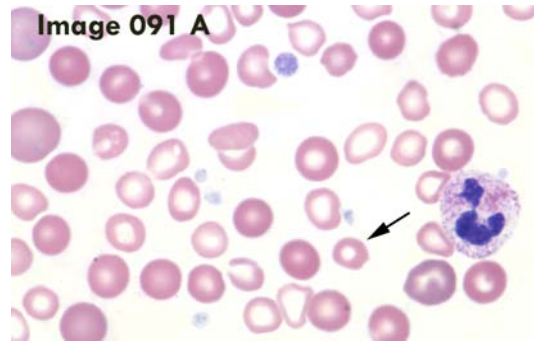


**NEW YORK STATE CYTOHEMATOLOGY PROFICIENCY TESTING PROGRAM**  
**Glass Slide - November 2012**

Results from this proficiency test event are available on our website at:  
<http://www.wadsworth.org/chemheme>

Slide 091	Diagnosis: Iron Deficiency Anemia	
Available data:  70 year-old male	WBC	$8.7 \times 10^9 /L$
	RBC	$4.25 \times 10^{12} /L$
	Hemoglobin	8.7 g/dL
	Hematocrit	29.7 %
	MCV	69.9 fL
	MCH	20.5 pg
	MCHC	29.3 g/dL
	RDW	---
	Platelet count	$344 \times 10^9 /L$



Slide 091 is from a 70 year-old male diagnosed with iron deficiency anemia secondary to chronic blood loss. The data provided with this case included normal WBC and RBC counts and decreased red blood cell indices. The mean corpuscular volume (MCV), the red cell index most often used, measures the average volume of a red blood cell (normal adult range is 80.0 – 97.0 fL). Cells of normal size (7  $\mu$ m) are characterized as normocytic, larger than normal size as macrocytic and smaller than normal size as microcytic. In Case 091, the MCV was decreased (69.9 fL) suggesting the presence of microcytes as reported by ninety percent (325) of participants. The arrowed cell in Image 091A is a microcyte.

The mean corpuscular hemoglobin (MCH) is a measure of the hemoglobin content of a red blood cell. The mean corpuscular hemoglobin concentration (MCHC) is the average hemoglobin concentration in each red blood cell. Red blood cells with normal concentration of hemoglobin are termed normochromic and those with lower than normal hemoglobin concentration are hypochromic. The decreased MCH and MCHC values in this case suggest the presence of hypochromic red blood cells. Many of the red blood cells in Image 091A possess increased central pallor and were correctly identified as hypochromic by ninety-nine percent (357) of participants.

Basophilic stippling and elliptocytes were expected findings and reported by more than fifty percent of participants. Schistocytes, spherocytes and dacrocytes were reported as significant findings by forty-two, twenty-eight and twenty percent of laboratories, respectively.

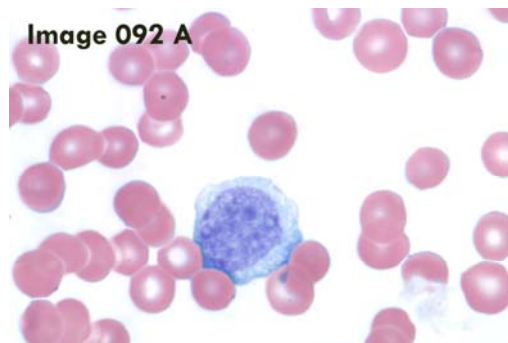
Slide: 091

Cell Classification or Finding	Expected Range	Participant Median	Participant Range
Blast cell not classified	0 - 0	0	0 - 0
Myeloblast/Promyelocyte	0 - 0	0	0 - 0
Lymphoblast/Prolymphocyte	0 - 0	0	0 - 0
Monoblast/Promonocyte	0 - 0	0	0 - 0
Erythroblast	0 - 0	0	0 - 0
Lymphoma/Sezary cell	0 - 0	0	0 - 0
Hairy cell	0 - 0	0	0 - 0
Myelocyte	0 - 1	0	0 - 2
Metamyelocyte	0 - 1	0	0 - 1
Band neutrophil	0 - 9	2	0 - 10
Segmented neutrophil	60 - 79	70	59 - 79
*[Total neutrophils]	65 - 80	73	64 - 81
Eosinophil	0 - 2	0	0 - 2
Basophil	0 - 1	0	0 - 2
Lymphocyte	11 - 25	18	10 - 25
Atypical lymphocyte	0 - 4	0	0 - 5
Monocyte	2 - 11	7	2 - 11
Plasma cell	0 - 0	0	0 - 0
NRBC / 100 WBC	0 - 1	0	0 - 1

Cell Classification or Finding	Expected Result	Participant Results			
Anisocytosis	Moderate	None ( 6%)	Slight (14%)	Moderate ( 61%)	Marked ( 20%)
Poikilocytosis	Slight	None ( 24%)	Slight (46%)	Moderate ( 27%)	Marked ( 3%)
Macrocytosis	None	None (50%)	Slight (38%)	Moderate ( 12%)	Marked ( 0%)
Microcytosis	Moderate	None ( 10%)	Slight (23%)	Moderate ( 57%)	Marked ( 10%)
Hypochromia	Moderate	None ( 1%)	Slight ( 9%)	Moderate ( 62%)	Marked ( 28%)
Polychromasia	Slight	None ( 15%)	Slight (65%)	Moderate ( 19%)	Marked ( 0%)
Reduced number of platelets	Absent		Absent( 98%)	Present( 2%)	
Increased number of platelets	Absent		Absent( 77%)	Present( 23%)	
Phagocytosis of platelet(s)	Absent		Absent( 100%)	Present( 0%)	
Bizarre or irregular platelets	Absent		Absent( 97%)	Present( 3%)	
Clumped platelets	Absent		Absent( 99%)	Present( 1%)	
Giant platelets	Present		Absent( 36%)	Present( 64%)	
Platelet satellitosis	Absent		Absent(100%)	Present( 0%)	
Auer rods	Absent		Absent(100%)	Present( 0%)	
Dohle bodies	Absent		Absent(100%)	Present( 0%)	
Hypersegmentation	Absent		Absent( 96%)	Present( 4%)	
Pelger Huet anomaly	Absent		Absent(100%)	Present( 0%)	
Smudge / Basket cells	Absent		Absent( 94%)	Present( 6%)	
Toxic granulation	Absent		Absent( 91%)	Present( 9%)	
Acanthocytes	Absent		Absent( 93%)	Present( 7%)	
Basophilic stippling	Present		Absent( 43%)	Present( 57%)	
Blistle cells (pre keratocytes)	Absent		Absent( 99%)	Present( 1%)	
Cabot rings	Absent		Absent(100%)	Present( 0%)	
Echinocytes (crenated/burr cells)	Absent		Absent( 87%)	Present( 13%)	
Elliptocytes (ovalocytes)	Present		Absent( 35%)	Present( 65%)	
Howell-Jolly bodies	Absent		Absent( 95%)	Present( 5%)	
Pappenheimer bodies	Absent		Absent( 96%)	Present( 4%)	
Red cell agglutinates	Absent		Absent(100%)	Present( 0%)	
Rouleaux	Absent		Absent( 97%)	Present( 3%)	
Schistocytes	Absent		Absent( 58%)	Present( 42%)	
Schuffner's granules	Absent		Absent(100%)	Present( 0%)	
Sickle cells (drepanocytes)	Absent		Absent(100%)	Present( 0%)	
Spherocytes	Absent		Absent( 72%)	Present( 28%)	
Stomatocytes	Absent		Absent( 95%)	Present( 5%)	
Target cells (codocytes)	Absent		Absent( 92%)	Present( 8%)	
Tear drop cells (dacrocytes)	Absent		Absent( 80%)	Present( 20%)	
Bacteria	Absent		Absent(100%)	Present( 0%)	
Fungi/yeast	Absent		Absent(100%)	Present( 0%)	
Malaria/Babesiosis	Absent		Absent(100%)	Present( 0%)	
Stain precipitate	Absent		Absent( 97%)	Present( 3%)	
Phagocytosis of red cell(s)	Absent		Absent(100%)	Present( 0%)	

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<b>Slide 092</b>	<i>Diagnosis:</i> History of Acute Myelogenous Leukemia	
<i>Available data:</i> 68 year-old male	WBC	9.5 x 10 <sup>9</sup> /L
	RBC	2.57 x 10 <sup>12</sup> /L
	Hemoglobin	8.4 g/dL
	Hematocrit	24.7 %
	MCV	96.1 fL
	MCH	32.7 pg
	MCHC	34.0 g/dL
	RDW	18.9 %
Platelet count	15 x 10 <sup>9</sup> /L	



Slide 092 is from a 68 year-old male diagnosed with a history of acute myelogenous leukemia (AML).

The prominent findings in this case of AML were the immature white blood cells (Image 092A), the majority of participants did not classify the blast forms present. For grading purposes, the blasts-all types and lymphoma cell combination was used. The median count for the combination was 41. Participants that reported fewer than ten or greater than seventy blast forms are expected to review the case. Hairy cells and plasma cells were reported by a few participants and are unacceptable responses.

Significant findings in this case included polychromasia and a critically low platelet count. The majority of participants (91% or 329) correctly recognized the severely decreased number of platelets (platelet count = 15 x 10<sup>9</sup>/L).

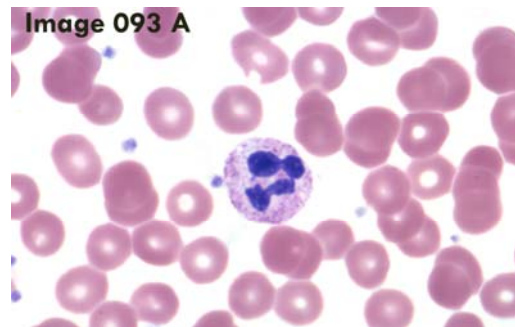
Slide: 092

Cell Classification or Finding	Expected Range	Participant Median	Participant Range
Blast cell not classified	25 - 55	33	0 - 60
Myeloblast/Promyelocyte	25 - 55	0	0 - 2
Lymphoblast/Prolymphocyte	25 - 55	0	0 - 6
Monoblast/Promonocyte	25 - 55	0	0 - 54
Erythroblast	0 - 0	0	0 - 0
*[Blasts, all types + Lymphoma Cells]	25 - 55	41	2 - 65
Lymphoma/Sezary cell	25 - 55	0	0 - 1
Hairy cell	0 - 0	0	0 - 0
Myelocyte	0 - 2	0	0 - 3
Metamyelocyte	0 - 2	0	0 - 2
Band neutrophil	0 - 3	1	0 - 4
Segmented neutrophil	6 - 18	11	5 - 19
*[Total neutrophils]	7 - 19	12	6 - 20
Eosinophil	0 - 2	1	0 - 3
Basophil	0 - 1	0	0 - 1
Lymphocyte	14 - 47	26	12 - 53
Atypical lymphocyte	0 - 19	0	0 - 22
Monocyte	2 - 40	15	2 - 40
Plasma cell	0 - 0	0	0 - 0
NRBC / 100 WBC	0 - 4	2	0 - 4

Cell Classification or Finding	Expected Result	Participant Results			
Anisocytosis	Slight	None ( 20%)	Slight (59%)	Moderate (20%)	Marked ( 1%)
Poikilocytosis	None	None (90%)	Slight ( 9%)	Moderate ( 1%)	Marked ( 0%)
Macrocytosis	None	None ( 57%)	Slight (40%)	Moderate ( 3%)	Marked ( 0%)
Microcytosis	None	None ( 78%)	Slight (19%)	Moderate ( 3%)	Marked ( 0%)
Hypochromia	None	None ( 69%)	Slight (26%)	Moderate ( 5%)	Marked ( 0%)
Polychromasia	Slight	None ( 31%)	Slight (66%)	Moderate ( 2%)	Marked ( 0%)
Reduced number of platelets	Present		Absent( 9%)	Present( 91%)	
Increased number of platelets	Absent		Absent(100%)	Present( 0%)	
Phagocytosis of platelet(s)	Absent		Absent(100%)	Present( 0%)	
Bizarre or irregular platelets	Absent		Absent( 99%)	Present( 1%)	
Clumped platelets	Absent		Absent(100%)	Present( 0%)	
Giant platelets	Absent		Absent( 98%)	Present( 2%)	
Platelet satellitosis	Absent		Absent(100%)	Present( 0%)	
Auer rods	Absent		Absent(100%)	Present( 0%)	
Dohle bodies	Absent		Absent(100%)	Present( 0%)	
Hypersegmentation	Absent		Absent( 98%)	Present( 2%)	
Pelger Huet anomaly	Absent		Absent(100%)	Present( 0%)	
Smudge / Basket cells	Absent		Absent( 91%)	Present( 9%)	
Toxic granulation	Absent		Absent(100%)	Present( 0%)	
Acanthocytes	Absent		Absent(100%)	Present( 0%)	
Basophilic stippling	Absent		Absent( 80%)	Present( 20%)	
Blister cells (pre keratocytes)	Absent		Absent(100%)	Present( 0%)	
Cabot rings	Absent		Absent(100%)	Present( 0%)	
Echinocytes (crenated/burr cells)	Absent		Absent(100%)	Present( 0%)	
Elliptocytes (ovalocytes)	Absent		Absent( 99%)	Present( 1%)	
Howell-Jolly bodies	Absent		Absent(100%)	Present( 0%)	
Pappenheimer bodies	Absent		Absent(100%)	Present( 0%)	
Red cell agglutinates	Absent		Absent(100%)	Present( 0%)	
Rouleaux	Absent		Absent( 90%)	Present( 10%)	
Schistocytes	Absent		Absent( 99%)	Present( 1%)	
Schuffner's granules	Absent		Absent(100%)	Present( 0%)	
Sickle cells (drepanocytes)	Absent		Absent(100%)	Present( 0%)	
Spherocytes	Absent		Absent( 94%)	Present( 6%)	
Stomatocytes	Absent		Absent( 99%)	Present( 1%)	
Target cells (codocytes)	Absent		Absent( 99%)	Present( 1%)	
Tear drop cells (dacrocytes)	Absent		Absent(100%)	Present( 0%)	
Bacteria	Absent		Absent(100%)	Present( 0%)	
Fungi/yeast	Absent		Absent(100%)	Present( 0%)	
Malaria/Babesiosis	Absent		Absent(100%)	Present( 0%)	
Stain precipitate	Absent		Absent( 98%)	Present( 2%)	
Phagocytosis of red cell(s)	Absent		Absent(100%)	Present( 0%)	

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<b>Slide 093</b>	<i>Diagnosis: Asymptomatic</i>	
<i>Available data:</i>  50 year-old male	WBC	$6.2 \times 10^9 /L$
	RBC	$4.67 \times 10^{12} /L$
	Hemoglobin	13.8 g/dL
	Hematocrit	40.6 %
	MCV	87.0 fL
	MCH	29.6 pg
	MCHC	34.1 g/dL
	RDW	14.4 %
	Platelet count	$235 \times 10^9 /L$



Slide 093 is from a 50 year-old asymptomatic male. Results of the complete blood count were within normal limits and, as expected, the majority of participants found no reportable findings. Image 093A depicts normocytic and normochromic red blood cells and, in the approximate center of the image, a normal segmented neutrophil. Two participants reported blast forms present in this unremarkable case and received an evaluation of "Unacceptable".

Slide: 093

Cell Classification or Finding	Expected Range	Participant Median	Participant Range
Blast cell not classified	0 - 0	0	0 - 0
Myeloblast/Promyelocyte	0 - 0	0	0 - 0
Lymphoblast/Prolymphocyte	0 - 0	0	0 - 0
Monoblast/Promonocyte	0 - 0	0	0 - 0
Erythroblast	0 - 0	0	0 - 0
Lymphoma/Sezary cell	0 - 0	0	0 - 0
Hairy cell	0 - 0	0	0 - 0
Myelocyte	0 - 0	0	0 - 0
Metamyelocyte	0 - 0	0	0 - 0
Band neutrophil	0 - 5	0	0 - 5
Segmented neutrophil	39 - 57	49	38 - 58
*[Total neutrophils]	40 - 58	50	39 - 59
Eosinophil	0 - 6	3	0 - 6
Basophil	0 - 2	0	0 - 2
Lymphocyte	27 - 47	39	24 - 49
Atypical lymphocyte	0 - 10	2	0 - 15
Monocyte	0 - 9	5	0 - 9
Plasma cell	0 - 0	0	0 - 0
NRBC / 100 WBC	0 - 0	0	0 - 0

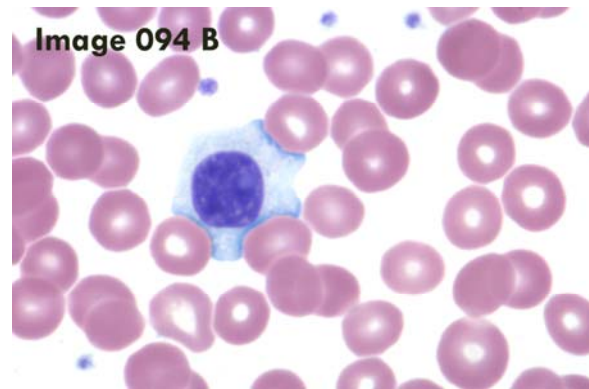
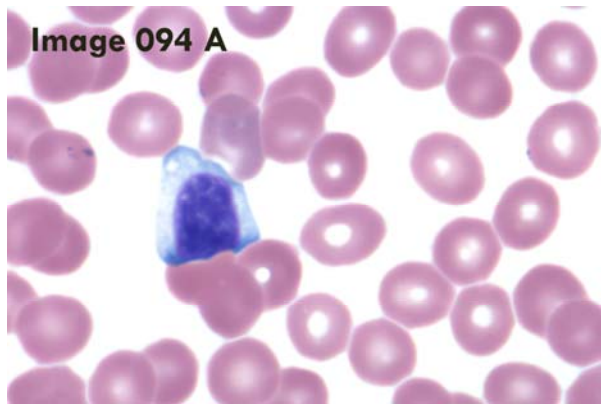
Cell Classification or Finding	Expected Result	Participant Results			
Anisocytosis	None	None ( 90%)	Slight (9%)	Moderate (0%)	MarKed ( 0%)
Poikilocytosis	None	None ( 95%)	Slight (5%)	Moderate (0%)	MarKed ( 0%)
Macrocytosis	None	None ( 99%)	Slight (1%)	Moderate (0%)	MarKed ( 0%)
Microcytosis	None	None ( 98%)	Slight (2%)	Moderate (0%)	MarKed ( 0%)
Hypochromia	None	None ( 98%)	Slight (2%)	Moderate (0%)	MarKed ( 0%)
Polychromasia	None	None ( 99%)	Slight (1%)	Moderate (0%)	MarKed ( 0%)
Reduced number of platelets	Absent	Absent( 99%)		Present( 1%)	
Increased number of platelets	Absent	Absent( 99%)		Present( 1%)	
Phagocytosis of platelet(s)	Absent	Absent(100%)		Present( 0%)	
Bizarre or irregular platelets	Absent	Absent(100%)		Present( 0%)	
Clumped platelets	Absent	Absent(100%)		Present( 0%)	
Giant platelets	Absent	Absent( 95%)		Present( 5%)	
Platelet satellitosis	Absent	Absent(100%)		Present( 0%)	
Auer rods	Absent	Absent(100%)		Present( 0%)	
Dohle bodies	Absent	Absent(100%)		Present( 0%)	
Hypersegmentation	Absent	Absent(100%)		Present( 0%)	
Pelger Huet anomaly	Absent	Absent(100%)		Present( 0%)	
Smudge / Basket cells	Absent	Absent( 99%)		Present( 1%)	
Toxic granulation	Absent	Absent( 98%)		Present( 2%)	
Acanthocytes	Absent	Absent(100%)		Present( 0%)	
Basophilic stippling	Absent	Absent( 99%)		Present( 1%)	
Blister cells (pre keratocytes)	Absent	Absent(100%)		Present( 0%)	
Cabot rings	Absent	Absent(100%)		Present( 0%)	
Echinocytes (crenated/burr cells)	Absent	Absent(100%)		Present( 0%)	
Elliptyocytes (ovalocytes)	Absent	Absent( 95%)		Present( 5%)	
Howell-Jolly bodies	Absent	Absent(100%)		Present( 0%)	
Pappenheimer bodies	Absent	Absent(100%)		Present( 0%)	
Red cell agglutinates	Absent	Absent(100%)		Present( 0%)	
Rouleaux	Absent	Absent( 99%)		Present( 1%)	
Schistocytes	Absent	Absent(100%)		Present( 0%)	
Schuffner's granules	Absent	Absent(100%)		Present( 0%)	
Sickle cells (drepanocytes)	Absent	Absent(100%)		Present( 0%)	
Spherocytes	Absent	Absent( 99%)		Present( 1%)	
Stomatocytes	Absent	Absent(100%)		Present( 0%)	
Target cells (codocytes)	Absent	Absent(100%)		Present( 0%)	
Tear drop cells (dacrocytes)	Absent	Absent( 99%)		Present( 1%)	
Bacteria	Absent	Absent(100%)		Present( 0%)	
Fungi/yeast	Absent	Absent(100%)		Present( 0%)	
Malaria/Babesiosis	Absent	Absent(100%)		Present( 0%)	
Stain precipitate	Absent	Absent( 99%)		Present( 1%)	
Phagocytosis of red cell(s)	Absent	Absent(100%)		Present( 0%)	

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<b>Slide 094</b>	<i>Diagnosis:</i> Infectious Mononucleosis	
<i>Available data:</i>  19 year-old female	WBC	4.8 x 10 <sup>9</sup> /L
	RBC	4.55 x 10 <sup>12</sup> /L
	Hemoglobin	13.3 g/dL
	Hematocrit	39.5 %
	MCV	86.7 fL
	MCH	29.1 pg
	MCHC	33.6 g/dL
	RDW	14.1 %
	Platelet count	201 x 10 <sup>9</sup> /L

Slide 094 is from a 19 year-old female diagnosed with infectious mononucleosis. Infectious mononucleosis is a herpesvirus infection and is spread by virions containing the Epstein-Barr Virus (EBV) genome, a double stranded linear DNA molecule. "Infected patients produce antibodies to EBV-specified antigens in a predictable sequence. Antibodies to the viral capsid antigen (VCA) are the first to appear. IgM anti-VCA antibodies emerge during the incubation period, peak during the second week of illness, and then fall off sharply as does IgA anti-VCA. IgG anti-VCA antibodies increase more slowly, reach maximum levels at 3 to 4 weeks, and persist thereafter for life. Hence, anti-VCA antibodies are present in the majority of the human population." Jandle, J.H. Blood: Textbook of Hematology 2<sup>nd</sup> Ed. Boston: Little, Brown and Company, 1996, p.718.

In Case 094, an EBV antibody panel was performed at the onset of symptoms (fever, fatigue, pharyngitis, lymphadenopathy and splenomegaly) and as expected VCA IgG and VCA IgM titers were elevated. Positive IgG and IgM titers indicate a primary or acute infection. The presence of reactive lymphocytes, as shown in Images 094A and 094B, confirm the diagnosis. Eighty-four percent of participants reported the presence of reactive/atypical lymphocytes, those who did not are expected to review their findings.



Slide: 094

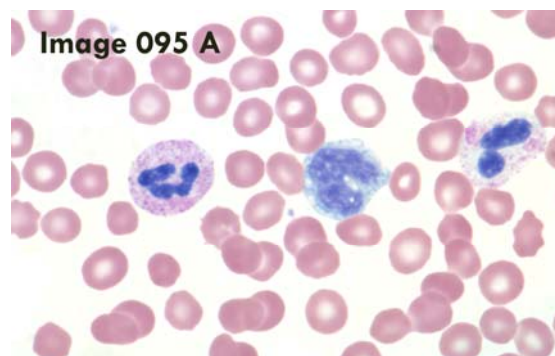
Cell Classification or Finding	Expected Range	Participant Median	Participant Range
Blast cell not classified	0 - 0	0	0 - 0
Myeloblast/Promyelocyte	0 - 0	0	0 - 0
Lymphoblast/Prolymphocyte	0 - 0	0	0 - 0
Monoblast/Promonocyte	0 - 0	0	0 - 0
Erythroblast	0 - 0	0	0 - 0
Lymphoma/Sezary cell	0 - 0	0	0 - 0
Hairy cell	0 - 0	0	0 - 0
Myelocyte	0 - 0	0	0 - 0
Metamyelocyte	0 - 0	0	0 - 0
Band neutrophil	0 - 7	1	0 - 8
Segmented neutrophil	27 - 47	37	26 - 48
*[Total neutrophils]	29 - 49	39	28 - 51
Eosinophil	0 - 4	2	0 - 5
Basophil	0 - 2	0	0 - 2
Lymphocyte	29 - 57	45	28 - 58
Atypical lymphocyte	1 - 20	5	0 - 20
*[Lymphocytes+Atypical lymphocytes]	41 - 60	51	39 - 61
Monocyte	1 - 11	6	1 - 11
Plasma cell	0 - 0	0	0 - 0
NRBC / 100 WBC	0 - 0	0	0 - 0

Cell Classification or Finding	Expected Result	Participant Results			
Anisocytosis	None	None ( 86%)	Slight (14%)	Moderate (0%)	Marked ( 0%)
Poikilocytosis	None	None (96%)	Slight ( 4%)	Moderate (0%)	Marked ( 0%)
Macrocytosis	None	None (96%)	Slight ( 3%)	Moderate (0%)	Marked ( 0%)
Microcytosis	None	None (97%)	Slight ( 2%)	Moderate (0%)	Marked ( 0%)
Hypochromia	None	None (91%)	Slight ( 8%)	Moderate (1%)	Marked ( 0%)
Polychromasia	None	None (99%)	Slight ( 1%)	Moderate (0%)	Marked ( 0%)
Reduced number of platelets	Absent	Absent( 98%)		Present( 2%)	
Increased number of platelets	Absent	Absent( 99%)		Present( 1%)	
Phagocytosis of platelet(s)	Absent	Absent(100%)		Present( 0%)	
Bizarre or irregular platelets	Absent	Absent(99%)		Present( 1%)	
Clumped platelets	Absent	Absent(100%)		Present( 0%)	
Giant platelets	Absent	Absent( 77%)		Present( 23%)	
Platelet satellitosis	Absent	Absent(100%)		Present( 0%)	
Auer rods	Absent	Absent(100%)		Present( 0%)	
Dohle bodies	Absent	Absent(100%)		Present( 0%)	
Hypersegmentation	Absent	Absent(100%)		Present( 0%)	
Pelger Huet anomaly	Absent	Absent(100%)		Present( 0%)	
Smudge / Basket cells	Absent	Absent( 97%)		Present( 3%)	
Toxic granulation	Absent	Absent(100%)		Present( 0%)	
Acanthocytes	Absent	Absent(100%)		Present( 0%)	
Basophilic stippling	Absent	Absent( 99%)		Present( 1%)	
Blister cells (pre keratocytes)	Absent	Absent(100%)		Present( 0%)	
Cabot rings	Absent	Absent(100%)		Present( 0%)	
Echinocytes (crenated/burr cells)	Absent	Absent( 99%)		Present( 1%)	
Elliptocytes (ovalocytes)	Absent	Absent( 95%)		Present( 5%)	
Howell-Jolly bodies	Absent	Absent(100%)		Present( 0%)	
Pappenheimer bodies	Absent	Absent(100%)		Present( 0%)	
Red cell agglutinates	Absent	Absent(100%)		Present( 0%)	
Rouleaux	Absent	Absent( 99%)		Present( 1%)	
Schistocytes	Absent	Absent(100%)		Present( 0%)	
Schuffner's granules	Absent	Absent(100%)		Present( 0%)	
Sickle cells (drepanocytes)	Absent	Absent(100%)		Present( 0%)	
Spherocytes	Absent	Absent( 99%)		Present( 1%)	
Stomatocytes	Absent	Absent(100%)		Present( 0%)	
Target cells (codocytes)	Absent	Absent(100%)		Present( 0%)	
Tear drop cells (dacrocytes)	Absent	Absent(100%)		Present( 0%)	
Bacteria	Absent	Absent(100%)		Present( 0%)	
Fungi/yeast	Absent	Absent(100%)		Present( 0%)	
Malaria/Babesiosis	Absent	Absent(100%)		Present( 0%)	
Stain precipitate	Absent	Absent( 98%)		Present( 2%)	
Phagocytosis of red cell(s)	Absent	Absent(100%)		Present( 0%)	



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<b>Slide 095</b>	<i>Diagnosis:</i> Unknown	
<i>Available data:</i>  88 year-old male	WBC	12.6 x 10 <sup>9</sup> /L
	RBC	4.38 x 10 <sup>12</sup> /L
	Hemoglobin	12.8 g/dL
	Hematocrit	37.3 %
	MCV	85.2 fL
	MCH	29.2 pg
	MCHC	34.3 g/dL
	RDW	14.4 %
	Platelet count	254 x 10 <sup>9</sup> /L



Slide 095 is from an 88 year-old male obtained during a visit to the hospital emergency department. A comprehensive chemistry panel, complete blood count and coagulation studies were ordered on admission. Serum sodium and chloride concentrations were slightly decreased and carbon dioxide, glucose and total bilirubin were slightly elevated. The complete blood count revealed a modest increase in the white blood cell count. No significant white blood cell abnormalities were reported by participants. The significant red blood cell finding reported by fifty-four percent of participants was elliptocytes. Other red cell findings reported by a fewer number of participants included acanthocytes, echinocytes, and schistocytes.

Slide: 095

Cell Classification or Finding	Expected Range	Participant Median	Participant Range
Blast cell not classified	0 - 0	0	0 - 0
Myeloblast/Promyelocyte	0 - 0	0	0 - 0
Lymphoblast/Prolymphocyte	0 - 0	0	0 - 0
Monoblast/Promonocyte	0 - 0	0	0 - 0
Erythroblast	0 - 0	0	0 - 0
Lymphoma/Sezary cell	0 - 0	0	0 - 0
Hairy cell	0 - 0	0	0 - 0
Myelocyte	0 - 0	0	0 - 0
Metamyelocyte	0 - 1	0	0 - 1
Band neutrophil	0 - 6	2	0 - 7
Segmented neutrophil	77 - 92	86	75 - 93
*[Total neutrophils]	80 - 93	88	79 - 93
Eosinophil	0 - 2	0	0 - 2
Basophil	0 - 1	0	0 - 1
Lymphocyte	1 - 11	6	1 - 11
Atypical lymphocyte	0 - 3	0	0 - 3
Monocyte	0 - 9	5	0 - 9
Plasma cell	0 - 0	0	0 - 0
NRBC / 100 WBC	0 - 0	0	0 - 0

Cell Classification or Finding	Expected Result	Participant Results			
Anisocytosis	None	None ( 58%)	Slight (40%)	Moderate (2%)	Marked ( 0%)
Poikilocytosis	Slight	None ( 46%)	Slight (50%)	Moderate (4%)	Marked ( 0%)
Macrocytosis	None	None ( 89%)	Slight (11%)	Moderate (1%)	Marked ( 0%)
Microcytosis	None	None ( 93%)	Slight (7%)	Moderate (0%)	Marked ( 0%)
Hypochromia	None	None ( 91%)	Slight (9%)	Moderate (0%)	Marked ( 0%)
Polychromasia	None	None ( 91%)	Slight (9%)	Moderate (0%)	Marked ( 0%)
Reduced number of platelets	Absent	Absent( 97%)		Present( 3%)	
Increased number of platelets	Absent	Absent( 98%)		Present( 2%)	
Phagocytosis of platelet(s)	Absent	Absent(100%)		Present( 0%)	
Bizarre or irregular platelets	Absent	Absent( 99%)		Present( 1%)	
Clumped platelets	Absent	Absent( 99%)		Present( 1%)	
Giant platelets	Absent	Absent( 91%)		Present( 9%)	
Platelet satellitosis	Absent	Absent(100%)		Present( 0%)	
Auer rods	Absent	Absent(100%)		Present( 0%)	
Dohle bodies	Absent	Absent(100%)		Present( 0%)	
Hypersegmentation	Absent	Absent( 99%)		Present( 1%)	
Pelger Huet anomaly	Absent	Absent(100%)		Present( 0%)	
Smudge / Basket cells	Absent	Absent( 98%)		Present( 2%)	
Toxic granulation	Absent	Absent( 99%)		Present( 1%)	
Acanthocytes	Absent	Absent( 68%)		Present( 32%)	
Basophilic stippling	Absent	Absent( 98%)		Present( 2%)	
Blister cells (pre keratocytes)	Absent	Absent(100%)		Present( 0%)	
Cabot rings	Absent	Absent(100%)		Present( 0%)	
Echinocytes (crenated/burr cells)	Absent	Absent( 73%)		Present( 27%)	
Elliocytes (ovalocytes)	Present	Absent( 46%)		Present( 54%)	
Howell-Jolly bodies	Absent	Absent(100%)		Present( 0%)	
Pappenheimer bodies	Absent	Absent(100%)		Present( 0%)	
Red cell agglutinates	Absent	Absent(100%)		Present( 0%)	
Rouleaux	Absent	Absent(100%)		Present( 0%)	
Schistocytes	Absent	Absent( 80%)		Present( 20%)	
Schuffner's granules	Absent	Absent(100%)		Present( 0%)	
Sickle cells (drepanocytes)	Absent	Absent( 99%)		Present( 1%)	
Spherocytes	Absent	Absent( 98%)		Present( 2%)	
Stomatocytes	Absent	Absent(100%)		Present( 0%)	
Target cells (codocytes)	Absent	Absent( 99%)		Present( 1%)	
Tear drop cells (dacrocytes)	Absent	Absent( 98%)		Present( 2%)	
Bacteria	Absent	Absent(100%)		Present( 0%)	
Fungi/yeast	Absent	Absent(100%)		Present( 0%)	
Malaria/Babesiosis	Absent	Absent(100%)		Present( 0%)	
Stain precipitate	Absent	Absent( 99%)		Present( 1%)	
Phagocytosis of red cell(s)	Absent	Absent(100%)		Present( 0%)	