

# AARC Clinical Practice Guidelines: Capillary Blood Gas Sampling for Neonatal and Pediatric Patients

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In the absence of an indwelling arterial catheter, capillary blood gas sampling may be used to evaluate the acid/base and ventilation status of neonatal and pediatric patients with cardiorespiratory conditions. These guidelines were developed from a comprehensive review of the literature to provide guidance for the collection, handling, and interpretation of blood obtained from an arterialized capillary sample. Capillary and venous blood gas measurements are a useful alternative to arterial blood gas measurements for neonatal and pediatric patients who do not require close monitoring of  $P_{aO_2}$ . In the presence of alterations in body temperature, blood pressure, or peripheral perfusion, agreement between a capillary blood gas with an arterial sample is recommended to determine whether changes in these physiologic conditions reduce reliability. Perfusion to the sample site should be assessed and preference given to blood sampling from a well perfused site, and blood should be analyzed within 15 min of sampling to minimize the propensity for pre-analytical errors. Clinicians should consider re-collecting a blood sample, obtained from an artery, vein, or capillary, when the blood gas or analyte result interpretation does not align with the patient's clinical presentation. A pneumatic tube system can be reliably used to transport blood gas samples collected in a syringe and capillary tube to a clinical laboratory for analysis. To reduce the cumulative pain effect and risk of complications, the capillary puncture procedure should be minimized when possible. Non-pharmacologic interventions should be used to reduce pain associated with capillary blood gas sampling. Automatic lancets are preferred to puncture the skin for capillary blood gas collection. *Key words: blood gas analysis; blood draw; capillary; point of care; neonatal; pediatrics; acid-base.* [Respir Care 2022;67(9):1190–1204. © 2022 Daedalus Enterprises]

## Introduction

Evaluating acid/base balance and ventilation through pH and blood gas analysis are essential to the care of infants and

children with cardiorespiratory impairment. Measurement of pH,  $P_{CO_2}$ , and  $P_{O_2}$  have diagnostic and prognostic value, and are used to guide the respiratory plan of care.<sup>1</sup> Although obtaining a blood sample from a percutaneous arterial