Government of Western Australia
Department of Health

WA Newborn Screening Program

PathWest
LABORATORY MEDICINE WA

WESTERN AUSTRALIAN NEWBORN BLOODSPOT SCREENING PROGRAM GUIDELINES

Information for midwives, early childhood nurses, laboratory personnel and other health professionals.

Specimen collection

The aim of newborn bloodspot screening is early detection, diagnosis and treatment. The success of screening is largely dependent on the quality of the samples collected ie. dried bloodspot samples taken at the correct time and in the correct manner. Rapid identification of potentially affected babies by screening leads to further diagnostic tests and early treatment.

The ideal sample

The best practice is to take the sample between **48 and 72 hours** of age. If the infant is discharged before 48 hours then arrangements need to be made to collect the sample later when the baby is 48 to 72 hours old. If there is any concern that this may not happen, or might be delayed, then collect a sample at discharge as well. False negative results may occur if the sample is taken too early.

The consent procedure

Before undertaking the collection procedure outlined in these guidelines, parents should have been provided information and consent obtained to undertake the sample collection according to local hospital policies and procedures.

Provide the information pamphlet ("Your Newborn Baby's Screening Test") to parents prior to collection and ensure they understand the contents. Discuss the collection and testing with parents, obtain their consent, and complete all relevant documentation. Inform the parents that they will only be contacted if the test is positive or if another sample is required for technical reasons.

The parent's consent to sample collection and testing should be recorded in the medical record. It is also important to record the sample collection date and time, card number, and who collected the sample in the baby's medical record/personal health record.

It is the responsibility of the hospital and/or midwife to ensure that a sample is collected and sent to the screening laboratory in a timely manner.

The collection procedure

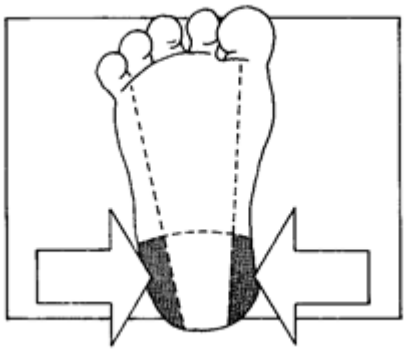
You will need the following items:

- A sterile, disposable lancet or automated lancet device (max. tip length 2.4 mm)
- 70% alcohol swab
- 3 sterile cotton wool balls or gauze swabs
- Disposable gloves
- Newborn screening card
- Baby's medical record and/or personal health record book

Universal precautions must be observed when collecting all blood samples. Health professionals should also be aware of local guidelines for reducing pain during heel lancing.

1. **Identify whether the baby is due for the test** and that the timing is acceptable.
2. **Check the baby's identification** band against the medical record or confirm the baby's identity with the parents. Then complete ALL the information on the sample card using a ballpoint pen and print clearly. Do not touch the sample area of the card at any stage.
3. **Wash your hands** and put on gloves. Wipe the collection site with alcohol and then dry with cotton wool or gauze. Do not leave any alcohol on the skin as this may dilute the sample and adversely affect the test results. Never use Vaseline or any other material on the collection site.
4. **Hold the foot firmly** to expose the collection site. Use only the inner or outer aspects of the plantar surface of the heel to avoid damaging the heel bone (see Figure 1). Try to avoid any previous puncture holes and do not apply excessive pressure to the lower limb or foot as this can cause bruising.

Figure 1



5. **Hold the lancet and puncture the** skin in a single motion. Only puncture once and do not twist or slice the lancet in the skin. The puncture depth should be no more than 2.4 mm.
6. **After the puncture**, wait five seconds as vasoconstriction occurs initially. Then gently apply intermittent pressure with your thumb to the area surrounding the puncture site. Avoid excessive pressure as this may graze or bruise the site.
7. **Wipe away the first drop of blood** as this contains tissue fluids that may dilute the sample. Wait for another large drop of blood to form and then touch this to the centre of the first circle on the back of the sample card. Place the next drop of blood in a blank part of the first circle until the circle is full. Examine both sides of the sample card to ensure that blood has penetrated and saturated the paper. **Blood must soak completely through the card.**
8. **Then continue to collect drops of blood** until the second and third circles are full. Do not rush the procedure and allow sufficient time for the blood drops to collect. Avoid contaminating the sample area on the card with talc from your gloves.
9. **If you have difficulties** during collection, attempt a second puncture with a new lancet and apply the blood to a new circle on the card. Do not layer new blood over partially dry blood from the previous attempt. If you are still experiencing problems stop and seek help.
10. **Place cotton wool over the puncture site** until bleeding stops. It is not advisable to place adhesive bandages over skin puncture sites in newborns.
11. **Dry the sample card** for a minimum of **four** hours, at room temperature, on a drying rack or a non-absorbent surface, in a horizontal position.
    - Keep the cards separate and avoid touching or smearing the blood spots.
    - Avoid excess heat or direct sunlight and never store the cards in a closed area, such as a drawer, or in a refrigerator.
    - The sample must be totally dry before placing the card in the envelope.
    - If the cards are collected outside of a hospital, an insulated container may help protect the samples from extremes of temperature.

Specimen mailing instructions

Mail or courier the sample cards on day of collection (or within 24 hours) to the screening program using the designated pre-addressed envelopes.

- If stacking several cards for mailing, then do not directly place one bloodspot on top of another as this can cause contamination; rotate each card in the stack to alternate the collection areas.
- Place the cards inside a protective paper cover before they are placed in the envelope. These covers are provided with the envelopes. If one is not readily available then wrap a sheet of clean white paper around the cards. Ensure the bloodspots are completely covered.
- There is minimal risk of infection from dried-blood samples. However, it is recommended that the sample cards be protected by a double layer of covering to ensure the samples remain sealed and well protected.

Ensuring all infants are screened

Each hospital or neonatal or midwifery service must nominate a contact position responsible for administering the Newborn Bloodspot Screening Program and who is the point of contact for PathWest and responsible for:

- Handling telephone calls and correspondence regarding the Newborn Bloodspot Screening Program.
- Checking fortnightly reports from PathWest to cross check and record all babies born under their care have been screened or declined consent for screening.
- Contacting PathWest if any baby's name is missing from the list to check and record if a sample has been received.
- Organising any repeat collections when required.
- Reporting complaints about the Newborn Bloodspot Screening Program to PathWest.

Please report any changes in nominated contact position to wanbs@health.wa.gov.au

Common sample problems

When the screening laboratory receives an unacceptable sample it must request a second sample to ensure the reliability of the test results. Poor quality samples cause unnecessary trauma to the infant (and parents), potentially delay the detection and treatment of an affected infant, and could contribute to a missed case. You have a vital role to ensure reliable samples are collected.

Common sampling problems include:

- **Insufficient blood** or not filling all circles may mean there is not enough sample to complete the testing. Blood must also soak completely through the card.
- **Milking or squeezing** the puncture site can cause haemolysis and mixing of tissue fluids with blood.
- **Layering or applying successive drops of blood** (double collection) in the same printed circle causes caking and/or non-uniform concentrations of blood. If blood flow diminishes, such that circles are not completely filled, then repeat the sampling technique in a new circle.
- **Contamination of the sample** during collection, drying, or mailing with water, milk, antiseptic solutions, alcohol, urine, meconium, talc, or soaps may interfere in the testing and render the results unreliable.
- **Inadequate or inappropriate drying**
  - Humidity and moisture adversely affect the quality of sample and analyte recovery.
  - Excess heat or sunlight bakes the sample.
  - Excess cold leads to separation of red blood cells and serum.
  - Placing the sample in a plastic bag causes sweating and promotes bacterial growth.

Please refer to the "**Simple Spot Check**" guide on page 5.

Common collection problems

1. Hospital transfers

Babies may miss being screened when sick neonates are transferred from one hospital to another or when well neonates are transferred from a base hospital to a district or country hospital. Responsibility must be taken by both hospitals to ensure that a sample is collected. The hospital site of birth is to communicate the screening status of the baby at transfer and the receiving hospital must ensure that a sample is collected from the baby if and when required.

2. Early discharges

If the infant is discharged before 48 hours then arrangements need to be made to collect the sample later when the baby is 48 to 72 hours old. If there is any concern that this may not happen, or might be delayed, then collect a sample at discharge as well.

3. Homebirths

Babies born at home must be offered a screening test.

4. Other babies at risk of not being screened

Other "at risk" groups include babies of Aboriginal or culturally and linguistically diverse mothers, of mothers who had no antenatal care, of mothers who discharge early against medical advice, and of mothers affected by drugs or alcohol. Midwives and nurses should take extra care to ensure all babies are followed up who did not have a sample collected during their hospital stay.

5. Declined consent

If consent to bloodspot screening is declined, reiterate the importance of screening, inform the parents of the risks if the baby does have a condition, and provide options for seeking further information from appropriate health professionals. If they continue to decline, record the baby's details on the bloodspot card and document in the medical record. Still send the incomplete card (without blood sample) to the screening program with the words "**declined consent**." Advise the family to seek medical advice if their baby is unwell, including notifying the provider that bloodspot screening was not performed.

6. Neonatal deaths

It is recommended that a sample is collected prior to any unexplained early neonatal death. Mark the card "**neonatal death**."

7. Feeding

A reliable sample can still be collected even if oral feeding has not started. However, the feeding status of the infant must be recorded on the card, so the laboratory can test accordingly.

8. Blood transfusions

A newborn screening sample must be taken **before** any blood transfusion. If this does not occur, a sample should not be taken until at least 48 hours after the transfusion. If a blood transfusion has occurred, it is vital that this information is recorded on the card.

9. Very-low-birthweight infants (≤1500g)

Immaturity of the hypothalamic-pituitary axis in very-low-birthweight and preterm infants may initially mask primary congenital hypothyroidism. It is therefore recommended that infants with a birthweight of **≤1500g** should have the newborn screening test repeated routinely on **Day 14**. Infants with a birthweight **≤1000g** should have the test repeated again on **Day 28**. Existing precautions regarding blood transfusion still apply when collecting these samples.

10. Syringe samples

Samples can be applied to the card from a syringe if collected from arterial or venous lines, as long as the standard procedure for sampling from lines is followed. Avoid mixing the sample with anticoagulant (eg. heparin or EDTA) as this may interfere with some screening tests.

11. Screening for cystic fibrosis

The ability to detect infants with cystic fibrosis is helped if the screening program is notified of any newborn in whom cystic fibrosis is suspected clinically (eg. meconium ileus) or where there is a family history of the disorder in a sibling. Record this additional information on the card.

12. Babies who present after the recommended timeframe

It may be relevant to screen babies who present after the recommended timeframe; for example, babies who were born overseas and newly arrived in Australia; or parents who change their consent. These babies may be referred to their GP or a Pathology service for sample collection **up to one year of age**. Contact PathWest for additional assistance if required.

Additional resources

Additional information is available from the WA Newborn Bloodspot Screening Program website, including access to an e-learning package for midwives and nurses.
https://ww2.health.wa.gov.au/Articles/U_Z/WA%20Newborn%20Bloodspot%20Screening%20Program

Information for parents is available from the Healthy WA website, including printable versions of the parent pamphlet in several other languages.
https://healthywa.wa.gov.au/Articles/U_Z/Your-newborn-babys-screening-test

Contacts

WA NEWBORN BLOODSPOT SCREENING PROGRAM
PathWest Specimen Reception
PP Block QEII Medical Centre
Locked Bag 2020
Nedlands WA 6909
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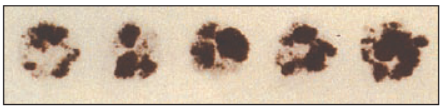
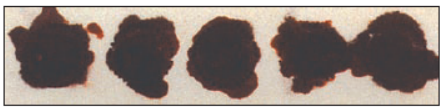
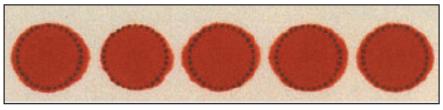
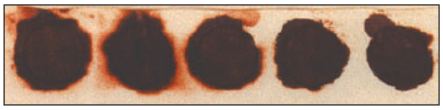
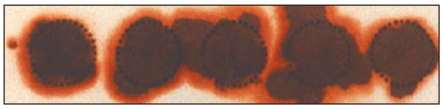
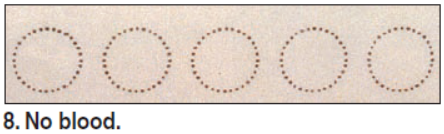
Email: wanbs@health.wa.gov.au

Simple Spot Check

Whatman®
Part of GE Healthcare

Valid specimen:

Allow a sufficient quantity of blood to soak through to completely fill the preprinted circle on the filter paper. Fill all required circles with blood. Do not layer successive drops of blood or apply blood more than once in the same collection circle. Avoid touching or smearing spots.

Invalid specimen:	Possible causes:
 1. Specimen quantity insufficient for testing.	• Removing filter paper before blood has completely filled circle or before blood has soaked through to second side. • Applying blood to filter paper with a capillary tube. • Allowing filter paper to come into contact with gloved or ungloved hands or substances such as hand lotion or powder, either before or after blood specimen collection.
 2. Specimen appears scratched or abraded.	• Applying blood with a capillary tube or other device.
 3. Specimen not dry before mailing.	• Mailing specimen before drying for a minimum of four hours.
 4. Specimen appears supersaturated.	• Applying excess blood to filter paper, usually with a device. • Applying blood to both sides of filter paper.
 5. Specimen appears diluted, discolored or contaminated.	• Squeezing or "milking" of area surrounding the puncture site. • Allowing filter paper to come into contact with gloved or ungloved hands or substances such as alcohol, formula, antiseptic solutions, water, hand lotion or powder, etc., either before or after blood specimen collection. • Exposing blood spots to direct heat.
 6. Specimen exhibits serum rings.	• Not wiping alcohol from puncture site before making skin puncture. • Allowing filter paper to come into contact with alcohol, hand lotion, etc. • Squeezing area surrounding puncture site excessively. • Drying specimen improperly. • Applying blood to filter paper with a capillary tube.
 7. Specimen appears clotted or layered.	• Touching the same circle on filter paper to blood drop several times. • Filling circle on both sides of filter paper.
 8. No blood.	• Failure to obtain blood specimen.

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