# National Typhoid and Paratyphoid Fever Surveillance Annual Summary, 2011

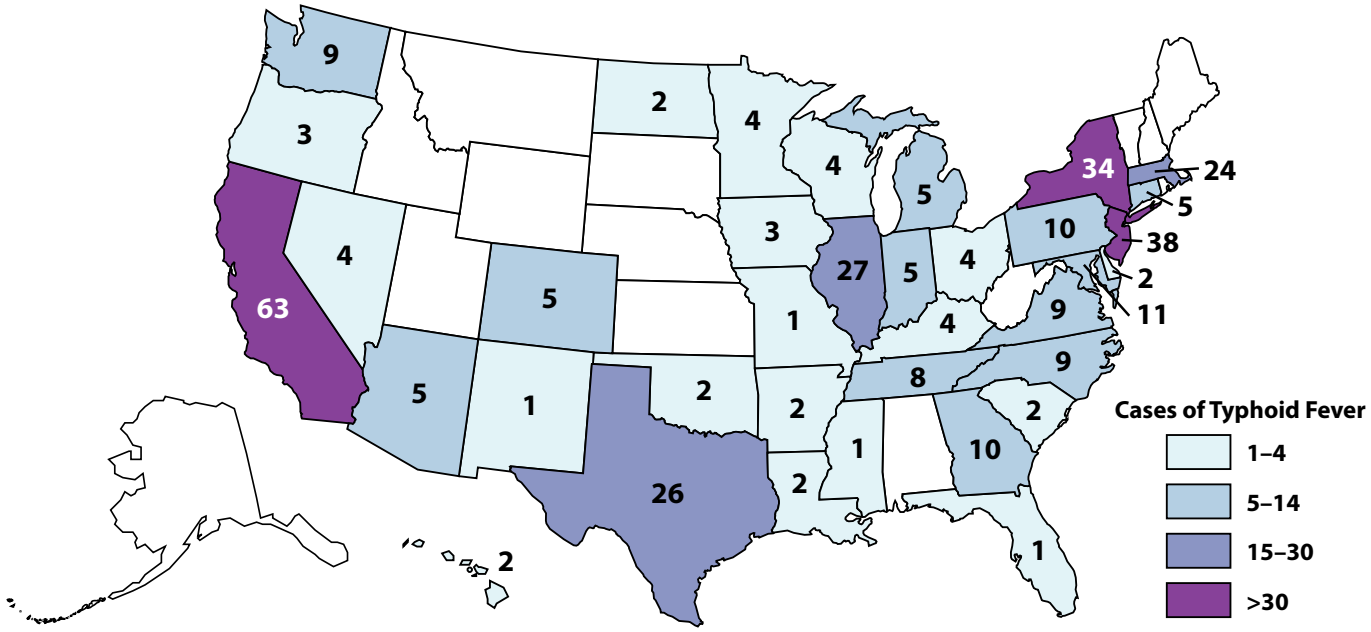
An overview of the National Typhoid and Paratyphoid Fever Surveillance (NTPFS) system is available at http://www.cdc.gov/ncezid/dfwed/PDFs/typhi_surveillance_overview_508c.pdf.

## National Typhoid and Paratyphoid Fever Surveillance Data

States reporting at least one typhoid or paratyphoid fever[1] case to the NTPFS during 2011 are shown in Figures 1 and 2.

- 37 states reported 347 typhoid fever cases (Figure 1)
- 21 states reported 107 paratyphoid fever cases (106 Paratyphi A; 1 Paratyphi C) (Figure 2)

**Figure 1.** States reporting at least one typhoid fever case to National Typhoid and Paratyphoid Fever Surveillance, 2011 (n=347)




[1] 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.

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Division of Foodborne Waterborne, and Environmental Diseases

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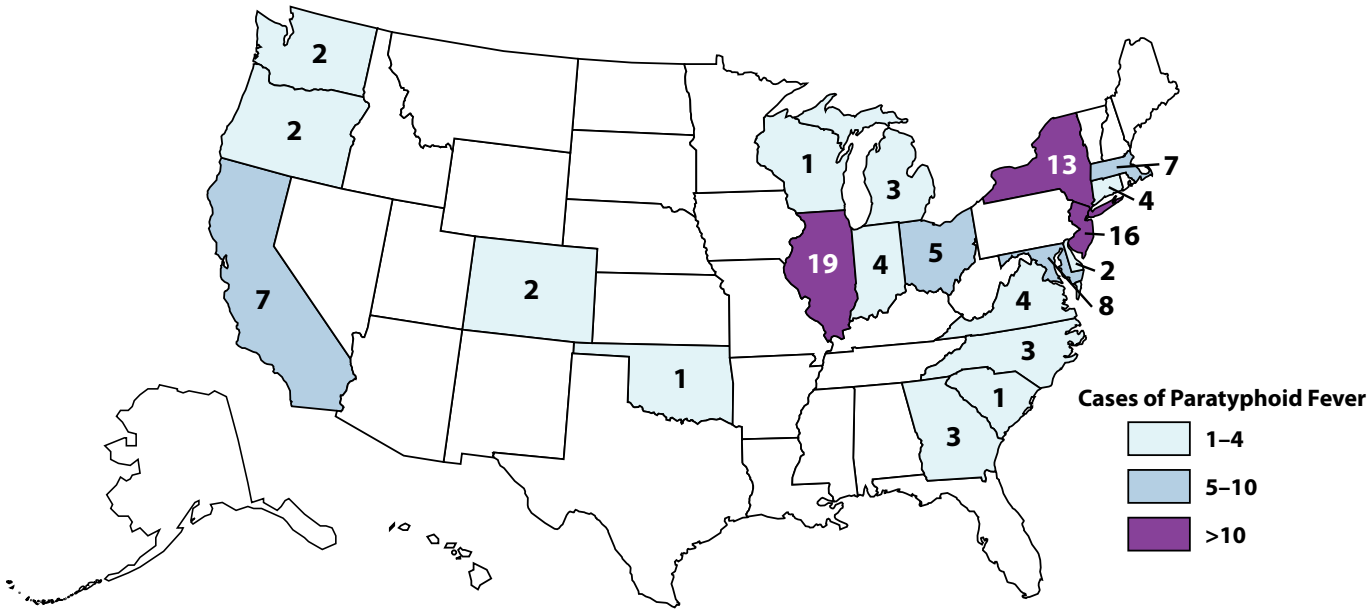
**Figure 2.** States reporting at least one paratyphoid fever case to National Typhoid and Paratyphoid Fever Surveillance, 2011 (n=107; 106 Paratyphi A, 1 Paratyphi C)




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 24 years
- The median age of patients with paratyphoid fever was 26 years
- One patient with typhoid fever died (0.3%)
- One patient with paratyphoid fever died (0.3%)

**Table 1.** Demographic and clinical characteristics of patients with typhoid fever reported to National Typhoid and Paratyphoid Fever Surveillance, 2011 (n=347).

| Characteristic (total number) | Count | Percent |
|---|---|---|
| Median age in years (range) | 24 (<1–89) | -- |
| Female (n=344) | 152 | 44 |
| US Citizen (n=284) | 124 | 44 |
| Vaccinated* (n=280) | 9 | 3 |
| ViCPS | 3 | 33 |
| Ty21a | 1 | 11 |
| Site of isolation (n=316) | | |
| Blood | 273 | 87 |
| Stool | 34 | 11 |
| Gall bladder | 9 | 3 |
| Other | -- | -- |
| Hospitalized (n=337) | 260 | 77 |
| Died (n=329) | 1 | 0.3 |

* Received typhoid vaccination within 5 years before onset of illness

**Table 2.** Demographic and clinical characteristics of patients with paratyphoid fever reported to National Typhoid and Paratyphoid Fever Surveillance, 2011 (n=107).

| Characteristic (total number) | Count | Percent |
|---|---|---|
| Median age in years (range) | 26 (1–83) | -- |
| Female (n=107) | 49 | 46 |
| US Citizen (n=96) | 44 | 46 |
| Vaccinated* (n=79) | 3 | 4 |
| ViCPS | 1 | 33 |
| Ty21a | -- | -- |
| Site of isolation (n=101) | | |
| Blood | 93 | 92 |
| Stool | 8 | 8 |
| Gall bladder | -- | -- |
| Other | -- | -- |
| Hospitalized (n=107) | 75 | 70 |
| Died (n=104) | 1 | 1 |

* Received typhoid vaccination within 5 years before onset of illness.
(Note that typhoid vaccination does not protect against paratyphoid fever.)

Travel destinations are shown in Table 3.

- 303 (88%) patients with typhoid fever and 93 (86%) patients with paratyphoid fever reported traveling or living outside the United States in the 30 days before illness onset
- Visiting friends or relatives was the most common reason for travel for patients with typhoid fever (70%) and paratyphoid fever (69%)

**Table 3.** Travel destinations reported to National Typhoid and Paratyphoid Fever Surveillance, 2011.

| Travel Destination | Typhoid (n=303) | Paratyphoid (n=93) |
|---|---|---|
| | no. (%) | no. (%) |
| India | 208 (69) | 71 (76) |
| Bangladesh | 25 (8) | 8 (9) |
| Pakistan | 23 (8) | 10 (11) |
| Mexico | 10 (3) | -- |
| Nepal | 5 (2) | -- |
| Other | 29 (10) | 4 (5) |
| Unknown | 3 (0.01) | -- |

## 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 January 2013. 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), 2000–2011.

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of jurisdictions reporting typhoid fever cases to NTPFS[1] | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 49 |
| Number of case reports received | 258 | 231 | 202 | 279 | 248 | 207 | 327 | 413 | 439 | 346 | 432 | 348 |
| NTPFS cases as a percentage of NNDSS reports[2] | 63% | 55% | 53% | 77% | 73% | 57% | 90% | 94% | 95% | 91% | 112%[3] | 88% |
| Reporting timeliness | | | | | | | | | | | | |
| Median days from specimen isolation date to date report form completed | 20 | 27 | 15 | 15 | 11 | 14 | 33 | 32 | 22 | 18 | 32 | 24 |
| Reporting completeness | | | | | | | | | | | | |
| Proportion of reports with "complete" demographic information[5] | 93% | 97% | 95% | 95% | 92% | 94% | 93% | 96% | 87% | 78% | 88% | 94% |
| Proportion of reports with "complete" epidemiologic information[6] | 95% | 94% | 95% | 95% | 88% | 92% | 73% | 74% | 82% | 77% | 86% | 71% |
| Proportion of reports with "complete" travel destination information[7] | 98% | 97% | 99% | 99% | 98% | 98% | 98% | 99% | 98% | 99% | 99% | 99% |
| Proportion of reports with "complete" vaccination information[8] | 96% | 98% | 99% | 97% | 97% | 99% | 99% | 96% | 96% | 95% | 97% | 80% |
| Proportion of reports with "complete" vaccine type information[9] | 20% | 10% | 75% | 33% | 36% | 50% | 57% | 44% | 24% | 57% | 46% | 44% |

**Table 5.** National paratyphoid fever reporting statistics by year, National Typhoid and Paratyphoid Fever Surveillance (NTPFS), 2007–2011.

| | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|
| Number of jurisdictions reporting paratyphoid fever cases to NTPFS[1] | 50 | 50 | 50 | 50 | 49 |
| Number of case reports received[2] | 4 | 85 | 78 | 115 | 107 |
| Reporting timeliness | | | | | |
| Median days from specimen isolation date to date report form completed | 69 | 20 | 76 | 67 | 35 |
| Reporting completeness | | | | | |
| Proportion of reports with "complete" demographic information[5] | 100% | 88% | 77% | 94% | 96% |
| Proportion of reports with "complete" epidemiologic information[6] | 100% | 91% | 90% | 90% | 80% |
| Proportion of reports with "complete" travel destination information[7] | 100% | 99% | 100% | 100% | 100% |
| Proportion of reports with "complete" vaccination information[8] | 100% | 90% | 94% | 97% | 74% |
| Proportion of reports with "complete" vaccine type information[9] | 100% | 60% | 83% | 69% | 100% |

**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 (2011) | Paratyphoid Current Performance (2011) | Proposed 2-year Goal (2014) | Proposed 4-year Goal (2016) | Typhoid Performance Status (2011) | Paratyphoid Performance Status (2011) |
| Number of jurisdictions reporting to NTPFS[1] | 49 | 49 | All | All | Needs improvement | Needs improvement |
| NTPFS cases as a percentage of NNDSS reports[3] | 88% | -- | ≥95% | ≥100% | Needs improvement | -- |
| Reporting timeliness | | | | | | |
| Proportion of forms completed within 31 days of specimen isolation date[4] | 24 (median) | 35 (median) | 85% | 100% | Meets 2014 goal | Needs improvement |
| Reporting completeness | | | | | | |
| Proportion of reports with "complete" demographic information[5] | 94% | 96% | 85% | 95% | Needs improvement | Meets 2014 goal |
| Proportion of reports with "complete" epidemiologic information[6] | 71% | 80% | 85% | 95% | Needs improvement | Needs improvement |
| Proportion of reports with "complete" travel destination information[7] | 99% | 100% | 99% | 100% | Meets 2016 goal | Meets 2016 goal |
| Proportion of reports with "complete" vaccination information[8] | 80% | 74% | 95% | 100% | Needs improvement | Needs improvement |
| Proportion of reports with "complete" vaccine type information[9] | 100% | 100% | 85% | 100% | Meets 2014 goal | Needs improvement |

1 Includes District of Columbia and Guam

2 Two jurisdictions do not report to NNDSS, these cases were excluded in the comparison

3 Is not calculable where 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 where no NTPFS reports are received or where specimen isolation date or date of form completion is not completed

5 For purposes of this report, "complete" demographic information is defined as information for all of the following: Age or Date of birth, Sex, and Hospitalization status

6 For purposes of this report, "complete" epidemiologic information is defined as information for all of the following: Travel, Receiving vaccine within 5 years before illness onset, Whether the patient was a food handler, Outbreak status, 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 onset of illness

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

## 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* serotype Typhi) 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, resistance to traditional first-line antimicrobial agents, ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole (ACT/S), is an important multidrug resistance pattern.

The most recently published NARMS annual report is from 2010, available at http://www.cdc.gov/narms/pdf/2010-annual-report-narms.pdf (1). The 2010 data showed the following:

For *Salmonella* serotype Typhi isolates

- 69% were resistant to nalidixic acid
- 3% were resistant to ciprofloxacin
- No isolates were resistant to ceftriaxone
- 11% were multidrug resistant

For *Salmonella* serotype Paratyphi isolates

- 90% were resistance to nalidixic acid
- 0% were resistant to ciprofloxacin
- No isolates were resistant to ceftriaxone
- 1% 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. Reports can be found at http://cdc.gov/outbreaknet/surveillance_data.html.

- In 2011, no typhoid fever outbreaks were reported.

### References


1. CDC. National Antimicrobial Resistance Monitoring System for Enteric Bacteria (NARMS): Human Isolates Final Report, 2010. Atlanta, Georgia: U.S. Department of Health and Human Services, CDC, 2010.
2. Fullerton KE, 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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