

1.5 Other Forms of Bacterial Meningitis*

(*excluding meningococcal disease)

Summary

Number of cases, 2014: 23
Number of cases, 2013: 21
Number of cases, 2012: 29
Crude incidence rate, 2014: 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 13th August, 2015. 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, 23 cases of meningitis under this disease category were notified in 2014, none of whom died. Thirteen of the 23 (56.5%) cases were case classified as confirmed, eight as probable (34.8%) and two as possible (8.7%) (table 1). The causative pathogens were identified in 47.8% (n=11/23) 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 2014 compared to previous years. In other words, without this change there would have been 21 extra cases reported under the Bacterial meningitis (NOS) category between 2012 and 2014. Furthermore, there is evidence of an additional 32 possible meningitis-related cases of this disease in this same age group during this same three 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 32 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 2009 and 2014.

Among the bacterial meningitis (NOS) cases notified in 2014 were six caused by *Escherichia coli* (age range two to eight weeks; none of which had serotype details), one each caused by *Enterococcus* species (30-34 years), *Klebsiella pneumoniae* (age unknown), *Micrococcus luteus* (2 months old); *Streptococcus agalactiae* (7 months old), and *Streptococcus suis* (50-54 years old). There were 12 other cases whose causative organism was not identified.

Bacterial meningitis caused by specified notifiable diseases:

Haemophilus influenzae

Seven cases of meningitis due to *H. influenzae* were notified in 2014, five of which were attributable to non-typeable/non-capsulated strains and the remaining two were PCR diagnosed positive, not typed. The age range was one month to 64 years. No deaths were reported among these cases. See Table 3 and the chapter on invasive *H. influenzae* disease for further details.

Listeria species

One case of listeriosis meningitis was notified in 2014. The case was 23 months of age, serotype 4b infection was diagnosed and the case had no underlying medical condition reported. See Table 3 and the chapter on listeriosis disease for further details.

Streptococcus pneumoniae

In 2014, 39 cases of pneumococcal meningitis were notified, compared to 33 in the previous year. The median age was 55 years (range one month to 87 years). Five (12.8%) pneumococcal meningitis related deaths were reported in 2014, with a median age of 56 years (range 9 to 83 years). The cause of death was reported for two cases: one was caused by this infection, the other was not; the cause of death was not reported on the remaining three cases.

Of the 39 cases in 2014, 24 were eligible for vaccination (13 cases were aged >65 years and 11 others had risk factors reported). Data on vaccination status were available for 34 of the 39 cases (87.2%). Eleven (28.2%) were vaccinated with either the PCV13 or PPV23

Table 1. Number and percentage of bacterial meningitis (NOS) cases reported by case classification, Ireland, 2009-2014

Case Classification	2009	2010	2011	2012	2013	2014	2009-2014
Confirmed	17	21	18	12	6	13	87
Probable	8	7	4	5	5	8	37
Possible	15	14	13	12	10	2	66
Total	40	42	35	29	21	23	190
% Confirmed	42.5%	50.0%	51.4%	41.4%	28.6%	56.5%	45.8%

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

Table 2. Number and percentage of bacterial meningitis (NOS) cases reported with and without an identified causative organism, Ireland, 2009-2014

Causative Organism	2009	2010	2011	2012	2013	2014	2009-2014
Known	15	21	20	11	6	11	84
Unknown/Not specified	25	21	15	18	15	12	106
Total	40	42	35	29	21	23	190
% Known	37.5%	50.0%	57.1%	37.9%	28.6%	47.8%	44.2%

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

Table 3. Annual notifications of bacterial meningitis (specified and NOS) except meningococcal disease, Ireland, 2009-2014

Notified under	Causative organism	2009	2010	2011	2012	2013	2014	2009-2014
<i>Haemophilus influenzae</i> disease (invasive)	<i>Haemophilus influenzae</i>	3	2	4	3	2	7	21
Leptospirosis	<i>Leptospira</i> spp.	1	0	1	1	0	0	3
Listeriosis	<i>Listeria</i> spp.	1	3	2	2	2	1	11
Salmonellosis	<i>Salmonella enteritidis</i>	1	0	0	0	0	0	1
<i>Streptococcus pneumoniae</i> infection (invasive)	<i>Streptococcus pneumoniae</i>	22	16	23	37	33	39	170
Streptococcus Group A infection (invasive) (iGAS)	<i>Streptococcus pyogenes</i>	0	2	0	1	3	0	6
Streptococcus Group B infection (invasive) (Group B Strep) < 90 days of age	<i>Streptococcus agalactiae</i> †	NA	NA	NA	11	5	5	21
Tuberculosis*	<i>Mycobacterium</i> spp.*	8	9	2	3	3	1	26
Total Bacterial Meningitis, specified		36	32	32	58	48	53	259
Bacterial Meningitis, not otherwise specified	<i>Enterococcus faecalis</i>	1	0	0	0	0	0	1
	<i>Enterococcus faecium</i>	0	0	0	1	0	0	1
	<i>Enterococcus</i> species	0	0	0	0	0	1	1
	<i>Escherichia coli</i>	3	2	1	7	4	6	23
	Group C Streptococcus	0	0	0	1	0	0	1
	<i>Klebsiella oxytoca</i>	0	0	1	0	0	0	1
	<i>Klebsiella pneumoniae</i>	0	0	0	0	0	1	1
	<i>Micrococcus luteus</i>	0	0	0	0	0	1	1
	<i>Mycoplasma pneumoniae</i>	0	1	0	0	0	0	1
	<i>Staphylococcus aureus</i>	2	6	2	1	0	0	11
	<i>Staphylococcus aureus</i> & <i>Staphylococcus capitis</i>	0	0	0	1	0	0	1
	<i>Staphylococcus capitis</i>	0	1	0	0	0	0	1
	<i>Streptococcus agalactiae</i> **	7	11	16	0	1	1	36
	<i>Streptococcus bovis</i> biotype II/2	2	0	0	0	0	0	2
	<i>Streptococcus salivarius</i>	0	0	0	0	1	0	1
	<i>Streptococcus suis</i>	0	0	0	0	0	1	1
Unknown	1	1	1	2	2	1	8	
Not specified	24	20	14	16	13	11	98	
Total Bacterial Meningitis, not otherwise specified		40	42	35	29	21	23	190
Total Bacterial Meningitis, specified and not otherwise specified		76	74	67	87	69	76	449

*Tuberculosis meningitis figure for 2014 is provisional

†*Streptococcus agalactiae* < 90 days of age in 2012 to 2014-these figures do not include 32 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 2009 to 2011 and for cases > 90 days of age only in 2012 to 2014

NA not applicable

vaccines, one (2.6%) was incompletely vaccinated with PCV13; the remaining 27 (69.2%) cases with pneumococcal meningitis were either unvaccinated (n=12; 30.8%) or had an unknown vaccination status (n=15; 38.5%).

Mycobacterium species

In 2014, one tuberculosis meningitis case was notified (provisional at the time of writing) aged 6-10 years, with no risk factors reported. See the chapter on tuberculosis for further details.

Fourteen cases (35.9%) had serotypes that were covered by either the PCV13 or PPV23 vaccines. Of the eleven cases (28.2%) that were vaccinated, six (15.4%) had serotypes that were covered by either the PCV13 or PCV23 vaccines, including two cases (aged 1-4 years) which were vaccinated with two and four doses of the PCV13 vaccine, respectively. Of the 24 cases eligible for vaccination, including 13 that were aged >65 years, 20 were reported to have additional risk factors. Additional details are presented in Table 4. See also a separate chapter on invasive pneumococcal disease for further details.

Table 4. Details of the 39 pneumococcal meningitis cases reported, Ireland, 2014

Age Group (years)	Died	Vaccination Status	No. of PCV13 / Prevenar 13 Doses	No. of PPV23 / Pneumovax 23 Doses	Serotype of Infection	Serotype Covered by Vaccine Type	Risk Factors
<1		I	1	NA	NA		NA
		U	0	NA	NA		N
1-4		Y	2	NA	19A	PCV13, PPV23	N
		Y	4	NA	15B	PPV23	Y
5-9	Y	U	0	NA	19F	PCV13, PPV23	Y
		N	0	0	NA		N
10-14		U	0	NA	35B	Not covered	Y
15-19		U	0	NA	NA		N
25-29		U	0	NA	15A	Not covered	NA
30-34		U	0	NA	23A	Not covered	Y
35-39		U	0	NA	35B	Not covered	Y
		U	0	NA	NA		N
40-44	Y	Y	0	1	37	Not covered	Y
		U	0	NA	11A	PPV23	NA
		U	0	NA	29	Not covered	Y
45-49		N	0	0	NA		N
		N	0	0	22F	PPV23	N
		N	0	0	NA		Y
50-54		U	0	NA	3	PCV13, PPV23	NA
55-59	Y*	U	0	NA	10A	PPV23	U
		N	0	0	15A	Not covered	Y
		N	0	0	NA		NA
		Y	0	1	NA		NA
60-64		N	0	0	6C	Not covered	Y
	Y	N	0	0	15C	Not covered	Y
		Y	0	1	NA		U
65+		U	0	NA	NA		Y
		U	0	NA	15A	Not covered	NA
		U	0	NA	9N	PPV23	NA
		N	0	0	NA		Y
		N	0	0	NA		Y
		N	0	0	20	PPV23	Y
		N	0	0	33F	PPV23	NA
	Y	Y	0	1	8	PPV23	Y
		Y	0	1	24F	Not covered	Y
		Y	0	1	12F	PPV23	Y
		Y	0	1	NA		N
		Y	0	1	3	PCV13, PPV23	Y
	Y	0	2	19A	PCV13, PPV23	Y	

NA=not applicable or not available; Vaccinated: Y=Yes, N=No, U=Unknown, I=Incompletely vaccinated; * IPD was cause of death