

Salmonellosis

Agent: *Salmonella* (bacteria)

Mode of Transmission: Ingestion of contaminated food or drinking water. Infected persons can spread the bacteria to other persons by not washing their hands properly after going to the bathroom and then handling food that other people will eat. Infection can also occur after eating, smoking, or touching one's mouth if hands are contaminated with the bacteria and not washed well. People can also be infected with *Salmonella* by the feces of some pets, including reptiles and young birds, if hands are not washed well after contact with sick or seemingly healthy infected animals.

Signs/Symptoms: Sudden onset of headache, fever, abdominal pain, diarrhea and sometimes vomiting. Dehydration, especially in older adults and young children, can be a severe complication.

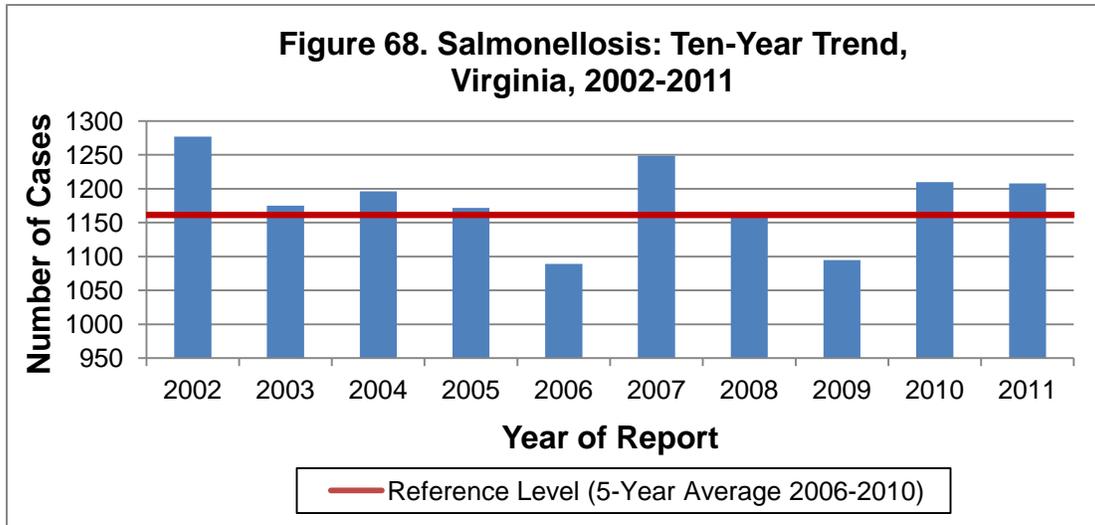
Prevention: Preventive measures should include following proper sanitation methods for food preparation and water supplies, including preventing cross-contamination of food preparation surfaces, maintaining sanitary sewage disposal, excluding infected people from handling food or providing healthcare, prohibiting the sale of small turtles and restricting the sale of other reptiles for pets, and observing proper hand hygiene, including washing hands after handling animals or their feces. Eggs and other animal food products should be cooked thoroughly.

Other Important Information: With approximately 42,000 salmonellosis cases reported each year in the United States, *Salmonella* is one of the leading pathogens that cause foodborne illnesses and result in hospital admissions. The incidence rate is highest among infants and young children. Mortality rates are higher in infants, older adults and people with impaired immune systems.

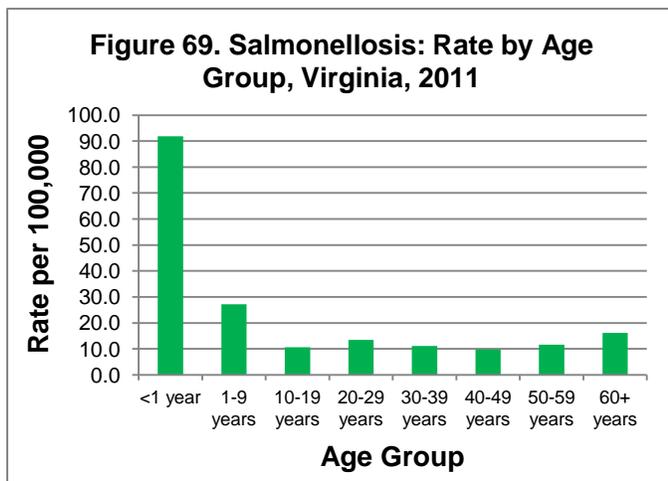
Special Note about Salmonellosis: While more than 2,500 serotypes of *Salmonella* that can cause human illness, two specific *Salmonella* serotypes (*S. Typhi* and *S. Paratyphi**) can lead to typhoidal illness (i.e., typhoid fever and paratyphoid fever, respectively). Typhoidal illness is found only in humans and often results in more serious infections than those seen in other *Salmonella* serotypes; up to 10% of people who are untreated for typhoidal illness may die. Cases of typhoid fever and paratyphoid fever are usually associated with foreign travel and are alike in regard to clinical features and measures necessary to control the spread of infection. However, despite their similarities, paratyphoid fever tends to be milder than typhoid fever, with a lower fatality rate. Due to its severity, typhoid fever is reported as a separate condition in Virginia (see the Typhoid Fever section of this report for more information), while cases of paratyphoid fever are included in the general salmonellosis report.

*Paratyphoid fever can be caused by any of three separate strains of *S. Paratyphi*: *S. Paratyphi* A, *S. schottmuelleri* (also called *S. Paratyphi* B), or *S. hirschfeldii* (also called *S. Paratyphi* C). A separate strain of *S. Paratyphi* B (i.e., *S. Paratyphi* B var. L[+] tartrate [+]) causes illness that resembles non-typhoidal salmonellosis; these cases are treated as general salmonellosis and are not considered to be paratyphoid fever.

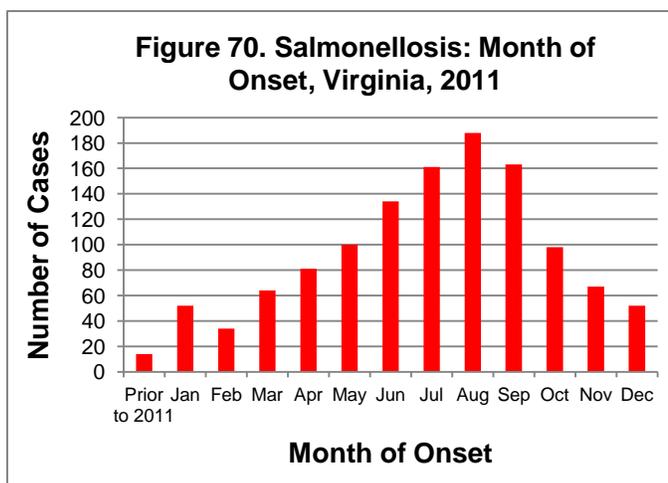
The 1,208 cases of salmonellosis reported in Virginia in 2011 is similar to the 1,210 cases reported in 2010, and represents a 4% increase from the five-year average of 1,162 cases per year (Figure 68).



The highest incidence rate was observed in the <1 year age group (91.9 per 100,000), followed by the 1-9 year age group (27.2 per 100,000) (Figure 69). Rates in the other age groups ranged from 9.8 to 16.2 per 100,000. Although information on race was missing for 39% of the cases, where race was known, incidence was higher in the white population (10.2 per 100,000) than the black and “other” race populations (9.9 and 2.3 per 100,000, respectively). Rates were higher among females than males (15.6 and 14.1 per 100,000, respectively).



By region, the eastern region had the highest incidence rate (18.0 per 100,000). Rates in all other regions ranged from 12.8 to 15.5 per 100,000. While salmonellosis occurs throughout the year, there is a seasonal pattern, with cases more common in the warmer summer months. During 2011, the largest proportion of cases (42%) occurred in the third quarter, peaking in July, August, and September (Figure 70). Among cases reported in 2011, two deaths were attributed to salmonellosis. Both occurred in females in the 60 year and older age group.



Seventeen confirmed salmonellosis outbreaks were reported during 2011. Nine were foodborne outbreaks and the

number of Virginia cases per outbreak ranged from two to 35. Five outbreaks were linked to zoonotic exposures and the number of Virginia cases ranged from one to 11; the associated animal exposures included frogs, turtles, chicks and ducklings, and feeder rodents. The other three salmonellosis outbreaks were attributed to person-to-person transmission. One involved nosocomial transmission of *Salmonella* between two patients in a hospital setting. Of the two remaining outbreaks, one involved five cases among family members living in separate households, while the other resulted from contact between a worker and child associated with a daycare facility. Eight of the 17 *Salmonella* outbreaks involving Virginia residents in 2011 were multi-state outbreaks. See the Outbreaks section of this report for more information.

Serotypes involved in the 2011 outbreaks included Agona, Altona, Berta, Bovismorbificans, Enteritidis, Infantis, Javiana, Newport, Paratyphi B, Paratyphi B var L(+) tartrate + (Java), Rubislaw, Typhimurium, and I 4,[5],12:i:-. For Virginia salmonellosis cases reported in 2011, the most commonly identified serotypes were *Salmonella* ser. Typhimurium and *Salmonella* ser. Enteritidis (Table 11).

Table 11. Number and Percent of *Salmonella* Infections by Serotype, Virginia, 2011

Serotype Causing Infection	Number	Percent	Serotype Causing Infection	Number	Percent
<i>S. ser</i> Typhimurium	220	18.1%	<i>S. ser</i> Heidelberg	23	1.9%
<i>S. ser</i> Enteritidis	220	18.1%	<i>S. ser</i> I 4, 12:i:-	22	1.8%
<i>S. ser</i> Newport	158	13.0%	<i>S. ser</i> infantis	21	1.7%
<i>S. ser</i> Javiana	86	7.1%	All Others	300	24.7%
<i>S. ser</i> Bareilly	35	2.9%	Unspecified	98	8.1%
<i>S. ser</i> I 4,[5],12:i:-	34	2.8%	Total*	1,217	
*The total number of serotypes (1,217) is larger than the total number of <i>Salmonella</i> cases (1,208) because a person may be infected with more than one serotype.					

Sixteen cases of paratyphoid fever (9 *S. Paratyphi* A and 7 *S. Paratyphi* B) were reported in Virginia during 2011, compared to 12 in 2010. Travel histories were obtained for all 16 infected individuals; 8 persons had traveled outside the United States in the 30 days before illness onset. The countries visited among case-patients were India (6 case-patients, 75%) and Pakistan (2 case-patients, 25%). Of the eight remaining individuals, one traveled to India but returned approximately 45 days prior to illness onset. Five others became ill after contact with an infected family member who had traveled to Ethiopia. The remaining two persons were associated with a common daycare. One case-patient in the daycare was an asymptomatic carrier, suspected to be the source of infection for the second person. Neither reported a recent history of travel.