

# Solano County Health & Social Services Department

Mental Health Services  
Public Health Services  
Substance Abuse Services  
Older & Disabled Adult Services



Eligibility Services  
Employment Services  
Children's Services  
Administrative Services

**Ann Edwards, Director**

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EMS Agency Medical Director

## EMERGENCY MEDICAL SERVICES AGENCY

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Ted Selby  
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## 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 CO<sub>2</sub>) 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 CO<sub>2</sub> (ETCO<sub>2</sub>) Monitor devices, to provide optimal care to all intubated patients utilizing end tidal CO<sub>2</sub> 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 CO<sub>2</sub> 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 ETCO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> monitoring for endotracheal tube verification.

**II. Training**

Each Advanced Life Support (ALS) Provider shall provide paramedics training on the use of ETCO<sub>2</sub> 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 ETCO<sub>2</sub>, based on the manufacturer's recommendations.
- B. Each paramedic must be trained in the use of ETCO<sub>2</sub> before they are authorized to use the device.

**III. Procedure**

- A. Attach the End-Tidal CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> detection or waveform will be documented.
- E. In all patients with a pulse an ETCO<sub>2</sub> > 20 is anticipated. In the post-resuscitation patient no effort should be made to lower ETCO<sub>2</sub> 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:**

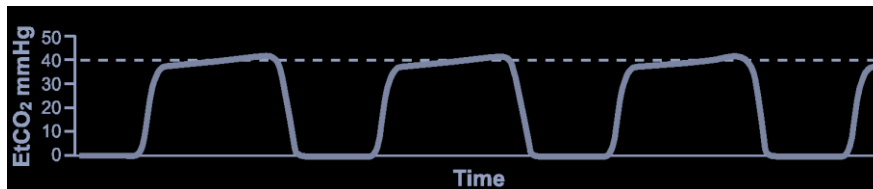
- A. The ALS Provider will audit the use of ET<sub>CO</sub><sub>2</sub> on a monthly basis to ensure the procedure is followed. This information will be reported during the quarterly PCC/CQI meeting.
  - a. This report will include, but not be limited to, the number of times the ET<sub>CO</sub><sub>2</sub> 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 ET<sub>CO</sub><sub>2</sub> by February 28 of each year..

**VI. Documentation.**

- A. Document ET<sub>CO</sub><sub>2</sub> 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.**

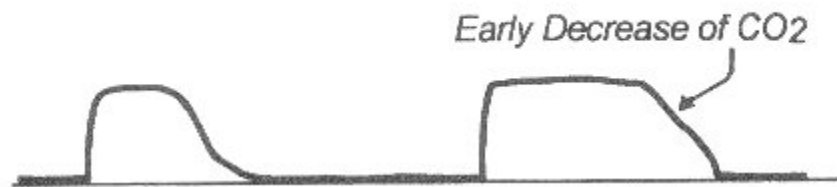
Intubated Patient.



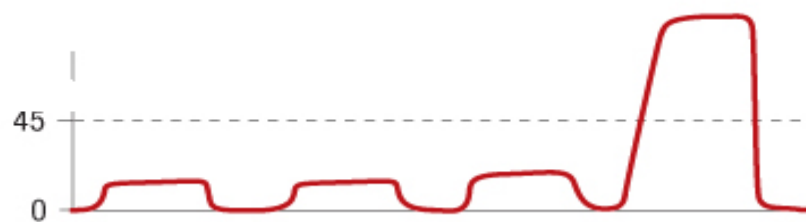
Esophageal Intubation



Cuff Leak



Return of Spontaneous Circulation (ROSC)



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