Saskatoon Health Region	Policies and Procedures Title: **COUGH ASSIST-MECHANICAL INSUFFLATION-EXSUFFLATION – PROVISION OF THERAPY** **RN Specialty Practice: RN Procedure:** Cough assist therapy **LPN Additional Competency:** Cough assist therapy with an established plan of care Number: **1192**
Authorization: [X] Former SktnHR Nursing Practice Committee	Source: Nursing, Physical Therapy, Respiratory Therapy Date Effective: May 2018 Date Revised: May 2019 Scope: **Former SKtnHR Urban Acute Care and Parkridge Centre**

DEFINITIONS

Client – Term used to refer to residents, patients and clients.

Cough Assist therapy is the delivery of positive pressure with a rapid shift to negative pressure to the airways to stimulate a cough. It is an alternative to traditional suctioning providing decreased mucosal trauma and increased client comfort. Cough Assist (CA) treatment may recruit lung volumes, treat and prevent atelectasis, improve cough effectiveness, increase mechanical compliance, optimize thoracic range of motion and increase speaking volume.

The term mechanical insufflation-exsufflation is the official term but will be referred to as Cough Assist Therapy for this policy. In addition, the equipment being used is the Respironics Cough Assist E70 (CAE70) https://www.youtube.com/watch?v=62cLLZO9-u4

Established Plan of Care – the plan of care for cough assist therapy will be considered established once the Physical Therapist or Registered Respiratory Therapist has determined settings and confirmed client response. The plan of care must be documented in the nursing care plan. The plan of care is no longer considered established if there is any change in the person's status/response, including a need for increased frequency of assessments or vital signs.

Health Care personnel (HCP) refers to certified Physical Therapists, Registered Respiratory Therapists , in addition, in acute care Registered Nurses only, in long term care Registered Nurses and Licensed Practical Nurses.

ROLES

Families and clients are often trained to provide CA to the client at home and may continue to do so in hospital if they and the client would like.

Licensed Practical Nurses (LPNs) LPNs identified by the manager in long term care, will be certified in the LPN Additional Competency: Cough Assist Therapy with an Established Plan of Care, as assigned, for clients who are less complex, more predictable and at lower risk for negative outcomes. If a change is required in the established plan of care, the LPN will consult with a PT, RRT, certified RN, RN (NP) or physician and work collaboratively to establish a new plan of care.

In practice settings which are not targeted, LPNs currently educated or certified may continue to provide care, as assigned, but LPNs requiring initial certification will not be certified until targeting is approved for the practice setting.

Most Responsible Healthcare Provider (MRHP) The MRP may order CA therapy but a physician's order is not necessary. Contact the MRP if CA ineffective or if the clients direction of care has changed and you need further direction.

Physical Therapist (PT) PTs are responsible for prescribing the required settings to the cough assist therapy in collaboration with the goals of care as outlined by the MRP or designate. They will initiate the therapy in most cases and always adjust to the patient's needs. Consultation with the RRT and RN will occur to facilitate the optimal care and comfort for the client.

Registered Nurses (RNs) RNs identified by their manager in targeted practice settings will be certified in the RNSP-RN Procedure: Cough Assist Therapy. If a change in therapy is required they will wait for direction from the Physical Therapist who is responsible for adjusting the therapy settings. RNs do not initiate therapy or make adjustments to the settings.

Registered Psychiatric Nurses (RPNs) RPN role is under review by the former SktnHR Nursing Practice Committee. RPNs currently educated or certified may continue to provide care, as assigned, but RPNs requiring initial certification will not be certified until the review is complete.

Registered Respiratory Therapist (RRT) Cough assist therapy is part of the core curriculum. RRTs may provide cough assist therapy for all clients. They may initiate CA therapy and make adjustments to settings when necessary.

1. PURPOSE

1.1 To identify appropriate application of the CA therapy.

1.2 To reduce the risks and other complications of CA therapy.

1.3 To outline training requirements and roles in the application of CA therapy.

1.4 To outline the steps required to perform CA therapy using the Respironics Cough Assist E70.

2. POLICY

2.1 The RN certified in this RNSP will have first completed the following learning modules/ activities prior to performing cough assist therapy.

2.1.1 Complete the required learning module “Cough Assist- provision of therapy" of the Adult Client” and quiz (teaching and learning methods may vary e.g. classroom and/or self-study using paper module or on-line link)

2.1.2 Complete a skills checklist with a certified RN during simulation or during first treatment to ensure safety checks are followed appropriately. Re-certification may be necessary if RN hasn’t had recent experience with CA or self identifies the need to recertify.

2.1.3 Provide documentation of learning module quiz and skills checklist to educator/supervisor.

2.2 The LPN certified in this Additional Competency will have first completed the following learning modules/activities prior to performing cough assist therapy for chronic clients.

2.2.1 Complete the required learning module and quiz (teaching and learning methods may vary e.g. classroom and/or self- study using paper module or on line).

2.2.2 Complete a skills checklist with a certified RN or certified LPN during simulation or during first treatment to ensure safety checks are followed appropriately.

2.2.3 Provide documentation of learning module quiz and skills checklist to educator/supervisor

2.2.4 Yearly recertification of cough assist therapy required.

2.3 A Physical Therapist’s or physician’s order is required.

2.4 CA therapy is initiated and settings are adjusted primarily by the PT.

2.4.1 The RRT may make adjustments and will work collaboratively with the PT or physician.

2.4.2 When CA treatment is initiated by the RRT, they must contact the PT department at the specific site where therapy was started (either by phone or fax). This will ensure that the patient is added to the PT patient list to continue therapy.

2.5 CA therapy may be performed solely by PT as part of a treatment plan.

2.5.1 Additional CA may be provided by trained HCP.

2.6 For clients receiving CA by nursing and/or RRT in addition to the PT treatment, the client will be transferred to units/facilities targeted in this therapy.

2.6.1 For clients that require CA treatment only by the PT, they may be cared for on general units.

2.6.2 See Appendix B for usual establishment of CA provision and treatment planning.

2.7 Contact the PT or RRT if CA seems ineffective or not producing the same effect as prior treatments.

2.8 Contact the physician if the client condition changes or if there are any concerns that the client no longer meets the clinical indications for cough assist or has met possible contraindications.

2.9 Cough Assist is a procedure at high risk of generating droplets, exposing staff to respiratory pathogens. Appropriate Personal Protective Equipment (PPE) is required.

2.10 The PT or RRT will assign a preset setting of 1, 2 or 3 if there is an expectation of the RRT,RN or LPN to perform CA therapy.

2.10.1 The detailed settings will be listed on the CA flow sheet. See Appendix A.

2.10.2 The HCP must verify the settings prior to performing CA therapy.

2.10.3 If settings do not correlate with the CA flow sheet, call the PT during their hours of work. If not available, call the RRT.

2.11 **Indications <u>for use</u>**:
Client is unable to mobilize or expectorate secretions effectively.

2.12 **Contraindications:**

Absolute:

2.12.1 Untreated pneumothorax.

2.12.2 Impaired consciousness and/or inability to communicate in instances where the client does NOT have an artificial airway.

Relative:

2.12.3 Presence of hemoptysis, recent pneumothorax, bullous emphysema, severe COPD, severe asthma, recent cardio-thoracic surgery and recent lobectomy.

2.12.4 Increased intra cranial pressure (ICP) including ventricular drains.

2.12.5 Nausea and emesis.

Cautions:

2.12.6 Therapy immediately following meals.

2.12.7 Rib fractures.

2.12.8 Pregnancy.

2.12.9 Tachypnea.

2.12.10 History of intrinsic lung disease.

2.12.10.1 The use of CA therapy in clients with intrinsic lung diseases (such as chronic obstructive pulmonary disease (COPD), bronchiectasis, cystic fibrosis (CF), pulmonary fibrosis, and asthma (where secretions may be abundant) should be introduced with caution and at times may not be indicated. The efficacy of the treatment in this instance must be monitored by a physician specialized in lung physiology, such as a staff Respirologist or Intensivist.

2.12.11 Clients with a combination of intrinsic diseases and paralytic/restrictive disorders must be referred to a staff Respirologist or Intensivist for consultation (CA therapy may cause early closure in flaccid airways such as COPD, CF, bronchiectasis).

2.12.12 Clients with long-standing thoracic cage restriction who may have severely reduced thoracic compliance will require slow incremental insufflations during the initial introductory period.

2.12.13 History of pneumothorax.

2.12.14 Large pleural effusion.

2.12.15 Unstable cervical spinal injury.

2.12.16 Hemodynamic instability.

2.12.16.1 Clients known to have cardiac instability should be monitored for arrhythmias (especially acute spinal cord injury) for Sp02, dyspnea, vital signs, and symptoms of cardiac instability.

2.12.17 Impaired consciousness / inability to communicate where the client has an artificial airway.

2.13 **Special considerations**:

2.13.1 The use of CA therapy in other conditions not specified in the policy should be discussed with the care team.

2.13.2 Notify physician if chest pain is present.

2.13.3 Supplemental oxygen should not be added to the CA E70 circuit as it is a potential fire hazard.

3. PROCEDURE

3.1 Supplies:

- Personal Protective Equipment (PPE): mask with attached visor, gown and gloves.

***Note**: Due to the higher risk of expelling secretions with the Cough Assist procedure, there would be a higher risk of it splashing to clothing, and therefore, a gown and gloves would be required.*

- CA E70 – (PT department provides the CA E70 in acute care, SAIL generally supplies to the community through the ALS clinic)
- Bedside resource sheet to be available on machine. See Appendix C.
- BacT trap hepa port (filter) SKU 44263.

- 6 foot clear corrugated tubing SKU 47400.
- Client interface. Ie. Mask (appropriately sized for client), endotracheal tube/ tracheostomy.
- 15 mm connector –SKU #47325.
- Suction source set up at bedside.

Note: *See Appendix C for supply list. Print the appendix and have a laminated copy with the machine*.

3.2 Perform hand hygiene and don PPE.

3.3 Turn on the CA E70 using the power button.

3.4 Set machine to the Preset as indicated on the Cough Assist flow sheet and confirm settings. (the preset will display in the top left hand corner) See Appendix A for example of the flow sheet.

3.4.1 To select a different Preset than the one currently visible on the screen:

- Press “Settings”
- Press “Modify”
- Press “Edit”
- Select “1,2,or 3” by using the arrow buttons
- Select “OK” and “Finish”

Additional options (for information only)

- *If the PT has selected the oscillation option (the pressure oscillates above and below the absolute number) the flow may oscillate on inhale, exhale or both. If oscillation is selected it will show in the title of the Preset eg. Preset 1 Auto Oscillation.*
- *If the PT has selected the cough trak option this allows the machine to detect the client’s inhale effort and synchronize the inhale phase with it. This will also display in the title of the Preset.*

3.5 Connect the tubing to the client interface.

3.6 Press the “Therapy” button to start the set. CA therapy begins immediately.

3.6.1 Provide the number of repetitions stated on the Cough Assist flow sheet.

3.6.2 Press the “Standby” button to have the machine temporarily stop cycling between sets.

3.7 Rest the client a minimum of 30 seconds between sets. The client will indicate when they are ready to proceed.

3.7.1 CA should be stopped immediately if new onset dyspnea, chest pain, or hemodynamic instability occurs. If CA therapy is ineffective or if the client is requesting CA frequently without the desired effect, contact the PT/RRT for a client assessment, MRHP may need to be consulted as client condition may no longer be supported by CA therapy.

3.8 Clearing secretions from the tubing as needed.

3.8.1 The client may cough up secretions during the treatment.

3.8.2 Press “Standby” and disconnect the tubing from the client interface to empty the secretions before the next cycle.

3.8.3 Press “therapy” to resume.

3.9 Suction the client as necessary.

3.9.1 CA and any form of deep breathing and coughing may mobilize mucous and this may cause a “mucous plug”. This must be cleared immediately and require another set of CA or coughing with suctioning.

3.10 Once you have completed the treatment as ordered, disconnect the tubing from the client interface.

3.11 Following the treatment:

3.11.1 Discard the 15mm connector and corrugated tubing.

3.11.2 The BacT trap filter may be kept and reused up to 2 weeks unless visibly soiled.

3.11.3 The face mask may be used until it becomes damaged. Use soap and water to clean and dry. Ensure face mask is dried thoroughly before being stored.

3.11.4 In between treatments, the BacT trap filter and face mask can be stored in a clean, sealed, plastic bag at the client bedside once completely dry.

3.12 Clean external surfaces of the CoughAssist E70 with a hospital-grade disinfectant as per manufacturer's guidelines.

3.13 Remove PPE and perform hand hygiene.

3.14 Document:

3.14.1 Treatment on Cough Assist flow sheet # 104125.

3.14.2 Client response, $Sp0_2$ and respiratory response on progress notes/vital sign record as per unit standard.

4. REFERENCES

Adhikari, NKJ. et al. (2017) Cough augmentation techniques for extubation or weaning critically ill patients from mechanical ventilation (Review) Cochrane Library. Pg 1-31

Canadian Alternatives in Noninvasive Ventilation (CANVENT) (2016) Health Professional Info-Mechanical Insufflation-exsufflation (MI-E) WWW. Canventottawa.ca Pg 1-4

Fernandez-Carmona, A. et al. (2017) Ineffective cough and mechanical mucociliary clearance techniques. Med Intensiva Pg. 1-10

Koenig, E et al. (2016) Mechanical insufflation-exsufflation for an individual with Duchenne muscular dystrophy and a lower respiratory infection. Respirology Case Reports- Asisan Pacific society of Respirology. Vol 5 Issue 2 page 00210-00212.

Koninklijke Philips Electronics N.V. CoughAssist E70 user manual (2012) Pg 1-48

Lung Volume Recruitment-Manual and Mechanical, Respiratory Services Policy and Procedure Manual, Calgary Health Region, 2008.

Mechanical Insufflation-Exsufflation for Paralytic/Restrictive Disorders Policy and Procedures, Regina Qu'Appelle Health Region Respiratory Therapy Services Policy and Procedure Manual, 2016

Mechanical Insufflation-Exsufflation for Paralytic/Restrictive Disorders, The Ottawa Hospital

Rose, L. et al. (2016) Cough Augmentation Techniques in the Critically Ill: A Canadian National survey. Respiratory Care vol 16, No 10 pg 1360-1368.

Saskatoon Health Region
Saskatoon, Saskatchewan
☐ RUH ☐ SCH ☐ SPH Other_____

Appendix A

Name: _____
HSN: _____
DOB: _____

COUGH ASSIST RECORD OF CARE

	Frequency of Treatment:		**Mode:** Manual / Auto	
Settings	**Preset** (circle one)**:** 1 2 3 None		**Position of treatment:**	
	Cough-Trak: On / Off **Pause:** seconds		**Interface:** Mask / Trach / ETT	
	Inhale: + cm H_2O seconds	**Exhale:** - cm H_2O seconds	**Pause:** seconds	
	FOR PT/RT USE ONLY			
	Inhale Flow: Low / Med / High			
	Oscillation: Inhale / Exhale / Both / NA		**Frequency:** Hz	**Amplitude:** cm H_2O

Treatment	Date:				
	Time:				
	Preset (circle)	1 2 3	1 2 3	1 2 3	1 2 3
	Patient Consent:	Yes / No	Yes / No	Yes / No	Yes / No
	Patient Position:	❑ Supine ❑ Chair ❑ HOB ____° ❑ WC tilt ____°	❑ Supine ❑ Chair ❑ HOB ____° ❑ WC tilt ____°	❑ Supine ❑ Chair ❑ HOB ____° ❑ WC tilt ____°	❑ Supine ❑ Chair ❑ HOB ____° ❑ WC tilt ____°
	Auscultation:	Pre	Pre	Pre	Pre
		Post	Post	Post	Post
	Sets / Reps:	/	/	/	/
	Amount Produced:				
	Color/ Consistency:				
	Mucous Plugs:	Yes / No	Yes / No	Yes / No	Yes / No
	SpO2: (Pre/Post)				
	Peak Cough Flow (L/min)				
	Other Treatment:				
	Treatment Tolerance:				
	Treated By: (name/ designation)				

Form 104125 04/18

APPENDIX B

Usual acquisition/Education of Cough Assist therapy-

1. Clients with motor neuron disease referred to the ALS clinic
2. Evaluated by RRT , if Peak flow less than 270, they qualify for Cough Assist therapy
3. ALS clinic to provide the CAE70 machine, **PT provides an assessment of CA needs to create a CA care plan**, provides education to the client and their family to be able to perform CA therapy at home.
4. Contact information provided to the client/family to be able to call the PT during work hours if they have questions

If client is admitted to acute or long term care

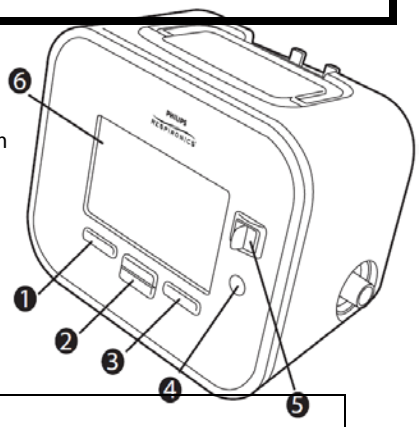
⇩

Physical Therapist must prescribe the Cough Assist therapy

Acute care	Long Term care
PT or RRT to see client to set up client with CA therapy	Contact PT for consultation regarding client needs. PT will be responsible for establishing CA therapy
PT will follow client and adjust settings as needed	Establish an education plan for the nursing staff • Contact Physical Therapist to set up educational session for facility staff • Review nursing policy and procedure, learning package and attend education session for certification
Client location • If PT only going to provide CA, client may be on any unit • If RRT and/or nursing to provide additional CA, then the client must be placed on one of the targeted units	CA therapy may be performed by qualified staff in long term care
Troubleshooting: • If established CA therapy not effective or producing usual results, contact the PT • If client condition changes from the established plan of care, contact the PT or physician for assessment or need to transfer to a different level of care	

APPENDIX C

Using CoughAssist - CAE70



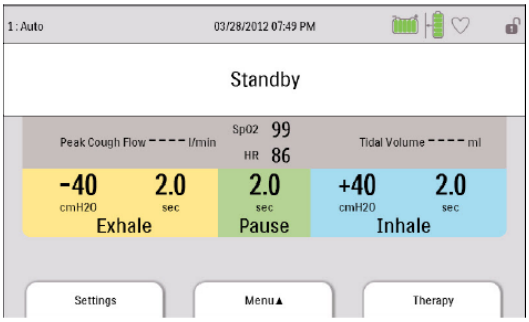
1. Left button- allows you to select display options
2. Up/down.button- navigates the display menu and edit device settings
3. Right button- allows you to select display options or perform actions specified on screen
4. Power on/off button- turns device on or off
5. Manual switch- activates the exhale and inhale phases during manual mode
6. Display screen- allows you to view settings

* for more details see the Philips Respironics CoughAssist E70 operators manual.

To start therapy:

Turn on the CA E70 using the power button

- The Standby screen will appear

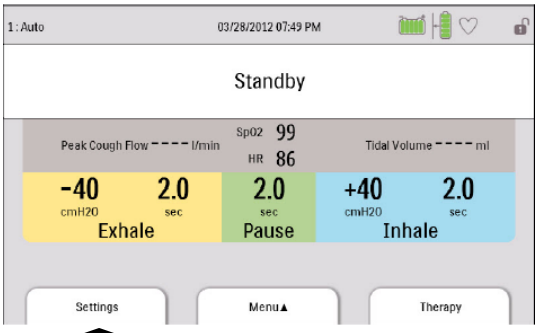


Set machine to the Preset as indicated on the Cough Assist flow sheet and confirm settings.
The preset will be displayed in the top left hand corner)

To select a different Preset than the one currently visible on the screen:

- Press "Settings",
- Press "Modify"
- Press "Edit"
- Select "1,2,or 3" by using the arrow buttons
- Select "OK" and "Finish."

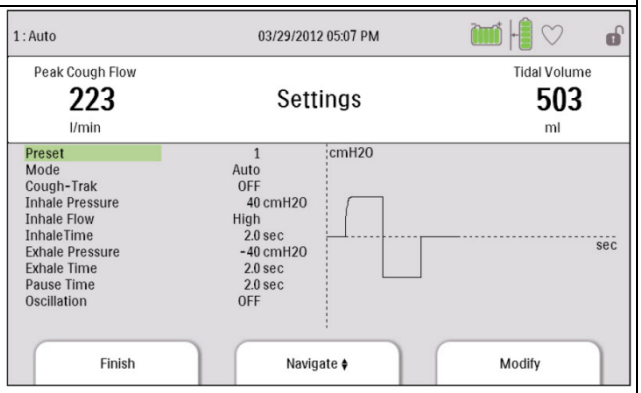
* Note whether cough trak is off or on

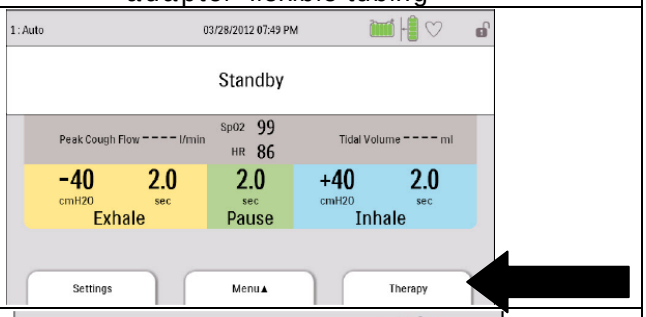
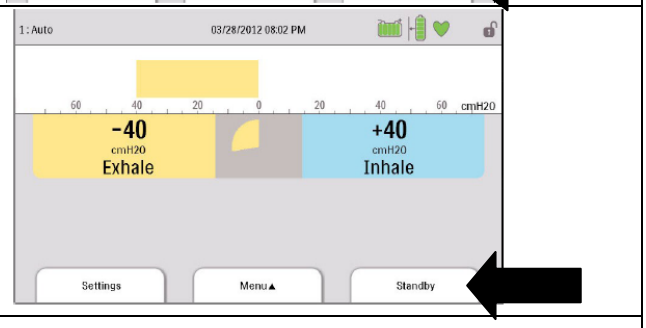
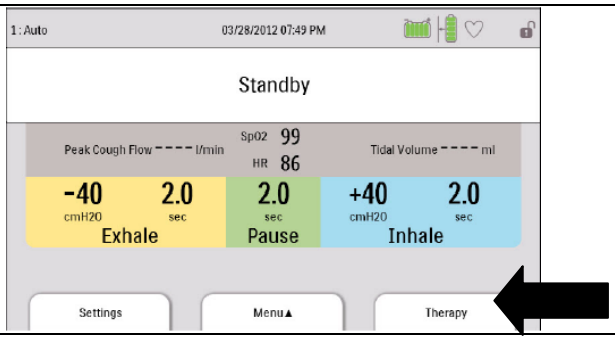


Press "settings" and follow Instructions to select correct preset

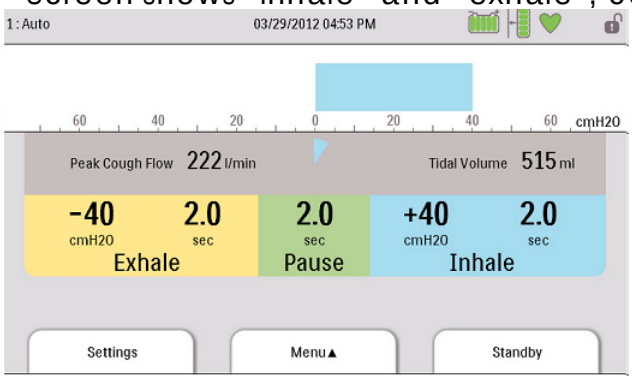
Example: This photo shows that preset "1" has been selected.

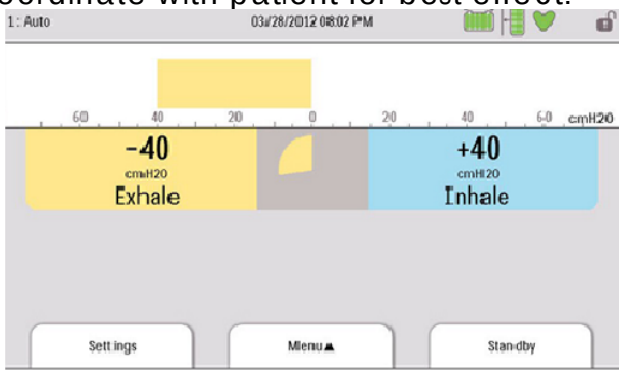
Note: The same CAE70 may be used for more than one patient. Settings are tailored specifically to each patient.



Assemble the circuit specific for the patient • interface +/- adaptor • bacterial filter • flexible tubing	Possible interfaces include: • Facemask to flexible tubing • Mouthpiece to flexible tubing • Endotracheal or tracheostomy tube – adaptor- flexible tubing
If Cough Trak is OFF <u>Cough Assist pre-therapy test</u> Press 'Therapy' and the cough assist therapy will start immediately for a test • test the settings against the circuit with a gloved hand occluding the end to confirm pressures	
Press "Standby" to stop test. **If Cough Trak is ON** ** if cough trak is on, you will not able to run a test as the patient wouldn't be connected to trigger the therapy	
Explain procedure to patient: Explain procedure to patient and have patient in a sitting or semi- recumbent position if possible Ensure the patient can see the screen so they can inhale and exhale in sync with the CA * Be aware of how many reps are prescribed so you can coach the patient.	CA therapy is most effective if the patient is upright and can follow the directions given by the care provider during the treatment • patients may experience soreness or pain in the chest when they use CA therapy for the first time
Begin the set <u>Cough trak off</u> Press the "Therapy" button to start the set. CA therapy begins immediately. <u>Cough trak on</u> Coach the patient to begin theset	

* Screen shows "inhale" and "exhale", coordinate with patient for best effect:





Coaching the patient to use the CoughAssist E70

1. Coach the patient to begin taking a deep breath and start the CA device
    - (Positive pressure will be delivered to the patient for the prescribed time)
    - Coach by saying → "IN-IN-IN"
2. After the set inhalation time, the device will automatically switch to the exhalation phase
    - (Negative pressure produced from the device therefore a pulling of air out of the patient).
    - Coach the patient for the change to breathe out by saying "OUT-OUT-OUT".

    - Assessment: Is there a change in patient condition?
        i. CA should be stopped immediately if new onset dyspnea, chest pain, or hemodynamic instability occurs. If CA therapy is ineffective or if the patient is requesting CA frequently without the desired effect, contact the PT/RRT for a patient assessment, physician may need to be consulted as patient condition may no longer be supported by CA therapy.
        ii. CA and any form of deep breathing and coughing may mobilize mucous and this may cause a "mucous plug". This must be cleared immediately and require another set of CA or coughing with suctioning.
3. Maintain the interface seal with the patient and **repeat** the inhalation-exhalation process 3 to 5 times, as prescribed on the Cough Assist Record of Care.
    - Multiple repetitions of inhale-exhale are included in one set.
    - The patient may have secretions that can be expectorated prior to the end of the set.
        i. Therapy can be **stopped on any exhalation phase** to allow secretions to be removed by removing the interface and pressing "Standby"
        ii. Press "therapy" to begin the next set
4. On the final exhalation (negative pressure), remove the interface from the patient and allow the patient to expectorate, if able, or provide shallow suction assistance to clear the inner cannula if needed.
5. Rest at least 30 seconds in between sets of CA therapy as required by the patient. The patient will indicate when they are ready to proceed.
6. Clearing secretions from the tubing as needed:
    - The patient may cough up secretions during the treatment.
    - Press "Standby" and disconnect the tubing from the patient interface to empty the secretions before the next cycle.
    - Press "therapy" to resume
7. Suction the patient as necessary. Shallow suction is preferred to decrease trauma.
8. Once you have completed the treatment as ordered, disconnect the tubing from the patient interface.

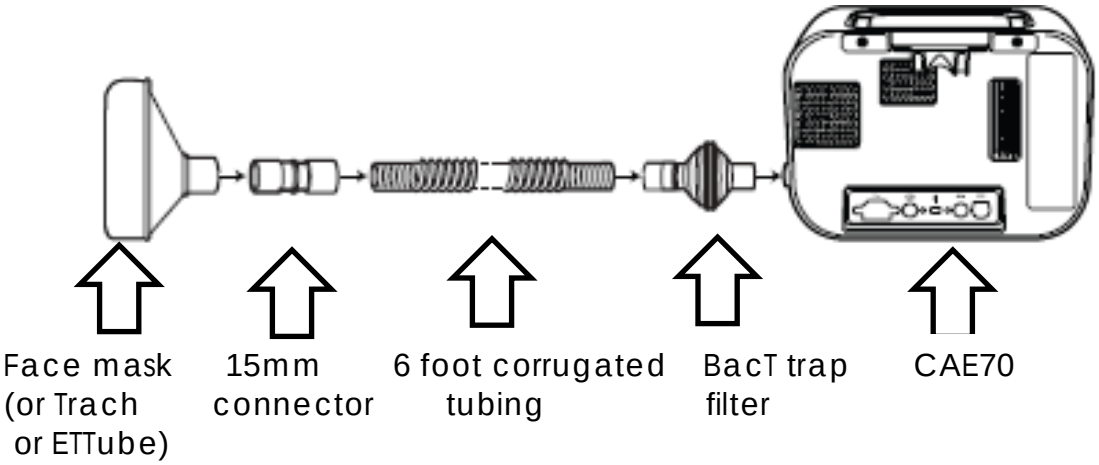
Cleaning and documentation

9. Equipment.
    - The BactTrap hepa port will be dated to be re-used for up to 2 weeks unless visibly soiled
    - 15mm connectors, PPE and corrugated tubing are discarded after each use.
    - The face mask may be used until it becomes damaged. Use soap and water , dry
    - The face mask and BacT Trap filter can be stored in a clean bag at the bedside
    - Clean external surfaces of the CoughAssist E70 with disinfectant as per facility policy.

10. Document
    - Treatment: Cough Assist Record of Care (#104125)
    - Patient response, Sp02, and respiratory response on progress notes/vital sign record as per unit standard.

3.5 Following the treatment- restock supplies as listed below

Equipment set up:



Restocking supply list: ensure you replace with supplies after each session

Item	Location obtained
CAE70	Physiotherapy or RRT
BacT trap hepa port (filter)	SKU 44263
6 foot clear corrugated tubing	SKU 47400
15 mm connector	SKU 47325
Client interface	• Appropriate mask for patient • Tracheostomy tube • Endotracheal tube
Suction @ bedside	