Training Programme
for Public Health Nurses and Doctors
in Child Health Screening, Surveillance and Health Promotion

Unit 8
Newborn Metabolic Screening
May 2006
Newborn Metabolic Screening Training

This unit of training is provided nationally by Dr Philip Mayne, Director of the National Metabolic Screening Laboratory based in Temple Street Children’s Hospital. The resource *Newborn Screening – Blood Specimen Collection and Handling Procedure* was produced by the HSE in partnership with Dr Mayne and is made available to participants at training. An A3 version is also available for display in health centres/clinics.
3.7 Neonatal Metabolic Screening

Working Group Membership
Ms Majella Loftus (chair), Regional Child & Adolescent Health Development Officer, NAHB
Ms Marie Faughey, Director of Public Health Nursing, SWAHB

Rationale
• Early detection of five inborn errors of metabolism allows dietary and medical management to prevent or ameliorate adverse effects on child intellectual and physical development.
• Requirements for quality assured national neonatal metabolic screening programme based on evidence and principles of best practice have been outlined in a recent national review report.

Recommendations
• Staff training in appropriate technique and use of equipment
• Improved communication with and information for parents
• Inclusion of visual aids to meet information needs of less literate population groups

Equipment
• Introduction of a standardised sample taking pack
• Introduction of consent form and refusal form
• Introduction of information materials for parents
• Visual aids for people with reading or language difficulties
Neonatal Metabolic Screening

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<td>After 72 hours and before 120 hours after birth</td>
<td>Breast Fed Infants: sample taken towards end of the 72 to 120 hour window. If protein sample is deemed to be suboptimal, further sample taken on about day 10 after birth.</td>
<td>Newborn Screening for Inherited Metabolic and Congenital Disorders</td>
<td>Disposable latex free gloves Newborn screening card Sterile lancet, controlled depth of to 2.5mm Paper towel Dry sterile gauze pad Cotton wool Warm water and soap Sharps bin Drying rack Consent form and Refusal form Parent information leaflet</td>
<td>Visual aids incorporating the needs of non-nationals/ethnic minorities Ante natal health promotion</td>
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<td>Premature Infants: sample taken after 72 hours and before 120 hours from birth. Further samples should be collected at weekly intervals until infant established on full feeds.</td>
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High Risk Screening

*Family history must be stated clearly on newborn metabolic screening card.*

**Siblings of known cases of Phenylketonuria (PKU):** Sample should be taken between 72 and 120 hours following birth and liquid sample taken on day 3 and day 10 for plasma phenylalanine and tyrosine determination.

**Siblings of known cases of Homocystinuria:** Sample should be taken on day 3 and day 10 for plasma total homocysteine, methionine and cysteine determination. This may be repeated on further occasions on the advice from the national screening laboratory, depending on results.

**Siblings of known cases of Maple Syrup Urine Disease:** A liquid sample should be taken on day 1 and after the second feed and then daily until established on full feeds. Urine should be tested daily for ketones. A newborn metabolic screening sample card should be taken between 72 and 120 hours after birth to test for the other conditions. The national newborn screening laboratory (NNSL) must be informed prior to delivery.

**Siblings of known cases of Galactosaemia and all infants of traveller parents** (including settled travellers): Sample should be taken immediately after birth and sent to the NNSL for the Beutler test.

The newborn metabolic screening sample should be taken between 72 and 120 hours following birth to test for the other conditions. All these at risk infants should be fed with a lactose/galactose free feed until results of Beutler test is known. It is important to state clearly on newborn metabolic screening card the reason why the sample was taken on day 1.
NEWBORN SCREENING
Blood Specimen Collection and handling procedure

1. Equipment: Maternal sterile lancet with tip no more than 2.5mm in depth, latex free gloves, cotton swab, newborn screening card, envelope, sharps bucket, paper towel, bowl of warm water and soap for cleaning heel.

2. Explain to the parents the reason for the test and its importance. Obtain written consent if not already available. Complete all sections of the newborn screening card in clear print using a black ballpoint pen. Do not contaminate filter paper cards by allowing cross contamination with spillage or by touching before or after blood collection.

3. Instruct parents to keep baby’s feet warm prior to visit by PreN by applying two sets of socks or placing a set of socks beneath baby's toes.

4. Select the puncture site on the heel. The preferred puncture and least hazardous site is indicated by the shaded area. Warm the site prior to sampling by rubbing the skin for 1-2 minutes to increase blood supply. Preferably take the sample from the infant while the parent cuddles the baby, the test may be taken while the baby is breastfeeding.

5. Cleanse the heel with warm soapy water. Pat dry.
6. Puncture heel. Wipe away any drop of blood with cotton wool. Allow another large drop to form.

7. Touch the circle marked on the card gently to the hearing drop of blood so that the blood seeps through from back of the card to the other side.

8. If the two outer circles first, blood drops must be sucked through from the rear to the front of the card, filling up exactly completely. Check that the blood has soaked completely through completing the circle on the front as well as the rear of the card. To enhance blood flow, very gentle intermittent pressure may be applied to one surrounding puncture site.

9. Wipe away any excess blood with cotton wool. Press cotton wool firmly onto wound until bleeding stops. Do not use plaster over puncture sites as fabric may swell then.

Air dry the newborn screening card before putting into the thralliker. This may take up to two hours. If the thralliker has loose covers, use excessive heating as this may evaporate the test.

10. Keep a record of all samples processed in each hospital.

Send the card by Registered post or by Courier to the newborn screening testing laboratory, using the yellow fluorescent label, to arrive as soon as possible for collection. More than one card may be put into an envelope providing that the blood spots do not touch i.e. please cards at 180° to each other.

The sender is responsible for making sure that the transport of cards complies with current legislation.

The blood spots must be dry before being placed into a tear-proof, water-resistant outer envelope.

If the infant and/or the mother has a known, or in high risk of having, an infectious pathogen (e.g. Human T-Cell Lymphoma Virus), the sender must package the sample in accordance with Packaging Instruction P650. The sender must:

- ensure that the blood spots are completely dry;
- place the card into a sealed, water-proof inner plastic envelope;
- place this envelope into an outer tear-proof, water-resistant envelope;
- place the marked, illustrated (inoculated) inner (EN 3770) on the external surface of the outer packaging in addition to the yellow fluorescent address label.

It is an offence not to comply with these regulations. It is also an offence to indicate that the package contains an at risk sample if it does not and the package is exempt from regulations.

Keep a record of all samples sent in each week:

Breastfeeding during a painful procedure effectively reduces the response in pain in the newborn infant.

Non-nutrition sucking e.g. pacifier and skin to skin contact reduce physiological pain in newborn infants. Current pharmacological treatments are not appropriate for pain relief during minor procedures like the heel prick in newborn infants.