

The Changing Epidemiology of Invasive Meningococcal Disease in Ireland

Four years after introducing the MenC conjugate vaccine

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Introduction

In the late 1990s:

- Ireland had one of the highest incidence rates of invasive meningococcal disease (IMD) in Europe; >14 cases per 100,000 total population were notified per annum.
- Over 80% of cases were laboratory confirmed – 12/100,000.
- Serogroup C disease accounted for 30% of laboratory confirmed cases. Infants and children under 5 years of age and young adults were mostly affected.

In October 2000:

- MenC conjugate vaccine was introduced in Ireland to the infant immunisation schedule at 2, 4 and 6 months. A catch-up campaign was also launched targeting all those under 23 years of age.

Aims

To describe the epidemiology of IMD in Ireland and the changes that have occurred in the four years since introducing the meningococcal serogroup C conjugate (MenC) vaccine.

Methods

- Invasive meningococcal disease (IMD) is a notifiable disease in Ireland. Clinicians and laboratories are legally obliged to notify.
- Cases are notified daily to the Health Protection Surveillance Centre.
- An enhanced surveillance system is in operation since 1997. Demographic, clinical, microbiological and epidemiological information are collected on each notification.
- Notification data are reconciled monthly with laboratory data from the Irish Meningococcal and Meningitis Reference Laboratory (IMMRL).

Results

Total IMD – Cases and Deaths

- Annual incidence rates of IMD have more than halved in recent years, from 14.8 cases per 100,000 in 1999 down to 5.1 cases in 2004 (Fig. 1).
- Number of IMD associated deaths has also decreased, 17 deaths in 1999 and 25 in 2000 down to 10 in 2004 (Fig. 2).
- Annual case fatality rates (CFR) ranged from 3% to 5% between 1999 and 2004 (Fig. 2). CFRs tended to be higher in the older age groups. Between 1999-2004, the average IMD CFR in adults was 7.8%.

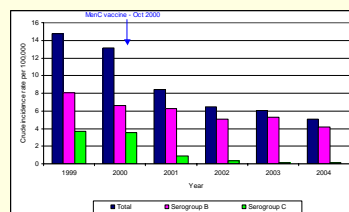


Figure 1. Annual crude incidence rates of IMD

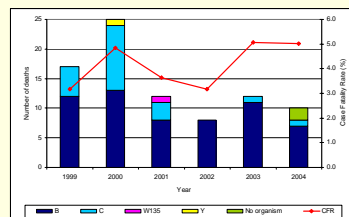


Figure 2. Number IMD deaths and CFR by serogroup

Results

Serogroup C – Cases and Deaths

- Incidence of serogroup C disease has declined from a high of 3.7 per 100,000 in 1999 to 0.1 per 100,000 in 2003 and 2004 (Fig. 1).
- Overall, the number of serogroup C IMD cases has declined by 96% when compared to the time pre MenC vaccination (Fig. 3 and Table 1).
- In 2004, no serogroup C cases occurred in any child under 15 years of age. In 2000, 123 cases occurred in this age group (Table 1).
- Over the past three years (2002-2004) no child or adolescent has died from serogroup C disease.
- From 2001-2004, five MenC vaccine failures have occurred, none of these have occurred in the last two years.

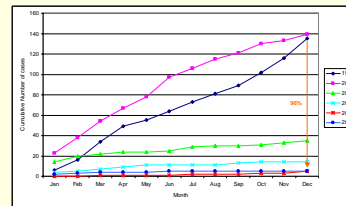


Figure 3. Cumulative number of serogroup C cases

Table 1. Comparison of number of serogroup C cases by age group in 2000 and 2004

Age group (Years)	2000	2004	% Reduction
<1	20	0	100
1-4	37	0	100
5-9	15	0	100
10-14	20	0	100
15-19	31	1	97
20-24	8	1	88
>25	8	3	75
Total	139	5	96

IMD and Laboratory Confirmation

- Serogroup B disease is by far the predominant serogroup in Ireland, accounting for 95% of confirmed cases in 2004 (Fig. 4).
- Serogroup C disease now only accounts for 3% of cases (Fig. 4).
- Incidence of non-B/non-C serogroups has not changed in recent years and their incidence remains low.
- Incidence of serogroup B disease is highest in young children. In 2004, the age specific incidence rate was 77 per 100,000 in the <1 year olds and 31 per 100,000 in the 1-4 year olds.
- There were seven serogroup B deaths in 2004, all occurring in children <5 years of age.
- Majority of cases were confirmed by PCR. In 2004, 60% by PCR alone, 36% by culture and PCR and 4% by culture alone.
- Many serogroup B serotypes are associated with IMD in Ireland. The most commonly reported ones are 4: P1.4; NT: P1.9; NT: P1.15 and 4: P1.15.
- In the few serogroup C cases that do occur, the most commonly identified serosubtype is 2a: P1.5, P1.2.

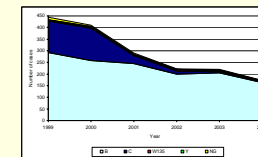


Figure 4. IMD notifications by serogroup, 1999-2004

Conclusions

- The incidence of invasive meningococcal disease has been steadily declining since 1999.
- The introduction of the MenC conjugate vaccine in Ireland in October 2000, has had a major impact in this decline.
- Uptake/coverage of the MenC vaccine at 24 months was 88% in 2004.
- Morbidity and mortality due to serogroup C disease have substantially declined.
- The epidemiology of non-B/non-C serogroups has not changed, incidence of these serogroups remains low.
- The incidence of serogroup B disease has also declined, suggesting Ireland is emerging from the hyper-endemic period experienced in the late 1990s.
- Serogroup B disease now accounts for 95% of the IMD cases in Ireland, with highest incidence rates in infants and young children.
- In 2004, 69% of serogroup B cases occurred in children <5 years of age, while all (100%) of the serogroup B deaths (n=7) occurred in this age group.
- Despite a decline in the incidence of serogroup B disease, the burden of illness due to this serogroup is still substantial in Ireland.
- The development and availability of a suitable and effective MenB vaccine targeting a broad spectrum of serosubtypes would be very much welcomed.

Acknowledgements

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Further Information

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