NEW YORK STATE

Parasitology Proficiency Testing Program

Blood Smears Only
04 October 2011

The purpose of the New York State Proficiency Testing Program in the category of Parasitology - Blood Smears Only is to monitor the performance of applicant laboratories that detect and identify parasites on blood films. This document reports the results for the October 2011 proficiency test in Blood Smears Only. Most laboratories in this category previously participated in the Parasitology-Blood Borne Parasites Only category, which was renamed after the May 2011 event.

This category is divided into two sub-categories. **Parasite Identification** is intended for labs that identify parasites and report *Plasmodium* to the species level on patient reports. **Parasite Screen** is intended for labs that report "Parasite Seen" and never report *Plasmodium* to the species level on patient reports. Participants in both sub-categories examine the same samples, however the scoring criteria for the two sub-categories are different. When reading this critique, ensure that you are comparing your performance to other laboratories in your sub-category.

Sample Preparation and Quality Control

All slides used in this test were prepared and stained by a commercial source. Numerous samples of each test specimen were selected at random by the Parasitology Unit of the David Axelrod Institute for Public Health, and were assayed for quality and confirmation of contents. Extensive quality control tests were also conducted by the supplying vendor and a detailed quality control report was submitted to the New York State Parasitology Laboratory for inspection and verification. Samples were authenticated by at least 80% of participating laboratories and/or referee laboratories.

11B-K

Correct identification: No Parasites Seen.

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
No Parasites Seen	22/22	100	10/10	Correct

Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
No Parasites Seen	2/2	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories agreed that **No Parasites Seen** was the correct response (100%). Quality control examination of 4% of this sample showed erythrocytes of normal size and staining characteristics. Normal blood elements are present and exhibit typical staining characteristics. The overall staining quality is good, but it was noted by both our lab and participating labs that some slide labels were applied to the wrong side of the slide.

11B-L

Correct identification: *Plasmodium malariae.*

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Plasmodium malariae	19/22	86	10/10	Correct
Plasmodium Not Falciparum	1	5	0	Incorrect
No Parasites Seen	2	9	0	Incorrect

Results of Participating Laboratories Who Perform Parasite Screen

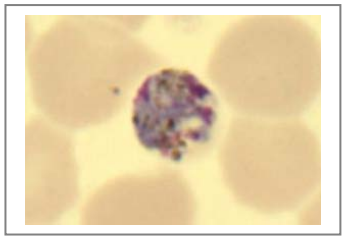
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	2/2	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories agreed that ***Plasmodium malariae*** was the correct response (86% and 100% respectively). Quality control examination of 4% of this sample showed parasites in every 20-30 100 X oil immersion fields. Infected cells are not enlarged and exhibit no stippling. The primary stage seen was the mature trophozoite; the organisms are compact and have coarse pigment. The staining quality is good.

Diagnostic Characteristics and Life Cycle

Plasmodium malariae is the least common of the species of malaria that infect humans, and is sporadic in distribution. Because *P. malariae* tends to infect older red blood cells the parasitemia is often low. The ring stage is short lived and therefore not usually seen in patient specimens. The stages most commonly observed are mature trophozoites and schizonts. The infected red blood cells are not enlarged, as they are in *P. vivax* and *P. ovale* infections, and may actually be smaller than uninfected cells. There is no stippling. The trophozoites are not amoeboid and often appear as compact rounded or band forms. The schizonts contain 6-12 merozoites, which are usually arranged in a rosette although they may be in an irregular cluster.



11B-M

Correct identification: *Plasmodium ovale.*

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Plasmodium ovale	9/22	41	10/10	**Correct**
Plasmodium vivax	4	18	0	Incorrect
Plasmodium malariae	3	14	0	Incorrect
No Parasites Seen	6	27	0	Incorrect

Results of Participating Laboratories Who Perform Parasite Screen

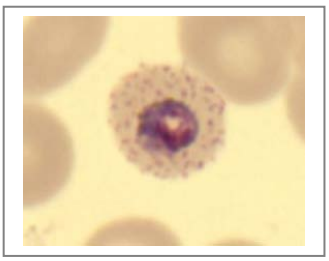
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	2/2	100	10/10	**Correct**

Quality Control and Referee Information

Referee laboratories agreed that ***Plasmodium ovale*** was the correct response (100%). Quality control examination of 4% of this sample showed parasites in every 30-40 100 X oil immersion fields. Infected cells are enlarged and have heavy stippling. Parasites are compact and have coarse pigment. The overall staining quality is good.

Diagnostic Characteristics and Life Cycle

Plasmodium ovale infections occur primarily in Central West Africa and some South Pacific Islands and account for fewer than 5% of all malaria cases. *P. ovale* malaria is usually less severe than other malarias and often ends in spontaneous recovery.



The infected cells are usually enlarged, although they tend to be smaller and with a more regular outline than cells infected with *P. vivax*. Infected erythrocytes are also usually fimbriate (= having a "spiky" periphery), and have Schüffner's stippling. The cytoplasm of the trophozoites is generally less amoeboid than then that of *P. vivax* and the schizonts have 4-12 merozoites compared to 12-24 for *P. vivax*. The chromatin is usually very pronounced and the pigment is coarse.

11B-N

Correct identification: *Plasmodium falciparum*.

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Plasmodium falciparum	21/22	95	10/10	**Correct**
Plasmodium malariae	1	5	0	Incorrect

Results of Participating Laboratories Who Perform Parasite Screen

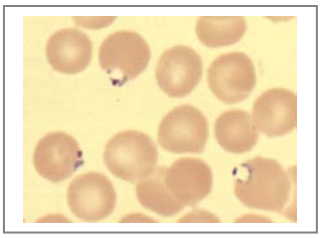
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	2/2	100	10/10	**Correct**

Quality Control and Referee Information

Participating and referee laboratories agreed that ***Plasmodium falciparum*** was the correct response (95% and 100% respectively). Quality control examination of 4% of this sample showed multiple parasites in every 100 X oil immersion field. The only stage seen was the ring stage trophozoite. Infected cells are not enlarged and exhibit no stippling. The overall staining quality is good.

Diagnostic Characteristics and Life Cycle

Plasmodium falciparum is one of the four species of *Plasmodium* known to infect humans. It causes the most dangerous and severe form of malaria and is always considered to be a medical emergency. Death may occur rapidly if proper treatment is not started immediately. Its distribution is limited to the tropics, primarily Africa and Asia.



P. falciparum invades all ages of RBCs leading to high parasitemia. The usual stages seen in the peripheral blood are rings and gametocytes. Since schizogony occurs in the internal organs it is rare to see other stages of parasite development, although they may be present in cases of severe malaria. The infected RBCs are not enlarged, nor do they contain Schüffner's dots. The rings are generally small, and may have one or two chromatin dots. Appliqué forms, as seen here, are also characteristic. Gametocytes are rounded to banana-shaped and contain a single well-defined chromatin dot and coarse rice-grain-like pigment.

11B-0

Correct identification: *Plasmodium vivax.*

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Plasmodium vivax	19/22	86	10/10	**Correct**
Plasmodium ovale	2	9	0	Incorrect
Plasmodium falciparum	1	5	0	Incorrect

Results of Participating Laboratories Who Perform Parasite Screen

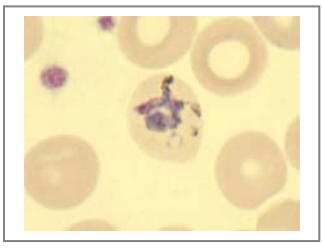
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	2/2	100	10/10	**Correct**

Quality Control and Referee Information

Participating and Referee laboratories agreed that ***Plasmodium vivax*** was the correct response (86% and 100% respectively). Quality control examination of 4% of this sample showed parasites in almost every 100 X oil immersion field. Infected cells are enlarged and pale staining. Parasites are amoeboid and the pigment is fine and scattered. The predominant stage seen was the trophozoite. The staining quality is good.

Diagnostic Characteristics and Life Cycle

Plasmodium vivax is the most common species of malaria to infect humans. It may account for as much as 80% of all malaria cases. It also has the widest geographical distribution. Infected red cells are usually enlarged and stain paler than uninfected ones. They may also contain Schüffner's dots. The trophozoites are generally amoeboid and have a large chromatin dot. Occasionally cells will contain more than one parasite, although this is rarer than it is with *Plasmodium falciparum.* Mature schizonts contain 12-24 merozoites and gametocytes are round and fill the entire cell. Pigment is fine and scattered.



Scoring Information

Distribution of Scores

Score	# of labs	% of labs
100	11/24	46
80-89	7	29
60-69	5	21
40-49	1	4

Answer Key

Sample	Correct Answer	Points
11B-K	No Parasites Seen	20
11B-L	*Plasmodium malariae*	20
11B-M	*Plasmodium ovale*	20
11B-N	*Plasmodium falciparum*	20
11B-O	*Plasmodium vivax*	20

TOTAL POSSIBLE POINTS 100

Grading

The answer key was derived from the response of all participating laboratories as per **CLIA Regulations**, Part 493, Subpart I, Section 493.917. These regulations can be viewed at www.phppo.cdc.gov. These regulations state that 80% or more of participating laboratories **or** referee laboratories must identify the parasite for it to be authenticated as a correct answer. Similarly, reporting of a parasite identified by less than 10% of the participating laboratories **or** referees finding parasites or ova is an incorrect response. Organisms that are not authenticated, but which were reported by more than 10% of the participating laboratories or referees, are "Unauthenticated" and are not considered for grading.

Each sample has a maximum value of 20 points. Credit is given according to the formula:

$$\frac{\text{Number of correct responses by lab}}{\text{\# Correct Parasites Present + \# Lab's Incorrect Answers}} \times 100$$

Important Reminders

The next Parasitology Proficiency Test is scheduled for **February 7, 2012.** You are responsible for notifying us **before February 14, 2012** if you do not receive your samples. Proficiency test results must be electronically submitted through EPTRS by **February 21, 2012** or the laboratory will receive a score of zero. These requirements are stated in the NYS Proficiency Testing Handbook provided by the NYS Clinical Laboratory Evaluation Program or can be accessed via the Internet at:

http://www.wadsworth.org/labcert/clep/ProgramGuide/WebGuide.pdf

News and Notes

Beginning with the February 2009 proficiency exam, the **grading policy changed**. In order to make the score on the NYS Parasitology PT exam more accurately reflect laboratory performance, and be more consistent across categories, a new scoring system was put into effect. Under the new scoring system, grades are based only on the specimen or organism types processed by your laboratory.