

PROFILES OF SELECTED NOTIFIABLE DISEASES

ESCHERICHIA COLI, SHIGA TOXIN-PRODUCING

<i>Number of cases in 2009:</i>	128	<i>Rate in 2009:</i>	1.1
<i>Number of cases in 2008:</i>	209	<i>Rate in 2008:</i>	1.8

* Rates are based on U.S. Census midpoint estimates for each year and are per 100,000 population.

Escherichia coli (*E. coli*) O157:H7, the most common Shiga toxin-producing *E. coli* (STEC) strain, was first recognized as a pathogen in 1982 when 47 persons became ill in two outbreaks associated with ground beef consumption at the same fast-food restaurant chain.¹ Since then, this bacterium has become an increasingly recognized cause of bloody diarrhea. It is estimated that 70,000 STEC infections occur in the U.S. each year.² Approximately 20 percent of STEC infections in the U.S. are linked to known outbreaks.²

In Ohio, the incidence of STEC significantly decreased from 2008 to 2009 by 39 percent ($p < 0.001$). Table 1 shows that more cases were linked to known outbreaks in 2008 (12 percent) than in 2009 (9 percent), although this was not statistically significant ($p = 0.39$). Outbreak-associated cases occurred in all age groups during 2008, especially in persons aged 10-19 years, while the majority of outbreak-associated cases occurred in children less than 10 years of age in 2009.

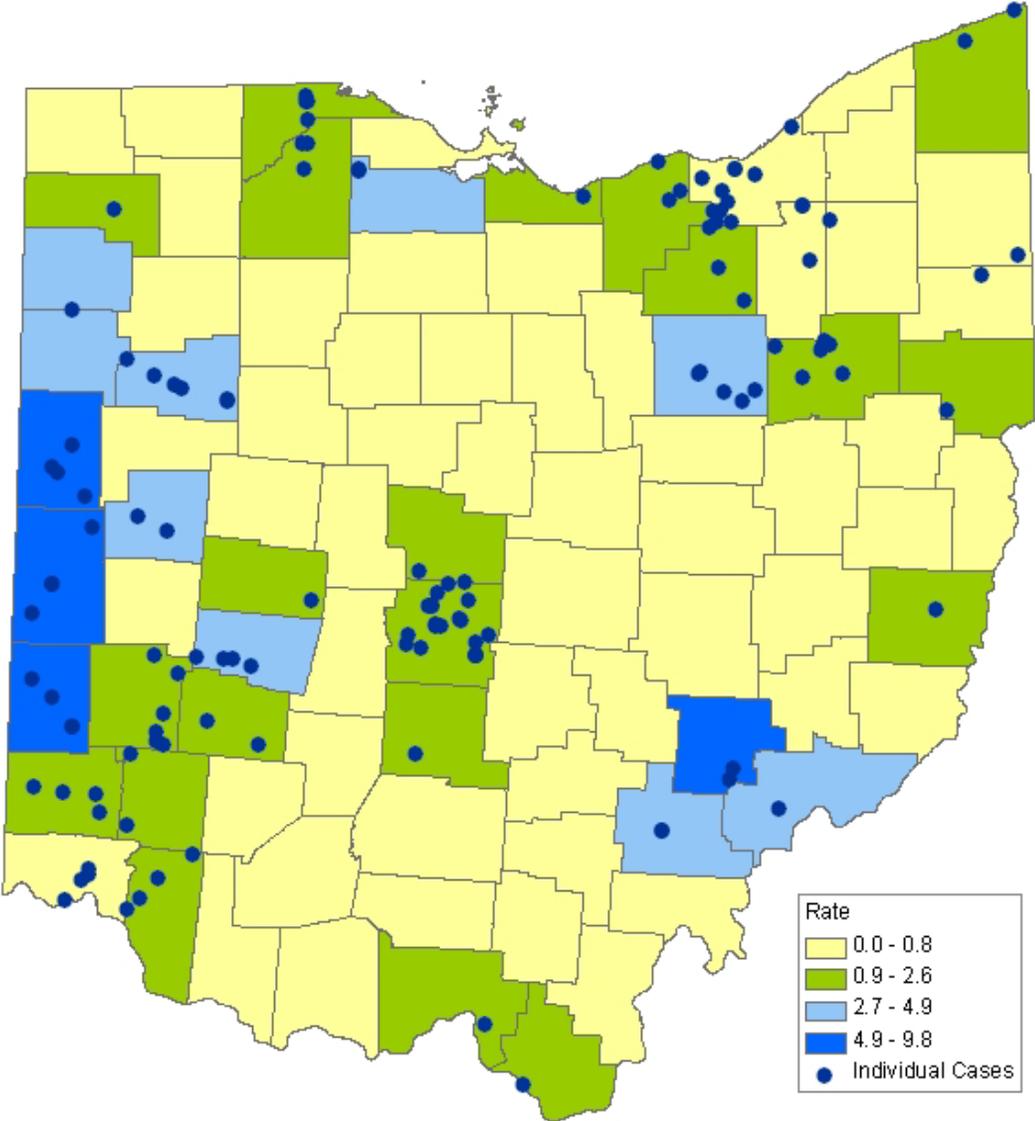
Table 1: Shiga Toxin-Producing *E. coli* by Age and Outbreak Status, Ohio, 2009

Age (Years)	2008				2009			
	Outbreak-associated		Sporadic		Outbreak-associated		Sporadic	
0-9	5	8%	58	92%	9	21%	33	79%
10-19	7	20%	28	80%	0	0%	31	100%
20-29	6	16%	32	84%	1	6%	16	94%
30-59	4	9%	39	91%	0	0%	21	100%
60 +	4	14%	25	86%	1	6%	15	94%
Unknown	0	0%	1	100%	1	100%	0	0%
Total	26	12%	183	88%	12	9%	116	91%

Source of disease data: Ohio Disease Reporting System.

In 2009, STEC incidence mostly occurred in the western, central and northeastern parts of Ohio (Figure 1). Most of the counties experiencing the highest rates of disease were situated in the western-most part of Ohio, but a few counties in southeastern Ohio and one in northeastern Ohio also had higher rates of disease in 2009.

Figure 1: Shiga Toxin-Producing *E. coli* Incidence, Ohio, 2009



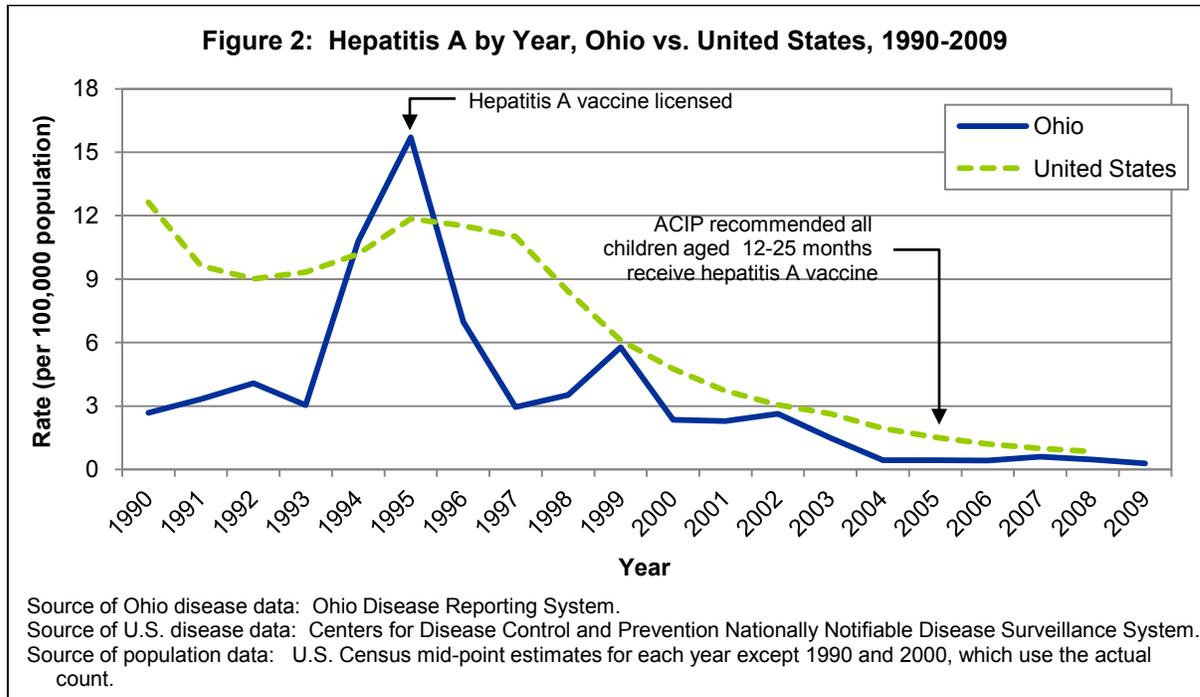
Source of disease data: Ohio Disease Reporting System.
Source of population data: 2000 U.S. Census.
Rates are per 100,000 population.

HEPATITIS A

<i>Number of cases in 2009:</i>	<i>34</i>	<i>Rate in 2009:</i>	<i>0.3</i>
<i>Number of cases in 2008:</i>	<i>54</i>	<i>Rate in 2008:</i>	<i>0.5</i>

* Rates are based on U.S. Census midpoint estimates for each year and are per 100,000 population.

The incidence rate of hepatitis A has substantially decreased over the past 20 years in Ohio and in the U.S. (Figure 2). In 1995, two vaccines to prevent hepatitis A infection were licensed in the U.S.³ Following this, rates of hepatitis A in Ohio and the U.S. began dramatically decreasing. To further reduce hepatitis A infection, the CDC's Advisory Committee on Immunization Practices (ACIP) recommended in 2005 that all children 12-25 months of age be routinely vaccinated for hepatitis A,³ Ohio adopted this recommendation in 2007. Except in 1995, Ohio's hepatitis A rate was at or below the national rate. In 2009, Ohio's hepatitis A incidence rate was the lowest in two decades (0.3 cases per 100,000 population). Both the U.S. and Ohio are well within the Healthy People 2010 goal to reduce the incidence of hepatitis A to 4.5 cases per 100,000.⁴



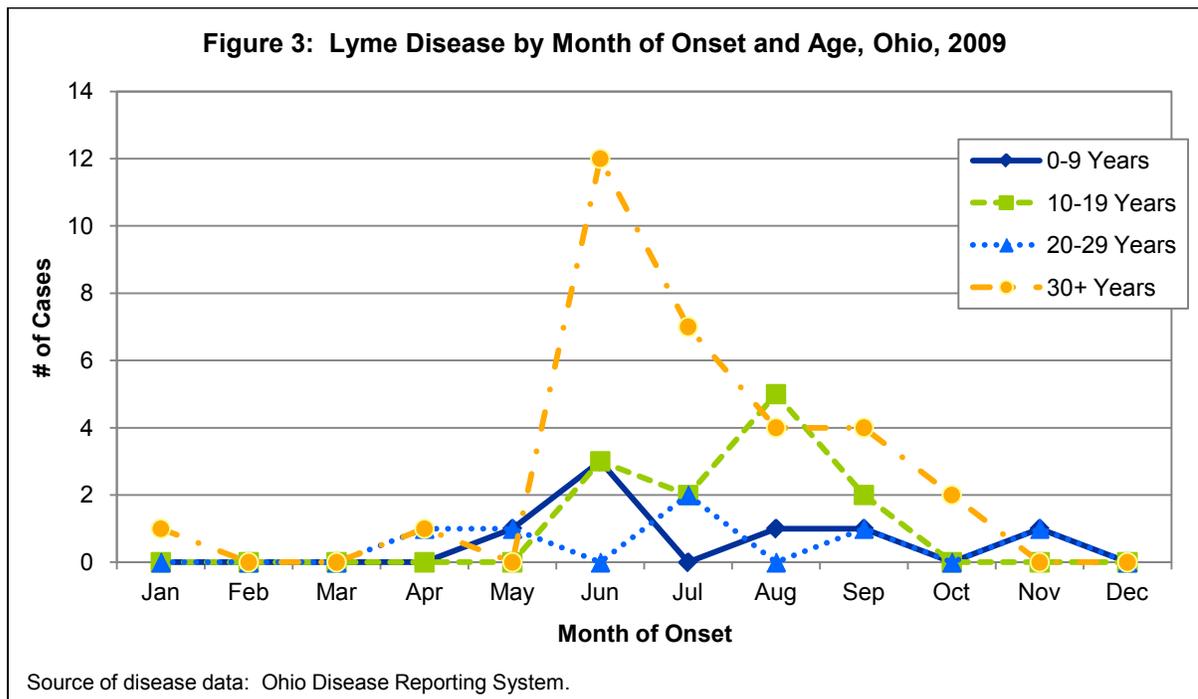
LYME DISEASE

<i>Number of cases in 2009:</i>	56	<i>Rate in 2009:</i>	0.5
<i>Number of cases in 2008:</i>	45	<i>Rate in 2008:</i>	0.4

* Rates are based on U.S. Census midpoint estimates for each year and are per 100,000 population.

Lyme disease is transmitted through the bite of a tick, *Ixodes scapularis*, in the eastern and midwestern U.S. and *I. pacificus* in the western U.S.. It is transmitted by a tick called the blacklegged tick (formerly known as the deer tick). Blacklegged ticks are rare in Ohio. The bacteria are normally found in mice, squirrels and other small mammals without causing illness. Lyme disease affects both humans and dogs. Most cases occur in the upper Midwest and North Atlantic states. Each year, approximately 40 cases are reported in Ohio, but many of Ohio's reported cases are actually acquired out of state.

Cases of Lyme disease followed a seasonal pattern in Ohio during 2009 (Figure 3). Cases began to increase in April and peaked in June. Adults 30 years and over demonstrated a higher burden of disease throughout the year except in May, August and November.



MALARIA

<i>Number of cases in 2009:</i>	36	<i>Rate in 2009:</i>	0.3
<i>Number of cases in 2008:</i>	31	<i>Rate in 2008:</i>	0.3

* Rates are based on U.S. Census midpoint estimates for each year and are per 100,000 population.

Malaria is a substantial public health problem worldwide and caused an estimated 190-311 million infections in 2008.⁵ In 1955, malaria was considered eradicated from the U.S. following extensive prevention and control strategies in the southeastern states.⁶ Despite being eradicated, approximately 1,500 cases continue to be reported each year in the U.S., the majority of which are acquired internationally; in addition, the *Anopheles* mosquito that transmits malaria is still present in the U.S., posing a threat for the reestablishment of domestic transmission.⁵

There are four organisms that cause nearly all malaria in humans: *Plasmodium falciparum*, *P. malariae*, *P. ovale* and *P. vivax*. In Ohio, the majority of malaria cases in 2009 were caused by *P. falciparum* (56 percent) followed by unknown *Plasmodium* species (22 percent), *P. vivax* (17 percent) and *P. malariae* (6 percent); no *P. ovale* infections were reported in Ohio during 2009 (Table 2). In addition, 78 percent of cases reported acquiring malaria in Africa during 2009, most notably in Nigeria and Ghana. The remainder of cases reported traveling to countries in Asia, Oceania and South America prior to becoming ill. All but one case of *P. falciparum* malaria occurred in persons who traveled to African countries, while all but one case of *P. vivax* malaria occurred in persons who traveled to countries in Asia, Oceania and South America.

Table 2: Malaria by Country of Infection and Organism, Ohio, 2009

Country of Infection	<i>P. falciparum</i>	<i>P. malariae</i>	<i>P. vivax</i>	Unknown species	Total
Africa	19	2	1	6	28
Cameroon	0	1	0	0	1
Cote d'Ivoire	1	0	0	0	1
Ethiopia	1	0	0	1	2
Ghana	6	0	0	1	7
Liberia	1	0	0	0	1
Nigeria	5	1	1	2	9
Senegal	1	0	0	0	1
Sierra Leone	3	0	0	1	4
Zambia	1	0	0	0	1
Unknown	0	0	0	1	1
Asia	1	0	3	2	6
India	1	0	2	2	5
Pakistan	0	0	1	0	1
Oceania	0	0	1	0	1
Solomon Islands	0	0	1	0	1
South America	0	0	1	0	1
Brazil	0	0	1	0	1
Total	20	2	6	8	36

Source of disease data: Ohio Disease Reporting System.
No cases caused by *P. ovale* were reported in 2009.

PERTUSSIS

<i>Number of cases in 2009:</i>	<i>1,100</i>	<i>Rate in 2009:</i>	<i>9.5</i>
<i>Number of cases in 2008:</i>	<i>628</i>	<i>Rate in 2008:</i>	<i>5.5</i>

* Rates are based on U.S. Census midpoint estimates for each year and are per 100,000 population.

As seen in Figure 4, the number of cases of pertussis reported in Ohio has fluctuated over the last five years. 2009 had the highest number of reported cases (1,100 cases), and 2006 had the lowest number of reported cases (594 cases). The most significant decrease in incidence was seen in 2005-2006 (2005: 1,094 cases reported, 2006: 594 cases reported), and the most significant increase in incidence was seen in 2008-2009 (2008: 628 cases reported, 2009: 1,100 cases reported). The reason for the large increase in incidence is not known. It may be because epidemics of pertussis occur throughout the U.S. every three to five years.⁷ The most recent epidemic of pertussis that occurred in the U.S. was in 2005 (25,616 reported cases).⁷

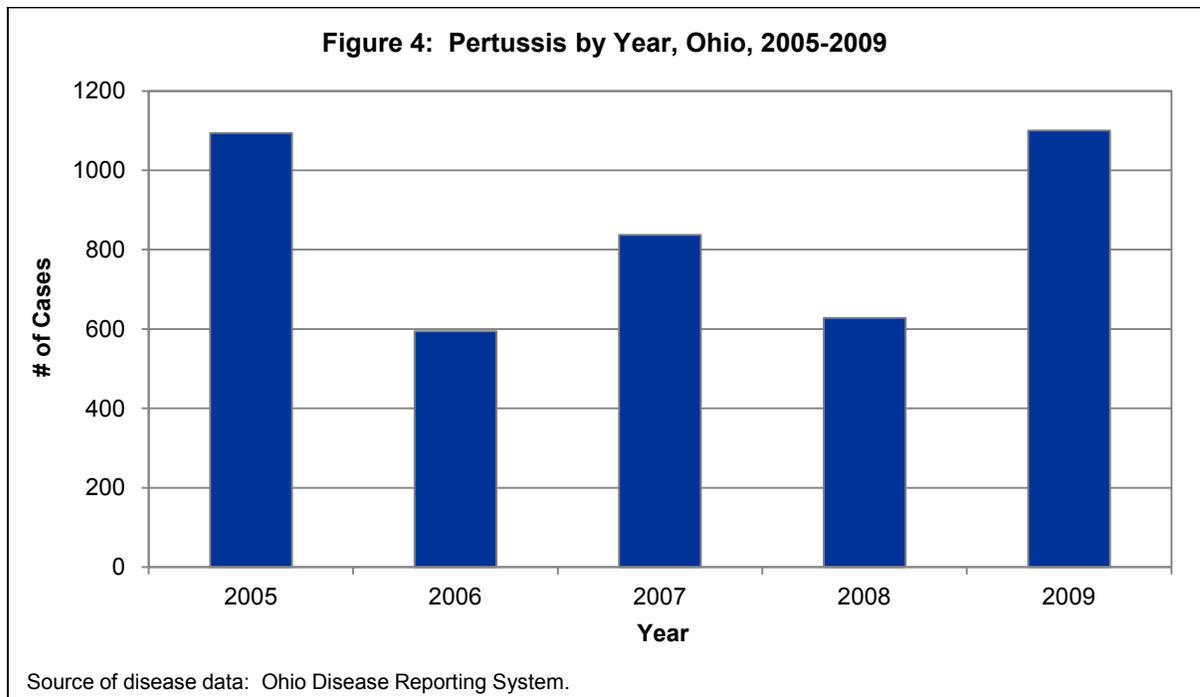
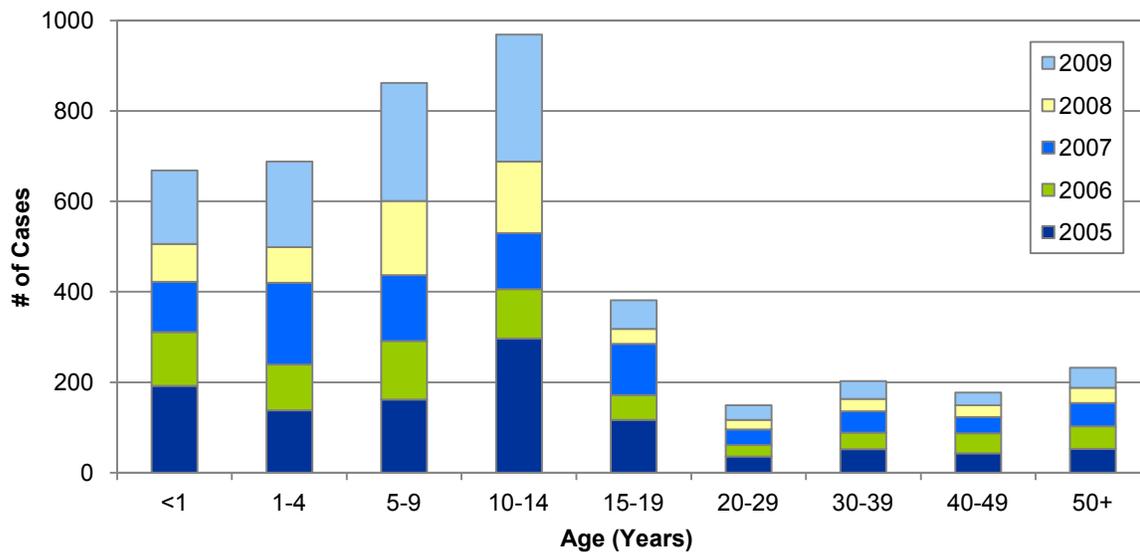


Figure 5 describes the age distribution of pertussis over the last five years. The majority of cases occurred in individuals less than 5 years of age (1,356 cases, 31 percent). There continues to be an increase in the incidence of pertussis cases in adolescents and adults. This could possibly be due to waning of vaccine immunity. A single dose of Tdap (tetanus, diphtheria and pertussis) is recommended as a booster for adolescents and adults.⁸

Figure 5: Pertussis by Age, Ohio, 2005-2009



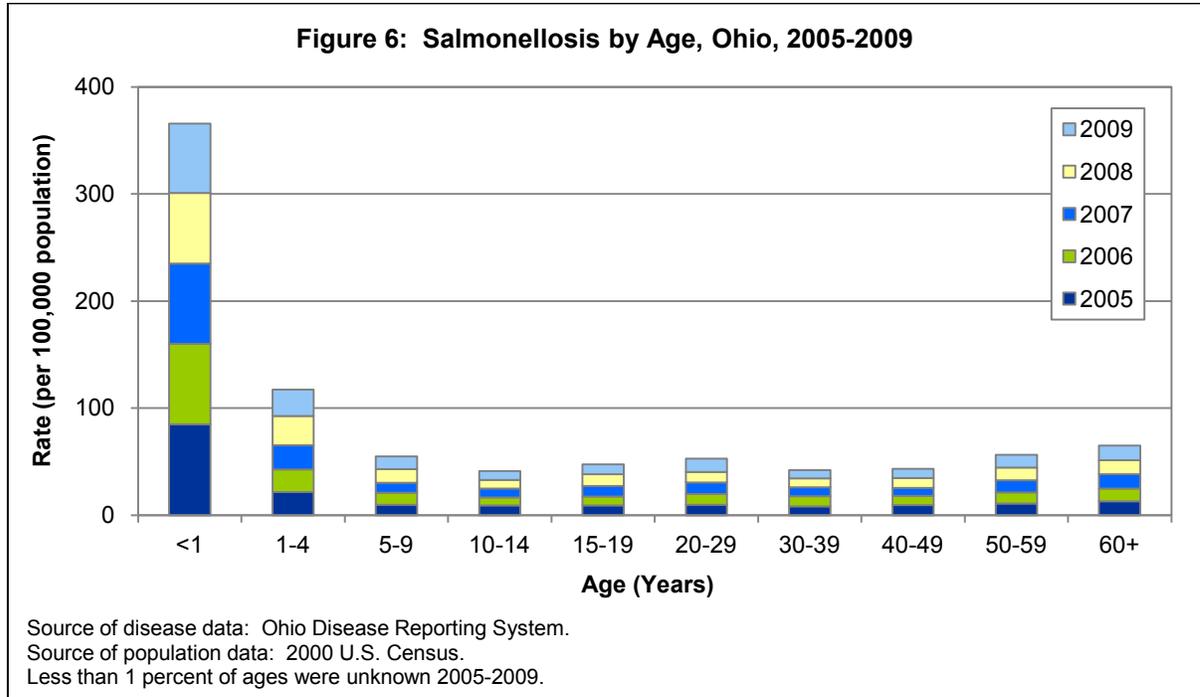
Source of disease data: Ohio Disease Reporting System.
Less than 1 percent of ages were unknown 2005-2009.

SALMONELLOSIS

<i>Number of cases in 2009:</i>	<i>1,377</i>	<i>Rate in 2009:</i>	<i>11.9</i>
<i>Number of cases in 2008:</i>	<i>1,378</i>	<i>Rate in 2008:</i>	<i>12.0</i>

* Rates are based on U.S. Census midpoint estimates for each year and are per 100,000 population.

Figure 6 demonstrates the burden of salmonellosis in Ohio over the past five years by age group. Although a higher incidence of *Salmonella* infection was observed among individuals less than 5 years of age (1,255 cases), for each of the five reporting years analyzed, all persons were at risk.



Ohio's salmonellosis trends followed a seasonal pattern throughout 2005-2009 (Figure 7). An increase in cases generally began in April, peaked in July and gradually declined thereafter.

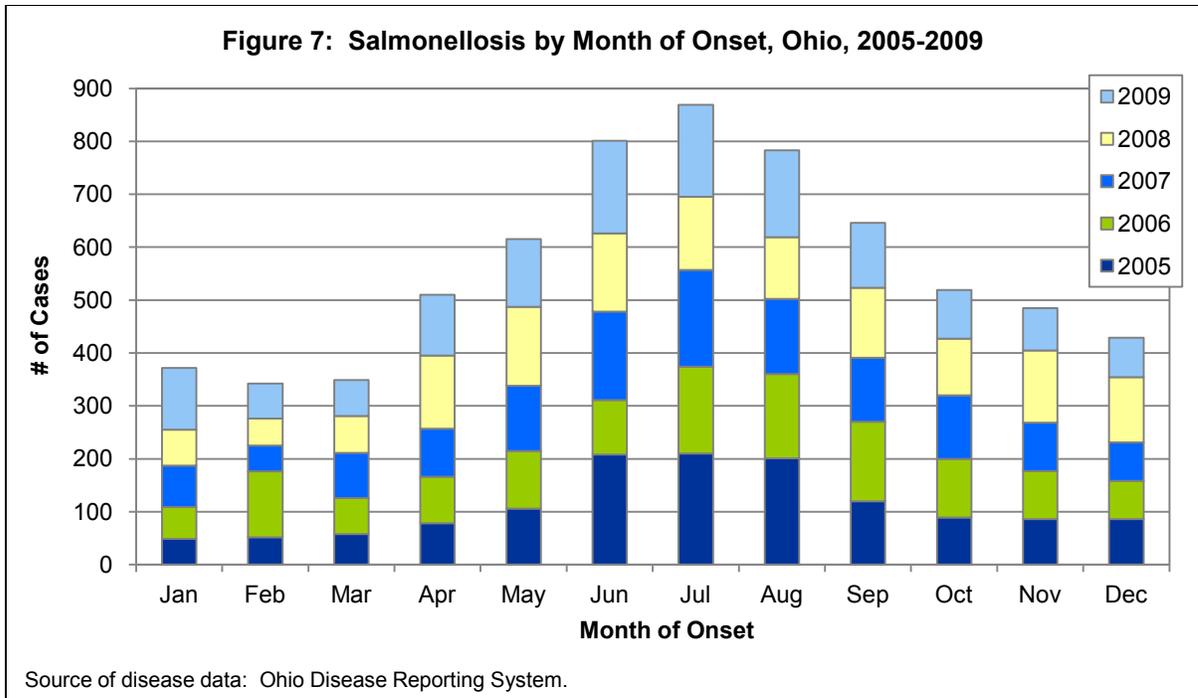
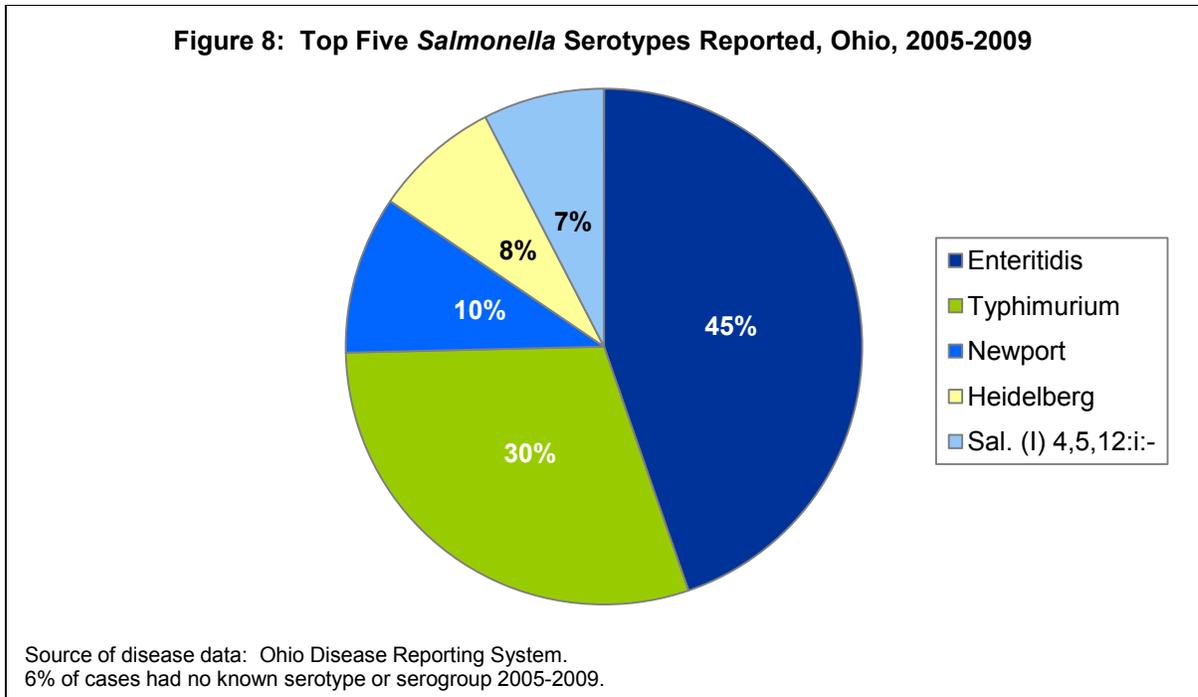


Figure 8 displays the incidence of the most common *Salmonella* serotypes reported in Ohio 2005-2009. *Salmonella* Enteritidis and Typhimurium were the most commonly isolated serotypes among Ohio's salmonellosis cases. Please see the *Salmonella* serotype table in this annual summary on pages 45-48 for data on all *Salmonella* serotypes identified 2005-2009.



TETANUS

<i>Number of cases in 2009:</i>	<i>2</i>	<i>Rate in 2009:</i>	<i>0.0</i>
<i>Number of cases in 2008:</i>	<i>0</i>	<i>Rate in 2008:</i>	<i>0.0</i>

* Rates are based on U.S. Census midpoint estimates for each year and are per 100,000 population.

Tetanus, otherwise known as lockjaw, is an acute disease that can often be fatal. This disease is caused by a toxin produced by *Clostridium tetani*, a slender, anaerobic, Gram-positive, spore-forming bacterium. Tetanus spores are found in soil and the intestines and feces of horses, sheep, cattle, dogs, cats, rats, guinea pigs and chickens.⁹ A person becomes infected after a wound becomes contaminated with tetanus spores, usually after an injury from a puncture wound or laceration. Tetanus is not transmitted person-to-person. Symptoms of tetanus include muscular stiffness in the jaw, stiffness in the neck, difficulty swallowing, rigidity of abdominal muscles, spasms, sweating and fever. The clinical symptoms do not result from the infection, but rather from the production of a neurotoxin called tetanospasmin.¹⁰

The DTaP vaccine (diphtheria, tetanus toxoid and acellular pertussis) is administered at 2, 4, 6 and 12 to 15 months of age, and between 4 and 6 years of age. A Td (tetanus and diphtheria toxoid) booster shot is recommended every 10 years.¹⁰

Tetanus occurs most often in the older population, although recent years have shown an increase in the number of younger individuals. This may be due to an increased number of cases among young injection drug users. Most reported cases of tetanus have never been vaccinated or have received their childhood vaccinations but never had a booster shot.¹⁰ In the state of Ohio, 0-2 cases are reported each year.