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# UNIT 23 SOME DISORDERS OF THE RESPIRATORY SYSTEM

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## 23.1 INTRODUCTION

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The respiratory system includes the nose, throat, pharynx, larynx, bronchi and lungs. All these are very vulnerable (sensitive) to infections, changes in outside temperature and pressure and various diseases.

Cold and cough are common infections during childhood. These can be very mild and not worry the child too much, or can become serious enough to produce difficulty in breathing and cause distress to the child, needing hospitalization.

**Respiratory infections are one of the commonest causes of death in children**, and, therefore, we have to be very alert and careful in dealing with any colds and coughs that children have.

In this Unit you shall read about some common infections of the respiratory system.

### Objectives

After studying this Unit, you should be able to:

- identify symptoms of infections of respiratory system
- take care of simple infections in the centre
- relieve the child's discomfort in the time it takes to reach a medical centre or call the doctor
- recognize emergencies and know when to take the child to the doctor
- explain to the parents the various respiratory infections and how to deal with them

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## 23.2 STRUCTURE AND FUNCTIONING

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To understand the mechanism in respiratory infections and the distress caused by breathing difficulty, we have to study the parts of the body that make up the respiratory system.

For the sake of convenience, the respiratory system has been divided into upper respiratory and lower respiratory parts.

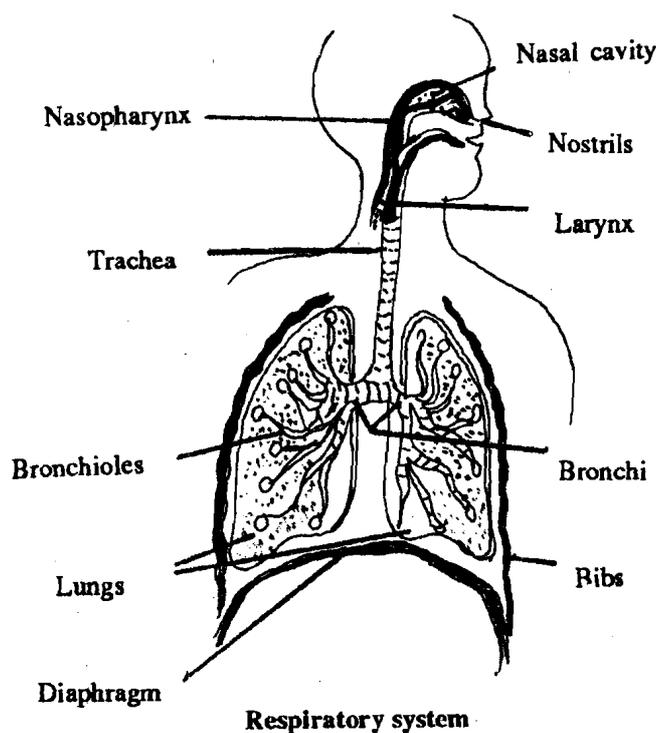
The **nasal cavities** (spaces inside the nose), the back of the throat which is called the **pharynx**, and the voice box or **larynx** are the **upper respiratory parts**. The **trachea** (air passage), **bronchi** (branches of the trachea) and **bronchioles** (sub-divisions of the bronchi), and the **lungs** are the **lower respiratory parts**.

Trachea is the large strong tube that extends downwards from the larynx. The trachea becomes divided into right and left bronchi. The right bronchus goes into the right lung, and the left bronchus into the left lung. In the lungs, the bronchi are further divided into smaller bronchi and bronchioles. Each bronchiole ends in a tiny sac, and these sacs are called alveoli. The alveoli are richly supplied with blood vessels. The tubes of the respiratory system (i.e., the trachea, bronchi, bronchioles and alveoli) are lined inside by a thin tissue, which produces mucus to keep the passage wet.

The lungs are inside a rib cage, which protects them from external injury. At the lower end, they are protected by the diaphragm which separates them from the abdomen. The lungs are covered by two thin layers of tissue called the pleura. The space between these tissues is called the pleural cavity. This cavity is normally empty, but in disease it can get filled with fluid, pus or blood.

While breathing, the body takes in oxygen through the nose. This oxygen is carried along the trachea and the bronchi, into the lungs. Once it reaches the alveoli, the tiny capillaries (blood vessels) covering the alveoli absorb the oxygen and give out the unwanted carbon dioxide from the body. Thus, an exchange of air takes place in the air sacs or alveoli. The carbon dioxide then travels back, up the trachea, to be expelled from the body.

When there is insufficient intake of oxygen in the blood, either due to lack of oxygen or due to blocked passages (as the cases of severe infections or in asthma where the bronchi constrict), the child turns bluish and is said to be cyanosed. This is a very serious condition.



The blood in the veins carries carbon dioxide to the lungs from the various parts of the body and the arteries carry blood rich in oxygen from the lungs to the various parts of the body. The blood in the veins is bluish because there is more carbon dioxide and less oxygen, and the blood in the arteries is redder because there is more oxygen and less carbon dioxide.

## 23.3 SYMPTOMS OF INFECTIONS OF RESPIRATORY SYSTEM

The following are some common problems that children experience when there is infection of the respiratory system.

- Runny nose (cold) with or without fever
- Cough, which may be dry and irritant or 'wet' (i.e., with secretions)
- Sore throat and difficulty in swallowing
- Difficulty in breathing with wheezing
- Fever with increased rate of breathing
- High fever with bluish tinge of skin

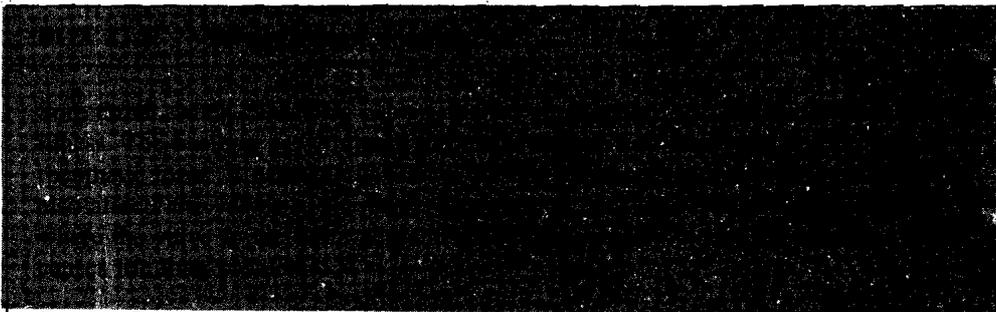
Upper respiratory infections affect the nose, pharynx and larynx. They are recognised by the following symptoms.

There is usually a cold (runny nose), sore throat and cough. Sometimes, there is pain in the middle ear because of the swelling of the tube (Eustachian tube) that connects the throat to the ear.

The cough is usually dry, and there is no sputum, i.e., there is no secretion or phlegm.

The tonsils (glands on either side of the throat) may become swollen and painful, and the child may find it difficult to swallow.

If the pharynx gets red and painful, it is called a sore throat and the child feels ill. Usually, the sore throat is not a serious illness. But sometimes, 'sore throat' can be caused by a particular bacteria that can affect the heart and joints. Therefore, we have to be careful not to ignore sore throats in children. Refer to the following box for details about this.



Lower respiratory infections affect the bronchi and lungs. These lower respiratory infections can be recognised by any of the following symptoms:

- A wet cough with yellow or smelly secretions.
- An increased respiratory rate. The normal rate is around 25 breaths per minute. A rate of over 40 breaths per minute indicates "respiratory distress", i.e., the child is having difficulty in breathing and the intake of oxygen is not sufficient.
- Fanning out of the sides of the nose. This is because there is obstruction to breathing, and additional muscles are called upon for inhalation. The sides of the nostrils expand every time air is taken in.
- Cyanosis (bluish colour due to inadequate oxygen going into the lungs): This occurs in asthma or pneumonia.
- Noisy breathing.
- Wheeze: The bronchi are often affected during an infection, and become narrow, such as in asthma. This makes it difficult for air to escape since the passages are narrow, and filled with secretions. But the body has to push out the unwanted carbon dioxide, and forces the air out through the narrow passages. This produces a wheezing sound.

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## 23.4 COMMON RESPIRATORY CONDITIONS AND THEIR MANAGEMENT

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Here we shall look at the common infections of the respiratory tract, and how to deal with them.

### 23.4.1 The Common Cold

This is indicated by a runny nose. This is because of excessive production of mucus in the air passage due to infection.

This is difficult to treat, but usually lasts for one week only. **It cures by itself.** During the course of infection, keep the child comfortable and try and clear the air passages. Older children can be taught to blow the nose. When the child sleeps, the head should be raised to make breathing easier.

### 23.4.2 Sore Throat

If there is a sore throat, i.e., the pharynx gets red and painful, and there is pain on swallowing. **If it is a simple case of sore throat, the child should be given a pain killer.** You can give half a tablet of paracetamol three times a day after food. Older children can gargle three to four times in a day. This relieves the pain.

**If the tonsils are enlarged and painful, the child should be referred to a doctor/PHC.** The child will usually complain of difficulty in swallowing and pain in the throat. Sometimes, it is difficult to differentiate between severe tonsillitis and diphtheria. This has to be seen by a doctor immediately.

**If the sore throat is severe or lasts more than three days, refer to a doctor to rule out a more serious condition** — streptococcal infection of the throat, which can affect the joints and the heart. You have read about this in the box above.

### 23.4.3 Cough

**The child may have a simple irritant cough accompanying a cold.** There may or may not be fever. Usually, a cough syrup will help control the symptoms.

Sometimes a dry cough is a result of worm infestations. You have read how to treat worm infestations in Unit 22.

**If the child has fever and a cough which is distressing, causing difficulty in breathing, it could be because of bronchitis.** If this occurs in older children, they can be asked to inhale steam to relieve distress. For this, boil water in a pot, and ask the child to breathe in deeply over it, to take in the steam. This helps to open up air passages and makes breathing easier. However, **bronchitis has to be referred to the doctor for treatment immediately.** Younger children should be referred to the doctor immediately as they will have distress, as well as may develop pneumonia early.

### 23.4.4 Wheeze

This is a condition where everytime the child breathes, there is a sucking sound as the air goes through the bronchi. This is because the bronchi have become narrow and are also full of secretions.

**Causes:** There are many causes of wheezing. Pollen, animal hair or dust cause allergic reactions which result in wheeze. The other common cause is worm infestation. Sometimes wheezing is present in infections like bronchitis, pneumonia and tuberculosis.

More severe wheezing is seen in asthma, where the child finds it difficult to breathe. As the disease progresses, there is great respiratory distress, and child turns bluish due to inadequate oxygen intake. This condition is very serious and the child should be taken to the doctor immediately.

**Treatment:** The treatment should be to relieve the discomfort. As mentioned above, steam inhalations can be tried. Cough syrups that will help to bring out the secretions that are causing the wheeze, can be given.

**If the wheeze is severe, refer to a doctor immediately.**

### 23.4.5 Respiratory Distress

This is a condition when breathing becomes difficult and the person becomes anxious. When there is severe infection of the respiratory system, the bronchus narrows and does not let in enough air. If the intake of oxygen is extremely inadequate, the child starts turning blue. It is seen in acute bronchitis, asthma, pneumonia and sudden onset of allergic conditions. Respiratory distress also occurs in severe anaemia and dehydration.

Sometimes the child may swallow something that gets stuck in the trachea or bronchus, and may cause respiratory distress. If this happens, thump (hit hard) the back of the child. It may help to dislodge the object.

**Treatment: When there is respiratory distress, do not wait. Rush the child to a hospital.**

In all respiratory infections, the children should be given plenty of fluids to drink. This is to replace the fluids lost through rapid breathing. Adequate fluid will also prevent the secretions in the respiratory tubes from drying up and blocking the air passages.

#### Check Your Progress Exercise 1

- 1) Fill in the blanks.
  - a) Upper respiratory tract infections affect .....
  - b) Dry cough indicates infection of .....
  - c) Lower respiratory tract infections affect .....
  - d) The blood in the veins contains more .....  
and is, therefore, ..... in colour.
- 2) What are the symptoms of infections of the lower respiratory tract?  
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- 3) Which symptoms will indicate to you that there is infection of upper respiratory tract?  
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- 4) State whether the following are correct or incorrect.
  - a) Sore throats in young children are not serious. ( )
  - b) Coughs spread through close contact. ( )
  - c) If the sore throat lasts for more than three days,  
refer the child to the doctor. ( )

- d) A dry cough sometimes is a symptoms of worm infestation. ( )
- e) Wheeze occurs because the passage through the nose has become narrow and is full of secretions. ( )
- f) Respiratory distress can be tackled at home or at the centre. ( )

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## 23.5 SOME SPECIFIC ILLNESSES

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Let us now read about some specific illnesses of the respiratory system and how you can relieve the child's distress during the time it takes to reach the doctor/hospital.

### 23.5.1 Obstructive Laryngitis

In this condition, due to a block in the larynx (voice box) there is a dry cough with difficulty in breathing. The child may turn bluish as there is not enough oxygen reaching the lungs. There is a sucking sound when the child breathes in. This is usually seen in diphtheria and is very serious.

**Treatment:** The child has to be referred to the hospital immediately.

### 23.5.2 Bronchitis

This is an infection of the bronchus, resulting in cough and fever. There is difficulty in breathing and the child gets a tight feeling around the chest. There may be severe respiratory distress.

**Treatment:** Refer to a doctor for treatment. Cough syrups that make the secretions in the air tubes less sticky, will help. So will steam inhalations.

### 23.5.3 Asthma

This is a very distressing condition and affects children quite early in life. Babies from the age of three years sometimes have asthma and they keep getting attacks.

**Causes:** Asthma is caused due to exposure to changes in temperatures, infections or allergens i.e., materials such as pollen, animal hair or house dust, producing allergic reactions. A person may get repeated attacks of asthma.

**Symptoms:** It starts with a runny nose and cough, and soon develops into a wheeze. The wheeze then goes on to produce respiratory distress. If the spasm of the bronchus is severe, less oxygen reaches the lungs and the child starts turning bluish. This is a very serious condition.

**Treatment:** Asthma has to be treated by a doctor. If the symptoms are very severe, the child may need oxygen to ease the breathing. In chronic cases, (long-standing) the mother or caregiver will have to be given specific instructions on how to deal when the child has an attack of asthma.

Asthma is not hereditary though the tendency to asthma may affect children in the same family.

### 23.5.4 Pneumonia

This is an infection of the lungs and can be caused by virus or bacteria. This distinction is made because virus infections have no specific treatment, while bacterial infections can be treated with antibiotics.

**Causes:** Pneumonia occurs as a result of progress of bronchitis, when the infection spreads to the lungs. It is more commonly seen in children and old people, where the body resistance to fight the disease causing bacteria is low. In children, it is a common occurrence after measles.

**Symptoms:** Pneumonia is recognized by fever, respiratory distress and cough.

**Treatment:** Refer the child to the doctor. Treatment will include cough syrups, antibiotics and medicines for fever control.

### 23.5.5 Whooping Cough

This is an infective condition producing severe cough which distresses the child, ending in a peculiar "whoop" and may be accompanied by vomiting. You have read about this condition in detail in Unit 14 of Block 4.

This is a childhood illness and does not affect children above the age of five years.

**Prevention:** The disease can be prevented by immunisation.

**Treatment:** Refer the child to the doctor. Treatment is with antibiotics but they are effective only during the first week of infection. The infection subsides by itself after three months.

### 23.4.6 Tuberculosis

**Symptoms:** Tuberculosis usually starts as a cough, and the person experiences a low rise in body temperature, especially in the evenings. In most cases, failure to thrive, i.e., inability to gain weight, or loss of weight, may be the only symptom.

TB not only affects the lungs. It can infect any part of the body, particularly lymph glands. Sometimes you may see children with swellings on the back of their necks. These are swollen lymph glands. The commonest cause is TB.

Children who are chronically ill or undernourished should be examined for TB. Any child who does not show weight gain should be examined for TB.

**Causes:** Tuberculosis is an infective disease that spreads through the air. It is caused by bacteria. It spreads from one person to another when they cough or sneeze, and is, therefore, very common in crowded areas. Most people are exposed to TB at sometime in their lives in our country. But if the body has strong resistance, and can produce immune bodies against this infection, they do not get the infection. On the other hand, children and adults who are weak and undernourished, and also live in crowded areas, become vulnerable to TB.

TB spreads more easily when the body is already weak because of measles, whooping cough, chronic diarrhoea or malaria. Lack of protein and calcium in the diet add to the possibility of the infection.

**Treatment:** TB is very difficult to treat. If you suspect TB in a child, refer the child to the hospital/PHC. It is resistant to many drugs, and it usually requires a combination of drugs to get rid of the infection.

Treatment of TB has to be carefully monitored and followed. Most cases of TB become resistant to the drugs because the patients do not follow instructions properly, and take underdoses. All cases have to be followed up, and others in the family protected, until the infection is eradicated.

Treatment for TB is prolonged and has to be given for many months. Mothers have to be told that even if symptoms disappear, the treatment has to be completed.

**NEVER TRY TO TREAT TB IN THE COUNTRY.  
ALWAYS REFER TO A HOSPITAL.**

**Prevention:** The BCG vaccine is a preventive vaccine against TB. It is given to children before they are ten days old. It is observed that while it prevents infection with TB, in cases of exposure to severe infection, BCG reduces the intensity of the infection.

**CASES OF OBSTRUCTIVE LARYNGITIS, BRONCHITIS, ASTHMA,  
PNEUMONIA, WHOOPING COUGH, TB, AND OTHER DISEASES HAVE  
TO BE REFERRED TO THE DOCTOR FOR TREATMENT. CHILDREN  
COMING IN CONTACT WITH THE CHILD IT CONCERNS SHOULD ALSO BE  
EXAMINED.**

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## 23.6 TALKING TO THE PARENTS

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When children are ill with colds and coughs, it is very important to explain to the mother or the caregiver about the various types of infectious that affect the respiratory system. The conditions that have to be particularly noted are:

- a) Sore throat that may be serious.
- b) Bronchitis and pneumonia that need immediate treatment.
- c) Emergency arising out of a foreign body in the trachea, preventing breathing.
- d) Severe asthmatic wheeze with the child going into distress.
- e) Whooping cough that is highly infectious.
- f) Tuberculosis, as it involves all the family.

The parent may not be able to tell the difference between one cough and another. So explain that further investigations will be needed to diagnose and rule out serious infections. The need for protection against infection from one to another and isolating the child, if necessary, have to be explained.

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## 23.7 EMERGENCIES

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The following are situations that can happen any time at your centre.

- a) Respiratory distress can occur very quickly and has to be dealt with immediately. A child who is playing normally can suddenly become breathless, because she has swallowed a bead or seed that has blocked her air passage.
- b) The other common emergency is a sudden attack of asthma.
- c) Severe dehydration or severe anaemia can cause difficulty in breathing.
- d) High fever with difficulty in breathing can occur in pneumonia.
- e) Sudden blocking of the air passage can happen in diphtheria.

In all these conditions, rush the child to a doctor.

### Check Your Progress Exercise 2

- 1) State whether the following are correct or incorrect.
  - a) Whooping cough is preventable. ( )
  - b) TB affects only poor people. ( )
  - c) Asthma is a hereditary disease. ( )
  - d) Cough accompanied with fever and respiratory distress could be symptoms of bronchitis or pneumonia. ( )
  - e) Cough with a low rise in temperature towards the evening is indicative of TB. ( )

- 2) What are the situations of emergency when you have to rush the child to the hospital?

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## 23.9 SUMMING UP

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In this Unit you have read about infections of the respiratory system, how to deal with them and their prevention.

Infections of the upper respiratory tract affect the nose, pharynx and the larynx. Runny nose, dry cough, tonsillitis, sore throat and pain on swallowing indicate infections of the upper respiratory tract.

Lower respiratory tract infections affect the bronchi and the lungs. 'Wet' cough, wheeze, cyanosis, fanning out of the sides of the nose, increased respiratory rate indicate infections of the lower respiratory tract.

The common cold is due to excess production of mucous in the air passage. It treats itself within a week.

Sore throat is also a common respiratory infection. If the sore throat is severe and lasts for more than three days, then refer the child to the doctor to rule out the more severe case of streptococcal infection.

Sometimes it is difficult to differentiate between severe tonsillitis and diphtheria. Refer the child to the doctor.

A simple cough is controlled by cough syrups. If the cough is accompanied by fever and breathing distress, it could be due to pneumonia or bronchitis. Steam inhalations will help to open the passage but the child has to be referred to the doctor.

Wheeze accompanies many respiratory tract infections. Help the child to feel comfortable by trying steam inhalations and giving cough syrups.

Severe wheezing should be referred to the doctor immediately.

Respiratory distress occurs when enough air does not reach the lungs. It can happen in many conditions. Rush the child to the hospital in this case.

Cases of obstructive laryngitis, pneumonia, bronchitis, asthma, tuberculosis and whooping cough have to be referred to the hospital. Try and make the child comfortable in the time it takes to reach the hospital.

Explain to the parents the various respiratory infections and how to deal with them.

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## 23.9 GLOSSARY

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<b>Cyanosis</b>	:	Bluish colour of the face because of less oxygen going into the lungs and, therefore, the blood.
<b>Dry cough</b>	:	Where the cough is irritant and there are no secretions.
<b>Larynx</b>	:	Voice box.
<b>Pharynx</b>	:	The part of the throat behind the tongue.

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## 23.10 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

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### Check Your Progress Exercise 1

- 1) a) nose, pharynx and larynx
- b) upper respiratory tract
- c) bronchi and lungs
- d) carbon dioxide, bluish.

**Common Childhood Illnesses,  
Their Prevention and  
Management - 1**

- 2)
  - a wet cough with yellow or smelly secretions
  - increased respiratory rate
  - cyanosis
  - fanning out of the sides of the nose
  - noisy breathing
  - wheeze
- 3)
  - Runny nose
  - Dry cough
  - Pain on swallowing, due to enlarged tonsils
  - Sore throat
- 4)
  - a) Wrong. It can be a streptococcal sore throat causing swelling of the joints and affecting the heart.
  - b) Wrong. Coughs spread through the air.
  - c) Right.
  - d) Right.
  - e) Wrong. It occurs because the bronchi have become narrow and are full of secretions.
  - f) Wrong. The child must be rushed to the hospital immediately.

**Check Your Progress Exercise 2**

- 1)
  - a) Correct. Through immunization.
  - b) Wrong. It can affect anybody who is exposed to the infection.
  - c) Wrong. Only the tendency is inherited.
  - d) Correct.
  - e) Correct.
- 2)
  - When the child has respiratory distress.
  - A sudden attack of asthma.
  - High fever with difficulty in breathing.
  - Blocking of trachea as in diphtheria.