

# Cough Assist Insufflator - Exsufflator

## Definition of Terms

**Airway** – The route by which air reaches the person's lungs; it consists of the nose, mouth, throat, trachea (windpipe) and bronchial tree.

**Airway clearance** – Movement of mucus out of the lungs by coughing or other applied techniques to reduce airway obstruction, prevent the likelihood of infection and improve lung function.

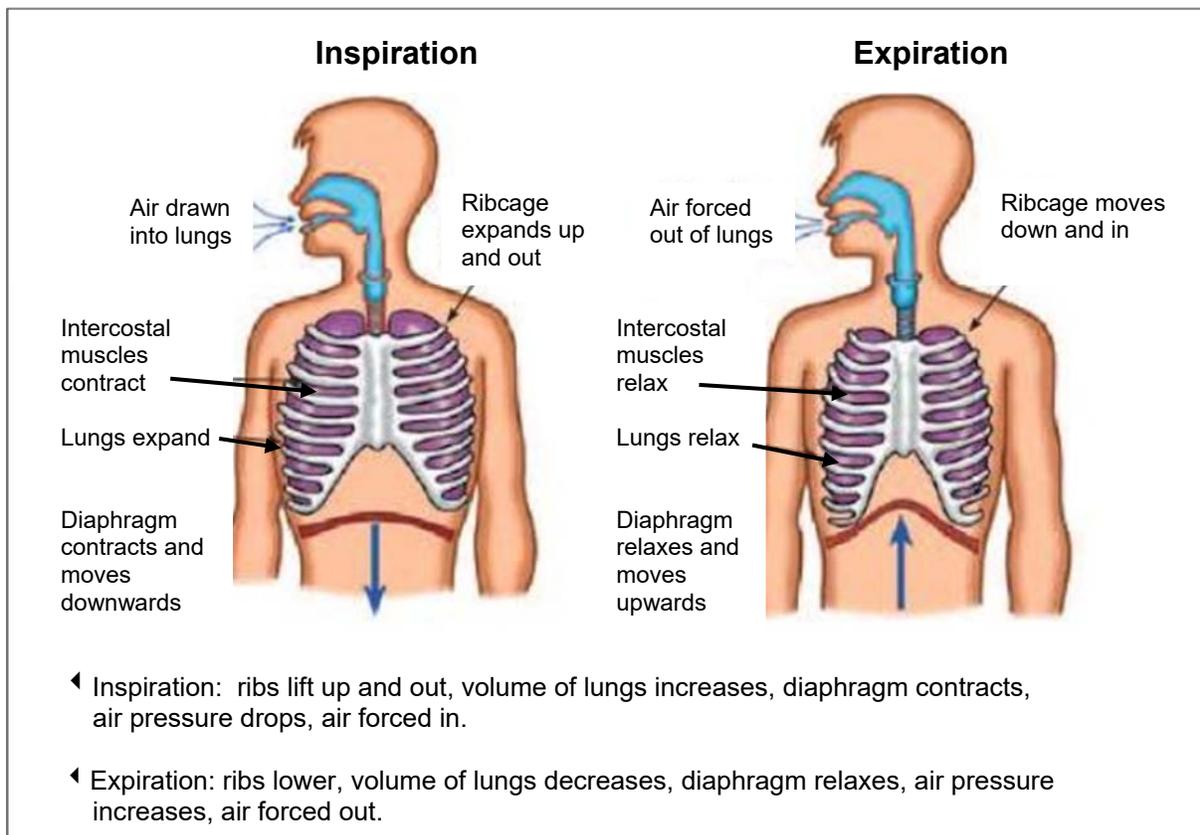
**Cough Assist Machine** – This device forces pressurized air into the lungs on inspiration to help a person breathe deeper and then applies negative pressure on exhalation to pull any loose secretions into the mouth and upper airway.



**Breathing Cycle** – 1 Inhalation + 1 Exhalation = a breathing cycle.

A normal rate of breathing should be 12-20 times per minute. If breaths at rest are fewer than 8 or more than 25 breaths per minute, seek urgent or emergency care.

## Illustration of Breathing Cycle



(Definition of terms continued)

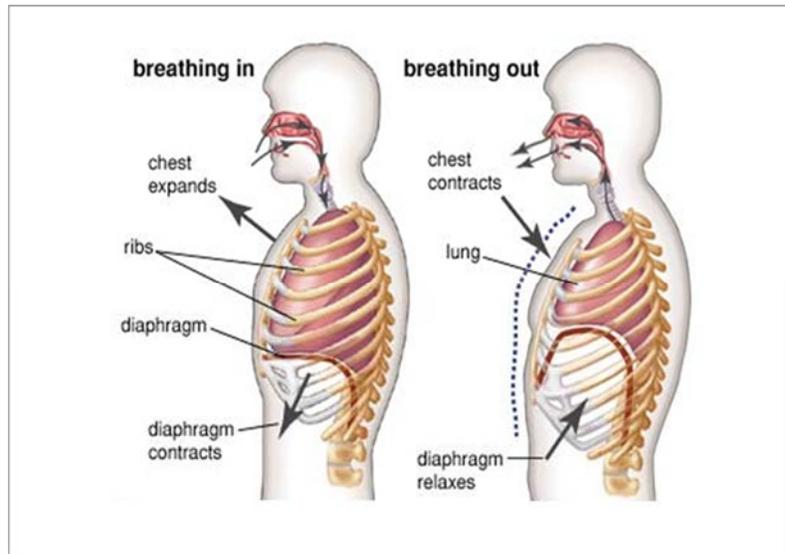
**Expiration/Exhalation** – Movement of air out of the lungs; chest falls during expiration.

**Exsufflation** – Mechanical application of negative pressure to pull air out of the lungs.

**Inspiration / Inhalation** – Taking a breath in; chest rises during inspiration.

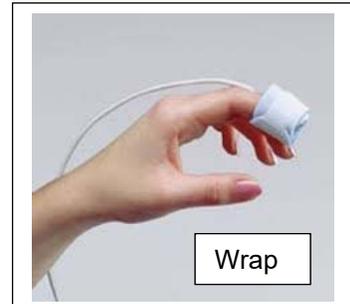
**Insufflation** – Mechanical application of positive pressure to push air into the lungs.

**Mode** – A machine may be operated by manual or auto mode. Auto mode allows the device to automatically function on pre-set settings. Manual mode expects the person using the device to adjust settings.



**Oxygen saturation** – The percentage of oxygen in the blood. Normal oxygen saturation levels are 95% or higher. Oxygen saturations below 92% are generally abnormal and require a call to the appropriate health care professional, unless individual specific orders say something different.

**Pulse oximeter** – A device with a clip or wrap placed on the finger (or sometimes ear) to measure the amount of oxygen in the blood (oxygen saturation).



**Secretions** – Substances that are produced by a gland or organ. For example, mucus is produced by glands lining the airways to keep its structures moist and lubricated. If the mucus becomes too thick and sticky, or builds up, it makes it difficult for the person to breathe properly.

**Sputum** – A mixture of saliva (spit) and mucus coughed up from the respiratory tract.

**Treatment Cycle:** One cycle is when the machine pushes air into the lungs **and** pulls air out of the lungs.

## Why is coughing an important body function?

Coughing is essential to life. The mucous layer in the airways traps dirt and bacteria. Coughing allows the airways to expel this mucus and prevents infection.



## What is a cough assist insufflator and what does it do?

It is a machine that helps people with a weak or ineffective cough bring up secretions so that air can move freely in and out of the lungs. Regular use of the insufflator reduces the likelihood of pneumonia caused by collection of secretions in the lungs, reducing the need for hospitalization. The in-exsufflator machine helps people with weak chest muscles get:

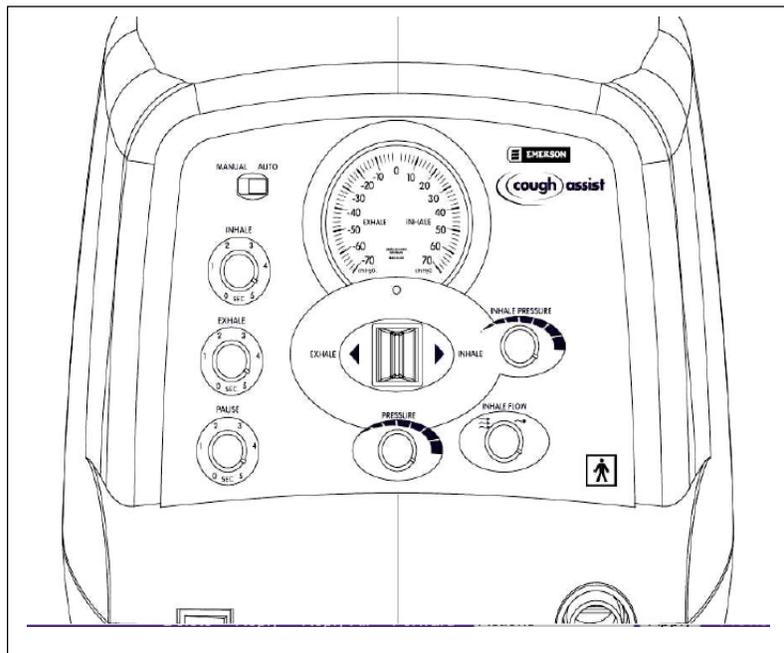
- ◀ a deep breath
- ◀ a simulated strong cough

## How does the cough assist insufflator – exsufflator machine work?

This machine simulates a natural cough by gradually delivering a large volume of air when the person breathes in. Once the lungs are inflated (expanded), the machine quickly reverses the positive pressure in the lungs to a negative pressure to pull secretions out of the airways.

Treatments are prescribed by numbers of cycles. A push of air in plus the pull of air out is one cycle.

With the assistance of the machine, the person's cough is stronger and thus more effective in removing built-up secretions that have collected in the airways.



Many people report that breathing is much easier for them after using a cough-assist device. This is because removing excess secretions decreases the resistance to airflow.

### **Who benefits from using a cough assist insufflator - exsufflator machine?**

People with weak chest muscles that make it difficult for them to breathe deeply and cough vigorously enough to remove excess mucus from their lungs. Weak chest muscles can be caused by spinal cord injuries, cerebral palsy, muscular dystrophy, and other debilitating diseases.

### **What are the advantages of using a cough assist insufflator – exsufflator machine?**

- ◊ Prevention of infections such as pneumonia
- ◊ Keeping the airways clear allowing for easier breathing
- ◊ Can be used with a mouthpiece, mask, or tracheostomy tube adapter
- ◊ Brings secretions into view so that removal can occur with oral or less invasive suctioning

### **Who would write the prescription and instructions for use of the cough assist insufflator - exsufflator?**

- ◊ A physician will write the order for using the cough assist in-exsufflator
- ◊ If the physician indicates that an insufflator - exsufflator is needed, a respiratory therapist will evaluate the individual's need and provide directions for settings and usage
- ◊ Directions will include machine settings to be set by the equipment supplier
- ◊ Certified staff may **NEVER** adjust the machine settings. Only the equipment supplier is allowed to adjust the settings
- ◊ If there is any problem with the settings or the equipment, call the equipment provider immediately to address the issue. (They are on call 24 hours a day)
- ◊ Directions for unlicensed staff will include only the number of cycles per treatment and the number of treatments per day

### **Are there any safety precautions?**

- ◊ Check ports for airflow to ensure they are open and working
- ◊ Check all settings before each treatment. The machine should be in “auto” mode at all times.
- ◊ Look at the pressure gauge to see that pressures are reaching the desired settings with cycles; if not, contact the equipment provider
- ◊ Allow the individual to rest and recover between cycles
- ◊ Keep machine away from curtains, blankets or any heat-generating device
- ◊ Do not attempt to repair the machine yourself – seek a professional repair service
- ◊ Keep machine away from water – never clean by immersing in water
- ◊ Use a grounded outlet only
- ◊ **Never use the machine until you have received proper training and fully understand how to use it.**
- ◊ **Be sure to follow the prescription information precisely**

## How is the cough assist insufflator – exsufflator cleaned and maintained?

**Be sure to follow the manufacturer's directions for cleaning and maintenance.**

**Generally speaking, you should plan to:**

- ◊ Wipe the outside of the machine with a damp cloth daily
- ◊ Thoroughly wash the hoses and mask with mild soap and water daily. Allow all parts to air-dry. Be sure all parts are completely dry before each use
- ◊ Replace any torn, worn, or broken parts that no longer work as they should
- ◊ Do **NOT** wash the bacterial filter. Leave it in place as long as it is not blocked by sputum or trapped moisture. Replace it per manufacturer's instructions
- ◊ If the pressure gauge does not return to zero when the device is turned off, refer to the manufacturer's instructions for what to do



## Checklist for Cough-assist Insufflator-Exsufflator

### How to use the Cough-assist Insufflator - Exsufflator

- \_\_\_\_\_ 1. Plug electrical cord into power socket and into back of machine.
- \_\_\_\_\_ 2. Wash hands and put on gloves.
- \_\_\_\_\_ 3. Insert the tubing into the cough assist machine.
- \_\_\_\_\_ 4. Attach the face mask to the other end of tubing.
- \_\_\_\_\_ 5. Position the person as instructed.
- \_\_\_\_\_ 6. If oral suctioning is required after exsufflation, prepare the oral suction machine.
- \_\_\_\_\_ 7. Turn on the cough machine using the power switch.
- \_\_\_\_\_ 8. Check the pressure by putting hand over mask. Check pressure gauge to ensure correct pressures are registering on the gauge for both inspiration & expiration.
- \_\_\_\_\_ 9. Check to be sure the machine is in auto mode.

### Now You Are Ready to Use the Cough-assist Insufflator - Exsufflator With the Person

- \_\_\_\_\_ 1. Make sure the person is comfortable and ready for the treatment.
- \_\_\_\_\_ 2. At the end of expiration or just at the start of inspiration, seal the mask firmly around the person's mouth and nose.
- \_\_\_\_\_ 3. Instruct the person to take a deep breath in with the machine during the inspiration and to cough strongly during expiration. (If they are able)
- \_\_\_\_\_ 4. After each cycle (inspiration and expiration) pause the machine and remove the mask.
- \_\_\_\_\_ 5. Instruct the person to spit out any secretions or orally suction if needed.
- \_\_\_\_\_ 6. Allow the person to recover.
- \_\_\_\_\_ 7. Repeat steps 2-6 for the prescribed number of cycles.
- \_\_\_\_\_ 8. Turn off machine at the switch and at the power socket.
- \_\_\_\_\_ 9. If gloves are soiled, remove them; wash hands; and put on clean gloves.
- \_\_\_\_\_ 10. Clean machine, mask, and tubing according to specific instructions for that individual's equipment.

✓ **Remember, it will be difficult for the person to take a normal breath while the insufflator is cycling air in and out. If the person is distressed by this, remove the mask promptly and start again when the person is calm and ready**

Trainee name: \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_ Instructor initials      Instructor Name \_\_\_\_\_

**Comments:**