



## SUMMARY

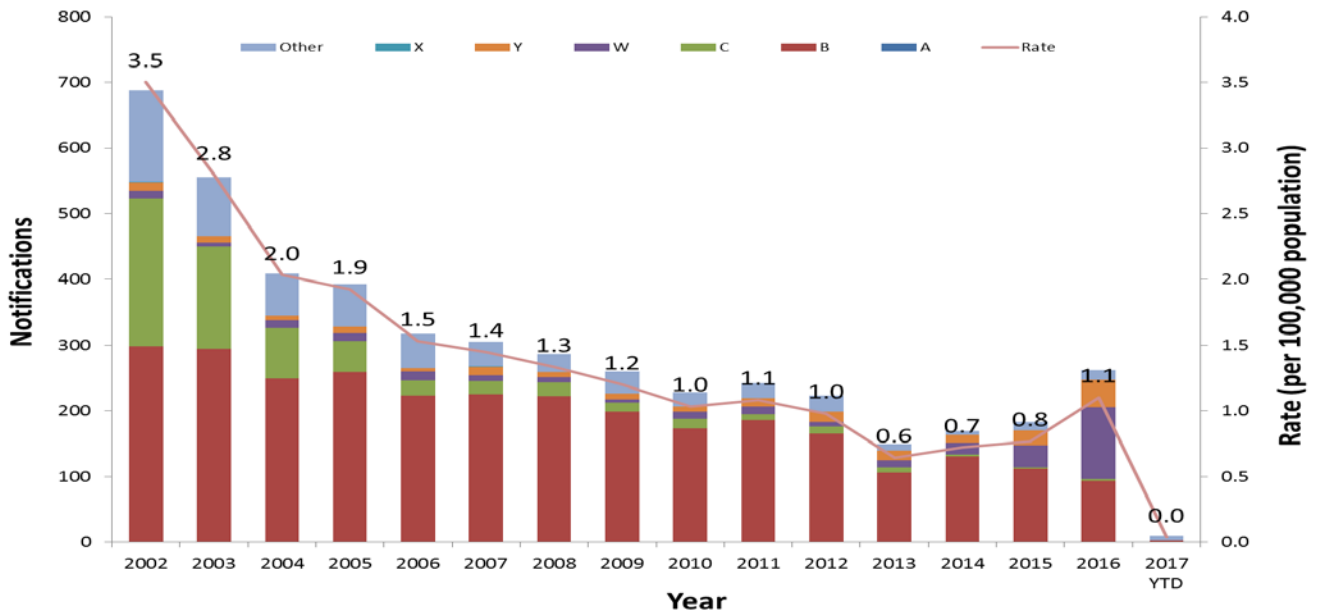
- The number of cases of invasive meningococcal disease (IMD) and overall risk remains low; however, since 2015 serogroup W (MenW) has emerged as a significant cause of IMD with notifications increasing nearly five-fold between 2014 and 2016.
- From 2002 to 2015 the predominant meningococcal serogroup in Australia was meningococcal B (MenB). However, in 2016, MenW became the predominant meningococcal serogroup in Australia.
- In 2016, MenW increases were not uniform across Australia but the serogroup accounted for an increasing burden of IMD across all jurisdictions, except the Northern Territory.
- IMD follows a seasonal trend in Australia with notifications usually peaking in winter and early spring. In 2016, notifications peaked later, with 38 cases in both August and October. A total of 9 cases of IMD have been reported in January 2017 year to date (YTD).
- While cases of MenW are more common in adults, there has been an increase in cases in children aged less than 5 years since 2015.
- Many of the MenW cases belong to the hypervirulent ST11 clonal complex, associated with a higher risk of invasive disease and a higher case fatality rate.

## ANALYSIS

### ***Serogroup trends***

- Overall there has been a decline in IMD cases since the 2003 introduction of the meningococcal C (MenC) vaccine on the National Immunisation Program (NIP) with the overall rate of IMD decreasing 82% from 3.5 per 100,000 (688 cases) in 2002 to 0.6 per 100,000 (149 cases) in 2013 (Figure 1). However, from 2014 the overall rate of IMD has increased. In 2016, there were a total of 262 IMD cases compared to 149 IMD cases in 2013 (Figure 1).
  - From 2002 to 2015 the predominant meningococcal serogroup in Australia was MenB. Annual notifications of MenB have decreased from 298 cases in 2002 (accounting for 43% of all IMD notifications) to 93 cases in 2016 (accounting for 35% of all IMD notifications).
  - MenC, the target of a national immunisation since 2003, has dramatically declined from 225 notifications in 2002 to 3 notifications in 2016 (a 99% decline).
  - Notifications of MenW doubled from 2014 (17) to 2015 (34), then more than tripled in 2016 (110).
  - Annual notifications of serogroup Y (MenY) have ranged from 5 to 41 since 2002, with an increasing trend since 2011. In 2016, there were 41 notifications on MenY compared to 22 and 12 in 2015 and 2014 respectively.
  - Serogroup A (MenA) and serogroup X (MenX) are rare, with a total of only 4 and 2 notifications respectively since 2002. There were no notifications of either MenA or MenX in 2016.

**Figure 1. Notifications of IMD by serogroup and rates, Australia, 2002 to 2017 YTD\***

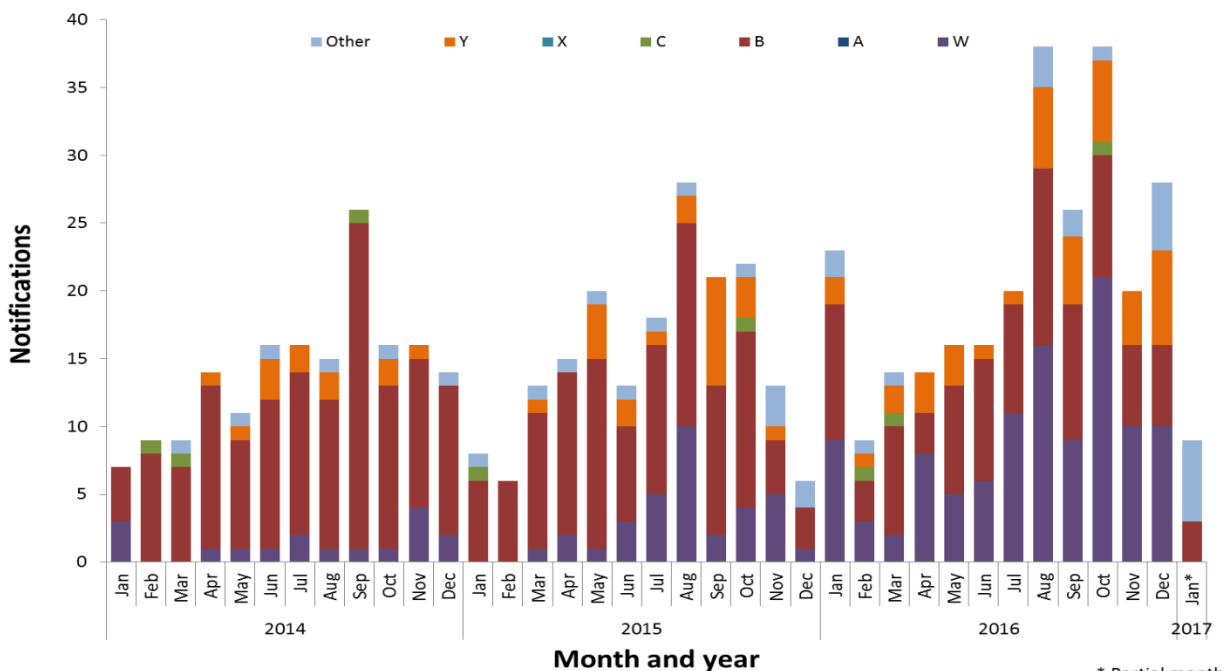


Note: Other includes where meningococcal isolates could not be identified ('not groupable'), other isolates not grouped and where serogroup was not known.

\*Data extracted from the National Notifiable Diseases Surveillance System on 9 January 2017.

- IMD tends to follow a seasonal pattern in Australia, with disease activity increasing between June and September each year. In 2016, notifications peaked later, with 38 cases in both August and October. Notifications decreased in November 2016 (20 cases) and December (28 cases).
  - The shift in serogroup predominance has become increasingly evident since April 2016, with one-third or more of IMD notifications each month caused by MenW (Figure 2).
  - A total of 9 cases of IMD have been reported in January 2017 YTD. Of these, 3 cases are MenB and 6 cases are serogroup typing pending or unknown.

**Figure 2. Notifications of IMD by month and year of diagnosis and serogroup, Australia, 2014 to 2017 YTD\***



\* Partial month

Note: Other includes where meningococcal isolates could not be identified ('not groupable'), other isolates not grouped and where serogroup was not known. \*Data extracted from the National Notifiable Diseases Surveillance System on 9 January 2017.

### Geographical distribution

- MenW accounted for 42% (110 cases) of notifications of IMD reported in 2016. Across jurisdictions MenW cases ranged from 0% in Northern Territory to 80% in Tasmania (Table 1).
- MenW increases are not uniform across Australia but the serogroup is accounting for an increasing burden of IMD across all jurisdictions, except the Northern Territory (Table 2). Compared to 2015, cases of MenW in 2016 were:
  - 3.4 times in New South Wales from 8 to 27 cases, respectively
  - 3.3 times in Queensland from 4 to 13 cases, respectively
  - 3.0 times in Western Australia from 4 to 12 cases, respectively
  - 2.8 times in Victoria from 17 to 48 cases, respectively, and
  - South Australia and Tasmania have also reported increases (from no cases to 5 cases in South Australia, and from 1 to 4 cases in Tasmania, respectively) and, in 2016, the Australian Capital Territory reported its first case of MenW since 2008.

**Table 1. Notifications of IMD by serotype, Australia, 2016 by state and territory**

State or territory	Notifications							Rate (per 100,000 population)	
	A	B	C	W	X	Y	Other		Total
ACT	0	1	0	1		0	0	2	0.51
NSW	0	27	2	27		16	6	78	1.02
NT	0	2	0	0		0	0	2	0.82
QLD	0	16	0	13		13	4	46	0.96
SA	0	23	0	5		0	0	28	1.65
TAS	0	0	0	4		1	0	5	0.97
VIC	0	18	1	48		9	4	80	1.35
WA	0	6	0	12		2	1	21	0.81
Australia	0	93	3	110		41	15	262	1.10

**Table 2. Notifications and rate of MenW, Australia, 2013 to 2017 YTD by state and territory**

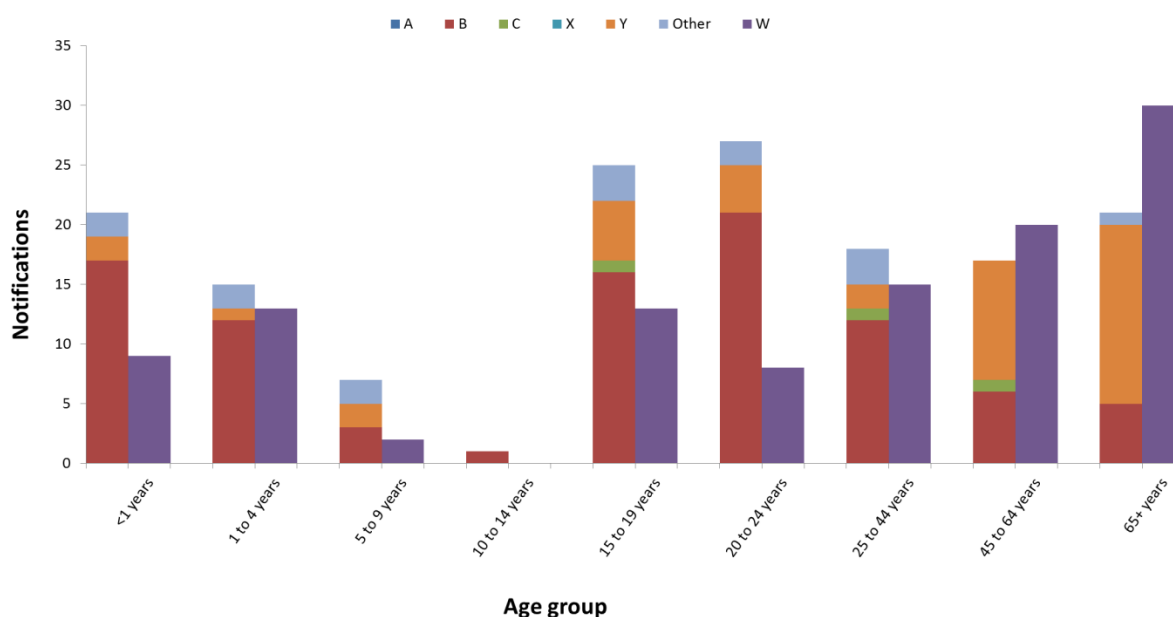
Year	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	AUS
	Notifications								
2013	0	5	0	3	1	0	1	1	11
2014	0	7	0	3	0	1	4	2	17
2015	0	8	0	4	0	1	17	4	34
2016	1	27	0	13	5	4	48	12	110
2017 YTD	0	0	0	0	0	0	0	0	0
Rate (per 100,000 population)									
2013	-	0.07	-	0.06	0.06	-	0.02	0.04	0.05
2014	-	0.09	-	0.06	-	0.19	0.07	0.08	0.07
2015	-	0.10	-	0.08	-	0.19	0.29	0.15	0.14
2016	0.26	0.35	-	0.27	0.29	0.77	0.81	0.46	0.46
2017 YTD*	-	-	-	-	-	-	-	-	-

\* annualised rate

### Age distribution

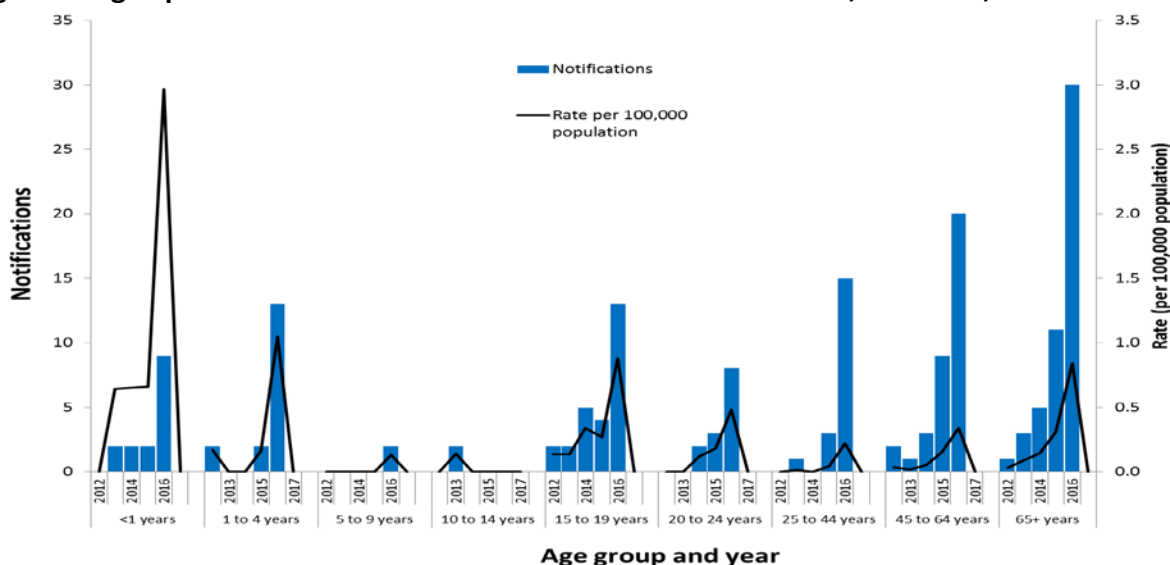
- In 2016, MenW was reported in all age groups, except in children aged 10 to 14 years.
- MenW accounts for 59% of IMD disease in adults aged 65 years and older.
- Age-specific rates of MenW, while remaining low, have increased in most age groups over the past 5 years (Figure 3).
- Notifications of MenW have remained low in children aged less than 5 years up until 2016, with no more than 2 cases reported annually in children aged less than 1 year and no more than 4 cases reported annually in children aged between 1 and 5 years since reporting began in 2002 (Figure 4). However in 2016, 9 cases of MenW were reported in children aged less than 1 year and 13 cases have been reported in children aged between 1 and 4 years.

**Figure 3. Notifications of IMD by age group, Australia, 2016\*, by serotype.**



\*Data extracted from the National Notifiable Diseases Surveillance System on 9 January 2017.

**Figure 4. Age-specific notifications and rate of MenW notifications, Australia, 2012-2017 YTD\***



\*Data extracted from the National Notifiable Diseases Surveillance System on 9 January 2017.

### **Clinical presentation and severity**

- Many MenW strains identified in Australia belong to the hypervirulent ST11 clonal complex. ST11 strains are associated with a high case fatality and atypical clinical presentation, making early diagnosis challenging.<sup>1</sup> However non-specific presentation is not uncommon for IMD.
- 14 of the 23 deaths due to IMD in Australia in 2015 and 2016 were due to MenW. The average case fatality rate (CFR) for MenW between 2007 and 2016 (8%) is nearly double the CFR of IMD due to all other serogroups (5%).
- It is important to note that mortality reporting against each notification of IMD is not complete, but has improved over time.

## Background

- Invasive Meningococcal Disease (IMD), manifests as meningitis, sepsis or bacteraemia and mainly affects children aged less than 5 years and adolescents (15-19 years) with a seasonal peak of cases in winter and early spring.
- The clinical manifestations of meningococcal septicaemia and meningitis may be non-specific and can include sudden onset of fever, rash (petechial, purpuric or maculopapular), headache, neck stiffness, photophobia, altered consciousness, muscle ache, cold hands, thirst, joint pain, nausea and vomiting.
- Meningococcal infections can progress rapidly to serious disease or death in previously healthy persons. A number of medical conditions are known to increase the risk of an individual developing IMD. People who survive infection can develop permanent sequelae, including limb deformity, skin scarring, deafness and neurologic deficits.
- The bacteria causing this disease, *Neisseria meningitidis*, is carried by a proportion of the population without developing disease. The prevalence and duration of asymptomatic nasopharyngeal carriage of meningococci vary over time and in different population and age groups. Adolescents have the highest carriage rates, peaking in 19-year olds, and so play an important role in transmission.<sup>2</sup>
- Vaccination against meningococcal disease in Australia has been targeted at MenC and is given to children at 12 months of age.

## Source

- Data extracted from the National Notifiable Diseases Surveillance System on 9 January 2017.
- Data extracted by diagnosis date.

## REFERENCES

- 
- 1 Mustapha, M. M. et al. 2016. Global epidemiology of capsular group W meningococcal disease(1970–2015): Multifocal emergence and persistence of hypervirulent sequence type (ST)-11 clonal complex. *Vaccine* 34 (13): 1515-1523.
  - 2 Christensen H. et al. 2010. Meningococcal carriage by age: a systematic review and meta-analysis. *Lancet Infectious Diseases* Dec 2010: 853-61.