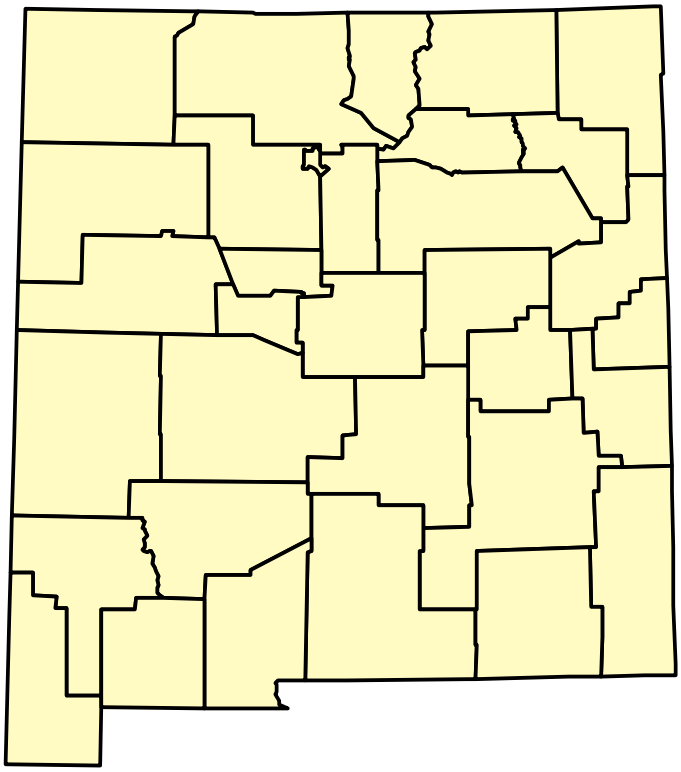
New Mexico
Waterborne Disease Surveillance Project
Annual Report
2003



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JPA # 00/667/JPA/012
July 2005

NEW MEXICO WATERBORNE DISEASE SURVEILLANCE PROJECT ANNUAL REPORT, 2003

INTRODUCTION

Purpose

Since 2000, the New Mexico Environment Department (NMED) and the New Mexico Department of Health (NMDOH), Office of Epidemiology now specifically the Environmental Health Epidemiology Bureau (EHEB), have collaborated to ensure safe drinking water in New Mexico. The EHEB of NMDOH maintains a waterborne disease surveillance project (WDSP) that includes three parasitic agents (*Entamoeba histolytica, Cryptosporidium sp., Giardia sp.*), three bacterial agents (*Campylobacter sp.,* enterohemorrhagic *Escherichia coli, and Shigella sp.*), and one viral agent (Hepatitis A). All of the identified diseases are "notifiable conditions" and are reportable by law to NMDOH. However, in August of 2003, *Entamoeba histolytica,* the parasite responsible for Amebiasis, was removed from the New Mexico's "notifiable conditions" list and the surveillance on this organism discontinued.

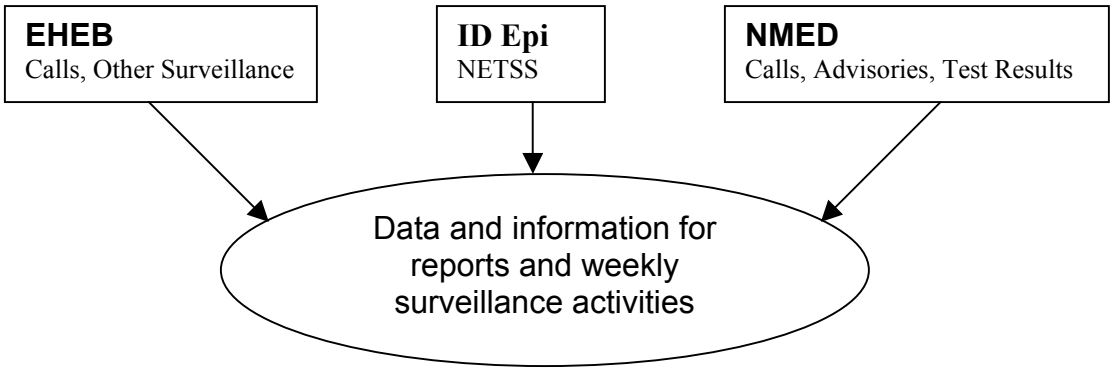
New Mexico has adopted all federal drinking water regulations established by the *Safe Drinking Water Act* as state regulations. The Environmental Protection Agency sets standards for approximately 90 contaminants in drinking water that for instance requires New Mexico public water systems to monitor for 16 inorganic chemicals (non-transient, non-community systems monitor fourteen), 30 synthetic organic contaminants and 21 volatile organic contaminants. In addition, radionuclide levels for gross alpha, beta, radium-226 and radium–228 and uranium are monitored. Results of these analyses are reported to the NMED's DWB. In the past, enforcement of drinking water standards was limited, thus some water systems remain in violation of drinking water standards. Microbiological violations constitute the most common drinking water violations in the state, which represent threats of acute health risks. NMDOH and NMED continue to work on ways to collaborate to provide public education and information on any of these chemicals that consistently exceed the MCL in New Mexico in order to improve the public health of New Mexicans.

Types of Public Water Systems:
Community water system: serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.
Non-transient non-community water system: serves at least 25 persons for more than 6 months per year, including but not limited to schools and factories.
Non-community water system: serves 25 or more persons who are not residents year-round (e.g. restaurants, rest areas, gas stations) or seasonal facilities (e.g. children's camps or recreational camping facilities).
Definitions: 20 NMAC 7.10.

This report encompasses year three of the WDSP for the calendar year 2003. Weekly monitoring of reported cases of each disease is a priority. The EHEB works closely with the Infectious Disease Bureau and the NMED Drinking Water Bureau, to follow up on potential cases. In addition, the EHEB systematically takes public calls and inquires on environmental health issues.

METHODS

Information was compiled through a number of different sources. An EHEB incident database, the infectious disease database (National Electronic Telecommunications System for Surveillance - NETSS) and additional information from NMED were all mechanisms used to track potential and actual, exposures and diseases in New Mexico. In addition, water quality data was compared with disease reports and calls to identify any suspected waterborne disease cases.



The EHEB incident database was developed to track calls and emails received by the EHEB. Caller type, location, major/minor call topics, and other specific information are some variables collected in the database. EHEB staff rotated taking all environmental health calls on a given day, however, all water related called are sent to the Environmental Waterborne Disease Epidemiologist for review.

The state of New Mexico conducts ongoing surveillance for notifiable conditions. Laboratories and health care providers report notifiable conditions to the Office of Epidemiology. State surveillance staff then informs the local public health office of the reportable condition case; local public health nurses use a standard enteric disease report form to document the investigation of enteric disease cases. The Office of Epidemiology receives the completed forms, reviews and enters them into the National Electronic Telecommunications System for Surveillance (NETSS) to the Centers for Disease Control and Prevention (CDC). When necessary, the EHEB calls upon by the Infectious Disease Epidemiology Bureau for assistance with possible waterborne disease-related illness reports. Assistance may be followed-up telephone calls, information gathering, and relaying information to and from NMED.

EHEB and the NMED Drinking water Bureau follow a communication protocol specified in their JPA. Both agencies annually reviewed and updated this protocol as needed (see Appendix 2). As specified in this protocol, NMED relays information regarding water system violations or refers concerned members of the public to EHEB. In turn, EHEB relays information regarding waterborne disease cases and outbreaks to NMED or other potential water related public health issues. In addition,

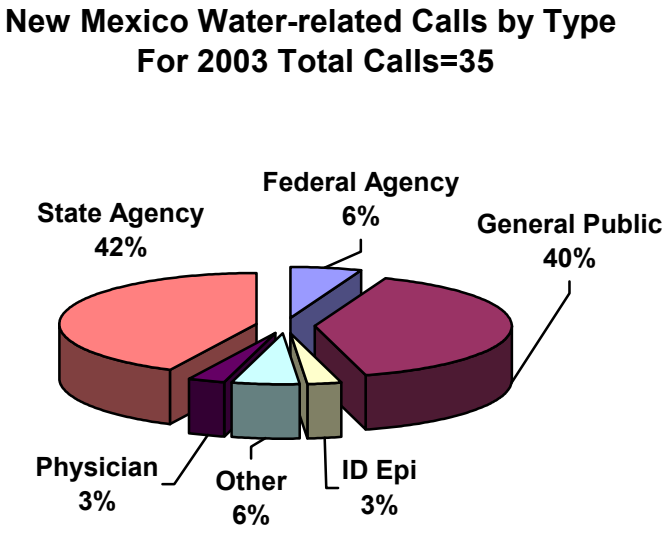
EHEB is responsible for notifying local public health offices when NMED issues drinking water advisories.

RESULTS

Calls

In 2003, EHEB entered 35 water-related calls into their "Incident Database." The three year average is 38 water-related calls, however procedures changed in 2002. NMED was responsible for the majority of the calls (42%) followed by the general public (40%). The remaining calls were from business, physician and internal DOH. Figure 1 shows calls by caller type during 2003.

Figure 1. Water-related Calls by Type, New Mexico, 2003



Chemical Maximum Contaminant Level (MCL) Violations

The "Maximum contaminant level" or "MCL" means the maximum permissible level of a contaminant in water that is delivered to any user of a public water system. The Safe Drinking Water Act (SDWA) regulates MCL. A Nitrate, Nitrite and Total Coliform MCL exceedence requires an acute response.

Nitrate

Nitrate is an inorganic chemical made up of nitrogen and oxygen that can cause some serious health effects in certain populations. Some New Mexico's water systems have a history of violating the Nitrate MCL, which can produce potential adverse health effects. Table 1 lists the water systems that had more than three nitrate MCL exceedences from 2001 through 2003.

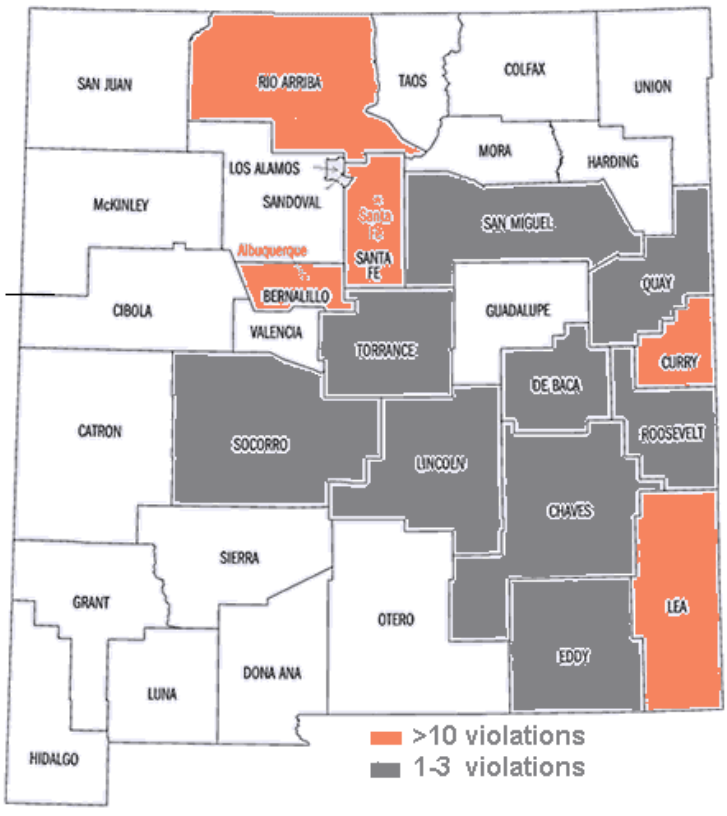
Table 1 Systems with more than 3 nitrate MCL violations from 2001-2003

WSS Code	Year			Total
	2001	2002	2003	
NM3503621	2	6	3	11
NM3553405	0	3	3	6
NM3556821	3	1	0	4
NM3581726	1	2	3	6
NM3596013	0	2	3	5
NM3598501	2	6	1	9

The syndrome called methemoglobinemia occurs when the ingested nitrate interferes with the ability for blood to carry oxygen to the body tissues, which need a constant supply of oxygen to survive. This is a particular problem in infants (blue baby syndrome), pregnant women, or the elderly, because of body chemistry.

An analysis of the NMED DWB's database indicated that for 2001 - 2003, 14 of the 33 (42%) counties had one or more public water systems that violated the MCL for nitrate. Figure 2 illustrates which counties have the highest number of water systems with nitrate violations during the 3-year period. The county with the highest percentage of water systems violating the MCL was Lea County in southeastern New Mexico. There were no reported cases of methemoglobinemia in 2002 or 2003 but it is not a reportable disease.

Figure 2. Number of Nitrate Violation (by County), New Mexico, 2001 - 2003



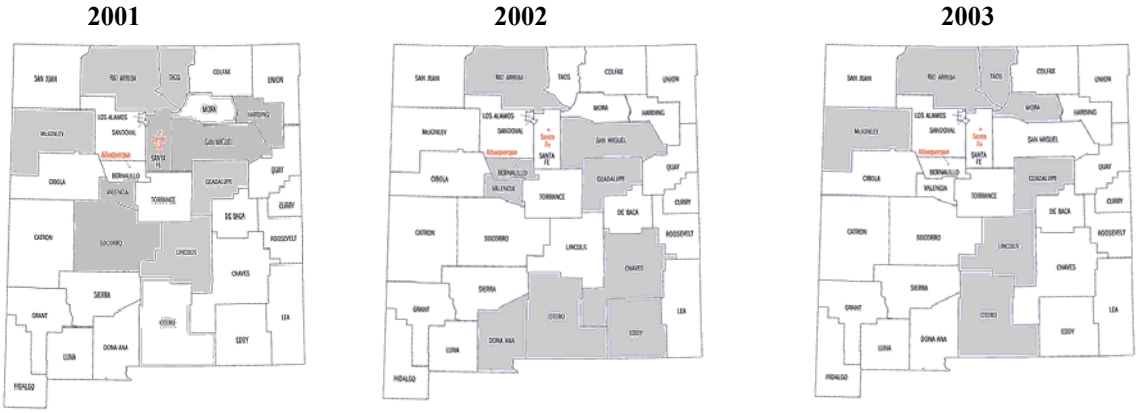
NMDOH continues to work with NMED to identify other chemical contaminants in public water systems that may result in adverse health effects in New Mexico.

Biological Contamination of Water Systems

Drinking water systems are sampled on a routine basis for total coliforms (TCs) to assure compliance with federal drinking water standards. Total coliforms are a group of bacterial organisms that are present in the natural environment. If a water system tests positive for TC, further testing is done for fecal coliform (FC) or for *E. coli*, one of the fecal coliform organisms. FCs are organisms that are present in intestinal systems of all warm-blooded animals; most are not dangerous to humans, however, some may cause adverse health effects. Fecal coliforms are also used as an indicator organism. Because fecal coliforms occur naturally in animal intestines, contamination may indicate that other disease-causing organisms spread through feces (bacteria, parasites, and viruses) could be present in the water.

When fecal contamination is identified in a system, confirmatory samples are taken immediately to rule out sampling or other errors. If the confirmatory samples show fecal contamination, NMED issues an acute violation and confers with NMDOH to decide whether to issue a "Boil Water Advisory". Figure 3 maps the "Boil Water Advisories by year and county. A situation in which an advisory might not be issued is when the water source is not being used as drinking water. Upon issuance, NMDOH notifies district public health offices to be on alert for cases of gastrointestinal illness. Water system consumers are notified by the water system through an interagency press release or individual notification.

Figure 3. Map of Water Advisories by County, New Mexico,



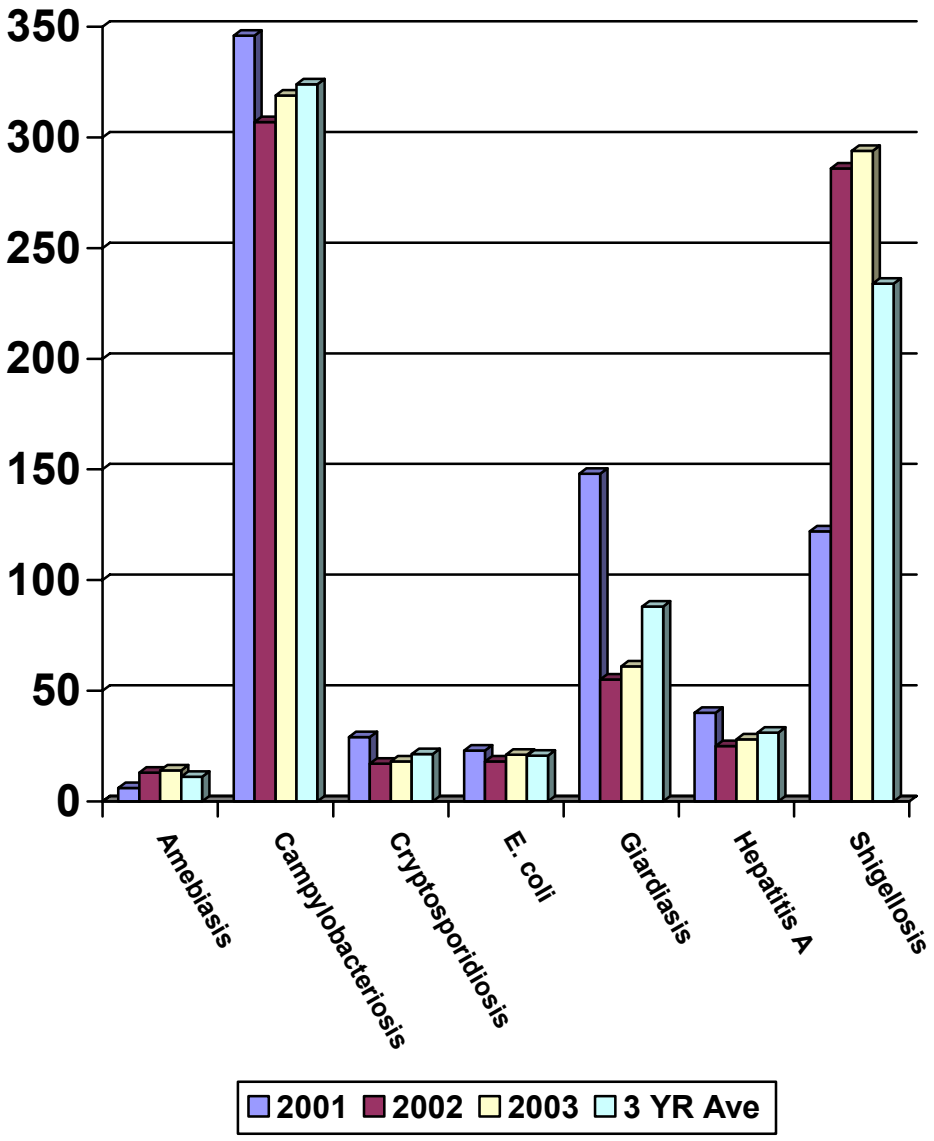
The pattern of "Boil Water Advisories" during the three years appears random. However, Rio Arriba and Guadulupe counties had an advisory each year. Further data of TC results were not available from NMED.

Cases of potential waterborne disease

There were no confirmed disease incidents related to public drinking water systems in 2003; however, data were collected on potential waterborne disease events to ensure that no waterborne outbreaks were missed. Absolute confirmation of disease

etiology is difficult, as it involves a timely stool sample and water sample, and a laboratory comparison of organisms identified in each. Often, diseases are not reported to the Office of Epidemiology until many days or weeks after symptom onset, which makes sample collection problematic. There were 755 reported cases of the selected potential waterborne diseases for 2003.

Figure 4. Yearly Number of potential waterborne cases



Based on estimates by the US Centers for Disease Control & Prevention, nearly half of those are probably foodborne (Mead et al, 2000). Table 2 indicates the counts of each disease that are **not** likely to be foodborne. Because the actual foodborne cases could not be separated from the others, all reported cases of the selected diseases were used in the analysis.

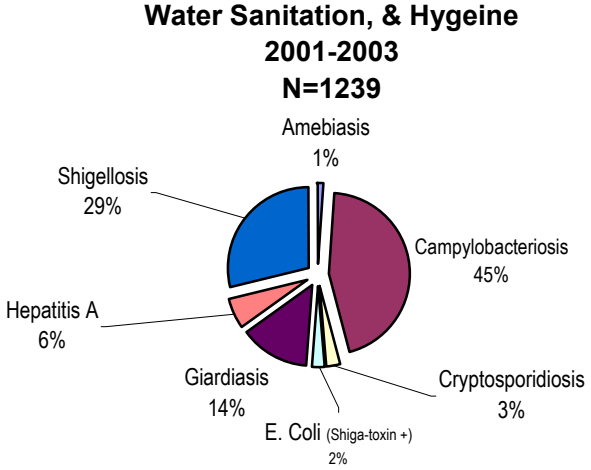
Table 2. Diseases **Estimated NOT** to be Foodborne, New Mexico, 2003

Disease	2003 Reported NM Cases	% Estimated to be waterborne or other**	% Estimated to be Foodborne*	**Estimated # waterborne or other etiology****
Amebiasis	14	Unknown	Unknown	**14**
Campylobacteriosis	319	20	80	**64**
Cryptosporidiosis	18	90	10	**16**
E. coli (O157:H7 & TX+)	21	15	85	**3**
Giardiasis	61	90	10	**19**
Hepatitis A	28	95[Ŧ]	5	**58[Ŧ]**
Shigellosis	294	80[Ŧ]	20	**235[Ŧ]**
Total	755			**409**

**Estimated percents from Mead, et al, (2000). Food-related illness and death in the United States, Emerging Infectious Diseases, 5 (5).*
***Other etiology could include person-to-person or animal-to-person*
[Ŧ]Hepatitis A and Shigella organisms are more often spread from person-to-person than through water.

Figure 5 shows a chart of illnesses reported in years 2001 through 2003 that are estimated to be related to water, sanitation and hygiene. Campylobacteriosis represents the highest percentage, however transmission can be due to contaminated food (particularly poultry), water, or contract with infected animals (particularly cats and puppies). Giardiasis, which is more commonly related to contaminated water ingestion and makes up 14% of the three-year sample.

Figure 5. Percentage of reported illnesses estimated to be due to water, sanitation, and hygiene, NM, 2001-2002



Analysis of infectious disease NETSS data was performed for each of the selected potential waterborne diseases on a weekly basis. The weekly data were compared

with a 12-year average rate. Each time the weekly rate exceeded one standard deviation above the average rate, a line listing which includes the case's city of residence and street address was run for that week and surrounding two weeks to determine if there was any unrecognized spatial clustering of disease. Enteric disease report forms were reviewed to see if there was any evidence of waterborne transmission. The surveillance charts for each disease are included in Appendix 1.

Maps were produced to analyze the spatial distribution of potential water-related disease cases throughout New Mexico. See Appendix 1 for disease-specific maps.

Table 3 compares 2002 New Mexico data with 2001 US rates (the most recent data available) for the selected diseases.

Table 3. Selected Disease Rates* in New Mexico (2003) and the US (2001)

Disease	NM Rate per 100,000 Persons	US Rate per 100,000 Persons**
Amebiasis	**0.7**	**NA**
Campylobacteriosis	**17.0**	**NA**
Cryptosporidiosis	**1.0**	**1.3**
***E. coli* (O157:H7 & STX+)**	**1.1**	**1.2**
Giardiasis	**3.2**	**7.4*** **
Hepatitis A	**1.5**	**3.8**
Shigellosis	**15.7**	**7.2**

**Rates were calculated using US Census 2003 population estimates.*
***2001 US data from Summary of Notifiable Diseases – United States, 2001 MMWR Volume 50/No. 53; amebiasis and campylobacteriosis are not nationally reportable diseases.*
****Giardiasis Surveillance Summaries MMWR January 28, 2005 / 54(SS01);9-16*

Trends in selected enteric diseases. Seven enteric diseases were selected for surveillance of waterborne illness. There were 755 reported cases of the selected potential waterborne diseases, however, there is no evidence that any of the cases was related to a public water system. Initial information such as gender, age, onset date, and address was collected for most cases. In addition, supplemental information was collected via the "Enteric Disease Report Form" for approximately 95% of the cases. This form included information on water supply, recreational water exposure, sewage exposure, various types of high-risk food exposure, travel history, and daycare exposure. Unfortunately, over 60% for some of these responses were marked "unknown".

The reported cases for all the diseases combined were distributed statewide, with the highest frequency of elevated reported disease rates in McKinley and Roosevelt Counties (see map, Appendix 1). As is often the case with enteric disease, rates were highest for children under 5 years of age. Most symptom onset occurred during fall months (September, October, November) followed closely by summer (June, July, and August). Appendix 1 contains charts and maps that graphically represent case characteristics and potential risk factors. The higher numbers of report cases for Campylobacteriosis and Shigellosis are drive these numbers.

Amebiasis. *Entamoeba histolytica* is a parasite that causes intestinal and other symptoms. Upon infection, humans can shed the cyst form in their feces. The disease caused by infection with *Entamoeba histolytica* is referred to as amebiasis. Cysts can survive outside the host in water and soils. While ingestion of only one viable cyst can cause infection, not all infections are symptomatic. The incubation period for this organism is usually between two and four weeks, but can be from a few days to years. Unlike most enteric illnesses, amebiasis is rare in children under five years. Worldwide, infection rates are higher in those areas with poor sanitation (Chin, 2000). When untreated, infections may last for years.

During 2003, there were only thirteen amebiasis cases reported in New Mexico and it was removed from the "notifiable disease" list in August 2003. It is unknown how many of those were in individuals who lived in or visited a foreign country .

Campylobacteriosis. This bacterial disease is one of the most frequently reported causes of gastroenteritis in the US and in the world. The organism is often found in the gastrointestinal tracts of a wide range of birds (especially poultry) and animals, and can frequently be isolated from surface water (Hunter, 1997). Eating undercooked chicken or contact with farm animals are important risk factors for *campylobacter* infection. The incubation period (the amount of time from ingestion of the organism to symptom onset) is approximately two to five days.

Campylobacter enteritis was the most frequently reported of the seven selected potential waterborne diseases in 2003. In New Mexico, there were 319 reported cases of campylobacteriosis in 2003; this is strikingly consistent with the previous two years reported cases. Forty-one percent of cases reported onset during summer months (mostly in July and August), 32% reported onset during the fall. While this disease had a statewide distribution, disease rates were highest in McKinley and Roosevelt Counties; Bernalillo (23%), McKinley (20%), and Dona Ana (12%) had the highest numbers of cases. Children aged 0 to 4 had the highest disease rates. Of the 319 cases, additional risk factor information from the enteric report form was unavailable on over half (173 cases – 54%).

Cryptosporidiosis. The organism responsible for this disease is a parasite. This organism is especially resistant to chlorine disinfection, and thus is a potential problem in both surface and recreational waters and in groundwater systems that may have experienced sewage contamination or infiltration of surface water. Cryptosporidium has a variable incubation period, ranging from two to twenty-eight days, but typically it takes about a week between infection and illness. The most common symptom is watery diarrhea but some people can be asymptomatic.

There were 18 reported cases of cryptosporidiosis in New Mexico during 2003. Due to the small number of cases generalization are problematical. However, there were more female cases then males (72% vs. 28%); children under one year of age had the highest rates. Of the 18 cases, additional information was available for 15 individuals. Sixteen percent reported some underlying illness, possibly reflecting

testing bias: providers may be more likely to test those patients who are most adversely affected by an illness, for example those with HIV/AIDS or some other disease that may suppress the immune system. Long incubation periods for this organism can lead to difficulties in pinpointing risk factors.

Enterohemorrhagic *Escherichia coli* infection. Enterohemorrhagic *E. coli* was first identified in 1982 and became a nationally reportable disease in 1993; the most commonly reported serotype is E. coli O157:H7. This type of *E. coli* produces a Shiga toxin that can cause severe damage to the lining of the intestine, and complications can result in serious kidney damage (Hemolytic Uremic Syndrome – HUS). Infection with this organism is most commonly associated with the ingestion of undercooked beef and other foods contaminated by cattle feces. However, waterborne transmission has also been documented. Contamination of a municipal water system in Walkerton, Ontario, Canada resulted in several deaths and significant illness in a small community. A report by the US Food and Drug Administration indicated that in the Pacific Northwest, *E. coli* O157:H7 was suspected to be second only to Salmonella as a cause of bacterial diarrhea, and mild infection was thought to be vastly under-reported (FDA, 2001). The incubation period ranges from two to eight days.

There were 21 reported cases of enterohemorrhagic E. coli infection in New Mexico in 2003, 15 of which were attributable to *E.coli* O157:H7. Again, due to the small number of cases, generalizations are problematical. However, 57 percent were in males and fall is the typical season of onset was typically fall (52%) as it was in 2002. Highest rates were reported in ages 0 to 4. Risk factor information was collected for over half the cases. While this family of organisms is frequently associated with undercooked food, none of the high-risk food variables (e.g., eating undercooked meat) seemed to play a role in the New Mexico cases.

Giardiasis. *Giardia lamblia* is a protozoa that is the most frequently identified cause of non-bacterial diarrhea in North America. It survives in the environment as a cyst, and is more resistant than most other waterborne pathogens (except Cryptosporidium) to chemical disinfection. *Giardia lamblia* infects a wide range of birds, amphibians, and other animals in nature, and is frequently found in surface water as a result of animal fecal contamination (especially beavers). The incubation period can be lengthy, ranging from three to twenty-five days.

There were 61 reported cases of giardiasis in New Mexico in 2002. Although the greatest numbers of cases were reported in both the winter and the fall, the cases were closely distributed throughout the yea as well as within the age groups and gender. Risk factor information was unavailable in nearly half the cases. Eleven percent of those reported swimming in some type of recreational water (i.e., swimming pool, reservoir, lake, river). Only 3% reported travel in the weeks preceding illness.

Hepatitis A. Hepatitis A is a viral organism that can result in the following symptoms: fever, malaise, nausea, anorexia, and abdominal discomfort, followed by jaundice. Hepatitis A has a long incubation period (between 10-50 days, with an average of 30 days), making it difficult to determine water or foodborne etiology. The FDA estimated that in 1988, 7.3% of cases (nationally) were foodborne or waterborne, however direct contact (fecal-oral) was the most common route of infection. A targeted immunization program begun in 1996 has been instrumental in reducing morbidity due to Hepatitis A in New Mexico.

Because of the long incubation period, additional food-related risk factor information was not analyzed for the 28 reported cases. Thirteen of the cases had traveled internationally; two had contact with children in daycare, however four of the cases was determined to be daycare associated.

Shigellosis. *Shigella sp.* is a bacterium that almost exclusively infects humans (other primates may be infected), and some species can result in death. The species endemic in developed countries (*S. sonnei* and *S. flexneri*) typically produce milder symptoms (in those with adequate immune response) than *Shigella dysenariae*, the species more common in developing countries. Shigellosis (bacillary dysentery) is mainly spread from person to person by direct contact (fecal-oral), but can occur through direct fecal contamination of water and food sources. The infectious dose is small, between 10 and 100 organisms, and the incubation period is relatively short (12 to 26 hours). Because this organism frequently causes bloody diarrhea, Mead et al. (1999) estimate that treatment is more often sought for shigellosis than other diarrheal illnesses, and is therefore more likely to be reported to health authorities.

There were 294 reported cases of shigellosis in New Mexico in 2003, showing a slight increase each year from 2001. Although New Mexico's rate of Shigellosis is over twice the national rate (table 3), this represents reported disease and not actually diseases. Some states, such as Nebraska, did not report Shigellosis to the Public Health Laboratory Information System (PHLIS) causing the national rate to be underestimated.

One to four year olds had the highest rates, followed by 5 to 14 year olds; as seen in 2002. Spatially, the highest disease rates were in McKinley, Cibola and Dona Ana counties. During February of 2003, the weekly rate exceeded the 1 standard deviation but this was due to nine cases in 3 non-contiguous counties indicating no unusual spatial clusting.

Of the cases with additional information available, 36% (N=57) were a case contact.

Discussion

Because of the sporadic nature and different risk factors for each of the seven selected diseases, it is difficult to draw broad conclusions regarding waterborne disease in New Mexico. There were no situations in which drinking water was

definitively identified as the source of infection. Relative numbers of cases remained the similar the past three years.

2003 was the third complete year of the waterborne disease surveillance project. Currently, this system is a tracking system for enteric disease, of multiple and frequently unknown etiology. Utilization and fine-tuning of the databases and protocols will allow the implementation of a surveillance system that has the potential to differentiate waterborne disease from diseases of other etiology.

Limitations. There are some major limitations to using reported enteric disease as a surveillance system for waterborne disease, including source determination, timeliness of reporting, recall bias, and reporting bias. All data is subject to reporting bias because although reporting is mandatory, it is not enforced plus it is passive. However, 98% (n=742) of the potential waterborne disease cases are laboratory confirmed, supporting the fact that laboratories, not providers, report most of the cases.

Primarily, it is difficult to determine specific etiology for many diseases, especially those with relatively long incubation periods. To be confirmed, the potential source must be identified in time to test it for the organism in question. Most of the selected enteric illnesses can be transmitted person-to-person, through food, or by animals in addition to waterborne transmission. Often, disease reports are not brought to public health practitioners' attention until after many days or weeks of symptoms. It is difficult for most people to recall food and activity histories for events that happened many weeks in the past. Frequently, no follow-up risk factor information is collected. Another reporting bias issue might occur because certain infections may be more likely to be reported than others; also, specific populations may be more likely to be tested, for example those with HIV/AIDs, or other immune-suppressing disorders. An otherwise healthy person may be diagnosed based on clinical symptoms rather than a confirmatory test, and therefore, never reported. In addition, most people don't seek medical care for diarrheal illness, preferring to self-medicate with over-the-counter medicines. As a result, due to natural of the reduction in the number of persons seeking medical care from those experiencing symptoms for enteric disease from those infected and again from all your were exposed adds another dimension to this issue. Lastly, basing the surveillance system on reportable diseases may miss waterborne outbreaks of diseases that are not reportable. For example, some viruses, such as noroviruses, can be transmitted through water but are not reportable to the State.

Generalizations are problematic for disease with low cases counts such as amebiasis, cryptosporidiosis, enterohemorrhagic *Escherichia coli* infections, and Hepatitis A.

Conclusion

2003 was a year of transition for the waterborne disease surveillance project, due to the change in staff resulting in a delayed compilation and completion of this report. Weekly analysis of data was limited during the last part of the year.

Recommendations

1. **Identify and monitor "susceptible water systems":** With the help of NMED, compare orders, advisories and exceedences with both nitrates and fecal coliform results.
2. **Provide periodic training for district NMED and NMDOH personnel:** New Mexico is a large, rural state. Because it is not always possible for state personnel from Santa Fe to be on scene immediately during a disease outbreak, it is essential that staff from local district offices be trained in appropriate disease investigation protocol. NMDOH and NMED will continue to work together to provide statewide training opportunities.
3. **Provide information for the general public, healthcare providers, and water system operators.**
4. **Collaborate with DWB to perform an analysis of the DWB database to help prioritize development of health information (eg, radionuclides, volatile organic compounds [VOCs], synthetic organic compounds [SOCs], disinfection by products).**

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Appendices

Appendix 1. Definition of Terms & Disease Specific Charts and Maps

APPENDIX 1, DISEASE SPECIFIC CHARTS AND MAPS

Definition of Terms:

Rates: Rates were calculated as number of cases per 100,000 people using the 2000 US Census population, increased by the overall estimated 2001 New Mexico population increase (1.6%).

Seasons: (Season of symptom onset)
- Winter: January, February, and December
- Spring: February, March, and April
- Summer: May, June, July, and August
- Fall: September, October, and November

Residential water source: source of drinking water at home.

Recreational water exposure: exposure to lake, pond, swimming pool, river, or other source of water for recreational purposes.

Potential sewage exposure: Combined variable includes any case that reported exposure to raw sewage, or have a home septic system or cesspool.

Case contact: Case reported contact with someone with diarrhea within two weeks before or after onset of illness.

Restaurant: Case reported eating at a restaurant within one week for a bacterial infection, two weeks for parasitic infections.

Underlying illness: Case reported some sort of underlying illness. Those with underlying illnesses may have a higher likelihood of being tested than the general population.

Travel: Case reported travel (any, outside New Mexico, or outside the US) within two weeks of symptom onset.

Farm: Recent visit to a farm reported.

Sick animal: Contact with sick animals, including reptiles, poultry, cattle, or any other (e.g. sick pet).

Food exposures: Nine different questions are asked regarding various food exposures, including raw meats (beef, chicken, eggs, shellfish, jerky), unpasteurized dairy products or cider, and unwashed fruits/vegetables. Different foods may be associated with each illness; for example, E. coli infection is often associated with undercooked beef, while campylobacter infection is more likely to be associated with undercooked chicken.

Contaminated drinking water: Drinking water with documented microbial contamination at the time the illness occurred. This variable is unknown in all cases.

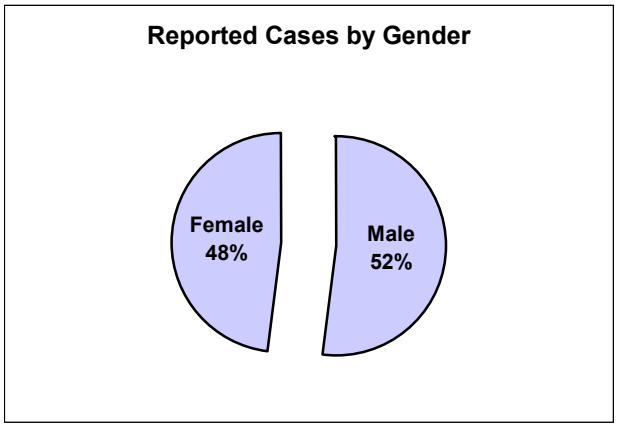
Note: Reporting a positive risk factor does not necessarily indicate source of illness, for example, if a case reports swimming in a lake then reports illness, the illness may not necessarily be related to the lake water exposure.

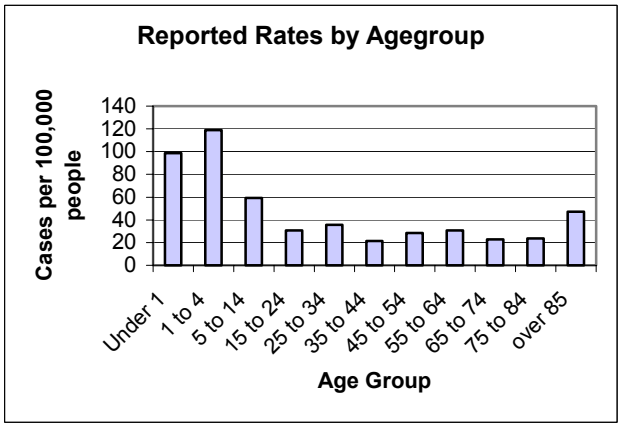
None of the variables is mutually exclusive; a single individual can be positive for more than one risk factor.

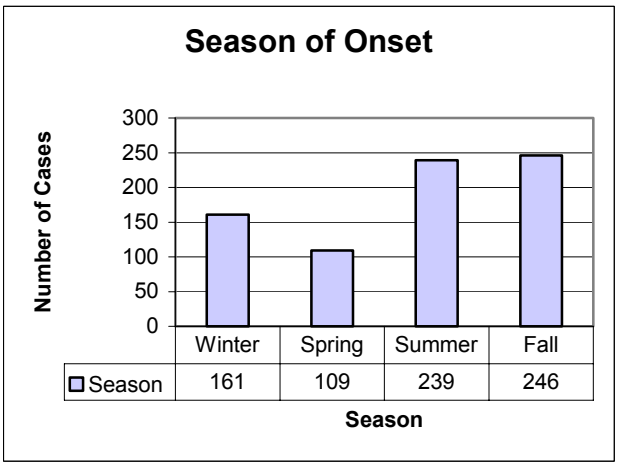
A risk factor graph was not produced for amebiasis due to lack of data. A limited graph was produced for Hepatitis A, which generally has a long incubation period.

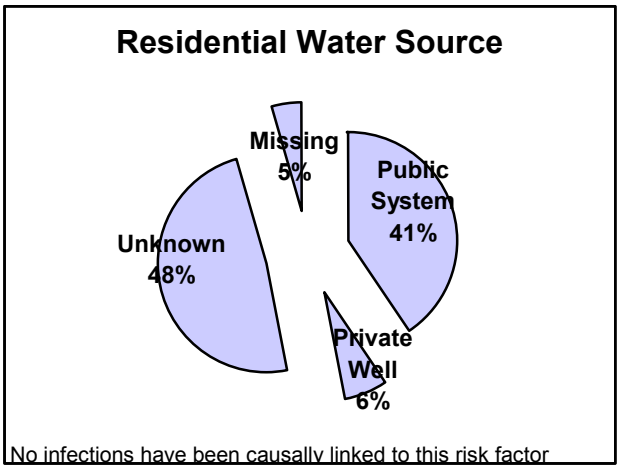
All Potential WBD **New Mexico, 2003**

Total reported cases: 755

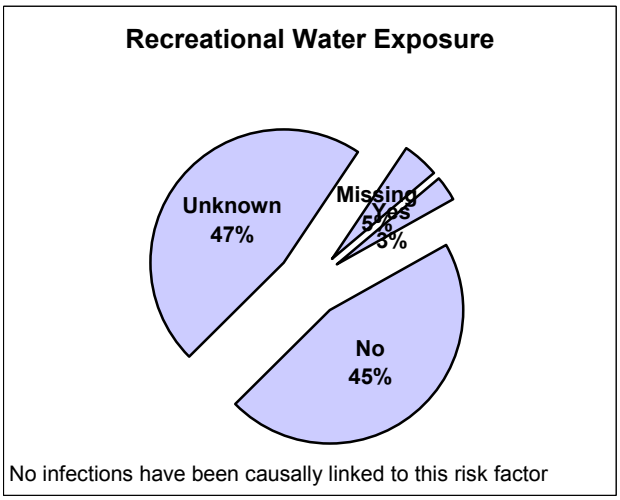




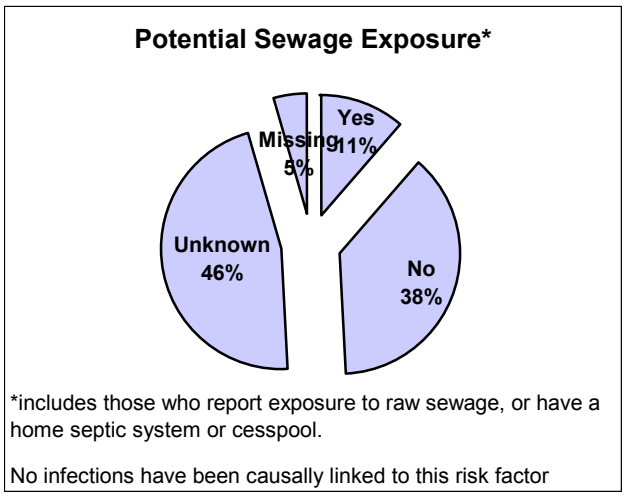




No infections have been causally linked to this risk factor



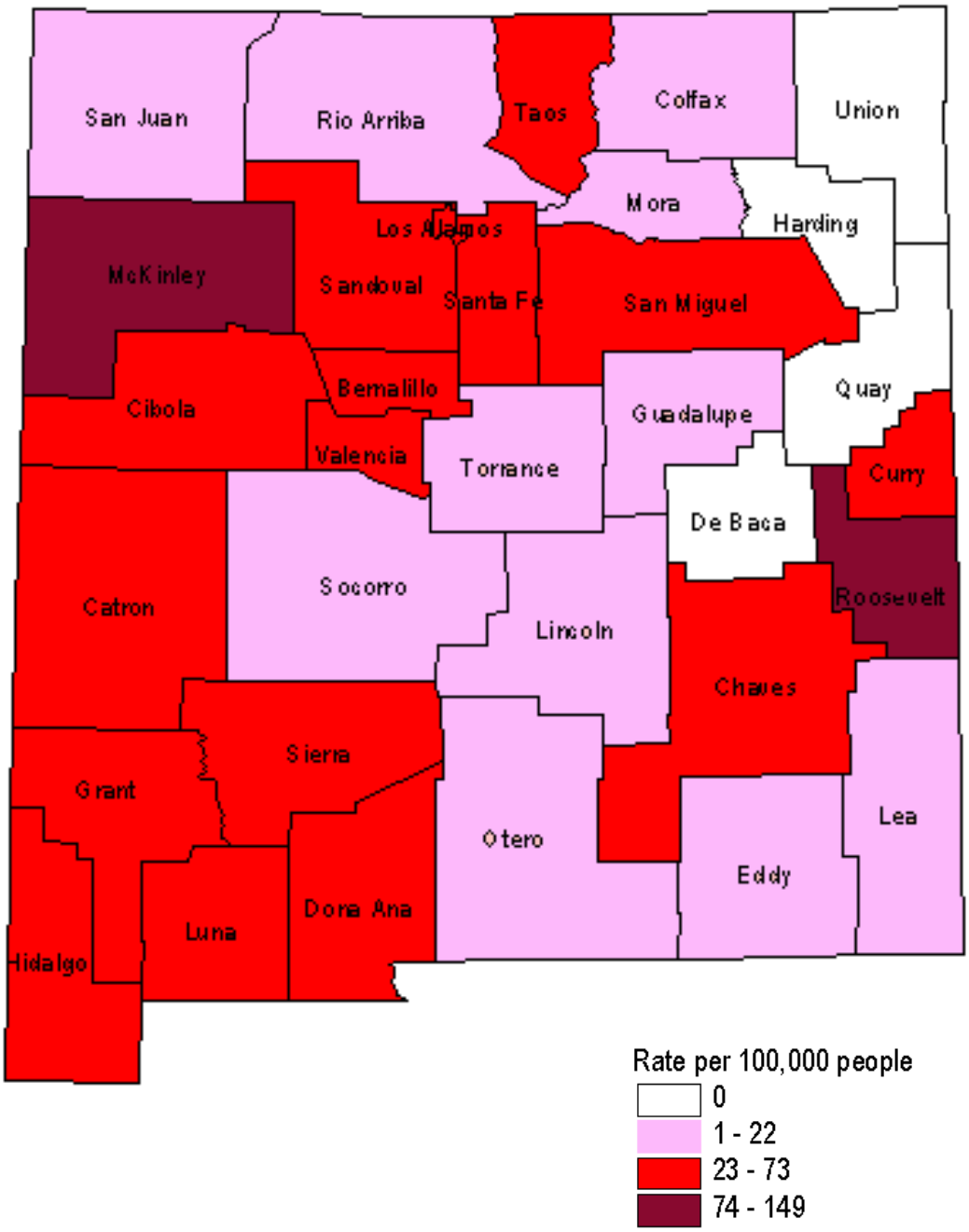
No infections have been causally linked to this risk factor



*includes those who report exposure to raw sewage, or have a home septic system or cesspool.

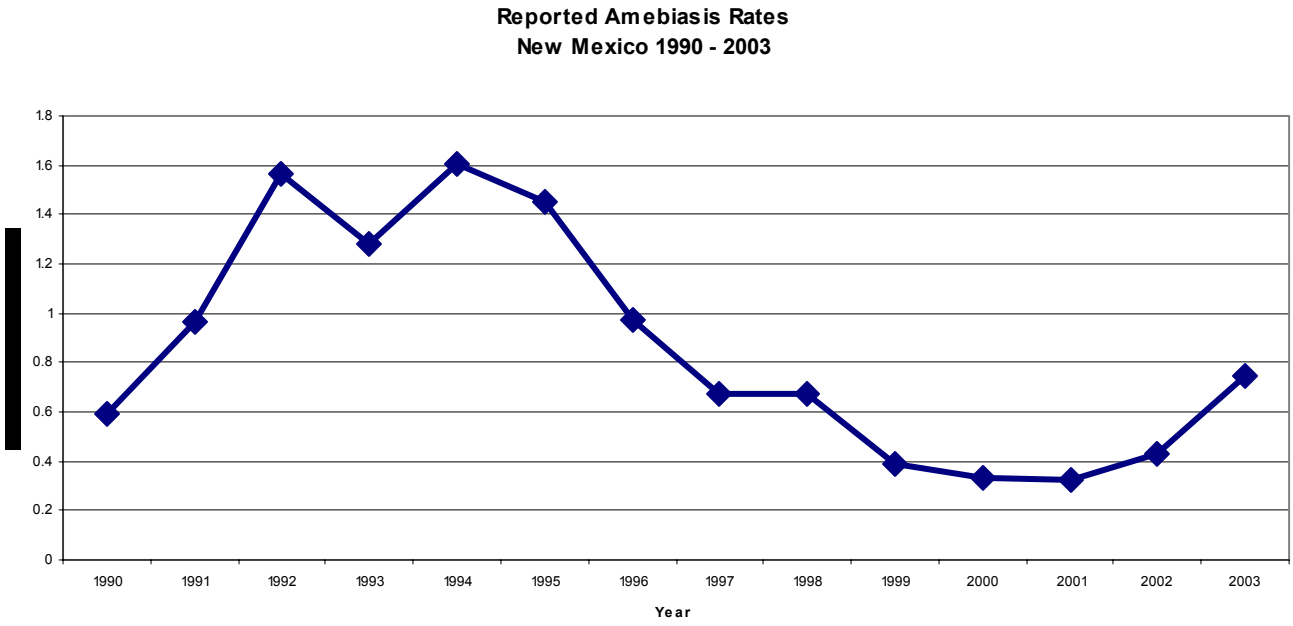
No infections have been causally linked to this risk factor

All Reported Potential Waterborne Diseases
County Rate per 100,00 People
New Mexico, 2003

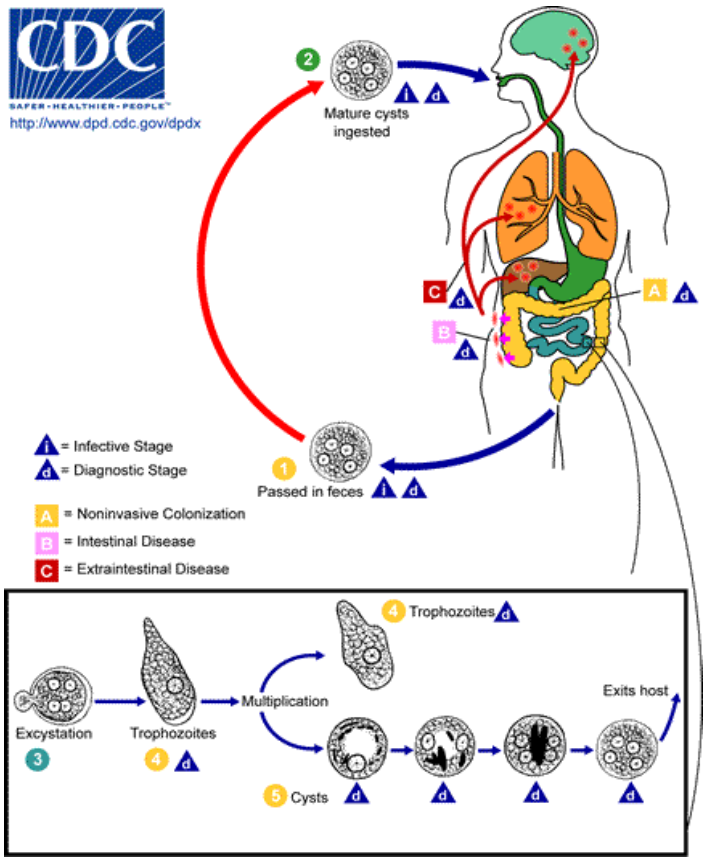


Reported Amebiasis in New Mexico, 2003

Total reported cases: 13

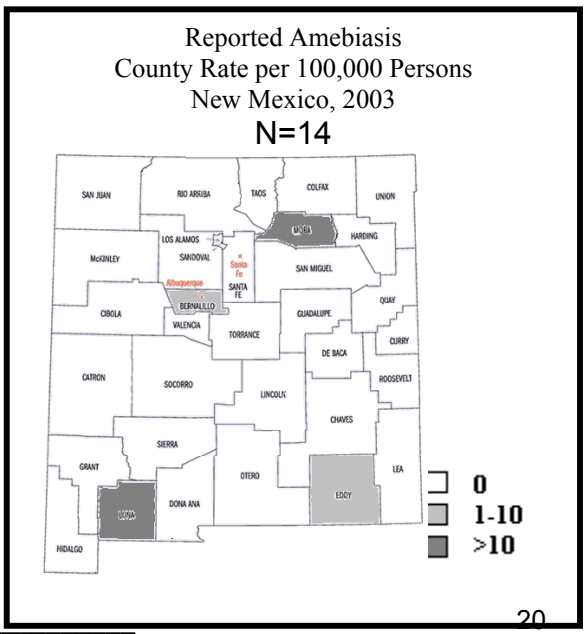


Life Cycle:

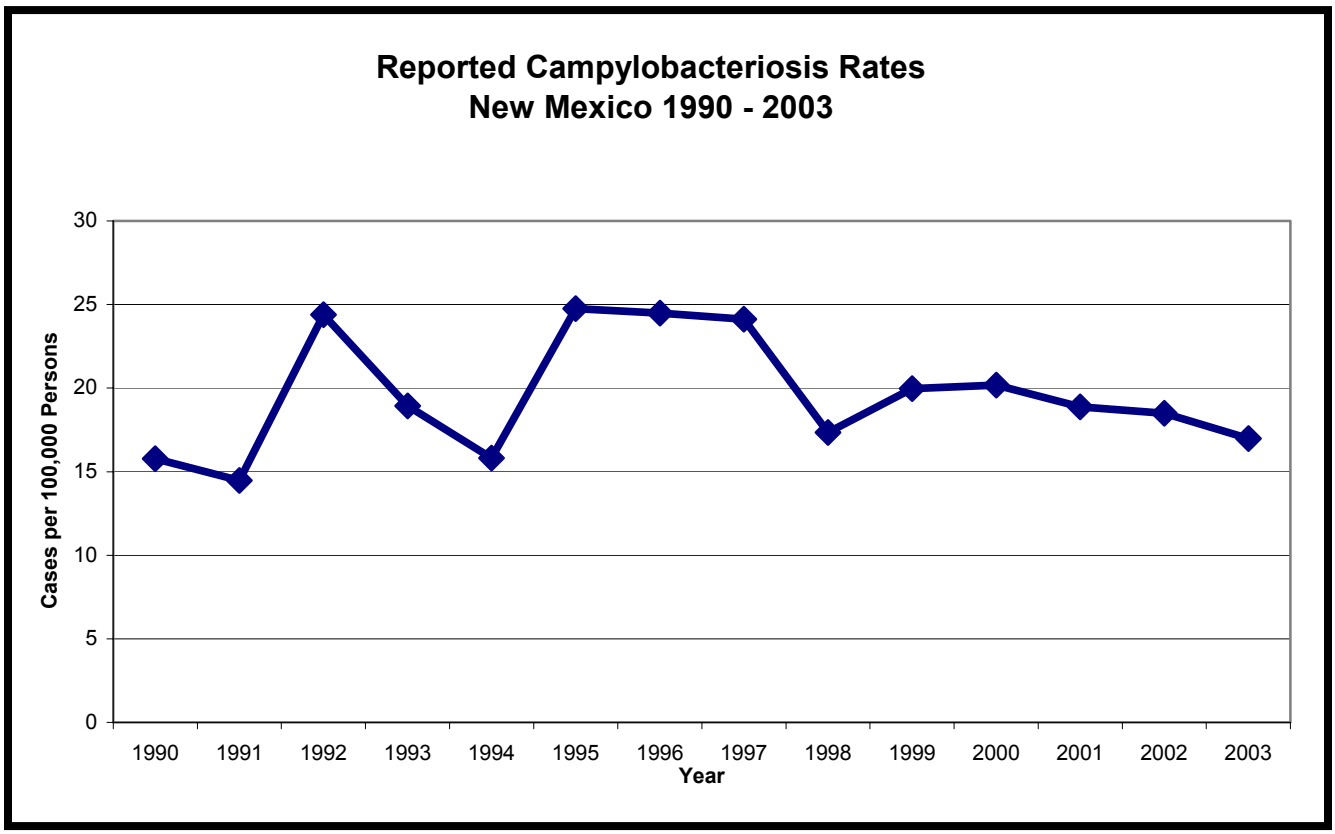


Special points of interest:

- Amebiasis was removed from NM "notifiable disease" list in August 2003.
- Common in developing counties and in industrialized countries, the risk groups include male homosexuals, travelers and recent immigrants, and institutionalized populations.



Reported Campylobacteriosis in New Mexico, 2003
Total reported cases: 319

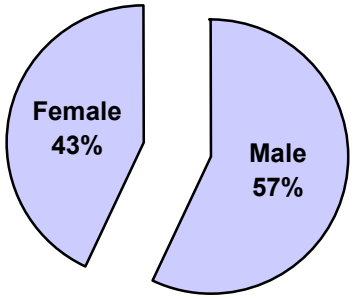


Special points of interest:

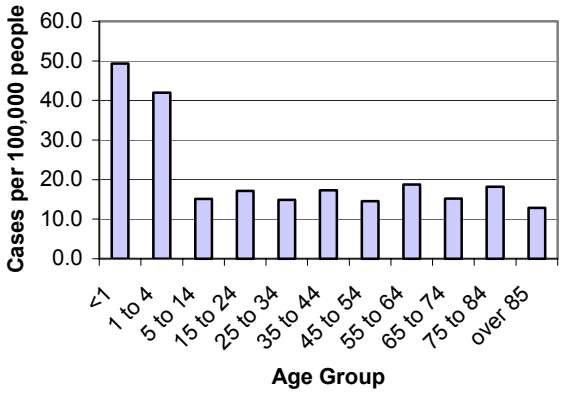
- Summer was the most frequent season of onset for this disease
- McKinley & Roosevelt Counties had the highest rates during 2000-2003; however, this may be due to greater reporting numbers than actual occurrences.
- It's more commonly reported for Children than Adults
- Almost all cases are sporadic events.
- In the U.S., there are about 15 cases per 100,000 annually
- Virtually all persons infected with *Campylobacter* will recover without any specific treatment.

Reported Campylobacteriosis, New Mexico, 2003
General Case Characteristics & Possible Water Exposures
Total reported cases: 319

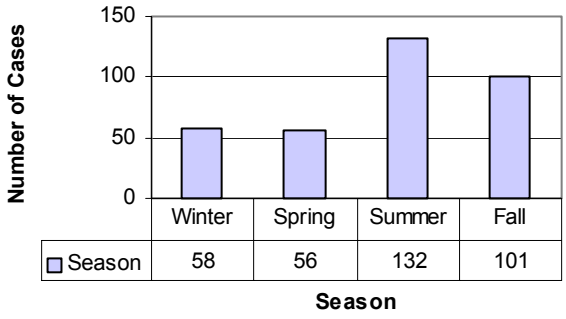
Reported Cases by Gender



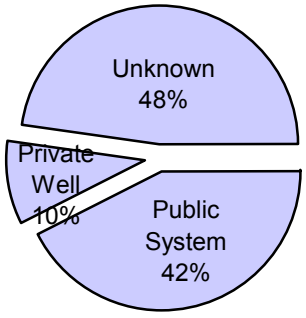
Reported Rates by Agegroup



Season of Onset

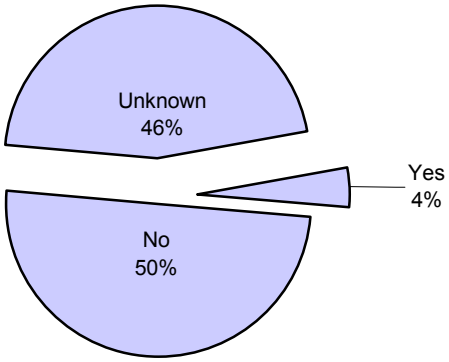


Residential Water Source



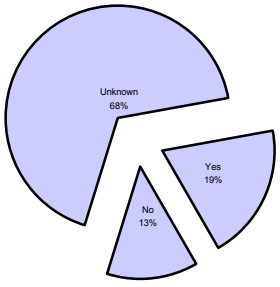
No infections have been causally linked to this risk factor

Recreational Water Exposure



No infections have been causally linked to this risk factor

Potential Sewage Exposure*



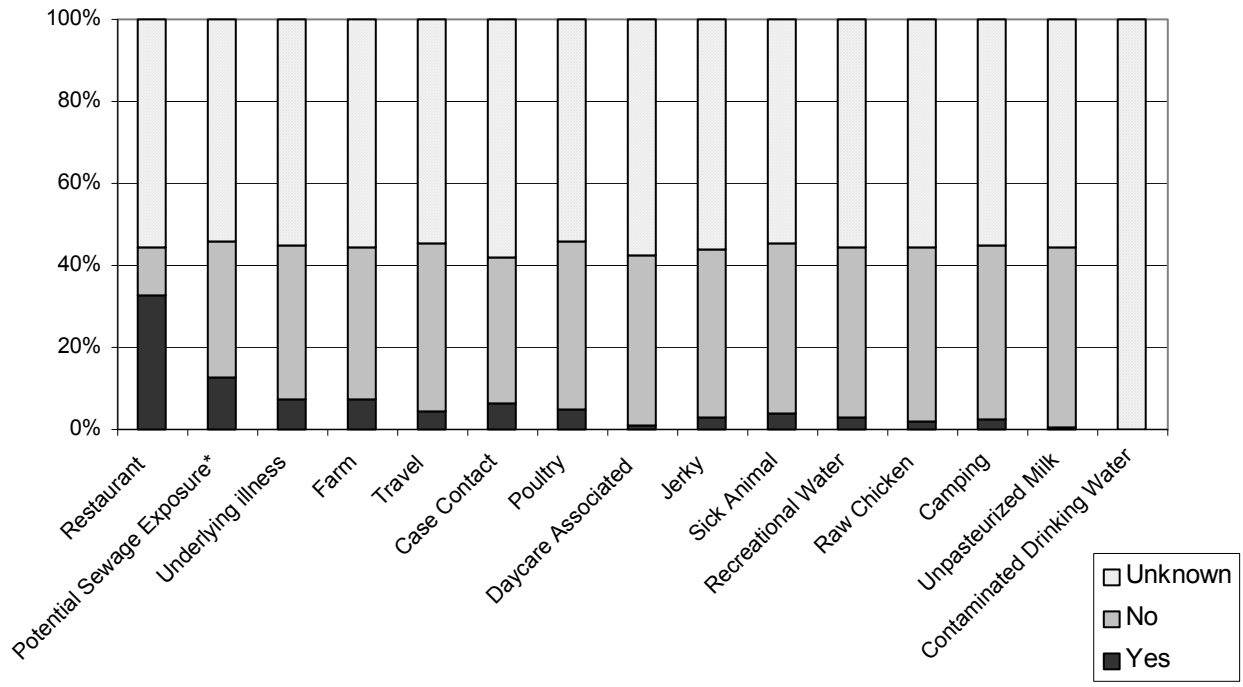
*includes those who report exposure to raw sewage, or have a home septic system or cesspool.

No infections have been causally linked to this risk factor

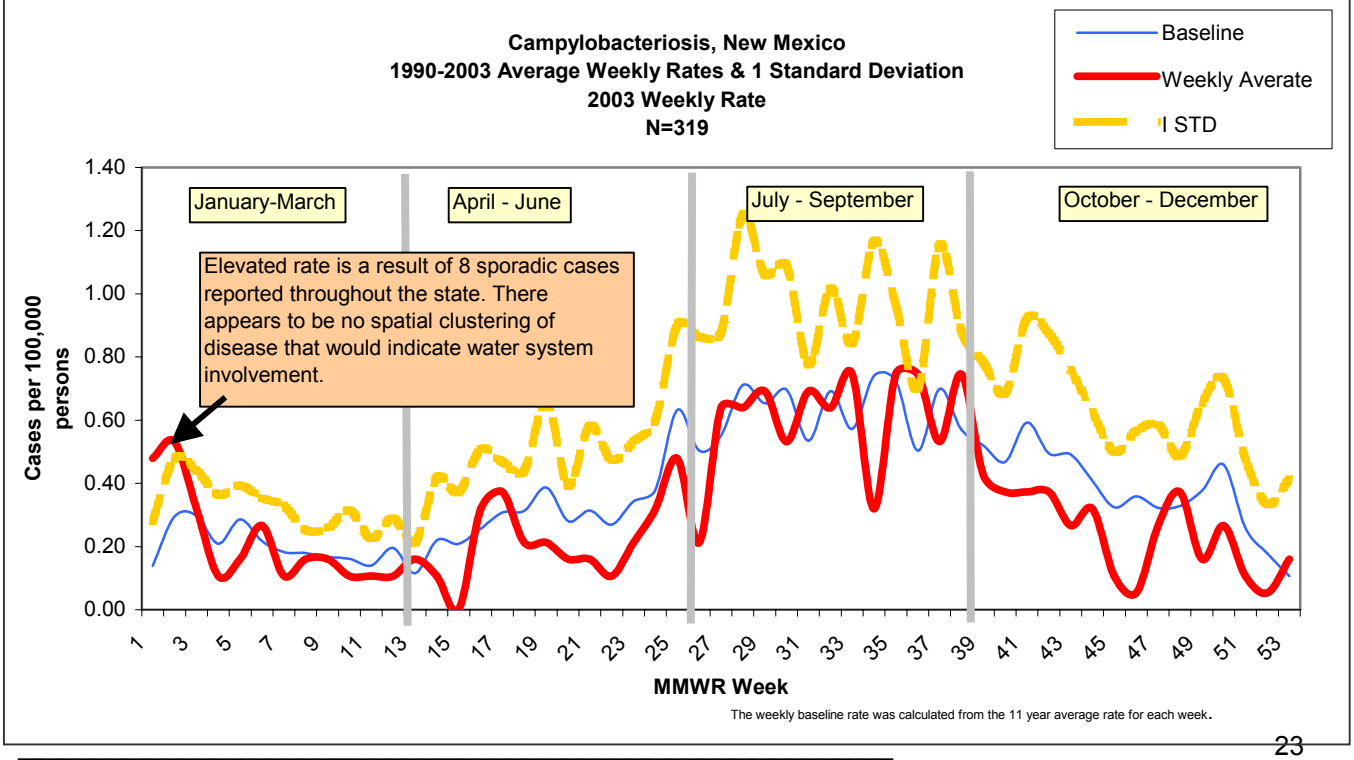
Reported Campylobacteriosis, New Mexico, 2003

Weekly Surveillance and Risk Factor Information

Total reported cases: 319

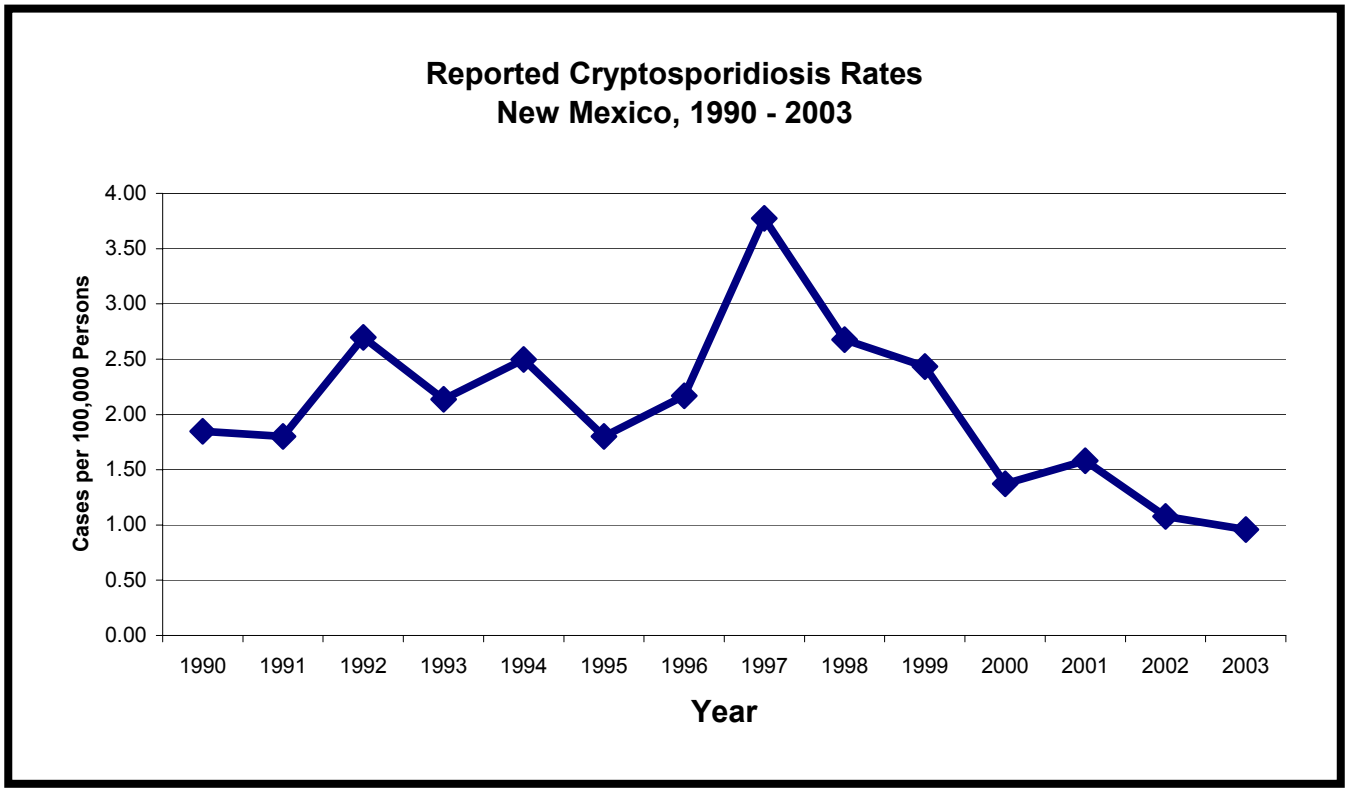


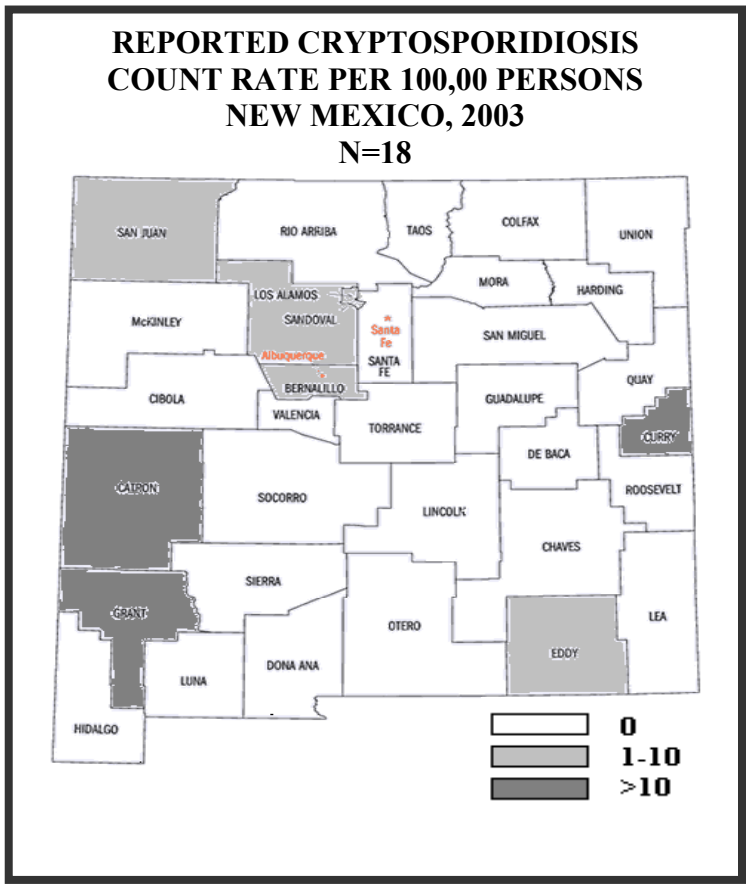
***Potential Sewage Exposure** includes those who reported contact with raw sewage, or have a home septic system or cesspool.



The weekly baseline rate was calculated from the 11 year average rate for each week.

Reported Cryptosporidiosis in New Mexico, 2003
Total reported cases: 18



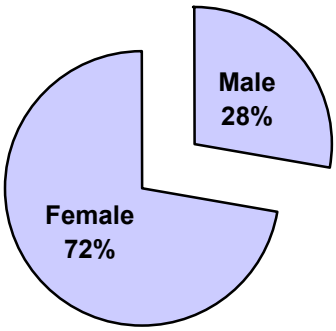


Special points of interest:

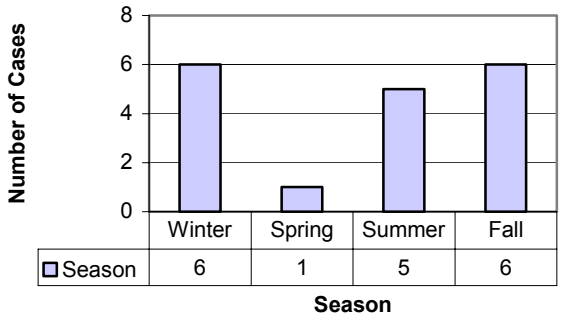
- Cryptosporidiosis has shown a slight decreasing trend, with the exception of a large increase in 1997
- Catron County had the highest rate in 2003 but only 2 cases
- Cryptosporidiosis is a low incidence disease in NM; most counties reported no cases in 2003
- Cryptosporidiosis occurs worldwide

Reported Cryptosporidiosis, New Mexico, 2003
General Case Characteristics & Possible Water Exposures
Total reported cases: 18

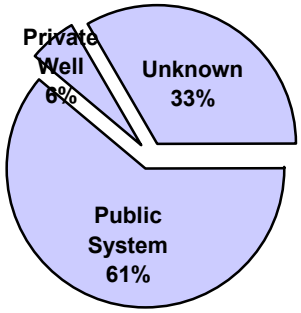
Reported Cases by Gender



Season of Onset

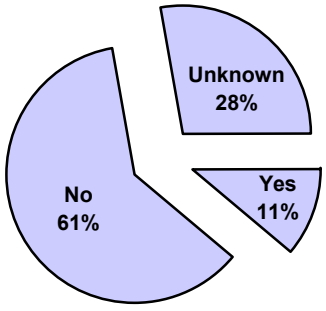


Residential Water Source



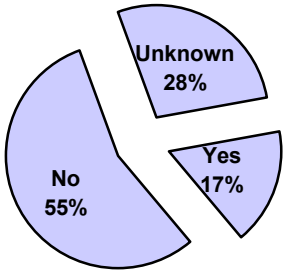
No infections have been causally linked to this risk factor

Recreational Water Exposure



No infections have been causally linked to this risk factor

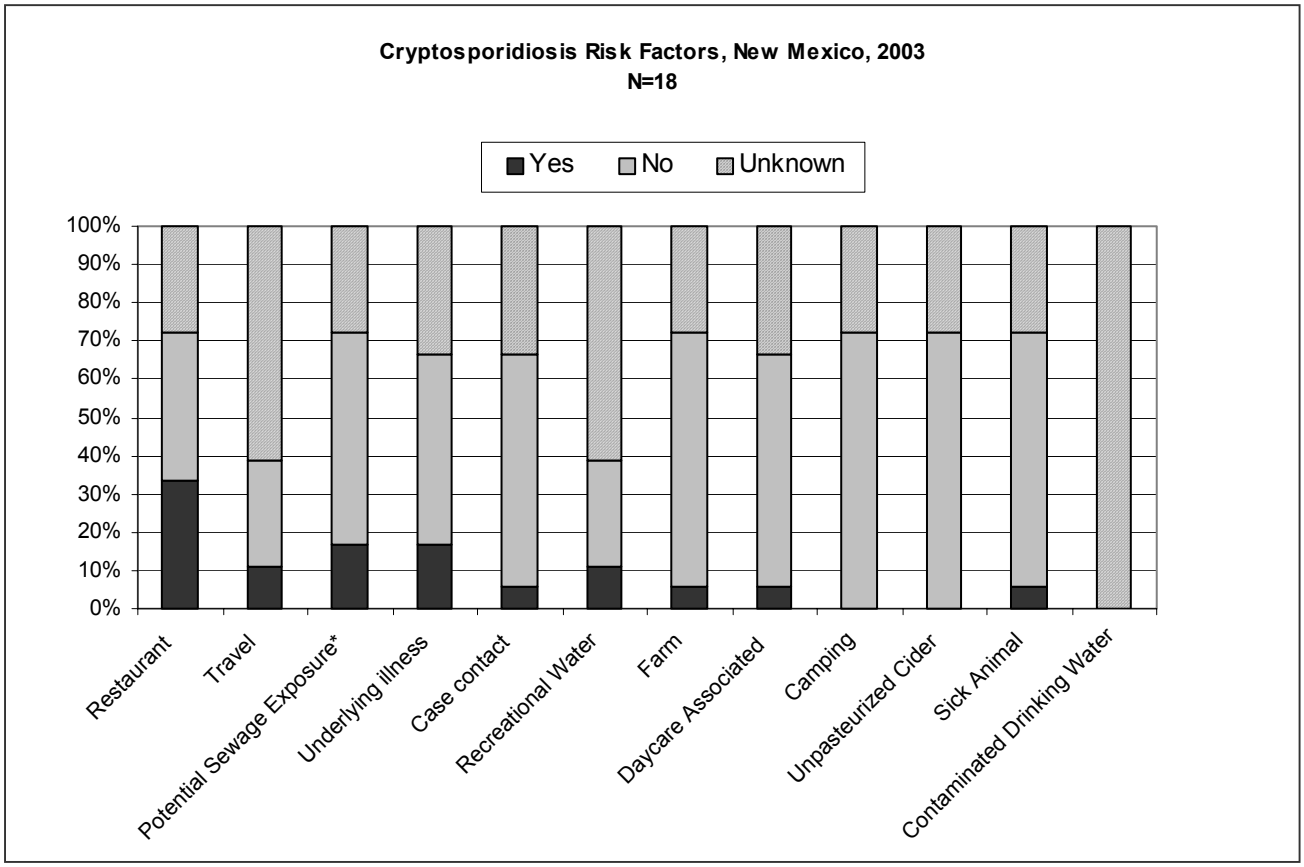
Potential Sewage Exposure*

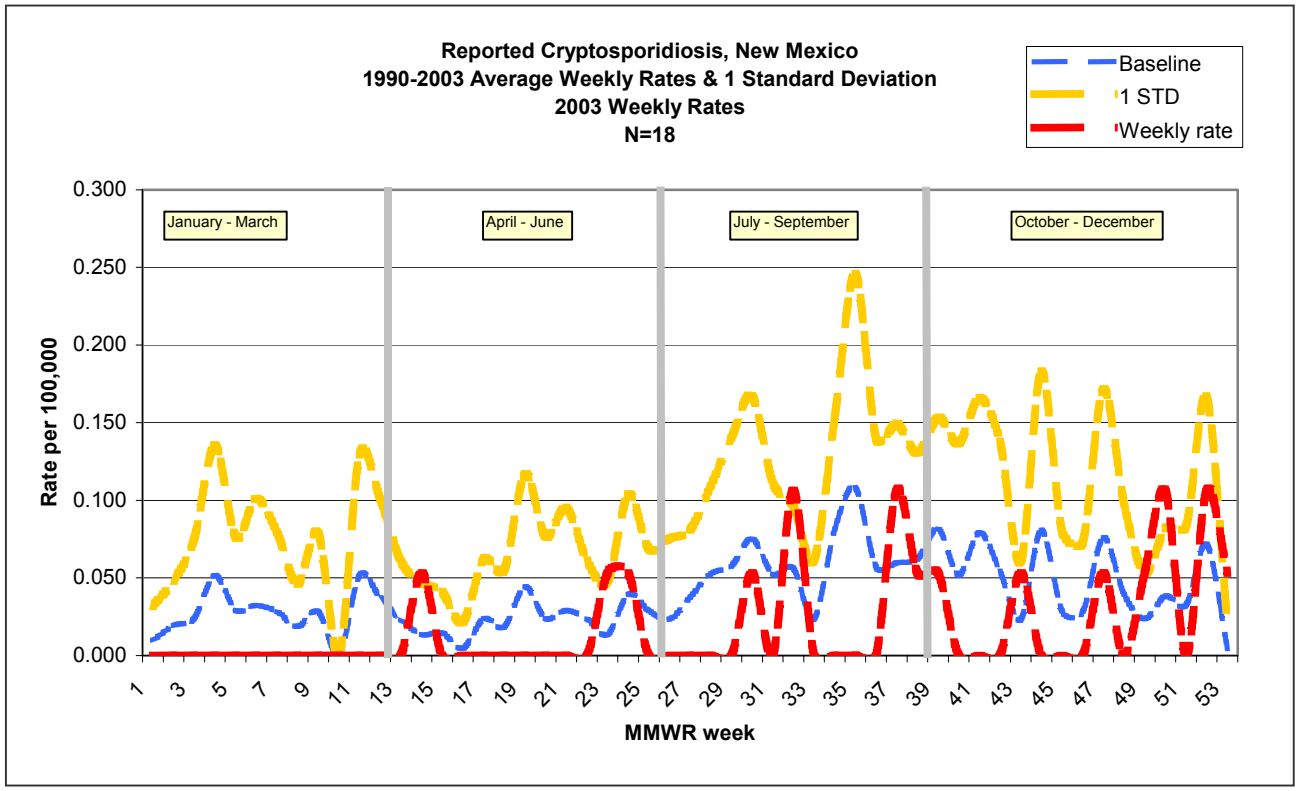


*includes those who report exposure to raw sewage, or have a home septic system or cesspool.

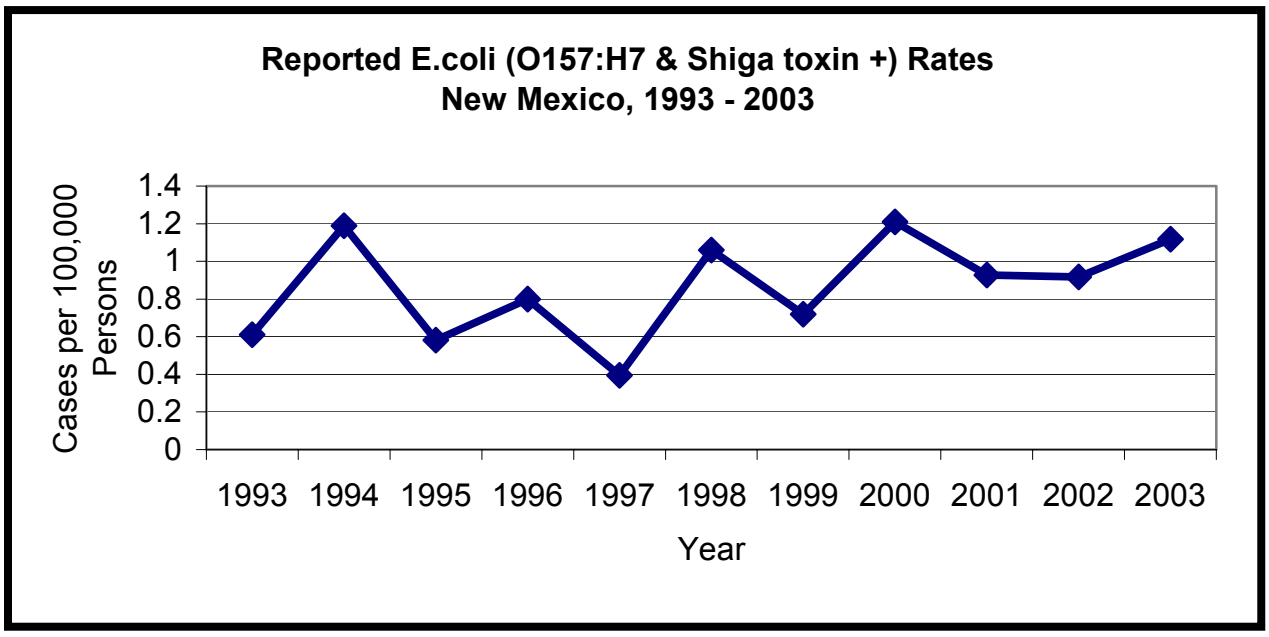
No infections have been causally linked to this risk factor

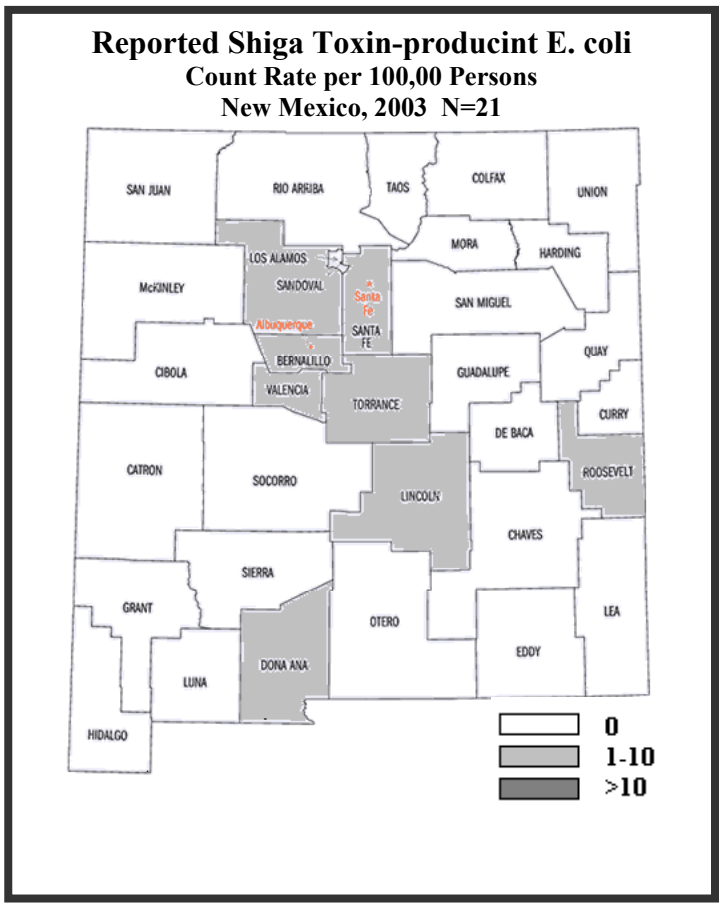
Reported Cryptosporidiosis, New Mexico, 2003
General Case Characteristics & Possible Water Exposures
Total reported cases: 18





Reported Enterohemorrhagic E. coli (EHEC) in New Mexico, 2003
Total reported cases: 21



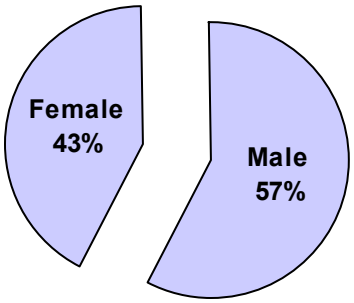


Special points of interest:

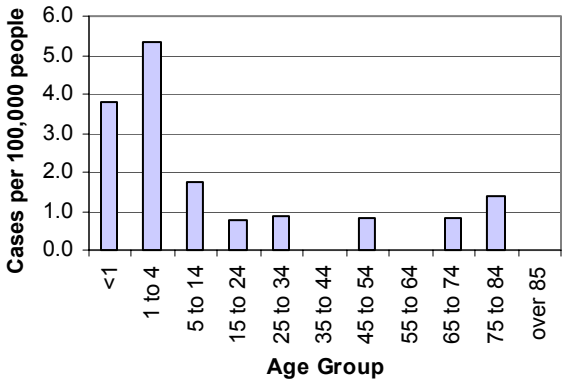
- This disease became reportable in 1993.
- Undercooked meat did not seem to be a significant risk factor.
- Due to the small number of cases in NM the rates in some county may only represent 1 case.

Reported Enterohemorrhagic E. coli infection, New Mexico, 2003
General Case Characteristics & Possible Water Exposures
Total reported cases: 21

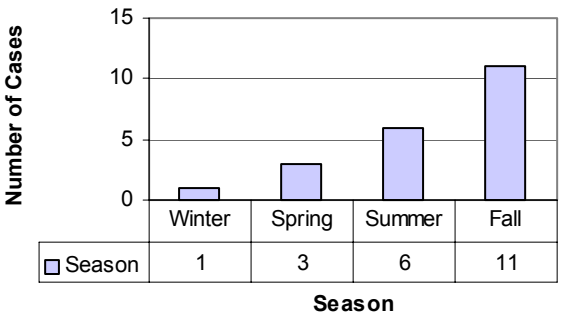
Reported Cases by Gender



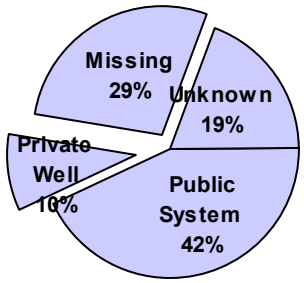
Reported Rates by Agegroup



Season of Onset

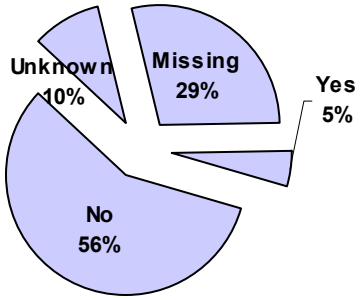


Residential Water Source



No infections have been causally linked to this risk factor

Recreational Water Exposure



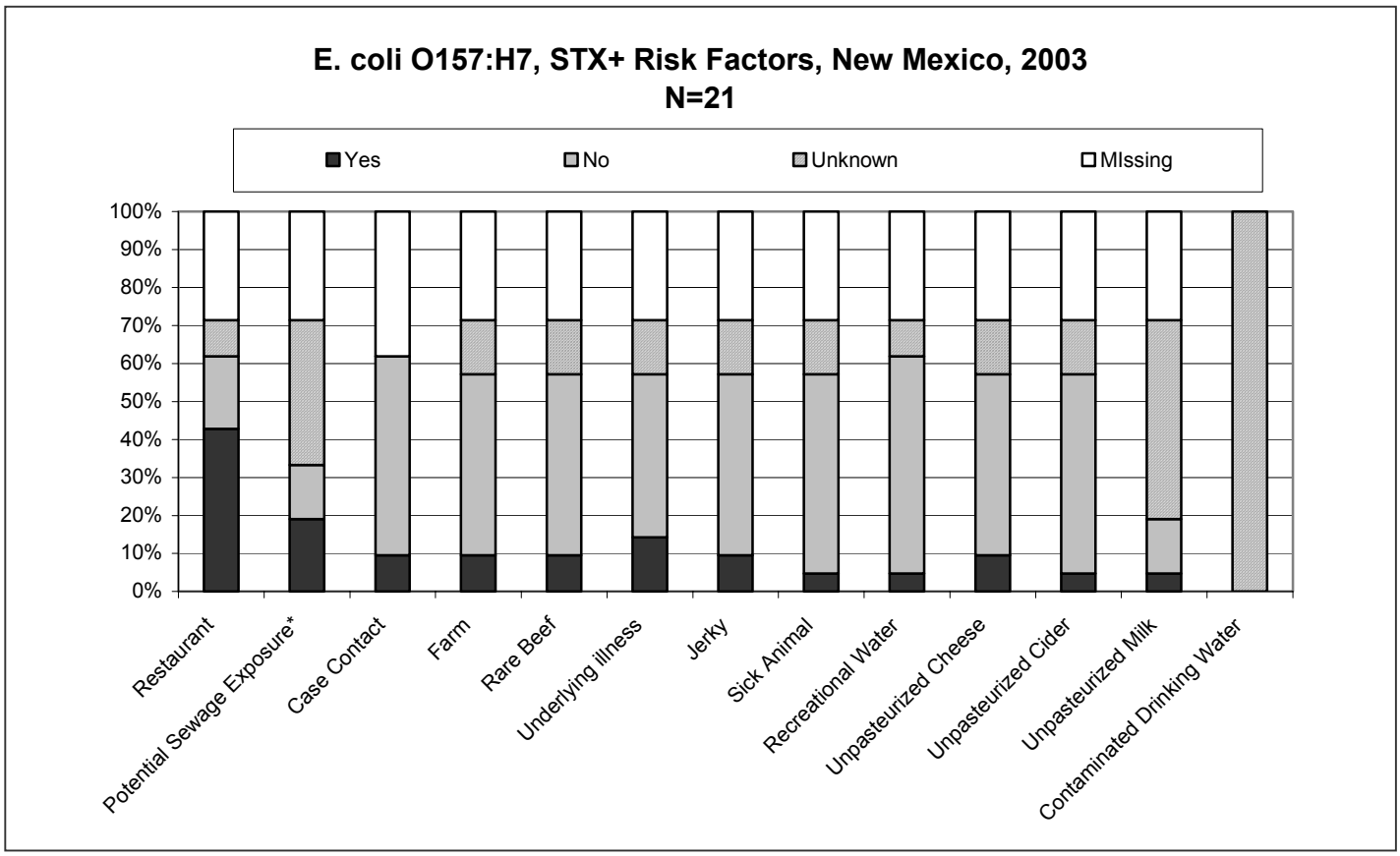
No infections have been causally linked to this risk factor

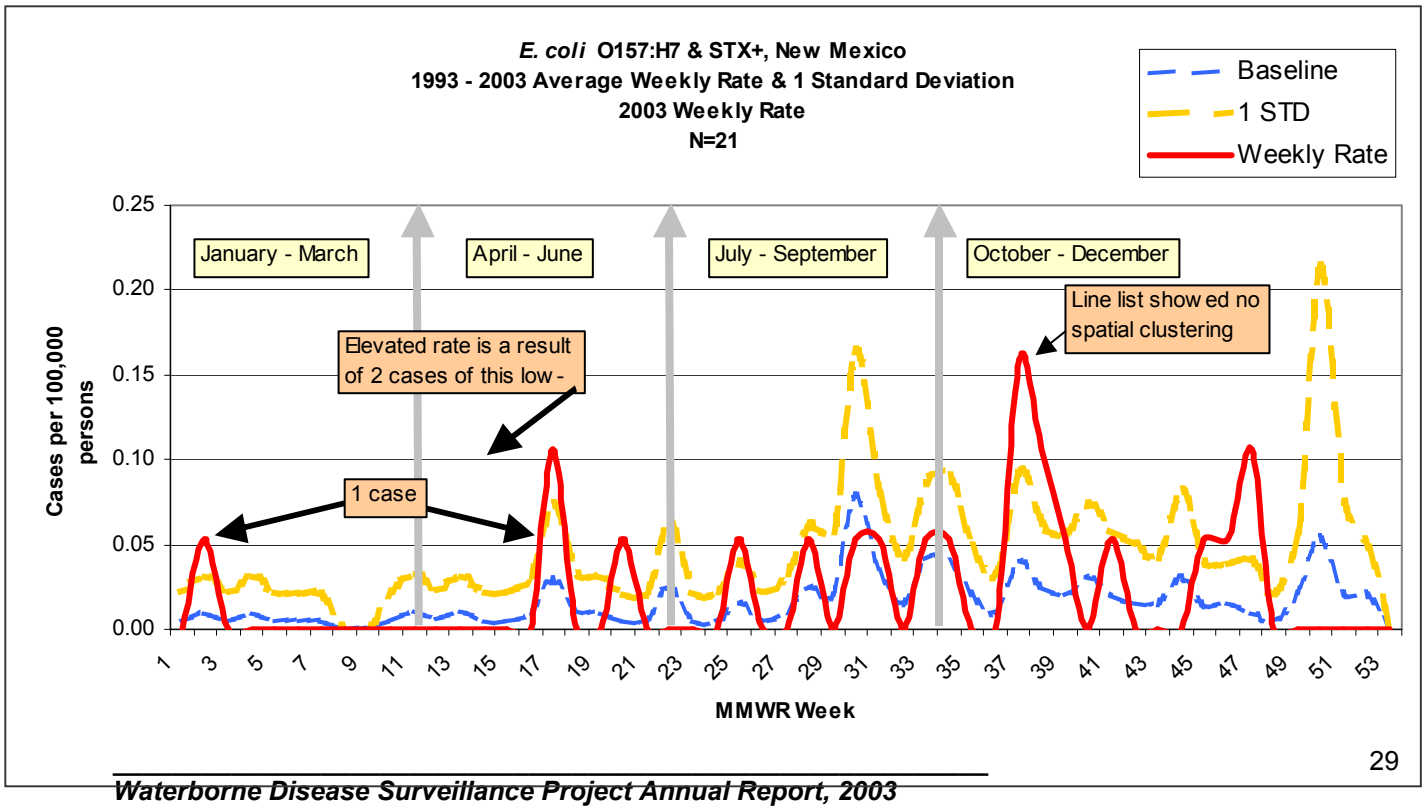
Potential Sewage Exposure*

*includes those who report exposure to raw sewage, or have a home septic system or cesspool.

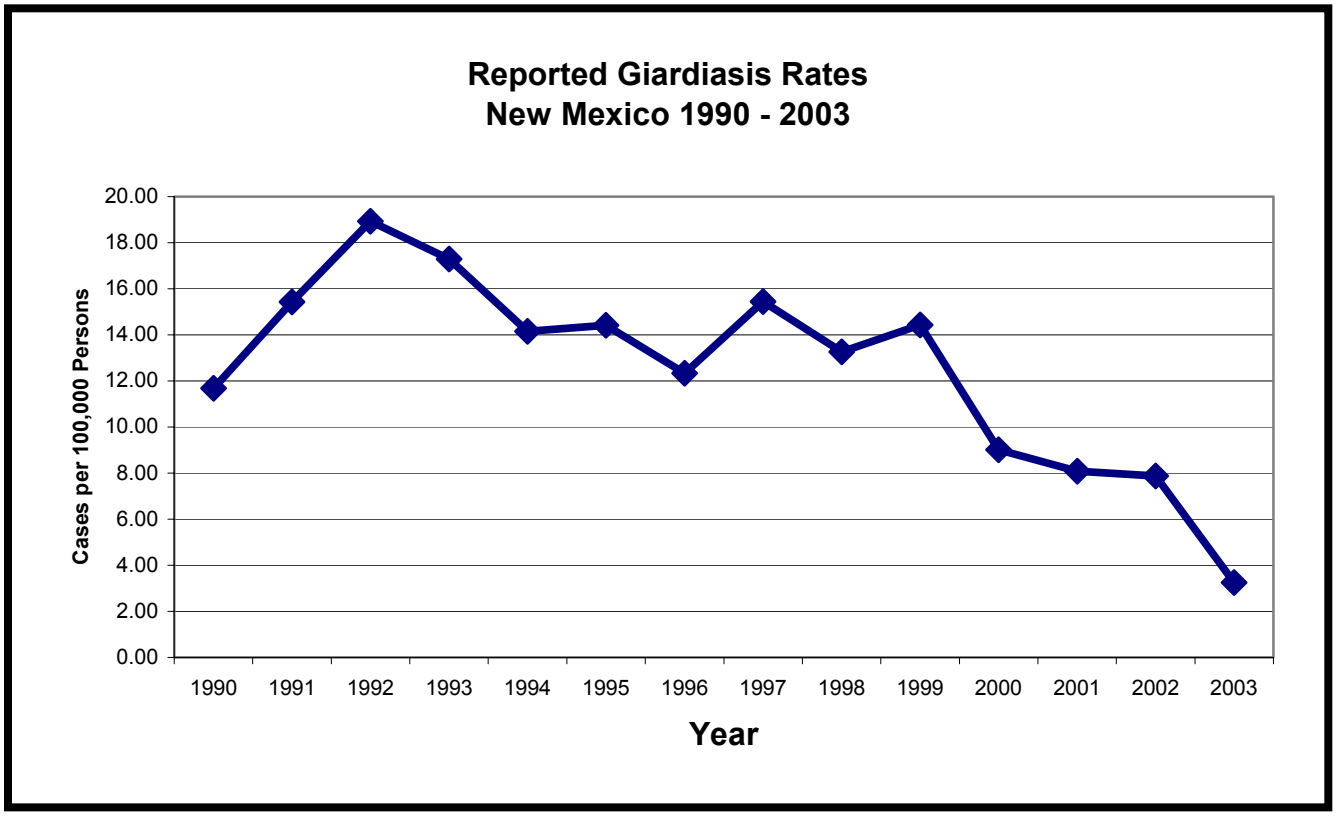
No infections have been causally linked to this risk factor

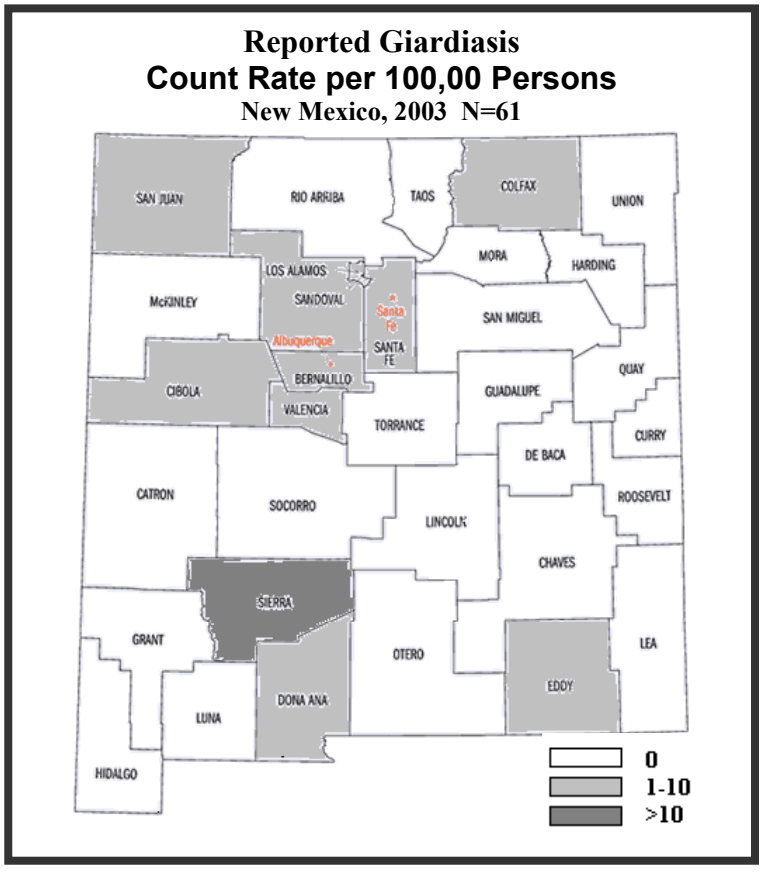
Reported Enterohemorrhagic E. coli, New Mexico, 2003
Weekly Surveillance and Risk Factor Information
Total reported cases: 21





Reported Giardiasis in New Mexico, 2003
Total reported cases: 61

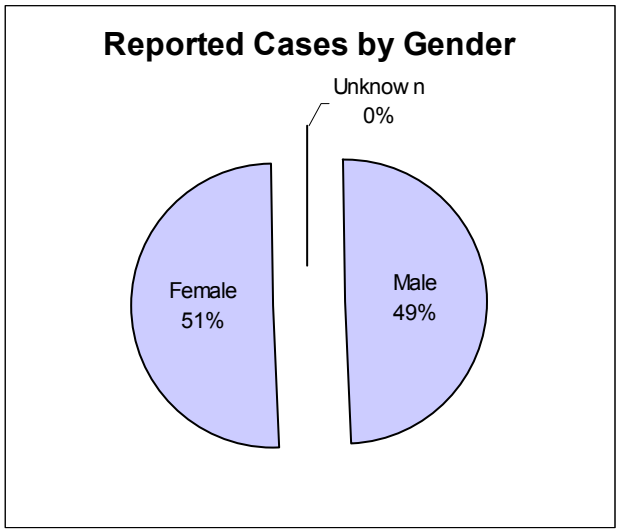


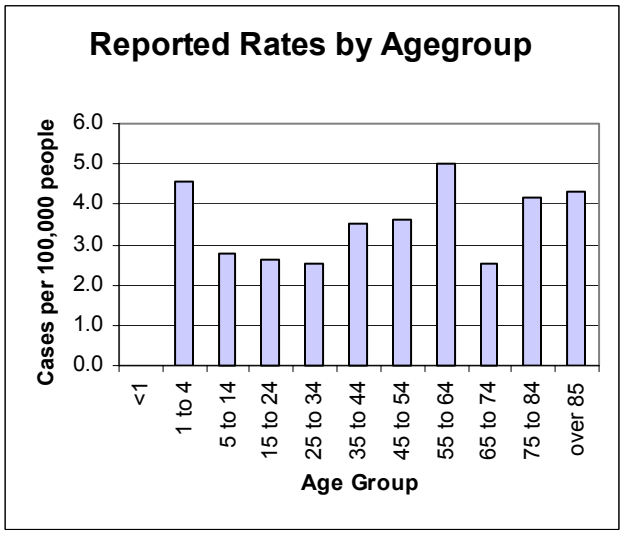


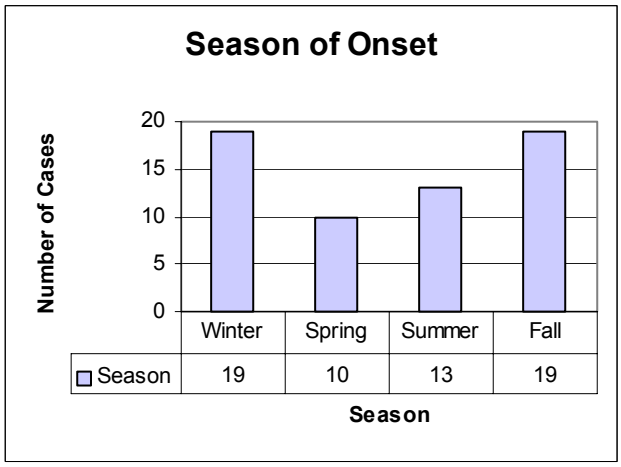
Special points of interest:

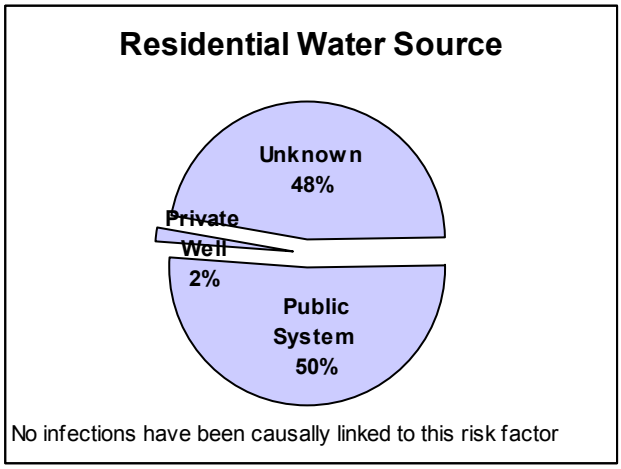
- Reported giardiasis has decreased slightly since 1990
- The rate of Giardiasis in NM is 3 per 100,000 persons
- National estimates based on state surveillance data indicate that as many as 2.5 million cases of giardiasis occur annually in the United States
- Spring & summer were the highest reported onset seasons

Reported Giardiasis, New Mexico, 2003
General Case Characteristics & Possible Water Exposures
Total reported cases: 61

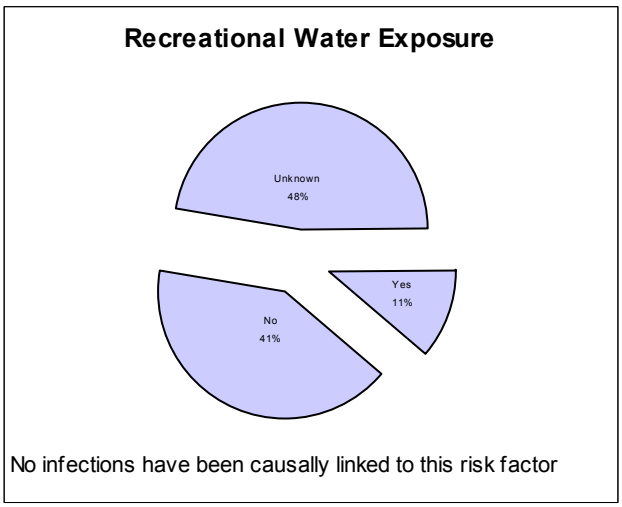




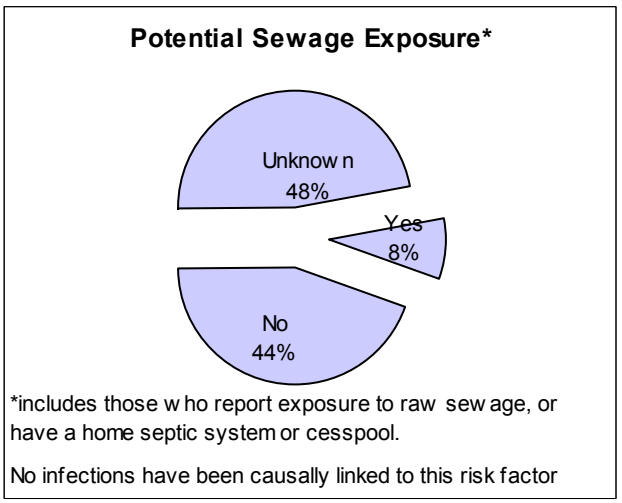




No infections have been causally linked to this risk factor



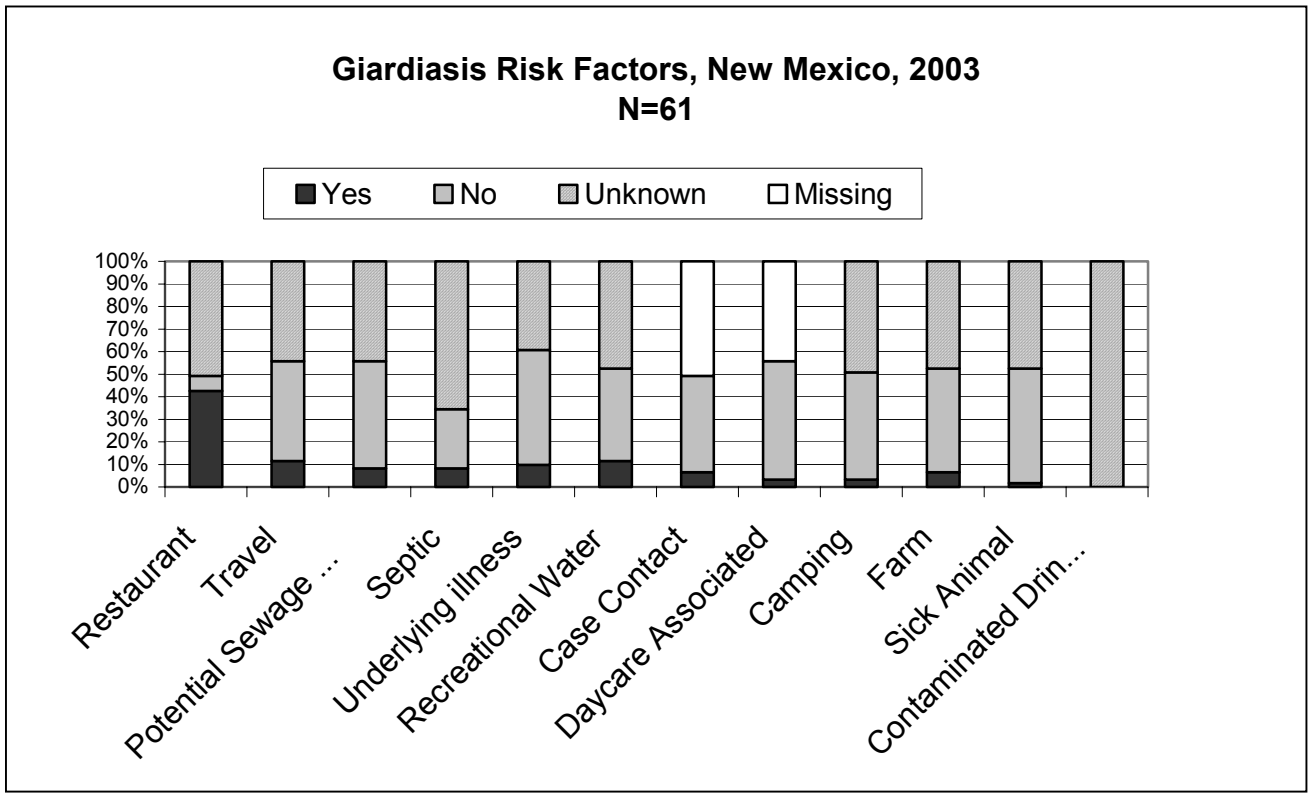
No infections have been causally linked to this risk factor

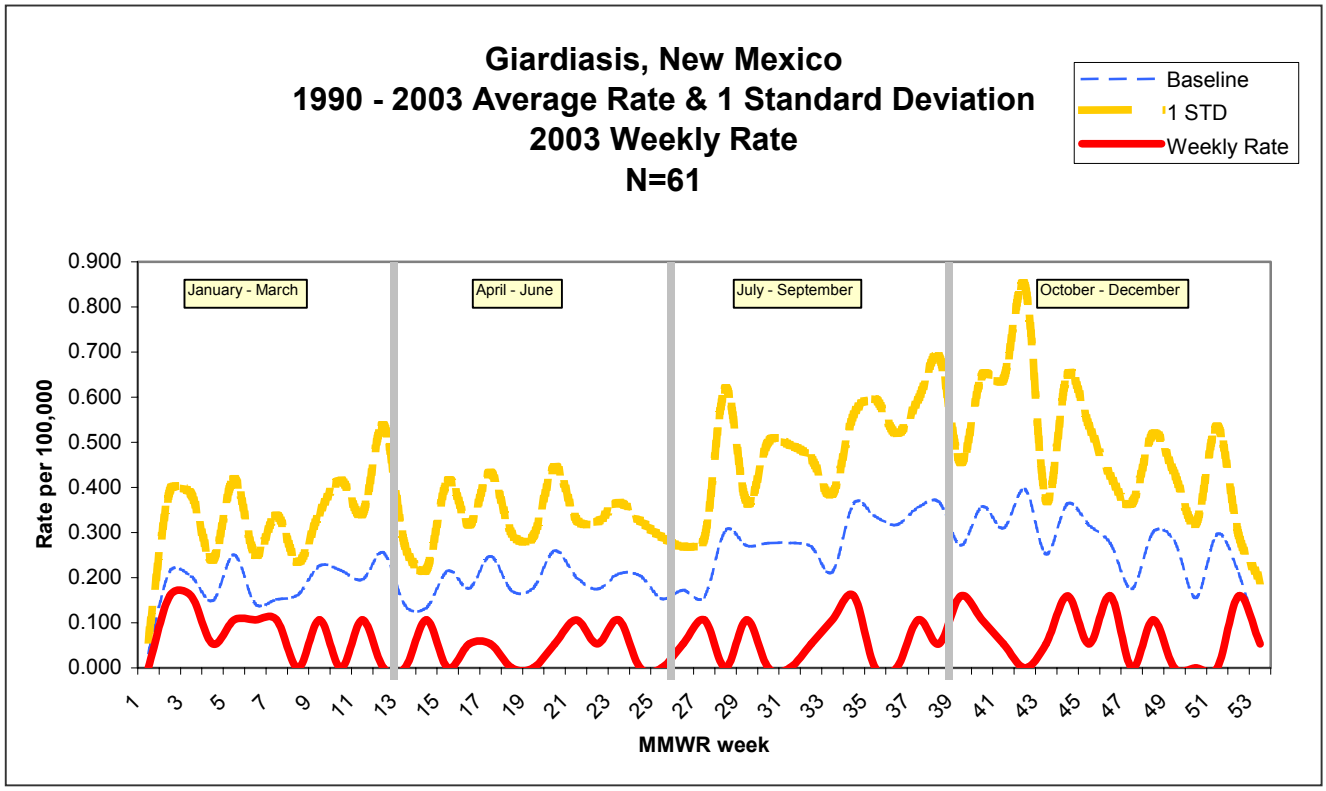


*includes those who report exposure to raw sewage, or have a home septic system or cesspool.

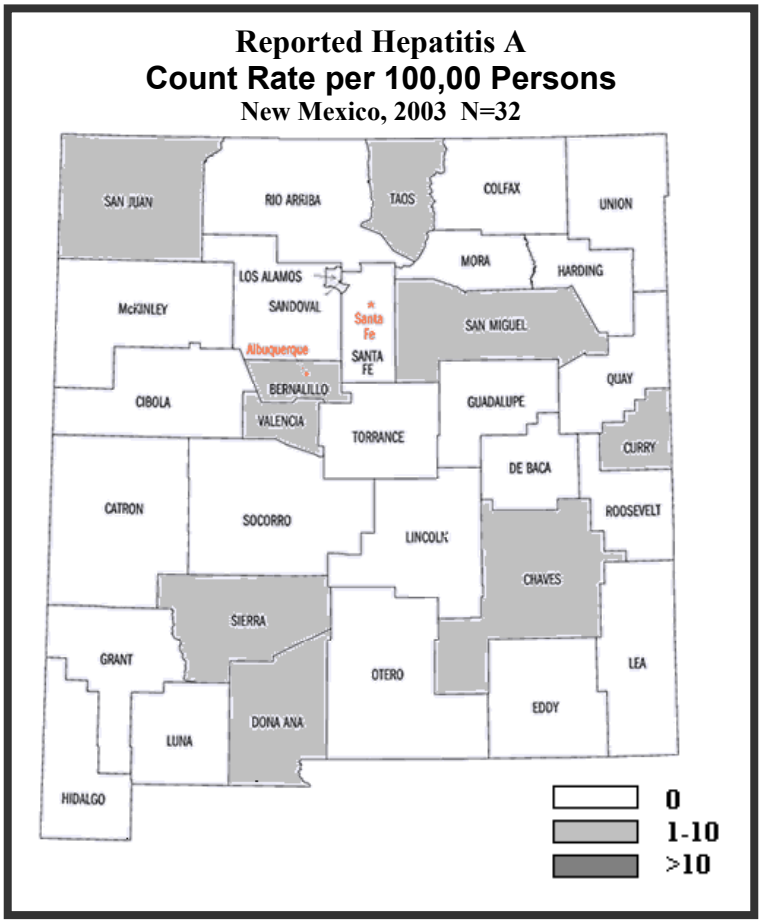
No infections have been causally linked to this risk factor

Reported Giardiasis, New Mexico, 2003
Weekly Surveillance and Risk Factor Information
Total reported cases: 61





Reported Hepatitis A infection in New Mexico, 2003
Total reported cases: 28

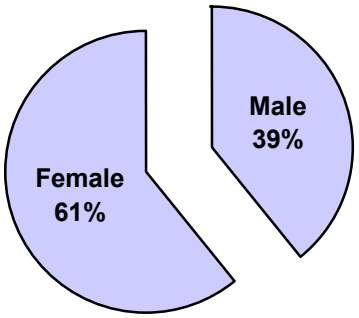


Special points of interest:

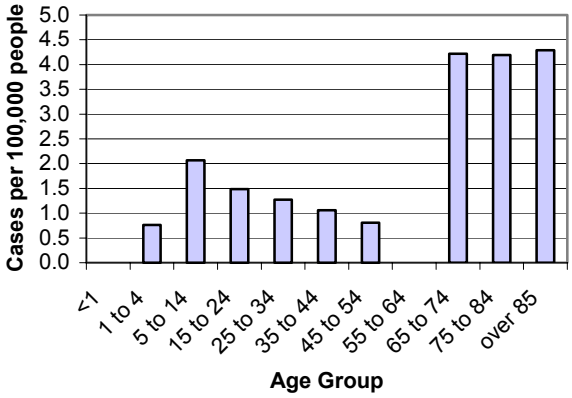
- The NM rate was well above the national rate until 1996, when targeted immunization strategies decreased rates statewide
- Most counties reported no cases in 2002 & 2003
- Approximately 45% reported international travel

Reported Hepatitis A infection, New Mexico, 2003
General Case Characteristics & Possible Water Exposures
Total reported cases: 28

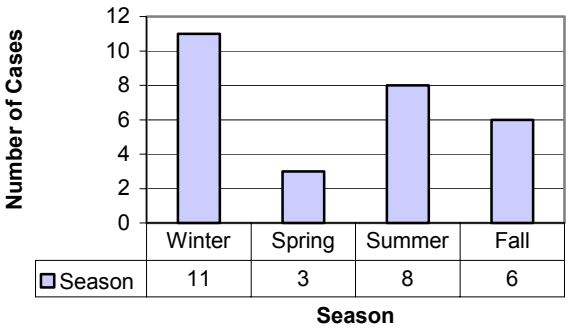
Reported Cases by Gender



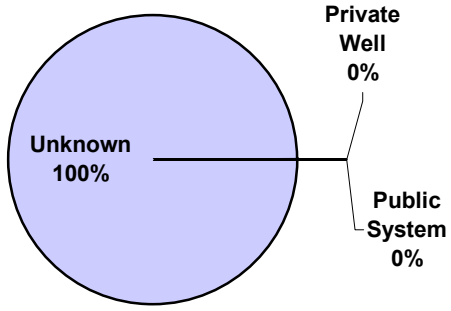
Reported Rates by Agegroup



Season of Onset

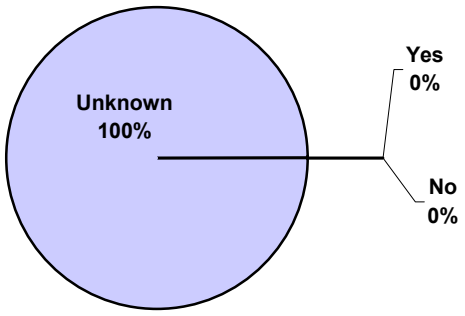


Residential Water Source



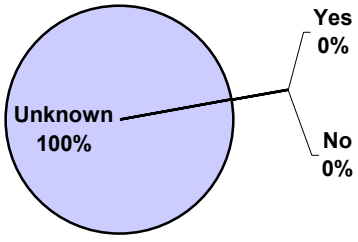
No infections have been causally linked to this risk factor

Recreational Water Exposure



No infections have been causally linked to this risk factor

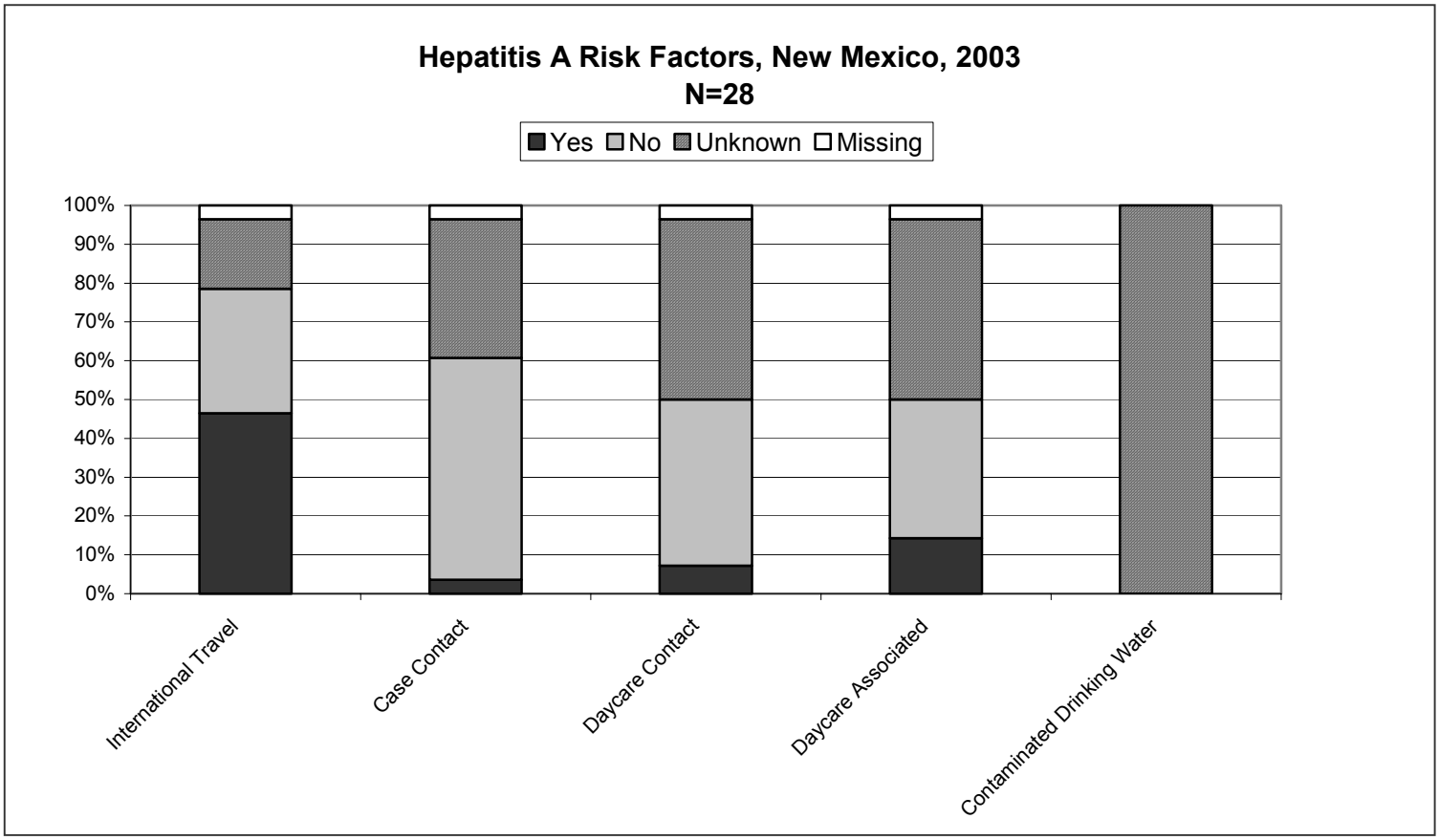
Potential Sewage Exposure*

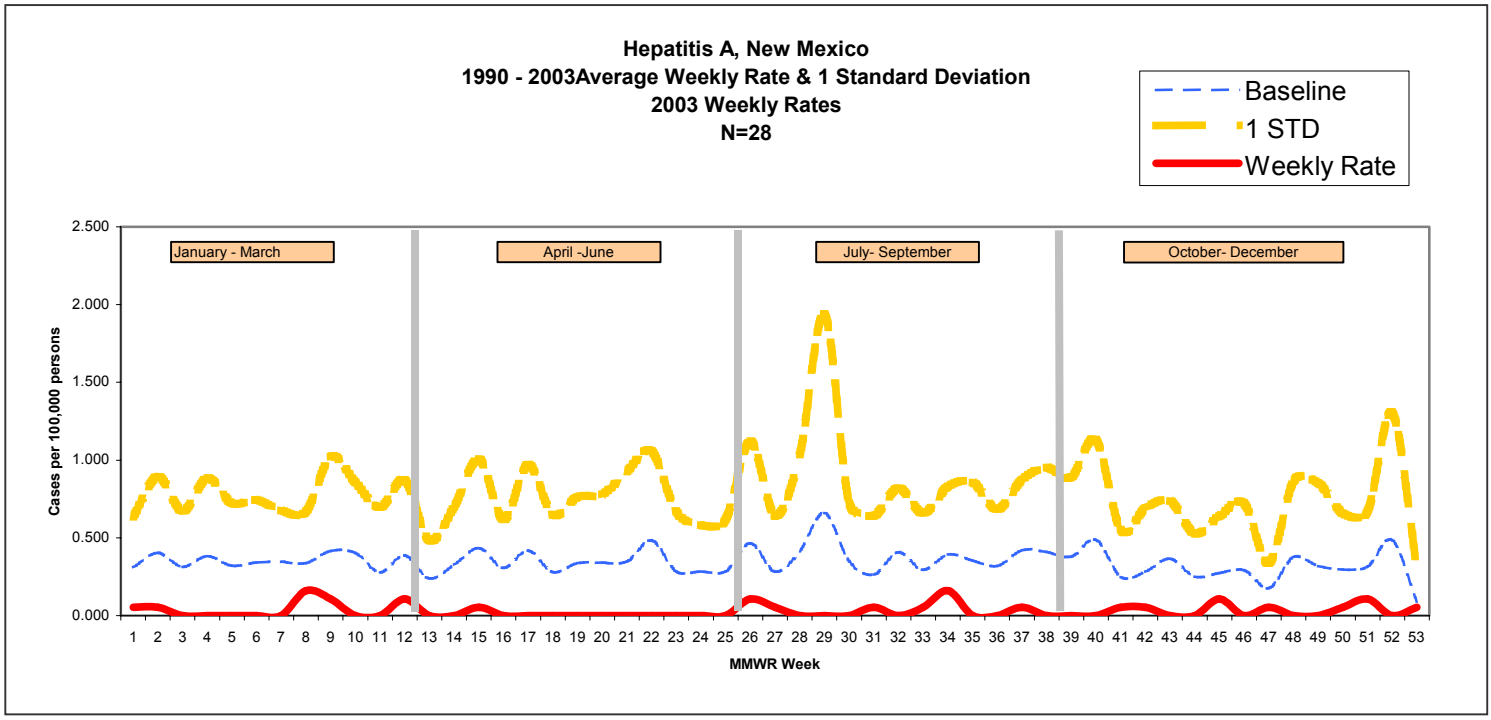


*includes those who report exposure to raw sewage, or have a home septic system or cesspool.

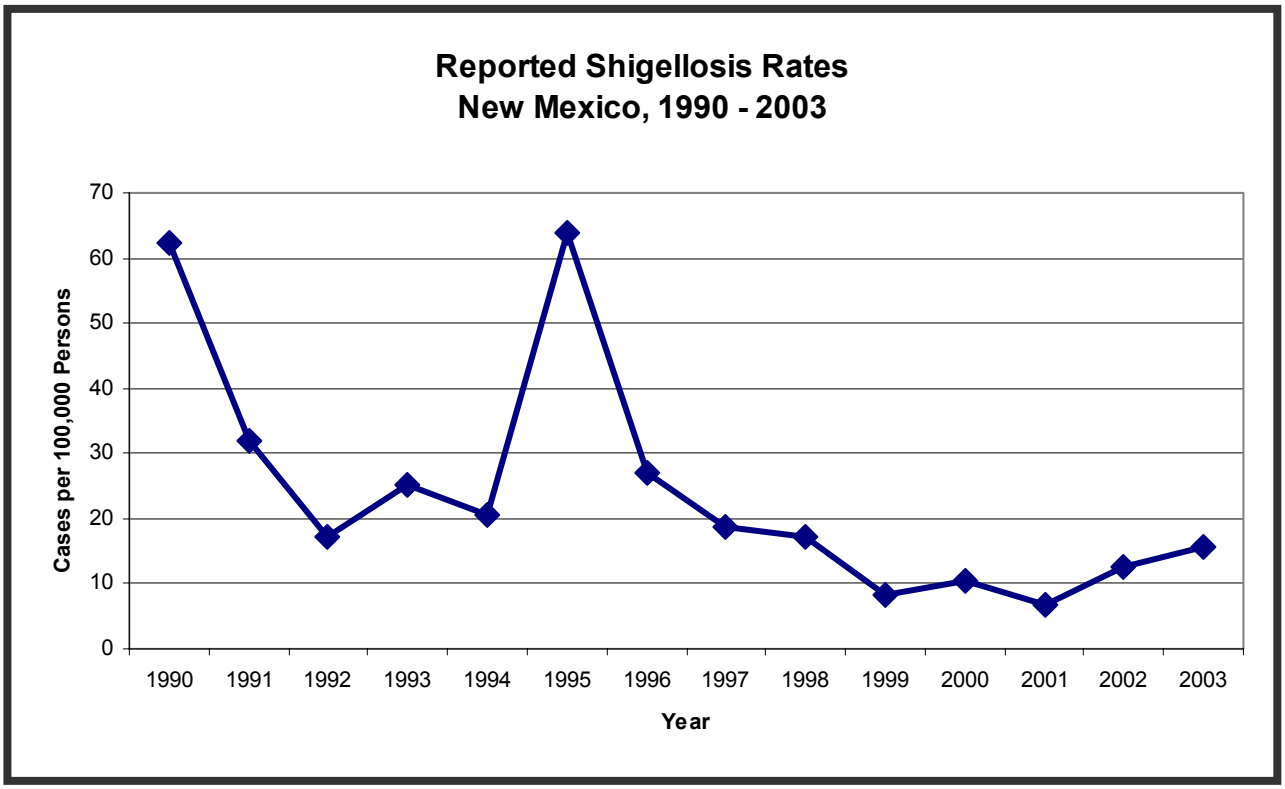
No infections have been causally linked to this risk factor

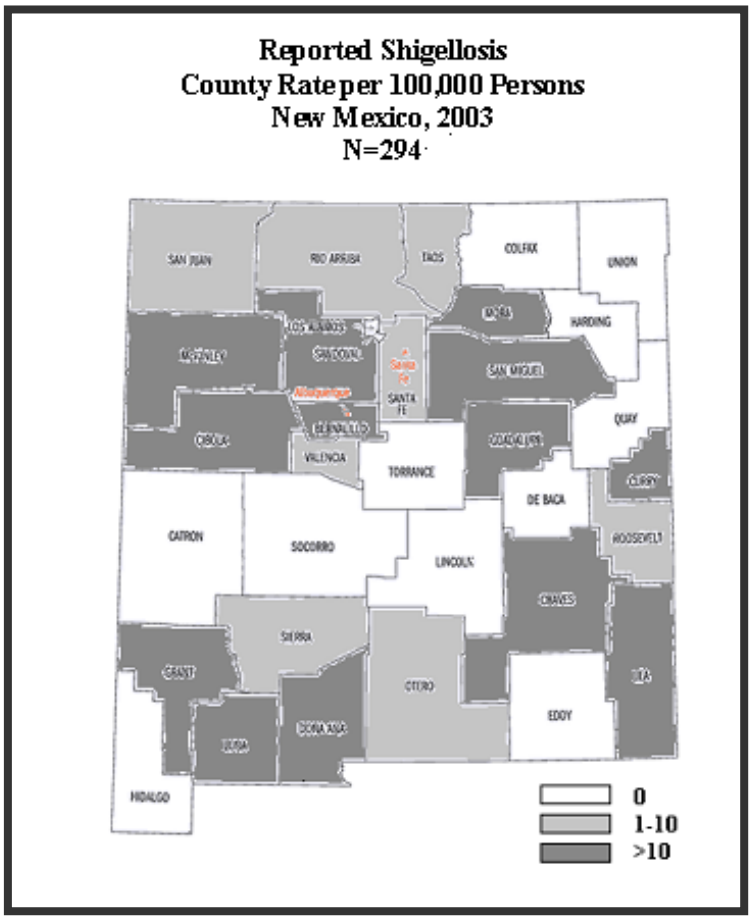
Reported Hepatitis A infection, New Mexico, 2003
Weekly Surveillance and Risk Factor Information
Total reported cases: 28





Reported Shigellosis in New Mexico, 2003
Total reported cases: 294



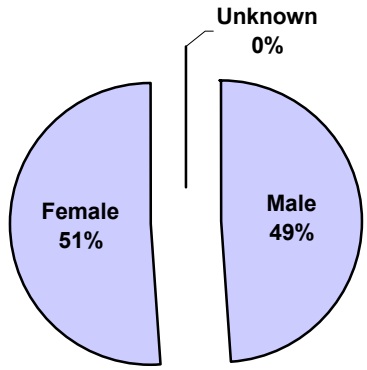


Special points of interest:

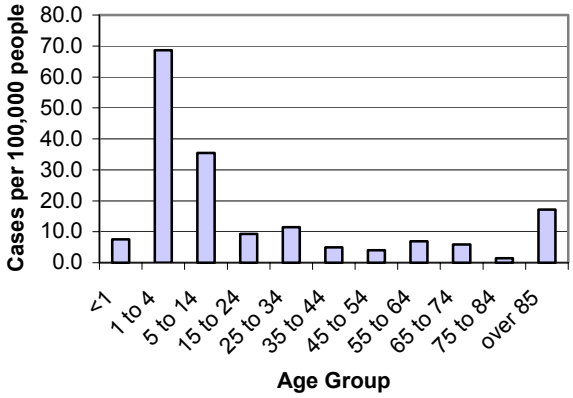
- The reported Shigellosis trend is relatively stable with the exception of an extreme rate in 1995
- McKinley County seems to be disproportionately affected by shigellosis
- Most infections occurred in fall months
- Children 1-5 have the most reported cases

Reported Shigellosis, New Mexico, 2003
General Case Characteristics & Possible Water Exposures
Total reported cases: 294

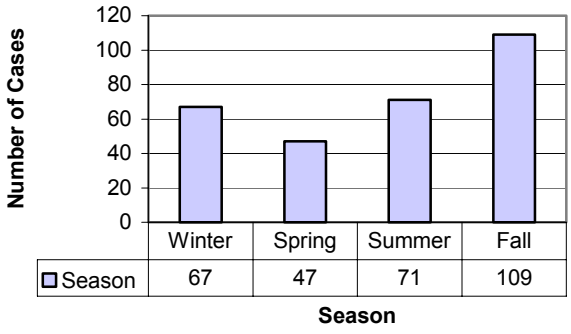
Reported Cases by Gender



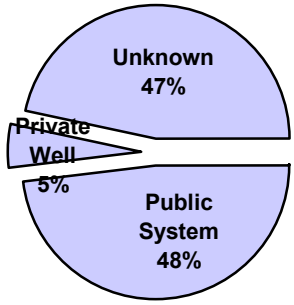
Reported Rates by Agegroup



Season of Onset

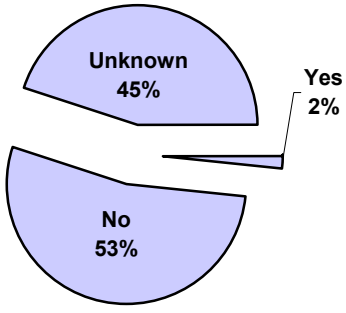


Residential Water Source



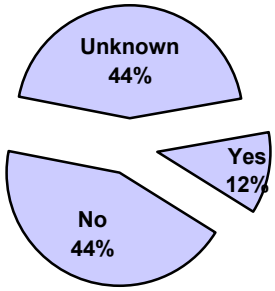
No infections have been causally linked to this risk factor

Recreational Water Exposure



No infections have been causally linked to this risk factor

Potential Sewage Exposure*



*includes those who report exposure to raw sewage, or have a home septic system or cesspool.

No infections have been causally linked to this risk factor

Reported Shigellosis, New Mexico, 2003
Weekly Surveillance and Risk Factor Information
Total reported cases: 294