# WEEKLY EPIDEMIOLOGICAL REPORT

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**Ministry of Healthcare & Nutrition**

231, de Saram Place, Colombo 01000, Sri Lanka.

Tele:(+94-011)2695112, 681548, 4740490, 4740492, 2677600 Fax: 2696583

Epidemiologist:(+94-011) 4740491, E-mail:chepid@sltnet.lk, epidunit@sltnet.lk

Web: www.epid.gov.lk

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## Meningococcal meningitis - Part II

Part I of this article was published in the last issue of the Weekly Epidemiological Report.

### Clinical manifestations

A great obstacle in diagnosing meningococcal disease is that clinical manifestations are hard to tell apart from other, less serious upper respiratory tract infections. Acute purulent meningitis is the usual manifestation of meningococcal disease. It is believed that meningeal infection is the result of hematogenous dissemination of the bacterium. This is observed in 50% of patients and is similar in its initial manifestations to other types of bacterial meningitis. The symptoms start with sudden , fever, stiff neck, nausea, vomiting, photophobia, and neurological alterations that may include stupor, delirium, coma, and convulsions. In infants, meningitis may be more difficult to identify, with atypical symptoms of a stiff neck, but a swollen fontanel may be present. Also, the child may be irritable, cry inconsolably, vomit, have seizures, refuse to eat, and be hypotonic.

Blood cultures are positive in 75% of *Meningococcal meningitis* patients. Meningococcemia is difficult to identify in isolated cases, as opposed to outbreaks. However, it is characterized by sudden fever, purpuric or petechial exanthema, which may progress to purpura or fulminant septicemia, associated with hypotension, acute adrenal hemorrhage (Waterhouse-Friderichsen syndrome) and multiple organic failure. Sometimes the exanthema associated with meningococcal disease may be maculopapular, similar to a viral exanthema, non-pruritic and transient, lasting approximately two days. Serogroups A and C are most commonly associated with meningitis out-breaks. However, they can also be present as meningococcemia.

*N. meningitidis* may affect the respiratory tract causing pneumonia, epiglotitis, and otitis media. Pneumonia occurs in 5 to 15% of invasive meningococcal disease cases, particularly when serogroups Y and W-135 are involved. Diagnosis of meningococcal pneumonia is difficult because isolation of the bacterium from sputum cannot differentiate asymptomatic carriers from diseased individuals. Some focal infections also occur in the form of septic arthritis, urethritis, pericarditis and conjunctivitis.

The latter type of infection may become complicated in 18% of cases, progressing from a localized infection of the conjunctiva to meningococcemia or bacterial meningitis. Chronic meningococcemia is rather uncommon and is characterized by intermittent fever, exanthema, arthralgia, and cephalea .

### Standard case definition of meningococcal meningitis and meningococcemia

- *Suspected case of acute meningitis:* Sudden Onset of fever (>38.5ºC rectal or 38ºC axillary) with stiff neck. In patients under one year of age, a suspected case of meningitis occurs when fever is accompanied by a bulging fontanelle.
- *Probable case of bacterial meningitis:* Sus-

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epidemic, or petechial or purpural rash.

- *Confirmed case:* Suspected or probable case as defined above, with either positive CSF antigen detection for *N. meningitides*, or positive culture of CSF or blood with identification of N. meningitides

This case definition allows the detection of cases of meningococcal septicaemia

**Diagnosis**

Diagnosis of meningococcal meningitis is based upon analysis of cerebrospinal fluid. The adequate medium is Mueller-Hinton or GC enriched with supplement, which have replaced agar chocolate medium. Gram stain of the cerebrospinal fluid is an important test for prompt and accurate identification of *N. meningitidis*. Commercial kits are available to detect the polysaccharide antigen in cerebrospinal fluid and are also very useful for preliminary diagnosis of meningococcal disease, including sero-group identification. False negative results may occur, particularly when serogroup B is involved. Currently, testing is performed with the polymerase chain reaction (PCR) in cerebrospinal samples, to identify the sero-group, with the advantage of not requiring live organisms to perform the test with a sensitivity and specificity greater than 90%.

In addition to cerebrospinal fluid abnormalities, one may find high white cell counts with an increased number of polymorphonuclear cells. When severe purpura occurs, it is usually associated with systemic intravascular coagulation. Blood cultures are frequently positive. When purpuric lesions occur, direct microscopic observation and culture of tissue specimens or pus may provide the diagnosis.

Differential diagnosis of meningococcal disease mainly has to exclude other bacterial meningitis caused by *Streptococcus pneumoniae* and *Haemophilus influenzae*. Meningococcemia is hard to tell apart from other acute febrile illnesses, particularly in the absence of purpuric exanthema. However, the presence of fever, purpura, and shock strongly suggests a diagnosis of meningococcal disease.

**Treatment**

At the beginning of the 20th century, mortality from meningococcal disease was 70%. The introduction of IV fluid therapy and sulfas caused a reduction in the case-fatality rates of this disease. However, even with the use of adequate supportive care and antibiotics, case fatality rates of between 9 and 12% have remained stable in the past 20 years. The case fatality rate of meningococcemia is high. The patient must be admitted to a hospital or clinic for diagnosis and treatment. Infectivity of patients is moderate and fades away soon after antimicrobial therapy; thus, isolation of the patient is not considered necessary after the initial 24-48 h. Antibiotics, include penicillin G, beta lactamic derivatives, ampicillin sulbactam combinations, amoxicillin, clavulanic acid, and cephalosporines like cefotaxime, ceftriaxone, cefuroxime and cefepime .

Third generation cephalosporines like ceftriaxone and cefotaxime are excellent but costly alternatives. Nevertheless, ceftriaxone frequently becomes the ideal alternative, since it can be administered once a day for periods as short as two days. The high morbidity and mortality rates associated with meningococcal disease, even in patients who are given appropriate antimicrobial therapy, suggest that some anti-inflammatory therapies may help to improve clinical prognosis. It has been estimated that 11 to 19% of meningococcal disease survivors are left with sequel like deafness, neurological abnormalities, and loss of a limb in cases of meningococcemia. Some studies have suggested that routine utilization of corticosteroids like dexamethasone may be useful prior to antimicrobial therapy to diminish meningeal inflammation caused by bacterial death; however, its use has not been established as standard therapy. Traditionally, two clinical situations are acknowledged to require the use of steroids to prevent sequel and probably to improve survival of patients; one is neurological damage resulting from meningeal inflammation identified at the moment of diagnosis, the other is the presence of a Gram stain positive for *N. meningitidis* .

| Macroscopic characteristics: murky or purulent. | |
|---|---|
| WBC count: | >1000 cells/mm3 with over 80% polymorphonuclears. |
| Proteins: | >80 g/L |
| Glucose: | <0.4 g/L |
| Gram stain: | Gram negative intracellular diplococci in 80% of untreated cases. |

Treatment is recommended for seven days in most countries. Intensive care by properly trained personnel is recommended for patients with severe disease, septic shock, fulminant purpura, meningitis, and coma.

**CSF Characteristics in Meningococcal meningitis**

**Sources**

*1. Meningococcal meningitis* : **WHO Fact sheet N°141**

2. A. Sachdeva, S. Kukreja, V. Jain and A.K. Dutta . Meningo
coccal Disease - Outbreak in Delhi. Indian Pediatrics 2005; 42:547-556.

3. Control of Communicable Diseases Manual by David

## Table 1: Vaccine-preventable Diseases & AFP

23rd - 29th August 2008 (35th Week)

| Disease | No. of Cases by Province | | | | | | | | | Number of cases during current week in 2008 | Number of cases during same week in 2007 | Total number of cases to date in 2008 | Total number of cases to date in 2007 | Difference between the number of cases to date between 2008 & 2007 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | C | S | N | E | NW | NC | U | Sab | | | | | |
| Acute Flaccid Paralysis | 01 CO=1 | 01 NE=1 | 00 | 00 | 00 | 00 | 01 AP=1 | 00 | 00 | 03 | 00 | 70 | 59 | +18.6% |
| Diphtheria | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00.0% |
| Measles | 00 | 01 NE=1 | 02 HB=2 | 00 | 00 | 01 KR=1 | 00 | 00 | 00 | 04 | 00 | 89 | 50 | +78.0% |
| Tetanus | 01 GM=1 | 01 KD=1 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 02 | 02 | 27 | 26 | +3.8% |
| Whooping Cough | 01 GM=1 | 01 NE=1 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 02 | 00 | 32 | 31 | +3.2% |
| Tuberculosis | 29 | 125 | 04 | 13 | 03 | 00 | 23 | 00 | 08 | 206 | 80 | 6204 | 6704 | -7.5`% |

## Table 2: Newly Introduced Notifiable Diseases

23rd - 29th August 2008 (35th Week)

| Disease | No. of Cases by Province | | | | | | | | | Number of cases during current week in 2008 | Number of cases during same week in 2007 | Total number of cases to date in 2008 | Total number of cases to date in 2007 | Difference between the number of cases to date between 2008 & 2007 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | C | S | N | E | NW | NC | U | Sab | | | | | |
| Chicken-pox | 12 | 02 | 03 | 00 | 01 | 09 | 02 | 08 | 06 | 43 | 46 | 3693 | 2315 | +59.5% |
| Meningitis | 04 GM=1 KL=1 CB=2 | 02 KD=3 | 00 | 01 JF=1 | 00 | 04 KR=4 | 03 AP=2 PO=1 | 01 BD =1 | 0 KG=1 RP=1 | 17 | 23 | 941 | 375 | +150.9% |
| Mumps | 04 | 10 | 08 | 00 | 02 | 15 | 01 | 09 | 13 | 62 | 36 | 1991 | 1238 | +60.8% |

**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.
**DPDHS 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.

## Table 3: Laboratory Surveillance of Dengue Fever

23rd - 29th August 2008 (35th Week)

| Samples | Number tested | | Number positive * | | Serotypes | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $D_1$ | | $D_2$ | | $D_3$ | | $D_4$ | | Negative | |
| | GT | AH | GT | AH | GT | AH | GT | AH | GT | AH | GT | AH | GT | AH |
| Number for current week | 02 | 02 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| Total number to date in 2008 | 126 | 132 | 09 | 22 | 00 | 00 | 06 | 08 | 01 | 08 | 00 | 00 | 02 | 00 |

**Sources:** Genetech Molecular Diagnostics & School of Gene Technology, Colombo [GT] and Genetic Laboratory Asiri Surgical Hospital [AH]
* Not all positives are subjected to serotyping.
**NA**= Not Available.

**Data Sources:**
**Weekly Return of Communicable Diseases:** Diphtheria, Measles, Tetanus, Whooping Cough, Human Rabies, Dengue Haemorrhagic Fever, Japanese Encephalitis, Chickenpox, Meningitis, Mumps.
**Special Surveillance:** Acute Flaccid Paralysis.
**National Control Program for Tuberculosis and Chest Diseases:** Tuberculosis.

## Table 4: Selected notifiable diseases reported by Medical Officers of Health
### 23rd - 29th August 2008 (35th Week)

| DPDHS Division | Dengue Fever / DHF* | | Dysentery | | Encephal-itis | | Enteric Fever | | Food Poisoning | | Leptos-pirosis | | Typhus Fever | | Viral Hepatitis | | Human-Rabies | | Re-turns Re-ceive |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | % |
| Colombo | 21 | 1232 | 11 | 164 | 00 | 11 | 10 | 84 | 02 | 78 | 43 | 349 | 00 | 02 | 01 | 90 | 00 | 00 | **92** |
| Gampaha | 19 | 755 | 00 | 144 | 00 | 16 | 00 | 39 | 00 | 96 | 59 | 397 | 00 | 06 | 05 | 107 | 00 | 04 | **86** |
| Kalutara | 07 | 362 | 04 | 242 | 00 | 11 | 00 | 45 | 01 | 19 | 14 | 359 | 00 | 02 | 00 | 33 | 01 | 02 | **100** |
| Kandy | 08 | 196 | 03 | 224 | 01 | 06 | 01 | 46 | 00 | 54 | 01 | 325 | 02 | 81 | 02 | 98 | 00 | 01 | **72** |
| Matale | 01 | 87 | 00 | 156 | 00 | 02 | 00 | 36 | 00 | 04 | 00 | 614 | 00 | 01 | 00 | 24 | 00 | 00 | **83** |
| Nuwara Eliya | 00 | 22 | 07 | 193 | 00 | 02 | 00 | 198 | 00 | 166 | 00 | 39 | 00 | 35 | 01 | 90 | 00 | 01 | **77** |
| Galle | 01 | 85 | 01 | 137 | 00 | 12 | 01 | 14 | 00 | 43 | 06 | 252 | 00 | 12 | 00 | 06 | 00 | 03 | **53** |
| Hambantota | 01 | 74 | 02 | 71 | 00 | 05 | 00 | 07 | 00 | 11 | 02 | 76 | 00 | 71 | 01 | 14 | 01 | 01 | **91** |
| Matara | 03 | 224 | 02 | 141 | 00 | 11 | 00 | 29 | 00 | 06 | 17 | 275 | 09 | 164 | 02 | 14 | 00 | 01 | **88** |
| Jaffna | 00 | 52 | 01 | 103 | 02 | 04 | 00 | 223 | 02 | 13 | 00 | 00 | 00 | 151 | 01 | 33 | 00 | 00 | **63** |
| Kilinochchi | 00 | 00 | 00 | 26 | 00 | 00 | 00 | 01 | 00 | 04 | 00 | 02 | 00 | 00 | 00 | 01 | 00 | 00 | **00** |
| Mannar | 00 | 25 | 02 | 17 | 00 | 06 | 01 | 146 | 00 | 00 | 00 | 00 | 00 | 01 | 00 | 13 | 00 | 00 | **50** |
| Vavuniya | 00 | 11 | 03 | 49 | 00 | 02 | 02 | 10 | 01 | 15 | 00 | 05 | 00 | 01 | 00 | 05 | 00 | 00 | **75** |
| Mullaitivu | 00 | 00 | 00 | 09 | 00 | 00 | 00 | 13 | 00 | 13 | 00 | 00 | 00 | 01 | 00 | 09 | 00 | 00 | **00** |
| Batticaloa | 00 | 85 | 00 | 93 | 00 | 04 | 00 | 20 | 00 | 20 | 00 | 05 | 00 | 01 | 00 | 83 | 00 | 05 | **73** |
| Ampara | 00 | 28 | 01 | 227 | 00 | 00 | 00 | 07 | 00 | 01 | 00 | 20 | 00 | 00 | 00 | 08 | 00 | 00 | **57** |
| Trincomalee | 00 | 176 | 01 | 73 | 00 | 00 | 00 | 13 | 00 | 12 | 01 | 30 | 00 | 16 | 00 | 12 | 00 | 00 | **80** |
| Kurunegala | 01 | 267 | 04 | 175 | 00 | 14 | 02 | 49 | 02 | 16 | 43 | 389 | 01 | 24 | 01 | 55 | 00 | 04 | **89** |
| Puttalam | 01 | 272 | 02 | 65 | 00 | 08 | 00 | 137 | 00 | 26 | 01 | 36 | 00 | 33 | 00 | 28 | 00 | 03 | **78** |
| Anuradhapur | 00 | 111 | 02 | 66 | 00 | 09 | 00 | 10 | 00 | 06 | 00 | 223 | 00 | 10 | 00 | 13 | 00 | 02 | **58** |
| Polonnaruwa | 00 | 59 | 03 | 97 | 00 | 01 | 00 | 21 | 00 | 12 | 00 | 55 | 00 | 01 | 00 | 18 | 00 | 00 | **71** |
| Badulla | 02 | 71 | 08 | 357 | 00 | 05 | 05 | 110 | 00 | 93 | 04 | 43 | 00 | 100 | 05 | 113 | 00 | 01 | **87** |
| Monaragala | 02 | 51 | 02 | 283 | 00 | 03 | 00 | 33 | 00 | 116 | 00 | 87 | 03 | 81 | 01 | 39 | 00 | 00 | **82** |
| Ratnapura | 06 | 225 | 03 | 248 | 00 | 27 | 00 | 42 | 00 | 62 | 01 | 130 | 00 | 75 | 00 | 46 | 00 | 00 | **69** |
| Kegalle | 05 | 326 | 01 | 235 | 00 | 24 | 00 | 52 | 02 | 06 | 10 | 266 | 00 | 56 | 01 | 438 | 00 | 01 | **91** |
| Kalmunai | 00 | 33 | 05 | 215 | 00 | 02 | 00 | 09 | 00 | 16 | 01 | 01 | 00 | 02 | 00 | 21 | 00 | 00 | **46** |
| SRI LANKA | **78** | **4829** | **68** | **3810** | **03** | **185** | **22** | **1394** | **10** | **908** | **203** | **3978** | **15** | **927** | **21** | **1411** | **02** | **29** | **74** |

**Source: Weekly Returns of Communicable Diseases (WRCD).**
***Dengue Fever / DHF** refers to Dengue Fever / Dengue Haemorrhagic Fever.
****Timely** refers to returns received on or before 6 September, 2008 Total number of reporting units =238. Number of reporting units data provided for the current week: 227

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**ON STATE SERVICE**

**Dr. M. R. N. ABEYSINGHE**
**EPIDEMIOLOGIST**
**EPIDEMIOLOGICAL UNIT**
**231, DE SARAM PLACE**
**COLOMBO 10**