CAPNOGRAPHY (END-TIDAL CO2 MONITORING)

PURPOSE
To provide guidelines for patient selection and capnography monitoring for patients in ICU and Emergency Department.

DEFINITIONS
A. Capnograph: A graphic representation (waveform) of exhaled CO2 levels in the form of a tracing.

B. Capnography: non-invasive method for monitoring the level of CO2 in exhaled breath (ETCO2) to assess a patient’s ventilator status. It is the combination of the numeric measurement (capnometry) with the waveform (capnography).

C. Capnometry: The numeric measurement of the concentration of CO2 in the airway during inspiration and expiration.

D. ETCO2/End-tidal CO2: Also known as PetCO2. Measurement of CO2 concentration at the very end of expiration is termed end-tidal CO2.

E. Capnoline: A nasal cannula-like device that allows sampling of the CO2 and can also deliver oxygen to the patient.

POLICY
A physician’s/licensed independent practitioner’s order is not needed for nurses to initiate and use Capnography or End Tidal CO2 (ETCO2) Monitoring.

Tubing Selection
A. The Smart CapnoLine H Plus O2 tubing should be used for all spontaneously breathing patients requiring ETCO2 monitoring greater than 12 hours. This tubing is marked by a yellow end piece.

B. The Smart CapnoLine Plus O2 tubing should be used for all spontaneously breathing patients requiring ETCO2 monitoring less than 12 hours. This tubing is marked by an orange end piece.

C. The Filterline H Set (M1921A) should be used for patients on the mechanical ventilator who require ETCO2 monitoring. This set is typically placed by Respiratory Therapy and is marked with a yellow end piece.

Patients appropriate for ETCO2 monitoring
A. Patients Receiving BIPAP Ventilation—if BIPAP will likely be used for more than 12 hours, the Smart CapnoLine H Plus O2 tubing with the yellow end piece should be used. Be aware that patients with the capnoline tubing under the BIPAP mask may be at risk for skin breakdown. Skin should be assessed with each physical assessment and each time the mask is removed for hydration and nutrition.

1. Obtain and record the ETCO2 value and waveform upon the initiation of monitoring.

2. ETCO2 monitoring may be discontinued when the patient is transferred to a lower level of care.

B. Patients sedated related to drug or alcohol overdose—The Smart CapnoLine Plus O2 tubing with the orange end piece may be used for these patients. ETOC2 monitoring is typically only needed short term until the patient becomes less sedate.
1. Obtain and record the ETCO2 value and waveform upon the initiation of monitoring.

2. Capnography monitoring may be discontinued once the patient is awake and alert as long as the patient trends of ETCO2 values are not moving up and the current value is below 50.

C. Patients receiving moderate sedation for procedures—The Smart CapnoLine Plus O2 tubing with the orange end piece should be used for these patients.

1. Obtain and record baseline ETCO2 values before the procedure.

2. Capnography monitoring may be discontinued when the procedure is complete and the ETCO2 is within +/- 20% of the baseline value for at least one minute.

D. Patients receiving mechanical ventilation--The Filterline H Set (M1921A) should be connected between the ETT and the breathing circuit by RT or Nursing being careful to maintain sterility of the connection. Ensure that the light source is on top of the circuit so that condensation and secretions do not pool and obstruct the light transmission in the sensor.

1. Obtain and record ETCO2 value and waveform upon the initiation of monitoring.

2. Once the patient is extubated, capnography monitoring may be continued by capnoline

E. Any patient the RN believes to be sedate, at risk for respiratory depression, or at risk for CO2 accumulation, may be monitored.

1. Obtain and record the ETCO2 value and waveform upon the initiation of monitoring.

2. Capnography monitoring may be discontinued once the patient is awake and alert as long as the patient trends of ETCO2 values are not moving up and the current value is below 50.

Obtaining a Baseline
A. Observe the patient in a non-stimulated environment for 2 minutes.

B. The patient should lie quietly without speaking or moving.

C. Document the baseline vital signs with ETCO2 and place a baseline waveform strip in the patient record.

Assessment and Interventions
See Mosby Nursing Skill “End-Tidal Carbon Dioxide Monitoring” for assessment and intervention information.

Documentation
A. Baseline should be documented as above.

B. Capnometry (the numeric value) should be documented with each vital sign.

C. Capnograph (the waveform) should be documented with each shift assessment or with change in the waveform.