Dignity Health Central Coast Service Area

**SUBJECT**: Corrected WBC Counts Due to Nucleated RBCs 7500.H.CC.14

**ORIGIN:** Clinical Laboratory/ Hematology

| **Document Category:** |
| --- |
| ☒ Policy | ☒Procedure | ☐Standardized Procedure | ☐Other:  |

| **Applies to:** |
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| ☒ Santa Maria Campus,Marian Regional Medical Center | ☒Arroyo Grande Campus,Marian Regional Medical Center | ☒French Hospital Medical Center |
| ☐St. John’s Pleasant Valley Hospital | ☐St. John’s Regional Medical Center |

# Purpose: Automated NRBC (nucleated red blood cell) methods are subject to inaccuracies due to interference from other cells or cellular components and might result in a spuriously elevated leukocyte count. When the automated WBC (white blood cell) count has flags in conjunction with NRBCs or the automated NRBC count has flags or differs significantly from the manual count it might be necessary to correct the automated white blood cell count for the presence of NRBCs to reflect the true leukocyte count.

# CLIA Complexity: High complexity

# Clinical Utility: The Coulter Unicel DXH 600/800 is capable of detecting and quantifying NRBCs and automatically reporting only the corrected cell counts. However, due to automated limitations occasionally WBC counts will be flagged or inaccurate and must be corrected using an alternate method.

# Principle: Outside the neonatal period, NRBCs in peripheral blood can be present in numerous conditions such as ineffective erythropoiesis, leukemia, severe hypoxia, myelofibrosis, hemolytic episodes, and septicemia. Occasionally analyzers are unable to discriminate between cellular elements which may lead to false Leukocytosis. Consequently, NRBCs should be correctly identified and enumerated and a corrected WBC count should be calculated if the number of NRBCs differs significantly from the number counted during the manual differential or if the automated WBC or NRBC count has a flag.

# Specimen Collection:

| Sample Type | Container | Minimum Volume |  StabilityMax Storage Temp |
| --- | --- | --- | --- |
| Peripheral whole blood | K2-EDTA  | 500 μl  | 24 H at 4 C |

# Materials:

| **Reagents / Media*** Wright Stain
 | **Supplies / Materials*** Glass slides
* Blood drop dispenser
 | **Equipment*** Coulter DxH 600/800
* CellaVision or Light microscope
* Autoprep Slide Maker
* Automated Stainer
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| --- | --- | --- |

# Maintenance

Refer to the CellaVision DM 96 User’s manual for maintenance and troubleshooting procedures. Record all maintenance on the CellaVision and Aerospray Stainer Maintenance Logs.

# Calibration

## Instrument calibration is performed every six (6) months or as needed according to procedure using Coulter S-Cal.

## Reproducibility and Carryover are performed every 6 months according to procedure.

# Quality Control

Three levels of 6C and Retic Quality control are performed once every 24 hours of use, after maintenance, calibration, and while troubleshooting. Latron is performed once daily after shutdown.

# Procedure:

## If the automated WBC count generates a flag due to cellular interference from NRBCs or the number of NRBCs disagrees with the amount viewed on smear, enumerate the number of NRBCs separately during the WBC differential count. Note: A manual differential must be performed if NRBCs is >10. For a Hemogram that has a system message indicating cellular interference a corrected WBC count must be performed if NRBCs are present at >10.

## Correct the WBC count as follows:

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### Corrected WBC Count =

## Compare the manually corrected WBC count to the automated count.

# Interpretation of Results (For Quantitative Tests):

The corrected WBC count can be reported or used to confirm automated WBC count corrected by the instrument.

Confirm the calculated WBC count corrected for presence of NRBCs is lower than the uncorrected or total WBC value taken from instrument.

# Result Reporting:

The automated WBC count corrected by the instrument can be reported if the manually corrected WBC count matches. Under Result Comment document that the automated WBC count was confirmed using manual correction of the WBC count due to presence of NRBCs.

If the WBC count is corrected, absolute differential values that did not automatically calculate must be calculated using the corrected WBC result and updated in Cerner.

Enter the Corrected WBC value in Cerner and document under Result Comment that the WBC count was corrected due to the presence of NRBCs.

# Limitations of Procedure:

NRBC analysis by the Coulter DxH instrument uses a combination of light scatter and fluorescence that occasionally is not able to distinguish NRBCs from other cellular populations.

Enumerating NRBCs using optical microscopy or CellaVision can have a high degree of imprecision due to small numbers of cells counted, uneven cell distribution, and misclassification errors.

# XIV. References:

Kwon MJ, Nam MH, Kim SH, et al. Evaluation of the nucleated red blood cell count in neonates using the Beckman Coulter UniCel DxH 800 analyzer. *Int J Lab Hematol.* 2011;33:620-628

McKenzie SB. Clinical Laboratory Hematology. Upper Saddle River, NJ. 2014. Pg 131

Rin DG., Vidali M., Balboni F. et al. Performance evaluation of the automated nucleated red blood cell count of five commercial hematological analyzers. *Int J Lab Hematol.* 2017;1-8.