PULSE OXIMETRY
STATEWIDE BLS PROTOCOL [OPTIONAL]

Criteria:

A. Patient with shortness of breath or respiratory distress.

B. Patient with chronic lung disease (COPD, emphysema) who are receiving oxygen therapy. [1]

C. Any patient requiring oxygen therapy as determined by other appropriate Statewide BLS medical treatment protocols.

Exclusion Criteria:

A. Patient with suspected carbon monoxide poisoning. These patients should all receive high-flow 100% oxygen without regard to pulse oximeter reading. [2]

System Requirements:

A. [Optional] BLS services may carry a pulse oximeter for use by appropriately trained EMTs.

1. These services must comply with additional Department of Health BLS pulse oximeter requirements including the presence of an agency medical director and appropriate provider education before the service is permitted to carry a pulse oximeter.

B. EMTs may provide optional pulse oximetry monitoring if the EMT has completed training in the use of the pulse oximeter, is approved by the EMS agency medical director, and is functioning with a BLS service that is approved to carry a pulse oximeter.

Procedure:

A. All patients requiring oxygen therapy

1. Initial Patient Contact – see Protocol #201.
2. Administer oxygen as determined by appropriate medical treatment protocol.
   a. Providing oxygen therapy, patient extrication, and on-scene time should never be delayed while obtaining an O_2 saturation reading.
3. Monitor O_2 saturation (SpO_2) with pulsoximeter
   a. Assure that reading is accurate. Patient's pulse should correlate with waves or pulsations on pulsoximeter.
   b. Possible causes of inability to obtain as accurate SpO_2 reading include:
      1) Peripheral vasoconstriction (cold extremities, smoking, chronic hypoxia, or vascular obstruction/deficit).
      2) Severe anemia (low hemoglobin).
      3) Hypovolemia.
      4) Dirty Fingers or dark/metallic nail polish.
      5) Methemoglobinemia.
      6) Carbon monoxide – **Do not apply pulsoximeter to patient with suspected carbon monoxide poisoning.** [2]
4. Use of SpO_2 reading to alter oxygen dosage:
   a. The following patients should receive high-flow oxygen at all times when possible:
      1) Patients with symptoms or signs of severe respiratory distress (air hunger, cyanosis, chest wall/subcostal retractions, etc.)
      2) Patients with suspected carbon monoxide poisoning.

3) Patients with respiratory distress who are being prepared for air medical transport.

b. Other patients (particularly patients with chronic lung disease or patients who do not tolerate an oxygen mask) may have oxygen mask replaced by nasal cannula or nasal cannula oxygen dose decreased if:

1) SpO_2 reading remains ≥ 94% on lower oxygen dose.

2) Patient's color is good (not cyanotic).

3) Patient's respiratory distress does not worsen.

5. Document initial SpO_2 reading after beginning oxygen therapy, and document SpO_2 reading after any changes in oxygen dose or type of delivery system/mask.

Notes:

1. Low oxygen in the blood (hypoxia) is sometimes needed as a stimulus to breathing in some patients with chronic lung diseases like COPD or emphysema. Pulse oximetry may be helpful in assuring that these patients are receiving adequate oxygen without suppressing their drive to breath with high-flow oxygen. **Note: Patients in significant respiratory distress should receive high-flow oxygen even if they have a history of chronic lung disease.**
2. Pulse oximetry readings can be falsely high in carbon monoxide poisoning, and it would not be appropriate to decrease oxygen therapy based upon pulse oximetry. For this reason, pulse oximetry should not be used in these patients.

Performance Parameters:

A. Monitor records for appropriate use of high-flow oxygen regardless of SpO_2 readings when appropriate.

B. Monitor records for documentation of SpO_2 readings ≥ 94% for all patients who receive less than high-flow 100% oxygen when lower doses are permitted by appropriate protocol.

RESPIRATORY DISTRESS/RESPIRATORY FAILURE STATEWIDE BLS PROTOCOL

Criteria:

A. Shortness of breath or difficulty breathing.

1. Conditions which produce SOB from bronchoconstriction that may respond to bronchodilators. These conditions generally are associated with wheezing.
   a. COPD (emphysema, chronic bronchitis)
   b. Asthma
   c. Allergic reaction
   d. Respiratory infections (pneumonia, acute bronchitis)
2. Conditions which produce SOB without bronchoconstriction that **do not** respond to bronchodilators. These conditions usually are not associated with wheezing.
   a. CHF
   b. Pulmonary embolism

Exclusion Criteria:

A. None.

System Requirements:

A. Only an EMT that has completed the bronchodilator module through the EMT curriculum or continuing education may assist the patient with administration of a bronchodilator.

B. CPAP may only be administered by an EMT that has completed the DOH BLS CPAP training and has been approved to administer CPAP by the EMS agency medical director.

C. **[Optional]** BLS services may carry CPAP devices for use by the agency's EMTs.

1. These services must assure that all EMTs using CPAP have completed the DOH BLS CPAP training and have been approved by the agency medical director.
2. These services must carry a CPAP device that has a manometer (or other means to provide specific CPAP pressure) and meets any other specifications required by the DOH.
3. These services must be approved to carry pulse oximeters – See Protocol #226.
4. The EMS agency medical director must oversee the CPAP training, use of CPAP, and quality improvement audits.

Treatment:

A. All patients:

1. Initial Patient Contact – see Protocol # 201.
   a. Consider call for ALS if available. See Indications for ALS Use protocol #210
2. If allergic reaction is suspected and patient meets criteria, proceed with Allergic Reaction / Anaphylaxis protocol #411.

B. Pediatric patients:

1. **NOTE:** If child is sitting in a tripod position with excessive drooling this may be epiglottitis, **transport immediately.** Do not lay the patient flat and do not attempt to visualize the throat.

C. All patients:

1. Apply high concentration oxygen. If necessary, assist respirations with a bag-valve-mask, but avoid overzealous hyperventilation.
2. Monitor pulse oximetry[1] [OPTIONAL – MANDATORY IF USING CPAP]
3. Continuous Positive Airway Pressure (CPAP) [OPTIONAL]:
   a. Apply CPAP to adult patient if patient does not have any contraindication to CPAP [2] AND has **at least TWO** of the following after high concentration oxygen:
      1) Pulse oximetry < 90%

2) Respiratory rate > 25 bpm
3) Use of accessory muscles during respiration

b. If CPAP is applied [3]:
1) Titrate pressure up until either improvement or **maximum of 10 cm H_2O pressure**.
2) Remove CPAP if respiratory status deteriorates and assist with BVM ventilation if needed.

4. Assist patient with his/ her bronchodilator inhaler [EMT ONLY] for conditions associated with wheezing [4,5,6]
a. Must be a "short-acting" rapid onset, **bronchodilator** [7,8]
5. Transport and reassess enroute
6. Contact medical command if EMT is unclear whether the patient's inhaler is a "short-acting" bronchodilator or if EMT has assisted with bronchodilator inhaler administration.[8,9]

Possible Medical Command Orders:

A. May order additional doses of patient's bronchodilator.

Notes:

1. See Pulse Oximetry Protocol #226. Pulse oximetry may only be used by BLS services and providers that meet DOH pulse oximetry requirements. If used, pulse oximetry must not delay the application of oxygen. Record SpO_2 after administration of oxygen. If pulse oximetry is used and patient does not tolerate NRB mask, may switch to nasal cannula as long as SpO_2 remains ≥94%.
2. CPAP is not indicated if patient:
a. has altered mental status and/or cannot follow commands.
b. ≤ 14 y/o, unless ordered by Medical Command
c. has respiratory rate < 10 ***OR*** apnea ***OR*** is unable to maintain an open airway.
d. has chest trauma or is suspected of having a pneumothorax.
e. has a tracheostomy.
f. is actively vomiting or has upper GI bleeding.
3. If CPAP is used:
a. Oxygen supply may be depleted rapidly, especially if prolonged transport times. Monitor supply to avoid complete depletion.
b. Assure that ALS has been requested, if available, and advise responding ALS service that CPAP is being used.
c. Notify hospital of CPAP use ASAP to assure that CPAP device is available on arrival. Transport patient into hospital on CPAP and do not remove until hospital therapy is ready to be placed on patient.
d. Watch for gastric distention, which can result in vomiting.
e. CPAP can be used on patient with Do-Not-Resuscitate order.
f. Vital signs (including pulse oximetry), must be obtained and documented every 5 minutes.
4. An EMT may assist with the medication **ONE TIME ONLY** prior to contacting Medical Command. Any subsequent administration requires direction from a medical command physician.
5. Bronchodilator inhaler must be prescribed for the patient, and EMS must identify and administer the prescribed dose ("one" or "two" inhalations) for the specific patient.
6. If unsure of the appropriate action, contact Medical Command for further direction.
7. If unable to contact medical command, may repeat previous dose of bronchodilator inhaler 20 minutes after initial dose.
8. The following are commonly prescribed short-acting, rapid-onset, beta-2 agonist inhalants that the EMT may assist with administration:

Brand Name	Generic Name
Combivent	Albuterol / Ipratroprium Combination
Maxair	Pirbuterol Acetate
Proair	Albuterol
Proventil	Albuterol
Ventolin,	Albuterol
Xopenex	Levalbuterol

9. The following are drugs that **SHOULD NOT** be used:

Long-acting, Delayed-Onset Inhalers	
Brand Name	**Generic Name**
Aero-Bid, Aero-Bid M	Flunisolide
Advair	Salmeterol / Fluticasone Combination
Alvesco	Ciclesonide
Asmanex	Mometasone
Atrovent	Ipratropium Bromide
Beclovent	Beclomethasone Dipropionate
Brovana	Arformoterol
Dulera	Formoterol / Mometasone Combination
Flovent	Fluticasone Propionate
Foradil	Formoterol
Intal	Cromolyn Sodium
Performomist	Formoterol
Pulmicort	Budesonide
Qvar	Beclomethasone Dipropionate
Serevent	Salmeterol Xinafoate
Spireva	Tiotropium
Symbacort	Formoterol / Budesonide Combination
Vanceril	Beclomethasone Dipropionate

Performance Parameters:

A. Review every case of EMT CPAP use or EMT-assisted bronchodilator inhaler administration for documentation for appropriate indication, appropriate medication, and appropriate contact with medical command.

B. Consider benchmark of on scene time < 15 minutes if ALS not on scene.