

For an overview of the specific indications and approach to the various non-invasive ventilation modalities, please refer to the **Respiratory Distress [A-01B]** Guideline.

INDICATIONS:

- Patients with significantly increased work of breathing (respiratory distress)
- Patients with suspected hypercarbic respiratory failure/CO₂ retention (mild-to-moderated alterations in mental status from sedating medications or underlying lung disease exacerbations).
- Patients who require oxygen supplementation beyond the capabilities of a low-flow nasal cannula.

CONTRAINDICATIONS:

- Patient anatomy is not conducive to the application of the mask (facial trauma, facial hair, etc.).
- Inability to protect the airway (from severe altered mental status or potential airway obstruction (active nausea or vomiting, significant secretions, facial/oropharyngeal bleeding, etc.))
- Impending respiratory failure/severe hypoventilation (decreased respiratory effort and/or rate)
- Known or suspected pneumothorax

Procedure (BI-LEVEL POSITIVE AIRWAY PRESSURE; BPAP):

- Ensure appropriate functioning of and adequate oxygen supply to the device.
 - If Prehospital initiation of BPAP:
 - a. Explain the procedure to the patient.
 - b. Place and secure the face mask (delivery device) as per the manufacturer's instructions.
 - c. Initiate air flow/oxygen levels (as per the initial settings, below).
 - If Facility-Initiated BPAP:
 - a. Continue or match the previous settings.
 - Continuously reassess the patient's airway and breathing, and **slowly titrate** device settings to achieve desired oxygen saturations and ventilation needs, as noted below. This includes continuous ECG, pulse oximetry and ETCO₂ monitoring.
 - Closely monitor the patient and escalate to more aggressive interventions (BVM ventilations, endotracheal intubation, etc.) as needed.
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BPAP SETTINGS

- Cannula size:
 - a. Prongs must not create a seal in the nares (a clear gap must be visible around each prong).
 - b. Discomfort is often due to velocity of the gas (smaller diameter cannulas create a higher velocity at the same flow rate), and may be eased by using a larger cannula size (if available).
- **FiO2 - Fractional Inspired Oxygen Level:**
 - a. Definition: The percentage of oxygen delivered to the patient.
 - b. **Initial: 100%** (may initiate at a lower level, depending on patient condition)
 - c. Titration: Titrate down as able to the patients desired oxygen saturation
- **Flow Trigger**
 - a. Definition: The percentage of oxygen delivered to the patient.
 - b. **Initial: 5 L/min**
 - c. Titration: Titrate down if ineffective patient effort. Titrate up if autotriggering.
- **PEEP - Positive End Expiratory Pressure:**
 - a. Definition: The pressure maintained at the end of expiration to keep the alveoli and small airways from collapsing and to recruit potential non-ventilated portions of the lung. The singular mechanism employed by CPAP devices.
 - b. **Initial: five (5) cmH2O** (or as otherwise directed by manufacturer recommendations).
 - c. Titration: Increase in increments of 1-2 cmH2O, based on continued hypoxemia.
- **IPAP - Inspiratory Positive Airway Pressure:**
 - a. Definition: The additional pressure delivered with inspiration. Depending on the device, this may be set in two (or more) ways:
 - The total inspiratory pressure, where the inspiratory pressure is added on top of the PEEP value → **IPAP or PIP** (positive inspiratory pressure)
 - The isolated inspiratory pressure → **Pinsp** (inspiratory pressure) or **Psupport** (pressure support), *which has to be added to the PEEP value*
 - b. **Initial:** (depending on device settings):
 - **IPAP or PIP: twelve (12) cmH2O**
 - Pinsp or Psupport: seven (7) cm H2O
 - c. Titration: Increase (or decrease if able) in increments of 1-2 cmH2O, based on continued work of breathing/respiratory distress.
- **Maximum IPAP** (Pinsp/Psupport *plus* PEEP):
 - a. **Twenty (20) cmH2O** (without direction from Online Medical Control)
 - b. *Critical Care Paramedics:* may titrate within the capabilities of the specific device.

1-PB3
BI-LEVEL POSITIVE
AIRWAY PRESSURE

BPAP requires service/
device-level training and credentialing
by the EMS Medical Director.



NOTES:

- Work of breathing (respiratory distress) is generally reduced by increasing the positive inspiratory pressure (PIP; although refer to device-specific settings).
- Blood oxygenation (hypoxemia) is improved with increased oxygen percentage (FiO₂) and positive end expiratory pressure (PEEP).

QI Review Parameters:

1. {Pending}