

PAEDIATRIC NURSING PRACTICE MANUAL  
SECTION 5

SPECIMEN COLLECTION

5.1 BLOOD

5.1.2 COLLECTION OF BLOOD SPECIMEN BY HEEL STAB

**Aims**

1. To obtain a blood sample from an infant (<6 months old) for diagnosis.
2. To obtain the best possible sample, minimise procedural pain/discomfort and avoid complications.

**Key points**

1. For Newborn Screening (Guthrie Test) also refer to [http://www.pmh.health.wa.gov.au/services/newborn/health\\_professionals/index.htm](http://www.pmh.health.wa.gov.au/services/newborn/health_professionals/index.htm)
2. This is a clean [aseptic technique](#).
3. Use of petroleum jelly eg. Vaseline® is not recommended as it can affect results and clog equipment.<sup>1,2</sup>
4. Isopropyl alcohol swabs are not recommended for premature infants<sup>3</sup> <27 weeks gestation.
5. Lipids may interfere with blood samples. Refer to Parenteral Nutrition [PNPM 2.7](#) pg 4 for requirements to discontinue lipids before sampling.
6. If unsure about the specific test requirements contact the appropriate laboratory, [Pathology Handbook](#) and/or the [Pathology Test Directory](#).

**Indications;**<sup>2-5</sup>

- Blood gas analysis
- Biochemistry tests ie. U&E's, antibiotics assays
- Newborn Screening
- Blood glucose monitoring
- Full blood picture

**Relative contraindications**

Not recommended for;

- Test(s) requiring a total sample size of >1mL<sup>3-5</sup>
- Infants over 6 months of age<sup>4</sup>
- Coagulation samples<sup>3,4</sup>
- Blood cultures<sup>1</sup>
- Chromosomal studies<sup>1</sup>
- When a non haemolysed sample is required<sup>4</sup>

**Possible complications of an improper heel puncturing technique**<sup>2,3,6</sup>

- the development of osteomyelitis
- the development of necrotising chondritis
- local trauma ie. bruising
- damage to nerves, blood vessels and bones

- infection

### Critical factors in preventing complications are:

- Selecting the appropriate automated lancet device<sup>3</sup> – see table below
- Selecting the correct puncture site – see diagram below
- Limiting the depth of the puncture wound to 2.4mm<sup>2, 6</sup>
- Using the most medial or lateral portions of the planter surface of the heel
- Rotating the sites and foot<sup>1, 2</sup>
- Avoiding areas of bruising, broken skin, infection, impaired skin integrity, previous puncture holes, poor perfusion and/or oedematous areas<sup>1-3</sup>

### Suitable Automated Lancet Devices

#### BD® Microtainer Contact-Activated Lancets

Width 1.5mm blade

Depth 2.0mm

Suggested use; high blood flow



#### BD® Microtainer Contact-Activated Lancets

Needle size 21 g

Depth 1.8mm

Suggested use; Medium blood flow



### Equipment

70% isopropyl alcohol swab

Appropriate automated lancet device

Sterile cotton ball(s) or gauze

Disposable gloves

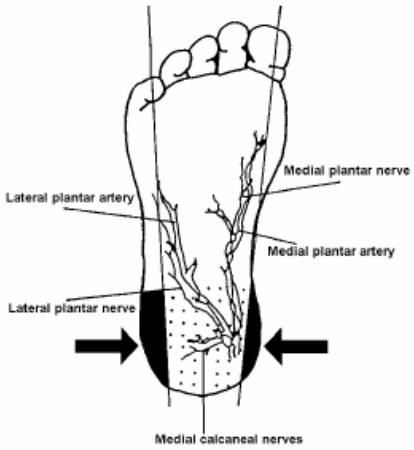

Pathology request form – *to be completed by medical staff*

Relevant blood specimen bottle(s)/capillary tube(s)/glucose stix – *check expiry dates*

+/- Adhesive tape

+/- Elastoplast

PROCEDURE	ADDITIONAL INFORMATION
Positively identify the patient.	Refer to the <a href="#">Pathology Handbook</a> for guidance.
Consider the need for appropriate comfort measures/pain relief <sup>3</sup> eg. breast feeding, <sup>7, 8</sup> sucrose, <sup>3, 9</sup> dummy and swaddling.	
Ensure the heel is warm.  Consider applying booties, extra clothing, swaddling or warming the heel with a soft cloth moistened with warm water prior to the procedure.	Blood taken from cool, poorly perfused sites can result in inaccurate results.  Warming the limb will dilate the capillaries and increase blood flow.  <b>Note:</b> Several recent studies have indicated that <b>routinely</b> pre-warming the heel prior to capillary blood sampling is of no benefit. <sup>10</sup>

PROCEDURE	ADDITIONAL INFORMATION
<p>Select puncture site.</p> <p>Position infant to allow easy access to the chosen site.</p> <p>Don gloves.</p>	<p>Avoid the anteromedial aspect of the foot as it is close to the calcaneus and is avascular.</p>  <p>Shaded areas indicate correct sites for sampling</p>
<p>Wipe the heel with alcohol swab.</p> <p>Allow to dry.</p>	<p>Puncturing the skin before the foot is dry may adversely affect the test results by diluting the sample and causing haemolysis.<sup>2, 11</sup></p>
<p>Partly encircle the infants heel at arch and ankle with non dominant hand and gently squeeze foot to bulge flesh away from bone.<sup>1</sup></p> 	<p>Hold puncture site downward to aid flow via gravity.<sup>1</sup></p>
<p>Puncture the heel at 90° angle to the skin with one continuous deliberate motion.</p>	<p>Do not use a scalpel blade.</p> <p>Never re use a lancet.</p>
<p>Relax tension and wipe away initial blood flow with cotton wool or gauze.<sup>1, 2, 11, 12</sup></p>	<p>Eliminates cellular debris and residual alcohol which can alter test results.<sup>2, 11, 13, 14</sup></p>

PROCEDURE	ADDITIONAL INFORMATION
<p>As drops of blood form, collect into the tube by touching the feeder to the droplet.<sup>1</sup></p> <p>Do not use the collection tube to scoop along the skin</p>	<p>This will damage the cells and cause inaccurate results.</p>
<p>For a capillary blood gas sample, ensure there are no air bubbles.</p> <p>Fill tube at least 2/3<sup>rd</sup>s full.</p>	<p>Keeping the capillary tube horizontal or angling the tube upwards can help to prevent air bubbles.</p>
<p>Intermittently release and reapply the pressure to the foot to aid blood flow.</p> <p><b>Note:</b> It may be necessary to wipe the puncture site to ensure drops remain well formed and to remove any clots that may be forming.<sup>2, 3, 11</sup></p>	<p>Avoid excessive squeezing which can cause haemolysis leading to inaccurate results.<sup>2, 3</sup></p>
<p>Gently flick or swirl the collection tube to mix the blood as it is collected</p> <p>Rotate capillary blood gas tube back and forth between the tips of your fingers.</p> <p>Do not shake the tube.</p>	<p>This will damage the blood cells and lead to inaccurate results</p>
<p>If more than one sample is required, fill the blood tubes in the correct order.</p>	<p>To avoid contamination from the tube additives.<sup>15, 16</sup></p> <p>Refer to the Pathology Handbook for specific requirements (order of draw, pathology manual, general guidelines section 2.6 pg 12-13).</p>
<p>Once the correct quantity is obtained, cap and gently invert each tube a few times.<sup>1</sup></p>	
<p><b>Once sample is obtained</b></p> <p>Place a dry cotton wool ball against the site</p> <p>Apply pressure for 1-2 minutes.<sup>17</sup></p>	<p>For children who are thrombocytopenic or on anti-coagulant therapy a longer period of gentle pressure may be required.<sup>18</sup></p>
<p>If the site is bleeding, an elastoplast or cotton wool and tape may be required.</p>	<p>If used on an infant, remove as soon as no longer required to avoid accidental choking.</p>
<p>At the bedside; label samples correctly, complete the collection details on the request form.</p>	<p>Refer to Pathology Manual, General Guidelines Section 2.</p>
<p>Transport to laboratory in a Biohazard bag.</p>	



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