**BLOOD GASES**

**Blood gas analysis:**

- \( \text{PaO}_2 = \text{Arterial PaO}_2 \)
- \( \text{PaCO}_2 = \text{Arterial PaCO}_2 \)
- \( \text{pH} = \text{Arterial pH} \)

1. **CDE Variable**

   - \( \text{PaO}_2/\text{PaCO}_2/\text{pH} \)
   - \( \text{LowPaO}_2 = \text{Lowest daily arterial pO}_2 \)
   - \( \text{HighPaO}_2 = \text{Highest daily arterial pO}_2 \)
   - \( \text{PaO}_2\text{Units} = \text{Units for arterial pO}_2 \)
   - \( \text{LowPaCO}_2 = \text{Lowest daily arterial pCO}_2 \)
   - \( \text{HighPaCO}_2 = \text{Highest daily arterial pCO}_2 \)
   - \( \text{PaCO}_2\text{Units} = \text{Units for arterial pCO}_2 \)
   - \( \text{LowpH} = \text{Lowest arterial pH} \)
   - \( \text{HighpH} = \text{Highest arterial pH} \)

2. **CDE Definition**

   - \( \text{PaO}_2/\text{PaCO}_2: \) Partial pressure of oxygen/carbon dioxide in arterial blood
   - **pH:** Arterial pH value

3. **Recommended instrument for assessment**

   - \( \text{PaO}_2/\text{PaCO}_2: \) mmHg or kPa (1 mmHg = 0.133 kPa; 1 kPa = 7.5 mmHg)

4. **Description of measure**

   - \( \text{PaO}_2/\text{PaCO}_2/\text{pH}: \) numerical values

5. **Permissible values**

   - **\( \text{PaO}_2: \)** 40-300 (0-650) mmHg
     - 5.3-39.9 (0-86.5) kPa
   - **\( \text{PaCO}_2: \)** 20-60 (0-99) mmHg
     - 2.7-8.0 (0-13.2) kPa
   - **\( \text{pH}: \)** 6.8 – 7.5 (6.5-7.8)

   *The range presented represents the range of plausible values. Values outside this range may be queried. The numbers given between brackets, represent the range of possible values, including extreme situations. Values outside these ranges, will be queried immediately.*

6. **Classification:**

   - **Basic/Intermediate/Advanced**
     - **Basic:** \( \text{PaO}_2/\text{PaCO}_2: \) record lowest and highest values measured over a 24 hour period.
     - **Intermediate/advanced:** pH: record lowest and highest pH per 24 hour period.

7. **Procedure**

   - Obtained from arterial blood gases, check unknown if information is not available

8. **Comments/Special instructions:**

9. **Rationale/justification:**

   Ensuring adequate oxygen delivery to the brain and preventing ischaemia are important principles in the management of TBI. Respiratory/ventilatory disturbances are common in trauma patients treated in the ICU, leading to low \( \text{PaO}_2 \) or high \( \text{PaCO}_2 \) values. Careful monitoring of arterial \( \text{PaCO}_2 \) is essential when moderate hyperventilation is employed for treatment of raised ICP. Careful monitoring of blood gases is therefore essential in the management of TBI.

10. **References:**


**Recommended time for assessment:**
On admission and daily as required by protocol.