

## Bacterial Meningitis

**Table 1. Pathogens That Cause Bacterial Meningitis, Based on Patient Age<sup>9</sup>**

Patient Age	Causative Agent (Percent of Cases)
≥ 1 month to < 3 months	<ul style="list-style-type: none"><li>• Group B <i>Streptococcus</i> (39%)</li><li>• Gram-negative bacilli (32%)</li><li>• <i>Streptococcus pneumoniae</i> (14%)</li><li>• <i>Neisseria meningitidis</i> (12%)</li></ul>
≥ 3 months to < 3 years	<ul style="list-style-type: none"><li>• <i>S pneumoniae</i> (45%)</li><li>• <i>N meningitidis</i> (34%)</li><li>• Group B <i>Streptococcus</i> (11%)</li><li>• Gram-negative bacilli (9%)</li></ul>
≥ 3 years to < 10 years	<ul style="list-style-type: none"><li>• <i>S pneumoniae</i> (47%)</li><li>• <i>N meningitidis</i> (32%)</li></ul>
≥ 10 years to < 19 years	<ul style="list-style-type: none"><li>• <i>N meningitidis</i> (55%)</li></ul>

## Meningococcal Meningitis

Meningococcus ( *Neisseria meningitides*). These illnesses are often severe and can be deadly. They include infections of the lining of the brain and spinal cord (meningitis) and bloodstream infections (bacteremia or septicemia). *Neisseria meningitides* have several major antigenic strains; A,B,C,W-135,X&Y.

Characterized by meningism (headache, photophobia, neck stiffness +ve kernigs sign, +ve brudzinskis sign) sudden onset of high fever and rigors, severe, nausea and vomiting, , characteristic petechial rash due to meningococcal septicemia , , convulsion, loss of consciousness. Floppy baby.

(in viral meningitis almost always a benign self-limiting condition lasting 4-10days).

Incubation period: usually 3-4 days, but may be 2-10 days.

### Epidemiology:

The incidence of the disease peaks in late winter to early spring, there is a world wide distribution of this infection; sporadic cases and epidemics occur in mid-Africa, Chad,Mali,Nigeria, Sudan, Uganda.

Outbreaks can occur in communities, schools, colleges, prisons, and other populations. An outbreak occurs when there are multiple cases of the same serogroup ("strain") in a community or institution over a short period of time. Depending on the size of the institution and specific circumstances, having just two cases of the same serogroup may be considered an outbreak.

Meningococcal meningitis is observed worldwide but the highest burden of the disease is in the meningitis belt of sub-Saharan Africa, stretching from Senegal in the west to Ethiopia in the east. Around 30 000 cases are still reported each year from that area. Meningococcal meningitis is associated with high fatality (up to 50% when untreated). (Early antibiotic treatment is the most important measure to save lives and reduce complications.

Risk factors: doctors, infants, travel to sub-saharan Africa, HIV patient.

Humans, Nasopharyngeal carriage ranges from 1-50% and is responsible for infection to persist in community.

Transmission:

Air droplet, nasopharyngeal carrier, respiratory droplets or oral secretions from patient. Travel and migration, large population

movements e.g pilgrimages and overcrowding (e.g slums) facilitate the circulation of virulent strains inside a country or from country to country.

Lab. Diagnosis:

- The organism can be recovered from nasopharyngeal swabs, blood and CSF.

CSF: Cloudy fluid, Numerous pus cells, increase protein content, Low or absent glucose

- Latex agglutination test permits rapid detection of meningococcal antigen.

Antibiotics Treatment:

**Table 2. Antibiotic Recommendations for Bacterial Meningitis**

Bacterial Organism	Recommended Antibiotics (IV)	Treatment Duration (days)
<i>Streptococcus pneumoniae</i>	Vancomycin + 3rd-generation cephalosporin (cefotaxime or ceftriaxone)	10-14
<i>Neisseria meningitidis</i>	3rd-generation cephalosporin (cefotaxime or ceftriaxone) or Penicillin G or ampicillin (depending on sensitivities)	5-10
<i>Haemophilus influenzae</i>	3rd-generation cephalosporin (cefotaxime or ceftriaxone)	7-10
<i>Listeria monocytogenes</i>	Ampicillin or penicillin G ± aminoglycoside	14-21
GBS	Ampicillin or penicillin G ± aminoglycoside	14-21
<i>Escherichia coli</i>	Third-generation cephalosporin (cefotaxime or ceftriaxone)	21

GBS: group B streptococcus.  
 Source: References 2, 15, 19-21.

*Aminoglycoside (streptomycin, vancomycin, gentamycin)*

Doses:

<b>Antibiotic</b>	<b>Total Daily Dose</b>	<b>Number of Daily Doses</b>
Penicillin G	Adults & children > 12 Years: 9.6 -14.4 g	4 - 6 divided dose
	Children 1 month - 12 years: 180-300 mg/kg	4 - 6
Ampicillin	250 mg/kg	4
Cefotaxime	200 mg/kg	4 - 6
Ceftriaxone	80-100 mg/kg	1 - 2
Chloramphenicol	75-100 mg/kg	4

Prevention:

Educate the public on the need to reduce direct contact and exposure to droplet infection, Reduce overcrowding in living places and workplaces such as in schools, People in the same household or roommates. Antibiotics for anyone with direct contact with a

patient's oral secretions (saliva or spit). Doctors or local health departments recommend who should get prophylaxis.. Vaccin containing groups A,C,Y,W-135, meningococcal polysaccharides for teens, children and adults.

Control:

- 1- Report to local health authority
- 2- Respiratory isolation for 24hours.
- 3- Concurrent disinfection of discharges from the nose and throat and articles.
- 4- management of sick patients and their contacts:

Single injection of **3gm. Chloramphenicol**

For close surveillance for household contacts rifampicin 600mg twice daily for 2 days, for child 1month 10mg/kg, less than 1month 5mg/kg

with immunization or even immunization alone without rifampicin.

5- Immunization; The recommended schedule is three doses for children aged 2,3, and 4 months. 2 doses over the age of 4month and below 1 year, than another one dose for all others.

6- for the effective control of this disease a systematical epidemiological surveillance must be established, data from treatment centers, hospitals, laboratory, and special surveys must be collated and evaluated, analyzed and disseminated to those who

have to take action in the field established committee responsible for meningococci disease should be established and meet at regular intervals to plan control strategies.

## **Surveillance (WHO)**

Surveillance, from case detection to investigation and laboratory confirmation is essential to the control of meningococcal meningitis. Main objectives include:

- Detect and confirm outbreaks.
- Monitor the incidence trends, including the distribution and evolution of meningococcal serogroups.
- Estimate the disease burden.
- Monitor the antibiotic resistance profile.
- Monitor the circulation, distribution and evolution of specific meningococcal strains (clones).
- Estimate the impact of meningitis control strategies, particularly preventive vaccination programs.