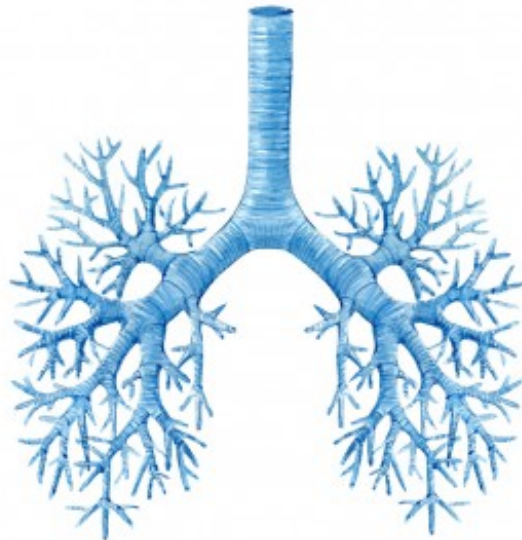


# Airway Clearance Therapy for Patients with COPD

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*Administering some type of airway clearance therapy for patients with COPD is essential to disease management and patient quality of life, and clinicians have several options for clearing the airway.*

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By Phyllis Hanlon

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In 2013, the American Association for Respiratory Care (AARC) issued guidelines regarding implementation of airway clearance therapy (ACT) for a number of respiratory conditions, including COPD. The purpose of the guidelines was to determine if "... nonpharmacologic ACT improves oxygenation, reduces length of time on the ventilator, reduces stay in the ICU, resolves atelectasis/consolidation, and/or improves respiratory mechanics, versus usual care in three populations."<sup>1</sup>

Although the effectiveness of ACT in certain patients is not definitive, administering some type of airway clearance for patients with COPD is important. Clinicians have several options for clearing the airway in these patients, but before establishing a course of action, they should determine the stage of disease. MeiLan Han, MD, MS, volunteer spokesperson for the American Lung Association, emphasized the importance of determining the severity of the disease prior to initiating therapy. "A diagnosis of COPD depends on airway obstruction found through spirometry. One-third of patients in the United States get a diagnosis without spirometry," she said. "Many are being diagnosed on clinical features only, which may or may not be accurate."

## Handheld Devices

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Furthermore, Han pointed out that not every patient with COPD needs airway clearance. Excessive coughing and sputum production might be due to bronchiectasis, which should be confirmed on CT scan, she said. “For the subset who fit into this group, treatment usually begins with Acapella or some other handheld device that increases respiratory clearance. If that is ineffective, the patient moves to a vest.”

A 2017 study recommended handheld oscillatory positive expiratory pressure (OPEP) devices for patients with stable COPD to remove secretions.<sup>2</sup> OPEP devices “...require patients to exhale against a fluctuating resistance.” Several exhalations through a device, such as the Flutter or Acapella, create positive pressure that sustains expiratory airflow and prevents airway collapse, while vibrations facilitate sputum clearance.

## High Frequency Chest Wall Oscillation (HFCWO)

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Another widely used airway clearance device is a vest that delivers high frequency chest wall oscillation (HFCWO); several different models are currently on the market.

Dana Kolflat, director of marketing, International Biophysics Corp, reported that the AffloVest, which features Patented Direct Dynamic Oscillation technology, has eight oscillating motors that create individual pressure waveforms and provide disruption in the lungs to mobilize secretions.

“The AffloVest is the first fully mobile battery operated HFCWO vest scientifically engineered to closely mimic manual chest PT,” said Kolflat, adding that the device is available only by prescription.

The AffloVest has three modes of oscillation treatment — percussion, vibration and drainage — three adjustable intensity levels with nine total setting variations and seven different sizes to accommodate patients with a chest circumference between 18 and 65+ inches.

Philips also delivers HFCWO with its Respirtech InCourage System, according to Dave Myers, Global Product Marketing, Ventilation and Airway Clearance at Philips Respironics. “The InCourage system consists of a Therapy Unit (TU), an inflatable garment, and interconnecting hoses. The TU delivers pulsating air to the garment resulting in a rhythmic inflation and deflation of the garment against the patient’s chest,” he said. “This inflation and deflation (ie compression) loosens and thins mucus so that it can mobilize and be expelled by the patient, offering a safe, effective, non-invasive airway clearance method.”

Myers added that Philips InCourage has been particularly useful for patients who have both COPD and bronchiectasis — a group that the National Center for Biotechnology Information (NCBI) estimates may include 50 percent of people living with serious COPD.

Another product whose primary goal is airway clearance therapy is the Philips

Respironics CoughAssist T70, Myers noted. “It is a mechanical insufflation-exsufflation (MI-E) device designed to clear secretions from the lungs by simulating a natural cough,” he said. “Similar to a normal deep breath, CoughAssist T70 gradually applies positive air pressure (insufflation) to obtain a large volume of air within the lungs. The device then quickly reverses the flow of air by shifting to negative air pressure (exsufflation). The resulting high expiratory flow helps mobilize secretions out of the airway — just like a deep, natural cough.”

## Combination Devices

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Ventec Life Systems manufactures a combination device that addresses multiple issues, depending on the patient’s condition and the degree to which the disease has progressed, according to Chris Brooks, managing director. “VOCSN combines a critical care ventilator, 6 LPM equivalent oxygen concentrator, touch button cough assist, hospital grade suction and a high performance nebulizer in a portable eighteen-pound device,” he said.

VOCSN works across the continuum of care, from the hospital to home, and for pediatric patients weighing more than 5 kg to adults, Brooks added. “VOCSN is designed to improve care for patients with neuromuscular disease, such as muscular dystrophy and ALS, impaired lung function, such as COPD, cystic fibrosis, lung cancer, emphysema, spinal cord injury, and pediatric development complications, such as premature births, chronic lung diseases,” he said. “Patients can get all five therapies or just the mix of therapies needed.”

## High-tech Advances

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Hillrom offers three HFCWO devices for at-home airway clearance therapy. According to Andy Reding, vice president/general manager, Hillrom Respiratory Health, The Vest Airway Clearance System fits a range of patients, from pediatrics to adults of different sizes. Patients have two options from which to choose: a garment that wraps around the torso and includes shoulder straps and one without the shoulder straps. “The traditional Vest System uses a pulse generator with hoses that connect the generator to The Vest System garment. So the patient is sitting in one location while doing therapy,” he said.

The VisiVest System with Bluetooth connectivity, similar to The Vest System, functions mechanically and clinically the same way, according to Reding. “But [this model] has Bluetooth, which enables the patient and health care team to collaborate on a care plan through the VisiView Health Portal, which basically shows how they use the device, how often, what settings and for how long. Keeping track of usage helps in coaching the patient,” he said.

Reding pointed out that physicians can manage disease more effectively with the Bluetooth-enabled VisiVest System. “Often patients are only treated with antibiotics for their reoccurring exacerbations. By introducing HFCWO, you help to keep airways clear of secretions, which helps break the vicious infection cycle,” he said. “With the VisiView

Health Portal, providers can log in and review accurate treatment information, allowing them to make tailored care decisions for their patient. It becomes a positive tool to understand where the patient is in adherence to a prescribed care plan and enhances the dialogue with the patient.”

## Portability

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For patients who are more active and wish to maintain mobility, a portable device, such as the Monarch Airway Clearance System, facilitates movement, according to Reding. “Patients can wear the Monarch System while doing the dishes, going to the garage, gardening and preparing for the day,” he said. “The value of a mobile product is that it helps the patient do therapy while doing daily activities of living.”

The Monarch System has been on the market for 18 months and is recommended for patients 15 years and older. “The Monarch System helps patients maintain a higher quality of life when faced with a chronic disease like COPD,” he said. “Hillrom continues to focus on solutions that advance mobile therapies.” As life expectancy increases, even for those with chronic disease, therapies should enable people to live life to the fullest, he added.

Karen Mullery, director of marketing for Hillrom Respiratory Health, pointed out that those who engage in more activity tend to have more muscle mass and better overall health. “Providing a device that allows someone with a chronic condition to continue their activity and their mobility is inspirational for patients who have had to sit while doing therapy,” she said.

## Bronchiectasis/COPD Overlap

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Although COPD is the third leading cause of death, according to the NCBI, the disease sometimes occurs in conjunction with bronchiectasis. The 2016 CHEST annual meeting discussed the issue of bronchiectasis and conducted a study that found 92.7% of COPD patients who had two or more exacerbations or at least one hospitalization per year had bronchiectasis, confirmed through CT scan.

By definition, bronchiectasis is permanent anatomical damage to airways that increases susceptibility for harboring bacteria and creating infections, resulting in a vicious cycle of exacerbations.

Mullery cited a study that estimates 4.1 million Americans have bronchiectasis, but there is some disparity in therapies.<sup>3</sup> She noted that using a handheld PEP device requires 20 minutes to achieve good airway clearance. “For someone with a lung condition, that is a lot of work,” she said. “They get exhausted just by breathing.”

An HFCWO vest produces significant improvements versus a PEP device, although fewer than 20,000 patients receive airway clearance therapy annually.<sup>4</sup> “We’ve seen fewer hospitalizations and less antibiotic use as result of therapy using HFCWO versus a

handheld device," Mullery said, pointing out that not all COPD patients need airway clearance therapy, but every bronchiectasis patient does.

Most manufacturers provide in-person training and/or manuals and videos with the purchase of a HFCWO device. Hillrom sends a trainer from its network to the patient's home and conducts a one-to-two hour training session. "We get them set up and provide clinical support over the phone," said Reding. "We also repair or replace a unit if something goes wrong. We get a new device if necessary out to the patient quickly, in most cases, the next day."

Patients with COPD and bronchiectasis typically experience excessive cough and sputum production, which, if left untreated, can lead to adverse outcomes. As adults with these diagnoses continue to work and, in some cases, lead active lifestyles, several airway clearance therapies are helping patients manage their disease.

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