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| Policy | It is the policy of the organization to perform WBC/Scan differential, RBC scan, Platelet scan, manual differential, supervisory review or a pathologist review on all CBC’s with differential that meet the organizations further review criteria. No Manual differential will be performed if the test order is CBC NO DIFF (Hemogram) only. |

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| Workplace Safety | All laboratory employees are expected to maintain a safe working environment and an injury-free workplace. Laboratory employees are responsible for their own safety, the safety of others and adhering to all departmental and medical center safety policies and procedures.* For standard precautions and safety practices in the laboratory; see **Safety Practices**, specifically, but not limited to, equipment safety, proper body mechanics, sharps exposure and proper use of personal protective equipment (PPE).
* For Universal Body Substance precautions, see **Universal Body Substance Precautions**, specifically, but not limited to, exposure to body fluids.
* For proper hand-washing, see **Hand washing Policy**, specifically, not limited to, proper hand-washing.
* For proper infection control, see **Infection Control**, specifically, but not limited to, proper use of gloves.
* For proper handling of regular and infectious waste, see **Handling of Regular and Infectious Waste**, specifically, but not limited to, proper disposal of regular and biohazardous waste.
* For proper cleaning of work area, see **Cleaning Work Areas**.
* For proper handling of chemicals and reagents, see the Chemical Hygiene Plan.

For proper storage and disposal of chemical hazardous waste, see **Storage & Disposal of Chemical Hazardous Waste**. All laboratory employees are expected to maintain a safe working environment and an injury-free workplace. Laboratory employees are responsible for their own safety, the safety of others and adhering to all departmental and medical center safety policies and procedures. |

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| Procedure | Perform tasks as outlined on the table below. Manual differential, supervisory review or a pathologist review is performed depending on which type of review is indicated. See section ***Criteria for manager review / pathologist’s review/ 2nd CLS review*** for more detailed information***.*** |
| **When to scan** |  |
| WBC ( White Blood Count) | <3.0 x 103 or >25.0 x 103   |
| Basophils | >0.19 ABS |
| MCV (Mean Corpuscular Volume) | <75 or > 105 fl |
| RDW | >22 |
| Platelet Count | <100,000 No previous result w/in 7 days |
| Additional criteria for scan | Suspect and specific flags |

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| **When to perform manual differential count** |  |
| Bands | >10% |
| Immature Granulocytes Blasts | present |
| Additional criteria for manual differential count | Suspect and specific flags (e.g. questionable automated differential count results) |

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| **Delta Checks** |
| * WBC: +/- 10 w/in 3 days
* Hgb: +/- 2 w/in 7 days
* MCV: +/- 5 w/in 90 days
* PLT: > 50% difference w/in 7 days
 | **Review, Repeat Run, and Scan slide if necessary.** |

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| Procedure, continued |

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| **Critical Result description** | **What to do** |
| WBC <2.0 or >30.0 | Call critical, and scan slide to confirm WBC Count. Perform manual differential count if indicated. |
| WBC >400.3 | WBC linearity; dilute 1:5 with diluent and rerun in single tube presentation mode. |
| If ANC <0.5 | Call critical, scan slide |
| Blast present | Call critical result. |
| Patient >30 days, HGB is <6.6 or >19.9 | Hgb critical, investigate, call critical |
| Patient </=30 days, HGB is <9.5 or >22.3 | Hgb critical, investigate, call critical |
| HGB >23.9 | Hgb linearity; dilute 1:5 with diluent and rerun in single tube presentation mode. |
| HGB Delta +/- 2# and inpatient within 7 days | Investigate results |
| Patient >30 days, HCT is <18 or >61 | Hct critical, investigate, call critical |
| Patient </=30 days, HCT is <30 OR >71 | Hct critical, investigate, call critical |
| Patient >18Y, PLT is <20 or >999 | Platelet critical, review smear - platelet, call critical |
| Patient </=18Y, PLT is <30 or >999 | Platelet critical, review smear – platelet, call critical |

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| Differential count and peripheral smear review reporting using Cellavision | See procedure ***LAMC-PPP-0273 Cellavision DM96 Operating Procedure*** for instrument operation.Follow steps below on how to perform WBC /scan differential and manual differential reporting using Cellavision.

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| Step | Action |
|  | Log in the Cellavision Software using assigned username and password. |
|  | Make sure Cell Location QC was performed in the Cellavision instrument. See procedure *LAMC-PPP-0274Cellavision Quality Control Procedure* on how to perform Cell Location QC. |
|  | To start analysis on a patient, click on Database View  to see the list of slides that is ready to be reviewed. Patient list will be under the *Processed Order tab*. |
|  | Double click on the accession number to be reviewed. *Note: Verified/Completed slides will have a green check mark before the accession numbers.* |
|  | After opening the desired slide, window will display these areas:* Patient Data- patient demographics with hematology analyzer results(hemogram and auto differential count)
* WBC tab – Cellavision differential count
* RBC tab- Cellavision rbc morphology analysis with a monolayer scanned area from slide for review
* PLT tab- 9 fields from the slide to be reviewed for platelet analysis
* Sign Slide tab – Summary of results to be verified
 |
|  | Start with the **WBC tab**, relocate all cells that were differentiated incorrectly by Cellavision instrument by either dragging cell(s) to desire cell group or right clicking on the cell(s) to choose which cell group the cell(s) should be relocated. Make sure to identify all *Unidentified Cells* and that all cells scanned by the instrument were reviewed. Additional wbc morphology can be entered by clicking WBC Comment. |

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| Differential count and peripheral smear review reporting using Cellavision, continued |

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| Step | Action |
|  | After reviewing WBC tab, proceed to **RBC tab** to review RBC morphology. Scan the image from the smear by zooming in an out to confirm RBC morphology. Choose *Use characterization* to use or edit Cellavision RBC morphology analysis.  |
|  | Proceed to **PLT tab** to review platelet count. Identify Concentration Level by clicking the drop down list to choose if platelets are increased, decreased, or normal. Click on platelet comment to enter additional morphology such as giant and large platelets. |
|  | Review results by clicking on the **Sign Slide tab** to display summary of analysis. Verify results by using username and password provided. |
|  | Results will be sent to LIS for final verification. See procedure *LAMC-PPP-0391 Manual Validation of Patient’s Results on Remisol Advance* to use middleware for final verification results. |

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| Differential count and peripheral smear review reporting using microscope for analysis |  If in need to perform differential count or peripheral smear review using a microscope, follow the procedure below:   |

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| WBC Scan/ Differential count |  Scanning is defined as the scanning of minimum of 10 fields at 40X or 50X magnification when the WBC is equal or greater than 25,000/cm3 or scanning of minimum of 15 fields at 40X or 50X when the WBC is less than 3,000/cm3. Manual differential is defined as classification of 100 WBC. If cells counted for manual differential is less than 25 WBCs, release the results in percentage and insert a comment under the result comment field for the **total number of WBCs** differentiated. If no WBC seen, report on all differential fields as “==” and insert comment on first differential field as **“No WBC seen”.** |
|  RBC scan | RBC scanning is defined as the scanning of minimum of 10 fields at 40X or 50X magnification in order to observe and report RBC morphology and immature RBC’s. Follow the table below on how to report RBC morphology. |
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| How to report RBC morphology at 100X |
|  | **Normal** | **Few** | **Moderate** | **Many** |
| Anisocytosis | RDW <14.9 | RDW 14.9-17.0 | RDW 17.1-21.0 | RDW >21.0 |
| Poikilocytosis | 0-3 cells/100X field | 4-10 cells/100X field | 11-20 cells/100X field | >20 cells/100X field |
| Hypochromasia | 0-5% MCHC >32 | 6-25%MCHC 30-32 | 26-50%MCHC 20-29 | >50%MCHC <20 |
| Polychromasia | 0-1 cells/100X field | 2-3 cells/100X field | 4-6 cells/100X field | >6 cells/100X field |
| Macrocytosis | 0-5%MCV 80-99 | 6-25% MCV 100-109 | 26-50%MCV 110-120 | 50%MCV >120 |
| Microcytosis | 0-5%MCV 80-99 | 6-25% MCV 76-79 | 26-50%MCV 65-75 | 50%MCV <65 |
| Basophilic stippling | None | 1-2 cells/100X field | 3-5 cells/100X field | >5 cells/100X field |
| Inclusions | Report as present |  |  |  |

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| How to report Nucleated RBC’s  |
|  | NRBC >2.0% | Do scan, if scan agrees report automated results. If disagrees, do manual differential and correct WBC if NRC>10%, use uncorrected WBC count to correct WBC |

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| Platelet scan | Platelet scan is defined as the scanning of minimum of 10 fields at 40X or 50X magnification in order to estimate platelet count and observe platelet morphology. Scan platelets and comment morphology.  |

 How to report Platelet enumeration at 100X

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| **Platelets / 100x field** | **Description** | **Estimated Platelet count (1000/mm3)** |
| <2.5 to <6.5 | Decreased | 50-129 |
| >=6.5 but <20 | Adequate | 130-400 |
| >=20 to >=30 | Increased | 401-600 |

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| HOW TO REPORT PLATELET MORPHOLOGY AT 100X, report as few, moderate, many |
|  | **Size** | **Appearance** |
| Large | 4-6.5 µm | Round or ovoid, pale blue or colorless, containing purplish-red granules |
| Giant | Larger than normalRBC (7)µm | Irregularly shaped or agranular. |

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|  |  See procedure ***LAMC-PPP-0391 Manual Validation of Patient’s Results on Remisol Advance*** to use middleware for result entry and final verification results or follow steps below for result entry and final verification using Cerner.1. Review the results received in Accession Result Entry (ARE), either in Accession Mode or in Instrument

Queue Mode. 1. If a Manual Differential is indicated:
2. Click the dns Diff Type field.
3. Click arrow down.
4. Choose Manual Diff.
* Warning:

Do not click Verify until the Manual Differential has been completed. If a CLS clicks Verify after step 3, both the hemogram and the auto differential are sent to KP HealthConnect. Click Perform to convert to a Manual Differential and cancel the Auto Differential.1. Click Perform
2. Click after the Accession Number in the Accession Field
3. Click Retrieve
4. The Manual Differential DTAs appear
5. Click Mode
6. Select Differential
7. Select Man Diff in the Procedure
8. Select CBC Diff in the Option field.
9. Click OK.
10. Use the keys indicated next to the
11. Procedure name on the computer
12. Keyboard to perform the Diff Count.
13. Click OK.
14. Add Morphology Results as needed.
15. Click Verify. Both the CBC and the Manual Differential are sent to KP HealthConnect.

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|  | 1. If scanning criteria were determined, prepare peripheral smear for scanning.
2. CLS holds the result for pending investigation and skips to the next result in ARE
3. CLS scans the slide.
4. If results are acceptable, CLS adds a result comment at the assay level – “Smear Review Consistent with Automated results”.
5. CLS verifies the result and clicks on the Verify button
6. The result is send to KPHC
7. If results are not acceptable, CLS selects “Manual Diff” or “Cell Morph” in dns DIFF TYPE and clicks on the Perform button.

Note: For “Cell Morph”, the auto differential order is NOT canceled and the Cell Morph order is reflexed. |

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| Platelet clumps/ Platelet clump flags | Follow steps below on how to report results with Platelet clumps/Platelet clump flags  |
| STEPS | ACTION |
|  | Scan a manual slide and if the slide shows evidence of platelet clumping **do not report the platelet instrument result**.   |
|  | Vortex EDTA specimen and rerun test. **Verify result if flag corrected**, if not proceed to STEP 3 |
|  | **Report as “==”** with a report comment of “Platelet clumping present” |

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| Criteria for manager review / pathologist’s review/ 2nd CLS review | Refer patients with *no previous history of blasts, who have any number of blasts on their differential, & patients with unexpected or unusual cells* for a 2nd CLS review/manager review. Documentation of review will be entered in the result comment as “Result reviewed with a 2nd CLS/Manager”. Save the slide resulted for the manager to determine if further review by pathologist is required. |

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| Non-Controlled Documents | The following non-controlled documents support this procedure.* SCPMG LIS – 0080 Procedure\_Resulting in Cerner GenLab - Manual Entry
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| Controlled Documents | The following controlled documents support this procedure.

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| **Document Number** | **Document Name** |
| LAMC-PPP-0123 | Safety Practices |
| LAMC-PPP-0127 | Infection Control |
| LAMC-PPP-0128 | Universal Body Substance Precaution |
| LAMC-PPP-0129 | Handling of Regular and Infectious Waste |
| LAMC-PPP-0130 | Cleaning Work Areas |
| LAMC-PPP-0132 | Hand-washing Policy |
| LAMC-PPP-0134 | Storage and Disposal of Chemical Hazardous Waste |
| LAMC-PPP-0391 | Manual Validation of Patient’s Results on Remisol Advance |
| LAMC-PPP-0273 | Cellavision DM96 Operating Procedure |
| LAMC-PPP-0274 | Cellavision Quality Control Procedure |

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| Author(s) | Alvin Castillo |