Blood Smears Only
4 February 2014

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 Feb 2014 proficiency test in Blood Smears Only.

This category is divided into two sub-categories. **Parasite Identification** is intended for labs that identify parasites and report them to the species level on patient reports. **Parasite Screen** is intended for labs that report "Parasites Seen" and never report organisms 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. Samples of each test specimen were selected at random by the Parasitology Laboratory of the Wadsworth Center, NYS DOH, and were assayed for quality and confirmation of contents. The supplying vendor also conducted extensive quality control tests and a detailed quality control report was submitted to the Parasitology Laboratory for inspection and verification. Samples were authenticated by 80% of participating laboratories and/or referee laboratories.

14B-A

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	21/21	100	10/10	**Correct**

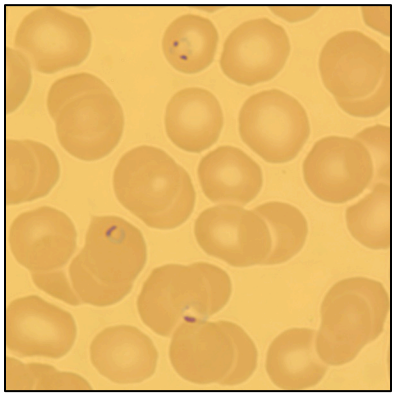
Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	3/3	100	10/10	**Correct**

Quality Control and Referee Information

Participating and referee laboratories agreed that ***Plasmodium falciparum*** was the correct response (100% respectively). Quality control examination of 4% of the slides for this sample showed an average of 5 organisms per 40X oil immersion field. Staining quality was good.

Diagnostic Characteristics



Plasmodium falciparum is one of the four species of *Plasmodium* commonly known to infect humans. *P. falciparum* invades all ages of red blood cells; thus the parasitemia can exceed 50%. The usual stages seen in peripheral blood are early trophozoites/ring form and gametocytes. In this specimen only ring forms were observed. Both cells with more than one ring and applique forms were present. Examples of each of these are shown in the accompanying image.

Infection with *P. falciparum* 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.

14B-B

Correct identification: *Trypanosoma brucei*

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Trypanosoma brucei	17/20	85	9/10	**Correct**
Trypanosoma cruzi	3/20	15	1/10	**Incorrect**

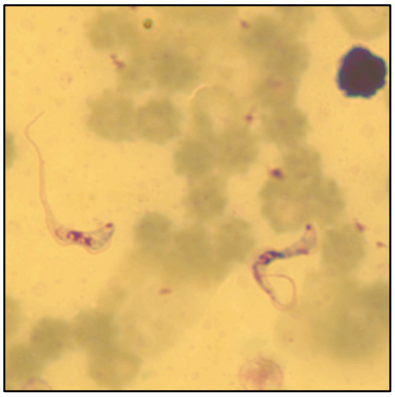
Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	4/4	100	10/10	**Correct**

Quality Control and Referee Information

Participating and Referee laboratories agreed that ***Trypanosoma brucei*** was the correct response (85 and 90% respectively). Quality control examination of 4% of the slides for this sample showed an average of 2-3 organisms per 40X oil immersion field. Staining quality was fair.

Diagnostic Characteristics



Trypanosoma brucei is the causative agent of African sleeping sickness, also know as human African trypanosomiasis (HAT). Trypomastigotes are detected in the blood on thick and thin Giemsa stained smears. The cytoplasm stains blue while the nucleus and kinetoplast will stain red or purple. Trypomastigotes of *T. cruzi* are similar but are generally shorter, have a larger, more prominent kinetoplast and often form a C or U shape. Organisms seen in this specimen were longer and had a smaller, less prominent kinetoplast.

HAT is limited to the tse-tse fly endemic area of Sub-Saharan Africa, where it has caused serious economic and social problems. The parasites measure 14-33 μm long. The nucleus is located in the middle of the organism and the kinetoplast (mitochondrial DNA) is located at the posterior end. A flagellum arises from the flagellar pocket near the kinetoplast and follows the undulating membrane to the anterior end where it projects as a free flagellum.

14B-C

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**	8/21	38	7/10	**Unauthenticated**
Plasmodium malariae	13	62	3	**No Penalty**

* Sample contained *Plasmodium ovale* but was not authenticated.

Results of Participating Laboratories Who Perform Parasite Screen

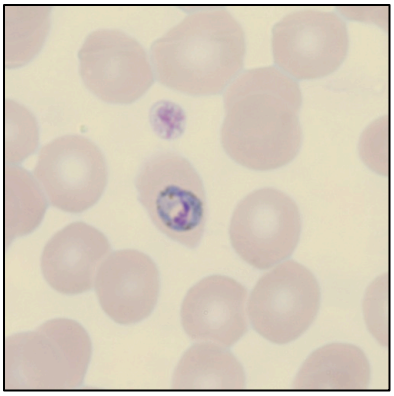
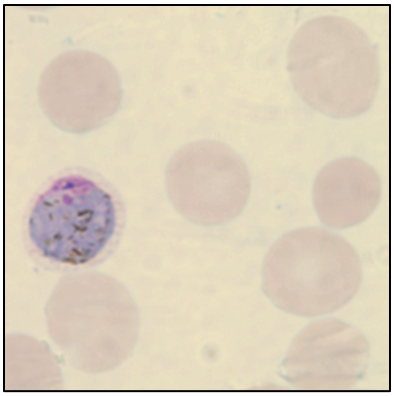
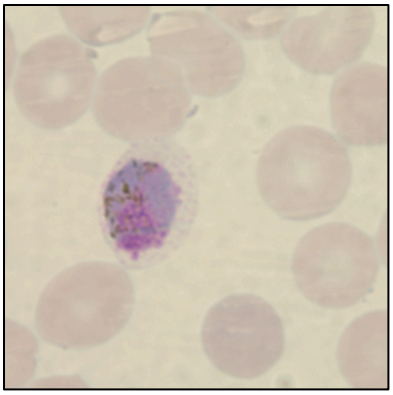
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	3/3	100	10/10	**Correct**

Quality Control and Referee Information

Neither the majority of participating nor referee laboratories were able to agree that ***Plasmodium ovale*** was the correct response (38 and 70% respectively). Therefore this sample was not authenticated by 80% of the participating or referee laboratories. As there was majority agreement to the genus this sample was graded as the correct response for Parasite Screen. Quality control examination of 4% of the slides for this sample showed an average of 5 organisms in every ten 40X oil immersion field. Staining quality was good.

Diagnostic Characteristics

Plasmodium ovale infected cells are normal sized to slightly enlarged (1-1.5x normal size), often fimbriated, and may have Schüffner's stippling. Both enlarged cells with a fimbriated edge and Schüffner's stippling were seen in this sample during quality control examination. These distinguishing characteristics are quite different than characteristics observed for *P. malariae.* Cells infected with *P. malariae* are normal in size or smaller than uninfected cells with no stippling. Gametocytes were also observed in this specimen. The gametocytes nearly fill the enlarged red blood cell and have course pigment.

14B-D

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	21/21	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	3/3	100	10/10	**Correct**

Quality Control and Referee Information

All participating and referee laboratories agreed that **No Parasites Seen** was the correct response (100 and 100% respectively). Quality control examination of 4% of the slides for 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.

14B-E

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	19/21	91	9/10	**Correct**
Plasmodium ovale	2	9	1	**Incorrect**

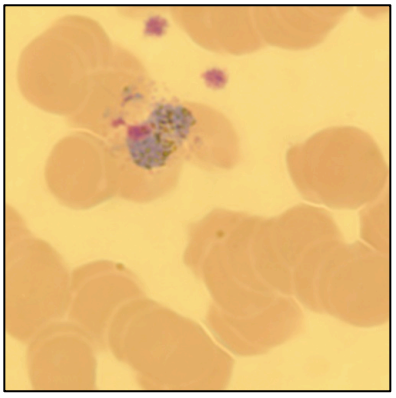
Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	3/3	100	10/10	**Correct**

Quality Control and Referee Information

Participating and referee laboratories agreed that ***Plasmodium vivax*** was the correct response (91 and 90% respectively). Quality control examination of 4% of the slides for this sample showed an average of 2-3 organisms per 40X oil immersion fields. The overall staining quality is good.

Diagnostic Characteristics



Plasmodium vivax infected red blood cells are usually enlarged and stain paler than uninfected ones. This specimen exhibited enlarged pale cells with amoeboid trophozoites, gametocytes filling the entire cell, and Schüffner's stippling. Characteristics of *P. vivax* infected cells are most similar to *P. ovale*. *P. vivax* infected cells are larger, up to twice the size of uninfected cells; more irregularly shaped; and have finer, less coarse sized pigment.

Scoring Information

Distribution of Scores

Score	# of labs	% of labs
100	19	79
90-99	0	0
80-89	5	21
70-79	0	0
60-69	0	0
0-59	0	0

Answer Key

Sample	Correct Answer
14B-A	*Plasmodium falciparum*
14B-B	*Trypanosoma brucei*
14B-C	*Plasmodium ovale**
14B-D	No Parasites Seen
14B-E	*Plasmodium vivax*

* Sample contained *Plasmodium ovale* but was not authenticated. Therefore this sample was graded as No Penalty.

Grading

The answer key was derived from the response of all participating laboratories as per **CLIA Regulations**, CFR Title 42, Part 493, Subpart I, Section 493.917. These regulations can be viewed at www.cdc.gov/clia/Regulatory/default.aspx. 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 is an incorrect response. Organisms that are not authenticated, but which were reported by more than 10% but less than 80% of the participating laboratories **or** referees are "Unauthenticated", and are not considered for grading.

Credit is given according to the formula:

[# of Correct Responses / (# of Correct Responses + # of Incorrect Responses)] X 100

For example, if a sample contained one principal parasite and the laboratory reported it correctly but reported the presence of an additional parasite, which was not present, the sample grade would be:

$1/(1+1)\times 100 = 50$ percent.

Important Reminders

The next Parasitology Proficiency Test is scheduled for **May 20, 2014.** Participating labs will need to notify us **before May 27, 2014** if the samples are not received. Proficiency test results must be electronically submitted through EPTRS by **June 3, 2014** or the laboratory will receive a score of zero. This and additional information can be found in the NYS Proficiency Testing Program Guide provided by the NYS Clinical Laboratory Evaluation Program, which can be accessed via the Internet at:

http://www.wadsworth.org/labcert/clep/ProgramGuide/pg.htm