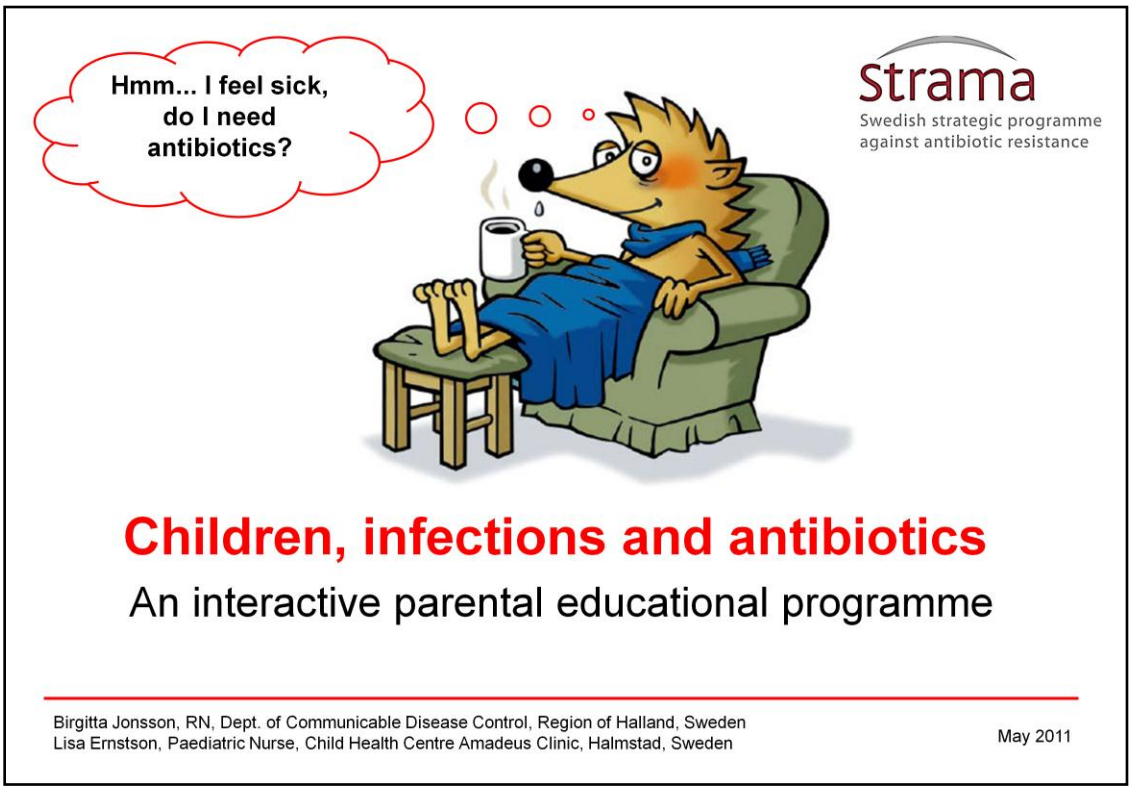


Introduction and background

This programme is produced by the Swedish Strama (Swedish strategic programme against antibiotic resistance). The aim is to educate parents of young children about common childhood infections, appropriate use of antibiotics and resistance. In Sweden the programme is used in the Child Health Centres (CHC) in which parental education is an established part.

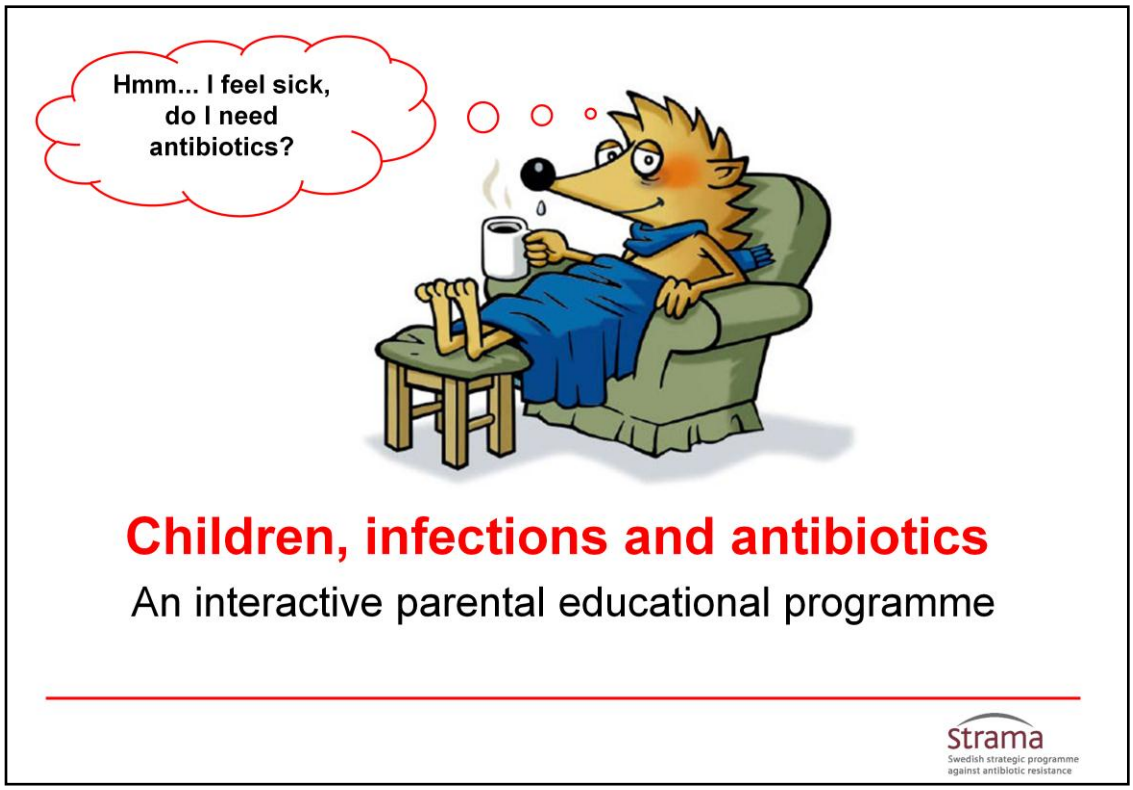
The educational programme is based on Swedish consensus and evidence based guidelines for treatment of common childhood infections. It can easily be adapted to fit into other countries health care systems and structures for children.

Antimicrobial resistance is a rapidly growing health problem. The message is global: **Use antibiotics wisely and prevent the spread of resistant microbes!** A multidimensional approach is required, where children and parents are one important target group.

About the educational programme: Advice for you as a tutor

The programme consists of a PowerPoint presentation and a manual. The slide show includes 20 slides. We have added a guidance text to each slide, including background information and suggestions of topics to discuss. The guidance text is for reference and is not intended as a script to be read word by word. In advance, prepare by reading the manual. Adapt it with flexibility to yourself and the parental group you will be teaching. After all, it is difficult to grab the attention of a parental group surrounded by their bustling children. Occasionally you will have the time to elaborate with the review of certain sections, at other times you will have to keep it brief. You decide.

The educational programme is available on Strama Halland's website **www.regionhalland.se/strama** (tab Strama-BVC)



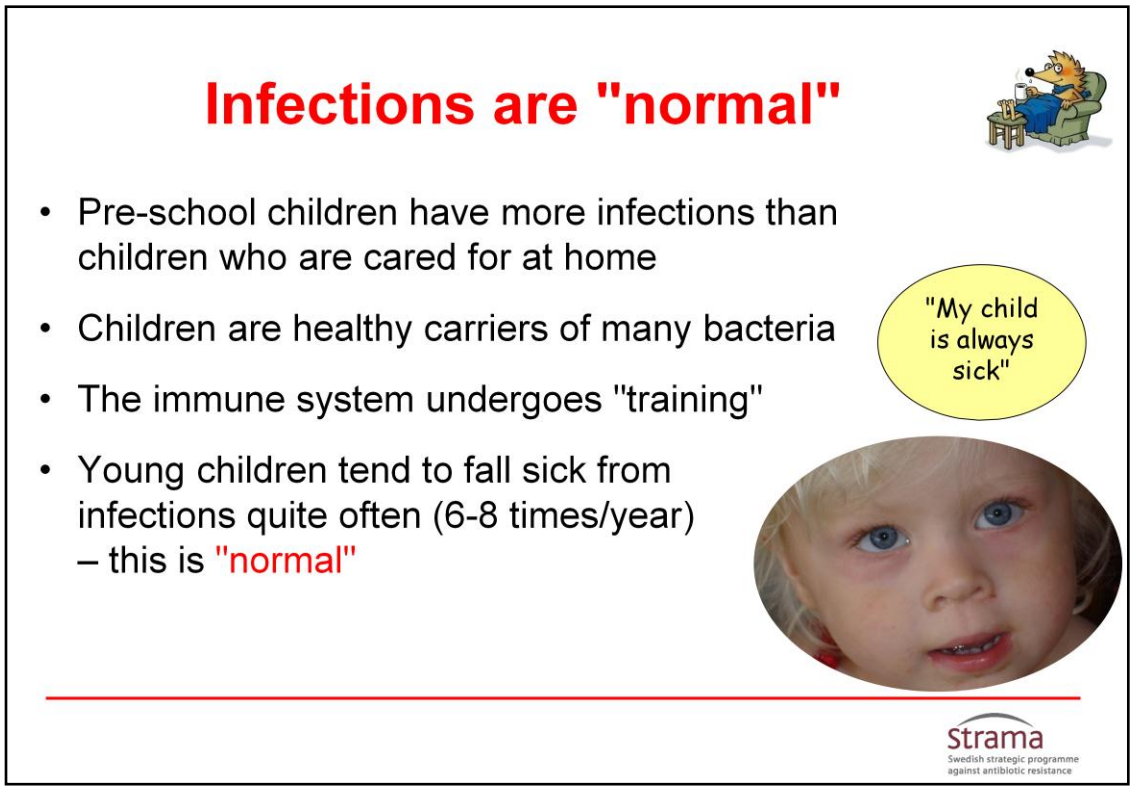
Welcome to the parental group education. The area of focus will be "**Children, infections and antibiotics**".

Objective of this programme:
An increasing number of children will be taking part in group activities and attending pre-school in the future. This is a positive aspect that allows children to develop and establish many new contacts.

In a pre-school setting, it is normal for children to catch different infections. As a parent you balance the child's best interest against the requirements of the pre-school, work and other commitments.

The purpose of this programme is to increase knowledge and awareness of normal infections affecting children and contribute to greater safety.

Many infections are self-healing, even when they are caused by bacteria. Sometimes antibiotics are vital and necessary. However, today there is a problem with overuse and misuse of antibiotics, which will make bacteria resistant.



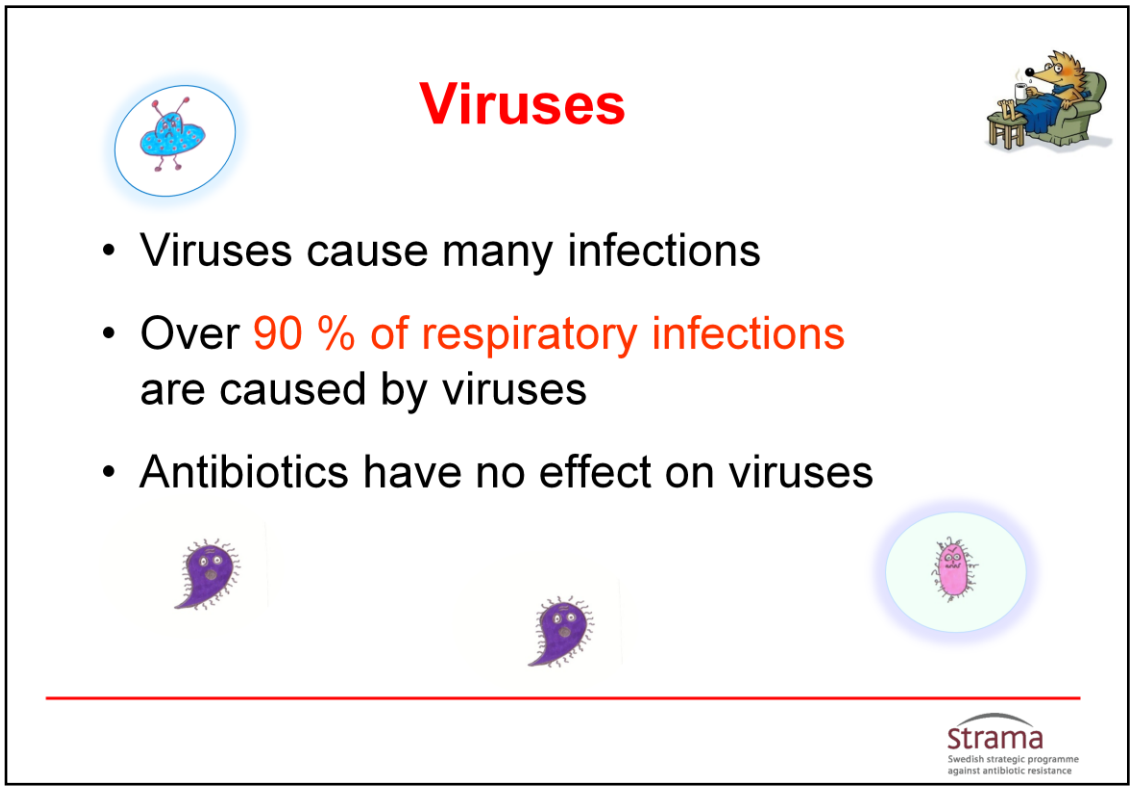
Children are constantly exposed to different viruses and bacteria, primarily at pre-school where the child seems to be "bombarded". Large groups of children constitute an intimate and close setting for bacteria as well. Studies show that children who attend pre-school catch more infections than children who are cared for at home.

Most bacteria do not cause a disease. This is a perfectly normal development where the child's immune system undergoes "training". Antibodies form and attack the "intruders". Children build up a "defence store" which contributes towards increased resistance of diseases.

Children go through intermittent periods of illness and many parents feel that their child is always sick. However, it is normal for children to have 6-8 respiratory infections per year during their first couple of years. Some children may even reach 10-12 infections per year. On average it takes one week to recover from an infection, which means that the average child is sick for approximately two months per year.

The likelihood of children falling ill decreases as they get older. From the age of 4-5 and into adulthood it is normal to have an average of 2-3 infections per year. The number of infections often increases again when you become a parent.

Respiratory infection is the most common infection among children.



Viruses can cause many different types of infections. There are more than 600 different viruses which can cause infections in humans and over 200 types of viruses for the common cold. This explains why you can catch a cold over and over again. You become immune to the specific virus you have been infected with and the next time you encounter that specific virus, your immune system will recognize it and launch an "attack"; hence you do not become ill.

However, immunity may vary. For example, immunity against winter vomiting disease (Calicivirus) is extremely short-term, while immunity against measles is lifelong.

Viruses cause 9 of 10 respiratory infections.

The mucous membranes are sensitive when you have a viral infection, which may contribute to the bacteria attaching more easily. For example, a cold that started as a viral infection may pave the way for bacteria, which then can cause an ear infection.

Antibiotics have no effect on viruses.

Bacteria

- Our body host many bacteria - necessary to maintain good health
- Antibiotics disturb the normal bacterial balance
- Infections caused by bacteria can be treated with antibiotics, however many infections heal just as well by the body's immune system

Strama
Swedish strategic programme against antibiotic resistance

There are thousands of different bacterial species, but only a hundred are pathogenic. Our body naturally contains approximately two kilogram of bacteria, primarily on the skin and in the intestine. These are referred to as **"normal flora"** and are important for the optimal functioning of our immune system and metabolism.

Using antibiotics when not necessary can be harmful and cause some bacteria to become resistant to the antibiotic. The normal bacterial balance is disturbed and it can take a long time to restore (months). An organic "vacuum" is created which can be filled with other pathogenic bacteria. This means that you are more receptive to other infections following a course of antibiotic treatment.

Examples of common bacteria which can cause infections among children include *Pneumococci, Streptococci* and *Haemophilus influenzae.*

Bacteria attaches to our cells and attacks us with different weapons. It can cause serious infections such as meningitis and sepsis - conditions which must be treated with correct antibiotics immediately.

Most people know that antibiotics have no effect on viruses, but believe that bacterial infections should always be treated with antibiotics. Today we know that many minor bacterial infections often heal as well without antibiotics.

Examples related to this aspect will be provided later.

Antibiotics

- Antibiotics are divided into several different groups
- Antibiotics kill or destroy bacteria
- Consider benefits vs side effects
- Bacteria can become resistant – not a person

Strama
Swedish strategic programme against antibiotic resistance

Antibiotics is a generic term. Some examples of different groups of antibiotics are Penicillins, Cephalosporins, Tetracyclines, Macrolides, and Quinolones.

Antibiotics kill or destroy bacteria. The antibiotics and the body's immune system deal with the infection.

Antibiotics have been around since the 1930s. This has involved a revolution for many bacterial infections which used to be fatal, such as pneumonia, scarlet fever and wound infections. Antibiotics have saved many lives.

Side effects vary with the type of antibiotic. Severe allergic reactions associated with antibiotic treatment are uncommon, however they represent a serious side effect when they do occur. Diarrhoea is a relatively common side effect, caused by a disrupted bacterial balance, however severe intestinal inflammation may also occur. Nettle rash may sometimes occur in conjunction with antibiotic treatment. It is difficult to determine whether the rash is caused by the medication or the infection. Contact the medical services for an assessment.

Resistance: Some bacteria survive despite treatment with antibiotics. They become strong - resistant. The greater the use of antibiotics, the larger the risk of developing resistance. This is a major threat to future opportunities for cure of infections. Resistance is one of the property's of bacteria. Thus, a person treated with antibiotics does not become resistant. Important measures for preventing the development of resistance include **reducing** the overall intake of antibiotics and ensuring that antibiotic treatment **does not end prematurely**.

Today we travel and interact with people from around the world in an exceptional manner. For the most part this involves positive experiences and memories. However, travel also creates conditions for the spread of bacteria.

Many countries have severe problems with resistant bacteria. The cause of this is the high and often uncontrolled use of antibiotics. In many countries antibiotics are used for the common cold. If the doctor does not provide the antibiotics, you can purchase them elsewhere (= incorrect preparation, incorrect dosage, incorrect period of treatment).

Taking antibiotics when they are not necessary is harmful and we must learn to never use antibiotics to ”be on the safe side”.

Common infections in children

Strama
Swedish strategic programme against antibiotic resistance

Now the programme continues with case studies about everyday infection problems in a family with children.

Invite the parents to participate with their own experiences and encourage discussions.

Common cold

- Common colds are caused by viruses
- The symptoms are usually a blocked nose, a runny nose, irritated throat, cough and a fever
- A common cold lasts about 1-2 weeks
- Common colds are more frequent during winter
- Hand hygiene and "coughing etiquette"

Strama
Swedish strategic programme against antibiotic resistance

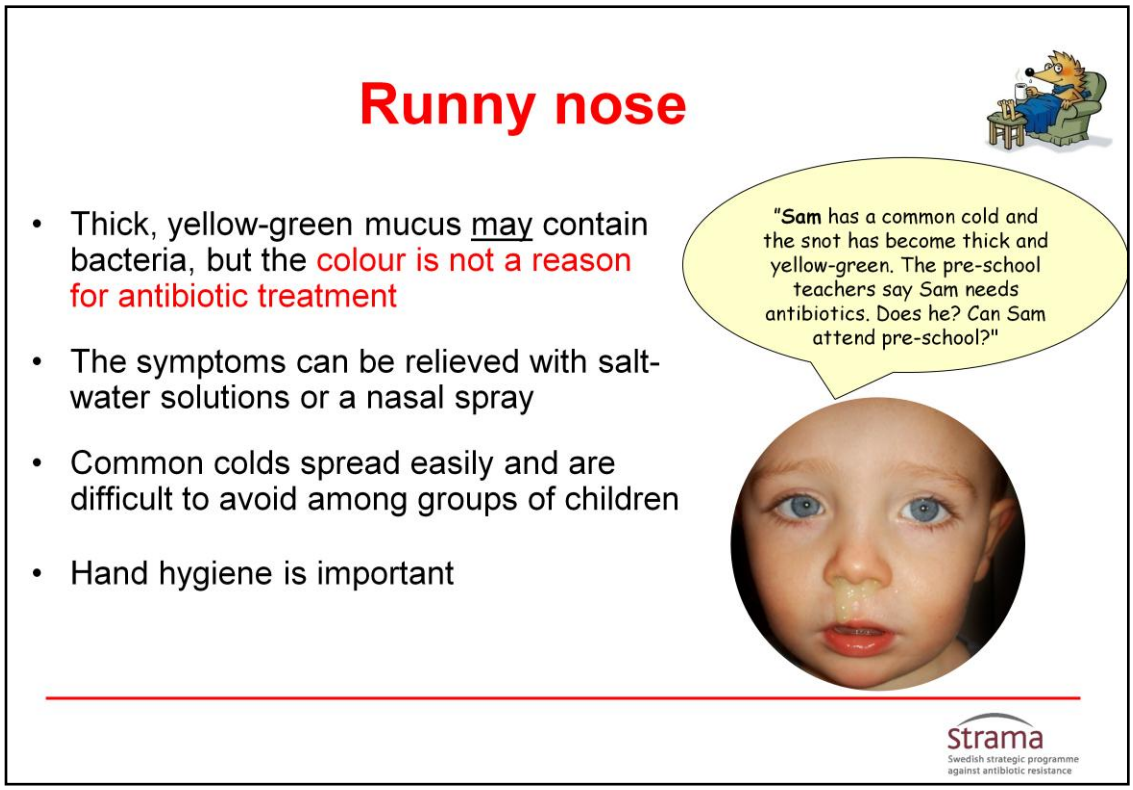
There are about 200 different common cold viruses. Common colds are transmitted through the air (coughing and sneezing) and by contact transmission (through hands). Transmission occurs a couple of days before the symptoms appear, which is why it is no point in keeping children with a cold at home instead of allowing them to attend pre-school. Instead it is the child's overall state of health which determines whether the child should attend pre-school or not.

Many colds overlap. That is why it may appear that your child has had the same cold for several weeks. If you bear in mind that it is normal to have 6-8 colds per year, this adds up to roughly two months. This usually occurs during the winter season. It may seem like your child has been sick all winter.

The fact that children have more colds during the winter is due to several reasons. For example, we spend more time indoors in smaller confined spaces, an aspect which is recognized as facilitating the spread of infections.

Coughing etiquette
It is advisable to teach children to cover their nose and mouth with their arm when sneezing and coughing.

Hand hygiene prevents contact transmission.



What do the parents think? Should Sam take antibiotics when the snot has become thick and yellow-green? Can he attend pre-school?

Nasal mucus is the body's defence against **common cold viruses** and represents the most common symptom of colds. Initially, the nasal mucus is watery and transparent. After a couple of days it becomes thicker and yellow-green. A common presumption at that stage is that the cold has turned into a bacterial infection and antibiotics will be needed. But the colour is not a valid reason to start using antibiotics.

A blocked nose can be relieved with salt-water solutions or a nasal spray.

It is difficult to avoid the spread of nasal colds in groups of children. Transmission occurs even before the cold symptoms appear.

The overall state of health determines whether the child should attend pre-school or stay at home.

Emphasize good **hand hygiene.**

Other examples of the cause of nasal mucus:

- Streptococcal infections can cause high temperature, purulent nasal mucus, inflamed nostrils and swollen throat glands.
- Allergic rhinitis (hay fever) is most common in the spring and is often accompanied by sneezing, an itchy nose and red, watery eyes.
- Foreign body which creates nasal mucus which is long-lasting, unilateral, has an unpleasant smell and may sometimes contain blood.

Cough

- Coughing is an important protective reflex
- Viruses are the most common cause
- Respiratory mucous membranes take a long time to heal
- Antibiotics are rarely needed
- Bronchodilators are sometimes used
- The efficacy of cough medicine is uncertain

Strama
Swedish strategic programme against antibiotic resistance

Should Max take antibiotics? What do the parents think?

Coughing, which is a protective reflex, starts when the respiratory mucous membranes become irritated. It is the body's way of defending itself and getting rid of the substances causing irritation in the respiratory tract.

Colds are the most common cause and are often triggered by **viruses.** Mucus may be produced whilst coughing or the cough may be dry. The cough often lasts for a long time, even after the cold has passed because the mucous membranes are sensitive and take time to recover. It usually lasts 2-4 weeks, sometimes longer.

Antibiotic treatment is rarely useful, as the disease is usually caused by a virus. The mucus produced during coughing may sometimes be yellow or green. It does not necessarily mean that there is a bacterial infection but is often a natural consequence of a viral infection.

Sometimes **bronchodilators** are prescribed to facilitate breathing, usually as inhalers.

A cough is not easy to treat. Experience shows that there is often an over-dependence on cough medicine. Unfortunately there is not really any effective **cough medicine**, but instead the effects are marginal. Cough medicine should not be given to children below the age of two or to children with asthma without consulting the medical services.

What can a parent do? Make sure your child drinks enough fluids. The mucus becomes less viscous and easier to cough. It is advisable to give your child a sip of water before putting him/her to bed. Elevate the head by, for example, using extra pillows. The decisive factor for determining whether to seek medical assistance is the overall state of the child's health, rather than just the cough. Children with a cough, a normal body temperature and a good overall health status may attend pre-school.

Other examples of the cause of coughing:
- croup (*virus*)
- Respiratory syncytial virus
- pneumonia (*virus or bacteria*)
- asthma and allergy
- whooping cough (most children are vaccinated, which provides a good, but not 100% level of protection)

Contact a doctor in the event of:
- breathing difficulties
- high temperature
- tiredness and drowsiness
- a cough which has lasted for a long time (weeks)

Sick in the middle of the night

- 15 month old Emma has a cold but is still playful and active. She falls asleep at 8 p.m.
- Emma wakes up at 2 a.m. She is very hot and cries inconsolably
- Her body temperature is 40 °C/104 °F
- Emma shows clear signs of pain when her parents press her ear
- The parents suspect that she has an ear inflammation - what can they do?

Strama
Swedish strategic programme against antibiotic resistance

Let the parents provide suggestions on what to do before scrolling to the next slide. What should they do about the high temperature, the cold and why do they suspect ear inflammation?

Ear inflammation is often preceded by a cold which lasts a couple of days, however ear inflammation may sometimes appear instantly, particularly among young children. The auditory tube swells and becomes clogged or blocked. This provides a good breeding ground for bacteria. The mucous membrane swells and mucous and pus form, which put pressure on the eardrum. It hurts when the child is lying down, the child wakes up and cries inconsolably.

Ear inflammation

- Upright position - reduces the pressure in the ear
- Nasal spray - relieves nasal congestion
- Emma gets medication to reduce her high temperature - which also works as a pain reliever
- They schedule a doctor's appointment at their health clinic the following day

Strama
Swedish strategic programme against antibiotic resistance

Elevating the head reduces the pressure in the ear and relieves the pain. Therefore, it is also advisable to hold the child upright when you are comforting him/her.

Nasal spray may provide relief for a blocked nose, but has no effect on the ear inflammation.

Pain relievers may be appropriate - paracetamol or ibuprofen

The formation of pus in the middle ear during an ear inflammation may **pierce the eardrum** and the pus escapes through the auditory canal. The bursting of the eardrum tends to reduce the pain. The child should be examined by a doctor, however this is not urgent and can wait until the following day. Clean the ear and perhaps insert a piece of cotton-wool in the ear.

How urgent is it to see a doctor?
In most cases, for children who are generally healthy, it is not as urgent to see a doctor as we sometimes believe to be the case. The discomfort is often experienced at night. The child may wake up due to the pain and as a parent it is natural to be concerned. This concern often rubs off on the child. However, it is seldom necessary to examine children with suspected acute ear inflammation during the evening or night.

Important exceptions
You should immediately contact a doctor in the following cases – even if it is in the middle of the night:
- If your child has a significantly slower reaction time than usual.
- If your child is struggling to maintain his/her balance.
- If your child has swelling behind his/her ear.
- If it is difficult to communicate with your child.
- If your child vomits repeatedly.
- If your child is younger than three months and has high temperature.

Ear inflammation

- Usually caused by a bacteria
- Often combined with a common cold
- The child should be examined within one day. As a general rule
  - seek medical care during daytime
- Most uncomplicated ear inflammations among children heal without using antibiotics
- Complications are very rare

Strama
Swedish strategic programme against antibiotic resistance

The most common bacteria that cause ear inflammations are *Pneumococci* and *Haemophilus influenzae*. Viral infections are very common in conjunction with ear inflammations, but it is extremely rare that viruses alone cause ear inflammations. Ear inflammation is not contagious but the bacteria that causes the inflammation can be contagious, like a cold.

General rule: If the child falls sick during the night, wait until the morning to contact the doctor. It's more important to soothe the pain and calm the child.

"Wait and see" - advice for the majority
In the past, almost all children used to be treated with antibiotics. There has been a switch from this principle due to several reasons. 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 one** and are otherwise healthy. Spontaneous healing is high and complications are very rare. Therefore, as a rule, it is advisable to wait for a while before using antibiotics. After all, it is unnecessary to expose the child to the possible side effects and risks of developing resistance, especially as no significant impact has been proven.
Pain relievers are given when necessary. It is advisable to elevate the head. Contact the medical services again in the event of a worsening or persistent ear ache or high temperature after two to three days.

Antibiotics in certain cases
However, in certain cases the benefit of taking antibiotics outweighs the side effects associated with them. Examples include cases where antibiotic treatment is recommended when the eardrum has burst. Antibiotics are also recommended for children under the age of two, who have ear inflammation in both ears. Antibiotics are always recommended for children below the age of one and above the age of 12 and for adults where an ear inflammation has been confirmed.

Check-ups
For a child who suffered from an otitis, it used to be a standard practice to check the child's hearing after three months. Nowadays check-ups are only conducted for some children. In uncomplicated cases, if the child has had an ear inflammation in just one ear, check-up is not necessary (irrespective of whether the child has received antibiotics).

Fever

- Children easily develop fever - it is rarely dangerous
- Fever is not an illness in itself
- Fever is a part of the body's natural defense mechanisms
- A fever is a temperature above 38 °C / 100.4 °F

Strama
Swedish strategic programme against antibiotic resistance

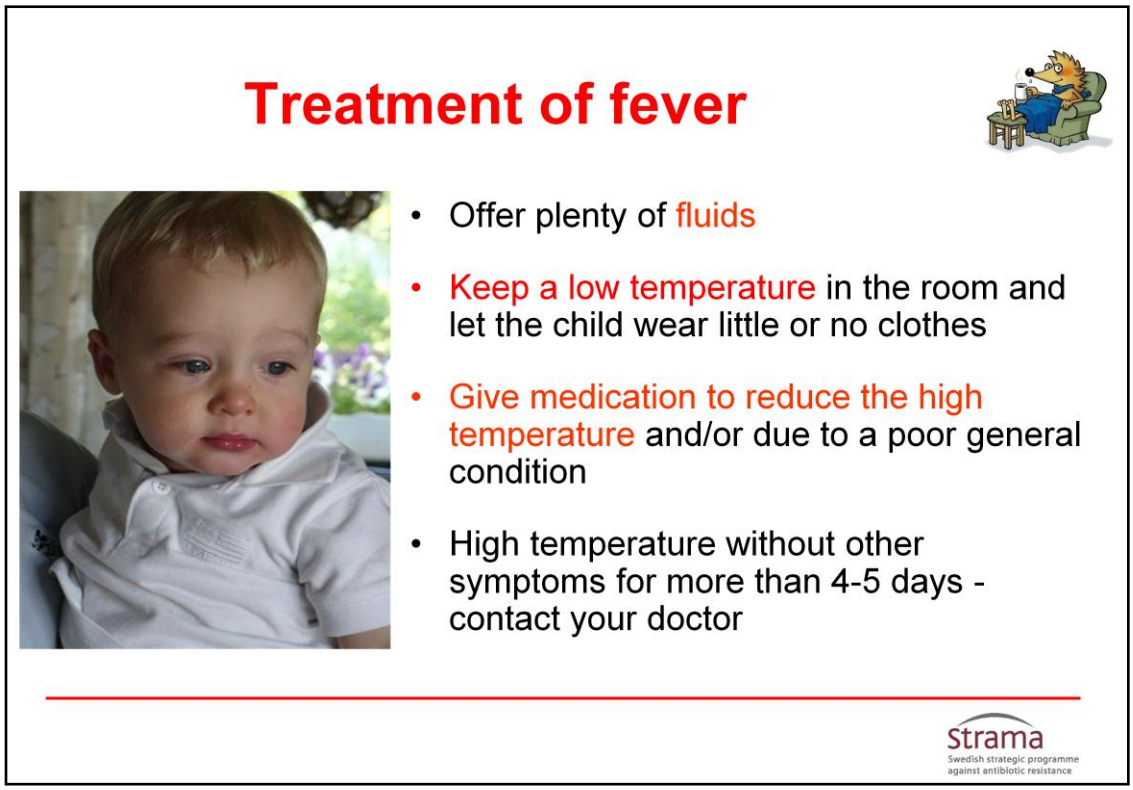
If your child has a slightly higher temperature this does not necessarily mean that the child is seriously ill. High temperature per se is not dangerous as it represents the body's defence against viruses and bacteria. In comparison to adults, children often develop a high temperature more often in conjunction with an infection.

Normal body temperature is defined as a rectal temperature between 36 °C / 96,8 °F and 37.8 °C / 100 °F. Children often have higher temperatures than adults. If the child is young and is wearing extremely warm clothes or has been very active, the temperature may be high without indicating illness. Therefore, it is advisable to wait half an hour before taking the temperature in order to obtain an accurate result. Temperature above 38 °C/100.4 °F measured after half an hour of resting is counted as a temperature

Measuring rectal temperature is the most reliable. Electronic rectal thermometers take approximately one minute to provide a measurement.

Ear thermometers are quick, only take a second to provide a measurement and have to be inserted correctly to provide an accurate measurement value. A large amount of wax or plug of wax in the auditory canal provides an inaccurate value.

Placing the thermometer in the **mouth** - under the tongue - takes about two minutes to provide a measurement and placing it in the **armpit** takes about 10 minutes. Both methods involve greater **uncertainty** than a measurement of the rectum and are not recommended for young children

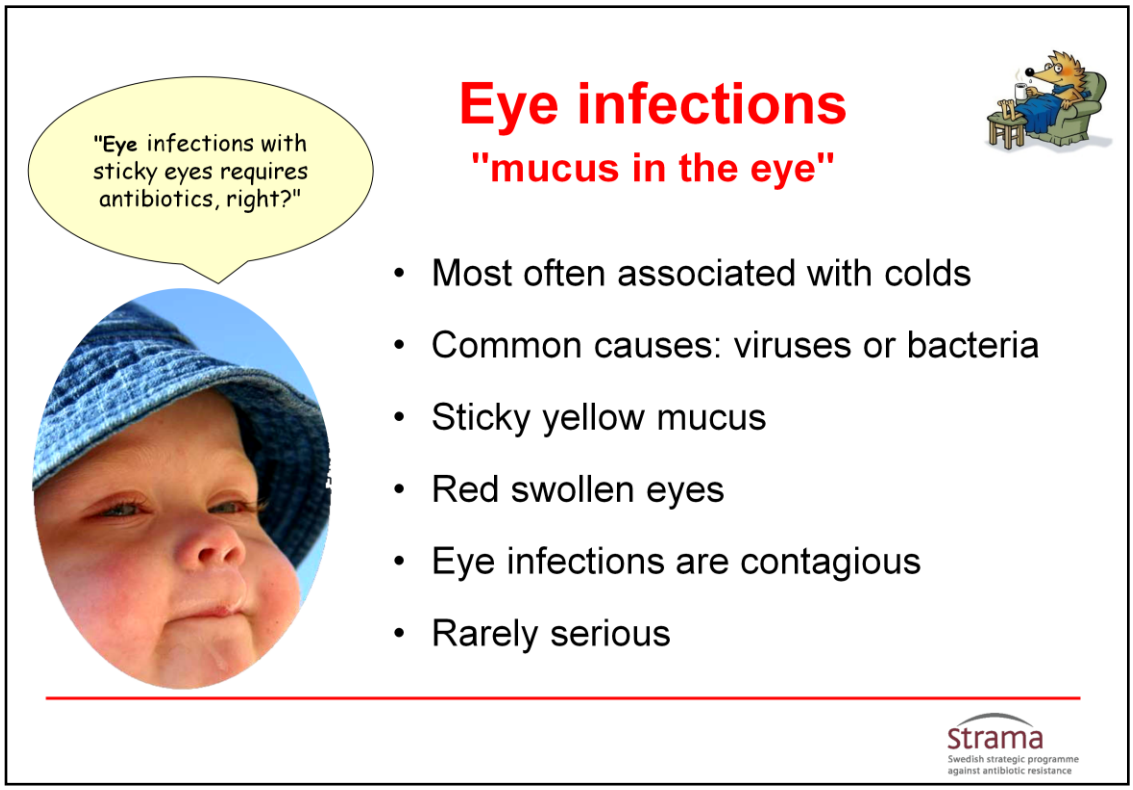


Give your child plenty to drink, preferably a drink your child likes - or why not offer them ice cream? Air the room and maintain a low temperature (18 °C/ 64.4 °F). Toddlers may be taken outdoors in a pram if the weather permits, however children who have a high temperature should avoid physical exertion.
Children with high temperature of > 39.5 °C/102.2 °F should be given medication to reduce the high temperature.

Why treat high temperature?
- Reduces the feeling of sickness which often accompanies high temperature
- Prevents extremely high temperatures of > 40 °C/104 °F
- Reduces the risk of febrile seizures

Medication to reduce high temperature is available both in oral form (liquid and tablets) and as suppositories. The medication to reduce high temperature should be given at regular intervals. Long intervals between the medication entail a risk of the temperature rising before the next dose, which leads to shivering and sweating Intermittently. If you choose to treat the high temperature it is appropriate for the treatment to last for the entire day. Medication to reduce high temperature should be given every 4-6 hours. The temperature in the morning, the following day, determines whether treatment should also be given again that day.

High temperature is not a cause of concern, but you should monitor the overall status of health and contact the medical services if the high temperature persists or if the child is abnormally tired, difficult to communicate with and refuses to drink.



It is not unusual for children of pre-school age to have an eye infection (conjunctivitis) in conjunction with a cold. The infection is in the conjunctiva. The tear duct represents a connection between the respiratory mucous membranes and the eyes, which transports the cold virus and bacteria to the eyes. It looks like "mucus in the eye".

Common causes

Bacteria: Yellow mucus in the eye is often caused by bacteria - usually the same bacteria found in the child's nose and throat. The eyes become sticky and stick together and the eyelids become red and swollen. Bacterial conjunctivitis is usually caused by *staphylococci, streptococci, pneumococci* or *hemofilus influenzae*. They often heal spontaneously.

Viruses: Red eyes with a small amount of secretion usually indicates a viral infection. Conjunctivitis caused by a virus is less purulent. No treatment is available. Spontaneous healing

Such eye infections are **contagious** - Advice on the treatment will be provided in the following slide.

Other causes of an eye infection

- Strong inflammation, formation of pus and sensitivity to light are examples of a **cornea infection** (keratitis). Loss of vision may possibly occur. It is a rare condition among children and should always be medically examined.
- An **allergic** inflammation of the eyes usually affects older children (school age children) and is associated with strong itching. The suspicion of an allergy will be strengthened if it is related to pollen/spring season.
- **Molluscs** located on the edge of the eyelid can lead to long-lasting conjunctivitis which will only heal once the mollusc has been scraped away.

Treatment

- Most cases are self-healing
- Clean your child's eyes several times
- Change towel, pillowcase, "favourite blanket"
- Accurate hand hygiene
- Stay at home when eyes are extremely sticky
- Children with mild discomfort may attend pre-school

Strama
Swedish strategic programme against antibiotic resistance

Most eye infections heal by themselves within one week. In most cases you can refrain from antibiotic treatment. Antibiotics (ointments or drops) may be appropriate if the discomfort is extreme or long-lasting (> one week).

The key message for the treatment is CLEANLINESS. Clean your child's eyes several times a day with a small cotton pad and water, moving from the outside towards the root of the nose (see image). Prevent transmission of the infection by thorough hand hygiene, changing/washing the pillow case, towel and possibly the favourite blanket on a daily basis.

Contact the medical services

- If the purulent secretion lasts for over a week

- If the child experiences extreme discomfort. A heavy and increasing flow of tears and sensitivity to light are indicating the cornea has become inflamed, which requires contact with an eye specialist.

Stay at home or not?

Eye infections are contagious. Transmission occurs through direct transmission via the hands and droplet transmission when children cough and sneeze. However, it is impossible to rule out the spread of cold viruses and respiratory bacteria in a group of children. Furthermore, the transmission of the infection usually occurs before the outbreak of the child's eye infection. A practical recommendation is that your child should stay at home when his/her eyes are extremely sticky, even if your child's overall health is good. Pre-school staff should not be required to clean your child's purulent eyes. In general, children with a mild eye infection who otherwise feel good can attend pre-school. In terms of the transmission of the infection, you will not gain from keeping your child at home.

Return to pre-school?

- The overall health condition determines when the child can return to pre-school
- A day at pre-school is like a day at work - if you feel drowsy and ill, you will not cope
- A good rule – one healthy day at home with normal temperature, a healthy appetite and alert = ready to return to pre-school

Strama
Swedish strategic programme against antibiotic resistance

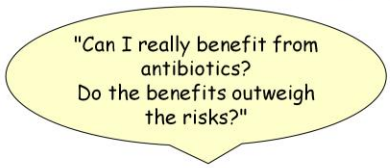
Many infections cannot be prevented. Viruses and bacteria may circulate among a group of children without any child falling ill. Thus, when a child falls ill the infectious substance may already have spread among the group. Therefore, it is difficult to know when the child is completely free from the infection before returning to pre-school. The infection may have a significant impact on some children, while others may not be particularly affected.

The recovery process also varies between children. It involves an individual assessment by parents and the pre-school. Sometimes you will need to consult your Child Health Centre or doctor before your child returns to pre-school.

Rule of thumb

An active child who has a good appetite is probably healthy, but it is also important to monitor the child's "current status". If the child has been ill for a long time it may be advisable to relax and stay at home an extra day to fully recover.

Should antibiotics always be avoided?



- NO, antibiotics should be used when necessary
- Antibiotics can be of vital importance
- Therefore, it should be taken with care and consideration

- Caring for our children and our future generations…

Strama
Swedish strategic programme against antibiotic resistance

Sometimes antibiotics are necessary for saving lives. Antibiotics are also a prerequisite as nowadays the level of health care is increasingly becoming more advanced. We carry out complex surgery, transplants, save lives of premature babies, etc. This would not be possible without effective antibiotics.

The medical services have a great responsibility, but as patients and consumers we need to be aware that the use of antibiotics has a price.

Contact the medical services if you are worried about the infection and request a medical assessment. Ask the questions:
- **Can I really benefit from antibiotics?**
- **Do the benefits outweigh the risks?**

These questions will make you an aware patient/consumer. And as stated earlier, antibiotics are sometimes necessary, in which case we should not be afraid to use them.

In addition to the case of resistance, there are also environmental reasons for reducing unnecessary prescriptions. Many types of antibiotics are not broken down by the body but remain active for a long time after they have been flushed from our body and circulate outside in our environment.

Therefore, using such medication with caution is necessary so that severe infections can be treated in future generations.

Summary

- Use antibiotics wisely
- TIME and PATIENCE

It usually takes 1 week to recover without antibiotics and 7 days to recover with antibiotics

Strama
Swedish strategic programme against antibiotic resistance

Characteristics which are not witnessed nowadays - but **TIME AND PATIENCE** are often sufficient for healing.

Antibiotics have no effect on a common cold. As a rule, other mild infections also heal just as well without antibiotics.

We hope that we have helped you to increase your awareness as a parent and that you feel more secure in your role as a parent of young children.

Ask the parents if they have any questions?

Produced for Strama

- Birgitta Jönsson, RN, Dept. of Communicable Disease Control, Region of Halland, Sweden
  birgitta.jonsson@regionhalland.se
- Lisa Ernstson, Paediatric Nurse, Child Health Centre Amadeus Clinic, Halmstad, Sweden
  lisa.ernstson@amadeushk.se
- Photos and images: Lisa Ernstson, Birgitta Jönsson and www.1177.se

SOURCES:

- Smitta i förskola (The National Board of Health and Welfare 2008)
- Growing people national handbook, www.growingpeople.se
- Barnmedicin 3rd edition, 2006, Tor Lindberg, Hugo Lagercrantz
- Health care advice – www.1177.se
- Strama, www.strama.se
- Medical Products Agency's treatment recommendations
  (otitis, 2010 and lower respiratory tract infection. 2008)

English version I, May 2011

Strama
Swedish strategic programme against antibiotic resistance