

Solano County Health & Social Services Department

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Children's Services
Administrative Services

Ann Edwards, Director

EMERGENCY MEDICAL SERVICES AGENCY

Aaron Bair, MD, MSc
EMS Agency Medical Director

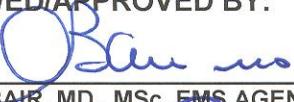
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EMS Agency Administrator

POLICY MEMORANDUM 6610

Implementation Date: 12/01/13
Release Date: 10/14/13

REVIEWED/APPROVED BY:


AARON BAIR, MD., MSc, EMS AGENCY MEDICAL DIRECTOR


TED SELBY, EMS AGENCY ADMINISTRATOR

SUBJECT: End Tidal Carbon Dioxide (ET CO₂) Monitoring

AUTHORITY:CALIFORNIA HEALTH & SAFETY CODE, DIVISION 2.5, 1797.220 & 1797.221

PURPOSE: It is the purpose of this policy to ensure proper use of End Tidal CO₂ (ETCO₂) Monitor devices, to provide optimal care to all intubated patients utilizing end tidal CO₂ monitoring, to confirm correct placement of the endotracheal tube, and/or to measure the adequacy of ventilation and perfusion of patients utilizing ventilatory assist devices.

Monitoring with waveform capnography will allows providers to closely watch the patient's condition and assess treatment.

Manufacturer specific guidelines should be followed.

I. Definitions

- A. End Tidal CO₂ Capnography – The process of continuously recording the level of carbon dioxide in expired air. The process is used to monitor critically ill patients. The data are typically recorded automatically on a strip of graph paper and numerically. The normal value for ETCO₂ is 35 – 45 mm Hg. This process is more reliable in determining correct placement of an endotracheal tube.
- B. Capnograph – an instrument used to produce a capnogram, a tracing that shows the proportion of carbon dioxide in a volume of gas.
- C. Capnometry - Is the measurement of CO₂ in a volume of gas.
- D. Capnometer - a device for monitoring the end-tidal partial pressure of carbon dioxide. Generally using color change to indicate the presence of carbon dioxide. This type of device is not as accurate as End Tidal CO₂ monitoring for endotracheal tube verification.

II. Training

Each Advanced Life Support (ALS) Provider shall provide paramedics training on the use of ETCO₂ Monitoring, including but not limited to, use, trouble shooting, and waveform evaluation.

- A. Each ALS Provider shall provide training approved by the Agency's Medical Director and Solano County EMS Agency on ETCO₂, based on the manufacturer's recommendations.
- B. Each paramedic must be trained in the use of ETCO₂ before they are authorized to use the device.

III. Procedure

- A. Attach the End-Tidal CO₂ detector to the Blind Insertion Airway Device (BIAD) or the Endotracheal Tube (ET). Capnography is the preferred method of verifying correct placement of the endotracheal tube.
- B. Note the CO₂ level and waveform changes. Levels and waveforms are to be documented on the PCR. A copy of all waveforms will be attached to PCRs.
- C. Capnography will remain in place and be monitored throughout the duration of the call, or until the patient is transferred to a higher level of care.
- D. Any loss of CO₂ detection or waveform will be documented.
- E. In all patients with a pulse an ETCO₂ > 20 is anticipated. In the post-resuscitation patient no effort should be made to lower ETCO₂ by modification of the ventilator rate. In post-resuscitation patients without evidence of ongoing, severe bronchospasm, the ventilator rate should never be < 6 breaths per minute.
- F. Any significant movement, emesis, or change in clinical condition shall be reassessed and documented in the PCR. If at any time the capnography indicates that the tube is not in the trachea the airway must be removed and the patient re-intubated.

IV. Quality Improvement:

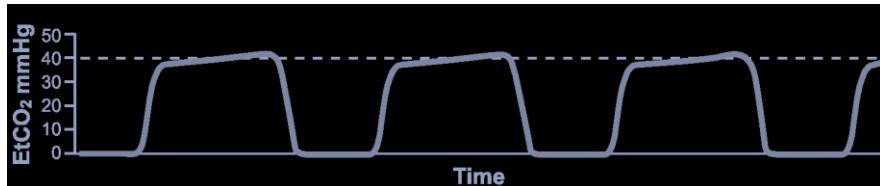
- A. The ALS Provider will audit the use of ETCO₂ on a monthly basis to ensure the procedure is followed. This information will be reported during the quarterly PCC/CQI meeting.
 - a. This report will include, but not be limited to, the number of times the ETCO₂ was used, number of total calls, percentage of use, failures, etc.
- B. ALS Providers will provide an annual record of paramedics trained in the use of ETCO₂ by February 28 of each year..

VI. Documentation.

- A. Document ETCO₂ numeric values and attach a copy of the waveform to the Patient Care Report (PCR).
- B. Capnography should be monitored in one minute intervals and each time the patient is moved. All numeric values will be documented on the PCR.

A. Examples of waveforms and explanations.

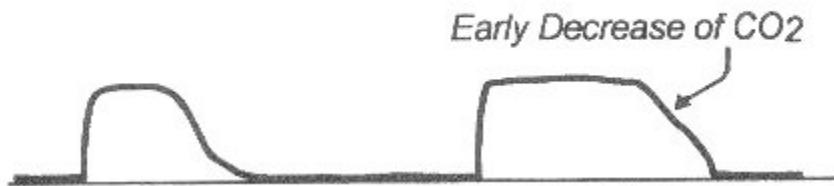
Intubated Patient.



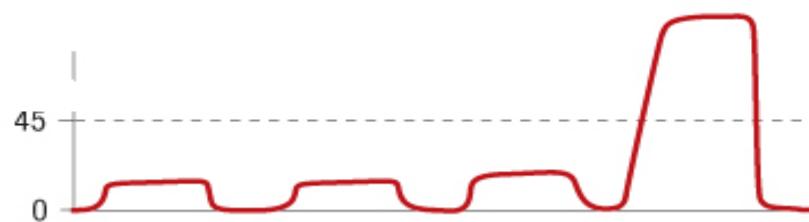
Esophageal Intubation



Cuff Leak



Return of Spontaneous Circulation (ROSC)



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