TYPHOID FEVER, ACUTE AND CARRIER

ACUTE TYPHOID CRUDE DATA	
Number of Cases	11
Annual Incidence[a]	
LA County[b]	0.11
California[c]	N/A
United States[c]	0.10
Age at Diagnosis	
Mean	37.2
Median	33
Range	9–75 years

[a]Cases per 100,000 population
[b]Rates based on less than 19 observations are considered unreliable
[c]Calculated from: CDC. *Notice to Readers:* Final 2016 Reports of Nationally Notifiable Infectious Diseases and Conditions *Weekly* / January 6, 2018 / 65(52). Available at: https://www.cdc.gov/mmwr/volumes/65/wr/mm6552md.htm?s_cid=mm6552md_w

DESCRIPTION

Typhoid fever, or enteric fever, is an acute systemic disease caused by the gram-negative bacillus *Salmonella typhi*. Transmission occurs person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include persistent fever, headache, malaise, anorexia, constipation (more common than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccines are available to those at high risk from close exposure to a typhoid carrier in the house or who travel to developing foreign countries.

Among untreated acute cases, 10% will shed bacteria for three months after initial onset of symptoms, and 2-5% will become chronic typhoid carriers. Some carriers are diagnosed by positive tissue specimen. Chronic carriers are by definition asymptomatic.

Hand washing after toilet use, before preparing/serving food, and before and after direct/intimate contact with others is important in preventing disease. Where sanitary practices are uncertain, foods should be thoroughly cooked, and bottled water should be used for drinking, brushing teeth, and making ice. Vaccination should be considered when traveling to developing countries in Asia, Africa, and Latin America where disease is endemic. LAC DPH screens household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases. A modified order of isolation restricts a carrier from engaging in a sensitive occupation or situation. LAC DPH monitors compliance with such isolation order and offers the case a chance to clear the infection with antibiotics.

2016 TRENDS AND HIGHLIGHTS

- In 2016, all acute typhoid cases reported travel to Asian countries where disease is endemic, except one who reported contact with a carrier.
- Asians (n=5, 45%) accounted for the largest proportion of acute cases followed by Blacks (n=2, 18%) (Figure 3). Asians had the highest incidence rate of all the race/ethnicity groups (0.4 cases per 100,000).
- SPA 5 had the highest incidence rate for acute typhoid fever (0.5 cases per 100,000). SPA 2 and 5 reported the largest proportion of case (n=3, 27%) followed by SPA 4 and 8 (n=2, 18%).
- During 2016, cases were observed throughout the year; however, more cases are typically observed during the summer

- months. Cases peaked above the five-year average in January, March, June, and September (Figure 5).
- LAC DPH monitors existing carriers who are listed on the state typhoid registry until they are cleared of infection. There were two new carriers reported in 2016 (Figure 6).
- Three paratyphoid cases were reported in 2016.

Reported Acute Typhoid Fever Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
LAC, 2012-2016

	2012 (N=6)			2013 (N=17)			2014 (N=15)			2015 (N=14)			2016 (N=11)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
1-4	0	-	-	3	17.6	0.6	0	-	-	3	21.4	0.6	0	-	-
5-14	1	16.7	0.1	3	17.6	0.2	2	13.3	0.2	2	14.3	0.2	1	9.0	0.1
15-34	3	50.0	0.1	7	41.2	0.2	7	46.7	0.2	7	50.0	0.2	6	54.5	0.2
35-44	1	16.7	0.1	1	5.9	0.1	2	13.3	0.2	0	-	-	0	-	-
45-54	1	16.7	0.1	2	11.8	0.2	2	13.3	0.2	0	-	-	1	9.0	0.1
55-64	0	-	-	1	5.9	0.1	1	6.7	0.1	1	7.1	0.1	2	18.1	0.2
65+	0	-	-	0	-	-	1	6.7	0.1	1	7.1	0.1	1	9	0.1
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Race / Ethnicity															
Asian	2	33.3	0.2	12	70.6	0.9	10	66.7	0.7	8	57.1	0.6	5	45.4	0.4
Black	0	-	-	0	-	-	0	-	-	0	-	-	2	18.1	0.3
Hispanic	4	66.7	0.1	5	29.4	0.1	5	33.3	0.1	4	28.6	0.1	1	9.0	-
White	0	-	-	0	-	-	0	-	-	2	14.3	0.1	1	9.0	-
Other	0	-	-	0	-	-	0	-	-	0	-	-	1	9.0	-
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
SPA															
1	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
2	1	16.7	-	2	11.8	0.1	1	6.7	-	7	50.0	0.3	3	27.2	0.1
3	1	16.7	0.1	6	35.3	0.4	5	33.3	0.3	2	14.3	0.1	1	9.0	0.1
4	2	33.3	0.2	3	17.6	0.3	4	26.7	0.3	4	28.6	0.3	2	18.1	0.2
5	0	-	-	2	11.8	0.3	0	-	-	1	7.1	0.2	3	27.2	0.5
6	0	-	-	1	5.9	0.1	2	13.3	0.2	0	-	-	0	-	-
7	1	16.7	0.1	0	-	-	1	6.7	0.1	0	-	-	0	-	-
8	1	16.7	0.1	3	17.6	0.3	2	13.3	0.2	0	-	-	2	18.1	0.2
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-

*Rates calculated based on less than 19 cases or events are considered unreliable

Reported Typhoid Fever Carrier Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
LAC, 2012-2016

	2012 (N=0)			2013 (N=0)			2014 (N=0)			2015 (N=0)			2016 (N=2)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
1-4	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
5-14	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
15-34	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
35-44	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
45-54	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
55-64	0	-	-	0	-	-	0	-	-	0	-	-	1	50.0	0.1
65+	0	-	-	0	-	-	0	-	-	0	-	-	1	50.0	0.1
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0		
Race / Ethnicity															
Asian	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Black	0	-	-	0	-	-	0	-	-	0	-	-	1	50.0	0.1
Hispanic	0	-	-	0	-	-	0	-	-	0	-	-	1	50.0	0.1
White	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Other	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
SPA															
1	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
2	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
3	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
4	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
5	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
6	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
7	0	-	-	0	-	-	0	-	-	0	-	-	1	50.0	0.1
8	0	-	-	0	-	-	0	-	-	0	-	-	1	50.0	0.1
Unknown	0	-	-	0	-	-	0	-	-	0	-	-			

*Rates calculated based on less than 19 cases or events are considered unreliable

**Figure 1. Reported Acute Typhoid Fever Rates by Year
LAC and US, 2006-2016**

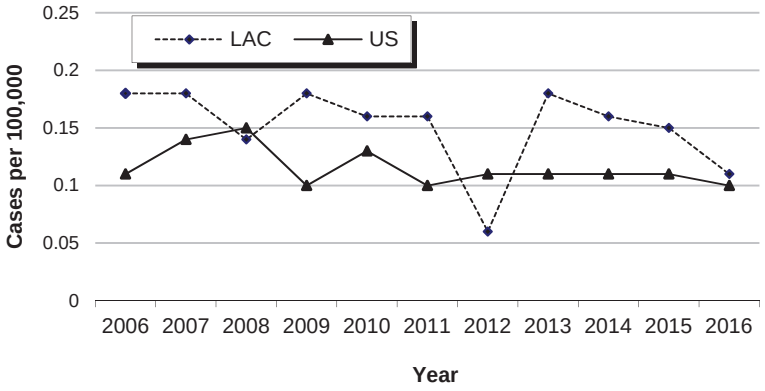


**Figure 2. Acute Typhoid Fever Cases by Age Group
LAC, 2016 (N=11)**

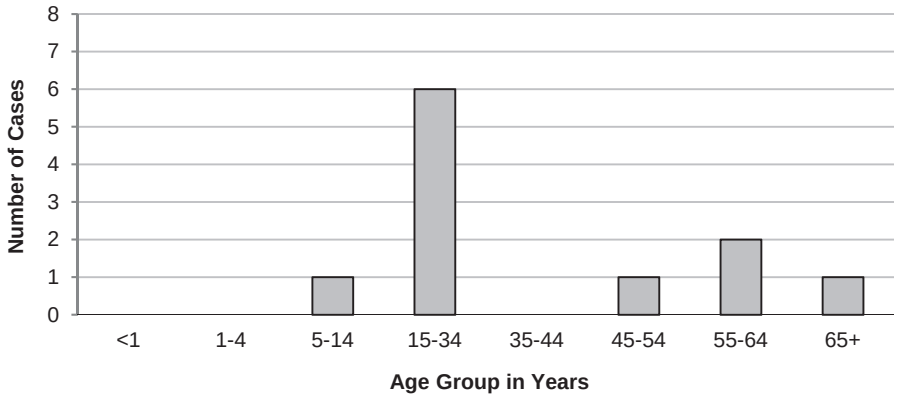


**Figure 3. Report Acute Typhoid Fever Cases by
Race/Ethnicity, LAC, 2016 (N=11)**

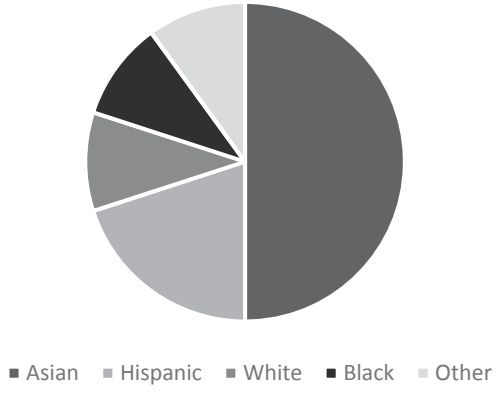


**Figure 4. Reported Acute Typhoid Fever Cases by SPA
LAC, 2016 (N=11)**

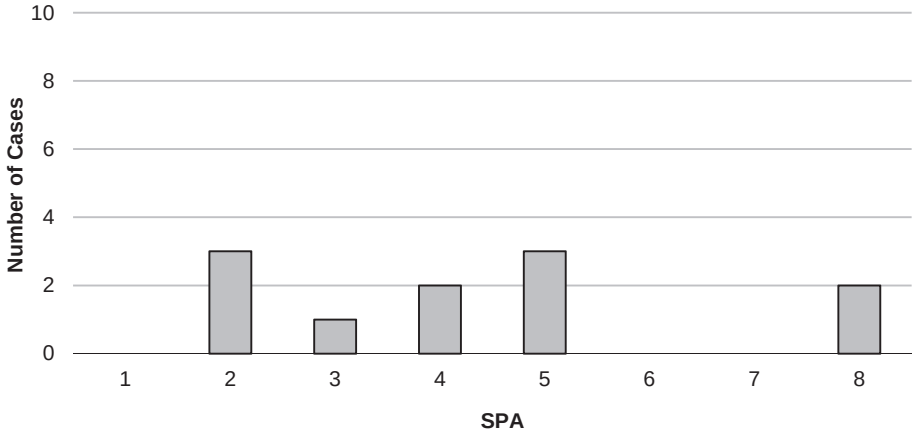


Figure 5. Acute Typhoid Fever Cases by Month of Onset
LAC, 2016 (N=11)

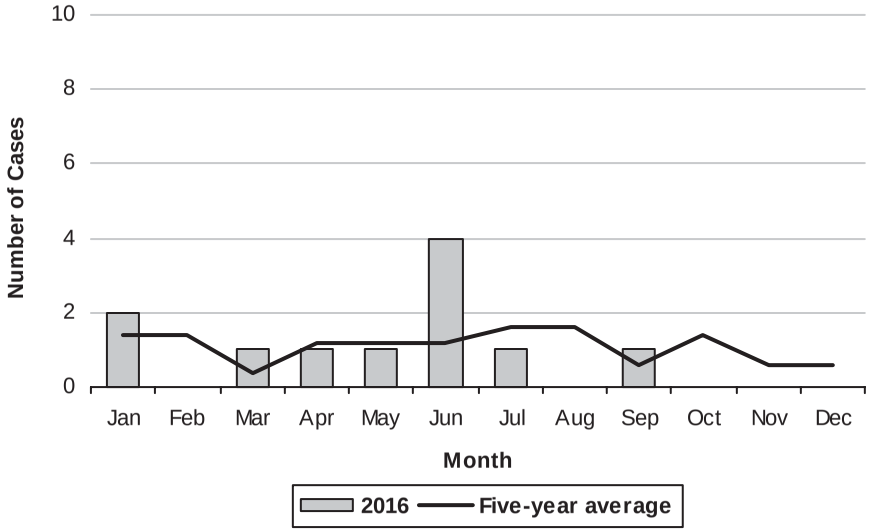
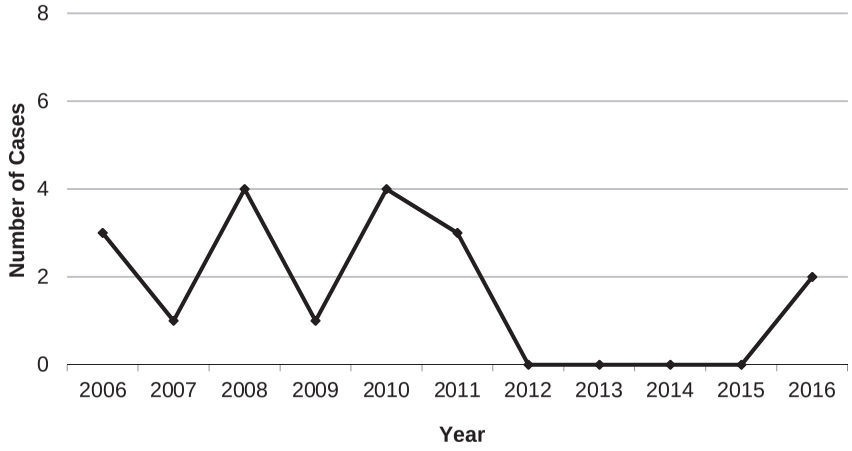


Figure 6. Cases of Chronic Typhoid Carrier by Year of Detection
LAC, 2006-2016



TYPHOID FEVER, ACUTE AND CARRIER

ACUTE TYPHOID CRUDE DATA	
Number of Cases	14
Annual Incidence[a]	
LA County[b]	0.15
California[c]	0.14
United States[c]	0.11
Age at Diagnosis	
Mean	21
Median	25
Range	2–79 years

[a]Cases per 100,000 population
[b]Rates based on less than 19 observations are considered unreliable
[c]Calculated from: CDC. *Notice to Readers:* Final 2015 Reports of Nationally Notifiable Infectious Diseases and Conditions *Weekly* / November 25, 2016 / 65(46);1306–1321. Available at: www.cdc.gov/mmwr/volumes/65/wr/mm6546a9.htm

DESCRIPTION

Typhoid fever, or enteric fever, is an acute systemic disease caused by the gram-negative bacillus *Salmonella typhi*. Transmission may occur person to person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include persistent fever, headache, malaise, anorexia, constipation (more commonly than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccines are available to those at high risk from close exposure to a typhoid carrier in the house or travel to developing foreign countries.

Among untreated acute cases, 10% will shed bacteria for three months after initial onset of symptoms and 2-5% will become chronic typhoid carriers. Some carriers are diagnosed by positive tissue specimen. Chronic carriers are by definition asymptomatic.

Hand washing after using the toilet, before preparing or serving food, and before and after direct or intimate contact with others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked, and bottled water should be used for drinking, brushing teeth, and making ice. Vaccination should be considered when traveling to endemic areas. LAC DPH screens household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases. A modified order of isolation restricts a carrier from engaging in a sensitive occupation or situation. LAC DPH monitors compliance with such isolation order and offers the case a chance to clear the infection with antibiotics.

2015 TRENDS AND HIGHLIGHTS

- In 2015, all acute typhoid cases reported travel to countries with endemic typhoid fever.
- Asians (n=8; 57%) accounted for the largest proportion of acute cases followed by Hispanic cases (n=4, 29%) (Figure 3). Asians had the highest incidence rate of all the race/ethnicity groups (0.6 cases per 100,000).
- SPA 2 and 4 both had the highest incidence rates for acute typhoid fever (0.3 cases per 100,000). SPA 2 reported the largest proportion of cases (n=7, 50%) followed by SPA 4 (n=4, 29%).
- During 2015, cases were observed throughout the year; however, more cases are typically observed during the summer months. Cases peaked above the five-year average in January, July, and November (Figure 5).
- LAC DPH monitors existing carriers who are listed on the state typhoid registry until they are cleared of infection (Figure 6). No new carriers were reported since 2012.
- No paratyphoid cases were reported in 2015.

Reported Acute Typhoid Fever Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
LAC, 2011-2015

	2011 (N=15)			2012 (N=6)			2013 (N=17)			2014 (N=15)			2015 (N=14)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	1	6.7	0.7	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
1-4	0	0.0	0.0	0	0.0	0.0	3	17.6	0.6	0	0.0	0.0	3	21.4	0.6
5-14	1	6.7	0.1	1	16.7	0.1	3	17.6	0.2	2	13.3	0.2	2	14.3	0.2
15-34	6	40.0	0.2	3	50.0	0.1	7	41.2	0.2	7	46.7	0.2	7	50.0	0.2
35-44	2	13.3	0.1	1	16.7	0.1	1	5.9	0.1	2	13.3	0.2	0	0.0	0.0
45-54	3	20.0	0.2	1	16.7	0.1	2	11.8	0.2	2	13.3	0.2	0	0.0	0.0
55-64	1	6.7	0.1	0	0.0	0.0	1	5.9	0.1	1	6.7	0.1	1	7.1	0.1
65+	1	6.7	0.1	0	0.0	0.0	0	0.0	0.0	1	6.7	0.1	1	7.1	0.1
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Race / Ethnicity															
Asian	7	46.7	0.5	2	33.3	0.2	12	70.6	0.9	10	66.7	0.7	8	57.1	0.6
Black	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Hispanic	8	53.3	0.2	4	66.7	0.1	5	29.4	0.1	5	33.3	0.1	4	28.6	0.1
White	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	2	14.3	0.1
Other	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
SPA															
1	1	6.7	0.3	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
2	4	26.7	0.2	1	16.7	0.0	2	11.8	0.1	1	6.7	0.0	7	50.0	0.3
3	0	0.0	0.0	1	16.7	0.1	6	35.3	0.4	5	33.3	0.3	2	14.3	0.1
4	4	26.7	0.3	2	33.3	0.2	3	17.6	0.3	4	26.7	0.3	4	28.6	0.3
5	3	20.0	0.5	0	0.0	0.0	2	11.8	0.3	0	0.0	0.0	1	7.1	0.2
6	1	6.7	0.1	0	0.0	0.0	1	5.9	0.1	2	13.3	0.2	0	0.0	0.0
7	1	6.7	0.1	1	16.7	0.1	0	0.0	0.0	1	6.7	0.1	0	0.0	0.0
8	1	6.7	0.1	1	16.7	0.1	3	17.6	0.3	2	13.3	0.2	0	0.0	0.0
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-

*Rates calculated based on less than 19 cases or events are considered unreliable

Reported Typhoid Fever Carrier Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
LAC, 2011-2015

	2011 (N=3)			2012 (N=0)			2013 (N=0)			2014 (N=0)			2015 (N=0)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
1-4	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
5-14	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
15-34	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
35-44	1	33.3	0.1	0	-	-	0	-	-	0	-	-	0	-	-
45-54	1	33.3	0.1	0	-	-	0	-	-	0	-	-	0	-	-
55-64	1	33.3	0.1	0	-	-	0	-	-	0	-	-	0	-	-
65+	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Race / Ethnicity															
Asian	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Black	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Hispanic	3	100.0	0.1	0	-	-	0	-	-	0	-	-	0	-	-
White	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Other	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
SPA															
1	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
2	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
3	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
4	1	33.3	0.1	0	-	-	0	-	-	0	-	-	0	-	-
5	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
6	1	33.3	0.1	0	-	-	0	-	-	0	-	-	0	-	-
7	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
8	1	33.3	0.1	0	-	-	0	-	-	0	-	-	0	-	-
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-

*Rates calculated based on less than 19 cases or events are considered unreliable

**Figure 1. Reported Acute Typhoid Fever Rates by Year
LAC and US, 2005-2015**

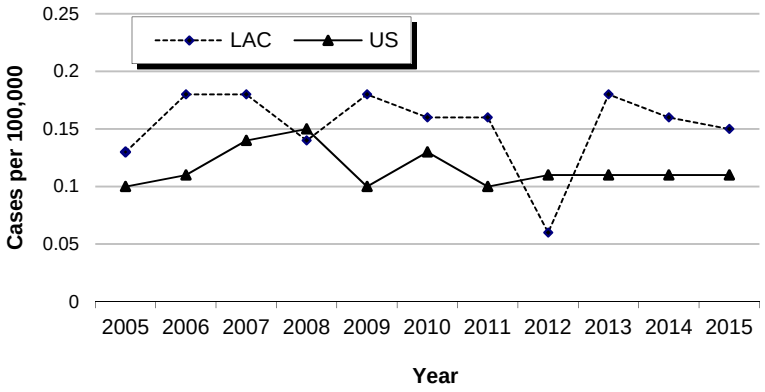


**Figure 2. Acute Typhoid Fever Cases by Age Group
LAC, 2015 (N=14)**

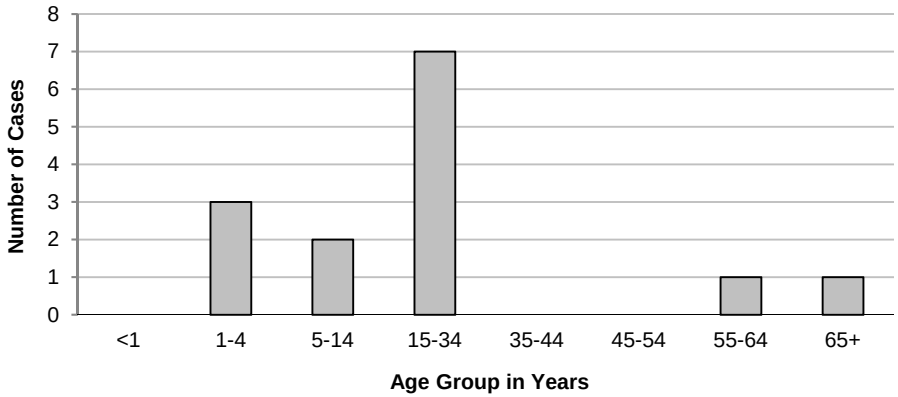


**Figure 3. Reported Acute Typhoid Fever Cases by Race/Ethnicity
LAC, 2015 (N=14)**

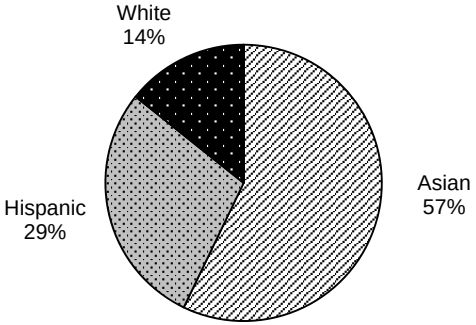


**Figure 4. Reported Acute Typhoid Fever Cases by SPA
LAC, 2015 (N=14)**

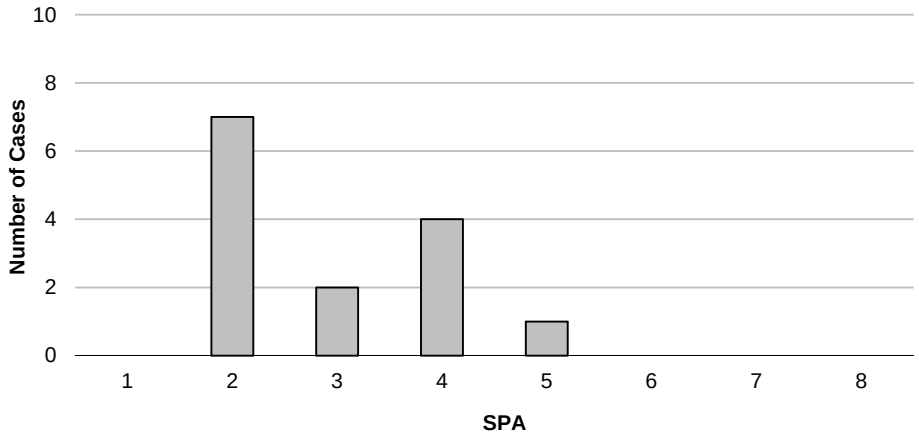


**Figure 5. Acute Typhoid Fever Cases by Month of Onset
LAC, 2015 (N=14)**

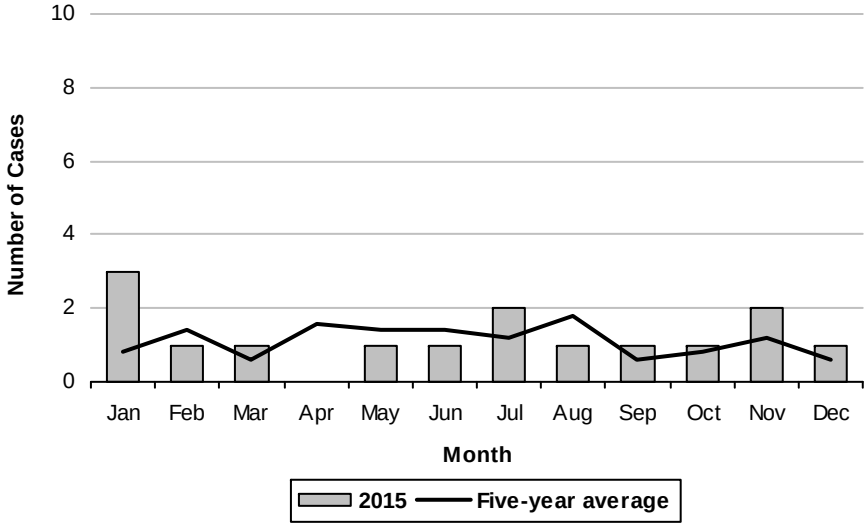
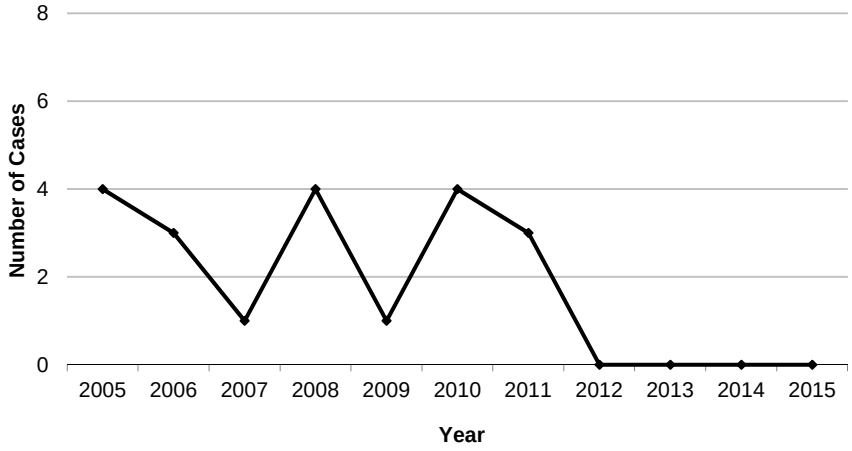


**Figure 6. Cases of Chronic Typhoid Carrier by Year of Detection
LAC, 2005-2015**



TYPHOID FEVER, ACUTE AND CARRIER

ACUTE TYPHOID CRUDE DATA	
Number of Cases	15
Annual Incidence[a]	
LA County[b]	0.16
California[c]	0.17
United States[c]	0.11
Age at Diagnosis	
Mean	34.0
Median	29
Range	8–88 years

[a]Cases per 100,000 population.
[b]Rates based on less than 19 observations are considered unreliable.
[c]Calculated from Final 2014 Reports of Nationally Notifiable Infectious Diseases. MMWR 64(36):1019–1033.

DESCRIPTION

Typhoid fever, or enteric fever, is an acute systemic disease caused by the Gram-negative bacillus *Salmonella typhi*. Transmission may occur person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more commonly than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccines are available to those at high risk from close exposure to a typhoid carrier in the house or who travel to developing countries.

Among untreated acute cases, 10% will shed bacteria for three months after initial onset of symptoms and 2% to 5% will become chronic typhoid carriers. Some carriers are diagnosed by positive tissue specimen. Chronic carriers are by definition asymptomatic.

Hand washing after using the toilet, before preparing or serving food, and before and after direct or intimate contact with others are important methods of preventing the spread of typhoid. When visiting locations where sanitary practices are uncertain, foods should be thoroughly cooked; bottled water should be used for drinking, brushing teeth, and making ice. Vaccination should be considered when visiting endemic areas. LAC DPH screens household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases. A modified order of isolation restricts a carrier from engaging in a sensitive occupation or situation. LAC DPH monitors compliance with isolation orders and offers the case the chance to clear the infection with antibiotics.

2014 TRENDS AND HIGHLIGHTS

- In 2014, 80% (n=12) of acute typhoid cases reported visiting countries with endemic typhoid fever.
- Asians accounted for the largest proportion of cases (67%) and had the highest incidence rate. All other reported cases occurred among Hispanics (33%). (Figure 3).
- Service Planning Areas (SPA) 3 and 4 both had the highest incidence rates for typhoid fever, with 0.3 cases per 100,000.
- In 2014, the majority of cases (60%) were observed during the summer but across years, there appears to be little seasonality (Figure 5).
- LAC continues to semi-annually monitor existing carriers who are on the state typhoid registry until they are cleared of infection (Figure 6). There were no new carriers reported for the past three years.
- Three paratyphoid cases were reported in 2014. One reported travel to Asia.

Reported Acute Typhoid Fever Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2010-2014

	2010 (N=15)			2011 (N=15)			2012 (N=6)			2013 (N=17)			2014 (N=15)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	-	-	1	6.6	0.7	0	-	-	0	-	-	0	-	-
1-4	3	20.0	0.6	0	-	-	0	-	-	3	17.6	0.6	0	-	-
5-14	4	26.6	0.3	1	6.6	0.1	1	16.7	0.1	3	17.6	0.2	2	13.3	0.2
15-34	5	33.3	0.2	6	40.0	0.2	3	50.0	0.1	7	41.1	0.2	7	46.6	0.2
35-44	1	6.6	0.1	2	13.3	0.1	1	16.7	0.1	1	5.8	0.1	2	13.3	0.2
45-54	1	6.6	0.1	3	20.0	0.2	1	16.7	0.1	2	11.7	0.2	2	13.3	0.2
55-64	1	6.6	0.1	1	6.6	0.1	0	-	-	1	5.8	0.1	1	6.6	0.1
65+	0	-	-	1	6.6	0.1	0	-	-	0	-	-	1	6.6	0.1
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Race/Ethnicity															
Asian	11	73.3	0.8	7	46.6	0.5	2	33.3	0.2	12	70.5	0.9	10	66.6	0.7
Black	0	-	-	0	0	0.0	0	-	-	0	-	-	0	-	-
Hispanic	3	20	0.1	8	53.3	0.2	4	66.7	0.1	5	29.4	0.1	5	33.3	0.1
White	1	0	0.0	0	-	-	0	-	-	0	-	-	0	-	-
Other	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
SPA															
1	1	6.6	0.3	1	6.6	0.3	0	-	-	0	-	-	0	-	-
2	6	40.0	0.3	4	26.6	0.2	1	16.7	0.0	4	23.5	0.2	1	6.6	0
3	2	13.3	0.1	0	-	-	1	16.7	0.0	3	17.6	0.2	5	33.3	0.3
4	2	13.3	0.2	4	26.6	0.3	2	33.3	0.1	2	11.7	0.2	4	26.6	0.3
5	1	6.6	0.2	3	20.0	0.5	0	-	-	3	17.6	0.5	0	-	-
6	2	13.3	0.2	1	6.6	0.1	0	-	-	2	11.7	0.2	2	13.3	0.2
7	1	6.6	0.1	1	6.6	0.1	1	16.7	-	0	-	-	1	6.6	0.1
8	0	-	-	1	6.6	0.1	1	16.7	-	3	17.6	0.3	2	13.3	0.2
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-

*Rates calculated based on less than 19 cases or events are considered unreliable

Reported Typhoid Fever Carrier Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2010-2014

	2010 (N=4)			2011 (N=3)			2012 (N=0)			2013 (N=0)			2014 (N=0)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
1-4	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
5-14	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
15-34	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
35-44	2	50.0	0.1	1	33.3	0.1	0	-	-	0	-	-	0	-	-
45-54	0	-	-	1	33.3	0.1	0	-	-	0	-	-	0	-	-
55-64	2	50.0	0.2	1	33.3	0.1	0	-	-	0	-	-	0	-	-
65+	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Race/Ethnicity															
Asian	2	50.0	0.2	0	-	-	0	-	-	0	-	-	0	-	-
Black	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Hispanic	2	50.0	0.0	3	100.	0.1	0	-	-	0	-	-	0	-	-
White	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Other	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
SPA															
1	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
2	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
3	1	25.	0.1	0	-	-	0	-	-	0	-	-	0	-	-
4	2	50.	0.2	1	33.3	0.1	0	-	-	0	-	-	0	-	-
5	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
6	1	25.	0.1	1	33.3	0.1	0	-	-	0	-	-	0	-	-
7	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
8	0	-	-	1	33.3	0.1	1	-	-	0	-	-	0	-	-
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-

*Rates calculated based on less than 19 cases or events are considered unreliable.

**Figure 1. Incidence Rates by Year of Onset of Acute Typhoid Fever
LAC and US, 2004-2014**

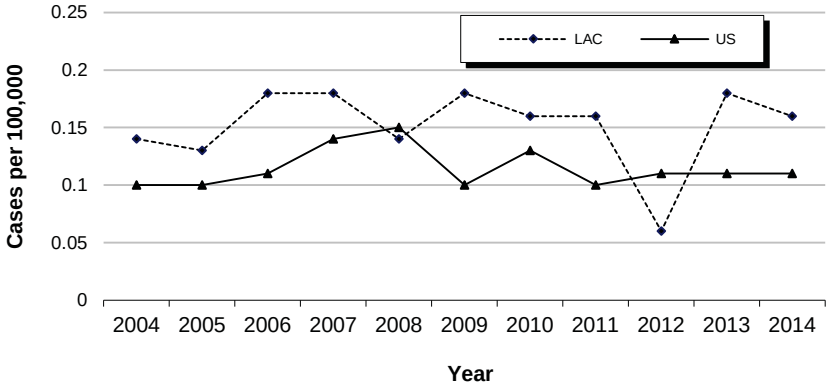


**Figure 2. Acute Typhoid Fever Cases by Age Group
LAC, 2014 (N=15)**

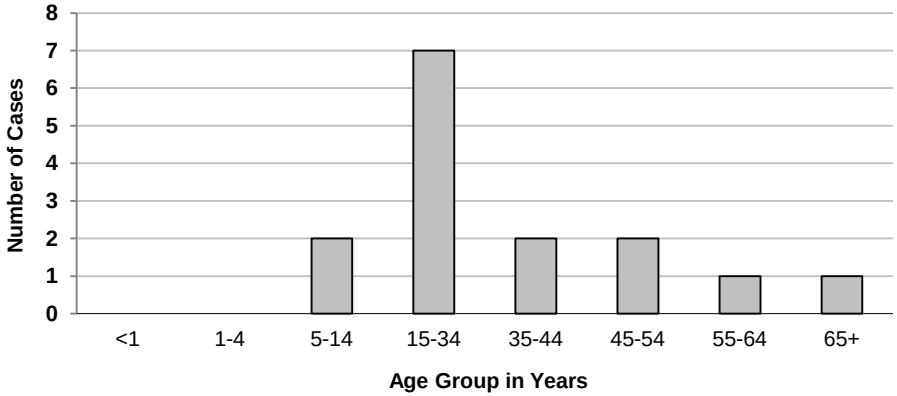


**Figure 3. Reported Acute Typhoid Fever Cases by Race/Ethnicity
LAC, 2014 (N=15)**

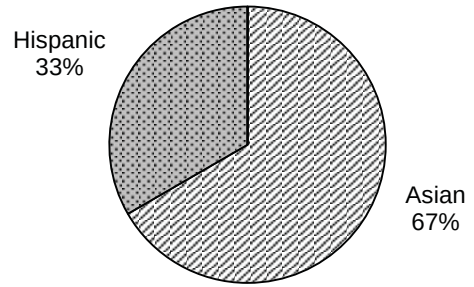


**Figure 4. Reported Acute Typhoid Fever Cases by SPA
LAC, 2013 (N=15)**

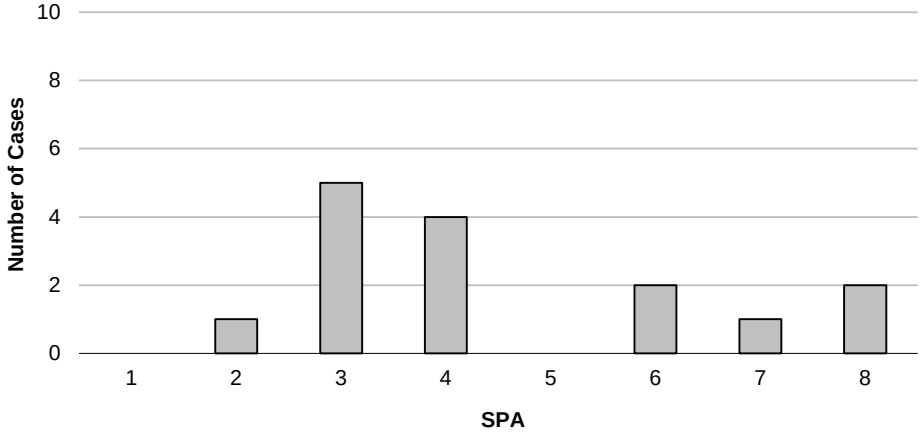


**Figure 5. Acute Typhoid Fever Cases by Month of Onset
LAC, 2014 (N=15)**

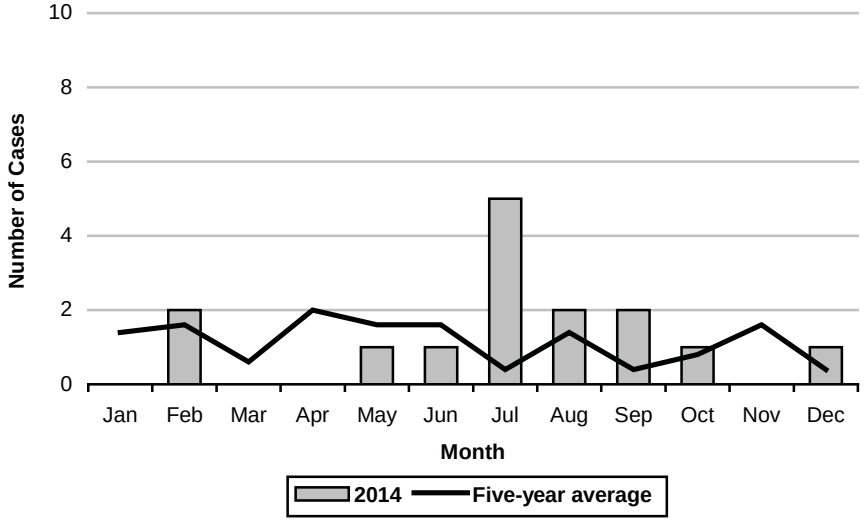
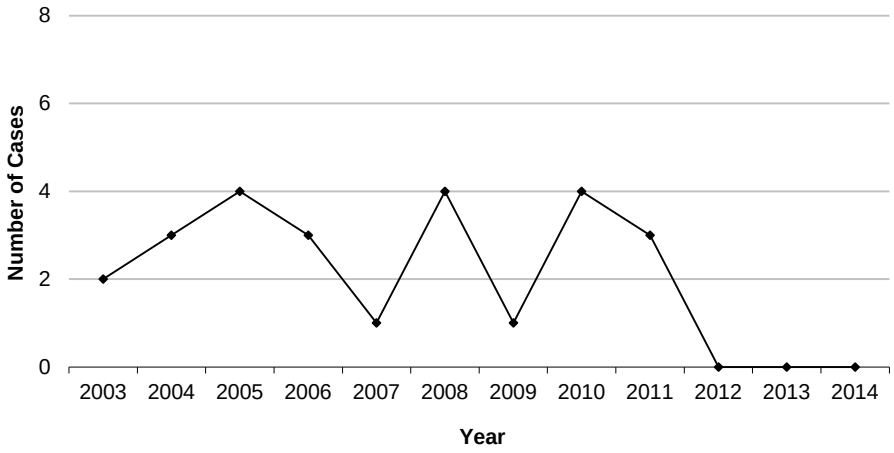


**Figure 6. Cases of Chronic Typhoid Carrier by Year of Detection
LAC, 2003-2014**



TYPHOID FEVER, ACUTE AND CARRIER

ACUTE TYPHOID CRUDE DATA	
Number of Cases	17
Annual Incidence[a]	
LA County[b]	0.18
California[c]	0.18
United States[c]	0.11
Age at Diagnosis	
Mean	23.4
Median	23
Range	2-62

[a]Cases per 100,000 population.
[b]Rates based on less than 19 observations are considered unreliable.
[c]Calculated from Final 2013 Reports of Nationally Notifiable Infectious Diseases. MMWR 63(32):702-716.

DESCRIPTION

Typhoid fever, or enteric fever, is an acute systemic disease caused by the Gram-negative bacillus *Salmonella typhi*. Transmission may occur person to person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more commonly than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccines are available to those at high risk from close exposure to a typhoid carrier in the house or travel to developing foreign countries.

Among untreated acute cases, 10% will shed bacteria for three months after initial onset of symptoms and 2% to 5% will become chronic typhoid carriers. Some carriers are diagnosed by positive tissue specimen. Chronic carriers are by definition asymptomatic.

Hand washing after using the toilet, before preparing or serving food, and before and after direct or intimate contact with others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked; bottled water should be used for drinking, brushing teeth, and making ice. Vaccination should be considered when traveling in endemic areas. Los Angeles County (LAC) Department of Public Health (DPH) screens household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases. A modified order of isolation restricts a carrier from engaging in a sensitive occupation or situation. LAC DPH monitors compliance with such isolation order and offers the case the chance to clear the infection with antibiotics.

2013 TRENDS AND HIGHLIGHTS

- In 2013, 76% (n=13) of acute typhoid cases reported traveling to countries with endemic typhoid fever.
- The Asian population had the highest percentage of acute cases; however, in the previous two years this disease was observed among the Hispanic population (Figure 3).
- Service Planning Area (SPA) 3 had the highest number of acute cases (Figure 4). There was at least one case reported within each of the SPAs 2, 3, 4, 5, 6, and 8.
- Typically, most cases occur in the spring; however, cases were observed during all seasons. Cases peaked last year during June above the five year average (Figure 5).
- No new chronic carriers were reported.
- LAC continues to semi-annually monitor existing carriers who are on the state typhoid registry until they are cleared of infection (Figure 6). In 2013, there were no new carriers reported.
- Three paratyphoid cases were reported in 2013. Two reported travel to Asia.

Reported Acute Typhoid Fever Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2009-2013

	2009 (N=17)			2010 (N=15)			2011 (N=15)			2012 (N=6)			2013 (N=17)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0	0.0	0	0	0	1	6.6	0.7	0	0	0	0	0	0
1-4	0	0	0.0	3	20.0	0.6	0	0	0	0	0	0	3	17.6	0.6
5-14	3	17.6	0.2	4	26.6	0.3	1	6.6	0.1	1	16.7	0.1	3	17.6	0.2
15-34	6	35.2	0.2	5	33.3	0.2	6	40.0	0.2	3	50.0	0.1	7	41.1	0.2
35-44	3	17.6	0.2	1	6.6	0.1	2	13.3	0.1	1	16.7	0.1	1	5.8	0.1
45-54	4	23.5	0.3	1	6.6	0.1	3	20.0	0.2	1	16.7	0.1	2	11.7	0.2
55-64	1	5.8	0.1	1	6.6	0.1	1	6.6	0.1	0	0	0	1	5.8	0.1
65+	0	0	0.0	0	0	0	1	6.6	0.1	0	0	0	0	0	0.0
Unknown	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0.0
Race/Ethnicity															
Asian	9	52.9	0.7	11	73.3	0.8	7	46.6	0.5	2	33.3	0.2	12	70.5	0.9
Black	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0	0	0	0.0
Hispanic	8	47.0	0.2	3	20	0.1	8	53.3	0.2	4	66.7	0.1	5	29.4	0.1
White	0	0	0.0	1	0	0.0	0	0	0.0	0	0	0	0	0	0.0
Other	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0	0	0	0.0
Unknown	0	0	0.0	0	0	0.0	0	0	0	0	0	0	0	0	0.0
SPA															
1	0	0	0	1	6.6	0.3	1	6.6	0.3	0	0	0.0	0	0	0.3
2	4	23.5	0.2	6	40.0	0.3	4	26.6	0.2	1	16.7	0.0	4	23.5	0.2
3	3	17.6	0.2	2	13.3	0.1	0	0	0	1	16.7	0.0	3	17.6	0.2
4	2	11.7	0.2	2	13.3	0.2	4	26.6	0.3	2	33.3	0.1	2	11.7	0.2
5	3	17.6	0.5	1	6.6	0.2	3	20.0	0.5	0	0	0.0	3	17.6	0.5
6	2	11.7	0.2	2	13.3	0.2	1	6.6	0.1	0	0	0.0	2	11.7	0.2
7	0	0	0	1	6.6	0.1	1	6.6	0.1	1	16.7	0.0	0	0	0.0
8	3	17.6	0.3	0	0.0	0.0	1	6.6	0.1	1	16.7	0.0	3	17.6	0.3
Unknown	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.0

*Rates calculated based on less than 19 cases or events are considered unreliable

Reported Typhoid Fever Carrier Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2009-2013

	2009 (N=1)			2010 (N=4)			2011 (N=3)			2012 (N=0)			2013 (N=0)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
1-4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
5-14	1	100	0.1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
15-34	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
35-44	0	0.0	0.0	2	50.0	0.1	1	33.3	0.1	0	0.0	0.0	0	0.0	0.0
45-54	0	0.0	0.0	0	0.0	0.0	1	33.0	0.1	0	0.0	0.0	0	0.0	0.0
55-64	0	0.0	0.0	2	50.0	0.2	1	33.3	0.1	0	0.0	0.0	0	0.0	0.0
65+	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Race/Ethnicity															
Asian	0	0.0	0.0	2	50.0	0.2	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Black	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Hispanic	1	100	0.2	2	50.0	0.0	3	100	0.1	0	0.0	0.0	0	0.0	0.0
White	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
SPA															
1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
2	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
3	0	0.0	0.0	1	25.	0.1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
4	0	0.0	0.0	2	50.	0.2	1	33.3	0.1	0	0.0	0.0	0	0.0	0.0
5	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
6	0	0.0	0.0	1	25.	0.1	1	33.3	0.1	0	0.0	0.0	0	0.0	0.0
7	0	0.0	0.0	0	0.0	0.0	0	0	0.0	0	0.0	0.0	0	0.0	0.0
8	1	100	0.2	0	0.0	0.0	1	33.3	0.1	0	0.0	0.0	0	0.0	0.0
Unknown	0	0.0	0.0	0	0.0	0.0	0	0	0.0	0	0.0	0.0	0	0.0	0.0

0

*Rates calculated based on less than 19 cases or events are considered unreliable.

**Figure 1. Incidence Rates by Year of Onset of Acute Typhoid Fever
LAC and US, 2003-2013**

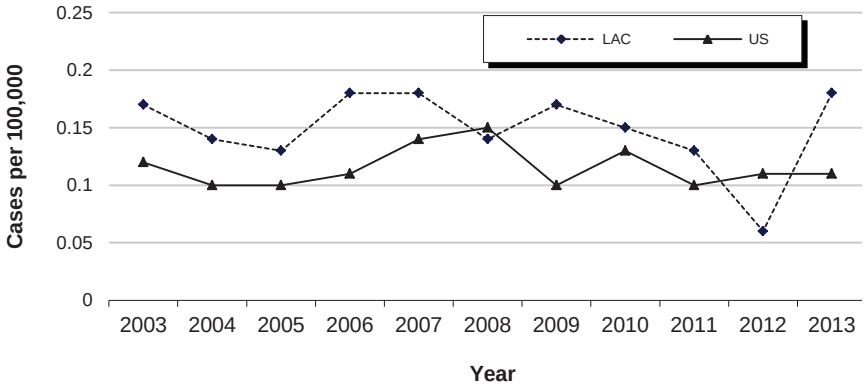


**Figure 2. Acute Typhoid Fever Cases by Age Group
LAC, 2013 (N=17)**

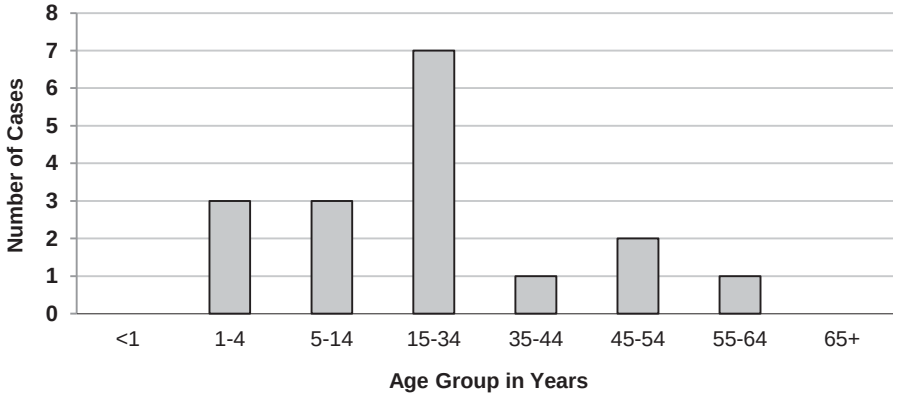


**Figure 3. Reported Acute Typhoid Fever Cases by Race/Ethnicity
LAC, 2013 (N=17)**

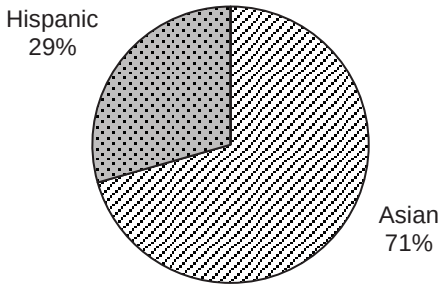


**Figure 4. Reported Acute Typhoid Fever Cases by SPA
LAC, 2013 (N=17)**

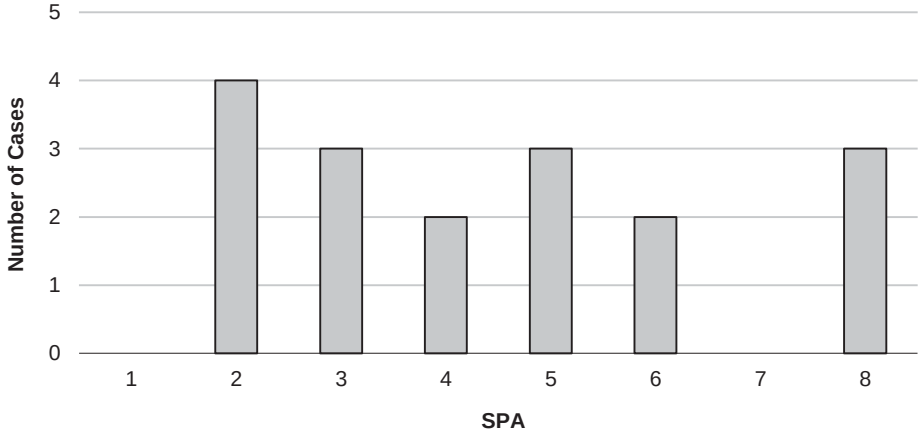


**Figure 5. Acute Typhoid Fever Cases by Month of Onset
LAC, 2013 (N=17)**

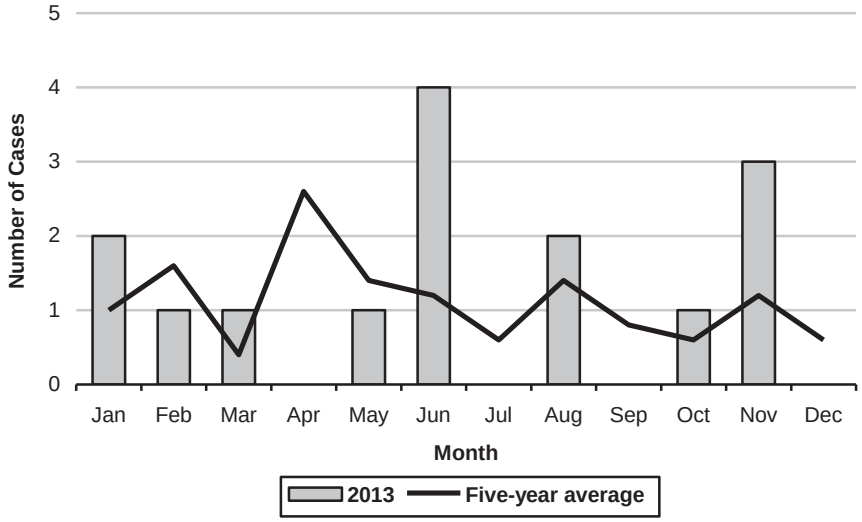
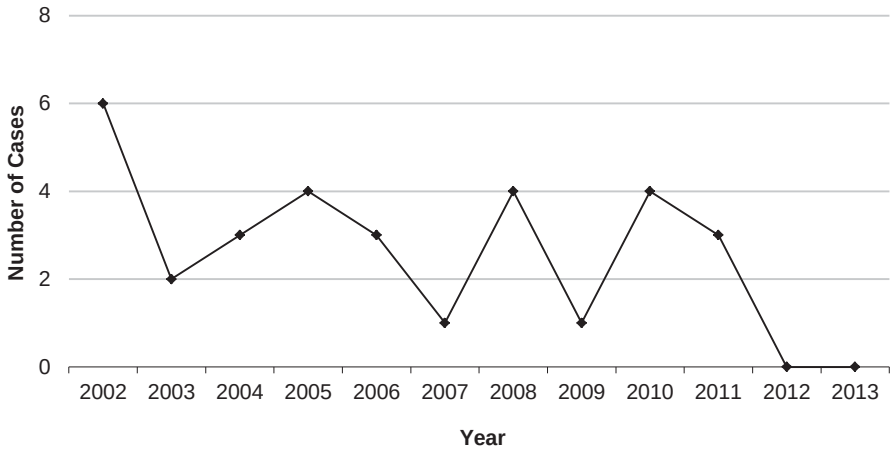


**Figure 6. Cases of Chronic Typhoid Carrier by Year of Detection
LAC, 2002-2013**



TYPHOID FEVER, ACUTE AND CARRIER

ACUTE TYPHOID CRUDE DATA	
Number of Cases	6
Annual Incidence[a]	
LA County[b]	0.06
California[c]	0.16
United States[c]	0.11
Age at Diagnosis	
Mean	29.5
Median	23
Range	14-45

[a]Cases per 100,000 population.
[b]Rates based on less than 19 observations are considered unreliable.
[c]Calculated from Final 2012 Reports of Nationally Notifiable Infectious Disease. MMWR 62(33);669-682.

DESCRIPTION

Typhoid fever, or enteric fever, is an acute systemic disease caused by the Gram-negative bacillus *Salmonella typhi*. Transmission may occur person to person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more commonly than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccines are available to those at high risk from close exposure to a typhoid carrier in the house or travel to developing foreign countries.

Among untreated acute cases, 10% will shed bacteria for three months after initial onset of symptoms and 2% to 5% will become chronic typhoid carriers. Some carriers are diagnosed by positive tissue specimen. Chronic carriers are by definition asymptomatic.

Hand washing after using the toilet, before preparing or serving food, and before and after direct or intimate contact with others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked; bottled water should be used for drinking, brushing teeth, and making ice. Vaccination should be considered when traveling in endemic areas. Los Angeles County (LAC) Department of Public Health (DPH) screens household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases. A modified order of isolation restricts a carrier from engaging in a sensitive occupation or situation. LAC DPH monitors compliance with such isolation order and offers the case the chance to clear the infection with antibiotics.

2012 TRENDS AND HIGHLIGHTS

- The LAC rate for acute typhoid fever cases is slightly below the US rate (Figure 1).
- As in the previous year, Hispanics have had the highest percentage of acute cases; however, in the previous years this disease was prevalent among the Asian population (Figure 3).
- Service Planning Areas (SPAs) 4 had the highest number of acute cases (Figure 4). There was at least one case reported within each of the SPAs 2, 3, 7, and 8.
- Typically, most cases occur in the spring, which was consistent in 2012, however, cases were also observed in the winter. Cases peaked in January above the five year average (Figure 5).
- No new chronic carriers were reported.
- LAC continues to semi-annually monitor existing carriers that are on the state typhoid registry until they are cleared of infection (Figure 6). In 2012, there were none.

Reported Acute Typhoid Fever Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2008-2012

	2008 (N=14)			2009 (N=17)			2010 (N=15)			2011 (N=15)			2012 (N=6)		
	No.	(%)	Rate/ 100,000	No.	No.	(%)	Rate/ 100,000	No.	No.	(%)	Rate/ 100,000	No.	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0		0	0		0	0		1	6.6		0	0	
1-4	1	7.1		0	0		3	20.0		0	0		0	0	
5-14	5	35.7		3	17.6		4	26.6		1	6.6		1	16.7	
15-34	5	35.7		6	35.2		5	33.3		6	40.0		3	50.0	
35-44	1	7.1		3	17.6		1	6.6		2	13.3		1	16.7	
45-54	0	0.0		4	23.5		1	6.6		3	20.0		1	16.7	
55-64	1	7.1		1	5.8		1	6.6		1	6.6		0	0	
65+	1	7.1		0	0		0	0		1	6.6		0	0	
Unknown	0	0.0		0	0		0	0		0	0		0	0	
Race/Ethnicity															
Asian	8	57.1		9	52.9		11	73.3		7	46.6		2	33.3	
Black	0	0.0		0	0		0	0		0	0		0	0	
Hispanic	5	35.7		8	47.0		3	20		8	53.3		4	66.7	
White	1	7.1		0	0		1	0		0	0		0	0	
Other	0	0.0		0	0		0	0		0	0		0	0	
Unknown	0	0.0		0	0		0	0		0	0		0	0	
SPA															
1	0	0.0		0	0		1	6.6		1	6.6		0	0	
2	5	35.7		4	23.5		6	40.0		4	26.6		1	16.7	
3	3	21.4		3	17.6		2	13.3		0	0		1	16.7	
4	3	21.4		2	11.7		2	13.3		4	26.6		2	33.3	
5	0	0.0		3	17.6		1	6.6		3	20.0		0	0	
6	1	7.1		2	11.7		2	13.3		1	6.6		0	0	
7	2	14.3		0	0		1	6.6		1	13.3		1	16.7	
8	0	0.0		3	17.6		3	20.0		1	6.6		1	16.7	
Unknown	0	0.0		0	0		0	0		0	0		0	0	

*Rates calculated based on less than 19 cases or events are considered unreliable

Reported Typhoid Fever Carrier Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2008-2012

	2008 (N=4)			2009 (N=1)			2010 (N=4)			2011 (N=3)			2012 (N=0)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0		0	0.0		0	0		0	0		0	0	
1-4	0	0.0		0	0.0		0	0		0	0		0	0	
5-14	0	0.0		1	100		0	0		0	0		0	0	
15-34	1	25.0		0	0.0		0	0		0	0		0	0	
35-44	2	50.0		0	0.0		2	50.0		1	33.3		0	0	
45-54	0	0.0		0	0.0		0	0		1	33.3		0	0	
55-64	0	0.0		0	0.0		2	50.0		1	33.3		0	0	
65+	1	25.0		0	0.0		0	0		0	0		0	0	
Unknown	0	0.0		0	0.0		0	0		0	0		0	0	
Race/Ethnicity															
Asian	1	25.0		0	00.0		2	50.0		0	0		0	0	
Black	0	0.0		0	0.0		0	0		0	0		0	0	
Hispanic	3	75.0		1	100		2	50.0		3	100		0	0	
White	0	0.0		0	0.0		0	0		0	0		0	0	
Other	0	0.0		0	0.0		0	0		0	0		0	0	
Unknown	0	0.0		0	0.0		0	0		0	0		0	0	
SPA															
1	0	0.0		0	0.0		0	0		0	0		0	0	
2	1	25.0		0	0.0		0	0		0	0		0	0	
3	1	25.0		0	0.0		1	25.0		0	0		0	0	
4	2	50.0		0	0.0		0	0		1	33.3		0	0	
5	0	0.0		0	0.0		2	50.0		0	0		0	0	
6	0	0.0		0	0.0		0	0		1	33.3		0	0	
7	0	0.0		0	0.0		0	0		0	0		0	0	
8	0	0.0		1	100		1	25.0		1	33.3		0	0	
Unknown	0	0.0		0	0.0		0	0		0	0		0	0	

*Rates calculated based on less than 19 cases or events are considered unreliable.

**Figure 1. Incidence Rates by Year of Onset of Acute Typhoid Fever
LAC and US, 2002-2012**

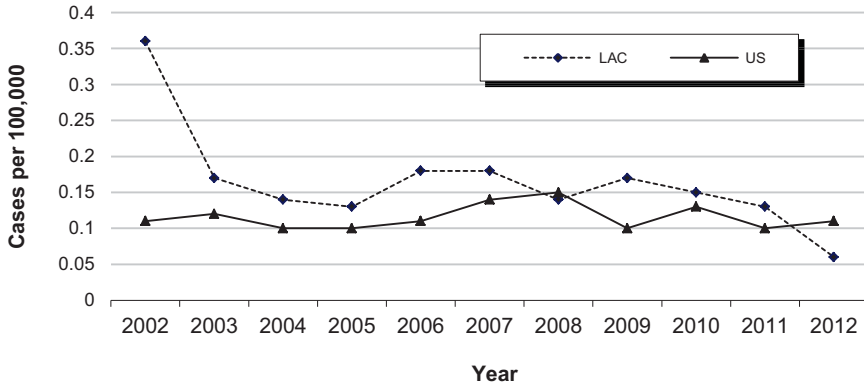


**Figure 2. Acute Typhoid Fever Cases by Age Group
LAC, 2012 (N=6)**

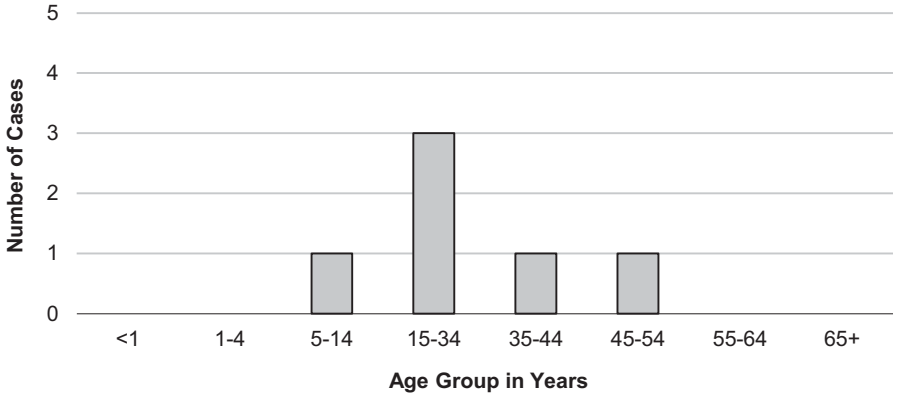


**Figure 3. Reported Acute Typhoid Fever Cases by Race/Ethnicity
LAC, 2012 (N=6)**

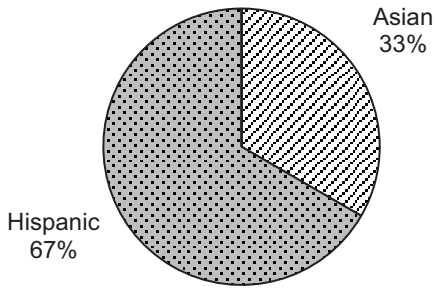
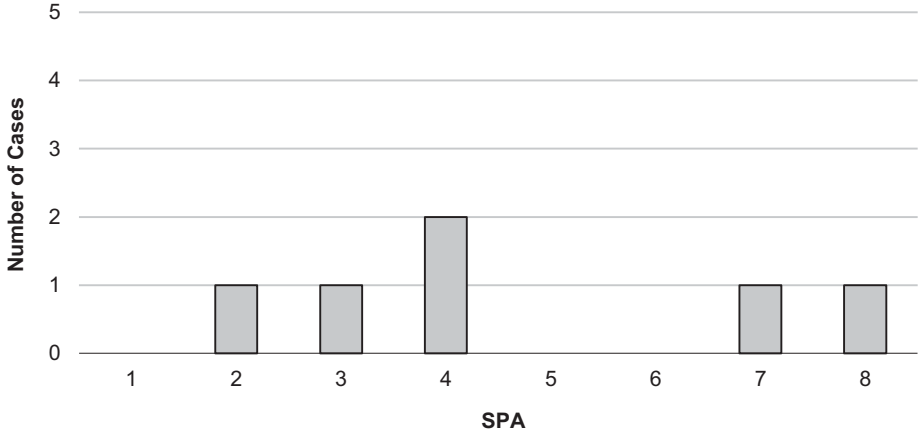


**Figure 4. Reported Acute Typhoid Fever Cases by SPA
LAC, 2012 (N=6)**



TYPHOID FEVER, ACUTE AND CARRIER

ACUTE TYPHOID CRUDE DATA	
Number of Cases	15
Annual Incidence[a]	
LA County[b]	0.15
California[c]	0.26
United States[c]	0.13
Age at Diagnosis	
Mean	35.4
Median	34
Range	0-69

[a]Cases per 100,000 population.
[b]Rates based on less than 19 observations are considered unreliable.
[c]Calculated from Final 2011 Reports of Nationally Notifiable Infectious Disease. MMWR 61(32);625-637.

DESCRIPTION

Typhoid fever, or enteric fever, is an acute systemic disease caused by the Gram-negative bacillus *Salmonella typhi*. Transmission may occur person to person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more commonly than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccines are available to those at high risk from close exposure to a typhoid carrier in the house or travel to developing foreign countries.

Among untreated acute cases, 10% will shed bacteria for three months after initial onset of symptoms and 2% to 5% will become chronic typhoid carriers. Some carriers are diagnosed by positive tissue specimen. Chronic carriers are by definition asymptomatic.

Hand washing after using the toilet, before preparing or serving food, and before and after direct or intimate contact with others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked; bottled water should be used for drinking, brushing teeth, and making ice. Vaccination should be considered when traveling in endemic areas. Los Angeles County (LAC) Department of Public Health (DPH) screens household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases. A modified order of isolation restricts a carrier from engaging in a sensitive occupation or situation. LAC DPH monitors compliance with such isolation order and offers the case the chance to clear the infection with antibiotics.

2011 TRENDS AND HIGHLIGHTS

- The LAC rate for acute typhoid fever cases is comparable to the US rate (Figure 1).
- In 2011, Hispanics had the highest percentage of acute cases, however, in previous years this disease was most prevalent among the Asian population (Figure 3).
- Service Planning Areas (SPAs) 2 and 4 had the highest number of acute cases (Figure 4). Cases were reported in all SPAs except SPA 3.
- Typically, most cases occur in the summer, however, in 2011 cases were also observed in early spring and fall (Figure 5).
- Three new chronic carriers were identified. They were added to the state typhoid registry to be monitored by LAC semi-annually until cleared of infection (Figure 6).

Reported Acute Typhoid Fever Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2007-2011

	2007 (N=17)			2008 (N=14)			2009 (N=17)			2010 (N=15)			2011 (N=15)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0		0	0.0		0	0		0	0		1	6.6	
1-4	0	0.0		1	7.1		0	0		3	20.0		0	0	
5-14	1	5.9		5	35.7		3	17.6		4	26.6		1	6.6	
15-34	10	58.8		5	35.7		6	35.2		5	33.3		6	40.0	
35-44	0	0.0		1	7.1		3	17.6		1	6.6		2	13.3	
45-54	2	11.8		0	0.0		4	23.5		1	6.6		3	20.0	
55-64	3	17.6		1	7.1		1	5.8		1	6.6		1	6.6	
65+	1	5.9		1	7.1		0	0		0	0		1	6.6	
Unknown	0	0.0		0	0.0		0	0		0	0		0	0	
Race/Ethnicity															
Asian	9	52.9		8	57.1		9	52.9		11	73.3		7	46.6	
Black	0	0.0		0	0.0		0	0		0	0		0	0	
Hispanic	7	41.2		5	35.7		8	47.0		3	20		8	53.3	
White	1	5.9		1	7.1		0	0		1	0		0	0	
Other	0	0.0		0	0.0		0	0		0	0		0	0	
Unknown	0	0.0		0	0.0		0	0		0	0		0	0	
SPA															
1	2	11.8		0	0.0		0	0		1	6.6		1	6.6	
2	6	35.3		5	35.7		4	23.5		6	40		4	26.6	
3	4	23.5		3	21.4		3	17.6		2	13.3		0	0	
4	1	5.9		3	21.4		2	11.7		2	13.3		4	26.6	
5	0	0.0		0	0.0		3	17.6		1	6.6		3	20.0	
6	2	11.8		1	7.1		2	11.7		2	13.3		1	6.6	
7	1	5.9		2	14.3		0	0		1	6.6		1	6.6	
8	1	5.9		0	0.0		3	17.6		3	20.0		1	6.6	
Unknown	0	0.0		0	0.0		0	0							

*Rates calculated based on less than 19 cases or events are considered unreliable

Reported Typhoid Fever Carrier Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2007-2011

	2007 (N=1)			2008 (N=4)			2009 (N=1)			2010 (N=4)			2011 (N=3)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0		0	0.0		0	0		0	0		0	0	
1-4	0	0.0		0	0.0		0	0		0	0		0	0	
5-14	0	0.0		0	0.0		1	100		0	0		0	0	
15-34	0	0.0		1	25.0		0	0		0	0		0	0	
35-44	0	0.0		2	50.0		0	0		2	50.0		1	33.3	
45-54	1	100.		0	0.0		0	0		0	0		1	33.3	
55-64	0	0.0		0	0.0		0	0		2	50.0		1	33.3	
65+	0	0.0		1	25.0		0	0		0	0		0	0	
Unknown	0	0.0		0	0.0		0	0		0	0		0	0	
Race/Ethnicity															
Asian	0	0.0		1	25.0		0	0		2	50.0		0	0	
Black	0	0.0		0	0.0		0	0		0	0		0	0	
Hispanic	1	100.		3	75.0		1	100		2	50.0		3	33.3	
White	0	0.0		0	0.0		0	0		0	0		0	0	
Other	0	0.0		0	0.0		0	0		0	0		0	0	
Unknown	0	0.0		0	0.0		0	0		0	0		0	0	
SPA															
1	0	0.0		0	0.0		0	0		0	0		0	0	
2	1	100.		1	25.0		0	0		0	0		0	0	
3	0	0.0		1	25.0		0	0		1	0		0	0	
4	0	0.0		2	50.0		0	0		0	0		1	33.3	
5	0	0.0		0	0.0		0	0		2	0		0	0	
6	0	0.0		0	0.0		0	0		1	0		1	33.3	
7	0	0.0		0	0.0		0	0		0	0		0	0	
8	0	0.0		0	0.0		1	100		0	100		1	33.3	
Unknown	0	0.0		0	0.0		0	0		0	0				

*Rates calculated based on less than 19 cases or events are considered unreliable.

Figure 1. Incidence Rates by Year of Onset of Acute Typhoid Fever LAC and US, 2002-2011

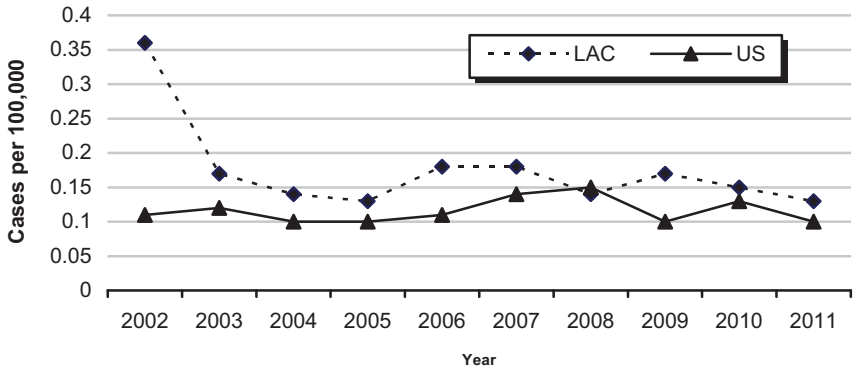


Figure 2. Acute Typhoid Fever Cases by Age Group LAC, 2011 (N=15)

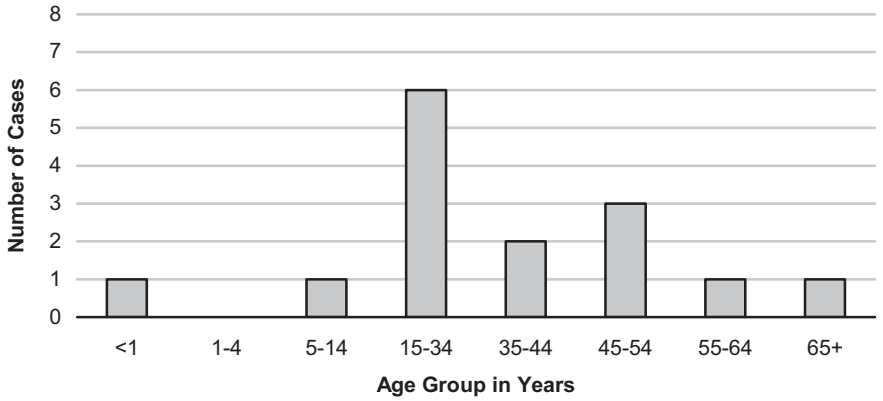


Figure 3. Reported Acute Typhoid Fever Cases by Race/Ethnicity LAC, 2011 (N=15)

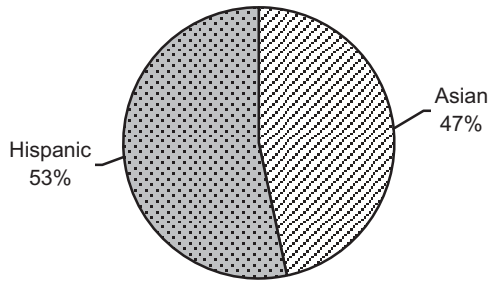


Figure 4. Reported Acute Typhoid Fever Cases by SPA LAC, 2011 (N=15)

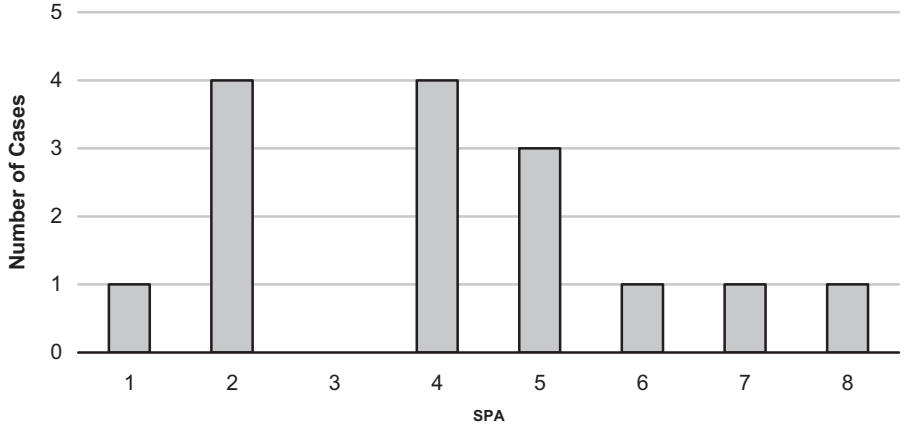


**Figure 5. Acute Typhoid Fever Cases by Month of Onset
LAC, 2011 (N=15)**

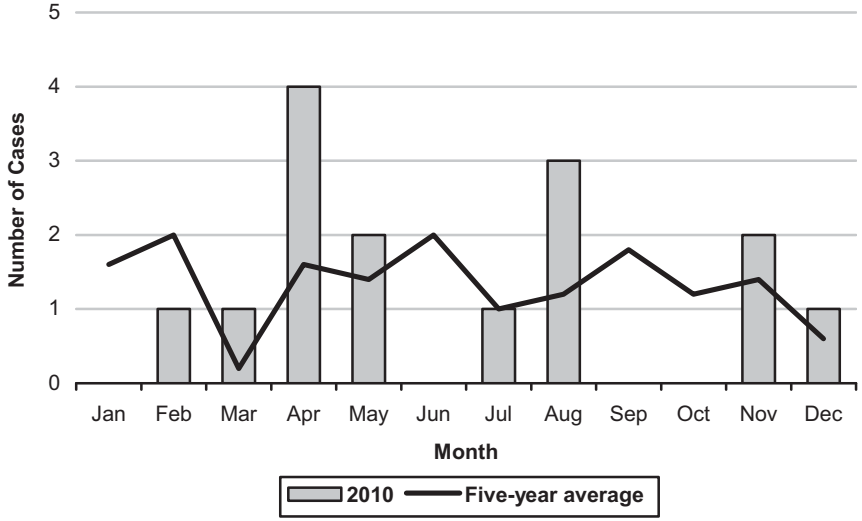
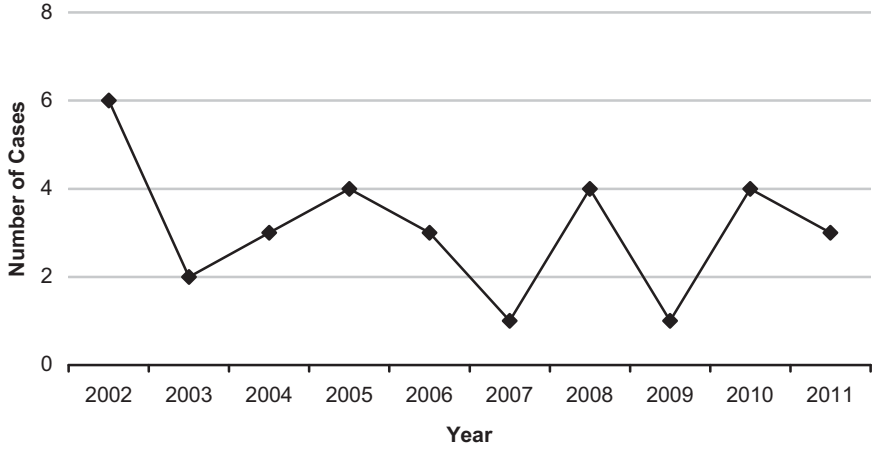


**Figure 6. Cases of Chronic Typhoid Carrier by Year of Detection
LAC, 2002-2011**



TYPHOID FEVER, ACUTE AND CARRIER

ACUTE TYPHOID CRUDE DATA	
Number of Cases	15
Annual Incidence[a]	
LA County[b]	0.15
California[c]	--
United States[c]	--
Age at Diagnosis	
Mean	21.2
Median	18
Range	2-56

[a]Cases per 100,000 population.
[b]Rates based on less than 19 observations are unreliable.
[c]See Final Summary of Nationally Notifiable Infectious Diseases, United States on MMWR website http://www.cdc.gov/mmwr/mmwr_nd/index.html.

DESCRIPTION

Typhoid fever, or enteric fever, is an acute systemic disease caused by the Gram-negative bacillus *Salmonella typhi*. Transmission may occur person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more commonly than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccines are available to those at high risk or from close exposure typhoid carrier in the house or taken travel to foreign countries.

Among untreated acute cases, 10% will shed bacteria for three months after initial onset of symptoms and 2% to 5% will become chronic typhoid carriers. Some carriers are diagnosed by positive tissue specimen. Chronic carriers are by definition asymptomatic.

Hand washing after using the toilet, before preparing or serving food, and before and after caring for others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked and served at appropriate temperature; bottled water should be used for drinking as well as for brushing teeth and making ice. Vaccination should be considered when traveling in high endemic areas. Los Angeles County (LAC) screens household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases. A modified order of isolation restricts a carrier from engaging in a sensitive occupation or situation. LAC DPH monitors compliance with the isolation order and offers the case the chance to clear the infection with antibiotics.

2010 TRENDS AND HIGHLIGHTS

- The LAC rate for acute typhoid fever cases is comparable to the US rate (Figure 1).
- Asians continue to comprise the highest percentage of acute cases (Figure 3).
- Service Planning Area (SPA) 2 continues to have the highest number of acute cases (Figure 4).
- Typically most cases occur in the summer; in 2010, cases were also observed in the spring and early fall (Figure 5).
- Four new chronic carriers were identified. They were added to the state typhoid registry to be monitored by LAC semi-annually until cleared of infection (Figure 6).

Reported Acute Typhoid Fever Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2006-2010

	2006 (N=17)			2007 (N=17)			2008 (N=14)			2009 (N=17)			20010 (N=15)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0		0	0.0		0	0.0		0	0		0	0	
1-4	2	11.8		0	0.0		1	7.1		0	0		3	20.0	
5-14	5	29.4		1	5.9		5	35.7		3	17.6		4	26.6	
15-34	8	47.1		10	58.8		5	35.7		6	35.2		5	33.3	
35-44	1	5.9		0	0.0		1	7.1		3	17.6		1	6.6	
45-54	1	5.9		2	11.8		0	0.0		4	23.5		1	6.6	
55-64	0	0.0		3	17.6		1	7.1		1	5.8		1	6.6	
65+	0	0.0		1	5.9		1	7.1		0	0		0	0	
Unknown	0	0.0		0	0.0		0	0.0		0	0		0	0	
Race / Ethnicity															
Asian	7	41.2		9	52.9		8	57.1		9	52.9		11	73.3	
Black	0	0.0		0	0.0		0	0.0		0	0		0	0	
Hispanic	8	47.1		7	41.2		5	35.7		8	47.0		3	20	
White	1	5.9		1	5.9		1	7.1		0	0		1	0	
Other	0	0.0		0	0.0		0	0.0		0	0		0	0	
Unknown	1	5.9		0	0.0		0	0.0		0	0		0	0	
SPA															
1	0	0.0		2	11.8		0	0.0		0	0		1	6.6	
2	3	17.6		6	35.3		5	35.7		4	23.5		6	40	
3	7	41.2		4	23.5		3	21.4		3	17.6		2	13.3	
4	0	0.0		1	5.9		3	21.4		2	11.7		2	13.3	
5	2	11.8		0	0.0		0	0.0		3	17.6		1	6.6	
6	1	5.9		2	11.8		1	7.1		2	11.7		2	13.3	
7	3	17.6		1	5.9		2	14.3		0	0		1	6.6	
8	1	5.9		1	5.9		0	0.0		3	17.6		3	20.0	
Unknown	0	0.0		0	0.0		0	0.0		0	0				

*Rates calculated based on less than 19 cases or events are considered unreliable

Reported Typhoid Fever Carrier Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2006-2010

	2006 (N=3)			2007 (N=1)			2008 (N=4)			2009 (N=1)			2010 (N=4)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0		0	0.0		0	0.0		0	0		0	0	
1-4	0	0.0		0	0.0		0	0.0		0	0		0	0	
5-14	1	33.3		0	0.0		0	0.0		1	100		0	0	
15-34	0	0.0		0	0.0		1	25.0		0	0		0	0	
35-44	1	33.3		0	0.0		2	50.0		0	0		2	50.0	
45-54	0	0.0		1	100.		0	0.0		0	0		0	0	
55-64	1	33.3		0	0.0		0	0.0		0	0		2	50.0	
65+	0	0.0		0	0.0		1	25.0		0	0		0	0	
Unknown	0	0.0		0	0.0		0	0.0		0	0		0	0	
Race / Ethnicity															
Asian	1	33.3		0	0.0		1	25.0		0	0		2	50.0	
Black	0	0.0		0	0.0		0	0.0		0	0		0	0	
Hispanic	2	66.7		1	100.		3	75.0		1	100		2	50.0	
White	0	0.0		0	0.0		0	0.0		0	0		0	0	
Other	0	0.0		0	0.0		0	0.0		0	0		0	0	
Unknown	0	0.0		0	0.0		0	0.0		0	0		0	0	
SPA															
1	0	0.0		0	0.0		0	0.0		0	0		0	0	
2	0	0.0		1	100.		1	25.0		0	0		0	0	
3	0	0.0		0	0.0		1	25.0		0	0		1	0	
4	1	33.3		0	0.0		2	50.0		0	0		0	0	
5	0	0.0		0	0.0		0	0.0		0	0		2	0	
6	0	0.0		0	0.0		0	0.0		0	0		1	0	
7	2	66.7		0	0.0		0	0.0		0	0		0	0	
8	0	0.0		0	0.0		0	0.0		1	100		0	100	
Unknown	0	0.0		0	0.0		0	0.0		0	0		0	0	

*Rates calculated based on less than 19 cases or events are considered unreliable.

Figure 1. Incidence Rates by Years of Onset of Acute Typhoid Fever
LAC and US, 2001-2010

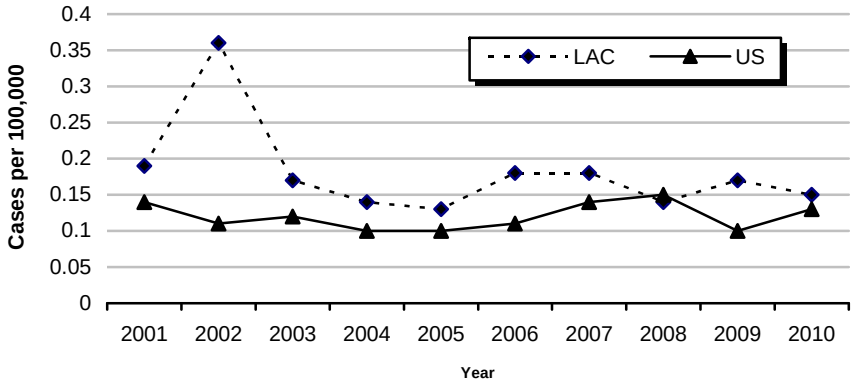


Figure 2. Acute Typhoid Fever Cases by Age Group
LAC, 2010 (N=15)

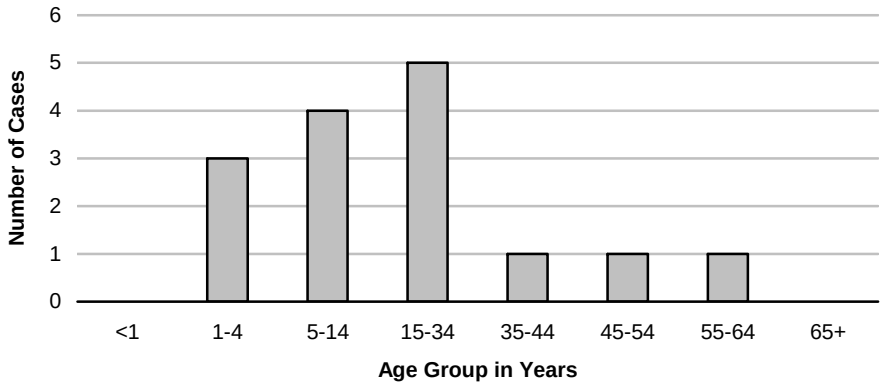


Figure 3. Reported Acute Typhoid Fever Cases by Race/Ethnicity
LAC, 2010 (N=15)

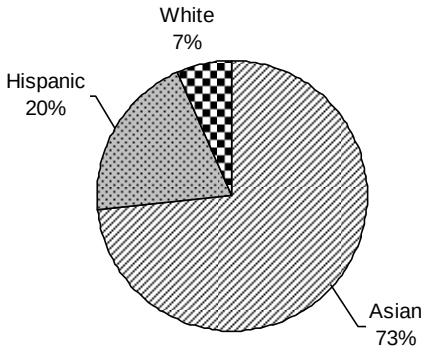


Figure 4. Reported Acute Typhoid Fever Cases by SPA
LAC, 2010 (N=15)

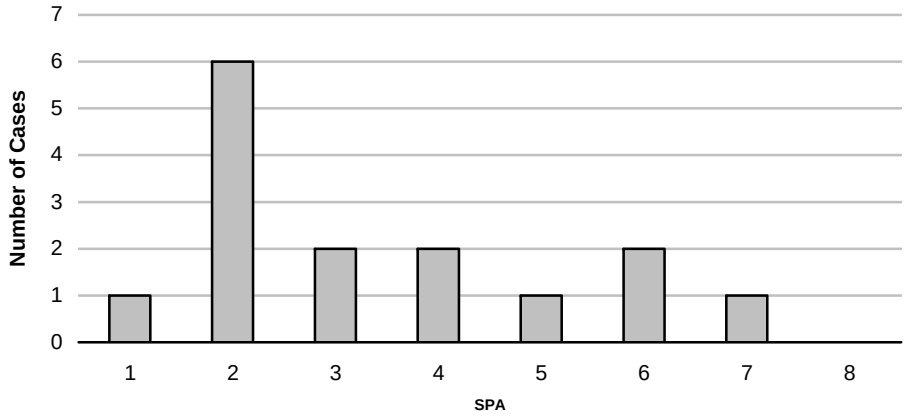


Figure 5. Acute Typhoid Fever Cases by Month of Onset
LAC, 2010 (N=15)

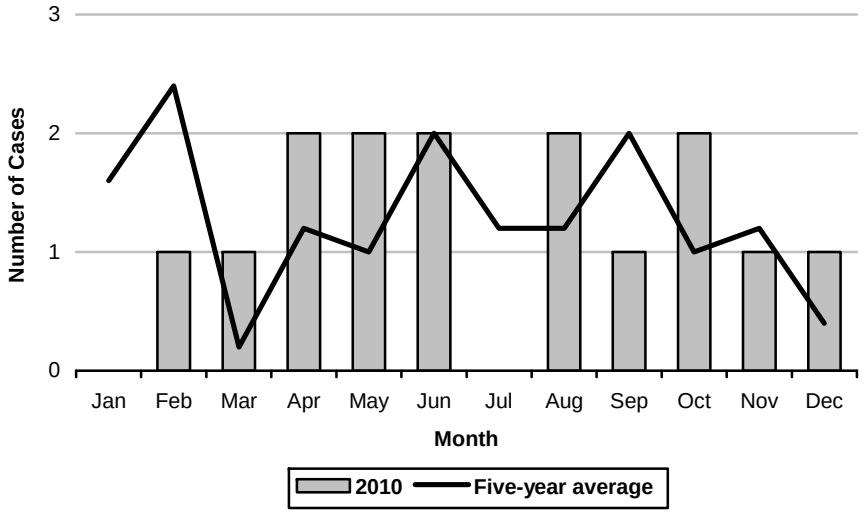
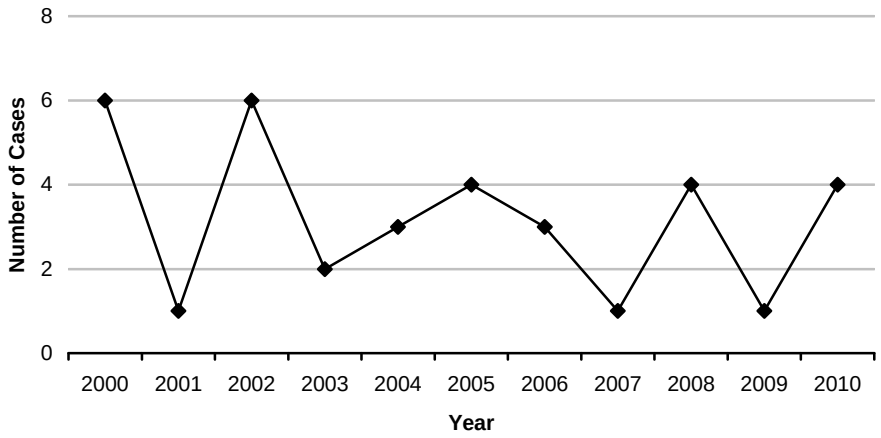


Figure 6. Cases of Chronic Typhoid Carrier by Year of Detection
LAC, 2001-2010



TYPHOID FEVER, ACUTE AND CARRIER

ACUTE TYPHOID CRUDE DATA	
Number of Cases	17
Annual Incidence[a]	
LA County	0.17[b]
California[c]	0.21
United States[c]	0.15
Age at Diagnosis	
Mean	32.5
Median	29
Range	6-55

[a]Cases per 100,000 population.
[b]Rates based on less than 19 observations are unreliable.
[c]Calculated from Final 2008 Reports of Nationally Notifiable Infectious Disease. MMWR 58(31);856-857;859-869.

DESCRIPTION

Typhoid fever, or enteric fever, is an acute systemic disease caused by the Gram-negative bacillus *Salmonella typhi*. Transmission may occur person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more commonly than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccines are available to those at high risk or from close exposure typhoid carrier in the house or taken travel to foreign countries.

Among untreated acute cases, 10% will shed bacteria for three months after initial onset of symptoms and 2% to 5% will become chronic typhoid carriers. Some carriers are diagnosed by positive tissue specimen. Chronic carriers are by definition asymptomatic.

Hand washing after using the toilet, before preparing or serving food, and before and after caring for others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked and served at appropriate temperature; bottled water should be used for drinking as well as for brushing teeth and making ice. Vaccination should be considered when traveling in high endemic areas. LAC tests household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases. A modified order of isolation restricts a carrier from engaging in a sensitive occupation or situation. LAC DPH monitors compliance with the isolation order and provides the chance to clear the infection bacteriologically.

2009 TRENDS AND HIGHLIGHTS

- The Los Angeles County (LAC) rates for acute typhoid fever cases continue to be higher than the US rates (Figure 1).
- Asians continue to have the highest percentage of acute cases (Figure 3).
- Service Planning Area (SPA) 2 continues to have the highest number of acute cases (Figure 4).
- Typically most cases occur in the summer; in 2009, the majority of cases occurred in winter and spring. Cases peaked in January and February with each having three cases (Figure 5).
- One new chronic carrier was identified.
- Four carriers are on the state typhoid registry and are monitored by LAC semi-annually (Figure 6).

Reported Acute Typhoid Fever Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2005-2009

	2005 (N=12)			2006 (N=17)			2007 (N=17)			2008 (N=14)			2009 (N=17)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
1-4	1	8.3	0.2	2	11.8	0.3	0	0.0	0.0	1	7.1	0.2	0	0	0
5-14	2	16.7	0.1	5	29.4	0.3	1	5.9	0.1	5	35.7	0.4	3	17.6	0.2
15-34	7	58.3	0.2	8	47.1	0.3	10	58.8	0.4	5	35.7	0.2	6	35.2	0.2
35-44	0	0.0	0.0	1	5.9	0.1	0	0.0	0.0	1	7.1	0.1	3	17.6	0.2
45-54	2	16.7	0.2	1	5.9	0.1	2	11.8	0.2	0	0.0	0.0	4	23.5	0.3
55-64	0	0.0	0.0	0	0.0	0.0	3	17.6	0.3	1	7.1	0.1	1	5.8	0.1
65+	0	0.0	0.0	0	0.0	0.0	1	5.9	0.1	1	7.1	0.1	0	0	0
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0	0
Race / Ethnicity															
Asian	6	50.0	0.5	7	41.2	0.6	9	52.9	0.7	8	57.1	0.6	9	52.9	0.7
Black	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
Hispanic	6	50.0	0.1	8	47.1	0.2	7	41.2	0.2	5	35.7	0.1	8	47.0	0.2
White	0	0.0	0.0	1	5.9	0.0	1	5.9	0.0	1	7.1	0.0	0	0	0
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
Unknown	0	0.0		1	5.9		0	0.0		0	0.0	0	0	0	0
SPA															
1	1	8.3	0.3	0	0.0	0.0	2	11.8	0.6	0	0.0	0.0	0	0	0
2	2	16.7	0.1	3	17.6	0.1	6	35.3	0.3	5	35.7	0.2	4	23.5	0.2
3	0	0.0	0.0	7	41.2	0.4	4	23.5	0.2	3	21.4	0.2	3	17.6	0.2
4	0	0.0	0.0	0	0.0	0.0	1	5.9	0.1	3	21.4	0.2	2	11.7	0.2
5	1	8.3	0.2	2	11.8	0.3	0	0.0	0.0	0	0.0	0.0	3	17.6	0.5
6	3	25.0	0.3	1	5.9	0.1	2	11.8	0.2	1	7.1	0.1	2	11.7	0.2
7	2	16.7	0.1	3	17.6	0.2	1	5.9	0.1	2	14.3	0.1	0	0	0
8	3	25.0	0.3	1	5.9	0.1	1	5.9	0.1	0	0.0	0.0	3	17.6	0.3
Unknown	0	0.0		0	0.0		0	0.0		0	0.0				

*Rates calculated based on less than 19 cases or events are considered unreliable

Reported Typhoid Fever Carrier Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2005-2009

	2005 (N=4)			2006 (N=3)			2007 (N=1)			2008 (N=4)			2009 (N=1)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
1-4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
5-14	0	0.0	0.0	1	33.3	0.1	0	0.0	0.0	0	0.0	0.0	1	100	0.1
15-34	1	25.0	0.0	0	0.0	0.0	0	0.0	0.0	1	25.0	0.0	0	0	0
35-44	0	0.0	0.0	1	33.3	0.1	0	0.0	0.0	2	50.0	0.1	0	0	0
45-54	2	50.0	0.2	0	0.0	0.0	1	100.	0.1	0	0.0	0.0	0	0	0
55-64	0	0.0	0.0	1	33.3	0.1	0	0.0	0.0	0	0.0	0.0	0	0	0
65+	1	25.0	0.1	0	0.0	0.0	0	0.0	0.0	1	25.0	0.1	0	0	0
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0	0
Race / Ethnicity															
Asian	1	25.0	0.1	1	33.3	0.1	0	0.0	0.0	1	25.0	0.1	0	0	0
Black	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
Hispanic	3	75.0	0.1	2	66.7	0.0	1	100.	0.0	3	75.0	0.1	1	100	0.1
White	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0	0
SPA															
1	1	25.0	0.3	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
2	0	0.0	0.0	0	0.0	0.0	1	100.	0.0	1	25.0	0.0	0	0	0
3	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	25.0	0.1	0	0	0
4	0	0.0	0.0	1	33.3	0.1	0	0.0	0.0	2	50.0	0.2	0	0	0
5	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
6	1	25.0	0.1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
7	2	50.0	0.1	2	66.7	0.1	0	0.0	0.0	0	0.0	0.0	0	0	0
8	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	100	0.1
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0	

*Rates calculated based on less than 19 cases or events are considered unreliable.

Figure 1. Incidence Rates by Years of Onset of Acute Typhoid Fever
LAC and US, 2000-2009

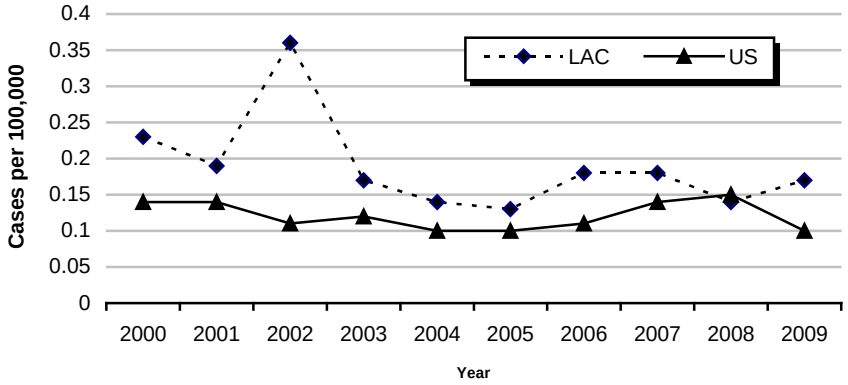


Figure 2. Acute Typhoid Fever Cases by Age Group
LAC, 2009 (N=17)

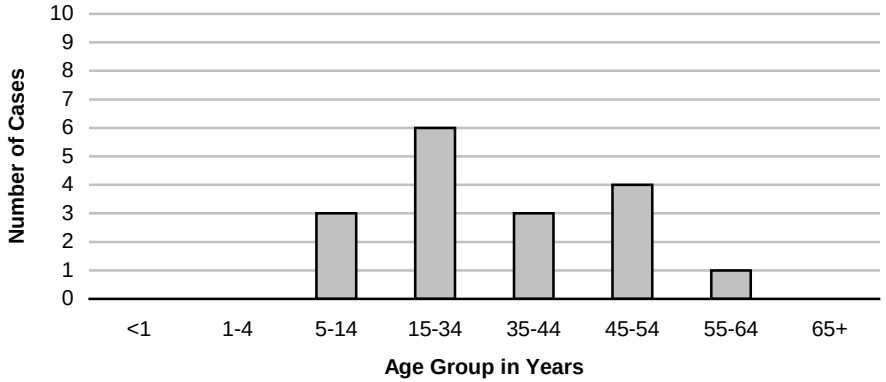


Figure 3. Reported Acute Typhoid Fever Cases by Race/Ethnicity
LAC, 2009 (N=17)

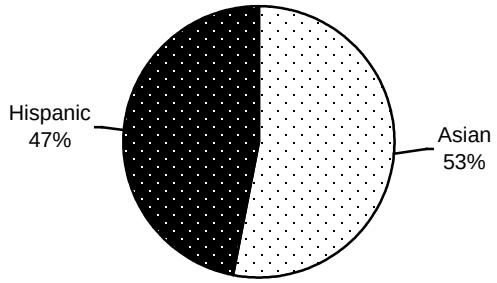
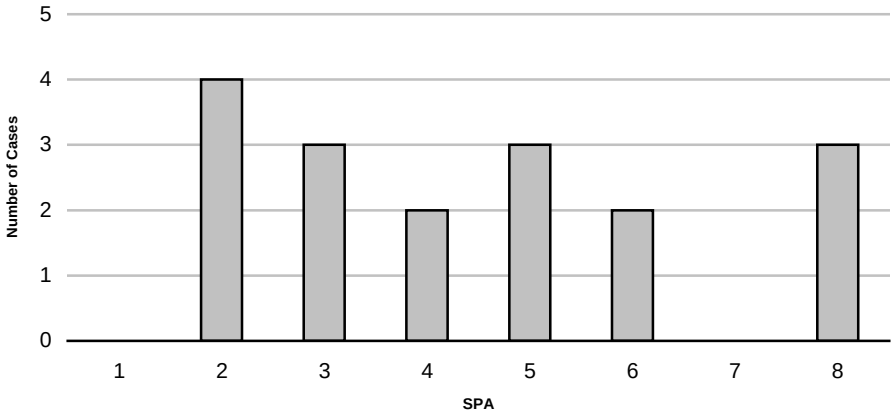


Figure 4. Reported Acute Typhoid Fever Cases by SPA
LAC, 2009 (N=17)



TYPHOID FEVER, ACUTE AND CARRIER

ACUTE TYPHOID CRUDE DATA	
Number of Cases	14
Annual Incidence[a]	
LA County	0.14[b]
California[c]	0.21
United States[c]	0.15
Age at Diagnosis	
Mean	25.8
Median	17
Range	1-75

[a]Cases per 100,000 population.
[b]Rates based on less than 19 observations are unreliable.
[c]Calculated from Final 2008 Reports of Nationally Notifiable Infectious Disease. MMWR 58(31);856-857;859-869.

DESCRIPTION

Typhoid fever, or enteric fever, is an acute systemic disease caused by the Gram-negative bacillus *Salmonella typhi*. Transmission may occur person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more commonly than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccines are available to those at high risk or travelers.

Among untreated acute cases, 10% will shed bacteria for three months after initial onset of symptoms and 2% to 5% will become chronic typhoid carriers. Some carriers are diagnosed by positive tissue specimen. Chronic carriers are by definition asymptomatic.

Hand washing after using the toilet, before preparing or serving food, and before and after caring for others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked and served at appropriate temperature; bottled water should be used for drinking as well as for brushing teeth and making ice. Vaccination should be considered when traveling in high endemic areas. LAC tests household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases.

2008 TRENDS AND HIGHLIGHTS

- The Los Angeles County (LAC) rates for acute typhoid fever cases continue to be higher than the US rates (Figure 1).
- The incidence of acute cases aged 5 to 14 years has increased (Figure 2).
- Asians continue to have the highest percentage of acute cases (Figure 3).
- Service Planning Area (SPA) 2 continues to have the highest number of acute cases (Figure 4).
- Typically most cases occur in the summer; in 2008, the majority of cases occurred in April (Figure 5).
- Four new chronic carriers were identified.
- Eight carriers are on the state typhoid registry and are monitored by LAC semi-annually.

Reported Acute Typhoid Fever Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2004-2008

	2004 (N=13)			2005 (N=12)			2006 (N=17)			2007 (N=17)			2008 (N=14)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
1-4	1	7.7	0.2	1	8.3	0.2	2	11.8	0.3	0	0.0	0.0	1	7.1	0.2
5-14	2	15.4	0.1	2	16.7	0.1	5	29.4	0.3	1	5.9	0.1	5	35.7	0.4
15-34	3	23.1	0.1	7	58.3	0.2	8	47.1	0.3	10	58.8	0.4	5	35.7	0.2
35-44	3	23.1	0.2	0	0.0	0.0	1	5.9	0.1	0	0.0	0.0	1	7.1	0.1
45-54	2	15.4	0.2	2	16.7	0.2	1	5.9	0.1	2	11.8	0.2	0	0.0	0.0
55-64	1	7.7	0.1	0	0.0	0.0	0	0.0	0.0	3	17.6	0.3	1	7.1	0.1
65+	1	7.7	0.1	0	0.0	0.0	0	0.0	0.0	1	5.9	0.1	1	7.1	0.1
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
Race / Ethnicity															
Asian	3	23.1	0.2	6	50.0	0.5	7	41.2	0.6	9	52.9	0.7	8	57.1	0.6
Black	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Hispanic	5	38.5	0.1	6	50.0	0.1	8	47.1	0.2	7	41.2	0.2	5	35.7	0.1
White	5	38.5	0.2	0	0.0	0.0	1	5.9	0.0	1	5.9	0.0	1	7.1	0.0
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	0	0.0		0	0.0		1	5.9		0	0.0		0	0.0	
SPA															
1	1	7.7	0.3	1	8.3	0.3	0	0.0	0.0	2	11.8	0.6	0	0.0	0.0
2	1	7.7	0.0	2	16.7	0.1	3	17.6	0.1	6	35.3	0.3	5	35.7	0.2
3	1	7.7	0.1	0	0.0	0.0	7	41.2	0.4	4	23.5	0.2	3	21.4	0.2
4	5	38.5	0.4	0	0.0	0.0	0	0.0	0.0	1	5.9	0.1	3	21.4	0.2
5	2	15.4	0.3	1	8.3	0.2	2	11.8	0.3	0	0.0	0.0	0	0.0	0.0
6	1	7.7	0.1	3	25.0	0.3	1	5.9	0.1	2	11.8	0.2	1	7.1	0.1
7	1	7.7	0.1	2	16.7	0.1	3	17.6	0.2	1	5.9	0.1	2	14.3	0.1
8	1	7.7	0.1	3	25.0	0.3	1	5.9	0.1	1	5.9	0.1	0	0.0	0.0
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	

*Rates calculated based on less than 19 cases or events are considered unreliable

Reported Typhoid Fever Carrier Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2004-2008

	2004 (N=3)			2005 (N=4)			2006 (N=3)			2007 (N=1)			2008 (N=4)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
1-4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
5-14	0	0.0	0.0	0	0.0	0.0	1	33.3	0.1	0	0.0	0.0	0	0.0	0.0
15-34	0	0.0	0.0	1	25.0	0.0	0	0.0	0.0	0	0.0	0.0	1	25.0	0.0
35-44	0	0.0	0.0	0	0.0	0.0	1	33.3	0.1	0	0.0	0.0	2	50.0	0.1
45-54	2	66.7	0.2	2	50.0	0.2	0	0.0	0.0	1	100.0	0.1	0	0.0	0.0
55-64	1	33.3	0.1	0	0.0	0.0	1	33.3	0.1	0	0.0	0.0	0	0.0	0.0
65+	0	0.0	0.0	1	25.0	0.1	0	0.0	0.0	0	0.0	0.0	1	25.0	0.1
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
Race / Ethnicity															
Asian	0	0.0	0.0	1	25.0	0.1	1	33.3	0.1	0	0.0	0.0	1	25.0	0.1
Black	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Hispanic	2	66.7	0.0	3	75.0	0.1	2	66.7	0.0	1	100.0	0.0	3	75.0	0.1
White	1	33.3	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
SPA															
1	0	0.0	0.0	1	25.0	0.3	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
2	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	100.0	0.0	1	25.0	0.0
3	1	33.3	0.1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	25.0	0.1
4	0	0.0	0.0	0	0.0	0.0	1	33.3	0.1	0	0.0	0.0	2	50.0	0.2
5	1	33.3	0.2	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
6	1	33.3	0.1	1	25.0	0.1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
7	0	0.0	0.0	2	50.0	0.1	2	66.7	0.1	0	0.0	0.0	0	0.0	0.0
8	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	

*Rates calculated based on less than 19 cases or events are considered unreliable.

Figure 1. Incidence Rates by Years of Onset of Acute Typhoid Fever, LAC and US, 1999-2008

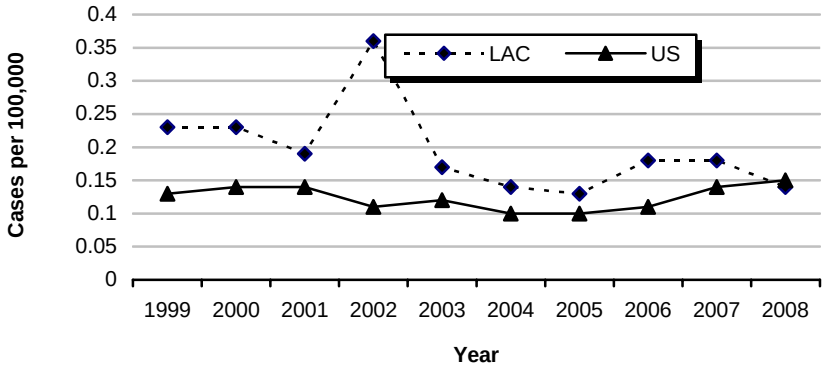


Figure 2. Acute Typhoid Fever Cases by Age Group LAC, 2008

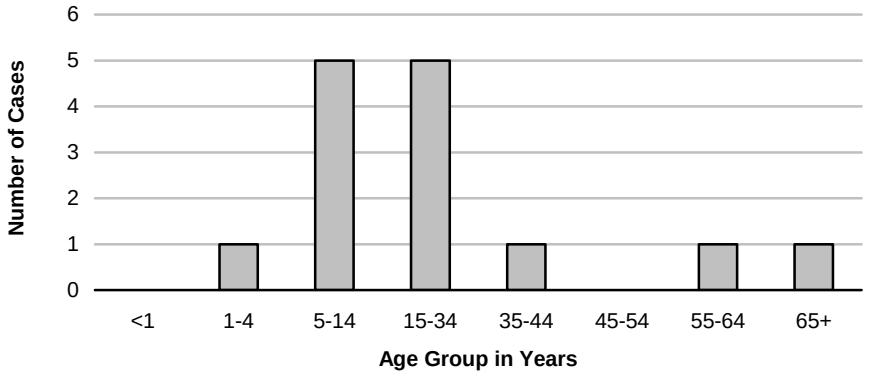


Figure 3. Reported Acute Typhoid Fever Cases by Race/Ethnicity LAC, 2008

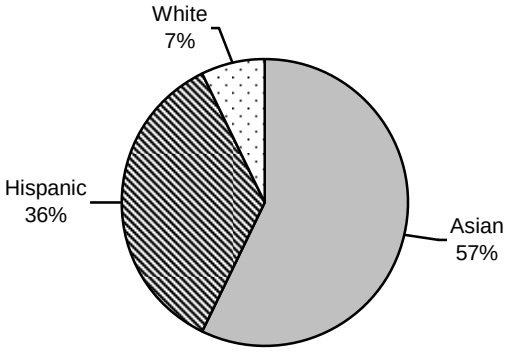


Figure 4. Reported Acute Typhoid Fever Cases by SPA LAC, 2008

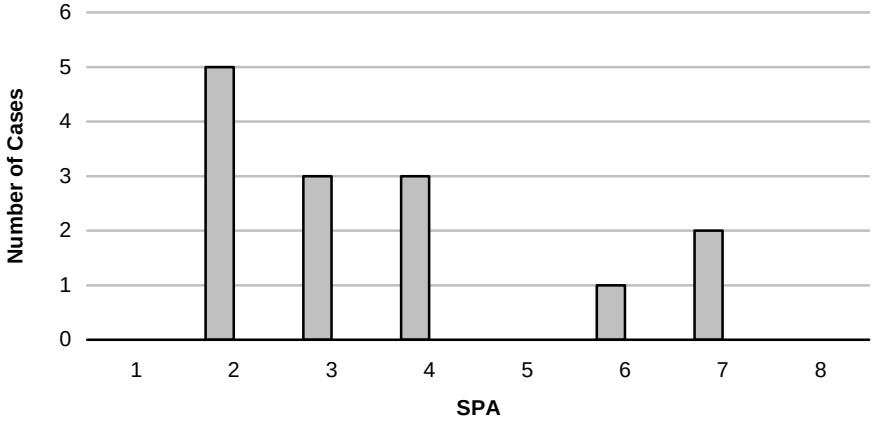


Figure 5. Acute Typhoid Fever Cases by Month of Onset
LAC, 2008 (N=14)

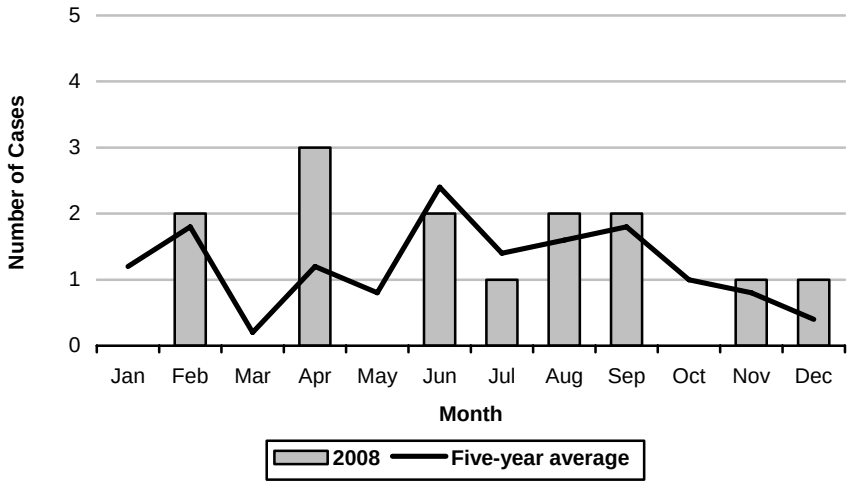
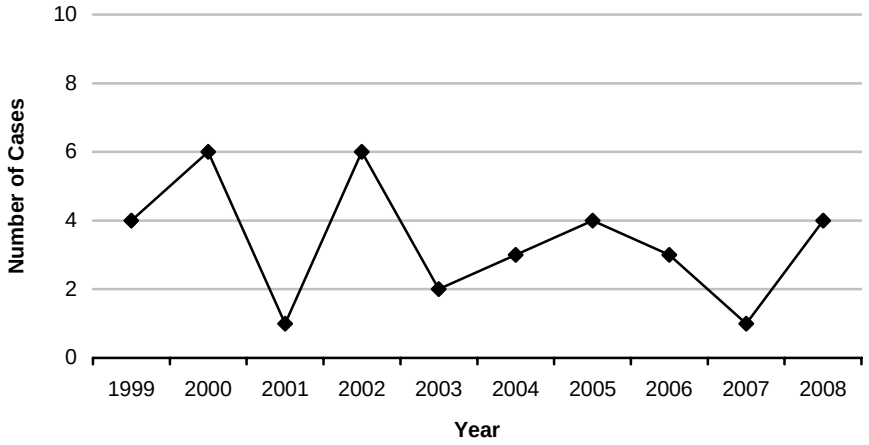


Figure 6. Cases of Chronic Typhoid Carrier by Year of Detection
LAC, 1999-2008

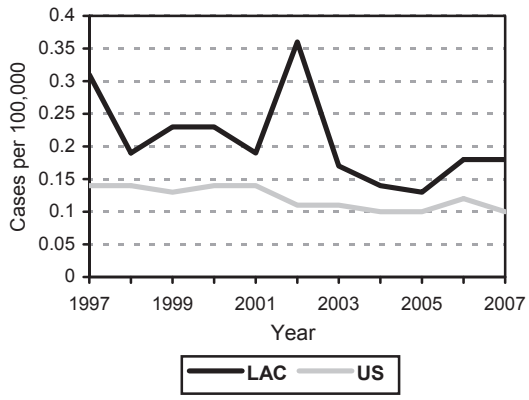


TYPHOID FEVER, ACUTE

CRUDE DATA	
Number of Cases	17
Annual Incidence[a]	
LA County	0.18[b]
California	0.16[c]
United States	0.10[c]
Age at Diagnosis	
Mean	36.4
Median	31.0
Range	13-75

[a] Cases per 100,000 population.
[b] Rates based on less than 19 observations are unreliable.
[c] Calculated from Final 2007 Reports of Nationally Notifiable Infectious diseases issue of MMWR (57:901, 903-913).

Figure 1
Acute Typhoid Fever
Incidence Rates by Year of Onset
LAC* and US, 1997–2007

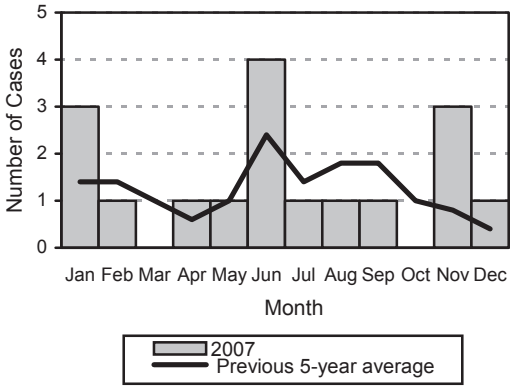


* Rates based on less than 20 observations are unreliable.

DESCRIPTION

Typhoid fever, or "enteric fever," is an acute systemic disease caused by the Gram-negative bacillus *Salmonella typhi*. Transmission may occur person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more commonly than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccine is available to those at high risk or travelers.

Figure 2
Acute Typhoid Fever
Cases by Month of Onset
LAC, 2007



DISEASE ABSTRACT

- Travel was the most common risk factor identified in LAC; 82.3% of cases reported travel to typhoid endemic countries. One case recently immigrated from an endemic country.
- Fifty-three percent of cases were Asian in 2007.

STRATIFIED DATA

Trends: The yearly incident has decreased after a peak in 2002 however, there was an increase in cases in 2006 but remains stable in 2007.

Age: In 2007, 59% of acute cases were in adults consistent with the five-year average (Figure 3).

Race/Ethnicity: In 2007, acute typhoid cases occurred in Asians and Latinos. There was one white case reported (Figure 4). Black cases are rare. In 2007, Asian cases increased compared to the five-year average.

Figure 3
Acute Typhoid Fever by Age Group
LAC, 2007

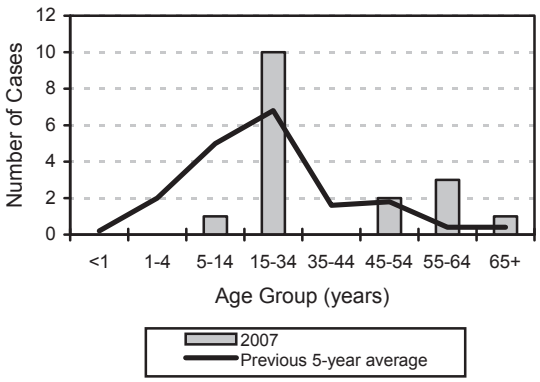
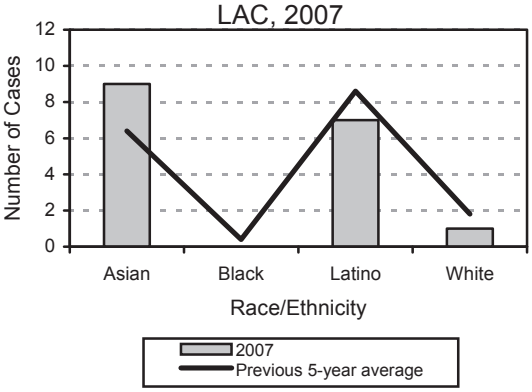


Figure 4
Acute Typhoid Fever by
Race/Ethnicity
LAC, 2007



PREVENTION

Handwashing after using the toilet, before preparing or serving food, and before and after caring for others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked and served at appropriate temperature; bottled water should be used for drinking as well as for brushing teeth and making ice. Vaccination should be considered when traveling in high endemic areas. LAC tests household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases.

COMMENTS

The majority of cases (n=14, 82.3%) traveled to endemic areas outside the US; Pakistan, India, Bangladesh, Philippines, and Cambodia were reported travel destinations. Some of the cases (n=6, 35%) traveled to India. Typhoid fever may have been a contributing cause to of death in one case.

ADDITIONAL RESOURCES

CDC General Information – http://www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

CDC Traveler's Health Information – http://wwwn.cdc.gov/travel/yellowBookCh4-Typhoid.aspx

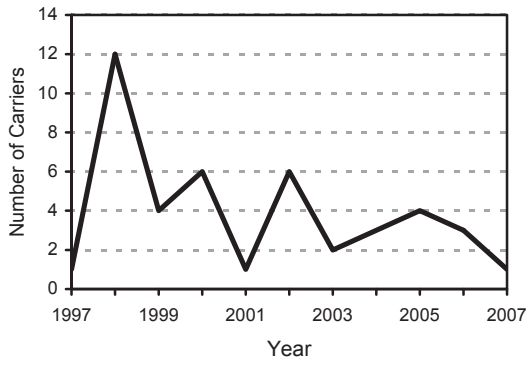
LAC General Information – http://www.lapublichealth.org/acd/Diseases/TyphoidCase.htm

TYPHOID FEVER, CARRIER

CRUDE DATA	
Number of New Carriers	1
Total Number of Carriers	10
Annual Incidence[a]	
LA County	N/A[b]
United States	N/A
Age at Diagnosis	
Mean	N/A
Range	N/A

[a] Cases per 100,000 population.
[b] Rates based on less than 19 observations are unreliable.

Figure 1
Typhoid Fever Carriers
by Year of Detection
LAC, 1997–2007



DESCRIPTION

The chronic typhoid carrier state can occur following symptomatic or subclinical infections of *Salmonella typhi*. Chronic carriers of typhoid are, by definition, asymptomatic. Transmission may occur person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Humans are the only known reservoir for S. typhi. Among untreated cases, 10% will shed bacteria for three months after initial onset of symptoms and 2-5% will become chronic carriers. The chronic carrier state occurs most commonly among middle-aged women.

DISEASE ABSTRACT

- There was one new carrier of typhoid fever identified in 2007.
- All typhoid carriers are monitored semi-annually and reported to the state registry. During 2007, no carriers of typhoid were closed at the state level. A total of 10 carriers remained under case management in LAC at the end of 2007.

COMMENTS

The single new carrier was foreign born. Previously unknown carriers are sometimes identified when testing household contacts to a new acute typhoid cases for S. *typhi.* The single new carrier was not associated with any acute cases. The carrier was identified during a cholecystectomy.

Upon identification, each new carrier is added to the typhoid carrier registry. All carriers are visited semi-annually by a public health nurse to assess and emphasize compliance with a signed typhoid carrier agreement. Per state code, carriers are to remain under the supervision of the local health officer until cleared. Conditions for release from supervision are also mandated by state code. An approved public health laboratory must test the cultures for the purpose of release.

ADDITIONAL RESOURCES

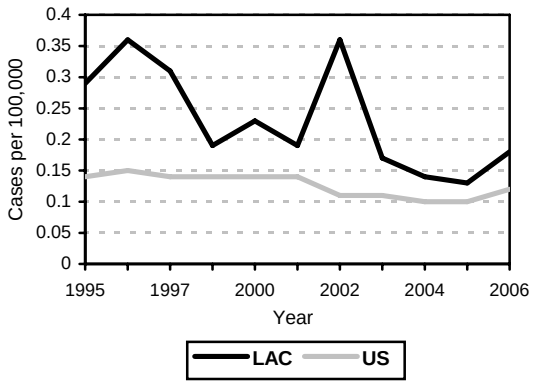
CDC General Information – http://www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm
LAC General Information – http://www.lapublichealth.org/acd/Diseases/TyphoidCarrier.htm

TYPHOID FEVER, ACUTE

CRUDE DATA	
Number of Cases	17
Annual Incidence[a]	
LA County	0.18[b]
California	0.21[c]
United States	0.12[c]
Age at Diagnosis	
Mean	18.70
Median	20.0
Range	1-48

[a] Cases per 100,000 population.
[b] Rates based on less than 19 observations are unreliable.
[c] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

Figure 1
Acute Typhoid Fever
Incidence Rates by Year of Onset
LAC* and US, 1996–2006

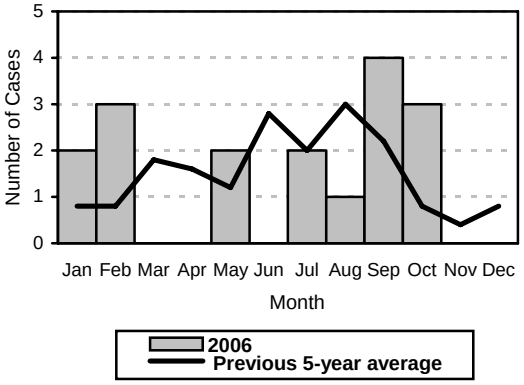


*Rates based on less than 20 observations are unreliable.

DESCRIPTION

Typhoid fever, or "enteric fever," is an acute systemic disease caused by the Gram-negative bacillus *Salmonella typhi*. Transmission may occur person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more commonly than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccine is available to those at high risk or travelers.

Figure 2
Acute Typhoid Fever
Cases by Month of Onset
LAC, 2006



DISEASE ABSTRACT

- Travel was the most common risk factor identified in LAC; 76% of cases reported travel to typhoid endemic countries. One case recently immigration and one case visited from endemic countries.
- Fifty-eight percent of cases were Asian in 2006.

STRATIFIED DATA

Trends: The yearly incident has decreased after a peak in 2002. However, there were 41% more cases in 2006 compared to 2005.

Seasonality: In 2006, the number of cases peaked in September (Figure 2); however, no cases seemed to coincide with the winter holidays. Typhoid cases occur sporadically throughout the year and are not necessarily associated with traditional travel periods.

Age: In 2005, 75% of acute cases were in adults consistent with the five-year average (Figure 3). The age group of 15-34 years has consistently represented the highest percentage of cases in the past five years.

Sex: The male-to-female ratio was 1:1.1.

Race/Ethnicity: In 2006, acute typhoid cases occurred in Asians and Latinos as seen in 2005. There were no cases in Blacks or White (Figure 4). In 2006, Asian cases increased compared to the five-year average. Continued surveillance is needed to identify emerging trends. I

Location: In 2006, SPA 3 had the majority of cases (41%). This may be due to the rise in Asian population in SPA 3. SPA 2 and 7 had three cases each (18%). SPA 6 and 8 had one case each (6%). SPA 5 had two cases (12%) (data not shown).

Figure 3
Acute Typhoid Fever
by Age Group
LAC, 2006

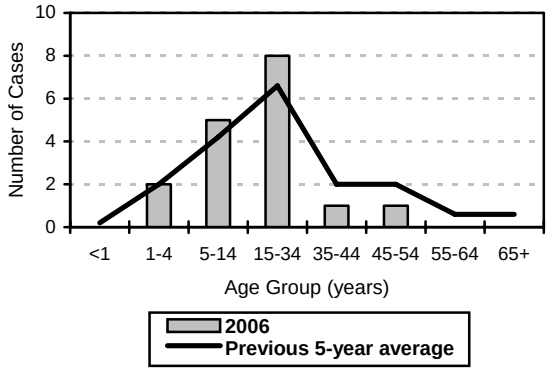
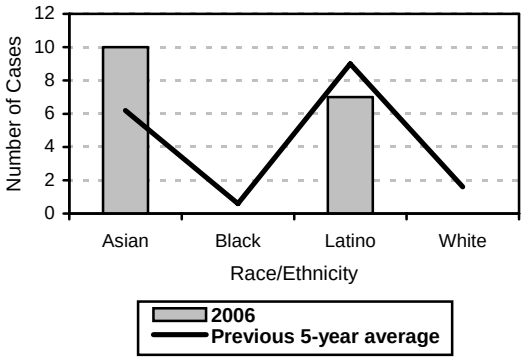


Figure 4
Acute Typhoid Fever
by Race/Ethnicity
LAC, 2006



PREVENTION

Handwashing after using the toilet, before preparing or serving food, and before and after caring for others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked and served hot; bottled water should be used for drinking as well as for brushing teeth and making ice. Vaccination should be considered when traveling in areas of high endemicity. LAC tests household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases.

COMMENTS

The majority of cases (n=11, 65%) traveled to endemic areas outside the US; Mexico, India, Bangladesh, Indonesia, Philippines and Cambodia were reported travel destinations. One case was infected by previously undiagnosed carrier in the household.

ADDITIONAL RESOURCES

General information about typhoid fever available from CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

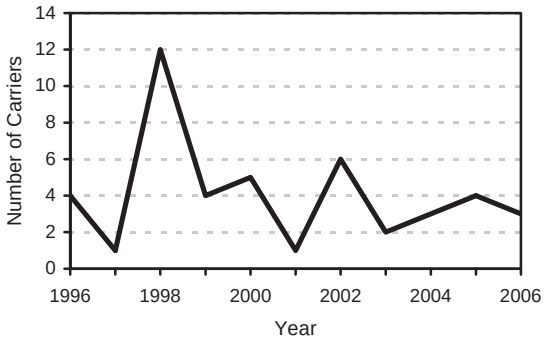
Traveler's health information is available at: wwwn.cdc.gov/travel/yellowBookCh4-Typhoid.aspx

General information and reporting information about this and other diseases in LAC is available at:
www.lapublichealth.org/acd/food.htm

TYPHOID FEVER, CARRIER

CRUDE DATA	
Number of New Carriers	3
Total Number of Carriers	17
Annual Incidence[a]	
LA County	N/A[b]
United States	N/A
Age at Diagnosis	
Mean	40 years
Range	5-61 years

Figure 1
Typhoid Fever Carriers
by Year of Detection
LAC, 1996–2006



[a] Cases per 100,000 population.
[b] Rates based on less than 19 observations are unreliable.

DESCRIPTION

The chronic typhoid carrier state can occur following symptomatic or subclinical infections of *Salmonella typhi*. Among untreated cases, 10% will shed bacteria for three months after initial onset of symptoms and 2-5% will become chronic carriers. The chronic carrier state occurs most commonly among middle-aged women.

DISEASE ABSTRACT

- There were three new carriers identified in 2006.
- During 2006, three carriers were closed as lost to follow-up, leaving a total of 17 carriers under case management in LAC at the end of 2006.

COMMENTS

All new carriers were foreign born; two were male and one was female. Two previously unknown carriers were identified while testing household contacts to a new acute typhoid case, all in the same household. The other carrier was identified when presented to the hospital with fevers and tested positive for Campylobacter; subsequently the patient was found to have *S. typhi* infection.

Upon identification, each new carrier is added to the typhoid carrier registry. All carriers are visited semi-annually by a public health nurse to assess and emphasize compliance with a signed typhoid carrier agreement. Per state code, carriers are to remain under the supervision of the local health officer until cleared. Conditions for release from supervision are also mandated by state code. An approved public health laboratory must test the cultures for the purpose of release.

ADDITIONAL RESOURCES

Disease information is available from CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

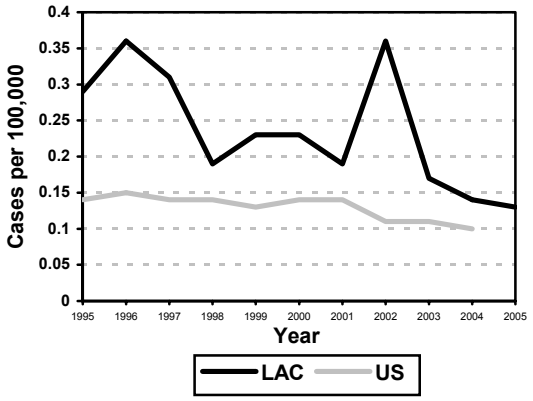
General information and reporting information about this and other diseases in LAC is available at:
www.lapublichealth.org/acd/food.htm

TYPHOID FEVER, ACUTE

CRUDE DATA	
Number of Cases	12
Annual Incidence[a]	
LA County	--- [b]
California	0.20
United States	0.11
Age at Diagnosis	
Mean	23.1
Median	20.5
Range	3-54
Case Fatality	
LA County	0.0%
United States	N/A

[a] Cases per 100,000 population.
[b] Rates based on less than 20 observations are unreliable.

Figure 1
Acute Typhoid Fever
Incidence Rates by Year of Onset
LAC* and US, 1995–2005



* Rates based on less than 20 observations are unreliable.

DESCRIPTION

Typhoid fever, or "enteric fever," is an acute systemic disease caused by the Gram-negative bacillus *Salmonella typhi*. Transmission may occur person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more commonly than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccine is available to those at high risk or travelers.

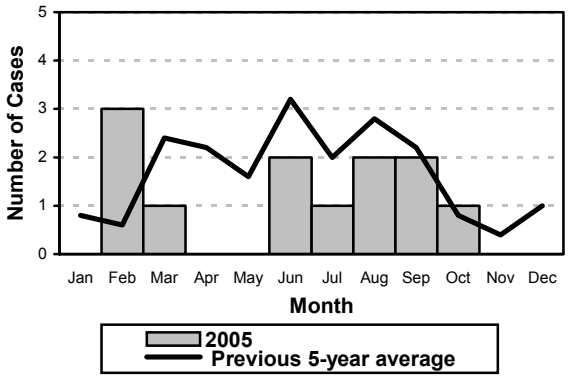
DISEASE ABSTRACT

- Travel was again the most common risk factor identified in LAC; 58% of cases reported visits to typhoid endemic countries.
- Adults represented 75% of all cases in 2005.

STRATIFIED DATA

Trends: The yearly incident has decreased after a peak in 2002. There were eight percent fewer cases in 2005. Twelve is the fewest number of cases reported in LAC in over twenty years.

Figure 2
Acute Typhoid Fever
Cases by Month of Onset
LAC, 2005



Seasonality: In 2005 the number of cases peaked in February, (Figure 2); however, no cases seemed to coincide with the winter holidays as in previous years. The majority of cases occurred in the summer months, however, the incidence was below the five-year average.

Age: In 2005, 75% of acute cases were in adults consistent with the five-year average (Figure 3). The age group of fifteen to thirty-four has consistently represented the highest percentage of cases in the past five years.

Sex: The male-to-female ratio was 3:1. In 2005, males had an increased incidence, unlike the previous years when there were more female cases.

Race/Ethnicity: In 2005, acute typhoid cases occurred in Asians and Latinos. There were no cases in Blacks or Whites (Figure 4).

Location: In 2005, SPA 6 and 8 each had three cases (25%). SPA 2 and 7 had two cases each (17%). SPA 1 and 5 had one case each (8%). SPA 3 and 4 had no reported cases.

Figure 3
Acute Typhoid Fever
by Age Group
LAC, 2005

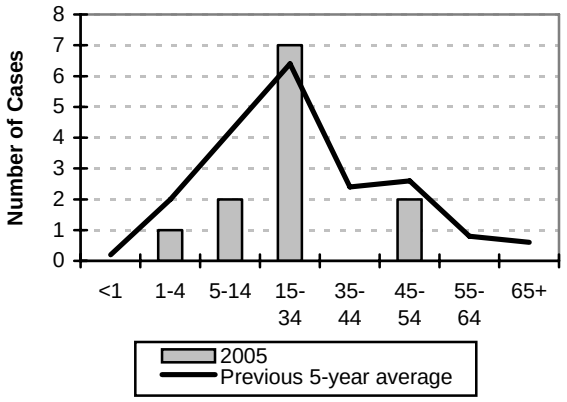
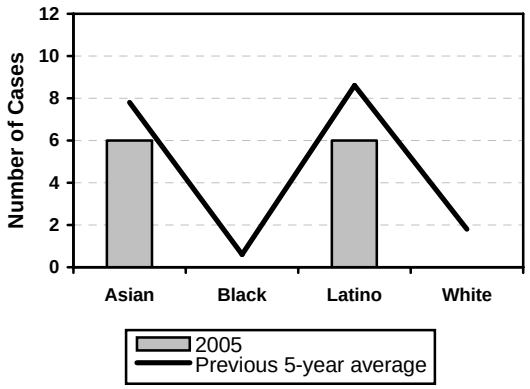


Figure 4
Acute Typhoid Fever
by Race/Ethnicity
LAC, 2005



PREVENTION

Handwashing after using the toilet, before preparing or serving food, and before and after caring for others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked and served hot; bottled water should be used for drinking as well as for brushing teeth and making ice. Vaccination should be considered when traveling in areas of high endemicity. LAC tests household contacts of confirmed cases for *S typhi* to identify any previously undiagnosed carriers or cases.

COMMENTS

The majority of cases (n=7, 58%) traveled to endemic areas outside the US; Mexico, Pakistan, India, Bangladesh, Indonesia and Chile were reported travel destinations. One adult case reported travel inside the US. Three cases were infected by previously undiagnosed carriers in the household; one family reported having a relative from Mexico that visits frequently.

ADDITIONAL RESOURCES

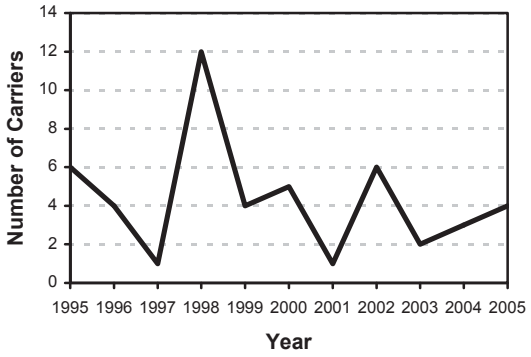
General information about typhoid fever available from CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

Traveler's health information is available at: www.cdc.gov./travel/diseases/typhoid.htm
General information and reporting information about this and other diseases in LAC is available at:
www.lapublichealth.org/acd/food.htm

TYPHOID FEVER, CARRIER

CRUDE DATA	
Number of New Carriers	4
Total Number of Carriers	14
Annual Incidence[a]	
LA County	N/A[b]
United States	N/A
Age at Diagnosis	
Mean	46 years
Range	26-69 years
Case Fatality	
LA County	0.0 %
United States	N/A

Figure 1
Typhoid Fever Carriers
by Year of Detection
LAC, 1995–2004



[a] Cases per 100,000 population.
[b] Rates based on less than 20 observations are unreliable.

DESCRIPTION

The chronic typhoid carrier state can occur following symptomatic or subclinical infections of *Salmonella typhi*. Among untreated cases, 10% will shed bacteria for three months after initial onset of symptoms and 2-5% will become chronic carriers. The chronic carrier state occurs most commonly among middle-aged women.

DISEASE ABSTRACT

- There were four new carriers identified in 2005.
- During 2005, two carriers were closed to follow-up and a total of fourteen carriers remained under case management in LAC at the end of 2005.

COMMENTS

All new carriers were foreign born; three were female. Three previously unknown carriers were found while testing household contacts to three new acute typhoid cases, all in the same household. The other carrier was identified during a diagnostic tissue culture.

Upon identification, each new carrier is added to the typhoid carrier registry. All carriers are visited semi-annually by a public health nurse to assess and emphasize compliance with a signed typhoid carrier agreement. Per state code, carriers are to remain under the supervision of the local health officer until cleared. Conditions for release from supervision are also mandated by state code. An approved public health laboratory must test the cultures for the purpose of release.

ADDITIONAL RESOURCES

Disease information is available from CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

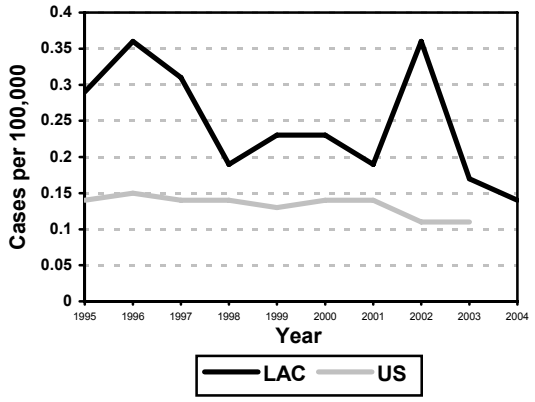
General information and reporting information about this and other diseases in LAC is available at:
www.lapublichealth.org/acd/food.htm

TYPHOID FEVER, ACUTE

CRUDE DATA	
Number of Cases	13
Annual Incidence[a]	
LA County	--- [b]
California	0.20
United States	0.11
Age at Diagnosis	
Mean	35.3
Median	35
Range	1-67
Case Fatality	
LA County	0.0%
United States	N/A

[a] Cases per 100,000 population.
[b] Rates based on less than 20 observations are unreliable.

Figure 1
Acute Typhoid Fever
Incidence Rates by Year of Onset
LAC* and US, 1995–2004



* Rates based on less than 20 observations are unreliable.

DESCRIPTION

Typhoid fever, or "enteric fever," is an acute systemic disease caused by the gram-negative bacillus *Salmonella typhi*. Transmission may occur person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more common than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccine is available to those at high risk or travelers.

DISEASE ABSTRACT

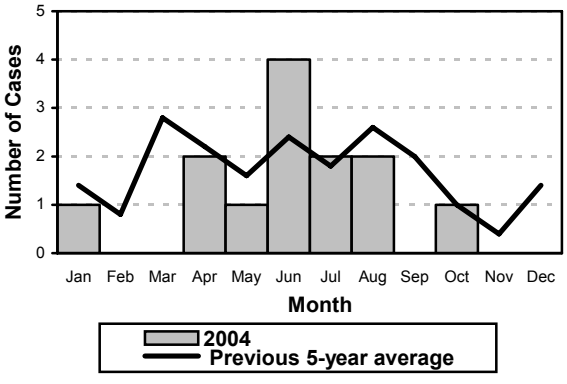
- Travel was again the most common risk factor identified in LAC; 85% of cases reported visits to typhoid endemic countries.
- Adults represented 77% of all cases in 2004.

STRATIFIED DATA

Trends: There has been a two year decrease since a peak in 2002. There were 19% fewer cases in 2004. Thirteen is the fewest number of cases reported in LAC in over twenty years.

Seasonality: Most cases again occurred in spring and summer (Figure 2), however, no cases seemed to coincide with the winter holidays as in previous

Figure 2
Acute Typhoid Fever
Cases by Month of Onset
LAC, 2004



years. In 2004 cases peaked in June, while in previous years, March had consistently had more cases (as indicated by the five year average).

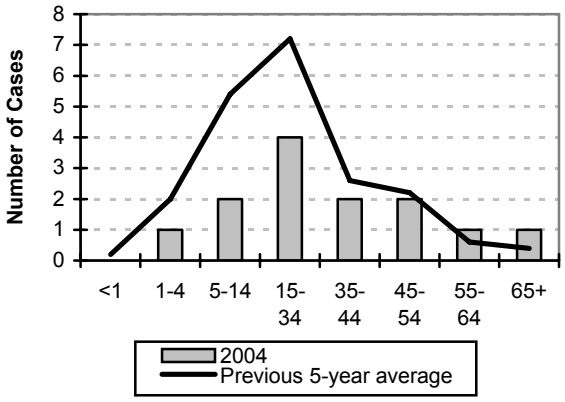
Age: In 2004, 77% of acute cases were in adults and this is consistent with the five year average. In the previous two years, children aged 5–14 years represented a high percentage of cases.

Sex: The male-to-female ratio was 1:1.6. There has been a female preponderance since 2002.

Race/Ethnicity: No one group was overrepresented in 2004. In the three previous years, typhoid fever cases were seen primarily in Latinos. Black cases are rare (Figure 4).

Location: Each SPA had at least one case. SPA 4 had five cases (38 %). SPA 5 had two cases (15 %).

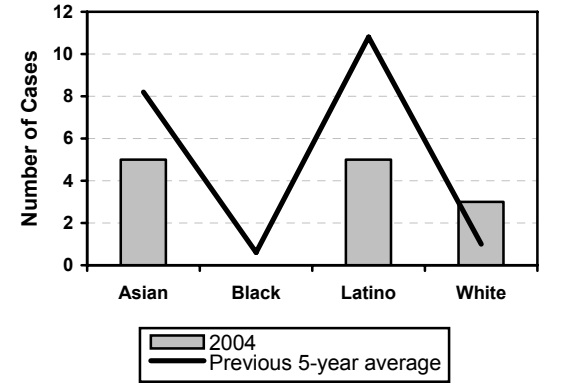
Figure 3
Acute Typhoid Fever
by Age Group
LAC, 2004



PREVENTION

Handwashing after using the toilet, before preparing or serving food, and before and after caring for others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked and served hot; bottled water should be used for drinking as well as for brushing teeth and making ice. Vaccination should be considered when traveling in areas of high endemicity. LAC tests household contacts of confirmed cases for *S typhi* to identify any previously undiagnosed carriers or cases.

Figure 4
Acute Typhoid Fever
by Race/Ethnicity
LAC, 2004



COMMENTS

The majority of cases (N=11, 85%) traveled to endemic areas outside the US; Mexico, Central and South America, Samoa, Bangladesh, Nepal and Indonesia, were reported travel destinations. One adult case denied travel, however, this history was not reliable. One case, a child, was infected by a previously undiagnosed carrier in the household.

ADDITIONAL RESOURCES

General information about typhoid fever available from CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

Traveler's health information is available at: www.cdc.gov./travel/diseases/typhoid.htm

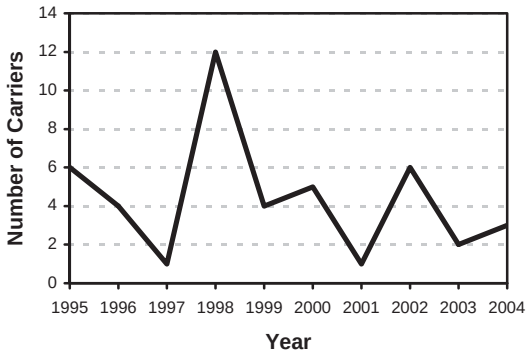
General information and reporting information about this and other diseases in LAC is available at:
www.lapublichealth.org/acd/food.htm

TYPHOID FEVER, CARRIER

CRUDE DATA	
Number of New Carriers	3
Total Number of Carriers	12
Annual Incidence[a]	
LA County	N/A[b]
United States	N/A
Age at Diagnosis	
Mean	53 years
Case Fatality	
LA County	0.0 %
United States	N/A

[a] Cases per 100,000 population.
[b] Rates based on less than 20 observations are unreliable.

Figure 1
Typhoid Fever Carriers
by Year of Detection
LAC, 1995–2004



DESCRIPTION

The chronic typhoid carrier state can occur following symptomatic or subclinical infections of *Salmonella typhi*. Among untreated cases, 10% will shed bacteria for three months after initial onset of symptoms and 2-5% will become chronic carriers. The chronic carrier state occurs most commonly among middle aged women.

DISEASE ABSTRACT

- There were three new carriers identified in 2004.
- During 2004, no carriers were closed to follow-up and a total of twelve carriers were under case management in LAC.

COMMENTS

All new carriers were foreign born; two were male. One previously unknown carrier was found while testing household contacts to a new acute typhoid case. The other two carriers were identified during diagnostic tissue culture.

Upon identification, each new carrier is added to the typhoid carrier registry. All carriers are visited semi-annually by a public health nurse to assess and emphasize compliance with a signed typhoid carrier agreement. Per state code, carriers are to remain under the supervision of the local health officer until cleared. Conditions for release from supervision are also mandated by state code. All cultures done for the purpose of release must be done by an approved public health laboratory.

ADDITIONAL RESOURCES

Disease information is available from CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

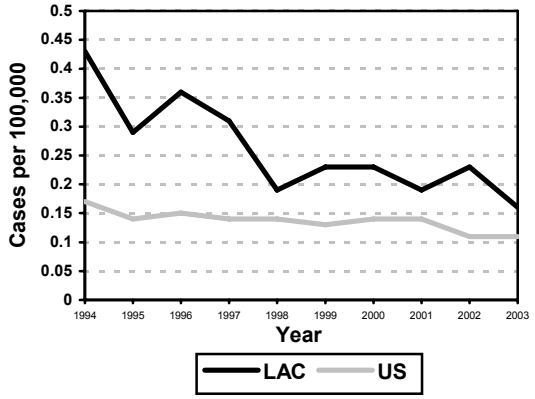
General information and reporting information about this and other diseases in LAC is available at:
www.lapublichealth.org/acd/food.htm

TYPHOID FEVER, ACUTE

CRUDE DATA	
Number of Cases	16
Annual Incidence[a]	
LA County	0.16[b]
California	0.25
United States	0.11
Age at Diagnosis	
Mean	23.4
Median	13
Range	4–55
Case Fatality	
LA County	0.0%
United States	N/A

[a] Cases per 100,000 population.
[b] Rates based on less than 20 observations are unreliable.

Figure 1
Acute Typhoid Fever
Incidence Rates by Year of Onset
LAC* and US, 1994–2003



* Rates based on less than 20 observations are unreliable.

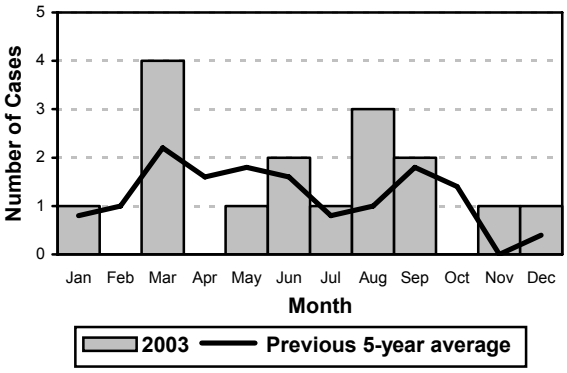
DESCRIPTION

Typhoid fever, or "enteric fever," is an acute systemic disease caused by the gram-negative bacillus *Salmonella typhi*. Transmission may occur person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more common than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccine is available to those at high risk or travelers.

DISEASE ABSTRACT

- Travel was again the most common risk factor with 63% of cases reporting visits to typhoid endemic countries.
- School aged children represented 50% of all cases.

Figure 2
Acute Typhoid Fever
Cases by Month of Onset
LAC, 2003



STRATIFIED DATA

Trends: Compared to the previous year, there were 51% fewer cases in 2003. The difference is attributed to the two outbreaks reported in 2002 and no outbreaks reported in 2003. Sixteen is the fewest cases reported in LAC in twenty years.

Seasonality: Fifty percent of cases occurred during the summer months. In previous years, most cases occurred

in late spring and summer, coinciding with holidays and school vacations (Figure 2). March has also consistently had more cases as indicated by the 5-year average.

Age: In 2003, children aged 5–14 years continued to have a high incidence (50%; n=8, Figure 3). Most of these children (89%) were born in the USA, but 78% of these children had traveled to countries where typhoid fever is endemic. Travel dates for these children did not necessarily coincide with school vacations in the spring, summer and winter.

Sex: The male-to-female ratio was 1:1.6. The female preponderance seen in 2002 and 2003 may be due to the decreasing number of reported cases.

Race/Ethnicity: In 2003, typhoid fever cases were again seen primarily in Latinos, who accounted for 56% of cases (Figure 4).

Location: Cases resided in one of four SPAs—SPA 2 (31%), SPAs 6 and 7 (25% each) and SPA 8 (19%).

Figure 3
Acute Typhoid Fever
by Age Group
LAC, 2003

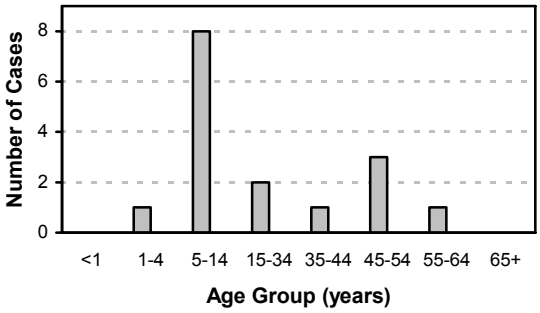
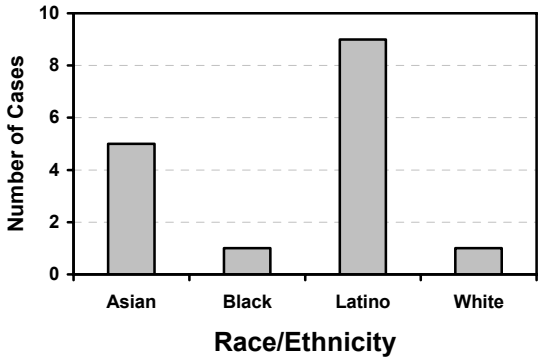


Figure 4
Acute Typhoid Fever
by Race/Ethnicity
LAC, 2003



PREVENTION

Handwashing after using the toilet, before preparing or serving food, and before and after caring for others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked and served hot; bottled water should be used for drinking as well as for brushing teeth and making ice. Vaccination should be considered when traveling in areas of high endemicity. LAC tests household contacts of confirmed cases for *S typhi* to identify and previously undiagnosed carriers or cases.

COMMENTS

The majority of the cases (n=10, 63%) traveled to endemic areas outside the US; Mexico, Guatemala, India and Nigeria were reported travel destinations. Four cases (25%) denied specific foreign travel. One case had household contacts (HHCs) born in a typhoid endemic country; the contacts were culture negative. Another case moved between LAC and another jurisdiction. HHCs in LAC were culture negative; the other jurisdiction declined to test the household. One case was infected by a previously undiagnosed carrier.

ADDITIONAL RESOURCES

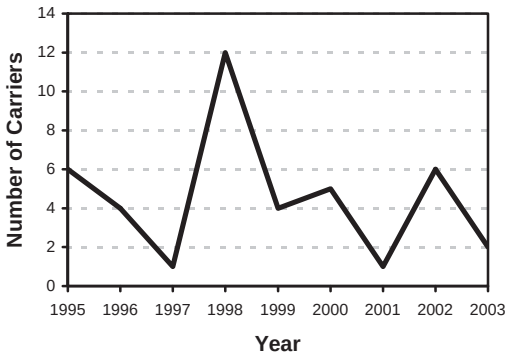
General information about typhoid fever available from CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

Traveler's health information is available at: www.cdc.gov./travel/diseases/typhoid.htm

TYPHOID FEVER, CARRIER

CRUDE DATA	
Number of New Carriers	2
Total Number of Carriers	15
Annual Incidence[a]	
LA County	N/A[b]
United States	N/A
Age at Diagnosis	
Mean	35 years
Case Fatality	
LA County	N/A
United States	N/A

Figure 1
Typhoid Fever Carriers
by Year of Detection
LAC, 1995–2003



[a] Cases per 100,000 population.
[b] Rates based on less than 20 observations are unreliable.

DESCRIPTION

The chronic typhoid carrier state can occur following symptomatic or subclinical infections of *Salmonella typhi*. Among untreated cases, 10% will shed bacteria for three months after initial onset of symptoms and 2-5% will become chronic carriers. The chronic carrier state occurs most commonly among middle age women.

DISEASE ABSTRACT

- In 2003, seven carriers were closed to follow-up; two expired due to non-typhoid related causes and five were cleared according to protocol.
- During 2003, a total of 15 carriers were under case management in LAC.

COMMENTS

Both new carriers were foreign born; both were female. One previously unknown carrier was found while testing household contacts to a new acute typhoid case. The other carrier was identified during diagnostic tissue culture. Upon identification, each new carrier is added to the typhoid carrier registry. All carriers are visited semi-annually by a public health nurse to assess and emphasize compliance with a signed typhoid carrier agreement.

ADDITIONAL RESOURCES

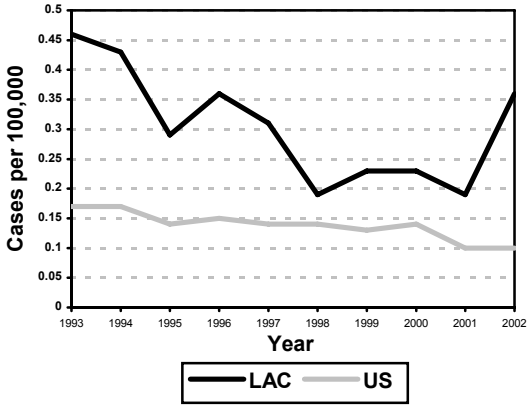
Additional information is available from CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

TYPHOID FEVER, ACUTE

CRUDE DATA	
Number of Cases	33
Annual Incidence[a]	
LA County	0.4
California	0.2
United States	0.1
Age at Diagnosis	
Mean	19
Median	18
Range	0–65 years
Case Fatality	
LA County	0.0%
United States	N/A

[a] Cases per 100,000 population.

Figure 1
Acute Typhoid Fever
Incidence Rates by Year of Onset
LAC* and US, 1993–2002



* Rates based on fewer than 20 observations are unreliable.

DESCRIPTION

Typhoid fever, or "enteric fever," is an acute systemic disease caused by the gram-negative bacillus *Salmonella typhi*. Transmission may occur person to person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more common than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*.

DISEASE ABSTRACT

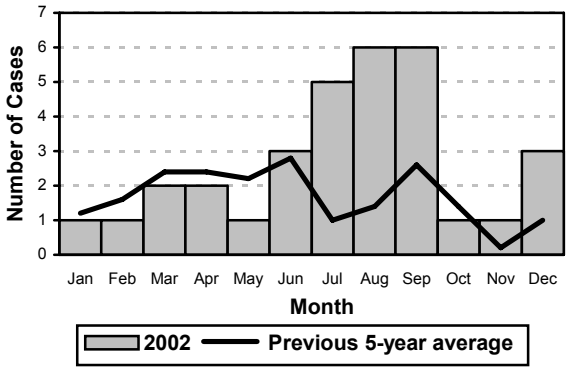
- During 2002, 27% (n=9) of all cases were related to two separate outbreaks, both occurred among Latino extended families during the summer season.
- Travel continued to be the most common risk factor—52% of cases reported visits to typhoid-endemic countries.

STRATIFIED DATA

Trends: The rate of typhoid fever cases increased due in part to two outbreaks. In 2001, the rate was 0.18.

Seasonality: The majority of cases (60%) had onset during the summer, which was the time period of the two outbreaks. In previous years, most cases occurred in late spring and summer, coinciding with holidays and school vacations (Figure 2).

Figure 2
Acute Typhoid Fever
Cases by Month of Onset
LAC, 2002



Age: In 2002, although persons aged 15–34 years continued to have a high incidence (Figure 3), persons aged 5–14 and 1–4 years also had high incidence. This was due to the two outbreaks occurring in extended families with many children.

Sex: The male-to-female ratio was 0.9:1.

Race/Ethnicity: In 2002, acute typhoid fever cases were seen primarily in Latinos, who accounted for 52% of cases (Figure 4). In 2001, Asians had the highest percentage. This change was due to the two outbreaks in the Latino community.

Location: The two outbreaks occurred in SPAs 1 and 2. Sporadic cases were seen in all SPAs except SPA 5.

Figure 3
Acute Typhoid Fever
by Age Group
LAC, 2002

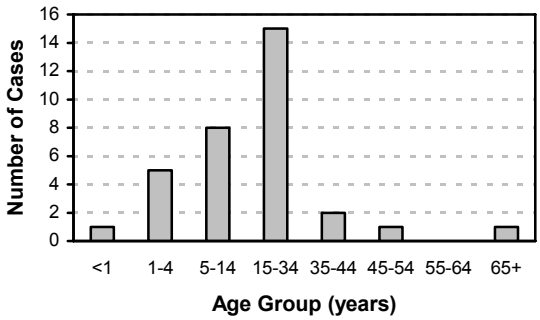
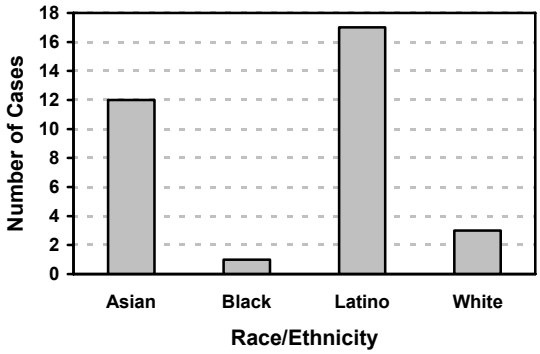


Figure 4
Acute Typhoid Fever
by Race/Ethnicity
LAC, 2002



PREVENTION

Handwashing after using the toilet, before preparing or serving food, and before and after caring for others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked and served hot; bottled water should be used for drinking as well as for brushing teeth and making ice. Vaccination should be considered when traveling in areas of high endemicity. LAC tests household contacts of confirmed cases for *S. typhi* to identify and previously undiagnosed carriers or cases.

COMMENTS

Nine cases (27%) were related to the two outbreaks. Two previously unknown carriers were identified as sources for these outbreaks. Half of the cases (n=17, 52%) were associated with travel to endemic areas outside the US; of these cases, most (n=11) acquired disease while in Asia and the Pacific Islands. Five cases acquired disease in Mexico and Central and South America.

Four cases (12%), that were not outbreak-related, denied foreign travel or having recent visitors from areas outside the US. It is presumed they became infected in LAC. Household contacts were tested for *S. typhi* and no source of infection was identified.

ADDITIONAL RESOURCES

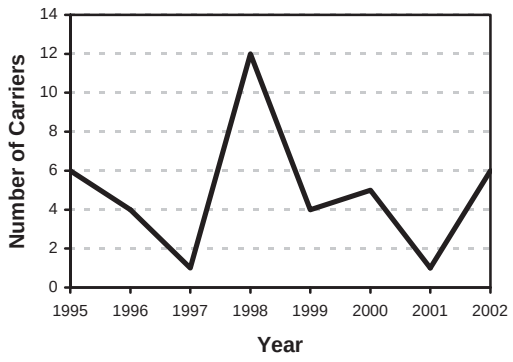
General disease information is available at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

Traveler's health information is available at: www.cdc.gov./travel/diseases/typhoid.htm

TYPHOID FEVER, CARRIER

CRUDE DATA	
Number of New Carriers	6
Annual Incidence[a]	
LA County	---[b]
United States	N/A
Age at Diagnosis	
Mean	43
Median	37
Range	16–89 years
Case Fatality	
LA County	N/A
United States	N/A

Figure 1
Typhoid Fever Carriers
by Year of Detection
LAC, 1995–2002



[a] Cases per 100,000 population.
[b] Rates based on less than 20 observations are unreliable.

DESCRIPTION

The chronic typhoid carrier state can occur following symptomatic or subclinical infection with *Salmonella typhi*. Among untreated cases, 10% will shed bacteria for three months after initial onset of symptoms and 2–5% will become chronic carriers. The chronic carrier state occurs most commonly among women in middle age.

DISEASE ABSTRACT

- Six new typhoid carriers were identified in 2002.
- Two typhoid carriers were identified while investigating two separate outbreaks.
- During 2002, a total of 17 carriers were under case management in LAC.

COMMENTS

All new carriers were foreign born; 66% were female. Three previously unknown carriers were found while testing household contacts to new acute typhoid cases. Of these three, two were sources for outbreaks (see Typhoid Fever, Acute). The remaining three carriers were identified during diagnostic tissue culture.

Upon identification, each new carrier is added to the typhoid carrier registry. All carriers are visited semi-annually by a public health nurse to assess and emphasize compliance with a signed typhoid carrier agreement. During 2002, two carriers died of non-typhoid related conditions, two moved, two were cleared as typhoid carriers and one was lost to follow up.

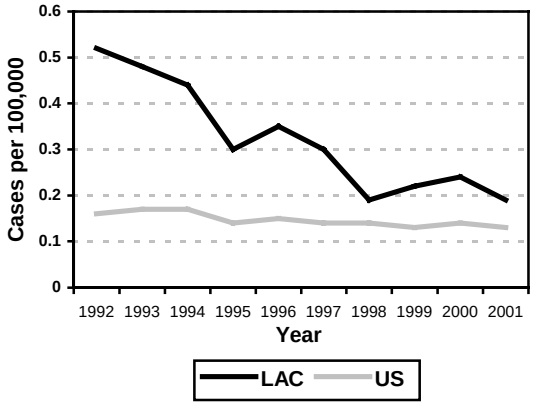
ADDITIONAL RESOURCES

Disease information is available from the CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

TYPHOID FEVER, ACUTE

CRUDE DATA	
Number of Cases	17
Annual Incidence[a]	
LA County	0.2[b]
California	0.2
United States	0.1
Age at Diagnosis	
Mean	32
Median	32
Range	2-90 years
Case Fatality	
LA County	0.0%
United States	N/A

Figure 1
Acute Typhoid Fever
Incidence Rates by Year of Onset
LAC* and US, 1992 - 2001



* Rates based on less than 20 observations are unreliable.

[a] Cases per 100,000 population.
[b] Rates based on less than 20 observations are unreliable.

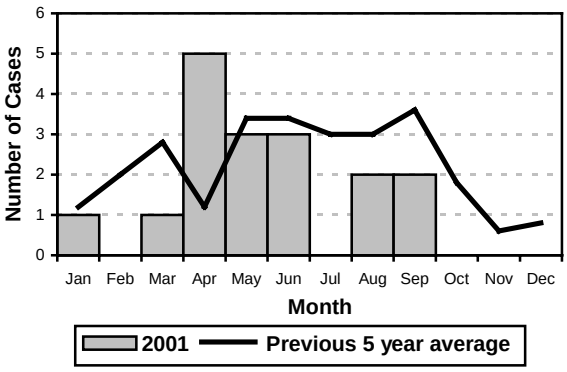
DESCRIPTION

Typhoid fever, or "enteric fever," is an acute systemic disease caused by the gram-negative bacillus *Salmonella typhi*. Transmission may occur person to person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more common than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*.

DISEASE ABSTRACT

- In LAC, 82% of the acute typhoid fever cases were associated with recent immigration and foreign travel.
- Most cases were reported among Asians, followed by Latinos.
- In 2001, no cases were linked to previously unknown carriers.

Figure 2
Acute Typhoid Fever
Cases by Month of Onset
LAC, 2001



STRATIFIED DATA

Trends: The rate of reported typhoid fever cases remained steady after decreasing for ten years. Annual incidence had declined from 0.67 in 1990 to 0.22 in 1999. In 2000, the incidence rate was 0.23. In 2001, the rate was 0.18.

Seasonality: In LAC, the majority of cases (65%) had onset in Spring. Most cases occur in late

spring and summer, coinciding with holidays and school vacation (Figure 2).

Age: In 2001, persons aged 15-34 years continued to have the highest incidence (Figure 3). This may be because persons in this age group travel or immigrate more.

Sex: The male-to-female rate ratio was 1.25:1. This slight male preponderance is typical.

Race/Ethnicity: Acute typhoid fever cases continue to be seen primarily in Asians, who accounted for 59% of cases (Figure 4). Latinos had the second highest incidence with 29% of cases. This trend may be related to individuals traveling to their countries of origin (see comments related to travel).

Location: Eighty-eight percent of cases were seen in SPAs 6, 5 and 4.

Figure 3
Acute Typhoid Fever
by Age Group
LAC, 2001

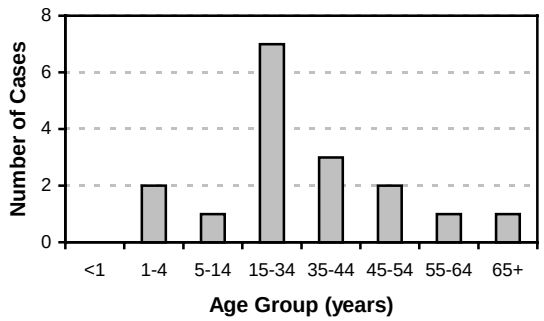
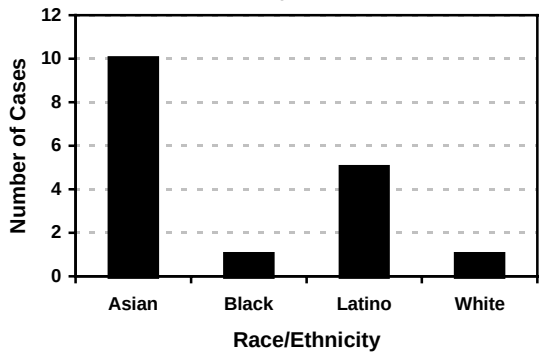


Figure 4
Acute Typhoid Fever
by Race/Ethnicity
LAC, 2001



COMMENTS

Fourteen cases (82%) were associated with travel to endemic areas outside the US. Of these cases, 9 apparently acquired disease in Asia and 5 acquired disease in Mexico or Central America.

Three cases (18%) denied foreign travel or having recent visitors from areas outside the US. It is presumed they became infected in LAC. Household contacts were tested for *S. typhi* and no source of infection was identified.

PREVENTION

Handwashing after using the toilet, before preparing or serving food, and before and after caring for others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked and served hot; bottled water should be used for drinking as well as for brushing teeth and making ice. Vaccination should be considered when traveling in areas of high endemicity.

ADDITIONAL RESOURCES

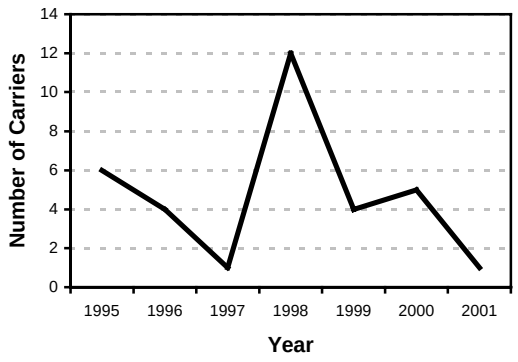
General disease information is available at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

Traveler's health information is available at: www.cdc.gov./travel/diseases/typhoid.htm

TYPHOID FEVER, CARRIER

CRUDE DATA	
Number of New Carriers	1
Annual Incidence[a]	
LA County	N/A
United States	N/A
Age at Diagnosis	
Mean	N/A
Median	N/A
Range	N/A
Case Fatality	
LA County	0.0%
United States	N/A

Figure 1
Typhoid Fever Carriers
by Year of Detection
LAC, 1995-2001



[a] Cases per 100,000 population.

DESCRIPTION

The chronic typhoid carrier state can occur after symptomatic or subclinical infections of *Salmonella typhi*. Among untreated cases, 10% will shed bacteria for three months after initial onset of symptoms and 2-5% will become chronic carriers. The chronic carrier state occurs most commonly among women in middle age.

DISEASE ABSTRACT

- During 2001, a total of 18 carriers were under case management in LAC. Only one new typhoid carrier was identified in 2001.
- Four carriers were successfully treated and cleared with antibiotics.
- Two previously known carriers moved into LAC from other jurisdictions.

COMMENTS

The single new carrier was foreign born. Previously unknown carriers are sometimes found when testing household contacts to new acute typhoid cases for *S. typhi*. The single new carrier was not associated with any acute cases. Each new carrier is added to the typhoid carrier registry. All carriers are visited semi-annually by a public health nurse to assess and emphasize compliance with a signed typhoid carrier agreement.

ADDITIONAL RESOURCES

Disease Information is available at: www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm