# WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiology Unit
Ministry of Health


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## Enteric Fever (Part I)

**This is the first in a series of two articles on Enteric Fever**

### Background

Enteric fever is a systemic infection caused by the human-adapted pathogens Salmonella enterica serotype Typhi (S. Typhi) and S. enterica serotpe Paratyphi (S. Paratyphi) A, B and C. These organisms are important causes of febrile illness in crowded populations with inadequate sanitation that are exposed to unsafe water and food and also pose a risk to travelers visiting Enteric fever endemic regions.

### Epidemiology

*Burden of illness and death*

In 2000, typhoid fever caused an estimated 21.7 million illnesses and 217,000 deaths, and paratyphoid fever caused an estimated 5.4 million illnesses worldwide. Infants, children, and adolescents in south-central and South-eastern Asia experience the greatest burden of illness. Typhoid and paratyphoid fever most often present as clinically similar acute febrile illnesses and accurate diagnosis relies on laboratory confirmation. Bone marrow culture remains the gold standard diagnostic test for enteric fever. Efforts to develop serologic methods for the diagnosis of typhoid fever that improve on the poor performance of the Widal test still suffer from substantial limitations of both sensitivity and specificity. Serological approaches to the diagnosis of S. Paratyphi A, B, and C have been developed but have not been evaluated or adapted for field use. Consequently, blood culture, a less sensitive method than bone marrow culture, is often the practical first choice test for both patient diagnosis and epidemiologic evaluation of S. Typhi and S. Paratyphi burden. However, most enteric fever occurs in low and middle-income countries where blood cultures are often unavailable, unaffordable or inconsistently applied. The most robust approach to the measurement of incidence of typhoid and paratyphoid fever is by regular, community-wide household visits to identify persons with febrile illness from whom blood samples for culture confirmation may be obtained. Alternatively, the results of surveys of health-seeking behaviour and sentinel health care facility-based surveillance may be combined to estimate incidence. Because of the limited availability of blood culture services and the logistic challenges of enteric fever surveillance techniques capable of measuring disease incidence, the burden of typhoid and paratyphoid fever is poorly characterized in much of the world, particularly in sub-Saharan Africa. Furthermore, accurate estimates of rates of complications and death at the population level are not available. To reduce gaps in the current understanding of typhoid fever incidence, complications and case-fatality rate, large population-based studies using blood culture confirmation of cases are needed in representative sites, especially in low and medium human development index countries outside Asia.

### Epidemiologic trends

Despite the limitations of currently available epidemiologic data, a number of recent trends in enteric disease epidemiology have emerged in the African, Asian and Latin American regions. In sub-Saharan Africa, where the burden of enteric fever is the least well characterized, hospital-based studies indicate that non-Typhi serotypes of Salmonella, particularly S. enterica serotype Enteritidis and S. enterica serotype Typhimurium, greatly outnumber S. Typhi and S. Paratyphi as causes of bloodstream infection. Nonetheless, outbreaks of typhoid fever are frequently reported from sub-Saharan Africa, often with large numbers of patients presenting with intestinal perforations leaving open important questions about the epidemiology of enteric fever in the region. In Asia, a large

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population-based prospective study using standardized surveillance methods estimated typhoid fever incidence in China, India, Indonesia, Pakistan and Vietnam to gather data for typhoid fever vaccine policy. This study confirmed the high incidence of typhoid fever in the region, particularly among children and adolescents, but also demonstrated that substantial variation in incidence occurs between surveillance sites in the same region. Simultaneously, S. Paratyphi A was responsible for a growing proportion of enteric fever in a number of Asian countries, sometimes accounting for 50% of Salmonella bloodstream isolates among patients with enteric fever. This trend raises important concerns about the impact of typhoid fever vaccine on enteric fever rates.

**Prevention and Control Strategies**

Contaminated water and food are important vehicles for transmission of typhoid fever. Historical surveillance data suggest that enteric fever was endemic in Western Europe and North America and this rate decreased in parallel with the introduction of water treatment facilities to municipal water supply schemes, pasteurization of dairy products and the exclusion of human faeces from food production. At present, enteric fever prevention focuses on improving sanitation, ensuring the safety of food and water supplies, identification and treatment of chronic carriers of S. Typhi and use of typhoid vaccines to reduce the susceptibility of hosts to infection.

**Non-vaccine measures**

Extending the benefits of improved sanitation and the availability of safe water and food that was achieved in industrialized countries a century ago to low and middle-income countries has proved to be a challenge. United Nations Millennium Development Goal 7 sets a target to halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation. Recent evidence suggests that interventions to improve the quality of drinking water may be relatively more important for the prevention of enteric infection relative to sanitation measures than was previously thought. Although centrally treated reticulated water for all is an important goal, a growing body of research suggests that improving water quality at the household level, as well as at the source, can significantly reduce diarrhoea. Although not formally evaluated with enteric fever as an outcome, it is likely that interventions that reduce the rate of diarrhoeal diseases transmitted through contaminated water, food and poor hygiene would have similar effects on rates of enteric fever.

The identification and treatment of S. Typhi carriers, particularly those involved with food production, has proven to be an important strategy for the control of typhoid fever in low-incidence settings.

**Source -** Global Trends in Typhoid and Paratyphoid Fever

*Available from http://cid.oxfordjournals.org/content/50/2/241.full*

**Compiled by**
**Dr. Madhava Gunasekera of the Epidemiology Unit**

**Invasive Bacterial Disease surveillance in Sentinel Sites- 3rd quarter 2013**

| | |
|---|---|
| No. of suspected meningitis cases | 26 |
| No. of probable meningitis cases | 4 |
| Percentage (%) of CSF samples tested positive for organisms | 0% |
| No. of children who met the pneumonia case definition | 117 |
| Percentage (%) of Pneumonia cases with positive blood cultures | 0% |
| No. of sepsis cases | 31 |
| Percentage (%) of Sepsis cases with positive blood cultures | 0% |

Source-LRH, Epidemiology Unit

**Rota virus surveillance in Sentinel Sites – 3rd quarter 2013**

| | |
|---|---|
| Number of acute diarrhoea hospitalizations in children <5 years | 362 |
| Number of stool specimen collected | 135 |
| Number of stool specimen tested positive for rotavirus | 42 |
| Percentage (%) of stool specimen tested positive for rotavirus | 33 % |

Source-MRI, Epidemiology Unit

**Table 3 : Water Quality Surveillance**
**Number of microbiological water samples - Sept / 2013**

| District | MOH areas | No: Expected * | No: Received |
|---|---|---|---|
| Colombo | 12 | 72 | 12 |
| Gampaha | 15 | 90 | 34 |
| Kalutara | 12 | 72 | NR |
| Kalutara NISH | 2 | 12 | 19 |
| Kandy | 23 | 138 | NR |
| Matale | 12 | 72 | 36 |
| Nuwara Eliya | 13 | 78 | 03 |
| Galle | 19 | 114 | 71 |
| Matara | 17 | 102 | NR |
| Hambantota | 12 | 72 | 55 |
| Jaffna | 11 | 66 | 47 |
| Kilinochchi | 4 | 24 | 88 |
| Manner | 5 | 30 | 28 |
| Vavuniya | 4 | 24 | 33 |
| Mullatvu | 4 | 24 | 18 |
| Batticaloa | 14 | 84 | 55 |
| Ampara | 7 | 42 | NR |
| Trincomalee | 11 | 66 | 19 |
| Kurunegala | 23 | 138 | NR |
| Puttalam | 9 | 84 | 7 |
| Anuradhapura | 19 | 114 | 43 |
| Polonnaruwa | 7 | 42 | 27 |
| Badulla | 15 | 90 | 53 |
| Moneragala | 11 | 66 | 70 |
| Rathnapura | 18 | 108 | NR |
| Kegalle | 11 | 66 | 29 |
| Kalmunai | 13 | 78 | NR |

* No of samples expected (6 / MOH area / Month)
**NR** = Return not received


to be continued

Table 4: Selected notifiable diseases reported by Medical Officers of Health 12th – 18th October (42nd Week)

| RDHS | Dengue Fever | | Dysentery | | Encephalit | | E Fever | | F Poisoning | | Leptospirosi | | T Fever | | V Hepatitis | | H Rabies | | Chickenpox | | Meningitis | | Leishmani- | | WRCD % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | T* | C** |
| Colombo | 48 | 7868 | 1 | 173 | 0 | 17 | 1 | 129 | 0 | 53 | 1 | 181 | 0 | 7 | 0 | 71 | 0 | 1 | 6 | 371 | 0 | 58 | 0 | 0 | **62** | **38** |
| Gampaha | 40 | 3023 | 2 | 175 | 2 | 18 | 0 | 46 | 0 | 31 | 5 | 347 | 0 | 18 | 0 | 167 | 0 | 0 | 7 | 149 | 1 | 83 | 0 | 5 | **47** | **53** |
| Kalutara | 22 | 1502 | 2 | 156 | 0 | 20 | 3 | 74 | 0 | 23 | 5 | 351 | 0 | 5 | 1 | 24 | 0 | 0 | 3 | 232 | 0 | 64 | 0 | 0 | **85** | **15** |
| Kandy | 11 | 1528 | 0 | 134 | 0 | 11 | 0 | 25 | 0 | 10 | 0 | 68 | 0 | 94 | 6 | 104 | 0 | 0 | 1 | 121 | 0 | 14 | 0 | 4 | **74** | **26** |
| Matale | 4 | 404 | 0 | 84 | 0 | 4 | 0 | 24 | 1 | 8 | 1 | 58 | 0 | 4 | 1 | 46 | 0 | 0 | 0 | 43 | 1 | 34 | 0 | 11 | **62** | **38** |
| NuwaraEliya | 2 | 217 | 1 | 142 | 0 | 2 | 1 | 14 | 0 | 217 | 2 | 26 | 1 | 58 | 2 | 22 | 0 | 0 | 0 | 107 | 0 | 12 | 0 | 0 | **85** | **15** |
| Galle | 3 | 751 | 3 | 103 | 0 | 19 | 0 | 6 | 8 | 89 | 0 | 194 | 1 | 53 | 1 | 14 | 0 | 2 | 6 | 286 | 0 | 45 | 0 | 0 | **84** | **16** |
| Hambantota | 0 | 283 | 1 | 52 | 0 | 3 | 0 | 15 | 0 | 32 | 1 | 160 | 0 | 62 | 0 | 84 | 0 | 0 | 3 | 95 | 1 | 46 | 1 | 279 | **67** | **33** |
| Matara | 3 | 409 | 3 | 74 | 1 | 13 | 0 | 28 | 0 | 27 | 0 | 136 | 2 | 80 | 2 | 138 | 0 | 2 | 2 | 237 | 0 | 70 | 5 | 83 | **94** | **6** |
| Jaffna | 9 | 603 | 18 | 346 | 0 | 10 | 3 | 302 | 0 | 96 | 0 | 8 | 2 | 331 | 0 | 17 | 0 | 1 | 2 | 137 | 1 | 55 | 0 | 0 | **75** | **25** |
| Kilinochchi | 1 | 58 | 0 | 35 | 0 | 0 | 0 | 14 | 0 | 5 | 0 | 9 | 0 | 16 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 7 | 0 | 11 | **50** | **50** |
| Mannar | 0 | 65 | 0 | 72 | 0 | 3 | 3 | 62 | 0 | 36 | 0 | 14 | 0 | 19 | 0 | 2 | 0 | 0 | 0 | 11 | 0 | 5 | 0 | 4 | **80** | **20** |
| Vavuniya | 1 | 65 | 0 | 55 | 0 | 13 | 0 | 12 | 0 | 20 | 0 | 50 | 1 | 3 | 0 | 3 | 0 | 2 | 0 | 22 | 0 | 33 | 0 | 10 | **100** | **0** |
| Mullaitivu | 2 | 112 | 0 | 19 | 0 | 2 | 1 | 9 | 0 | 43 | 0 | 37 | 1 | 7 | 0 | 1 | 0 | 2 | 0 | 8 | 0 | 6 | 0 | 14 | **80** | **20** |
| Batticaloa | 3 | 507 | 5 | 278 | 0 | 5 | 0 | 10 | 0 | 73 | 0 | 33 | 0 | 2 | 0 | 14 | 0 | 3 | 1 | 41 | 0 | 7 | 0 | 0 | **64** | **36** |
| Ampara | 0 | 170 | 4 | 153 | 0 | 1 | 0 | 5 | 0 | 10 | 0 | 33 | 0 | 1 | 0 | 8 | 0 | 0 | 0 | 81 | 1 | 18 | 0 | 3 | **43** | **57** |
| Trincomalee | 0 | 183 | 0 | 60 | 0 | 3 | 0 | 6 | 0 | 3 | 0 | 59 | 0 | 15 | 0 | 3 | 0 | 1 | 0 | 37 | 0 | 4 | 0 | 28 | **67** | **33** |
| Kurunegala | 15 | 2524 | 1 | 159 | 0 | 36 | 0 | 38 | 0 | 26 | 1 | 286 | 0 | 41 | 0 | 52 | 0 | 1 | 3 | 323 | 1 | 95 | 4 | 48 | **78** | **22** |
| Puttalam | 2 | 806 | 5 | 74 | 0 | 7 | 0 | 16 | 0 | 36 | 0 | 42 | 0 | 12 | 0 | 7 | 0 | 1 | 0 | 78 | 0 | 32 | 1 | 9 | **62** | **38** |
| Anuradhapur | 2 | 465 | 4 | 100 | 0 | 16 | 0 | 3 | 19 | 59 | 1 | 303 | 0 | 23 | 0 | 25 | 0 | 2 | 0 | 159 | 2 | 92 | 10 | 368 | **68** | **32** |
| Polonnaruwa | 2 | 396 | 3 | 74 | 1 | 2 | 0 | 14 | 2 | 64 | 2 | 160 | 0 | 3 | 0 | 29 | 0 | 2 | 0 | 121 | 0 | 17 | 3 | 148 | **86** | **14** |
| Badulla | 5 | 450 | 5 | 179 | 0 | 5 | 1 | 18 | 1 | 11 | 0 | 54 | 4 | 81 | 0 | 44 | 0 | 0 | 3 | 116 | 2 | 64 | 0 | 7 | **82** | **18** |
| Monaragala | 5 | 222 | 1 | 106 | 0 | 4 | 0 | 23 | 0 | 25 | 0 | 196 | 0 | 57 | 3 | 159 | 0 | 1 | 0 | 48 | 0 | 23 | 0 | 10 | **73** | **27** |
| Ratnapura | 4 | 1575 | 6 | 340 | 0 | 83 | 0 | 38 | 0 | 17 | 5 | 320 | 1 | 65 | 17 | 437 | 0 | 1 | 4 | 156 | 1 | 76 | 0 | 13 | **72** | **28** |
| Kegalle | 16 | 985 | 3 | 114 | 0 | 16 | 0 | 28 | 0 | 11 | 7 | 202 | 0 | 71 | 6 | 208 | 0 | 0 | 7 | 291 | 0 | 99 | 0 | 2 | **100** | **0** |
| Kalmune | 0 | 492 | 0 | 138 | 0 | 2 | 0 | 3 | 0 | 117 | 1 | 9 | 0 | 2 | 0 | 5 | 0 | 0 | 0 | 83 | 0 | 9 | 0 | 1 | **38** | **62** |
| SRI LANKA | **200** | **25663** | **68** | **3395** | **04** | **315** | **13** | **962** | **31** | **1142** | **32** | **3336** | **19** | **1130** | **39** | **1684** | **00** | **24** | **48** | **335** | **11** | **1068** | **24** | **1058** | **72** | **28** |

**Source: Weekly Returns of Communicable Diseases (WRCD).**

***T=**Timeliness refers to returns received on or before 18th October , 2013 Total number of reporting units 339. Number of reporting units data provided for the current week:244 C** Completeness

**A** = Cases reported during the current week. **B** = Cumulative cases for the year.**H Rabies***= Human Rabies, **E Fever***=Enteric Fever, **F Poison*** =Food Poisoning, **T Fever***=Typhus Fever, **V Hepatitis***=Viral Hepatitis

## Table 1: Vaccine-Preventable Diseases & AFP 12th – 18th October 2013 (42ndWeek)

| Disease | No. of Cases by Province | | | | | | | | | Number of cases during current week in 2013 | Number of cases during same week in 2012 | Total number of cases to date in 2013 | Total number of cases to date in 2012 | Difference between the number of cases to date in 2013 & 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | C | S | N | E | NW | NC | U | Sab | | | | | |
| AFP* | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | 00 | 01 | 01 | 76 | 65 | + 16.9% |
| Diphtheria | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | - | - | - | - | - |
| Mumps | 01 | 01 | 02 | 00 | 02 | 04 | 00 | 00 | 02 | 12 | 33 | 1274 | 3904 | - 67.3 % |
| Measles | 09 | 01 | 08 | 00 | 00 | 01 | 03 | 01 | 07 | 30 | 01 | 3215 | 52 | + 6082.7 % |
| Rubella | 00 | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | - | 26 | - | - |
| CRS** | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | - | 06 | - | - |
| Tetanus | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | 19 | 10 | + 90.0 % |
| Neonatal Tetanus | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | - | 00 | - | - |
| Japanese Encephalitis | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | - | 68 | - | - |
| Whooping Cough | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | 00 | 70 | 87 | - 19.5 % |
| Tuberculosis | 02 | 00 | 02 | 05 | 00 | 06 | 05 | 00 | 00 | 20 | 327 | 6617 | 7150 | - 04.5 % |

### Key to Table 1 & 2

**Provinces:** **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

**RDHS Divisions:** **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

**Data Sources:**

**Weekly Return of Communicable Diseases:** Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

**Special Surveillance: AFP* (**Acute Flaccid Paralysis ), Japanese Encephalitis

**CRS** =**Congenital Rubella Syndrome

**AFP and all clinically confirmed Vaccine Preventable Diseases except Tuberculosis and Mumps should be investigated by the MOH**

| Influenza Surveillance in Sentinel Hospitals - ILI & SARI | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Month | Human | | | | Animal | | | |
| | No Received | Infl A untyped | Infl B | A(H1N1)pdm09 | A(H3N2) | Pooled samples | Serum Samples | Positives |
| September | 233 | 9 | 9 | 26 | 8 | 190 | 460 | 0 |

*Source: Medical Research Institute & Veterinary Research Institute*

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