

Salmonellosis, Orange County, 2011 – 2020



Background

Salmonellosis is an infection caused by *Salmonella* bacteria. Illness usually develops 12 to 72 hours after infection, and symptoms most commonly include diarrhea, fever and abdominal cramps. Most people recover in 4 to 7 days without treatment, and antibiotics are only recommended for more severe cases. There are over 2000 different strains of *Salmonella* bacteria that can infect humans. The most common sources of infection are eating or preparing contaminated food and contact with animals. *Salmonella* bacteria also can be spread person-to-person and, rarely, through contaminated water. Since animals may carry *Salmonella*, foods of animal origin must be handled properly to avoid contamination of surfaces in the kitchen and cooked thoroughly to kill the bacteria. Animals kept as pets can also be a source of *Salmonella*. Outbreaks have resulted from reptiles including small turtles, (the sale of which was banned in California in 1972 and in the U.S. in 1975) iguanas and young birds such as chicks or ducklings.

Whole genome sequencing (WGS) identifies DNA differences between bacteria. WGS significantly improves the detection of foodborne outbreaks by showing how close different strains of *Salmonella* are related. WGS is much more precise than the previously used Pulse Field Gel Electrophoresis (PFGE).

Key Points:

- 2020 had the lowest overall incidence rate with 10.2 cases per 100,000 Orange County residents. 2015 saw the highest overall rate, with 15.5 cases per 100,000 residents (**Table 1**)
- Salmonellosis is reported most frequently in late summer and early fall. This seasonality is demonstrated in the last 10 years with most reports in July–October. (**Figure 3**)
- OC case counts are highest in larger more dense cities like Anaheim and Irvine (**Figure 4**)
- The top 3 serotypes in Orange County are Enteritidis, Newport and Typhimurium consistent with national trends (https://www.cdc.gov/mmwr/volumes/68/wr/mm6816a2.htm?s_cid=mm6816a2_w) (**Figure 1**)
- Probable impacts from COVID on *Salmonella* epidemiology:
 - With fewer people seeing providers due to the COVID-19 lockdown, OC saw a decrease in cases from 2019 to 2020 (**Table 2**)
 - Historically *Salmonella* cases are foodborne related, however reported animal exposures increased in 2020. (**Figure 1**)

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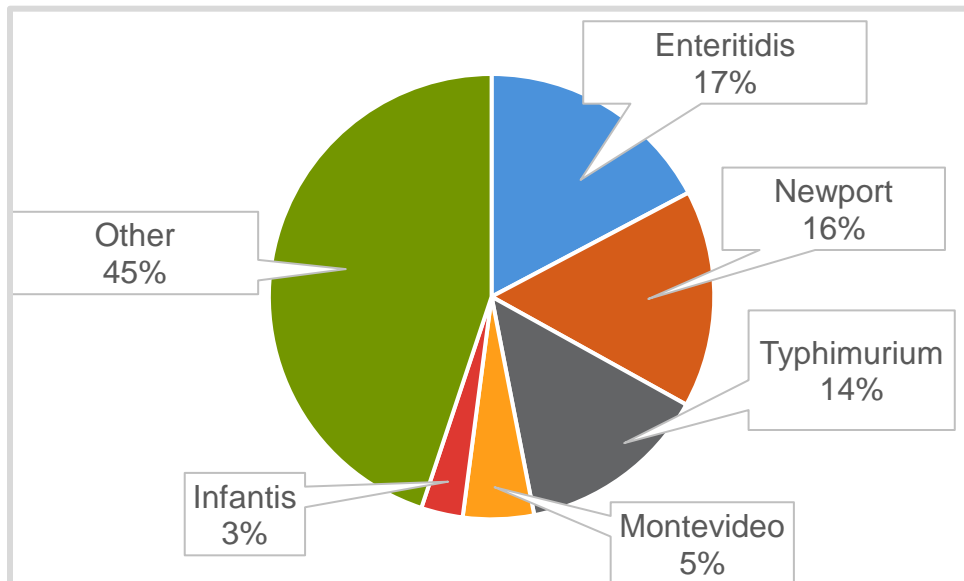
In the last 10 years, the rates of Salmonellosis in Orange County have ranged from a high of 17.3 in 2012 to a low of 10.2 in 2020. 2020 had markedly lower-case numbers presumably due to the COVID epidemic. Some ill individuals in 2020 reported providers refusing to see them based on symptoms. It is possible other individuals did not seek a provider due to the COVID lockdown. See **Table 1**.

Table 1. Salmonellosis Rates per 100,000 population, Orange County, 2011-2020

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Orange County	10.0	14.2	12.6	13.2	15.6	11.0	11.6	13.5	13.4	10.2
California	10.6	12.2	13.1	13.8	14.3	12.1	13.7	15.8	14.2	-
United States	16.8	17.3	16.1	16.1	17.2	16.7	16.7	18.6	17.8	-

The top 5 *Salmonella* serotypes in Orange County are Enteritidis, Newport and Typhimurium, Montevideo and Infantis. These serotypes comprise more than 50% of all cases from 2011-2020 as seen in **Figure 1**.

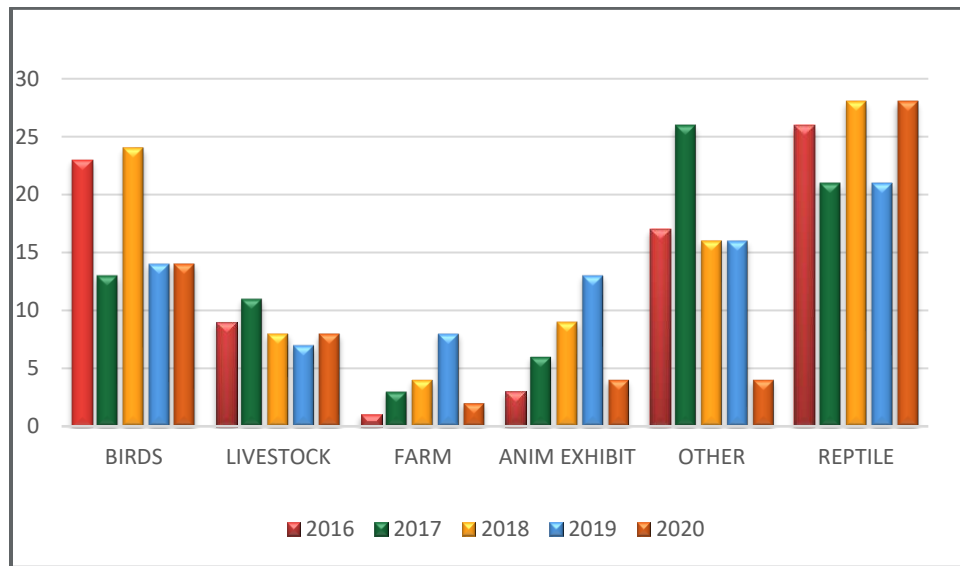
Figure 1. Top 5 Reported Salmonella Serotypes, Orange County, 2011-2020



Since many children were being home schooled during the COVID-19 shutdown, more animals may have been brought into homes for educational or entertainment purposes. **Figure 2** below shows a slight increase in reported exposure to livestock and reptiles in Salmonellosis cases from 2019 to

2020. The decrease in reported farm and animal exhibit reported from 2019 to 2020 is also consistent with the COVID-19 lockdown preventing access to these types of exposures.

Figure 2. Salmonellosis, Animal Exposure reported by Type, Orange County, 2016-2020



Salmonella cases generally increase during the summer and fall months. **Figure 3** shows the total case counts by month for 2011-2020. The highest case count is consistently during late summer, early fall. Figure 2 shows August through October months consistently having higher case counts over the last 5 years. This mirrors trends both state and nationwide.

Figure 3. Salmonellosis Case Count by Create Date, Orange County, 2016-2020

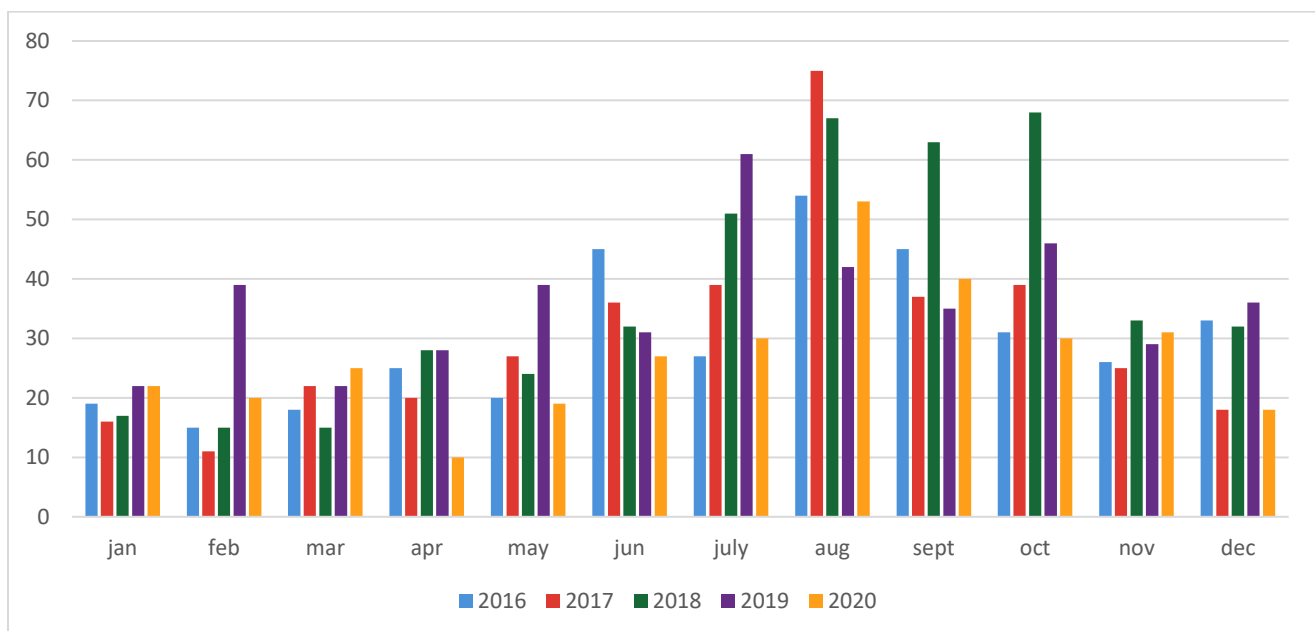
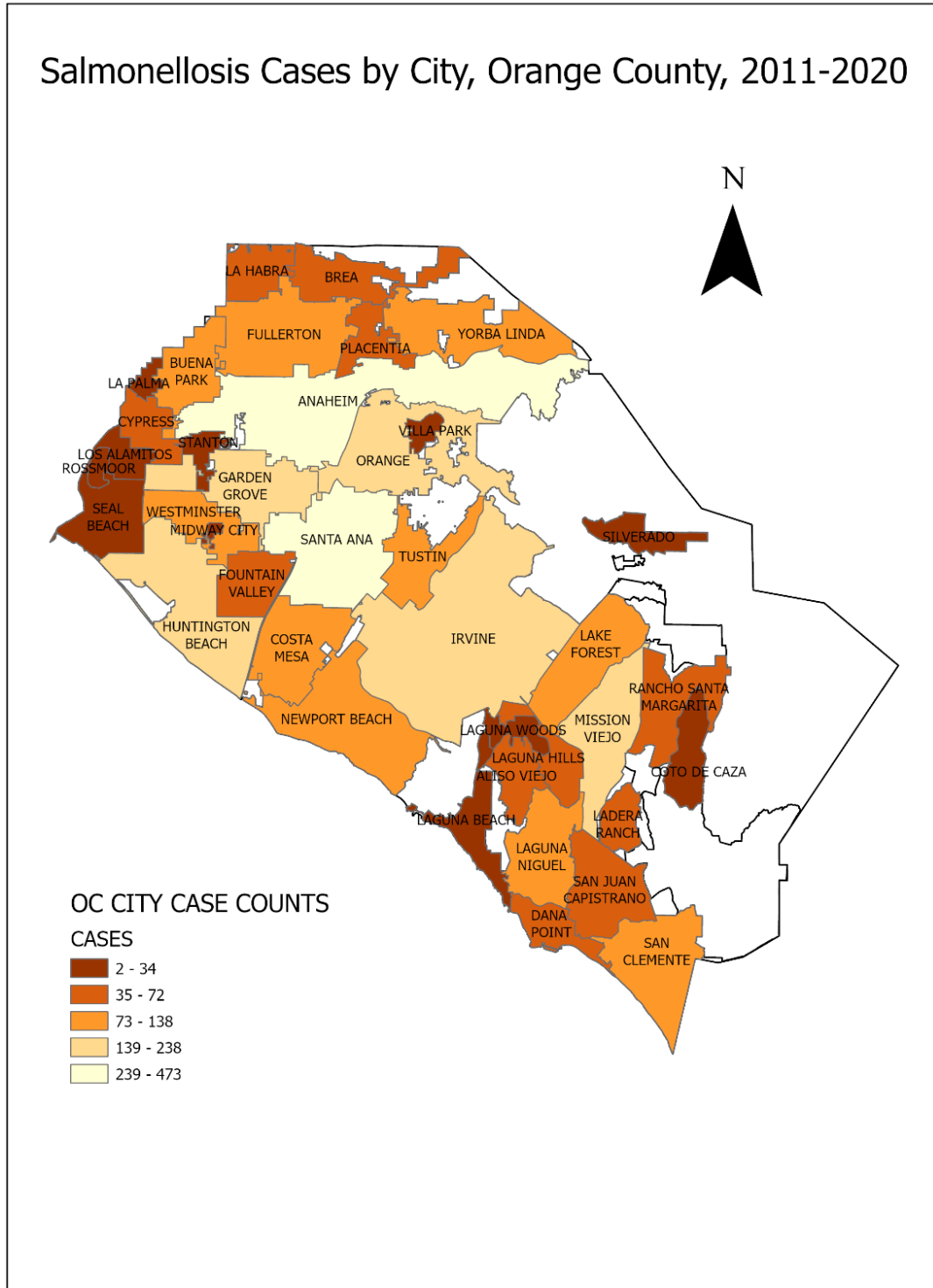


Table 2. Salmonellosis: Orange County Incidence Rates with Gender, Race/Ethnicity, and Age Group, 2011-2020

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Rate	10.4	14.5	12.8	13.3	15.5	11.3	11.5	13.6	13.4	10.2
Gender										
Male	10.1	14	13.5	12.8	14.8	10.8	11	12.8	12.3	8.8
Female	10.7	14.7	12.1	13.8	16.2	11.7	11.9	14.5	14.4	11.6
Unknown	--	--	--	--	--	--	--	--	--	--
Race/ Ethnicity										
White	9.7	12.0	10.8	14.6	16.7	10.9	11.2	5.1	9.7	9.0
Black	13.2	10.8	12.8	--	10.5	--	--	--	20.5	--
Hispanic	9.1	13.1	13.2	12.8	14.5	13.0	11.6	5.1	9.0	7.3
Asian	7.9	8.5	5.9	8.4	6.9	6.8	7.4	5.5	6.5	6.5
Pacific Islander	--	--	--	--	--	--	--	--	--	--
AI/AN*	--	--	--	--	--	--	--	--	--	--
Multiracial	--	--	32.6	8.0	10.4	16.5	14.9	--	--	--
Other/ Unknown	--	--	--	--	--	--	--	--	--	--
Age Group										
Under 1 year	57.3	86.5	49.9	67.4	60.8	49.2	39.9	53.9	49.9	65.2
1-4	29.3	33.3	28.2	36.0	31.8	29.0	30.8	34.7	26.5	21.3
5-9	17.6	24.4	22.9	24.1	20.3	11.2	16.3	12.3	12.2	9.1
10-14	10.0	11.1	12.6	13.1	13.6	13.6	10.1	13.0	7.7	8.4
15-19	6.2	16.6	11.8	8.8	12.6	9.5	10.5	11.1	15.5	8.8
20-24	6.3	9.5	10.2	8.9	12.8	6.1	9.5	13.1	15.1	10.3
25-34	7.8	13.8	10.4	11.8	13.7	9.7	8.0	11.1	13.1	8.5
35-44	7.4	11.0	8.5	9.2	10.7	6.7	8.4	10.0	8.3	8.2
45-54	5.8	9.0	9.4	6.9	11.0	10.2	8.0	8.9	11.5	8.0
55-64	7.7	9.5	10.9	8.5	14.3	8.8	8.6	13.0	15.6	8.4
65 & over	13.7	13.3	13.0	16.4	19.2	13.4	14.0	16.0	11.7	10.8
Unknown	--	--	--	--	--	--	--	--	--	--

Figure 4. Map of Salmonellosis. Orange County, 2011 - 2020

As shown in **Figure 4** below, the geographic areas with the highest density of Salmonella infections are in central/northern Orange County. Most cases are seen in the areas surrounding Anaheim, Irvine and Santa Ana, which are also the county's top 3 most populous cities.



For more information, please visit the California Department of Public Health webpage on [Salmonella](#).