Allied Health Professions

Adult Oxygen Management: Category 1 and 2 Allied Health Staff

Health Shared Services

This document is intended to support **Category 1** and **Category 2** Allied Health staff working with adult patients requiring supplemental oxygen in various clinical settings. It serves as a companion resource to the **Allied Health – Adult Oxygen Management – Category 1 and 2** module available on MyLearningLink (MLL).

The content of this document will be reviewed and updated every five years or as required, based on substantial changes to policies or accepted practices.

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Revision History:

- **2026:** Reviewed and revised by Allied Health Professions (AHP) and subject matter experts to align with *Adult Oxygen Management: Practice Guidance for Allied Health Providers* which replaced the previous 2019 Oxygen Management Guideline – Allied Health Adult Acute Care Inpatients. Document was expanded to include allied health providers working in diverse clinical settings including community and continuing care.

- **2019:** Reviewed and revised to reflect changes in the Oxygen Management Guideline – Allied Health Adult Acute Care Inpatients.

- **2015:** Reviewed and revised by an Allied Health provincial multidisciplinary group to reflect the needs of all areas of the province. At this time, the focus of the document was on allied health staff working in acute care settings only.

- **2013:** Reviewed and revised by Allied Health Educators of the Calgary zone.

- **2006:** The original version of this document was developed by a group of Calgary Health region staff including Physical Therapists, Management and Program Facilitators.

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Definitions and Abbreviations

Acute care - Includes rural and community hospitals, regional hospitals, metropolitan hospitals, and tertiary hospitals.

Adult - 18 years or older.

Artificial Airway – A medical device inserted into the respiratory tract to maintain or secure an open passage for air. Examples include endotracheal tubes, tracheostomy tubes or nasotracheal tubes.

Category 1 Staff – Occupational Therapists, Physical Therapists, Speech Language Pathologists, and students of these disciplines. [1]

Category 2 Staff – Therapy Assistants and Therapy Assistant students.[1]

Chronic Obstructive Pulmonary Disease (COPD) - A lung condition characterized by the blockage of airflow in the lungs and associated structures that makes breathing difficult. The disease is progressive and often worsens over time, resulting in breathlessness, fatigue, and a decreased ability to perform activities of daily living. Emphysema and bronchitis are conditions that are considered to be COPD.

FiO_2 - Fraction of inspired oxygen.

Hypoxemia - A decreased oxygen tension ($Pa0_2$) in the blood below the normal range.

Hypoxia - An inadequate supply of oxygen to the tissue or cell.

Initiate – To place a patient on supplemental oxygen, when they were previously not on supplemental oxygen.

LPM - Liters per minute

Most Responsible Health Practitioner - The healthcare practitioner who has responsibility and accountability for the specific treatment/procedure(s) provided to a patient and who is authorized to perform the duties required to fulfill the delivery of such a treatment/procedure(s), provided it is within their scope of practice.[1]

Order – A directive issued by a regulated healthcare professional, instructing the initiation or discontinuation of specific medical interventions, treatments or care plans for a patient. An Order may be written (including handwritten and or electronic), verbal, by telephone or facsimile. [1]

Oxygen Therapy Risk Assessment - Clinical determination of the patient's level of risk related to oxygen administration, including the ability of the patient to tolerate interruptions in therapeutic oxygen administration.

$PaCO_2$ - Partial pressure of carbon dioxide in arterial circulation.

Pulse Oximetry – A non-invasive method used to measure the oxygen saturation of hemoglobin in arterial blood, with 100% as the maximum reading possible. It is a measure of the average amount of oxygen bound to each hemoglobin molecule.

Significant Change - A variation in values outside of a predefined range, set by an appropriate regulated health professional (e.g., physician, nurse practitioner, registered nurse, respiratory therapist, or category 1 staff). The predefined range will be individual for each patient.

SaO_2 - Arterial oxygen saturation of hemoglobin.

SpO_2 - The measurement of functional saturation of oxyhemoglobin. This measurement is obtained non-invasively using a sensor, typically attached to a finger, toe, or earlobe (i.e. via pulse oximeter).

Student - An individual enrolled in an entry-level educational program for a healthcare discipline, aiming to achieve initial entry-to-practice as either a regulated or non-regulated healthcare provider.[1]

Titration - The process of gradually adjusting the dose of oxygen until the desired effect is achieved.

Section 1: Respiratory Anatomy & Physiology

Bony Anatomy of the Thorax

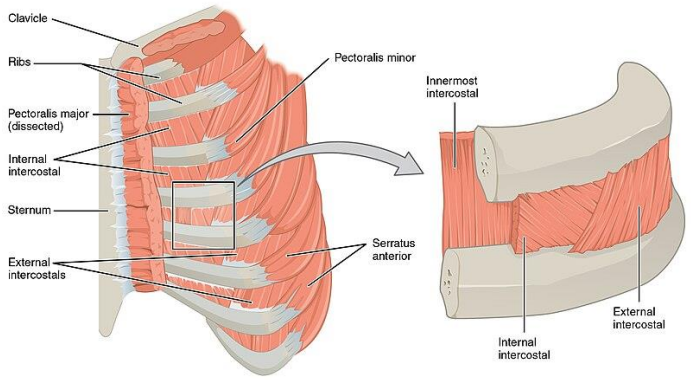
The thorax (chest wall) protects vital organs including the lungs, heart, liver and stomach and serves as an attachment site for the respiratory muscles. It consists of the:

- **Posterior thorax** – 12 thoracic vertebrae and the poster surface of 12 rib pairs
- **Anterior thorax** – Sternum and costochondral cartilage
- **Lateral thorax** – Ribs

Inspiratory Muscles

The inspiratory muscles contract to expand the thoracic cavity, which lowers intrapulmonary pressure and allows air to flow into the lungs. These muscles include:

- **Diaphragm** (primary muscle of respiration) - Contracts by flattening and moving downward, displacing abdominal contents and elongating the thorax.
- **External Intercostals** – Lift the ribs upward and outward, increasing the anteroposterior and transverse dimensions of the thorax.[2]
- **Accessory Muscles** (used during increased demand) – Scalenes, sternocleidomastoids, upper trapezius, pectoralis major/minor and serratus anterior.[3]



Thorax by OpenStax, CC BY 4.0, via Wikimedia Commons

Expiratory Muscles

The process of expiration occurs passively through relaxation of the inspiratory muscles and elastic recoil of the lungs. However, during activities like exercise, speaking, coughing, or with certain health conditions (e.g., COPD), accessory muscles may be activated to help force air out of the lungs. These muscles include rectus abdominus, transverse abdominis, internal and external obliques, and internal intercostals. [2,3]

Respiratory Physiology

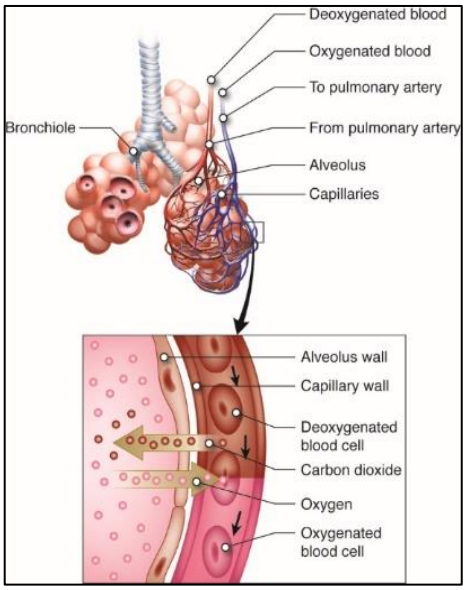
Respiration is the exchange of gases between the atmosphere, blood, and cells. Respiration is a complex process comprised of four stages:

1. **Ventilation –** The movement of air into and out of the lungs during inspiration and expiration. Air enters through the nose or mouth, travels down the trachea, and branches into the bronchi, bronchioles, and finally the alveoli – tiny air sacs where gas exchange occurs.[3]

2. **External Respiration –** The exchange of gases between the alveoli and the bloodstream. Oxygen (O_2) diffuses from the alveoli into the capillaries, while carbon dioxide (CO_2) move from the blood into the alveoli, where it is exhaled.[3] The efficiency of this process depends on several factors including:

    - **Alveolar surface area:** Diseases or injuries that reduce lung surface area, such as COPD, emphysema, or pulmonary fibrosis, can impair gas exchange.

    - **Ventilation perfusion (V/Q) matching:** Gas exchange is optimized when ventilation (air flow) and perfusion (blood flow) are matched. Conditions that cause low perfusion (e.g., pulmonary embolism) or low ventilation (e.g., COPD, atelectasis) can impair gas exchange.[4]



Respiratory-Cardiovascular Junction by Cenveo, licensed under CC BY 3.0 US.

3. **Gas Transport** - After oxygen diffuses from the alveoli into the capillaries, it binds to hemoglobin in red blood cells. Oxygenated blood is then transported to the left side of the heart via the pulmonary veins and pumped throughout the body via the arteries. This process depends on the oxygen carrying capacity of blood and cardiac output.[5]

4. **Internal Respiration** – The exchange of gases between the blood and tissues of the body. In the capillaries, oxygen is released to the tissues, and carbon dioxide is collected for elimination.

When any part of this process is disrupted – due to cardiopulmonary disease or dysfunction – oxygen demands at rest and during activity can increase significantly.[3]

Section 2: Role of Oxygen Therapy

Hypoxemia and Hypoxia

Hypoxemia refers to below-normal levels of oxygen in the arterial blood (normal PaO_2 = 80-100 mmHg). Hypoxemia is important because it is the most common cause of **hypoxia** – an inadequate supply of oxygen at the tissue level.[6]

Hypoxemia can result from several mechanisms:

- **Low inspired oxygen –** Reduced oxygen in the environment (e.g., high altitudes)
- **Hypoventilation** – Inadequate air movement into the lungs (e.g., slow or shallow breathing).
- **Ventilation perfection (V/Q) mismatch** – An imbalance between ventilation (airflow) and perfusion (blood flow) in the lungs.
- **Diffusion impairment** – Reduced oxygen transfer across the alveolar membrane (e.g., pulmonary fibrosis)
- **Shunt** – When blood bypasses ventilated areas of the lung, preventing gas exchange (e.g., collapsed lung, heart defects)

Conditions that may cause acute hypoxemia include:

• Asthma • Anemia • COPD exacerbation • Heart failure • Pleural effusions	• Pneumonia • Pneumothorax • Pulmonary edema • Pulmonary emboli • Pulmonary fibrosis

Indications and Goals of Oxygen Therapy

Oxygen therapy is primarily indicated in the treatment of acute hypoxemia. It may also be used post-operatively, to prevent the development of hypoxemia.[7,8]

The goal of oxygen therapy is to maintain adequate oxygenation using the lowest effective does, thereby reducing the risk of oxygen-related complications. Suggested targets include:

- **SpO_2 92%-96%** in adults without COPD or other causes of CO_2 retention[9]
- **SpO2 88%-92%** in adults with COPD or known CO_2 retention [9]

It is essential to follow patient-specific oxygen orders to optimize safety and effectiveness.

If no oxygen order is in place, **Category 1 staff** may initiate oxygen therapy based on their assessment of the patient's condition. Consultation and formal orders for continued oxygen therapy should be obtained as soon as possible.

Oxygen Titration and Weaning

- Oxygen titration (gradually adjusting the dose until the desired effect is achieved) must follow the prescribed range (e.g., 92%-96%), or other instructions outlined by the most responsible health practitioner.
- Oxygen flow or concentration should be reduced in stable patients who have oxygen saturations above the prescribed range, or if they have been in the upper zone of the target range for 4-8 hours.[7]
- Changes in oxygen concentration or flow rate must be documented.[7]
- Reassess and document findings 5-15 minutes after any oxygen adjustment.
- The Oxygen Titration Quick Reference Tool is designed to support oxygen orders that specify a target range.
- Trained Category 2 staff who have demonstrated competency, may titrate oxygen and/or switch oxygen supply sources within the parameters set by the assigning Category 1 staff member.[1]

Section 3: Assessment, Monitoring and Signs of Respiratory Distress

Physical Assessment and Monitoring

All staff must be proficient in monitoring patients and promptly identifying values that fall outside the patient's defined normal range. In addition, staff must be able to recognize the signs and symptoms of respiratory distress. Measurement and observation of key respiratory parameters should be completed **pre and post** rehabilitation intervention on all patients receiving supplemental oxygen.

1. **Respiratory rate (RR)**: Normal adult range = 12-16 breaths per minute[3]
    - Assessed by observing the movement of the chest wall and/or abdomen. The client should be unaware that this measurement is being performed, or they may alter their breathing pattern. The health care provider should not place their hands on the patient to complete this measurement.
2. **Respiratory pattern**:
    - Normal breathing:
        - Thoracic (upper chest) – the thorax elevates and expands during inspiration, while the abdomen stays still.
        - Diaphragmatic (abdominal) – the abdomen expands during inspiration, while the chest remains still.
    - Abnormal breathing:
        - Excessive accessory muscle use – significant upper chest movement with increased use of sternocleidomastoid, scalenes and other accessory muscles of inspiration.[3]
        - Paradoxical breathing pattern – the reverse pattern of normal breathing where the abdomen is drawn inward during inspiration.[3]
3. **Heart Rate (HR):** Normal adult range = 60 – 100 beats per minute[3]
    - Assessed by palpating the radial pulse. Count for 15 seconds and multiply by 4. If pulse is irregular, count for a full minute.
4. **Blood Pressure (BP):** Normal adult range = 95/60 -140/90 mm Hg[3]
    - Not routinely measured unless clinically indicated.

5. **Oxygen parameters:**
    - Saturation of oxygen by pulse oximetry (SpO_2): See Section 6
        - Normal adult range = 95-100%
    - Oxygen flow rate/FiO_2: See Section 7
    - Oxygen delivery device: See Section 8
    - Connection to oxygen source: See Section 8

Signs of Respiratory Instability

The signs of respiratory distress or instability may include:

1. **Oxygen saturation** consistently below the prescribed acceptable range indicated in an order from the most responsible health practitioner, or below 90% on supplemental oxygen when no range has been specified.[1]
2. **Respiratory rate** less than eight (8) breaths per minute, greater than twenty (20) breaths per minute, or a significant change from baseline (as per clinical judgement).[1]
3. Evidence of excessive use of accessory respiratory muscles, forced exhalation or increased work of breathing which may be demonstrated by:
    - **Grunting** – A grunting sound may be heard each time the person exhales. This is the body's way of trying to keep air in the lungs so they will stay open.
    - **Nasal Flaring** – Nostrils spreading open while breathing may indicate the person is working harder to breathe.
    - **Retractions** (indrawing) – The inward movement of the chest wall during inhalation (usually seen between the ribs or above the clavicle).
    - **Sweating** – There may be increased sweat on the head, but the skin may feel cool or clammy. May occur with increased respiratory rate.
    - **Wheezing** – A whistling or musical sound with each breath may indicate the air passages are smaller, making it harder to breathe.[10]
4. Excessive secretions requiring suctioning.
5. A known unstable airway. Risk factors for an unstable airway may include:
    - Retropharyngeal abscess
    - Laryngospasm

- Smoke inhalation & facial burns from a thermal or chemical injury
- Neck masses
- Epiglottitis
- Inflammation by whatever cause
- Foreign body
- Laryngitis
- Asthma and COPD exacerbations
- Tracheostomy
- Laryngectomy or tracheal stent
- Chest injuries
- Fractured ribs causing hemothorax and/or pneumothorax

Respiratory Distress Response

A patient who is showing signs of respiratory instability/distress is considered to be breathing inadequately and requires immediate clinical attention.

- **Category 1 Staff:** Promptly assess the patient's condition. Initiate or increase supplemental oxygen to restore adequate oxygenation and, where possible, address the underlying cause of respiratory instability (e.g., low oxygen levels, mucous plugging). If necessary, page Respiratory Therapy or activate the appropriate emergency response system –see Section 10.

- **Category 2 Staff:** Immediately discontinue any activity and notify the nurse or any available Category 1 staff member. In cases of acute respiratory distress, Category 2 staff may initiate oxygen or increase the flow of oxygen while awaiting further medical direction, unless the patient's oxygen order explicitly prohibits such action.

Note: Under no circumstances should a patient in respiratory distress, who has not been assessed by a category 1 staff or RN, be sent back to the patient care unit.

Section 4: Level of Patient Risk and Therapy Assistant Assignment

Level of Patient Risk

Oxygen therapy risk assessment involves determining the patient's ability to tolerate interruptions in therapeutic oxygen administration. This document defines two levels of patient risk: High-Risk and Low-Risk.

High-Risk patient criteria:

a) requires eight (8) litres per minute (LPM) or greater of oxygen; or
b) requires high-flow oxygen and greater than 50% concentration; or
c) exhibits one or more signs of respiratory instability; or
d) requires extra support and monitoring due to a medical condition or diagnosis (e.g., altered cognition or decision-making capacity, less than seven (7) days post-operative artificial airway insertion), or as determined by the care team

Low-Risk patient criteria:

a) requires supplemental oxygen and does not meet the high-risk criteria

Expectations for Category 1 Staff Assigning Oxygen Management to Therapy Assistants

1. **Determine level of risk**

2. **Determine activities, location of activity and treatment parameters.**

    a. **Low-Risk Patients**:
    - Category 2 staff may titrate oxygen, switch oxygen sources, transport patients, or work with them away from the patient care unit, within the parameters set by the Category 1 staff member.

    b. **High-Risk Patients:**
    - Category 1 staff may assign Category 2 staff to work with stable, high-risk patients provided they have completed specialized oxygen training and have demonstrated competency.
    - Trained Category 2 staff may titrate oxygen and switch oxygen sources within parameters set by the assigning Category 1 staff member, if deemed appropriate by the Category 1 staff member.

- In acute care settings, trained Category 2 staff may transport patients, or work with them away from the patient care unit, **only** if there is a Category 1 staff member present at all times.
- In community and continuing care settings, trained Category 2 staff may transport patients, or work with them away from the patient care unit, if deemed appropriate by the assigning Category 1 staff member (e.g., patient is medically stable but requires high levels of oxygen at baseline).

c. In **acute care settings**, all staff must review and be aware of existing policies which guide the transportation of patients on supplemental oxygen away from the patient care unit. See Use of Portable Oxygen During Patient Transfers policy – HCS-205.

3. Communicate relevant information to the category 2 staff member. This may include:
   a. Level of risk
   b. O_2 LPM or FiO_2
   c. Target ranges for SpO_2, heart rate, and respiratory rate
   d. If flow rate of O_2 can be adjusted up or down to maintain specified SpO_2
   e. Max O_2 flow rate a patient can be raised to, before the category 1 staff or RN/RT must be called
   f. Frequency of treatment and detailed activities
   g. Treatment goals (these should be specific and time limited)

4. Perform clinical documentation according to discipline specific standards.

5. Document TA assignment:

   a. **Inpatient settings** - use the **Navigator** to document TA assignment has been made and document the details of the assignment related to oxygen management in a **Progress Note**. Tag the note as treatment change.

   b. **Community / Continuing Care** - Create a **Progress Note** with details of the TA assignment relating to oxygen management and tag this progress note as a treatment change.

Section 5: Activity and Oxygen

Activity and Oxygen

Endurance is the ability to sustain activity over time and resist fatigue, relying on the oxygen transport system to supply muscles with the oxygen required for movement. Several factors influence this system, each responding to exercise in different ways:

System	Function	Normal response to exercise
Heart	Pumps the blood	Increased heart rate and force of heartbeat
Lungs	Transfers the O_2 to the blood	Increased respiratory rate and deep breathing
Vascular	Transports the oxygen	Increased blood pressure
Muscles	Utilize the oxygen	Increased oxygen extraction and utilization

Factors Affecting Exercise Tolerance

Certain medical conditions, medications, or deconditioning can impair the body's response to activity:

- **Heart:** Conditions like heart disease or heart rate limiting medications (e.g., beta blockers) may limit heart rate response.
- **Lungs:** Conditions impacting the lungs such as COPD, pneumonia or pulmonary fibrosis may reduce oxygenation.
- **Muscle:** Reduced muscle mass or strength increases the effort required for movement.

Deconditioned patients may benefit from supplemental oxygen during activity to reduce physiological stress and limit exercise induced oxygen desaturation.[11] With regular activity, the deconditioned body can respond quickly to improve heart, lung and muscle function.

General Considerations

- **Patients should never exercise on less oxygen than required at rest.**
- Larger bodies expend more energy and may require more oxygen or rest than smaller individuals.[12]
- If a patient stops activity, assess if the cause is muscle fatigue or respiratory distress.
- Recovery after vigorous activity may take 5-10 minutes or more to return to baseline vitals.

Vital Signs Monitoring and Actions

Vital Sign	Findings	What it means	Category 2 (Therapy Assistant) Action	Category 1 (Therapist) Action
Heart Rate (HR) **Normal Range:** 60-100 bpm **Measured by:** Cardiac monitor, manual pulse check, pulse oximeter (correlated with manual pulse check)	Increased	Normal to a set maximum identified by the therapist	If maximum HR reached, rest patient and monitor HR for 3 minutes. If still at or near maximum, call any category 1 staff or RN	Regulated rehabilitation professionals will use their clinical judgement and assessment skills. May require the following interventions: - Stop treatment, let patient rest, and observe vital signs. Once stable, document event - Change position - Change oxygen level and/or delivery system - Contact Nursing and/or Respiratory Therapist - Contact doctor Activate the emergency response system at your site as required– see Section 10
	Decreased	Concerning if below set minimum	Call any category 1 staff or RN	
	No change	May be due to rate control medication, cardiac pacemaker or transplant	Monitor SpO_2 and RR closely	
Oxygen Saturation (SpO2) **Normal Range:** 95 to 100% **Measured by:** Pulse oximeter	Increased	Normal after exercise		
	Decreased	Normal within the range specified by therapist	Below the specified range, rest the patient, do breathing exercises, and if required increase oxygen within specified parameters. If saturation does not return to specified range, then call any category 1 staff or RN/RT to assess.	
Respiratory Rate (RR) **Normal Range:** 12 to 16 breaths per minute **Measured by:** Manual count	Increased	Normal with exercise to set maximum identified by the therapist	Above set maximum stop activity, encourage slow deep breaths and check SpO_2. If too fast or distressed, call any category 1 staff or RN/RT to assess.	
	Decreased	Normal if taking deeper breaths		

Section 6: Pulse Oximetry

Pulse oximetry is a non-invasive method which uses light absorption to estimate the oxygen saturation (SpO_2) of hemoglobin in arterial blood. Pulse oximetry supports clinical assessment by monitoring oxygenation status and evaluating activity tolerance.

A pulse oximeter measures:

- Oxygen saturation (SpO_2)
- Pulse rate

A pulse oximeter does **NOT** measure:

- Hemoglobin, CO_2 or PaO_2 levels
- Adequacy of ventilation
- Cardiac output or blood pressure

Limitations

- Pulse oximetry readings correlate closely with the oxygen saturations obtained by arterial blood gases, when the SpO_2 (saturation of oxyhemoglobin) level is above 70%. **Oxygen saturation values below 70%, obtained by pulse oximetry, are unreliable.**[13]
- Pulse oximeters rely on adequate peripheral perfusion. Cold extremities or hypotension may cause inaccurate readings.[14]
- Skin pigmentation, acrylic nails, and nail polish may affect accuracy.[13]
- Improperly positioned sensors, shivering, seizures or tremors can cause motion artifacts which may lead to inaccurate readings.[14]
- Smokers and those exposed to carbon monoxide may show falsely high SpO_2.[14]

Clinical Considerations

- Confirm target SpO_2 range from medical record.
- Monitor SpO_2 trends and document influencing factors.
- Verify accuracy by comparing the reading with radial pulse, heart rate monitor and signal quality indicator (1-3 bars).
- Clean the probe and devices according to local infection prevention and control (IP&C) policies and manufacturers recommendations.
- Avoid placing a pulse oximeter on the same arm as a blood pressure cuff.

Section 7: Oxygen Equipment

Low-Capacity Alarm Tanks

If low-capacity alarm tanks are in use at your site and an alarm sounds immediately replace the tank or switch to a wall oxygen source.

Oxygen Cylinders (e.g., Grab'nGo)

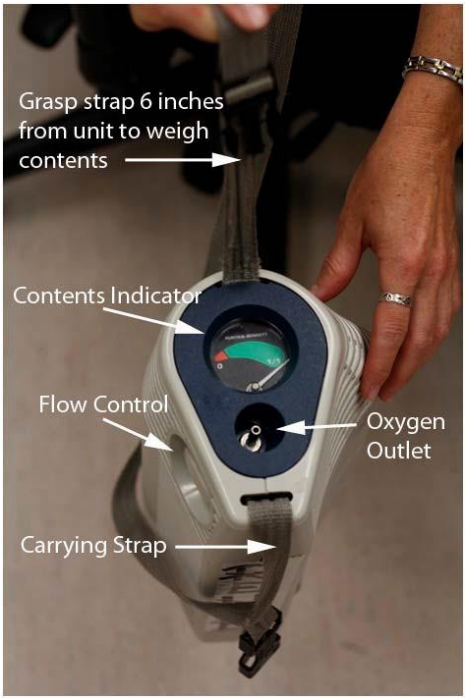
- Made of steel or aluminum; contain compressed oxygen at 2000-2200 psi
- A pressure regulator reduces cylinder pressure to 50 psi for safe use
- The flow meter controls the rate of delivery

Important Guidelines:

- Change tanks at 500 psi – never allow them to run dry.
- Grab'nGo systems only deliver oxygen at marked flow rates. If the exact rate isn't available, select the next highest option (e.g., for 2.5 LPM, choose 3 LPM)
- For high-flow rates, if the correct setting is not available on the tank, any change in flow rate should be discussed with a respiratory therapist or physician and documented.
- Refer to the duration chart at your site to estimate the remaining oxygen (see example in Appendix A)
- Some sites require manual regulator attachments (see Appendix B)

Liquid Oxygen Tanks/Units

- Not best practice due to cost and safety risks.
- Contents are measured by weight:
    - Hold the strap ~ 6 inches above the tank
    - Lift the tank off the floor
    - Observe the needle movement:
        - Green zone = Indicates the amount of oxygen remaining
        - Red zone = Indicates a new oxygen source is needed
    - Repeat 3 times for accuracy
- Please refer to the chart at your site for approximate use times (see example on page 19). The approximate use time will vary depending on tank size.
- See Appendix C for liquid oxygen tank filling instructions.
- If a tank is not functioning, remove it from circulation and report it to the patient care unit so it can be sent for maintenance (as per site policy).



Approximate use time of a FULL portable liquid oxygen tank	
Flow control knob setting	Approx. use time
1	15.5 hours
1.5	11 hours
2	8 hours
2.5	6.5 hours
3	5.5 hours
3.5	5 hours
4	4 hours
5	3 hours
6	2.5hours
8	2 hours
10	1 hour
15	0.5 hours

Troubleshooting the portable oxygen system

Problem	Cause	Solution
Portable unit not filling	Unit has become disengaged from the reservoir	1. Push portable down to secure it onto the reservoir. 2. Make sure the vent valve lever is open.
Unit has been filled but no oxygen is coming out	Unit is frozen due to excessive filling	1. Allow the unit to sit at room temperature until it thaws. 2. If the problem persists once the unit is thawed, it is considered faulty and should not be used.
Portable unit cannot disengage from the reservoir after filling procedure	Unit is frozen onto valve. This can happen after filling numerous portables in a row. Allow 15 minutes between filling portables.	1. Make sure the vent valve is in the closed position and let sit for 15-20 minutes to thaw. 2. Do not attempt to pull off or you will break the lip seal on the portable.
Filling valve on the reservoir is frosted or very wet	Reservoir has just been filled, or more than 1 portable has been filled	1. Wipe excessive moisture with a lint free cloth. 2. Use as required once the fill valve is dry.

Portable Oxygen Safety

Improper handling of portable oxygen can create a potentially unsafe work area. Improper handling of a portable oxygen cylinder can convert it into an unguided missile with enormous destructive power. If the oxygen cylinder is punctured, or if a valve breaks off, the results can be lethal.

Transport & Storage:

- Always transport E-size cylinders in a holder.
- Secure all tanks to prevent tipping.
- Liquid oxygen tanks must remain upright – never place on a stretcher or a patient's lap.
- Spilled liquid oxygen can cause frostbite or corrosion of building materials.

Patient & Family Safety Instructions (provided as appropriate):

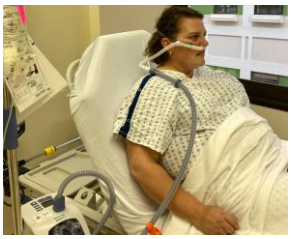
- No open flames or smoking near oxygen.
- Avoid synthetic fabrics due to static electricity risk.
- Do not apply oils or petroleum products to the face while using oxygen.
- Prevent oxygen tubing from becoming tangled or kinked.

Key Considerations

- Never transport a patient with a low or empty oxygen tank. Replace the tank if the supply is inadequate.
- Check tank levels before and after treatment – ensure sufficient oxygen for the full duration of treatment including transportation and potential delays.
- Always test the tank function and ensure airflow prior to use.
- Ensure back-up oxygen sources are available for high-risk patients.
- If a patient is found connected to an empty tank:
    - Replace the tank immediately.
    - Submit a Patient Safety Learning Report through the Reporting and Learning System (RLS)

Section 8: Oxygen Delivery Devices

Low Flow		
Provides **variable** oxygen concentration (fraction of inspired oxygen = FiO_2). Concentration cannot be guaranteed. It is influenced by the patient's rate and depth of breathing.		
Device	**Flow Meter Rate**	**Points of Interest**
Nasal prongs/cannula 	1-6 LPM	• Tubing color is clear. • Flow is adjusted to meet a target SpO_2. • Ensure nostrils are not blocked. • Effectiveness is decreased with deformity, secretions, silastic or NG tubes.
High flow nasal prongs/cannula 	Typically 7-15 LPM	• Tubing color is green. • Used for clients who require higher flows to adequately oxygenate but cannot tolerate face masks for long periods. • May be used at lower flow rates in emergency situation where regular nasal prongs are not available.
Simple oxygen mask 	5-10 LPM	• Never use flow rates less than 5LPM to prevent re-breathing CO_2. • Not recommended for long term use or when changing levels of oxygen.
High concentration oxygen mask with reservoir 	Oxygen rate is set to ensure reservoir bag is at least 2/3 inflated during inspiration. Typically run at 10 LPM.	• Tubing color is clear. • Flow is adjusted to meet a target SpO_2. • Ensure nostrils are not blocked. • Effectiveness is decreased with deformity, secretions, silastic or NG tubes.

High Flow			
Concentration is precise and constant, regardless of the patient's breathing pattern.			
Device	**Concentration**	**Flow Meter Rate**	**Points of Interest**
Venturi device 	Available in: 24% (blue) 28% (yellow) 31% (white) 35% (green) 40% (pink) 50% (orange	 = 2 LPM = 4 LPM = 6 LPM = 8 LPM = 10 LPM = 12 LPM	• The minimum flow rate for a particular oxygen concentration is stamped on the bottom of each venturi adapter.
Cold nebulizer 	28%, 30%, 35%, 40%, 50%, 70%, or 100% The dial on the neck of the nebulizer controls O_2 concentration.	10-15 LPM	• Nebulizer unit attaches directly to oxygen flow meter. • Adjust the flow meter so that mist is visible exiting the mask during inspiration. • Adjust the oxygen concentration by turning the collar on the nebulizer. • At 50% or more, the flow delivered will be diluted by the patients inspiratory efforts lowering the effective FiO_2. • **Do not use for transport.**
High flow nebulizers 	60%, 65%, 75%, 85% or 96%. The dial on the neck of the nebulizer controls O_2 concentration.	Flow meter must be open all the way ("flush").	• Despite high concentrations on dial, the actual delivered oxygen concentration is less, but still greater than with a cold nebulizer. • **Do not use for transport.**
Heated humidified high flow oxygen (HHHFO) 	30-100%	10-60 LPM	• May be referred to as "Optiflow" or "Airvo" • Specialized training is required to use this device. • Indicated for patients with high oxygen requirements, high inspiratory flow demands, retained secretions, hypothermic core body temperature, poor compliance or tolerance of conventional oxygen delivery devices. • **Do not use for transport.**

Interfaces used with high flow devices	
These interfaces may be used with Venturi, cold nebulizer, high flow nebulizer or heated humidified high flow oxygen (HHHFO) systems.	
Interface	**Points of Interest**
Aerosol mask with or without tusks 	• 'Tusks' refer to pieces of corrugated respiratory tubing attached to the lateral ports of an oxygen mask. This modification is sometimes used in critically ill patients to increase the fraction of inspired oxygen (FiO_2) by reducing entrainment of room air.
Tracheostomy mask / collar 	• Can be used with a venturi device for short term application (i.e. patient transport).
Face tent 	• Used for patients who are claustrophobic, have burns to the face or have had facial/nasal surgery.

Note: There may be other oxygen delivery devices used at your site. Please contact Nursing or Respiratory Therapy for further details on a specific oxygen delivery device.

Section 9: Chart Review & Documentation

Chart Review

All Allied Health staff are expected to review the chart prior to initiating treatment. For Category 2 staff, if the flow rate of FiO2 (fraction of inspired oxygen) is outside the parameters provided by the Category 1 staff, they need to clarify the flow rate or FiO2 with the Category 1 staff.

Documentation Requirements

- Allied Health documentation must occur **at least once per rehabilitation visit** and must align with Connect Care standards.
- Assessment and documentation of oxygen administration must include:
  - Oxygen flow rate or FiO_2
  - Oxygen delivery device
  - Connection of the device to the oxygen source
- Any initiation or change in FiO_2 or flow rate must be documented.
- SpO_2 (where monitored), vital signs, and respiratory assessments (including respiratory rate and abnormal breathing patterns) must be recorded:
  - Before and 5-15 minutes after and FiO2 or flow rate change
  - When a patient's condition changes
  - Before and after transport for diagnostic or therapeutic procedures
  - After connection/reconnection to a portable oxygen system
  - Before and after any intervention that may affect oxygenation
- Depending on the zone, program and facility, documentation may occur on a flow sheet or a multi-disciplinary progress note. Documentation may be in the electronic medical record (Connect Care) or paper as per downtime procedures.

Timing of Documentation

Where the **patient's condition and response to treatment are <u>within</u> the expected parameters**, documentation should be completed as soon as possible and no later than the end of the shift. The actual time of treatment should be recorded within the note.

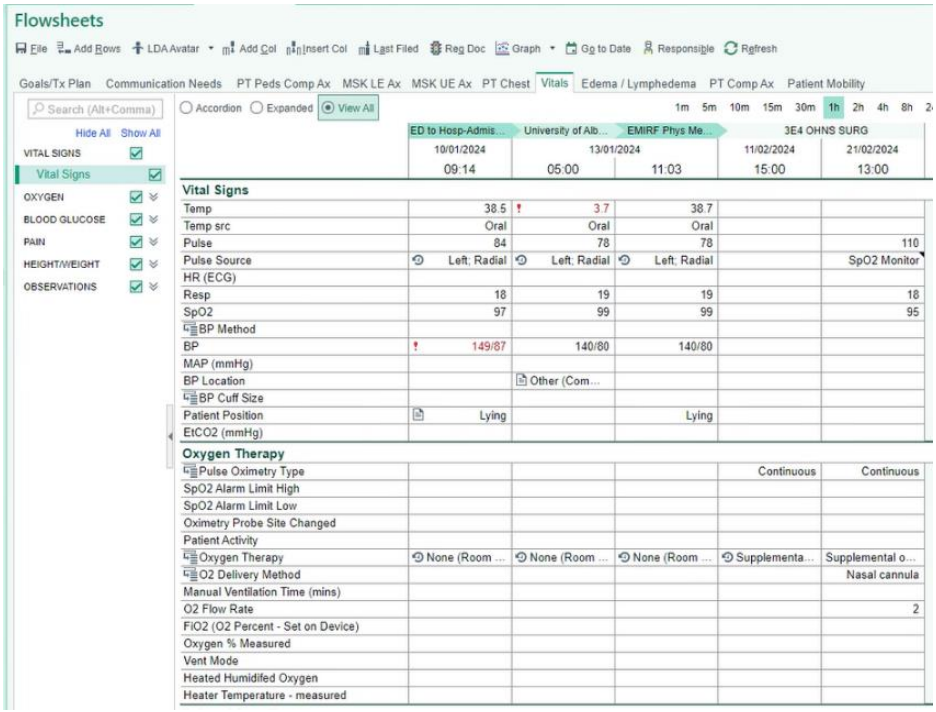
Where the **patient's condition and response to treatment are <u>outside</u> of the expected parameters**, documentation should occur as soon as possible - ideally immediately. Other healthcare providers must be informed as required.

Examples of Connect Care Documentation

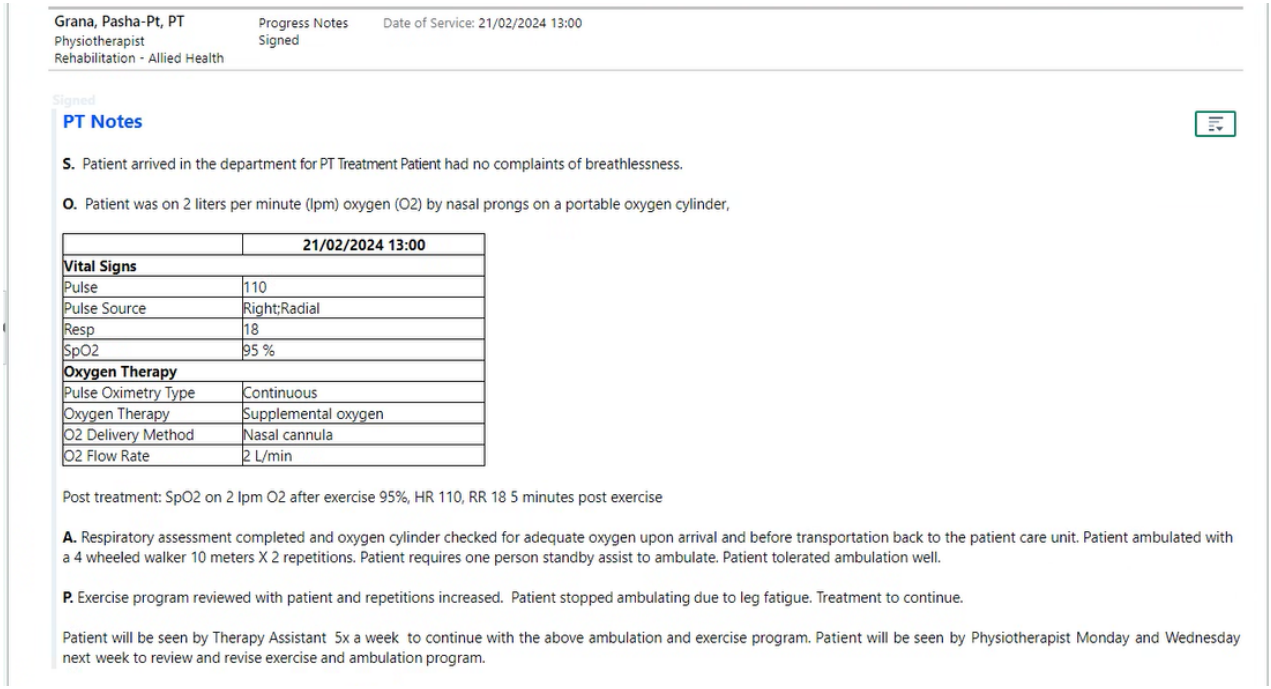
Vital signs documented in notes are not readily available to the interprofessional team. Therapists are encouraged to document these values on the Vital Signs Flowsheet.

Once vital signs are entered, clinicians should **immediately** document in the progress note. Delays may result in vital signs documented by others being incorporated into their note.

Vital Signs Flowsheet



Progress Note



Grana, Pasha-Pt, PT
Physiotherapist
Rehabilitation - Allied Health

Progress Notes
Signed

Date of Service: 21/02/2024 13:00

Signed

PT Notes

S. Patient arrived in the department for PT Treatment Patient had no complaints of breathlessness.

O. Patient was on 2 liters per minute (lpm) oxygen (O2) by nasal prongs on a portable oxygen cylinder,

	21/02/2024 13:00
Vital Signs	
Pulse	110
Pulse Source	Right;Radial
Resp	18
SpO2	95 %
Oxygen Therapy	
Pulse Oximetry Type	Continuous
Oxygen Therapy	Supplemental oxygen
O2 Delivery Method	Nasal cannula
O2 Flow Rate	2 L/min

Post treatment: SpO2 on 2 lpm O2 after exercise 95%, HR 110, RR 18 5 minutes post exercise

A. Respiratory assessment completed and oxygen cylinder checked for adequate oxygen upon arrival and before transportation back to the patient care unit. Patient ambulated with a 4 wheeled walker 10 meters X 2 repetitions. Patient requires one person standby assist to ambulate. Patient tolerated ambulation well.

P. Exercise program reviewed with patient and repetitions increased. Patient stopped ambulating due to leg fatigue. Treatment to continue.

Patient will be seen by Therapy Assistant 5x a week to continue with the above ambulation and exercise program. Patient will be seen by Physiotherapist Monday and Wednesday next week to review and revise exercise and ambulation program.

Section 10: Allied Health Emergency Response

Allied Health Emergency Response

Calling for Medical Assistance is required for any of the following:

- Any patient you are seriously worried about
- Signs of respiratory instability (see Section 3)
- Acute Change in O_2 Sats less than 90 despite O_2 greater than 5LPM
- Heart rate less than 40 or greater than 140
- Systolic blood pressure less than 90 or greater than 200 or acute drop in systolic blood pressure
- Sudden decrease in level of consciousness or Glasgow Coma Scale (GCS) drops greater than 2 points
- Seizures

In cases of acute respiratory distress, Category 1 and 2 staff may initiate oxygen or increase the flow of oxygen while awaiting further medical direction, unless the patient's oxygen order explicitly prohibits such action.

Calling for Medical Assistance

The process of calling for assistance will vary depending on your area of practice. For example, in acute care environments, a Code Blue may be initiated for any person experiencing acute physiological compromise, airway threat, respiratory and/or cardiac arrest. In the community, clinicians would need to call 911 to seek emergency assistance.

Please refer to your site-specific emergency response guidelines for more information.

Goals of Care Documentation

Staff must be aware of the patient's Goals of Care Designation (GCD) at all times, especially when working away from the patient care unit.

- GCDs are documented in the patient's chart and serve as the source of truth while on hospital property
- The green sleeve (where available) is the universally identified container for Goals of Care documentation in the community.

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Appendix A: Portable Cylinders

New All-In-One Portable Oxygen Cylinder

Praxair Vantage Grab'nGo

Never search for a cylinder regulator again!

Never worry about removing or attaching a cylinder regulator again!

No cylinder wrench?
No problem, you won't need one!

Available flow rates of **0.5 to 25 LPM**. Other flow rates available with respiratory or physician consult.

How to Use the Grab'nGo Portable Oxygen Cylinder:

- Ensure adequate amount of oxygen (check pressure gauge)
- Attach O_2 tubing to outlet port
- Turn flow-adjusting knob to desired flow setting
- Verify flow at the patient's end of the tubing before applying on patient
- When patient is returned to wall oxygen, ensure flow-adjusting knob is turned to the "OFF" position

Flow Rates Available on the Grab'nGo (Litres Per Minute)

0.5	1.0	1.5	2.0	3.0	4.0	6.0	8.0	15	25

E-Size Oxygen Cylinder Duration Chart (in Minutes)

	Cylinder Pressure (PSI)									
Flow (LPM)	2200	2000	1800	1600	1400	1200	1000	800	600	500
0.5	1066	941	815	690	565	439	314	188	63	0
1	533	470	408	345	282	220	157	94	31	0
1.5	355	314	272	230	188	146	105	63	21	0
2	267	235	204	172	141	110	78	47	16	0
3	178	157	136	115	94	73	52	31	10	0
4	133	118	102	86	71	55	39	24	8	0
6	89	78	68	57	47	37	26	16	5	0
8	67	59	51	43	35	27	20	12	4	0
15	36	31	27	23	19	15	10	6	2	0
25	21	19	16	14	11	9	6	4	1	0

NEVER attach an oxygen connector (Christmas tree) to the Auxiliary Port!

When you first use the Grab'nGo, tear off the lower section of the label to indicate the cylinder is now in use. Once the tank reaches 500 psi, tear off the IN USE section of the label to indicate that the tank is now empty.

Appendix B: Oxygen Cylinder Regulators

How to attach a regulator to an oxygen cylinder

- Identify the oxygen cylinder.
- Check that the label says "USP MEDICAL OXYGEN".
- If the cylinder has not been used before it will have a green tab covering a seal around the outlet.
- Remove the tab by pulling it sharply forward and one green seal should remain around the outlet.

- Place the wrench on the cylinder valve and turn it counter-clockwise just enough (usually less than 45 degrees) to allow gas to escape for less than 1 second and then close the valve before attaching the regulator. This is done to expel foreign material from the outlet port of the valve.
- If the cylinder is already in use, only **one** green seal should be present. Remove any other seals including any seals attached to the regulator.
- The regulator has two pins on it.
- The cylinder post has two matching holes.
- Place the regulator over the stem of the cylinder and line up the pins with the holes.
- Hand tighten the handle of the regulator as much as you can to get a good seal, but don't use a wrench.

To turn cylinder on

- Place the wrench on the cylinder valve and turn it counter-clockwise until it is fully open, then back it off ¼ turn.
- Observe the cylinder pressure gauge. A full cylinder will read about 2200 psi.
- Check the cylinder duration chart to ensure that there is enough oxygen to last as long as you require (see below).

Duration chart for compressed gas portable oxygen cylinders
calculation assumes that cylinder is empty 500 psi

Set Flow	2200psi (full)	1600psi (3/4 full)	1100 psi (1/2 full)
2 LPM	4 hours	2 hours 30 min.	1 hour 25 min
3 LPM	2 hours 50 min	1 hour 45 min.	56 min.
4 LPM	2 hours	1 hour 15 min.	42 min.
5 LPM	1 hour 30 min.	1 hour	34 min.
6 LPM	1 hour 20 min.	51 min.	28 min.
7 LPM	1 hour 10 min.	44 min.	24 min.
8 LPM	1 hour	39 min.	21 min.
9 LPM	53 min.	34 min.	19 min.
10 LPM	48 min	31 min.	17 min.
11 LPM	43 min.	28 min.	15min.
12 LPM	40 min.	26 min.	14 min.
13 LPM	37 min.	24 min.	13 min.
14 LPM	34 min.	22 min.	12 min.
15 LPM	32 min.	21 min.	11 min.

- Turn the handle to obtain the desired flow rate.

To turn cylinder off

- Place wrench on cylinder valve and turn clockwise until off.
- When the needle in the pressure gauge is at zero, ball in flow litre gauge will fall to zero. Turn flow litre control knob to off.
- Tear off the lower section of the label to indicate that the cylinder is "IN USE".

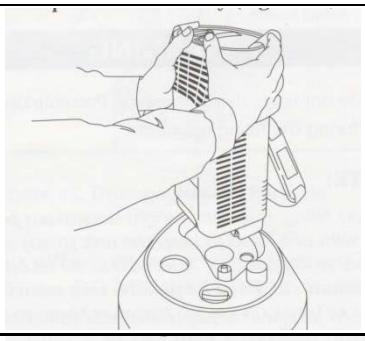
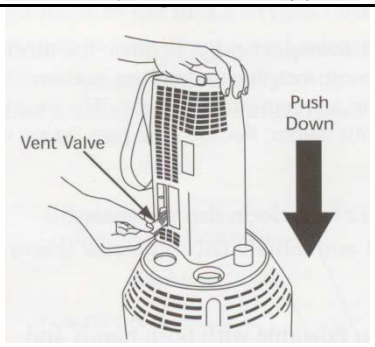
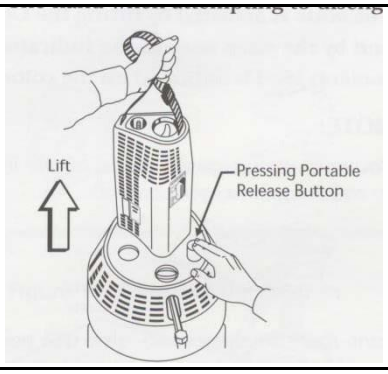
- A cylinder should be changed when the pressure gauge reaches 500 psi and enters the 'red zone'. To indicate the cylinder is "EMPTY", tear off the remaining section of the label.

Cylinders should be stored upright, secured in a stand or lying horizontally (DO NOT store under the Total Care beds).

Reference: Airgas Product and Service Information Manual.
FDA and NIOSH Public Health Notification: Oxygen regulator Fires Resulting from incorrect use of CGA 870 Seals April 24 2006.

Appendix C: Filling Liquid Oxygen Tanks

*Thermal gloves and eye protection should be used while filling portable liquid oxygen units.

1. Clean and dry the fill connectors on both the stationary and portable units to prevent freezing. Hold the portable unit with both hands and position the contoured case over the matching recessed area on top of the stationary reservoir. Ensure that the fill connectors are properly engaged. Place one hand on top of the portable, directly over the fill connector and press straight down. The portable will lower a further 10 mm into place.	
2. While still holding the portable down in the fill position, open the side vent valve. A loud hissing sound will occur. This will continue until the valve is closed. Filling the portable completely should not take longer than two minutes. An irregular hissing sound will occur when the unit is full. You may also note that there is a white cloud of liquid oxygen around the reservoir. Close the valve when this occurs as the unit is full.	
3. Disengage the portable from the stationary reservoir by holding the carrying strap above the unit and depressing the release button. Place portable unit upright on the floor. There will be some 'steam' at the bottom of the portable unit – this is normal. To weigh contents: with one hand, grasp the strap closest to the contents indicator, about six inches from portable. The needle will move into the green area on the content indicator. Repeat 3 times for an average reading.	

- Ensure the portable unit is fully seated on the reservoir and hold firmly while filling.
- If the unit sounds like it's filling but the hissing fades within a minute, it wasn't properly connected. Reconnect and try again.
- A hissing sound after filling is normal—excess pressure is being released.
- If the portable is leaking, it will vent immediately.
- The portable unit may make a 'honk' sound if knocked over or picked up suddenly. If the 'honking' continues after being placed upright, the unit may be faulty and should not be used. If the unit is found lying down and is not 'honking', send the tank for maintenance as per site protocol.