

Cryptosporidiosis

Cryptosporidiosis is a Class C Disease and must be reported to the state within five business days.

Cryptosporidiosis is a parasitic disease of public health importance, causing gastro-intestinal disease and, in more severe cases, pulmonary disease. Surveys of the U.S. have demonstrated *Cryptosporidium* in approximately 2% of the population. Annual incidence rates for the disease are very low and reflect the often asymptomatic nature of the infection as well as under-reporting, especially of mild cases.

Members of the *Cryptosporidium* genus, protozoan obligate intracellular organisms, are the causative agents. *Cryptosporidium* has been found in a variety of hosts, including mammals, birds and reptiles. The two species that most commonly affect humans are *C. parvum* and *C. hominis*.

Cryptosporidium may be found in drinking and recreational waters in all regions of the U.S. and throughout the world. *Cryptosporidium* theoretically can also be found on any food touched by a contaminated food handler.

In humans, infection is sporadic with cases usually occurring either from the consumption of contaminated water, or in daycare centers. The incidence is higher in daycare centers that serve food.

Oocysts, the infectious stage, appear in stool at the onset of symptoms and are infectious immediately upon excretion. Diagnosis is traditionally made by the identification of oocysts in feces. *Cryptosporidium* oocysts are resistant to most chemical disinfectants but are sensitive to ultraviolet radiation and desiccation. The oocysts are approximately three micrometers in diameter and may penetrate some larger pore filters.

Although the disease is often self-limiting, in immune-deficient individuals, (especially those patients with CD4 counts greater than 200 per microliter), the disease can be more severe and persistent, leading to increased reporting from populations with immunocompromised individuals.

Data Sources

Data from both the Louisiana Infectious Disease Epidemiology (IDEpi) Reportable Disease Database (IDRIS) as well as the Louisiana Inpatient Hospital Discharge Data (LAHIDD) were used in this report in order to create a well-rounded picture of the burden of cryptosporidiosis within Louisiana.

IDRIS

Laboratory confirmed cases of cryptosporidiosis are reported to IDEpi and recorded in the Infectious Disease Reporting Information System (IDRIS). Cases that are recorded in IDRIS are typically reported by hospital infection preventionists, hospital labs, reference labs, physicians or public health units. Data is available for reported cases of cryptosporidiosis in IDRIS from 1996 to 2015.

Hospitalization Surveillance

Hospitalization surveillance is based on the Louisiana Inpatient Hospital Discharge Data (LaHIDD). In 1997, the Louisiana legislature mandated the reporting of hospital discharge data. LaHIDD serves as the state registry containing hospital discharge data submitted to the Department of Health (LDH). The Office of Public Health (OPH) is responsible for making the data available to OPH sections as needed. The IDEpi Section uses these data sets for the surveillance of infectious diseases in hospitals. LaHIDD data sets contain demographic information such as names, gender, age, date of birth, address, admit diagnosis, discharge diagnoses (main plus eight more diagnoses), procedures (main plus five), charges, length of stay and hospital name. The diagnoses and procedures are coded with ICD-9 codes. The data are based on the years 1999 to 2014.

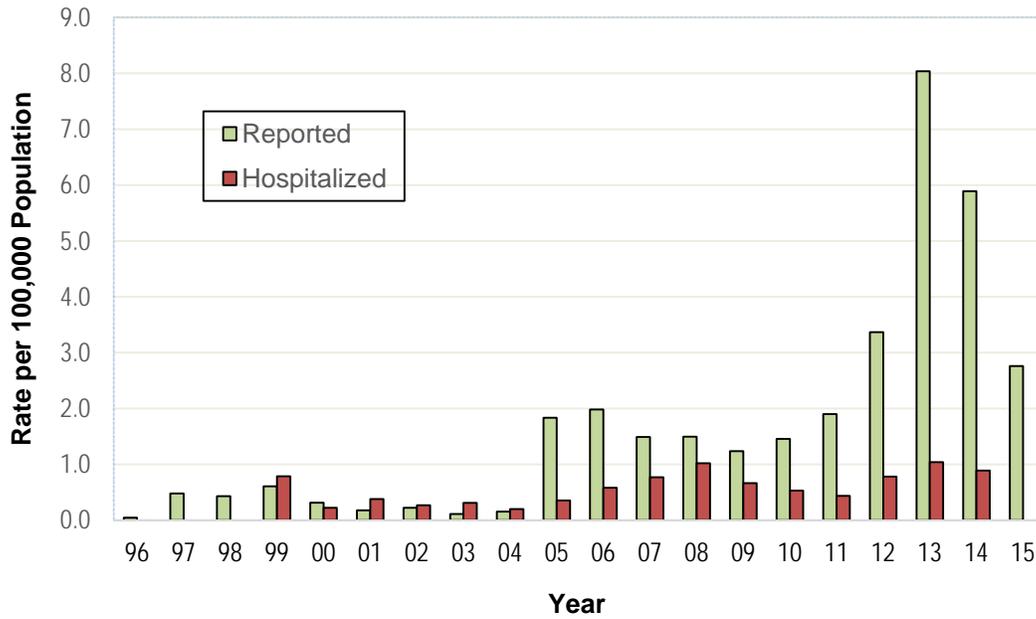
Records of patients with Cryptosporidiosis were extracted from LaHIDD using ICD-9 code 0074. Records with the following ICD-9 code listed as either a main diagnosis or secondary diagnoses were pulled for this report.

Numbers, Rates and Trends

There was a large increase in the number of cases reported to OPH in 2005 and 2006; 83 cases of cryptosporidiosis in 2005 and 85 cases in 2006 versus 74 cases reported from 1999 to 2004. This increase is due in part to two outbreaks that occurred in 2005 and 2006. Other reasons for the upswing involve an increase in laboratory diagnostic testing and diagnosis of *Cryptosporidium* in addition to an increase in the reporting of cryptosporidiosis.

In 2005 and 2006, the number of reported cases for Cryptosporidiosis in Louisiana peaked due to outbreaks. Post 2006, the number of cases remained higher than years prior to 2005 due in part to increased testing in the parishes in which the outbreaks occurred. The number of hospitalized cases has also increased since 2004. Reported cases numbers are traditionally higher than the number of hospitalized cases due to a high proportion of cases being diagnosed and reported by primary care physicians. In Louisiana from 1996 to 2013, reported case incidence rates have ranged from 0.05 to 8.04 cases per 100,000 (Figure 1).

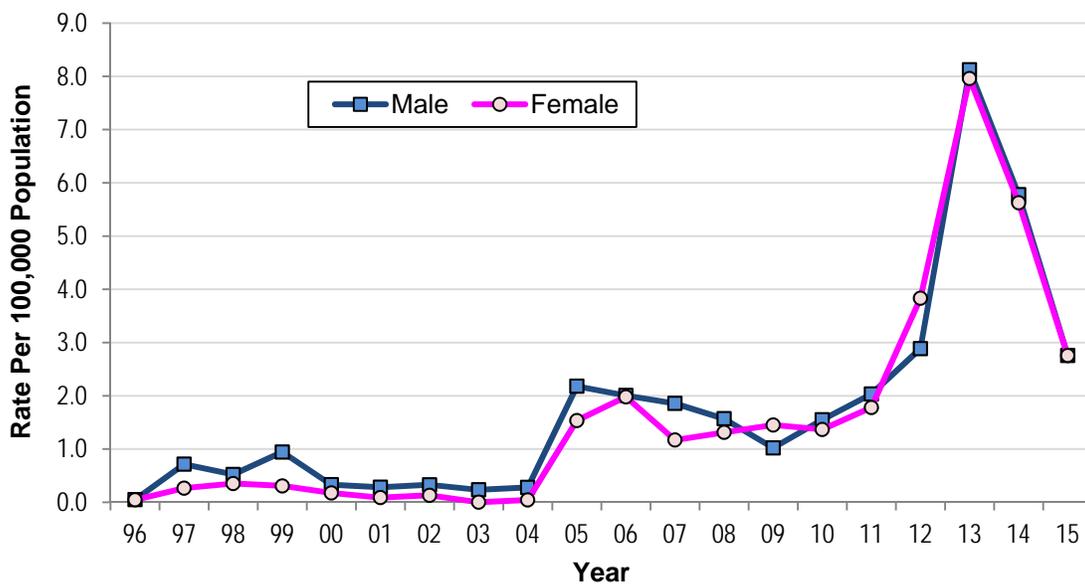
Figure 1: Reported Cryptosporidiosis Rates - Louisiana, 1996-2015 compared to Hospitalized Patients Diagnosed with Cryptosporidiosis Infections - Louisiana, 1999-2014



Sex

From 2000 to 2015 the average reported rates of male cryptosporidiosis cases were 16% higher than the average rates of female cryptosporidiosis cases (Figure 2).

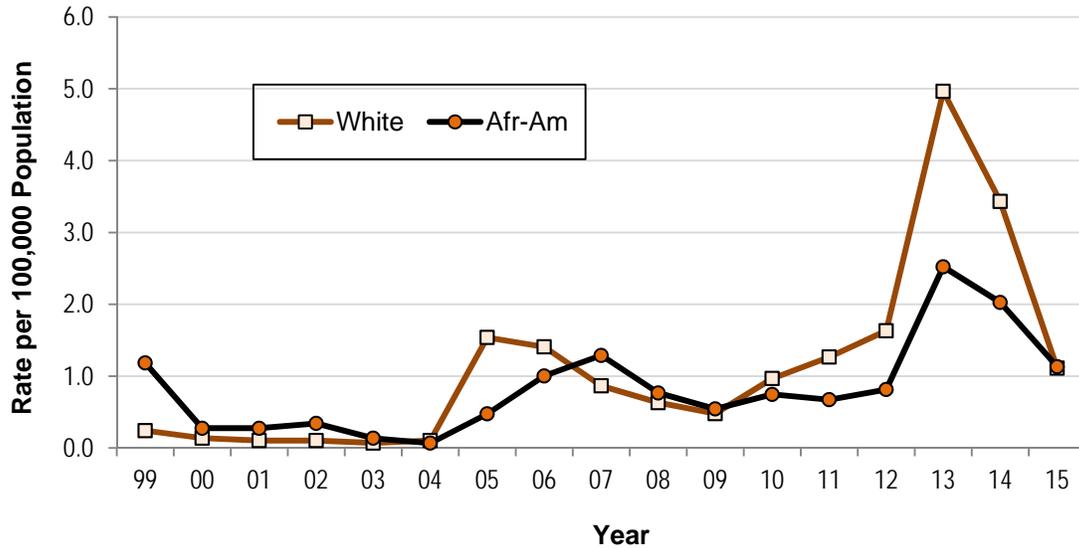
Figure 2: Reported Cryptosporidiosis Incidence Rates by Sex- Louisiana, 1996-2015



Race

Rates were calculated for Whites and African-Americans only. Numbers for other race and ethnic groups are small; the population numbers are often inaccurate. Rates based on rates are underestimates of real rates since a good proportion of cases do not have race reported (Figure 3).

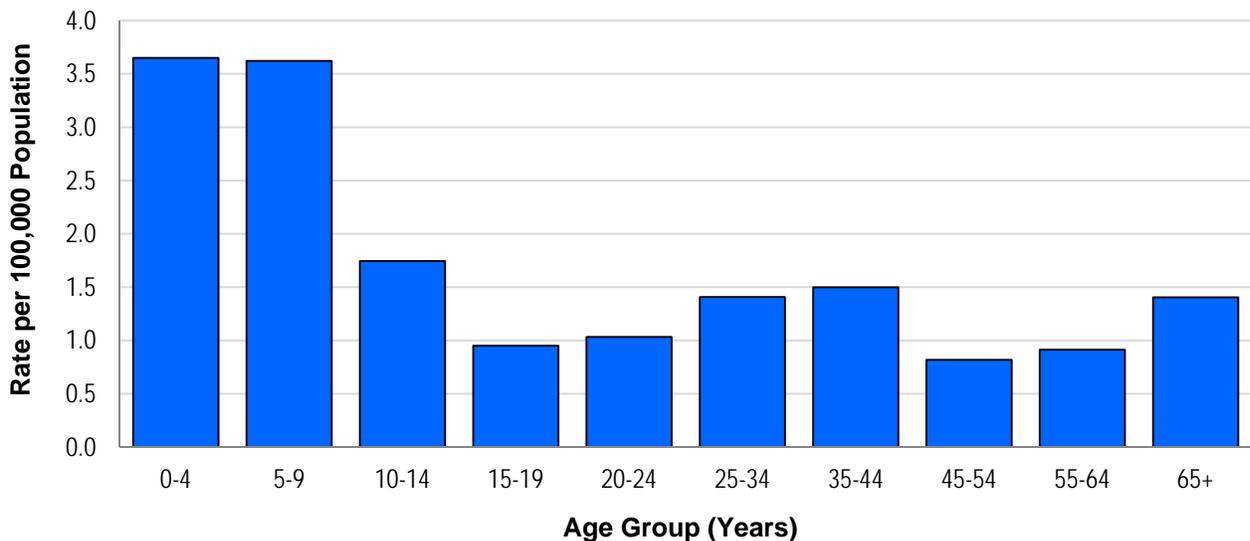
Figure 3: Reported Cryptosporidiosis Cases by Race- Louisiana, 1999-2015



Age

The highest rates of cryptosporidiosis are reported among very young children, newborn to four years of age (Figure 4).

Figure 4: Average Rates of Reported Individuals with *Cryptosporidium* by Age Group Louisiana, 2001-2015



High incidence rates in Ascension, East Baton Rouge and Livingston parishes are all linked to the aforementioned outbreaks of 2005 and 2006. Increased testing in these parishes post-outbreaks also contributes to the higher average incidence rates (Table).

Table: Reported Case Numbers and Incidence Rates of Cryptosporidiosis by Parish Louisiana, 2001-2015

Parish	Avg. Inc.	Parish	Avg. Inc.
ACADIA	1.24	MADISON	0.00
ALLEN	0.00	MOREHOUSE	0.91
ASCENSION	1.37	NATCHITOCHE	0.49
ASSUMPTION	0.35	ORLEANS	0.96
AVOUELLES	0.00	OUACHITA	1.25
BEAUREGARD	0.89	PLAQUEMINES	0.00
BIENVILLE	0.94	POINTE COUPEE	3.13
BOSSIER	1.02	RAPIDES	0.44
CADDO	0.62	RED RIVER	0.00
CALCASIEU	0.93	RICHLAND	0.93
CALDWELL	0.00	SABINE	0.27
CAMERON	0.00	ST. BERNARD	1.22
CATAHOULA	0.00	ST. CHARLES	1.37
CLAIBORNE	0.00	ST. HELENA	0.59
CONCORDIA	5.38	ST. JAMES	1.18
DE SOTO	0.83	ST. JOHN	0.72
EAST BATON ROUGE	2.27	ST. LANDRY	1.30
EAST CARROLL	1.12	ST. MARTIN	3.34
EAST FELICIANA	0.93	ST. MARY	1.29
EVANGELINE	0.28	ST. TAMMANY	1.31
FRANKLIN	0.93	TANGIPAHOA	4.50
GRANT	0.28	TENSAS	0.00

IBERIA	6.70	TERREBONNE	0.98
IBERVILLE	2.75	UNION	0.00
JACKSON	0.82	VERMILION	1.85
JEFFERSON	0.63	VERNON	0.24
JEFFERSON DAVIS	1.01	WASHINGTON	0.70
LAFAYETTE	0.85	WEBSTER	0.00
LAFOURCHE	2.87	WEST BATON ROUGE	4.27
LASALLE	0.28	WEST CARROLL	0.00
LINCOLN	0.43	WEST FELICIANA	1.54
LIVINGSTON	7.46	WINN	0.40

Primary Diagnosis - Hospitalization

Of the 413 cryptosporidiosis infections diagnosed in hospitalized patients, only 19% were primary diagnoses. Between 1999 and 2014, the single major condition of all cryptosporidiosis-related hospital admissions was HIV. The primary diagnosis for 69% of hospitalizations associated with *Cryptosporidium* was HIV.

Mortality

There were seven mortalities attributed to Cryptosporidiosis diagnosis among the 413 documented hospitalizations with cryptosporidiosis listed as one of the eight diagnoses. All seven had a main diagnosis of HIV, with a secondary diagnosis of Cryptosporidiosis infection.

Outbreaks

2005 Outbreak

In August 2005, the Louisiana OPH was contacted by a concerned parent reporting severe diarrheal illness in her two-year old child. The parent suggested the child may have contracted the illness while playing at the water-splash playground of a local municipal park. Several additional children that had been at the playground were also reported ill. The children were diagnosed with laboratory-confirmed cryptosporidiosis. In total, 31 cases were considered part of the outbreak. All but two were children, with an average age of seven years.

It was determined that the event most likely resulted from a fecal accident on the splash playground. Even though a report of such an accident was not obtained, it is almost certain that the water-splash grounds were contaminated with fecal material of either a pet that strayed onto the

grounds or an already sick child (possibly one of the smaller children in diapers). The park was thoroughly disinfected and reopened shortly after.

2006 Outbreak

From July to August 2006, 35 laboratory-confirmed cases of cryptosporidiosis were reported in the greater Baton Rouge area. An additional 38 probable cases (not included in the total of confirmed cases) were identified. After an epidemiologic investigation, it was determined that this outbreak was linked to attendance at a water park in the area. The average age of affected persons was 10.8 years with a range of one year through 66 years of age.

2013 Outbreak

Compared to previous years, there was a significant increase in reported cases of cryptosporidiosis in 2013 starting in mid-July and lasting until December. Most of the cases were residing in OPH regions 2, 4 and 9 (Figure 5).

Figure 5: Louisiana Department of Health Regional Map



A case control study was performed from August to September. It was found that over 50% of Cryptosporidiosis cases reported exposure to surface or recreational water in the two weeks prior to onset compared to 20% of controls. Those having a diagnosis with Cryptosporidiosis were five times more likely to have been exposed to surface or recreational water prior to onset compared to those without a diagnosis of Cryptosporidiosis.

Although water exposure was significantly associated with illness, this does not appear to be a point source outbreak, but a continuous community outbreak involving multiple water venues including public and private recreational water venues. Because *Cryptosporidium* is resistant to chlorine, the following recommendations were made:

- Avoid swimming in pools, splash parks, and other recreational water facilities until two weeks after cessation of diarrhea.
- Change diapers in the bathroom, not at the poolside.
- Wash children thoroughly (especially their bottoms) with soap and water after they use the toilet, or after their diapers are changed and before they enter the water; shower before entering the water.