The Changing Epidemiology of *Haemophilus influenzae* type b disease in Ireland

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Introduction

- *Haemophilus influenzae* can cause serious invasive disease especially in young children.
- Of the 6 capsular types (a-f), *H. influenzae* type b (Hib) is the predominant cause of infections such as meningitis, septicemia and epiglottitis in children.
- Other capsular types such as a and f and non-capsulated strains can also cause infection.
- Hib conjugate vaccine was introduced in Ireland in October 1992:
  - To the routine infant immunisation schedule at 2, 4 and 6 months.
  - A catch-up targeting the under 5 year olds was also undertaken at the time.
- Uptake of the Hib vaccine (3 doses) at 24 months is currently 90%.
- Since introducing the vaccine, the number of Hib cases has declined by 90%
  - In the late 1980’s there were approx 100 Hib cases per year (2.8/100,000).
  - By 2002, the number of cases had declined to 10 per year (0.26/100,000).
- Hib disease has not disappeared completely.
- A small number of cases continue to occur, sometimes in fully vaccinated children.

Methods

- A case of Hib disease is defined as the isolation of *H. influenzae* type b or the detection of its nucleic acid from a normally sterile site.
- A true Hib vaccine failure (TVF) is defined as the occurrence of Hib disease in a fully vaccinated child (i.e. 3 doses at <1 year or 1 dose at >1 year)
- HPSC has detailed data on Hib disease since 1996.
- Data on Hib disease was obtained through a number of sources:
  - Prior to 2003, these data were obtained from bacterial meningitis notifications, surveys with laboratories and updates from Haemophilus Reference Unit, UK.
  - Since 1st January 2004, invasive *H. influenzae* is a notifiable disease with clinicians and laboratories legally obliged to notify. HPSC receives notifications of cases on a weekly basis.
  - An enhanced surveillance system is in place since 2000 on cases reported.
- Data analysis: CIDR* Business Objects Reporting, MS Access and MS Excel.

*CIDR*: Computerised Infections Disease Reporting system

H. influenzae type b disease, 1996 – 2005

- The annual number of Hib cases declined dramatically following the introduction of the Hib vaccine (Fig. 1).
- Of the Hib cases that continued to occur these were predominantly in the <15 year olds, accounting for between 57%- 91% of the cases from 1996-2003.
- In 2004, although the number of Hib cases rose, the proportion occurring in <15 year olds actually declined to 50% (Fig. 1)
- Therefore, the number of adult Hib cases increased from four cases in 2003 to nine in 2004 (Fig. 2)
- A similar rise in adult cases has not been seen to date in 2005. Hib disease in <15 year olds has accounted for the majority of these notifications, 85% (Fig. 2).

True Hib vaccine failures, 1996 – 2005

- Over the eight year period, 1996-2003:
  - 22 TVFs were reported (Fig. 2).
  - Range: 1.4 TVF/year. Mean: 2.75 TVF/year.
  - 42% of Hib cases in <15 year olds were fully vaccinated.
- In the 21 month period, Jan 2004 – Sept 2005:
  - 16 TVFs have occurred (Fig. 2)
  - Majority of these TVFs (88%), seen since last quarter of 2004 (Fig. 3).
  - 80% Hib cases in <15 year olds were fully vaccinated
  - Greater proportion of TVFs occurring at a younger age.
  - In 2004-2005, 38% of TVFs were in children <18 months of age, compared to just 14% in 1996-2003
  - TVFs have been occurring at younger age in recent birth cohorts, namely the 2002, 2003 and 2004 cohorts (Fig. 4).

Results

- Over the eight year period, 1996-2003:
  - 22 TVFs were reported (Fig. 2).
  - Range: 1.4 TVF/year. Mean: 2.75 TVF/year.
  - 42% of Hib cases in <15 year olds were fully vaccinated.
- In the 21 month period, Jan 2004 – Sept 2005:
  - 16 TVFs have occurred (Fig. 2)
  - Majority of these TVFs (88%), seen since last quarter of 2004 (Fig. 3).
  - 80% Hib cases in <15 year olds were fully vaccinated
  - Greater proportion of TVFs occurring at a younger age.
  - In 2004-2005, 38% of TVFs were in children <18 months of age, compared to just 14% in 1996-2003
  - TVFs have been occurring at younger age in recent birth cohorts, namely the 2002, 2003 and 2004 cohorts (Fig. 4).

Conclusions

- Incidence of Hib disease declined by 90% following the introduction of the vaccine in 1992. However, some cases continued to occur.
- In 2004 an increase in adult Hib cases was observed.
- So far in 2005 an increase in Hib cases in children <15 years of age has been seen.
- Since Quarter 4-2004, the number of TVFs has been steadily rising.
- Prior to 2004, the number of TVFs never exceeded four per year.
- In the 12 months from 01/10/2004 – 30/09/2005, 14 TVFs have occurred.
- Presentation of Hib disease and TVFs has been associated with younger children in recent birth cohorts.
- A resurgence of Hib disease particularly in vaccinated children is now being observed in Ireland, similar to the situation that emerged in the UK between 1999-2002.

Recommendations

- As a result of this continued upward trend of Hib disease predominantly in vaccinated children, the National Immunisation Advisory Committee has recommended that an additional Hib booster dose is now required in Ireland.
- A Hib catch-up campaign is to be launched in November 2005 offering an additional dose of vaccine to under 4 year olds in order to further protect them against the disease.
- HPSC will continue to monitor the situation closely through surveillance.

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