Model of Care for Complex Home Mechanical Ventilation

APPENDICES

ISSN 2040-2023: British Thoracic Society Reports, Vol 15, Issue 8, 2024
BTS Model of Care for Complex Home Mechanical Ventilation- Appendices

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BTS Model of Care for Complex Home Ventilation: Appendices

These appendices contain examples of documents that are currently used by NHS organisations in the delivery of Complex Home Ventilation. They have been included to support implementation and should be adapted to local requirements before being used.

1. **Appendix 1:** NHS Payment Scheme
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20. **Appendix 14g**: Dislodged tracheostomy tube (emergency algorithm b)

Appendix 1

NHS Payment Scheme

The payment scheme, understood as the tariff, has a variety of aspects that should be captured to record the activity and provide a source of income for the ventilation service. Both the mechanisms of payment and the actual tariff change regularly hence this information is included as an appendix. Up to date tariffs tend to come into force each April but the ones below reflect a mid year uplift for the pay settlements. The actual income does vary slightly from that below as there is a local factor that is applied, the market forces factor (MFF), that is provider specific, but the changes produced tend to be small.

During the course of a patient's journey they will probably attend medical and physiology clinics and also different environments for the initiation and / or follow up post initiation of ventilation. While the latter can be captured as a formal medical or nursing attendance it is appropriate for this activity to be captured under a procedure code, E85.2 'ventilation not otherwise specified'.

Ensuring coding departments are informed of the activity is important and this can be captured by using the correct OPCS code on clinic attendance / booking forms or via electronic booking systems for those with electronic patient records, together with a formal letter to primary care. Discussing this with the directorate management team and coding departments is essential to ensure the information is captured correctly.

For patients attending clinic being assessed or monitored *prior* to receiving NIV the respiratory medicine Treatment Function Code (TFC) 340 should be used, either as a new or follow up patient, currently:

Tariff for 340 is £249 or £111 for a new or follow up attendance respectively.

If the patient undergoes pulmonary function tests (eg erect and supine spirometry, tests of muscle function, blood gases etc) in the physiology department these should be booked into a physiology clinic which has a different treatment function code of 341 'respiratory physiology service' and as this is a different service (ie different TFC), it can generate a separate tariff, currently:

Tariff for 341 is £189 or £88 for a new or follow up attendance respectively.

Once it is determined that a patient needs to start ventilatory support, this can be done within a ward setting where there will be a formal admission but there is an increasing move to initiation in a non-ward setting. Under these circumstances the patient should be booked as a day case, reflecting the resources required. Using the OPCS code of E85.2 'ventilation not otherwise specified'. This code in a day case setting maps to health resource group (HRG) DZ37 that has a mandatory tariff of £534.

For patients who are already established on NIV but are seen in a clinic setting then the same code of E85.2 should be used in the OPD setting that has a mandatory tariff £168.

For the pulmonary function, day case initiation and follow up when on ventilation the patient needs to be booked onto the correct appointment.

Appendix 2 Consumables for tracheostomy invasive ventilated patients

ITEM	WHO TO ORDER	ORDER SYSTEM	PRODUCT CODES / SYSTEM CODES	FREQUENCY OF CHANGE	MONTHLY ORDER
AIRWAY					
Tracheostomy Tube	CHC / NRS	NHS supply chain (NHS SC)	TBC by hospital discharge team	TBC but usually monthly	1 per month
Tracheostomy inner cannulas	CHC / NRS	NHS SC	TBC by hospital discharge team	Monthly / PRN	TBC
Heat-moisture exchanger (HME) for self-ventilating tracheostomy tube. 	ATOS care – order direct once patient is registered. All products are on prescription so the GP will be charged. Therefore, orders can be placed by care agency / patient / family member	1. NHS SC 2. ATOS care 3. ATOS care 4. ATOS care ATOS care – order direct once patient is registered. All products are on prescription so the GP will be charged.	1. Portex Thermovent PC: 100/570/022 NHS code: FTC242 – pack 50 2. Freevent Xtracare PC: 7768 blue - pack 30 3. Freevent Xtracare PC: 7767 white – pack 30 4. Trachephone PC: 7704 pack 50	Changed daily / PRN	Depending on how many in the pack: If 50 then 1 pack per month If 30 then 2 packs each month
HME for ventilated patients to go into ventilator circuit 	CHC / NRS	NHS SC	1. Intersurgical Hydrotherm PC: 1850000 NHS: FDB 1020 Box 20 2. HME with catheter mount Intersurgical PC: 1341012s NHS FDD5394 pack 50 3. HME with catheter mount Intersurgical PC: 1941351 NHS FTC 134 Box 20	Changed daily or PRN	Depends on the amount per package

ITEM	WHO TO ORDER	ORDER SYSTEM	PRODUCT CODES / SYSTEM CODES	FREQUENCY OF CHANGE	MONTHLY ORDER
			4. HME Portex PC: 100/582/000 NHS FTC 076 Box 20		
Tracheostomy tube ties	As above	ATOS care	Freevent Neck Band 2-piece Small – PC: 1752 pack 100 Large – PC: 1762 pack 100	Changed daily / PRN	1 pack per month
Trache stoma dressing	As above	ATOS care	Metalline PC: 23094 pack 50 Trachi dressing small PC: TRDRE0001 pack 20 Advadraw T PC: CR/4416 pack 20	Changed daily / PRN	Depending on how many in a pack
Tracheostomy tube shower cover	As above	ATOS care	Shower cover cascade PC: AS3835 pack 1	Changed when damaged	PRN
Tracheostomy tube inner cannula cleaning swabs 	As above	ATOS care	PROVOX swabs Medium PC: 8251 pack 50 Large PC: 8252 pack 50		2 packs
Lubricant for tracheostomy tube changes	As above	ATOS care	Optilube tube 42g PC:1121 pack 1	As required	
Dressing pack	As above	ATOS care	Sterile dressing pack PC: DP SPEC35 pack 12	Single use daily	3 packs
Normal saline for cleaning	As above	ATOS care	Normasol 25ml PC: NOR206B pack 25	Single use	2 packs
Suction catheters for tracheal deep suction. Size will	CHC / NRS	NHS SC	All suction catheters must have a suction port: Tendertip **size 10** PC: TT01-10-060 NHS: FSQ 580	Single use only	5-6 boxes of 100 per month

ITEM	WHO TO ORDER	ORDER SYSTEM	PRODUCT CODES / SYSTEM CODES	FREQUENCY OF CHANGE	MONTHLY ORDER
depend on trache tube size 10, 12, 14			Tendertip **size 12** PC: TT01-12-060 NHS FSQ 576 Tendertip size 14 PC: TT01-14-060 NHS FSQ 578 Argyle Size 12 01952061 / NHS FDR305 Gen Cath GXM-7860SCC12 / FSQ2825 All come in box 100		
Suction unit **x 2** which are portable (has an internal battery) reusable cannister I large 1 portable to go out of the house	CHC / NRS	NHS SC	• Laerdal with reusable cannister PC: 78000003 NHS FSL 984 Pack 1 • Laerdal LSCU4 300ml cannister PC: 880052 NHS FDR608 ○ Carry case PC: 886110 NHS FSL 1082	Should be under contract with local medical equipment supply chain	
Suction tubing for suction unit	CHC / NRS	NHS SC	Serres PC: 5833181 NHS FSL 1702 Pack 1	Change monthly PRN	2 monthly
Suction catheter for oral secretions: Yankauer	CHC / NRS	NHS SC	PC: PB-431004 NHS: FDF2259 pack 20 PC: YS-3005 NHS: FDB 136 1 per pack PC: 1180501106 NHS FWP 501 pack 10	Change weekly / PRN	Depends on the number in each pack
Nebuliser compressor /device	CHC / NRS	NHS SC	• Pari-Turbo BoySX PC: 085G3204 NHS FAG071 • Respironics UK PC: 1112279 NHS FAG1072	Change when broken. Needs to be under a local medical service agreement	

ITEM	WHO TO ORDER	ORDER SYSTEM	PRODUCT CODES / SYSTEM CODES	FREQUENCY OF CHANGE	MONTHLY ORDER
			• Clement Clarke PC: 3605050HW NHS FAG034		
Nebuliser chamber with T-piece 	CHC / NRS	NHS SC	• Hudson Teleflex Medical PC: 41745 NHS FDD2311 Box 50 • Cirrus 2 nebuliser breathing kit Intersurgical PC: 2605000 Box 40	Change weekly / PRN (may need 2 nebuliser pots depending on the type of drugs being used)	
Tracheostomy mask for self-ventilating patients with trache tube requiring nebuliser 	CHC / NRS	NHS SC	Vyaire Medical PC: 001225 NHS FDQ3519 Box 50	Change weekly	
Bag valve mask circuit with self-inflating reservoir bag	Patient should be given the one they had in hospital	NHS SC	Ambu resuscitator PC: 335002000RH NHS FDE375 Pack 1	When damaged	N/A

ITEM	WHO TO ORDER	ORDER SYSTEM	PRODUCT CODES / SYSTEM CODES	FREQUENCY OF CHANGE	MONTHLY ORDER
					
Upper airway restoration valve / speaking valve **(ONLY TO BE ORDERED IF PRESCRIBED BY A SPECIALIST CLINICIAN)**		1. GP prescription 2. ATOS care	1. Kapitex: Passy Muir Valve a. Aqua for in line with ventilator circuit: **PC: TRPMV0002** (pack of 1) b. Purple/clear for self-ventilating patients: PC: **TRPMV1003 / TRPMV1002** (pack of 1) 2. Speaking valve for self-ventilating patient only: **PC: TSV/100** (pack 12)	Changed when damaged or after 3 months	1 every 3 months
VENTILATION					
Domiciliary ventilator with internal and	Home mechanical	Specialist team	N/A	N/A	N/A

ITEM	WHO TO ORDER	ORDER SYSTEM	PRODUCT CODES / SYSTEM CODES	FREQUENCY OF CHANGE	MONTHLY ORDER
portable batteries x 2 and 1 carry case.	ventilation specialist team				
Active heated humidifier: Fisher and Paykal MR550 or MR850 with temp wires	As above	Specialist team			
MI-E Device (cough assist): Breas clearway or Phillips Respironics	As above as should be responsible for prescription	As above			
Heated breathing ventilator circuit with humidification chamber 	CHC / NRS	NHS SC	• Fisher & Paykel PC: RT202 NHS FDC205 Box 10 • F&P PC: RT319FE NHS FDC202 Box 10 • Breas Medical PC: 0810/SP1 NHS FAG2548 Box 10 • Intersurgical PC: 2026310 HNS FDC534 Box 7	Every 2 months	
Dry circuit for day use and mobility	CHC / NRS	NHS SC	• Breas Medical breathing circuit with CO2 exhaust port (leak valve) PC: 0792/SP2 NHS FAG442 Box 10	Change 2 monthly	
Sterile water for inhalation /irrigation for heated	CHC / NRS	NHS SC	• Aquuiant 1000mls PC: 500.186 NHS FDD4490 Box 10	As required – usually daily	2-4 boxes per month

ITEM	WHO TO ORDER	ORDER SYSTEM	PRODUCT CODES / SYSTEM CODES	FREQUENCY OF CHANGE	MONTHLY ORDER
humidification system			• Viaflo 1litre bag PC: 34962211000001107 / 5413760137247		
Flexible catheter mount with suction port 	CHC	NHS SC	• Intersurgical PC: 3516000 HNS FDB939 Box 50 • Intersurgical PC: 5180000 NHS FDB938 Box 50	Change daily / PRN	1 box per month
Exhalation port / Leak valve/port or CO2 leak port disposable 	CHC / NRS	NHS SC	Intersurgical PC: 5802001 NHS: FDB1030 Box 30	Change weekly / PRN wash daily	1 box per month
Exhalation port / leak valve/port re-usable for 6 months 	CHC / NRS	NHS SC	Respironics Swivel valve PC: 332113 NHS: FAG4900 Pack 1	Change every 6 months if not damaged. Wash daily	2 per year

Appendix 3: Examples of multiprofessional working within complex HMV services

The following sets out examples of how allied health professional operate with complex HMV services. This includes Dietitians, Medical Engineering Technicians, Occupational Therapists, Physiologists/Clinical Scientists, Practitioner Psychologists and Speech and Language Therapists.

Role of Dietitian within Complex Home Ventilation

Malnutrition has been associated with reduced survival risk in neuromuscular disease such as MND (Marin et al, 2011). Furthermore, malnutrition in combination with chronic respiratory failure is acknowledged as a predictor of adverse outcomes such as reduced life expectancy (BTS, 2002). The dietitian therefore plays a significant role in the complex HMV service and is a critical part of the multi-disciplinary team and daily patient management.

Nutritional assessment is complicated and additionally includes gastrostomy assessment and monitoring of indicators such as dysphagia, prolonged mealtimes, chewing fatigue and modification of diet textures as dietary textures are often changed without community SLT involvement. All inpatients should therefore have a blanket dietetic screen and referral; and all outpatients should have nutritional screening at every visit to detect those with or at risk of developing malnutrition (DOH, 2014). Ideally, every neuromuscular/inherited muscle outpatient clinic should include a dietitian assessment.

Patients often require gastrostomy placement therefore, a positive therapeutic relationship with the dietitian is vital in pre-gastrostomy counselling confronting anxiety and concerns. Successful placement is complex and arguably much higher risk, requiring expert respiratory, anaesthetic, gastroenterology and sometimes cardiology input before and during the procedure. Consequently, the dietitian's role as the gastrostomy pathway coordinator is essential in liaising with the gastrostomy MDT, and patient pre-admission. Dietitian role in complex discharge planning is additionally essential to ensure an individualised home feed regimen, gastrostomy training and in liaising with community dietitians, care agencies and nutrition company nurses to ensure smooth admission, and timely discharge.

All patients on HMV require regular dietetic monitoring in the community e.g., those with MND present rapidly changing clinical needs requiring frequent and unplanned dietetic reviews. Monitoring of long-term issues such as weight gain with enteral feeding, constipation and delayed gastric emptying in e.g., DMD, require regular dietetic reviews and enteral feed management. The dietitian's role should therefore start at referral to HMV service and continue throughout the patient's life.

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Marin, B., Desport, J.C., Kajeu, P., Jesus, P., Nicolaud, B., Nicol, M., Preux, P.M., Couratier, P. (2011). Alteration of nutritional status at diagnosis is a prognostic factor for survival of amyotrophic lateral sclerosis patients. *Journal of Neurology Neurosurgery Psychiatry.* 11;82:628e634

Role of Medical Engineering Technicians within Complex Home Ventilation

A service must be in place to ensure routine service / maintenance of ventilators and accessory devices used in the community setting. It should also include loan stock kept on the hospital site. This may be provided by the Medical Electronics Department from the organisation that delivers the home ventilation service, or may be contracted out to an external provider. Service and maintenance should be device specific, and in line with manufacturers' recommendations, *by suitably trained technicians experienced with these types of devices.*

This support should also include breakdown replacement in the event of mechanical failure. The timing in which the replacement equipment can be provided, and which equipment this applies to, should be agreed at a local level. This level of support must be available 24 hours a day for patients receiving complex HMV.

It should be very clear to the patients and care givers who is responsible for service and maintenance, and who to contact in the event of mechanical failure.

Role of Occupational Therapists within Complex Home Ventilation

Occupational Therapists (OTs) support patients who use ventilation to engage in, and as be as independent as possible participating in, their occupations. Occupations are all of the meaningful activities and tasks that individuals need to or want to do, which are essential to our roles, identity, overall health and well-being, and quality of life. This may include, but is not limited to, personal care tasks such as showering, domestic tasks, and leisure and social activities, such as making a phone call, or going out with friends. All individuals requiring invasive or non-invasive ventilation will face barriers to their occupations, or have their daily routine altered in some way. OTs are holistic practitioners, and their assessment and intervention is essential to considering the impact of ventilation and an individual's physical, cognitive and psychosocial abilities and impairments on their occupational performance, all in the context of their physical and social environments.

Due to their specialist skill set, OTs are vital in complex discharge planning for ventilated patients, supporting the transition between the acute environment, to the home environment or long-term placement in the community. This can be through occupation-focussed rehabilitation, education and advice, provision of equipment and environmental set-up, recommendation and coordination of formal care, and onward referrals for further specialist input, if required. Similarly, OTs are often called upon for their expertise to ensure someone can continue to live well and safely in the community, with the aim to avoid re-admission to the acute environment.

It is therefore essential that a specialist OT - who has highly specialist skills and understanding of ventilation, conditions requiring ventilation, and the complexity of arranging equipment and appropriate care and funding for the patient group - is integrated within the complex ventilation

team. This allows timely assessment and intervention, promotes continuity and quality of care for long-term ventilated patients known to a service, and ensures collaborative MDT working, to ensure a better quality of life for patients with complex ventilation needs in the community.

Role of respiratory physiologists and clinical scientists in Complex Home Ventilation

Healthcare Scientists including Clinical Scientists (HCPC registered) and Physiologists specialising in Respiratory and Sleep Sciences is an integral part of the complex home ventilation team, performing both diagnostic tests and commencing patients onto NIV. Historically, considered to be involved predominantly in the performance of Spirometry, over the past decade, Respiratory and Sleep Healthcare Scientists are now involved in advanced clinical practice, much beyond downloading NIV data or fitting an NIV interface. One significant advantage of Healthcare Scientists working within the MDT, is the ability to deliver diagnostic testing and, if required NIV set-up, alongside medical consultation, all within one hospital visit. Certainly, this approach to delivering complex home ventilation contributes towards '*further faster'*, allowing patients to receive the right care at the right time.

Respiratory and Sleep Healthcare Scientists, with the appropriate education and training, can commence NIV and provide follow up care to patients with long-term and palliative conditions including neuromuscular disease. Nevertheless, these advanced clinical roles should not detract from the clinically significant data which is obtained from the performance of quality assured pulmonary function testing, and particularly in neuromuscular disease, use to aid clinical decisions around diagnosis and starting treatment.

References

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Role of Practitioner Psychologists within Complex Home Ventilation

The Practitioner Psychologist (HCPC registered) is an essential member of the complex home ventilation service. Integration within the team, promotes MDT care of patients with complex needs, whereby physical and psychological wellbeing is jointly considered and addressed, rather than external referrals to psychological services without specialist skills and knowledge of, or accommodations made for, those with significant ventilation (amongst other) needs.

Most notably, patients are referred to assess and address psychological barriers to NIV use. This may occur early in the patient journey, when claustrophobia is recognised as an immediate challenge to NIV use, and standard acclimatisation techniques are unsuccessful. In such cases, cognitive behaviour therapy (Volpato, Banfi, & Pagnini, 2022) effectively combines graded exposure to NIV with identification and challenging of negative thoughts about NIV, or the patient's ability to cope with NIV such as, "I can't breathe; I can't cope with this; I'm trapped" to promote and maintain NIV use.

Additionally, patients with a positive initial adjustment to NIV, may later be referred due to reduction or abandonment of NIV use. The practitioner psychologist conducts a thorough assessment and develops an individualised formulation to understand the complex factors influencing NIV use, which can guide further psychological intervention and MDT care. When depression is associated with reduced NIV adherence (Annunziata, Calabrese, Simioli, *et al.* 2023) psychological therapy such as Acceptance and Commitment Therapy is effective in supporting patients with complex health needs or disabilities to develop an accepting attitude towards their condition and associated treatments (such as NIV) in fulfilment of their personal values (Konstantinou, Ioannou, Melanthiou, *et al,* 2023).

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Role of Speech and Language Therapists within Complex Home Ventilation

Speech and Language Therapists (SLTs) are essential members of the complex home ventilation team supporting patients with communication, swallowing and upper airway management. Patients requiring invasive or non-invasive ventilation often experience difficulties achieving intelligible speech, a strong voice and a safe swallow due to their neurological and bulbar issues, comorbidities, iatrogenic laryngeal injury or lack of upper airway airflow with a tracheostomy. SLT intervention is vital for determining the underlying causes, severity and prognosis and for providing individualised communication and swallowing therapy and compensatory strategies (Andersen 2024).

Facilitating effective and efficient patient communication in patients with long-term, or degenerative diseases may be via verbal or alternative and augmentative approaches and requires specialist knowledge. Enabling patient communication is central to their ability to access and engage with other treatments provided by the MDT, for preventing psychological harm and optimising independence, socialisation and quality of life. Flexible SLT input is important as patients often require ongoing monitoring and reassessment due to disease progression and changing needs and optimises timing of 'voice banking' (RCSLT 2018).

Since dysphagia is often chronic and complex in nature, access to highly skilled SLTs trained in performing instrumental assessment (Flexible Endoscopic Evaluation of Swallowing FEES and

Videofluoroscopy) is necessary. Providing tailored intervention is essential to mitigating complications such as pneumonia, malnutrition and dehydration.

Whilst working in the community setting SLTs should be embedded in the complex home ventilation MDT and be able to liaise closely and request review if indicated. In close collaboration with Dietitians, SLT assessment supports the patient, carers and MDT to make quality of life decisions regarding long-term PEG tube feeding or eating and drinking with acknowledged risks (EDAR – RCSLT 2021). SLTs also need advanced nasendoscopy skills to support physiotherapists in optimisation of Mechanical Insufflation-Exsufflation (cough-assist) airway clearance (Boggianno 2024). For patients living with a long-term tracheostomy, invasive or non-invasive ventilation and respiratory support, skilled SLT intervention assists the MDT in secretion management and tube selection decisions, and enhances respiratory, communication and swallowing outcomes and quality of life.

References

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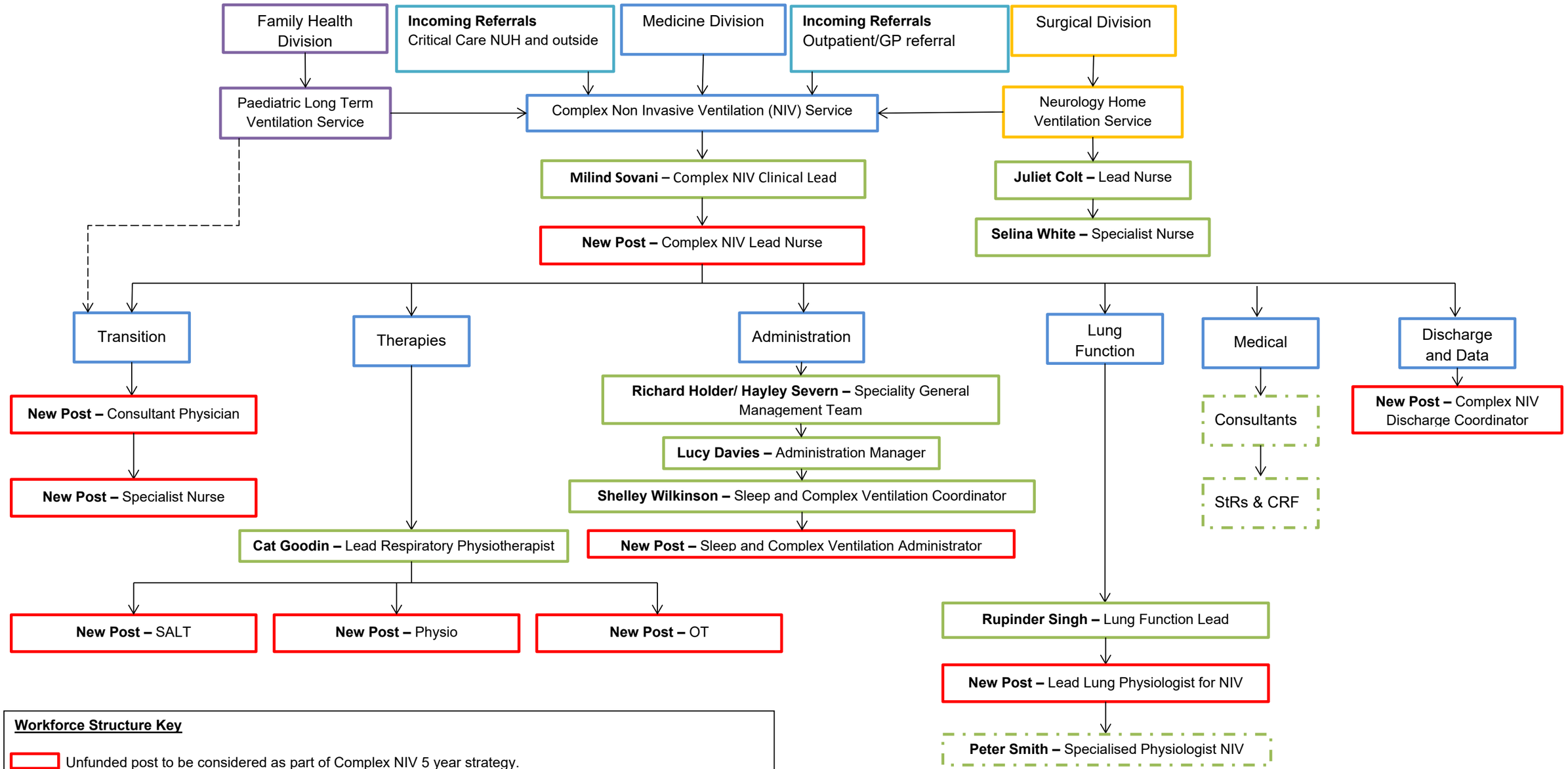
Appendix 4: Complex Ventilation Workforce Structure and Five Year Strategy



Workforce Structure Key

- Unfunded post to be considered as part of Complex NIV 5 year strategy.
- Certain amount funded but has other clinical commitments within wider Department
- Funded posts (Medicine Division)
- Funded posts (Family Health Division)
- Funded posts (Surgical Division)

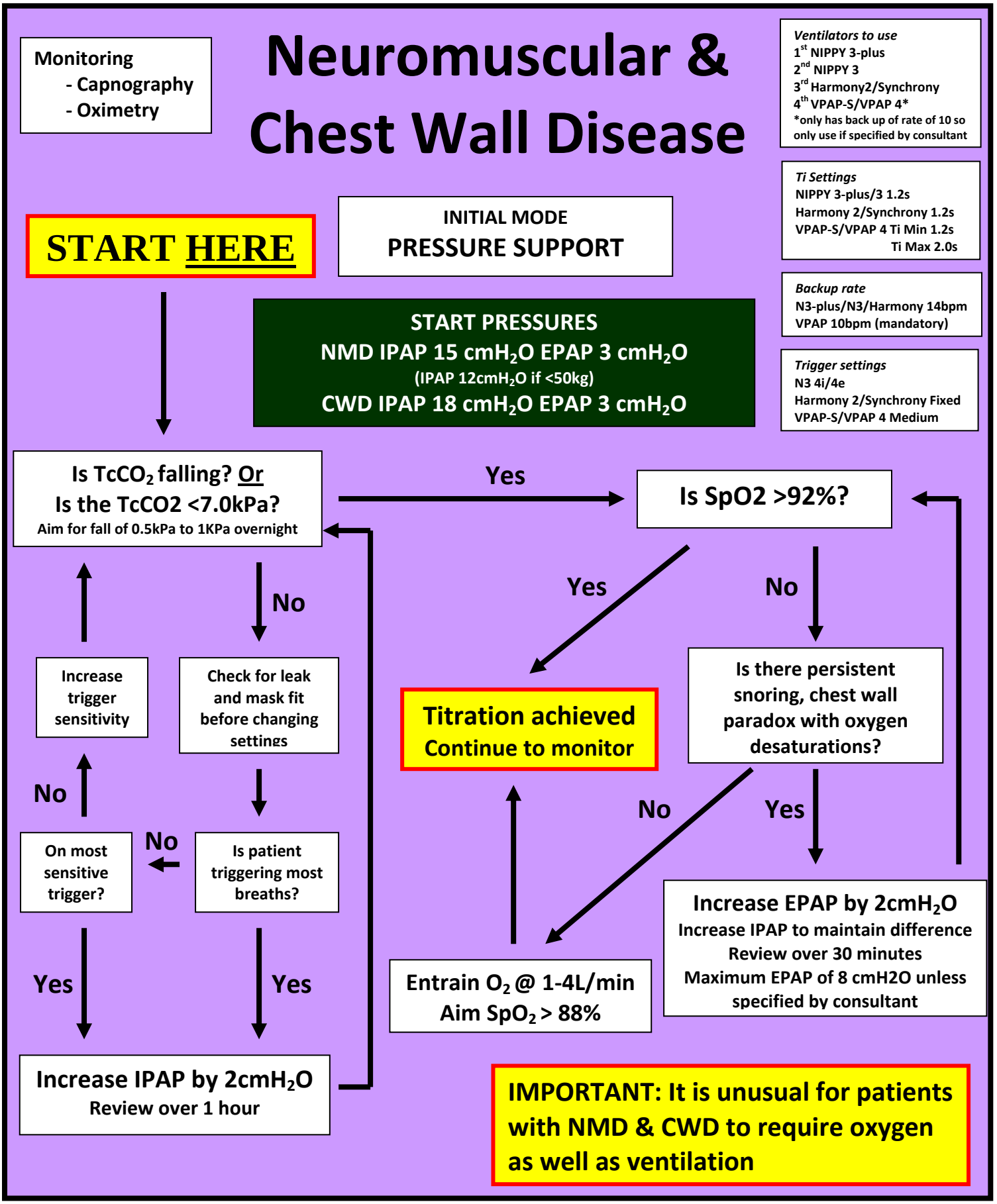
Appendix 5: Evidence for Long Term Ventilation

COPD	Home NIV may be considered for patients with chronic stable hypercapnic COPD,[20] or following an episode of acute hypercapnic respiratory failure if hypercapnia persists.[20-21] Home NIV may also be considered in COPD where LTOT is required but causes significant hypercapnia.[22] Where COPD exists in an overlap syndrome e.g. with obstructive sleep apnoea/hypopnoea syndrome (OSAHS), home NIV may be considered instead of CPAP if hypercapnia is severe (PaCO2 >7kPa).[23]
Obstructive sleep apnoea / hypopnoea syndrome (OSAHS)	CPAP is the recommended treatment for OSAHS. Home NIV may be considered where OSAHS is refractory to maximal CPAP therapy.[24]
Obesity hypoventilation syndrome (OHS)	Acute NIV should be utilised in OHS with acute respiratory failure. After stabilisation and control of hypercapnia, home NIV should be considered if decompensation occurs after acute NIV is stopped and/or a trial of CPAP therapy fails.[24] CPAP is the first-line treatment for patients with OHS and severe OSAHS who do not have acute respiratory failure.[24] Home NIV should be considered for OHS with severe OSAHS refractory to maximal CPAP therapy.[24] Home NIV should be considered for patients with OHS and nocturnal hypoventilation in the absence of OSAHS, who do not have acute respiratory failure.[24]
Neuromuscular disorders	Home ventilation may offer survival benefit, reduce unplanned hospital admissions, and relieve symptoms for patients with neuromuscular disorders and hypoventilation.[25-26] In MND, respiratory function tests and symptoms should be monitored in line with NICE guidance. Referral to the ventilation service may be made on the basis of respiratory function, or on symptoms of hypoventilation or sleep-related respiratory disturbance alone. Blood gas analysis should be done by referrer if oxygen saturation is ≤92% with known lung disease, or ≤94% without. Where $PaCO_2$ is >6kPa, urgent referral is required and a complex ventilation service should see the patient within 1 week.[27]
Restrictive thoracic disorders	Home ventilation may offer survival benefit, reduce unplanned hospital admissions, and relieve symptoms for patients with restrictive thoracic disorders and hypoventilation.[25]
Central hypoventilation	Home ventilation may be required, with clinical indication and level of treatment complexity determined by severity of hypoventilation (impairment of neural drive).[28]

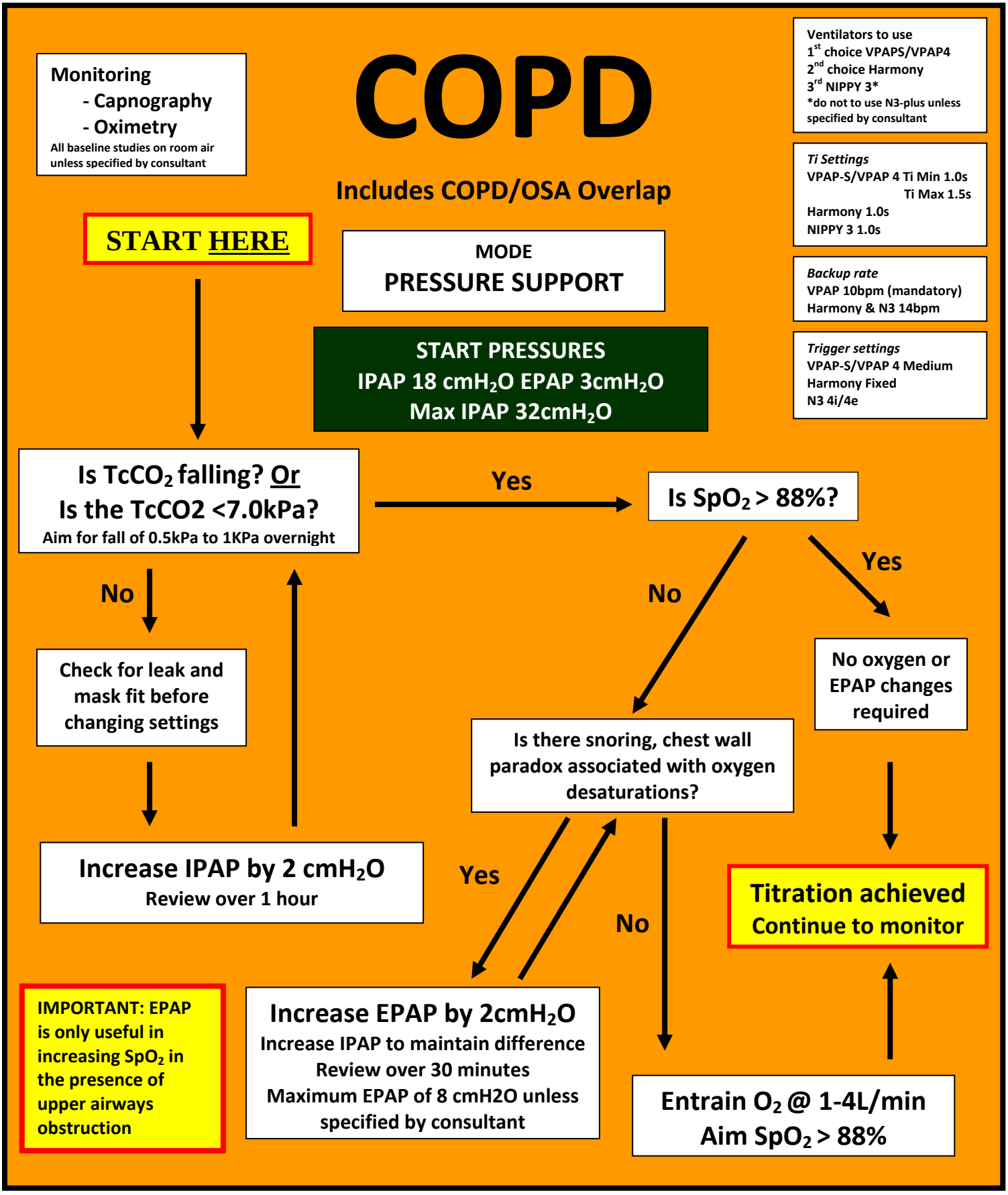
Appendix 5: Evidence for LTV

Pulmonary hypertension	Patients with pulmonary hypertension associated with hypoventilation may be considered for home NIV, based on possible physiological benefit.[29]
Spinal cord injury	Home ventilation may be required, with clinical indication and level of treatment complexity determined by degree of respiratory impairment.[28]
Cystic fibrosis	Home NIV may be offered for control of hypercapnia and bridge to transplant in CF.[30] NIV may also be considered as an adjunct to airway clearance in selected cases.[31]
Paediatric transition	Planned transition from paediatric to adult ventilation services should be undertaken with patients established on or expected to require long-term invasive or non-invasive ventilation, with services working collaboratively.[32]

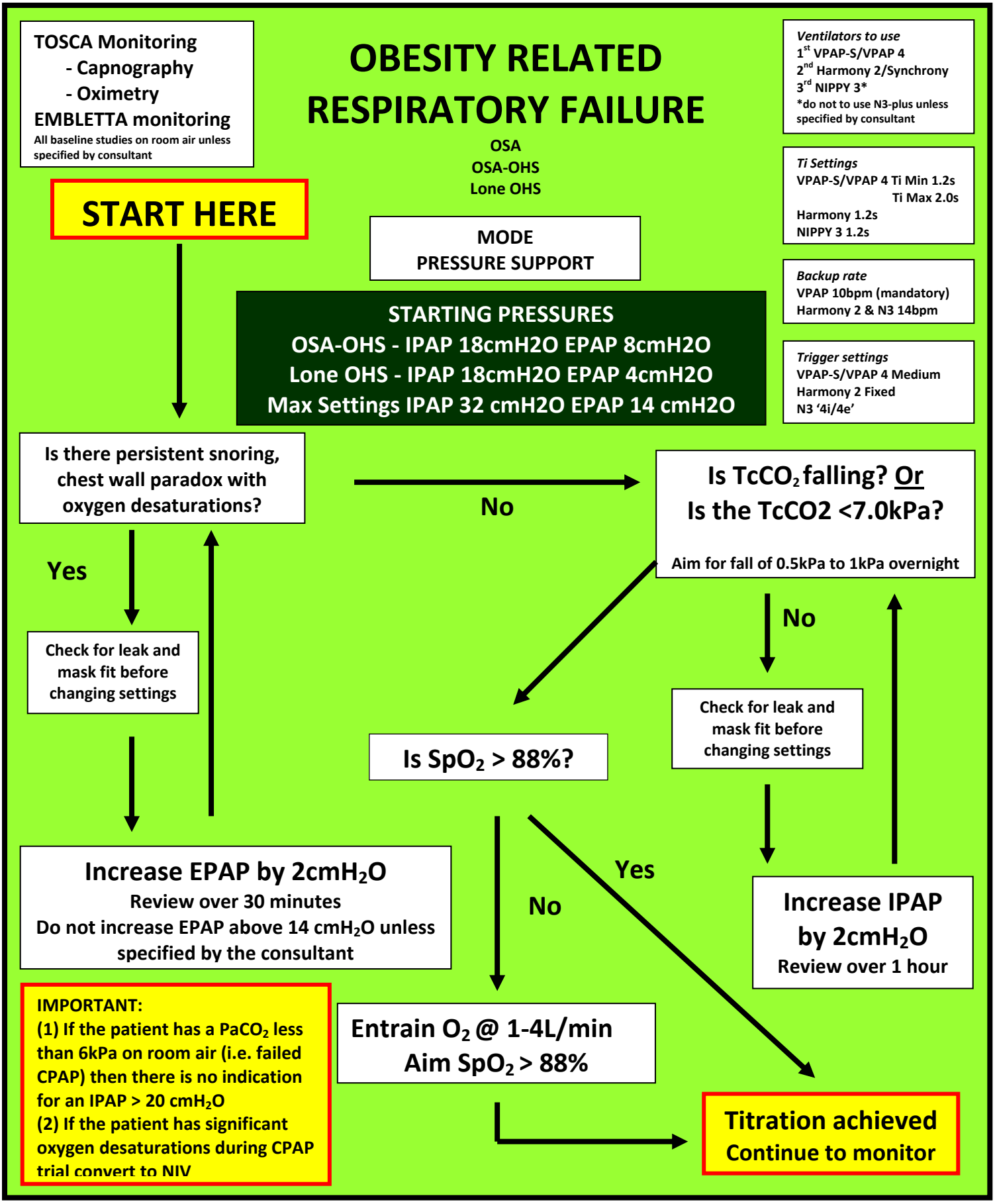
Appendix 6 - Ventilator Set-up



Appendix 7: Ventilator Set-up

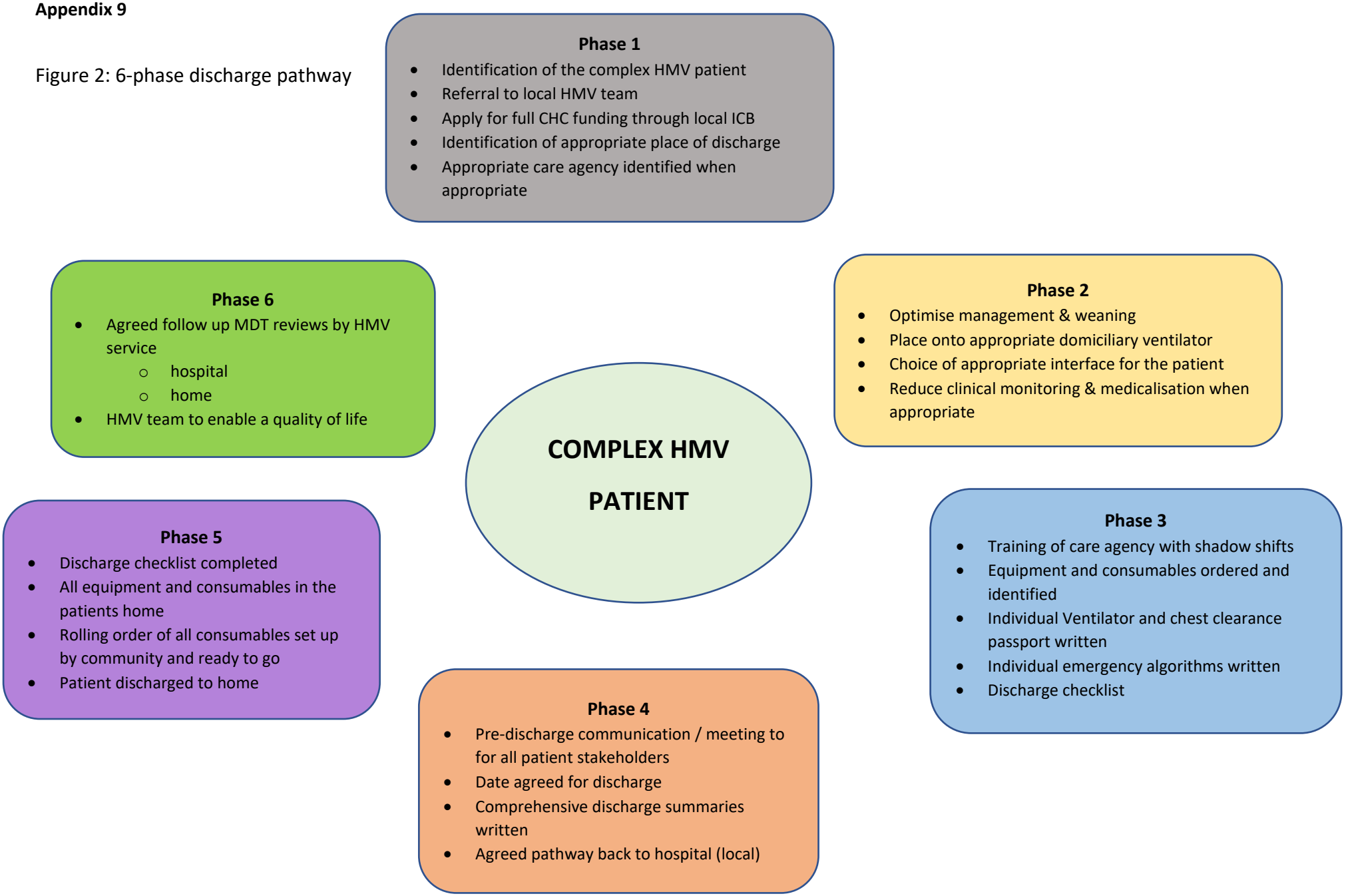


Appendix 8: Ventilator Set-up



Appendix 9

Figure 2: 6-phase discharge pathway



Appendix 10

Tracheostomy Tube Care and Mechanical Ventilation: Routine and Emergency

Safe Practice Training for carers

Staff Name: Assessor Name:

Job Title: Job Title:

Date of Assessment:

Competency Statement

The carer will demonstrate **SAFE PRACTICE** for patients with a tracheostomy tube requiring invasive mechanical ventilation.

Key skills	Discuss Theory and Observe Practice	Safe to Practice

Understands the principles and practices of tracheostomy care and mechanical ventilation: Routine and Emergency
• Knows the type and size of tracheostomy tube the patient has
• Knows why the patient has a tracheostomy
• Essential information about patient's upper airway
• Previous red flags
• How often the patient's tracheostomy tube has to be changed and who should carry this out
• The correct position of the tracheostomy tube
• Type of Humidification
• How the tracheostomy tube is secured
• Stoma cleaning and observation
• Inner tracheostomy cannula cleaning
• Patency of tracheostomy tube
• Routine suctioning (separate training)
• Cuff pressure (where appropriate)
• Cuff deflation (where appropriate)
• Use of upper airway restoration one-way valve (where appropriate)
• Emergency algorithms and how they are managed:
  ○ Blocked tracheostomy tube
  ○ Dislodged tracheostomy tube
  ○ Respiratory distress
  ○ Bleeding
• Identifies the ventilator used
• Understands why the patient requires ventilation
• Identifies the mode of ventilation the patient is on
• Identifies what the ventilator alarms mean		

Appendix 10

• Identify **ALL** the components of the ventilator circuit, humidifier, and cough assist with their generic names • Identify the signs and symptoms of respiratory distress and chest infections • Understands the algorithms and how to manage the above		
1. **Carer is able to demonstrate:** • Two person technique in cleaning stoma, changing tracheostomy tapes/collar and dressing • Discuss the potential risks when cleaning and changing tracheostomy tape/collar		
2. **Carer is able to demonstrate:** • Safe removal of inner cannula and replacement with clean inner cannula • Appropriate cleaning and storage of spare inner cannula • How to measure cuff pressure and how to troubleshoot • How to carry out safe cuff deflation • How to use the nebuliser in the ventilator circuit • How to put any of the following into the ventilator circuit: o HME o Oxygen entrainer o Upper airway restoration one-way valve (PMV – speaking valve) o Nebuliser		
3. **Carer can identify all emergency equipment:** • working appropriately • fully charged • In easy access • All spare emergency tracheostomy tubes are in date • Emergency tracheostomy box is correct		
4**. Carer can demonstrate safe and effective tracheal suction** • Identifies when patient needs suction • Gathers the correct equipment • Sets the correct suction pressure • Carries out effective deep tracheal suction • Observes type and amount of secretions obtained		
5. Carer can identity an emergency and is able to discuss / carry out the steps required for each emergency: • Sputum plug • Dislodged tracheostomy tube • Respiratory distress • Bleeding • Vasal vagal response to suctioning		
6. Carer demonstrates the correct use of the bag-mask-valve resuscitation device (e.g. AMBU bag)		
7. Carer demonstrates how to troubleshoot ventilator alarms & when / who to escalate issues		
8. Carer demonstrates how to set up and change all components of the: • Ventilator Circuit & exhalation valve for:		

▪ Dry circuit with HME ▪ Wet circuit with Fisher & Paykal humidification system • Cough Assist device circuit		

Outcome of assessment	Safe to practice	Not safe to practice *(complete action plan)*	Action Plan Completed
Signatures		Signature of Trainee:	Signature of Assessor:

Appendix 11

Carer training – Standards expected in terms of knowledge and skills

Consensus statement on behalf of:
RISCI (GBI) - Respiratory Information in Spinal Cord Injury
and SiLVaH – Specialists in Long-Term Ventilation at Home

Version: 2
Status: Ratified by RISCI (GBI) April 2013 and by SiLVaH Feb 2014
Authors:

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Sue Pieri-Davies	AHP Consultant and Lead Clinician Ventilation NW Regional Spinal Injuries Centre, Southport
Alison Armstrong	Senior Nurse Specialist, Assisted Ventilation Service, Newcastle-upon-Tyne

Document objectives:
To give clear guidance to Commissioning bodies of the knowledge and skills necessary to provide safe care for a ventilator user in the community. To give care agencies and nursing homes guidance of care and knowledge standards to attain within their teaching programme.

Intended Recipients:
Commissioning bodies, Nursing homes and home care providers.

Training/Resource Implications:
It is suggested that training courses are designed to meet these criteria

For more information on this document, please contact:

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Extended Scope Practioner Physiotherapist
Osborn Building
Northern General Hospital
Herries Road
Sheffield
S5 7AU
Tel: 0114 2434343 bleep 2732

Appendix 11

Executive summary

It is becoming increasingly common for patients with a tracheostomy or ventilator to be cared for outside the acute hospital environment. Individuals with more complex care needs are being looked after in their own homes, or in long term care facilities. As a result there is an expectation that care, nursing, medical and other staff will have the necessary skills and knowledge to care for these patients safely and competently. An intra-disciplinary team has worked together to formulate evidence based guidelines. These guidelines form a framework to which home care providers and nursing homes can formulate their own competency or training statements.

Staff knowledge needed to look after ventilator users:

1. A clear understanding of the global concepts of ventilation
2. Able to interpret observations relating to the efficiency of the individuals breathing.
3. Understand tracheostomy tubes in relation to the anatomy in which they are placed.
4. Understand features of the tracheostomy tube or mask / interface specific to the individual.

Staff skills needed to look after ventilator users:

1. Basic understanding of the particular ventilator used.
2. Ability to manage the tube or mask / interface.
3. Ability to perform chest clearance techniques including suction.
4. Ability to perform manual ventilation

The home care provider should evidence that their staff have been trained or have access to training for all of the following standards, and that this training is updated regularly.

Appendix 11

Care Aspects are divided into five categories

1. Ventilation

- Set up vent and circuitry ready for use, check and document against prescription and configuration
- Perform ventilator safety checks
- Respond appropriately to alarms
- Attach the machine to the patient and start and stop treatment
- Perform routine cleaning and maintenance, to include battery and power management
- Provide manual hand ventilation when needed
- Troubleshoot clinical and technical problems and escalate in a timely manner to an appropriate source of assistance

2. Interface

- Understand specific features of chosen interface
- Apply to patient ensuring correct fit / seal
- Perform routine cleaning and maintenance and ensure replacement when necessary
- Troubleshoot problems

3. Tracheostomy

- Provide routine care of the stoma and tracheotomy tube
- Perform routine and emergency tracheotomy tube changes
- Perform sterile suction procedure beyond the length of the tracheotomy tube
- Troubleshoot clinical and technical problems and escalate in timely manner to appropriate source of assistance

4. Management of Associated equipment

- Correct set up of all associated devices
- Operate and apply equipment appropriately to the patient
- Perform routine cleaning and maintenance including power and battery management
- Troubleshoot clinical and technical problems and escalate in timely manner to appropriate source of assistance

5. Emergency and urgent care needs

- Understand need, and have access to 24 hour support
- Appropriate decision making and procedure for emergency / urgent / routine contact for clinical and technical issues.

Nottingham University Hospitals NHS
NHS Trust

Home Ventilation Service

Patient Name: $$FORENAME$$ $$SURNAME$$
DOB: $$DOB$$
NHS Number: $$NHS$$
Hospital Number: $$ID$$

Home Ventilation Nurse Specialists
Tel: 0115 9709496
Email: HomeVentilationNurses@nuh.nhs.uk

VENTILATION PLAN

Commenced Ventilation: [insert date]

Updated: $$TODAY$$

Signature: S.Byers, RN

Consultant: Dr M Sovani (Respiratory Consultant, NUH)
Dr F Mabeza (Respiratory Consultant, NUH)

Includes:
Background and normal status (including care agency and AHP contacts)
Emergency Information
Tracheostomy Information
Ventilator Information
Airway Clearance Information

Advance Decision to Refuse Treatment (ADRT) form	Yes/ No
Recommended Summary Plan for Emergency Care and Treatment (ReSPECT) form	Yes/ No
Do Not Attempt Cardiopulmonary Resuscitation (DNACPR) within the RESPECT form?	Yes/ No
Lasting Power of Attorney (LPA) appointed to act on their behalf in the event they are unable to make decisions about health and finances themselves?	Yes/ No

These plans do not time expire. They have been written in conjunction with the named individual and discussed with their home care teams. The plans are reviewed regularly as the individual's condition changes.

Please keep visible at the front of home care records at all times

BACKGROUND AND NORMAL STATUS

[insert preferred name] has a diagnosis of [insert diagnosis] and has the following additional support in place:	
Airway	e.g. has a size 6 non-fenestrated tracheostomy tube
Breathing	e.g. uses non-invasive ventilation overnight with a face mask
Airway Clearance	e.g. has cough assist machine and suction machine for home use; medical management of secretions
Cardiovascular	e.g. has pacemaker (PPM))
Nutrition & Swallow	e.g. has artificial feeding tube (RIG). Eating and drinking – modified diet
Mobility	e.g. uses an electric wheelchair and is fully dependent for all moving and handling needs. Has lifting hoist
Pain	e.g. has chronic pain – medically managed
Communication	e.g. has eye-gaze technology
Education/ Employment/ Social	e.g. employment/social
[insert preferred name] lives at home with [insert name and relationship]. Support at home is provided by the following people:	
Care	e.g. full healthcare funding with 24/7 domiciliary support from [insert name and contact details of care agency]
Occupational Therapist	Called as needed- NAME & NUMBER
Physiotherapist	Called as needed- NAME & NUMBER
Dietician	Called as needed- NAME & NUMBER
District Nurse	Called as needed- NAME & NUMBER
Social Worker	Called as needed- NAME & NUMBER
Other/ Hospice/ Wheelchair Services	Called as needed- NAME & NUMBER

HOME VENTILATION SERVICE ADVICE & CONTACTS

For technical problems with your ventilator, or to arrange servicing or replacement parts, call Lung Function and Sleep Services (Queen's Medical Centre Campus):

- QMC: 0115 924 9924 Ext: 84470

For technical problems with your ventilator outside of normal working hours, call Advanced Respiratory Care Unit (ARCU) Nurse in Charge (Nottingham University Hospital)

- 07812 276225

For technical problems or to arrange servicing of equipment or replacement parts for equipment provided elsewhere, please contact provider (e.g. District Nursing Team/Health Centre) – see relevant section of plan for provider details.

For general advice and queries, call the Home Ventilation Nurses:

- 0115 9709496

If you need emergency hospital assessment, call 999 for an ambulance and refer to Emergency Plan

Nottingham University Hospitals NHS
NHS Trust

Home Ventilation Service

Patient Name: $$FORENAME$$ $$SURNAME$$
DOB: $$DOB$$
NHS Number: $$NHS$$
Hospital Number: $$ID$$

Home Ventilation Nurse Specialists
Tel: 0115 9709496
Email: HomeVentilationNurses@nuh.nhs.uk

EMERGENCY INFORMATION

Updated: $$TODAY$$ Signature: S.Byers, RN

IN THE EVENT OF A SUDDEN DETERIORATION

For example: unresponsive, not breathing, choking, loss of airway [for tracheostomies add 'unresolved tube blockage, dislodged tube]

ADVICE FOR CARERS

- **Call 999** for ambulance and explain the problem (e.g. *my relative is ventilator dependent and is now…… unresponsive/not breathing/choking)*
- **Show this plan** to the ambulance staff on their arrival
- **Contact next of kin** [insert name/relationship/contact details]
- **Resite tracheostomy tube** [delete if no tracheostomy or carers not trained]
- Try to remain calm and **help the named individual to use the ventilator**

ADVICE FOR AMBULANCE STAFF

- Use oxygen with caution (long term respiratory impairment)
- If still not breathing adequately despite the ventilator:
- Do not start CPR (DNAR paperwork in place) [delete instruction if no DNAR documentation in place]
- Transfer to Nottingham University Hospitals
- Contact Advanced Respiratory Care Unit, (ARCU) Nurse in Charge (07812 276225) to discuss admission pathway if appropriate
- **Bring home ventilator, cough machine/ Lung Volume Recruitment (LVR) bag and Ventilation Plan (this document) with you**

ADVICE FOR HOSPITAL STAFF

- Contact Advanced Respiratory Care Unit (ARCU) Nurse in Charge (07812 276225) for advice and to alert of admission.
- Consider early empirical antibiotics
- Consider other symptom relief

IN THE EVENT OF A GRADUAL DETERIORATION

For example: *Increased or thicker respiratory secretions; discoloured secretions (e.g. yellow/green); increased breathlessness; decreased activity/sleeping more; increased cough frequency; decreased cough strength; reduced speech volume and/or wet sounding voice; unable to complete sentences; sweating/shivering/high temperature*

ADVICE

- **Contact Rapid Response NUMBER** and/ or **Home Ventilation Nurses** 0115 9709496 for advice
- **Start home supply of oral antibiotics** promptly and **obtain sputum sample** for investigation (inform GP)
- **Increase chest clearance techniques** e.g. - increase chest physiotherapy and use of cough assist device as directed by the respiratory physiotherapist.
- **Increase ventilator use** e.g. - use whenever tired/short of breath/after physio or exertion.

IF NO IMPROVEMENT AFTER 48 HOURS

- **Contact Rapid Response NUMBER** and/ or **Home Ventilation Nurses** 0115 9709496 and/or **GP** $$GP_PHONE_NO$$ for advice
- **Consider admission to hospital for intravenous antibiotics and chest physio**

IF DETERIORATING RAPIDLY refer to instructions on previous page for 'IN THE EVENT OF A SUDDEN DETERIORATION'

The following people have been provided with copies of the plan *(please ensure they are provided with updated copies)*

Name	Relationship	Telephone Number
$$GP_TITLE$$ $$GP_INITS$$ $$GP_SURNAME$$	GP	$$GP_PHONE_NO$$
(Add names as necessary)		

A copy has been added to the hospital Digital Health Record (DHR)

Nottingham University Hospitals NHS
NHS Trust

Home Ventilation Service

Patient Name: $$FORENAME$$ $$SURNAME$$
DOB: $$DOB$$
NHS Number: $$NHS$$
Hospital Number: $$ID$$

Home Ventilation Nurse Specialists
Tel: 0115 9709496
Email: HomeVentilationNurses@nuh.nhs.uk

TRACHEOSTOMY INFORMATION

Updated: $$TODAY$$ Signature: S.Byers, RN

EQUIPMENT INFORMATION

	Type	Manufacturer /Supplier	Model/Size	Change Frequency	Provided by
Tracheostomy tube	*(insert details - e.g cuffless non-fenestrated)*	*(insert details)*	*(insert details)*	*(insert details)*	*(insert details)*
Spare tube 1					
Spare tube 2					
Spare inner tube					
Speaking valves					
Tracheostomy tapes					
Tracheostomy dressings					
Cleaning swabs					
Swedish nose (HME)					
Cuff manometer					
Syringes					
Tracheal dilators					

PLEASE CARRY SPARE TUBE AT ALL TIMES

TRACHEOSTOMY INFORMATION

CARE INFORMATION

CUFFLESS TUBE *(delete section if not applicable)*

	Change Frequency	Changed by
Outer tube	*(e.g. monthly)*	*(e.g. ENT QMC)*
Inner tube	*(e.g. 4 hourly)*	*(e.g. Carers)*
Tapes	*(e.g. daily)*	
Tracheostomy Dressing	*(e.g. daily)*	

CUFFED TUBE *(delete section if not applicable)*

	Change Frequency	Changed by
Outer tube	*(e.g. monthly)*	*(e.g. ENT QMC)*
Inner tube	*(e.g. 4 hourly)*	*(e.g. Carers)*
Tapes	*(e.g. daily)*	
Tracheostomy Dressing	*(e.g. daily)*	

		(please tick all that apply)
Inflate cuff:	with air using a cuff pressure manometer to a pressure of *(insert values)*	
	at night	
	during the day	
	when using ventilator	
	when using the cough assist machine	
	if struggling to breathe	
	at other times *(please describe)*	

CONTACTS

Name	Role/Team	Contact Information
(Add contacts as required)		

Nottingham University Hospitals NHS
NHS Trust

Home Ventilation Service

Patient Name: $$FORENAME$$ $$SURNAME$$
DOB: $$DOB$$
NHS Number: $$NHS$$
Hospital Number: $$ID$$

Home Ventilation Nurse Specialists
Tel: 0115 9709496
Email: HomeVentilationNurses@nuh.nhs.uk

VENTILATOR INFORMATION

Updated: $$TODAY$$ Signature: S.Byers, RN

SETTINGS AND USE Trilogy EVO ventilator (x1)

Ventilator Settings		
Prescription		
Mode/ Circuit		
Pressure Control (cmH_2O)		
PEEP (cmH_2O)		
Inspiratory Time(s)		
Breath Rate (bpm)		
Rise Time (s)		
AVAPS		
Trigger Type		
Trigger Sensitivity		
Humidification		
Alarms		
Tidal volume (L)		
Min Vent (L/min)		
Resp rate		
Circuit disconnect alarm(s)		

Ventilator use
For use overnight with a nasal, hybrid, or facemask as preferred. See Emergency Plan for use during chest infection

EQUIPMENT INFORMATION

	Ventilator 1	**Ventilator 2**	**Humidifier**
Manufacturer	Philips Respironics	Philips Respironics	Fisher & Paykel
Model	Trilogy EVO	Trilogy EVO	MR810
Issued by	Home Ventilation Service, NUH	Home Ventilation Service, NUH	Home Ventilation Service, NUH
Servicing	MESU NUH (3 yearly)	MESU NUH (3 yearly)	MESU NUH (annual)

VENTILATOR INFORMATION

CONSUMABLES INFORMATION- Trilogy EVO consumables

		Type	Manufacturer/ Supplier	Model/Size	Change Frequency	Provided by
Mask 1.		Vented nasal pillows mask	Respirio **OR** ResMed	MODEL (SIZE pillows)	1 mask every 3 months	Lung Function, QMC
Mask 2.		Vented nasal **AND/ OR** nasal cradle mask	ResMed	MODEL (SIZE cushion/ cradle)		
Mask 3.		Vented hybrid **AND/ OR** facemask	ResMed	MODEL (SIZE)		
Other interface		Chin strap	Various suppliers	Ref:		
Circuit 1.		Passive 'dry' circuit **OR** Active 'dry' circuit	Philips Respironics	Ref:	1 circuit every 3 months	
Circuit 2.		Humidification 'wet' circuit	Fisher & Paykel	Ref:	1 circuit every 6 months	
Chamber		Reusable humidification chamber	Fisher & Paykel	Ref: HC300	1 chamber every 3 months	
Other circuit adjuncts	**1.**	Air inlet filter (standard foam)	Philips Respironics	Ref: 1134591	1 filter every 3 months	
	2.	Air inlet filter (particle filter)	Philips Respironics	Ref: 1134430	1 filter per month	
	3.	Oxygen connector *(for use by ambulance crew)*	Philips Respironics	Na	Replace if damaged or misplaced	Home Ventilation Nurses, NUH
Manual resuscitation back-up		AMBU bag (Adult)	AMBU UK Ltd	Na	Replace if damaged or misplaced	Home Ventilation Nurses, NUH

CONTACTS

Name	Role/Team	Contact Information
	CCG	
	Lung Function Department	0115 924 9924 ext.84470

Nottingham University Hospitals NHS
NHS Trust

Home Ventilation Service

Patient Name: $$FORENAME$$ $$SURNAME$$
DOB: $$DOB$$
NHS Number: $$NHS$$
Hospital Number: $$ID$$

Home Ventilation Nurse Specialists
Tel: 0115 9709496
Email: HomeVentilationNurses@nuh.nhs.uk

VENTILATOR INFORMATION

Updated: $$TODAY$$ Signature: S.Byers, RN

SETTINGS AND USE NIPPY 4+ ventilator (x1)

Ventilator Settings		
Profile	Profile 1	Profile 2
Mode (Home)		
IPAP (cmH_2O)		
EPAP (cmH_2O)		
Ti (s)		
Breath (bpm)		
Rise (s)		
Trigger Sensitivity		
Alarms		
Flow (Lo/ Hi)		
Pressure (Lo/ Hi)		
Disconnection		
Rebreathing		
Vti (Lo/ Hi)		

Ventilator use
For use overnight with a nasal, hybrid, or facemask as preferred. See Emergency Plan for use during chest infection

EQUIPMENT INFORMATION

	Ventilator 1	**Ventilator 2**	**Humidifier**
Manufacturer	Breas Medical Ltd	Breas Medical Ltd	Fisher & Paykel
Model	NIPPY 4+	NIPPY 4+	MR810/ HC150
Issued by	Home Ventilation Service, NUH	Home Ventilation Service, NUH	Home Ventilation Service, NUH
Serviced by	MESU NUH (annual)	MESU NUH (annual)	MESU NUH (annual)

VENTILATOR INFORMATION

CONSUMABLES INFORMATION- NIPPY 4+ consumables

		Type	Manufacturer/ Supplier	Model/Size	Change Frequency	Provided by
Mask 1.		Vented nasal pillows mask	Respireo **OR** ResMed	MODEL (SIZE pillows)		Lung Function, QMC
Mask 2.		Vented nasal **OR** nasal cradle mask	ResMed	MODEL (SIZE cushion/ cradle)		
Mask 3.		Vented hybrid **OR** facemask	ResMed	MODEL (SIZE)		
Other interface	**1.**	Chin strap	*Various suppliers*			
Circuit 1.		Passive **OR** Active circuit	Breas Medical Ltd	Ref:		
Circuit 2.		Humidification 'wet' circuit	Breas Medical Ltd	Ref:		
Chamber 1.		Reusable humidification chamber (built in)	Breas Medical Ltd	Ref: 006490		
Other circuit adjuncts	**1.**	Air inlet filter (course)	Breas Medical Ltd	Ref: 007104	1 filter every 3 months	
	2.	Air inlet filter (fine)	Breas Medical Ltd	Ref: 007103	1 filter per month	
	3.	Oxygen connector *(for use by ambulance crew)*	Breas Medical Ltd	Na	Replace if damaged or misplaced	Home Ventilation Nurses, NUH
Manual resuscitation back-up		AMBU bag (Adult)	AMBU UK Ltd	Na	Replace if damaged or misplaced	Home Ventilation Nurses, NUH

CONTACTS

Name	Role/Team	Contact Information
	CCG	
	Lung Function Department	0115 924 9924 ext.84470

Nottingham University Hospitals NHS
NHS Trust

Home Ventilation Service

Patient Name: $$FORENAME$$ $$SURNAME$$
DOB: $$DOB$$
NHS Number: $$NHS$$
Hospital Number: $$ID$$

Home Ventilation Nurse Specialists
Tel: 0115 9709496
Email: HomeVentilationNurses@nuh.nhs.uk

VENTILATOR INFORMATION

Updated: $$TODAY$$ Signature: S.Byers, RN

SETTINGS AND USE LUMIS 150 VPAP ST-A ventilator (x1)

Ventilator settings	
Mode	
IPAP (cmH_2O)	
EPAP (cmH_2O)	
Ti (s)	
Back-up rate(bpm)	
Trigger	
Alarms	
High Leak	
Low MV	

Ventilator use
For use overnight with a nasal, hybrid or facemask as required. See Emergency Plan for use during chest infection
Humidifier use
Built in humidifier for use overnight with ventilator, as preferred.

EQUIPMENT INFORMATION

	Ventilator 1	**Humidifier**
Manufacturer	ResMed	ResMed
Model	Lumis 150 ST-A	Lumis 150 ST-A (built-in)
Issued by	Home Ventilation Service, NUH	Home Ventilation Service, NUH
Serviced by	MESU NUH	MESU NUH
Servicing requirement	Annual	Annual

VENTILATOR INFORMATION

CONSUMABLES INFORMATION- LUMIS 150 VPAP ST-A consumables

		Type	Manufacturer/ Supplier	Model/Size	Change Frequency	Provided by
Mask 1.		Vented nasal pillows mask	ResMed	MODEL (SIZE pillows)	1 mask every 3 months	Lung Function, QMC
Mask 2.		Vented nasal **AND/ OR** nasal cradle mask	ResMed	MODEL (SIZE cushion/ cradle)	1 mask every 3 months	
Mask 3.		Vented hybrid **AND/ OR** face mask	ResMed	MODEL (SIZE)	1 mask every 3 months	
Circuit 1.		Passive OR active circuit (non-heated slim line tube)	ResMed	Ref:	1 circuit every 3 months	
Circuit 2.		Passive OR active circuit (heated tube)	ResMed	Ref:	1 circuit every 3 months	
Chamber		HumidAir humidifier chamber	ResMed	Ref:	1 chamber every 3 months	
Other circuit adjuncts	**1.**	Standard air inlet filters	ResMed	Ref: 36852	1 filter every 3 months	
	2.	Oxygen connector *(for use by an ambulance crew)*	ResMed	Na	Replace if damaged or misplaced	

CONTACTS

Name	Role/Team	Contact Information
	CCG	
	Lung Function Department	0115 924 9924 ext.84470

Nottingham University Hospitals NHS
NHS Trust

Home Ventilation Service

Patient Name: $$FORENAME$$ $$SURNAME$$
DOB: $$DOB$$
NHS Number: $$NHS$$
Hospital Number: $$ID$$

Home Ventilation Nurse Specialists
Tel: 0115 9709496
Email: HomeVentilationNurses@nuh.nhs.uk

AIRWAY CLEARANCE INFORMATION

Updated: $$TODAY$$ Signature: S.Byers, RN

SETTINGS AND USE NIPPY CLEARWAY 1

Cough assist machine settings	
Mode	Timed Auto
Insufflation (cmH_2O)	
Exsufflation (cmH_2O)	
Ti (s)	
Te (s)	
Pause (s)	
Inspiratory repeat	
Cycle repeat	
Cough assist machine use	
For use as directed by a respiratory physiotherapist.	
Lung volume recruitment (LVR) bag use	
For use as directed by a respiratory physiotherapist.	
Suction machine use	
For use with oral suction tip for oral suction as required.	
See Emergency Plan for use during chest infection	

EQUIPMENT INFORMATION

	Cough Assist Machine	**Cough Assist Battery**	**Cough Assist Charger**	**Suction Machine**
Manufacturer/Supplier	Breas Medical Ltd	Breas Medical Ltd	Breas Medical Ltd	
Model	NIPPY Clearway 1			
Issued by	Ventilation Service, NUH	Ventilation Service, NUH	Ventilation Service, NUH	
Serviced by	MESU, NUH	MESU, NUH	MESU, NUH	British Red Cross
Servicing requirement	Annual	Annual	Annual	Annual
Switch	Y/N [delete as required]			

AIRWAY CLEARANCE INFORMATION

CONSUMABLES INFORMATION- NIPPY Clearway consumables

		Type	Manufacturer/ Supplier	Model/Size	Change Frequency	Provided by
Cough assist mask		Anaesthetic face mask	Intersurgical	Size 4/5 *[delete as required]*	1 mask per month	Home Ventilation Nurses, NUH
Cough assist circuit		22mm NIPPY Clearway circuit with filter	Breas Medical Ltd	Ref: 008157	1 circuit every 3 months	
Circuit adjuncts- for cough assist	**1.**	Bacterial filter	Breas Medical Ltd	Ref: 008169	1 filter per month	
	2.	Sputum trap	Intersurgical	Ref: MST-3070	As requested	
Lung volume recruitment bag		Adult LVR bag 1.5L	Breas Medical Ltd	Ref: LVR Kit2	Replace if damaged or misplaced	
Oral suction tip		Yankauer suction tip	Various suppliers	Ref:		
Suction tubing		24CH FFM vacuum control tubing	Pennine Healthcare	Ref:		
Suction Catheters				Ref:		
Other circuit adjuncts for suction equipment		Aerosol filters		Ref:		
Disposable waste container for suction machine		Laerdal **OR** Devilbiss suction unit RESUABLE CANISTER		Ref:		

CONTACTS

Name	Role/Team	Contact Information
	CCG	
	Home Ventilation Nurses	0115 9709496

Please contact Lung Function or the Home Ventilation Nurses for more information relating to the use, care and maintenance of your ventilation and/ or cough assist equipment (including trouble-shooting alarms, comfort issues, travel advice and power cut information)

Please bring your ventilator with you for all planned hospital admissions

Nottingham University Hospitals NHS
NHS Trust

Home Ventilation Service

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NHS Number: $$NHS$$
Hospital Number: $$ID$$

Home Ventilation Nurse Specialists
Tel: 0115 9709496
Email: HomeVentilationNurses@nuh.nhs.uk

AIRWAY CLEARANCE INFORMATION

Updated: $$TODAY$$ Signature: S.Byers, RN

SETTINGS AND USE NIPPY CLEARWAY 2

Cough assist machine settings		
	Profile 1 (e,g, Normal use)	Profile 2 (e.g. Emergency use)
Mode	Timed Auto	
Insufflation (cmH_2O)		
Exsufflation (cmH_2O)		
Ti (s)		
Te (s)		
Trigger		
Pause (s)		
Inspiratory repeat		
Cycle repeat		1
Recruitment Breaths	e.g. +2/OFF	e.g. +2/OFF
Oscillations	e.g. ON/OFF	e.g. ON/OFF
Cough assist machine use		
for use twice daily (3 cycles) and as required *See Emergency Plan for use during chest infection*		
Lung volume recruitment (LVR) bag use		
(e.g. for use once daily and as required)		
Suction machine use		
For use with oral suction tip for oral suction as required		

EQUIPMENT INFORMATION

	Cough Assist Machine	**Cough Assist Battery**	**Cough Assist Charger**	**Suction Machine**
Manufacturer/Supplier	Breas Medical	Breas Medical	Breas Medical	
Model	NIPPY Clearway2			
Issued by	Ventilation Service, NUH			e.g. District Nurses
Serviced by	MESU, NUH			e.g. Red Cross
Servicing requirement	Annual			
Switch	Y/N [delete as required]			

AIRWAY CLEARANCE INFORMATION

CONSUMABLES INFORMATION- NIPPY Clearway 2 consumables

		Type	Manufacturer/ Supplier	Model/Size	Change Frequency	Provided by
Cough assist mask		Anaesthetic face mask	Intersurgical	Size 4/5 *[delete as required]*	1 mask per month	Home Ventilation Nurses, NUH
Cough assist circuit		22mm NIPPY Clearway circuit with filter	Breas Medical Ltd	Ref:	1 circuit every 3 months	
Circuit adjuncts- for cough assist	**1.**	Bacterial filter	Breas Medical Ltd	Ref:	1 filter per month	
	2.	E.g. Sputum trap		Ref:	As requested	
Lung volume recruitment bag		Adult LVR bag 1.5L	Breas Medical Ltd	Ref:	As requested	
Suction tubing		(e.g. 24CH FFM vacuum control tubing)	(e.g. Pennine Healthcare)	Ref:		
Oral suction tip		(e.g. Yankauer suction tip)		Ref:		
Suction Catheters				Ref:		
Other circuit adjuncts for suction equipment	**1.**	(e.g. bacterial filter)		Ref:		
	2.	(e.g. sputum trap)		Ref:		
Disposable waste container for suction machine				Ref:		

CONTACTS

Name	Role/Team	Contact Information
	Home Ventilation Nurses	0115 9709496

Please contact Lung Function or the Home Ventilation Nurses for more information relating to the use, care and maintenance of your ventilation and/ or cough assist equipment (including trouble-shooting alarms, comfort issues, travel advice and power cut information)

Please bring your ventilator with you for all planned hospital admissions

Appendix 13

Tracheostomy Passport

NAME:

Hospital identifier:

DEMOGRAPHICS

NAME	
DOB	

MEDICAL DIAGNOSIS & RELEVANT HISTORY	
COMMUNITY CONTACT	
HOSPITAL CONTACT	

GRADE	DIFFICULTY OF CHANGE	WHERE & BY WHO
1	***Low risk*** for self-ventilating patients	Community RN / Level 3 Carer
2	***Low risk*** for invasively ventilated patients who can self-ventilate (SV) for >5 minutes	Community RN/ Level 3 carer
3	***Medium risk*** for invasively ventilated patients who are fully dependent on ventilation and cannot Self Ventilate. Has some RED FLAGS	Community RN
4	***High risk*** for any patient with some tracheal bronchial malacia / tracheal stenosis but able to maintain airway for > 5 minutes with trache tube removed. RED FLAG	Community / Hospital Specialist Tracheostomy Practitioner
5	***High risk*** for any patient with severe dynamic airway collapse / tracheal bronchial malacia,. Unable to maintain any airway without tracheostomy tube in situ. Severe RED FLAGS	Hospital ENT specialist team

CURRENT STATUS

<table>
<tr><td>Type & size of trache</td><td></td></tr>
<tr><td>State of stoma</td><td></td></tr>
<tr><td>Routine cuff management</td><td></td></tr>
<tr><td>Upper Airway Patency</td><td></td></tr>
<tr><td>Communication</td><td></td></tr>
<tr><td>Respiratory support</td><td>
<table>
<tr><td>MODE</td><td></td></tr>
<tr><td>Circuit type e.g passive</td><td></td></tr>
<tr><td>IPAP</td><td></td></tr>
<tr><td>EPAP</td><td></td></tr>
<tr><td>PC / PS</td><td></td></tr>
<tr><td>Ti</td><td></td></tr>
<tr><td>RR</td><td></td></tr>
<tr><td>Tirgger</td><td></td></tr>
</table>
</td></tr>
<tr><td>Tracheostomy weaning</td><td></td></tr>
<tr><td>Humidification and hydration</td><td></td></tr>
<tr><td>Eating and Drinking</td><td></td></tr>
<tr><td>Secretion management</td><td>
<table>
<tr><td>MODE</td><td>Timed Auto</td></tr>
<tr><td>Insufflation</td><td></td></tr>
<tr><td>Exsufflation</td><td></td></tr>
<tr><td>Ti</td><td></td></tr>
<tr><td>Te</td><td></td></tr>
<tr><td>Insp repeat</td><td></td></tr>
<tr><td>Pause</td><td></td></tr>
<tr><td>Cycle repeat</td><td></td></tr>
</table>
</td></tr>
<tr><td>Trache changes (time, place issues and by who)</td><td></td></tr>
<tr><td>Red flags</td><td></td></tr>
</table>

Appendix 14a

MANAGEMENT OF POSSIBLE CHEST INFECTION
TIV

Signs and Symptoms

- Increase in resting respiratory rate >30 bpm sustained
- Increase in secretion load on suctioning & increase need for tracheal suctioning
- Secretions thicker and more sticky
- Secretions have changed colour / may be 'smelly'
- Patient is pyrexial and/or having episodes of being hot / cold
- Patient looks unwell and short of breath

Patient has 1 or 2 signs and symptoms

Patient has >3 signs and symptoms

Management Plan A

- Give extra **normal saline (0.9%)** nebulisers to reduce thickness of secretions
- If continues to be thick give an extra **3% saline nebuliser (mucoclear)** on top of routine
- Increase chest physiotherapy
- Try to keep patient in an upright position even if lying on side
- Ensure patient is well hydrated
- Give regular paracetamol for 24-48 hours

Patient has not improved after 24 hours or signs and symptoms have increased go to Management Plan B

Management Plan B

- Follow **Management Plan A PLUS**
- Start rescue antibiotics (prescribed by GP and should be always in the home)
    - Give **double** dose as the first dose then as prescribed
- Inform GP
- Inform outreach
- If symptoms do not improve within **48-72 hours** OR patient significantly gets worse OR becomes:
    - Drowsy
    - Temperature not managed with paracetamol

RING 999

Appendix 14b

MANAGEMENT OF SUSPECTED SPUTUM PLUG WITH MI-E

- Difficulty in breathing & patient is distressed
- Respiratory rate is greater than 28bpm, for more than 1 minute
- Observed use of accessory muscles (abdomen, shoulders)
- Ventilator is alarming

↓

- Reassure patient
- Check all ventilator tubing and exhalation valve are free from obstruction (water in tubing, sputum in exhalation valve)
- Check inner cannula for blockage, replace with clean inner cannula
- Give deep tracheal suction x 2

RESOLVED ← | → **NOT RESOLVED**

RESOLVED

- Reassure Patient
- Give 3% saline nebuliser
- Give extra 0.9% saline nebulisers if required
- Ensure patient is well hydrated
- Think about giving an extra cough assist
- Keep a close observation of secretions tenacity and amount

← **RESOLVED**

- Commence cough assist therapy
- Re-connect ventilator and carry out deep tracheal suction x 2
- Repeat cough assist therapy
- Re-connect ventilator and carry out deep tracheal suction x 2

NOT RESOLVED

- Deflate cuff
- Give deep suction

NOT RESOLVED

RESOLVED

- Disconnect patient from ventilator and attach patient to **AMBU BAG** via trache tube
- Give **5** deep breaths using the AMBU BAG
- Re-connect ventilator and carry out deep tracheal suction

NOT RESOLVED

- Repeat **AMBU BAG** breaths if still in distress
- If not able to ventilate patient via Tracheostomy Tube **TAKE OUT TUBE**
- **Try re-inserting new tracheostomy tube**
- **IF UNABLE TO** commence **AMBU BAG** ventilation via patient's nose and mouth using face mask – ENSURE TRACHE STOMA IS COVERED

CALL 999

Appendix 14c

SUSPECTED SPUTUM PLUG
Patients with uncuffed or cuff down tracheostomy tube
THINK A – B - C

- Difficulty in breathing & patient is distressed
- Respiratory rate is greater than 25 bpm for more than 1 minute
- Observed use of accessory muscles (abdomen, shoulders)

↓

- Reassure patient
- Remove tracheostomy inner cannula and replace with clean one
- Give deep tracheal suction x 2

RESOLVED / **NOT RESOLVED**

RESOLVED

- Reassure patient
- Give 0.9% saline nebuliser
- Give extra saline nebulisers if required
- Ensure patient is well hydrated
- Keep a close observation of secretions tenacity and amount

NOT RESOLVED

- Give 0.9% saline nebuliser
- Carry out deep tracheal suction x 2
- Give 0.9% saline nebuliser
- Carry out deep tracheal suction x 2

RESOLVED

NOT RESOLVED

- Attach patient to **AMBU BAG** via tracheostomy tube
- Give **5** deep breaths using the AMBU BAG
- Carry out deep tracheal suction

RESOLVED

NOT RESOLVED

- Repeat **AMBU BAG** breaths if still in distress
- If not able to ventilate patient via Tracheostomy Tube **TAKE OUT TUBE**
- **Try re-inserting new tracheostomy tube – same size or 1 size smaller**
- **IF UNABLE TO re-insert and patient not breathing** Commence **AMBUBAG** ventilation via patient's nose and mouth using face mask – **ENSURE TRACHE STOMA IS COVERED**

CALL 999

Appendix 14d

MANAGEMENT OF SUSPECTED SPUTUM PLUG
TIV

- Difficulty in breathing & patient is distressed
- Respiratory rate is greater than 30bpm, for more than 1 minute
- Observed use of accessory muscles (abdomen, shoulders)
- Ventilator is alarming

↓

- Reassure patient
- Check all ventilator tubing and exhalation valve are free from obstruction (water in tubing, sputum in exhalation valve)
- Check inner cannula for blockage, replace with clean inner cannula
- Give deep tracheal suction x 2

RESOLVED ← | → **NOT RESOLVED**

- Reassure patient
- Re-inflate cuff if deflated
- Give 3% saline nebuliser
- Give extra 0.9% saline nebulisers if required
- Ensure patient is well hydrated
- Keep a close observation of secretions tenacity and amount

RESOLVED ←

- Instil 5mls 0.9% saline directly into tracheostomy tube
- Give deep suction

NOT RESOLVED ↓

RESOLVED ←

- Deflate trache tube cuff
- Carry out deep tracheal suction x 2

NOT RESOLVED ↓

RESOLVED ←

- Disconnect patient from ventilator and attach patient to **AMBU BAG** via trache tube
- Give **5** deep breaths using the AMBU BAG
- Re-connect ventilator and carry out deep tracheal suction

NOT RESOLVED ↓

- Repeat **AMBU BAG** breaths if still in distress
- If not able to ventilate patient via Tracheostomy Tube **<u>TAKE OUT TUBE</u>**
- **Try re-inserting new tracheostomy tube – same size or 1 size smaller**
- **IF UNABLE TO re-insert commence AMBU BAG** ventilation via patient's nose and mouth using face mask – **ENSURE TRACHE STOMA IS COVERED**

<u>CALL 999</u>

Appendix 14e

MANAGEMENT OF POSSIBLE CHEST INFECTION
TIV

Signs and Symptoms

- Increase in resting respiratory rate >30 bpm sustained
- Increase in secretion load on suctioning & increase need for tracheal suctioning
- Secretions thicker and more sticky
- Secretions have changed colour / may be 'smelly'
- Patient is pyrexial and/or having episodes of being hot / cold
- Patient looks unwell and short of breath

Patient has 1 or 2 signs and symptoms

Management Plan A

- Give extra **normal saline (0.9%)** nebulisers to reduce thickness of secretions
- If continues to be thick give an extra **3% saline nebuliser (mucoclear)** on top of routine
- Increase chest physiotherapy
- Try to keep patient in an upright position even if lying on side
- Ensure patient is well hydrated
- Give regular paracetamol for 24-48 hours

Patient has not improved after 24 hours or signs and symptoms have increased go to Management Plan B

Patient has >3 signs and symptoms

Management Plan B

- Follow **Management Plan A PLUS**
- Start rescue antibiotics (prescribed by GP and should be always in the home)
  - Give **double** dose as the first dose then as prescribed
- Inform GP
- Inform outreach
- If symptoms do not improve within **48-72 hours** OR patient significantly gets worse OR becomes:
  - Drowsy
  - Temperature not managed with paracetamol

RING 999

Appendix 14f

DISLODGED TRACHEOSTOMY TUBE (TT)

ALGORITHM A

REMEMBER
A B C

Dislodged Tracheostomy Tube (Partial / Total)

Tracheostomy tube is partially out of stoma

- If cuff inflated, deflated cuff
- Gently push the TT back into the stoma
- Check TT patency with suction

Can you easily pass a suction catheter down the TT?

NO

Resolved?

NO

Take out TT

YES

- Tracheostomy completely out of stoma
- Call for assistance
- Get emergency Trache box ready

Patient distressed?

Go to Emergency Algorithm B

NO

- Position patient with head tilted back to open airway
- Insert new TT of same size into stoma**
- Remove obturator
- Connect patient to ventilator if ventilated
- If cuffed, re-inflate and check with manometer (unless water cuff)
- Ensure patient is ventilating adequately, carry out respiratory assessment
- Check TT patency with suction catheter

**IF SAME SIZE TT DOES NOT GO IN INSERT TT ONE SIZE SMALLER

Resolved?

NO

Go to Emergency Algorithm B

YES

Appendix 14g

EMERGENCY ALGORITHM B

CALL 999 FOR MEDICAL ASSISTANCE

- Tracheostomy tube completely out of stoma
- Patient distressed and / or not breathing
- **Carry out ABC basic life support assessment**

- Connect **ambu-bag** to facemask
- Position patient with head tilted back to open airway
- 1 person to cover trache stoma with gauze and gloved hand
- Second person to place ambu-bag face mask over patient's nose and mouth ensure a good seal
- Give breaths using ambu-bag, ensure chest is rising and falling**
- Keep checking ABC as per BLS protocol
- Wait for ambulance crew

****After 10-12 breaths if you are confident try to re-insert a new tracheostomy tube same size or 1 size smaller**

- If re-inserted reconnect to ventilator if ventilated
- Secure TT with ties
- If cuffed re-inflate cuff
- Check tube patency with suction catheter
- Carry out respiratory assessment
- Wait for ambulance crew to do further respiratory assessment
- At an appropriate time Inform RBHT outreach team/ GP