Information about childhood vaccinations for parents and relatives
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Questions about vaccinations
What is a vaccination?
A vaccination is an immunisation intended to prevent a serious infectious disease. The vaccines are either extracted from attenuated viruses or bacterias, or they contain chemicals found in these germs. The vaccines themselves cause little symptoms but provoke an antigenic response in the body which prevents or decreases the likelihood of children becoming ill from the disease being vaccinated against. Vaccinations derive their name from the vaccinia (cowpox) vaccination which a British doctor, Edward Jenner, identified as a prevention against smallpox in the year 1796. No other infectious disease had caused such harm to the nation as the smallpox as it nearly destroyed the nation in the earlier centuries. Icelanders were among the first nations to commence vaccination against smallpox by a decision made by the Danish health administration already in the year 1802. Jenner pointed out that it would be possible to eliminate smallpox from the world by vaccinations. Nevertheless it took nearly 200 years to achieve that goal and it was first safe to discontinue vaccinations against this serious disease during the 1970s.

What is the purpose of vaccination?
The objective of vaccinations is to prevent serious diseases, especially in children. Vaccinations also prevent pestilences and minimise dangerous consequences of infectious diseases. In some cases it is possible to eliminate diseases entirely. Many childhood diseases such as measles, diphtheria, whooping cough and polio are rarely seen nowadays. Infant mortality due to these diseases was however common in the 19th century and the early 20th century. The experience of many Eastern European states shows that these diseases can return if childhood vaccinations are stopped.

What is the usefulness of vaccinations?
The usefulness of vaccinations is the protection which it provides for the child. The usefulness is also found in the fact that each and every vaccinated child does not transmit the disease it has been vaccinated against to other susceptible children. Thus vaccinations are a unique measure parallel to nothing in preventive measures against diseases. In order to achieve this success, vaccinations need to be general and reach as many children as possible. Icelanders did not take enough caution in this regard in the beginning of the 19th century when smallpox was being vaccinated against. For this reason smallpox re-emerged in 1839 for the last time but the damage was less than before. The World Health Organization claims that no action is as efficacious for humans as vaccinations.

Can there be a reason for not vaccinating a child?
There is very rarely a reason for not vaccinating a child. If any of this applies to your child you must discuss it with the doctor or nurse at the health care centre:
- If the child is sick for some reason or has a fever (in this case the vaccination is postponed until the child is well).
- If the child has suffered a side effect or complication from prior vaccinations.
- If the child has had a serious allergic reaction after having consumed eggs (i.e. the mouth or throat has swelled, shock, breathing difficulties or generalized rash).
- If the child is taking particular medication, especially steroids.
- If the child has a chronic disease, such as compromised immune system.
Which diseases are vaccinated against in Iceland?

**Diphtheria**
Diphtheria is a disease caused by a bacterium. The main symptoms are a severe sore throat with coating, but the disease can become very serious and lead to death. The bacterium produces poison which is transmitted to the blood. This poison is harmful to tissues such as a heart muscle. Antibiotics kill the bacterium but do not prevent the toxic effects. Therefore vaccination is the only protection against the disease. Diphtheria is very rare nowadays due to the protective effects of the vaccination.

**Tetanus**
Tetanus is caused by a bacterium found in many places in nature, such as in soil and domestic animal manure. It is easy to become infected by impurities that get into a wound. The bacterium produces poison which causes muscles spasms that can lead to death if no action is taken. An antidote exists which works if it is used in time, but the only safe protection is a vaccination.

**Pertussis, whooping cough**
Pertussis (whooping cough) is caused by a bacterium which produces poisonous chemicals. The bacterium is highly contagious and is transmitted between people by airborne droplets. The symptoms begin with a mild cold, then an increasing cough, mucus buildup and severe coughing spells, particularly during the night. The disease is both strenuous and prolonged and can be life threatening to infants. They often have severe coughing spells with breathing difficulties. Antibiotics do not help much except in the early stages of the disease. With vaccinations it is possible to protect the children and it is important to begin vaccinating them young as the disease is most dangerous for the youngest children.

**Polio**
Polio or poliomyelitis is caused by a virus which can be transmitted to people by fecal contamination, food and liquid and possibly also by airborne droplets. Symptoms can be very mild but also serious due to paralysis which can lead to death. No medication exists to cure the disease. Great success has been achieved by vaccinations and the disease has virtually been eliminated from the world.

**Haemophilus influenzae disease type b (Hib)**
Haemophilus influenzae type b is a bacterium which can cause serious diseases, such as meningitis, laryngitis, pneumonia, sepsis and arthritis. Vaccination against this bacterium has been very successful. From the beginning of vaccinations against Hib in Iceland in 1989 no case of meningitis or other serious infections caused by it has been diagnosed, but before that time approximately 10 children were diagnosed every year with meningitis caused by Hib.

**Pneumococcus**
Penumococcus is a bacterium which can cause serious and life threatening diseases, such as meningitis, sepsis, pneumonia, ear infection and sinusitis, especially amongst the youngest children. The most dangerous of these diseases are meningitis and sepsis. Before the time of vaccinations 11 children were diagnosed with such infections every year in this country. By vaccinating against the most dangerous bacterial isolates up to 90% of these diseases can be prevented. It can also be estimated that the vaccination minimises acute and chronic ear infections and pneumonia in young children. It is furthermore expected that yearly consumption of antibiotics by this group will be reduced by up to a quarter and this
would minimise the danger of antibiotic-resistant pneumococci being spread.

**Meningococcus**

Up to the year 2003, approximately 10-15 individuals were diagnosed with a disease caused by meningococcus C every year in this country, in addition to epidemics where many more were infected. These were mainly children younger than 6 years old and adolescents 10-18 years of age. The infections were very serious as approximately 10% of those infected died and another 20% suffered severe consequences. During the latter half of 2002, vaccination against meningococcus C was introduced in Iceland where 18-year-old individuals and younger were vaccinated and at the same time general vaccination at 6 and 8 months of age was introduced. Since the vaccination began, no vaccinated individual in this country has been diagnosed with meningococcus C and the infection has reduced considerably among those unvaccinated. The vaccination however does not prevent infections caused by other types of meningococci.

**Morbilli, measles**

Measles are caused by a virus which is very contagious and is transmitted between people by airborne droplets. The intensity of symptoms varies but the disease can be dangerous and even cause death. Approximately 10% of those who are infected have serious complications such as meningitis or pneumonia. Vaccination gives good protection.

**Parotitis epidemica, mumps**

Mumps, which is caused by a virus, is most often a mild disease but is known to cause serious complications. Meningitis is the most common complication, other complications are hearing impairment and inflammation of the testicle which can cause sterility. Vaccination provides good protection against the disease.

**Rubella**

Rubella is a mild viral disease in children but if a pregnant woman contracts the disease the fetus can be harmed. Fetal damage can be a hearing impairment, blindness, deformation, growth impairment and even miscarriage. By vaccinating everyone in the community it is possible to prevent epidemics of rubella and prevent women of childbearing age from being infected.

**HPV**

HPV is an abbreviation for Human Papilloma Virus, a common virus, especially among young people, that it is easily transmitted through sexual intercourse. It is estimated that approximately 80% of those who are sexually active are infected by the virus at some point in their life and the virus has many subspecies which can cause genital diseases. In most cases, the virus subsides by itself from the body, but some types of it can cause chronic premalignant changes in the cervix which can develop into cervical cancer with time. The HPV vaccine prevents infection and therefore girls must be vaccinated before they commence sexual activity. The vaccine provides protection against the most common types of the virus that can cause cervical cancer. It is expected that the vaccination provides at least 70% protection against cervical cancer. This vaccination is only intended for girls and they are vaccinated at the age of 12 years.

As a full protection is not accomplished by the vaccination it is necessary that all girls have a regular cancer screening later in life as recommended by the health authorities.
Is there a cause for concern about the consequences of vaccinations?

What should be done if the child develops a fever?
If the child develops a fever, doctors and nurses normally advise doses of paracetamole in order to reduce the fever. This is then repeated 4-6 hours later if needed. If the fever lasts longer than 24 hours or if it is accompanied by other symptoms a doctor should be consulted.

What about the injection point?
Sometimes a redness or inflammation appears at the injection point. This is normal and all signs disappear by themselves. If you are concerned you should speak with a nurse or a doctor at a health care center.

When should a doctor be consulted?
If you have any concerns you should contact a nurse or a doctor. If the child develops a high fever, cries abnormally or has a convolution you should contact a doctor as soon as possible.
Safety and side effects of vaccinations

**Vaccine against whooping cough, diphtheria, tetanus, haemophilus influenzae diseases of type b and polio**
(*administered to 3-, 5- and 12-month-old children*)

Side effects of these vaccines are generally mild and subside within two to three days. Mild fever, irritation and general discomfort can appear in 4–6 hours. These side effects normally subside in the first 24 hours after a vaccination. Swelling and redness may appear at the injection point and the child can experience certain discomfort for a short time. Furthermore, a thickening may appear at the injection point, which will gradually subside.

**Vaccine against pneumococcus**
(*administered to 3-, 5- and 12-month-old children*)

The most common side effects are pain, redness and swelling at the injection point as well as a possible fever on the day of the vaccination. Serious side effects are not known.

**Vaccine against meningococcus C**
(*administered to 6- and 8-month-old children*)

Side effects are mild. A pain, redness and swelling may appear at the injection point and the child may develop a fever.

**Vaccine against morbilli (measles), parotitis epidemica (mumps) and rubella**
(*administered to 18-month and 12-year-old children*)

Side effects are generally mild. A fever and rash may appear 5–12 days after the vaccination in less than 10% of cases, but children generally do not become very sick. A local redness, soreness and mild swelling may appear at the injection point in less than 10% cases. These symptoms subside within a few days.

**Vaccine against whooping cough, diphtheria, and tetanus**
(*administered to 4-year-old children*)

Side effects of these vaccines are generally mild. A mild fever, irritation and general discomfort may appear in 4–6 hours but normally subside within 24 hours. Swelling and redness may appear at the injection point and the child may experience certain discomfort for a short time. A thickness may develop at the injection point which will gradually subside.

**Vaccine against HPV**
(*administered to 12–year-old girls*)

Main side effects of the vaccine are pain, redness, burn and swelling at the injection point, which soon subsides, but as applicable to other vaccinations, serious side effects are extremely rare. There are however examples of adolescents fainting when they are vaccinated but this is not caused by the vaccine itself.

**Vaccine against polio, whooping cough, diphtheria**
(*administered to 14-year-old children in one injection*)

Side effects are rare. Pain, redness and swelling may appear at the injection point up to 48 hours after vaccination and last for one to two days.
## General childhood vaccinations in Iceland from September 2015

<table>
<thead>
<tr>
<th>Age</th>
<th>Vaccination against:</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 months</td>
<td>Whooping cough, diphtheria, tetanus, haemophilus influenzae disease of type b and polio in one injection. Pneumococcus in another injection.</td>
</tr>
<tr>
<td>5 months</td>
<td>Whooping cough, diphtheria, tetanus, haemophilus influenzae disease of type b and polio in one injection. Pneumococcus in another injection.</td>
</tr>
<tr>
<td>6 months</td>
<td>Meningococcus C.</td>
</tr>
<tr>
<td>8 months</td>
<td>Meningococcus C.</td>
</tr>
<tr>
<td>12 months</td>
<td>Whooping cough, diphtheria, tetanus, haemophilus influenzae disease of type b and polio in one injection.</td>
</tr>
<tr>
<td>18 months</td>
<td>Measles, mumps and rubella in one injection.</td>
</tr>
<tr>
<td>4 years</td>
<td>Whooping cough, diphtheria and tetanus in one injection.</td>
</tr>
<tr>
<td>12 years</td>
<td>Measles, mumps and rubella in one injection. HPV in another injection only for girls.</td>
</tr>
<tr>
<td>14 years</td>
<td>Whooping cough, diphtheria, tetanus and polio in one injection.</td>
</tr>
</tbody>
</table>

Basic vaccination against whooping cough, diphtheria, tetanus, haemophilus influenzae disease of type b and polio as well as pneumococcus (two separate injections) consists of two vaccinations to children at 3 and 5 months of age. When the child is 6 and 8 months it is vaccinated against meningococcus C. In order to strengthen the child’s defense it is vaccinated again at the age of 12 months against whooping cough, diphtheria, tetanus, haemophilus influenzae disease of type b and polio as well as pneumococcus (in two separate injections).

When the child is 4 and 14 years old the vaccination against whooping cough, tetanus and polio is repeated. The HPV vaccination is only intended for 12 year old girls and the vaccination is administered twice with at least six months’ interval. It is important to have both injections in order to provide maximum protection.

It is advised to maintain protection against diphtheria, tetanus and polio by a repeat vaccination every 10 years, at least in the case of travelling to countries where the respective diseases are endemic.

Basic vaccination against measles, mumps and rubella is administered to 18-month-old children and a booster dose when they are 12 years old. Individuals should then have received a lifelong protection against these diseases.

Chief Epidemiologist for Iceland
Further information about childhood vaccinations can be obtained from the website of the Directorate of Health (www.landlaeknir.is) and at health care centers.