

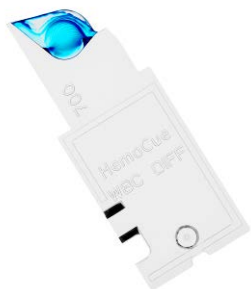
A Novel Technology for 5-Part Differentiation of Leukocytes Point-of-Care

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HemoCue® WBC DIFF System - the first 5-part Diff WBC counter for POCT



Review Results

"Patient" 1/25

WBC	10 ⁹ /L	DIFF	10 ⁹ /L	%
5.4		NEU	2.8	52
		LYM	2.0	38
		MON	0.4	8
		EOS	0.1	1
		BAS	0.0	1

10/30/09 12:06 PM



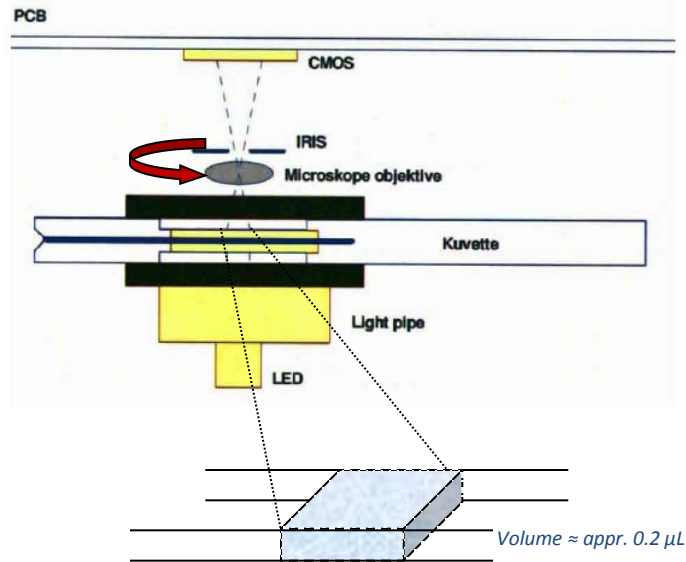
1. Fill the microcuvette with 10 μ L blood
2. Push the button for patient test and place the microcuvette in the cuvette holder
3. The results will be displayed within five minutes

A Photo Microscope is used to detect the stained white cells

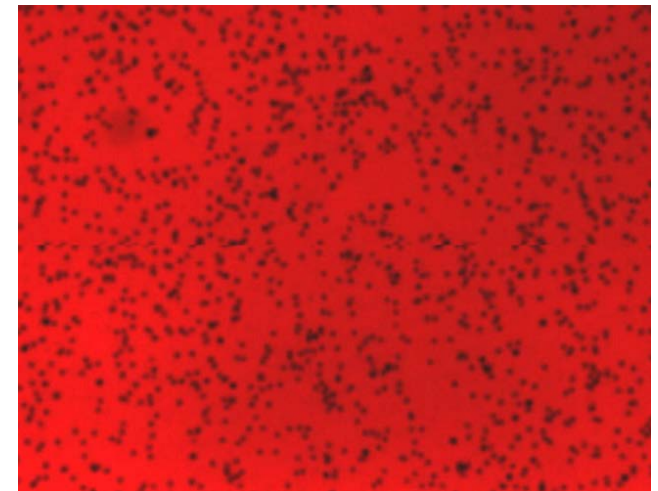
Chemistry in the microcuvette:

Saponin – Haemolyses the red blood cells

Methylene Blue – stains the nucleus of the white cell



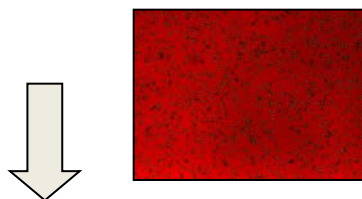
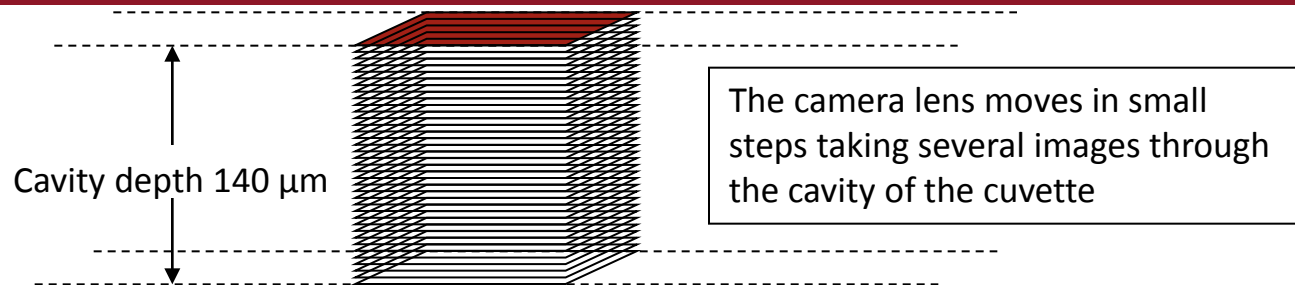
Cuvette chamber with a fixed thickness and a defined detection area gives a fixed volume for enumerations of stained cells



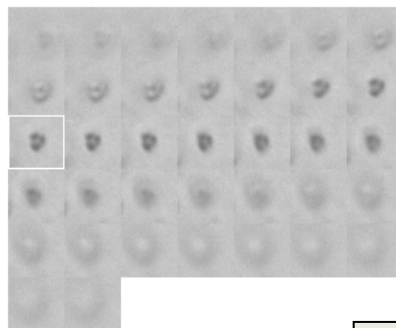
The volume is well specified by having:

- a specific measurement area of the microcuvette
- tight tolerances of the cavity depth in the microcuvette

The cavity is analyzed in separate layers to enable detection of cells at different depths

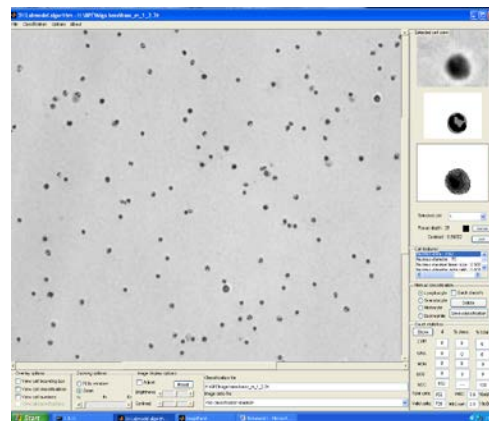


All cells in all images will be cut out



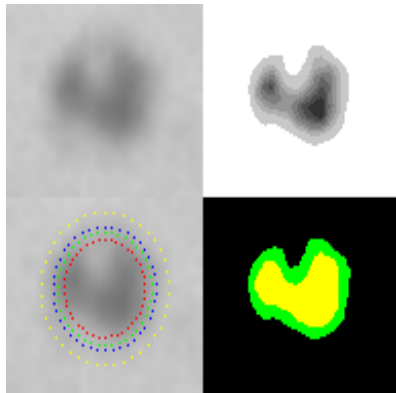
Identifying when each cell is in focus

Mount the focused cells into one image

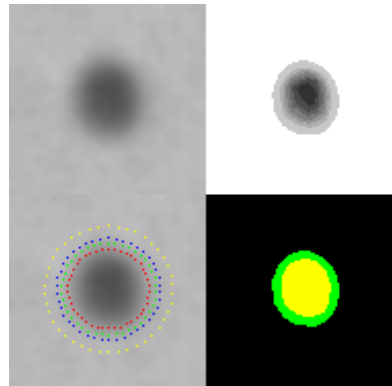


Count WBC and differentiate on this final image

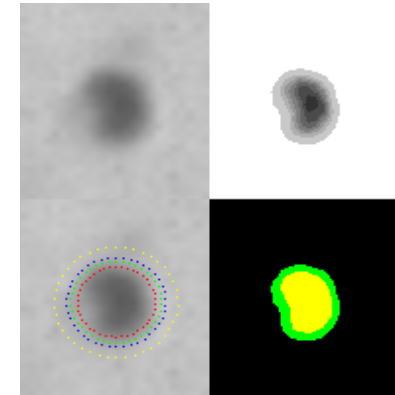
“Photoshopping” of each cell in the images



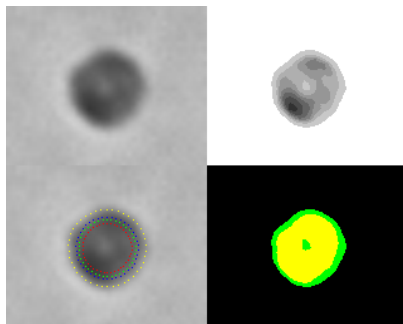
Neutrophils



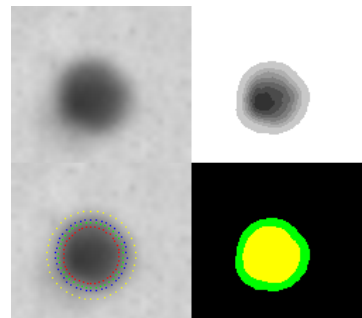
Lymphocytes



Monocytes



Eosinophils



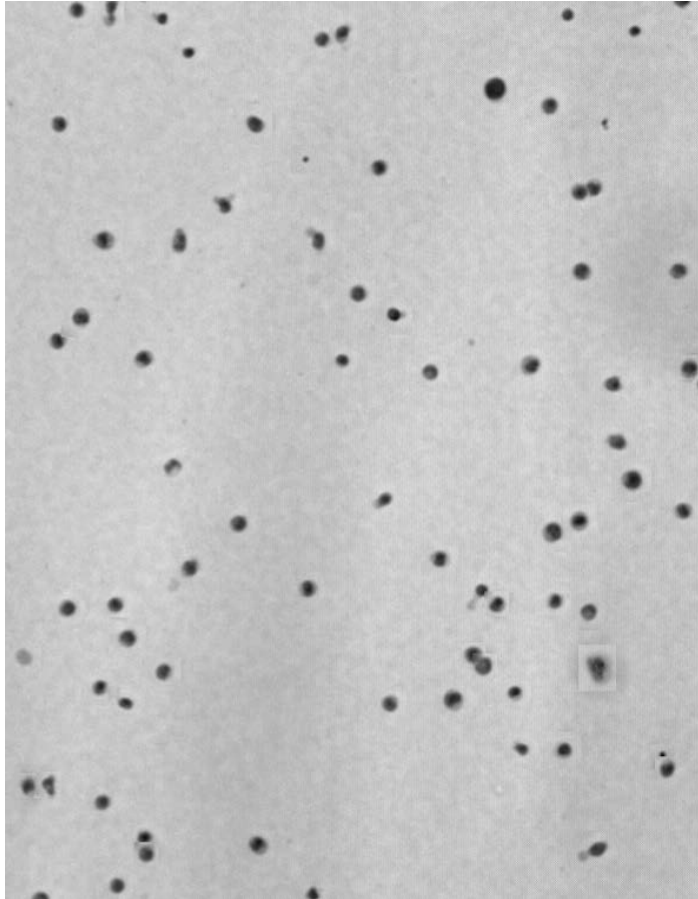
Basophils

Transferring characteristics
into mathematical algorithms

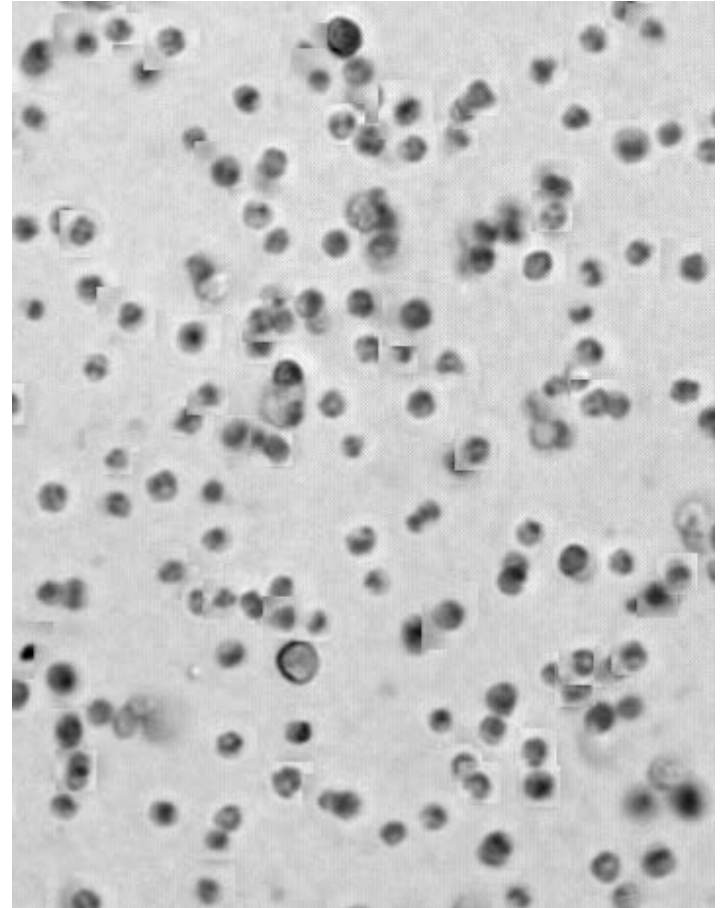
WBC DIFF uses over 30
features and state-of-the-art
image analysis technology

WBC DIFF can identify and flag pathological cells

Sample with 87,5 % blast cells



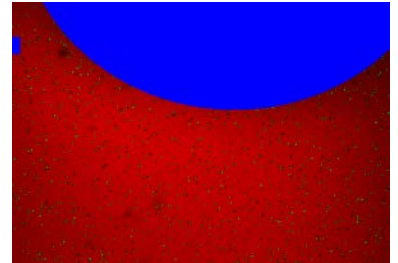
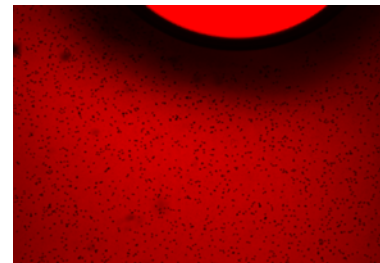
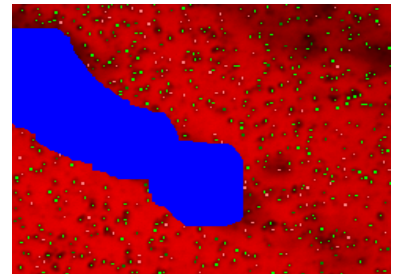
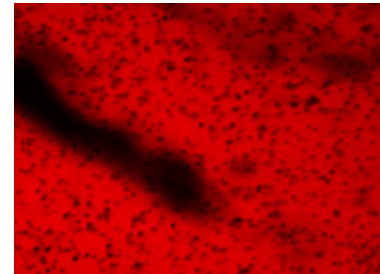
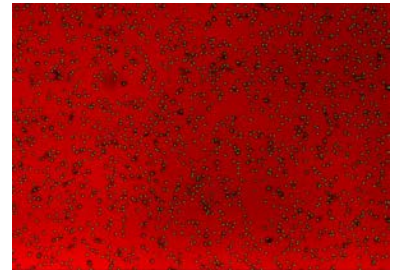
Sample with 25,0 % myelocytes and 4,3 % metamyelocytes



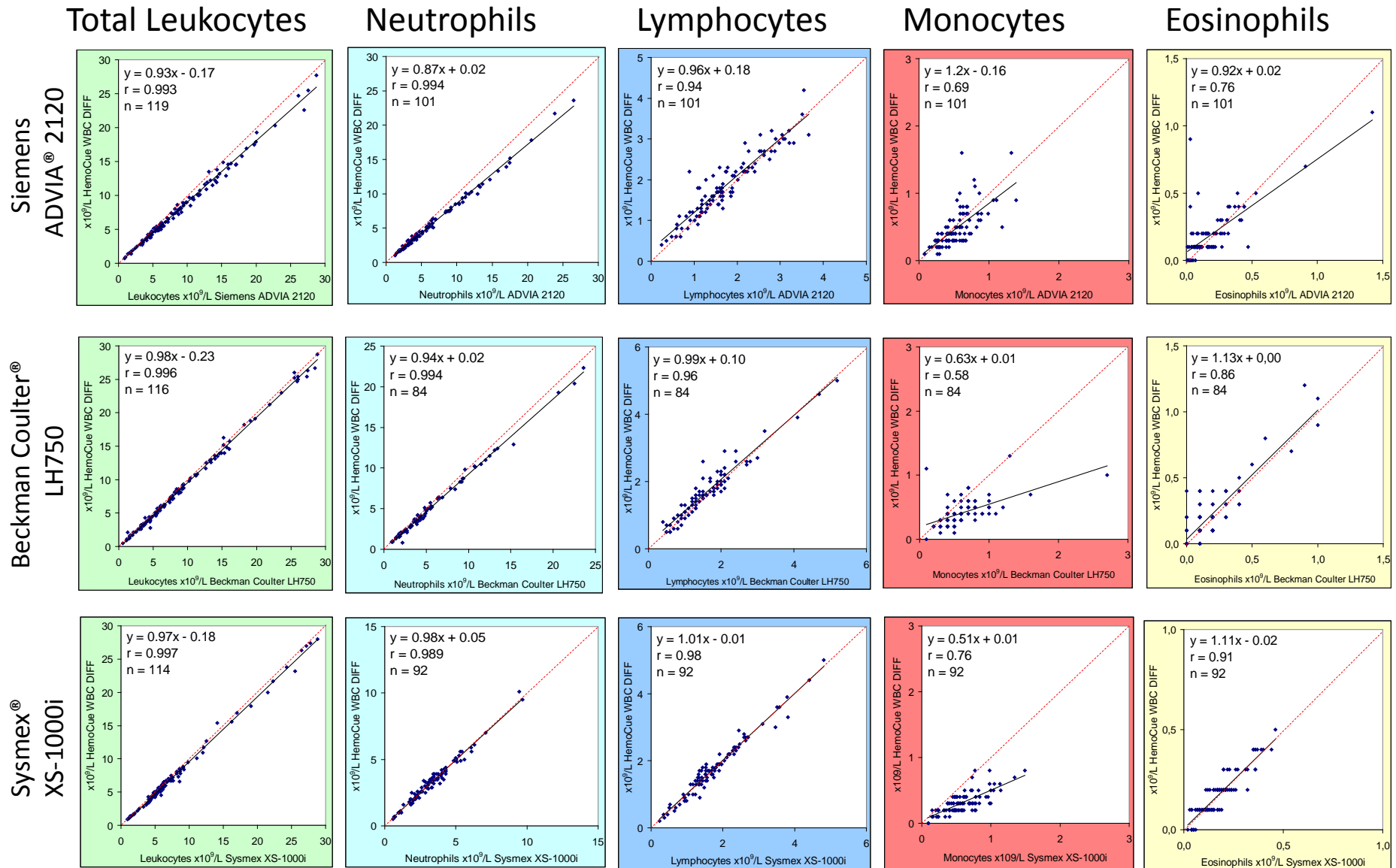


Advanced Internal QC System

1. At power up (“Self test”):
 - Test of electronics and software
 - Blanking test (Quality of light, check for dirt in the optics)
2. Between samples:
 - Blanking test
3. For each sample:
 - Correct sampling detection
 - Bad area detection
 - Out of focus detection
 - Air bubble detection
 - Poor light intensity
 - Bad cell distribution



The results from WBC DIFF correlate well to common laboratory cell counters





WBC DIFF at POC fulfills a clinical unmet need in several care settings and clinical applications

Emergency clinic

- *“We conclude that for clinicians who evaluate patients with a suspected severe infection in the ED, special attention should be directed to the RR, CRP, and WBC, and that low Hb may be an underestimated biomarker in this context”*
Gille-Johnson P., et al., Scand. Journal of Infectious Diseases (2012)
- *“In an emergency care setting, both lymphocytopenia and NLCR are better predictors of bacteremia than routine parameters like CRP level, WBC count and neutrophil count. Attention to these markers is easy to integrate in daily practice and without extra costs.”*
de Jager C.P., et al., Crit Care 14 (2010)

Doctor’s office

- *“In conclusion, the NLCR (Neutrophil to Lymphocyte Count Ratio) may serve as a simple marker for discrimination between severe bacterial and viral infections.”*
Holub M. et al., Cent. Eur. J. Med. (2012)

Pediatric clinic

- White blood cell count can aid judicious antibiotic prescribing in acute upper respiratory infections in children
Casey, J. et al, Clin Pediatr 42 (2003)

Psychiatric clinic

- Monitoring total WBC and neutrophils (NEU) with a point-of-care device during Clozapine treatment on schizophrenic patients
Nielsen, J., et al., Eur. Neuropsychopharmacol. (2011)

Oncology clinic

- Monitoring before next doze of chemotherapy
Price CP, et al, Point-of-care testing; 2nd ed. (2004)



Conclusion

- The novel POCT HemoCue® WBC DIFF technology is built on state-of-the art imaging technology
- The results from the system are accurate and precise and correlate well to laboratory cell counters both in the hands of lab technicians as well as untrained users
- A white blood cell count including a 5-part diff at the point of care will increase the availability of already well established and frequently used lab parameters
- Rapid and easy access will be a valuable tool for physicians in making direct and more well informed decisions in several clinical conditions



Acknowledgements:

- Jönsson, Inger and Nilsson, Magnus, Växjö Central Hospital Clin Chem Dept, Växjö, Sweden
 - Wahlström, Saga, Malmö University Hospital, Clin Chem Dept, Malmö, Sweden ¹
 - Jonasson-Bjäräng, Tomas and Johnsson, Elin, HemoCue AB, Ängelholm, Sweden
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¹⁾ Saga Wahlström has sadly passed away since the study was done, the data has been published by permission from her clinic in Malmö