fact sheet

Diphtheria, tetanus, whooping cough, poliomyelitis, Hib, hepatitis B

Recommended basic vaccinations against diphtheria, tetanus, whooping cough, poliomyelitis, meningitis and epiglottitis due to Haemophilus influenzae b (DTPa-IPV/Hib, penta = 5-fold) as well as against hepatitis B (DTPa-IPV-HBV/Hib, hexa = 6-fold).

Children frequently suffer from infectious diseases, especially in the autumn and winter months. Fortunately, most of these diseases, which are accompanied by a runny nose, fever, cough, diarrhoea, vomiting or skin rash, are benign. Thus, no one suggests vaccinating against them. However, some infectious diseases can be severe, and in some cases may prove fatal. Vaccinations are available against some of the most important and most dangerous infections of childhood. Vaccines contain weakened or killed microbes or their components, which mimic the natural infection. The child's immune system reacts to the vaccine with a defensive reaction comparable with that occurring with the disease itself. Thanks to the training induced by the vaccination, the immune system can rapidly render the most dangerous microbes harmless. Vaccinations provide protection both for the individual and for the general population. The more children are vaccinated, and thus protected, the less frequently a particular illness occurs, because the microbes cannot spread in the population. The vaccination of children and adolescents is one of the greatest successes of preventive medicine.

Combined penta- and hexa-vaccines provide protection against diseases with potentially serious or fatal complications.

These combined vaccines provide reliable protection (between 85% protection for whooping cough, 90% for diphtheria and at least 95% protection for the other components) against diseases that may have serious or even fatal complications, which still occur today in persons who are not vaccinated:

- **Diphtheria** is a bacterial infection which occurs only in humans. It is transmitted mainly by droplets (through speaking, sneezing or coughing), rarely by contact. The disease starts with a simple sore throat. It can rapidly take a life-threatening course. In spite of treatment, the disease proves fatal in about 10% of patients. Membranes form in the throat, which narrow the airways and thus make breathing difficult or impossible. Certain bacteria excrete a toxin that can lead to myocardial insufficiency, neural paralysis and the disease of other vital organs. Thanks to vaccination, no cases of diphtheria have been reported in Switzerland for the past 20 years. Diphtheria still occurs, however, in countries that are only a few hours away by air (e.g. Russia, North Africa etc.).
- **Tetanus/Lockjaw.** Tetanus spores occur everywhere, especially in the soil or in street dust. Even a small, insignificant injury can lead to tetanus. The bacteria secrete a toxin that is responsible for the disease. Painful muscle cramps develop. If the respiratory musculature is affected, the disease is fatal in about 25% of cases despite the best medical treatment. In Switzerland, only 0–2 cases are reported annually, mostly in elderly, unprotected persons, but also in non-vaccinated children.
- **Whooping cough/Pertussis** is a bacterial infection which is accompanied by attacks of coughing, wheezing and vomiting provoked by bronchial secretions and food. It is often the parents who unwittingly infect their children. The attacks of coughing can persist for several weeks, making it difficult for the child to sleep, eat and breathe. Particularly in newborns and infants, threatening respiratory distress and respiratory arrest can occur. Other complications are pneumonia, otitis media, convulsions (2–4%), and brain damage (0.5%) which can have life-long consequences. One child in a thousand dies from whooping cough. Antibiotic therapy does not protect against the complications of whooping cough.
- **Haemophilus influenzae type b (Hib)** is the name of the bacteria which induces purulent meningitis or acute inflammation of the epiglottis, which can lead to rapid suffocation in infants and small children. In spite of treatment with effective antibiotics, in about 10% of cases the disease leaves permanent damage such as loss of hearing, mental and/or physical disability, or can even prove fatal. Before the introduction of Hib vaccination in Switzerland, 1 in 500 children (200 a year) suffered from a severe Hib disease. Since Hib vaccination has been included in the standard vaccination schedule, there are now only a few cases per year, mostly in children who have not been vaccinated or whose vaccination was incomplete.
- **Poliomyelitis/Infantile paralysis** is caused by a virus that is transmitted either by direct contact with faecal matter (dirty hands) or by contaminated water. In many cases, the infection is asymptomatic. In about 1% of those infected the disease develops with acute, severe and often permanent paralysis. Before the vaccine existed, it was not uncommon to put to bed a healthy child only to find him/her paralysed for life the following morning. The paralysis affects the arms and legs. If the respiratory and circulatory centres in the brain are affected, poliomyelitis can be fatal in 20–60% of cases. There are no drugs available for the treatment of poliomyelitis. Thanks to systematic vaccination, no cases of poliomyelitis have been registered in Switzerland since 1982. However, the virus still circulates in various regions of the world.
- **Hepatitis B** is a viral disease that affects the liver. It is transmitted through blood contact or unprotected sex with a person who is carrying the hepatitis B virus. The acute phase is mostly accompanied by jaundice (yellow skin and eyes), tiredness and vomiting, but can also pass unnoticed. Especially in newborn children of infected mothers, there is the danger that hepatitis B infection becomes chronic, possibly leading to cirrhosis of the liver and even liver cancer. These children must therefore be protected by vaccination starting immediately after birth. In infected adults, the risk of developing chronic hepatitis B is about 10%. These persons unfortunately remain infectious for the rest of their lives. General vaccination against hepatitis B has been recommended in Switzerland since 1997.

The ideal age for penta- or hexa-vaccines.

The risk of falling ill with whooping cough or meningitis due to Hib already begins a few weeks after birth. The first basic vaccinations should therefore be given as soon as possible, because the maternal antibodies, which are passed from the mother to the foetus before birth and provide partial protection against infection, are gradually lost during the first few months

of life. Breast-feeding does not provide sufficient protection against infant infectious diseases, as it can only prevent in part certain gastrointestinal infections. Through early vaccination, the child is already protected when the danger of the diseases and their complications is greatest. Delaying the start of the vaccination leads to an increased risk of infection. This is unnecessary, as the immune system can already respond to vaccinations very soon after birth. It is therefore recommended to give the first vaccines at the age of 2 months. The vaccination series with the penta- or hexa-vaccines consist of 4 doses given at the age of 2, 4, 6 and 15–24 months. In order to obtain early and uninterrupted protection, it is important to keep to the recommended vaccination schedule.

Not vaccinating against these diseases means increased risks for your child.

Not to vaccinate means an increased risk of infection for your child and his/her entourage. With the exception of tetanus, which is present in the environment, all the vaccinations presented here provide protection against infectious diseases that are transmitted from person to person.

Penta- or hexa-vaccination.

Penta-vaccines contain detoxified toxins from diphtheria and tetanus bacteria, antigens (substances which are recognised by the immune system as «foreign») of whooping cough and Hib bacteria, and three different inactivated poliomyelitis viruses. Hexa-vaccines (6 combined vaccines) also contain the surface antigen of the hepatitis B virus (HBs). These vaccines contain an aluminium compound in order to strengthen the immune response, a salt solution, and some contain an alcoholic compound as preservative. They are free from mercury and are administered by intramuscular injection.

Side effects of the penta- or hexa-vaccines.

These combined vaccines were developed specially for infants. In about 5–15%, the vaccination leads to transient local reactions (redness, swelling, pain at the injection site) or general reactions (e.g. fever, mostly <39°C). These reactions generally occur in the first 24–48 hours after the vaccination and subside rapidly. If the fever is very high, it can trigger convulsions. For this reason, it is important to check the child's temperature after the vaccination. About one infant per thousand reacts with prolonged crying that can last for several hours after the vaccination. Very rarely, in persons with a corresponding predisposition, hypersensitive reactions (allergy) to components of the vaccines occur with redness of the skin or itching. More pronounced reactions, like anaphylactic shock, are extremely rare (less than 1 in 1 million). In older children, swelling of the arm can appear at the site of injection. It recedes completely after 2 to 3 days. Other problems have been reported after infant vaccinations. They are extremely rare (1 in 100,000 or 1 in 1 million), such that it is difficult to define whether the vaccination is their cause or not. It must be stressed that infant vaccines do not weaken the child's immune system, nor do they increase the risk of allergies and other diseases later in life. If there is a special problem that worries you, do not hesitate to ask your doctor.

When must these vaccinations not be given?

There are very few contraindications regarding combined penta- or hexavalent infant vaccines. They have been developed especially for this age group. Severe reaction to an earlier vaccination, serious allergy and unclear or controlled neurological disorders should be discussed with your doctor.

Cost of the penta- or hexa vaccines.

These vaccinations are considered so important by the health authorities that their cost is covered by the basic health insurance.

Your doctor recommends the penta- or hexa-vaccines for the health of your child.

In all countries of the world, it is recommended that infants be vaccinated against diphtheria, tetanus, whooping cough and poliomyelitis. Vaccination against hepatitis B is also recommended worldwide. Hepatitis B vaccination can either be combined with the other infant vaccines (= hexa- vaccination) or can be given to adolescents aged between 11 and 15 years. Discuss with your doctor about vaccination against DTPa-IPV/Hib (penta) or DTPa-IPV-HBV/Hib (hexa). He/she will be able to give you further detailed information.

This document was drawn up by the Federal Commission for Immunization.

Status of the information: June 2006

Doctor's Stamp

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Home Affairs FDHA
Federal Office of Public Health FOPH

EKIF : CFV

FEDERAL COMMISSION FOR IMMUNIZATION

Secretariat: Vaccinations Section, Federal Office of Public Health FOPH
Tel. Secretariat: +41 (0)31 323 87 06, Fax Secretariat: +41 (0)31 323 87 95
E-Mail: info@ekif.ch, Internet: www.ekif.ch