

MONTHLY COMMUNICABLE DISEASE REPORT

SEPTEMBER 2023

Volume 7, Issue 9: October 16, 2023

SHIGA TOXIN-PRODUCING *E. COLI*

Escherichia coli (*E. coli*) are a large and diverse group of bacteria. Many strains are harmless and are part of the normal intestinal flora of humans and animals. Other types may cause diverse illnesses including urinary tract infections, respiratory infections and pneumonia, and meningitis.

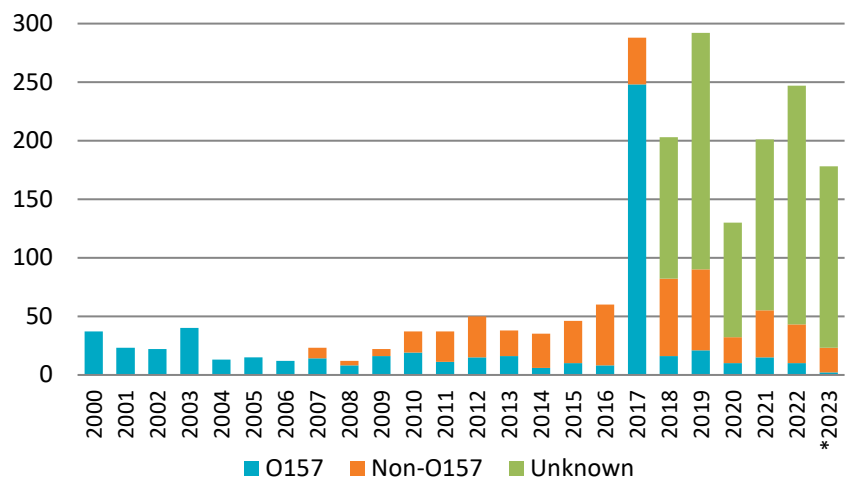
Shiga toxin-producing *E. coli* (STEC) are one of six types of *E. coli* that cause diarrhea, stomach cramps and vomiting. STEC, also referred to as entero-hemorrhagic *E. coli* (EHEC) or verocytotoxic *E. coli* (VTEC), are classified into serogroups based on the O antigen. STEC produce two types of Shiga toxins (Stx1, Stx2).

E. coli O157 was the first serogroup recognized to cause disease and remains the most commonly reported serogroup in the United States. Increased use of culture independent diagnostic tests (CIDT) for Shiga toxins has resulted in more frequent identification of other serogroups. Although [clinical laboratories](#) test for Shiga toxin, specimens must still be sent to public health laboratories for full serogroup identification.

In 2020, 9,922 cases of STEC were reported nationally. However, the Centers for Disease Control and Prevention (CDC) estimates that [STEC causes about 265,000 illnesses per year](#). There were 220 STEC reports among San Diego County residents in 2022. In 2018, the [CSTE case definition](#) was [updated](#) to include clinically compatible illness in a person with a positive result from a CIDT without culture confirmation. These cases, not included in case counts before 2018, are considered probable and account for the increase in cases in 2018 and the large number with unknown serogroup.

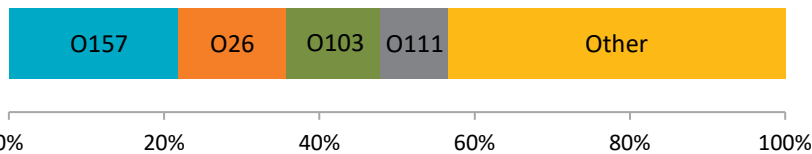
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Figure 1. Shiga Toxin-Producing *E. coli* (STEC) Cases, San Diego County, 1993-2023*



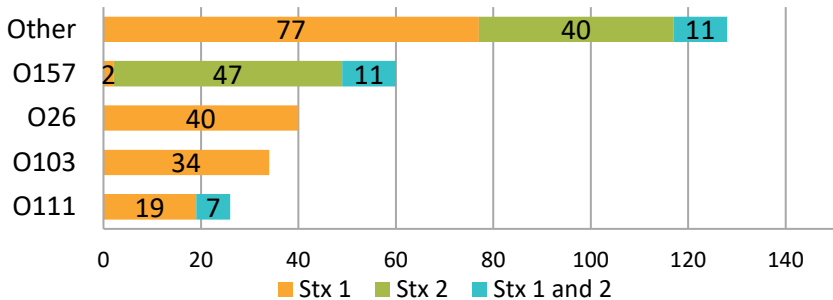
*2023 data are year-to-date; current as of 9/25/2023. Data are provisional and subject to change as additional information becomes available. Data are grouped by CDC disease years. Data are limited to San Diego County residents who meet the case definition. The case definition changed in 2018 to include cases detected by culture-independent diagnostic testing, which does not provide serogroup. In 2017, there was a large outbreak of *E. coli* O157 in a military population.

Figure 2. STEC Serogroups, San Diego County, 2018-2022 N=297



Includes only cases where serogroup was identified. O157 (n=65), O26 (n=41), O103 (n=36), O111(n=26). Other includes O121 (n=3), O145 (n=5), and those where the serogroup was not O26, O103, O111, O121, O145, or O157 (n=121).

Figure 3. Common STEC Serogroups by Shiga Toxin (Stx) Type, San Diego County, 2018-2022 (N=288)



Includes only cases where serogroup was identified AND where complete Stx information was available. Other includes O121 (n=3), O145 (n=5), and those where the serogroup was not O26, O103, O111, O121, O145, or O157 (n=120).

The Monthly Communicable Disease Surveillance Report is a publication of the County of San Diego Public Health Services Epidemiology and Immunization Services Branch (EISB). EISB identifies, investigates, registers, and evaluates communicable, reportable, and emerging diseases and conditions to protect the health of the community. The purpose of this report is to present trends in communicable disease in San Diego County. To subscribe to this report, visit the [Data and Reports](#) page on the Epidemiology Program website (www.sdepi.org) and click on the subscribe link.

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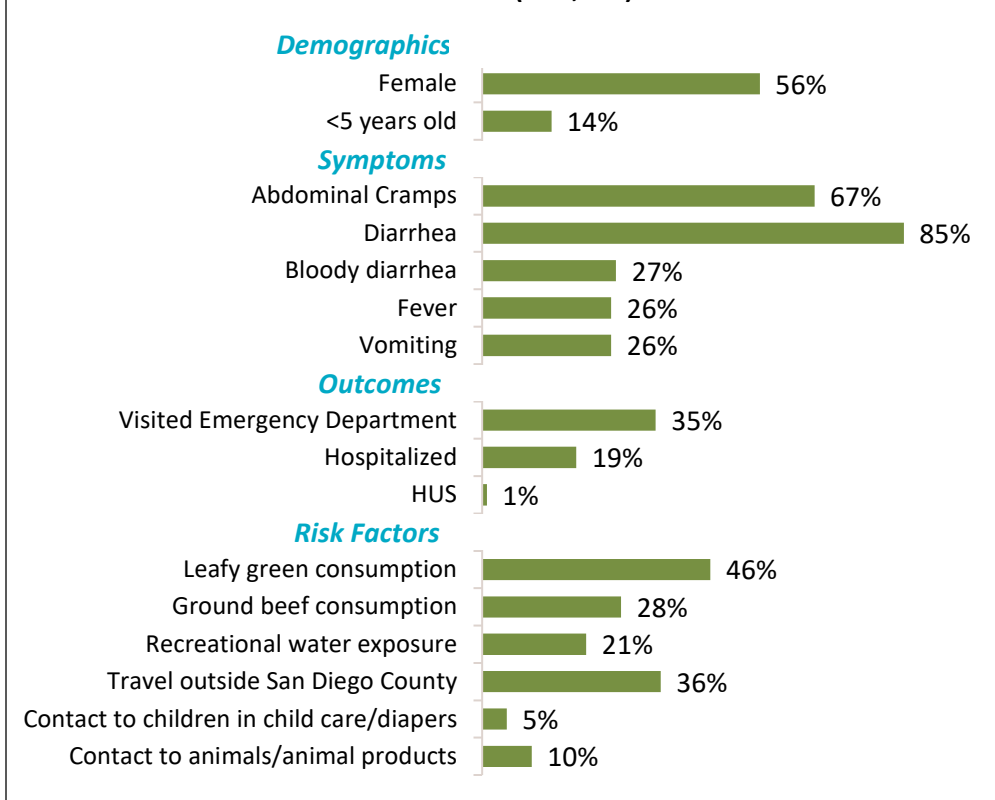
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SHIGA TOXIN-PRODUCING *E. COLI* (STEC), continued

Symptoms of STEC infection usually begin 3-4 days after exposure and can include diarrhea, severe stomach cramps, and vomiting. Diarrhea is often bloody. Some people may experience a fever, although it is usually not very high. Most people recover within a week, however, infections can lead to severe illness requiring hospitalization. An estimated 5-10% develop a life-threatening complication known as hemolytic uremic syndrome (HUS), characterized by decreased urination, fatigue, and anemia. In San Diego County from 2018-2022, there were 11 non-outbreak and 4 outbreak-associated cases of post-STEC HUS (1.4%) reported; five were identified as O157 and 2 as *E. coli* not O26, O103, O111, O121, O145, or O157. Young children and the elderly are at increased risk of severe infection, including HUS. Antibiotic treatment of STEC cases is [usually not recommended](#) due to potentially [increased risk of HUS](#).

Although non-O157 STEC can also cause HUS, in general, non-O157 STEC infections are less severe. In addition, strains of STEC producing Stx2 tend to cause more serious illness. O157 bacteria usually produce Stx2 alone or Stx1 and Stx2, whereas other common serogroups, such as O103, almost exclusively produce Stx1 and usually cause milder illness. In San Diego County, 69% of O157 cases between 2018-2022 had bloody diarrhea compared to 30% of non-O157 cases. Also, 25% of O157 cases were hospitalized compared to 12% of non-O157 cases.

Figure 4. Select Characteristics of STEC Cases, San Diego County, 2018-2022 (N=1,063)



Denominators for characteristics are cases with available information. Risk factors are potential exposures either elicited by standardized questions or mentioned by case-patients, but not confirmed sources of infection.

Resources

- [Centers for Disease Control and Prevention \(CDC\) E. coli website](#)
- [United States Department of Agriculture Food Safety and Inspection Service E. coli website](#)
- [CDC E. coli Outbreak Investigations website](#)
- [California Department of Public Health Shiga Toxin-Producing E. coli website](#)

Suggested citation: Springfield O, Nelson JA. Shiga Toxin-Producing *E. coli*. County of San Diego Monthly Communicable Disease Report 2023; 7(9):1-2.

E. coli O157 was first recognized as a human pathogen, in 1982, during an outbreak of bloody diarrhea traced to beef consumption and has since been associated with raw or undercooked beef products. *E. coli* O157 live naturally in the intestines of healthy cattle and ruminants and can also be transmitted to humans through animal contact or contact with contaminated surfaces. In 2019, the County of San Diego investigated an outbreak of *E. coli* O157 related to contact with animals at the San Diego County Fair. The outbreak involved 13 cases, including four pediatric cases. Three people were hospitalized, and [one child died due to the illness](#). All individuals reported visiting the animal areas or had other animal contact at the fair.

Contaminated raw produce has also been a frequent source of outbreaks. National outbreaks of O157 linked to consumption of romaine lettuce occurred in [2018](#) and [2019](#). Both outbreaks included San Diego County residents.

A variety of other products, including [cheese](#), [flour](#), [cookie dough](#), and [nuts](#), have caused outbreaks. Recent national outbreaks have included food items such as [frozen falafel](#), [cake mix](#), and [SoyNut Butter](#).

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Table 1. Select Reportable Diseases		2023			Prior Years		
		Sept.	August	January – Sept. (YTD)	2022 YTD	Avg YTD, 2020-2022	2022 Total
Disease and Case Inclusion Criteria (C,P,S)							
Botulism (Foodborne, Infant, Wound, Other)	C,P	0	0	0	3	2.0	5
Brucellosis	C,P	1	0	2	3	1.7	5
Campylobacteriosis	C,P	114	133	884	706	634.3	955
<i>Candida auris</i>	C	9	16	76	32	12.0	55
Chickenpox, Hospitalization or Death	C,P	0	2	7	0	1.0	1
Chikungunya	C,P	0	0	0	2	0.7	2
Coccidioidomycosis	C	6	32	316	359	347.3	426
Cryptosporidiosis	C,P	11	17	98	67	45.7	93
Dengue Virus Infection	C,P	4	4	15	11	5.7	14
Encephalitis, All	C	1	2	18	18	25.0	27
Giardiasis	C,P	13	21	163	153	130.7	191
Hepatitis A, Acute	C	0	3	35	21	14.7	30
Hepatitis B, Acute	C	2	0	9	11	11.0	12
Hepatitis B, Chronic	C,P	55	61	576	684	580.3	904
Hepatitis C, Acute	C,P	0	0	52	66	52.0	88
Hepatitis C, Chronic	C,P	271	284	1,879	2,366	2,672.0	2,943
Legionellosis	C	2	6	68	62	44.3	84
Listeriosis	C	2	2	12	16	11.7	18
Lyme Disease	C,P	2	3	12	5	7.3	7
Malaria	C	5	1	9	8	6.3	11
Measles (Rubeola)	C	0	0	0	0	0.0	0
Meningitis, Aseptic/Viral	C,P,S	3	3	40	55	48.7	75
Meningitis, Bacterial	C,P,S	2	5	28	27	21.0	33
Meningitis, Other/Unknown	C	1	3	15	17	21.7	23
Meningococcal Disease	C,P	0	0	4	1	2.0	2
Mumps	C,P	0	0	0	3	6.7	3
Pertussis	C,P	2	8	64	54	104.3	102
Rabies, Animal	C	1	3	7	3	4.3	3
Rocky Mountain Spotted Fever	C,P	0	0	3	3	2.3	3
Salmonellosis (Non-Typhoid/Non-Paratyphoid)	C,P	69	70	461	527	436.7	680
Shiga toxin-Producing <i>E. coli</i> (including O157)	C,P	20	17	144	174	127.0	208
Shigellosis	C,P	57	59	346	362	247.0	527
Typhoid Fever	C,P	0	2	5	12	8.3	13
Vibriosis	C,P	9	4	31	30	35.0	38
West Nile Virus Infection	C,P	0	1	1	3	2.3	3
Yersiniosis	C,P	11	8	56	33	24.7	46
Zika Virus	C,P	0	0	0	1	0.3	1

Case counts are provisional and subject to change as additional information becomes available. Cases are grouped into calendar months and calendar years on the basis of the earliest of the following dates: onset, lab specimen collection, diagnosis, death, and report received. Counts may differ from previously or subsequently reported counts due to differences in inclusion or grouping criteria, late reporting, or updated case information. Inclusion criteria (C,P,S = Confirmed, Probable, Suspect) based on Council of State and Territorial Epidemiologists/Centers for Disease Control and Prevention (CSTE/CDC) surveillance case criteria. Includes San Diego County resident cases only.

[San Diego County Sexually Transmitted Infection Data](#) | [San Diego County Tuberculosis Data](#)

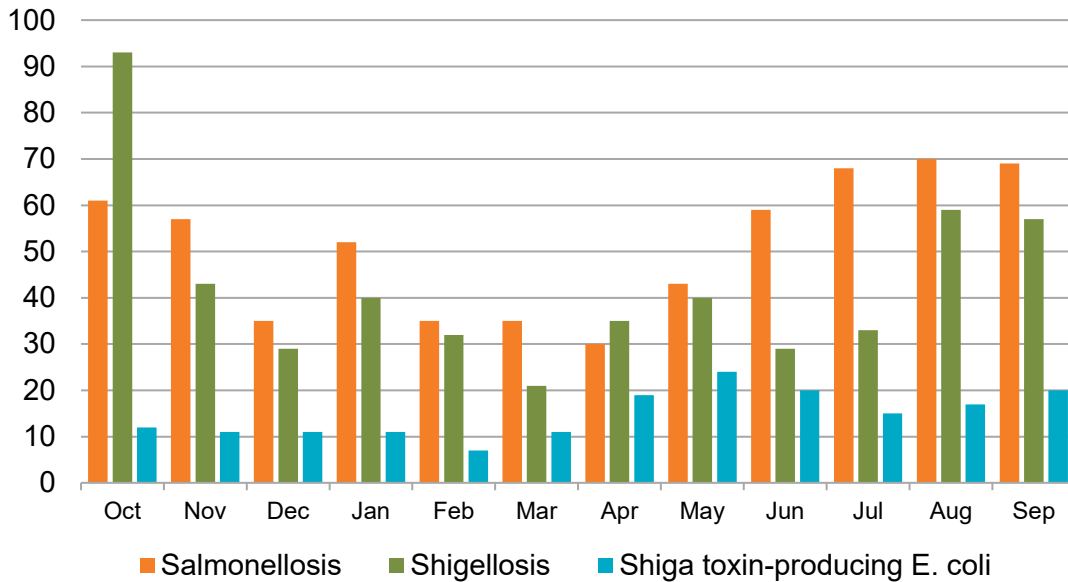


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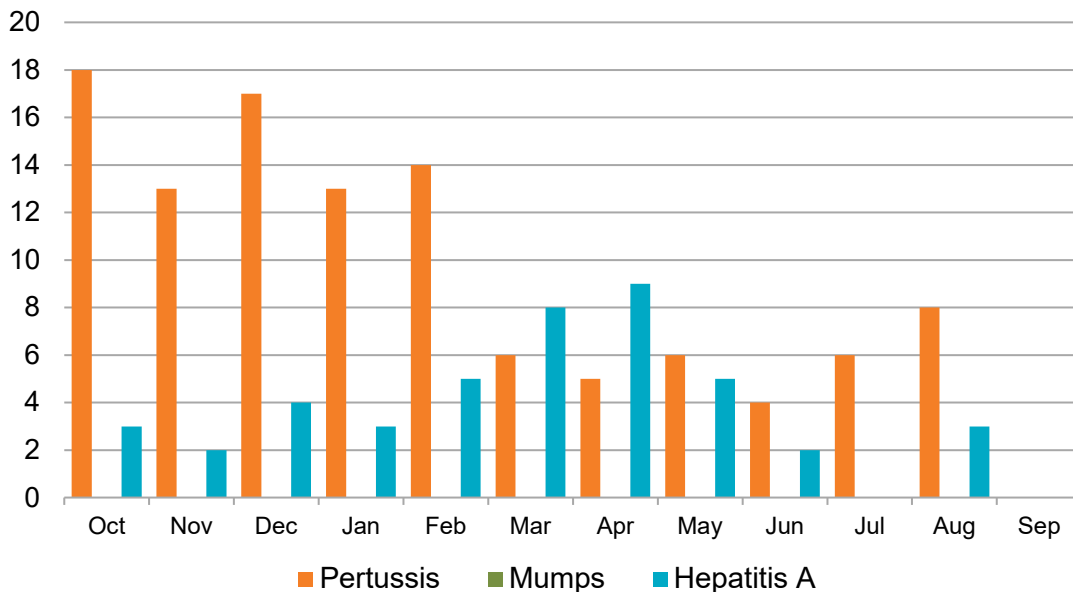
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**Figure 5. Select Enteric Infections by Month
October 2022 – September 2023**



**Figure 6. Select Vaccine-Preventable Infections by Month
October 2022 – September 2023**



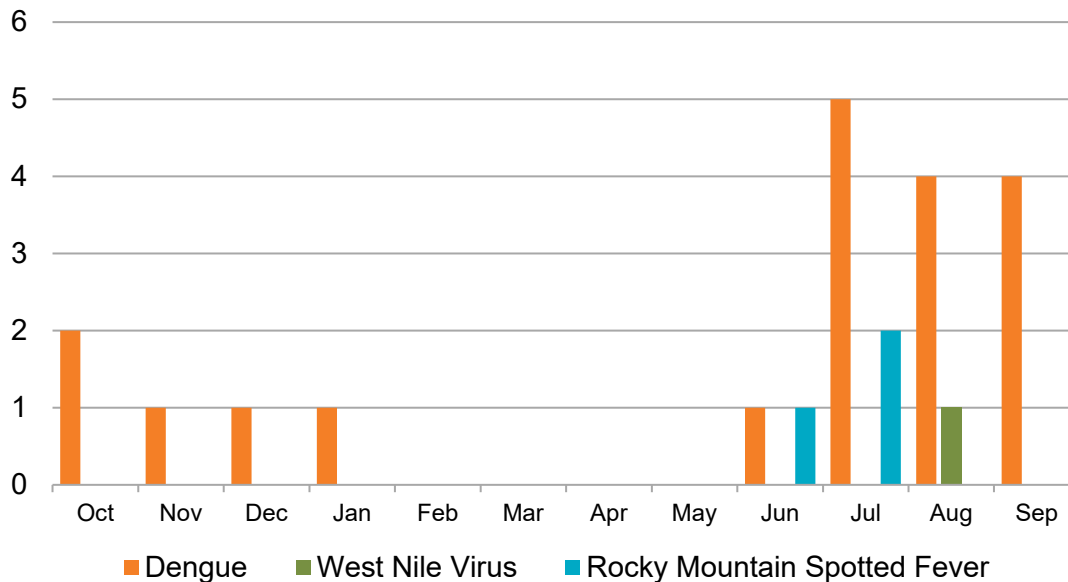
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**Figure 7. Select Vector-Borne Infections by Month
October 2022 – September 2023**



All of the dengue cases are travel-associated. For more information on West Nile virus, see the [County West Nile virus webpage](#). **Case counts are provisional and subject to change as additional information becomes available.** Cases are grouped into calendar months and calendar years on the basis of the earliest of the following dates: onset, lab specimen collection, diagnosis, death, and report received. Counts may differ from previously or subsequently reported counts due to differences in inclusion or grouping criteria, late reporting, or updated case information. Inclusion criteria (C,P,S = Confirmed, Probable, Suspect) based on Council of State and Territorial Epidemiologists/Centers for Disease Control and Prevention (CSTE/CDC) surveillance case criteria.

Disease Reporting in San Diego County

San Diego County communicable disease surveillance is a collaborative effort among Public Health Services, hospitals, medical providers, laboratories, and the [San Diego Health Connect](#) Health Information Exchange (HIE). The data presented in this report are the result of this effort.

Reporting is crucial for disease surveillance and detection of disease outbreaks. Under the California Code of Regulations, Title 17 (Sections [2500](#), [2505](#), and [2508](#)), public health professionals, medical providers, laboratories, schools, and others are mandated to report more than 80 diseases or conditions to San Diego County Health and Human Services Agency.

To report a communicable disease, contact the Epidemiology Program by phone at (619) 692-8499 or download and print a Confidential Morbidity Report form and fax it to (858) 715-6458. For urgent matters on evenings, weekends or holidays, dial (858) 565-5255 and ask for the Epidemiology Program duty officer. For more information, including a complete list of reportable diseases and conditions in California, visit the Epidemiology Program website, www.sdepi.org.

Tuberculosis, sexually transmitted infections, and HIV disease are covered by other programs within Public Health Services. For information about reporting and data related to these conditions, search for the relevant program on the Public Health Services website, <http://www.sandiegocounty.gov/content/sdc/hhsa/programs/phs.html>.