Beaumont Laboratory

Royal Oak

Effective Date:	03/27/2017
Supersedes:	04/14/2015
Related Documents:	
RC.HM.PR.069 CBCD and Retic – Sysmex XE5000	
RC.HM.PR.020 CBC Corrections	

HEMATOLOGY WAM WORKFLOWS

RC.HM.WF.042.r02

Purpose

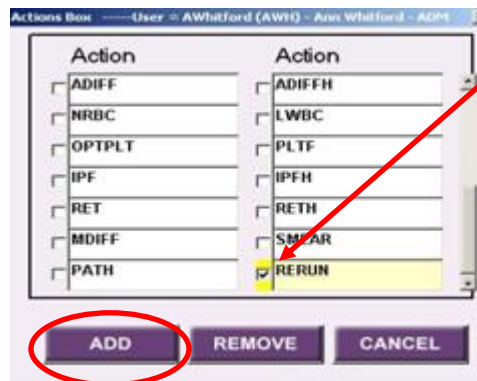To ensure the proper processing of Hematology samples that are validated in the Sysmex WAM system.

Procedure

HIGH MCHC

If there is a high MCHC (>38) result on first run of sample:

If warming sample to 37 degrees:

1. Do not validate sample. In [ACTIONS] box, click on Rerun then ADD.

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2. After warming, run sample in open mode on analyzer (to prevent specimen cool-down). If MCHC is acceptable, choose Run 2 in WAM from the Rerun tab.

3. Add ''possible cold agglutinin'' comment by double clicking on COM field next to MCHC result field and selecting HE03 and SAVE.

4. [VALIDATE CBC] or [VALIDATE ALL] according to SOP.

5. If smear does not need review, "Cancel Smear" in pop-up box.

If 1:5 dilution is made:

1. Do not validate sample. In Action box, add Rerun.

2. Prepare dilution then run dilution in capillary mode using barcode scanner.

3. From Rerun tab, select the CBC from the diluted run and the automated differential from the initial run. To do so, select Run 2, go to Run 1 and click on the gray boxes next to the diff parameters that you want to report. These values will then populate the result field. (You will not see a checkmark or X in the boxes you click on.) Then click on STORE.

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4. Go to the Result Validation tab and add appropriate correction comment (lipemic, icteria) as underline internal comment and validate as appropriate. If cold agglutinin, enter as comment next to MCHC so that this gets reported on patient chart.

5. An Action on Smear pop-up box will appear. If slide is to be reviewed by morph bench, QUIT. If a slide does not need review, Cancel Smear.

If you perform a HCT manually:

1. Replace the analyzer HCT value with the manual result by editing the analyzer results. Click on the result to be edited and hit 'delete'. Answer YES to pop-up box asking if you want to modify result, then enter manual result.

2. Replace the MCV and MCHC indices with the recalculated values.

3. Add underline internal comments: "Manual HCT. RBC indices recalculated."

4. STORE and validate as appropriate.

5. Action on smear box will pop-up. If smear needs review at morph bench, QUIT.

6. If smear does not need review, Cancel Smear.

CBCND THAT REQUIRES WBC or PLT SLIDE REVIEW

A. If all parameters except WBC or PLT autoverify:

    1. **HST tech** – QUIT.

    2. **Morph Tech** –
       a. Review slide.

       b. In Morphology tab, perform "Morphology Checks" by clicking on and selecting appropriate responses for WBC estimate, instrument flags, RBC morphology and platelet estimate. If significant RBC morphology is present, you may enter appropriate grading in Diff Comment field (since morphology doesn't go to LIS on a CBCND.

       c. In Result Validation tab: double click on Result field next to Smear 1 in the Manual Column.

       d. Select 'Verified" and SAVE.

       e. STORE and Validate All.

B. If none of CBC parameters autoverify:

    1. **HST tech** –
       a. In Result Validation tab, click on ALL column to check all parameters.

       b. Deselect parameter to be reviewed (PLT or WBC and WBCOR) so smear can be reviewed by morph tech.

       c. Validate Selection and ACCEPT or QUIT.

    2. **Morph tech** –
       a. Review slide.

       b. In Morphology tab, perform "Morphology Checks" by clicking on and selecting appropriate responses for WBC estimate, instrument flags, RBC morphology and platelet estimate. If significant RBC morphology is present, you may enter appropriate grading in Diff Comment field (since morphology doesn't go to LIS on a CBCND.

       c. In Result Validation tab: double click on Result field next to Smear 1 in the Manual Column.

       d. Select "Verified" and SAVE.

       e. STORE and Validate All.

PLT < 75

1. Platelets less than 75 bill/L will automatically reflex for an optical PLT. In the example below, the initial results appear in the Run 1 column:

2. The optical PLT will be Run 2. Click on the Rerun tab to see both sets of results. Select the optical PLT results by clicking on Run 2. Results will then appear in Selection Results column.

3. Return to the Result Validation tab. Run 2 results will now appear in the Result column and "Platelet verified by alternate method" will appear in the Comment column next to the PLT result.

All	EC	Test	Result	Com	Run 1	P Res	P Com
□		WBC	5.9		5.9	5.9	
□		WBCOR	5.9		5.9	5.9	
□		RBC	4.82		4.82	4.82	
□		HGB	15.1		15.1	15.1	
□		HCT	45.4		45.4	45.4	
□		MCV	94		94	94	
□		MCH	30		30	30	
□		MCHC	33		33	33	
□		PLT	73	Platelet ve	74	224	
□		OPTPLT	#v				
□		RDWSD	45		45	45	
□		RDWCV	13		13	26	
□		NEUTRE	56.7		56.7	56.7	
□		LYMPRE	34.5		34.5	34.5	
□		MONORE	5.4		5.4	5.4	
□		EOSIRE	2.7		2.7	2.7	
□		BASORE	0.5		0.5	0.5	
□		IGRE	0.2		0.2	0.2	
		NEUTAD					

Result Validation | Rerun | Manual Differential | Morphology | Previou

INSTRUMENT — Instr RXE511 | Instr RXE511 | P-Date 03/20/13

MANUAL — All | Test | Result | Com

STORE | VALIDATE ALL | VALIDATE SELECTION | VALIDATE CBC

NOTE: If a Run is not selected, the following window will appear when attempting to Validate results:

[WAM4] Discipline: Hematology Site ID:R Site Name:ROYAL OAK

ⓘ Please select a run first.

OK

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4. Note that the Op Alert states to check for a clot and review a smear.

    a. Retrieve specimen and check for a clot. If no clot is found, click on the Comments button. A Comments window opens. Double click on the yellow window. A Canned Comments window appears. Click on CKD (Checked for a clot), then click OK.
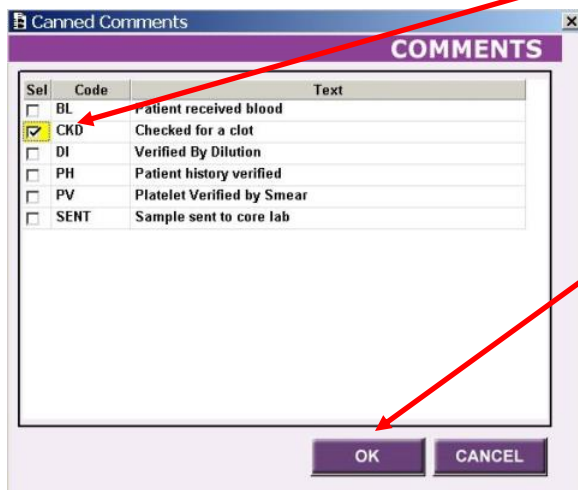
    b. "Checked for a clot" will then appear as an internal comment in the yellow area of the Order Comments box. Click SAVE, then QUIT.
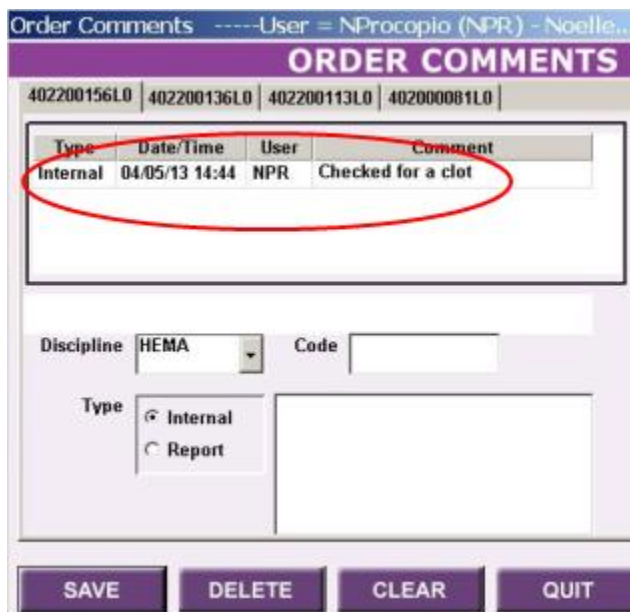
    c. A message icon will then appear in the upper right hand corner of the screen near the Op Alerts.

    d. This icon alerts another tech to the fact that there is a comment regarding the specimen. By clicking on it, the comment as well as the tech, date and time the comment was entered can be viewed.

    e. If a clot is found, cancel specimen <u>both</u> in WAM and SoftLAB. Document contact information in LIS.

5. **The HST will <u>not</u> automatically make a smear on PLTs < 75.** Check previous results (Previous Result tab) to determine if the patient had a previous PLT less than 75 that was verified by a smear. Be sure to <u>scroll</u> down to see if previous results had a smear looked at (e.g. RBC morphology, PLTE field resulted).

   a. If unable to determine that a smear was previously reviewed for a PLT less than 75, click on the Action button and add desired smear (check desired Smear, then OK button).

   b. The selected smear will now appear in the Manual column. Retrieve specimen and place back onto HST so that a smear is made.

6. From the Result Validation screen, select all but the PLT and OPT PLT parameters, then click on Validate Selection. Results are released to SoftLAB except for the PLT which states "in-lab".
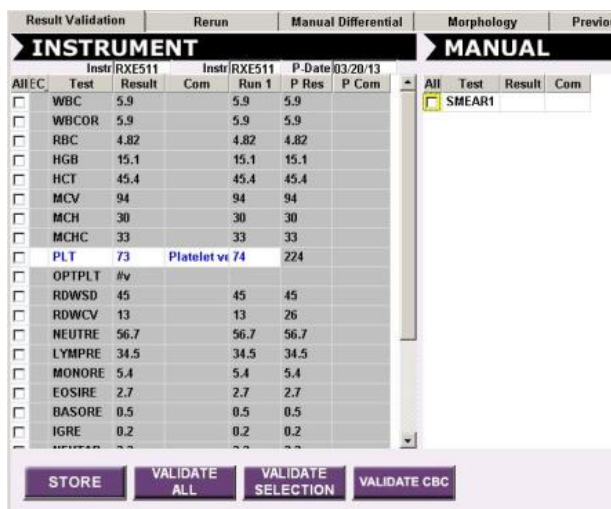
7. After the smear is made and stained, the morphology tech will access the case in WAM.
   a. If a CBCWD is ordered, the tech must perform the "Morphology Checks" by clicking on the WBCEST (WBC estimate), INSTFL (instrument flags), RBCM (RBC morphology) and PLTE (PLT estimate) fields and entering applicable findings.
   b. Regardless of whether a CBCWD or CBCND is ordered, the morphology tech will click on the Result field next to the designated smear (i.e. "Smear 1") in the Manual column.
   c. The following window will open:

   d. The morphology tech will click on Verified, then click SAVE.

e. After saving the verified comment, "#v" appears in smear result column, indicating that the smear was verified:

8. The morphology tech then clicks on Validate All. This will finalize all results in WAM (all fields, including morphology responses will be black on gray) and SoftLAB.

CLUMPED PLATELETS OR PLATELET SATELLITOSIS

HST tech –

   If the XE5000 gives any clumped platelet flags or OP Alert for Platelet Satellitosis, check sample for clots. Enter internal comment by choosing COMMENT tab, select "Checked for clot", then SAVE and QUIT.

> Double click in yellow box to have comment options appear.
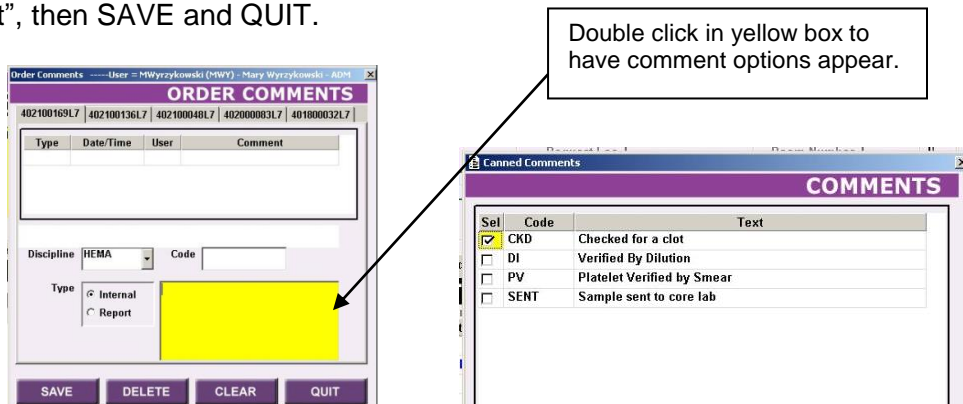
   Select appropriate CBC parameters to be validated, excluding the PLT, and Validate Selection. QUIT.

Morph tech –

1. Review slide. If platelet clumps or platelet satellitosis is present and your platelet estimate differs from the instrument count, go into Morphology tab, double click in PLT estimate result field and choose appropriate platelet estimate (increased, decreased, adequate). Result all of required morphology fields appropriately.

2. In Result Validation tab, remove platelet result by clicking on platelet result field, then clicking Delete. A window will appear, asking if you really want to modify this result. Click on Yes.
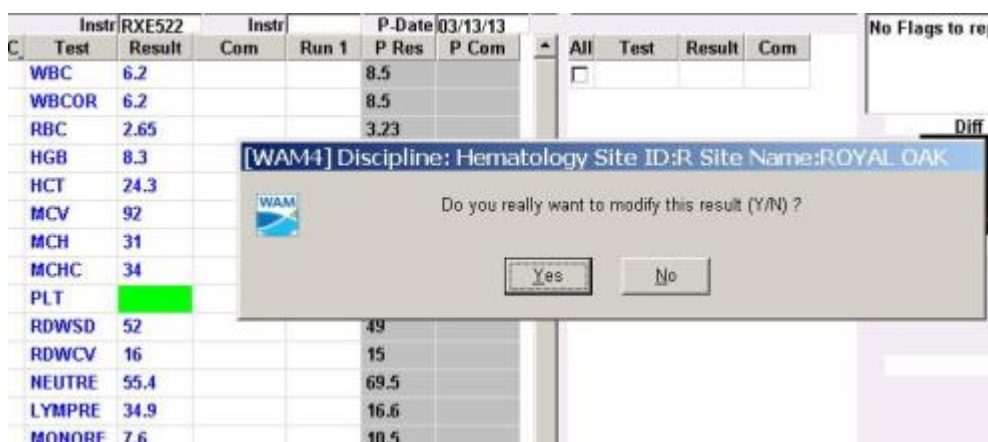
3. Double click on the Platelet Result field. A window will open. Select the appropriate
    clumped platelet/ platelet satellitosis comment that correlates with the platelet estimate.

4. STORE and Validate All.

WBC <1.0

1. **WBC < 1.0 with #nm for differential parameters and no previous differential:**
    a. A manual differential will have to be performed in the manual differential tab using
        the 2 slides made on the SP1000i.
    b. After performing the manual differential, complete the "Morphology Checks" in the
        Morphology tab. If differential was performed on less than 100 cells add the
        comment (HD13) in the DIFFC result field in the morphology tab.

c. Return to Result Validation tab, click on STORE, then Validate All.

2. **WBC<1.0 with #nm for diff and previous differential was performed:**
   a. When differential parameters from the analyzer vote out, #nm is what crosses over into the WAM. #nm converts to "Unable to perform" in SoftLAB. Replace all numerical percentage and absolute values with "#nm". Do this by clicking on the numerical value, deleting, and double-clicking on the empty result field. Choose the #nm option and SAVE. Repeat until all numerical values are replaced with #nm.

   b. STORE, then Validate All.

c. Click 'Cancel Smear' in the Smear pop-up box. This will remove the Smear 1 order in WAM.

d. The instant report in Soft will look like this:

SECOND LEVEL REVIEW FOR BLAST FLAG

HST tech –
    Validate CBC only after addressing flags, Op alerts, etc.

Morph tech –
    If only a scan is required:

    a. **Morph tech:** Perform scan and under Morphology tab, result required morphology
       fields (WBC estimate, Instrument flag check, RBC morphology and PLT estimate). If
       differential can be released without further review by pathologist and only secondary
       blast review is needed, STORE and Validate All. This will send out the differential
       and leave only the SECREV result field pending.

    b. **Secondary Review Tech:** Under Result Validation tab, enter order number and
       Search. After reviewing smear, result SECREV. To do so, double click on result
       field for SECREV to call up keypad. Choose "Reviewed" option, SAVE and QUIT.
       STORE, and Validate All.
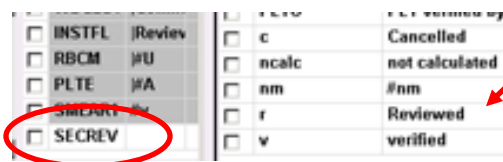
    If a differential is required:

    a. **Morph tech:** Perform manual differential under Differential tab. When you click
       on Morphology tab, the following box will pop-up. Answer 'Yes'.
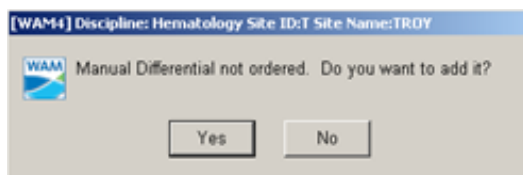
    b. Result required morphology under Morphology tab (WBC estimate, Instrument flag
       check, RBC morphology and PLT estimate).

    c. If a second differential is to be performed, second tech will perform differential, go to
       Result Validation tab and pop-up will appear.

    d. Choose which diff you would like to accept. Do NOT choose to average the two
       differentials.
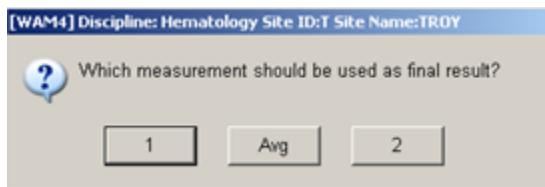
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e. STORE. Validate All if diff is to be reported. Otherwise, click ACCEPT or QUIT.

Manual diff parameter and morphology fields are shown in blue prior to validation.

f. **Second Level Review Tech:** Review smear and result SECREV under the Result Validation tab. To do so, double click on result field for SECREV to call up canned comments. Choose "Reviewed" option, SAVE and QUIT. STORE, and Validate All.

g. After Second Level Review comment is added, case goes to completion (all black numerals on gray background):

h. Since the secondary review is internal, it will not appear in Soft:

Test Name	Result
Complete Blood Count w Diff	
WBC	5.9
RBC	4.82
Hemoglobin	15.1
Hematocrit	45.4
MCV	94
MCH	30
MCHC	33
RDW SD	45
RDW CV	13
Platelet	224
Neutrophils	1.9
Lymphocytes	1.8
Basophils	**0.8**
Metamyelocyte	**0.77**
Myelocyte	0.59
Platelet Estimate	Adequate
RBC Morphology	Unremarkable

i. **Note** that if the Second Level Review is not answered, it will remain pending in WAM and will create WAM issues. The following shows a Second Level Review that is pending:

WAM pending logs should be called up twice per shift to address any missing parameters (i.e. SECREV).

NRBC ABNORMAL SCATTERGRAM

HST tech –
If after a NRBC? Flag sample is reflexed and the NRBC Abn Scattergram is present:
Place checkmarks next to all CBC parameters <u>except</u> the WBC/WBCOR/WBCUN. Do not check the diff parameters. Validate Selection. These will release the CBC parameters that were checked, holding back the diff and WBC result fields.

Morph tech –
1. Review the slide and determine if a manual differential should be performed. If the number of NRBC's does not match the automated NRBC count, perform a manual differential under the Manual Differential tab.

2. Perform the WBC estimate, Instrument flag check, RBC morphology and PLT estimate.

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3. Return to the Result Validation tab and **STORE.** Notice that the corrected WBC count recalculates if a manual diff was performed. Validate All.

> **NOTE: If the HST had released the WBC result fields in WAM, the morph tech would have to recalculate the WBC manually and make the correction in SoftLAB.**

RET ABN SCATTERGRAM – Dilution of 1:2, 1:3

Check to see if the RET value has exceeded linearity. If so, a 1:2 or 1:3 dilution is necessary per SOP (refer to the procedure manual for proper handling of sample with this error).

In WAM:
1. In the Result Validation tab, click on the ACTION box and add a rerun.
2. After you have prepared your dilution, run the diluted sample in the manual mode (NOT capillary mode!). This run will cross over into WAM and can be seen in the RERUN tab.
3. There is an open blank box under the diluted samples Rerun results. This row of boxes is where your dilution will be entered. If you have a 1:2 dilution, enter "2" in this box, if you have a 1:3 dilution, enter a "3" in this box, etc.
4. Return to Result Validation tab and STORE.

MICROORGANISMS FOUND ON PERIPHERAL SMEAR

Morph tech –
1. In Morphology tab, after reviewing the slide and resulting all of the required morphology fields (WBC estimate, flag check, RBC morphology and platelet estimate) double click on Intracellular Bacteria result field and result "Present" (send directly to micro for confirmation).

SPHE	SPHEROCYTES		Sel	Code	Tex
TARG	TARGET CELLS		☐	BACT	Present (send directly to micro for cor
STOM	STOMATOCYTES				
BURC	ECHINOCYTES				
TEARD	TEAR DROP CELL				
ACAN	ACANTHOCYTES				
SCHI	SCHISTOCYTES				
HJBO	HOWELL-JOLLY				
PASI	PAPPENHEIMER				
SICK	SICKLE CELLS				
BACT	INTRACELLULAR				
CRYHB	HGB CRYSTALS				

2. Validate All and take slides to microbiology.

3. In SoftLAB, the Take2 test field will be generated that prompts you to take the slides to microbiology for an appropriate stain.

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4. Go into SoftLAB, Order Entry and result the Take2 result field with option "Yes". Verify. The prompt that the order is not collected/received will pop-up. Collect/Receive this under specimen tab and SAVE.

5. From the Source field, click on the dropdown box next to HAEM. A pop-up box appears; click OK then SAVE.

6. This is the Hematology generated gram stain that micro will result and that will show up on Micro's pending list.

7. A barcode label prompt appears. Print (HGRM) label; track specimen to Micro; deliver label and specimen to Micro.

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ADDING A PATH REVIEW IN WAM

In this sample we would first investigate the failed delta, and document the delta with "HE 38."

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HST Tech –
   Select the parameters to release: HGB, WBC, RBC, PLT and "Validate the Selection".

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Morph Tech –

1. Review the automated differential and decided whether to perform manual differential.

2. Determine if the case needs to be sent for a Path Review.

3. Double click on Diff Comment and select "HE 25" (Smear to be reviewed by pathologist) then click SAVE.
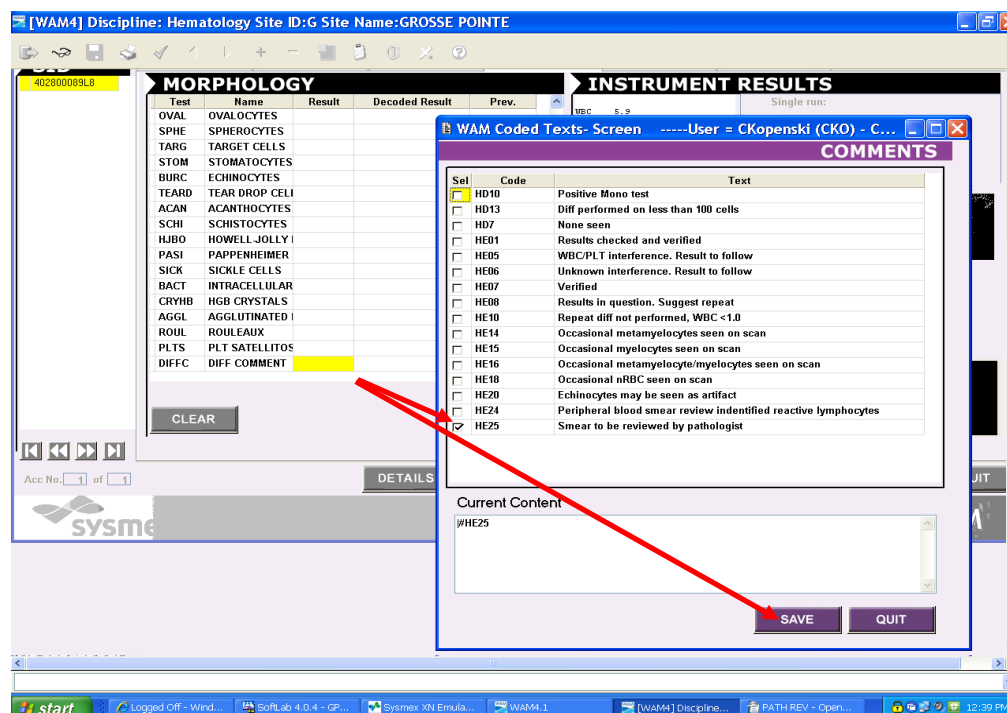
4. Go to SoftLAB and send for Path Review. "HE25" can be seen in SoftLAB Order Entry:

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Checking for a Previous Path Review in WAM:

If you would like to know if a patient was previously sent for a PATH REV:

1. Select the "Previous Result" tab and scroll down to the lower part of the Morphology tab. The "HE 25" code will display in the Diff Comment field, denoting the smear was previously sent for pathologist review:

Using HE25 will allow you to see when a case was previously sent for a path review.

Note that SoftLAB will state "Smear to be reviewed by pathologist".

Authorized Reviewers
    Supervisor, Hematology

HEMATOLOGY WAM WORKFLOWS

Document Control

Location of Master: Hematology Workflow Manual
Master electronic file stored on the Beaumont Laboratory server under:
S:/Hemacoag/Document Control/Hematology/Workflows/Hematology WAM Workflows.doc
Number of Controlled Copies posted for educational purposes: 0
Number of circulating Controlled Copies: 1
Location of circulating Controlled Copies: STAT Lab

Document History

Signature	Date	Revision #		Related Documents Reviewed/ Updated
Prepared by: Mary Wyrzykowski, MT(ASCP) Ann Whitford, MT(ASCP) Cindy Kopenski, MT(ASCP) Noelle Procopio, MT(ASCP)SH	04/09/2013			
Approved by: Noelle Procopio MT(ASCP)SH	04/12/2013			

Reviewed by: (Signature)	Date	Revision #	Modification	Related Documents Reviewed/ Updated
Noelle Procopio, MT(ASCP)SH	04/12/2013	00	New workflow.	OK
Noelle Procopio, MT(ASCP)SH	04/14/2015	01	Removed directive to document cancellations on Specimen Problem Log; clarified directive to check Previous Result tab and scroll when viewing previous results; added directive/purpose for calling up WAM pending logs twice per shift; updated steps for taking label/specimen to Microbiology.	OK
Noelle Procopio, MT(ASCP)SH	03/27/2017	**02**	Added Morphology Checks to CBCND smear review; Added Platelet Satellitosis to PLT Clumped section and updated pic; added CBC Corrections to related documents; updated logo.	OK
Peter Millward, MD	02/13/2019		New Medical Director	

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