

Invasive *Haemophilus influenzae* in Ireland, 2005

Key Points

- 34 cases of invasive *Haemophilus influenzae* were notified in 2005
- 41% of cases occurred in children <5 years of age
- 18 cases of *H. influenzae* type b (Hib) were notified
- 72% of Hib cases occurred in children <5 years
- 14 true Hib vaccine failures occurred in 2005 compared to six in 2004
- 92% of Hib cases occurring in children <5 years in 2005 were associated with Hib vaccine failures
- A Hib catch-up booster campaign was launched in November 2005

Introduction

Haemophilus influenzae and in particular *H. influenzae* type b (Hib) causes serious invasive diseases. These infections occur predominantly in children and the clinical manifestations include meningitis, septicaemia, epiglottitis and cellulitis. Invasive disease due to other *H. influenzae* serotypes or to non-capsular strains can also occur. Routine use of the Hib conjugate vaccine has led to a remarkable decline in Hib disease in both developed and developing countries. Ireland has been no exception. Following the introduction of the vaccine to the Irish childhood immunisation schedule in October 1992, the incidence of Hib disease declined from 2.9 per 100,000 total population in the late 1980s to 0.2 per 100,000 total population by 2000. However, towards the end of 2004 a rise in the number of Hib cases and vaccine failures was seen and this continued into 2005.¹

Materials and Methods

Since January 1st 2004 with the implementation of the Infectious Diseases (Amendment) (No. 3) Regulations 2003, invasive *H. influenzae* is a notifiable disease, with clinicians and laboratories legally obliged to notify. Prior to this, data on invasive *H. influenzae* cases were obtained through regular laboratory surveys, bacterial meningitis notifications and reports from the Health Protection Agency reference laboratory in the UK. An enhanced surveillance system commenced in 1999. A case of invasive *H. influenzae* is defined as the isolation of the organism or its nucleic acid from a normally sterile site. Full details of the case definition are provided in the HPSC Case Definitions booklet.²

Table 1. Number of invasive *H. influenzae* cases by serotype and age group in 2005

	Type b	Type f	Non capsular	Not typed	Total	ASIR of Hib	ASIR of all <i>H. influenzae</i>
<1	1	0	1	0	2	1.8	3.7
1-4	12	0	2	0	14	5.4	6.3
5-9	1	0	1	0	2	0.4	0.8
10-14	1	0	0	0	1	0.4	0.4
15-19	0	0	0	2	2	0.0	0.6
20-44	0	2	1	0	3	0.0	0.2
45-64	1	0	1	1	3	0.1	0.4
65+	2	0	4	1	7	0.5	1.6
All ages	18	2	10	4	34	0.5	0.9

ASIR, age specific incidence rate per 100,000

Data pertaining to *H. influenzae* cases prior to 2004 (1996-2003) are on an MS Access database. *H. influenzae* notifications since 2004 are inputted to the Computerised Infectious Disease Reporting System (CIDR). At least once per quarter events on CIDR were reconciled by HPSC with reports from the HPA Haemophilus Reference Unit, relating to Irish isolates typed there. Departments of Public Health were requested by HPSC each quarter to review events to date for 2005 to ensure data were accurate and complete. Following year-end, final data cleaning and validation checks on the 2005 notifications/events were undertaken by HPSC in conjunction with the Departments of Public Health. Any updates to these events were made in the CIDR system. Analysis for this report was performed using Business Objects Reporting in CIDR and MS Excel. Incidence rates were calculated using the 2002 Census of Population as the denominator.

Data for this report were extracted from CIDR on 4th September 2006. These figures may differ from those published previously, due to ongoing updating of notification data in CIDR.

Results

H. influenzae – Cases

In 2005, 34 cases (0.9/100,000) of invasive *H. influenzae* disease were notified in Ireland, compared to 38 in 2004 (0.97/100,000). Sixteen of the thirty four cases notified in 2005 were in children <5 years of age, three were in 5-14 year old children and the remainder were in adults (n=15) (table 1). The highest age specific incidence rates were in the 1-4 year olds (6.3/100,000), followed by the <1 year olds

(3.7/100,000) (table 1). The clinical diagnosis for the 19 cases that occurred in children were as follows: meningitis (n=8), septicaemia (n=5), epiglottitis (n=3), cellulitis (n=1), septic arthritis (n=1) and unknown (n=1).

Over half of the cases in 2005 (n=18) were due to *H. influenzae* type b (Hib) disease (table 1). Thirteen (72%) of the Hib infections occurred in children <5 years and two in 5-14 year old children. Over the same period in 2004, 18 cases of invasive Hib were also reported; nine were in children <5 years of age and nine were in adults. In addition to the 18 Hib cases in 2005, cases of invasive *H. influenzae* disease due to type f (n=2), non capsular (n=10) and strains that were not typed (n=4) also occurred (table 1).

H. influenzae – Deaths

Four deaths due to invasive *H. influenzae* were reported in 2005. Two were due to Hib disease, one occurring in a young child the other in an elderly adult. The two other deaths were also in a young child and an elderly adult and were due to non-capsular strains of *H. influenzae*.

Hib vaccine failures

A true Hib vaccine failure (TVF) is defined as Hib disease occurring in an individual despite being fully vaccinated against the disease. An apparent vaccine failure (AVF) is Hib disease arising in an individual who had received some but not all the recommended doses of Hib vaccine and therefore was incompletely immunised.

There were 14 Hib TVFs and one AVF in 2005. In 2004 and 2003, six and three TVFs occurred respectively (figure 1). The

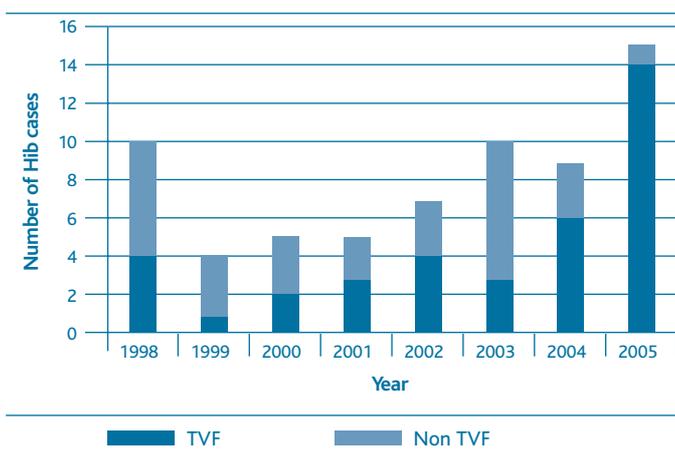


Figure 1. Number of Hib cases in <15 year olds that were associated with and not associated with a true vaccine failure (TVF), 1998-2005

14 TVFs in 2005 ranged in age from 13 months to 14 years. The majority (86%; 12/14) arose in children <5 years of age. Therefore, 92% (12/13) of the Hib cases in 2005 that occurred in children <5 years of age were associated with TVFs.

Discussion

The number of invasive *H. influenzae* disease notifications declined very slightly in 2005 compared with 2004 i.e. down from 38 to 34 cases. The proportion of cases occurring in adults declined from 66% in 2004 (25/38) to 44% in 2005 (15/34). Therefore, an increase in the proportion of cases occurring in children was seen in 2005, accounting for 56% of the cases. This increase of invasive *H. influenzae* cases in children <15 years of age can largely be attributed to an increase in type b cases in 2005, 15 cases occurred compared to 9 in 2004. Associated with this increase in Hib cases in 2005, was a very substantial rise in Hib vaccine failures, 14 occurring in total. Prior to 2004 the number of TVFs never exceeded four, ranging between one and four per year. In 2004, six TVFs occurred with four of these occurring in the last quarter of the year. This increase continued on into 2005, with five, and three TVFs reported in Quarter 1 and Quarter 2, respectively.

The increase in the number of Hib cases in fully vaccinated children led to concerns that a three-dose infant schedule was no longer sufficient to maintain long term protection. A similar situation had emerged in the UK a number of years previously.³ Therefore, in response to this emerging trend in Ireland and coupled with the scientific evidence that Hib vaccine efficacy is higher in those immunised at an older age (>12 months), than in children vaccinated routinely as

infants,⁴ the National Immunisation Advisory Committee recommended that a catch up Hib dose be offered to children <4 years of age, in order to further protect this age group from Hib disease.

The catch up campaign was launched by HSE on 21st November 2005 and ran until May 2006. Defaulters were followed up over the summer months.

Furthermore, as recommended by the National Immunisation Advisory Committee, HSE Management Team have now approved the inclusion of a routine Hib booster in the childhood immunisation schedule at 12 months of age, commencing on 18th September 2006.

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References

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