# Airway Clearance Devices (for North Carolina Only)

**Policy Number**: CSNCT0700.06
**Effective Date**: April 1, 2025

➲ Instructions for Use

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**Related Policy**

- Durable Medical Equipment, Orthotics, Medical Supplies, and Repairs/Replacements (for North Carolina Only)

## Application

This Medical Policy only applies to the state of North Carolina.

## Coverage Rationale

### High Frequency Chest Wall Oscillation System

For medical necessity clinical coverage criteria, refer to the North Carolina Medicaid (Division of Health Benefits) Clinical Coverage Policy, Medical Equipment: 5A-2, Respiratory Equipment and Supplies.

### Oscillatory Positive Expiratory Pressure (PEP) Device and Flutter Device

For medical necessity clinical coverage criteria, refer to the North Carolina Medicaid (Division of Health Benefits) Clinical Coverage Policy, Medical Equipment: 5A-2, Respiratory Equipment and Supplies.

### Intrapulmonary Percussive Ventilation (IPV) Device

**Intrapulmonary percussive ventilation (IPV) devices for home use are considered unproven and not medically necessary.**

## Applicable Codes

The following list(s) of procedure and/or diagnosis codes is provided for reference purposes only and may not be all inclusive. Listing of a code in this policy does not imply that the service described by the code is a covered or non-covered health service. Benefit coverage for health services is determined by federal, state, or contractual requirements and applicable laws that may require coverage for a specific service. The inclusion of a code does not imply any right to reimbursement or guarantee claim payment. Other Policies and Guidelines may apply.

| HCPCS Code | Description |
|---|---|
| *A7021 | Supplies and accessories for lung expansion airway clearance, continuous high frequency oscillation, and nebulization device (e.g., handset, nebulizer kit, biofilter) |
| A7025 | High frequency chest wall oscillation system vest, replacement for use with patient owned equipment, each |
| A7026 | High frequency chest wall oscillation system hose, replacement for use with patient owned equipment, each |

| HCPCS Code | Description |
|---|---|
| *E0469 | Lung expansion airway clearance, continuous high frequency oscillation, and nebulization device |
| *E0481 | Intrapulmonary percussive ventilation system and related accessories |
| E0483 | High frequency chest wall oscillation system, with full anterior and/or posterior thoracic region receiving simultaneous external oscillation, includes all accessories and supplies, each |

Codes labeled with an asterisk (*) are not on the State of North Carolina Medicaid Fee Schedule and therefore may not be covered by the State of North Carolina Medicaid Program.

| Diagnosis Code | Description |
|---|---|
| A80.0 | Acute paralytic poliomyelitis, vaccine-associated |
| A80.1 | Acute paralytic poliomyelitis, wild virus, imported |
| A80.2 | Acute paralytic poliomyelitis, wild virus, indigenous |
| A80.30 | Acute paralytic poliomyelitis, unspecified |
| A80.39 | Other acute paralytic poliomyelitis |
| A80.4 | Acute nonparalytic poliomyelitis |
| A80.9 | Acute poliomyelitis, unspecified |
| B91 | Sequelae of poliomyelitis |
| E74.02 | Pompe disease |
| E74.4 | Disorders of pyruvate metabolism and gluconeogenesis |
| E84.0 | Cystic fibrosis with pulmonary manifestations |
| E84.9 | Cystic fibrosis, unspecified |
| G12.0 | Infantile spinal muscular atrophy, type I [Werdnig-Hoffman] |
| G12.1 | Other inherited spinal muscular atrophy |
| G12.9 | Spinal muscular atrophy, unspecified |
| G12.21 | Amyotrophic lateral sclerosis |
| G12.22 | Progressive bulbar palsy |
| G12.25 | Progressive spinal muscle atrophy |
| G12.8 | Other spinal muscular atrophies and related syndromes |
| G14 | Post-polio syndrome |
| G35 | Multiple sclerosis |
| G71.00 | Muscular dystrophy, unspecified |
| G71.11 | Myotonic muscular dystrophy |
| G71.20 | Congenital myopathy, unspecified |
| G71.21 | Nemaline myopathy |
| G71.220 | X-linked myotubular myopathy |
| G71.228 | Other centronuclear myopathy |
| G71.29 | Other congenital myopathy |
| G71.3 | Mitochondrial myopathy, not elsewhere classified |
| G71.8 | Other primary disorders of muscles |
| G72.41 | Inclusion body myositis [IBM] |
| G72.89 | Other specified myopathies |
| G73.1 | Lambert-Eaton syndrome in neoplastic disease |
| G73.3 | Myasthenic syndromes in other diseases classified elsewhere |
| G73.7 | Myopathy in diseases classified elsewhere |
| G80.0 | Spastic quadriplegic cerebral palsy |
| G82.50 | Quadriplegia, unspecified |

| Diagnosis Code | Description |
|---|---|
| G82.51 | Quadriplegia, C1-C4 complete |
| G82.52 | Quadriplegia, C1-C4 incomplete |
| G82.53 | Quadriplegia, C5-C7 complete |
| G82.54 | Quadriplegia, C5-C7 incomplete |
| J47.0 | Bronchiectasis with acute lower respiratory infection |
| J47.1 | Bronchiectasis with (acute) exacerbation |
| J47.9 | Bronchiectasis, uncomplicated |
| J98.6 | Disorders of diaphragm |
| M33.02 | Juvenile dermatomyositis with myopathy |
| M33.12 | Other dermatomyositis with myopathy |
| M33.22 | Polymyositis with myopathy |
| M33.92 | Dermatopolymyositis, unspecified with myopathy |
| M34.82 | Systemic sclerosis with myopathy |
| M35.03 | Sicca syndrome with myopathy |
| Q33.4 | Congenital bronchiectasis |
| R53.2 | Functional quadriplegia |
| Z99.11 | Dependence on respirator [ventilator] status |

# Description of Services

An IPV is a mechanized form of chest physical therapy, which delivers mini bursts (more than 200 per minute) of respiratory gases to the lungs via a mouthpiece. Its purpose is to mobilize endobronchial secretions and diffuse patchy atelectasis. The patient controls variables such as inspiratory time, delivery rates, and peak pressure. Alternatively, a therapist will do a slapping or clapping of the patient's chest wall.

# Clinical Evidence

## Intrapulmonary Percussive Ventilation (IPV)

There is insufficient quality evidence or consistency of findings to support the long-term home use of intrapulmonary percussive ventilation devices.

Hassan et al. (2021) conducted a retrospective pilot study to evaluate the safety and feasibility of intrapulmonary percussive ventilation (IPV) intervention in non-intubated patients admitted to an intensive care unit. The medical records of 35 subjects were reviewed, including 22 subjects who received IPV intervention, and 13 subjects matched for age, sex, and primary diagnosis who received chest physiotherapy (CPT). The records were audited for feasibility, safety, changes in oxygen saturation, chest X-ray changes, and intensive care unit length of stay. A total of 104 treatment sessions (IPV 65 and CPT 39) were delivered to subjects admitted with a range of respiratory conditions in critical care. Subjects completed 97% of IPV sessions. No major adverse events were reported with intrapulmonary percussive ventilation intervention. Intensive care unit length of stay in the intrapulmonary percussive ventilation group was 9.6 ±6 days, and in the CPT group, it was 11 ±9 days (p = 0.59). Peripheral oxygen saturation pre to post intervention was 92% ±4 to 96% ±4 in IPV group and 95% ±4 to 95% ±3 in the CPT group. The authors concluded that application of IPV intervention was feasible and safe in spontaneously breathing non-intubated adult patients in critical care. The study is limited by its retrospective observations. There is a need for an adequately powered randomized controlled trial (RCT) to further evaluate the effects of IPV intervention in a non-intubated population in critical care.

Hassan et al. (2021) performed a systematic review to summarize the evidence of the effectiveness of intrapulmonary percussive ventilation (IPV) on intensive care unit length of stay (ICU-LOS) and respiratory outcomes in critically ill patients. A systematic search of IPV in intensive care units (ICU) was performed on five databases from 1979 to 2021. Studies were considered for inclusion if they evaluated the effectiveness of IPV in patients aged ≥ 16 years receiving invasive or non-invasive ventilation or breathing spontaneously in critical care or high dependency units. Study titles and abstracts were screened, followed by data extraction by a full-text review. Due to a small number of studies and observed heterogeneities in the study methodology and patient population, a meta-analysis could not be included in this review. Out of 306 identified abstracts, seven studies (630 patients) met the eligibility criteria. Results of the included studies provide

weak evidence to support the effectiveness of IPV in reducing ICU-LOS, improving gas exchange, and reducing respiratory rate. The authors concluded that based on the findings of this review, the evidence to support the role of IPV in reducing ICU-LOS, improving gas exchange, and reducing respiratory rate is weak. The therapeutic value of IPV in airway clearance, preventing pneumonia, and treating pulmonary atelectasis requires further investigation. This study has several limitations. The number of studies retrieved was small (7). Heterogeneities resulting from differences in study design, patient population, dosage, and frequency of IPV intervention were frequently observed in the included studies. Further, small sample sizes and poor methodological quality introduces some bias and weakens the strength of conclusions of this review. Further investigation is needed before clinical usefulness of this procedure is proven.

Nicolini et al. (2018) conducted a four-week RCT to determine if adding Intrapulmonary percussive ventilation (IPV) or high-frequency chest wall oscillation (HFCWO) with the best pharmacological therapy (PT) will provide clinical benefit to patients with chronic obstructive pulmonary disease (COPD) over just chest physiotherapy (CPT). There was a total of 63 patients randomized into three groups (20 patients completed the trial in each group): IPV group (treated with PT and IPV), PT group with (treated with PT and HFCWO), and control group (treated with PT alone). Primary outcomes measured are the dyspnea scale [modified Medical Research Council (mMRC)] and Breathlessness, Cough, and Sputum scale (BCSS), along with daily life activity [COPD Assessment Test (CAT)]. Secondary outcomes measured are pulmonary function testing (PFT), arterial blood gas analysis, and hematological examinations. Patients in both the IPV and HFCWO group showed marked improvement in dyspnea and mMRC, BCSS and CAT compared to the control group. IPV patients showed an improvement in BCSS ($p = 0.001$) and CAT ($p = 0.02$) scores in comparison with HFCWO. Both IPV and HFCWO secondary outcomes improved compared to the control group. In the group comparison analysis of the IPV group and HFCWO group variables, there was marked improvement in the IPV group in total lung capacity (TLC) and TLC% ($p = 0.03$), residual volume (RV) and RV% ($p = 0.04$), and diffusing lung capacity monoxide (DLCO), maximal inspiratory pressure (MIP), and maximal lung capacity (MEP, $p = 0.01$). The authors concluded that both IPV and HFCWO can improve lung function, muscular strength, dyspnea and overall health status. and that IPV demonstrated better effectiveness in improving test results in small bronchial airways and alveolar ventilation (RV and DLCO) and muscular strength (MIP and MEP) as well as scores on daily life activity and health status assessment scales (BCSS and CAT) compared with HFCWO. A multi-center, larger population study with measurement of primary and secondary outcomes over a longer term is needed. Limitations of this study included single center, small sample size, and short duration and lack of masking or sham procedure. Furthermore, the intervention was delivered by a physical therapist; therefore, these findings may not be generalizable to IPV used at home and without professional supervision or for conditions other than COPD.

Reychler et al. (2018) conducted a systematic review to summarize the physiological and clinical effects related to the use of IPV as an airway clearance technique in chronic obstructive airway diseases. Using predetermined criteria, a search was conducted in PubMed, PEDro, and Scopus online databases. Outcomes of interest included immediate or prolonged physiological effects (e.g., gas exchange, cardiorespiratory parameters, lung function, and mechanics) and clinical effects (e.g., symptoms, adverse effects, and length of hospital stay). A total of 109 studies were identified and after further evaluation, 12 studies were included in the review. Of those, one study evaluated patients with bronchiectasis (n = 22), four studies evaluated patients with cystic fibrosis (n = 78), and six studies (one study included phase I and two results) evaluated patients with COPD (n = 178). In patients with COPD, IPV improved gas exchange during exacerbation and reduced the hospital length of stay however, IPV was no more beneficial than other airway clearance techniques when subjects were stable. Two studies reported complications or discomfort with IPV and in another study, two patients did not tolerate settings with a higher frequency of percussions (1.220 cm $H_2O$-350 c/min and 1.840 cm $H_2O$-350 c/min). In patients with CF, cardiorespiratory parameters and lung function did not improve with IPV. One study reported mild hemoptysis, which was associated with a respiratory infection. In patients with bronchiectasis, dyspnea and respiratory frequency improved after one session of IPV; however, there was no difference in sputum dry weight and in patients with productive bronchiectasis, immediate efficacy of IPV vs. other airway clearance techniques did not differ. Minor adverse events (dry throat, nausea, and/or fatigue) were reported in 27% of patients treated with both IVP and chest physical therapy. The authors concluded that use of IPV as an airway clearance technique in chronic obstructive airway diseases is not supported by sufficiently strong evidence to recommend routine use in this patient population.

# U.S. Food and Drug Administration (FDA)

This section is to be used for informational purposes only. FDA approval alone is not a basis for coverage.

## High-Frequency Chest Wall Compression Devices

High-frequency chest wall compression devices are designed to promote airway clearance and improve bronchial drainage. They are indicated when external chest manipulation is the physician's treatment of choice to enhance mucus

transport. Refer to the following website for more information (use product code BYI): https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/pmn.cfm. Accessed October 31, 2024

## References


Hassan A, Lai W, Alison J, et al. Effect of intrapulmonary percussive ventilation on intensive care unit length of stay, the incidence of pneumonia and gas exchange in critically ill patients: A systematic review. PLoS One. 2021 Jul 28;16(7):e0255005.

Hassan A, Milross M, Lai W, et al. Feasibility and safety of intrapulmonary percussive ventilation in spontaneously breathing, non-ventilated patients in critical care: A retrospective pilot study. J Intensive Care Soc. 2021 May;22(2):111-119.

Nicolini A, Grecchi B, Ferrari-Bravo M, et al. Safety and effectiveness of the high-frequency chest wall oscillation vs intrapulmonary percussive ventilation in patients with severe COPD. Int J Chron Obstruct Pulmon Dis. 2018 Feb 16;13:617-625.

North Carolina Medicaid, Division of Health Benefits, Clinical Coverage Policies, Respiratory Equipment and Supplies, 5A-2. Available at: https://medicaid.ncdhhs.gov/5a-2-respiratory-equipment-and-supplies/download?attachment. Accessed November 20, 2024.

Reychler G, Debier E, Contal O, et al. Intrapulmonary percussive ventilation as an airway clearance technique in subjects with chronic obstructive airway diseases. Respir Care. 2018 May;63(5):620-631.


## Policy History/Revision Information

| Date | Summary of Changes |
|---|---|
| 04/01/2025 | **Coverage Rationale**<br>***High Frequency Chest Wall Oscillation System and Oscillatory Positive Expiratory Pressure (PEP) Device and Flutter Device***<br>• Removed coverage statement<br>**Applicable Codes**<br>• Added HCPCS codes A7021 and E0469<br>**Supporting Information**<br>• Updated *Clinical Evidence* and *References* sections to reflect the most current information<br>• Archived previous policy version CSNCT0700.05 |

## Instructions for Use

This Medical Policy provides assistance in interpreting UnitedHealthcare standard benefit plans. When deciding coverage, the federal, state or contractual requirements for benefit plan coverage must be referenced as the terms of the federal, state or contractual requirements for benefit plan coverage may differ from the standard benefit plan. In the event of a conflict, the federal, state or contractual requirements for benefit plan coverage govern. Before using this policy, please check the federal, state or contractual requirements for benefit plan coverage. UnitedHealthcare reserves the right to modify its Policies and Guidelines as necessary. This Medical Policy is provided for informational purposes. It does not constitute medical advice.

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