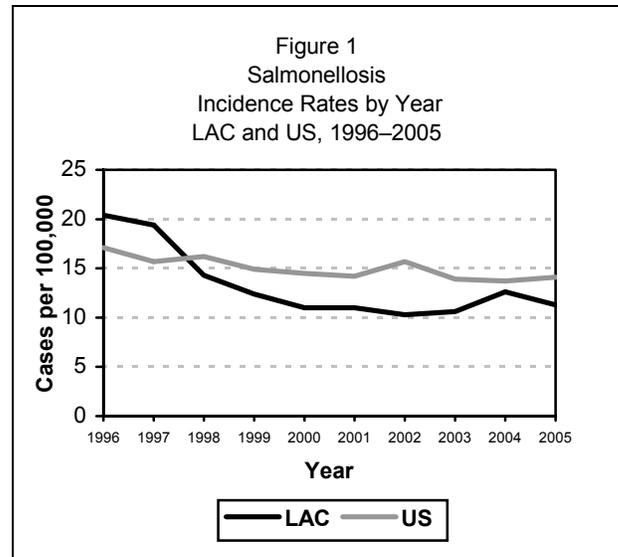




## SALMONELLOSIS

CRUDE DATA	
Number of Cases	1,085
Annual Incidence <sup>a</sup>	
LA County	11.3
California	11.7
United States	14.1
Age at Diagnosis	
Mean	27
Median	22
Range	<1-95 years
Case Fatality	
LA County	0.7%
United States	N/A



<sup>a</sup> Cases per 100,000 population.

### DESCRIPTION

Salmonellosis is caused by a Gram-negative bacillus, *Salmonella* enterica, of which there are more than 2,500 serotypes. This disease is transmitted by the fecal-oral route, from animal or human, with or without intermediary contamination of foodstuffs. The most common symptoms include diarrhea, fever, headache, abdominal pain, nausea and sometimes vomiting. Occasionally, the clinical course is that of enteric fever or septicemia. Asymptomatic infections may occur. The incubation period is usually 12–36 hours for gastroenteritis, longer and variable for other manifestations. Communicability lasts as long as organisms are excreted, usually from 2–5 weeks, but may last for months to years. Healthy people are susceptible, but persons especially at risk are those who are on antacid therapy, have recently taken or are taking broad-spectrum antibiotic therapy or immunosuppressive therapy, or those who have had gastrointestinal surgery, neoplastic disease, or other debilitating conditions. Severity of the disease is related to the serotype, the number of organisms ingested, and host factors. Immunocompromised persons, such as those with cancer or HIV infection, are at risk for recurrent *Salmonella* septicemia. Occasionally the organism may localize anywhere in the body, causing abscesses, osteomyelitis, arthritis, meningitis, endocarditis, pericarditis, pneumonia, or pyelonephritis.

### DISEASE ABSTRACT

- The LAC 2005 salmonellosis crude rate decreased 10.3% when compared to 2004 (Figure1). It has remained below the national rate since 1998.
- *Salmonella* serotype Enteritidis was again the most common isolate in 2005 and the percent of change was an increase of 77% due to the increase in the total number of isolates (Table 1).
- *S. Typhimurium* was the second most common serotype in 2005 accounting for 14% of all isolates and increasing 8.2% from 2004.
- SPA 5 had the highest rate (13.4 per 100,000) of salmonellosis during 2005.



## STRATIFIED DATA

**Trends:** The rate of salmonellosis cases for LAC in 2005 was 11.3 cases per 100,000 population, a 10.3% decrease from the 2004 rate of 12.6 (Figure 1). This was below the national rate. Reasons for this decrease may be improved food safety measures implemented in LAC and California, and fewer laboratory confirmed diagnoses made in California due to managed care practices. In 2005, ACDC continued to include “presumptive cases,” those that meet a clinical case definition and have an epidemiological link to a laboratory confirmed case. If the presumptive cases are removed, the 2005 rate decreases to 10.8 per 100,000 population.

**Salmonella Serotypes:** For the second year, *S. Enteritidis* was the number one serotype, increasing to 29.5% of total isolates serotyped. After the 37.4% increase in *S. Enteritidis* cases in 2004, there was a 77% increase in 2005. The incomplete serotype I 4,5,12:i:–, which had increased 1,500% in 2004 due to an outbreak at a mental health facility, remained in the ten most frequently seen serotypes. *S. Heidelberg*, which accounted for 30 outbreak related cases in 2004, showed a decrease in 2005. The increase seen in serotype Berta was due primarily to a family cluster. The increase seen in serotype I 4,5,12:b:– was mostly due to a cluster in July; cases in this cluster could not be linked. There were no identified links between Muenchen cases.

**Table 1. Most Frequent *Salmonella* Serotypes—LAC, 2004–2005**

Serotype	2004 (N=1,213)*		2005 (N=1,032)*		%Change
	No.	Percent	No.	Percent	
Enteritidis	202	16.7	306	29.6	+77.0
Typhimurium**	162	13.4	150	14.6	+9.0
Newport	62	5.1	60	5.8	+13.7
Heidelberg	99	8.2	47	4.5	-45.0
I 4,5,12:i:–	34	2.6	32	3.1	+19.0
Oranienburg	17	1.4	24	2.3	+64.2
Berta	3	0.2	24	2.3	+1050.0
Thompson	25	2.1	21	2	-4.8
I 4,5,12:b:–	6	0.4	19	1.8	+350.0
Muenchen	10	0.8	18	1.7	+112.0

\* Includes only serotyped isolates. (Eight cases for 2004 had two different serotypes of *Salmonella* .)

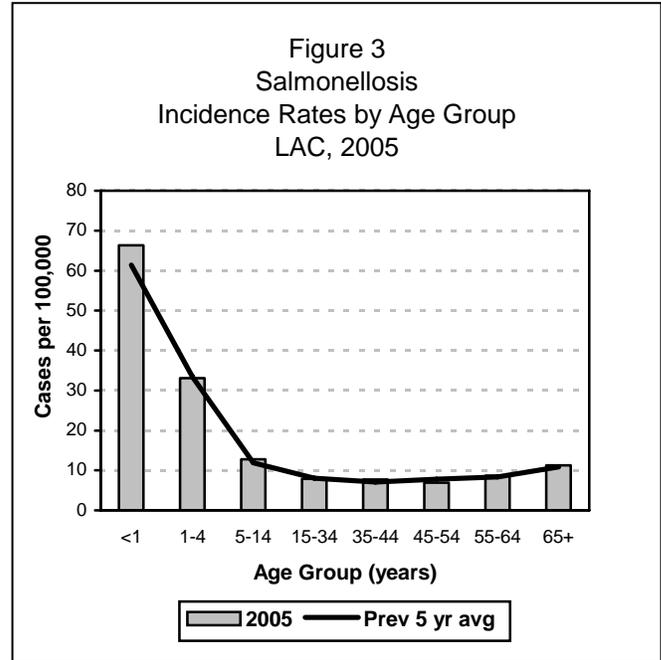
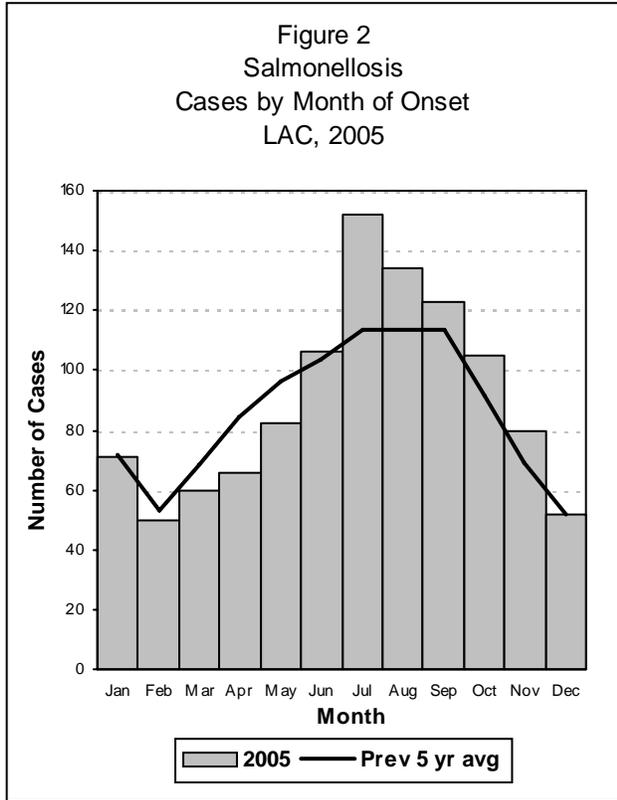
\*\* Includes *S. Typhimurium* var. Copenhagen and degraded form.

**Seasonality:** In 2005, incidence peaked in July (Figure 2) and was dramatically greater than the five-year average. Incidence remained greater than the five-year average until December. The increase was primarily due to *S. Enteritidis*.

**Age:** As shown in Figure 3, the highest age group rates of infection occurred among infants aged less than 1 year (66.3 per 100,000 population) followed by children aged 1–4 years (33.1 per 100,000 population). This is typical for salmonellosis.

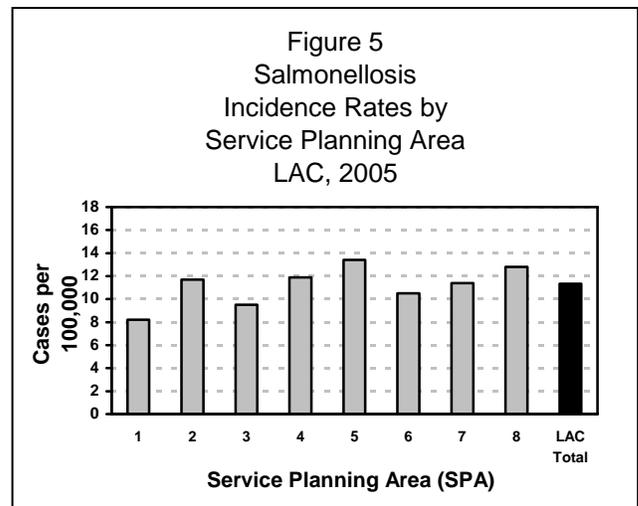
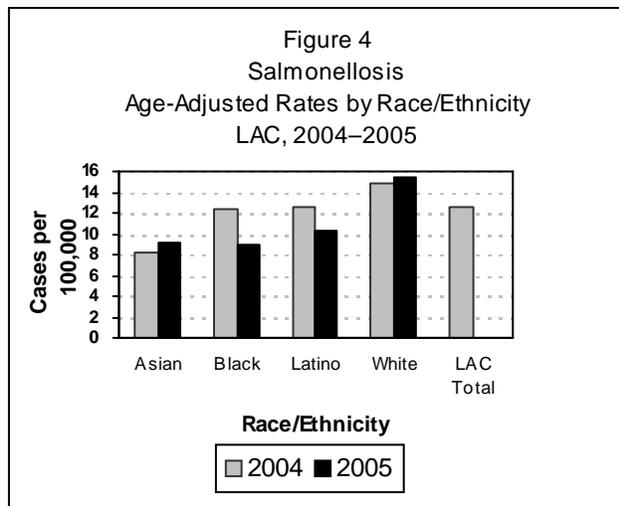
**Hospitalized:** In 2005, 23% of cases were hospitalized for more than 24 hours, compared to 21.3% in 2004.

**Sex:** The male-to-female rate ratio was 1:1.09



**Race/Ethnicity:** Again, the highest age-adjusted rate was among Whites (15.42 per 100,000 population), followed by Latinos (10.32 per 100,000 population) then Asians (9.12 per 100,000 population), and Blacks (8.92 per 100,000 population). The rates for Latinos and Blacks decreased while the rates for Asians and Whites increased when compared to 2004 (Figure 4).

**Location:** Glendale Health District had the highest district rate with 16.1 cases per 100,000. The lowest district rate was in East Valley Health District with 5.4 cases per 100,000. Both of these districts are part of SPA 2, which has a rate of 11.7 cases per 100,000. Of all SPAs, SPA 5 had the highest rate with 13.4 cases per 100,000. In 2004, SPA 8 (15.2 per 100,000 population) had the highest rate. SPA 1 again had the lowest rate at 8.2 cases per 100,000 (Figure 5). No single SPA had a rate significantly higher or lower than LAC average.





## PREVENTION

Each outbreak of salmonellosis is investigated and preventive measures are recommended. Review of investigation reports shows that many persons engage in high-risk food handling behaviors such as: consumption of raw or undercooked meats, or produce, use of raw eggs, not washing hands and/or cutting boards after handling raw poultry or meat, and not maintaining food at proper temperature to prevent bacterial growth. These investigations demonstrate a need for improved public education on proper handling and preparation of produce and animal-derived foods.

Health education targeted at specific high-risk groups is necessary; for example, 26.4% of the salmonellosis cases in 2005 were in the infant through four-year age group. This age group has consistently been the highest risk group for LAC since 1982. When cases occur, District Public Health Nurses should educate parents and teachers in preschools and day care facilities. Emphasis is on the following:

- Washing hands for parents, teachers and preschoolers.
- Proper preparation of foods and formula for this age group.
- Proper handling and cooking of uncooked meat, poultry and fish to prevent cross contamination.
- Keeping kitchen and utensils clean and preventing cross contamination.
- Avoiding reptile pets in the home, preschool and child care facilities.
- Avoiding other pets that may carry Salmonella, such as baby chicks or ducks.

**Table 2. Salmonellosis Outbreaks in LAC, 2005**

Onset Month	Outbreak Setting	Total # Ill	Culture Positive	Serotype	Suspect Vehicle	Suspect Source
April	Restaurant	5	4	<i>S. Heidelberg</i>	Dessert	Raw shell egg
April	Daycare	3	3	<i>IIIa41:z4,z23</i> <i>IIIB65:k:z</i>	Animals in aquariums	Reptiles
July	Restaurant	11	6	<i>S. Enteritidis</i>	Dessert	Raw shell egg
September	Restaurant	19	3	<i>S. Enteritidis</i>	Unknown food vehicle	Unknown food source
<b>TOTAL</b>		<b>38</b>	<b>16</b>			

## COMMENTS

After a peak in 1994, starting in 1995 through 2000, a steady decline occurred in the LAC rate of salmonellosis. This decline continued, dipping below the national average in 1998 (Figure 2). Specific reasons for the declining rate have not been studied scientifically, but several factors may have contributed. These include the increase in managed care and medical practice guidelines recommending treatment for patients with fever and diarrhea without confirmed diagnosis. Other potential contributing factors include: industry-based programs such as the California Egg Quality Assurance Program and the California Poultry Meat Quality Assurance Program, various government laws and regulations affecting food safety from farm to distribution as well as the increased use of safe food preparation labels on packaged meats. The LAC rate in 2004 increased, but did adjust down again in 2005 (Figure 2).

There were four salmonellosis outbreaks during 2005 compared to 12 identified in 2004. Two outbreaks were serotype Enteritidis, one was Heidelberg and the other involved multiple serotypes (Figure 1). Outbreak related cases (both confirmed and presumptive) made up only 3.5 % of total cases compared to 19.2% of total cases in 2004. *Salmonella* Enteritidis has reemerged as the number one etiologic agent identified in outbreaks in LAC, after no outbreaks in 2002 and 2003 and one small outbreak (three cases) in 2004. This year Enteritidis, the predominant serotype for 2005, was found to be the cause for two outbreaks with a total of thirty cases. Three of the four salmonellosis outbreak investigations cited restaurant prepared food as a source. Two investigations identified raw shell eggs as the suspected



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source (Table 2). The use of PFGE and comparison of PFGE patterns with other laboratories through PulseNet, the national molecular subtyping network for foodborne disease, continues to help identify potentially related clusters within LAC.

Salmonellosis was reported as a contributing cause of death in seven people, all of whom had underlying health problems such as cancer, immune deficiency, malignant brain tumor, and complications post gastric tube placement. Ages of these individuals ranged from 26 to 91 years.

### **ADDITIONAL RESOURCES**

General information about salmonellosis is available at:  
[www.cdc.gov/ncidod/dbmd/diseaseinfo/salmonellosis\\_g.htm](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/salmonellosis_g.htm)

General information and reporting information about this and foodborne diseases in LAC is available at:  
[www.lapublichealth.org/acd/food.htm](http://www.lapublichealth.org/acd/food.htm)

# Map 11. Salmonellosis Rates by Health District, Los Angeles County, 2005\*

