

Fairview Health Services
 Department Laboratory /Nursing
 Section Acute Care: Collection
 Category Provision of Care

Subject BLOOD FILMS FOR MALARIA – PREPARATION (INCLUDES BABESIA, EHRLICHIA (ANAPLASMA), TRYPANOSOMES, MICROFILARIAE)

Purpose Ensure correct preparation of blood films for malarial examination.

Policy This procedure is for the collection of blood films for malaria. Follow the Blood Collection by Venipuncture, Capillary Puncture, Patient Identification and Laboratory Specimen Handling procedures for all other steps.

Specimen Use only clean, grease-free slides that have been stored in a dust-proof container. The slides should be handled only on the edges to avoid fingerprints on the surface.

All STAT requests must have an EDTA tube accompanying the thick and thin films. It is highly suggested to have an EDTA tube accompany all blood films for BinaxNOW Rapid Malarial Screening.

Procedure The optimum time for preparing blood films for malarial parasite examination is about **midway between chills** to ensure obtaining stages on which species identification can be made. Blood samples must be taken **before any antimalarial drugs are used** to ensure demonstration of organisms if the patient does have malaria. Note the time of collection on the request form.

Prepare a minimum of **3 thick** and **3 thin** blood films from **fingerstick blood**.

The use of **anticoagulated (EDTA) blood is discouraged** because:

- smears require longer time to dry
- thick smears tend to flake from the slide
- stain quality is affected, stippling of infected RBC's may not be visible
- parasite forms may be distorted and may lyse
- RBC's may become crenated and look fimbriated

If it is necessary to use EDTA for collection, slides should be made as soon as possible (**less than 2 hours after collection**) in order to reduce distortion of the parasites and RBC's. These effects can compromise correct species identification.

If highly suspect malaria, the diagnosis can usually be made by collection of 2 sets of thin and thick slides (8 hours apart) per day for 3 days. Most of the time, diagnosis is made on the first set of slides.

Notify Parasitology as soon as possible when a request for malaria or other blood parasites has been made (612-273-3415). Specify which blood parasite is suspected. Have the following information available. Record on the Blood Smears for Parasites form and submit with the smears (see Attachment A).

- Patient's Name
- PCU or Clinic
- Doctor's Name, Beeper/Phone #
- Collection Date and Time
- Is the patient from another country or has the patient recently traveled outside the United States:

- Has the patient been previously diagnosed? If yes, what parasite? If yes, when?
- Is the patient symptomatic? Brief description of clinical symptoms.

THIN FILM

Make at least three good smears with long feathered edges similar to those used to study cell morphology in Hematology. Structural detail of individual parasites is best preserved where cells lie free of each other.

A properly prepared thin film is thick at one end and thin at the other. The thin, feathered end of the film should be centrally located on the slide with free margins on both sides; when properly prepared, it will be only one cell layer thick at this end (see Figure 1). Badly shaped smears and the presence of streaks and holes in the film generally indicate faulty preparation and dirty or greasy slides, respectively.

Good films may be prepared directly from blood obtained by fingerstick, provided that the drop of blood is not squeezed from the wound. Milking blood from the finger will tend to dilute it with tissue fluids.

To prepare the thin film

1. Place one drop of blood near one end of pre-cleaned microscope slide.
2. Hold a second, narrower spreader slide with polished edges at a 45° angle and immediately draw into the drop of blood. Allow the blood to spread almost to the width of the slide.
3. Rapidly and smoothly push the spreader slide to the opposite end of the slide pulling the blood behind it. (see Figure 1)

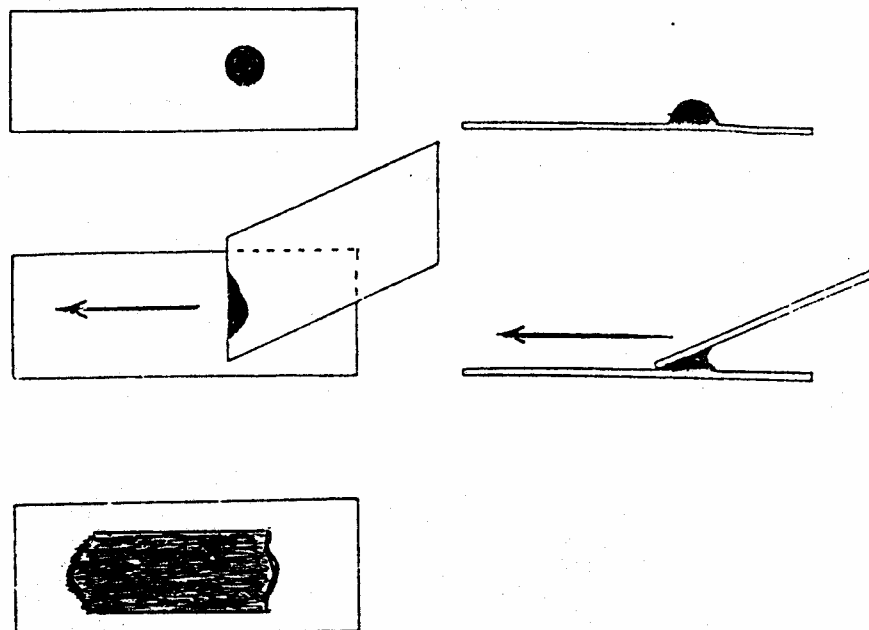


FIGURE 1

THICK FILM

Make at least three thick blood films.

The thick film is a method of concentrating blood to be examined for parasites and is a valuable screening technique. It is estimated that up to 30 times as much blood can be examined in the same amount of time on a thick film as on a thin film.

A properly prepared thick film is several cell layers thick in the center and has a thinner edge of one cell thickness. You should be able to read average sized print through the wet center of the film.

There are two accepted techniques for preparing thick films:

1. Contact Method - (causes less distortion of parasites)
 - Lower the slide into a large, rounded drop of blood still on the finger. Without losing contact with the drop of blood or touching the skin, move the slide using a circular motion until a smear about the size of a dime and of the appropriate thickness is made. Dry in a flat position, away from heat. (see Figure 2)
2. Puddle Method - (may result in distorted organisms)
 - Place three average sized drops of blood near each other on the slide. With the corner of another slide, quickly puddle these into one smooth drop about the size of a dime and of the appropriate thickness. Stir only until drops are combined. Dry in a flat position away from heat. (see Figure 3)

Note: To facilitate a more rapid diagnosis of malaria, an additional thick smear can be made slightly thinner than usual. This allows the lab the opportunity to begin staining the thick smear one hour after collection, rather than the usual 8-12 hours.

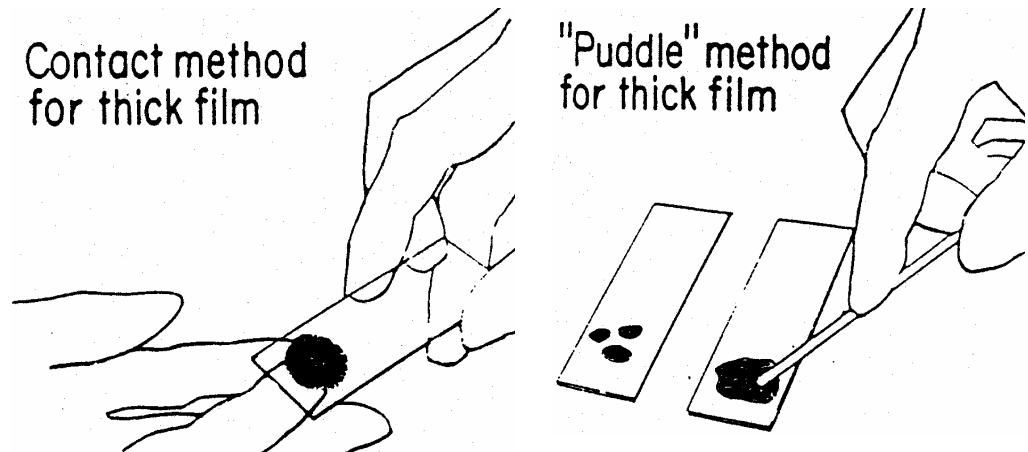


FIGURE 2

FIGURE 3

- References
1. Ash LR and Orihel TC. Parasites: A Guide to Laboratory Procedures and Identification. ASCP Press, Chicago. 1987:99-101.
 2. Wilcox, A. Manual for the Microscopical Diagnosis of Malaria in Man, DHEW, 1960. pp. 7-9 and 23-27.
 3. Garcia LS, Bullock-Lacullo SL, Fritsche TR, Healy GR, Neimeister RP, Palmer J, Wolfe MS, and Wong J. Slide Preparation and Staining of Blood Films for the Laboratory Diagnosis of Parasitic Diseases; Tentative Guideline. NCCLS publication M15-T (ISBN 1-56238-161-X) Aug 1992 Villanova, Pennsylvania. pp. 1 and 6.
 4. Williams, JE. Points to be Remembered When Diagnosing Malaria by Thick and Thin Blood Films. Parasitology Symposium. ASM General Meeting 1993.

5. Hummert BA. Plasmodium Vivax Ookinetes in Human Peripheral Blood. J Clin Microbiol 1994;32:2578-80.

- Ext Ref:
1. McCall RE, Tankersley CM. Phlebotomy Essentials, 2nd Edition. J.B. Lippincott, 227 E Washington Square, Philadelphia, PA 19106. 1998.
 2. Strasinger SK, Di Lorenzo MA. Phlebotomy Workbook for the Multi-skilled Healthcare Professional. FA Davis Company, 1915 Arch Street, Philadelphia, PA 19103. 1996
 3. Chloraprep® One-step Training Manual. Medi-Flex Hospital Products, Inc. 8717 W. 110th Street, Overland Park, KS 66210-1129. 9/01

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Medical Director Approval 5/09

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Attachment A



BLOOD SMEARS FOR PARASITES (PSTN)

Specimen Status: _____ Routine _____ Stat/Emergency

If the smears are needed on an emergency basis, immediately contact the Microbiology Lab at 612-273-3665. All STAT requests must have an EDTA tube accompanying the thick and thin films. It is highly suggested to have an EDTA tube accompany all blood films for BinaxNOW Rapid Malarial Screening.

Patient name	
MR #	
PCU/Clinic	
DOB/age	
Sex	

Ordering Physician	
Pager	

Please specify what parasite is suspected:

Malaria Babesia Ehrlichia Trpanosomes Microfilariae

Travel history.
Has the patient been previously diagnosed?
If yes, what parasite and when?
Is the patient symptomatic?
Brief description of clinical symptoms.