

# MULTISITE EVALUATION OF A NEW FIVE-PART DIFFERENTIAL CONTROL MATERIAL FOR HAEMATOLOGY

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# Introduction

Five-part differential control products are usually instrument specific with limited cross-applicability between different hematology analyser families.

# Provisional target ranges of D-check 5 diff

(Science Innovation Unit, Diagon, Hungary)

## on different haematology platforms

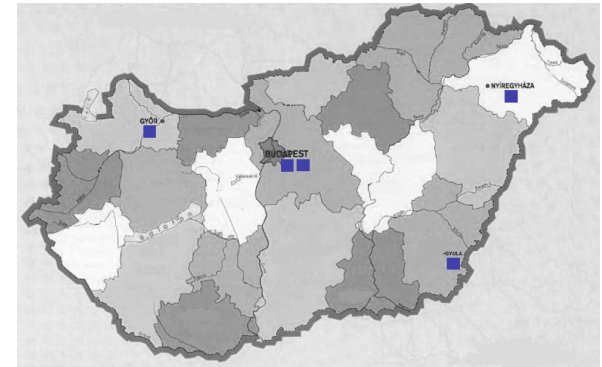
PARAMETER		LOW			
		Platform 1	Platform 2	Platform 3	Platform 4
WBC	$10^3 / \mu\text{L} \ \& \ 10^9 / \text{L}$	$3.1 \pm 0.5$	$3.2 \pm 0.5$	$3 \pm 1$	$3.1 \pm 1$
RBC	$10^6 / \mu\text{L} \ \& \ 10^{12} / \text{L}$	$2.58 \pm 0.18$	$2.66 \pm 0.18$	$2.6 \pm 0.15$	$2.64 \pm 0.15$
Hgb	g/L	$78 \pm 4$	$76 \pm 4$	$76 \pm 4$	$75 \pm 4$
Hct	%	$20.9 \pm 2.5$	$23.1 \pm 2.5$	$22 \pm 2.5$	$20.7 \pm 2.5$
Plt	$10^3 / \mu\text{L} \ \& \ 10^9 / \text{L}$	$56 \pm 30$	$56 \pm 30$	$60 \pm 30$	$55 \pm 30$
NEUT%	%	$33.8 \pm 10$	$33.2 \pm 10$	$37.7 \pm 12.4$	$37.8 \pm 12.4$
LYMPH%	%	$40.6 \pm 12$	$48.4 \pm 12$	$47.7 \pm 17.9$	$50.2 \pm 17.9$
MONO%	%	$17.2 \pm 15.8$	$14.7 \pm 11.7$	$12.3 \pm 12$	$2.6 \pm 2$
EO%	%	$2.3 \pm 2$	$1 \pm 1$	$1.8 \pm 1$	$9.4 \pm 6$
BASO%	%	$3.2 \pm 3$	$2.7 \pm 2$	$0.5 \pm 0.5$	$50 \pm 50$

# Aim

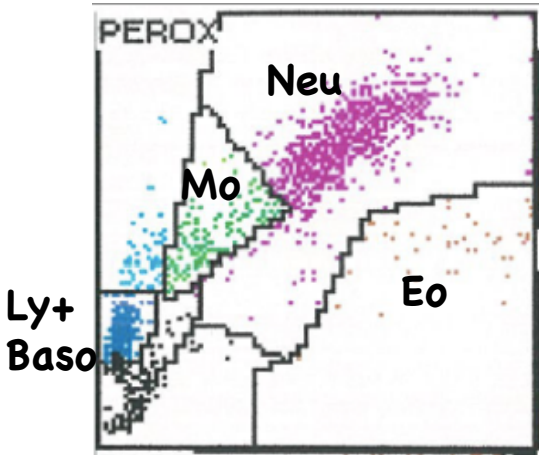
Evaluate applicability of the tri-level-control material -D-check 5 diff- in quality assessment of CBC and WBC differential parameters on different haematology platforms.

# Methods

- four platforms (five labs ten analysers)
- Repeatability on each instrument with 10 within-run measurements.
- Reproducibility on 1 rep of each platforms.
- Imprecision of CBC and WBC differential parameters were calculated by
  - analysers
  - platforms
  - whole study basis



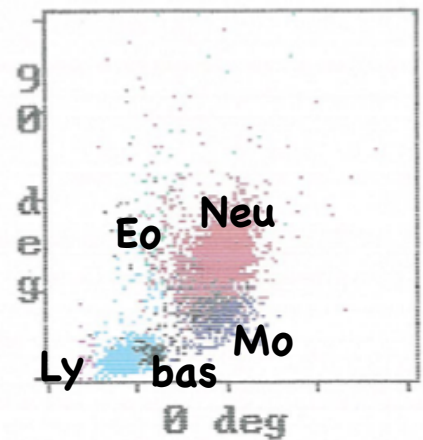
# Platforms



## one Advia 120

(Siemens)  
Flow+ leu  
myeloperoxidase

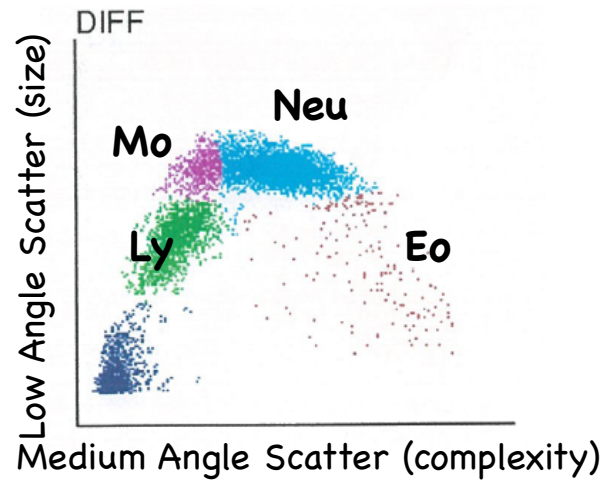
WBC diff: MPO 4-  
part diff +  
basophil channel



## four Cell Dyne 3700

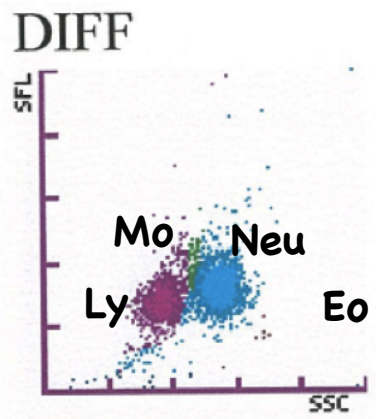
(Abbott)  
electronic impedance  
with high-resolution  
flow cytometry

WBC diff: multi angle  
polarized scatter  
separation



## three BC-5500

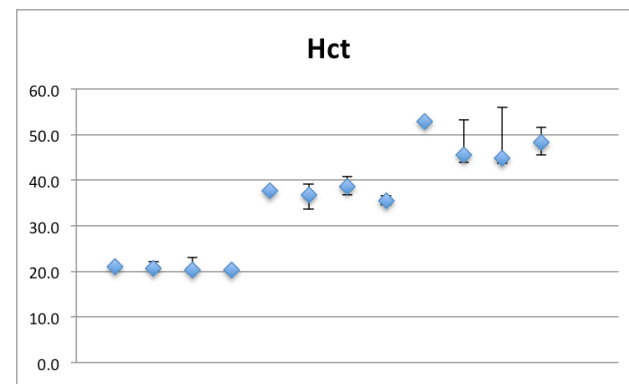
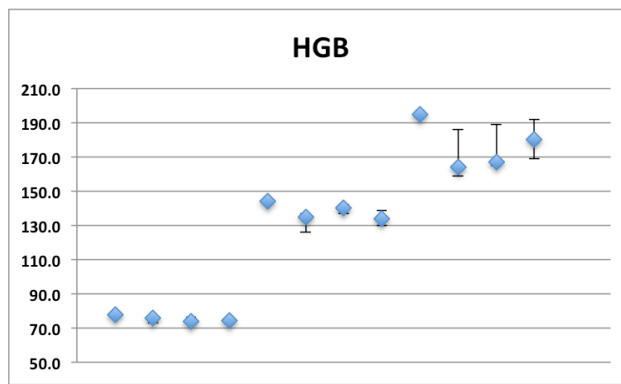
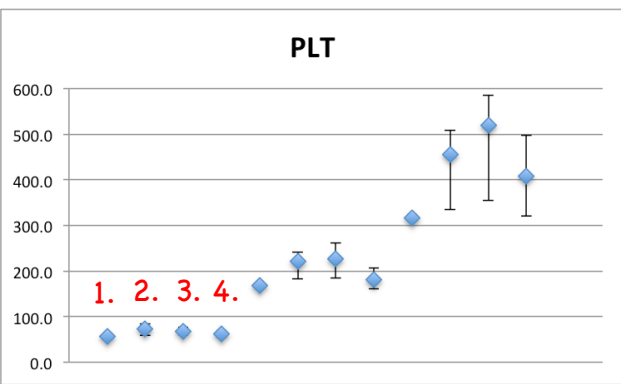
(Mindray)  
WBC diff:  
multidimensional  
optical system and  
absorbance + basophil  
channel  
laser scatter  
technology combined  
with chemical dye  
method and flow  
cytometry



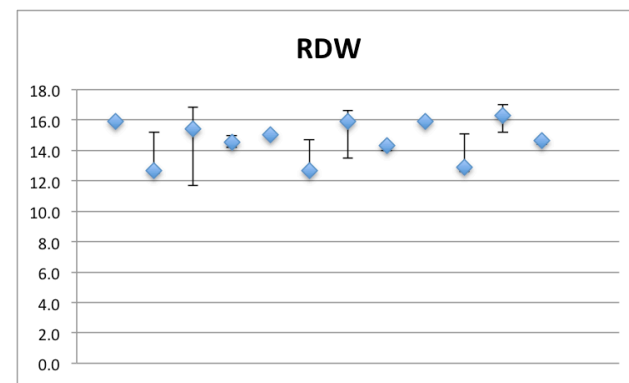
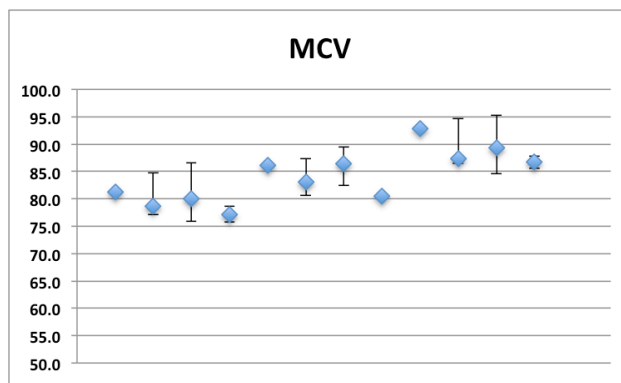
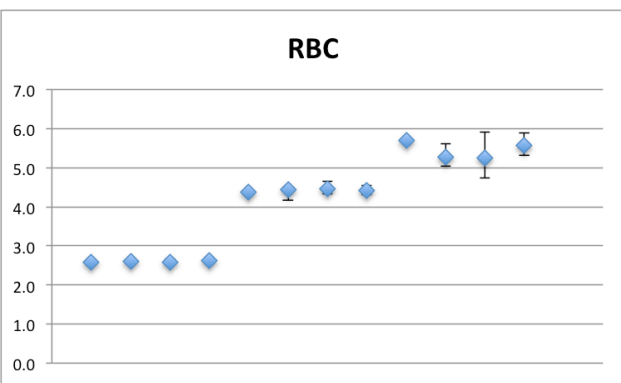
## two XE-2100

(Sysmex)  
fluorescent flow  
cytometry +  
adaptive Cluster  
Analysis System  
+ basophil  
channel

# Imprecision of CBC parameters of D-check on different haematology platforms



LOW NORMAL HIGH



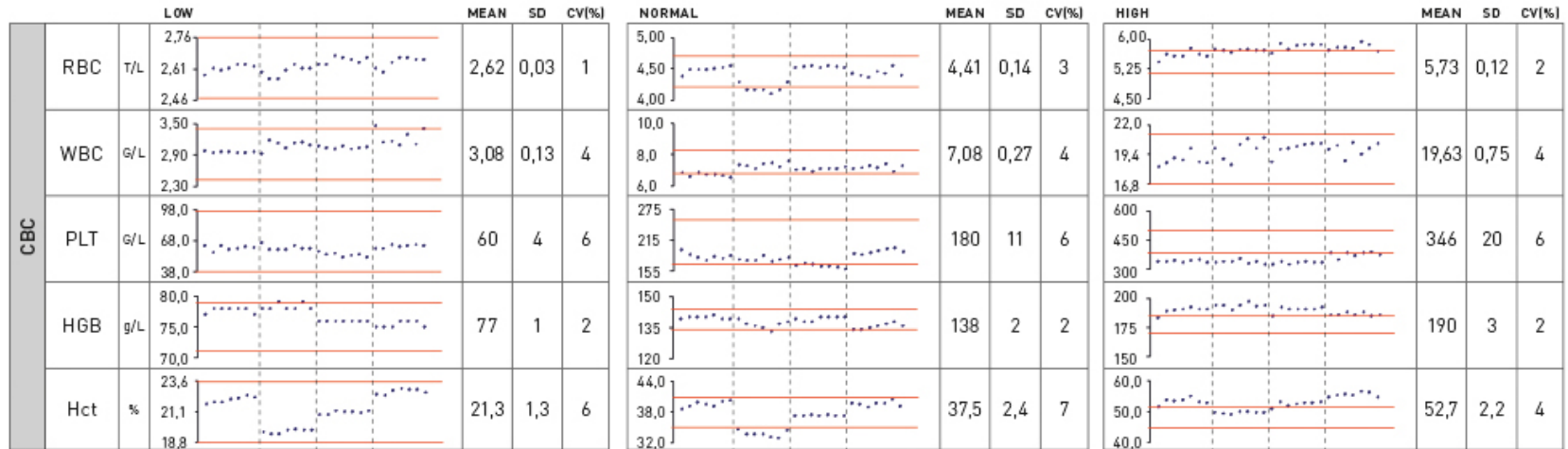
1. Advia 120 (1 site)

2. BC-5500 (3 sites)

4. XE-2100 (2 sites)

3. CellDyn 3700 (4 sites)


# Reproducibility of CBC parameters



1 2 3 4

1 2 3 4

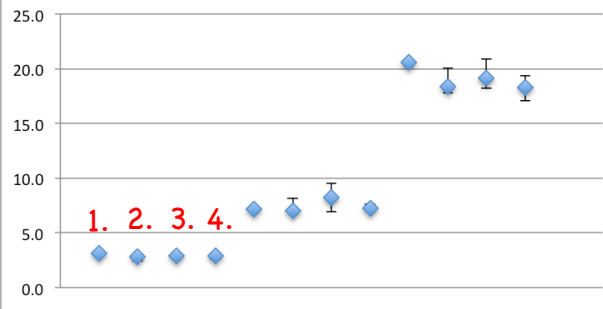
1 2 3 4

1 - BC-5500 (3 sites)    2 - Advia 120 (1 site)     Provisional target range  
 3 - XE-2100 (2 sites)    4 - Cell Dyn 3700 (4 sites)

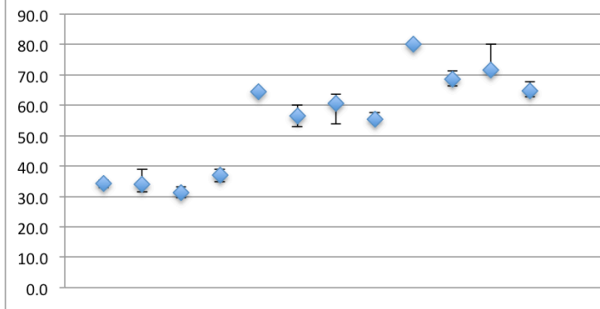


# Imprecision of WBC differential parameters of D-check on different haematology platforms

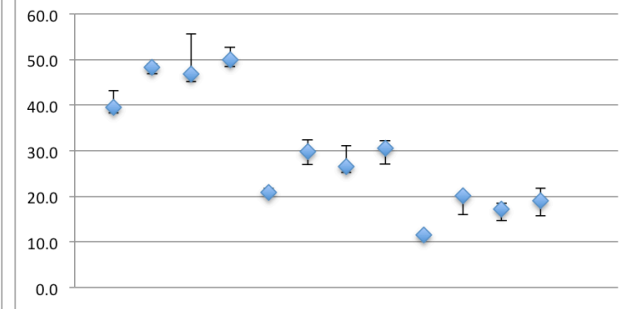
**WBC**



**NEU**

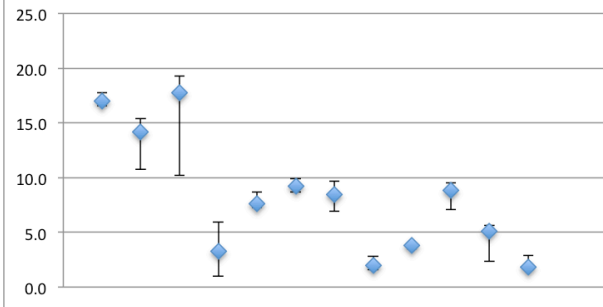


**LYMPH**

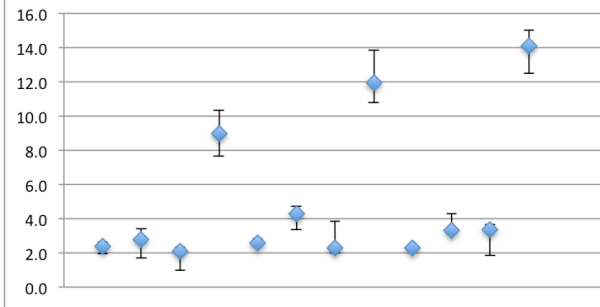


LOW NORMAL HIGH

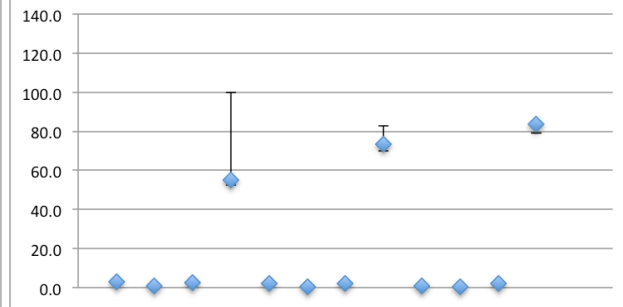
**MONO**



**EOS**



**BASO**



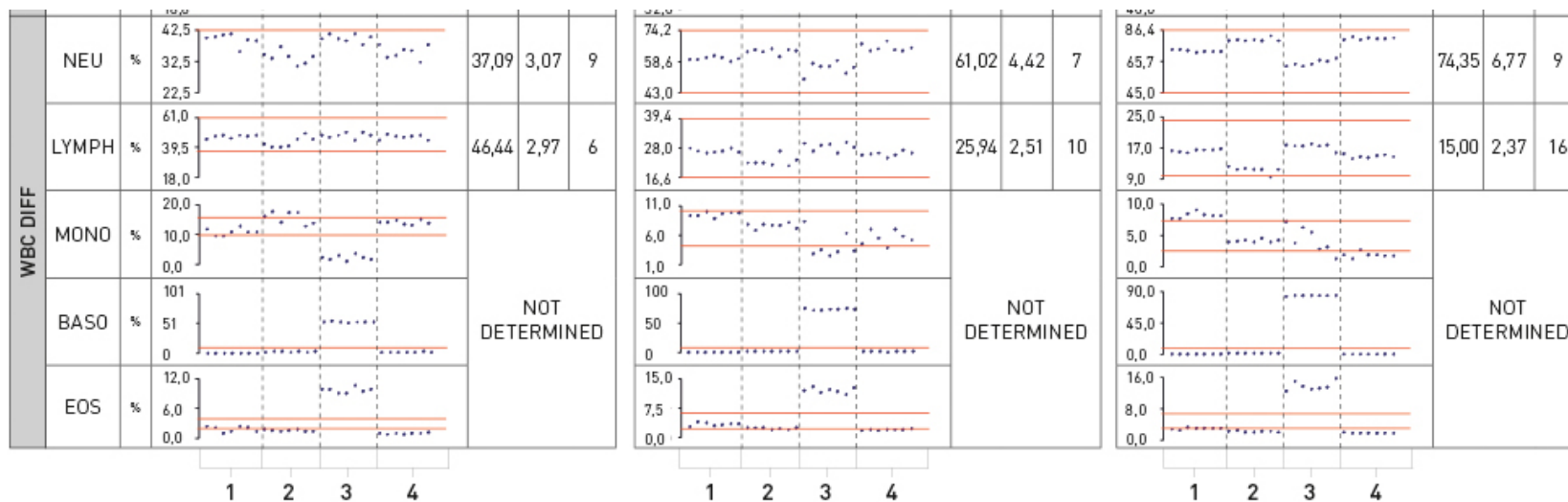
1. Advia 120 (1 site)

2. BC-5500 (3 sites)

3. CellDyn 3700 (4 sites)

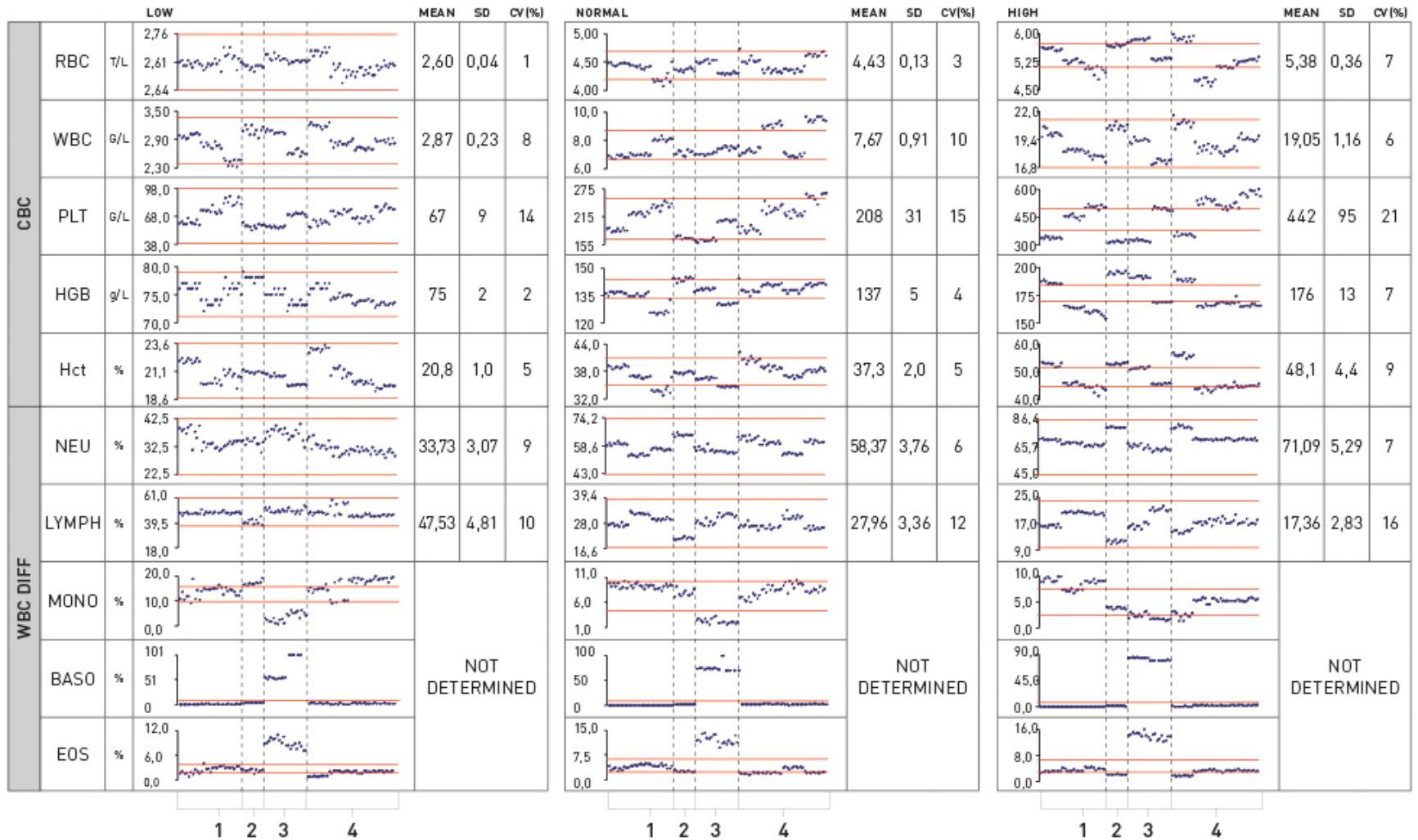
4. XE-2100 (2 sites)

# Reproducibility of WBC-diff parameters



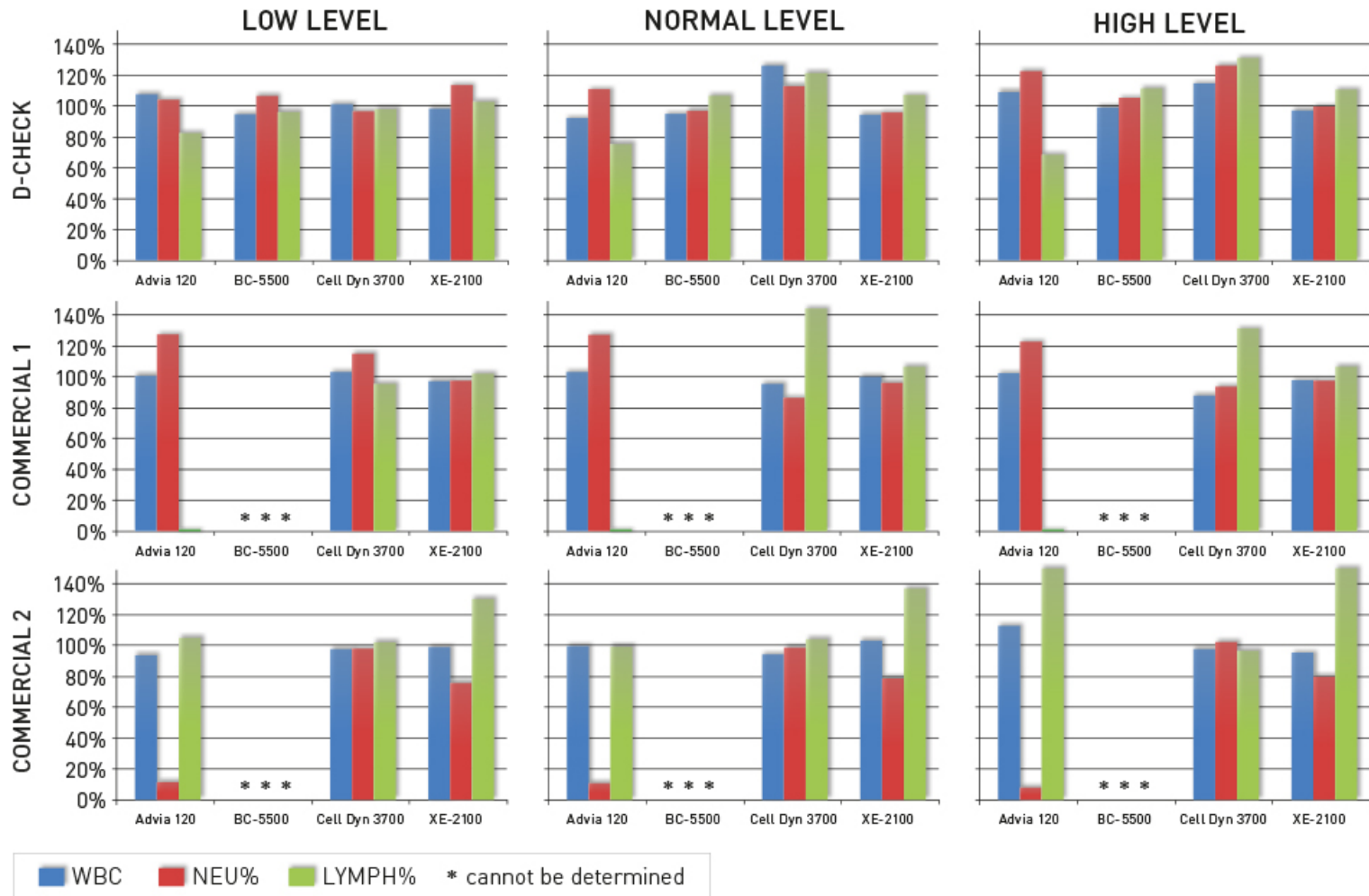
1 - BC-5500 (3 sites)    2 - Advia 120 (1 site)    — Provisional target range  
 3 - XE-2100 (2 sites)    4 - Cell Dyn 3700 (4 sites)

# Repeatability of D-check on different haematology platforms



1 - BC-5500 (3 sites)    2 - Advia 120 (1 site)    — Provisional target range  
 3 - XE-2100 (2 sites)    4 - Cell Dyn 3700 (4 sites)

# Recoveries of WBC, NEU, LYMPH on different quality control materials

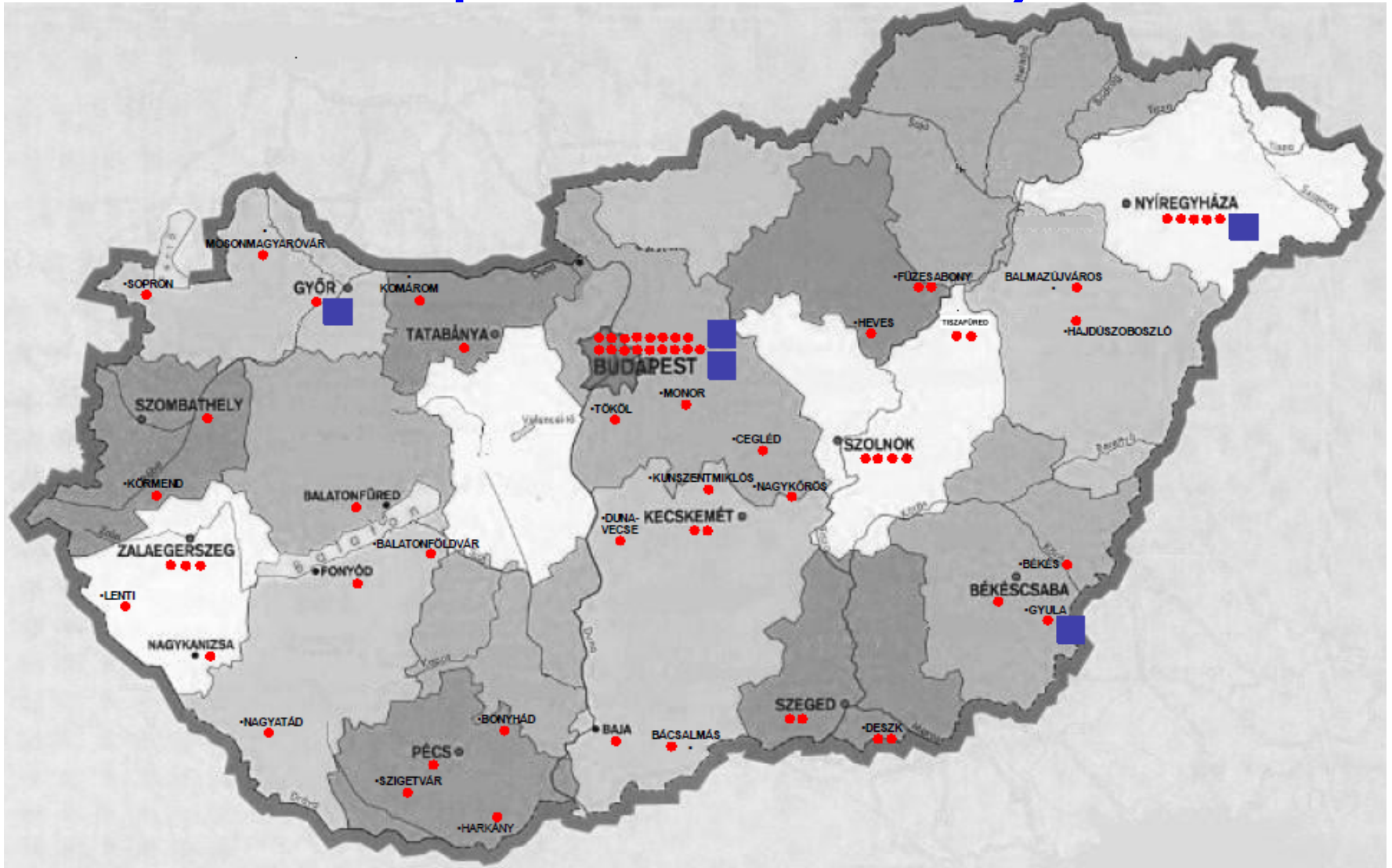


# Conclusions

D-check three-level-control material

- low imprecision of CBC parameters and WBC differential
  - on 10 individual instruments in five laboratories representing 4 haematology analyser platforms.
  - on 4 WBC differential platforms
- Main WBC populations -neutrophil and lymphocyte fractions- of D-check could be measured within very similar target ranges by four different haematology analyser platforms.
- Based on these findings the control material worth further testing for its suitability as a control material in external quality assessment schemes.

# Laboratories invited to participate in pilot EQA study



# Interim report of EQA pilot

Response rate until today 65%

38 laboratories with any of the 4 platforms

Advia 2120	6
Advia 120	2
BC-5500	8
CellDyn3700	4
XT 1800i	7
XE 2100	5
XS-1000i	2
XT, XE 2000i	2
XE 5000	1
XT XE 4000i	1

	LOW				NORMAL			
	Platform 1*	Platform 2	Platform 3	Platform 4**	Platform 1	Platform 2	Platform 3	Platform 4
n	8	8	4	18	8	8	4	18
HB	3%	4%	3%	2%	4%	5%	2%	2%
RBC	5%	2%	2%	3%	3%	3%	2%	2%
MCV	4%	3%	3%	4%	5%	2%	2%	3%
HTC	7%	2%	4%	5%	6%	2%	2%	5%
WBC	7%	3%	5%	4%	5%	3%	5%	3%
PLT	12%	7%	8%	24%	13%	10%	13%	10%
NEU%	22%	6%	2%	13%	8%	2%	1%	10%
LYMPH%	12%	1%	10%	6%	17%	3%	11%	16%

\* - 4 in WBC differential

\*\* - 5 in WBC differential

THANK YOU VERY MUCH FOR  
YOUR ATTENTION