

Department of  
**Respiratory & Critical Care Medicine**

# Oxygen Therapy



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# 1. Introduction to Oxygen Therapy

Oxygen is essential for life. Medical conditions such as lung, heart and sleep-related breathing disorders may result in lower oxygen levels in the blood. This could cause symptoms such as breathlessness, tiredness and reduced attention.

Oxygen therapy aims to provide you with extra oxygen during breathing to improve the oxygen levels in your blood.

## HOW IS OXYGEN LEVEL MEASURED?

Oxygen level ( $SpO_2$ ) in the blood is measured by:

- Analysing blood sample from the artery (blood vessel that carries oxygen-rich blood from the heart to the rest of the body)
- Using a finger pulse oximeter (device that measures blood oxygen level)

## WHAT IS NORMAL BLOOD OXYGEN LEVEL ( $SpO_2$ )?

A normal  $SpO_2$  ranges from 95-100%. For patients with chronic lung conditions like chronic obstructive pulmonary disease (COPD), a lower  $SpO_2$  range (88-92%) may be acceptable. Your doctor will advise you on your acceptable  $SpO_2$  range.

## DETERMINING THE NEED FOR OXYGEN THERAPY

Your doctor will review your medical condition and treatment plans before recommending oxygen therapy. You may be required to complete the following tests to determine if you are suitable for oxygen therapy:

- **The Arterial Blood Gas (ABG) test:** A blood sample is usually drawn from an artery in your wrist and tested for blood oxygen and carbon dioxide levels. A low blood oxygen level (hypoxemia) indicates a need for oxygen therapy.
- **The 6-Minute Walk Test:** You will be asked to walk as far as possible over 6 minutes. Your  $SpO_2$ , pulse rate and breathing difficulty will be checked during this test. A decrease in  $SpO_2$  may indicate a need for oxygen therapy during physical activities.

# 1. Introduction to Oxygen Therapy

## HOW CAN OXYGEN THERAPY HELP YOU?



Oxygen therapy helps to:

- ↑ amount of oxygen in the blood
- ↓ the stress on the heart and lungs
- ↑ quality of life

Patients on oxygen therapy often experience the following benefits:

- Increased energy level
- Improved alertness
- Better tolerance to physical activities
- Decreased breathlessness during daily activities

However, do note that your response to oxygen therapy may be different depending on your medical condition.

It is important to continue oxygen therapy unless you have discussed with your doctor.

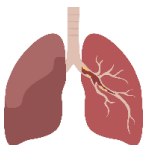
## SIDE EFFECTS OF OXYGEN THERAPY

Oxygen therapy is usually well-tolerated. However, you may experience occasional side effects, such as:



### 1. Dry Nose

You may experience dry nose, which may cause nose bleed. This can be prevented by applying moisturiser and repositioning the nose prongs (small lightweight tube that provides oxygen into your nose through two small prongs) regularly.

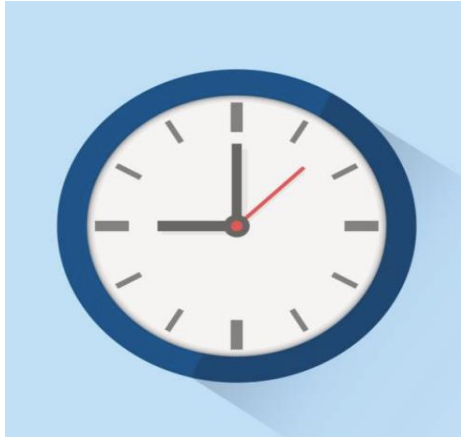


### 2. Excessive Oxygen

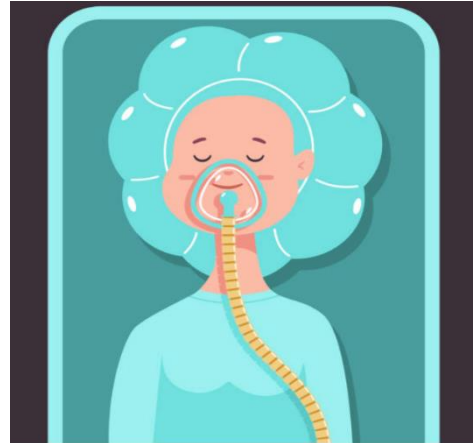
In some conditions, such as severe COPD with carbon dioxide retention, too much oxygen may be harmful. Consult your doctor before adjusting your oxygen therapy settings.

## 2. When Is Oxygen Therapy Required?

Oxygen therapy is prescribed based on your needs, usually in one of the following ways:



Continuous  
(Long-Term Oxygen Therapy - LTOT)



During Sleep  
(Nocturnal/Night Oxygen Therapy)



During Physical Exertion



In Palliative Care

## 2. When Is Oxygen Therapy Required?

### **LONG TERM OXYGEN THERAPY (LTOT)**

LTOT refers to the longer use of oxygen therapy. LTOT is usually prescribed for patients with chronic lung disease (e.g. COPD), who suffer from continuously low levels of oxygen in the blood. The individual would be recommended to use at least 15 hours of oxygen therapy, including during sleep.

### **NOCTURNAL (NIGHT) OXYGEN THERAPY**

During sleep, lower oxygen levels in the blood is common if you already have low oxygen levels during the day.

For individuals with sleep-breathing disorders such as obesity hypoventilation syndrome, oxygen therapy may be prescribed along with sleep breathing equipment (e.g. Positive Airway Pressure Therapy).

### **DURING PHYSICAL ACTIVITIES**

For some individuals, oxygen levels in the blood may become low during physical activities or activities requiring effort.

Oxygen therapy is therefore only used during activities such as toileting, walking or during exercise.

### **PALLIATIVE**

Oxygen therapy may be prescribed as part of palliative therapies that focus on improving comfort, providing symptom-relief and enhancing quality of life.

In this situation, there is less focus on checking blood oxygen levels. Oxygen therapy can be used whenever the individual feels breathless.

# 3. Oxygen Therapy Devices

Disclaimer: All products shown on this page and following pages are used as **examples only**, and not for product endorsement. The actual devices and accessories may differ across brands and models.

## STATIONARY OXYGEN CONCENTRATOR

A stationary oxygen concentrator increases the amount of oxygen in the air before it is delivered to the user.



Examples of Oxygen Concentrators

Features	Details
Weight	20 to 30 kg
Power Source	Electrical outlet
Location of Usage	At home
Amount of Oxygen Delivered	5 to 10 litres per minute of oxygen (depending on model)
Maintenance	Yearly checks or as advised by vendor
Others	Option to attach humidifier for higher oxygen flow settings

# 3. Oxygen Therapy Devices

## PORTABLE OXYGEN CONCENTRATOR

A portable oxygen concentrator has similar functions as a stationary oxygen concentrator.



Examples of Portable Oxygen Concentrators

Features	Details
Weight	Lighter than stationary oxygen concentrator
Power Source	Batteries
Location of Usage	At home or outside the house
Duration of Oxygen Delivery	Depends on battery charge and flow setting <ul style="list-style-type: none"><li>• Most provide extra oxygen for a few hours, making them useful for short trips</li></ul>
Maintenance	Batteries need to be charged before use and replaced at intervals
Settings	<ol style="list-style-type: none"><li>1) <b>Continuous Flow</b> A steady flow of oxygen is delivered. This setting is used if you require a higher oxygen flow.</li><li>2) <b>Pulsed Flow</b> A pulse (bolus) of oxygen is delivered each time you breathe in. This setting is used if you require a lower oxygen flow. It also allows the battery to last longer.</li></ol>



# 3. Oxygen Therapy Devices

## OXYGEN CYLINDER

An oxygen cylinder stores oxygen as a gas.



Example of Oxygen Cylinder

Features	Details
Type of cylinder	Stationary or portable
Weight	3 to 18 kg
Power Source	None
Location of Usage	<b>Stationary:</b> Used as backup if oxygen concentrator is faulty <b>Portable:</b> Used when going out
Duration of Oxygen Delivery	Depends on size of cylinder and oxygen flow rate
Maintenance	Check needle gauge frequently to know if oxygen level in cylinder is running low and if cylinder needs a refill

# 4. Oxygen Therapy Accessories

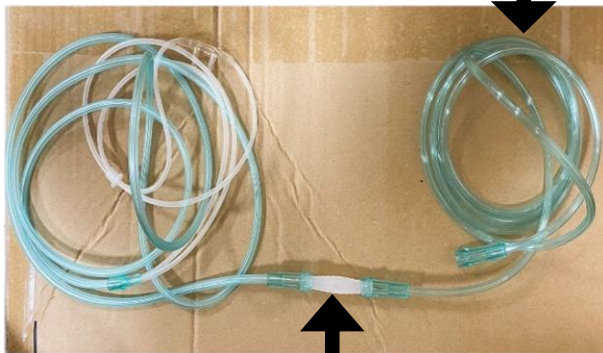
## NASAL CANNULA



A nasal cannula delivers oxygen from the oxygen source to your nose.

## CONNECTOR TUBE & OXYGEN TUBING EXTENSION

Oxygen Tubing



You can use a connector tube to extend your oxygen tubing and move around the house more freely.

Use only what you need to ensure that the correct amount of oxygen is delivered.

Connector Tube

## HUMIDIFIER CONTAINER



The humidifier container is filled with distilled water to provide moisture to the oxygen delivered. This prevents your airways from becoming too dry when oxygen therapy is used for a long period or at high flow.

# 5. Oxygen Therapy Device Setup

## Step 1: Turn Device On

### STATIONARY OXYGEN CONCENTRATOR



Plug the concentrator into the AC/DC power supply and switch it on.

### PORTABLE OXYGEN CONCENTRATOR



Switch the device on.

### OXYGEN CYLINDER



Ensure that the oxygen regulator is connected to the oxygen cylinder.



Check the needle gauge. If the needle is in the **red zone**, it indicates low oxygen levels in the cylinder. Contact the vendor for refill before the needle reaches the red zone.

# 5. Oxygen Therapy Device Setup

Step	Stationary Oxygen Concentrator	Oxygen Cylinder	Portable Oxygen Concentrator
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## Step 2: Connect Nasal Cannula

Connect the nasal cannula to the oxygen outlet nozzle (yellow arrow) of the device.



## Step 3: Adjust Oxygen Flow

Turn the flowmeter knob (yellow arrow) to the prescribed level.



Adjust the oxygen flow from the flow control panel.



# 5. Oxygen Therapy Device Setup

Step	Stationary Oxygen Concentrator	Oxygen Cylinder	Portable Oxygen Concentrator
<b>Step 4:</b> <b>Check for Airflow</b>	Check that there is airflow from the nasal cannula by: <ul style="list-style-type: none"> <li>• looking out for bubbles when putting the cannula into water</li> <li>• feeling the ends of the cannula</li> </ul>		
<b>Step 5:</b> <b>Wear Nasal Cannula</b>	a) Place the nasal cannula comfortably into your nose. b) Loop the tubing over your ears. c) Adjust the plastic slide under your chin to ensure that the nasal cannula fits comfortably. d) Breathe through your nose for better oxygen delivery. <div data-bbox="501 938 1036 1267" data-label="Image"> </div>		
<b>Step 6:</b> <b>Post-Usage</b>	Ensure that the oxygen device is fully switched off after use.  Check that the oxygen flow has stopped by putting the nasal cannula into water. If no bubbles appear, the oxygen device has been switched off.		

# 6. My Oxygen Therapy Prescription



Your prescription provides you with information on:

- when you should use an oxygen device
- appropriate oxygen device to use
- appropriate oxygen flow rate

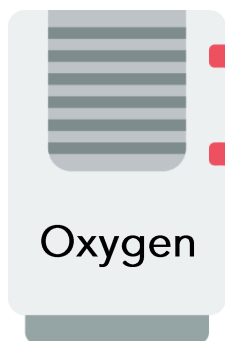
According to your doctors, you are recommended for home oxygen therapy. The type of oxygen therapy that you require is (*tick as appropriate*):

- Supplemental Oxygen Therapy
- Palliative Oxygen Therapy
- Nocturnal Oxygen Therapy
- Long-Term Oxygen Therapy

You are recommended to **keep your oxygen saturation SpO<sub>2</sub>** at \_\_\_\_\_ % (*to be filled by your doctor*).

## HOW MUCH OXYGEN SHOULD I USE?

- Oxygen therapy is a medical treatment and should be used according to your prescription so that you can fully benefit from it.
- Oxygen will be prescribed in terms of “flow rate”. Your doctor may prescribe different flow rates for different activities. Always follow the flow rate given by your doctor, and only change as recommended by your doctor.



Flow rate (litres per minute) is the amount of oxygen that is delivered to you from the oxygen device per minute.

# 6. My Oxygen Therapy Prescription

## **PRESCRIBED USE** *(to be filled by your doctor):*

At rest - use flow of \_\_\_\_ L/min

Exercise or physical activities - use flow of \_\_\_\_ L/min

Sleep - use flow of \_\_\_\_ L/min

With Positive Airway Pressure Therapy devices - use flow of \_\_\_\_ L/min

Long Term Oxygen Therapy (LTOT) - Please use O<sub>2</sub> therapy for at least 15 hours/day, including sleep.

Note: \_\_\_\_\_  
 \_\_\_\_\_

## **RECORDING MY OXYGEN USAGE**

	Flow Rate	Number of Hours on O <sub>2</sub>	Activity
E.g. Mon	2L	30 minutes	Morning walk
Tue			
Wed			
Thu			
Fri			
Sat			
Sun			

# 7. Important Safety Concerns

**DO** ✓



Use your oxygen therapy device as per your doctor's prescription.



Keep your oxygen device in a cool and well-ventilated area.



Check that the power socket is in good working condition.



Keep your oxygen device away from heat or flames (e.g. stoves, gas).



Clean your oxygen device and accessories regularly.

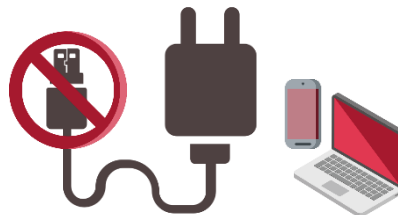


Contact your vendor regularly for maintenance checks and timely replacements of oxygen cylinders.

**DON'T** ✗



Do not smoke near your oxygen equipment. This includes e-cigarettes.



Do not charge any personal re-chargeable electronic devices (especially the ones with lithium batteries) anywhere near your oxygen equipment.



# 8. Infection Control

## OXYGEN CONCENTRATOR

- Change the distilled water in the humidifier container every 24 hours. Wash the humidifier container before each refill.
- Change your oxygen concentrator filter regularly (usually every six months). Check with your vendor if you are unsure.



## NASAL CANNULA

- Clean or wash your nasal cannula at the end of the day. Change the nasal cannula monthly, or whenever the tubing changes in colour and texture (e.g. becoming brittle).



Washing nasal cannula

# 9. Emergency

## HOW DO I KNOW IF MY OXYGEN LEVELS ARE LOW?

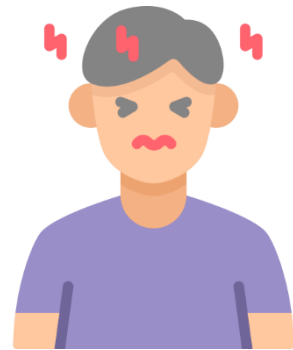
- If your blood oxygen level drops greatly from your usual level for a long time, the function of your important organs can be affected.
- You may experience the following symptoms if your oxygen levels are low:



Shortness Of Breath/  
Rapid Breathing



Increased Heart Rate



Headache,  
Dizziness,  
Confusion



Becoming Unconscious



Chest Pain



Restlessness

# 9. Emergency

## WHAT SHOULD I DO IF MY OXYGEN LEVELS ARE LOW?

1. Measure SpO<sub>2</sub> daily at rest.
2. Seek advice from your medical provider or doctor.
  - Check with them your concerns and queries on oxygen use or prescription.
3. Use continuous oxygen and seek medical attention immediately.
  - Do this when SpO<sub>2</sub> falls below the acceptable range for a long period.
4. Call 995 for medical emergencies.

## WHAT SHOULD I DO IF MY OXYGEN RUNS OUT?

1. Contact your vendor for:
  - **Replacement** – If your oxygen cylinder runs out of oxygen
  - **Maintenance** – If your oxygen concentrator has no oxygen flow. Check your oxygen concentrator regularly to ensure there is enough oxygen at all times.
2. Seek advice from your medical provider or doctor.
3. Call 995 for medical emergencies.



For other urgent emergencies that require immediate medical attention, call 995.

# Notes

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- Department Of Respiratory and Critical Care Medicine
- Department Of Physiotherapy
- Department Of Nursing

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