

1.5 Other Forms of Bacterial Meningitis*

(*excluding meningococcal disease)

Summary

Number of cases, 2015: 32
Number of cases, 2014: 23
Number of cases, 2013: 21
Crude incidence rate, 2015: 0.69/100,000

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 30th August, 2016. These figures may differ from those published previously due to on-going updating of notification data on CIDR.

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

In total, 32 cases of meningitis under this disease category were notified in 2015, two of whom died. Of these two deaths, one had a *Staphylococcus aureus* infection, which was reported as the cause of death and the other had an *Escherichia coli* infection. Half of the 32 (50%) cases were case classified as confirmed, nine as probable (28.1%) and seven as possible (21.9%) (Table 1). The causative pathogens were identified in 53.1% (n=17/32) of cases (Table 2).

Prior to 1st 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, declined between 2012 and 2015 compared to previous years. In other words, without this change there would have been 25 extra cases reported under the bacterial meningitis (NOS) category between 2012 and 2015. Furthermore, there

is evidence of an additional 43 possible meningitis-related cases of this disease in this same age group during this same four year period where *S. agalactiae* was either isolated from or detected in CSF specimens from patients that were not clinically categorised as having 'meningitis' and had in fact no clinical diagnosis reported on CIDR. These 43 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 2010 and 2015.

Among the bacterial meningitis (NOS) cases notified in 2015 were 15 caused by *Escherichia coli* (age range two weeks to 82 years; none of which had serotype details reported) and one each caused by *Pasteurella multocida* (0-2 months) and *Staphylococcus aureus* (70-74 years). There were 15 other cases whose causative organism was not identified.

Bacterial meningitis caused by specified notifiable diseases: Haemophilus influenzae

Five cases of meningitis due to *H. influenzae* were notified in 2015, three of which were attributable to strains that were not type b, one to a non-typeable/non-capsulated strain and one that was PCR diagnosed positive, not typed. The age range was one month to 86 years. No deaths were reported among these cases. See Table 3 and the chapter on invasive *H. influenzae* disease for further details.

Listeria species

Five cases of listeriosis meningitis were notified in 2015 (age range 16 months to 76 years), all of whom were male and one of which, an adult, died from the infection. Of the three serotypes identified, two were type 4b and one was type 1/2a. Of the five cases, two had an underlying medical condition reported, one of whom died. See Table 3 and the chapter on listeriosis disease for further details.

Mycobacterium species

During 2015 two tuberculosis meningitis cases, aged 40-79 years, were notified and both had risk factors reported (provisional at the time of writing). See Table 3 and the chapter on tuberculosis for further details.

Table 1. Number and percentage of bacterial meningitis (NOS) cases reported by case classification, Ireland, 2010-2015

Case Classification	2010	2011	2012	2013	2014	2015	2010-2015
Confirmed	21	18	12	6	13	16	86
Probable	7	4	5	5	8	9	38
Possible	14	13	12	10	2	7	58
Total	42	35	29	21	23	32	182
% Confirmed	50.0%	51.4%	41.4%	28.6%	56.5%	50.0%	47.3%

Note: Meningitis related-*Streptococcus agalactiae* < 90 days of age excluded from 2012, 2013, 2014 and 2015 figures

Table 2. Number and percentage of bacterial meningitis (NOS) cases reported with and without an identified causative organism, Ireland, 2010-2015

Causative Organism	2010	2011	2012	2013	2014	2015	2010-2015
Known	21	20	11	6	13	17	88
Unknown/Not specified	21	15	18	15	10	15	94
Total	42	35	29	21	23	32	182
% Known	50.0%	57.1%	37.9%	28.6%	56.5%	53.1%	48.4%

Note: Meningitis related-*Streptococcus agalactiae* < 90 days of age excluded from 2012, 2013, 2014 and 2015 figures

Table 3. Annual notifications of bacterial meningitis (specified and NOS) except invasive meningococcal disease, Ireland, 2010-2015

Notified under	Causative organism	2010	2011	2012	2013	2014	2015	2010-2015
<i>Haemophilus influenzae</i> disease (invasive)	<i>Haemophilus influenzae</i>	2	4	3	2	7	5	23
Leptospirosis	<i>Leptospira</i> spp.	0	1	1	0	0	0	2
Listeriosis	<i>Listeria</i> spp.	3	2	2	2	1	5	15
<i>Streptococcus pneumoniae</i> infection (invasive)	<i>Streptococcus pneumoniae</i>	16	23	37	33	39	29	177
Streptococcus Group A infection (invasive) (iGAS)	<i>Streptococcus pyogenes</i>	2	0	1	3	0	4	10
Streptococcus Group B infection (invasive) (Group B Strep) < 90 days of age	<i>Streptococcus agalactiae</i> †	NA	NA	11	5	5	4	25
Tuberculosis*	<i>Mycobacterium</i> spp.*	9	2	4	3	1	2	21
Total Bacterial Meningitis, specified		32	32	59	48	53	49	273
Bacterial Meningitis, not otherwise specified	<i>Enterococcus faecium</i>	0	0	1	0	0	0	1
	<i>Enterococcus</i> species	0	0	0	0	1	0	1
	<i>Escherichia coli</i>	2	1	7	4	8	15	37
	Group C Streptococcus	0	0	1	0	0	0	1
	<i>Klebsiella oxytoca</i>	0	1	0	0	0	0	1
	<i>Klebsiella pneumoniae</i>	0	0	0	0	1	0	1
	<i>Micrococcus luteus</i>	0	0	0	0	1	0	1
	<i>Mycoplasma pneumoniae</i>	1	0	0	0	0	0	1
	<i>Pasteurella multocida</i>	0	0	0	0	0	1	1
	<i>Staphylococcus aureus</i>	6	2	1	0	0	1	10
	<i>Staphylococcus aureus</i> & <i>Staphylococcus capitis</i>	0	0	1	0	0	0	1
	<i>Staphylococcus capitis</i>	1	0	0	0	0	0	1
	<i>Streptococcus agalactiae</i> **	11	16	0	1	1	0	29
	<i>Streptococcus salivarius</i>	0	0	0	1	0	0	1
	<i>Streptococcus suis</i>	0	0	0	0	1	0	1
	Unknown	1	1	2	2	1	2	9
Not specified	20	14	16	13	9	13	85	
Total Bacterial Meningitis, not otherwise specified		42	35	29	21	23	32	182
Total Bacterial Meningitis, specified and not otherwise specified		74	67	88	69	76	81	455

*Tuberculosis meningitis figure for 2015 is provisional

†*Streptococcus agalactiae* < 90 days of age in 2012 to 2015-these figures do not include 43 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'

***Streptococcus agalactiae* for all ages only in 2010 to 2011 and for cases > 90 days of age only in 2012 to 2015

NA not applicable

Streptococcus Group A infection (invasive) (iGAS)

Four cases of iGAS were notified during 2015, compared to none in the previous year (Table 3). The age range was 12 months to 39 years. Three of the cases were male and one female. Three of the four cases had risk factors identified, but no deaths were reported.

Streptococcus Group B infection (invasive) (Group B Strep) <90 days of age

Four cases of Group B Strep under 90 days of age were notified to CIDR during 2015, compared to five in 2014 (Table 3). Three of the four cases in 2015 were female and one was male. No deaths were reported.

Streptococcus pneumoniae

In 2015, 29 cases of pneumococcal meningitis were notified, compared to 39 in the previous year (Table 3). The median age was 54 years (range one month to 77 years). No pneumococcal meningitis-related deaths were reported during 2015. Of the 29 cases in 2015, data on vaccination status were available for 22 (75.9%) of the 29 cases; four cases were aged >65 years. Table 4 presents the vaccination status, serotype and additional risk factor for each case.

Table 4. Details of the 29 pneumococcal meningitis cases reported, Ireland, 2015

Case No.	Age Group (years)	Vaccination Status	No. of PCV13 / Prevenar 13 Doses	No. of PPV23 / Pneumovax 23 Doses	Serotype of Infection	Serotype Covered by Vaccine Type	Additional Risk Factors (excluding age 65+ years)
1	<1	Y	2	NA	12A	Not covered	N
2		N	0	0	NA		N
3		I	2	0	15B	PPV23	N
4	5-9	N	0	0	23A	Not covered	N
5		Y	2	0	NA		N
6	10-14	Y	0	1	33F	PPV23	Y
7		N	0	0	NA		N
8	20-24	U	0	NA	NA		Y
9	30-34	N	0	0	9N	PPV23	Y
10	35-39	U	0	NA	8	PPV23	N
11	40-44	U	0	NA	34	Not covered	NA
12	45-49	N	0	0	NA		N
13	50-54	N	0	0	19A	PCV13, PPV23	Y
14		U	0	NA	NA		Y
15		N	0	0	NA		Y
16	55-59	N	0	0	24F	Not covered	N
17		N	0	0	NA		Y
18		U	0	U	7F	PCV13, PPV23	N
19		Y	NA	U	NA		Y
20		N	0	0	NA		Y
21		U	0	NA	NA		NA
22	60-64	U	0	U	23A	Not covered	Y
23		N	0	0	8	PPV23	Y
24		N	0	0	NA		Y
25		N	0	0	24F	Not covered	Y
26	65+	N	0	0	22F	PPV23	N
27		N	0	0	22F	PPV23	Y
28		Y	0	1	9N	PPV23	Y
29		N	0	0	18C	PCV13, PPV23	Y

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