

# Surveillance of invasive bacterial diseases in the Czech Republic – a baseline for the vaccination strategy in the country

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## Objectives

Invasive bacterial diseases (IBD), i.e. invasive meningococcal disease (IMD), invasive pneumococcal disease (IPD), and invasive haemophilus disease (IHD), are serious conditions, with quite a high case fatality rate. IBD are vaccine preventable and need a close surveillance as a prerequisite for the implementation of an effective vaccination strategy.

## Methods

A case definition of IBD compatible with the EU case definition from 2008 was used. Three accredited National Reference Laboratories (NRL) are responsible for the confirmation of the laboratory diagnosis and molecular characterisation of the etiological agents: NRL for Meningococcal Infections, NRL for Streptococcal Infections, and NRL for Haemophilus Infections. In the Czech Republic, active surveillance of IBD was implemented progressively: IMD have been included since 1993, IHD since 1999, and IPD since 2007. The active surveillance database is created by merging the data from the respective NRL and the routine reporting system (EPIDAT).

## Results

### Invasive haemophilus disease

Based on the IHD surveillance data, the vaccine against *Haemophilus influenzae b* (Hib vaccine) was introduced into the National Immunisation Programme (NIP) in 2001 with a 3+1 dose schedule. The Hib vaccine is provided free of charge for infants and the vaccination coverage is high. The post-vaccination incidence of Hib invasive disease dropped rapidly in children under 5 years of age, now reaching zero - **Figures 1, 2, 3**.

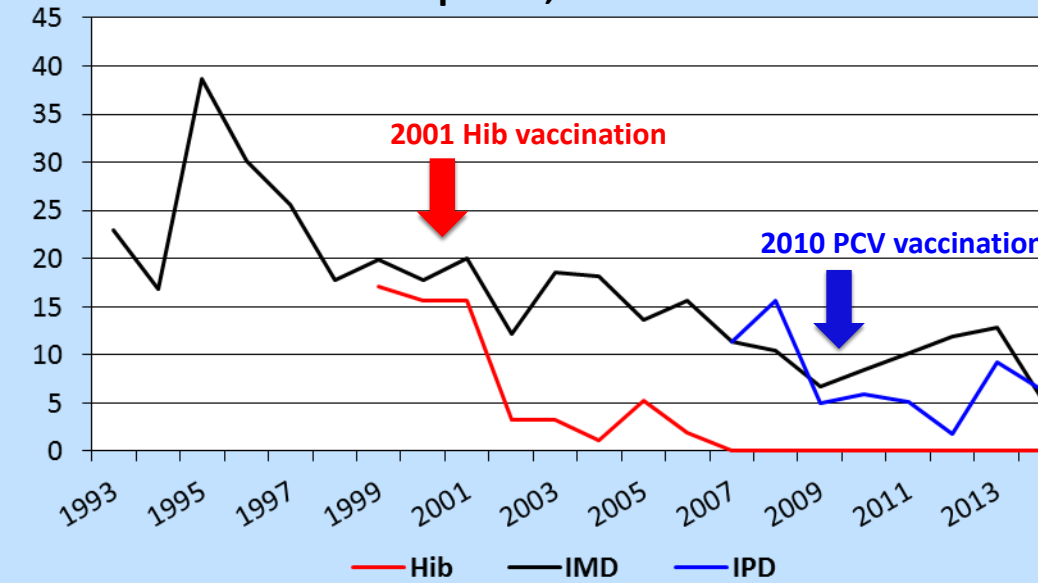
### Invasive pneumococcal disease

The conjugate pneumococcal vaccine (PCV) was incorporated into the NIP in 2010, with a 3+1 dose schedule. Two vaccines are available and both are reimbursed by the health insurance system: PCV10 is fully covered and PCV13 is subject to parental co-payment. The vaccination coverage was high in the first two years, but dropped to 80% in 2012 and to 75% in 2013. The incidence of IPD declined rapidly in infants 0-11 months of age after the PCV was introduced into the NIP: from 15.7/100 000 in the pre-vaccination year 2008 to 1.8/100 000 in 2012. However, in 2013, the incidence in this vaccine-target age group increased to 9.2/100 000 - **Figures 1, 2, 4**. Fourteen of 18 IPD cases reported in 0-11 month-olds in 2011-2013 occurred in unvaccinated infants.

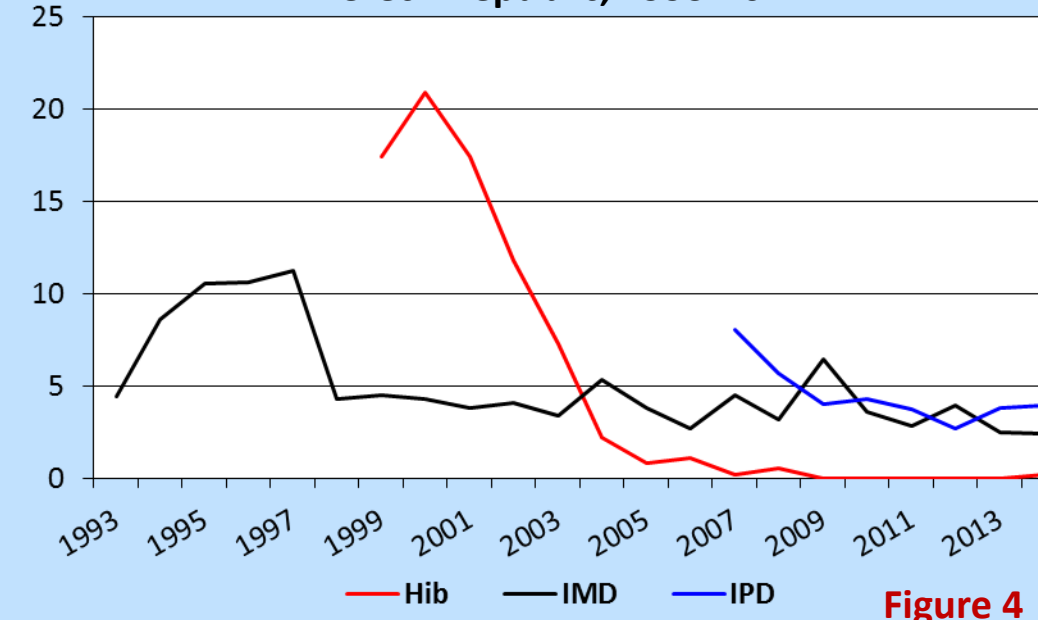
### Invasive meningococcal disease

In the light of the current epidemiological situation in the Czech Republic, when the incidence of IMD is low (0.5-1.0/100,000 inhabitants in the last 10 years) - **Figures 1, 2, 5**, the importance of individual protection and vaccination of risk groups stands out. The aim is to ensure as complex and long immunity as possible of the vaccinated person ([http://www.szu.cz/uploads/IMO/Recommendation\\_for\\_vaccination\\_IMD.pdf](http://www.szu.cz/uploads/IMO/Recommendation_for_vaccination_IMD.pdf)). The possibility of the inclusion of MenB vaccine into the non-mandatory NIP for children under one year of age has now been discussed.

**Figure 1**  
Incidence per 100000 - IMD, IPD, Hib - 0-11 m, Czech Republic, 1993-2014

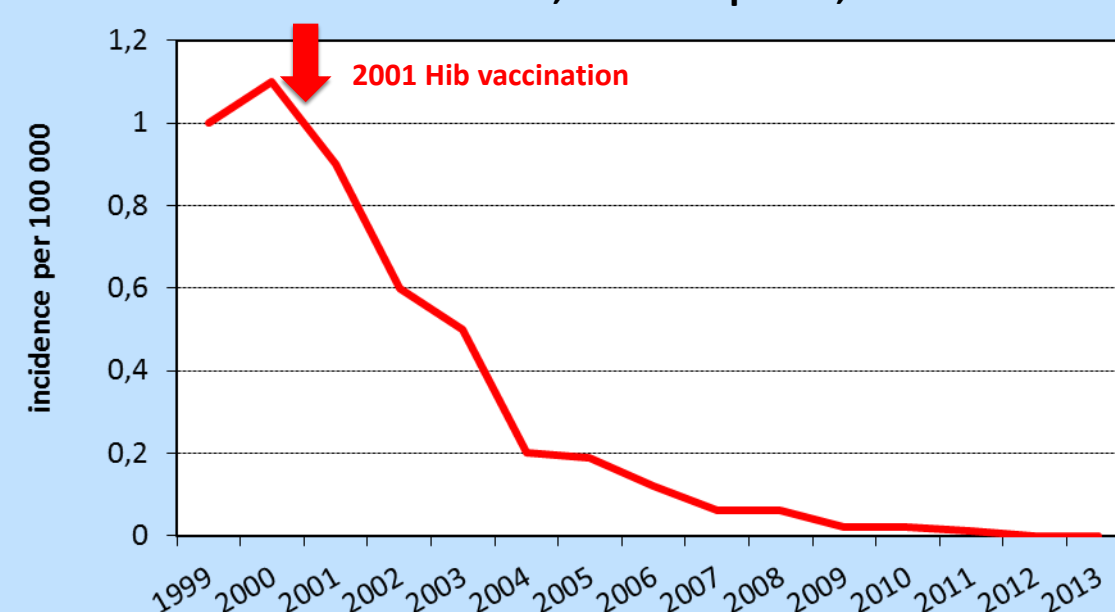


**Figure 2**  
Incidence per 100000 - IMD, IPD, Hib - 1-4 y, Czech Republic, 1993-2014

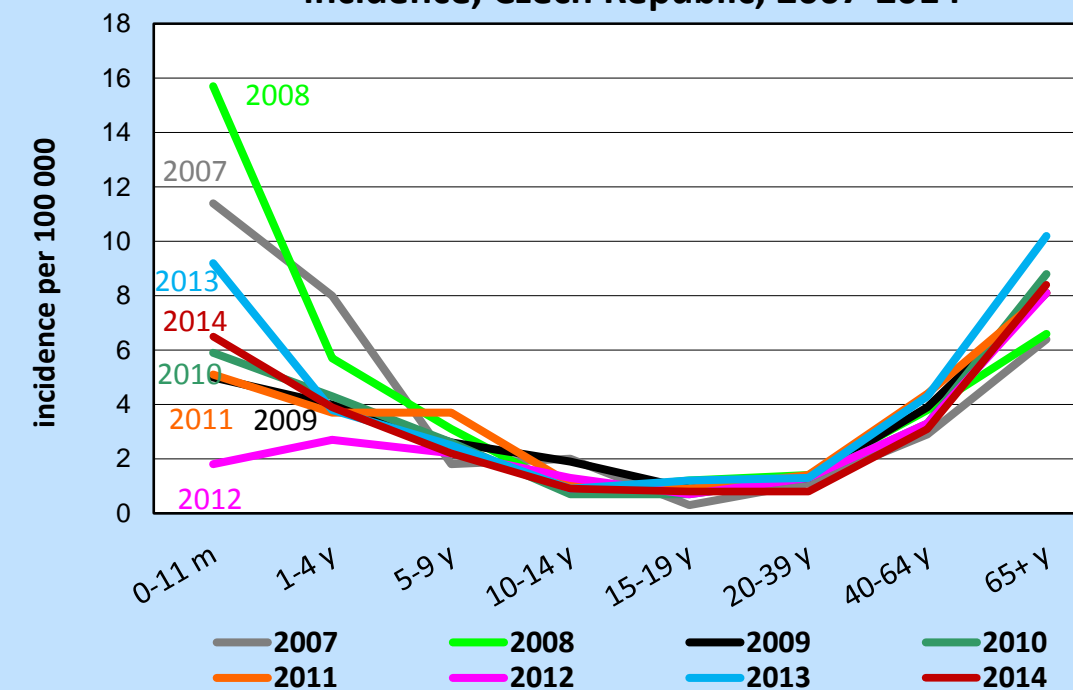


**Figure 3**

Hib invasive disease, Czech Republic, 1987 – 2013

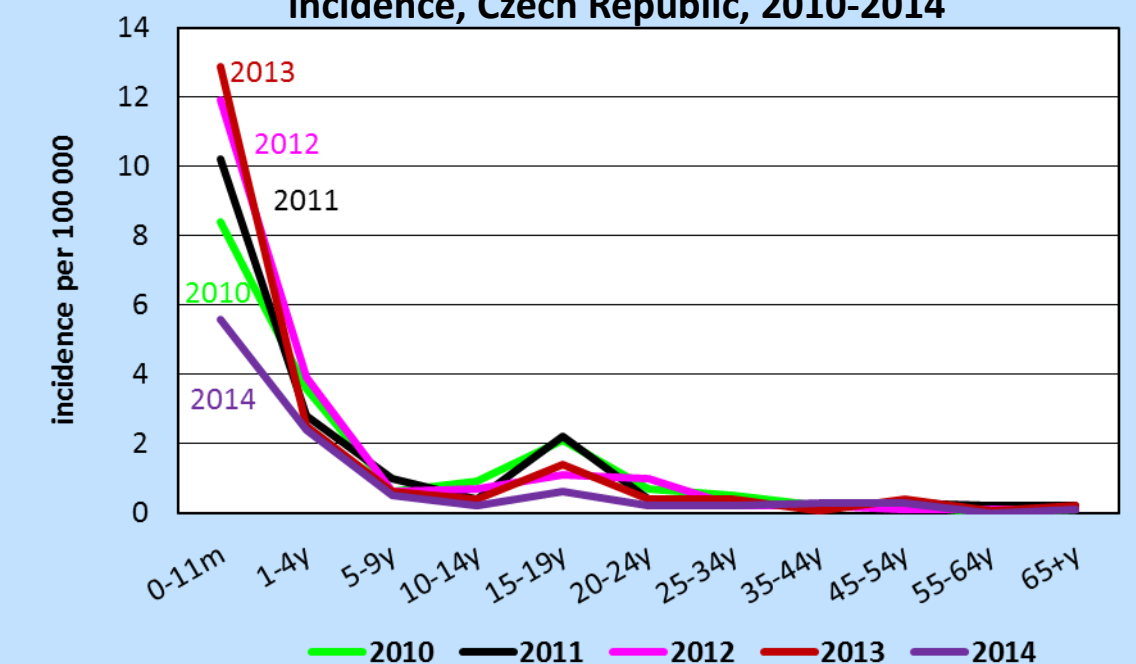


**Figure 4**  
Invasive pneumococcal disease - age specific incidence, Czech Republic, 2007-2014



**Figure 5**

Invasive meningococcal disease - age specific incidence, Czech Republic, 2010-2014



## Conclusion

Precise surveillance data are a baseline for the implementation of an effective vaccination strategy against IBD in the Czech Republic.

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