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Guidance for Oropharyngeal Suction of a Child or Young Adult



Association of Paediatric Chartered
Physiotherapists
Respiratory Committee

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Guidance for Oropharyngeal Suction of a Child or Young Adult

Throughout this guidance the term child/children can be taken to represent child/young person/young adult (term baby to 19 years old).

Introduction

This guidance has been produced by the ACP Respiratory Committee to provide healthcare professionals with an evidence-based guide to promote safe and effective oropharyngeal (OP) suction.

Suctioning is defined as “a procedure used to remove substances from the trachea, pharynx, nose, or mouth either through a natural orifice (nose or mouth) or artificial tubing (endotracheal tube, tracheostomy tube, nasal or oral airway)” (Overend et al. 2009, p6). The focus of this guidance is suctioning through an *oropharyngeal* orifice for children and young people from term gestation through to 19 years of age. For additional guidance on suctioning via the nasal-pharyngeal orifice, please see nasopharyngeal (NP) suction guidance, previously developed by the ACP Respiratory Committee ([ACPC 2020](#)).

Suctioning is a procedure used in children along the continuum of their care, from intensive care to the community setting. This guidance is suitable for all settings but will identify context-specific factors to consider when undertaking this procedure. The guidance can be easily adapted for use with carers and trained family members. It is intended that this guidance is used as a template; additions may be required to fit in with local policies.

To inform this guidance, the committee undertook a detailed literature search using primary and secondary searches in Medline and CINAHL. No high-quality research or literature reviews were found to inform the overall safest and most effective oropharyngeal suction method. Therefore, the following guidance has been informed by research from elements of similar practice (e.g., suction via artificial airway), supported by clinical expert consensus reached by the ACP Respiratory Committee. The evidence search was considered up to date as of October 2022 and the document is due for review in October 2025

Background

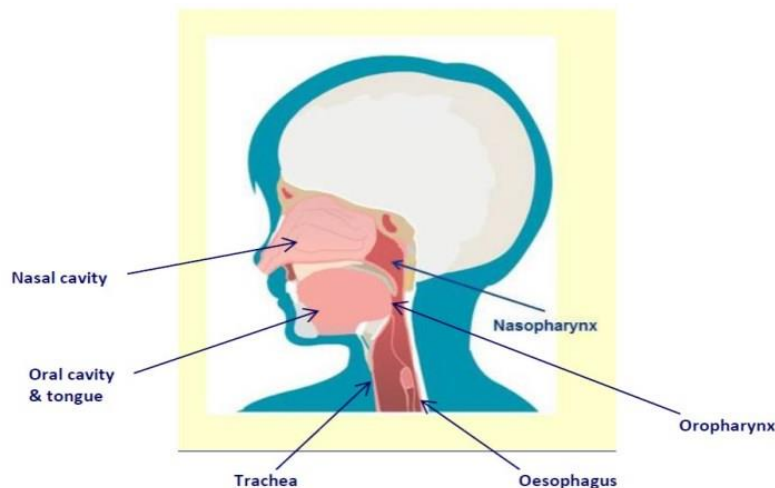
The aim of airway suctioning is to remove excessive secretions to facilitate a patent airway, improve ventilation and oxygenation, and reduce work of breathing (WOB). However, suctioning is an invasive procedure and adverse physiological effects can occur. These effects can be both immediate and long term; therefore, a sound knowledge of the procedure is required to minimise risk and maximise efficacy

(Moore, 2003; Trigg and Mohammed, 2010; Royal Liverpool Children’s NHS Trust, 2018; Mallet and Dougherty, 2000).

The procedure of airway suctioning is a common practice in the treatment of children with a variety of conditions. It is undertaken to remove excessive or retained secretions from a child’s respiratory tract. This could be due to:

- Respiratory dysfunction/disease, causing an alteration in the type or quantity of secretions or disruption of the normal mucociliary clearance process
- Neurological disorders which inhibit or depress normal cough reflex
- An artificial airway (i.e., endotracheal tube or tracheostomy tube) in situ (suctioning via an artificial airway is not covered in this guideline, except a nasopharyngeal airway)

The general principles of suctioning are the same, whether the child requires suction of the mouth, pharynx or via an artificial airway (Glass and Grapp, 1995; Knox, 2011). However, nasal and oral suctioning procedures need addressing separately due to differences in indication for use, technique, and associated risk. Figure 1 details normal airway anatomy.



There are 5 main types of airway suctioning. Table 1 sets out the definitions of each type for the purposes of this document.

Suction Type	Definition
Nasal	suction of visible/audible secretions in the nasal cavity
Oral	suction of visible/audible secretions in the oral cavity
Nasopharyngeal	suction to stimulate a cough and clear secretions in the pharynx/trachea via the nasal cavity.
Oropharyngeal	suction to stimulate a cough and clear secretions in the pharynx/trachea via the oral cavity

Artificial airway (e.g. ventilator or tracheostomy)	suction via a tracheostomy to clear secretions from the lower airway
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Table 1

Indications for Oropharyngeal Suctioning

Suctioning is a potentially hazardous procedure and should only be performed when there are clear indications that excessive lower or upper airway secretions are affecting the patency of the child's airway or the effective ventilation of the patient. (Hough, 2014; AARC, 2004). It is an essential procedure which is determined by the child's clinical condition and not predetermined intervals. The frequency of suctioning should be assessed for each child on an individual basis and should only be carried out when the child is unable to clear their own airway effectively. It should not be performed as a matter of routine (Edwards, 2019).

An appropriate assessment must be undertaken to establish the need for suction. Evidence of retained secretions will be shown by one or more of the following:

- Visible, audible or palpable secretions.
- Decreased oxygen saturation levels (most likely due to retained secretions)
- Increased oxygen requirements (most likely due to retained secretions)
- Poor cough/inability to generate effective spontaneous cough
- Reduced movement / breath sounds of the chest
- Signs of distress due to retained secretions i.e. increased WOB (nasal flaring/tracheal tug/costal recession), increased respiratory rate, tachycardia or bradycardia, change of colour. (Moore, 2003; Mallet and Dougherty, 2000; AARC, 2004)

Oropharyngeal suction is indicated when there is evidence of retained secretions, but the child is not able to clear the secretions independently and secretions are too low down in the airway for oral or nasal suction only.

Choosing between OP and NP suction will be clinician dependent and should be based on individually assessed tolerance, effectiveness and contra-indications/precautions.

Contra-indications of Oropharyngeal Suctioning

(In some acute situations, such as trauma or acute hypoxia due to sputum plugging, OP suction may be indicated with discussions with medical team)

- Unexplained haemoptysis (the coughing up of blood from the lungs or bronchi)
- Laryngospasm (stridor)

- Bronchospasm
- Recent oesophageal or tracheal anastomosis (the joining of the branches of two blood vessels) and other forms of tracheobronchial trauma
- Unexplained nasal or oral bleeding
- Severe hypoxaemia/hypoxia
- Raised intracranial pressure
- Acute hypo or hypertension
- Severe clotting disorders
- Gag reflex present (unless NP not appropriate)

Precautions

Significant caution should be taken, and other safer options considered before undertaking oropharyngeal suction

- Loose teeth
- Recent oral surgery
- Bite reflex
- Avoid suction soon after feeds if possible (ideally an hour after)
- Uncontrolled seizures

In an emergency, where risk to a child or young person is critical, suction could be considered despite these precautions and contra-indications only if within the scope of that person's safe clinical reasoning and practice (Mallet and Dougherty, 2000; AARC, 2004).

Consent

This must be obtained prior to this procedure being carried out. If the child is unable to give consent verbally, other ways of obtaining it must be explored. For example: blinking, squeezing of the hand.

If the child is unable to give any form of consent and not carrying out the procedure would be detrimental to their health, it is acceptable to proceed with parental/ carer consent, providing the person performing the procedure is not aware of any documented evidence that the client has refused the procedure should the need arise.

Guidance – For patients who may not be competent to give informed consent, for example unconscious patients, some children, patients with severe mental health problems, confusion and/or severe learning difficulties, consent is obtained whenever possible from parents, guardians, carers or others with designated legal authority to act on the patient's behalf

Brief guide- capacity and competence to consent in under 18s

Verbal information given to children prior to consent to suctioning procedures

- Reason for the selected suctioning procedure
- Explanation of the equipment involved
- Explanation of the practical procedure proposed
- Explanation of any techniques used in conjunction with the suctioning procedure e.g., postural drainage, vibrations etc
- Discussion of relevant precautions/contraindications
- Explanation of cleaning and equipment maintenance (may not need to be discussed before obtaining consent but will be covered by the end of the first treatment session, see individual procedures)
- Informed consent will be obtained in initial assessment

Important! - The child should be made aware that they have a right to withdraw their consent *at any point* during the treatment.

- Consent and the way it has been obtained should be documented within the child's suction record (Appendix A).

Equipment

- a. Personal protective equipment, which may include apron, goggles or visor shield, depending on the setting and the risk of contamination and your local PPE guidelines.
- b. Gloves: It is common practice to wear a non-sterile glove on the dominant hand for oropharyngeal suction, following your local infection control policy. However, gloves do not replace the need for handwashing. Hands should be washed before and after the procedure in line with location infection control policy (Parker, 1999).
- c. An adequate supply of sterile suction catheters of the correct size and type:
 - Sizing: consider size of child and thickness of secretions
 - Multi-eyed catheters (Fiorentini, 1992)
 - It is preferable to use suction catheters with graduations and integrated valve for vacuum control.
 - Selected suction catheter size should be documented in the child's suction record (Appendix A).
- d. Have Yankeur suction on hand if appropriate for if the child has a strong cough and clears thick secretions past the suction catheter into the oral cavity
- e. Suction unit with variable vacuum control
 - A vacuum pump with filter and clean tubing. Check the charge by switching it on and looking for charge levels.

- Look at the machine to ensure all parts of the equipment are clean and intact.
 - Check a charger is available.
 - Set age-appropriate suction pressure (see table 2) and check the pressure by switching the machine on; bend the tubing from the machine to the catheter to cut off air from the machine/ or place a finger over the end of the suction tubing -this will show the maximum pressure the machine can give.
- f. Tap water for flushing
 - g. Bag for waste
 - h. Pulse oximeter if available and appropriate to use
 - i. Oxygen concentrator or cylinder (if indicated and available to use)

Pre-oxygenation indications / post-oxygen indications

Suctioning removes oxygen from the airways and in some cases, can cause hypoxia. Pre-oxygenation and/or post-oxygenation can minimise this risk but the need for this should be assessed on an individual basis in line with hospital / community policy and documented within the child's suction record (Appendix A).

Children particularly at risk of hypoxia because of suctioning include those who:

- require oxygen therapy
- have previously demonstrated desaturations during suctioning as confirmed by pulse oximetry
- Are considered young children, infants and babies
- have impaired respiratory or cardiac function

(Knox, 1993; NHS Quality Improvement Scotland, 2008).

NB: If following clinical assessment suction is deemed to be indicated on an ongoing basis and oxygen is required, it will be necessary to liaise with the child's GP, community paediatrician or respiratory hospital consultant about oxygen provision if this isn't already available.

Oropharyngeal suction pressure guide

Table 2 summarises the recommended ranges for sub-atmospheric (negative) pressure applied in oropharyngeal suction.

Age	Suction pressure	
	mmHg	kPa
Neonates	60-80	8-10
0-3 years	75-90	10-12
3-13 years	90-150	12-20
13 years +	100-150	13-20

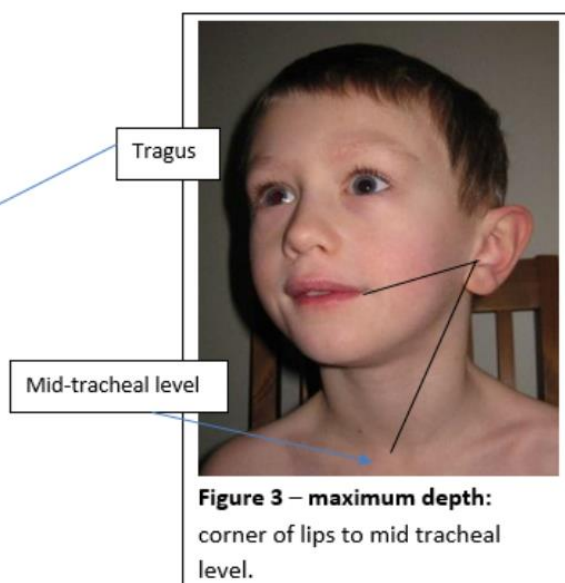
Table 2 (Mallet and Dougherty, 2000)

It is important that the lowest pressure of suction which is effective in clearing secretions is used. If secretions are not clearing with the above pressures, sound clinical reasoning may indicate higher pressures can be used. However, this will require additional risk assessment with the child's multi-disciplinary team (Morrow and Argent, 2008; Mallet and Dougherty, 2000).

Consideration should also be given to secretion mobilisation and other clearance techniques with, or without the addition of mucolytics if within the child's care plan. This can be advised by the multidisciplinary team. Secretion mobilisation and other chest clearance techniques can be performed at the same time as suctioning to increase the effectiveness of suction. These techniques must only be performed by those that have been taught by and signed off as competent (Shepherd, 2019).

Measurement of Oropharyngeal suction

Minimum depth: aim to go beyond the base of the tongue – estimated externally before procedure by measuring from the corner of the mouth to the tragus with the child facing forward.



Optimum depth/range: Child specific and usually where the cough is stimulated (unless the child is desensitised). The optimum depth or range should be recorded the in the child's suction record (Appendix A).

Protocol

	Procedure		Rationale/Evidence
1.	<p>Assess the need for oro-pharyngeal suction (see indications in guidance section):</p> <ul style="list-style-type: none"> Whenever possible the child should be encouraged to clear their airway by coughing or other clearance techniques. If the child can clear their secretions independently, do not use suction. Suction should not be carried out as a matter of routine, only when there is evidence of retained secretions. 	1.	<p>Suction is an invasive and potentially dangerous procedure which may be traumatic to the child. It should therefore be used with care and thorough assessment and when less invasive procedures are ineffective (Thompson, 2000; Moore, 2003; Trigg and Mohammed, 2010).</p> <p>The major concerns are the possibility of:</p> <ul style="list-style-type: none"> Respiratory distress Hypoxia Vomiting and risk of aspiration Tracheobronchial trauma and granulation or ulcer formation Pneumothorax in infants Raised intracranial pressure or arrhythmias if carina touched Intraventricular haemorrhages in premature infants Hypo- or hypertension <p>(Trigg and Mohammed, 2010; Mallet and Dougherty, 2000; AARC, 2004)</p>
2.	<p>Check all equipment is available and in working order.</p> <p>NB: Safety goggles and other personal protective equipment as appropriate are advised if there is a risk of contamination to the person who is undertaking the procedure.</p>	2.	<p>Suction equipment needs to be prepared and ready to use.</p> <p>To maintain the safety of the person undertaking the procedure (AARC, 2004; Mallet and Dougherty, 2000).</p>
3.	<p>Explain and discuss the procedure with the child and family if possible. Gain consent (see guidance above).</p>	3.	<p>To ensure understanding and consent is given and to encourage cooperation and/or reduce anxiety (CSP, 2016).</p>

4.	<p>Assessment</p> <p>Observe the child's respiratory status and baseline values e.g., heart rate, blood pressure, work of breathing, colour and auscultation.</p> <p>Note the child's normal and accepted level of oxygen saturation level pre-suction.</p> <p>SpO2 monitoring, if available and appropriate, should be in place throughout suctioning and until the child is settled post suctioning.</p>	4.	<p>To enable assessment of the effectiveness of treatment. Maintain child's safety.</p> <p>(AARC, 2004)</p>
5.	<p>Prepare the child for the procedure. Position the child:</p> <ul style="list-style-type: none"> • If able, position the child on their side in full side lying, with their head turned to the side. • If possible, elevate the head of the bed • Assistance of a second person may be helpful to position/support the child. • For planned suction events, pause feeds and wait 30 minutes post pause/meal. This may not be possible in an emergency, but feed should be paused during suction where possible • 	5.	<p>This side lying position is the preferred and safer position to reduce the risk of aspiration. It also prevents the child's tongue from obstructing their airway.</p> <p>Pausing feeds/ suction after meals for 30 minutes minimises reflux and risk of aspiration</p> <p>(Trigg and Mohammed, 2010; AARC 2004; Mallet and Dougherty, 2000)</p>
6.	<p>Wash hands using soap and water. Dry hands thoroughly.</p>	6.	<p>Reduces transmission of micro-organisms (WHO 2019).</p>
7.	<p>Choose an appropriately sized, graduated suction catheter, with side port suction control:</p> <ul style="list-style-type: none"> • size of the suction catheter should be half the diameter of the smallest nostril • depth of suction – see <u>measurement of oro-pharyngeal suction in guidance.</u> <p>All details should be recorded in the care plan.</p>	7.	<p>Suction can cause mucosal trauma and arrhythmias (abnormal heart rhythm) (Mallet and Dougherty, 2000).</p> <p>Measured suction depth with multi eye catheters cause less trauma and arrhythmias (Mallet and Dougherty, 2000).</p>

8.	<p>Switch on the suction machine. With a gloved hand, test the suction equipment by placing the thumb over the end of the suction tubing for 5-10 seconds.</p> <p>Observe the pressure on the manometer of the suction machine and adjust as required:</p>	8.	<p>There is a risk of atelectasis (partial lung collapse) and hypoxia if the suction pressure is too high (Carrol, 1989; Glass and Grap, 1995; Trigg and Mohammed, 2010).</p> <p>Appropriate suction pressure can minimise the risk of atelectasis and hypoxia (Edwards, 2019; AARC, 2004).</p>
9.	<p>Attach a suction catheter to the suction tubing:</p> <ul style="list-style-type: none"> • peel back the catheter to expose the hard plastic connector. • leave the rest of the catheter in the protective cover. 	9.	<p>To ensure sterility of the suction catheter (AARC, 2004).</p>
10.	<p>Put a clean glove on your dominant hand. Do not touch anything EXCEPT the sterile part of the catheter.</p>	10.	<p>To maintain a clean technique (AARC, 2004; Edwards, 2019). This gloved hand will be used to insert the sterile catheter mouth or artificial airway.</p>
11.	<p>Remove the suction catheter with your gloved hand.</p>	11.	<p>To maintain a clean technique (AARC, 2004)</p>
12.	<p>Hold the end of the suction catheter with your gloved hand, and the plastic connector with your non-gloved hand</p>	12.	<p>To maintain a clean technique (AARC, 2004)</p>
13.	<p>Check the child's observations and breathing pattern immediately prior to inserting the suction catheter.</p>	13.	<p>To enable early recognition of any potential complications. To maintain the child's safety (AARC, 2004)</p>
14	<p>If the child is receiving oxygen, increase the oxygen flow rate for 1 minute. If the child is not receiving oxygen, consider giving oxygen prior to the procedure or have an oxygen cylinder close at hand if needed in an emergency.</p>	14.	<p>To prevent hypoxia (AARC, 2004). Other child specific preoxygenation protocols may be appropriate</p>

<p>15.</p>	<p>With no suction pressure applied insert the suction catheter. If resistance is felt <u>DO NOT FORCE THE SUCTION CATHETER</u>, pull back and gently re-insert the suction catheter.</p> <p>NB: The maximum depth of insertion of the catheter should be monitored according to the assessed catheter length. A yankeur may be used to clear (thick) secretions which are present in the patient’s mouth.</p>	<p>15.</p>	<p>Pushing against resistance may cause trauma to the airways or indication incorrect positioning of the catheter</p> <p>Applying suction pressure during insertion may increase the risk of hypoxia</p>
<p>16.</p>	<p>At the desired depth apply constant suction for around 2 seconds (depending on the child), then withdraw the suction catheter slowly.</p> <p>Suctioning should be quick and effective i.e., 5-10 seconds for infants and 15 seconds for older children. The procedure should take no longer than 15-20 seconds. The person suctioning must use their judgement to assess if a child can only tolerate shorter duration of suction based on their clinical symptoms.</p> <p>Do not rotate, stir or trombone (repeatedly move the catheter in and out a short distance whilst in the airway) the catheter.</p>	<p>16.</p>	<p>To allow optimal secretion clearance and reduce the need for a second attempt (Hough, 2014; Mallet and Dougherty, 2000). If the technique is too quick, there is a risk that not all the secretions will be cleared.</p> <p>If it is too slow the child may become breathless and develop hypoxia. Prolonged suctioning or repeated insertion of the suction catheter may produce vagal stimulation, which can cause profound bradycardia (AARC, 2004)</p> <p>To prevent tissue damage and to enhance the child’s comfort (Edwards, 2019)</p>
<p>17.</p>	<p>Monitor the child during and after the procedure using pre-suction baseline observations as a guideline.</p> <p>NB: If the child deteriorates during the procedure, stop suction immediately and reassess.</p>	<p>17.</p>	<p>To assess the safety and efficacy of the procedure and the child’s wellbeing</p>
<p>18.</p>	<p>Assess the need for further suction.</p> <p>NB: Allow 20-30 seconds before reinserting a new suction catheter unless clinically unsafe to do so (e.g., excessive secretions compromising airway).</p>	<p>18.</p>	<p>To evaluate the effectiveness of suction and to determine if the procedure needs repeating.</p> <p>Allows for re-oxygenation (Edwards, 2019)</p>

<p>19.</p>	<p>Each suction catheter should only be used for one episode of suction. There is no limitation on how many times the child is suctioned; it is decided on clinical need.</p> <p>Signs of Successful Suctioning</p> <ul style="list-style-type: none"> • Child appears more comfortable • Respiratory status is normal • Observations have returned to the baseline values • Removal of pulmonary secretions • Improved oxygenation, saturations and/or colour • Improved breath sounds and/or chest movement • Auscultation may be used if trained in the skill • Audible secretions have gone 	<p>19.</p>	<p>To minimise the risk of infection to the child and person performing the procedure (Glass and Grap, 1995; AARC, 2004; Scobie et al 2001; Mallet and Dougherty, 2000)</p> <p>Guidance on frequency of use of suction catheters may differ with local policy. Some policies will allow that a catheter can be reused if a repeat suction is required and has not touched any surface other than the child's airway. A suction catheter should never be reinserted in the packaging and reused.</p>
<p>20.</p>	<p>Once fully withdrawn, discard the suction catheter by wrapping it around the gloved hand, disconnect from the suction tubing and pull the glove off, inside out, so that the suction catheter is enveloped in the glove.</p>	<p>20.</p>	<p>Safe disposal of equipment and prevention of cross infection (AARC 2004)</p>
<p>21.</p>	<p>Flush the suction tubing with water (from the container)</p> <p>NB: The container of water must be washed in hot soapy water, rinsed thoroughly, dried and re-filled with tap water.</p> <p>Turn off the suction machine.</p>	<p>21.</p>	<p>To prevent growth of micro-organisms. Secretions left in the suction tubing may decrease suction and provide an environment for growth of micro-organisms.</p> <p>In community setting advice is tap water as more practical for parents/ carers and soon as you put the tubing in the water it is no longer sterile, the container itself is not advised to be sterilised and after flushing the tubing is left in a none sterile environment (AARC, 2004).</p>
<p>22.</p>	<p>Wean down the oxygen to the prescribed amount, to maintain oxygen saturations within normal limits for the child (if applicable).</p>	<p>22.</p>	<p>Normal oxygen delivery should resume after the procedure (AARC, 2004)</p>

23.	Ensure the suction machine is clean with suction equipment nearby ready for the next treatment with suction.	23.	To maintain the child's safety (Knox, 2011; Edwards, 2019) To ensure sterility of the suction catheter (Edwards, 2019)
25.	Wash hands using soap and water. Dry hands thoroughly.	25.	Reduces transmission of micro-organisms (WHO, 2019)
26.	Ensure the child has recovered from the procedure and he/she is left in a comfortable position.	26.	Promotes comfort and reduces anxiety. To influence future suction practice (Knox 1993)

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World Health Organisation: 5 moments of clean hands
<https://www.who.int/qpsc/5may/background/5moments/en/> Last accessed 23rd October 2019

Appendix A

Suction Record Sheet

Patient Name	DOB & Age	NHS No

Date completed:

Procedure explained:

Consent gained:

Contra-indications /precautions:

Equipment fit for purpose:

Patient specific (e.g., best position, best nostril):

Modifications (e.g., increase size of catheter if secretions too thick, use of lubricant):

Suction Procedure:

Catheter Size		
Catheter Type		
Optimum and Maximum Depth		
Suction Pressure <i>Dependent on Age</i>		
Observations and use of oxygen if required	Pre:	Post:
Target Saturations (if monitored)		

Name of Clinician:

Job Role:

Signature: