



*safePICO*

# A golden opportunity to improve blood gas testing

The *safePICO* syringe with an integrated mixing ball,  
enhance analytical quality

# Reduce potential risk in blood gas testing

In blood gas testing, accuracy of the result is crucial. Even the slightest error in the preanalytical phase can impact the quality of the sample and lead to inaccurate blood gas test results.

The **safePICO** syringe is constructed to improve sample quality. The vented **safeTIPCAP** and the barcode as well as the gold-coated mixing ball helps to make the processes of collecting, mixing and handling easier.

## **safePICO Aspirator**

– for arterial line sampling. An easy to mix syringe, specially designed for aspiration from catheters

## **safePICO Self-fill**

– for arterial puncture sampling and self-filling mechanism

## **safeTIPCAP**

– supports expelling of air bubbles. The vented **safeTIPCAP** helps you remove air bubbles and securely seal the sample. The sample remains sealed during mixing and handling. Minimizing your risk of contact with patient blood

## **Needleshield device**

– easily remove needle. Using only one hand you can easily and securely lock it with an audible click. It is designed to protect you from needlestick injury.

## **Needle**

– minimize risk of opposite arterial wall puncture. The thin-walled, short beveled needle helps ensure a smooth puncture and fast filling of the syringe, keeping patient discomfort to a minimum.

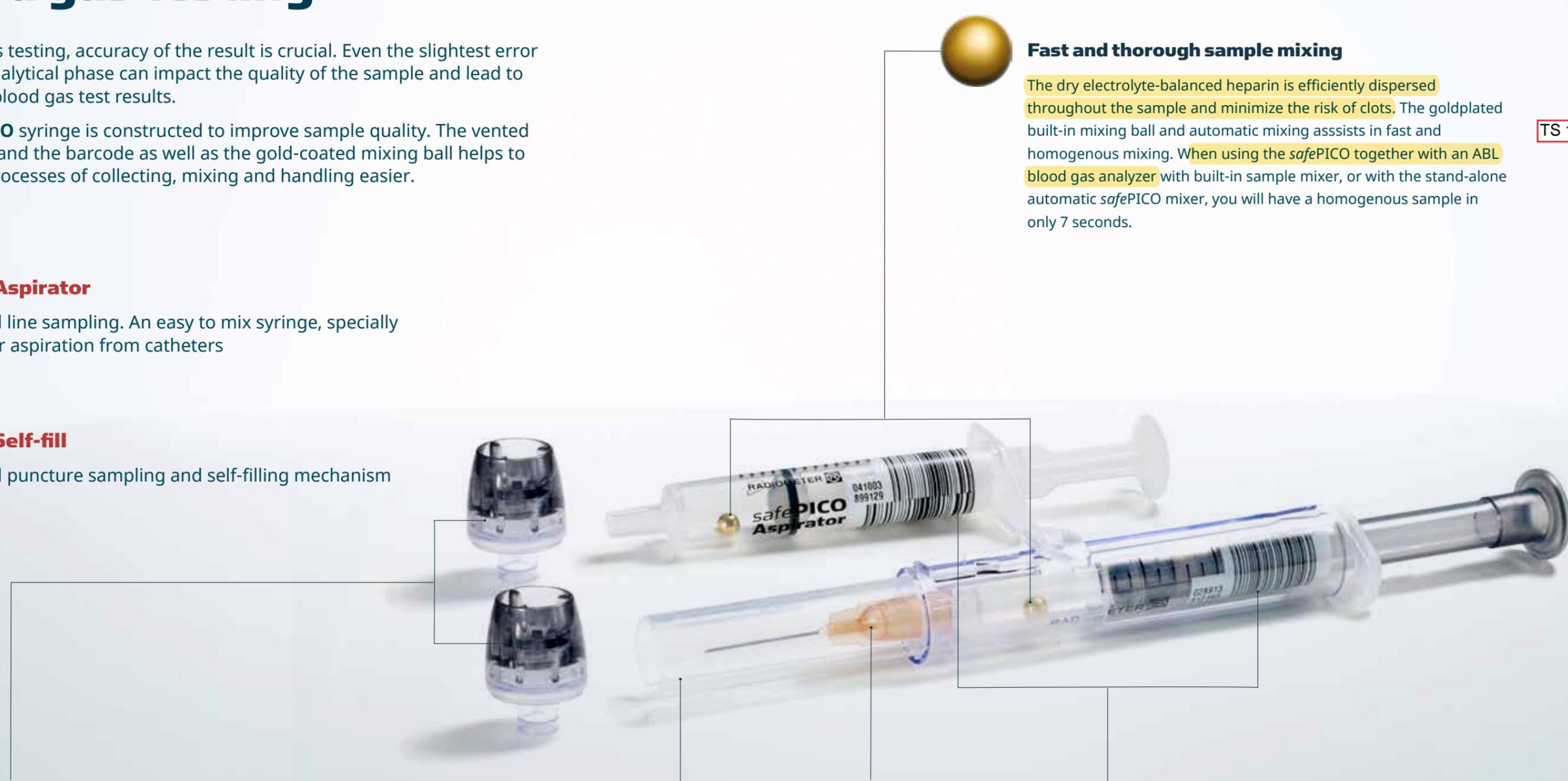
## **Barcode**

– correct patient ID and sample match. An integrated barcode helps ensure correct patient identification every time. With Radiometer's data management system, AQUIRE, you scan the sample directly at bedside linking it with operator and patient IDs.

## **Fast and thorough sample mixing**

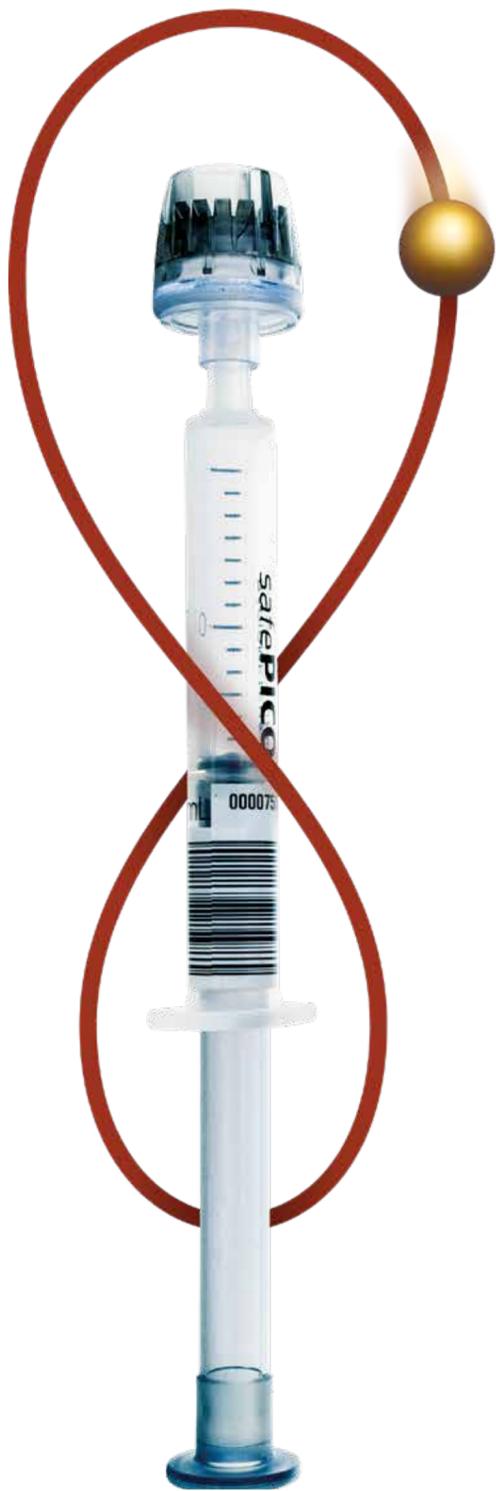
The dry electrolyte-balanced heparin is efficiently dispersed throughout the sample and minimize the risk of clots. The goldplated built-in mixing ball and automatic mixing assists in fast and homogenous mixing. When using the **safePICO** together with an ABL blood gas analyzer with built-in sample mixer, or with the stand-alone automatic **safePICO** mixer, you will have a homogenous sample in only 7 seconds.

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Up to 62% of testing errors occur in the preanalytical phase [1]; luckily, many preanalytical errors can be prevented. Following the steps in this guide will help you avoid preanalytical errors when collecting, mixing and handling samples for blood gas testing.



## 1. Prepare patient sample

- For each patient use at least two identifiers when collecting blood samples [2]
- The unique barcode on *safePICO* syringes can be scanned and linked with the syringe and patient ID at the bedside with AQUIRE FLEXLINK

**WHY?** Incorrect or missing patient and sample IDs are some of the most frequent – and critical – preanalytical errors occurring in blood gas testing [3].

## 2. Minimize risks while operating

### Arterial puncture

- Position needle at an angle of approximately 30-45 degrees before puncturing the skin [4]

**WHY?** Accidentally puncturing a vein can lead to contamination of the sample with venous blood, which leads to bias on O<sub>2</sub> and CO<sub>2</sub> values.

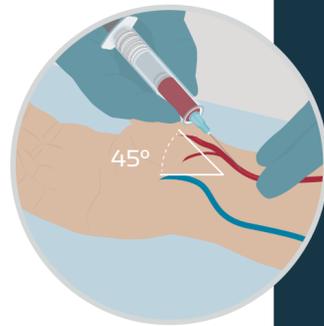
- Use a safety device that limits the risk of contact with patient blood
- Use a protection device for the safe removal of needles
- Make sure to follow a dedicated procedure for operator safety

**WHY?** Needlestick injury and unwanted contact with patient blood can lead to infection by blood-borne pathogens [5].

### Arterial line

- Remove sufficient flush solution from catheter prior to collecting the sample [4] as specified on the arterial line package

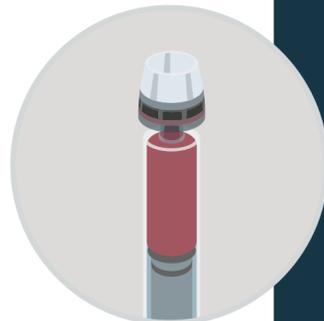
**WHY?** Contamination with flush solution leads to dilution of the sample, which may lead to inaccurate results.



## 3. Expel air from sample

- Gently tap the sides of the syringe and expel air bubbles by pushing the plunger. Arterial blood gas syringes with a vented *safeTIPCAP* will allow you to expel air and seal the syringe - limiting the operator contact with patient blood.

**WHY?** Air bubbles in the sample can lead to wrong results especially on pO<sub>2</sub> values [6, 7].

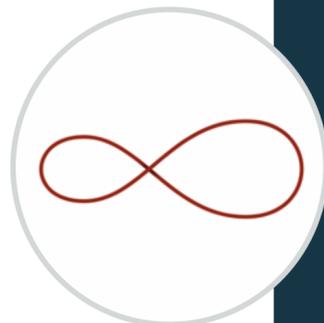


## 4. Mix sample correctly

- Immediately after expelling air bubbles, mix thoroughly by rotating or inverting the sample several times to dissolve heparin in the blood and prevent clotting

- Do not mix too vigorously as it may cause hemolysis [4]
- Transfer the sample to the analyzer for immediate analysis [4]

**WHY?** Clot formation and hemolysis may lead to wrong results and incorrect patient treatment [6, 8, 9].



## 5. Analyze sample

- If your analyzer\* provides automatic mixing, place the sample in the mixing inlet or the FLEXQ, and have the sample automatically mixed in 7 seconds.

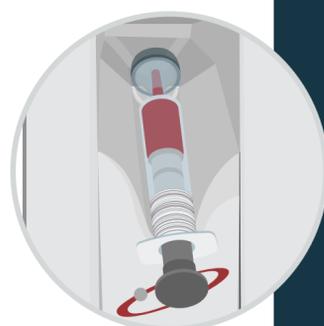
- If your analyzer has no automatic sample mixer, manually mix the sample a second time for a minimum of 1 minute, by rotating or inverting the sample several times [6].

**WHY?** Insufficient mixing can cause the sample to be non-homogenous which can lead to wrong results. Automatic mixing is superior to manual mixing to achieve a homogenous sample if the manual mixing is not done in a standardised way [10, 11].

**Note:** If storage cannot be avoided, store the sample at room temperature and analyze within 30 minutes [4].

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*\*Automatic mixing is found on the following analyzers: ABL90 FLEX, ABL90 FLEX PLUS and ABL800 with FLEXQ. The stand-alone automatic safePICO mixer is also available.*



**References**  
 1. Carraro P *et al.* Errors in a stat laboratory: Types and frequencies 10 years later. *Clin Chem* 2007; 53,7: 1338-42. 2. Joint Commission on Accreditation of Healthcare Organization. National Patient Goals. www.jointcommission.org Accessed Jun 2013. 3. Kahn S. Specimen mislabeling: A significant and costly cause of potentially serious medical errors. www.acutecaretesting.org Apr 2005. 4. CLSI. Procedures for the Collection of Arterial Blood Specimens: Approved Standard—Fourth Edition. CLSI document GP43-A4. Clinical and Laboratory Standards Institute, 950 West Valley Road, Suite 2500, Wayne, Pennsylvania 19087 USA, 2004. 5. Sharps safety. RCN guidance to support implementation of the EU Directive 2010/32/EU on the prevention of sharps injuries in the health care sector. Royal College of Nursing 2011. 6. CLSI. Blood Gas and pH Analysis and Related Measurements: Approved Guideline—Second Edition. CLSI document C46-A2. Clinical and Laboratory Standards Institute, 950 West Valley Road, Suite 2500, Wayne, Pennsylvania 19087 USA, 2009. 7. Toffaletti J. Effect of small air bubbles on changes in blood pO<sub>2</sub> and blood gas parameters: calculated vs. measured effects. www.acutecaretesting.org Jul 2012. 8. Higgins C. The use of heparin in preparing samples for blood gas analysis. www.acutecaretesting.org Apr 2007. 9. Siggaard-Andersen O *et al.* The concentration of free calcium ions in the blood plasma "ionized calcium". *AS-79*. Radiometer Medical ApS publication 1980: 163-90. Code no. 918-193. 10. Benoit M *et al.* Evaluation and advantages of an automatic magnetic mixing of syringes integrated to a whole blood gas analyzer. *Scand J Clin Lab Invest* 2009; 69(5): 628-32. 11. Grenache D *et al.* Integrated and automatic mixing of whole blood; an evaluation of a novel blood gas analyzer. *Clin Chem Acta* 2007; 375: 153-57.

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