

# **PFC WG - Point of Care Testing (POCT)**

**December, 2014**

## **Limitations and Employment:**

Prior to fielding any Point of Care Testing device, an understanding of biochemical measurement interpretation and correctly using these values in patient management is a must. Proper initial instruction, hands-on training, and sustainment training will build the medic's level of competence in deciding which patients warrant POCT. This level of competence can range from a basic understanding of POCT and will only be employed with telemedicine prompting, to a substantial level of knowledge and experience where POCT can be fully employed based solely on clinical judgment.

Biochemical measurements are only a means of quantifying the severity of a disorder (acid-base imbalance, respiratory compromise, etc), the degree of compensation, and for guiding resuscitation in both traumatic and non-traumatic patients. These measurements rarely lead to a change in diagnosis, initial triage and/or initial evacuation precedence. Trending these values may increase the evacuation precedence, can be relayed to higher medical facilities to adequately prepare for patient arrival, can influence decision for transport to a host nation medical facility vs. wait for patient transport out of the host country, or determine the need for high risk medical interventions via telemedicine or other consultation.

## **Recommended Labs:**

The following biochemical measurements, in no particular order, can be applied to potentially reduce morbidity, mortality, and/or conserve resources in a prolonged field care situation.

1. Blood Gas (pH, PCO<sub>2</sub>, HCO<sub>3</sub>, pO<sub>2</sub>, Base Excess/Deficit):
  - a. Monitor patient's ability to ventilate and oxygenate in conjunction with EtCO<sub>2</sub> and pulse oximetry.
  - b. Measures the effectiveness of mechanical ventilation (PPV) in correcting respiratory acidosis/alkalosis and hypoxia.
  - c. Used in Damage Control Resuscitation Clinical Practice Guideline from JTTR for predictor of massive blood transfusion.
  - d. Used as markers to guide resuscitation.
  - e. Used as potential early physiologic predictor of injury severity and intra-abdominal injuries requiring surgical repair.
2. Electrolytes (Na, K, Cl, etc):
  - a. Used to diagnose and trend metabolic derangements.
  - b. Used to diagnose and trend primary electrolyte abnormalities.
  - c. Guides the use of hypertonic saline (HTS) therapy in closed head injury.
3. Hemoglobin (Hb):
  - a. Correlates with signs of shock.
  - b. Helps guide emergency resuscitation in conjunction with a patient assessment, blood gases, and lactate.
4. Lactate:
  - a. Serves as quantifiable marker for hypoperfusion, hypoxemia, reduced oxygen delivery, and predictor of mortality rate.
  - b. Measuring is particularly useful in sepsis and burn resuscitation.
  - c. Trending during resuscitation provides feedback on resuscitation effectiveness.

## **POCT Device Options readily available in United States Special Operations Forces inventory:**

1. i-STAT (manufactured by Abbott Point of Care): Currently in USAMMCE (US Army Medical Materiel Center – Europe), various Sets, Kits, and Outfits, and medical maintenance system. Provides all lab values, for both venous and arterial blood, listed above through combinations of various cartridges. Cartridges must be stored in refrigerator at 35F-46F (2C-8C), must “equalize” at room temperature for five minutes per cartridge at temperature <86F/30C, (one hour for a complete box of cartridges), and cannot be returned to refrigerator after equilibration at room temperature. Different cartridges expire at different times at room temperature; current range is 5 days to 2 months. Analyzer cannot be stored in direct sunlight and must be kept within 61F-86F (16C-30C). Must be filled exactly to fill line without air bubbles and kept level and face-up for successful results that are normally given in two minutes. Impaired use on ground vehicles; may have to stop vehicle for device to function accurately.
2. epoc (enterprise point of care) Blood Analysis System from Alere : **Not** in USAMMCE, various Sets, Kits, and Outfits, and medical maintenance system. Performs blood gas, electrolyte, and metabolites on either venous or arterial blood, but no coagulation analysis at this time. Uses “Smart Cards” instead of cartridges, they must be stored within 59F-86F (15C-30C) and cannot be refrigerated or frozen. Smart Cards require calibration in Epoc prior to use which takes about 165 seconds to calibrate. After calibration, card is ready for blood sample which must be given within 7.5 minutes or the card will “time out” and no longer accept a sample. Once blood is delivered to sensor area via 1mL or 3mL syringe or the included blood collection tubes, results are given in 30 seconds.

\*\*\*Disclaimer: The SOCOM PFC WG does NOT, in any way, endorse or recommend either of these products. These observations are presented for information purposes only based on current experience by units.\*\*\*