

HAEMOPHILUS INFLUENZAE MENINGITIS 1989-2003

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Before the introduction of vaccination against infections caused by *Haemophilus influenzae* type b (Hib) in the Danish childhood vaccination programme on 1 June 1993, Hib was one of the most common causes of meningitis in children under 5 years. The vaccine was initially given at the age of 5, 6 and 16 months and in a one-dose catch-up programme for children 1-5 years old. From 1 January 1996, the vaccine was given at the age of 5, 6 and 15 months and from 1 January 1997 at the age of 3, 5 and 12 months. Since 1 July 2002, Hib is given in a combination vaccine with DTaP and IPV. Vaccination with conjugated Hib vaccine protects against invasive disease such as meningitis, epiglottitis, sepsis, pneumonia, osteomyelitis, cellulitis, arthritis, etc. caused by Hib, but not by other serotypes. The Hib vaccine has few side effects. In Denmark, all types of *Haemophilus influenzae* (Hi) meningitis are individually notifiable on form 1515.

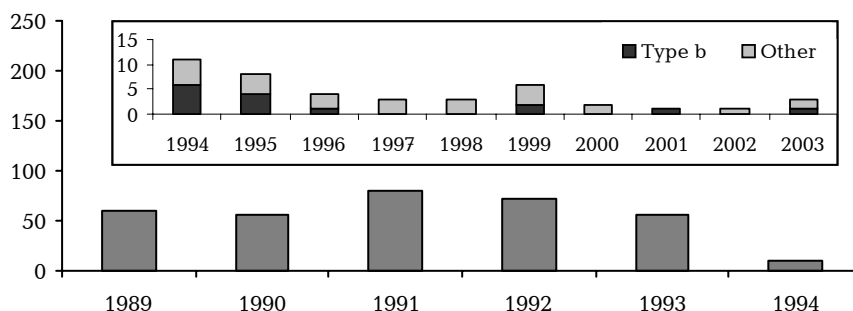
Notified cases

In the period 1989-1992, the Department of Epidemiology received 56-80 notifications annually of patients with Hib meningitis. In 1993, there was a total of 56 notified patients; 18 children <1 year, 33 children 1-4 years old and five adults. For children <1 year old, the incidence of Hib meningitis decreased already in the first six months after the introduction of Hib vaccination, while the incidence in the other age groups was evenly distributed throughout the whole year. After 1993, the number of notified patients has decreased drastically, [fig. 1](#). In the period 1994-2003, there was a total of 42 notified patients with *Haemophilus influenzae* meningitis; 11 in 1994, eight in 1995 and hereafter 1-6 patients per year. Of these, a total of 15 notified patients had meningitis caused by Hib; 12 children and three adults, 26, 38 and 63 years old, respectively, [table 1](#).

Table 1. Notified cases of Hi meningitis, by serotype and age, 1994-2003

	Age (yrs)				Total
	<1	1	2-6	>25	
Capsular					
type b	4	4	4	3	15
non-b	1	0	2	1	4
Non-capsular	0	2	1	3	6
Unknown	3	2	0	12	17
Total	8	8	7	19	42

Fig. 1. Notified cases of *Haemophilus influenzae* meningitis, 1989-2003



A total of 27 notified patients had *Haemophilus influenzae* meningitis caused by unknown type or a type other than type b; 11 children and 16 adults, [table 1](#). The adult patients were between 25 and 86 years of age.

Vaccination status

The annual vaccination coverage has been at least 93% for Hib 1, at least 90% for Hib 2 and at least 78% for Hib 3. After two doses, a protection of more than 90% is achieved, and the third dose, a booster, gives further protection. The catch-up programme provided herd immunity, i.e. protection of unvaccinated children.

Table 2. Vaccination status for 23 children with notified Hi meningitis, 1994-2003

No. of vacc.	Type b	Other
0 vacc.	6	4
1 vacc.	2	
2 vacc.	1	4
3 vacc.	1	1
Unknown	2	2
Total	12	11

Vaccination status for children with *Haemophilus influenzae* meningitis is shown in [table 2](#). Since the start of the programme, only two cases of vaccine failure have been recorded, defined as Hib meningitis occurring a week after at least two vaccinations given before the age of 1 year or occurring two weeks after one vaccination given after the age of 1 year. The cases were two healthy children who had been vaccinated two and three times, respectively, [table 2](#).

Sequelae of the disease

There were no deaths among notified patients with Hib meningitis after 1993. In the cases of one child and two adults, information was provided of sequelae in the form of impaired hearing. Two patients with other type of *Haemophilus influen-*

zae meningitis died, 84 and 86 years old, respectively. Information has been provided of impaired hearing in three adults.

Comments

The incidence of non-b capsular *Haemophilus influenzae* infections is low in both Denmark and other European countries where the Hib vaccine is used. There is thus no sign that other serotypes have become more common, a phenomenon known as replacement. The number of notified cases of meningitis caused by Hib is virtually the same as the number caused by other types of *Haemophilus influenzae*, which emphasises how important it is that *Haemophilus influenzae* isolates are serologically typed at a reference laboratory. Even though the incidence of *Haemophilus influenzae* meningitis is low, intensive surveillance is still important. This is emphasised by the fact that a steady rise in the incidence of invasive Hib infection has been recorded in England, Ireland and Scotland in the period 1999-2002, particularly in children aged 1-4 years. In England and Scotland, studies have shown that 90% of the patients were fully vaccinated against Hib. Several factors contributed to the rise: the vaccination programme did not include a booster dose for children of 1 year or over, the effect of the catch-up programme was waning, and finally a change had been made to a less immunogenic vaccine in the period. A catch-up programme for children aged 6 months to 4 years has now been launched. In Ireland, it was found that 50% of the patients under 5 years of age were unvaccinated, which suggests a low vaccination coverage as the cause of the increased incidence (A. H. Christiansen, S. Samuelsson, Department of Epidemiology)

Patients with confirmed *Listeria monocytogenes* infection

1st quarter of 2004 compared with the corresponding period in 2003, and 2003, whole year

	1st quarter 2004	1st quarter 2003	Total 2003
Mother/child infection	0	1	4
Septicaemia	4	3	19
Meningitis	2	1	4
Other	1 *	0	2
Total	7	5	29

* Intraabdominal abscess

(DBMP)

Streptococci isolated from blood and CSF from infected patients

1st quarter of 2004 compared with the corresponding period in 2003 and 2002

		1st quarter 2004				1st quarter	
		< 2 yrs	2-59 yrs	60+ yrs	Total	2003	2002
January	S. pneumoniae	4	47	76	127	115	123
	Gr. A strep.	0	4	14	18	12	11
	Gr. C strep.	0	0	2	2	3	2
	Gr. G strep.	0	2	1	3	15	4
February	S. pneumoniae	10	44	97	151	142	121
	Gr. A strep.	0	4	6	10	11	11
	Gr. C strep.	0	0	3	3	1	0
	Gr. G strep.	0	0	6	6	14	16
March	S. pneumoniae	13	52	79	144	194	115
	Gr. A strep.	1	7	5	13	20	23
	Gr. C strep.	0	1	0	1	1	3
	Gr. G strep.	0	7	9	16	7	8
1st quarter	S. pneumoniae	27	143	252	422	451	359
	Gr. A strep.	1	15	25	41	43	45
	Gr. C strep.	0	1	5	6	5	5
	Gr. G strep.	0	9	16	25	36	28

(DBMP)