



# Capillary Blood Sampling: Best Practices for Accurate Point-of-Care Hematology Testing

**FOR GUIDANCE ONLY**  
Always follow the manufacturer's  
Instructions For Use (IFU)



# The Importance of Capillary Blood Sampling



Capillary blood (fingerstick) sampling is increasingly being used worldwide due to the growing availability of point-of-care testing (POCT).

With anemia affecting about 25% of the global population with much higher prevalence in developing countries, hemoglobin (Hb) is the most frequently performed test in hematology POCT, and is also being used routinely by blood collection services to ensure safe donations.

At the same time, hemoglobin values are among the parameters most prone to being affected by pre-analytical errors so, in order to avoid generating inaccurate and misleading Hb results, healthcare personnel drawing blood must adhere to strict and standardized blood sampling techniques to ensure accurate and consistent POCT results that are comparable to laboratory techniques.

This guide provides an overview of best practices in capillary sampling to help healthcare professionals understand common pre-analytical errors and minimise their impact on hemoglobin results.

## Did you know?

Detailed capillary sampling guidelines have been published by both the Clinical and Laboratory Standards Institute and the World Health Organization.<sup>1,2</sup>

## The importance of good capillary blood sampling procedures for hemoglobin testing

- Incorrect capillary sampling is the leading cause of inaccurate hemoglobin POCT results.<sup>4</sup>
- Global adoption of capillary sampling continues to grow as POCT expands.
- Hemoglobin testing is the most frequently performed POCT hematology assay.<sup>3</sup>
- Hemoglobin values are highly susceptible to pre-analytical errors, meaning improper technique directly increases variability and risk of false readings.<sup>4</sup>

## Understanding common causes of pre-analytical errors

Variability in reported hemoglobin values can be caused by physiological factors such as dehydration, smoking behavior, or altitude, and it can be significantly affected by pre-analytical errors related to incorrect capillary blood sampling technique. Detailed in this guide are some of the most common sources of error that occur that healthcare workers should be aware of.

- **Correct choice of lancet** - The lancet must make a sufficiently deep puncture to ensure an adequate flow of blood. Shallow punctures may prevent adequate flow, leading to squeezing and sample contamination. 1.85mm to 2.25mm is recommended for adults, depending on the thickness of the skin. For children aged below 8 years, the penetration depth should not exceed 1.5 mm.<sup>2</sup>
- **Correct selection of puncture site** - The middle or ring finger should be used, ideally on the non-dominant hand, as they are generally less calloused and less sensitive to pain when compared to the index finger or thumb. The thumb should be avoided due to its arterial pulsation. The fifth finger should also be avoided, as the distance between the skin surface and the bone is insufficient for safe and proper capillary sampling.<sup>2</sup>
- **Cleaning, disinfection and drying** - Cleaning and disinfection of the puncture site is essential to remove any potential contaminants that could affect the reading or jeopardize patient safety. The puncture site must also be dried completely, after cleaning, to remove any remnants of alcohol solution that can dilute the blood sample and cause false low readings.
- **Applying too much pressure around the puncture site** - The finger can be massaged gently before and after the puncture to stimulate blood circulation, but not going past the first knuckle. Maintaining a light pressure at the moment of puncture ensures effective penetration. However, the finger should not be pressed too hard as this will push fluid from the tissue into the blood and cause false low readings.

The puncture should be made slightly off center from the central, fleshy portion of the fingertip - near lateral side where the skin is thinner with fewer nerve endings and less pain sensation, but not directly on the side of the finger. Selecting the right finger and puncture site will ensure best chance of good consistent blood flow and minimize pain for the patient.



### The importance of time and blood flow

Another key factor that influences Hb measurement is capillary flow. Typically for hemoglobin, the first 1-3 drops after puncture show a higher degree of variability of the Hb concentration independent of the analytical device used for the test. It is for this reason that these first few drops of blood should be wiped away, as they may contain tissue fluid and debris from the puncture, causing higher variability.

The highest accuracy is generally reached from the 4th drop after puncture, with good capillary flow occurring for a period of 30-45 seconds. After this time, coagulation will occur where blood clotting would lead to inaccurate Hb results if blood is sampled then.

Figure 1 demonstrates the ideal capillary blood sampling window.

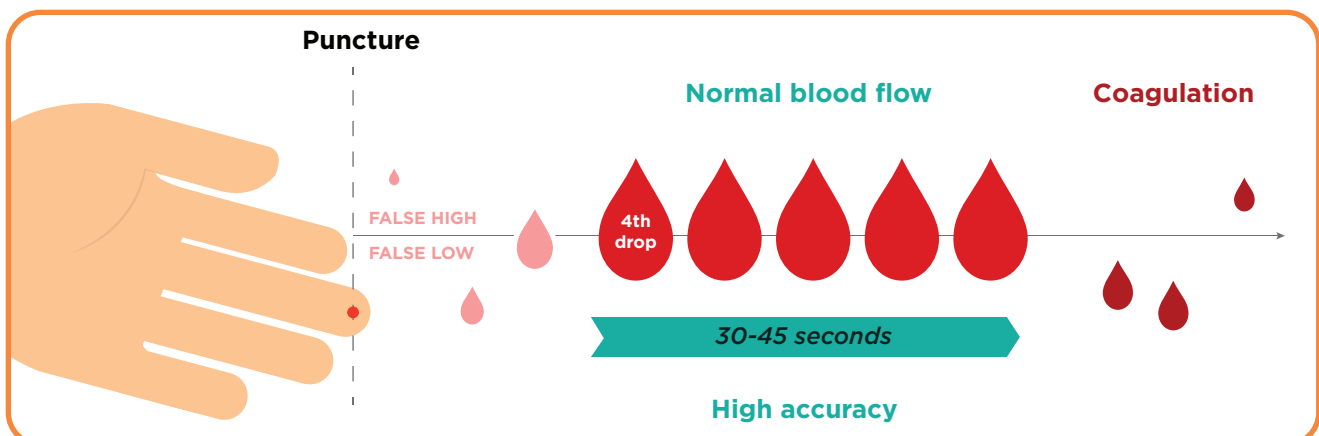


Figure 1 - The effect of time and capillary blood flow on hemoglobin results

# A step-by-step guide for best practice capillary sampling

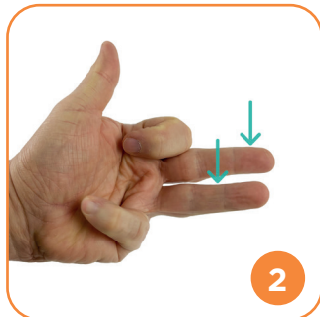
The following steps outline how to properly collect a capillary blood sample to ensure accurate point-of-care Hb measurements and minimize pre-analytical errors. Achieving free, spontaneous blood flow is critical, as the ideal drop size and timing of collection after puncture are not standardised, and manufacturer guidelines vary.



1

Perform hand hygiene and then put on well-fitting non-sterile gloves.

Make sure all items for capillary sampling and performing the test are available and close to hand.



2

Select the middle or ring finger, ideally of the non-dominant hand.

The patient must not wear a ring on the finger as this may obstruct the blood circulation.



3

Ensure the patient's hand is warm and relaxed and ensure the patient is comfortably seated.

The puncture should be made slightly off center from the fleshy portion of the fingertip, near to the side of the fingertip.



4

Disinfect and thoroughly dry the puncture site.



5

Gently massage the finger towards the tip to increase blood flow. Avoid going past the first knuckle.



6

Make the incision on the upward-facing side of the fingertip, to facilitate filling of the cuvette.

Apply only light pressure towards the fingertip until a blood drop appears.

Don't press or milk the finger. It may take a few seconds after the puncture for the blood flow to start.



7

Wipe away the first 2-3 drops and make sure there is free blood flow before filling the cuvette.

Be sure to have a sufficient sized blood drop to fill the cuvette.

Release the grip on the finger when wiping off a blood drop.



8

Fill the cuvette completely in one go.

Do not refill and avoid air bubbles. Dispose sharps safely.

Always refer to the Instructions for Use provided by the manufacturer of the hemoglobin analyzer.

## References

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3. Briggs C et al, Where are we at with point-of-care testing in haematology? British Journal of Haematology, 2012, 158, 679-690
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