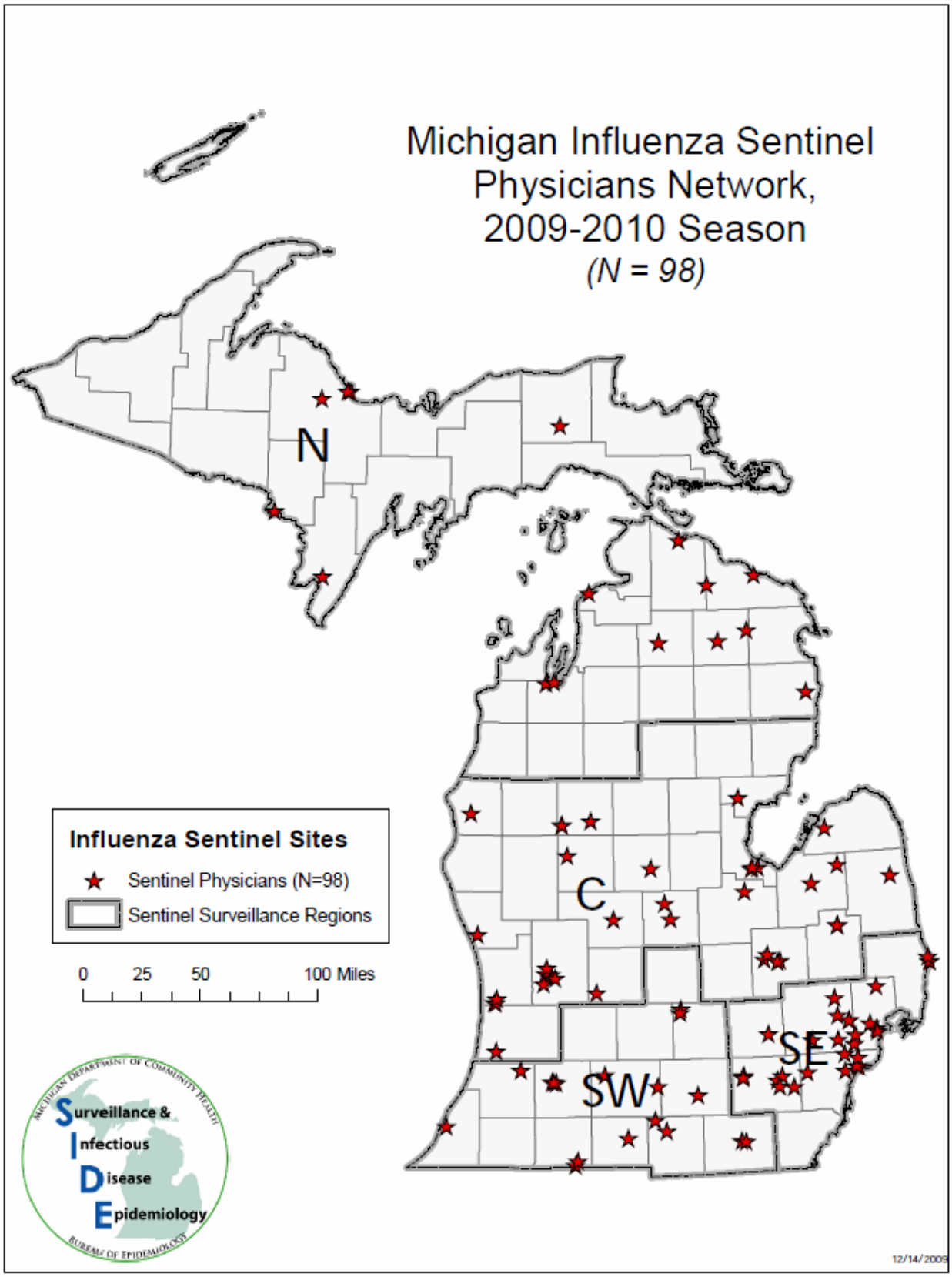

Figure 2. Influenza sentinel physician sites, Michigan 2009 – 2010

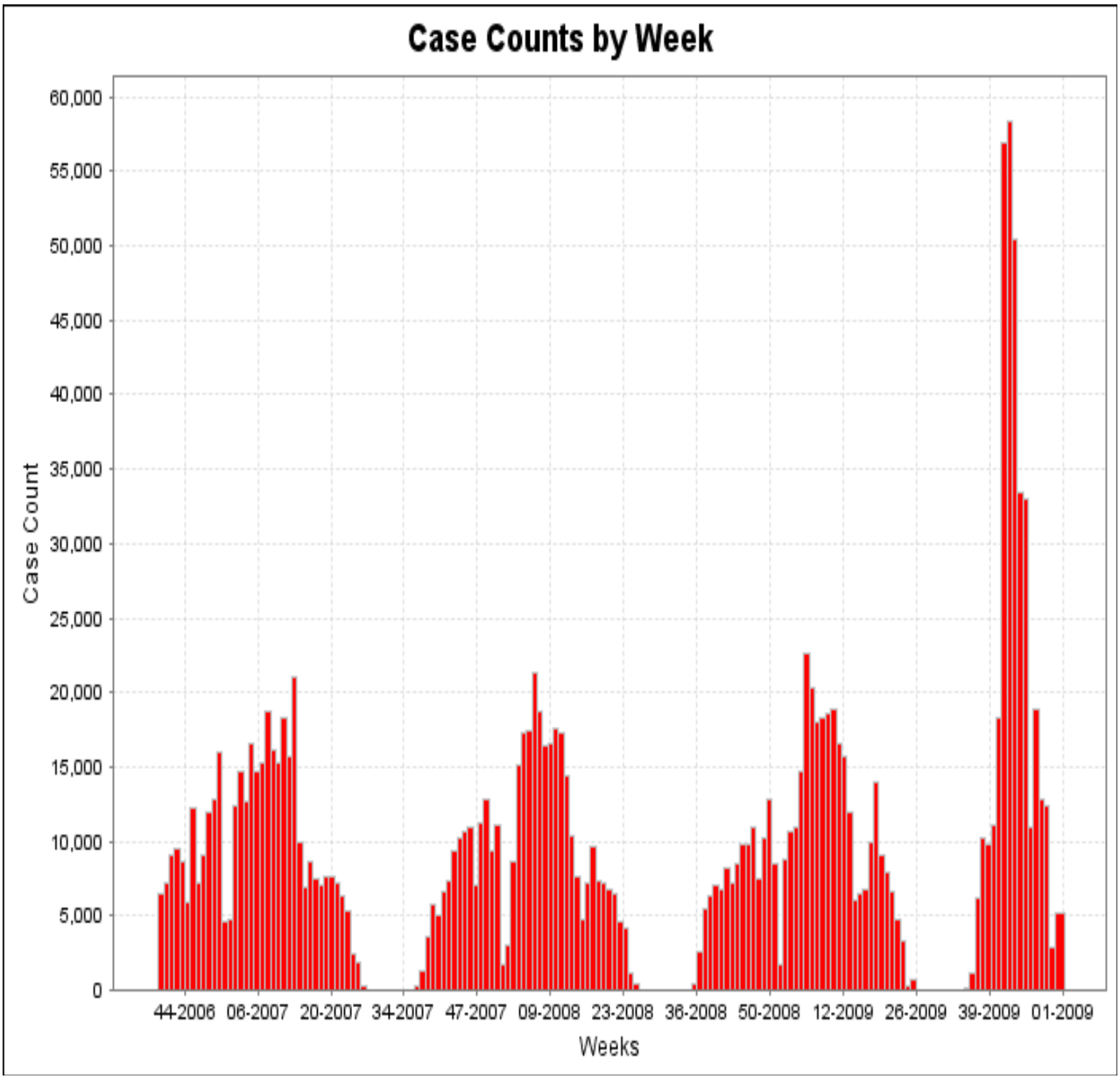

Figure 2. Aggregate and individual counts of influenza-like illness, by MMWR week, October 1, 2006 – Dec 31, 2009

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 a more severe illness because it causes mild to severe pneumonia

Clinical features:
The early symptoms of legionellosis may be influenza-like with muscle aches, headache, tiredness, dry cough, 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 (e.g. water heaters and air-conditioning systems) in their homes, workplaces, hospitals, or other public places. *Legionella* bacteria live in the environment. Therefore, groups of persons who are exposed to a common source of water mist can be exposed to the bacteria at the same time. A legionella outbreak can occur when several group members become sick from exposure to the same source. 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:
The incubation period for Legionnaires' disease is usually 2 to 14 days. The incubation period for Pontiac fever is typically less than 2 days.

High-risk groups:
People of any age can get legionellosis but the disease most often affects elderly persons, as well as, those who smoke or who have chronic lung disease (e.g. emphysema). Those with underlying illnesses such as cancer, diabetes, kidney failure, or lowered immune system are also at higher risk.

Prevention of legionellosis:
Cooling towers should be drained when not in use and should have regular maintenance and cleaning 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. Maintaining hot water system temperatures at 50ºC (122ºF) or higher may reduce the risk of transmission. Do not swim in pools or fountains that appear unclean.

References:
http://www.cdc.gov/legionella/index.htm

American Public Health Association. Legionellosis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 337 - 340.

Michigan statistics:
Reported legionellosis during 2005 – 2009 totaled 845 cases. Cases were primarily men (62%). Age analysis of legionellosis showed that almost three-fourths of cases reported were found to be in persons 50 years and older (27% age 50 - 59, 21% age 60 – 69, 21% age 70+). Caucasians (57%) and African Americans (21%) had the highest incidence of disease. One percent of reported cases were Hispanic or Latino.

Table 1. Demographic characteristics of legionellosis cases, Michigan 2005-2009

*N=	845	Number of Cases	Percent Total
	Sex		
	Male	524	62%
	Female	317	38%
	Race		
	African American	177	21%
	American Indian or Alaska Native	5	1%
	Asian	1	0%
	Caucasian	480	57%
	Hawaiian or Pacific Islander	0	0%
	Other	12	1%
	Ethnicity		
	Hispanic or Latino	5	1%
	Age groups (years)		
	0-9	2	0%
	10-19	6	1%
	20-29	30	4%
	30-39	66	8%
	40-49	158	19%
	50-59	228	27%
	60-69	175	21%
	≥70	180	21%

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

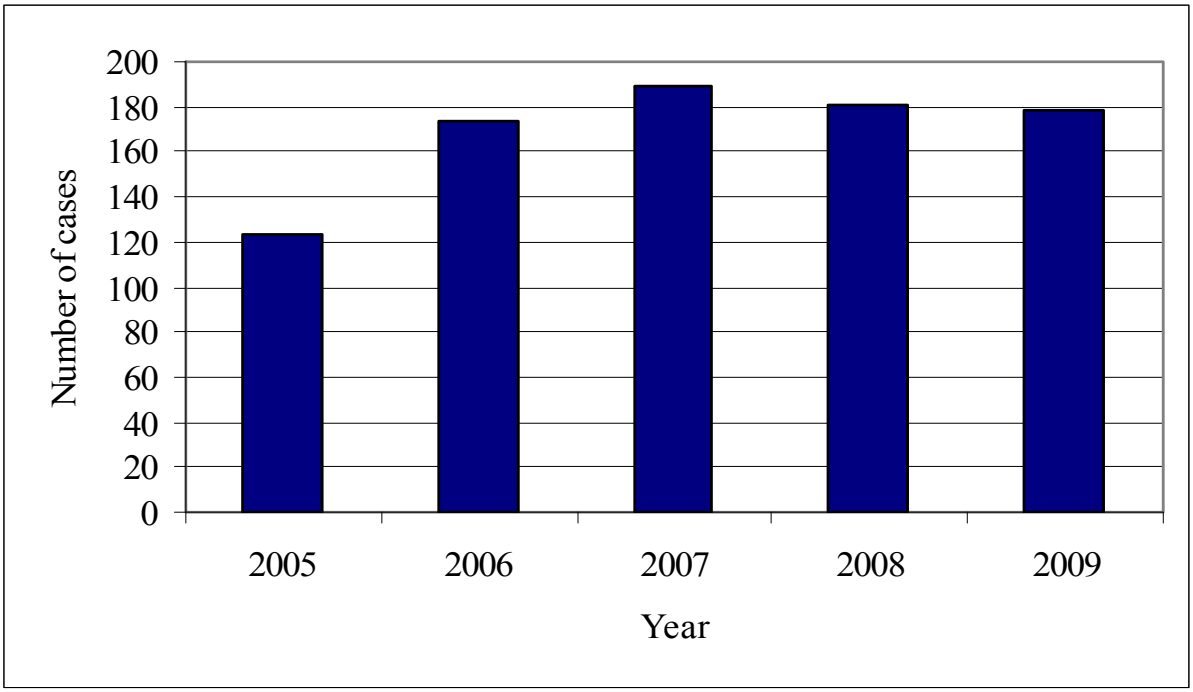

Figure 1. Number of legionellosis cases in Michigan, 2005-2009

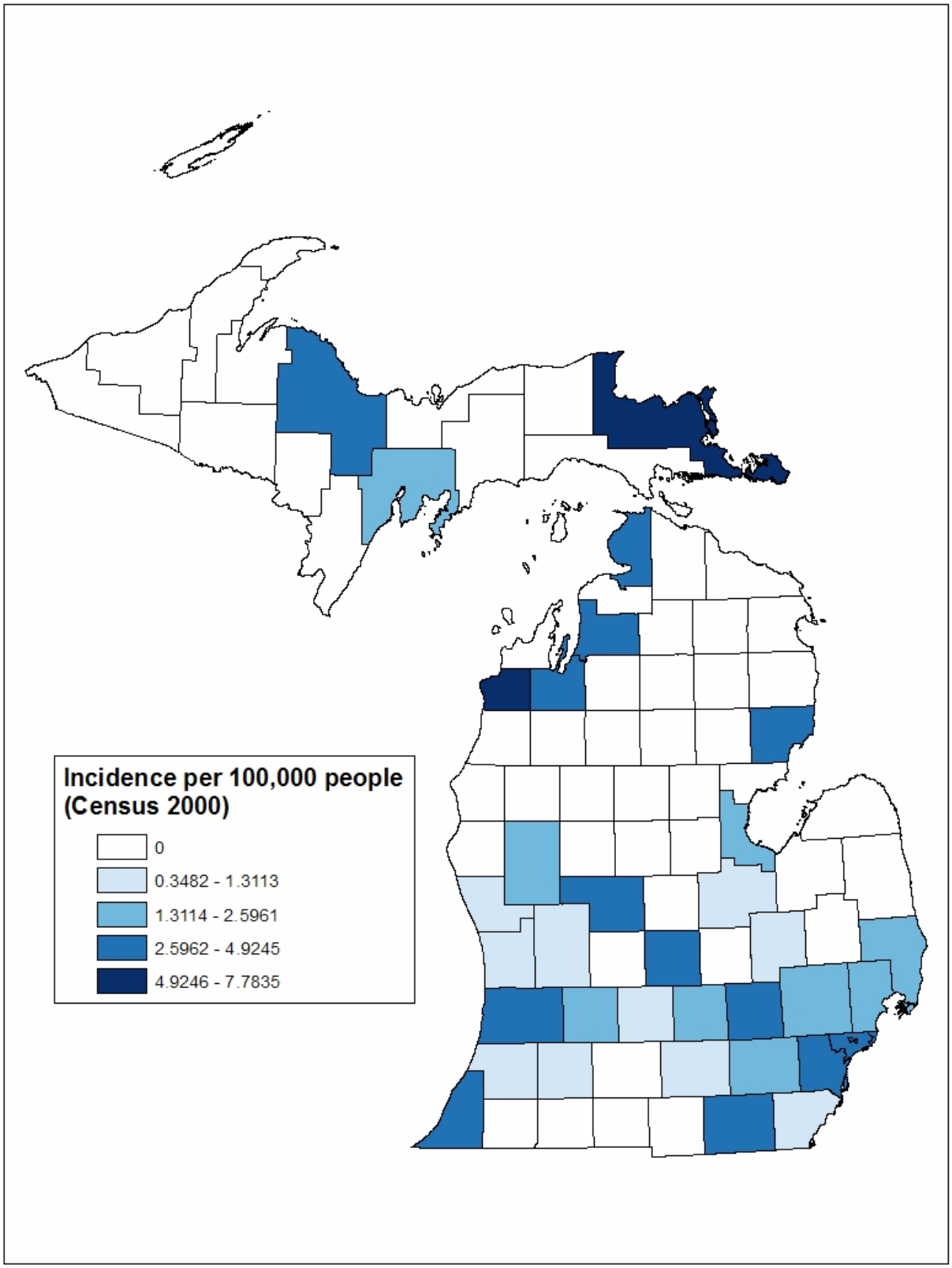

Figure 2. Incidence of legionellosis by county, Michigan 2009

LISTERIOSIS

Causative agent:
Listeria is caused by the bacteria known as *Listeria monocytogenes*.

Clinical features:
Listeriosis causes fever and flu-like symptoms such as fever, muscle aches, 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. Infected pregnant women may only experience mild flu-like symptoms. However, infections during pregnancy can result in miscarriage, stillbirth, premature delivery, or illness in the newborn.

Mode of transmission:
The main route of transmission is oral by ingestion of contaminated food. Other routes include vertical transmission from infected mother to newborns. *Listeria monocytogenes* is found in soil and water. Vegetables can become contaminated from soil or manure used as fertilizer. The bacterium has been found in a variety of raw foods (e.g. uncooked meats and vegetables) and processed foods that become contaminated after handling (e.g. soft cheeses and cold cuts at the deli counter). Unpasteurized (raw) milk or foods made from unpasteurized milk may contain the bacterium. *Listeria* is killed by pasteurization and cooking. Certain ready-to-eat foods such as hot dogs and deli meats may be contaminated after cooking but before packaging.

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. The average incubation period is 3 weeks.

High-risk groups:
Pregnant women, newborns and persons with weakened immune systems are more likely to be vulnerable to *Listera* infections.

Prevention of listeriosis:
The risk of listeriosis can be reduced by thoroughly cooking all raw animal products. Vegetables and fruits should be washed before eating. Uncooked meats should be kept 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.

In addition to the above recommendations, pregnant women, the elderly and those with weakened immune systems should also:

- Not eat hot dogs, luncheon meats or deli meats unless they are reheated until steaming hot.
- Avoid getting fluid from hot dog packages on other foods, utensils and food preparation surfaces; and wash hands after handling hot dogs, luncheon meats and deli meats.

- Do not eat soft cheeses such as feta, Brie, Camembert, blue-veined cheeses, or Mexican-style cheeses such as queso blanco, queso fresco, and Panela, unless they have labels that clearly state they are made from pastuerized milk.
- Do not eat refrigerated pâtés or meat spreads. Canned or shelf-stable pâtés and meat spreads may be eaten.
- Do not eat refrigerated smoked seafood unless it is contained in a cooked dish, such as a casserole. Refrigerated smoked seafood, such as salmon, trout, whitefish, cod, tuna, or mackerel, is most often labeled as "nova-style," "lox," "kippered," "smoked," or "jerky." The fish is found in the refrigerator section or sold at deli counters of grocery stores and delicatessens. Canned or shelf-stable smoked seafood may be eaten.

References:

http://www.cdc.gov/nczved/dfbmd/disease_listing/listeriosis_gi.html

American Public Health Association. Listeriosis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 357 - 361.

Michigan statistics:

For the 2005 – 2009 time period, a total of 118 cases of listeria were reported in Michigan. Fifty-four percent of the cases were female. The majority (46%) of cases were in persons age 70 and older. Caucasians (64%) and African Americans (14%) had the highest incidence of disease. Two percent of reported cases were Hispanic or Latino.

Table 1. Demographic characteristics of listeriosis cases, Michigan 2005-2009

*N=	118	Number of Cases	Percent Total
	Sex		
	Male	53	45%
	Female	64	54%
	Race		
	African American	17	14%
	American Indian or Alaska Native	0	0%
	Asian	1	1%
	Caucasian	75	64%
	Hawaiian or Pacific Islander	0	0%
	Other	2	2%
	Ethnicity		
	Hispanic or Latino	2	2%
	Age groups (years)		
	0-9	7	6%
	10-19	3	3%
	20-29	5	4%
	30-39	4	3%
	40-49	6	5%
	50-59	19	16%
	60-69	19	16%
	≥70	54	46%

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

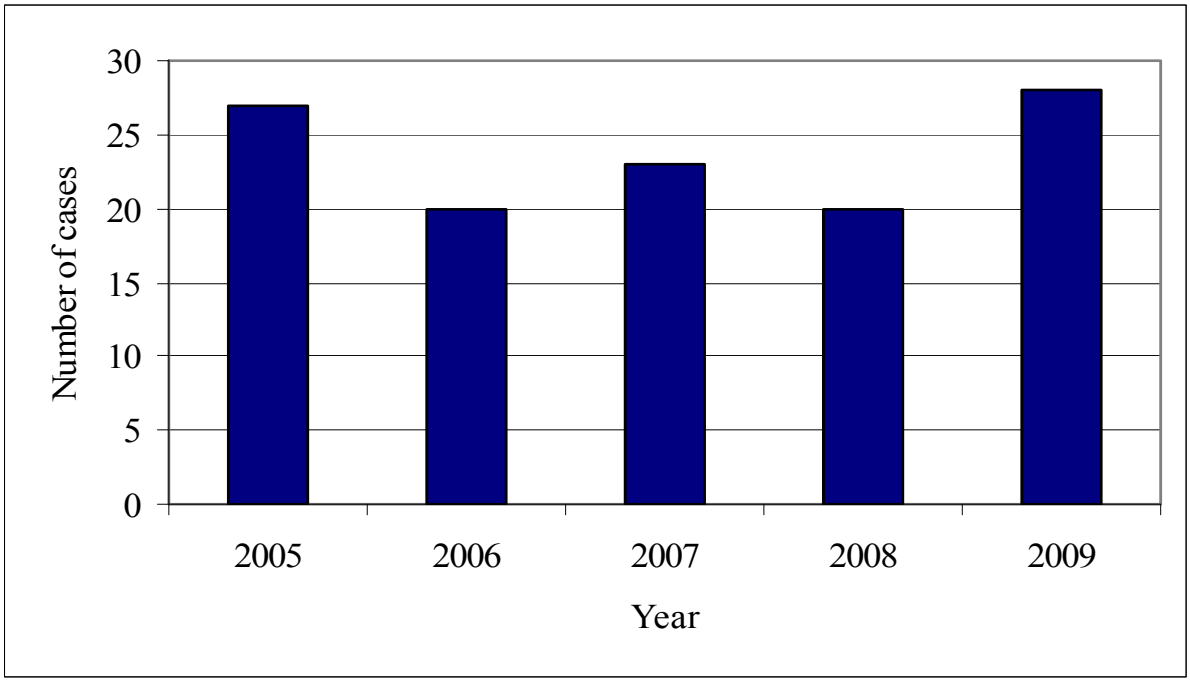

Figure 1. Number of listeriosis cases in Michigan, 2005-2009

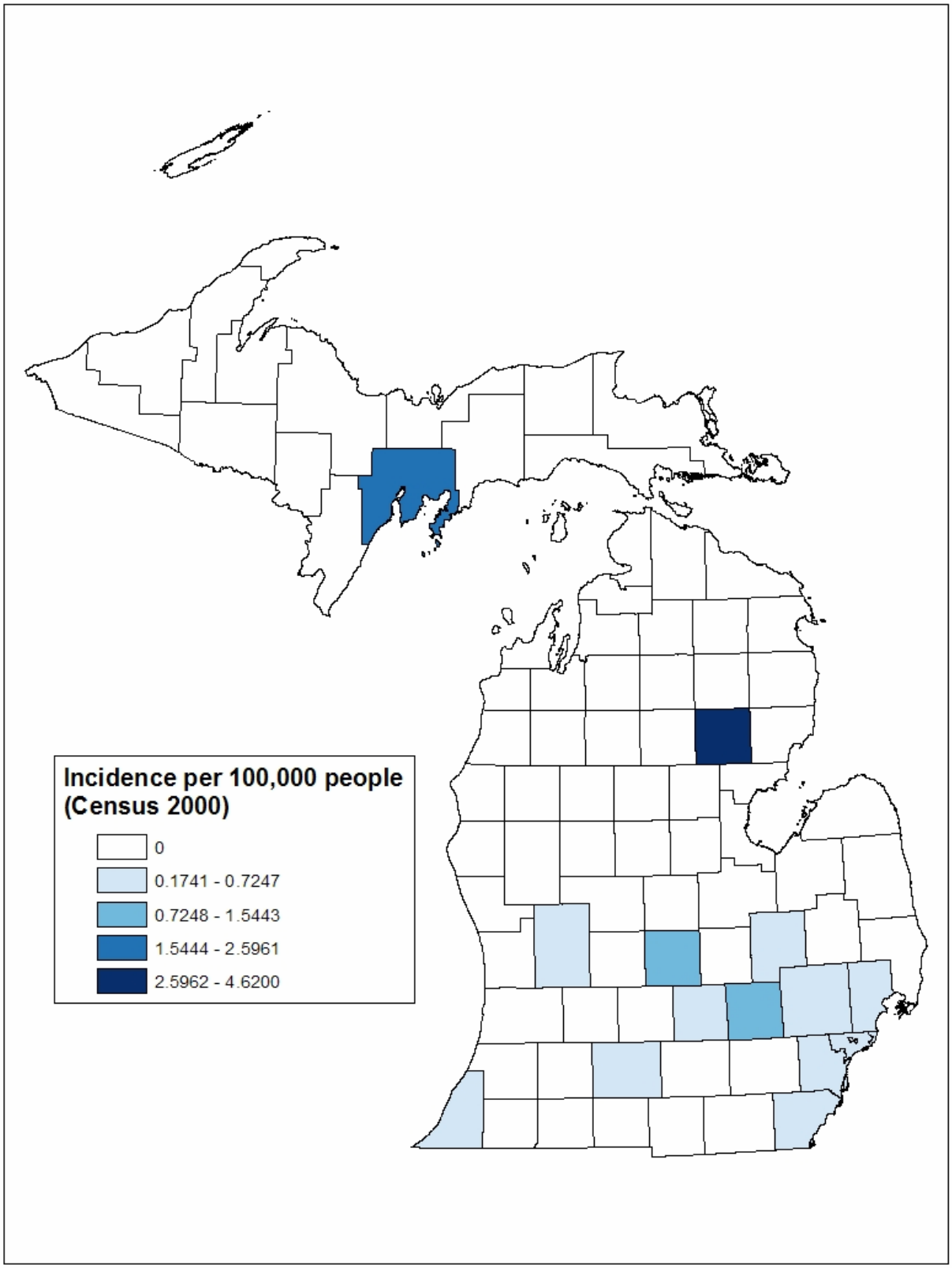

Figure 2. Incidence of listeriosis by county, Michigan 2009

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 bacterium can infect several areas of the body resulting in different symptoms at different times. Not all patients with Lyme disease will have all symptoms. The illness starts with a circular red rash in 70-80% of patients at or near the site of the tick bite after a delay of 3 - 30 days. A distinctive feature of the rash is that it gradually expands in size and may become as large as 12 inches in diameter. It may be warm but usually isn't painful. Often there may be a clearing in the center of the rash resulting in a "bull's-eye" appearance. Along with the rash, other "influenza-like" symptoms may appear such as fever, chills, headache, fatigue, stiff neck, muscle aches, joint pain, and swollen lymph nodes. 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.

Untreated Lyme disease
If the patient is not treated, the infection may spread to other parts of the body producing some of the following symptoms: loss of muscle tone on one or both sides of the face (called facial or "Bell's palsy), severe headaches and neck stiffness due to meningitis, shooting pains that may interfere with sleep, heart palpitations and dizziness due to changes in heartbeat, and pain that moves from joint to joint. After several months, approximately 60% of patients with untreated infection will begin to have intermittent bouts of arthritis, with severe joint pain and swelling. Large joints are most often affected (particularly the knees). In addition, up to 5% of untreated patients may develop chronic neurological complaints months to years after infection. These include shooting pains, numbness or tingling in the hands or feet, problems with concentration, and short-term memory loss.

Treated Lyme disease
Most cases of Lyme disease can be cured with antibiotics, especially if treatment is begun early in the course of illness. However, a small percentage of patients with Lyme disease have symptoms that last months to years after treatment with antibiotics. These symptoms can include muscle and joint pains, arthritis, cognitive defects, sleep disturbance, or fatigue. The cause of these symptoms is not known. There is some evidence that they result from an autoimmune response in which a person's immune system continues to respond even after the infection has been cleared.

Mode of transmission:
In the northeastern and north-central United States these bacteria are spread to humans from the bite of an infected black-legged (deer) 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. Research has shown that infection is unlikely if the tick is removed within 24 hours and removal within 48 hours greatly reduces the risk of illness. Lyme disease is most common during the spring and summer months when ticks are most active and people are frequently outdoors.

Period of communicability:

No evidence of natural transmission from person-to-person has been documented.

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

High-risk groups:
Anyone can get Lyme disease. Campers, hikers and others who frequent wooded, brushy and grassy places where ticks are found are at higher risk for infection.

Prevention of Lyme disease:

- Know where to expect ticks. Ticks like warm, moist environments especially in or near woody or grassy areas. Avoid tick-infested areas, especially during the months of May, June and July.
- Walk in the center of trails to avoid overhanging grass and brush.
- Wear white colored clothing, which allows you to see ticks crawling on your clothing.
- Wear long sleeves, long pants, socks, and closed toe shoes when outdoors in possible tick-infested areas.
- Check your body for ticks after being outdoors in a potentially tick-infested area. Check your children and pets for ticks after returning from tick-infested areas.
- Use a repellant containing DEET or permethrin (e.g. on clothing, shoes or camping equipment). Always follow product instructions.
- Prevent ticks on pets by contacting your veterinarian for tick prevention advice. There are several topical products available for tick prevention. Read and follow label instructions.
- Immediately remove any attached tick on your body gently with tweezers. Watch for signs of rash or illness and contact your healthcare provider if these develop.

References:
http://www.cdc.gov/ncidod/dvbid/lyme/index.htm

http://www.michigan.gov/emergingdiseases/0,1607,7-186-25890---,00.html

http://www.cdc.gov/Features/StopTicks/

Michigan statistics:
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.

Michigan has had a total of 367 cases reported during 2005 – 2009. Over half of the cases were male (57%). Seventy-eight percent of cases were Caucasian. Hispanic or Latino cases totaled one percent. The majority of cases occurred in persons between the ages of 41 – 60 years (17% 41 – 50 years, 20% 51 – 60 years).

Table I. Demographic characteristics of Lyme disease cases by year, Michigan 2005 – 2009

*N=	367	Number of Cases	Percent Total
	Sex		
	Male	209	57%
	Female	158	43%
	Race		
	African American	0	0%
	American Indian or Alaska Native	2	1%
	Asian	2	1%
	Caucasian	286	78%
	Hawaiian or Pacific Islander	0	0%
	Other	77	21%
	Ethnicity		
	Hispanic or Latino	2	1%
	Age groups (years)		
	0-10	45	12%
	11-20	55	15%
	21-30	44	12%
	31-40	31	8%
	41-50	64	17%
	51-60	74	20%
	61-70	31	8%
	≥71	23	6%

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

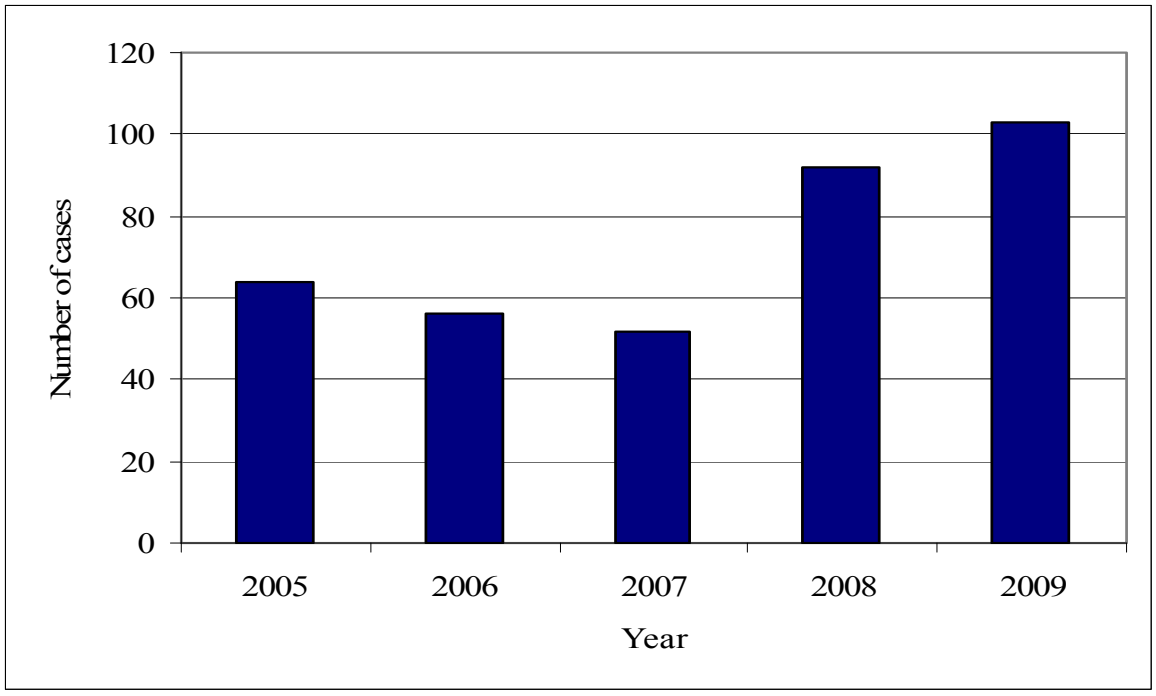

Figure I. Number of Lyme cases by year, Michigan 2005 - 2009

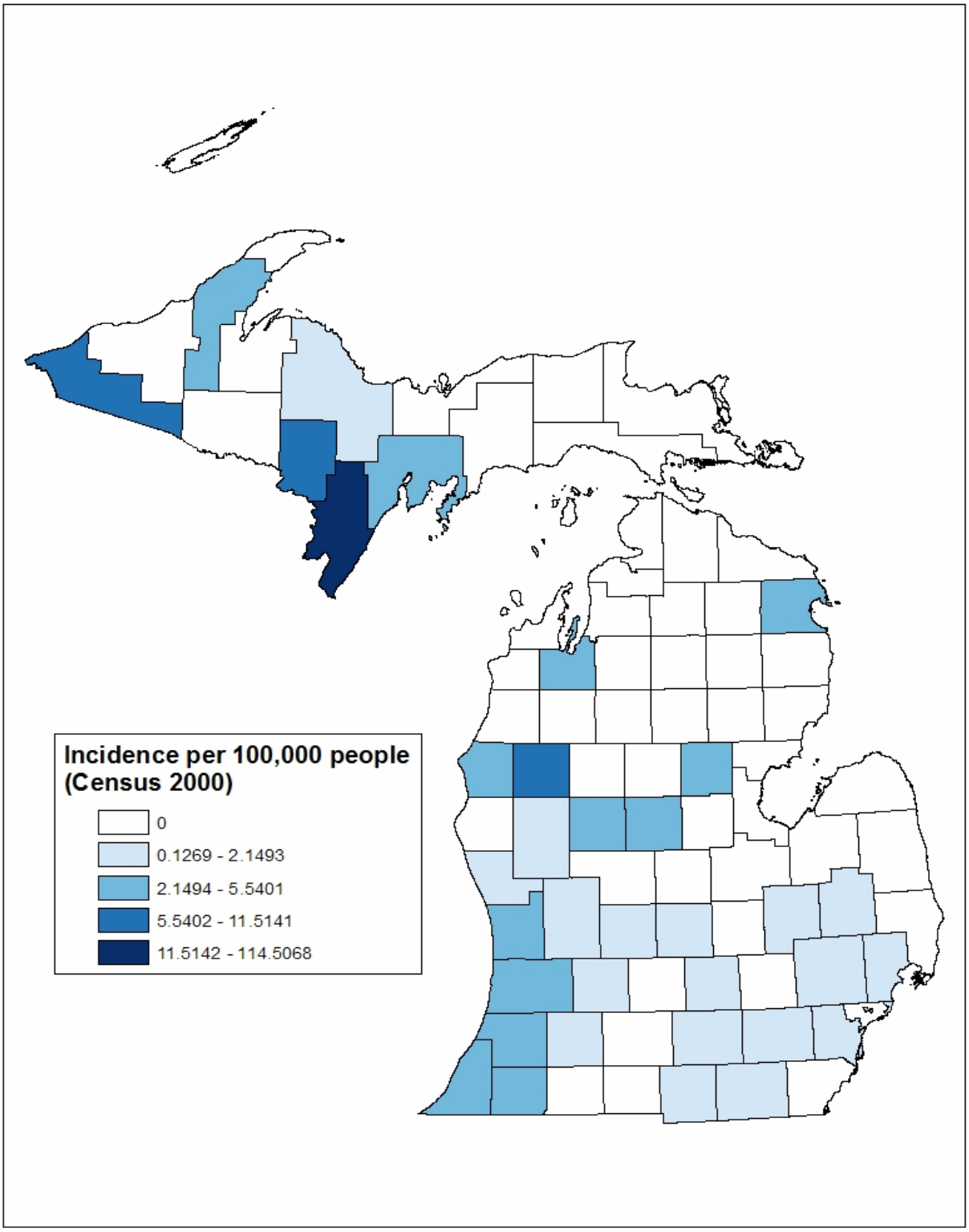

Figure 2. Incidence of Lyme disease by county, Michigan 2009*

* Lyme disease case incidence by county is based on cases reported in citizens of that county. This does not necessarily reflect 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 exposure.

MALARIA

Causative agent:
Malaria is a disease caused by a family of parasites called *Plasmodium*. Most United States cases were those who traveled to or lived in areas where malaria is common (e.g. tropics and sub-tropics).

Clinical features:
Infection with malaria parasites can result in a wide variety of symptoms ranging from absent to severe or even death. Symptoms of malaria include fever, chills, headache, muscle aches, and malaise. Malaria can cause fluid in the lungs, liver and kidney failure, swelling of the brain, coma, and death. Symptoms can appear months after an infected bite depending on the type of parasite.

Mode of transmission:
The female *Anopheles* mosquito acquires the parasite when it bites a person who is infected. The infected mosquito spreads malaria to other humans when it feeds on the blood. Infants born to infected mothers can become infected before or during delivery. Because the parasite lives on the red blood cell it can also be transmitted via blood transfusion, organ donation and sharing of needles or syringes.

Period of communicability:
There is no direct human-to-human transmission and it cannot be transmitted sexually.

Incubation period:
The time between the infective bite and the appearance of clinical symptoms is approximately 9 - 40 days depending on the strain. Some strains (mostly from temperate areas) have an incubation period of 8 - 10 months and longer. With infection through blood transfusion, incubation period depends upon the number of parasite infused.

Susceptibility:
Travelers to endemic zones of malaria (e.g. South America, Southeast Asia, sub-Saharan Africa, the Caribbean, and South Pacific Islands) are at risk for acquiring malaria. Pregnant women are at increased risk of developing severe malaria compared to non-pregnant women. Malaria can increase the risk of serious pregnancy outcomes, including premature birth, miscarriage and stillbirth.

Prevention of malaria:
Malaria is no longer endemic in the U.S. Thus, the risk of acquiring malaria in the U.S. is very low. The risk depends on the destination, activities and duration of travel. If personal protection measures are utilized (e.g. taking antimalarial drugs, using 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. Those that travel to areas known to have malaria cannot donate blood for one year and those who either lived in an endemic area or have been treated for malaria cannot donate for three years.

References:

http://www.cdc.gov/malaria/index.htm

American Public Health Association. Malaria. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 373 - 393.

Michigan statistics:
One hundred and seventeen cases of malaria have been reported during 2005 – 2009. None of the cases have been acquired domestically. The majority of cases have occurred in African Americans (38%) and Caucasians (21%). Two cases were Hispanic or Latino. Almost one quarter of the cases were between the ages of 20 – 29 (24%). Most cases were reported by local health departments in the southern part of the Lower Peninsula of Michigan.

Table I. Demographic characteristics of malaria cases by year, Michigan 2005 – 2009

*N=	117	Number of Cases	Percent Total
	Sex		
	Male	79	68%
	Female	38	32%
	Race		
	African American	44	38%
	American Indian or Alaska Native	0	0%
	Asian	11	9%
	Caucasian	24	21%
	Hawaiian or Pacific Islander	0	0%
	Other	26	22%
	Ethnicity		
	Hispanic or Latino	2	2%
	Age groups (years)		
	0-9	8	7%
	10-19	16	14%
	20-29	28	24%
	30-39	25	21%
	40-49	16	14%
	50-59	16	14%
	60-69	4	3%
	≥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.

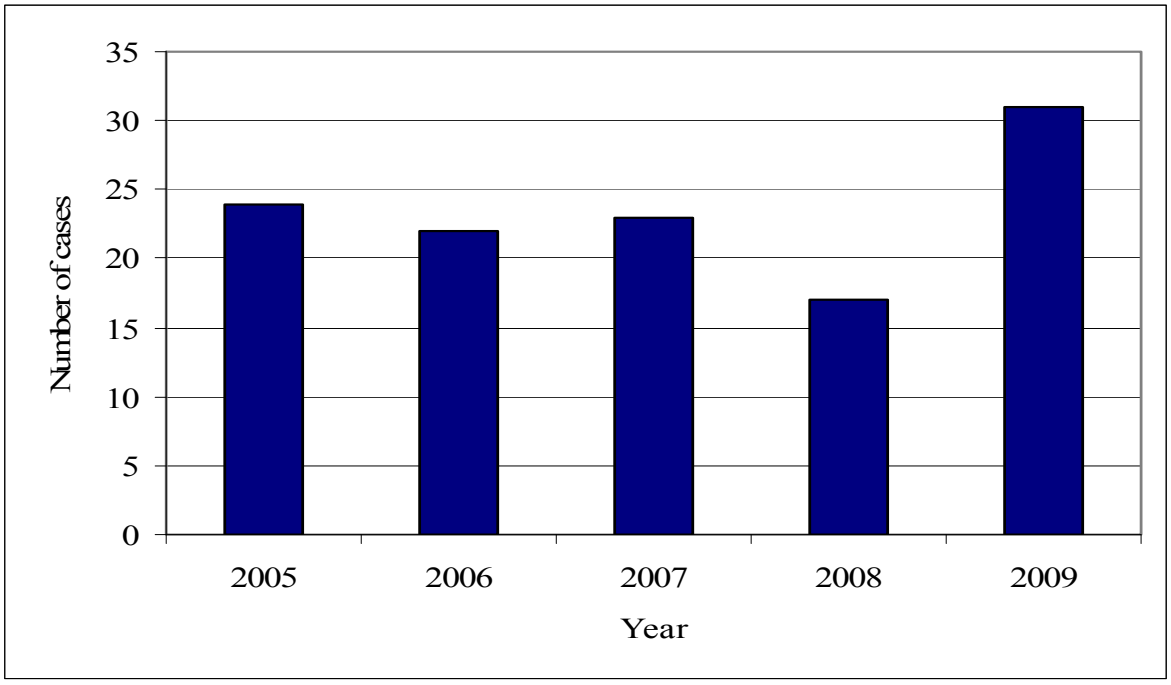

Figure I. Number of malaria cases by year, Michigan 2005 - 2009

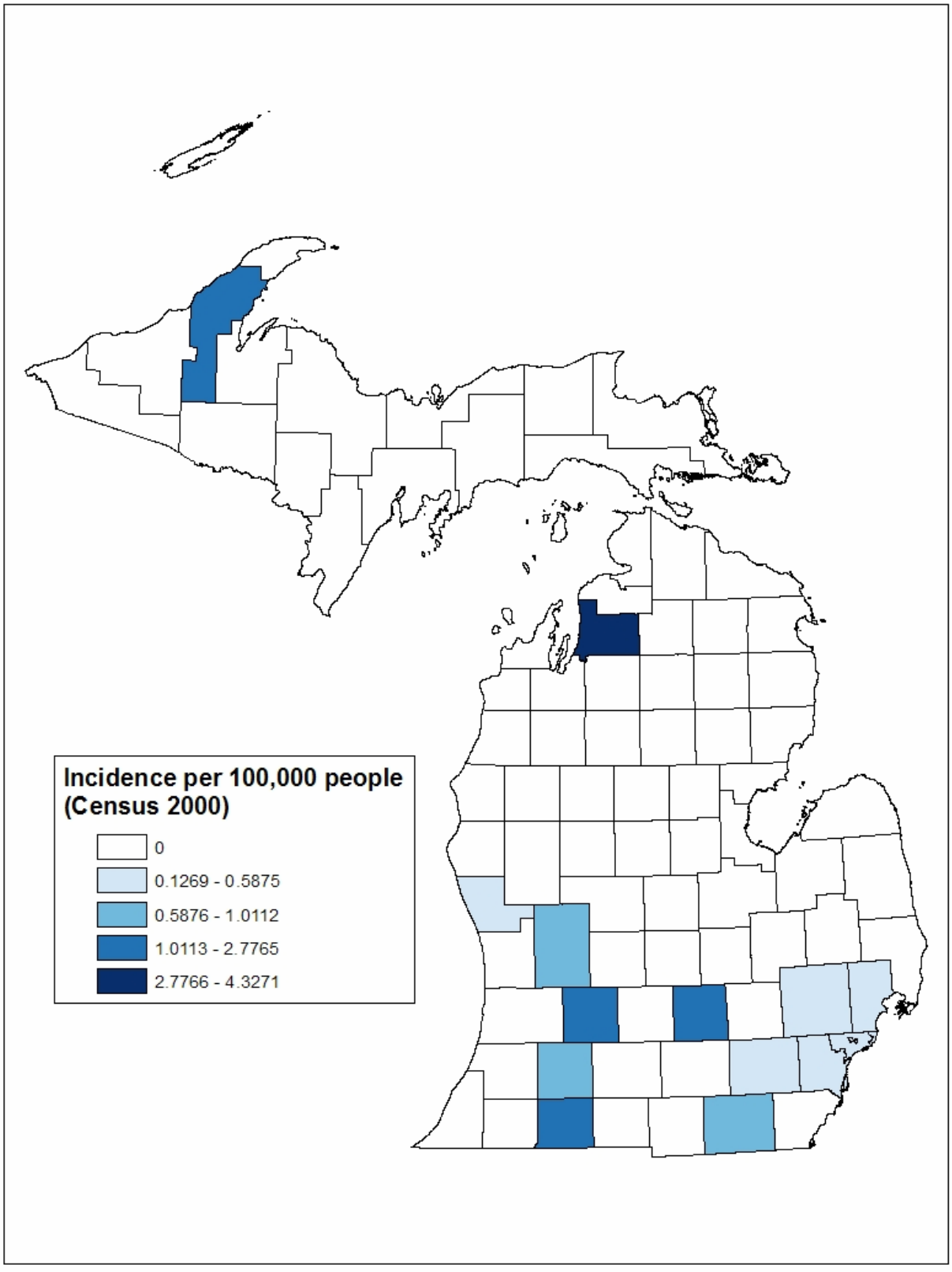

Figure 2. Incidence of malaria by county, Michigan 2009

PERTUSSIS (WHOOPING COUGH)

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

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 not have the "whoop" and may stop breathing for a period of time. Un-immunized or under-immunized infants usually develop 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 with raspy, hoarse coughing. Bronchitis may last for weeks.

Mode of transmission:
Bordetella pertussis is found in the mouth, nose and throat of infected persons. The bacteria are spread in the air by droplets produced during sneezing or coughing. Pertussis is highly contagious and most unvaccinated household members living with an infected person will contract the disease.

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

Incubation period:
The average incubation period is 7 - 10 days but may range from 4 – 24 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.

References:
http://www.cdc.gov/vaccines/vpd-vac/pertussis/default.htm

American Public Health Association. Pertussis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 455 - 461.

Michigan statistics:
A total of 902 pertussis cases were reported to MDCH in 2009, representing an increase of 186% over the 2008 total of 315.

The increase in reported cases started in the second half of 2008 and continued unabated into, and throughout, 2009. Females comprised 55% of cases. The largest proportion of cases, nearly one-third, occurred among adults (persons 19 years of age or older), followed by adolescents (defined here as persons 10-18 years of age). Of the 902 total cases, 111 (12.3%) were infants less than 6 months of age, a group at high risk for pertussis complications; 70 of these (63%) were hospitalized. There were no reported deaths. Among 601 cases under 19 years of age, a cohort for whom immunization history information should be readily available, 160 (26.6%) lacked documentation of the recommended number of pertussis vaccine doses for their age. Cases were reported from 60 counties in 2009

There were 315 pertussis cases reported to MDCH in 2008, an 8% increase over the number reported in 2007. Case reports increased steadily through the year, with twice as many cases reported in the 2nd half of the year compared to the first half. Females accounted for 57% of cases. The largest proportion of cases, 36%, was among adults (persons aged 19 years and older), followed by 10-19 year-olds (24%). Fifty-eight cases (18%) were reported in infants less than 6 months of age, a group at high risk for severe disease and complications; 71% of cases in this age group were hospitalized. There were no reported deaths. Among the 205 cases less than 19 years of age, a cohort for whom immunization history information should be readily available, 63 (31%) lacked documentation of the recommended number of pertussis vaccine doses for their age.

In 2007, 292 pertussis cases were reported to MDCH, a decline of 54% from the 632 cases reported in 2006, but still considerably higher than the annual average of 78 cases reported in the period 1990-2000. Case onsets occurred throughout the year. Geographically, cases occurred broadly throughout the state, with cases reported from 53 counties. Females accounted for 56% of cases. Cases ranged in age from under 1 week to 81 years. Adults (20 years of age and older) accounted for 53% of cases. Positive culture results were reported for 23 cases (8%), positive PCR tests were reported for 84 (29%). There were no deaths reported. Information on vaccination history was available for 188 (64%) case records. Of these, 152 (52%) indicated receipt of at least one dose of pertussis-containing vaccine. Among 136 cases under age 20, 107 (79%) indicated a history of at least one dose of pertussis vaccine.

In 2006 there were 632 confirmed or probable pertussis cases reported to MDCH, representing an increase of 97% over the 321 cases reported in 2005. This continues a trend of substantial increases in the reported incidence of pertussis cases in recent years. One county accounted for 44% of reported cases. Onset date was available for 532 (84.2%) cases. Cases occurred throughout the year with a prominent peak in September.

In 2005 there were 321 cases of pertussis reported to MDCH, an increase of 7.6% over the 303 cases reported in 2005. The number of cases reported in 2005 and 2005 were substantially greater than previous years and accentuated the trend of increasing incidence of reported pertussis disease cases over the past 2 decades. Onset date was available for 270 (83%). Cases occurred throughout the year, with two noticeable peaks occurring in March and August.

Table 1. Demographic characteristics of pertussis cases, Michigan 2005-2009

*N=	2462	Number of Cases	Percent Total
Sex			
	Male	1067	43%
	Female	1391	56%
Race			
	African American	178	7%
	American Indian or Alaska Native	11	0%
	Asian	21	1%
	Caucasian	1,655	67%
	Hawaiian or Pacific Islander	1	0%
	Other	52	2%
Ethnicity			
	Hispanic or Latino	51	2%
Age groups (years)			
	0-9	652	26%
	10-19	961	39%
	20-29	142	6%
	30-39	198	8%
	40-49	223	9%
	50-59	153	6%
	60-69	91	4%
	≥70	55	2%

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

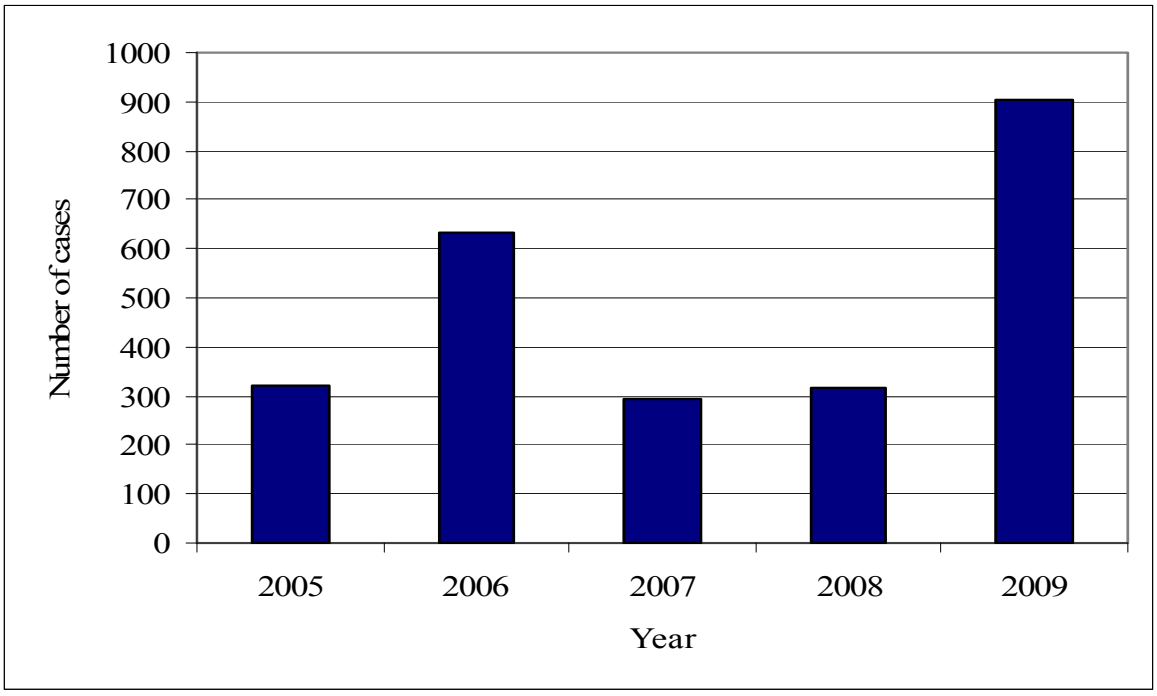

Figure 1. Number of pertussis cases in Michigan, 2005-2009

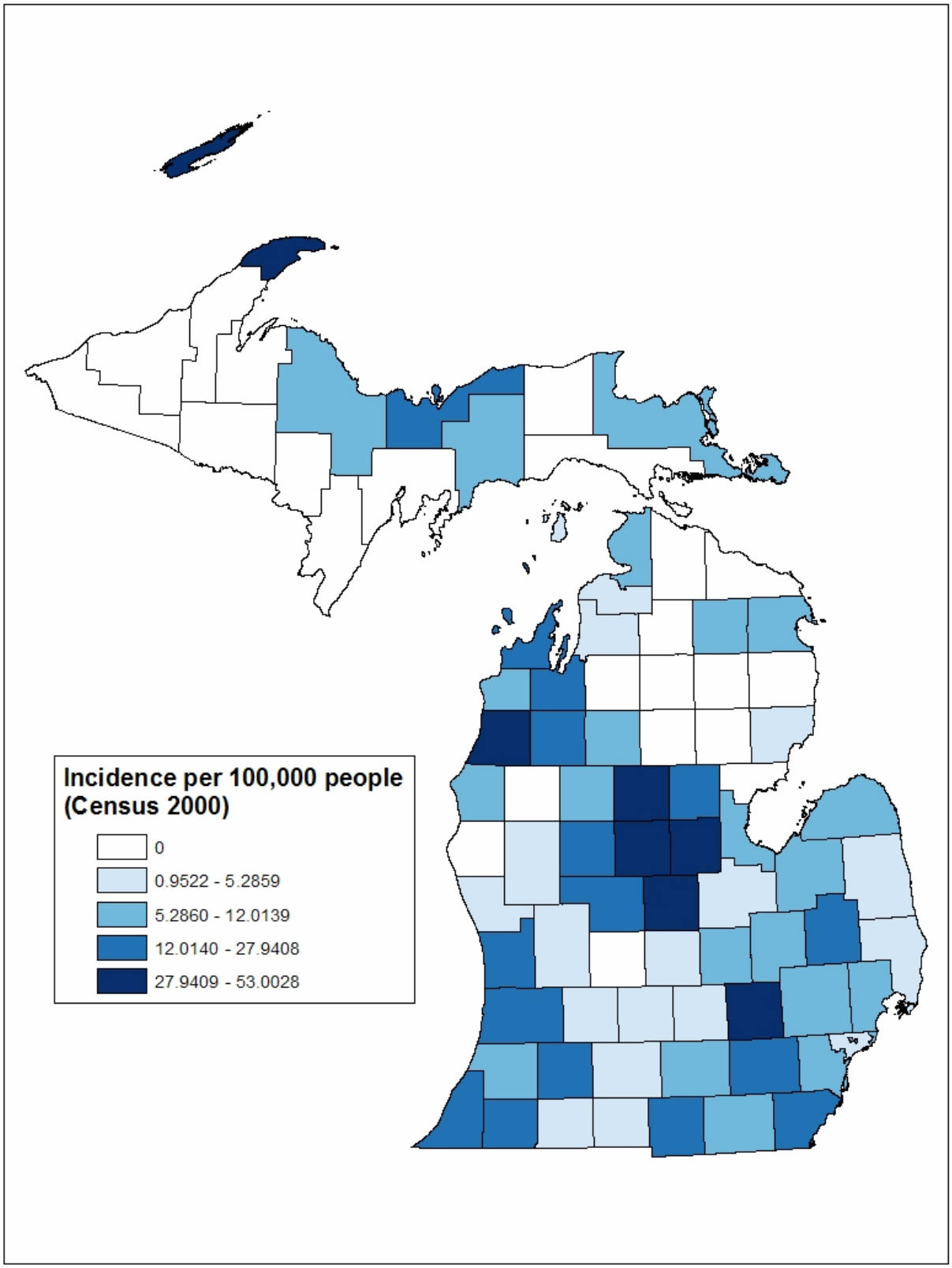

Figure 2. Incidence of pertussis by county, Michigan 2009

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:
Yersinia pestis can infect three different locations of the body. Infection of the lymph nodes is called bubonic plague, which is the most common site of infection. Septicemic plague (infection in the blood) and pneumonic plague (infection of the lungs) are the other two sites of infection. Symptoms of bubonic plague include high fever, chills, severe malaise, headaches, delirium, nausea, vomiting, diarrhea, coma, and death. The most distinctive symptom is swelling of the lymph nodes (buboes) in the groin, armpits and/or neck. The buboes become painful and pus-filled often resulting in rupture and fluid oozing. Symptoms of septicemic plague are similar to bubonic. Symptoms of pneumonic plague include cough, bloody sputum, high fever, and chills. Any form of plague can be fatal if not treated, however, septicemic and pneumonic plagues are more fatal than bubonic.

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 such as rodents and rabbits. Domestic pets, particularly house cats, may carry plague-infected fleas into homes and occasionally transmit infection by their bites or scratches. Very rarely, cats or humans infected with plague pharyngitis or pneumonia may spread infection via production of airborne droplets while coughing.

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:
Infection usually takes 1 - 7 days to develop after exposure. Primary plague pneumonia may take 1 – 4 days.

High-risk groups:
Persons with occupations such as laboratory work, geology or biology may have more contact with infected rodents and fleas in areas where plague is present in animals (enzootic).

Prevention of plague:
When traveling to areas where plague is common avoid exposures to animals that may carry fleas infected with plague bacteria. Ensure appropriate storage and disposal of food and garbage to prevent attraction of rodents. People with pneumonic plague should be isolated until 3 full days of antibiotic treatment has been completed.

References:
http://www.cdc.gov/ncidod/dvbid/plague/index.htm

American Public Health Association. Plague. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 463 - 471.

Michigan statistics:
No cases of plague have 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:
Only about half of those infected with *Coxiella burnetii* show signs of illness. Most acute cases begin with one or more of the following symptoms: a sudden high fever (up to 104-105), severe headache, chills, confusion, weakness, malaise, severe sweats, sore throat, cough, vomiting, diarrhea, abdominal pain, and chest pain. Fever lasts one to two weeks and some patients have weight loss. Thirty to fifty percent of those with symptoms develop pneumonia. Many patients have abnormal liver function tests and some will develop hepatitis. Most patients recover to good health within several months without treatment and mortality is low (1-2%). Chronic Q fever (an infection lasting longer then 6 months) is an uncommon but more serious disease. Patients who have the acute form may develop the chronic form one to twenty years later. Endocarditis (inflammation of the heart valves) is a serious complication. In contrast to the acute form, mortality from the chronic form can be as high as 65%.

Mode of transmission:
Q fever is spread to humans primarily through inhalation of dust contaminated by bodily fluids or excreta of infected animals. Transmission via direct contact with infected animals and ingestion of contaminated raw milk has been documented. Direct human-to-human and tick bite transmission are very rare.

Period of communicability:
C. burnetti is resistant to heat, drying and many common disinfectants and can survive in the environment for long periods of time.

Incubation period:
Incubation period is typically 2 – 3 weeks after exposure but may vary.

High-risk groups:
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. This includes veterinarians, meat workers, sheep and dairy workers, and livestock farmers. *C. burnetii* can be found in a wide variety of livestock and in domestic pets.

Prevention of Q fever:
Educate those in high-risk occupations about the signs and symptoms of Q fever, as well as bio-security measures. A Q fever vaccine 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.

References:
http://www.cdc.gov/ncidod/dvrd/qfever/index.htm

American Public Health Association. Q fever. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 494 - 498.

Michigan statistics:

Eleven cases of Q fever have been reported in Michigan during 2005 - 2009. Sixty-four percent of cases were male. Sixty-four percent of cases were Caucasian. The majority of reported cases were between the ages of 40 – 49 years (36%).

Table 1. Demographic characteristics of Q fever cases, Michigan 2005-2009

*N= 11	Number of Cases	Percent Total
Sex		
Male	7	64%
Female	4	36%
Race		
African American	1	9%
American Indian or Alaska Native	0	0%
Asian	0	0%
Caucasian	7	64%
Hawaiian or Pacific Islander	0	0%
Other	0	0%
Ethnicity		
Hispanic or Latino	0	0%
Age groups (years)		
0-9	0	0%
10-19	0	0%
20-29	1	9%
30-39	1	9%
40-49	4	36%
50-59	2	18%
60-69	1	9%
≥70	2	18%

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

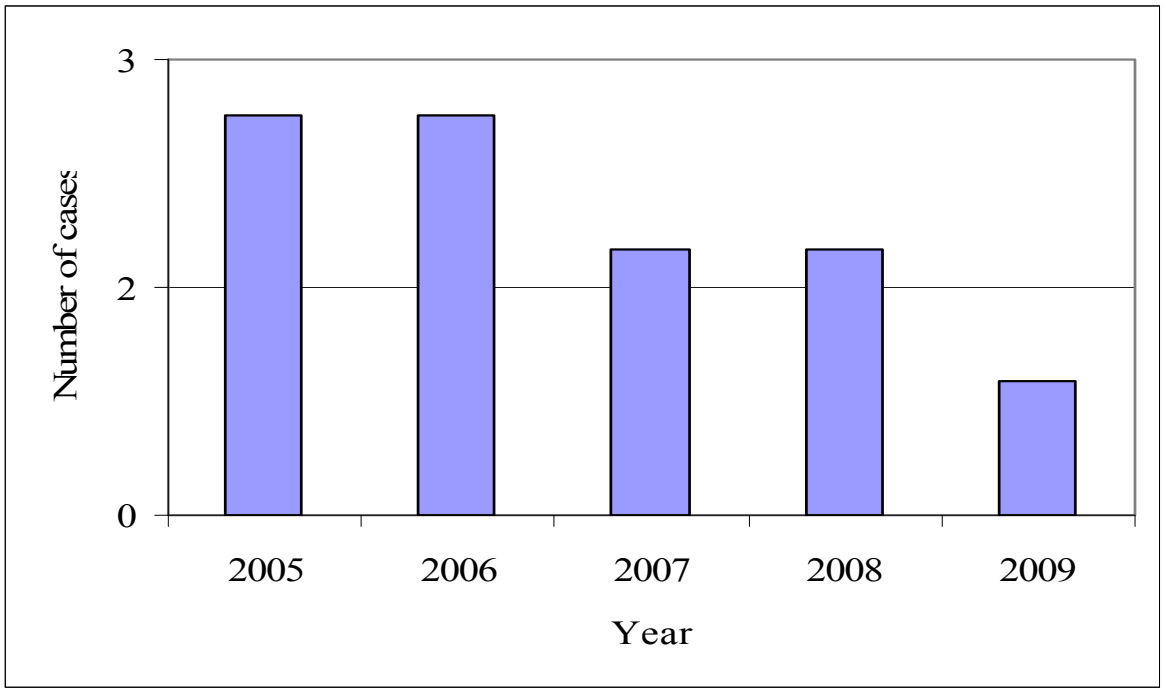

Figure I. Number of Q fever cases by year, Michigan 2005 – 2009

RABIES

Causative agent:
Rabies is viral disease of mammals often transmitted through the bite of a rabid animal.

Clinical features:
The rabies virus infects the central nervous system causing encephalopathy (damage to the brain) and ultimately death. Early symptoms in humans are general flu-like symptoms such as fever, headache and general malaise (not feeling well). Sometimes there is pain at the site of the exposure. As the disease progresses, neurological symptoms appear and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation, difficulty swallowing, and hydrophobia (fear of water). Death usually occurs within days of the onset of symptoms.

Mode of transmission:
People and animals get rabies primarily from the bite of an infected animal. Although rare, it is possible to get rabies if infectious material (such as saliva or brain tissue) from a rabid animal enters a wound, eyes, nose, or mouth. Rarely, non-bite transmission has been reported such as:

- inhalation of aerosolized rabies virus, most people are unlikely to be exposed to aerosolized virus outside of a laboratory
- human-to-human transmission has been documented in cornea and organ transplant recipients

Period of communicability:
The rabies virus enters through a bite wound and travels from the bite location along the nerves to the brain. The person or animal does not appear ill during this time. The virus cannot be transmited at this point of infection because it is not present in the saliva. Only late in the disease, after the virus has reached the brain and multiplied there, does the virus move from the brain to the salivary glands and saliva. Also at this time, after the virus has multiplied in the brain, almost all animals begin to show the first signs of rabies. Most of these signs are obvious to even an untrained observer, but within a short period of time, usually within 3 to 5 days, the virus has caused enough damage to the brain that the animal begins to show unmistakable signs of rabies and is infectious.

Incubation period:
Incubation can be as short as 9 days or as long as 7 years. The average incubation period is 3 – 8 weeks.

High-risk groups:
Persons at high-risk include those who work closely with animals that have the potential to have rabies infection. Veterinarians, wildlife conservation personnel, park rangers, and animal control personnel all have a higher risk for coming in contact with the rabies virus.

Prevention of rabies:
Following rabies prevention measures is critical to preventing infection. The following measures should be taken at all times:

- Never handle wild or unfamilar animals. Teach children never to handle unfamiliar animals, wild or domestic, even if they appear friendly. "Love your own, leave other animals alone" is a good principle for children to learn.
- Wash any wound or bite from an animal thoroughly with soap and water and seek medical attention immediately.
- Have all dead, sick, or easily captured bats tested for rabies if exposure to people or pets occurs.
- If you awaken and find a bat in your room, see a bat in the room of an unattended child, or see a bat near a mentally impaired or intoxicated person, seek medical advice and submit the bat for rabies testing.
- Prevent bats from entering living quarters or occupied spaces in homes, churches, schools, and other similar areas where they might contact people and pets.
- Be a responsible pet owner by keeping vaccinations current for all dogs, cats, and ferrets, keeping your cats and ferrets inside and your dogs under direct supervision, calling animal control to remove stray animals from your neighborhood, and consider having your pets spayed or neutered.
- Many exotic species make poor pets, and no rabies vaccine is licensed for use in these species. It is illegal in Michigan to have wild animals as pets.
- Rabies is more common in some Asian, African and Latin American countries. If you plan travel abroad you should contact your health care provider, travel clinic or health department about risk for rabies exposure.

References:

http://www.cdc.gov/rabies/

http://www.michigan.gov/emergingdiseases/0,1607,7-186-25807---,00.html

American Public Health Association. Rabies. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 498 - 508.

Michigan statistics:

Rabies in humans is very rare in Michigan and in the United States. One human case of rabies was reported in 2009. Prior to 2009, the last reported case of human rabies in Michigan was during 1983.

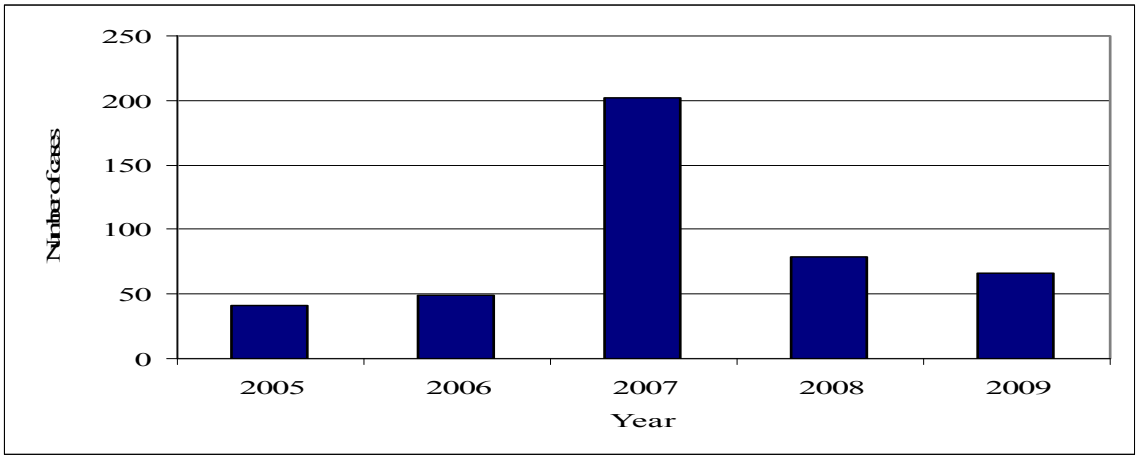

Figure I. Number of animal rabies cases by year, Michigan 2005 – 2009

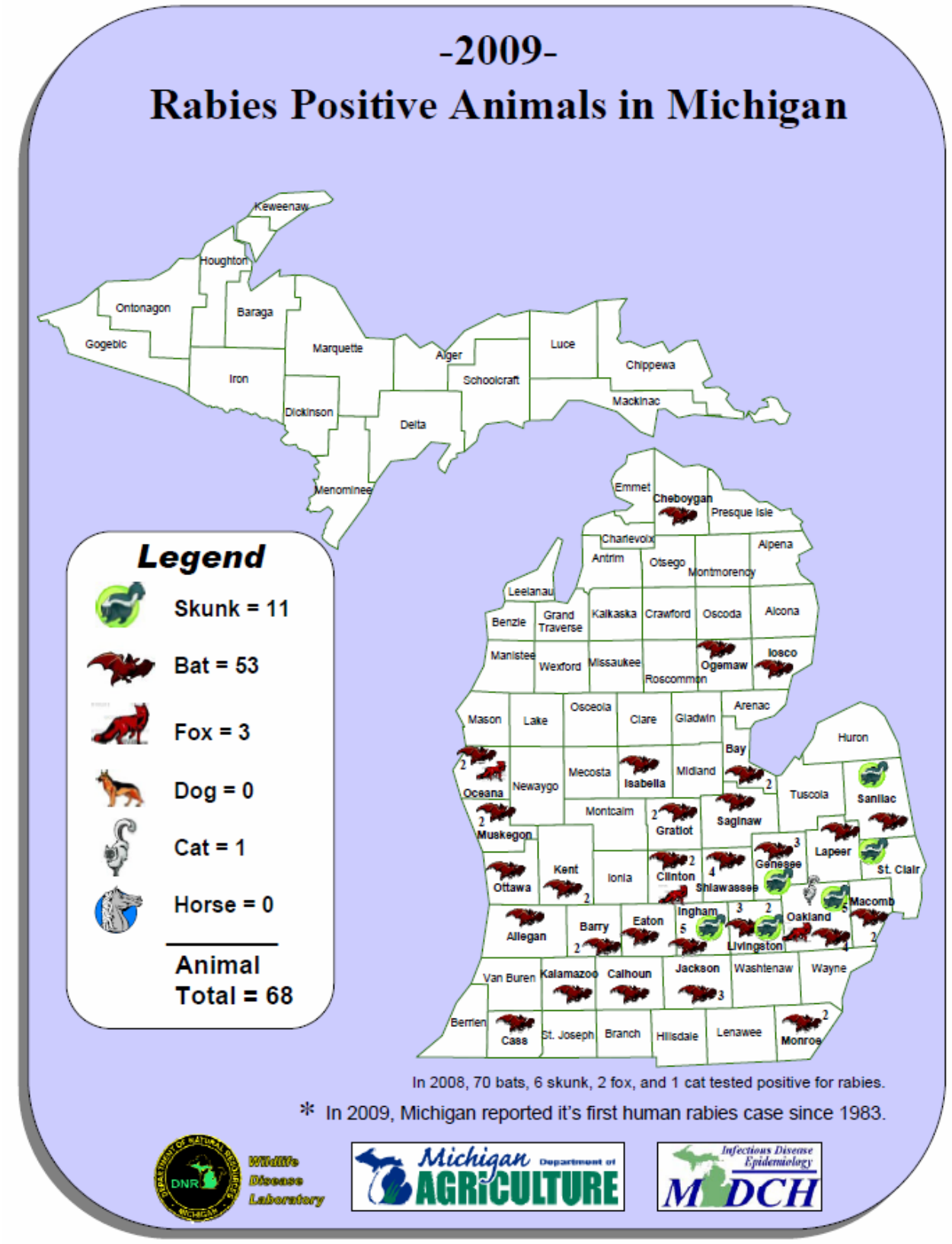

Figure 2. Location and types of rabies positive animals, Michigan 2009

SALMONELLOSIS

Causative agent:
Salmonellosis is caused by the bacterium *Salmonella*. Over 2,400 *Salmonella* serotypes have been identified. Most human salmonellosis is caused by the typhimurium, enteritidis, Newport, and Heidelberg serotypes.

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, severe diarrhea causes the patient to be hospitalized. In these patients, infection may spread from the intestines to the blood stream and then to other body sites. Death can occur from severe infection.

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. However, all foods including fruits and vegetables may become contaminated during preparation and handling. *Salmonella* can also be found in the feces of some pets and people. Persons can become infected if they don't wash their hands after contact with infected pets or pet feces. Reptiles (such as turtles, lizards, and snakes) and chicks or young birds are particularly likely to carry *Salmonella.*

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:
Incubation ranges from 6 – 72 hours. Average incubation is 12 – 36 hours.

High-risk groups:
The elderly, infants and those with impaired immune systems have a higher risk of contracting salmonellosis than the general population.

Prevention of salmonellosis:
The risk of S*almonella* infection can be reduced if the following preventative measures are taken:

- Cook poultry, ground beef and eggs thoroughly. Do not eat or drink foods containing raw eggs or raw (unpasteurized) milk.
- Wash hands, kitchen work surfaces and utensils with soap and water immediately after they have been in contact with raw meat or poultry.
- Wash hands with soap after handling reptiles, birds or baby chicks, and after contact with pet feces.
- Reptiles (turtles, iguanas, other lizards, and snakes) are not appropriate pets for small children and should not be in the same house as an infant.
- Don't work with raw poultry or meat and an infant (e.g. cooking, feeding and changing diapers) at the same time.

References:

http://www.cdc.gov/nczved/dfbmd/disease_listing/salmonellosis_gi.html

American Public Health Association. Salmonellosis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 534 - 540.

Michigan statistics:

A total of 4,813 cases were reported in Michigan during 2005 – 2009. The majority of the cases were Caucasian (62%) and African American (8%). Almost one quarter of the cases were between the ages of 0 – 9 years (24%). Three percent of the cases were Hispanic or Latino.

During the first half of 2009, two multi-state outbreaks of *Salmonella* Saintpaul infections were identified and investigated. The first occurred in April 2009 when the Michigan joined a multi-state outbreak investigation of Salmonella Saintpaul infections linked to raw alfalfa sprouts.

The second *Salmonella* Saintpaul cluster was detected in late May 2009. Twenty-two (22) confirmed PFGE-matched cases were identified in Michigan from 10 counties in the southern part of the state and 1 county in the northwest corner of the state. Through the PulseNet system, 6 additional confirmed illnesses in 3 other states and Canada were detected. The Michigan investigation revealed that 10 (of 16) confirmed Michigan cases reportedly consumed fresh tomatoes and fresh lettuce at the Mexican style food chain.

In September – October 2009, a cluster of 14 *Salmonella* Typhimurium cases in south/southeastern MI with an uncommon PFGE pattern was found to be molecularly linked to an earlier sprouts outbreak involving other states.

During September 2008 to August 2009, Michigan was part of 9 multi-state outbreaks of salmonella. The outbreaks were associated with reptile contact, peanut products, beef, foreign travel, sprouts, lamb, tomatoes.

During September 2007 to August 2008, Michigan was part of 12 multi-state outbreaks of salmonella. The outbreaks were associated with reptile contact; vegetable, poultry, cereal and fish consumption; and foreign travel.

During September 2006 to August 2007, 14 multi-state outbreaks of salmonella were investigated by MDCH due to cases residing in Michigan. The outbreaks were associated with vegetables, peanut butter, pet food, and snack chip consumption, as well as, travel.

Table 1. Demographic characteristics of salmonellosis cases, Michigan 2005-2009

*N=	4,813	Number of Cases	Percent Total
Sex			
	Male	2,109	44%
	Female	2,598	54%
Race			
	African American	364	8%
	American Indian or Alaska Native	28	1%
	Asian	84	2%
	Caucasian	3,006	62%
	Hawaiian or Pacific Islander	2	0%
	Other	148	3%
Ethnicity			
	Hispanic or Latino	143	3%
Age groups (years)			
	0-9	1,150	24%
	10-19	532	11%
	20-29	570	12%
	30-39	482	10%
	40-49	600	12%
	50-59	533	11%
	60-69	380	8%
	≥70	563	12%

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

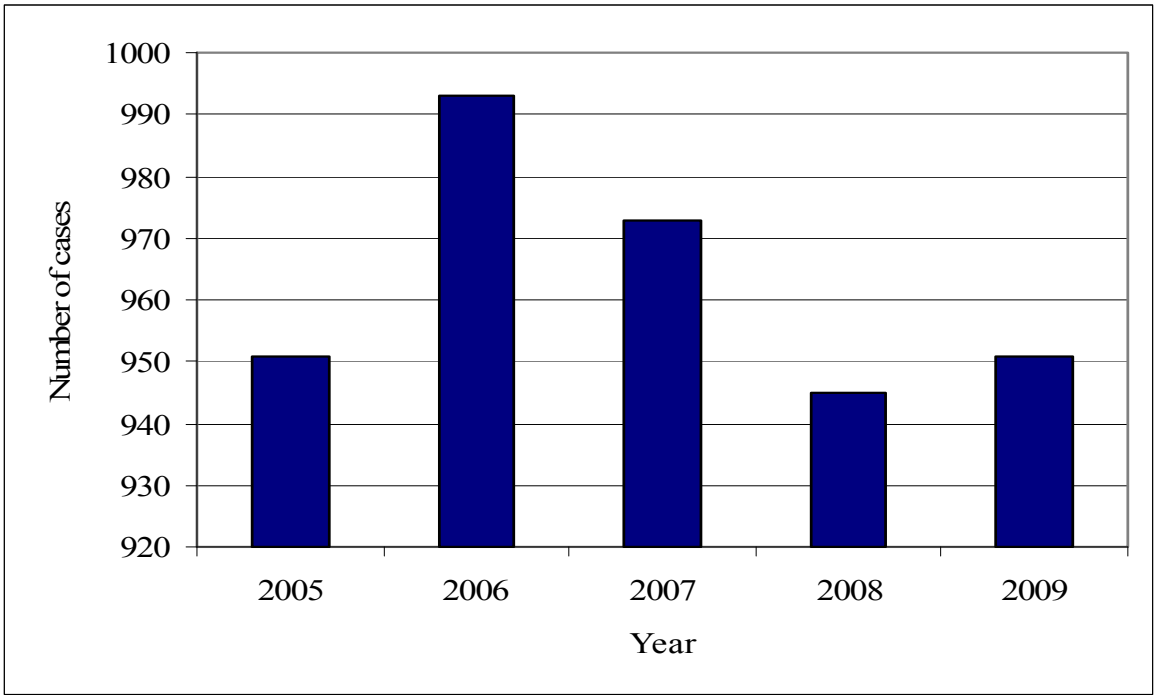

Figure 1. Number of salmonellosis cases in Michigan, 2005-2009

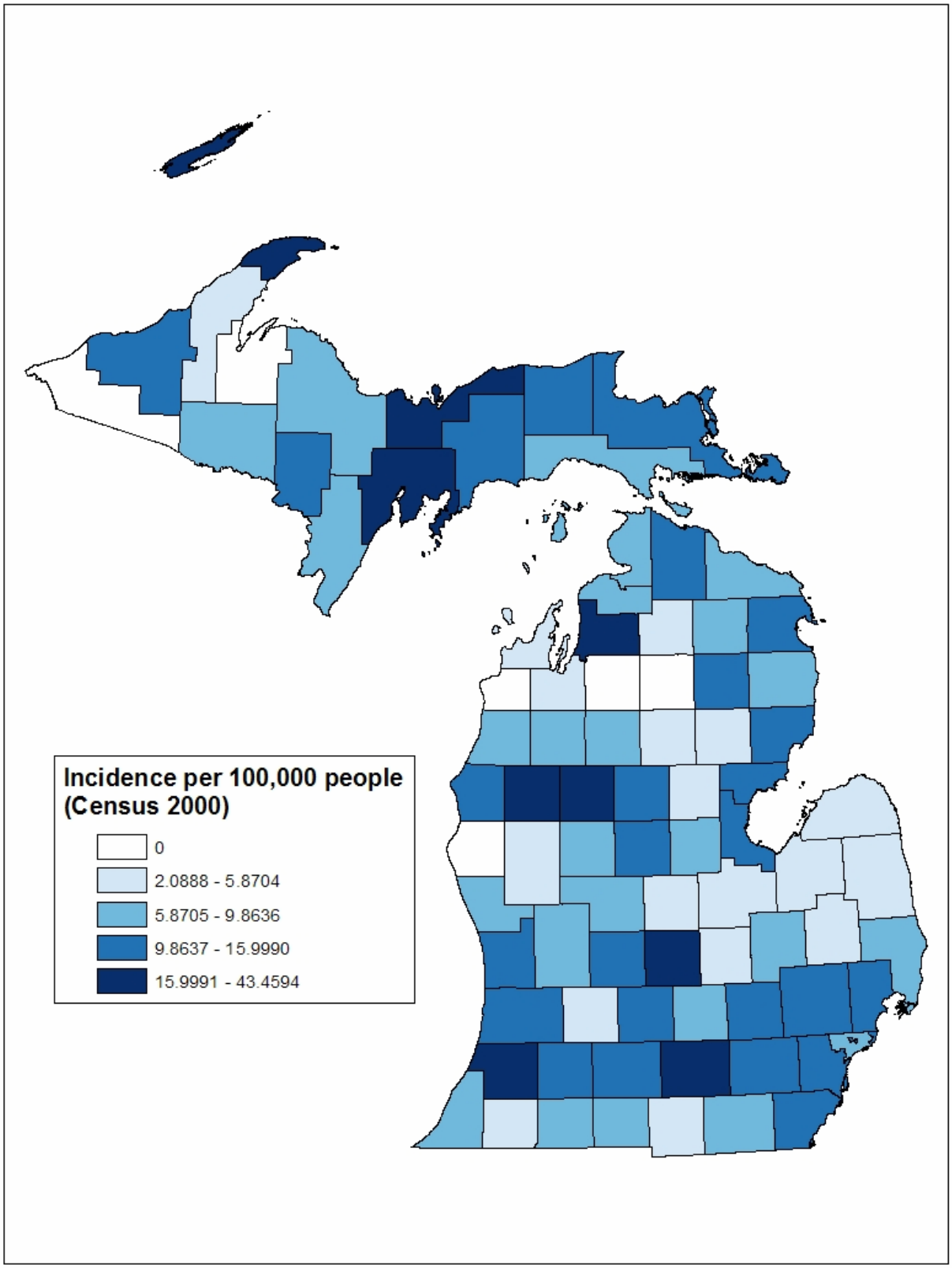

Figure 2. Incidence of salmonellosis by county, Michigan 2009

SHIGELLOSIS

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

Clinical features:
Diarrhea, fever, nausea, vomiting, and abdominal cramps characterize shigellosis. Stools usually contain blood, mucus and pus. Some cases may present with watery diarrhea. Asymptomatic infections can 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 through direct or indirect fecal-oral routes. *Shigella* can be transmitted through food or water contaminated with human feces. Contaminated food, water and milk have all been identified as sources of infection.

Period of communicability:
Shigellosis 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 for months or years.

Incubation period:
The average incubation period is 1 –3 days but can range from 12 hours to one week.

High-risk groups:
The elderly, children and individuals who are immunocompromised are at higher risk.

Prevention of shigellosis:
The following prevention measures may limit the risk of acquiring infection:

- Wash hands with soap carefully and frequently; especially after going to the bathroom, after changing diapers and before preparing foods or beverages.
- Dispose of soiled diapers properly in a closed lid garbage can.
- Disinfect diaper-changing areas after use.
- Keep children with diarrhea out of child care settings.
- Supervise hand washing of toddlers and small children after they use the toilet.
- Do not prepare food for others while ill with diarrhea.
- Avoid swallowing water from ponds, lakes or untreated pools.

References:
http://www.cdc.gov/nczved/dfbmd/disease_listing/shigellosis_gi.html

American Public Health Association. Shigellosis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 556 - 560.

Michigan statistics:
A total of 942 shigellosis cases were reported during 2005 – 2009. Fifty-two percent of cases were female. Thirty-nine percent of cases were Caucasian and 26% were African American. Nine percent of cases were Hispanic or Latino. The majority of cases were found in children age 0 to 9 years of age (44%).

Table 1. Demographic characteristics of shigellosis cases, Michigan 2005-2009

*N=	942	Number of Cases	Percent Total
	Sex		
	Male	432	46%
	Female	486	52%
	Race		
	African American	248	26%
	American Indian or Alaska Native	1	0%
	Asian	17	2%
	Caucasian	372	39%
	Hawaiian or Pacific Islander	0	0%
	Other	53	6%
	Ethnicity		
	Hispanic or Latino	89	9%
	Age groups (years)		
	0-9	417	44%
	10-19	93	10%
	20-29	150	16%
	30-39	97	10%
	40-49	75	8%
	50-59	55	6%
	60-69	26	3%
	≥70	24	3%

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

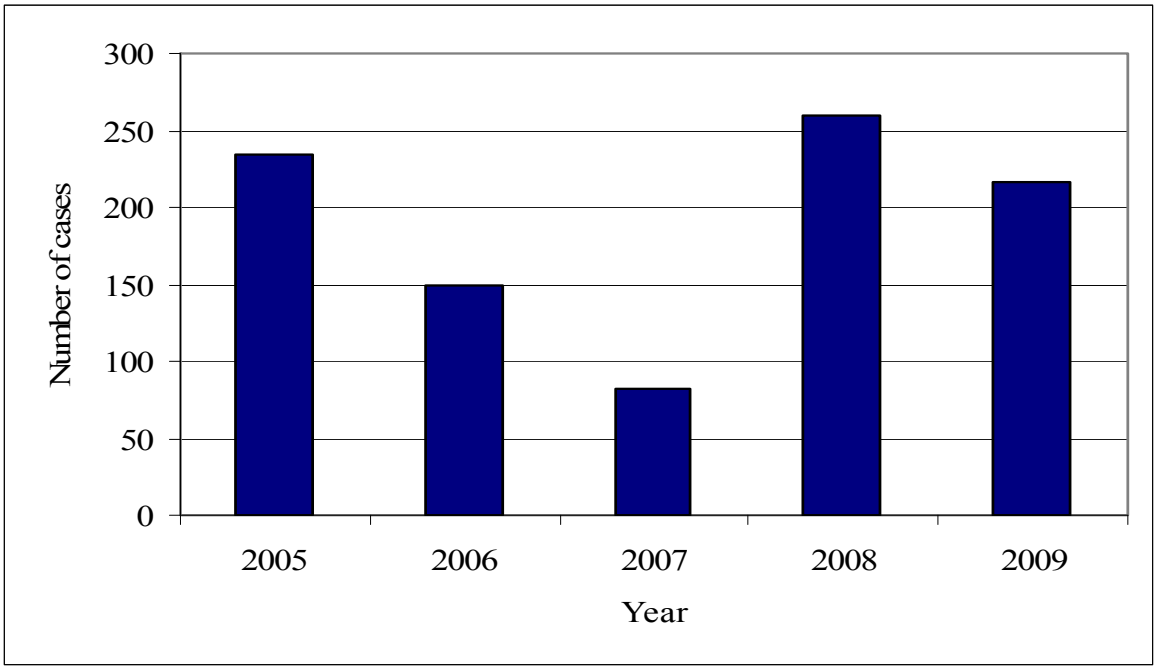

Figure 1. Number of shigellosis cases in Michigan, 2005-2009

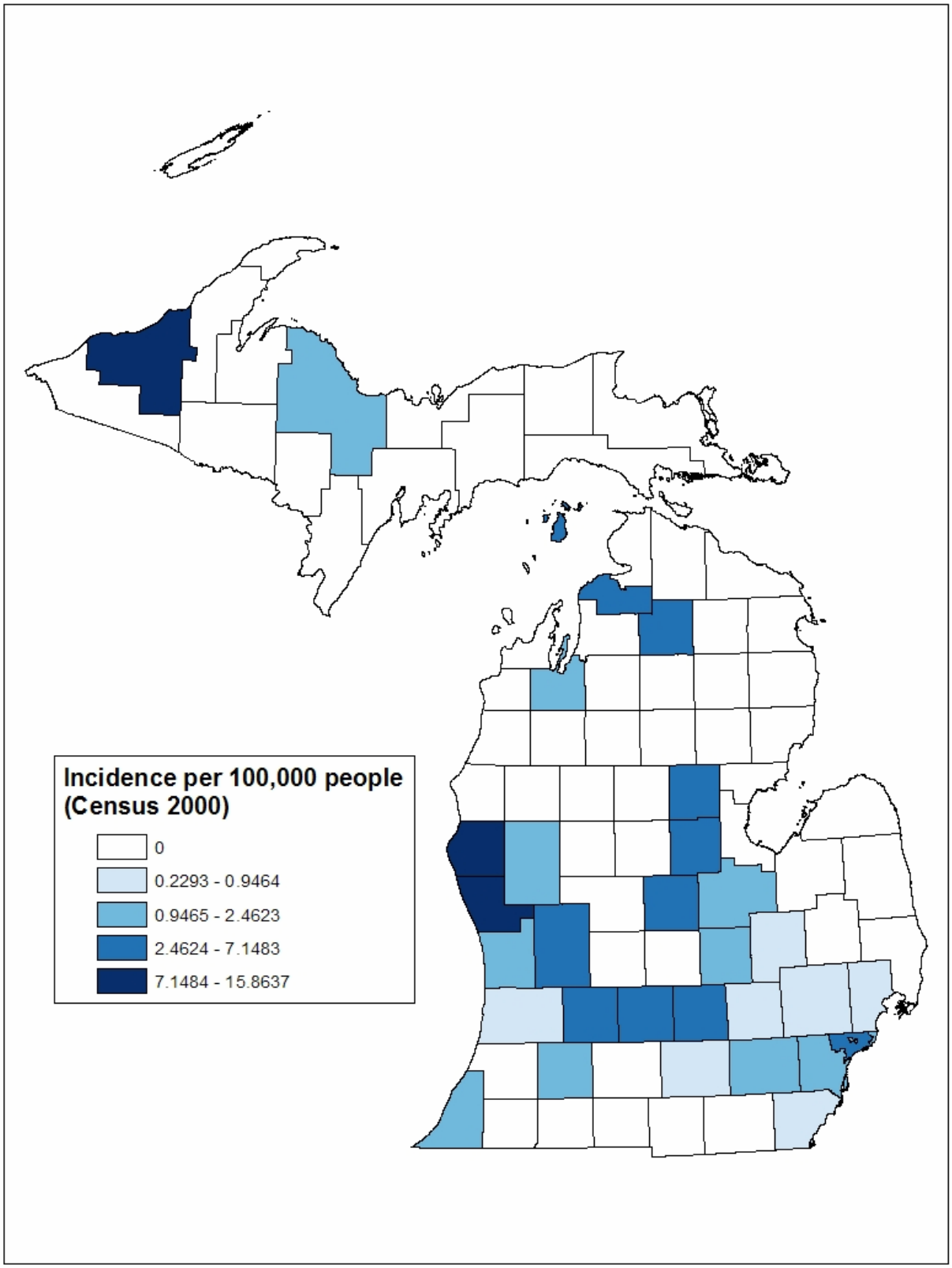

Figure 2. Incidence of shigellosis by county, Michigan 2009

SMALLPOX

Causative agent:
Smallpox is an acute infection caused by a virus. The last naturally occurring smallpox case was in 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 appears flat or as 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 (vesicles). The fluid in the vesicles gradually changes from clear to pus-like. The spots 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:
Typically, the respiratory secretions of an infected person spread the smallpox virus. Less often it is spread through direct contact with smallpox lesions of the skin and mucous membranes or through contact with contaminated materials (e.g. bedding, clothing). Rarely, it is spread through airborne means. Humans are the only known hosts. Animals or insects do not spread the virus.

Period of communicability:
Communicability last from the time of spot development until the disappearance of all scabs, which takes approximately 3 weeks. Smallpox may be contagious in the earliest phase but is most infectious during the first 7 – 10 days following the onset of rash.

Incubation period:
The average incubation period is 12 – 14 days but may last 7 – 17 days after exposure.

High-risk groups:
Persons who have not had smallpox or not received the vaccine are at higher risk for infection if the virus was to re-emerge.

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.

References:
http://emergency.cdc.gov/agent/smallpox/disease/

American Public Health Association. Smallpox. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 560 - 564.

Michigan statistics:
No cases have been reported in Michigan for decades. In 1980, the World Health Organization declared that smallpox had been eradicated worldwide. The last naturally occurring case of smallpox occurred during 1977 in Somalia. One laboratory-associated death (which occurred in England in 1978) has been identified since then.

STREPTOCOCCAL DISEASE, INVASIVE, GROUP A (GAS)

Causative agent:
Streptococcal disease is caused by the bacterium, *Streptococcus pyogenes*. This bacterium is commonly found in the throat and on the skin. "Group A" refers to the classification of the bacteria's cell wall in the genus *Streptococcus.*

Clinical features:
Most GAS infections are relatively mild such as "Strep throat" and impetigo. Strep throat causes fever, sore throat, and swollen lymph glands. Impetigo is a skin infection that displays 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. Severe and sometimes life-threatening, GAS disease may occur when bacteria get into parts of the body where bacteria usually are not found, such as blood, muscle or lungs. These infections are termed "invasive GAS disease." Two of the most severe, but least common, forms of invasive GAS disease are necrotizing fasciitis and streptococcal toxic shock syndrome. Necrotizing fasciitis (occasionally described by the media as "flesh-eating bacteria") is a rapidly progressive disease that destroys muscles, fat and skin tissue. Streptococcal toxic shock syndrome (STSS) results in a rapid drop in blood pressure and organ (e.g. kidney, liver, lungs) failure. STSS is not the same as "toxic shock syndrome" caused by the bacteria *Staphylococcus aureus* that has been associated with tampon usage.

Mode of transmission:
Group A streptococcal bacteria are spread by direct person-to-person contact. The bacteria are carried in discharge 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. Untreated cases can be communicable 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.

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

Prevention of streptococcal group A disease:

The spread of all types of *Streptococcus* 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 results are positive for 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.

References:

http://www.cdc.gov/ncidod/dbmd/diseaseinfo/groupastreptococcal_g.htm

American Public Health Association. Streptococcal diseases. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 577 - 585.

Michigan statistics:

Reported GAS cases during 2005 – 2009 totaled 975 cases. Cases were primarily men (51%). Age analysis of GAS showed that over one-fifth of reported cases were found to be in persons 70 years and older (24%). Caucasians (57%) and African Americans (22%) had the highest incidence of disease. Three percent of reported cases were Hispanic or Latino.

Table 1. Demographic characteristics of invasive *Streptococcus* Group A cases, Michigan 2005-2009

*N= 975		Number of Cases	Percent Total
Sex			
	Male	496	51%
	Female	478	49%
Race			
	African American	211	22%
	American Indian or Alaska Native	3	0%
	Asian	9	1%
	Caucasian	558	57%
	Hawaiian or Pacific Islander	2	0%
	Other	27	3%
Ethnicity			
	Hispanic or Latino	26	3%
Age groups (years)			
	0-9	112	11%
	10-19	46	5%
	20-29	53	5%
	30-39	88	9%
	40-49	145	15%
	50-59	142	15%
	60-69	151	15%
	≥70	238	24%

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

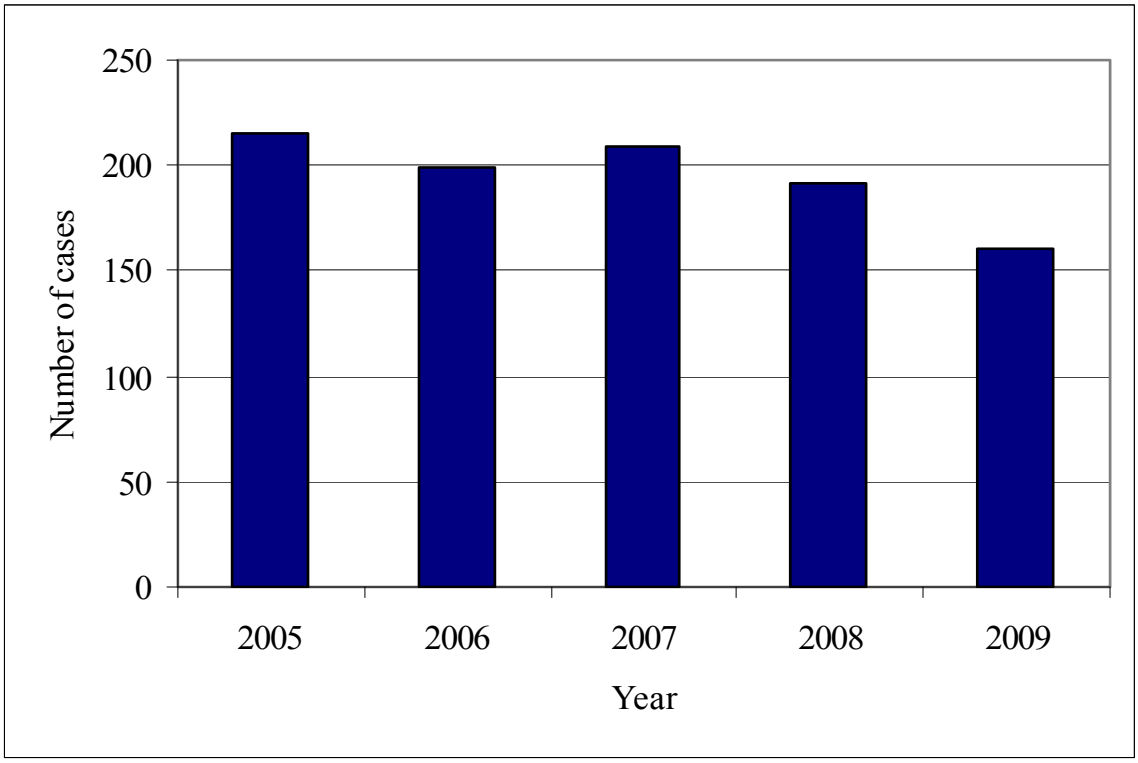

Figure 1. Number of *Streptococcus* Group A (invasive) cases in Michigan, 2005-2009

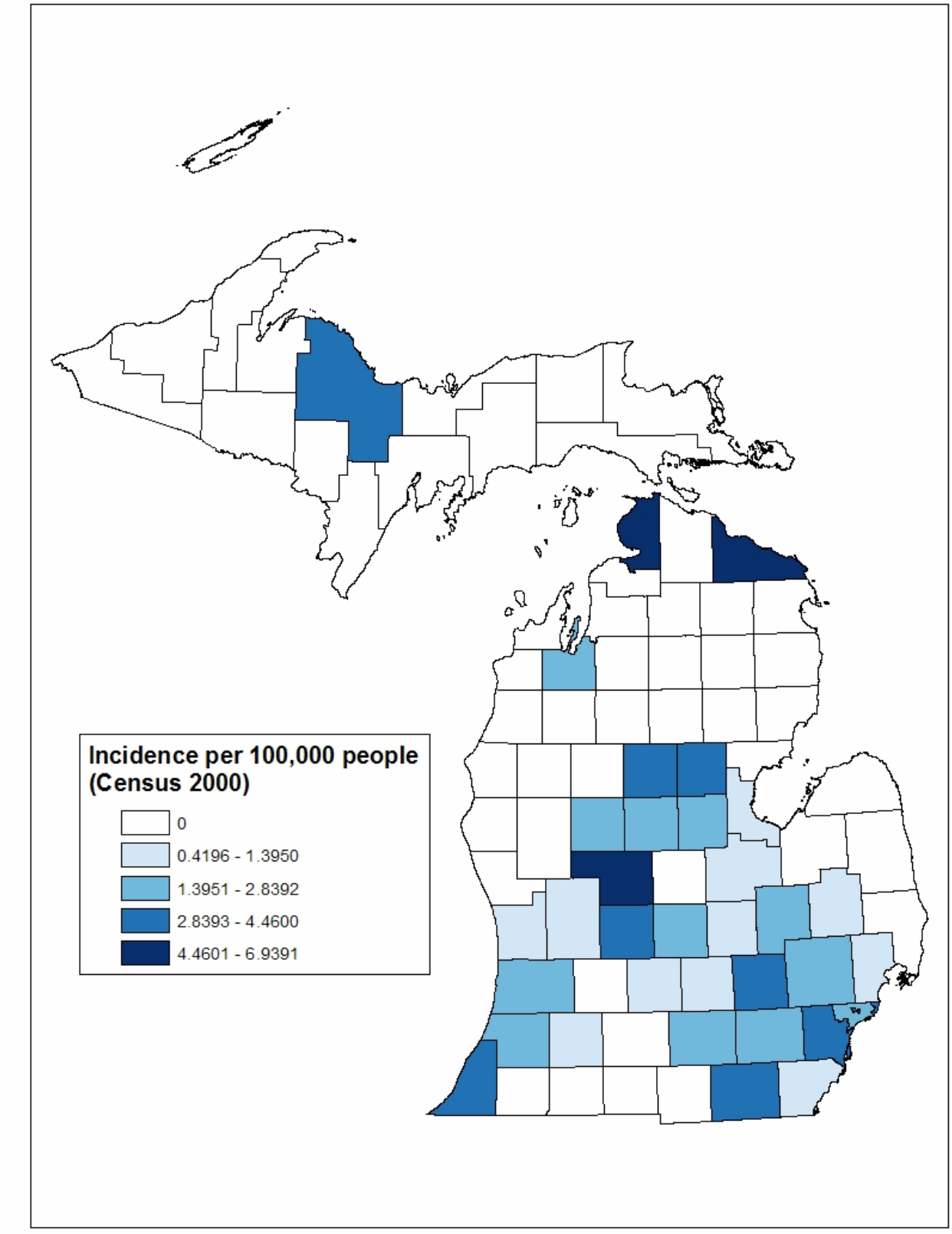

Figure 2. Incidence of *Streptococcus* Group A (invasive) cases by county, Michigan 2009

SYPHILIS

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

Clinical features:
Many of the symptoms of syphilis are indistinguishable from other diseases and are characterized by progressive stages. If people with syphilis are treated early they 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, blister or an ulcer with a raised border. 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. Hair loss from the scalp, eyebrows or pubic area may occur. 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: The late stage of syphilis can develop in 15% of those who are infected but have not been treated and can occur 10-20 years after the infection was first. The disease may damage internal organs including the brain, nerves, eyes, heart, blood vessels, liver, bones, and joints. Symptoms of the late stage include difficulty coordinating muscle movements, paralysis, numbness, gradual blindness, and dementia. The disease may lead to death. 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 last 2 - 4 weeks.

High-risk groups:
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:
The following measures can prevent syphilis infection if followed carefully.

- Avoid unprotected sexual intercourse with persons infected with syphilis.
- Regular screenings 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.

References:
http://www.cdc.gov/std/syphilis/default.htm

American Public Health Association. Syphilis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 591 - 596.

Michigan statistics:
Since 2005, reporting of primary and secondary cases of syphilis has increased. From 2005 to 2009, 815 cases were reported. Three-fourths of cases were male (75%). Two-thirds of cases were African American (66%). Three percent of cases were identified to be Hispanic or Latino. Over half of reported cases were in persons aged 20 – 39 years (29% 20 – 29 years, 25% 30 – 39 years).

Table 1. Demographic characteristics of primary & secondary syphilis cases, Michigan 2005 - 2009

*N= 815	Number of Cases	Percent Total
Sex		
Male	614	75%
Female	174	21%
Race		
African American	541	66%
American Indian or Alaska Native	0	0%
Asian	5	1%
Caucasian	221	27%
Hawaiian or Pacific Islander	0	<1%
Other	0	<1%
Ethnicity		
Hispanic or Latino	22	3%
Age groups (years)		
0-9	0	0%
10-19	59	7%
20-29	236	29%
30-39	204	25%
40-49	176	22%
50-59	93	11%
60-69	14	2%
≥70	5	1%

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

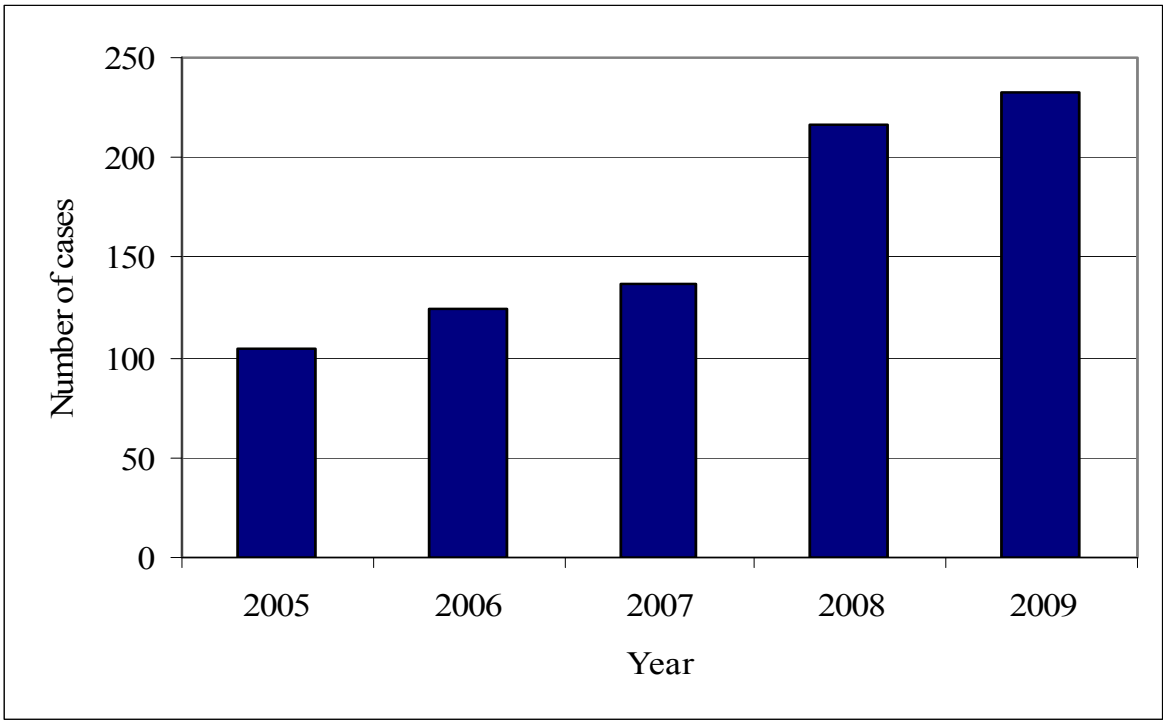

Figure 1. Number of primary and secondary syphilis cases in Michigan, 2005-2009

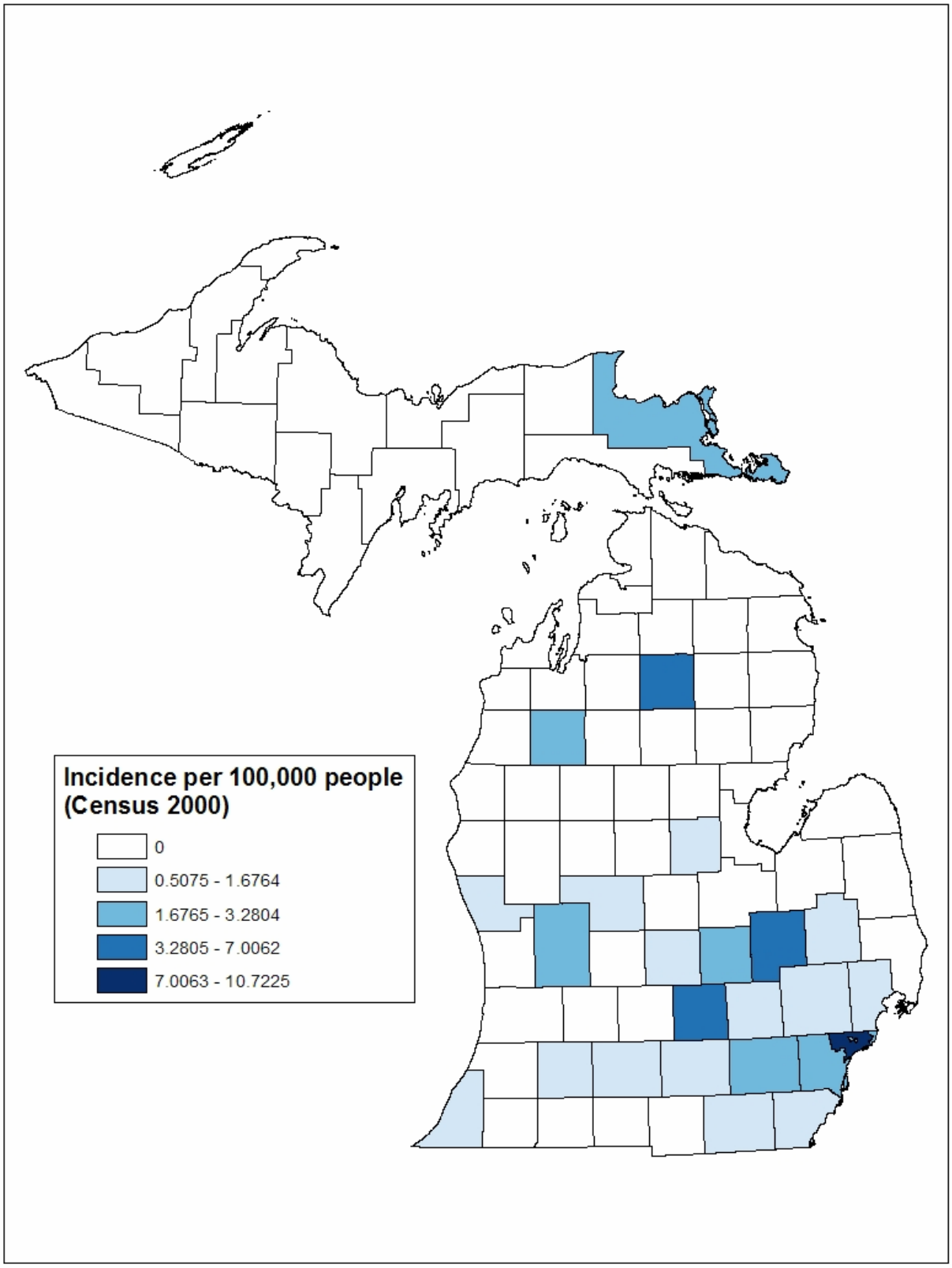

Figure 2. Incidence of primary and secondary syphilis by county, Michigan 2009

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, kidneys, brain, or spine.

Clinical features:
Not everyone who is infected with *M. tuberculosis* becomes sick. Those that have infection but have no symptoms and do not feel sick are said to have latent TB. They cannot spread the infection to others. Some with latent infection will develop the active form of disease. The symptoms of TB depend on where in the body the infection is located. TB in the lungs can cause symptoms such as a cough that lasts three weeks or longer, chest pain, and coughing up blood or sputum. Other symptoms of TB disease include generalized weakness, weight loss, fever, loss of appetite, and night sweats. Other symptoms depend on the part of the body that is affected. If not treated properly TB can be fatal.

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. However, 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 two to three weeks.

Incubation period:
Most people who are exposed to TB germs will develop a positive tuberculin skin test approximately 2 - 10 weeks after exposure. 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 a positive tuberculin skin test is identified.

High-risk groups:
Anyone can get TB. Higher risk persons include:

- Infants and small children
- People who share the same breathing space (such as family members, friends, and coworkers) with someone who has TB disease
- People with low income who live in crowded conditions, have poor nutrition, and have poor health care (e.g. homeless persons)
- 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)
- People who have been recently (<2yrs) infected with TB
- Those who were not received adequate TB treatment in the past

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.

Guidelines for those infected with TB to prevent transmission to others include:

- Always completing course of medication.
- Cover the mouth with a tissue when coughing, sneezing or laughing. Dispose of tissues in a closed paper sack and throw it away.
- Do not go to work or school. Avoid close contact with anyone. Sleep in a bedroom away from other household members.
- Air out living quarters to the outside of the building frequently. TB spreads in small closed spaces where air doesn't move. Place fans in windows to blow out (exhaust) air that may be filled with TB bacteria.

References:
http://www.michigantb.org/genpub/default.asp

http://www.cdc.gov/tb/default.htm

American Public Health Association. Tuberculosis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 639 – 660.

Michigan statistics:
The incidence rate for Tuberculosis (TB) in 2009 was 1.4 cases per 100,000. While Michigan is considered to have 'low incidence' of TB, the demographic characteristics warrant some attention. Fifty-eight percent of the 144 reported TB cases reside in the Detroit Metro Area (DMA). Of these, 24 percent (35 cases) are residents of the City of Detroit. These cases are managed and reported by the Detroit Department of Health and Wellness Promotion (DDHWP). Specifically, DDHWP manages and reports all TB cases that are residents of Detroit and its surrounding areas. The remaining cases in the DMA are residents of the following counties: Wayne County (excluding Detroit) (18 percent, 26 cases), Macomb County (3 percent, 4 cases), and Oakland County (13 percent, 18 cases).

In 2009, Michigan started to align with National data that show that the majority of TB cases are found in persons born outside the US. In 2009, 50 percent of Michigan cases were born in the US and 50 percent were foreign-born. It is expected that the number of foreign born cases will increase.

Michigan has reported a relatively constant number of cases among foreign-born persons. During the period 2005 – 2009, an average of 87 TB cases were reported annually among foreign-born persons, compared to an annual average of 118 cases among U.S.-born persons. These data indicate that TB prevention and control activities need to be targeted more effectively toward Michigan's foreign-born population

Coinfection with TB and HIV remains at a low level in Michigan. During the period 2000 – 2009, the percent of incident TB cases reported to be coinfected with HIV averaged 5.4% (range 2.5% - 7.8%). However, the TB Program has greatly improved the percent of incident TB cases for which HIV status was reported, from ~26% in 1999 to ~70% in 2009.

Homelessness is a growing problem in the TB population in Michigan. From 2005 through 2009, a total 44 cases (an average of 4.6% of annual morbidity) were reported as having been homeless in the prior 12 months. Given the difficult economic times in Michigan, this number will most likely continue to increase. The TB program recognizes the challenges that arise in locating and treating this population and are working with local partners to address these issues.

Michigan continues to report a low number of cases from congregate settings. From 2005 through 2009, a total of 20 cases were reported from State Correctional facilities, comprising an average of 2.1% of annual morbidity. The TB Program and the State Department of Corrections have a long history of strong collaboration to promote early screening and detection of latent TB infection (LTBI) or disease among prisoners. Upon admission, a TST is placed on all prisoners lacking documentation of a prior positive TST. Any prisoners producing a positive TST are immediately referred for chest x-ray and initiated on appropriate treatment.

Thirty-six cases of TB were reported from long-term care facilities from 2005 through 2009, comprising an average of 3.7% of annual morbidity. The TB Program provides consultation and training on best practices and infection control strategies for TB to long-term care facilities, but licensure and inspections are conducted through the Michigan Occupational Safety and Health Administration (MIOSHA).

Table 1. Demographic characteristics of tuberculosis cases, Michigan 2009

*N= 144	Number of Cases	Percent Total
Sex		
Male	86	60%
Female	58	40%
Race		
African American	62	43%
American Indian or Alaska Native	0	0%
Asian	33	23%
Caucasian	49	34%
Hawaiian or Pacific Islander	0	0%
Other	0	0%
Ethnicity		
Hispanic or Latino	23	16%
Age groups (years)		
0-9	3	2%
10-19	11	8%
20-29	33	23%
30-39	22	15%
40-49	26	18%
50-59	21	15%
60-69	15	10%
≥70	13	9%

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

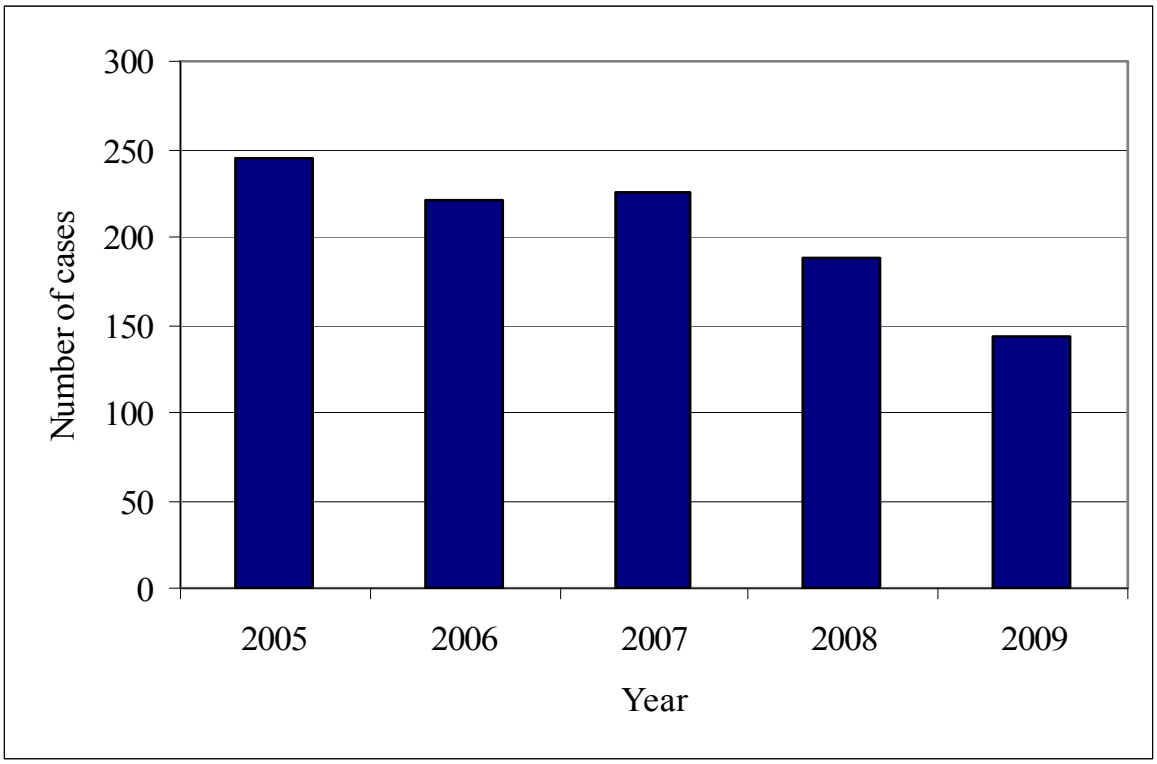

Figure 1. Number of tuberculosis cases in Michigan, 2005-2009

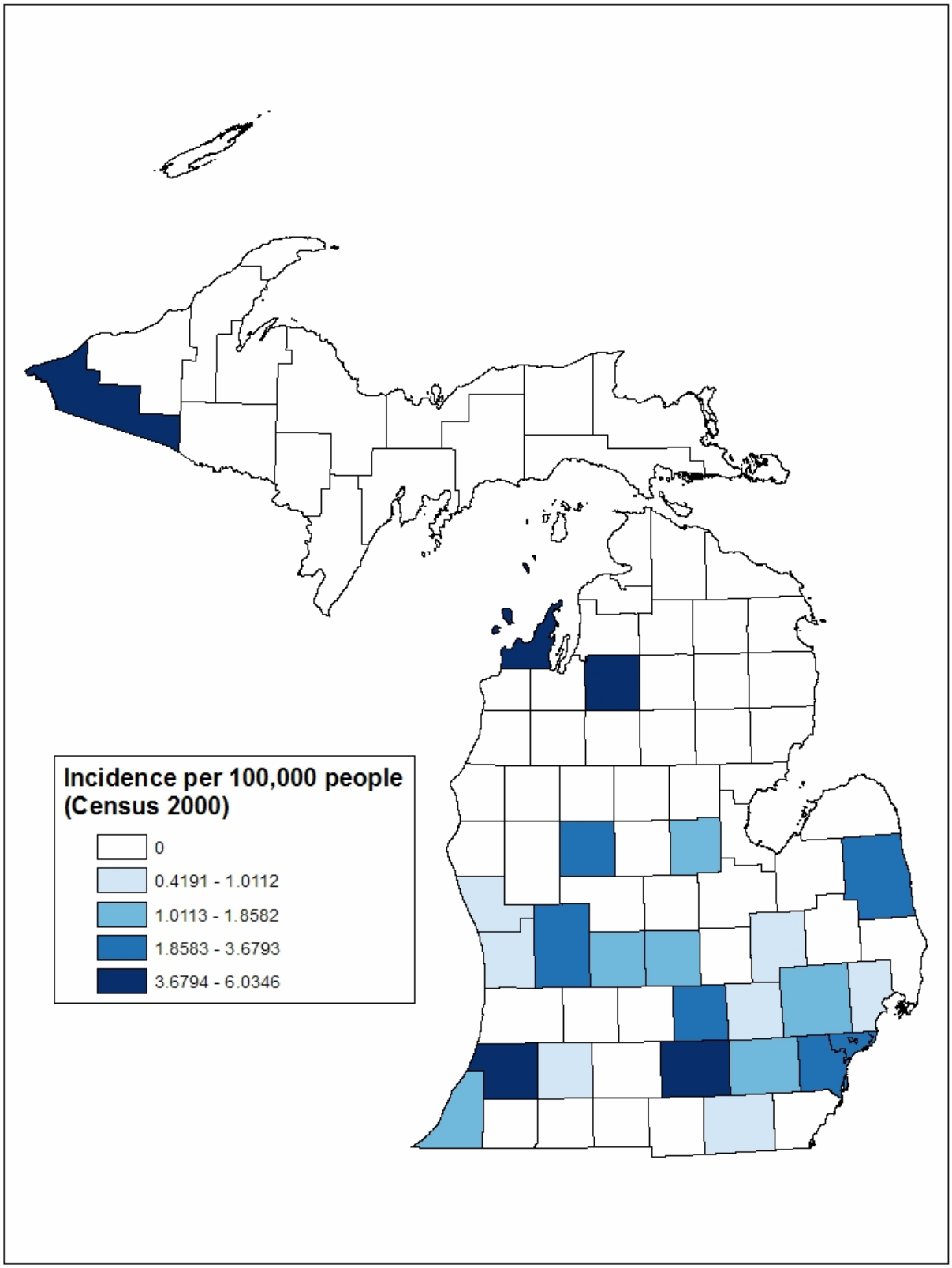

Figure 2. Incidence of tuberculosis by county, Michigan 2009

VANCOMYCIN-RESISTANT STAPHYLOCOCCUS AUREUS (VRSA)

Causative agent:
Vancomycin Resistant *Staphylococcus aureus* (VRSA) is defined as a *Staphylococcus aureus* with a vancomycin MIC $\geq$ 16. Vancomycin is the drug that is most commonly used to treat Methicillin-resistant *Staphylococcus aureus* (MRSA) infections.

Clinical features:
Staphylococcus aureus, often simply referred to simply as "staph", are bacteria commonly found on the skin and in the noses of healthy people. Occasionally, staph can cause infection; staph bacteria are one of the most common causes of skin infections in the United States. Most of these infections are minor (such as pimples, boils and other skin conditions) and most can be treated without antimicrobial agents (also known as antibiotics or antibacterial agents). However, staph bacteria can also cause serious and sometimes fatal infections (such as bloodstream infections, surgical wound infections and pneumonia). In the past, most serious staph bacterial infections were treated with a type of antimicrobial agent related to penicillin. Over the past 50 years, treatment of these infections has become more difficult because staph bacteria have become resistant to various antimicrobial agents, including the commonly used penicillin-related antibiotics (e.g. vancomycin).

Mode of transmission:
All reported cases of VRSA have not been acquired through transmission.

Period of communicability:
Period of communicability cannot be determined due to the lack of documented transmission.

Incubation period:
Incubation period cannot be determined due to the lack of documented transmission.

High-risk groups:
Persons with several underlying health conditions (such as diabetes and kidney disease), previous infections with methicillin-resistant *Staphylococcus aureus*, tubes going into their bodies (such as intravenous [IV] catheters), recent hospitalizations, and recent exposure to vancomycin and other antimicrobial agents are at a higher risk of developing disease.

Prevention of VRSA:
Use of appropriate infection control practices (such as wearing gloves before and after contact with infectious body substances and adherence to hand hygiene) by healthcare personnel can reduce the spread of VRSA.

Because VRSA is only part of the larger problem of antimicrobial resistance in healthcare settings, the CDC has started a Campaign to Prevent Antimicrobial Resistance. The campaign centers around four strategies that clinicians can use to prevent antimicrobial resistance: prevent infections, diagnose and treat infections effectively, use antimicrobials wisely, and prevent transmission. A series of evidence-based steps are described that can reduce the development and spread of resistant organisms such as VRSA.

References:
http://www.cdc.gov/ncidod/dhqp/ar_visavrsa.html

Michigan statistics:
In 2002, Michigan identified and investigated the first clinical case of VRSA in the world. Since then, eleven additional cases of vancomycin-resistant *Staphylococcus aureus* (VRSA) have been reported in the United States. These cases occurred in Michigan (n=8), Pennsylvania (n=1), Delaware (n=2), and New York (n=1). All of the eight Michigan cases with VRSA have been from southeastern Michigan. VRSA is a reportable condition in Michigan that may be reported on a Michigan Disease Surveillance System (MDSS) form.

This major transition in the resistance pattern of *S. aureus*, from oxacillin to vancomycin, is a significant warning of the infections to come if resistant organisms aren't dealt with seriously. Overall measures to reduce emergence of antibiotic resistant bacteria include: reduction of antibiotic use and hospital-acquired infections, and increasing vaccine coverage. However, maintaining a surveillance system that will monitor the significant organisms and detect changes and trends in levels of resistance over time, is necessary to make appropriate recommendations to our healthcare providers and consumers regarding control of risk factors and appropriate antibiotic use. These activities are necessary in order to protect our antibiotic lifeline.

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 other mammals.

Clinical features:
Approximately 80% of people that become infected with the WNV have no illness and < 20% experience only a mild flu-like illness that includes fever, headache, and body aches lasting only a few days. Some may also develop a mild rash or swollen lymph nodes. 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. Biting a bird that carries the virus infects a mosquito. In areas where WNV is actively circulating, less than 1 in 100 mosquitoes will be infected. In a small number of cases, WNV has also been spread by blood transfusions, organ transplants, breastfeeding, and from mother to baby during pregnancy. Currently all blood banks screen for WNV. 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 their entire lifespan.

Incubation period:
Symptoms generally appear 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:
The following measures may prevent WNV transmission:

- Avoid exposure to mosquitoes, especially at peak activity hours (dusk and dawn).
- Wear lightweight long sleeve shirts and long pants to avoid mosquito exposure.
- Use DEET containing mosquito repellent when outdoors. Repellants containing Picaridin and oil of lemon eucalyptus have been approved by the EPA and recommended by the CDC. Follow the manufacturers label instructions.
- Eliminate breeding places for mosquitoes.
- Maintain window and door screens to keep mosquitoes out of buildings

References:

http://www.cdc.gov/ncidod/dvbid/westnile/wnv_factsheet.htm

http://www.michigan.gov/emergingdiseases/0,1607,7-186-25805---,00.html

American Public Health Association. West Nile Virus. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 52 - 55.

Michigan statistics:
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.

MDCH received 152 reports of WNV during 2005 – 2009. The majority of cases are male (61%). Age analysis of WNV demonstrated that over one-fourth of reported cases were found to be in persons 70 years and older (29%). Caucasians (57%) and African Americans (13%) had the highest incidence of disease. Three percent of reported cases were Hispanic or Latino.

Table 1. Demographic characteristics of West Nile Virus cases, Michigan 2005-2009

*N=	152	Number of Cases	Percent Total
	Sex		
	Male	93	61%
	Female	59	39%
	Race		
	African American	20	13%
	American Indian or Alaska Native	2	1%
	Asian	0	0%
	Caucasian	87	57%
	Hawaiian or Pacific Islander	0	0%
	Other	0	0%
	Ethnicity		
	Hispanic or Latino	5	3%
	Age groups (years)		
	0-9	2	1%
	10-19	2	1%
	20-29	8	5%
	30-39	11	7%
	40-49	25	16%
	50-59	35	23%
	60-69	25	16%
	≥70	44	29%

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

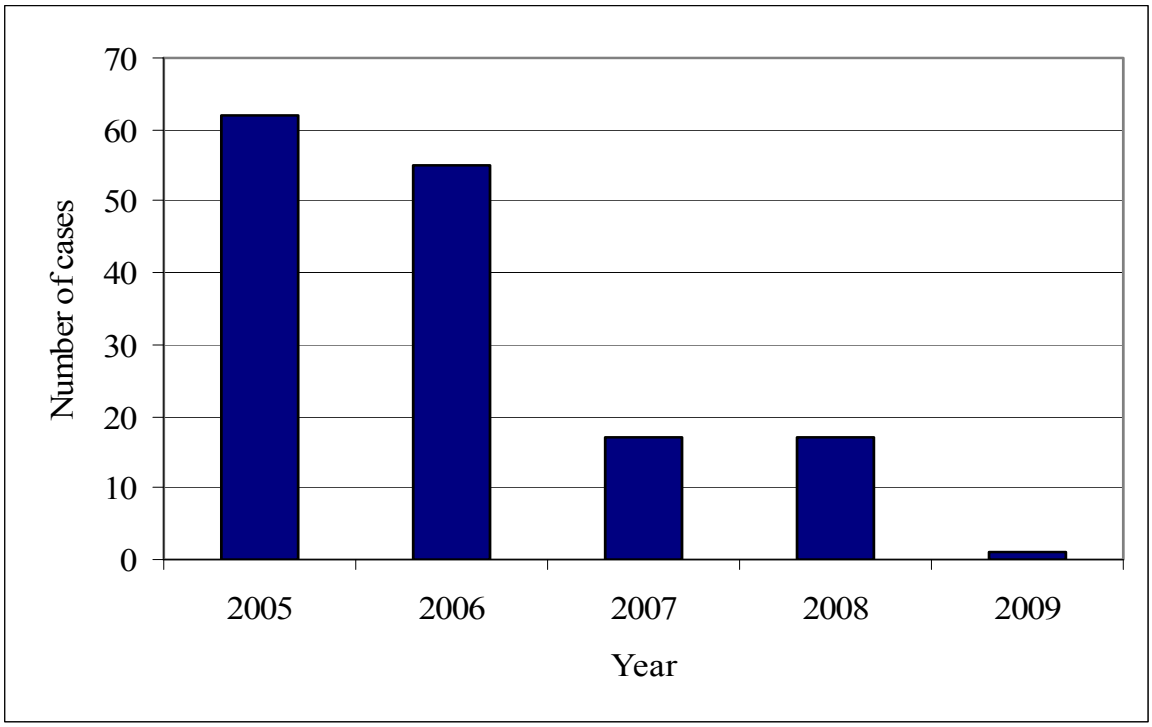

Figure 1. Number of West Nile Virus cases in Michigan, 2005-2009

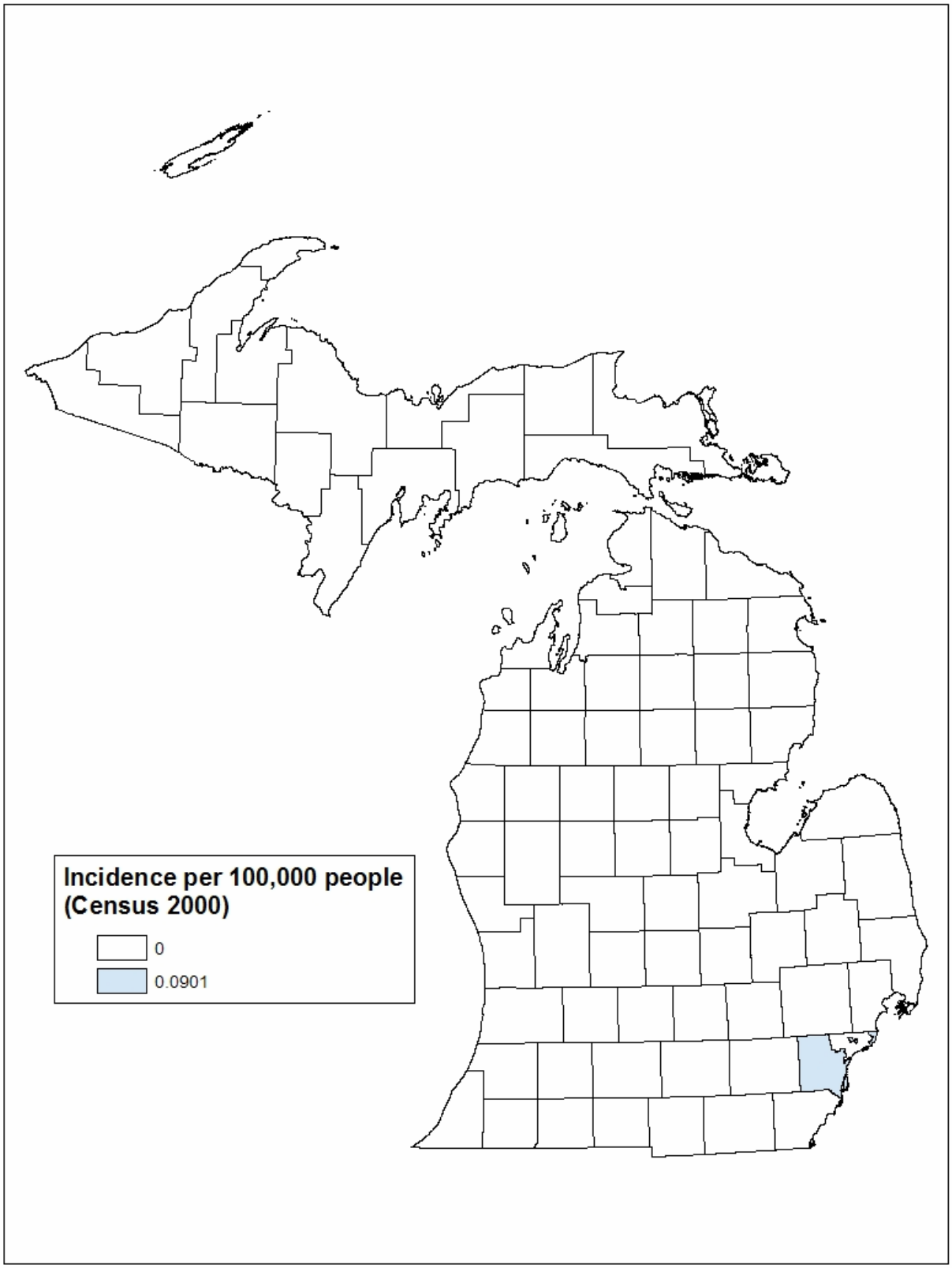

Figure 2. Incidence of West Nile Virus by county, Michigan 2009

YERSINIOSIS

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

Clinical features:
Common symptoms in children include watery diarrhea (which is often bloody), abdominal pain and fever. In older children and adults, fever and right-sided abdominal pain (which can be confused with appendicitis) predominate. In a small number of cases, complications such as joint pain, skin rash or spread of the bacteria into the blood stream can occur. People who have not had antibiotics may have the bacteria in their stool for 2 to 3 months, even if they have no symptoms.

Mode of transmission:
Eating contaminated food, especially raw or undercooked pork products most commonly cause infection. Preparation of chitterlings (pork intestines) can be particularly risky for spreading infection. Caretakers who handle raw pork and have poor hand hygiene can infect infants. Persons who have had contact with feces from infected animals or drink unpasteurized milk or untreated water are also at risk for infection. *Yersinia enteritis* is rarely transmitted through the fecal-oral route or through blood transfusions.

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:
The incubation period is typically 3 – 7 days but can be as high as 10 days.

High-risk groups:
Immunocompromised individuals and elderly people are at higher risk of developing yersiniosis than the general population. Children are affected more commonly then adults.

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

- Avoid eating raw or undercooked pork.
- Consume only pasteurized milk or milk products.
- Wash hands with soap and water after using the toilet, handling raw meat, coming in contact with farm animals and pets, after changing diapers, and before eating or preparing food.
- After handling raw chitterlings, clean hands and fingernails scrupulously with soap and water before touching infants or their toys, bottles or pacifiers. Someone other than the food handler should care for children while chitterlings are being prepared
- Thoroughly cook meat, especially pork. Leftover foods should be completely heated.
- Store raw meat on the lowest shelf of the fridge to keep the juices from dripping onto other foods.
- Store cold foods below 33°F.
- Thoroughly clean knives, cutting boards and other surfaces after contact with raw meat and before contact with other foods.

- Before eating raw fruits and vegetables, thoroughly wash with drinking quality water to remove bacteria.

References:

http://www.cdc.gov/ncidod/dbmd/diseaseinfo/yersinia_g.htm

American Public Health Association. Yersiniosis. In: Heymann D, ed. *Control of Communicable Manual.* 19th ed. Washington, DC: American Public Health Association; 2009: 690 - 693.

Michigan statistics:

The total number of reported yersiniosis cases during 2005 – 2009 was 113. Fifty-eight percent of cases were female. Three-fourths of the reported cases were Caucasian (55%) or African American (20%). One-third of cases were less than or equal to 9 years of age (32%). Three percent of cases were Hispanic or Latino.

Table 1. Demographic characteristics of yersiniosis cases, Michigan 2005-2009

*N=	113	Number of Cases	Percent Total
	Sex		
	Male	48	42%
	Female	65	58%
	Race		
	African American	23	20%
	American Indian or Alaska Native	0	0%
	Asian	1	1%
	Caucasian	62	55%
	Hawaiian or Pacific Islander	0	0%
	Other	3	3%
	Ethnicity		
	Hispanic or Latino	3	3%
	Age groups (years)		
	0-9	36	32%
	10-19	7	6%
	20-29	7	6%
	30-39	5	4%
	40-49	10	9%
	50-59	16	14%
	60-69	9	8%
	≥70	21	19%

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

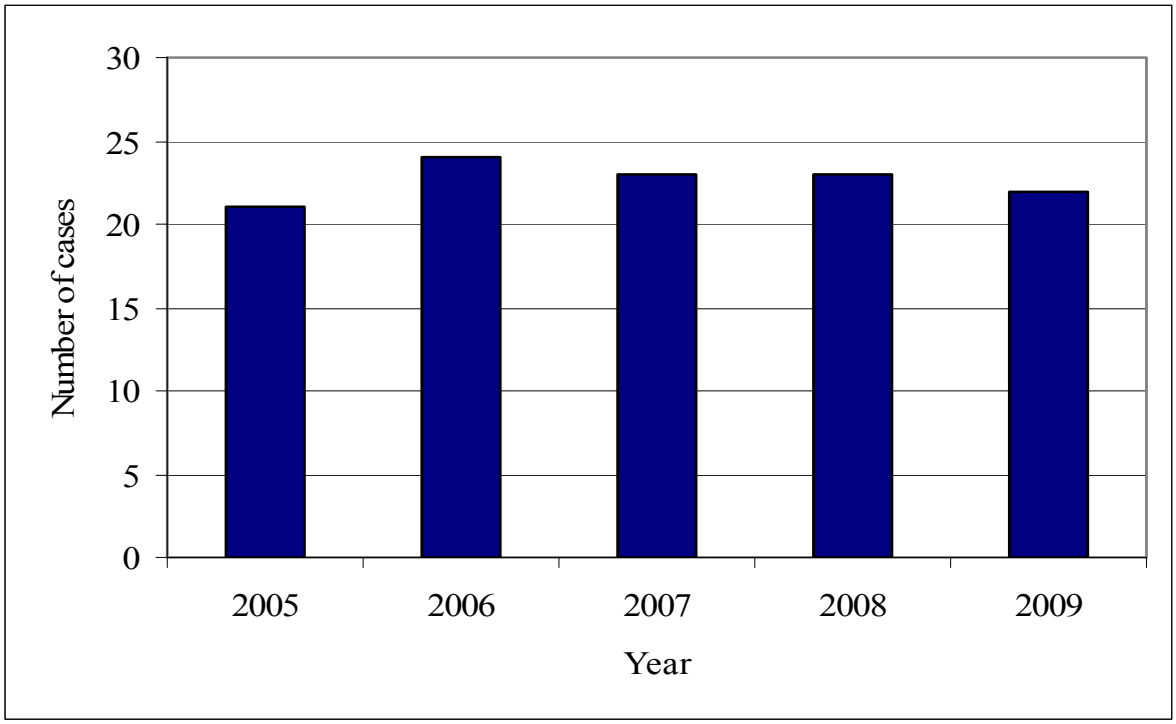

Figure 1. Number of yersiniosis cases in Michigan, 2005-2009

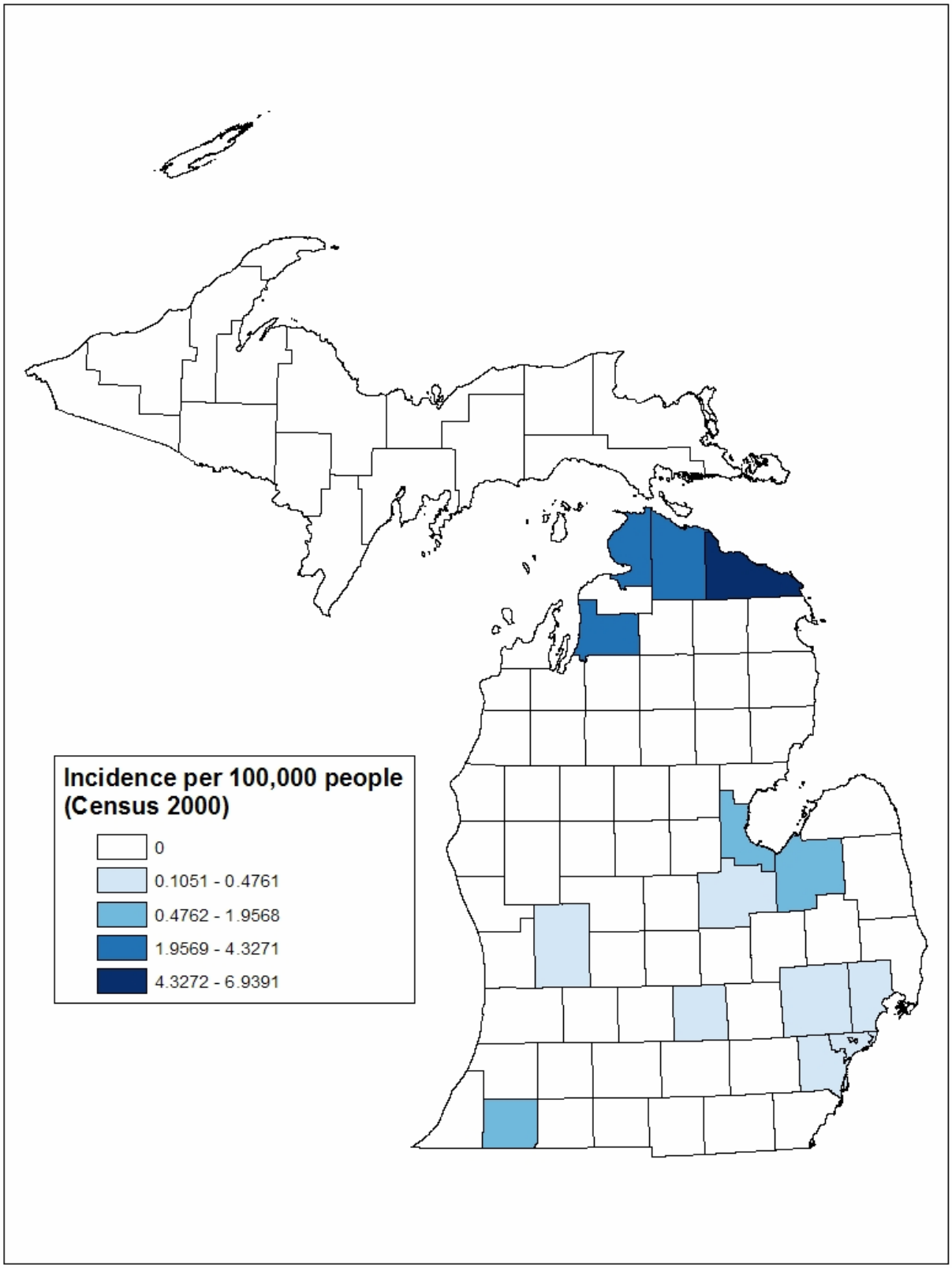

Figure 2. Incidence of yersiniosis by county, Michigan 2009

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 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