

and was responsible for 150,000 reported cases and 5,000 deaths. Control was established through mass vaccination programmes.

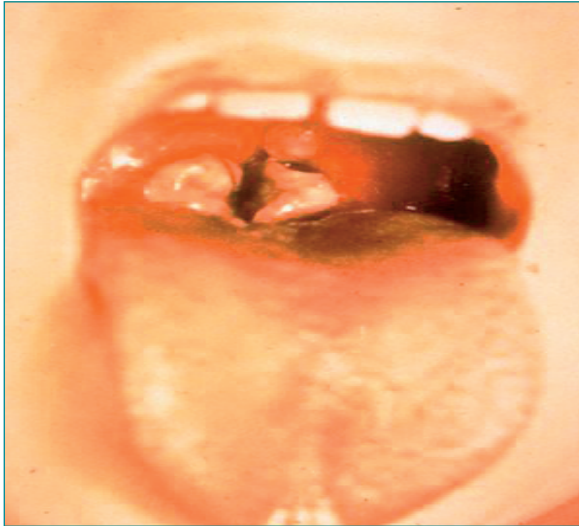


Photo courtesy of CDC

#### Clinical features

Early features include mild fever, swollen neck glands, anorexia, malaise, cough.

In classical respiratory diphtheria the patient has a sore throat, enlarged cervical lymph nodes and swelling of the neck- the bull neck appearance. The pharyngeal membrane is not always present, but if present is typically grey in colour, thick and difficult to remove and can lead to respiratory distress. Nasal diphtheria usually presents with a blood stained nasal discharge.

#### Transmission

Diphtheria is transmitted by droplet infection or by direct contact with discharges or secretions. The bacteria can infect the throat and sometimes the skin. The bacteria release a toxin that causes cardiac toxicity (myocarditis, heart block) and neurological damage. Death occurs in 5-10% of all cases.

#### Incubation period

The incubation period ranges between 2-5 days.

#### Period of infectivity

Those infected with untreated disease can be infectious for up to four weeks (rarely up to six months).

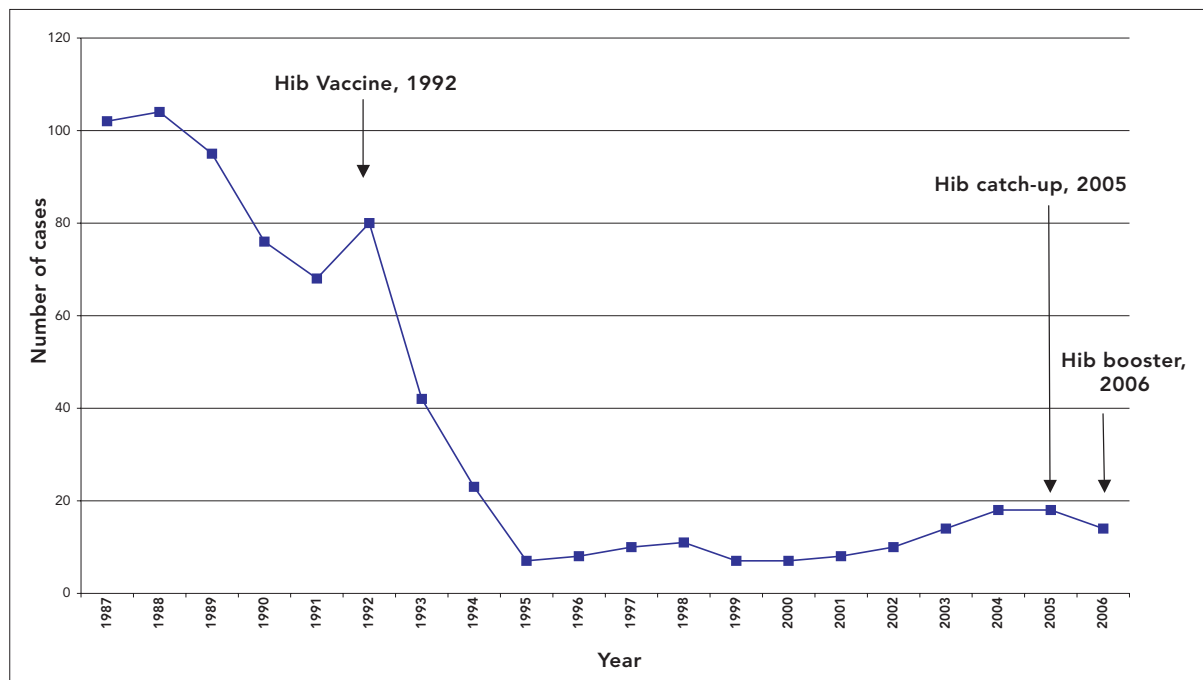
#### Vaccine schedule in Ireland

Diphtheria vaccine protects children by providing immunity to the toxin that causes the symptoms of the illness, rather than immunity to the bacteria itself. As it acts on the toxin, it is called a toxoid. Diphtheria vaccine is given as part of the routine childhood immunisation program, together with tetanus, whooping cough (pertussis), Haemophilus influenzae type B (Hib), hepatitis B, and inactivated polio (IPV) vaccines (referred to as the "6-in-1" vaccine). Vaccination is given at 2, 4 and 6 months of age. Booster vaccine doses are given at 4-5 years of age and again between 11-14 years of age.

### 4.2.2 Haemophilus influenzae

#### Epidemiology of disease and impact of vaccination

*Haemophilus influenzae* is a bacterial infection that can cause serious infection in humans, particularly in children, but also in individuals with weakened immune systems. There are a number of strains of *Haemophilus influenzae*. *Haemophilus influenzae* type b (Hib) is one of the most common types. Hib accounted for up to 95% of all strains that caused invasive illness prior to vaccine development. Healthy individuals can carry bacteria in their nose and throat without symptoms. The number of invasive *Haemophilus influenzae* cases reported in Ireland 1987-2006 are outlined in Figure 4.2. A vaccine against Hib was introduced into Ireland in 1992 and led to a decline in the number of invasive Hib cases notified. A booster dose of Hib was introduced in 2006.



**Figure 4.2: Invasive *Haemophilus influenzae* cases reported in Ireland 1987- 2006.**

Source: Health Protection Surveillance Centre

### Transmission

Transmission occurs through respiratory droplets, or contact with respiratory secretions from an infected person. Individuals are infectious as long as the bacteria are present in the nose and pharynx.

### Incubation period

The incubation period is thought to be between one and four days.

### Period of infectivity

Cases are non-infectious within 48 hours of starting effective antibiotic treatment.

### Clinical features

The clinical feature of *Haemophilus influenzae* infection include

- Otitis media
- Meningitis- the most frequent presentation
- Pneumonia
- Septicaemia
- Epiglottitis – 15% of cases present with epiglottitis (Bacterial croup)
- Septic arthritis
- Cellulitis
- Osteomyelitis
- Pericarditis.

The complications of *Haemophilus influenzae* disease include deafness, convulsions, intellectual impairment and death. The case fatality rate can be in the order of 2-5%, even with effective antimicrobial therapy.

### Vaccine schedule in Ireland

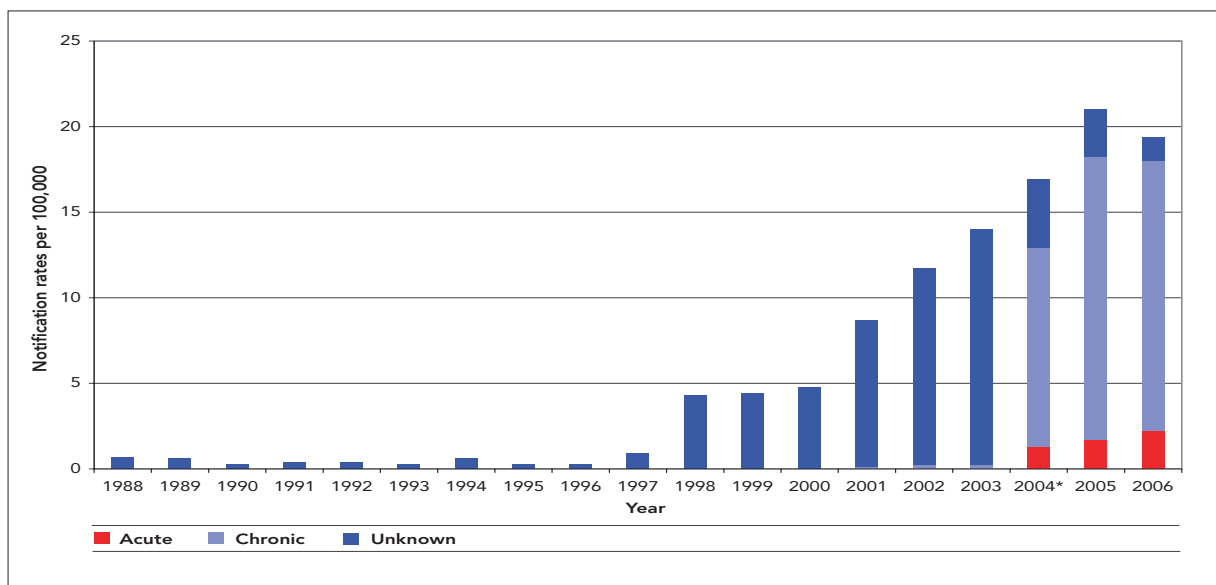
Hib vaccine is given as part of the routine childhood immunisation programme, together with diphtheria, tetanus, whooping cough (Pertussis), hepatitis B and IPV vaccines (referred to as the "6-in-1" vaccine). Vaccination is given at 2, 4 and 6 months of age.

A changing epidemiological pattern was seen in Ireland in the latter half of 2004, and continued into 2005, when an increase in invasive Hib disease was noted in children who had been vaccinated. This led to the introduction of a Hib booster catch-up campaign for those children aged between one and four years. In 2006 a Hib booster was added to the National Immunisation Schedule for those children aged 12 months.

### 4.2.3 Hepatitis B

#### *Epidemiology of disease and impact of vaccination*

Hepatitis B is a viral infection of the liver caused by the hepatitis B virus. It is a major cause of liver disease worldwide and can cause hepatitis, cirrhosis and liver cancer. In Ireland, notifications of hepatitis B disease have increased every year to 2005. This trend changed in 2006 when hepatitis B notifications decreased by 8% (Figure 4.3).



**Figure 4.3: Hepatitis B cases reported in Ireland 1988-2006.**

Source: Health Protection Surveillance Centre

#### *Transmission*

Hepatitis B is spread when blood or body fluids from an infected person enter the body of a person who is not immune. This occurs in a variety of ways including sexual contact with an infected person, sharing of needles and other drug paraphernalia by injecting drug users, accidental needle stick injuries or from an infected mother to her baby around the time of birth.

#### *Incubation Period*

The average incubation period is 2-3 months (range 6 weeks to 6 months).

#### *Period of infectivity*

Patients may be infectious one week before the onset of symptoms and may remain infectious through the acute clinical course of disease. Chronic carriers may also pose an infection risk.

#### *Clinical features*

The initial infection can be asymptomatic. If symptoms occur they include loss of appetite, nausea, vomiting, abdominal discomfort, joint pain, and are often followed by jaundice. About 70-90% of people infected as infants and young children and 1-10% of people infected as adults develop chronic (long term) hepatitis B infection.