

# Midwifery and Neonatal Nursing

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## Neonatal Meningococcal Meningitis in France from 2001 to 2013

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Neonatal meningitis contributes substantially to neurological disability worldwide. Neonates are at increased risk of sepsis and meningitis than other age groups. The most frequent cause of neonatal bacterial meningitis is *Streptococcus agalactiae* (59%) and the second most frequent is *Escherichia coli* (28%) and *Listeria monocytogenes* is considered the third most frequent pathogen in the United States (5-10%) and France (< 3%). *Neisseria meningitidis* is occasionally implicated in neonatal bacterial meningitis. The objectify of this study is to describe epidemiological, clinical and bacteriological characteristics of *N. meningitidis* in France

**Methods:** In total, 233 pediatric wards covering 61% of French pediatric wards participated in this network. Pediatric wards included 45% neonatal units in France. All patients  $\leq$  28 days of age with confirmed bacterial meningitis were included. Isolates were identified in the microbiology laboratory of each hospital. Neonatal meningitis was defined as early-onset (when occurring between days 0 and 4) and late-onset meningitis (when occurring between days 5 and 28). We crosschecked the databases of the (NRCM) for microbiological data and GPIP/ACTIV for clinical data. The data collection was approved by the French National Data Protection Commission (Commission National Informatique et Libertés, CNIL, no. 913006).

**Results:** Between 2001 and 2013, data for 5,139 cases of bacterial meningitis were collected; 831 cases were neonatal bacterial meningitis (16.2%). Bacterial species implicated in the neonatal period were *S. agalactiae* (n=464; 55.8%), *E. coli* (n=232; 27.9%), *N. meningitidis* (n=23; 2.8%), *L. monocytogenes* (n=20; 2.4%), *S. pneumoniae* (n=18, 2.2%), other streptococcus (n=16; 2%), and other bacterial species (n=58; 7%). Among 23 patients with *N. meningitidis*, 12 were male (52%). The median gestational age at birth was 39.2 weeks. The median age was 17.9 days. Among the 23 cases, only 1 was early-onset (day 4); the remainders were late-onset (96%). Seasonal variation occurred, with the highest proportion of cases reported in winter. At diagnosis, 6 patients (27.3%) presented at least 1 sign of disease severity: all showed signs of shock (27.3%), 3 needed mechanical ventilation (13.6%), 2 were in a coma (9.1%), and 2 presented extensive purpura (9.1%); noseizures were reported. In the 434/807 term-born patients (53.8%) with late-onset meningitis, the proportion of NMM was 5.1% (22/434). *N. meningitidis* was isolated in 91% in CSF 2 had negative CSF culture (9%), one was diagnosed with positive PCR in CSF and other one had positive antigens. The serogroup distribution was serogroup B for 18 cases (78%), C for 3 cases (13%) and others for 2 cases (9%). The minimum inhibitory concentration was tested for cefotaxime, amoxicillin and penicillin G for 17 strains. All tested isolates were susceptible to cefotaxime. (12%) showed intermediate susceptibility to amoxicillin and penicillin G. Two patients died (both were girls, who showed late-onset meningitis at days 10 and 23, respectively).

**Conclusions:** Among 831 cases of neonatal bacterial meningitis occurring from 2001 to 2013, *Neisseria meningitidis* was the third most frequent bacterial species found. All cases occurred only in term neonates and were mainly late-onset. Serogroup B accounted for 78.3% of cases. At diagnosis, 27.3% of cases had at least 1 sign of disease severity. All strains were susceptible to cefotaxime, but 12% showed intermediate susceptibility to penicillin G and to aminopenicillin.

### Biography

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