

<b>The Village Residence</b>	<b>POLICY NO:</b>	
	<b>Date reviewed</b>	<b>November 2021, Revised September 2023</b>
	<b>Page 1 of 14</b>	
<b>Policy on the use of Oxygen</b>		

<b>Policy on use of Oxygen</b>	
<b>Developed by: Nursing Administration</b>	<b>Date Developed: November 2021, Sept 2023</b>
<b>Developed By: Nursing Department.</b>	<b>Date Approved: November 2021</b>
<b>Implementation Date: November 2021</b>	<b>Review Date: November 2024</b>
<b>Policy Reference Number:</b> Medicines Management HIQA Schedule 5 Policies under Safety	<b>No. of Pages: 14</b>
<b>Status of the Policy: Final</b>	

<b>The Village Residence</b>	<b>POLICY NO:</b>	
	Date reviewed	November 2021, Revised September 2023
	Page 2 of 14	
<b>Policy on the use of Oxygen</b>		

Oxygen therapy can be lifesaving but nurses must know how it works, when to use it, and how to correctly assess and evaluate a resident's treatment. Health Care Assistants must be familiar with oxygen and only follow instructions of nursing staff in relation to safety around the use of oxygen.

## **Competencies required for delivering oxygen therapy**

### **Basic**

- Be aware of, and understand, local oxygen policy/guidelines
- Demonstrate a basic understanding of oxygen physiology, normal and abnormal values
- Be able to discuss the indications for oxygen and the potential risks
- Demonstrate an ability to use oxygen equipment safely, including an awareness of fire risks and cylinder use
- Demonstrate an ability to use a pulse oximeter to determine oxygen saturations
- Demonstrate accurate monitoring and recording of oxygen therapy
- Be able to recognise changes in a patient's respiratory status
- Understand how to use oxygen in emergency situations, for example, cardiac arrest.

### **Registered nurses (basic plus)**

- Demonstrate an understanding of target range prescriptions and applications to different patient groups
- Demonstrate an ability to assess suitability of delivery devices for individual patients and recognise when a change of device is needed
- Be able to correctly identify and set up a range of oxygen-delivery devices
- Understand how to select appropriate oxygen/driving gas for nebulised therapy
- Demonstrate accurate recording of adjustments to the oxygen dose and the patient's response
- Recognise the need for escalation of treatment/medical review and further assessment

<b>The Village Residence</b>	<b>POLICY NO:</b>	
	Date reviewed	November 2021, Revised September 2023
	Page 3 of 14	
<b>Policy on the use of Oxygen</b>		

## Key points

---

- Hypoxia is an indication that oxygen therapy should be started
- If blood oxygen levels are not low, oxygen will not treat breathlessness
- A target oxygen saturation range should be prescribed to guide therapy
- A lower target saturation range should be prescribed for patients at risk of hypercapnia
- The amount of oxygen received by the patient is dependent on the delivery device used; ensure appropriate device is selected

### Introduction

Oxygen is required by all tissues to support cell metabolism; in acute illness, low tissue oxygenation (hypoxia) can occur due to a failure in any of the systems that deliver and circulate oxygen. Hypoxia is an indication to start oxygen therapy; this can be a life-saving intervention, but given without appropriate assessment and ongoing evaluation, it can also be detrimental to residents' health (Ridler et al, 2014).

### Oxygen treatment

When used as a medical treatment, oxygen is regarded as a drug and must be prescribed. In 2008, the British Thoracic Society produced guidelines for its use with acutely unwell adult patients (O'Driscoll et al, 2008). This was endorsed by 21 professional groups across a wide range of professions and specialties.

<b>The Village Residence</b>	<b>POLICY NO:</b>	
	Date reviewed	November 2021, Revised September 2023
	Page 4 of 14	
Policy on the use of Oxygen		

**The guidelines recommend:**

**Administering oxygen to treat hypoxaemia (low blood oxygen levels);**

**Prescribing a target oxygen saturation range to guide therapeutic treatment.**

**Oxygen does not treat breathlessness in the absence of hypoxaemia (O'Driscoll et al, 2008).**

In an emergency situation, immediate assessment of airway patency, breathing and circulation is essential, and in critical illness such as peri-arrest, high-concentration oxygen should be commenced via reservoir mask at 10-15L/min if the resident is hypoxic, with continuous monitoring of pulse oximetry and prescription of an appropriate target range once the resident's condition is stabilised (Resuscitation Council (UK), 2015).

The target saturation range is prescribed according to the risk of type 2 (hypercapnic) respiratory failure pending arterial blood gas measurement. For most residents, a target of 94-98% is appropriate. For those at risk of carbon dioxide retention (hypercapnia), a target of 88-92% ensures safe levels of oxygenation and minimises risk of respiratory acidosis. Those at risk include residents with:

Chronic obstructive pulmonary disease (emphysema);

Neuromuscular and chest wall disorders;

Cystic fibrosis;

Morbid obesity.

Pulse oximetry is available in this setting where emergency oxygen is used. It is essential to:

<b>The Village Residence</b>	<b>POLICY NO:</b>	
	Date reviewed	November 2021, Revised September 2023
	Page 5 of 14	
<b>Policy on the use of Oxygen</b>		

Record inspired oxygen (FiO<sub>2</sub>), delivery device and oxygen saturations;

Monitor and document the effect of any changes to administered oxygen therapy.

### **Delivery devices**

Oxygen is delivered in this service via fixed-performance devices.

### **Simple face mask**

The simple, or “low flow”, face mask is intended for short-term use, Oxygen is delivered at 2-10L/min and supplemented with air drawn into the mask during breathing.

The FiO<sub>2</sub> achieved cannot be predicted as it depends on the rate and depth of the resident’s breathing. Oxygen flow rates of <5L/min may result in the resident rebreathing exhaled carbon dioxide, which may build up in the mask. Simple face masks should not be used for residents at risk of type 2 respiratory failure.

### **Nasal cannulae**

Nasal cannulae (Fig 1, attached) are comfortable and well tolerated by most residents. They do not need to be removed when the resident is talking or eating. Oxygen is inhaled even when breathing through the mouth. Nasal cannulae are useful:

For residents who are stable;

To provide supplemental oxygen therapy during meals;

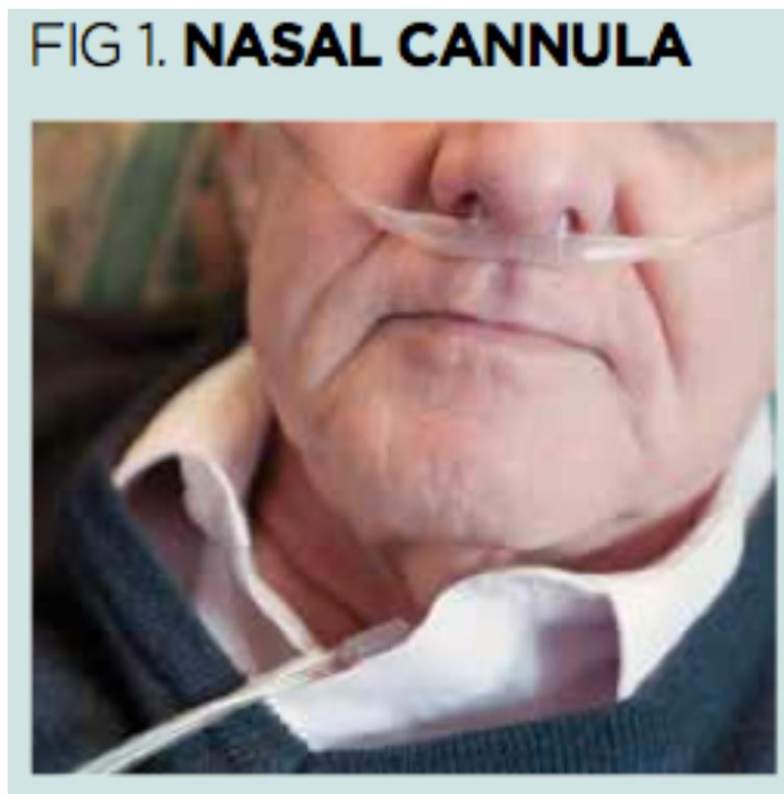
To provide air-driven nebulised therapy for those requiring controlled oxygen therapy.

They are commonly used to deliver oxygen in the residential setting.

Flow rates above 4L/min can cause considerable drying of nasal mucosa and are more difficult to

<b>The Village Residence</b>	<b>POLICY NO:</b>	
	Date reviewed	November 2021, Revised September 2023
	Page 6 of 14	
<b>Policy on the use of Oxygen</b>		

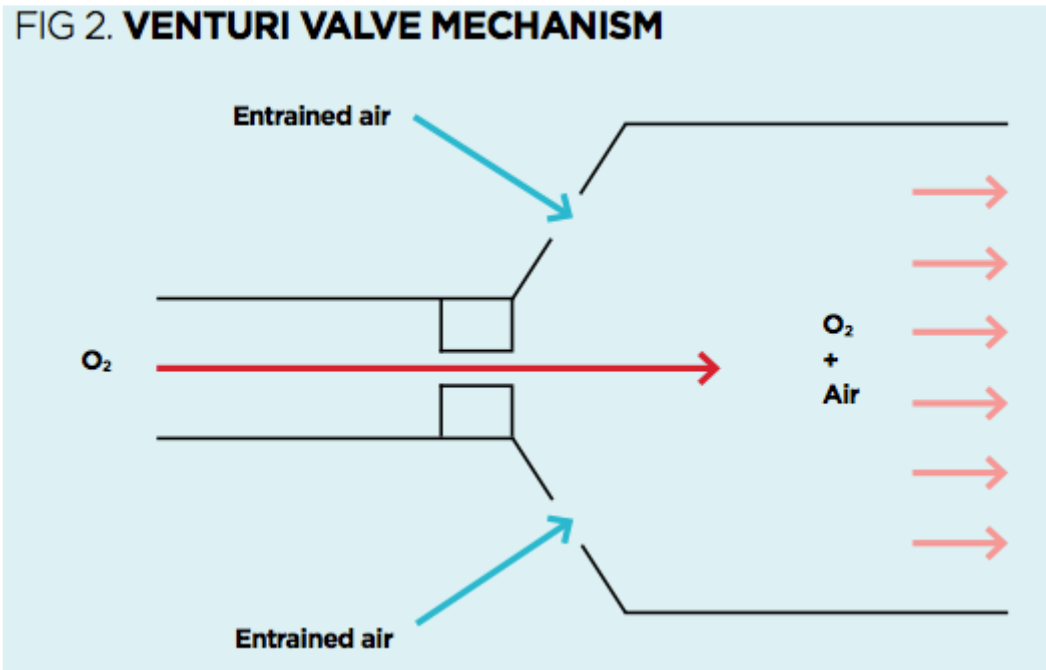
tolerate. The FiO<sub>2</sub> achieved varies with the rate and depth of breathing and, therefore, nasal cannulae should not be used in residents with unstable type 2 respiratory failure.



### **Fixed-performance devices**

Fixed-performance devices (also known as controlled oxygen delivery systems) deliver a fixed proportion of air and oxygen via a Venturi valve, ensuring an accurate concentration of oxygen is delivered, regardless of inspiratory volumes and respiratory rate (Fig 2, attached).

FIG 2. VENTURI VALVE MECHANISM



Fixed-performance devices should be used in acute illness in residents who are at risk of carbon dioxide retention.

Venturi valves (Fig 3, attached) are colour-coded to denote the fixed percentage of oxygen delivered; these range from 24% (blue) to 60% (green), provided that the minimum oxygen flow rate on the barrel of the device is given.

FIG 3. VENTURI VALVES



<b>The Village Residence</b>	<b>POLICY NO:</b>	
	Date reviewed	November 2021, Revised September 2023
	Page 8 of 14	
<b>Policy on the use of Oxygen</b>		

The minimum flow rate varies between oxygen-mask manufacturers, so it is important to check the minimum rate that is recommended on the device in use.

If residents are extremely breathless but achieving adequate oxygen saturation rates, increasing the oxygen flow rate by 50% (for example, increasing from 2L/min to 3L/min) will increase the gas flow into the mask without increasing the percentage of oxygen delivered, and may be more comfortable for them.

**Infection Control.**

Oxygen Masks should be changed everyday

Oxygen tubing should be changed at least every twenty four


All residents should have individual administration sets and machines and these should be cleaned daily.

All oxygen administration sets is single use only and is disposed in domestic waste unless COVID positive or influenza positive or infection of any kind, then disposed of in clinical waste.



<b>The Village Residence</b>	<b>POLICY NO:</b>	
	Date reviewed	November 2021, Revised September 2023
	Page 9 of 14	
<b>Policy on the use of Oxygen</b>		

## Fire Safety.



### Oxygen Enrichment & Fire Safety

The current COVID surge has resulted in an increased number of high flow oxygen (O2) devices I use outside of ICU/ HDU areas in our hospitals. In some cases, these devices are I use on standard wards which may be reliant on natural ventilation or ventilation systems with lower air change rates than those of a typical ICU or Critical Care Environment. As such, there is an enhanced fire risk than those of a typical ICU or Critical environment. As such, there is an enhanced fir risk associated with O2 enrichment in these areas.

**Particular Issues that might increase the risk**

- Mobile phones and tablets being charged at the bedside particularly with non-OEM chargers.
- O2 therapy devices left switched on when not in use; for example, when residents are having their meal. Devices should not be placed on bed sheets without being switched off at the wall outlet.

**Main causes of fires and explosions when using O2 includes:**

- O2 enrichment from leaking equipment.
- Use of materials not compatible with O2.
- Use of O2 in equipment not designed for oxygen service.
- Incorrect operation of O2 equipment.
- Pockets of O2 entrapped in bed linen, for example when proning.
- Ignition sources in the vicinity of O2 equipment.

**Mitigating the Risk**

proper

under

- ✓ Ensure Clinical Engineering inspection sticker is present.
- ✓ Minimize O2 concentrations through prudent use of O2 and Ventilation.
- ✓ Ensure an adequate level of ventilation.
- ✓ Control heat/ ignition sources I the vicinity of residents on oxygen.
- ✓ Manage fuels; allow vapours to dissipate; prevent O2 pooling

Resident.

- ✓ Keep areas clear of bedding, paper, and control waste.
- ✗ Do not use oil-base emollients on residents on high flow oxygen Unless there is specific clinical indication.

**Actions in the event of an Oxygen Enriched Fire**

- Site specific fire action and evacuation procedures.
- The location of your fighting equipment.

<b>The Village Residence</b>	<b>POLICY NO:</b>	
	<b>Date reviewed</b>	<b>November 2021, Revised September 2023</b>
	<b>Page 10 of 14</b>	
<b>Policy on the use of Oxygen</b>		

- Where & how to operate oxygen isolation points.
- Only trained personnel should attempt to rescue residents in the immediate vicinity of a fire.

**Oxygen cylinders can explode in fires.  
Follow the designated procedures for  
Storage and deployment.**

HSE, 2021

## **Use of Portable Medical Oxygen (Integral Valve) Cylinders**

The Health and Safety Authority (HSA) have issued a revised Safety Alert in relation to the use of CD Portable Medical Oxygen Cylinders, which are medicinal products incorporating a medical



device as part of their closure system.

Oxygen is non-flammable but strongly supports combustion (fire) and, under high pressure with certain conditions, can cause common materials to ignite suddenly (including some materials which do not normally burn in air). Oxygen at high pressure is highly dangerous and a fire can result when in contact with oils, greases, tarry substances and many plastics.

Portable Medical Oxygen cylinders are utilised throughout and across all aspects of the healthcare system to provide a temporary uninterrupted portable oxygen supply to residents and patients. They are further utilised in the home environment to enhance quality of life for oxygen dependent people.

<b>The Village Residence</b>	<b>POLICY NO:</b>	
	Date reviewed	November 2021, Revised September 2023
	Page 11 of 14	
<b>Policy on the use of Oxygen</b>		

Operatives need to be mindful of the following potential occurrences and treat the Medical Oxygen cylinders with due care and attention at all times.

### **Potential Occurrence 1**

*Although rare, when the valve of a Medical Oxygen cylinder is initially opened and a flow selected, an ignition within the cylinder valve can occur potentially leading to hot sparks being emitted.*

- *Ensure that a medical oxygen cylinder is set up and tested for use in a safe place away from the patient to prevent any adverse consequences should an ignition occur.*

### **Potential Occurrence 2**

*When the valve of a Medical Oxygen cylinder is initially opened, an uncontrolled release or escape of the gas can sometimes occur.*

- *Ensure that the medical oxygen cylinder is set up and tested for use in a safe well-ventilated place where increased gas concentration levels are not a factor.*

The following advice is provided by the HSA for guidance to enhance awareness and vigilance in the preparation and use of Portable Medical Oxygen and ENTONOX cylinders.

### **Important General Advice**

Vigilance and attention by the operator during preparation / set up is of critical importance.

*Oxygen cylinders should be set up and prepared for use in a safe place away from the resident.*

- *Always follow manufacturers' "Instructions for Use" to ensure safe preparation, set-up and safe therapy delivery.*
- *When setting up the cylinder, ensure there are no sources of ignition, combustible materials or anyone smoking in the vicinity.*
- *Never use oil or grease when using an oxygen cylinder or associated delivery equipment. Oils and greases can automatically ignite when in the presence of oxygen at high temperatures.*

*Preparation / Set up of the cylinder includes:*

- *Attaching the tubing to the cylinder;*
- *Opening the valve (slowly)*
- *Selecting a flow rate*

During preparation/ set up - at all times observe for unusual noises or events and the potential occurrences outlined above. When opening the cylinder valve a click may be heard as the gas enters the valve. This will occur when the valve is operating normally.

*Always open and close the cylinder valve slowly.*

- *Opening the valve quickly can cause the gas to become hot which may, in extreme conditions, lead to an external fire. Although Oxygen is non-flammable it will strongly support combustion once a fire has started.*

<b>The Village Residence</b>	<b>POLICY NO:</b>	
	Date reviewed	November 2021, Revised September 2023
	Page 12 of 14	
<b>Policy on the use of Oxygen</b>		

*During set up and testing the cylinder outlets should be facing away from the patient, bed and operator.*

*Ensure that the cylinder is functioning correctly before administering the gas to the patient.*

*Do not place the cylinder on the resident's bed unless there is no alternative and never do so before set up and testing has been completed.*

- *Use extra care when there is no alternative to placing the cylinder on the bed, ensuring that the cylinder is functioning correctly.*

*Should any adverse event occur, the cylinder and associated attachments should be appropriately segregated and stored as per manufacturer's instructions for examination.*

- *The event should be reported to the health service provider, the Health Products Regulatory Authority (HPRA) and the gas provider/ supplier.*
- *Should a dangerous occurrence arise the event should be reported to the Health and Safety Authority (HSA) and to HIQA.*

## Cylinder storage and handling

*Under Health and Safety at work Regulations and hospital pipeline installation and operation guidelines.*

Medical gas cylinders should be kept in a purpose built cylinder store that should allow the cylinders to be kept dry and in a clean condition. When designing the cylinder store a risk assessment should be carried out to ensure that the chosen location is as safe as is practicable and that any manual handling issues are engineered out at the planning stage.

As far as possible the medical gas cylinder store should:

- Allow cylinders to be stored under cover, preferably enclosed and not subjected to extremes of temperature
- Be kept dry, clean and well ventilated (both top and bottom)
- Have good access for delivery vehicles and reasonably level floor areas
- Be large enough to allow for segregation of full and empty cylinders and permit separation of different medical gases within the store
- Be totally separate from any non medical cylinder storage areas
- Be sited away from storage areas containing highly flammable liquids and other combustible materials and any sources of heat or ignition
- Have warning notices posted prohibiting smoking and naked lights within the vicinity of the store
- Be secure enough to prevent theft and misuse

<b>The Village Residence</b>	<b>POLICY NO:</b>	
	Date reviewed	November 2021, Revised September 2023
	Page 13 of 14	
<b>Policy on the use of Oxygen</b>		

## Handling cylinders

In order to comply with current manual handling regulations, it is advisable that when handling medical gas cylinders, the following precautions are followed:

- Allow cylinders to be stored under cover, preferably enclosed and not subjected to extremes of temperature
- Be kept dry, clean and well ventilated (both top and bottom)
- Have good access for delivery vehicles and reasonably level floor areas
- Be large enough to allow for segregation of full and empty cylinders and permit separation of different medical gases within the store
- Be totally separate from any non medical cylinder storage areas
- Be sited away from storage areas containing highly flammable liquids and other combustible materials and any sources of heat or ignition
- Have warning notices posted prohibiting smoking and naked lights within the vicinity of the store
- Be secure enough to prevent theft and misuse.

<b>The Village Residence</b>	<b>POLICY NO:</b>	
	<b>Date reviewed</b>	<b>November 2021, Revised September 2023</b>
	<b>Page 14 of 14</b>	
<b>Policy on the use of Oxygen</b>		

**Read and Understood,**