



# 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

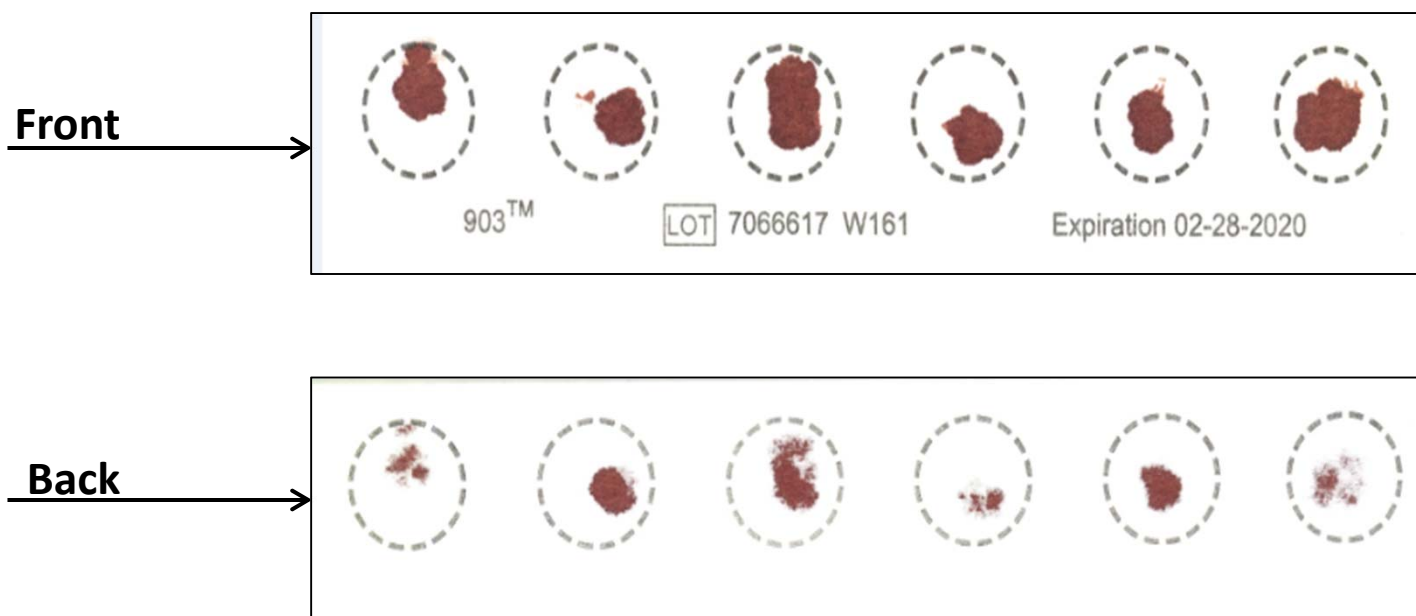


**Why is this specimen  
unsatisfactory?**

# Common Causes

## Non-Uniform

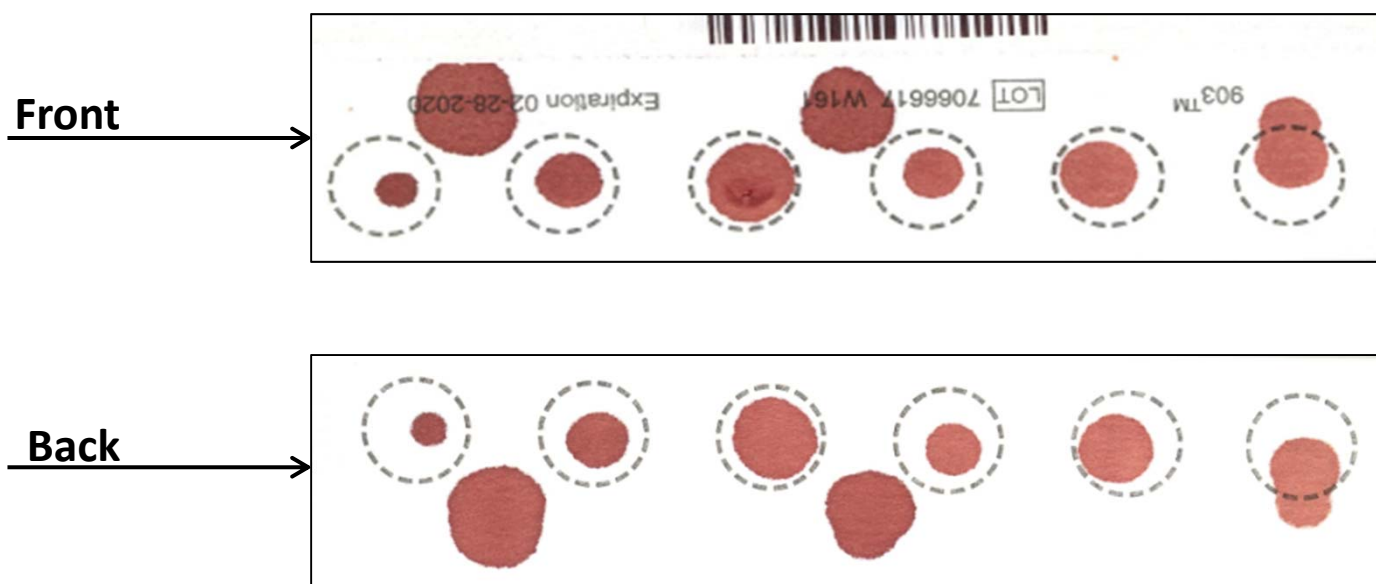
- Apply a large, single drop of blood to fill the circle
- Avoid application of blood with a capillary tube/syringe
- Do not touch the blood drops when they are wet



# Common Causes

## Cells and Serum Separated

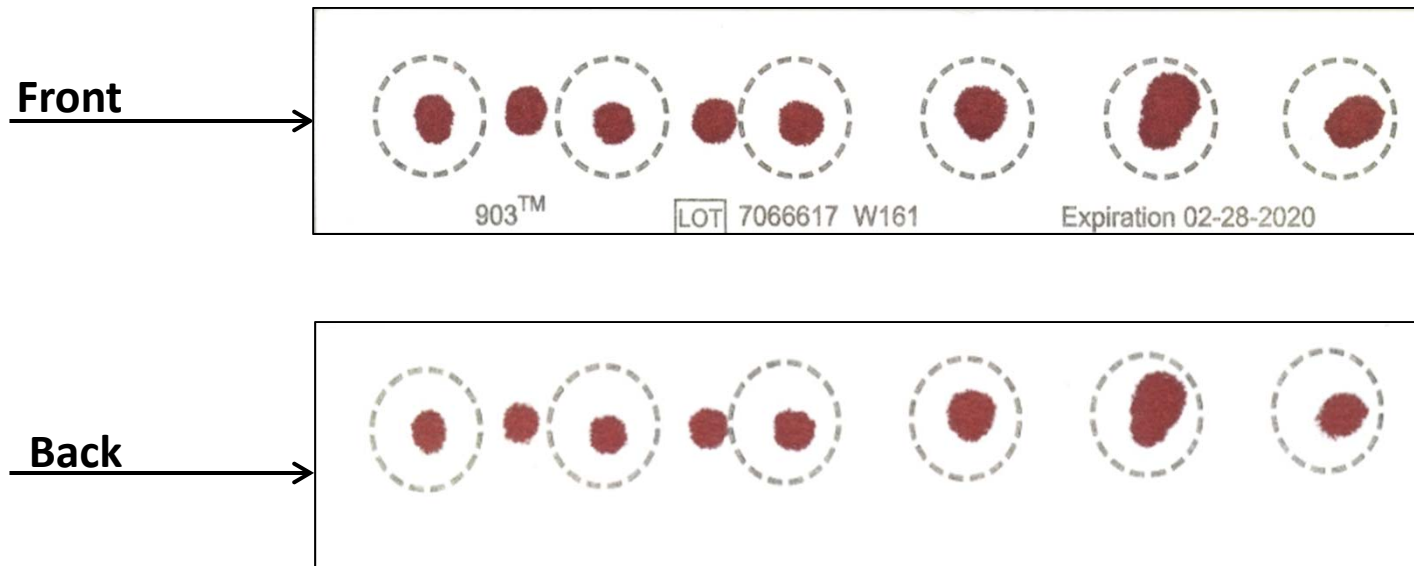
- Rapidly apply the drop of blood onto the card
- Make sure the puncture site is dry after wiping with alcohol
- Avoid excessive squeezing at the puncture site
- Do not use a capillary tube/syringe



# 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

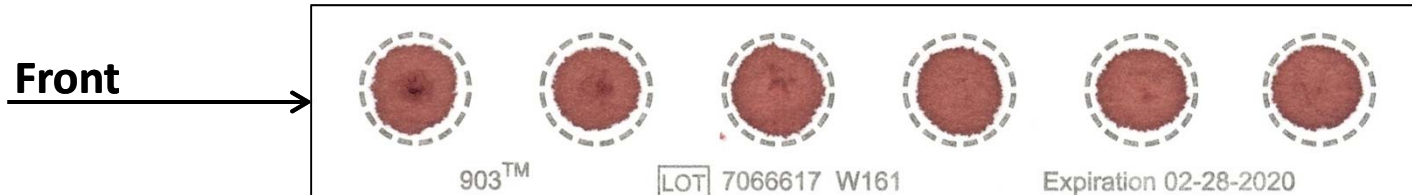


# Common Causes

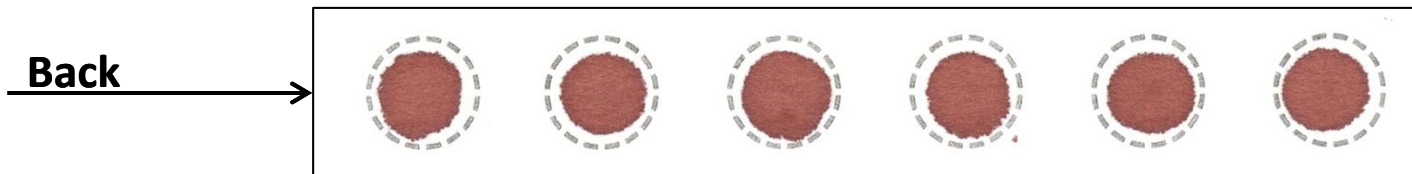
## Blood Clotted

- 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

**Front**



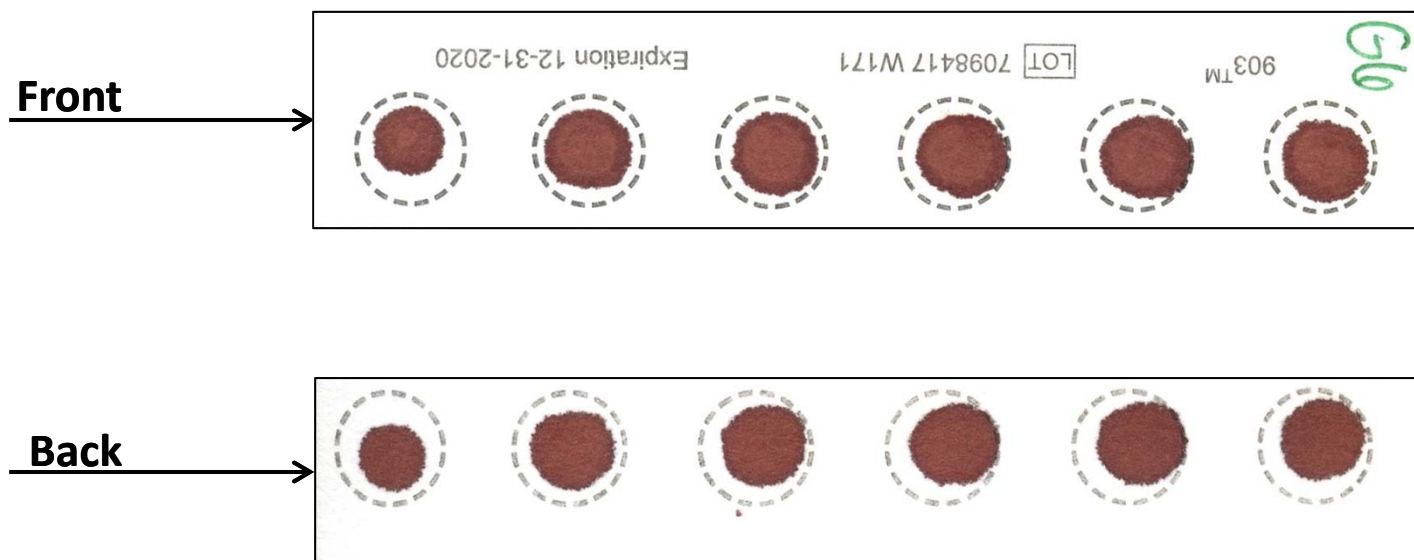
**Back**



# 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

10634416 Rev.AJ REF E951819 SN E951819

7098417 W171 IVD 1) Do not touch sample area 2) Do not use if damaged

Collectors Initials

**NEWBORN SCREENING** TO AVOID RECOLLECTION – Accurately complete the entire form. All information must be printed.

First \_\_\_\_\_ Repeat: \_\_\_\_\_ Prior Unsat \_\_\_\_\_ Prior <24Hrs or Transf \_\_\_\_\_ Prior Abnormal \_\_\_\_\_ Previous TDH# \_\_\_\_\_

INFANT'S INFORMATION		HOSPITAL INFORMATION	
NO BLOOD SCREEN: <input type="checkbox"/> 1. EXPIRED (Date ___/___/___) <input type="checkbox"/> 2. REFUSED (Attach Refusal Form)		Hospital of Birth ID _____ Hospital of Collection ID _____	
Infant's Last Name _____ First _____ Previous Last Name _____		Infant Medical Record No. _____	
Birth Date ___/___/___ (_____) ML TIME (_____) 1. Single Birth		MOTHER'S INFORMATION	
Birth Time _____ (_____) 2. Twin ( J A ( ) B		Mother's Current Last Name _____ First _____ Age _____	
Collect Date ___/___/___ (_____) ML TIME (_____) 3. Other		Address _____	
GENDER: RACE: (_____) 1. White (_____) 2. Black ETHNICITY: (_____) 1. Hispanic		City _____ State _____ Zip _____	
(_____) 1. M (_____) 3. Asian (_____) 4. Am. Ind (_____) 5. Other (_____) 2. Non-Hispanic		Phone _____ (_____) – _____ 2 Digit Code _____	
(_____) 2. F BIRTH WEIGHT: _____ Grams GESTATION AGE: _____		Mother's Social Security No. _____ County of Residence _____	
INFANT STATUS AT TIME OF SPECIMEN COLLECTION: CURRENT WEIGHT: _____ Grams		PRIMARY CARE PROVIDER'S INFORMATION	
TRANSFUSED: (_____) Y (_____) N If yes, Date of Last: ___/___/___		Name _____	
ANTIBIOTICS: (_____) Y (_____) N NICU: (_____) Y (_____) N		Address _____	
*FEEDING: (_____) 1. Breast (_____) 2. Non-Lactose (_____) 3. TPN/Lipids (_____) 4. Lactose (_____) 5. NPO		State _____ Zip _____	
HEARING		PULSE OXIMETRY	
Date: ___/___/___		SEE BACK OF FORM FOR SCREENING INSTRUCTIONS	
Method: _____ ABR _____ OAE		Initial O2 Screen Date/Time: _____ @ _____	
Right Ear: _____ Pass (1) _____ Refer (2)		Did both RH and foot need to be tested? (_____) Y (_____) N	
Left Ear: _____ Pass (1) _____ Refer (2)		Final Result: Passed (_____) Failed (_____)	
_____ Declined (5) _____ Still in Hospital (7)		Referred to Cardiology: (_____) Y (_____) N	
_____ Transferred (6) _____ Expired (8)		If O2 screen not performed, reason:	
_____ Unable to test (9)		Refused (1) _____ Expired (2) _____ On O2 (3)	
Risk Factors: 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/>		Echo'd (4) _____ Dx w/CCHD (5) _____ Transferred (6)	
A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F <input type="checkbox"/>		lab Unsat _____	
TENNESSEE DEPARTMENT OF HEALTH LABORATORY SERVICES 630 HART LANE, NASHVILLE, TENNESSEE		DO NOT WRITE IN THIS AREA	
SPECIMEN CONTROL NUMBER SN E-951819		DATE REC'D/LAB NO _____	
Expiration 12-31-2020		Form PH 1582 REV. 02/17	

7098417 W171 LOT 7098417 W171 SN E951819

Expiration 12-31-2020

# 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

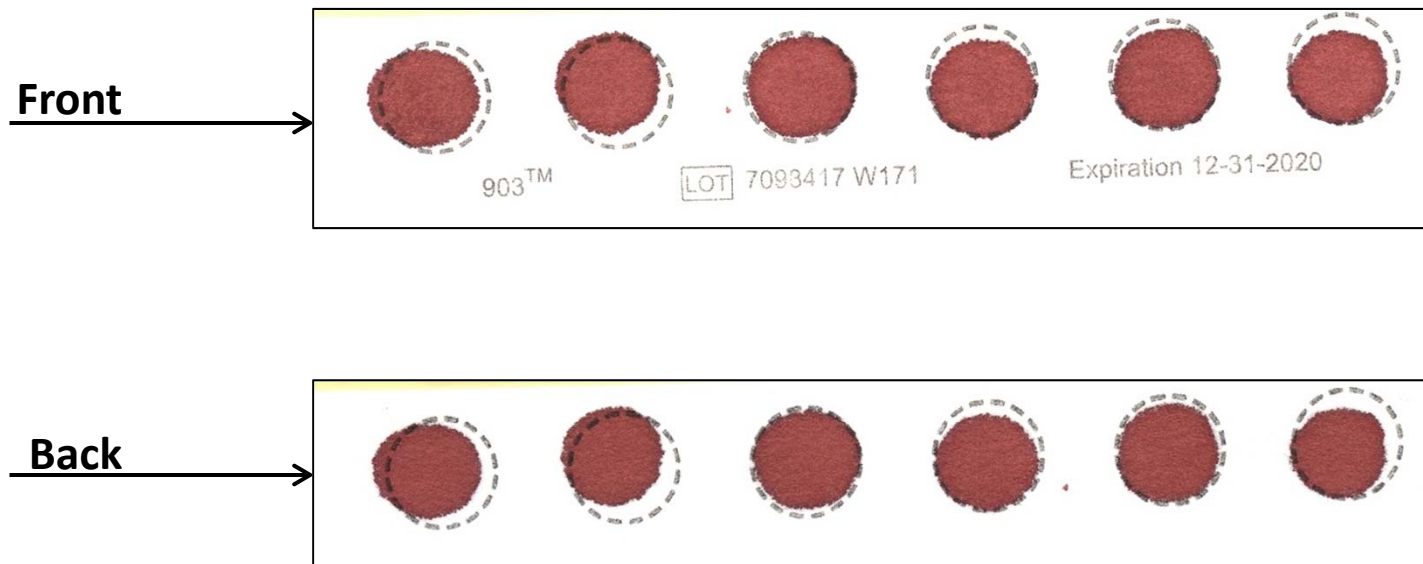


**What is considered  
satisfactory?**

# A Satisfactory Specimen

## A satisfactory specimen has the following components:

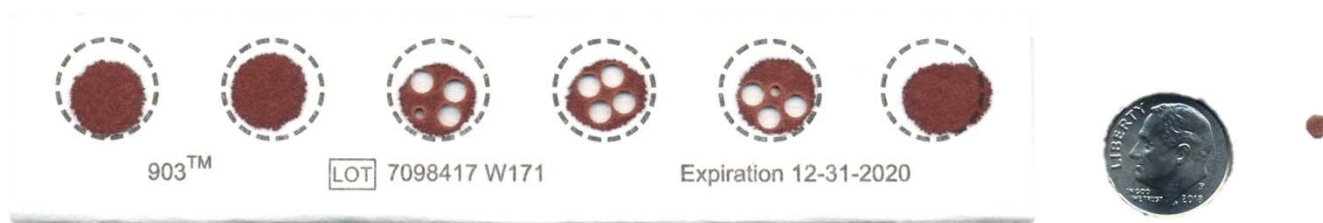
- No contaminations on the filter paper
- All printed circles completely filled with blood that is applied evenly on one side of the filter paper
- No layering or clots; blood is soaked through evenly
- Dried for 3 hours on a horizontally level, non-absorbent, open surface





# Blood Spot Size

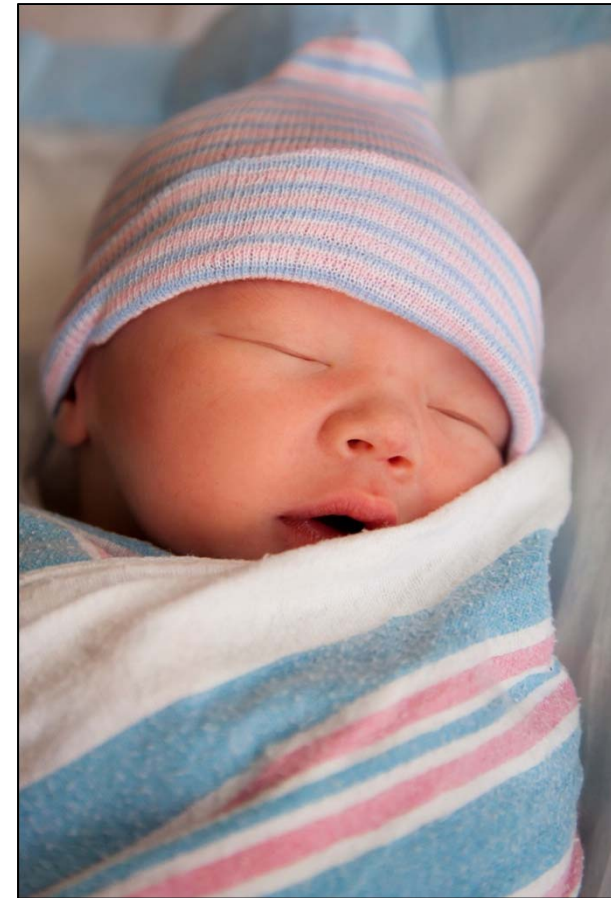
- The punches used for the newborn screening testing are 3.2 mm



- 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.**