

# 1.5 Other Forms of Bacterial Meningitis\*

(\*excluding meningococcal disease)

## Summary

Bacterial meningitis, not otherwise specified (NOS)  
Number of cases, 2013: 21  
Number of cases, 2012: 29  
Number of cases, 2011: 35  
Crude incidence rate, 2013: 0.5/100,000

Apart from *Neisseria meningitidis*, which is the most common cause of bacterial meningitis in Ireland, other pathogens cause this disease, including those caused by non-notifiable organisms. For information on invasive meningococcal disease (*Neisseria meningitidis*), see that chapter within this report. Information on bacterial meningitis caused by specified notifiable diseases is summarised below and further pathogen-specific data are available in the relevant chapter. The figures presented in this chapter are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 27<sup>th</sup> August, 2014. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

### Bacterial meningitis caused by diseases not otherwise specified (NOS):

In total, 21 cases of meningitis under this disease category were notified in 2013, none of whom died. Six of the 21 (28.6%) cases were case classified as confirmed, five as probable (23.8%) and ten as possible (47.6%) (table 1). The causative pathogens were identified in 28.6% (n=6/21) of cases, which is considerably less than the annual average observed between 2008 and 2012 at 48% (table 2).

Prior to 1<sup>st</sup> January 2012, all cases of Group B streptococcus, also known as *S. agalactiae*, were notifiable under the 'Bacterial Meningitis (NOS)' disease category. In 2012, this changed when *Streptococcus agalactiae* in children < 90 days of age was notifiable in its own right, including those which were meningitis-related. This has meant that the overall number of bacterial meningitis (NOS) cases has, as a result, fallen in both 2013 and 2012 compared to previous years. In other words, without this change there would have been five and 11 extra cases reported under the Bacterial meningitis (NOS) category in 2013 and 2012,

respectively (table 2). Furthermore, there is evidence of an additional 23 possible meningitis-related cases of this disease in this same age group during 2012 and 2013 where *Streptococcus agalactiae* was either isolated from or detected in CSF specimens from patients that were not clinically categorised as having 'meningitis'. These 23 cases have been excluded from Table 3, which is a summary breakdown of all bacterial meningitis cases by their causative pathogen (both specified and not specified types except for meningococcal disease) between 2008 and 2013.

Among the bacterial meningitis (NOS) cases notified in 2013 were four caused by *Escherichia coli* (age range 1 week to 63 years; none of which had serotype details), one caused by *Streptococcus salivarius* in a one year old and another by *Streptococcus agalactiae* in an elderly adult. There were 15 other cases whose causative organism was not identified. No deaths were reported.

### Bacterial meningitis caused by specified notifiable diseases:

#### *Haemophilus influenzae*

Two cases of meningitis due to *H. influenzae* were notified in 2013, one of which was attributable to a non-typeable/non-capsulated strain and another that was not typed. The age range was 22 to 32 years. One death was reported, but the actual cause was not known. See Table 3 and the chapter on invasive *H. influenzae* disease for further details.

#### *Listeria* species

Two cases of listeriosis meningitis were notified in 2013: both had a serotype 4b infection, one was aged 60 to 64 years with an underlying medical condition and the other was a two week old infant. See Table 3 and the chapter on listeriosis disease for further details.

#### *Streptococcus pneumoniae*

In 2013, 32 cases of pneumococcal meningitis were notified, compared to 37 in the previous year. The age range of the 32 cases was one month to 85 years (median 52 years). Four (12.5%) pneumococcal meningitis related deaths were reported in 2013 with an age range of 4 to 85 years (median 50 years) and all caused by the infection itself. Of the 32 cases in 2013, five were vaccinated with the

Table 1. Number and percentage of bacterial meningitis (NOS) cases reported by cases classification, Ireland, 2008-2013

Case Classification	2008	2009	2010	2011	2012	2013	2008-2013
Confirmed	22	17	21	18	12	6	133
Probable	12	8	7	4	5	5	72
Possible	6	15	14	13	12	10	146
Total	40	40	42	35	29	21	351
% Confirmed	55.0%	42.5%	50.0%	51.4%	41.4%	28.6%	37.9%

Note: *Streptococcus agalactiae* < 90 days of age excluded from 2012, 2013 figures

Table 2. Number and percentage of bacterial meningitis (NOS) cases reported with and without an identified causative organism, Ireland, 2008-2013

Causative Organism	2008	2009	2010	2011	2012	2013	2008-2013
Known	23	15	21	20	11	6	133
Unknown/Not specified	17	25	21	15	18	15	218
Total	40	40	42	35	29	21	351
% Known	57.5%	37.5%	50.0%	57.1%	37.9%	28.6%	37.9%

Note: *Streptococcus agalactiae* < 90 days of age excluded from 2012, 2013 figures

Table 3. Annual notifications of bacterial meningitis (specified and NOS) except meningococcal disease, Ireland, 2008-2013

Notified under	Causative organism	2008	2009	2010	2011	2012	2013	2008-2013
<i>Haemophilus influenzae</i> disease (invasive)	<i>Haemophilus influenzae</i>	3	3	2	4	3	2	17
Leptospirosis	<i>Leptospira</i> spp.	2	1	0	1	1	0	5
Listeriosis	<i>Listeria</i> spp.	3	1	3	2	2	2	13
Salmonellosis	<i>Salmonella enteritidis</i>	0	1	0	0	0	0	1
<i>Streptococcus pneumoniae</i> infection (invasive)	<i>Streptococcus pneumoniae</i>	27	22	16	23	37	32	157
<i>Streptococcus</i> Group A infection (invasive) (iGAS)	<i>Streptococcus pyogenes</i>	2	0	2	0	1	3	8
<i>Streptococcus</i> Group B infection (invasive) (Group B Strep) < 90 days of age	<i>Streptococcus agalactiae</i> †	NA	NA	NA	NA	11	5	16
Tuberculosis*	<i>Mycobacterium</i> spp.*	6	8	9	2	3	2	30
Total Bacterial Meningitis, specified		43	36	32	32	58	46	247
Bacterial Meningitis, not otherwise specified	<i>Streptococcus agalactiae</i> **	6	7	11	16	0	1	41
	<i>Escherichia coli</i>	11	3	2	1	7	4	28
	<i>Staphylococcus aureus</i>	3	2	6	2	1	0	14
	<i>Enterococcus faecalis</i>	1	1	0	0	0	0	2
	<i>Streptococcus bovis</i> biotype II/2	0	2	0	0	0	0	2
	<i>Citrobacter koseri</i>	1	0	0	0	0	0	1
	<i>Enterococcus faecium</i>	0	0	0	0	1	0	1
	Group C <i>Streptococcus</i>	0	0	0	0	1	0	1
	<i>Klebsiella oxytoca</i>	0	0	0	1	0	0	1
	<i>Mycoplasma pneumoniae</i>	0	0	1	0	0	0	1
	<i>Serratia liquefaciens</i>	1	0	0	0	0	0	1
	<i>Staphylococcus aureus</i> & <i>Staphylococcus capitis</i>	0	0	0	0	1	0	1
	<i>Staphylococcus capitis</i>	0	0	1	0	0	0	1
	<i>Streptococcus salivarius</i>	0	0	0	0	0	1	1
	Unknown		2	1	1	1	2	1
Not specified		15	24	20	14	16	14	103
Total Bacterial Meningitis, not otherwise specified		40	40	42	35	29	21	207
Total Bacterial Meningitis, specified and not otherwise specified		83	76	74	67	87	67	454

\*Tuberculosis meningitis figure for 2013 is provisional

\*\**Streptococcus agalactiae* for all ages between 2008 and 2011 and for cases > 90 days of age only in 2012 and 2013

†*Streptococcus agalactiae* < 90 days of age in 2012 and 2013 figures do not include 23 meningitis-related cases where the causative organism was isolated from or detected in CSF specimens from patients that were not clinically categorised as having 'meningitis'

NA not applicable

PCV7, PCV13 or PPV23 vaccines only or a combination of them, two were incompletely vaccinated with PCV13, 24 were unvaccinated and the vaccination status of one case was not reported. Two deaths were reported among these 32 cases: one was aged 65+ years, had a type 6B infection and had received one dose of the PPV23 vaccine and had been on immunosuppressive therapy; the other was aged 1 to 4 years, had received three doses of the PCV7 vaccine plus one dose of the PPV23 vaccine, had no risk factors reported and had a type 3 infection (which is covered by the PPV23 vaccine). Four cases could not have been prevented by vaccination as the serotypes involved were not covered by any vaccine, but there were 12 others that could have potentially been prevented. Additional details are presented in Table 4. See also a separate chapter on invasive pneumococcal disease for further details.

*Streptococcus agalactiae* < 90 days of age (also known as Group B streptococcus)

Five cases of meningitis causing Group B streptococcus infection were notified in 2013; their age range was one day to one month with no deaths reported. See Table 3 and the chapter on invasive Group B streptococcal infections disease for further details.

*Mycobacterium* species

In 2013, two tuberculosis meningitis cases were notified (provisional at the time of writing). Cases ranged in age from 35 to 49 years. See the chapter on tuberculosis for further details.

Table 4. Details of the 32 pneumococcal meningitis cases reported, Ireland, 2013

Age Group (years)	Died	Vaccinated	No. of Vaccine Doses Received	No. of PCV7 / Prevenar 7 Doses	No. of PCV13 / Prevenar 13 Doses	No. of PPV23 / Pneumovax 23 Doses	Serotype of Infection	Potentially Vaccine Preventable	Serotype Covered by Vaccine Type
<1		Y	3		3		NA		NA
		I	1		1		NA		NA
		I	1		1		7F		PCV7, PCV13, PPV23
		N	0				7F	Y	PCV7, PCV13, PPV23
1-4		Y	3	2	1		NA		NA
	Y	Y	4	3		1	3		PCV13, PPV23
5-9		Y	3	3			NA		NA
15-19		N	0				3	Y	PCV13, PPV23
		N	0				10A	Y	PPV23
30-34		N	0				35F		No
		N	0				NA		NA
	Y	N	0				NA		NA
35-39		N	0				7F	Y	PCV7, PCV13, PPV23
		N	0				6C		No
40-44		N	0				14	Y	PCV7, PCV13, PPV23
45-49		N	0				7F	Y	PCV7, PCV13, PPV23
55-59		N	0				7F	Y	PCV13, PPV23
		N	0				NA		NA
		N	0				NA		NA
		N	0				14	Y	PCV7, PCV13, PPV23
		N	0				22F	Y	PPV23
60-64		N	0				23A		No
		N	0				NA		NA
		N	0				22F	Y	PPV23
65+	Y	Y	1			1	6B		PCV7, PCV13, PPV23
		N	0				NA		NA
		N	0				31		No
	Y	N	0				NA		NA
		N	0				19F	Y	PCV7, PCV13, PPV23
		N	0				NA		NA
		N	0				18C	Y	PCV7, PCV13, PPV23
	U	NA					23B		No

NA=not applicable or not available; Vaccinated: Y=Yes, N=No, U=Unknown, I=Incompletely vaccinated