Hardware, Software, & now Middleware –

The experience at Vancouver General Hospital

Hematology Lab
Vancouver General Hospital

May 12, 2015

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Vancouver Coastal Health

Outline

- Discuss autoverification
- Discuss middleware
- Reason for this project
- Our experience / timeline
    - Sysmex XE2100, XN, Coagulation, Auto Immune

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About Us……..

- Academic Health Science Centre
- Fully affiliated with the University of BC
- BCIT Med. Lab. Science training site
- Programmes in
  - Neurosurgery, Orthopedic, General
  - Solid organ transplant centre
  - Leukemia & Bone marrow transplant centre
  - Trauma centre

Vancouve
Coasta
Promoting

Hematology Laboratory

Daily Workload:

- Mon-Fri: approximately 1100 – 1200 CBCs
  - Day shift: ~800
  - Evening shift: 200
  - Night shift: 120
- Manual slide review rate daily: ~ 140 slides
- Approximately 20 CSF/ body fluid cell counts & differentials
- ~450 INR / APTT

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Labs are continually challenged to decrease turnaround time while handling higher volumes and maintaining high data quality despite labour shortages and tightening budgets.

→ **autoverification**

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Benefits of Middleware vs LIS for Auto-Verification Rules

- Lab control of process
- Lab has understanding of what exactly needs to be done
- Complete audit trail available
- May be programmed within lab by lab people
- MW able to be have much more complex rules *therefore higher rate of AV*

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CAP TODAY

June 2011 Feature Story
Minting QC and efficiency gains with middleware
Anne Paxton, *Seattle*

Our Goals

- Gain efficiencies in workflow by
  - Integration of CBC analyzer, diff keyboard, CellaVision into one ‘IT’ platform
    - More powerful rules written
    - ‘one stop shopping’ for Inquiry of previous results
  - Continually critiquing process / reduce repetitive tasks
- Decrease number of reporting errors
- Minimize misinterpretation of results handling
- Further improve TAT of CBC results
- Adopt a paperless system

LEAN attributes

Before / After Implementation
Turnaround Time Report
Test code: HB

VGH Inpatient Locations – All Priorities

VGH ED Locations

Jan 2011 (Before)		Apr 2011 (After)		Sept 2011 (ED locations)	
Receipt to Result		Receipt to Result		Receipt to Result	
25th percentile:	7.50	25th percentile:	7.00	25th percentile:	5.00
50th percentile:	13.00	50th percentile:	9.50	50th percentile:	6.00
75th percentile:	18.00	75th percentile:	13.00	75th percentile:	8.00
90th percentile:	26.00	90th percentile:	19.00	90th percentile:	10.00
100th percentile:	214.00	100th percentile:	40.00	100th percentile:	26.00
Average:	16.90	Average:	11.04	Average:	6.84

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→ Research:

- Although Sysmex WAM appeared to be the most logical, due to costs, alternatives had to be investigated.

- CAP today magazine annual March issues have a feature on Middleware
- Chemistry VGH had middleware, our LIS analyst noted the deficiencies, that ‘brand’ not pursued
- Sent off an email to Data Innovations to start the ball rolling
- visited AACC congress
- Customer interviews

- Initial webinar:
  - overview of the product & functionalities

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DI Customer Call: Mid America Clinical Laboratories:

- Self built and went ‘live’ in 6 mos
- LIS: Sunquest
- A lot of set up was self-taught
- Very easy to tweak rules
- Always had very good support
- Easy Maintenance
- Overall very favorable opinion

DI Customer Call: Toronto Metro Labs

- Had DI for 8 yr, all instruments running through it
- LIS: ultra GE
- Rules: Training course. 1000+ rules
- Quality of Training: Quite good
- Recent Software Improvements:
  - Rule values contained in tables
  - Further improved rule writing
- Generally the IT dept can solve all the IT issues
- Overall very satisfied

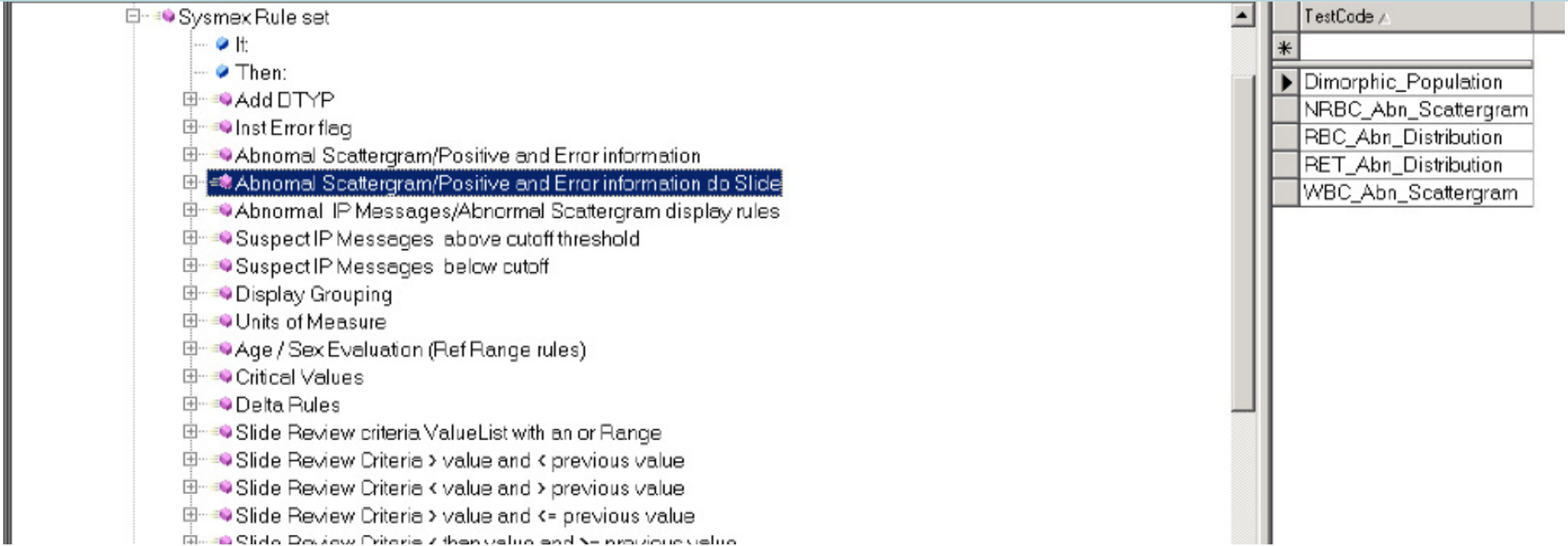
October 4 – 7, 2010

- VGH on-site visit install from DI to establish connectivities and 4 short training classes

October 12 - 14, 2010

- **Training Classes in Vermont**
  - **Emphasis on rules writing with hands-on practice**

‘out of box’ rules holding all tests for verification → much customization required



IF: {Test Resulted} {Value List:TestCode}

THEN: {**Hold all Tests** for Verification} {AND} {Add Test Error Flag Display Name of} {Value List:TestCode}
"Verify All Results / Slide Review Required"

Our approach…

For rules that trigger, a test "ACTION" will be added, the Test ACTION is held for verification.

Actions required will be in the Test Comment field. To view complete Test comment, place mouse over comment and hover.

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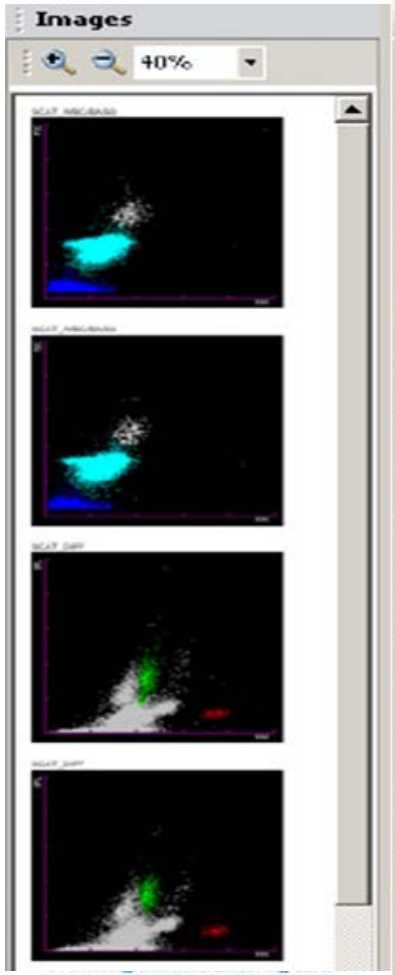
“ACTION”



Test Worksheet

	Test Name	Result	Units	Test Ins..	Test Comment(s)	Reference Ra..	Error Name(s)	Previous Result
	Number of Cells...	100		VDIU				
	.01 - Validity Alert							
	30/May/2011 11:52:36 AM							
	ACTION	See comment			WBC Abn Sgram.			
	30/May/2011 11:54:56 AM							
	PLT_Clumps?	300		VSYS1				
	WBC_Abn_...			VSYS1				
	30/May/2011 12:32:06 PM							
	ACTION	See comment			WBC A			
	30/May/2011 12:34:34 PM							
	NRBC_Abn_...			VSYS1				
	PLT_Clumps?	300		VSYS1				
	WBC_Abn_...			VSYS1				
	.02 - WBC, RBC, PLT Abnormal							
	30/May/2011 11:54:56 AM							
	Anemia			VSYS1				
	Hypochromia			VSYS1				
	.03 - WBC Suspect							
	30/May/2011 11:54:56 AM							
	Immature_Gran?	160		VSYS1				
	NRBC?	300		VSYS1				
	30/May/2011 12:34:34 PM							
	Immature_Gran?	170		VSYS1				
	.09 - Diff Type							
	30/May/2011 11:52:36 AM							
	Phone Number	54995						
	Slide	Slide Needed		VSYS1	Slide for Clinical		Slide Review	

Test Comment(s):

WBC Abn Sgram. Release diff if consistent with previous. Screen slide.

Chk for CLOTS _prev history of PLT clumping. Screen slide BEFORE releasing PLT result.

MCHC <300 NFR. Report Morphology.

HB <65. Chk for clots if no previous results. Screen if no previous result _report Morph. Refer slide if no previous result (except PAR, OR, BCCA, T15, known acute bleed or trauma, ICU). Screen if no previous <65 (except post DPJ or if no slide for > 6mos _report morph.

HB <100 OutPatient. Screen _report Morph if no previous result or if no slide for > 6 mos.

Report Morphology, Slide Review Required

Chk for clots, Rerun, Critical Result, Screen _refer if no previous

Approach with an attempt to:

- reduce reporting errors
- streamline workflow
- increase TAT

Use Case:	IF NRBC abn Scattergram? (ip 13) = 1	THEN hold all (abnormal 5) AND make a Smear
IF:	(({Test Resulted} {Value List:Abn Scattergram}) {AND} ({Result} {On Test} "WBC" > "0.19"))	
THEN:	{Hold Test for Verification} "NRBC%" "NRBC#" "ANRB" "NEUTRE" "NEUTAB" "LYMPRE" "LYMPAB" "LYMPH" "MONORE" "MONOAB" "EOSIRE" "EOSIAB" "BASORE" "BASOAB" "IGRE" "IGAB" "DTYP" {AND} {Add Test} "ACTION" {AND} {Set} {Result} {On Test} "ACTION" = "See comment" {AND} {Add} {Test Comment(s)} "WBC Abn Scattergram. Release diff if consistent with previous. Screen slide. " {On Test} "ACTION" {AND} {Add} {Error Name(s)} {Value List:Alert} {On Test} {Value List:Abn Scattergram}	

Value List:

	Row Enabled	Abn Scattergram	Alert
*	☐		
▶	☑	WBC_Abn_Scattergram	Diff Review

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WBC 250.0 – 450.0 rule

R19: WBC > 250	if WBC> 250 **and** prev WBC < 250 **or** WBC> 250 **and** prev WBC = 0	**then** hold CDNR (abnormal 5) **and** make a smear (addorder_test

IF:	(({Test Result of} "WBC" {Is Numeric}) {AND} (({Test Result of} "WBC" > = "250.0") {AND} ({Test Result of} "WBC" < "450.0")))
THEN:	({Hold Test for Verification} "DTYP" "NEUT%" "NEUT#" "LYMPH%" "LYMPH#" "MONO%" "MONO#" "EO%" "EO#" "BASO%" "BASO#" "IG%" "IG#") {AND} {Set Test Result of} {Value List:Testcodes} = {Value List:results} {AND} {Add Test} "ACTION" {AND} {Set Test Result of} "ACTION" = "See comment" {AND} {Hold Test for Verification} "ACTION" {AND} {Add Test Comment of} "ACTION" "If Hgb/Turb? flag present, report Manual HCT and file Hgb as UNAV"
Value List:	

Testcodes	results
RDW-CV	UNAV
MCV	UNAV
MCHC	UNAV
MCH	UNAV
HCT	UNAV

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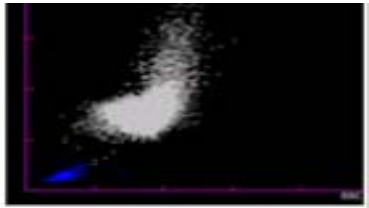

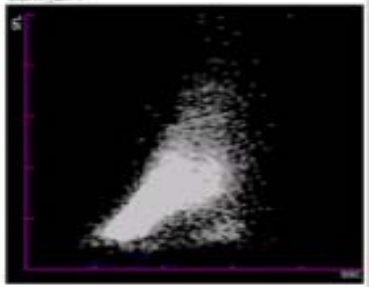

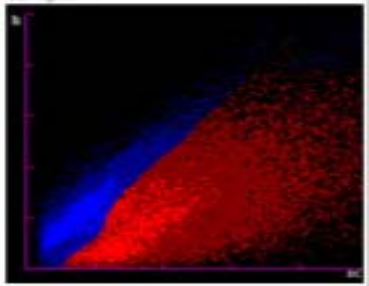

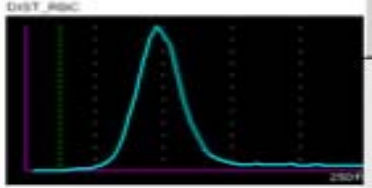

.03 - WBC Suspect

1/27/2011 5:58:40 PM

Atypical_Lymph...	300		VSYS2	Slide Review		A,Slide Review...
Blasts?	300		VSYS2			A,SOP: Slide P...
Immature_Gran?	300		VSYS2			A
Left_Shift?	300		VSYS2			A,SOP Slide Pr...

.1 - CBC

1/27/2011 5:58:40 PM

WBC	430.0	giga/L	VSYS2			W
RBC	2.47	tera/L	VSYS2			
HGB	76	g/L	VSYS2			L
HCT	UNAV	L/L	VSYS2			
MCV	UNAV	fL	VSYS2			
MCH	UNAV	pg	VSYS2			
MCHC	UNAV	g/L	VSYS2			L,Report Morp...
PLT	50	giga/L	VSYS2			W,Plt <100 NP...
MPV	8.3	fL	VSYS2			W
RDW-CV	UNAV	%	VSYS2			
RDW-SD	59.4	fL	VSYS2			H

1/31/2011 2:11:47 PM

nonLIS comment	HIDE		VDID			
referral reason	HIDE		VDID			

.2 - Autodiff

1/27/2011 5:58:40 PM

NEUT#	----	giga/L	VSYS2			A
LYMPH#	----	giga/L	VSYS2			A
MONO#	----	giga/L	VSYS2			A
EO#	0.1	giga/L	VSYS2			W
BASO#	----	giga/L	VSYS2			A

PLT_Clumps? above threshold

if PLT Clumps? (ip 83) = 1

then hold PLT (abnormal 6)
and make a smear (addorder_test Smear)

Parent Rule IF:	({Test Result of} {Value List:TestCode} > = {Value List:Cutoff})
Parent Rule THEN:	{Hold Test for Verification} "PLT" {AND} {Add Test Error Flag Display Name of} {Value List:TestCode} {Value List:Alert} {AND} {Add Test} "ACTION“ {AND} {Set Test Result of} "ACTION" = "See comment" {AND} {Add Test Comment of} "ACTION" "Chk for clots & prev Hx of plt clumping. Screen slide BEFORE validation. Slide Review Required."
Child Rule IF:	Note: PLT_Clumps? above cutoff threshold & PLT <75 HOLD ALL ({Test Result of} "PLT" {Is Numeric}) {AND} ({Test Result of} "PLT" < "75")
Child Rule THEN:	{Hold all Tests for Verification} {AND} {Add Test} "ACTION" {AND} {Set Test Result of} "ACTION" = "See comment" {AND} {Add Test Comment of} "ACTION" "PLT <75 & PLT Clumps flag. All tests held. Check for clots & release all results but the PLT. Screen slide for clumping before releasing PLT result."

TestCode ▲	Cutoff	Alert
PLT_Clumps?	150	Slide Review Required

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Example: Critical Results Rule

IF:

(({Age in Days} > = {Value List:LowAgeDays}) {AND} ({Age in Days} < {ValueList:HighAgeDays}) {AND} ({Age in Days} {NOT} = "")) {AND} ({Test Result of} {Value List:TestCode} {Is Numeric}) {AND} (({Test Result of} {Value List:TestCode} < = {Value List:LowValue}) {OR} ({Test Result of} {ValueList:TestCode} > = {Value List:HighValue}))

THEN:

{Hold all Tests for Verification} {AND} {Add Test Error Flag Display Name of} {ValueList:TestCode} "Critical Result“ {AND} {Add Test} "Critical result" {AND} {Set Test Result of} "Critical result" = "Critical result"

Value List:

	Row Enabled	LowAgeDays	HighAgeDays	TestCode	LowValue	HighValue
*	☐					
▶	☑	4383	6939.75	HGB	50	230
	☑	2191.5	4383	HGB	50	230
	☑	730.5	2191.5	HGB	100	230
	☑	182.625	730.5	HGB	100	230
	☑	60.875	182.625	HGB	50	230

Critical Results 'in practice'

Test Name	Result	Units	Test Ins..	Test Comment(s)	Reference Ra..	Error Name(s)
Critical result	Critical result					
Pathologist Rev...	HOLD					
Physician	BARNETT....					
Physician Phone	604-875-5387					
01/May/2011 2:19:38 PM						
PLTORDER	DONE		VCEL1			
RBCORDER	DONE		VCEL1			
WBCORDER	DONE		VCEL1			
01/May/2011 2:21:17 PM						
DONE	DONE					
.0002 -other						
01/May/2011 2:19:31 PM						
Artefact %	2.9	%	VCEL1		0 - 100	
Giant thromboc...	2.9	%	VCEL1		0 - 100	
Smudge cell %	0.7	%	VCEL1		0 - 100	
.0011 -Manual Diff						
01/May/2011 2:19:37 PM						
DTYP	MDIF		VCEL1			
POLY#	0.35	giga/L	VCEL1		2.0 - 8.0	Critical Result
LYMP#	0.19	giga/L	VCEL1		1.2 - 3.5	
MONO#	0.51	giga/L	VCEL1		0.2 - 1.0	
BLST#	0.05	giga/L	VCEL1		0 - 0	blasts present
POLY%	31.6	%	VCEL1			
LYMP%	17.6	%	VCEL1			
MONO%	46.3	%	VCEL1			
BLST%	4.4	%	VCEL1			
Nbr of WBC Cel...	100		VCEL1			

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Delta rule “in practice”

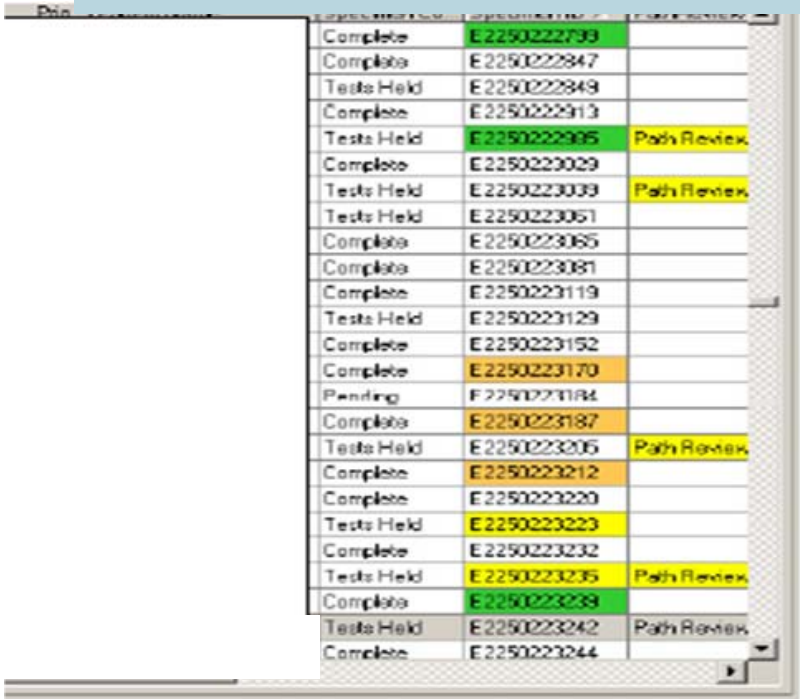
01/May/2011 4:16:58 PM							
ACTION	DELTA, Se...			Delta Check,			
.02 - WBC, RBC, PLT Abnormal				Test Comment(s):			
				Delta Check, Check for clots. If MCV delta, check ABO.			
01/May/2011 4:18:22 PM							
Macrocytosis			VSYS1				
Thrombocytope...			VSYS1				
.09 - Diff Type							
01/May/2011 4:16:58 PM							
Phone Number	54182						
.1 - CBC							
01/May/2011 4:16:58 PM							
nonLIS comment	NO CLOT-A...		VDID				
referral reason	HIDE		VDID				HIDE
01/May/2011 4:18:22 PM							
WBC	4.0	giga/L	VSYS1		4.0 - 11.0		
RBC	2.54	tera/L	VSYS1		3.80 - 5.20		
HGB	100	g/L	VSYS1		115 - 155		
HCT	0.31	L/L	VSYS1		0.35 - 0.45		
MCV	121	fL	VSYS1		82 - 98	Delta Check	
MCH	39	pg	VSYS1		25 - 34		33
MCHC	327	g/L	VSYS1		300 - 375		339
PLT	49	giga/L	VSYS1		150 - 400		44
MPV	10.1	fL	VSYS1		7.5 - 10.5		10.1
RDW-CV	18.0	%	VSYS1		11.0 - 15.0		18.3
RDW-SD	78.2	fL	VSYS1				74.9

	TestCode	NumDays	DeltaValue
*			
▶	HGB	3	40
	MCV	90	5

Delta Rule for Percentage Difference

	TestCode	Trigger	NumDays	DeltaLow
*				
▶	PLT	40	4.125	.5

Outpatient / critical result phone criteria



Complete	E2250222799	
Complete	E2250222847	
Tests Held	E2250222849	
Complete	E2250222913	
Tests Held	E2250222985	Path Review
Complete	E2250223029	
Tests Held	E2250223039	Path Review
Tests Held	E2250223051	
Complete	E2250223065	
Complete	E2250223081	
Complete	E2250223119	
Tests Held	E2250223129	
Complete	E2250223152	
Complete	E2250223170	
Pending	E2250223184	
Complete	E2250223187	
Tests Held	E2250223205	Path Review
Complete	E2250223212	
Complete	E2250223220	
Tests Held	E2250223223	
Complete	E2250223232	
Tests Held	E2250223235	Path Review
Complete	E2250223238	
Tests Held	E2250223242	Path Review
Complete	E2250223244	

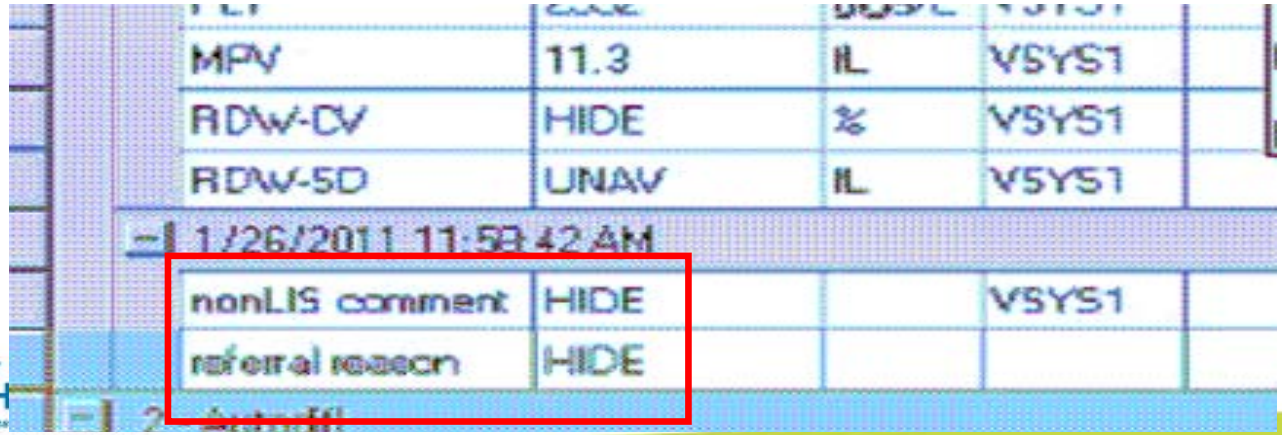
ecimen Information

tient Name: TEST,RICHMOND
tient ID: R501 Date of Birth: 01/Jan/1927
ecimen ID: E2250223242 Sex: F
llection Date/Time: 21/Sep/2011 2:00:00 AM
dering Physician: 99991,1,,,
tient Comment(s):
cation - Facility: TESTOP

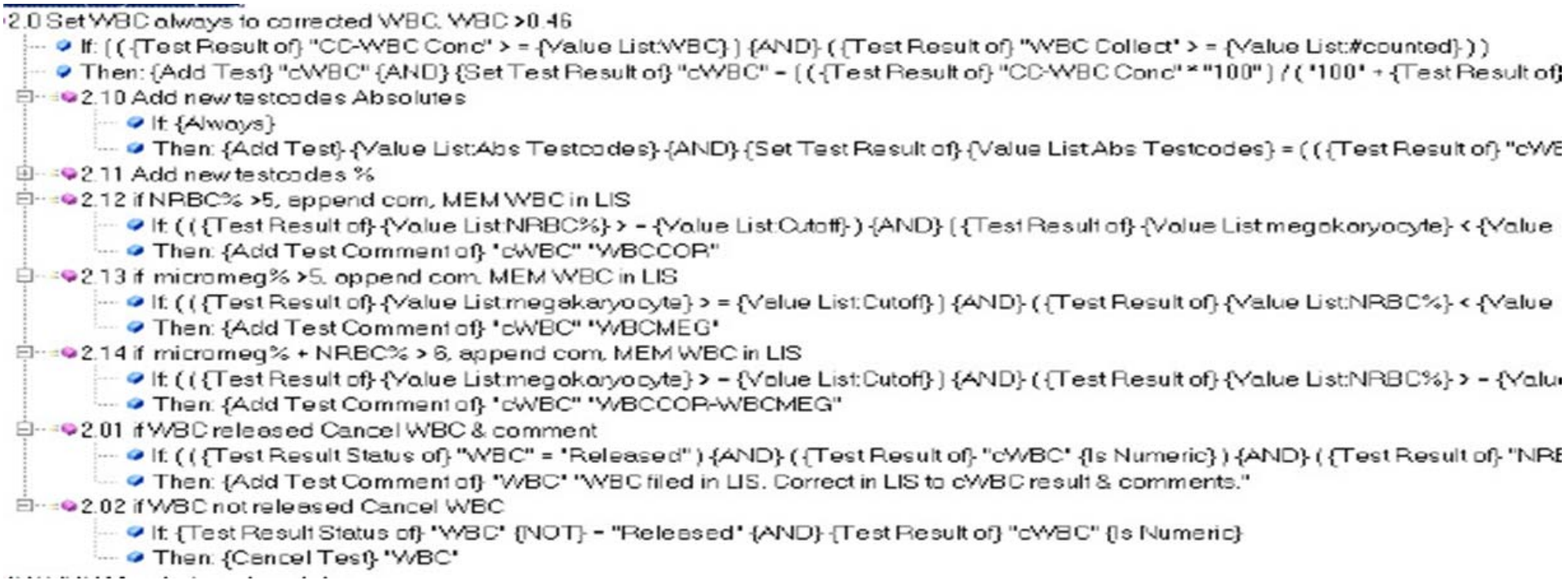
2 slides required	2 slides requ...		VSYS2			Only if Manual ...	2 slides requir...	2
.1 - CBC								
21/Sep/2011 1:59:20 PM								
CBCMT	NONE		VSYS2				NONE	2
nonLIS comment	HIDE		VDID				HIDE	2
previous	HIDE						HIDE	2
referral reason	HIDE		VDID				HIDE	2
21/Sep/2011 2:00:16 PM								
WBC	1.2	gigaA	VSYS2		4.0 - 11.0		1.2	2
RBC	3.26	teraA	VSYS2		3.80 - 5.20		3.22	2
HGB	99	gA	VSYS2		115 - 155		99	2
HCT	0.27	LA	VSYS2		0.35 - 0.45		0.27	2
MCV	83	lL	VSYS2		82 - 98		83	2
MCH	30	pg	VSYS2		25 - 34		31	2
MCHC	368	gA	VSYS2		300 - 375	SCN for MORF...	371-SCN-SC...	2
PLT	34	gigaA	VSYS2		150 - 400	Outpatient PLT	32	2
MPV	11.2	lL	VSYS2		7.5 - 10.5		11.5	2
RDW-CV	11.6	%	VSYS2		11.0 - 15.0		11.6	2
RDW-SD	35.1	lL	VSYS2				blst nrbc	2
.2 - AutoDiff								
21/Sep/2011 1:59:20 PM								
DTYP	ADIF		VSYS2				MDIF	2
21/Sep/2011 2:00:16 PM								
NEUT#	0.3	gigaA	VSYS2		2.0 - 8.0	Critical Result...	5.8	0
LYMPH#	0.6	gigaA	VSYS2		1.2 - 3.5		0.2	0
MOND#	0.1	gigaA	VSYS2		0.2 - 1.0		0.58	2
EO#	0.0	gigaA	VSYS2		0.0 - 0.7		0.0	0
BASO#	0.0	gigaA	VSYS2		0.0 - 0.2		0.0	0
IG#	0.0	gigaA	VSYS2	HIDE	0.0 - 0.0		0.1	0
NEUT%	28.4	%	VSYS2				96.4	0
LYMPH%	63.3	%	VSYS2				2.7	0
MOND%	7.5	%	VSYS2				53.0	2
EO%	0.0	%	VSYS2				0.2	0

Lab-Use only Comments

- The **nonLIS comment** is always added within DI and auto-results as HIDE:
  - examples of use:
    - eg. MCV delta: type in ‘ABO chk’d’
    - eg. ↓ plt: type in ‘no clot’, etc, etc



Differential keyboard



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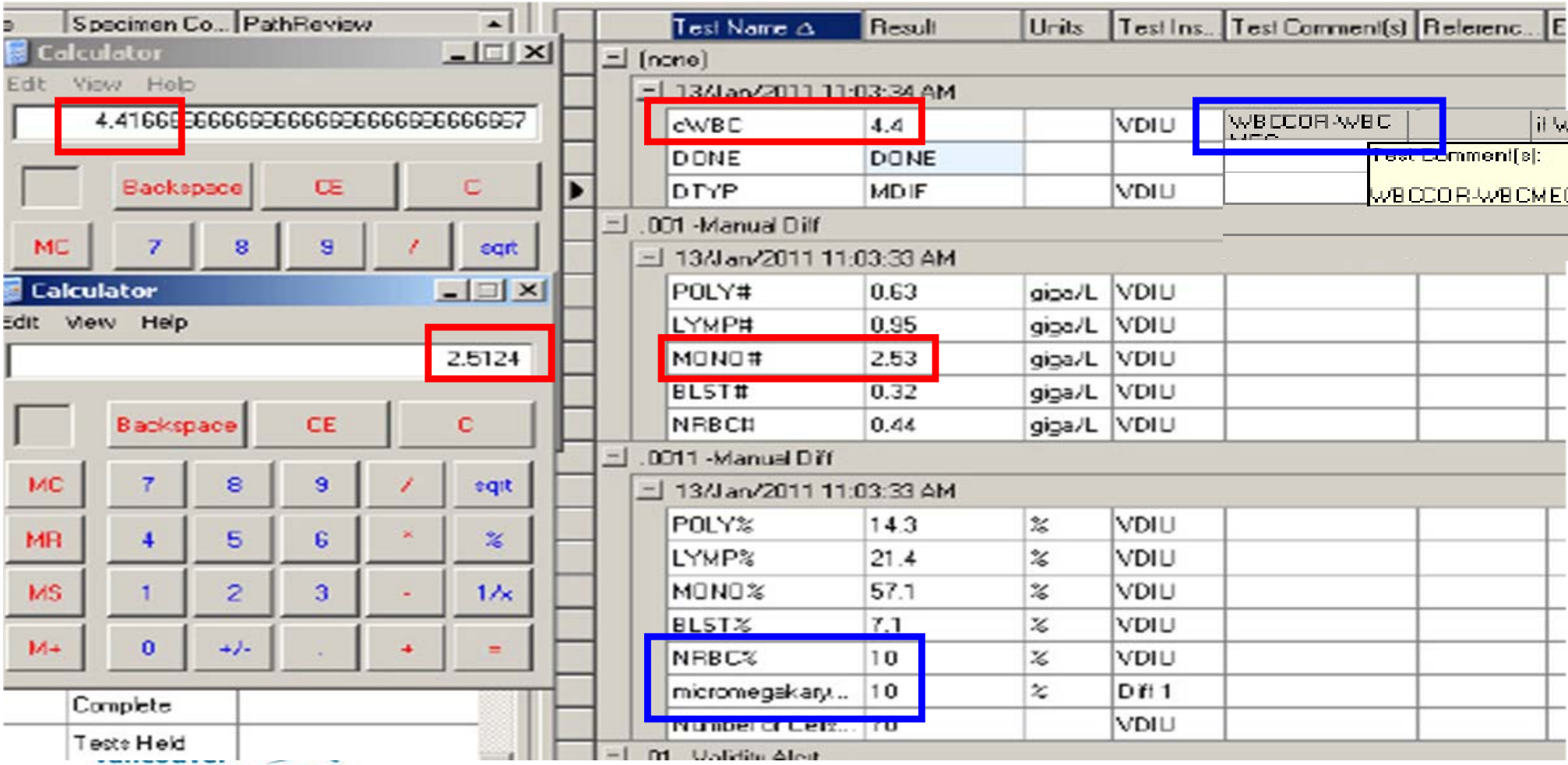

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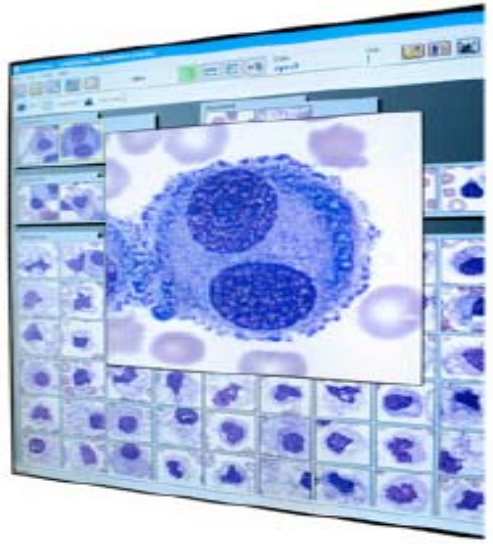
CELLAVISION



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- Cellavision ↔ Sunquest interface took ~ 4 mos (2008)
- Cellavision ↔ DI interface took ~ 2 wks
- Workarounds resolved
  - ❑1.WBC, RBC, PLT commenting
  - ❑2. Corrected WBC for NRBCs
  - ❑3. Zero neutrophils
- *July 2014, Everett, WA –*
- *Aug 1st, Seattle Children's Hosp*

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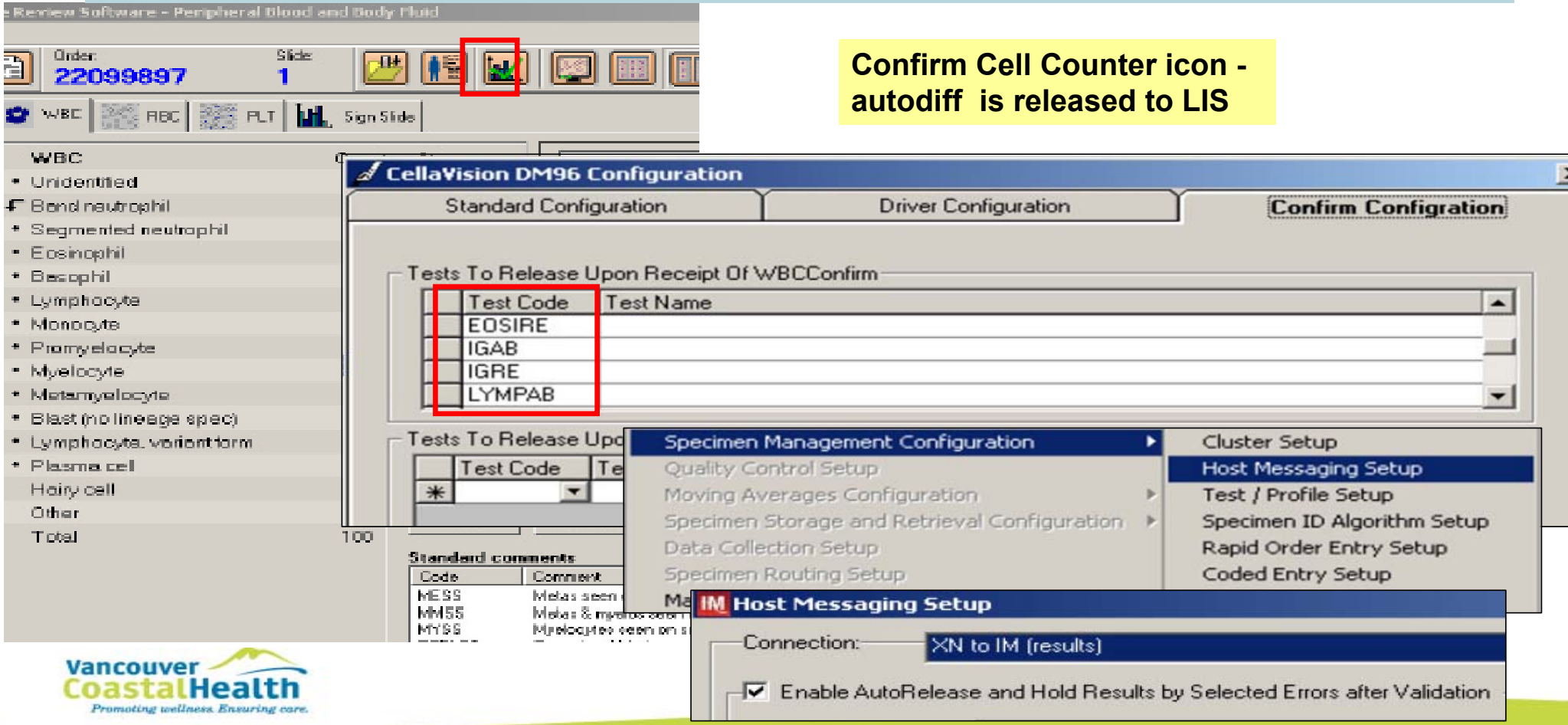
Added functionality

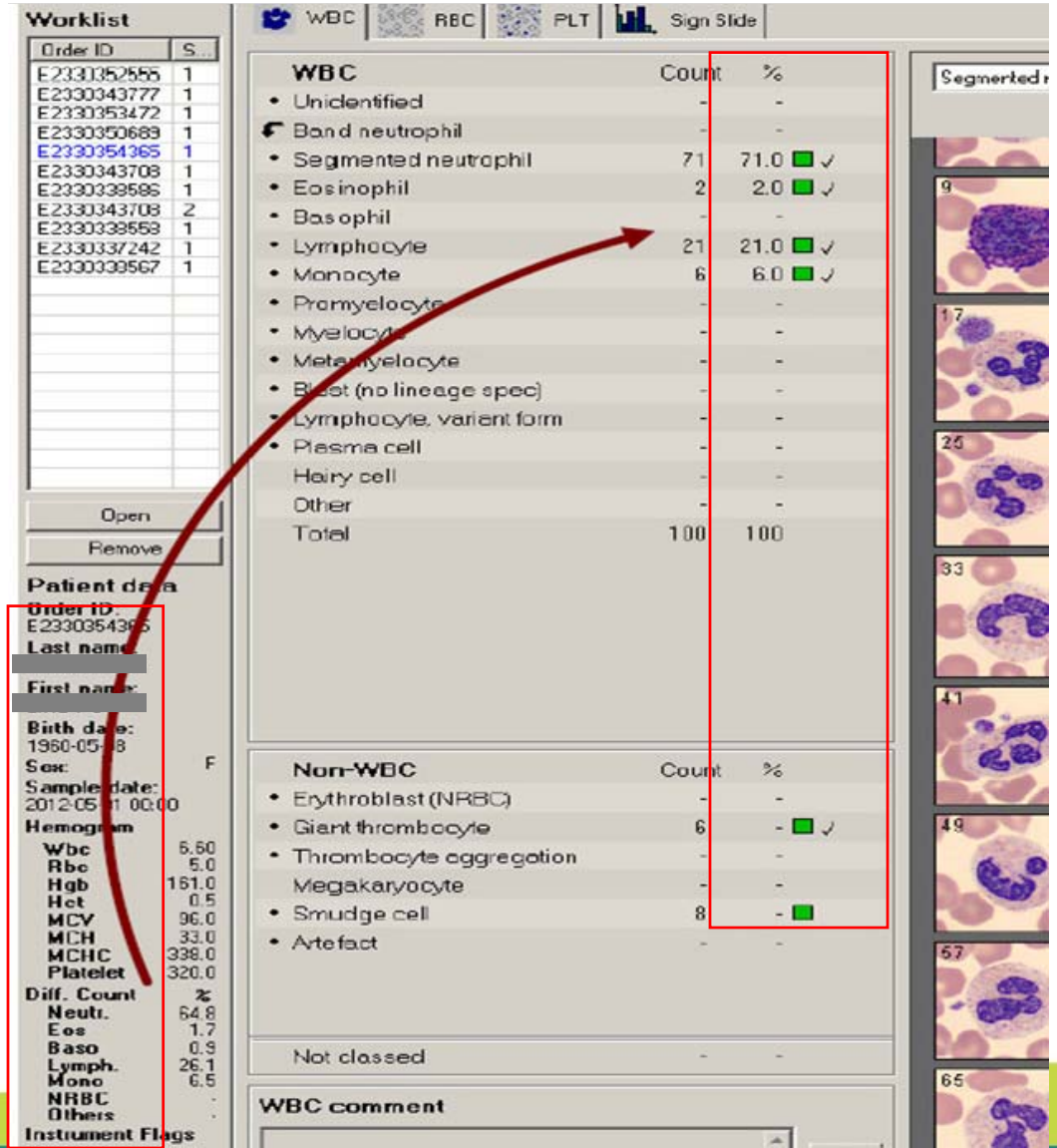


Confirm Cell Counter icon - autodiff is released to LIS

WBC CONFIRM

Hemogram & Auto differential populate CellaVision allowing for quick auto diff and PLT approximation / verification.

→ WBCCONFIRM



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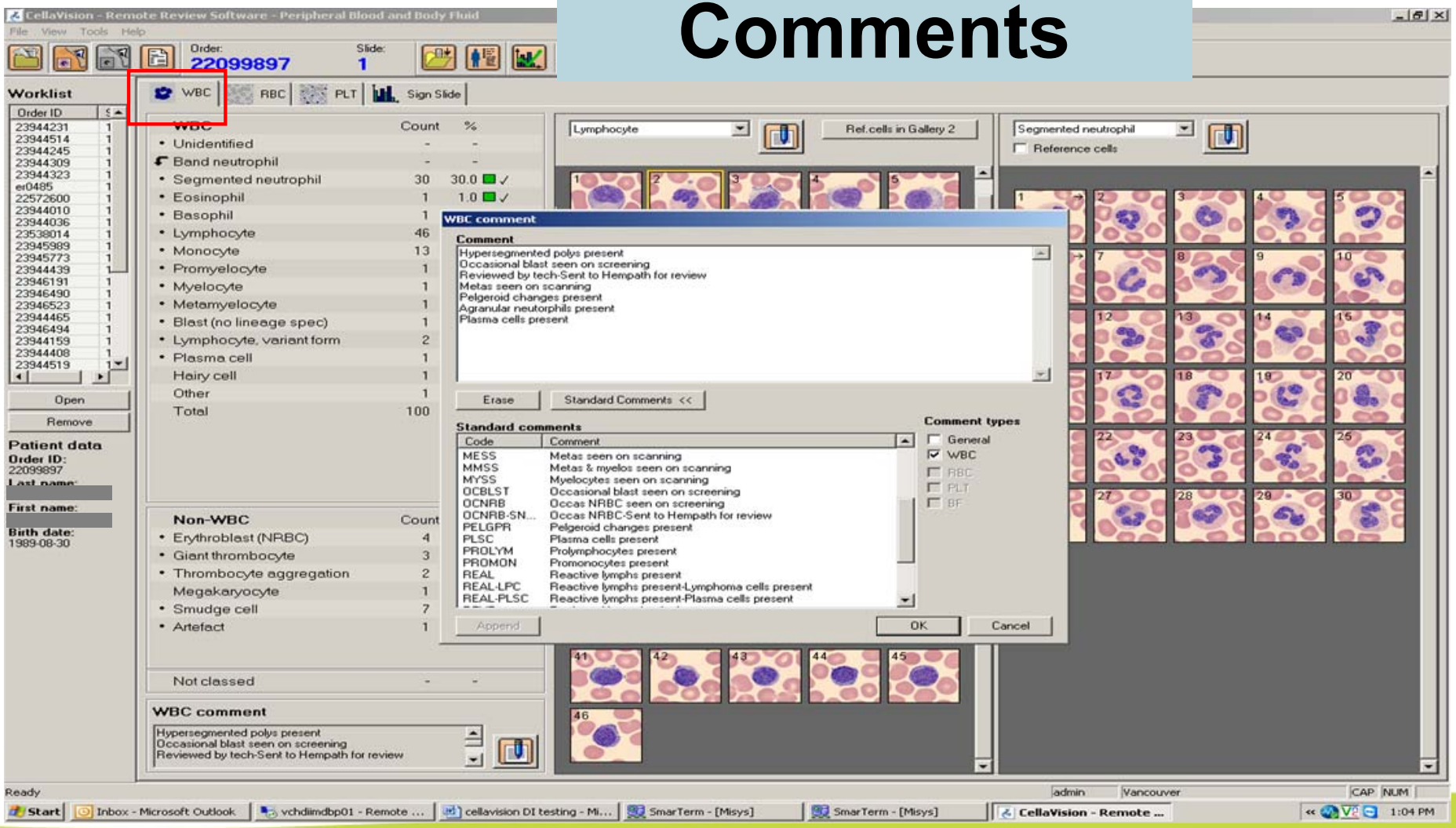
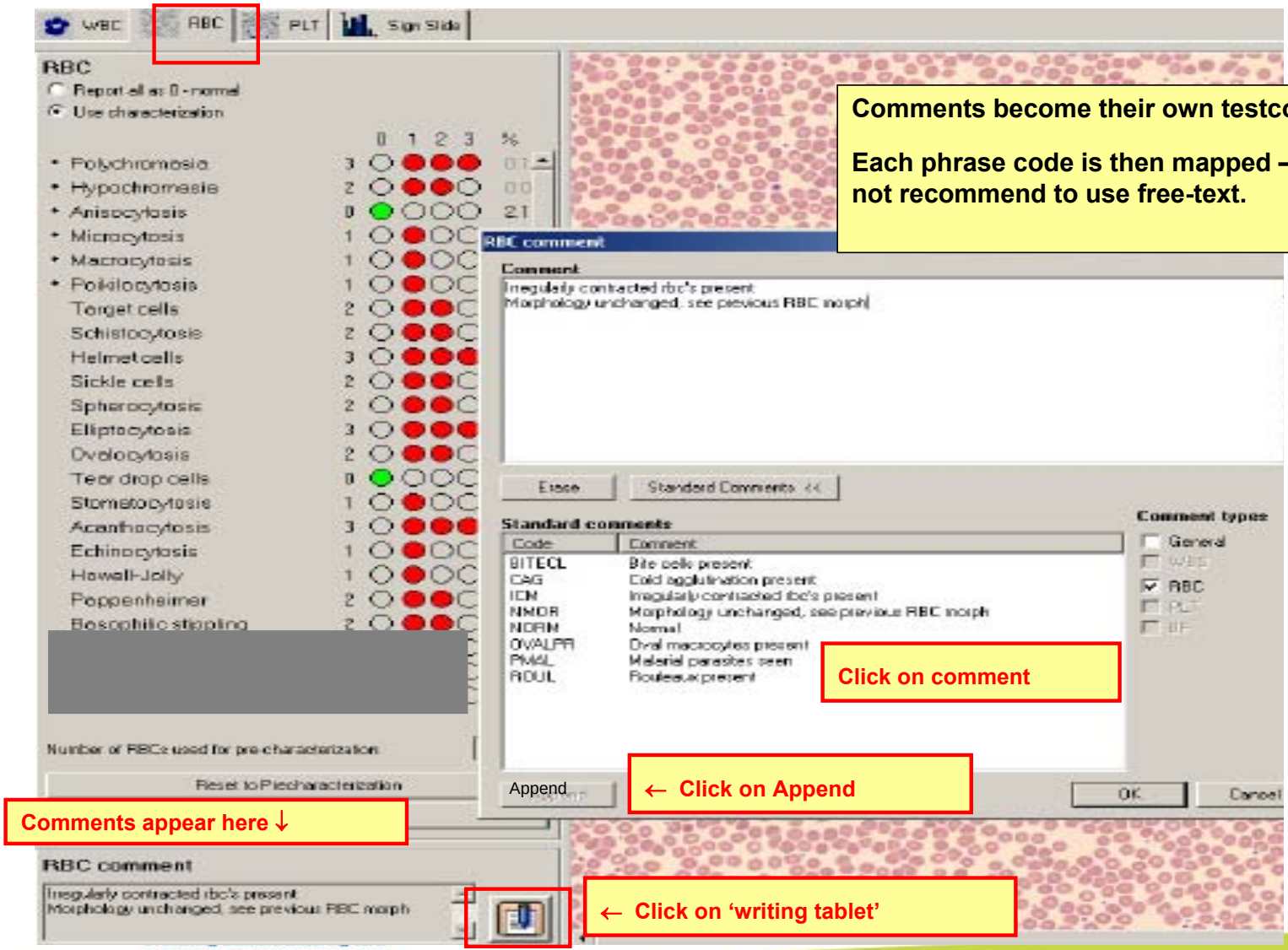
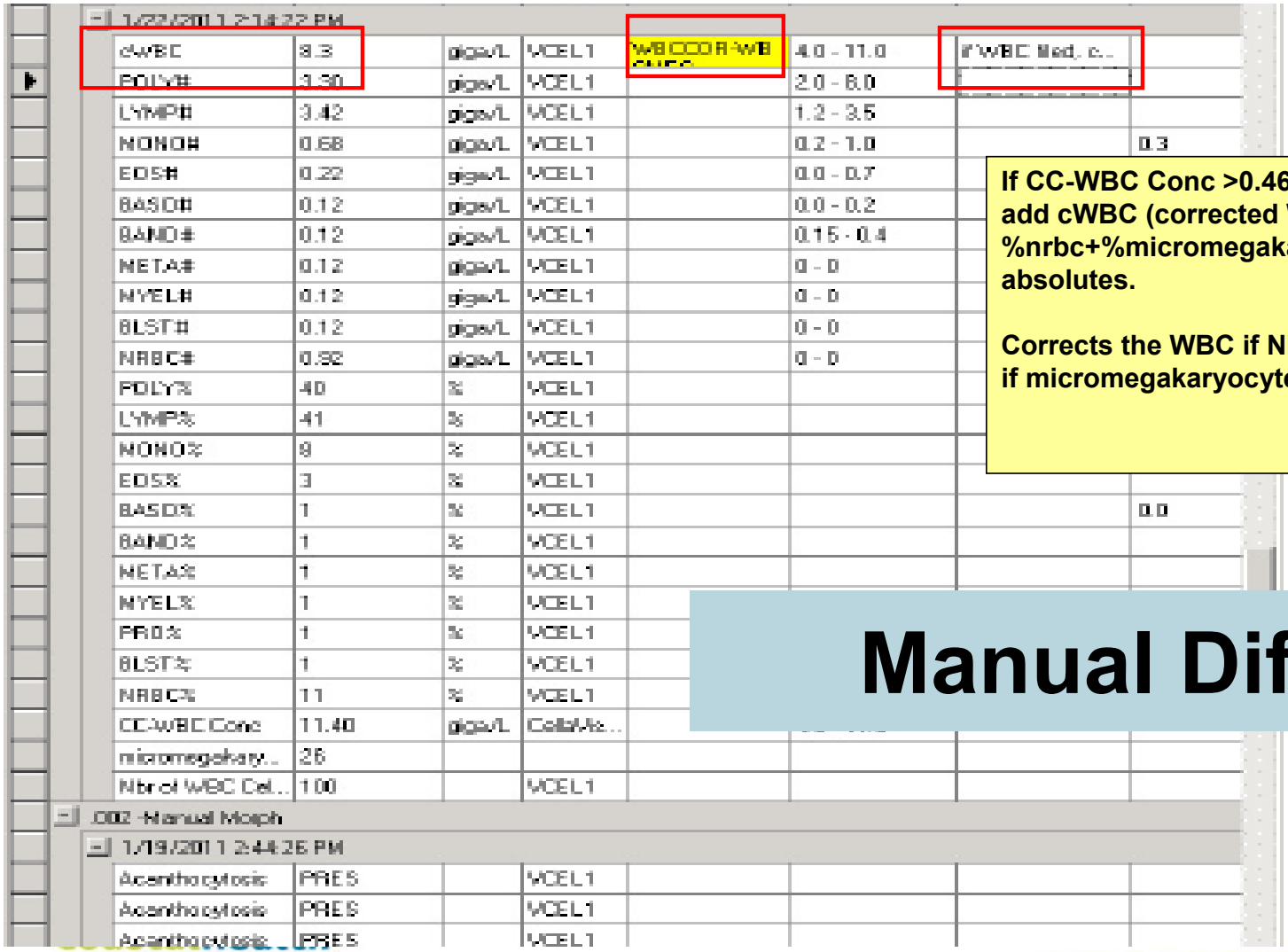
Comments


CellaVision - Remote Review Software - Peripheral Blood and Body Fluid
File View Tools Help
Order: 22099897
Slide: 1
Worklist
Order ID
WBC
RBC
PLT
Sign Slide
Count %
Unidentified
Band neutrophil
Segmented neutrophil 30 30.0
Eosinophil 1 1.0
Basophil 1
Lymphocyte 46
Monocyte 13
Promyelocyte 1
Myelocyte 1
Metamyelocyte 1
Blast (no lineage spec) 1
Lymphocyte, variant form 2
Plasma cell 1
Hairy cell 1
Other 1
Total 100
Non-WBC Count
Erythroblast (NRBC) 4
Giant thrombocyte 3
Thrombocyte aggregation 2
Megakaryocyte 1
Smudge cell 7
Artefact 1
Not classed
WBC comment
Hypersegmented polys present
Occasional blast seen on screening
Reviewed by tech-Sent to Hempath for review
Open
Remove
Patient data
Order ID:
22099897
First name:
Birth date:
1989-08-30
Lymphocyte
Ref.cells in Gallery 2
Segmented neutrophil
Reference cells
WBC comment
Comment
Hypersegmented polys present
Occasional blast seen on screening
Reviewed by tech-Sent to Hempath for review
Metas seen on scanning
Pelgeroid changes present
Agranular neutorphils present
Plasma cells present
Erase
Standard Comments <<
Standard comments
Code Comment
MESS Metas seen on scanning
MMSS Metas & myelos seen on scanning
MYSS Myelocytes seen on scanning
OCBLST Occasional blast seen on screening
OCNRB Occas NRBC seen on screening
OCNRB-SN... Occas NRBC-Sent to Hempath for review
PELGPR Pelgeroid changes present
PLSC Plasma cells present
PROLYM Prolymphocytes present
PROMON Promonocytes present
REAL Reactive lymphs present
REAL-LPC Reactive lymphs present-Lymphoma cells present
REAL-PLSC Reactive lymphs present-Plasma cells present
Comment types
General
WBC
RBC
PLT
BF
Append
OK
Cancel
Ready
admin
Vancouver
CAP
NUM
Start
Inbox - Microsoft Outlook
vchdiimdbp01 - Remote ...
cellavision DI testing - Mi...
SmarTerm - [Misys]
SmarTerm - [Misys]
CellaVision - Remote ...
1:04 PM


WBC
RBC
PLT
Sign Slide
RBC
Report all as 0 - normal
Use characterization
0 1 2 3 %
Polychromasia 3
Hypochromasia 2
Anisocytosis 0
Microcytosis 1
Macrocytosis 1
Poikilocytosis 1
Target cells 2
Schistocytosis 2
Helmet cells 3
Sickle cells 2
Spherocytosis 2
Elliptocytosis 3
Ovalocytosis 2
Tear drop cells 0
Stomatocytosis 1
Acanthocytosis 3
Echinocytosis 1
Howell-Jolly 1
Poppenheimer 2
Basophilic stippling 2
Number of RBCs used for pre-characterization
Reset to Precharacterization
RBC comment
Irregularly contracted rbc's present
Morphology unchanged, see previous RBC morph
Comments become their own testcode.
Each phrase code is then mapped –
not recommend to use free-text.
RBC comment
Comment
Irregularly contracted rbc's present
Morphology unchanged, see previous RBC morph
Erase
Standard Comments <<
Standard comments
Code
Comment
BITECL Bite cells present
CAG Cold agglutination present
ICN Irregularly contracted rbc's present
NMOR Morphology unchanged, see previous RBC morph
NORN Normal
OVALPR Oval macrocytes present
PMAL Malarial parasites seen
ROUL Rouleaux present
Comment types
General
WBC
RBC
PLT
BF
Click on comment
Append
← Click on Append
OK
Cancel
Comments appear here ↓
RBC comment
Irregularly contracted rbc's present
Morphology unchanged, see previous RBC morph
← Click on 'writing tablet'



1/22/2011 2:14:22 PM							
cWBC	8.3	gigs/L	VCEL1	WBCCOR-WB...	4.0 - 11.0	if WBC Med, c...	
POLY#	3.30	gigs/L	VCEL1		2.0 - 8.0		
LYMP#	3.42	gigs/L	VCEL1		1.2 - 3.5		
MONO#	0.68	gigs/L	VCEL1		0.2 - 1.0		0.3
EOS#	0.22	gigs/L	VCEL1		0.0 - 0.7		
BASO#	0.12	gigs/L	VCEL1		0.0 - 0.2		
BAND#	0.12	gigs/L	VCEL1		0.15 - 0.4		
META#	0.12	gigs/L	VCEL1		0 - 0		
MYEL#	0.12	gigs/L	VCEL1		0 - 0		
BLST#	0.12	gigs/L	VCEL1		0 - 0		
NRBC#	0.92	gigs/L	VCEL1		0 - 0		
POLY%	40	%	VCEL1				
LYMP%	41	%	VCEL1				
MONO%	9	%	VCEL1				
EOS%	3	%	VCEL1				
BASO%	1	%	VCEL1				0.0
BAND%	1	%	VCEL1				
META%	1	%	VCEL1				
MYEL%	1	%	VCEL1				
PRO%	1	%	VCEL1				
BLST%	1	%	VCEL1				
NRBC%	11	%	VCEL1				
CC-WBC Conc	11.40	gigs/L	CellMe...				
micromegakary...	26						
Nbr of WBC Cel...	100		VCEL1				
002 - Manual Morph							
1/19/2011 2:44:26 PM							
Acanthocytosis	PRES		VCEL1				
Acanthocytosis	PRES		VCEL1				
Acanthocytosis	PRES		VCEL1				

If CC-WBC Conc >0.46 & WBC Collect is Numeric, then add cWBC (corrected WBC) and set = WBC*100/(100+ %nrbc+%micromegakaryocyte), then calculate absolutes.

Corrects the WBC if NRBC >5%,
if micromegakaryocytes >5%.

Manual Differential

Morphology

.002 -Manuel Morph

1/22/2011 1:37:18 PM

Acanthocytosis	PRES		VCEL1					
Basophilic stippl...	PRES		VCEL1					
Echinocytosis	PRES		VCEL1					
Elliptocytosis	MANY		VCEL1	Refer if not				
Helmet cells	MANY		VCEL1	Refer if not				
Howell-Jolly bo...	PRES		VCEL1	Refer if not				
Hypochromasia	PRES		VCEL1					
Macrocytosis	MKD		VCEL1					
Microcytosis	MKD		VCEL1					
Ovalocytosis	MANY		VCEL1	Refer if not				
Pappenheimer ...	PRES		VCEL1					
Polychromasia	MKD		VCEL1	Refer if not				
Schistocytosis	PRES		VCEL1					
Sickle cells	MANY		VCEL1	If Sickle screen				
Spherocytosis	MANY		VCEL1	Refer if not				
Stomatocytosis	PRES		VCEL1					
Target cells	MANY		VCEL1	Refer if not				
Tear drop cells	MANY		VCEL1	Refer if not				

Test Comment(s):

If Sickle screen never previously performed, perform it before reporting Sickle cells. If not previously known, refer to Hematopathologist.

1/22/2011 1:37:33 PM

PLCOM1	PCLP-PLED		VCEL1	PLT: Plts				
PLCOM2	GPEPR-ME...		VCEL1	PLT:				
RBCOM1	NORM		VCEL1	RBC: Normal				
RBCOM2	PMAL		VCEL1	RBC: Malarial				
WBCOM1	REVT		VCEL1	WBC: Reviewe				
WBCOM2	TOXPR-DO...			WBC: Toxic				
WBCOM3	MYSS		VCEL1	WBC:				
WBCOM4	PELGPR-A...		VCEL1	WBC: Pelgeroid				
WBCOM5	LPC		VCEL1	WBC:				
WBCOM6	ABNL-SMDG		VCEL1	WBC: Abnormal				

Test Comment(s):

WBC: Toxic changes present-Dohle bodies present

If MANY, MKD poikilocytes reported, test comment 'Refer if not previously reported.'

If sickle cells reported, comment to do sickle test before reporting sickle cells.

For English text codes defined in Sunquest. If tech can't remember what the code is, they display in the Test Comment field.

Absolute Neutrophil 0.00

1/28/2011 11:37:52 AM							
Smudge cell %	4.1	%	VCEL1		0 - 100	N	
Thrombocyte a...	1.0	%	VCEL1		0 - 100	N	
1/28/2011 11:37:57 AM							
DTYP	MDIF		VCEL1				
.0011 -Manual Diff							
1/28/2011 11:37:57 AM							
POLY#	0.00	giga/L	VCEL1			Critical Result	
LYMP#	2.90	giga/L	VCEL1				
MONO#	0.93	giga/L	VCEL1				
BLST#	5.23	giga/L	VCEL				
NRBC#	0.93	giga/L	VCEL				
POLY%	0.0	%	VCEL				
LYMP%	32.0	%	VCEL1				
MONO%	10.3	%	VCEL1				
BLST%	57.7	%	VCEL1				
NRBC%	10.3	%	VCEL1				
Nbr of WBC Cel...	105		VCEL1				
.002 -Manual Diff							
1/28/2011 11:37:57 AM							
DONE	DONE						
.1 - CBC							
1/28/2011 11:37:57 AM							
cWBC	9.1	giga/L	VCEL1	WBCCOR			

If Neutrophils 0.00, they will be reported as 0.00
(Sunquest keyboard did not report 0.00)

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Issues encountered & resolution

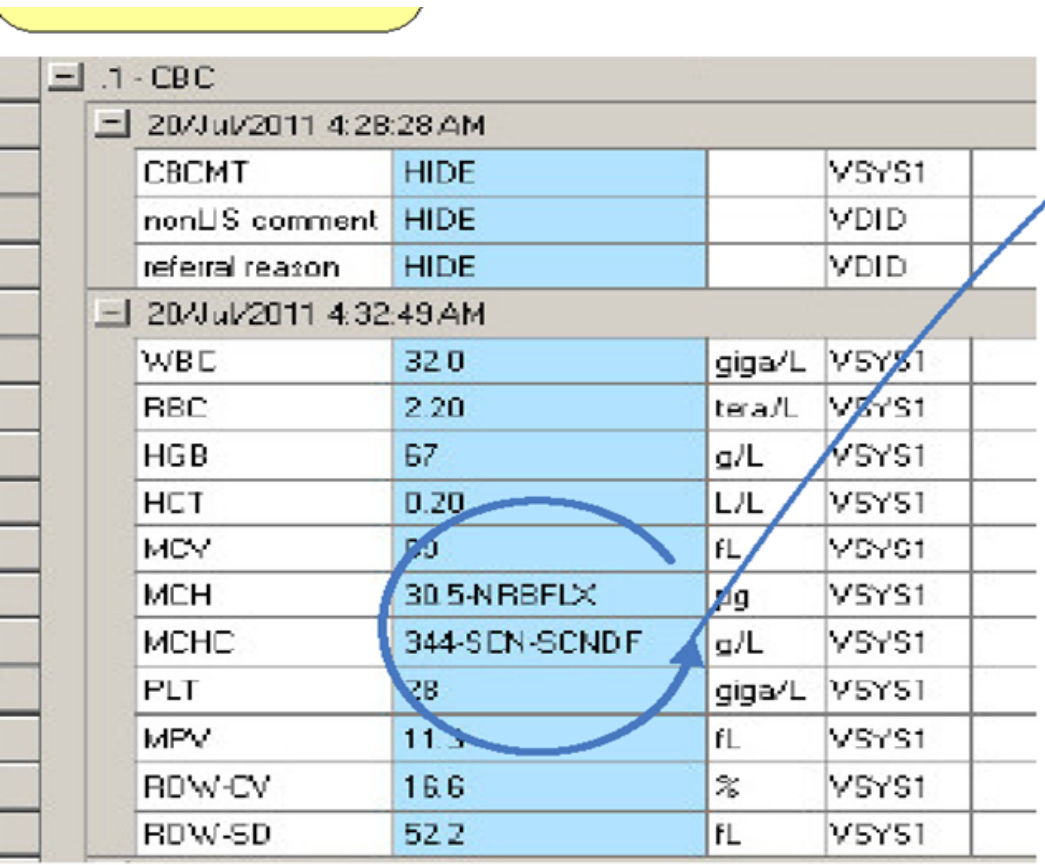
Issues Post "live"

- Underwent a "lean" review, with minor tweaks to:
  - **improve rules**
  - **cut down # slides**

- May 3, 2011 Sunquest LIS upgrade

- Curtailment of piggyback functionality of RBC morphologies & manual differential
  - Note: Piggyback is a function with Sunquest Laboratory LIS for Hematology
  - – Diff & morph reflex order in LIS first
  - – NRBC (Sysmex) must reflex order in LIS first
  - – Rules within DI to append triggers to MCH/MCHC
- Test server purchased

Reflex tests



.1 - CBC

20/Jul/2011 4:28:28 AM			
CBCMT	HIDE		VSYS1
nonLIS comment	HIDE		VDID
referral reason	HIDE		VDID
20/Jul/2011 4:32:49 AM			
WBC	32.0	giga/L	VSYS1
RBC	2.20	tera/L	VSYS1
HGB	67	g/L	VSYS1
HCT	0.20	L/L	VSYS1
MCV	89	fL	VSYS1
MCH	30.5-NRBFLX	pg	VSYS1
MCHC	344-SCN-SCNDF	g/L	VSYS1
PLT	28	giga/L	VSYS1
MPV	11.3	fL	VSYS1
RDW-CV	16.6	%	VSYS1
RDW-SD	52.2	fL	VSYS1

MCHC held for verification when rule breaks.

Slide-related rule: SCN reflexes MORFL
Diff-related rule: SCNDF reflexes MORFL & DIFM

If no reflexes are required,
remove the -SCN, -SCNDF or both and file MCHC

~20 mos ago,
→ Combined MORFL & DIFM
→Allow reflex to occur & cancel with *"not indicated…."*

Peripheral Smear Review					
Neutrophils		4.06	[2.0-8.0]	X10 9/L	(1282)
Band Cells		<<DO NOT REPORT>>			
			[0.0-0.4]	X10 9/L	(1282)
Eosinophils		<<DO NOT REPORT>>			
			[0.0-0.7]	X10 9/L	(1282)
Basophils		<<DO NOT REPORT>>			
			[0.0-0.2]	X10 9/L	(1282)
Lymphocytes		1.80	[1.2-3.5]	X10 9/L	(1282)
Monocytes		0.67	[0.2-1.0]	X10 9/L	(1282)
Metamyelocytes		<<DO NOT REPORT>>			
			[0]	X10 9/L	(1282)
Myelocytes		<<DO NOT REPORT>>			
			[0]	X10 9/L	(1282)
Promyelocytes		<<DO NOT REPORT>>			
			[0]	X10 9/L	(1282)
Blast Cells	*	4.86	[0]	X10 9/L	(1282)
Other		<<DO NOT REPORT>>			
			[0]	X10 9/L	(1282)
Nucleated RBCs		<<DO NOT REPORT>>		X10 9/L	(1282)
<<200 Cells>>		<<DO NOT REPORT>>			(1282)
Slide comment		<<DO NOT REPORT>>			(1282)
Slide comment		<<DO NOT REPORT>>			(1282)
Slide comment		<<DO NOT REPORT>>			(1282)
Slide comment		Pelgeroid changes present			(1282)
		Agranular neutrophils present			
Slide comment		<<DO NOT REPORT>>			(1282)
Slide comment		<<DO NOT REPORT>>			(1282)
Morphology comment		<<DO NOT REPORT>>			(1282)
Morphology comment		<<DO NOT REPORT>>			(1282)
Platelet comment		<<DO NOT REPORT>>			(1282)
Platelet comment		<<DO NOT REPORT>>			(1282)
Howell Jolly bodies		<<DO NOT REPORT>>			(1282)
Schistocytes		<<DO NOT REPORT>>			(1282)
Spherocytes		<<DO NOT REPORT>>			(1282)
Sickle cells		<<DO NOT REPORT>>			(1282)

Auto-Suppression

- Any result not reported will auto-suppresses in LIS

Peripheral Smear Review				
Neutrophils		4.06	[2.0-8.0]	X10 9/L
Lymphocytes		1.80	[1.2-3.5]	X10 9/L
Monocytes		0.67	[0.2-1.0]	X10 9/L
Blast Cells	*	4.86	[0]	X10 9/L
Slide comment		Pelgeroid changes present		
		Agranular neutrophils present		

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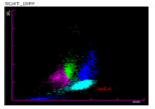
Bone Marrow Transplant / Oncology blast-flagged diffs

BMT & BCCA ?blast flagged differentials
Goal: BMT & BCAQ want their automated NEUT stat

18/Jan/2013 10:31:33 AM						
Blasts?	180		VSYS2			Diff Review
Left_Shift?	190		VSYS2			
.09 - Diff Type						
18/Jan/2013 10:29:04 AM						
CBCGRA	12.6		VSYS2	IDIF	2.0 - 8.0	If blasts likely, remove te...
18/Jan/2013 10:31:33 AM						
WBC	15.7	giga/L	VSYS2			
RBC	3.15	tera/L	VSYS2			
HGB	92	g/L	VSYS2			
HCT	0.29	L/L	VSYS2			
MCV	91	fL	VSYS2			
MCH	29.2-GRAFLX	pg	VSYS2			
MCHC	323-SCN	g/L	VSYS2			
PLT	392	giga/L	VSYS2			
MPV	11.2	fL	VSYS2			
RDW-CV	15.4	%	VSYS2			
RDW-SD	49.3	fL	VSYS2			



MCH is concatenated with GRAFLX

CBCGRA "Neutrophils, Prelim" is:

- **Added to IM**
- **Result set = result of Neutrophils.**
- **Test reflex-orders in LIS.**

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Life….months after go-live

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PERL request

Resulting Hematopathologist Comments within DI middleware:

- Want an editable macro within IM
  - BioChem, Hem, AP, Micro applications (diagnostic comments, pathology comments)
- Now standard in v8.13

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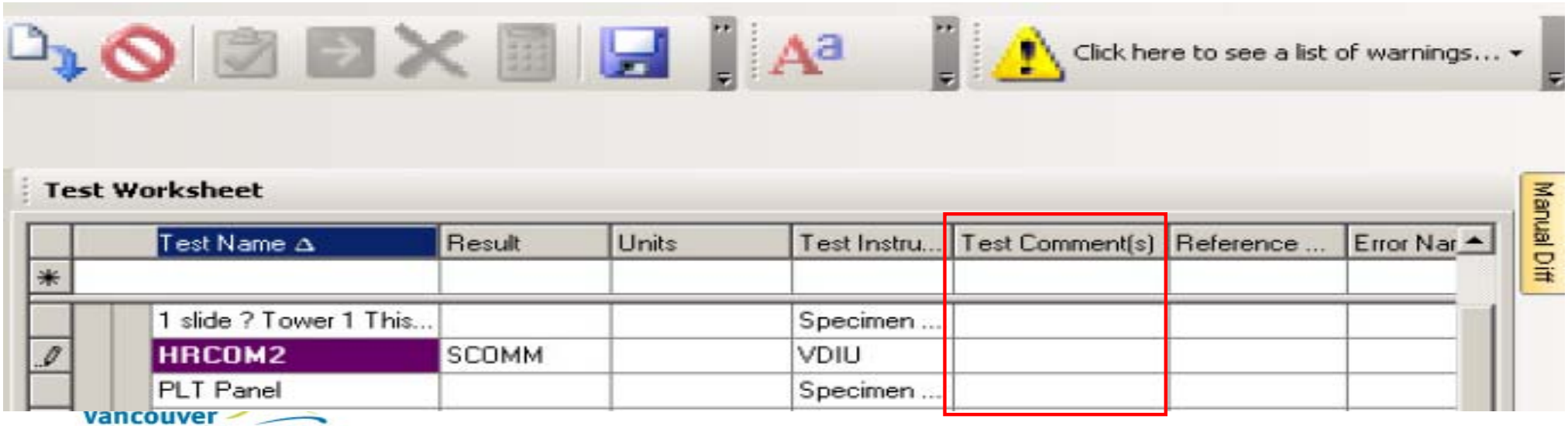
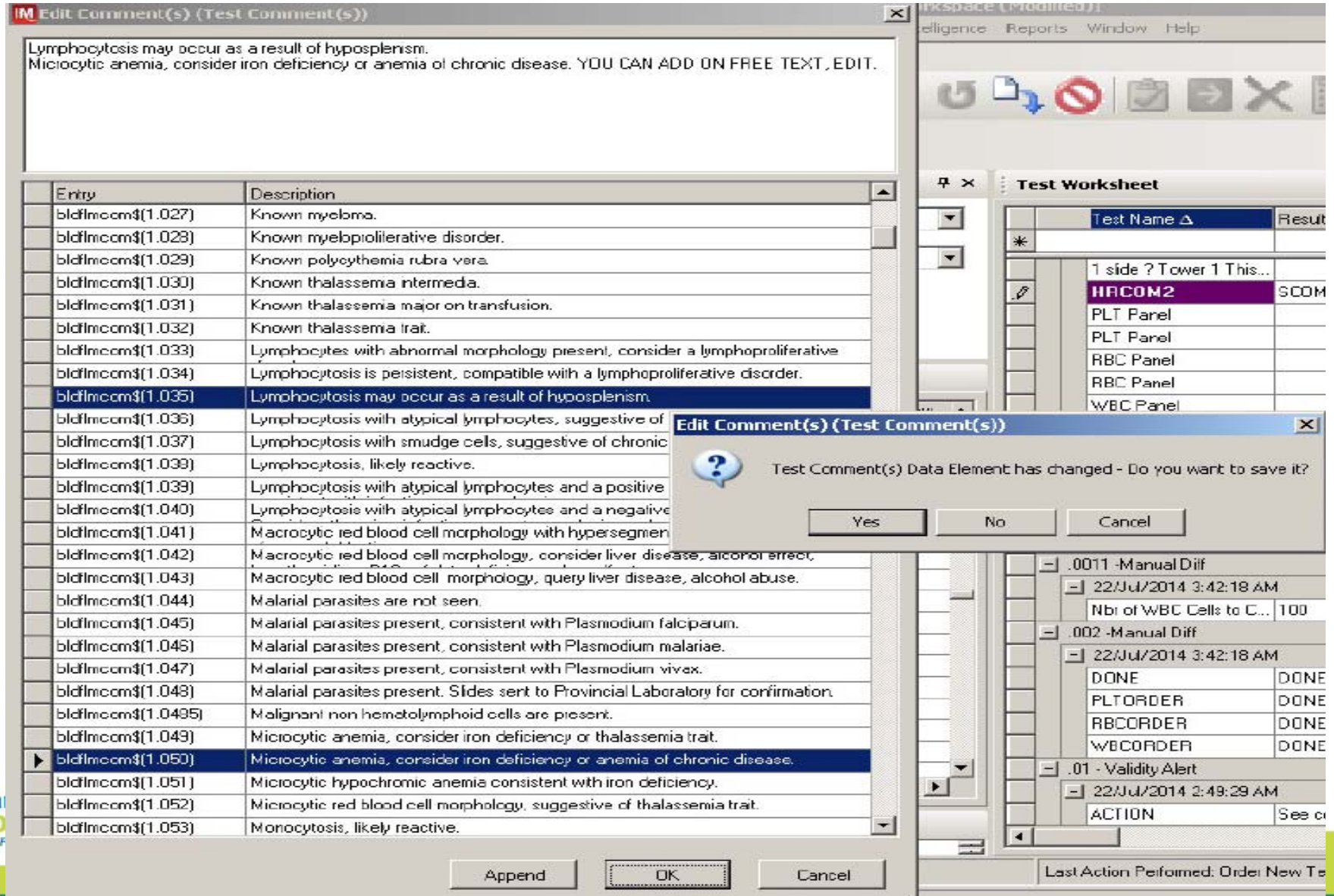
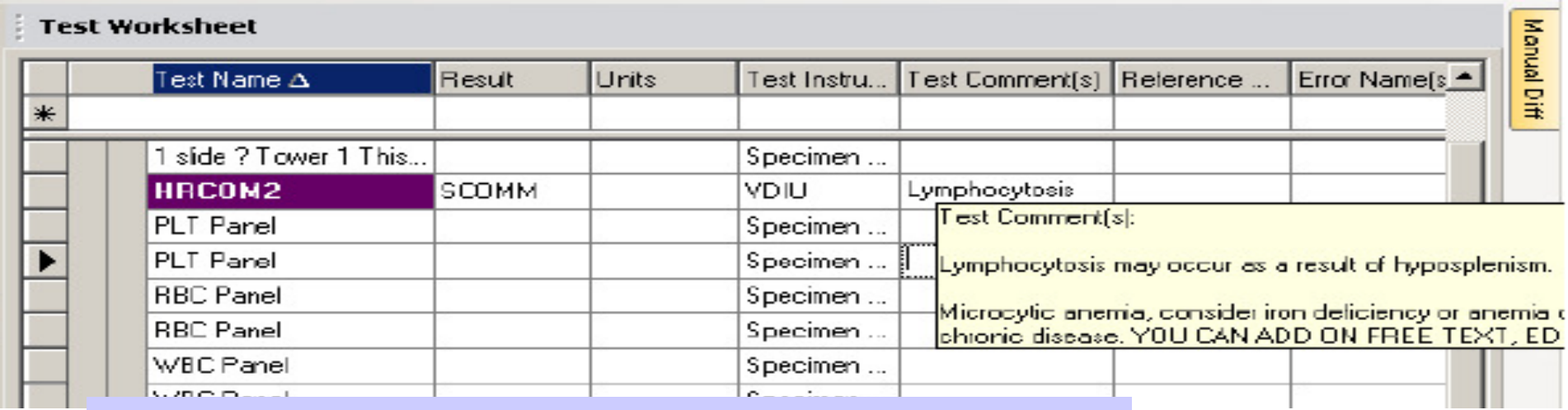
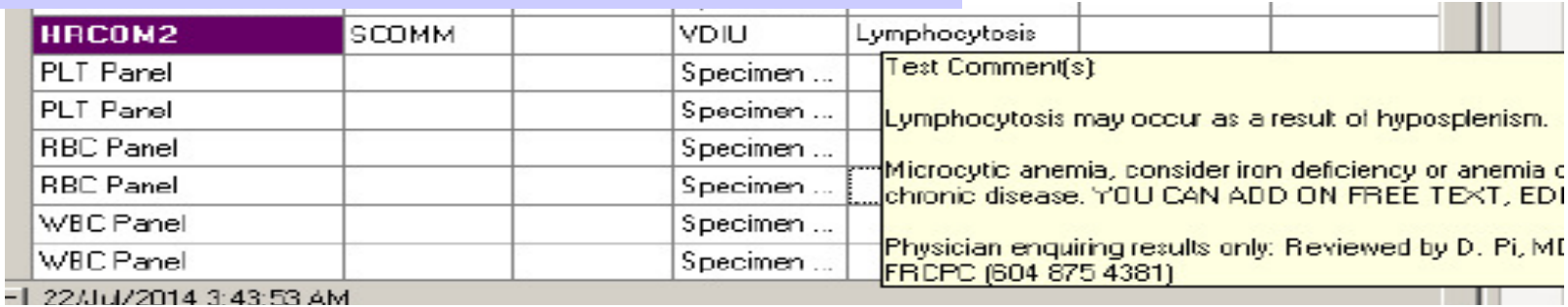
- New LIS test built
- Would be reflex-added by rule within IM



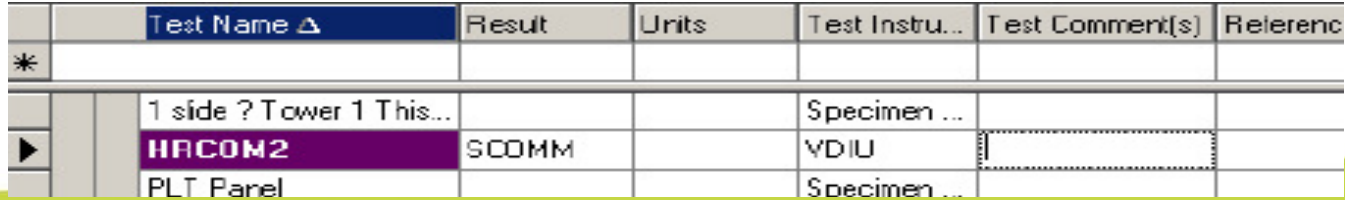

Edit Comment(s) (Test Comment(s))
Lymphocytosis may occur as a result of hyposplenism.
Microcytic anemia, consider iron deficiency or anemia of chronic disease. YOU CAN ADD ON FREE TEXT, EDIT.
Entry
Description
bldflmcom$(1.027) Known myeloma.
bldflmcom$(1.028) Known myeloproliferative disorder.
bldflmcom$(1.029) Known polycythemia rubra vera.
bldflmcom$(1.030) Known thalassemia intermedia.
bldflmcom$(1.031) Known thalassemia major on transfusion.
bldflmcom$(1.032) Known thalassemia trait.
bldflmcom$(1.033) Lymphocytes with abnormal morphology present, consider a lymphoproliferative
bldflmcom$(1.034) Lymphocytosis is persistent, compatible with a lymphoproliferative disorder.
bldflmcom$(1.035) Lymphocytosis may occur as a result of hyposplenism.
bldflmcom$(1.036) Lymphocytosis with atypical lymphocytes, suggestive of
bldflmcom$(1.037) Lymphocytosis with smudge cells, suggestive of chronic
bldflmcom$(1.039) Lymphocytosis, likely reactive.
bldflmcom$(1.039) Lymphocytosis with atypical lymphocytes and a positive
bldflmcom$(1.040) Lymphocytosis with atypical lymphocytes and a negative
bldflmcom$(1.041) Macrocytic red blood cell morphology with hypersegmen
bldflmcom$(1.042) Macrocytic red blood cell morphology, consider liver disease, alcohol effect,
bldflmcom$(1.043) Macrocytic red blood cell morphology, query liver disease, alcohol abuse.
bldflmcom$(1.044) Malarial parasites are not seen.
bldflmcom$(1.045) Malarial parasites present, consistent with Plasmodium falciparum.
bldflmcom$(1.046) Malarial parasites present, consistent with Plasmodium malariae.
bldflmcom$(1.047) Malarial parasites present, consistent with Plasmodium vivax.
bldflmcom$(1.048) Malarial parasites present. Slides sent to Provincial Laboratory for confirmation.
bldflmcom$(1.0495) Malignant non hematolymphoid cells are present.
bldflmcom$(1.049) Microcytic anemia, consider iron deficiency or thalassemia trait.
bldflmcom$(1.050) Microcytic anemia, consider iron deficiency or anemia of chronic disease.
bldflmcom$(1.051) Microcytic hypochromic anemia consistent with iron deficiency.
bldflmcom$(1.052) Microcytic red blood cell morphology, suggestive of thalassemia trait.
bldflmcom$(1.053) Monocytosis, likely reactive.
Append
OK
Cancel
Reports
Window
Help
Test Worksheet
Test Name Δ
Result
1 slide ? Tower 1 This...
HRCOM2
SCOM
PLT Panel
PLT Panel
RBC Panel
RBC Panel
WBC Panel
Edit Comment(s) (Test Comment(s))
Test Comment(s) Data Element has changed - Do you want to save it?
Yes
No
Cancel
.0011 -Manual Diff
22/Jul/2014 3:42:18 AM
Nbr of WBC Cells to C...
100
.002 -Manual Diff
22/Jul/2014 3:42:18 AM
DONE
DONE
PLTORDER
DONE
RBCORDER
DONE
WBCORDER
DONE
.01 - Validity Alert
22/Jul/2014 3:49:29 AM
ACTION
Last Action Performed: Order New Te



Edit, add physician contact info….



Edit, by removing it completely ….



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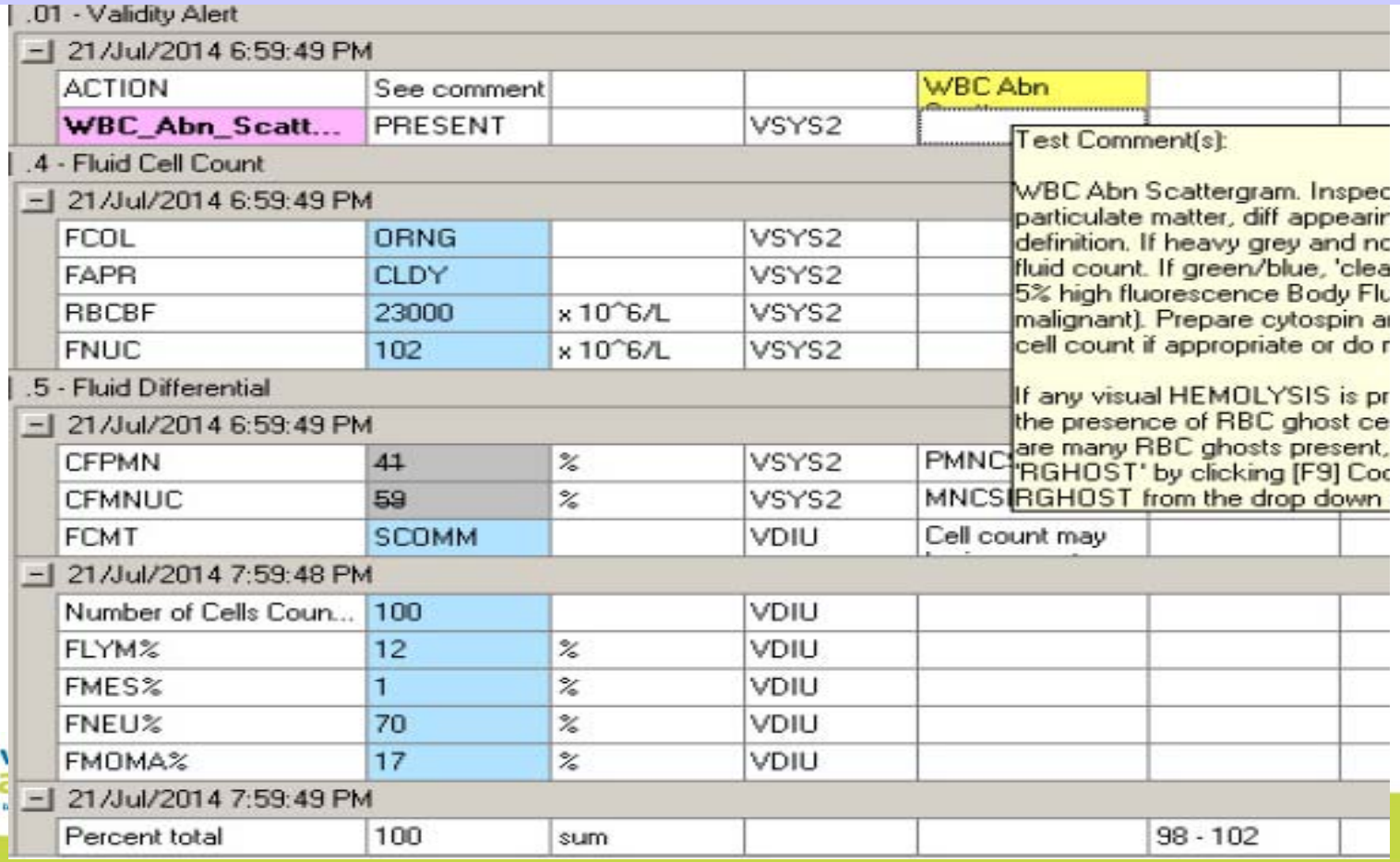
Body Fluid / CSF

with keyboards



.01 - Validity Alert

21/Jul/2014 6:59:49 PM						
ACTION	See comment			WBC Abn		
WBC_Abn_Scatt...	PRESENT		VSYS2			

.4 - Fluid Cell Count

21/Jul/2014 6:59:49 PM						
FCOL	ORNG		VSYS2			
FAPR	CLDY		VSYS2			
RBCBF	23000	x 10^6/L	VSYS2			
FNUC	102	x 10^6/L	VSYS2			

.5 - Fluid Differential

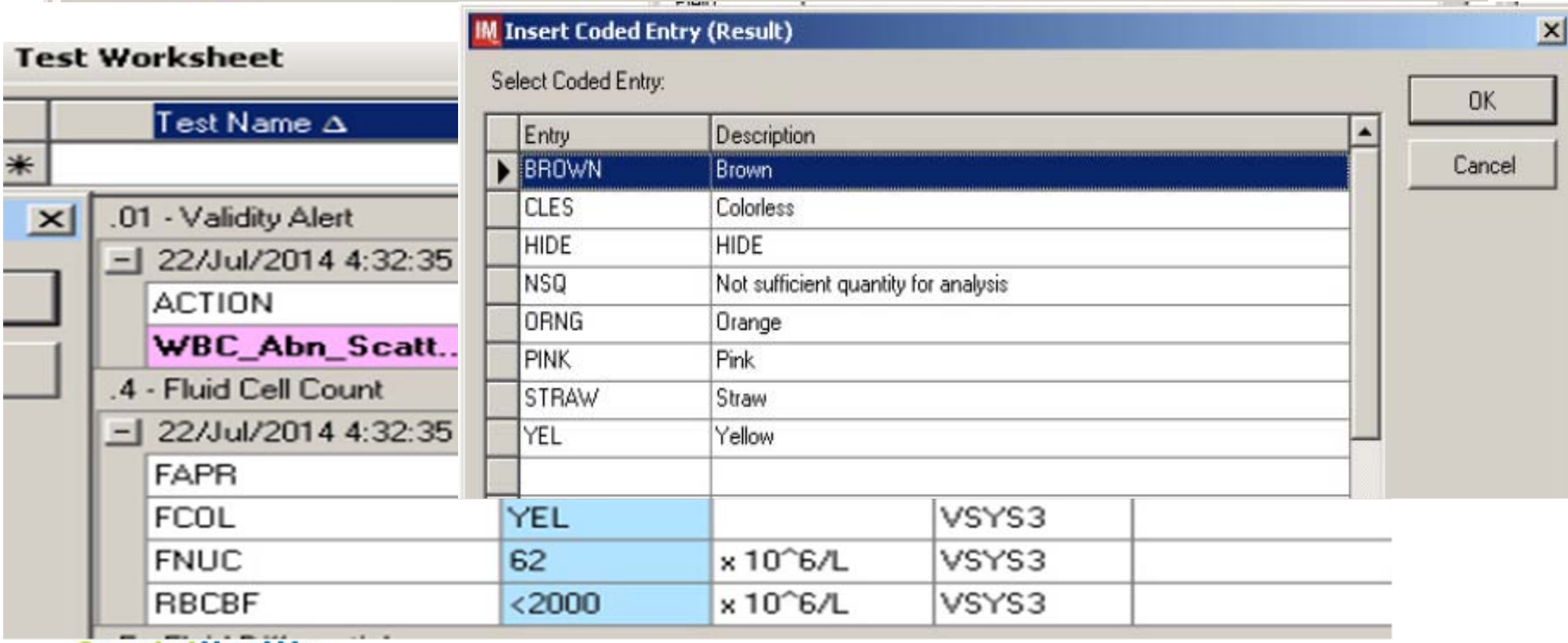
21/Jul/2014 6:59:49 PM						
CFPMN	41	%	VSYS2	PMNC		
CFMNUC	59	%	VSYS2	MNCS		
FCMT	SCOMM		VDIU	Cell count may		
21/Jul/2014 7:59:48 PM						
Number of Cells Coun...	100		VDIU			
FLYM%	12	%	VDIU			
FMES%	1	%	VDIU			
FNEU%	70	%	VDIU			
FMOMA%	17	%	VDIU			
21/Jul/2014 7:59:49 PM						
Percent total	100	sum			98 - 102	

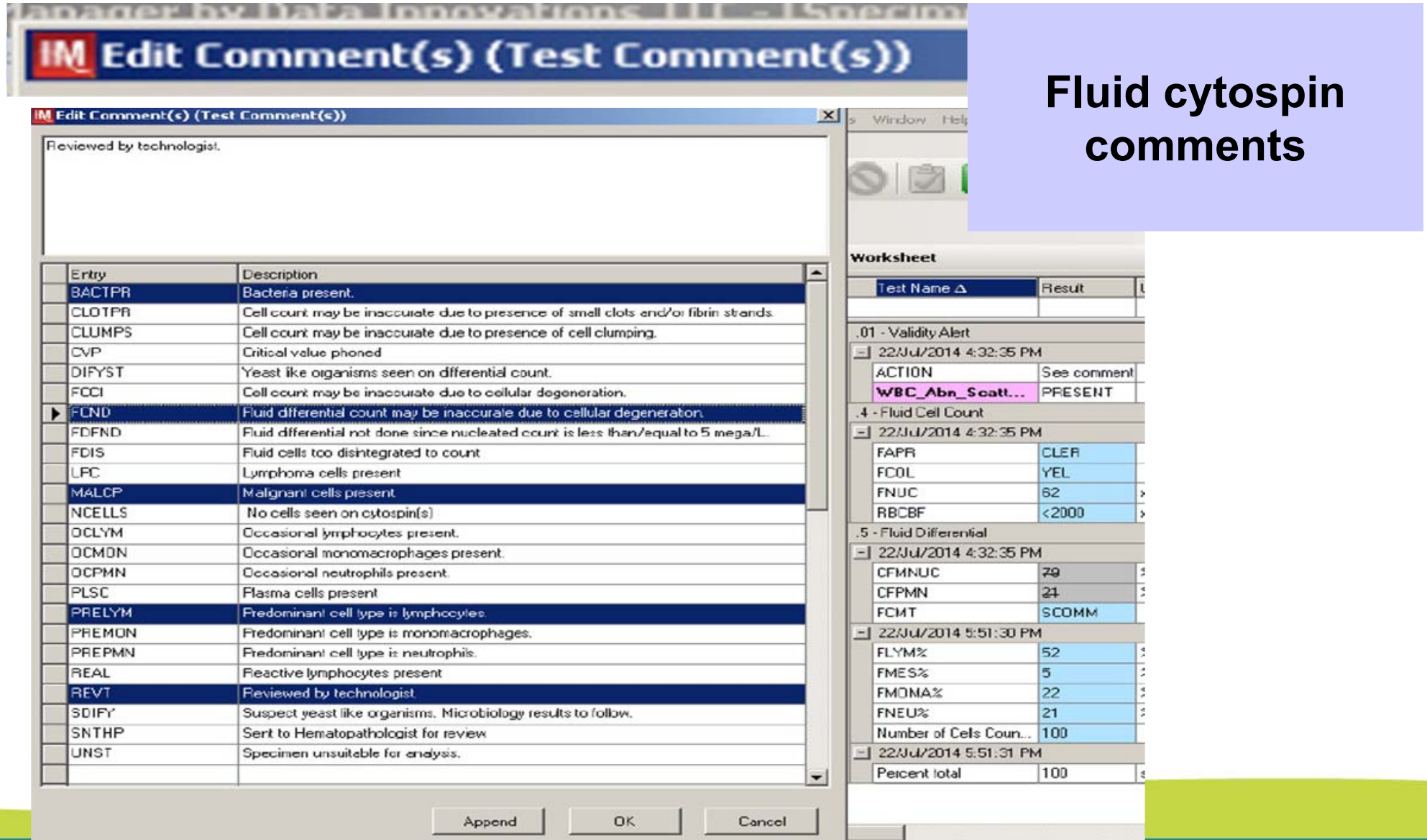
Test Comment(s):

WBC Abn Scattergram. Inspec
particulate matter, diff appearir
definition. If heavy grey and nc
fluid count. If green/blue, 'clea
5% high fluorescence Body Flu
malignant). Prepare cytospin a
cell count if appropriate or do r

If any visual HEMOLYSIS is pr
the presence of RBC ghost ce
are many RBC ghosts present,
'RGHOST' by clicking [F9] Coc
RGHOST from the drop down

Insert Coded Entry (Result)





Fluid cytospin comments

Keyboard rule ~
Fluid vs CSF keyboard

Test Worksheet

Test Name	Result	Units	Test Instru...	Test Com...	Referen...	Error Name(s)
(none)						
(none)						
MNREF			VDID			
PMNREF			VDID			
08/Apr/2015 8:06:28 PM						
RBCBF	3000		VSYS3			
TCBF	20		VSYS3			
.5 - Fluid Differential						
08/Apr/2015 8:11:10 PM						
CBAS%	~~3~~	%	VDIU			use VFLU keyboard
CEOS%	~~4~~	%	VDIU			use VFLU keyboard
CFMON%	~~25~~	%	VDIU		3 - 37	use VFLU keyboard
CLYM%	~~23~~	%	VDIU		63 - 99	use VFLU keyboard
CNEU%	~~46~~	%	VDIU		0 - 2	use VFLU keyboard
Number of Cells C...	~~79~~		VDIU			use VFLU keyboard
Percent total	~~101~~	sum			98 - 102	use VFLU keyboard
08/Apr/2015 11:31:28 PM						
FEOS%	5	%	VDIU			
FLYM%	25	%	VDIU			
FMOMA%	37	%	VDIU			
FNEU%	34	%	VDIU			
Number of Cells C...	89		VDIU			
Percent total	101	sum			98 - 102	

Coagulation
June 2013 - 3 sites

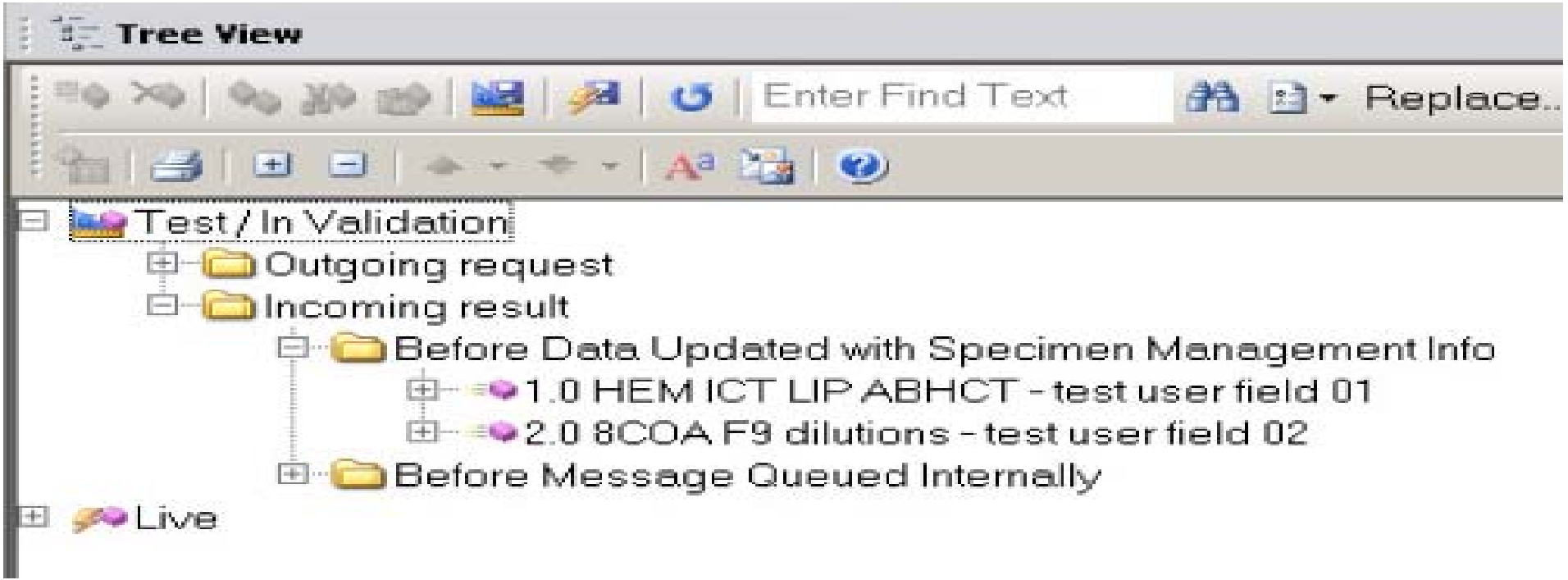
est Worksheet

Test Name Δ	Result	Units	Test Instrume...	Test Comment(s)	Reference Ra...	Error Name(s)	Previous Res
.01 - OTHER							
23/Jul/2014 10:08:42 AM							
non LIS comment	NO CLOT		VACL1				HIDE
phone number	62827		VACL1				55657
Referral reason	HIDE		VACL1				HIDE
23/Jul/2014 10:46:17 AM							
action	See comment		VACL2	FAILED clot			See comment
23/Jul/2014 10:46:18 AM							
action	See comment		VACL2	FAILED clot			See comment
1 - Routine Coagulation							
23/Jul/2014 10:38:05 AM							
INR	1.0	INR	VACL2				
PT	11.6	s	VACL2		3.2 - 12.5	Maintenance d...	11.6
23/Jul/2014 10:41:01 AM							
PTT	>140	s	VACL2	RPTP-;MV	25 - 38	.	29
23/Jul/2014 10:48:05 AM							
PTT	~~FAILED~~	Extended	VACL2		25 - 38	.	>140

Test Comment(s):

FAILED clot curve. Inspect clot curve(s). Seek assistance in interpretation as required.

Continue to learn complexities / possibilities available



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Additional elements, eg, test user fields 01 through 15…

Sysmex XN line – July 2013

- Significant change in interface to that of Sysmex XE2100
  - LIS → XN-IC → XN-IPU & CT90: replaces LASC
  - Repeat / reflex orders
    - » Required driver modification to capture [Specimen Action] element to write rule to reject 1st run and re-run
  - scattergrams

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SPH - Sysmex XN 3000
with digital slide scanner
DI-60

- This configuration interacts differently with DI than the XN9000, with direct instrument interfaces.

Other differences from the XN9000 interfacing:

- differential flagging – eg Present vs a number
- results from the XN9000 analyzers are routed through a central processor called the XN-IC. This is a WAM unit with its functionality “turned” off. All test codes and flagging are converted to WAM syntax and sent to DI.

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IF: (({Specimen Action} = "N") {AND} ({Result Status} {On Any Test} = "P"))
THEN: {Reject That Test} {AND} {Rerun That Test} {With Comment} "Sample rerun" {With Test Dilution} "1"

Test Name	Result	Units	Test Instru...	Test Com...	Referen...	Error Name(s)	Previou
MCHC	~~322~~	g/L	VSYS1		300 - 375		319-SCI
PLT	~~10~~	x 10^9/L	VSYS1		150 - 400	Critical Result	18
MPV	~~12.5~~	fL	VSYS1		9.5 - 12.5		11.5
CBCMT	~~HIDE~~		VSYS1				HIDE
RDW-CV	~~14.6~~	%	VSYS1		11.0 - 15.0		14.3
RDW-SD	~~47.8~~	fL	VSYS1				47.8
28/Apr/2015 7:01:19 AM							
WBC	3.0	x 10^9/L	VSYS1		4.0 - 11.0	repeated result	2.3
RBC	3.45	x 10^12...	VSYS1		3.80 - 5.20	repeated result	2.69
HGB	100	g/L	VSYS1		120 - 155	repeated result	79
HCT	0.31	L/L	VSYS1		0.35 - 0.45	repeated result	0.25
MCV	90	fL	VSYS1		82 - 98	repeated result	92
MCH	29	pg	VSYS1		25 - 34	repeated result	29
MCHC	323	g/L	VSYS1		300 - 375	repeated result	319-SCI
PLT	10	PLT-F	VSYS1		150 - 400	Critical Result,r...	18
MPV	11.5	fL	VSYS1		9.5 - 12.5	repeated result	11.5
CBCMT	HIDE		VSYS1				HIDE
RDW-CV	14.6	%	VSYS1		11.0 - 15.0	repeated result	14.3
RDW-SD	47.5	fL	VSYS1				47.8
.2 - Autodiff							
28/Apr/2015 6:59:37 AM							
DTYP	~~ADIF~~		VSYS1				ADIF
GRA	~~1.9~~	x 10^9/L	VSYS1		2.0 - 8.0		1.5
LYMA	~~0.5~~	x 10^9/L	VSYS1		1.2 - 3.5		0.3
MOA	~~0.4~~	x 10^9/L	VSYS1		0.2 - 1.0		0.3
EOA	~~0.0~~	x 10^9/L	VSYS1		0.0 - 0.7		0.0
BASB	~~0.0~~	x 10^9/L	VSYS1		0.0 - 0.2		0.0
IMGRAN	~~0.1~~	x 10^9/L	VSYS1	HIDE	0.0 - 0.0		0.2
NEUT%	~~65.0~~	%	VSYS1				65.0
LYMPH%	~~16.0~~	%	VSYS1				13.0
MONO%	~~15.0~~	%	VSYS1				13.0
EO%	~~0.0~~	%	VSYS1				0.0
BASO%	~~0.0~~	%	VSYS1				0.0
IG%	~~4.0~~	%	VSYS1				8.0

Autoimmune Testing - Luminex – Sept 2013

Microsoft Excel - CP-ANA-2011NOV19-85 post Athena Multilyte software.csv

File Edit View Insert Format Tools Data Window Help

Arial 10

Q18

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Well ID	Sample ID	Status	Qual	NSC	SSA	SSB	Sm	RNP	Scl 70	Jo 1	dsDNA	Cent B	Histone
2	E1	W282328	OK	56	-	27	25	22	23	56	36	11	37	38
3	F1	W282328	OK	26	-	5	6	8	9	14	7	11	11	26
4	G1	W282328	OK	18	-	10	18	8	18	14	15	3	6	18
5	H1	W282328	OK	76	-	21	7	13	16	76	19	5	31	15
6	A2	W282328	OK	17	-	11	3	10	10	11	11	10	7	17
7	B2	W282328	OK	50	-	9	4	4	4	50	5	8	17	50
8	C2	W282328	OK	63	-	21	6	12	55	63	25	0	11	16
9	D2	W282328	OK	36	-	31	8	11	16	17	17	2	8	36
10	E2	W282328	OK	19	-	13	4	10	11	17	13	5	11	19
11	F2	W282328	OK	12	-	10	4	6	10	11	8	6	4	12
12	G2	W282328	OK	45	-	16	6	11	10	21	20	11	16	45
13	H2	W282328	OK	25	-	11	6	7	10	12	13	6	6	25
14	A3	W282328	OK	11	-	7	4	4	11	6	7	5	5	9
15	C3	W282328	OK	22	-	17	6	8	22	22	10	8	5	13
16	D3	W282328	OK	18	-	7	4	4	5	9	5	8	2	18
17	E3	W282328	OK	15	-	4	2	4	3	4	2	2	2	15
18	F3	W282328	OK	7	-	7	2	4	6	5	5	1	2	4
19	G3	W282328	OK	68	-	9	5	12	53	68	13	2	4	8
20	H3	W282328	OK	143	-	31	19	32	108	143	51	13	17	30
21	A4	W282328	OK	5	-	4	2	5	2	5	2	1	2	5
22	B4	W282328	OK	32	-	32	6	8	9	13	11	4	31	7
23	C4	W282328	OK	133	-	21	12	17	115	133	30	12	27	15
24	D4	W282328	OK	49	-	26	13	11	21	19	24	15	12	49
25	E4	W282328	OK	42	-	9	3	7	15	42	17	3	3	13
26	F4	W282328	OK	31	-	12	5	5	14	24	19	5	28	31
27	G4	W282328	OK	65	-	65	14	18	21	16	31	10	13	24
28	H4	W282328	OK	287	-	26	8	25	236	287	43	4	47	34
29	A5	W282328	OK	76	-	30	7	10	9	76	13	10	7	24
30	B5	W282328	OK	18	-	3	4	5	13	18	7	1	2	5
31	C5	W282328	OK	10	-	6	4	4	5	10	3	3	3	6
32	D5	W282328	OK	515	-	427	231	262	127	237	219	515	290	410
33	E5	W282328	OK	141	-	25	19	21	53	80	38	61	107	141

CP-ANA-2011NOV19-85 post Athena

Step 3: Plate Layout for

Instructions

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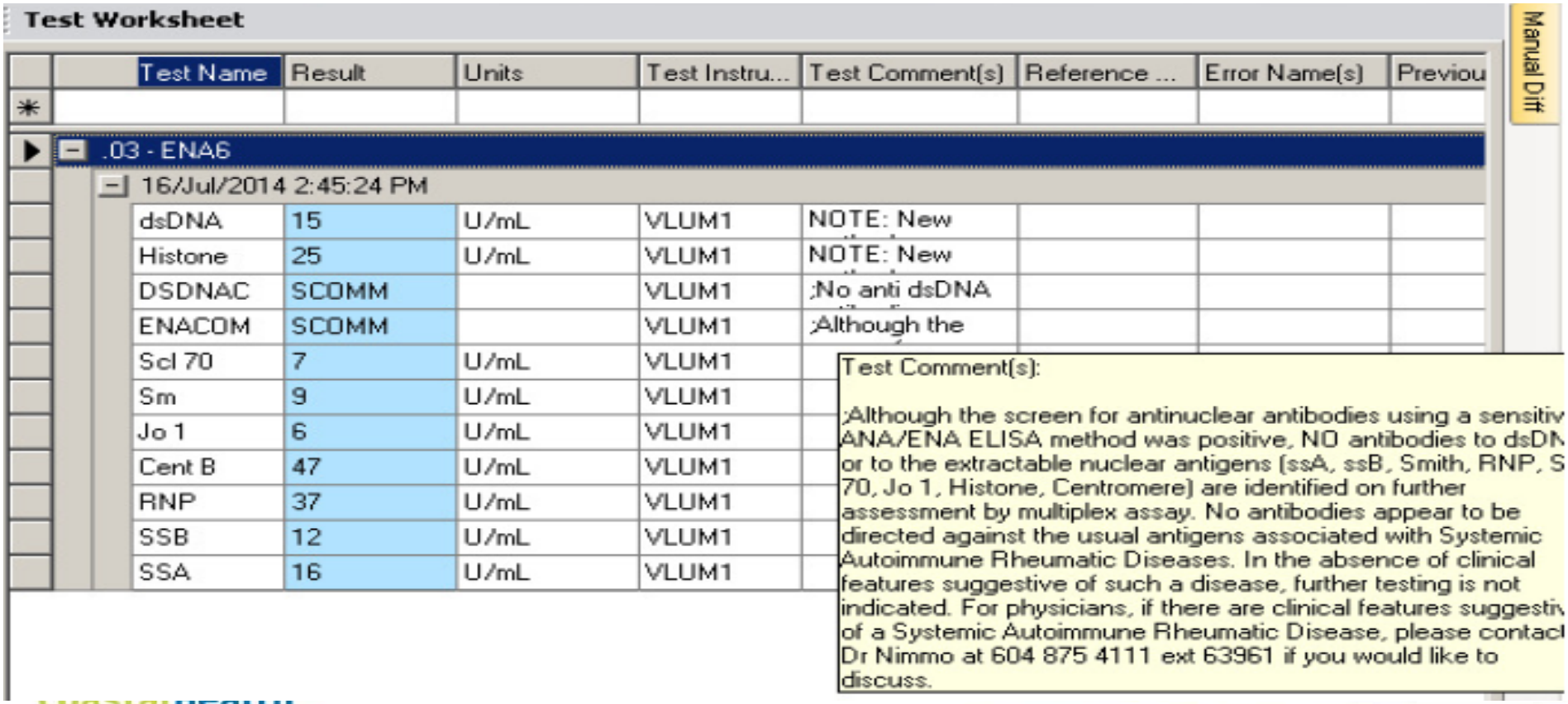
Autoimmune Testing - Luminex



Test Worksheet

Manual Diff

	Test Name	Result	Units	Test Instru...	Test Comment(s)	Reference ...	Error Name(s)	Previou
✳								
▶	.03 - ENA6							
	16/Jul/2014 2:45:24 PM							
	dsDNA	15	U/mL	VLUM1	NOTE: New			
	Histone	25	U/mL	VLUM1	NOTE: New			
	DSDNAC	SCOMM		VLUM1	;No anti dsDNA			
	ENACOM	SCOMM		VLUM1	;Although the			
	Scl 70	7	U/mL	VLUM1				
	Sm	9	U/mL	VLUM1				
	Jo 1	6	U/mL	VLUM1				
	Cent B	47	U/mL	VLUM1				
	RNP	37	U/mL	VLUM1				
	SSB	12	U/mL	VLUM1				
	SSA	16	U/mL	VLUM1				

Test Comment(s):

;Although the screen for antinuclear antibodies using a sensitiv
ANA/ENA ELISA method was positive, NO antibodies to dsDN
or to the extractable nuclear antigens (ssA, ssB, Smith, RNP, S
70, Jo 1, Histone, Centromere) are identified on further
assessment by multiplex assay. No antibodies appear to be
directed against the usual antigens associated with Systemic
Autoimmune Rheumatic Diseases. In the absence of clinical
features suggestive of such a disease, further testing is not
indicated. For physicians, if there are clinical features suggestiv
of a Systemic Autoimmune Rheumatic Disease, please contact
Dr Nimmo at 604 875 4111 ext 63961 if you would like to
discuss.

Take home lessons:

- Don’t underestimate the time post “live” for ‘tweaking’ rules in 1st few months
- LIS Department integral in support of non-technical issues
- Recommend a test server
  - Continually linked to LIS Test environment
  - Test LIS upgrades (and DI rules) before migrating them to ‘live’ environment
- Is your lab able to execute such a project?
- End product is dependent on:
  - Perseverance
  - Capabilities
  - Imagination of ‘Super-Users’

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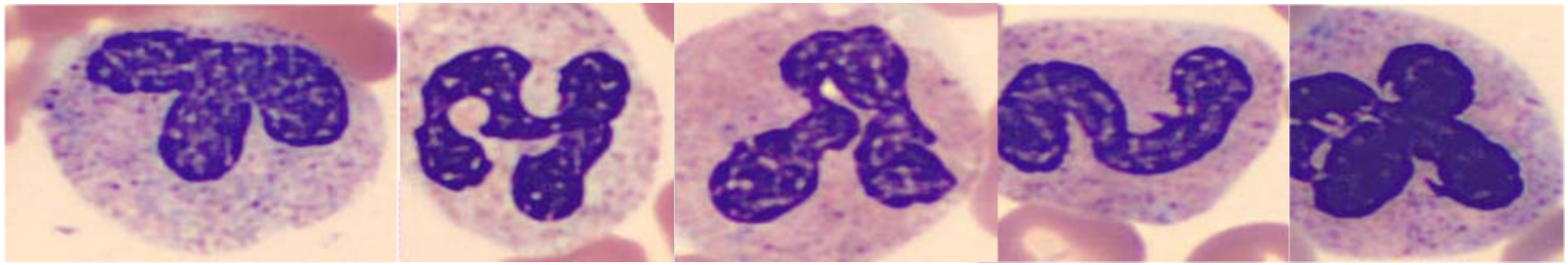

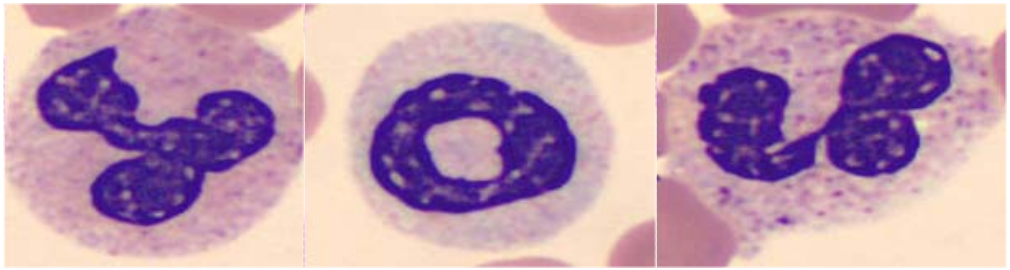

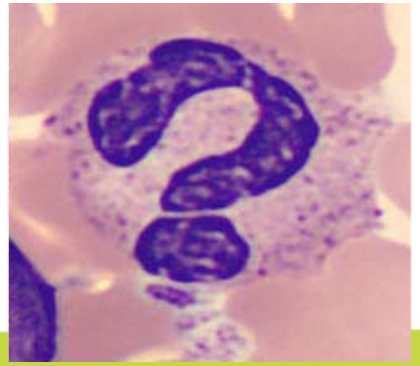

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