



# VACCINE *HAEMOPHILUS INFLUENZA* TYPE B DISEASE



## 1. Vaccine indication

*Haemophilus influenzae* type b (Hib) vaccine is indicated for the active primary prevention of infection with *Haemophilus influenzae* type b.

## 2. Rationale for vaccination

Hib is a major cause of invasive infections in infants and young children accounting for the majority of meningitis and pneumonia cases. Hib vaccination aims at reducing the prevalence of these diseases as well as the associated complications such as vision and hearing loss, mental retardation, and delays in motor skills and speech development.

## 3. Type of vaccine

The first Hib vaccines produced contained only the polysaccharide capsule, polyribosyl ribitol phosphate (PRP). Although immunogenic in children older than 24 months, these vaccines were found to be poorly immunogenic in infants where the cases of Hib infection are more common. The current Hib vaccines (second generation) have the PRP covalently conjugated to a T cell-dependent protein carrier to enhance their immunogenicity.

## 4. Composition of the vaccines

The conjugate vaccines differ in their carrier protein, method of chemical conjugation, and by polysaccharide size, giving them somewhat different immunological properties.

- **PRP-Tetanus Toxoid Conjugate Vaccine**

In this vaccine, the PRP is linked by a six-carbon spacer to the tetanus toxoid carrier. It is a highly potent vaccine effective from 6 weeks of age, and has no adjuvant.

- **PRP-Diphtheria Toxoid Conjugate Vaccine**

The PRP is linked by a six-carbon spacer to a diphtheria toxoid carrier. The vaccine is not a good immunogen with infants below 6 months responding poorly. It has no adjuvant.

- **PRP-Outer Membrane Protein Conjugate Vaccine**

The PRP is attached by a thioether linkage to protein components of the outer membrane of strain B11 of *Neisseria meningitidis*. It contains aluminium hydroxide as an adjuvant.

- **Hib Oligosaccharide Conjugate Vaccine**

The vaccine differs from the others in that it contains oligosaccharides of approximately 20 PRP repeats that are covalently linked to the protein carrier CRM<sub>197</sub>, which is a nontoxic variant of diphtheria toxin. The vaccine is available either with or without an adjuvant, depending on the size of the oligosaccharide attached to the protein.

## **5. Immunogenicity of the vaccines**

The immunogenicity of Hib vaccines differ according to the type of carrier protein they contain. PRP-D is a poor immunogen that is not recommended for first round vaccination. The immune response is age dependent, with children older than 15 months showing GMT levels above 1 mg/ml with only one dose, compared to children under 15 months who required two doses to show the same level of response. Other Hib conjugated vaccines are effective from 6 weeks of age, making it easy to administer Hib vaccine simultaneously with other EPI vaccines.

## **6. Efficacy and long term protection**

Hib conjugate vaccines used in the EPI-SA are highly effective. The efficacy rates range from 90% to 100%.

## **7. Integration of the Hib vaccine into immunisation programmes**

Hib vaccine was introduced into the South African Expanded Programme on Immunisation programme in 1998.

## **8. Candidates for vaccination**

In South Africa, Hib vaccine is given to babies as part of the EPI-SA schedule starting from 6 weeks of age. Infants with HIV infection should be vaccinated within the EPI-SA schedule.

In addition, the following persons are at risk of Hib infection and should be vaccinated:

- Persons with chronic lung disease
- Immunocompromised persons.

## **9. Vaccination regimen and route of administration**

Liquid vaccine is used directly from the vial, whilst the freeze-dried vaccine must be reconstituted before administration either with diluent or another vaccine specifically indicated for this purpose. Hib vaccine is given by intramuscular injection to the anterolateral aspect of the thigh for infants, or the deltoid muscle in older children. The vaccine can be given as a combination with DTP and Hep B or as a monovalent, in which case it should not be administered to the same limb at the same time as the other vaccines. The paediatric dose is 0.5 ml and the vaccine has a three dose schedule, with the first dose at six weeks of age.

## **10. Interchangeability of vaccines**

Different types and formulations can be used interchangeably to complete a vaccination course. However, diluents, both in saline and made from other vaccines, are produced to go with specific vaccines and are not interchangeable.

## **11. Does Hib vaccine protect against other forms of bacterial meningitis or pneumonia?**

Hib vaccine only confers protection against invasive disease caused by Hib.

## **12. Side effects and special precautions**

Hib vaccine is safe with no noted serious side effects. However, redness, swelling, and pain at the site of injection are common. Less commonly, children may develop fever or irritability for a short time after immunisation. If allergic reaction occurs after injection, Hib immunisation must be stopped.

### **Where to find us:**

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