

National Typhoid and Paratyphoid Fever Surveillance Annual Summary, 2013

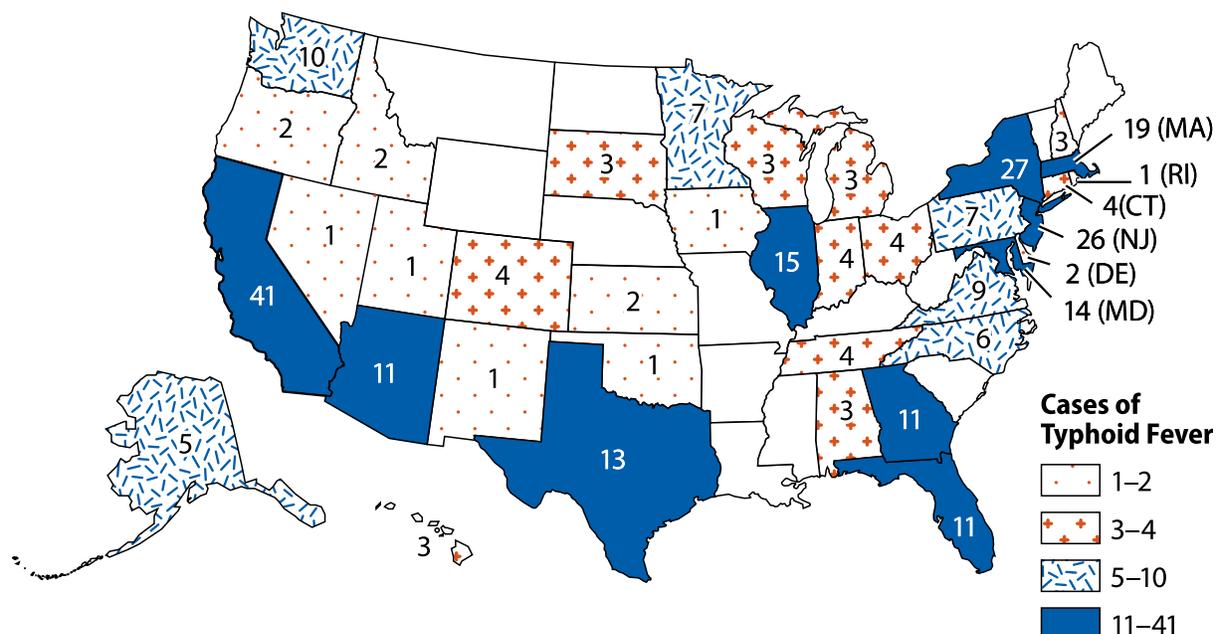
An overview of the National Typhoid and Paratyphoid Fever Surveillance (NTPFS) system is available at http://www.cdc.gov/ncezid/dfwed/PDFs/typhi_surveillance_overview_508c.pdf

National Typhoid and Paratyphoid Fever Surveillance Data

Jurisdictions¹ reporting at least one typhoid or paratyphoid fever² case to the NTPFS during 2013 are shown in Figures 1 and 2.

- 37 jurisdictions reported 284 typhoid fever cases (Figure 1)
- 24 jurisdictions reported 73 paratyphoid fever cases (Figure 2)

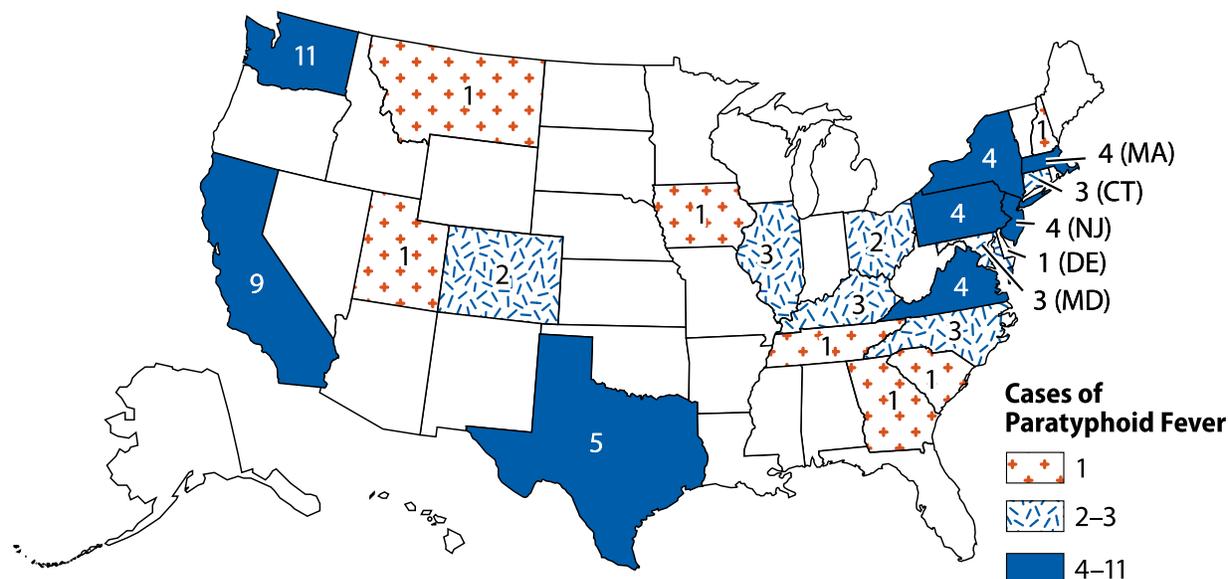
Figure 1. Jurisdictions reporting at least one typhoid fever case to National Typhoid and Paratyphoid Fever Surveillance, 2013 (n = 284)



¹ Includes all 50 states and District of Columbia

² Paratyphoid fever is caused by *Salmonella* serotypes Paratyphi A, Paratyphi B, and Paratyphi C. Two distinct pathotypes of Paratyphi B are recognized; one is associated with paratyphoid fever and the other is associated with uncomplicated gastroenteritis. The two pathotypes have distinct virulence characteristics, and are differentiated based on the ability to ferment tartrate. The paratyphoidal pathotype is unable to ferment tartrate and is designated serotype Paratyphi B; the nonparatyphoidal pathotype ferments tartrate and is designated serotype Paratyphi B var. L (+) tartrate+. Only those isolates laboratory confirmed as not able to ferment tartrate are included in the annual NTPFS summary. For many Paratyphi B reports submitted to CDC, this information is not available; these reports are therefore excluded from the NTPFS summary.

Figure 2. Jurisdictions reporting at least one paratyphoid fever case to National Typhoid and Paratyphoid Fever Surveillance, 2013 (n = 73; all were Paratyphi A)



Demographic and clinical characteristics of patients with typhoid fever and paratyphoid fever are shown in Tables 1 and 2.

- The median age of patients with typhoid fever was 27 years
- The median age of patients with paratyphoid fever was 31 years
- Zero patients with typhoid fever died
- Zero patients with paratyphoid fever died

Table 1. Demographic and clinical characteristics of patients with typhoid fever reported to National Typhoid and Paratyphoid Fever Surveillance, 2013 (n = 284)

Characteristic (total number)	Count	Percent
Median age in years (range)	27 (1–93)	---
Female (n = 281)	135	48
US Citizen (n = 105)	72	69
Foreign travel (n = 279) ¹	227	81
Vaccinated ² (n = 171)	8	5
Site of isolation (n = 278)		
Blood	236	85
Stool	34	12
Gallbladder	6	2
Other	2	1
Hospitalized (n = 280)	213	76
Died (n = 249)	0	0

¹ Travel destinations are shown in Table 3

² Received typhoid vaccination within 5 years before onset of illness; of the 8 cases in vaccinated persons, 1 received only the oral, live attenuated vaccine (Ty21a), 1 received the Vi capsular polysaccharide vaccine (ViCPS) and the oral, live attenuated vaccine, and the vaccine type was not reported for the other 6.

Table 2. Demographic and clinical characteristics of patients with paratyphoid fever reported to National Typhoid and Paratyphoid Fever Surveillance, 2013 (n = 73; all were Paratyphi A)

Characteristic (total number)	Count	Percent
Median age in years (range)	31, (2 - 59)	---
Female (n = 72)	39	54
US Citizen (n = 21)	17	81
Foreign travel (n = 71) ¹	64	90
Site of isolation (n = 73)	61	11
Blood	61	84
Stool	11	15
Gallbladder	1	1
Hospitalized (n = 72)	45	62
Died (n = 70)	0	0

¹ Travel destinations are shown in Table 3.

- Two-hundred twenty-seven (80%) patients with typhoid fever reported traveling or living outside the United States in the 30 days before illness onset, 52 (18%) reported no travel, and travel status was not reported for 5 (2%) patients.
- Sixty-four (88%) patients with paratyphoid fever reported traveling or living outside the United States in the 30 days before illness onset, 7 (10%) reported no travel, and travel status was not reported for 2 (2%) patients.
- Of those patients reporting travel, 207 (74%) patients with typhoid fever and 59 (83%) patients with paratyphoid fever reported travel to a single destination (Table 3).
- Visiting friends or relatives was the most common reason for travel for patients with typhoid fever (51%) and paratyphoid fever (44%)

Table 3. Travel destinations for patients who reported a single destination country, National Typhoid and Paratyphoid Fever Surveillance, 2013

Travel Destination	Typhoid (n = 207)	Paratyphoid (n = 59)
	no. (%)	no. (%)
India	117 (57)	34 (58)
Bangladesh	18 (9)	4 (7)
Pakistan	11 (5)	6 (10)
Guatemala	9 (4)	---
El Salvador	7 (3)	---
Cambodia	---	11 (19)
Indonesia	---	3 (5)
Other	45 (22) ¹	1 (2) ²

¹ Patients reported travel to Haiti (6), Mexico (5), Nepal (5), Samoa (5), Philippines (5), Indonesia (3), Cambodia (2), Chad (2), Dominican Republic (2), Nigeria (2), Tanzania (2), The Bahamas (1), Democratic Republic of the Congo (1), Peru (1), Rwanda (1), and Ukraine (1)

² Patient reported travel to Nepal

Surveillance performance measures

Reporting statistics and goals for National Typhoid and Paratyphoid Fever Surveillance (below) were proposed at the 2012 Council of State and Territorial Epidemiologists (CSTE) Annual Meeting (2).

State-specific summaries were sent to state epidemiologists in November 2015. Health department personnel may request their state's reporting statistics by emailing edebresponse@cdc.gov.

Table 4. National typhoid fever reporting statistics by year, National Typhoid and Paratyphoid Fever Surveillance (NTPFS), 2000–2013¹

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of jurisdictions reporting typhoid fever cases to NTPFS ²	50	50	50	50	50	50	50	50	50	50	50	49	50	51
Number of case reports received by NTPFS	258	232	201	275	248	204	324	414	437	343	434	363	298	284
Number of cases reported to NNDSS	377	368	321	356	322	324	354	435	449	398	472	394	358	350
NTPFS case reports as a percentage of NNDSS reports ³	68%	63%	63%	77%	77%	63%	92%	95%	97%	86%	92%	92%	83%	81%
Reporting timeliness														
Proportion of reports submitted within 30 days after specimen obtained ⁴	61%	52%	64%	64%	70%	68%	47%	48%	56%	57%	48%	57%	33%	49%
Reporting completeness														
Proportion of reports with "complete" demographic information ⁵	84%	92%	91%	87%	93%	85%	85%	89%	80%	76%	84%	90%	88%	86%
Proportion of reports with "complete" epidemiologic information ⁶	86%	91%	89%	89%	78%	90%	71%	72%	80%	75%	85%	70%	68%	47%
Proportion of reports with "complete" travel destination information ⁷	98%	96%	99%	100%	98%	97%	98%	99%	98%	99%	99%	99%	100%	99%
Proportion of reports with "complete" vaccination information ⁸	84%	79%	83%	73%	73%	75%	69%	71%	65%	63%	70%	53%	64%	60%
Proportion of reports with "complete" vaccine type information ⁹	80%	20%	75%	33%	43%	50%	64%	39%	32%	57%	46%	44%	50%	25%

¹ The national typhoid fever and paratyphoid fever surveillance data are dynamic; data from previous years may change as surveillance case reports are added or corrected

² Includes all states and District of Columbia

³ Is not calculable when no cases are reported to NNDSS; can be greater than 100% if more cases are reported to NTPFS than to NNDSS

⁴ Is not calculable when no NTPFS reports are received or when dates are not submitted

⁵ For purposes of this report, "complete" demographic information is defined as information for all of the following: age or date of birth, sex, hospitalization status, and case outcome

⁶ For purposes of this report, "complete" epidemiologic information is defined as information for all of the following: international travel, whether the patient was a food handler, whether part of an outbreak, and citizenship

⁷ For purposes of this report, "complete" travel destination information is defined as report of at least one travel destination if patient reported travel outside of the US in the 30 days before illness onset

⁸ For purposes of this report, "complete" vaccination information is defined as a response of "Yes", "No", or "Don't know" regarding receipt of typhoid vaccination primary series or booster within 5 years before illness onset

⁹ For the purposes of this report, "complete" vaccine type information was calculated for patients whose reports specified receipt of typhoid fever vaccination within 5 years before illness onset; a response of "unknown" was considered missing for this variable

Table 5. National paratyphoid fever reporting statistics by year, National Typhoid and Paratyphoid Fever Surveillance (NTPFS), 2007–2013¹

	2007	2008	2009	2010	2011	2012	2013
Number of jurisdictions reporting paratyphoid fever cases to NTPFS ²	50	50	50	50	49	50	51
Number of case reports received	4	86	77	116	111	81	73
Reporting timeliness							
Proportion of reports submitted within 30 days after specimen obtained ³	25%	61%	30%	35%	43%	41%	39%
Reporting completeness							
Proportion of reports with "complete" demographic information ⁴	100%	81%	77%	89%	89%	84%	95%
Proportion of reports with "complete" epidemiologic information ⁵	100%	80%	87%	89%	67%	67%	49%
Proportion of reports with "complete" travel destination information ⁶	100%	100%	100%	100%	100%	100%	100%
Proportion of reports with "complete" vaccination information ⁷	50%	49%	52%	47%	39%	46%	32%
Proportion of reports with "complete" vaccine type information ⁸	100%	80%	83%	79%	67%	88%	

1 The national typhoid fever and paratyphoid fever surveillance data are dynamic; data from previous years may change as surveillance case reports are added or corrected

2 Includes all states and District of Columbia

3 Is not calculable when no NTPFS reports are received or when dates are not submitted

4 For purposes of this report, "complete" demographic information is defined as information for all of the following: age or date of birth, sex, hospitalization status, and case outcome

5 For purposes of this report, "complete" epidemiologic information is defined as information for all of the following: international travel, whether the patient was a food handler, whether part of an outbreak, and citizenship

6 For purposes of this report, "complete" travel destination information is defined as report of at least one travel destination if patient reported travel outside of the US in the 30 days before illness onset

7 For purposes of this report, "complete" vaccination information is defined as a response of "Yes", "No", or "Don't know" regarding receipt of typhoid vaccination primary series or booster within 5 years before illness onset

8 For the purposes of this report, "complete" vaccine type information was calculated for patients whose reports specified receipt of typhoid fever vaccination within 5 years before illness onset; a response of "unknown" was considered missing for this variable

Table 6. Proposed 2- and 4-year national typhoid and paratyphoid fever reporting goals, National Typhoid and Paratyphoid Surveillance (NTPFS)

	Proposed National Goals					
	Typhoid Current Performance (2013)	Paratyphoid Current Performance (2013)	2014 Goal	2016 Goal	Typhoid Performance Status (2013)	Paratyphoid Performance Status (2013)
Number of jurisdictions reporting to NTPFS ¹	51	51	All	All	Meets goals	Meets goals
NTPFS reports as a percentage of NNDSS reports ²	81%	--	≥95%	≥100%	Needs improvement	--
Reporting timeliness						
Proportion of reports submitted within 30 days after specimen obtained ³	49%	40%	85%	100%	Needs improvement	Needs improvement
Reporting completeness						
Proportion of reports with "complete" demographic information ⁴	86%	95%	85%	95%	Meets 2014 goal	Meets 2016 goal
Proportion of reports with "complete" epidemiologic information ⁵	47%	49%	85%	95%	Needs improvement	Needs improvement
Proportion of reports with "complete" travel destination information ⁶	99%	100%	99%	100%	Meets 2014 goal	Meets 2016 goal
Proportion of reports with "complete" vaccination information ⁷	60%	32%	95%	100%	Needs improvement	Needs improvement
Proportion of reports with "complete" vaccine type information ⁸	25%	95%	85%	100%	Needs improvement	Meets 2014 goal

1 Includes all states and District of Columbia

2 Is not calculable when no cases are reported to NNDSS; can be greater than 100% if more cases are reported to NTPFS than to NNDSS

3 Is not calculable when no NTPFS reports are received or when dates are not submitted

4 For purposes of this report, "complete" demographic information is defined as information for all of the following: age or date of birth, sex, hospitalization status, and case outcome

5 For purposes of this report, "complete" epidemiologic information is defined as information for all of the following: international travel, whether the patient was a food handler, whether part of an outbreak, and citizenship

6 For purposes of this report, "complete" travel destination information is defined as report of at least one travel destination if patient reported travel outside of the US in the 30 days before illness onset

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NNDSS Data

The National Notifiable Disease Surveillance System (NNDSS) collects and compiles reports of nationally notifiable infectious diseases, including typhoid fever. Paratyphoid fever is not nationally notifiable. Reports can be found at http://www.cdc.gov/mmwr/mmwr_nd/index.html

Antimicrobial Resistance Data

The National Antimicrobial Resistance Monitoring System (NARMS) monitors antimicrobial resistance among enteric bacteria (including *Salmonella* serotypes Typhi and Paratyphi A and C) from humans. In *Enterobacteriaceae*, resistance to nalidixic acid, an elementary quinolone, correlates with decreased susceptibility to ciprofloxacin (MIC = 0.12 µg/mL) and possible fluoroquinolone treatment failure. For *Salmonella* serotypes Typhi and Paratyphi, NARMS defined resistance to traditional first-line antimicrobial agents, ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole (ACT/S) as multidrug resistant.

The most recently published NARMS annual report is from 2013, available at <http://www.cdc.gov/narms/pdf/2013-annual-report-narms-508c.pdf>. The 2013 data showed the following:

For *Salmonella* serotype Typhi isolates

- 67% were resistant to nalidixic acid
- 9% were resistant to ciprofloxacin
- No isolates were resistant to ceftriaxone
- 10% were multidrug resistant

For *Salmonella* serotype Paratyphi isolates

- 81% were resistant to nalidixic acid
- 4% were resistant to ciprofloxacin
- No isolates were resistant to ceftriaxone
- No isolates were multidrug resistant

Outbreak Data

The Foodborne Disease Outbreak Surveillance System (FDOSS) collects reports of foodborne disease outbreaks from local, state, tribal, and territorial public health agencies. The most recently published foodborne outbreaks annual report is from 2013, available at <http://www.cdc.gov/foodsafety/pdfs/foodborne-disease-outbreaks-annual-report-2013-508c.pdf>. Data on foodborne disease outbreaks are available at www.cdc.gov/foodborneoutbreaks.

The Waterborne Disease and Outbreak Surveillance System (WBDOS) collects reports of waterborne disease outbreaks associated with drinking water and recreational water from local, state, tribal, and territorial public health agencies.

Reports are available at <http://www.cdc.gov/healthywater/surveillance/surveillance-reports.html>.

- In 2013, no typhoid fever outbreaks were reported.

References

1. CDC. National Antimicrobial Resistance Monitoring System for Enteric Bacteria (NARMS): Human Isolates Final Report, 2013. Atlanta, Georgia: U.S. Department of Health and Human Services, CDC, 2015.
2. Fullerton KA, Newton AE, Heiman KE, Silk BJ. Cholera, vibriosis, typhoid and paratyphoid fever: National Surveillance. 2012 Council of State and Territorial Epidemiologists Annual Conference, Omaha, NE; June 3-7, 2012.

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