NBS Unsatisfactory Specimens Explained

TN Newborn Screening Laboratory
What is an unsatisfactory specimen?

• An unsatisfactory specimen is one that cannot be accurately interpreted after testing due to one or more of the following:
  – Improper collection
  – Expired filter paper
  – Inaccurate information
  – The infant’s age at collection
• Results from unsatisfactory specimens may be spurious and unreliable
Why is this specimen unsatisfactory?
Common Causes

Non-Uniform

- Apply a large, single drop of blood to fill the circle
- Avoid application of blood with a capillary tube/syringe
- Do not touch the blood drops when they are wet
Common Causes

Cells and Serum Separated
- Rapidly apply the drop of blood onto the card
- Make sure the puncture site is dry after wiping with alcohol
- Avoid excessive squeezing at the puncture site
- Do not use a capillary tube/syringe
Common Causes

**Quantity Not Sufficient**

- The drops of blood are too small
- Allow a large drop of blood to form before the drop touches the card
- Improper lancet use during collection
- Do not use blood from a capillary tube/syringe
Common Causes

Blood Clotted

- Ensure proper puncture methods
- Do not allow time for a blood drop to form
- Do not use a capillary tube to distribute blood drops
- Insufficient time allowed for a drop of blood to form
Common Causes

**Altered Paper**
- Do not use a capillary tube/syringe to apply blood to the filter card
- Avoid contact with the blood spot while it is wet
- Keep the infant’s heel from pressing card during collection
- Store filter cards on their side in a cool, clean, and dry place
Other Causes

Contaminated Specimens

- Avoid use of hand creams or lotions prior to use of filter paper
- Do not touch the blood drops when they are wet
- Make sure the puncture site is dry after wiping with alcohol
Other Causes

Poly Bag Mailing

- Specimens received in a sealed poly bag, plastic zip lock bag, plastic envelope or shipping bag
- Only use paper envelopes for mailing
Other Causes

Expired Filter Paper
- Check the expiration date before collection
- Do not collect on expired filter paper
Other Causes

**Blood on Both Sides of Filter Paper Card**
- Only apply blood to one side of the card
- Blood can be applied to *either side*, but **NOT BOTH**

**Supersaturated**
- The drops of blood are too large and overlap or touch one another
- Do not drop blood drops on top of each other, let blood spots touch, or use a capillary tube to distribute blood drops
Other Causes

**Heated**
- Can be caused by use of heat as a drying method, long transit times, and/or humidity
- Do not use heat to dry specimens

**>10 Days**
- Specimen was received in the laboratory greater than 10 days after the date of collection
- Mail specimens using the provided courier service/FedEx labels within 24 hours of collection
Other Causes

**Inaccurate Information**
- Information on the collection form is not correct (e.g. date of collection is before the date of birth)
- This can be avoided by using caution when completing the cards and checking all information for accuracy

**Incomplete Information**
- Occurs when the information on the card is not completed (e.g. missing date/time of birth, missing date/time of collection)
- Complete all fields on the form legibly and accurately
What is considered satisfactory?
A Satisfactory Specimen

A satisfactory specimen has the following components:

- No contaminations on the filter paper
- All printed circles completely filled with blood that is applied evenly on one side of the filter paper
- No layering or clots; blood is soaked through evenly
- Dried for 3 hours on a horizontally level, non-absorbent, open surface
Blood Spot Size

- The punches used for the newborn screening testing are 3.2 mm

- It takes about 11 punches on a satisfactory specimen to test all disorders **one time**
  - The lab may require more punches if the initial screen results are abnormal
  - If there is an abnormal screen value, the lab will re-punch the dried blood spots and run the necessary test(s) again
  - Note that some infants may have an abnormal screen value for more than one disorder
Dried Blood Spot Collection Tips

• Check the filter paper expiration date; **do not use expired filter paper**
• Swaddle the infant, leaving free the foot you are collecting from
• Place a heel warmer on the infant’s heel
  – A warm wash cloth will achieve the same effect
Dried Blood Spot Collection Tips

- Turn the baby on the opposite side of the foot you are using to collect the newborn screening
- Allow the baby to cry; crying helps with the blood flow
- Let a large drop of blood to form before the drop touches the card
Important Points

- All specimens received in the Newborn Screening Laboratory are examined for quality, quantity, and acceptability.
- It takes about 11 punches on a satisfactory specimen to test all disorders **ONE TIME.**