Automated Body Fluid analysis

6 October 2016 • Gebruikersdag Vlaanderen • Claudia Wienefoet
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Basics about body fluids and its clinical relevance
Clinically relevant decision limits: Viral or bacterial?

Liquor (CSF): 0 – 5 x10^6/L

CAPD: bacterial: WBC > 100 x10^6/L and PMN> 50%

ASCITES: bacterial: PMN> 250 x10^6/L

Pleura: transsudaat (WBC<1000 x10^6/L)
         exsudaat   (WBC>1000 x10^6/L)

Synoviaal: WBC< 2000 x10^6/L (non inflammatory)
            WBC> 2000 x10^6/L (inflammatory)
Cerebrospinal fluid (CSF)

Diagnostic indication to analyse CSF

» Detect / exclude CNS disease

» Therapeutic indication to reduce pressure of CSF if drainage is reduced / blocked

CSF can be obtained by

» Lumbar puncture (spinal tap)

» Ventricular puncture

» Shunt
Pleural fluid

The analysis is performed to identify the cause of the pleural effusion and to detect / exclude the following:

» Infection of the lung / pleura (bacteria, viruses, fungi, protozoans)
  – Even non-infectious pleural effusions may contain up to 5000 cells / μL
  – Normal ranges: < 70% monocytes, < 30% lymphocytes, < 10% neutrophils
    and up to 70% mesothelial cells

» Cancer cells present?
  – Bloody pleural effusion is most often due to cancer invasion

Pleural fluid can be very viscous.
Analysis is performed to identify the cause of the fluid’s presence and to detect / exclude the following:

» Infection of the peritoneum (bacteria, viruses, fungi, protozoans)
  - In bacterial infection the neutrophil count can be very high
  - There is usually no bacterial infection if neutrophils are < 250 / μL (exception in tuberculosis)

» Presence of cancer cells
  - Bloody peritoneal effusion is most often due to cancer invasion
Synovial fluid (joint fluid)

Physiological body fluid inside the joint cavity.

Increased amount of fluid in arthritis and infection.

» Cellular composition:
  - Normally < 180 WBC / μL (mainly mono-nuclear cells)
  - Degenerative, non-inflammatory diseases < 2,000 WBC / μL
  - Inflammation > 2,000 WBC / μL
  - Very high WBC in infection (often > 100,000 / μL, mainly neutrophils).

Synovial fluid can be very viscous.
Pericardial fluid

Abnormal accumulation of fluid in the pericardial cavity (normally only 20-50 mL)

» Causes:
  – Pericarditis
  – Viral infections
  – Inflammatory disorders
  – Cancer that has spread to the pericardium
  – Trichinosis (worm infection)
  – Kidney failure with excessive blood levels of urea / nitrogen
  – Heart surgery
CAPD
Continuous Ambulatory Peritoneal Dialysis

4 times / day approx. 2 L of wash fluid are exchanged

Frequency:
- Ca. 60,000 patients world-wide
- Ca. 3,000 patients in Germany
  (8% of all dialysis patients use this technique)
- Could be suitable for 30 – 35 % of all patients

Benefits:
- Convenience for the patient compared to traditional dialysis systems

Risk:
- Peritonitis (in almost all patients every 20 – 30 months)

Diagnostics:
- Regular analysis of CAPD fluid
BAL fluid (bronchoalveolar lavage)

» One or more segments of the lungs are washed with a sterile physiological saline solution

» BAL is recovered and analysed for types of cells and proteins

» BAL is performed for diagnostic, therapeutic and research purposes
Body fluid analysis on XN-Series
XN-BF

TC-BF
WBC-BF
MN %, #
PMN %, #
RBC-BF

3.5-higher counting volume than counting chamber
XN BF result display

WBC
- Item: WBC-BF
  - Data: 433
  - Unit: 10^6/L

RBC
- Item: RBC-BF
  - Data: 0.037
  - Unit: 10^6/uL

WBC Differential

- Item: MN#
  - Data: 130
  - Unit: 10^6/L

- Item: PMN#
  - Data: 303
  - Unit: 10^6/L

- Item: MN%
  - Data: 30.8
  - Unit: %

- Item: PMN%
  - Data: 79.2
  - Unit: %

- Item: TC-BF#
  - Data: 455
  - Unit: 10^6/L

2013/07/31 01:04:06
Research parameter in BF mode

HF-BF
NE-BF
LY-BF
MO-BF
EO-BF
RBC-BF2

<table>
<thead>
<tr>
<th>Item</th>
<th>Data</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC-BF</td>
<td>433</td>
<td>10^6/L</td>
</tr>
<tr>
<td>RBC-BF</td>
<td>0.037</td>
<td>10^6/µL</td>
</tr>
<tr>
<td>MN#</td>
<td>130</td>
<td>10^6/L</td>
</tr>
<tr>
<td>PMN#</td>
<td>303</td>
<td>10^6/L</td>
</tr>
<tr>
<td>MN%</td>
<td>30.0</td>
<td>%</td>
</tr>
<tr>
<td>PMN%</td>
<td>70.0</td>
<td>%</td>
</tr>
<tr>
<td>TC-BF#</td>
<td>455</td>
<td>10^6/L</td>
</tr>
<tr>
<td>HF-BF#</td>
<td>22</td>
<td>10^6/L</td>
</tr>
<tr>
<td>HF-BF%</td>
<td>5.1</td>
<td>/100 WBC</td>
</tr>
<tr>
<td>RBC-BF2</td>
<td>0.0373</td>
<td>10^6/µL</td>
</tr>
<tr>
<td>NE-BF#</td>
<td>302</td>
<td>10^6/L</td>
</tr>
<tr>
<td>NE-BF%</td>
<td>69.8</td>
<td>%</td>
</tr>
<tr>
<td>LY-BF#</td>
<td>50</td>
<td>10^6/L</td>
</tr>
<tr>
<td>LY-BF%</td>
<td>11.5</td>
<td>%</td>
</tr>
<tr>
<td>MO-BF#</td>
<td>80</td>
<td>10^6/L</td>
</tr>
<tr>
<td>MO-BF%</td>
<td>18.5</td>
<td>%</td>
</tr>
<tr>
<td>EO-BF#</td>
<td>1</td>
<td>10^6/L</td>
</tr>
<tr>
<td>EO-BF%</td>
<td>0.2</td>
<td>%</td>
</tr>
</tbody>
</table>
## Technical specifications

### Linearity

#### Linearity for WB mode

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC</td>
<td>within ±3% or ±0.20 x 10^9/μL (0.00 to 100.00 x 10^9/μL)</td>
</tr>
<tr>
<td></td>
<td>within ±6% (100.01 to 310.00 x 10^9/μL)</td>
</tr>
<tr>
<td></td>
<td>within ±11% (310.01 to 440.00 x 10^9/μL)</td>
</tr>
<tr>
<td>RBC</td>
<td>within ±2% or ±0.03 x 10^6/μL (0.00 to 8.00 x 10^6/μL)</td>
</tr>
<tr>
<td></td>
<td>within ±4% or ±0.06 x 10^6/μL (8.01 to 8.80 x 10^6/μL)</td>
</tr>
<tr>
<td>HGB</td>
<td>within ±2% or ±0.2 g/dL (0.0 to 25.0 g/dL, 0.00 to 15.52 mmol/L)</td>
</tr>
<tr>
<td></td>
<td>within ±5% or ±0.5 g/dL (25.1 to 26.0 g/dL, 15.53 to 16.14 mmol/L)</td>
</tr>
<tr>
<td>HCT</td>
<td>within ±3% or ±1.0 HCT (0.0 to 75.0%)</td>
</tr>
<tr>
<td>PLT</td>
<td>within ±5% or ±10 x 10^9/μL (0 to 1000 x 10^9/μL)</td>
</tr>
<tr>
<td></td>
<td>within ±6% (1001 to 5000 x 10^9/μL)</td>
</tr>
<tr>
<td>PLT</td>
<td>within ±7% or ±10 x 10^9/μL (0 to 5000 x 10^9/μL)</td>
</tr>
<tr>
<td>PLT</td>
<td>within ±10% or ±20 x 10^9/μL (0.00 to 20.00 x 10^9/μL)</td>
</tr>
<tr>
<td>NRBC#</td>
<td>within ±10% or ±20 x 10^9/μL (0.00 to 20.00 x 10^9/μL)</td>
</tr>
<tr>
<td>NRBC%</td>
<td>within ±20% or ±2.0 NRBC% (0.0 to 600.0/100WBCC)</td>
</tr>
<tr>
<td>RET%*4</td>
<td>within ±20% or ±0.30 RET% (0.00 to 30.00%)</td>
</tr>
<tr>
<td>RET#*4</td>
<td>within ±20% or ±0.0150 x 10^6/μL (0.0000 to 0.7200 x 10^6/μL)</td>
</tr>
</tbody>
</table>

*1 PLT counted in the RBC/PLT channels (PLT particle size distribution).
*2 PLT counted in the RET channels.
*3 PLT counted in the PLT-F channels.
*4 These items do not appear with all analyzer types.

#### Linearity for body fluid analysis

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC-BF</td>
<td>within ±0.010 x 10^9/μL (0.000 to 0.050 x 10^9/μL, RBC &lt; 1.000 x 10^9/μL)</td>
</tr>
<tr>
<td></td>
<td>within ±20% (0.051 to 10.000 x 10^9/μL, RBC &lt; 1.000 x 10^9/μL)</td>
</tr>
<tr>
<td>RBC-BF</td>
<td>within ±2% or ±0.010 x 10^9/μL (0.000 to 5.000 x 10^9/μL)</td>
</tr>
<tr>
<td>TC-BF#</td>
<td>within ±0.010 x 10^9/μL (0.000 to 0.050 x 10^9/μL, RBC &lt; 1.000 x 10^9/μL)</td>
</tr>
<tr>
<td></td>
<td>within ±20% (0.051 to 10.000 x 10^9/μL, RBC &lt; 1.000 x 10^9/μL)</td>
</tr>
</tbody>
</table>

*1 The HPC analysis can only be performed if the instrument offers the HPC analysis mode.
*2 The body fluid analysis can only be performed if the instrument offers the body fluid analysis mode.
Technical specifications

Carryover

Carryover

<table>
<thead>
<tr>
<th>Carryover [Body Fluid] mode</th>
<th>WBC-BF</th>
<th>RBC-BF</th>
<th>TC-BF#</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.3 %</td>
<td>0.3 %</td>
<td>0.3 %</td>
</tr>
<tr>
<td></td>
<td>or 0.001 x 10^3/μL or less</td>
<td>or 0.003 x 10^6/μL or less</td>
<td>or 0.001 x 10^3/μL or less</td>
</tr>
</tbody>
</table>

LoB, LoD and LoQ

LoB, LoD, LoQ (Informative)
Limits of detection and quantitation were performed on the WBC, RBC, HGB, HCT, PLT-F and PLT-I, parameters in accordance with CLSI EP17-A approved guideline. The instrument diluent (Cellpack DCL) was used as a blank sample and run 60 consecutive times in the Whole Blood Automated analysis mode. Samples with the target concentrations listed below were run 60 consecutive times in the Whole Blood Automated analysis mode. The dilutions were done with the instrument diluent.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>LoB</th>
<th>LoD</th>
<th>LoQ</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC-BF</td>
<td>0.000</td>
<td>0.001 to 0.001</td>
<td>0.001</td>
<td>x 10^5/μL</td>
</tr>
<tr>
<td>RBC-BF</td>
<td>0.000</td>
<td>0.000 to 0.001</td>
<td>0.001</td>
<td>x 10^6/μL</td>
</tr>
</tbody>
</table>
XN CHECK BF

- Available in two concentration levels:
  - L1 contains approx. 80 cells/μL WBC and 0.03 x 10^6 cells/μL RBC.
  - L2 contains approx. 300 cells/μL WBC and 0.08 x 10^6 cells/μL RBC.

- Parameters: WBC-BF, RBC-BF, PMN #/%, MN #/%, TC-BF

- Period of use: 8 weeks per lot

- Open vial stability: 30 days if stored at 2 - 8 °C.

- Volume: 3.0 mL per vial
Body fluid – scattergram examples
Extended IPU BF rule set:
All Body fluids appears in the validation list
In order to support the technical validation optimally
the specification of collection source is required
Cut OFF-values are customisable
Recomendation: check always the plausibility of scattergram

**Example:**
- Cellcount within reference range

**Cases:**
**CSF**

**Counting chamber**
WBC: $2,72 \times 10^6/l$
Cases: CSF

Counting chamber
WBC: 84,32 × 10^6/L

Extended IPU BF rule set:
All Body fluids appears in the validation list
In order to support the technical validation optimally
the specification of collection source is required
Cut OFF-values are customisable
Recommendation: check always the plausibility of scattergram

Example:
• Pleocytosis > Cytospin
Extended IPU BF rule set:. All Body fluids appears in the validation list In order to support the technical validation optimally the specification of collection source is required Cut OFF-values are customisable Recomendation: check always the plausibility of scattergram

**Example:**
- Pleocytosis > Cytospin
Ghost region is well separated. Because of high HF-BF a cytospin should be performed.
Cases: Ascites

Extended IPU BF rule set:
All Body fluids appears in the validation list
In order to support the technical validation optimally
the specification of collection source is required
Cut OFF-values are customisable
Recomendation: check always the plausibility of scattergram

Example:
- Granulocytosis
**Cases: Pleura**

Extended IPU BF rule set:
All Body fluids appears in the validation list
In order to support the technical validation optimally the specification of collection source is required
Cut OFF-values are customisable
Recommendation: check always the plausibility of scattergram

**Example:**
- Cellcount > Cytospin
Cases: Unknown fluid

Extended IPU BF rule set:
All Body fluids appears in the validation list
In order to support the technical validation optimally
the specification of collection source is required
Cut OFF-values are customisable
Recommendation: check always the plausibility of scattergram

Example:
- No rule check > missing collection source
## Cases

**CAPD : Eosinophilic peritonitis !**

### Measurement Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Data</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC-BF</td>
<td>802</td>
<td>$10^6/L$</td>
</tr>
</tbody>
</table>

### Research Parameters

<table>
<thead>
<tr>
<th>Item</th>
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<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-BF#</td>
<td>9</td>
<td>$10^6/L$</td>
</tr>
<tr>
<td>HF-BF%</td>
<td>1.1</td>
<td>/100 WBC</td>
</tr>
<tr>
<td>TC-BF#</td>
<td>811</td>
<td>$10^6/L$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Data</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>EO-BF#</td>
<td>567</td>
<td>$10^6/L$</td>
</tr>
<tr>
<td>EO-BF%</td>
<td>70.7</td>
<td>%</td>
</tr>
</tbody>
</table>

### WBC Differential

<table>
<thead>
<tr>
<th>Item</th>
<th>Data</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN#</td>
<td>176</td>
<td>$10^6/L$</td>
</tr>
<tr>
<td>PMN#</td>
<td>626</td>
<td>$10^6/L$</td>
</tr>
<tr>
<td>MN%</td>
<td>21.9</td>
<td>%</td>
</tr>
<tr>
<td>PMN%</td>
<td>78.1</td>
<td>%</td>
</tr>
</tbody>
</table>

### Flag

- [ ] RBC-BF 0.3 $10^9/L$
Body fluid – scattergram examples…
with interferences
Possible interferences

- Liposoms (Part of medication e.g DepoCyt)
- Bacteria
- Damaged cells („Zellschrott“)
- Tissue cells because of Shunt
- PLT-aggregate in case of bleeding
Examples for interferences

Bacteria interference

Cell fragments (CSF from shunt)

Liposomes „Banana shape“

These screenshots are examples. Mentioned interferences can cause also different scatterplots.
Product information:
Interferences by liposomes

Product Information
Interference by liposomes in the WBC count of the XN-Series Body Fluid Mode in CSF samples

Date: 17 November 2014
Subject: Interference in WBC-channel by liposomes
Issued by: SYSTEMEX EUROPE GMBH
Number: 141117-HKA
Keywords: CSF, liposomes, interference, DepoCyt, cytospin

1. Phenomenon

Recently, Sysmex Europe received cases which showed interference by a liposome drug called cytarabine (DepoCyt) in cerebrospinal fluid samples. Affected were the WBC and RBC count in the XN-1000i and the XN-E600i in the Body Fluid Mode. This resulted in a high WBC and RBC value which were artificially increased due to the liposomes in the cerebrospinal fluid sample. The liposomes are recognized in the scattergram of the WBC channel by a typical banana-shaped distribution of the neutrophil population. However, currently the XN software algorithms cannot detect this typical shape in the scattergram for flagging purposes, therefore the user needs to look at the scattergram by itself. Please find included some examples on pages 3 and 4 of the product information.

1.1 Liposomes

Liposomes are lipid particles (vesicles) which can be used as a vehicle in the administration of pharmaceutical drugs and are therefore known as drug delivery systems (DDS). They are provided to the patient through an intravenous injection into the venous canal (subcutaneous space) so that it reaches the cerebrospinal fluid. Fields of application include the use of liposomes as targeted DDS systems that introduce drugs that treat cerebral diseases, particularly neurodegenerative. The drug needs to be given by this way in order to avoid the blood brain barrier. The same drug given orally must enter the bloodstream and may not be able to pass out and into the brain. Therefore, intravenous injection is being used for the above-mentioned group of patients. One of these drugs which is expected to cause interference in the XN-1000i Body Fluid Mode is liposomal cytarabine also called DepoCyt (Pharmanova) which is in the treatment of malignant lymphomatous meningitis.

1.1.1 Influence in the Body Fluid Mode of XN-Series

If a cerebrospinal fluid sample is taken in the same time span as the liposome test, these liposomal particles which contain stromal nuclei shown in the scattergram of the XN Series and affect the WBC-RBC count. Interference by liposomes in cerebrospinal fluid samples will be artificially increased to a level that a normal CSF sample with WBC concentrations will show abnormal high WBC values in the range from ca. 15 - 600 WBC/µl.

1.1.2 Are liposome particles found in the cytospin smear?
The centrifugal force in the cytospin centrifuge is affecting these particles that no liposomes are found in the smear. However, these particles can be visualized in the cytospin smear during the normal WBC count even without the centrifugal force.
Check RBC-BF Histogram and WDF-Scattergram

In case of interferences in GHOST region are falsely elevated RBC-BF, WBC-BF and TC-BF possible!

Possible interferences:
Bacteria, „Debris”
In case of interferences in GHOST region are falsely elevated RBC-BF, WBC-BF and TC-BF possible!

Possible interferences:
Bacteria, "Debrist"
Scattergrams with interferences: CSF

WDF scatterplot is unreliable: WBC abn scattergram.

The count has to be checked.
WDF scatterplot is unreliable: WBC abn scattergram.

The count has to be checked.
Points of attention and considerations for handling body fluid samples

» Analyse as soon as possible after collecting the sample. Particularly in the case of cerebrospinal fluid (CSF), it has been indicated that cell breakdown starts to occur within one hour after collection*.
  * CLSI H56-A: Clinical and Laboratory Standards Institute H56-A

» Excessive mixing of a body fluid sample may cause false WBC-BF and TC-BF# values. Mix as gently as possible.

» For automated analysis:
  Blood aspiration sensor not used (minimum sample volume required for analysis should be checked by the operator, high risk of wrong count).
Scientific publications
Validation of the body fluid module on the new Sysmex XN-1000 for counting blood cells in cerebrospinal fluid and other body fluids

Chérina Fleming, Rob Brouwer, Jan Lindemans and Robert de Jonge*

Department of Clinical Chemistry, Erasmus MC, University Medical Center Rotterdam, Rotterdam, The Netherlands

Abstract

Background: We evaluated the body fluid (BF) module on the new Sysmex XN-1000 for counting blood cells.

Introduction

Analysis of white blood cells (WBCs) and red blood cells (RBCs) in body fluids (BF) are important for detecting signs of organ injury or infection, which can cause fluid formation in several diseases (1). For example, the presence of elevated WBCs (differential) and/or RBCs in cerebrospinal fluid (CSF) may aid in the diagnosis of meningitis, encephalitis, brain abscess, multiple sclerosis and intracerebral hemorrhage (2). Diseases such as: tuberculosis, congestive
Customer information:
Literature List – Body Fluids

Cerebrospinal Fluid (CSF)


What we see as the essence: Excellent reviewer on body fluid analysis. An analysis was performed, including the XE-5000, 3X (Semia) and UF-2000. The authors concluded that a multivariable method for determination of blood cell counts is necessary for accurate measurement.


What we see as the essence: It was found that cell counts obtained from the XN-9000 body fluid mode were comparable to counts obtained from microscopy. The authors recommend that samples with highly dissociated cells (HDCs) should be further analyzed.


What we see as the essence: This software is an improvement for cerebrospinal fluid analysis. It was observed that the XE-5000 UF mode had a higher sensitivity for detecting nucleated cells.


What we see as the essence: This study compared the performance of the XE-1500 for counting blood cells in cerebrospinal fluid and other body fluids.


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What we see as the essence: This study compared the performance of the XE-1500 for counting blood cells in cerebrospinal fluid and other body fluids.
Vragenlijst BF –
Bedankt voor het invullen!
1.1 Hoe worden hematologische analyse van vochten uitgevoerd? (24 responses)

- Manuele methode (ga door naar vraag 2)
- Automatische methode (ga door naar vraag 1.2)
- Combinatie van beiden (ga door naar vraag 1.2)
1.2 Welk toestel gebruikt u hiervoor (19 responses)

» 13x XN serie
» 4 x XE-5000/XE2100
» 4x XT-4000/XT-2000
» 1x XS
» 1x UF-1000
2. Voor welk type vochten gebruikt u de automatische methode? (21 responses)

<table>
<thead>
<tr>
<th>Vochten</th>
<th>Aantal</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleuravocht</td>
<td>17</td>
<td>81%</td>
</tr>
<tr>
<td>Peritoneaal vocht</td>
<td>11</td>
<td>52.4%</td>
</tr>
<tr>
<td>Ascites vocht</td>
<td>17</td>
<td>81%</td>
</tr>
<tr>
<td>Pericard vocht</td>
<td>10</td>
<td>47.6%</td>
</tr>
<tr>
<td>Synoviaal vocht</td>
<td>17</td>
<td>81%</td>
</tr>
<tr>
<td>BAL vocht</td>
<td>-7</td>
<td>33.3%</td>
</tr>
<tr>
<td>Lumbaal vocht</td>
<td>16</td>
<td>76.2%</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>19%</td>
</tr>
</tbody>
</table>

3. Voor welk type parameters gebruikt u de automatische methode?
(21 responses)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Aantal</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bepaling tota...</td>
<td>-10</td>
<td>47.6%</td>
</tr>
<tr>
<td>Bepaling WBC</td>
<td>20</td>
<td>95.2%</td>
</tr>
<tr>
<td>Bepaling RBC</td>
<td>18</td>
<td>85.7%</td>
</tr>
<tr>
<td>WBC-different...</td>
<td>-11</td>
<td>52.4%</td>
</tr>
<tr>
<td>Polymor/mo...</td>
<td>-9</td>
<td>42.9%</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>9.5%</td>
</tr>
</tbody>
</table>
4. Wat rapporteert u vanuit de automatische methode? (20 responses)

- Totaal aantal...
- Het aantal W...
- Het aantal R...
- WBC-differen...
- Other

5. Uit welke cel-populaties bestaat uw cel differentiatie voor de verschillende vochten? Hematologische cellen:
(23 responses)

- Neutrofielen
- Eosinofielien
- Basofielien
- Lymfocyten
- Monocyten
- Macrofagen
- Mesotheel...
6.1 Bij een vraag naar maligniteit, in welk labo wordt het cytologisch onderzoek uitgevoerd?
(23 responses)
6.2 Zijn er voor deze vochten verschillende procedures? (20 responses)

» 5x ja, 4x neen
» Alles zelfde procedure behalve BAL steeds manueel
» Ja, voornamelijk pré analytisch en in het al of niet rapporteren van differentiatie
» Ja, in functie van viscositeit en macroscopisch uitzicht van het vocht.
» afh resultaat wordt resultaat automaat manueel gecontroleerd
» Verschillend voor lumbaal vocht, gewrichtsvocht en andere vochten
» Bij te hoog aantal WBC in pleura of gewrichtsvocht of ascitesvocht: verdunnen staal
» cytospin maken (hoeveelheid vocht afhankelijk van cytose)
» Vraag voor cytologie, wordt steeds gescreend voor maligniteit
» CSV en niet-CSV (verschillende rules)
» nee, differentiatie en opsporen maligniteit is altijd via microscopie
» neen (hematologische maligniteit: flow cytometrie)
7.1 Wat zijn de in het labo gebruikte grenzen voor de rapportage van Cytose? (16 responses)

» steeds gerapporteerd
» nvt
» afhankelijk van vocht
» verschilt van soort BF
» gerapporterde waarde Xn
» Niet gerapporteerd
» 0.005 x10E3/µL
» Vocht-afhankelijk
» CSV: < 5
» CSV <10/µL; andere geen refw vermeld, wel diff >250/µL
» Afhankelijk van type vocht
Vragenlijst BF

7.2 Wat zijn de in het labo gebruikte grenzen voor de rapportage van WBC? (20 responses)

- 2x < 0 / µL
- 2x < 1/µL
- 2x < 2/µL
- 3x < 5/ul voor LV
- 1x`` < 10/µl
- cf 7.1

- 2x < 200/µL andere vochten
- < 200 WBC/µl voor gewrichtsvocht, geen grenzen voor andere vochten

- verschilt van soort BF/Vocht-afhankelijk/afhankelijk van type vocht

- Xn word gerapporteerd
- worden niet gerapporteerd
7.3 Wat zijn de in het labo gebruikte grenzen voor de rapportage van RBC?

- <100/µL
- 2x <1000/µL
- <3000/µL
- <500/µL
- 5,000,000/µL
- <1/µL
- > 10000/µL
- <10/µL voor LV, geen bepaling van RBC voor andere vochten
- geen rapportage van RBC behalve bij CSV
- Xn met BF2 (vermelding non CE)
- 0,001 x10E6/µL
- 0/µL (afwezig) / ondergrens 0
- Geen /geen gedefinieerd/Geen grenzen
- Ratio berekening met WBC en RBC; < 0.002
- afhankelijk van type vocht, vb bij BAL geen rapportage van RBC
8.1 Voegt u een interpretatie of commentaar toe aan de differentiatie/het cytologisch onderzoek?
(22 responses)

- Ja (ga door naar vraag 8.2 en 8.3) - 59.1%
- Nee (ga door naar vraag 9) - 40.9%
8.2 Zo ja, wat voor commentaar? (bijvoorbeeld: lymfocytair, monocytair, neutrofilie, mengformule)
(8 responses)

zoals jullie vb

overmaat tijpe WBC

Enkel commentaar bij atypische celpopulaties suggestief voor maligniteit

niet systematisch, enkel bij vermoeden maligniteit

1. Verdacht op maligne cellen; 2. Kapotte cellen (geen andere commentaren)

type formule, aanwezigheid van puinmacrofagen, mesotheelcellen, mogelijk maligne cellen,...

Beschrijving formule of extra bevindingen: puinmacrofagen, leucofagie, erythrofagie, ...al dan niet veel mesotheel, reuscellen, enzoverder enzoverder.

perifere bloedbijmenging
### Vragenlijst BF

#### 8.3 zo ja, wat voor interpretatie? (7 responses)

<table>
<thead>
<tr>
<th>Interpretatie</th>
</tr>
</thead>
<tbody>
<tr>
<td>evt opmerking ikv aberrante cellen</td>
</tr>
<tr>
<td>suggestief maligniteit of niet met beschrijving morfologie</td>
</tr>
<tr>
<td>Beschrijving atypische celpopulation</td>
</tr>
<tr>
<td>Geen verdere interpretatie (dochter nodig wel verdere uitwerking via gespecialiseerde technieken)</td>
</tr>
<tr>
<td>mogelijk maligne (te correleren met APO)</td>
</tr>
<tr>
<td>Al dan niet aanwezigheid van maligne cellen. Indien aanwezigheid maligniteit: beschrijving de morfologie van de voor maligniteit verdachte cellen</td>
</tr>
<tr>
<td>Als EPU rule en/of scattergram een cytospin vragen, wordt er mogelijk commentaar/interpretatie meegegeven.</td>
</tr>
</tbody>
</table>

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9.1 Voert u een iQC voor lichaamsvochten uit? (23 responses)

- Ja: 47.8%
- Nee: 52.2%

9.2 Welk iQC materiaal gebruikt u? (13 responses)

- Commercieel (ga door naar vraag 9.3): 92.3%
- Home made (ga door naar vraag 9.4): 7.7%
- Other:
  - 11 x Sysmex (level1 en 2, 2x level1)
  - 1 x Eurocell (hoog en laag)
  - 1 x nvt
10.1 Participereert u aan een eQC programma voor lichaamsvochten?
(23 responses)

87%

13%

Ja (ga door naar vraag 10.2 en 10.3)
Nee

10.2 Welk eQC programma? (5 responses)

<table>
<thead>
<tr>
<th>Eurocell</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGKL - Zellzählung im Liquor RfB - Survey for cell count in cerebrospinal fluid</td>
</tr>
<tr>
<td>Nvt</td>
</tr>
<tr>
<td>RfB voor cylose (WBC) en RBC</td>
</tr>
<tr>
<td>nvt</td>
</tr>
</tbody>
</table>
Thank you for your attention!