



**NICU**

## **Careful monitoring in the NICU**

Supporting well-informed treatment  
decisions in the NICU

# Careful monitoring of the neonate

As a NICU professional, you know the care that the neonate receives in the first hours and days can have a significant impact on their life. [1-2]

In the short term, the recognition and treatment of critical conditions can save the newborn's life. In the long term, when caregivers provide correct and timely treatment and avoid life-altering complications, this can help contribute to better quality of life. [2]

Blood gas and transcutaneous monitoring of the neonate.

The Radiometer point-of-care-testing (POCT) solution for the NICU supports you in monitoring and caring for neonates. The solution combines blood gas analysis with non-invasive transcutaneous monitoring. It includes the ABL90 FLEX PLUS blood gas analyzer, the *safeCLINITUBES* capillary tubes, and the TCM CombiM transcutaneous monitor.

This combination of advanced technologies gives you access to accurate and real-time information about the neonate's condition to support well-informed treatment decisions.

## THE BLOOD GAS EXPERTS

Radiometer is no stranger to acute care diagnostics. When the polio epidemic swept across Europe in the early 1950s, many children were at risk of respiratory failure, which led to the development of the first blood gas analyzer by Radiometer in 1954. Since then, Radiometer has specialized in acute care diagnostics, delivering connected point-of-care-testing solutions for the ICU, NICU, and ED in hospitals in more than 130 countries.



*The more we can do without handling the baby, without painful stimuli, the better the chances are that those babies will have a better outcome long term. That's where we look at getting equipment that allows us to monitor the child from a distance without the nurse or doctor having to intervene frequently."*

**Dr. Sijo Francis, Consultant Neonatologist,  
St. George's University Hospitals  
NHS Foundation Trust, United Kingdom**

1. Ancel PY, *et al.* Survival and morbidity of preterm children born at 22 through 34 weeks' gestation in France in 2011: results of the EPIPAGE-2 cohort study. *JAMA Pediatr.* 2015; 169, 3: 230-238.  
2. BOOST II United Kingdom Collaborative Group; BOOST II Australia Collaborative Group; BOOST II New Zealand Collaborative Group, Stenson BJ, Tarnow-Mordi WO. Oxygen saturation and outcomes in preterm Infants. *N Engl J Med* 2013; 368, 22:2094-2104.





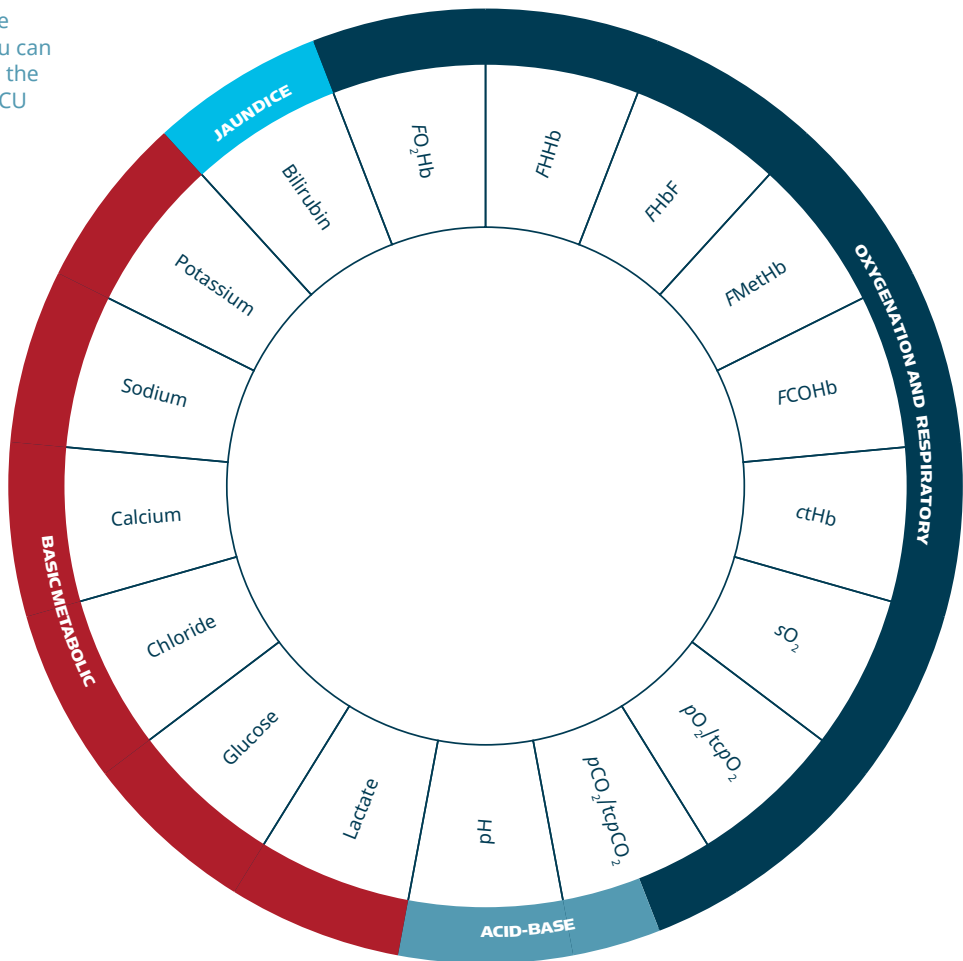
# Parameters you need to monitor neonate status

When neonates are critically ill, arterial blood gas results provide valuable information to clinicians.

However, while blood gas results are valuable, neonates have a limited amount of blood. The risk of iatrogenic anemia because of a limited blood volume stems from the low body weight of the neonate. This restricts the amount of blood you can collect. [3]

The oxygen status of the neonate can change rapidly, and, if undetected, can cause organ damage to develop. Transcutaneous monitoring – or continuous, non-invasive monitoring – of  $tcpO_2$  and  $tcpCO_2$  can detect changes in the neonate’s oxygenation and ventilation status. [2,4,5]

Overview of the parameters you can measure using the Radiometer NICU solution.



## Respiratory risks to a neonate

Preterm neonates can have respiratory insufficiency and thus, need oxygen therapy after birth. [6]

Both high and low oxygen and carbon dioxide levels can pose a risk to the neonate.

- High oxygen levels are associated with increased incidence of bronchopulmonary disease and retinopathy of prematurity. [2,4]
- Low oxygen levels are associated with increased incidence of necrotizing enterocolitis and even increased mortality. [2,5]
- High levels of carbon dioxide are associated with intraventricular hemorrhage. [7]
- Low carbon dioxide levels are also associated with increased incidence of bronchopulmonary disease. [8]

3. Jakacka, N. *et al.* Prevention of Iatrogenic Anemia in Critical and Neonatal Care. *Adv Clin Exp Med*, 2016, 25 (1), pp. 191–197. DOI: 10.17219/acem/32065.

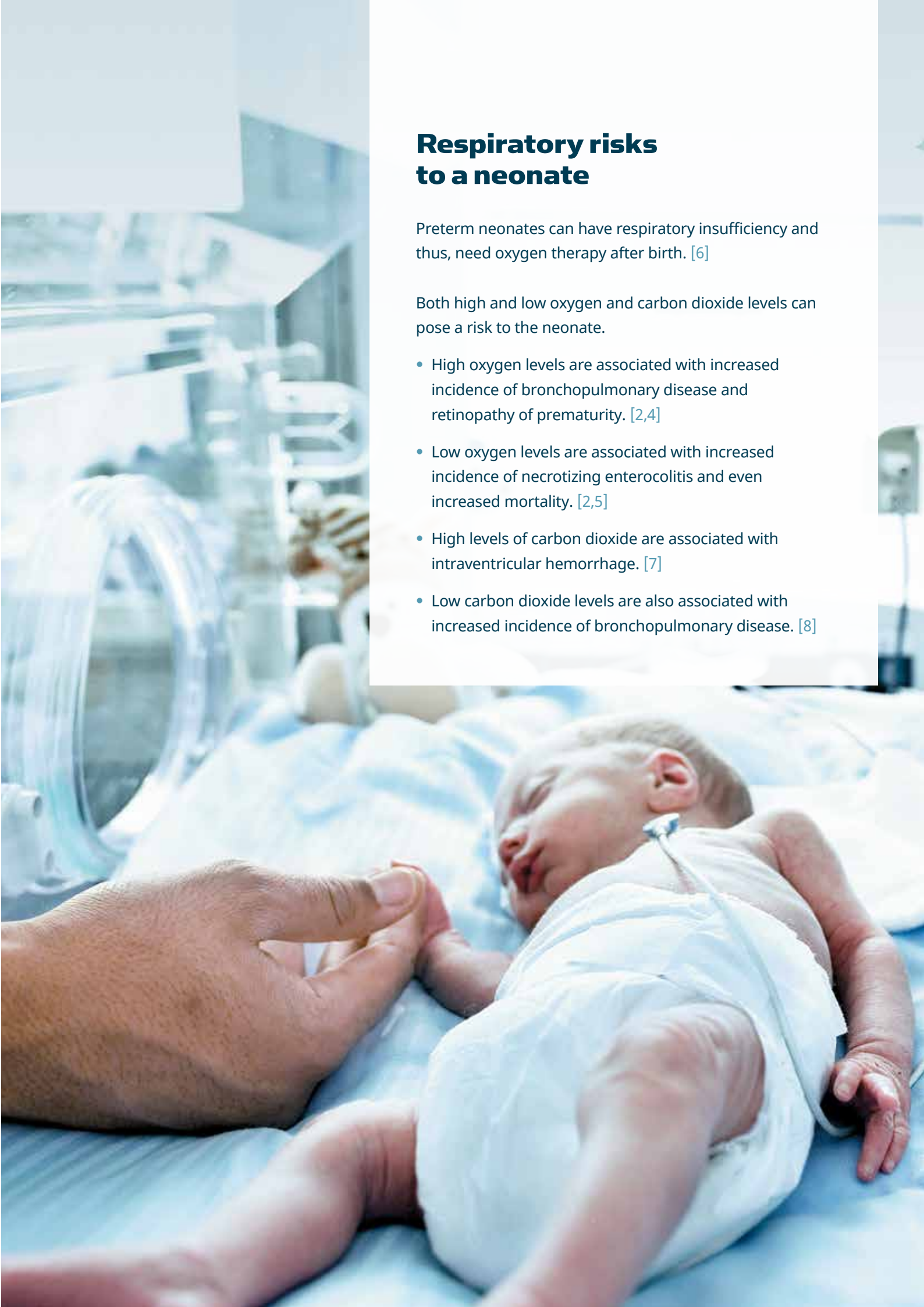
4. Northway, W. H. (1990). Bronchopulmonary dysplasia. Then and now. *Arch Dis Child*, 1990, 65 (10 Spec No), pp. 1076–1081.

5. Neu, J. *et al.* Necrotizing enterocolitis. In *N Engl J Med*, 2011, 364 (3), pp. 255–264.

6. Goldsmith, Karotkin, Keszler & Suresh: “Assisted ventilation of the neonate” Ch. 11; 2017

7. Kaiser JA *et al.*: Hypercapnia during the first 3 days of life is associated with severe intraventricular hemorrhage in very low birth weight infants; *J Perinatol* 2016 May; 26(5):279-85

8. Erickson, S. J. *et al.* Hypocarbica in the ventilated preterm infant and its effect on intraventricular haemorrhage and bronchopulmonary dysplasia. In *J Paediatr Child Health*, 2002, 38 (6), pp. 560–562.



# One solution to monitor oxygenation and ventilation

Together, the ABL90 FLEX PLUS analyzer and *safe*CLINITUBES capillary tubes are designed to meet the needs of neonatal blood gas testing. Transcutaneous monitoring with the TCM CombiM monitor complements arterial

and capillary blood sampling. It can help you schedule when to take blood samples and ensure careful monitoring of your most fragile patients. [9-11]



SAMPLERS

*safe*CLINITUBES  
CAPILLARY TUBES

Designed with rounded ends



BLOOD GAS TESTING

**ABL90 FLEX PLUS**  
BLOOD GAS ANALYZER

17 critical parameters on only  
65 microliters of blood

Results in 35 seconds

The ABL90 FLEX blood gas analyzer  
utilizes the AQM system for quality  
management and IQCP is not required



TRANSCUTANEOUS MOITORING

**TCM CombiM**  
TRANSCUTANEOUS MONITOR

Real-time trending complements  
blood gas sampling

SmartHeat reduces the time to get the  
first results

SmartCal keeps the sensor calibrated  
and ready in the background



*The transcutaneous monitor allows you to get a real-time view of changes in the child's physiology, changes in their lung status, and ventilation.*

*You can then use your blood gas analyzer to complement it to get slightly more accurate readings of what's going on in the blood stream*

*but the trends are now coming from the non-invasive form."*

**Dr. Sijo Francis, Consultant Neonatologist,  
St. George's University Hospitals  
NHS Foundation Trust, United Kingdom**

## Partner with the blood gas testing specialists

When you choose Radiometer, you tap into more than fifty years of acute care diagnostics experience. You get access to services, support, and knowledge including:

- Radiometer LIVE — a customer care program with services, tools, and educational resources to support you throughout the lifetime of your Radiometer solution
- Installation of your point-of-care analyzers with on-site consultation
- Staff training with a customizable high-impact learning program
- MyRadiometer — a dedicated customer portal with an extensive library of information on our product portfolio



### FIVE REASONS TO CHOOSE A RADIOMETER NICU POINT-OF-CARE-TESTING SOLUTION

- 1 Blood gas test results on 17 parameters in 35 seconds, including Lactate

2 Small blood sample volume

3 Compact, easy-to-use blood gas analyzer with built-in QC
- 4 User-friendly transcutaneous monitor with system defined limits of site time versus temperature

5 Real-time trending measurements for monitoring of critical changes in neonate status.

9. Mukhopadhyay S, Maurer R and Puopolo M. Neonatal transcutaneous carbon dioxide monitoring - effect on clinical management and outcomes. Respiratory Care; January 2016 Vol 61; No.1.

10. Spelten O. Transcutaneous PTCCO2 measurement in combination with arterial blood gas analysis provides superior accuracy and reliability in ICU patients. J Clin Monit Comput (2017) 31:153–158.

11. Sandberg KL *et al*. Transcutaneous blood gas monitoring during neonatal intensive care. ACTA PÆDIATRICA 2011; 100.

## Whatever comes next, we make sure life comes first

Radiometer products and solutions are used in hospitals, clinics, and laboratories in over 130 countries, providing information on critical parameters in acute care diagnostics. Through connected solutions, expert knowledge, and trusted partnership, we help health care professionals make diagnostic decisions to improve patient care.

Contact us today.

Visit our website to arrange for a demo.

[www.radiometeramerica.com/NICU](http://www.radiometeramerica.com/NICU)