

## Evaluation of three POCT Hematology analyzers for white blood cell analysis

M. Chevallier, W. Wilbie, M. Schoorl, J. van Pelt

Laboratory KCHI, Noordwest Ziekenhuisgroep, Alkmaar, the Netherlands

**Introduction:** Recently several small hematology analyzers for point-of-care purposes were introduced, which can be used for the same analyses as centralized systems but the possibility to use capillary blood from a fingerprick is a serious advantage in several occasions. An interesting example is the follow up of WBC and granulocyte or neutrophil counts in case of clozapine medication, which can cause neutropenia or agranulocytosis.

**Method:** The three tested systems were the WBC DIFF system of Hemocue (Denmark), the Microsemi-CRP of Horiba (Japan) and the Norma Icon hematology analyzer (Austria).

The Microsemi and WBC Diff systems were evaluated simultaneously. For the agreement with the laboratory method 125 samples ( $K_2$ EDTA-blood, patients from general practitioners) were compared with the Sysmex XE-2100. For the agreement of the Norma Icon with the laboratory method 188 samples ( $K_2$ EDTA-blood, 90 clinical and 98 outpatients) were compared with the Sysmex XN-9000.

Intra-assay variation was determined in ten-fold at three levels. Inter-assay variation was performed with QC material on ten different days.

**Results:** The intra assay coefficients of variation of the samples and QC material are in all systems better than stated by the manufacturer (for WBC <3% and for differential fractions <5%) except for the monocyte counts ( $CV\% \pm 25\%$ ).

The agreement of the WBC, granulocyte and lymphocyte counts of the 3 POCT hematology analyzers with Sysmex were calculated with linear regression analysis and Bland-Altman difference analysis (Table). In case of the monocytes the correlation coefficient was inadequate for linear regression.

	R	const.	SE	Prop.	SE	B-A number of deviations
<b>Icon</b>						
WBC	0.998	-0.09	0.047	1.01	0.004	9/188 >6%
Granulocytes	0.998	0.03	0.042	1.04	0.005	34/188 >10%
Lymphocytes	0.989	0.07	0.023	0.92	0.010	66/188 >10%
<b>Microsemi</b>						
WBC	0.996	0.35	0.081	0.94	0.008	16/125 >6%
Granulocytes	0.987	0.58	0.095	0.95	0.014	37/125 >10%
Lymphocytes	0.986	0.08	0.046	0.86	0.013	72/125 >10%
<b>Hemocue</b>						
WBC	0.996	-0.12	0.087	1.03	0.008	21/125 >6%
Neutrophils	0.967	0.66	0.152	0.94	0.022	35/125 >10%
Lymphocyte	0.984	0.19	0.560	0.99	0.016	48/125 >10%

**Conclusion:** All three POCT hematology analyzers are suitable for WBC measurements including differential analyses of granulocytes or neutrophils and lymphocytes in venous blood. However, evaluations with capillary fingerprick blood is another challenge and needs to be performed in an additional study.