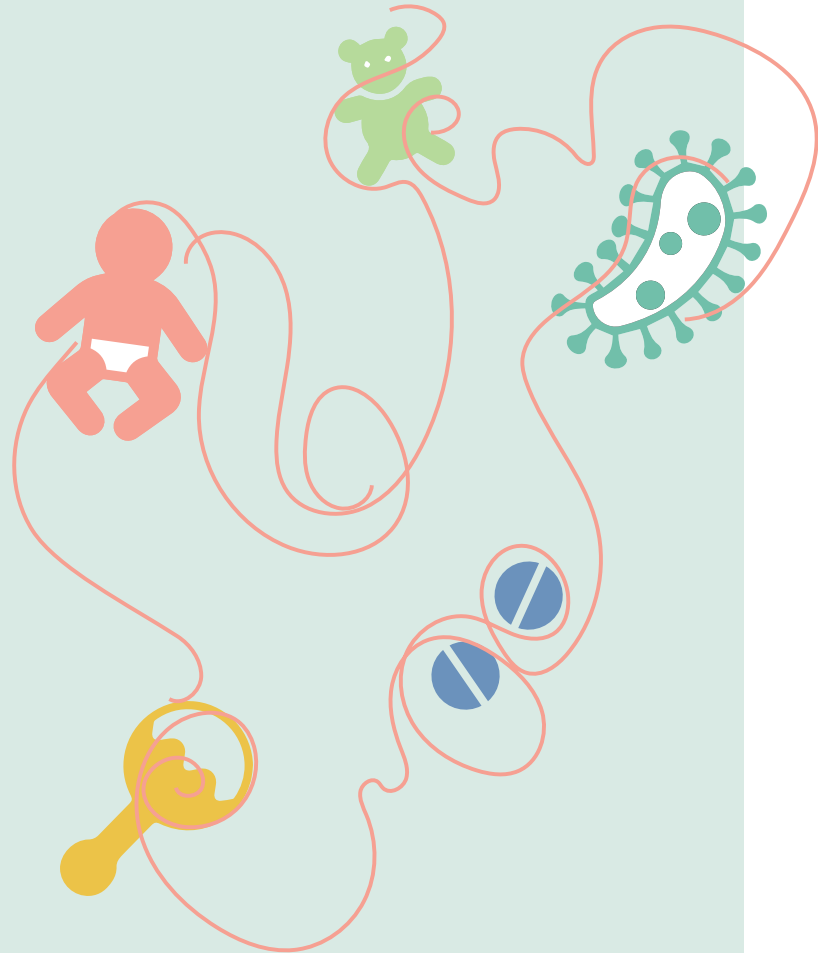


Infections and Antibiotic Use among Toddlers

An Information Booklet
for Parents



Introduction

Small children get sick often, causing parents to believe that their child is “always sick”. However, an average of eight infections is normal in a child’s first year, respiratory infections comprising the majority of them.

It can be difficult for a parent when your child is sick. Tons of questions arise: What should I know in terms of prevention of infections? Which infections are commonly caused by bacteria – and which are commonly caused by virus? In which cases should I wait and see, in order to avoid unnecessary use of antibiotics? Your doctor can answer all of these questions, but your awareness is important in the dialog concerning the treatment of your sick child.

The purpose of this booklet is to prepare you as a parent to speak with your doctor regarding infections and antibiotics. The aim is also to make you more confident when your child is sick.

- Children are healthy carriers of many bacteria.
- Our body hosts lots of bacteria, both inside and outside, without causing sickness (normal flora).
- The normal flora contained within the human body is an important and necessary part in the development of our immune system.
- It is perfectly normal that small children have infections frequently.
- Children in daycare tend to have more infections compared to children who aren’t regularly in daycare.
- The majority of mild infections get better on their own.

Virus and bacteria

The child’s own immune system can fight most infections. In some cases, it is necessary to use antibiotics in order to help the body fight the infection. In these instances it is essential to clarify whether bacteria or/and virus has caused the infection, as these two are treated in different ways.

INFECTIONS CAUSED BY VIRUS

Viruses cause the majority of all infections. Research has identified about 600 different kinds of virus that can cause infections in humans. Within cold virus alone there exist approximately 200 different kinds. The existence of many kinds of virus explains why we repeatedly catch colds. Children are very early exposed to different kinds of virus. The immune system is stimulated and activated by the exposure to these viruses.

Antibiotics have no effect on viral infections.

INFECTION CAUSED BY BACTERIA

Some infections are caused by bacteria. Several thousands of different kinds of bacteria exist and the human body hosts many of them both inside and outside of the body. The presence of bacteria usually does not cause problems and are in fact important and essential part of the normal flora.



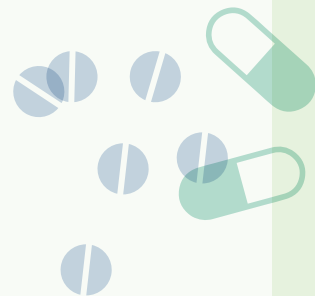
- Viruses cause many different kinds of infections.
- 9 out of 10 respiratory infections are caused by virus (e.g. cold).
- Antibiotics have no effect on viral infections
- The majority of mild infections caused by bacteria get better on their own.
- If a bacterial infection is suspected, a sample is needed before your doctor can prescribe the right antibiotics.

Appropriate use of antibiotics

Appropriate use of antibiotics is efficacious in treating infections caused by bacteria. Inappropriate and redundant use of antibiotics contributes to the development of antibiotic resistant bacteria.

Antibiotic resistance is the ability of bacteria to resist the effects of antibiotics. Taking antibiotics when they are not needed can cause some bacteria to become resistant to the antibiotic. Since resistant bacteria can hamper treatment of future infections, it is important to minimize the development of resistance by using antibiotics with caution and prudence.

Antibiotics can cause adverse side effects. The most common side effects are skin rashes and changes in normal flora, causing diarrhea. Rash can be a symptom of penicillin allergy. If your child develops some sort of side effect, please contact your doctor.

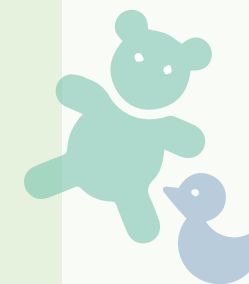


- **Antibiotics can be divided into subgroups. Penicillin is an example of one these subgroups.**
- **Antibiotics kill bacteria.**
- **Bacteria can become resistant to certain antibiotics.**
- **Antibiotics affect the normal flora.**
- **Reduce the empirical use of (“better safe than sorry”) antibiotics.**

Minimising the transmission of infectious agents

Correct hand washing is the single most important measure that can reduce the risk, and limit the spread of, infections. Microorganisms (e.g. germs) are often spread by the hands, thus proper hand hygiene is essential. Washing hands with soap and water is the best way to reduce the number of germs; alternatively or additionally adults can use a hand sanitizer.

Besides hand washing, it is important to keep the child’s toys clean. Toys are constantly in contact with both a child’s hands and mouth and children also exchange toys often. Toys may thus be an important channel for the transmission of germs, and for that reason it is important to keep children’s toys in proper hygiene.



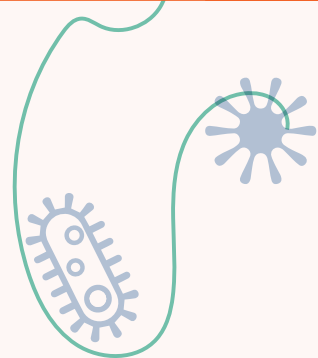
WHEN SHOULD YOU WASH YOUR HANDS?

- **After using the toilet.**
- **After a diaper change.**
- **Before eating.**
- **Before you feed your child.**
- **After blowing your nose.**
- **After you wipe your child’s nose.**
- **After cleaning your child’s eye, e.g. if an eye infection is present.**
- **When you get home (e.g. after work or shopping); wash your hands as well as your child’s.**

Common cold

It is not uncommon that one cold overlaps another cold, which is reason why sometimes children experience continuous cold for several weeks. Children have several colds throughout a year resulting in about two month of illness a year. Sometimes parents feel that their child has been ill “all winter”. This is because of the seasonality of colds as the cold activity peaks during the winter months.

Colds are always caused by virus. It is important to remember that antibiotics neither work on viruses nor ease the symptoms of a cold.



- Colds are always caused by some sort of virus.
- There exist approximately 200 different kinds of viruses causing cold.
- The main symptoms of a cold are: a blocked or runny nose, sore throat, cough, and at times high temperature (fever).
- Thick, yellowish/greenish nasal catarrh (snot) may contain bacteria, but the colour in itself is not a basis for treating with antibiotics.
- A common cold lasts usually about 1-2 weeks.
- Colds are most common in the winter period.

Tonsillitis/sore throat (inflammation of the tonsils)

Most tonsillitis inflammations are triggered by a viral infection or, less commonly, a bacterial infection. This also applies to children less than three years old.

Both tonsillitis caused by virus and tonsillitis caused by bacteria come with symptoms such as fever, sore throat, difficulty swallowing, white pus-filled spots on your tonsils and abnormal general appearance.

Tonsillitis triggered by bacteria should be treated with antibiotics, whereas tonsillitis triggered by a viral infection should not be treated with antibiotics. Tonsillitis triggered by a viral infection will often go away by itself.

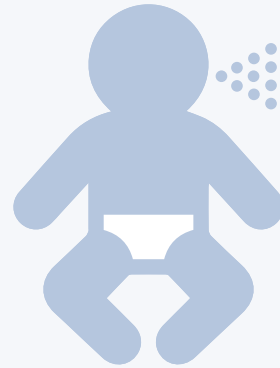
- 2 out of 3 cases of tonsillitis are triggered by a viral infection.

Cough

Cough alone is not dangerous; it is a protective reflex that starts when the respiratory mucous membranes become irritated. Cough is the body's way of defending itself and getting rid of substances causing irritation in the respiratory tract.

Colds are the most common cause to a cough and are often triggered by virus. The cough may be dry, or mucus may be produced. The cough often lasts for a long time, even after the cold has passed, as the mucous membranes are sensitive and take time to recover. Cough usually lasts 2-4 weeks, sometimes longer.

Antibiotic treatment is rarely useful, as the cough is usually caused by a virus. The mucus produced during coughing may occasionally be yellowish or greenish. The colour of the mucus does not necessarily indicate whether it is a bacterial infection or viral infection.



- Cough is an important protective reflex.
- Cough can be caused by several things (e.g. irritation in the respiratory tract).
- A cough may last for a long time, even after the cold has passed. About 2-4 weeks of coughing is not unusual.

Influenza

Influenza (also known as the flu) is a virus and a respiratory illness. There are several types of influenza viruses, including various subtypes and strains. Influenza virus peaks in the winter months. When the occurrence of an influenza virus is widespread it is called an influenza epidemic.

Influenza (or the flu) usually comes on suddenly. When children have influenza they often feel some or all of these symptoms: feverishness/ chills, sore throat, a cough, runny nose and muscle or body aches.

- Most healthy children recover from the flu without any serious problems
- Fever often declines after 3-4 days of influenza, and the child will be healthy again after approximately 6-7 days. Children may experience some fatigue the following days.
- Influenza virus can cause complications such as tonsillitis, bronchitis, and ear infection together with other infections. These infections may sometimes be treated with antibiotics.

Ear infection (otitis media)

In most cases, for children who are generally healthy, an ear inflammation is not as acute as one might think. Ear inflammation is for the most part caused by virus, but is once in a while caused by bacteria. Ear inflammation often occurs together with a cold.

Children experience discomfort primarily at night. The mucous membrane swells and mucus and pus form, which put pressure on the eardrum. The pressure on the eardrum often hurts. Antibiotics are often necessary if a child without ear ventilation tubes (drainage tubes) gets an ear infection with visible drainage or discharge from the ear canal.

The child may wake up in the middle of the night due to pain and as a parent it is natural to be concerned. This concern often rubs off on the child. However, it is rarely necessary to examine children with suspected acute ear inflammation during the evening or night. It is all right to wait till the following day to see doctor. Pain relievers may be appropriate (Caution: paracetamol and other pain relievers should not be given to children aged less than 2 years without consulting a doctor).

”WAIT AND SEE”

In the past almost all children with an ear infection used to be treated with antibiotics. Several studies have shown that antibiotics do not have a significant impact on the healing process of acute ear inflammations among children who are above the age of 2. Therefore, as a rule, it is advisable to wait for a while before using antibiotics.

- An ear infection is most often caused by virus, but can occasionally be caused by bacteria.
- It is very common for small children to develop ear infection together with a cold.
- An ear infection can usually go away by itself without the use of antibiotics.
- Pain relievers can sometimes be appropriate (Caution: pain relievers should not be given to children aged less than 2 years without consulting a doctor).

Eye discharge of pus (eye infection)

Bacterial eye infections are common with colds. The infection occurs in the conjunctiva. The tear duct represents a connection between the respiratory mucous membranes and the eyes, and transports the cold virus and bacteria to the eyes. For this reason, eye infections are often described as “a cold in the eye”.

Either bacteria or virus may cause a minor eye infection. The child’s eye sticks together due to mucus and the eyelids are often red and swollen. This type of eye infection is typically non-contagious and often heals spontaneously. There exists no effective treatment for minor eye infections such as these and the child can attend daycare. Usually, the child’s general appearance is normal.

Either bacteria or virus can cause a severe eye infection, although a severe eye infection is uncommon. The main symptom is a red, swollen and very tender eyelid together with discharge from the child’s eye. A severe eye infection can cause more pain, light sensitivity, tearing/lacrimation, and searing/burning eye. The child’s general appearance can be abnormal.

MINOR EYE INFECTION

- The infection is non-contagious.
- The child may attend day care.
- Antibiotics have usually no effect.

SEVERE EYE INFECTION

- The infection is very contagious.
- The child should not attend day care.
- Please contact your doctor as treatment is needed.

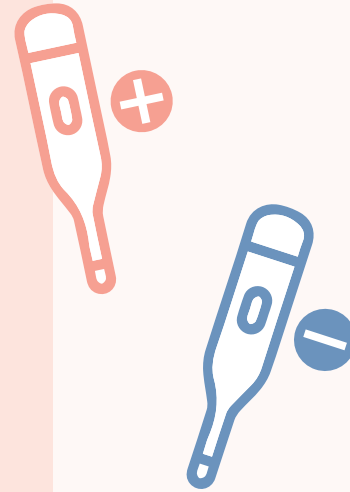
Fever (high temperature)

Children easily develop fever. If your child has slightly higher temperature than normal, this does not necessarily mean that the child is seriously ill. Fever is not dangerous and is in fact an important part of the body's natural defense mechanisms against virus and bacteria, as virus and bacteria do not thrive in high body temperatures. In comparison to adults, children often develop a high temperature in conjunction with an infection.

Fever is a general symptom to most contagious illnesses. Temperature above 38°C/100.4°F is counted as a high temperature. When measuring rectally, temperatures in the range of 36.5-37.5°C (morning) and 37.9°C (in the evening) are considered normal. The temperature is normally about 0.5°C higher when measured orally or in the ear. Ear thermometers may be used in children above the age of 1 year. Skin thermometers (i.e. forehead strip thermometers) are not considered to be as accurate as the other types. The most accurate temperature is obtained after the child has rested for half an hour at room temperature.

Playing or crying children can easily have a temperature of 38°C without being ill.

The section about fever is written according to the Danish Health Authority's guidance 'Smitsomme sygdomme hos børn og unge, 2013' (published in Danish).



- **Fever (a high temperature) = temperature over 38°C/100.4°F**
- **Children easily get a high temperature. It is typically harmless.**
- **Fever is a part of the body's natural defense mechanisms.**

When to return to day care?

Many infections cannot be prevented.

Deciding whether the child is too sick for daycare can be a challenging decision on some occasions. Infections may have a significant impact on some children, while others may not be particularly affected. The recovery process varies among children, and the recovery also depends on the type of infection.

An active child who has a good appetite is probably healthy, but it is also important to monitor the child's general appearance. If the child has been ill for a long time it is advisable to let him/her stay at home an extra day to relax and fully recover. This is important, as the immune system can be weakened and the child consequently is in greater risk of catching another infection.

- **The overall health condition determines when the child can return to day care.**
- **A day at day care is like a day at work – if you feel drowsy and ill, you are not equipped to cope.**
- **A good rule: One healthy day at home with normal temperature, a healthy appetite and alertness = ready to return to day care.**

Further information

Read more about the subject:

cdc.gov/getsmart/community/ (in English)
antibiotikaellerej.dk (only in Danish)
sundhed.dk (only in Danish)
bedrehygiejne.dk (only in Danish)
sst.dk/da/sygdom-og-behandling/smitsomme-sygdomme/smitsomme-sygdomme-hos-boern (only in Danish)

If you are in doubt whether your child has caught an infection and/or is in need of antibiotics, please contact your doctor or the Medical Helpline (+ 45) 1813. Your doctor can also advise you on how to manage your child's pain in the best manner, until the infection is fully gone.

Publication: This book is published as a part of a research project aimed at decreasing unnecessary use of antibiotics in small children.

Supported by: Tværspuljen, the Capital Region of Denmark, and the Danish Ministry of Health

Developed by: Antibiotic Stewardship & Implementation Research Unit, Department of Clinical Microbiology, Herlev & Gentofte, in collaboration with health-visitors (sundhedsplejersker) from the following municipalities: Egedal, Hørsholm and Gentofte and medical doctor Malene Plejdrup Hansen and inspired by the Swedish strategic Programme against Antibiotic Resistance (STRAMA).