



Communicable Disease in Kent County

Part I:

Gastrointestinal Diseases



REPORT TO THE
COMMUNITY 2001

Preface

Communicable diseases are illnesses that are contagious — infections that are transmitted directly from a person or animal to another, or passed indirectly through contaminated food or water. Communicable diseases are caused by a variety of agents — bacteria, viruses, and other organisms — and can be transmitted a variety of ways: physical contact with the body or blood of an infected person or animal, through air, food, or water, and through sexual activity. Communicable diseases also cause a wide range of illnesses — from nuisance colds and respiratory infections from which people typically recover quickly, to severe sicknesses resulting in multiple organ failure and almost certain death. In spite of extraordinary scientific and technological progress in public health generally and health care specifically, communicable diseases continue to be one of the most common health problems people face.

The purpose of this report is to provide an overview and understanding of communicable disease, how communicable diseases are transmitted, and how they impact the population of Kent County. An overview of epidemiology — the study of disease in the popula-

tion and how to control it — highlights the role of the public health department in the prevention, surveillance, and control of communicable disease in the community. Finally, an examination of how the Kent County Health Department tracks and investigates communicable diseases, as well as an epidemiological assessment of communicable disease in Kent County, provides a foundation for the development and implementation of community-based disease prevention and education programs.

Because any discussion of ‘communicable disease’ encompasses a wide range of illnesses, modes of transmission, and methods of prevention, this report will be released in three parts. Part I examines gastrointestinal and diarrheal illnesses generally associated with food or waterborne disease organisms. Part II explores vaccine-preventable diseases — communicable diseases for which there are existing vaccines — and their incidence and prevalence in the community. The final section of this report, Part III, examines sexually transmissible infections including AIDS and HIV, as well as tuberculosis in the community.

Introduction

Preventing and controlling infectious (i.e., communicable) disease is a necessary and critical aspect of assuring community health, and is an affirmative duty of local public health departments and the public health system generally. Many of the advances in public health and life expectancy realized in the U.S. during the 20th century are a direct result of communicable disease control. Until roughly the 1950’s, most Americans died of infectious disease, long before they were old enough to develop one of the chronic diseases (i.e., heart disease, cancer) that are the leading killers of Americans today.

However, in spite of the tremendous progress that has been made in controlling communicable disease in the U.S., these diseases continue to present challenges to the public health community and the community at large. Newly emerging infectious diseases (i.e., ebola), familiar diseases (i.e., influenza), and the ‘evolution’ of drug-

resistant strains of various diseases (i.e., tuberculosis), require continued public health vigilance. Furthermore, globalization, coupled with the specter of bioterrorism, increases the potential for diseases to occur on continents or in areas where they have not previously been identified (the globe-spanning air transportation capabilities of today mean that any infectious organism is only a 24-hour plane ride from any other place in the world). Protecting the public’s health from these threats requires a proactive public health disease surveillance system, vigilant epidemiological assessment, and ongoing disease prevention education.

There are many methods of reducing the (risk of) transmission of communicable diseases. Immunization, hand washing, proper food handling and preparation, antibiotics, and safer sexual practices have all been shown to reduce the risk of catching or transmitting an infectious illness. Antiviral

Disease Reporting and Investigation

Timely and accurate reporting of cases of disease allows the Health Department to:

- quickly identify single or multiple cases of disease occurring within a similar location or time;
- identify persons at risk of acquiring or transmitting disease;
- identify care needs and recommend appropriate prevention measures for those affected;
- provide education for future prevention; and
- assess the effectiveness of public health disease prevention programs.

These five steps are the very essence of disease outbreak investigation and control.

COMMUNICABLE DISEASE IN KENT COUNTY

medications, which continue to be improved and new ones developed, promise to play an increasingly critical role in reducing disease transmission, as well as improving the quality of life of those already infected.

But in addition to disease prevention for the individual, a critical component of disease prevention is community disease surveillance

and control. The Kent County Health Department monitors the occurrence of specific diseases on a community-wide basis. Physicians, laboratories, and schools all report cases of disease to the Health Department so that both the incidence (new cases) and prevalence (existing cases) of disease in the community can be monitored. This type of reporting and monitoring is a vital part of community disease control and prevention.

Public Health Disease Surveillance System

Systematic reporting of disease to public health authorities in the U.S. began in 1874 with weekly voluntary reporting of prevalent diseases by physicians. Reporting was first done using a postcard to “reduce to the minimum the expenditure of time and trouble incident to the service asked of busy medical men.” Interestingly, in 1883, Michigan was the first state to mandate reporting of specific diseases (cholera, smallpox, yellow fever). By 1901, all states had instituted communicable disease reporting requirements.

The poliomyelitis and influenza epidemics that occurred in the U.S. between 1916 and 1918 intensified interest in disease reporting at the national level. Still, it was only recently, in 1989, that standardized case definitions were developed for reportable communicable diseases, and a national list of notifiable diseases was developed by the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE). (Note that the terms “reportable disease” and “notifiable disease” are used interchangeably – both refer to any of a list of 52 diseases that are required to be reported to the local or state health department when a case is diagnosed by a physician or through laboratory testing.)

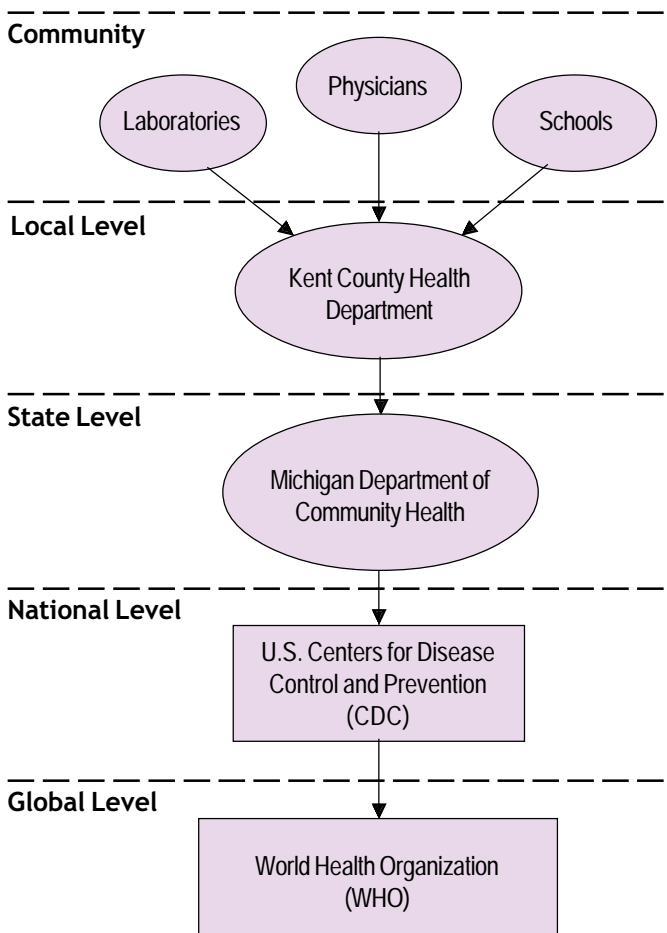
Because timely and accurate reporting of communicable disease can mean the difference between a ‘cluster’ of infected persons and a full-blown disease epidemic that can infect hundreds or thousands of people, disease reporting is taken very seriously and is required by state law. In Michigan, the state Public Health Code requires that healthcare providers (physicians, physicians’ assistants, pharmacists, dentists, nurses, veterinarians, etc.) report any of 77 specific diseases, and that laboratories report any of 42 specific organisms identified, to the local health department within 72 hours.

While physicians are typically concerned with the health of an individual patient, collectively, these individuals could represent an outbreak of disease. Timely communicable disease reporting allows the health department to see ‘the big picture,’ to determine if there are more cases of a particular disease than typical, if there is some commonality among infected individuals, and to conduct an investigation if necessary. The Kent County Health Department Communi-

cable Disease Unit is responsible for disease surveillance for Kent County’s nearly 600,000 residents.

As an epidemiological investigation is conducted, the local health department reports cases to the state health department – in Michigan, the Michigan Department of Community Health Bureau of Epidemiology — where statewide disease assessment is made. Continuing this hierarchy, reports from state health departments are sent to the U.S. Centers for Disease Control and Prevention in Atlanta where communicable diseases are tracked across the entire country.

Communicable Disease Reporting Flowchart



This flow of information – from physician to local health department, to state health department, to CDC – is how communicable disease is monitored and controlled in the United States. For its part, the CDC reports national disease statistics to the World Health Organization (WHO).

Nationwide, it has been estimated that only 10% of diseases are actually reported to the public health system. Strengthening the disease reporting system will improve the quality of data received by the public health system, while also enhancing the public health response to diseases, promoting development of better public health prevention and education programs, and allowing for more accurate assessment of the benefits of these programs within the community.

Along with improved reporting, routine assessment of the total number of diseases reported, coupled with evaluation of the people affected, may assist in identifying early outbreaks, implementing prevention methods, or identifying specific populations to target for intervention and prevention education.

Leading Causes of Death, and Percentage of Deaths by Cause, U.S., 1900 and 1998

1900	%	1998	%
Pneumonia/influenza	12	Heart disease	31
Tuberculosis	11	Cancer	24
Heart disease	9	Stroke	7
Stroke	8	Emphysema	5
Diarrhea/enteritis	6	Accidents	4
Kidney disease	6	Pneumonia/influenza	4
Cancer	5	Diabetes	3
Accidents	4	Suicide	1
Diphtheria	2	Kidney disease	1
Other	37	Other	20

Note that in 1900, infectious diseases accounted for four of the top nine causes of death in the U.S. While heart disease was the third leading killer in 1900, it was responsible for only 9% of deaths, due mainly to the fact that most people died of infectious disease before they lived long enough to develop chronic disease. By 1998, only one infectious disease remains among the top nine causes of death in the U.S., while heart disease has emerged as the leading killer of Americans. Influenza and pneumonia continue to kill some 20,000 primarily elderly Americans every year, highlighting the need for diligent flu surveillance and annual flu vaccination among at-risk populations.

History of Epidemiology

Epidemiology, considered the basic science of public health, is defined by the U.S. Centers for Disease Control and Prevention as the study of the distribution and determinants of health-related states or events in specified populations and the application of this study to the control of health problems. Put more simply, epidemiology asks what is making people unhealthy, and what can be done to fix it?

In 1662, John Graunt, using weekly reports of births and deaths in London, was the first to identify patterns of birth, death, and disease occurrence. In the mid-1800's, William Farr began to collect and analyze Britain's mortality statistics, developing a set of basic practices in vital statistics that are still used today.

Building upon the ideas of Graunt and Farr, English scientist John Snow was able to identify the source of a cholera epidemic in London in 1854, and is considered the father of field epidemiology. Snow observed that death rates from cholera were higher in areas served by a particular water pump in London, and postulated that the water from the pump was the source of the illness. Testing his hypothesis, he removed the handle from the suspect pump, and within weeks deaths due to cholera in the areas served by the pump declined. Snow's grand experiment demonstrated two things: first, that water could serve as a vehicle for transmitting cholera (and hence, presumably, other diseases), and, second, that epidemiological information could be used to prompt and direct appropriate public health action.

Since the days of John Snow, thousands of microorganisms (bacteria and viruses) have been identified as infectious agents for communicable diseases. The importance of public sanitation and hygiene to prevent disease *occurrence* became increasingly evident, while technologies such as antibiotics, vaccination, and pasteurization were developed and implemented for the control of disease *transmission*. With these advances, life expectancy in the United States rose from 50 years in 1900 to 75 years in 1990.

Even though infectious diseases are no longer the most common causes of death in the U.S., many of the communicable disease deaths that do occur are preventable. Communicable disease surveillance is necessary to detect outbreaks, to evaluate the effectiveness of current disease prevention efforts (i.e., vaccination), and to identify new, re-emerging, and drug-resistant diseases. Epidemiology will continue to be of critical importance in minimizing the impact of infectious disease in the community.

Epidemiology of Gastrointestinal Illness

Early in the 20th century, communicable disease associated with overcrowding, poor housing and sanitation, as well as contaminated water, milk and food were responsible for many illnesses and deaths. Tuberculosis, diphtheria, and typhoid fever, as well as illnesses such as botulism and dysentery, among others, were leading killers because all thrived and were easily transmitted through poor hygiene and unsanitary living conditions. Subsequent improvements in housing, public water supplies—including water chlorination and filtration — waste-disposal systems, and safe food production and handling practices (including refrigeration and pasteurization) — resulted in swift progress in disease control, and constitute one of the greatest public health accomplishments of the 20th century.

Although death from gastrointestinal illness (also called diarrheal illness) is no longer one of the top ten causes of death, as it was in 1900 (see table, page 3), diarrheal illness is a major cause of illness in the U.S.: salmonellosis, shigellosis, and hepatitis A were each within the top ten most commonly reported diseases in 1998.

In the U.S., estimates show that only 8% of persons with gastrointestinal illness seek medical care; the numbers in the table at right represent only those persons who received medical care, appropriate diagnostic testing, and whose results were reported to the public health system. Based on these numbers, estimates of the true impact of diarrheal illness can be startling: foodborne infections alone have been estimated to cause 76 million illnesses, 325,000 hospitalizations, and 5,200 deaths in the U.S. each year.

At the Kent County Health Department, gastrointestinal illness surveillance, reporting, and follow-up are initiated by: 1) diagnosis of illness with a causative agent confirmed by laboratory testing, and/or 2) suspected food or water-related illness without a confirmed etiology. Because so few people seek medical care for diarrheal illness, both methods of surveillance are helpful for understanding how people in the community may be affected by diarrheal illness. For all reports of illness occurring at higher than expected levels (e.g., outbreak/epidemic), an epidemiological investigation is conducted to identify where prevention methods should be implemented. Surveillance of food and waterborne illness continues to improve and more of these types of diseases will likely become reportable.

Leading Food, Waterborne, and Diarrheal Illnesses (Confirmed Cases), U.S., 1998

Disease	Confirmed Cases Reported
Salmonellosis	43,694
Shigellosis	23,626
Hepatitis A	23,229
Cryptosporidiosis	3,793
E. coli O157:H7	3,161
Botulism	116
Cholera	17

Other Gastrointestinal and Food and Waterborne Illnesses

Other types of gastrointestinal/diarrheal illness are also included on the national notifiable disease list. Though not as common as others discussed in this report, many of these diseases can be relatively severe for susceptible individuals (i.e., 5% of people with botulism die from the disease) or cases may occur as the result of a disease outbreak situation. In 1993, cryptosporidium contaminated a public water supply in Milwaukee, Wisconsin, causing an outbreak of diarrheal illness in an estimated 400,000 persons. In another outbreak, listeriosis (not a nationally notifiable disease, but reportable in Michigan), was identified to be the cause of 101 illnesses and 21 deaths in 22 states in the U.S., including Michigan, in 1999-2000. That outbreak was traced to consumption of contaminated hot dogs.

Overall, however, because few persons seek medical care for diarrheal illness, and fewer still receive diagnostic testing, many cases of these diseases go unreported — making identification of situations

that put people at risk for them difficult, and as a result, increasing the risk of outbreaks. Until more intensive disease surveillance methods are in place, the Kent County Health Department continues to monitor complaints of illness from residents (unconfirmed disease) to provide an early warning of a potential disease outbreaks, and to allow for implementation of preventive measures. For this reason, the Health Department’s Communicable Disease Unit conducts epidemiological investigations and assessment of all complaints of foodborne and waterborne illness.

“Improved understanding of the epidemiology of infectious diseases in subgroups of the U.S. population can assist public health agencies and others in strengthening measures to prevent, monitor, and control the incidence of infectious diseases.”
- Centers for Disease Control and Prevention

Foodborne and Waterborne Illness Complaints

Throughout the cycle of food production, harvesting, processing, packaging, transportation, preparation, storage, and service, there are several points at which any food (or water) has the potential to become contaminated. Safe food handling and storage, and cooking food at adequate temperatures, will minimize the risk of illness from eating the food, however, when these procedures are not followed the result can be what is commonly referred to as “food poisoning.”

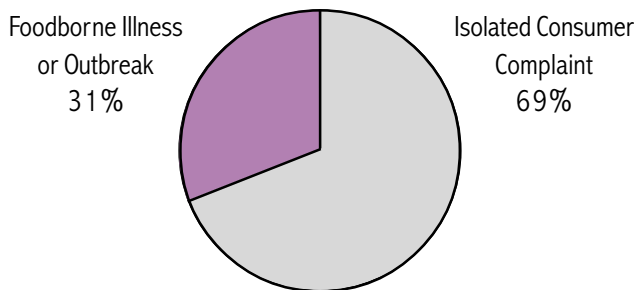
When the Health Department receives a complaint of (suspected) foodborne illness from a community member, the Communicable Disease Unit begins an investigation by compiling all of the information the person making the complaint can report about the particular (suspected) food item. A record is made of all food the person has eaten in the past 72 hours, the food service establishment involved (most complaints of foodborne illness derive from meals eaten in restaurants, catered meals, and to a lesser extent, food purchased in

grocery stores), and other pertinent information. Complaints of suspected waterborne illness record the source or water supply involved. The complaint record is also compared to other complaints to determine if the illness may be associated with a particular restaurant, food product, or common event (i.e., a banquet or reception).

Foodborne illness and outbreak information is also shared with the Michigan Department of Agriculture (MDA), the Michigan Department of Community Health Bureau of Epidemiology, and, if necessary, the CDC, to assist with early recognition of illness and outbreak detection and control. This information sharing is critical to identifying potential outbreaks, and was central to resolving the multi-state outbreak of listeriosis in 1999-2000 that was eventually traced to contaminated hotdogs manufactured in a Michigan food plant.

From 1995-1999, the Kent County Health Department received an average of 412 food-related complaints per year, approximately a third of which were reports of illness, while the remainder were complaints of adulterated food (food that has been intentionally contaminated or denigrated by a server or food server worker, or food containing a visible foreign object of some sort). Approximately 300 persons per year report a food-related illness in Kent County (often several cases of illness are identified through the investigation of a single complaint). Fifty-eight percent of complaints are classified as alerts (1 person ill), while 35% of complaints involve two to four persons with illness. Four percent of reports have involved five to nine persons, and 3% have involved greater than 10 persons ill. According to the MDA, in Michigan in 1999, 1,250 food-related illness events were reported that affected 2,723 people.

Food-Related Complaints, Kent County, 1995-1999



Illness Complaint Investigation

The purposes of food/waterborne illness investigations is to:

- Identify illnesses associated with an incident and verify that the causative agent is food/waterborne;
- Detect all cases, the causative agent, the implicated food(s), and the place(s) where food was mishandled or mistreated, or an implicated water source;
- Determine source or mode of contamination, processes or practices by which proliferation, and/or survival of the etiologic agent occurred;
- Stop the outbreak or prevent further exposures; and
- Gather information on the epidemiology of foodborne diseases and the etiology of the causative agents that can be used for education, training, and program planning, which can make an impact on preventing foodborne illness.

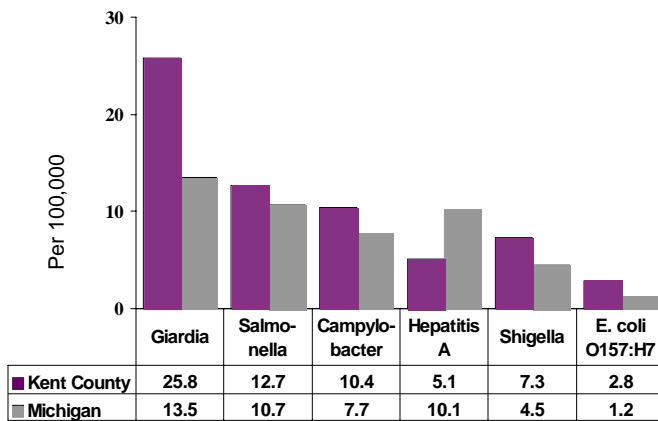
Environmental Health

Along with the investigation of foodborne and waterborne illness complaints by the Communicable Disease Unit, the Health Department’s Environmental Health Division conducts many regulatory activities, and provides many services, that contribute to prevention of these illnesses. All food service establishments are licensed and inspected by the Environmental Health Division to ensure that sanitary conditions for food storage, handling, and preparation are maintained. The results of these inspections are posted on the Health Department’s web site to raise awareness of food sanitation generally, and help consumers make a more informed choice when dining out. In addition, the Environmental Health Division provides a free class in safe food handling and preparation practices specifically for food service workers. Environmental Health Sanitarians also monitor ground water and well water quality to minimize the risk of waterborne illness in the community.

Gastrointestinal Illness Surveillance and Prevention

Epidemiological surveillance and investigation of confirmed gastrointestinal (diarrheal, foodborne, and waterborne) illness in Kent County allows the Health Department to assess both the incidence (new cases) and prevalence (existing cases) of these diseases, and to evaluate the effectiveness of prevention efforts and activities. Epidemiological surveillance also reveals community-specific disease events, patterns, and circumstances, and allows comparisons to other communities, the state as a whole, and the nation.

Confirmed Gastrointestinal Illness Case Rate, Kent County and Michigan, 1995-1999



While effective surveillance, investigation, and control assure that risks to the community at-large are minimized, outbreaks of foodborne, waterborne, and diarrheal illness, have all occurred in Kent County. Outbreaks may be local, part of a statewide increase in illness, or linked to a national outbreak.

A 1997 outbreak of shigella in a Kent County school system was traced back to a child caregiver. Treatment and education were initiated for those at risk, and the outbreak subsided. In another example, statewide monitoring of reported hepatitis A cases revealed an increase in cases in Southeastern Michigan beginning in 1997. Statewide health alerts were issued and forwarded to local health departments and healthcare providers.

Examples of nationwide outbreaks of disease affecting Kent County include hepatitis A associated with the consumption of contaminated strawberries in 1997 (6 states involved); *Salmonella agona* associated with consumption of contaminated toasted oat cereal in 1998 (11 states affected); and listeriosis associated with the consumption of contaminated hot dogs in 1999-2000. The graph at left, as well as the overview of gastrointestinal diseases on the following six pages, represent confirmed cases of these diseases (those reported by a physician or laboratory) in Kent County and in Michigan.

Conclusion

Reducing the risk of illness is the primary goal of diarrheal and food and waterborne disease surveillance. But other prevention strategies — inspection of food production and retail establishments, and consumer education on safe food handling practices and healthy hygiene habits — are essential complements to public health surveillance. In addition, longer-term research and development will likely produce any number of innovations to promote a safer food supply: improvements in pasteurization/irradiation techniques, improved sanitizers, new vaccines (for animals and plants), and refined animal husbandry techniques. Finally, improved laboratory testing, disease reporting, and epidemiological assessment of the effects of hygiene practices, housing, access to medical care and other risk factors will promote development of more effective prevention messages.

Ultimately, the public relies on the food industry, as well as regulatory public health and food safety agencies, to protect them and the food supply from foodborne pathogens. Such protection depends upon

rapid detection of outbreaks and a thorough knowledge of the agents and factors responsible for foodborne illness (environmental health assessment). As epidemiological data accumulate, information will indicate critical control points in food production, processing, and preparation, environmental sanitation, as well as appropriate methods for reducing the risk of diarrheal and food and waterborne illness. This information is essential to guide public health, industry, and community leaders in making rational decisions and setting program priorities to provide the highest degree of food safety at the lowest cost.

Preventing the spread of communicable diseases — foodborne, waterborne, and diarrheal, among others — is both a primary goal and primary responsibility of public health departments. Epidemiological disease surveillance, regulatory activities, and prevention education constitute a three-pronged approach to disease control that is both proactive and responsive.

Overview of Common Gastrointestinal Diseases

Giardiasis

Epidemiology

During the past 15 years, giardia has become one of the most common causes of waterborne disease in humans in the U.S., causing an estimated 2.5 million infections annually. However, because giardiasis is not yet a nationally notifiable disease, it is difficult to know the actual number of people affected in a given year.

Giardiasis is the most commonly reported diarrheal illness in both Michigan and Kent County. Statewide, there has been an average of 1,255 cases of giardiasis reported annually during the past five years, while in Kent County there are an average of 130 cases reported each year. In Michigan, where giardiasis is reportable, the five-year average case rate is 14 cases per 100,000 population. The case rate in Kent County — 26 cases per 100,000 population — is almost twice the state rate. (In contrast, case rates reported in Wisconsin and Vermont, states with active giardiasis surveillance systems, were approximately 45 cases per 100,000 — due largely to better reporting but not necessarily more actual cases of disease.) The relatively high case rate in Kent County may be related to a relatively high number of international refugees and travelers, involvement of people in outdoor recreation, and an efficient reporting system. Continued improvement in testing and reporting may reveal that an even higher rate of infection actually exists in Kent County and Michigan.

The distribution of people affected by giardiasis in Kent County has been similar to the national pattern with the highest percentage of cases occurring in persons 0-9 years old (38%) and 30-39 years old (22%). While there is no difference in the distribution of cases by sex (52% female: 48% male), which is also consistent with national patterns, it is interesting to note that women are 22-70% more likely to be hospitalized for giardiasis than men.

Organism: Protozoan

Transmission: By accidentally ingesting fecally contaminated soil, food, water, or transferred from fecally contaminated surfaces to the mouth.

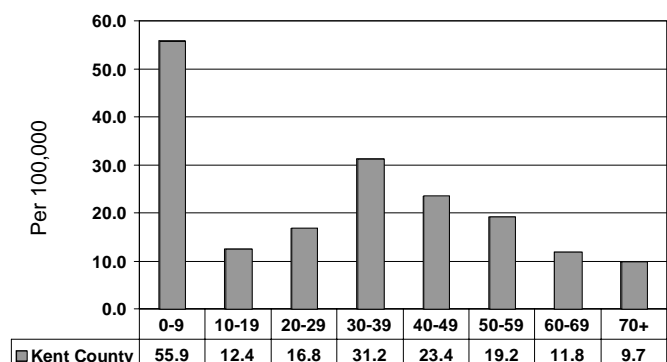
Symptoms: Diarrhea, abdominal cramps and nausea beginning 1-2 weeks after infection. Illness may last for months if untreated. Not everyone infected has symptoms.

Treatment: Prescription drugs are available for treatment.

At Risk: Child care workers; diaper-aged children who attend day care centers; international travelers; hikers; campers; and others who may drink untreated water from contaminated sources.

Prevention: Wash hands thoroughly with soap and water after using the toilet and changing a diaper and before handling food. Avoid ingesting food or water that might be contaminated. Avoid fecal exposure during sex.

Giardiasis Case Rate by Age
Kent County, 1995-1999



Overview of Common Gastrointestinal Diseases

Salmonellosis

Epidemiology:

There are approximately 40,000 culture-confirmed cases of salmonellosis reported in the U.S. each year, making it the second most common diarrheal illness in the country. It has been estimated that 1.4 million cases occur annually in the U.S. Although most people who become infected will recover without complications, salmonellosis is not without consequences. Approximately 1,000 persons die from salmonellosis each year, and it has been estimated that medical costs and lost wages due to foodborne salmonellosis alone exceed \$1 billion per year.

Salmonellosis is the second most commonly reported diarrheal illness in Michigan and Kent County. During the past five years, there have been an average of 996 cases reported annually statewide, and 64 cases annually in Kent County. The five-year average case rate for salmonellosis is 11 per 100,000 in Michigan, and 13 per 100,000 in Kent County, both slightly higher than the 1992-1994 national average of 10 cases per 100,000 in people aged 15 years and older.

The distribution of people affected by salmonellosis locally is similar to the national pattern. In Kent County, almost one-half (47%) of salmonellosis cases occur in children 0-9 years old. Nationally, the case rate of salmonellosis in children less than 15 years of age is estimated to be two to three times the rate for adults (26 per 100,000 population). Inconsistent or poor hygienic practices, coupled with more severe disease and increased medical follow-up, may contribute to the increased rate among children. There is no significant difference in the distribution of cases by sex either locally (51% female: 49% male) or nationally. Interestingly however, when cases are evaluated by age, 20% more adult females (20 years of age and older) were affected by salmonellosis than men. This may be related to exposure associated with food preparation or contact with infected children.

Organism:	Bacterium. Approximately 2000 serotypes cause human disease.
Transmission:	By accidentally ingesting fecally contaminated soil, food, water, or by transfer from fecally contaminated surfaces to the mouth.
Symptoms:	Fever, abdominal cramps, and diarrhea (sometimes bloody) beginning 12 to 72 hours after infection. Illness usually resolves in 5-7 days.
Treatment:	Fluids or antibiotic treatment only if dehydrated or if disease invades areas of the body other than the intestines.
At Risk:	Affects all age groups, especially those at greatest risk for severe or complicated disease including infants, the elderly, and persons with compromised immune systems.
Prevention:	Cook poultry, ground beef, and eggs thoroughly before eating. 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 or birds or after contact with pet feces.

Overview of Common Gastrointestinal Diseases

Campylobacteriosis (Campylobacter enteritis; Vibrionic enteritis)

Epidemiology:

Campylobacteriosis is the most common *bacterial*/diarrheal illness in the U.S. Up to 2.4 million persons are estimated to become infected with campylobacteriosis each year in the U.S., an estimated case rate of approximately 20 per 100,000. Approximately 500 persons die of campylobacteriosis every year, and 1 of every 1,000 cases will develop a paralytic condition known as Guillain-Barre Syndrome.

Campylobacteriosis is the third most commonly reported diarrheal illness in both Michigan (with an average of 719 cases annually) and Kent County (with an average of 52 cases annually) in the past 5 years. The five-year average case rate for campylobacteriosis is 8 per 100,000 in Michigan, and 10 cases per 100,000 in Kent County. Although campylobacteriosis is not nationally reportable, the case rate from reporting states is 6 cases per 100,000 population. Improved access to medical care, consistent testing, and universal reporting would help provide a more accurate assessment of the true impact of campylobacteriosis.

In Kent County campylobacteriosis is more widely distributed across age categories than other diarrheal illnesses: only 19% of cases are in children ages 0-9 years old, while 21% of cases occur in persons 20-29 years old, 18% in persons 40-49 years old. This wide age distribution may be related to the fact that campylobacteriosis is both foodborne and transmitted person-to-person, placing more people at risk across the age spectrum. Although it appears that males are more likely to be affected by campylobacteriosis than females in Kent County (55% male, 45% female), the significance of this difference is difficult to evaluate given the relatively small number of cases locally. Because the campylobacter organism is transmitted in ways similar to salmonella, differences in age and sex distribution bear further evaluation. In addition, the impact of occupational exposure (i.e., livestock/animal handler, childcare provider) and dietary habits should be investigated to implement more targeted prevention messages.

Organism:	Bacterium.
Transmission:	Contaminated food (particularly poultry), water, or contact with infected animals (particularly cats and puppies); can be transmitted person-to-person in limited circumstances.
Symptoms:	Fever, abdominal cramps, and diarrhea (often bloody) occurring within 2-5 days of infection. Illness typically lasts one week. Not everyone infected has symptoms.
Treatment:	Fluids or antibiotic treatment only if dehydrated or if disease invades areas of the body other than the intestines.
At Risk:	All age groups. Infants and young adults are particularly likely to be infected.
Prevention:	Cook all poultry products thoroughly before eating. 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 contact with pet feces.

Overview of Common Gastrointestinal Diseases

Hepatitis A (Infectious hepatitis; Type A hepatitis; Epidemic jaundice; HA)

Epidemiology:

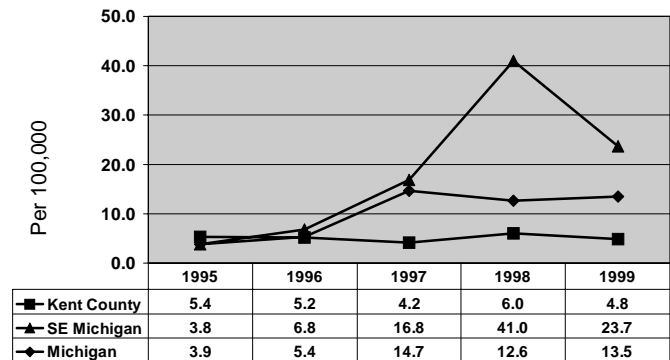
Although 23,229 cases of hepatitis A were reported in the U.S. in 1998, it has been estimated that there are actually between 125,000-200,000 cases of hepatitis A each year, with approximately 100 deaths. Hepatitis A is associated with impressive economic losses: an adult infected with hepatitis A virus loses an average of 30 days work and about \$2,600 in wages, while medical care for hepatitis A can cost \$2,800 for each hospitalized case. In addition, for each case of hepatitis A diagnosed, an average of 11 persons are identified as close contacts (having the potential to become infected through contact with the primary case) and are offered or provided recommended post-exposure prophylaxis (vaccinations) paid for by the public health system. The annual cost associated with hepatitis A is estimated at \$200 million in the U.S.

Hepatitis A is the fourth most commonly reported diarrheal illness in Michigan and Kent County with an average of 930 cases reported annually in Michigan, and 26 cases annually in Kent County, for the past five years. The five-year average case rate in Kent County (5 per 100,000 population) is half of the rate reported for Michigan (10 per 100,000). The 1992-1994 national rate for adults is slightly over 10 cases per 100,000 population. Since 1997, an outbreak of hepatitis A in southeastern Michigan has contributed to an increase in the overall case rate for Michigan.

In Kent County, over half (63%) of Hepatitis A cases occur in persons between the ages of 20 and 50 years of age: 20% of cases are 20-29 years old, 22% of cases are 30-39 years old, and 21% of cases are 40-49 years old. Children infected with hepatitis A generally have no symptoms, and so are not usually diagnosed or reported. However, because of this, children are the single largest reservoir of hepatitis A virus transmission. The sex distribution of hepatitis A cases in Kent County is 60% male and 40% female, fairly consistent with the 1992-1994 national patterns (56% male, 44% female). The impact of hepatitis A on the adult population may be related to the level of international travel, intravenous drug use, sexual practices, or other factors, and should be evaluated in more detail.

- Organism:** Virus
- Transmission:** By accidentally ingesting fecally contaminated soil, food, water, or by transfer from fecally contaminated surfaces to the mouth.
- Symptoms:** Fever, fatigue, abdominal pain, jaundice and diarrhea beginning 15 to 50 days after exposure. Illness usually lasts 1-2 weeks.
- Treatment:** Treatment is supportive only.
- At Risk:** Household/sexual contacts of infected persons; international travelers; persons living in American Indian reservations, Alaska Native villages, and other regions with endemic hepatitis A; during outbreaks: day care center employees or attendees; homosexually active men; and intravenous drug users.
- Prevention:** Wash hands thoroughly with soap and water after using the toilet and changing a diaper and before handling food. Avoid ingesting food or water that might be contaminated. Avoid fecal exposure during sex. Receive Immune Globulin injection pre- or post-exposure. Receive pre-exposure hepatitis A vaccine.

Hepatitis A Case Rate by Year
Kent County, Southeast Michigan, and Michigan, 1995-1999



Overview of Common Gastrointestinal Diseases

Shigellosis (Bacillary dysentery)

Epidemiology:

Although 23,626 cases of shigellosis were reported in the U.S. in 1998, it has been estimated that 450,000 cases actually occur (mostly due to *S. sonnei*) in the U.S. annually.

Shigellosis is the fifth most commonly reported diarrheal illness in Michigan and Kent County with an average of 418 cases annually in Michigan, and an average of 36 cases annually in Kent County for the past five years. The average case rate is similar in Michigan (5 per 100,000) and Kent County (7 per 100,000 population), and is consistent with the 1992-1994 nationwide adult case rate (4 per 100,000).

Children, especially those aged 2 to 4 years of age, are most likely to experience shigellosis. Children 0-9 years old account for almost half (47%) of shigellosis cases in Kent County, consistent with nationwide patterns. The 1992-1994 nationwide case rate of shigellosis in children under 15 years of age (26 per 100,000) was approximately three times higher than the rate for adults. The high case rate among children may be related to the fact that shigellosis is particularly common and causes recurrent problems in settings where hygiene is poor. As other diarrheal illnesses, there is no significant difference in the distribution of shigellosis by sex in Kent County (52% male, 48% female), though nationally, shigellosis is more common in adult females.

Organism: Bacterium.

Transmission: By accidentally ingesting fecally contaminated soil, food, water, or by transfer from fecally contaminated surfaces to the mouth (person-to-person transmission usually).

Symptoms: Most develop diarrhea, fever, and stomach cramps starting 1-2 days after exposure. The diarrhea is often bloody. Illness usually resolves in 5 to 7 days.

Treatment: Supplemental antibiotic therapy is available, however, resistant organisms are becoming more common.

At Risk: Children in childcare centers (2 to 4 years old) and persons in custodial institutions, where personal hygiene is difficult to maintain; Native Americans; orthodox Jews; international travelers; homosexual men; and those in homes with inadequate water for hand washing.

Prevention: Wash hands with soap carefully and frequently, especially after going to the bathroom, after changing diapers and before preparing foods or beverages. Avoid ingesting food or water that may be contaminated.

Overview of Common Gastrointestinal Diseases

E. coli O157:H7 (Enterohemorrhagic *E. coli*; Shiga Toxin-producing *E. coli*; EHEC)

Epidemiology:

Although only 3,161 cases were reported in the U.S. in 1998, it has been estimated that *E. coli* O157:H7 causes 73,000 cases of infection, 2,100 hospitalizations, and 61 deaths annually in the U.S..

E. coli O157:H7 is the sixth most commonly reported diarrheal illness in Michigan (with an average of 114 cases annually) and Kent County (with an average of 13 cases annually). The five-year average case rate both in Michigan and nationally is 1 per 100,000, however, the case rate for Kent County is 3 per 100,000. *E. coli* O157:H7 has only been nationally notifiable since 1994; inconsistencies in reporting coupled with regional outbreaks and a relatively small number of cases reported overall may cause variations in rates.

Although all people are at risk of contracting *E. coli* O157:H7, children, especially those under five years of age, and the elderly are more likely to develop serious complications. In Kent County 30% of reported cases of *E. coli* O157:H7 are 0-9 years old. Distribution of *E. coli* O157:H7 cases by sex shows that women are more likely to be infected than men (female 65%, male 35%). As with salmonella and shigella, this may be related to increased rates of exposure from food preparation or increased care-giving responsibility for and exposure to infected children.

Organism:	Bacterium that produces a powerful toxin.
Transmission:	Most illness associated with eating undercooked contaminated ground beef. Person-to-person contact in families and childcare centers also an important mode of transmission. Infection can occur after drinking raw milk and after swimming in or drinking sewage-contaminated water.
Symptoms:	Infection often leads to bloody diarrhea and occasionally to kidney failure (Hemolytic Uremic Syndrome [HUS]) beginning 2 to 8 days after exposure. Illness usually lasts 5 to 10 days.
Treatment:	Treatment with antibiotics may precipitate kidney complications. Antidiarrheal agents should be avoided. HUS requires blood transfusions and dialysis.
At Risk:	All persons. Children under 5 years old and the elderly are more likely to develop serious complications.
Prevention:	Wash hands with soap carefully and frequently, especially after going to the bathroom, after changing diapers and before preparing foods or beverages. Thoroughly cook ground beef. Avoid drinking unpasteurized milk. Avoid ingesting food or water that may be contaminated.

Washing your hands, before eating or preparing food, and after going to the bathroom, is the most effective way to reduce your risk of becoming infected with gastrointestinal and respiratory illnesses.

**Communicable Disease in Kent County
Part I: Gastrointestinal Diseases**

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