

1.5 Other forms of Bacterial Meningitis*

(*excluding meningococcal disease)

Summary

Number of cases, 2016: 15

Number of cases, 2015: 32

Number of cases, 2014: 23

Crude incidence rate, 2016: 0.31/100,000

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 9th November, 2017. Census data from 2016 were used to calculate 2016 incidence rates. 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, 15 cases of meningitis under this disease category were notified in 2016, none of whom died. Five each (33.3%) of the 15 cases were case classified as confirmed, probable and possible (Table 1). The causative pathogens were identified in five (33.3%) 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 2016 compared to previous years. In other words, without this change there would have been 27 extra cases reported under the bacterial meningitis

(NOS) category between 2012 and 2016. Furthermore, there is evidence of an additional 54 possible meningitis-related cases of this disease in this same age group during this same five year period where *S. agalactiae* was either isolated from or detected in CSF specimens from patients that were not clinically categorised as having 'meningitis'. These 54 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 2011 and 2016.

Among the bacterial meningitis (NOS) cases notified in 2016 were five caused by *Escherichia coli* (age range two weeks to 87 years; three were confirmed and none of which had serotype details reported). There were 10 other cases whose causative organism was not identified.

Bacterial meningitis caused by specified notifiable diseases: Haemophilus influenzae

One case of meningitis related *H. influenzae* was notified in 2016, aged 6-11 months old with a non-typeable/non-capsular strain. See Table 3 and the chapter on invasive *H. influenzae* disease for further details.

Listeria species

Four cases of listeriosis meningitis were notified in 2016 (age range 1 week to 74 years), none of whom died from their infections. All serotypes were identified, two were type 4b and one each of type 1/2a and 1/2b. Of the four cases, three had an underlying medical condition reported. See Table 3 and the chapter on listeriosis disease for further details.

Streptococcus pneumoniae

In 2016, 37 cases of pneumococcal meningitis were notified, compared to 32 in the previous year (Table 3). The median age was 56 years (range two months to 83 years). Five pneumococcal meningitis-related deaths were reported during 2016. Of the 37 cases, nine were vaccinated with either the PCV13 (three cases aged <10 years) or PPV23 vaccine (seven cases aged between 34-83 years), 19 were not vaccinated with either vaccine and nine had a vaccination status that was either unknown or not specified. Table 4

Table 1. Number and percentage of bacterial meningitis (NOS) cases reported by case classification, Ireland, 2011-2016

Case Classification	2011	2012	2013	2014	2015	2016	2011-2016
Confirmed	18	12	6	13	16	5	70
Probable	4	5	5	8	9	5	36
Possible	13	12	10	2	7	5	49
Total	35	29	21	23	32	15	155
% Confirmed	51.4%	41.4%	28.6%	56.5%	50.0%	33.3%	45.2%

Note: Meningitis related-*Streptococcus agalactiae* < 90 days of age excluded from 2012, 2013, 2014, 2015 and 2016 figures

Table 2. Number and percentage of bacterial meningitis (NOS) cases reported with and without an identified causative organism, Ireland, 2011-2016

Causative Organism	2011	2012	2013	2014	2015	2016	2011-2016
Known	20	11	6	13	17	5	72
Unknown/Not specified	15	18	15	10	15	10	83
Total	35	29	21	23	32	15	155
% Known	57.1%	37.9%	28.6%	56.5%	53.1%	33.3%	46.5%

Note: Meningitis related-*Streptococcus agalactiae* < 90 days of age excluded from 2012, 2013, 2014, 2015 and 2016 figures

Table 3. Annual notifications of bacterial meningitis (specified and NOS) except invasive meningococcal disease, Ireland, 2011-2016

Notified under	Causative organism	2011	2012	2013	2014	2015	2016	2011-2016
<i>Haemophilus influenzae</i> disease (invasive)	<i>Haemophilus influenzae</i>	4	3	2	7	5	1	22
Leptospirosis	<i>Leptospira</i> spp.	1	1	0	0	0	0	2
Listeriosis	<i>Listeria</i> spp.	2	2	2	1	6	4	17
<i>Streptococcus pneumoniae</i> infection (invasive)	<i>Streptococcus pneumoniae</i>	23	37	33	39	32	37	201
Streptococcus Group A infection (invasive) (iGAS)	<i>Streptococcus pyogenes</i>	0	1	3	0	4	0	8
Streptococcus Group B infection (invasive) (Group B Strep) < 90 days of age	<i>Streptococcus agalactiae</i> †	NA	11	5	5	4	2	27
Tuberculosis*	<i>Mycobacterium</i> spp.*	2	3	3	1	2	0	11
Total Bacterial Meningitis, specified		32	58	48	53	53	44	288
Bacterial Meningitis, not otherwise specified	<i>Enterococcus faecium</i>	0	1	0	0	0	0	1
	<i>Enterococcus</i> spp	0	0	0	1	0	0	1
	<i>Escherichia coli</i>	1	7	4	8	15	5	40
	Group C Streptococcus	0	1	0	0	0	0	1
	<i>Klebsiella oxytoca</i>	1	0	0	0	0	0	1
	<i>Klebsiella pneumoniae</i>	0	0	0	1	0	0	1
	<i>Micrococcus luteus</i>	0	0	0	1	0	0	1
	<i>Pasteurella multocida</i>	0	0	0	0	1	0	1
	<i>Staphylococcus aureus</i>	2	1	0	0	1	0	4
	<i>Staphylococcus aureus</i> & <i>Staphylococcus capitis</i>	0	1	0	0	0	0	1
	<i>Streptococcus agalactiae</i> **	16	0	1	1	0	0	18
	<i>Streptococcus salivarius</i>	0	0	1	0	0	0	1
	<i>Streptococcus suis</i>	0	0	0	1	0	0	1
Unknown		1	2	2	1	4	3	13
Not specified		14	16	13	9	11	7	70
Total Bacterial Meningitis, not otherwise specified		35	29	21	23	32	15	155
Total Bacterial Meningitis, specified and not otherwise specified		67	87	69	76	85	59	443

*Tuberculosis meningitis figure for 2016 is provisional

†*Streptococcus agalactiae* < 90 days of age in 2012 to 2016-these figures do not include 54 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 2011 and for cases > 90 days of age only in 2012 to 2016

NA not applicable

presents the vaccination status, serotype and additional risk factor, if any, for each case. See chapter on pneumococcal disease for further details.

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

Two cases of *Streptococcus agalactiae* under 90 days of age were notified to CIDR during 2016, compared to four in 2015 (Table 3). Both cases in 2016 were male and one week old.

Table 4. Details of the 37 pneumococcal meningitis cases reported, Ireland, 2016

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	Additional Risk Factors (excluding age 65+ years)
<1		N	0	0	38	Not covered	NA
		NA	NA	NA	NA	.	NA
1-4		Y	3	0	10A	PPV23	N
		Y	3	0	NA	.	N
5-9		Y	3	NA	NA	.	N
30-34		N	0	0	19A	PCV13, PPV23	Y
		Y	0	1	NA	.	Y
		Y	0	1	NA	.	Y
		N	0	0	6C	Not covered	Y
40-44		N	0	0	NA	.	N
		N	0	0	15C	Not covered	N
		NA	0	NA	19F	PCV13, PPV23	Y
45-49		N	0	0	3	PCV13, PPV23	N
		N	0	0	10A	PPV23	Y
55-59		NA	0	NA	12F	PPV23	N
		N	0	0	NA	.	Y
		N	0	0	15B/C	Undetermined	Y
		N	0	0	15B/C	Undetermined	Y
		N	0	0	9N	PPV23	Y
		NA	0	NA	11A	PPV23	Y
		N	0	0	20	PPV23	Y
		N	0	0	NA	.	N
	NA	0	NA	NA	.	Y	
60-64		N	0	0	NA	.	N
		NA	NA	NA	15A	Not covered	N
	Died	N	0	0	NA	.	N
	Died	U	U	U	19A	PCV13, PPV23	N
	Died	NA	NA	NA	3	PCV13, PPV23	NA
		N	0	0	35B	Not covered	N
	Died	U	U	0	NA	.	Y
65+		N	0	0	NA	.	NA
		N	0	0	7F	PCV13, PPV23	Y
		Y	0	1	23B	Not covered	Y
		N	0	0	15B/C	Undetermined	Y
	Died	Y	0	1	12F	PPV23	Y
		Y	0	1	22F	PPV23	Y
		Y	0	1	11A	PPV23	Y

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