



KAISER PERMANENTE®

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BODY FLUID ANALYSIS

Policy Body fluid counts and analysis must be completed asap and all CSF counts must be done within 1 hour of being received in the laboratory

Workplace safety All laboratory employees are expected to maintain a safe working environment and an injury-free workplace. Laboratory employees are responsible for their own safety, the safety of others and adhering to all departmental and medical center safety policies and procedures.

- For standard precautions and safety practices in the laboratory; see LGM 8000, specifically, but not limited to, equipment safety, proper body mechanics, sharps exposure and proper use of personal protective equipment (PPE).
- For Universal Body Substance precautions, see LGM 8005, specifically, but not limited to, exposure to body fluids.
- For proper hand washing, see LGM 8010, specifically, but not limited to, proper hand washing.
- For proper infection control, see LGM 8004, specifically, but not limited to, proper use of gloves.
- For proper handling of regular and infectious waste, see LGM 8006, specifically, but not limited to proper disposal of regular and biohazardous waste.
- For proper cleaning of work area, see LGM 8007 - Cleaning Work Areas.
- For proper handling of chemicals and reagents, see the Chemical Hygiene Plan. For proper storage and disposal of chemical hazardous waste, see LGM 8012.

Specimen type The following types of specimens are considered to be body fluids:

- CSF
- Pleural fluid
- Peritoneal fluid
- Gastric fluid
- Synovial fluid
- Pericardial fluid
- Abdominal fluid
- Ascites fluid
- Thoracentesis fluid

Continued on next page

BODY FLUID ANALYSIS, Continued

**Specimen
collection**

Fluid specimens for cell counts are collected in EDTA or sterile container.
Note: CSF specimens are collected in sterile containers only

Note: Observe specimen for fibrin clots and pellicle formation. If a small
fibrin clots are detected, perform test as usual and include a comment in
report stating that results may not be accurate due to fibrin clot formation.

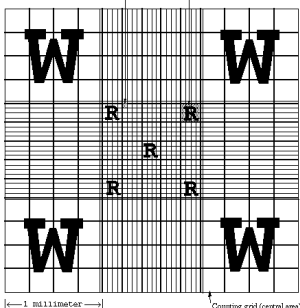
If specimen is completely clotted do not perform the cell count. Notify unit
or provide that the specimen is clotted.

Note: Always use sterile technique when handling body fluid specimens.

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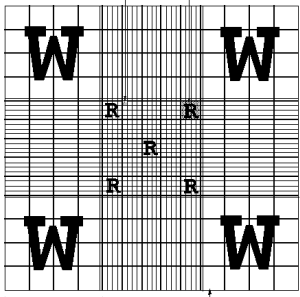
BODY FLUID ANALYSIS, Continued

Completing cell count Follow the steps below to complete the cell count for RBC's and WBC's on body fluids.

Step	Action
1	Mix specimen well. Use either disposable counting chamber or reusable one. (Note: if using re-usable counting chamber cover slip the hemacytometer). Load both chambers of the hemacytometer, with undiluted body fluid specimen. Note: On high counts a dilution may be necessary. Place hemacytometer in A covered Petri dish with a damp paper and two small applicator sticks. Let equilibrate for five minutes before counting
2	Verify that QC is done before performing patient testing. If not perform QC in same manner as patient testing and document the results in the QC log. Refer to Fluid Quality Control Procedure (LHM287) for detailed information about QC procedure.
3	Perform cell count in duplicate using 40x magnification. Count the RBC's and WBC's. In the same number of squares in both chambers. Typically 9 squares are counted on each side of the chamber, for very high counts less squares may be counted, however, equal number of corresponding squares must be counted on both sides of the chamber. Follow the No cell counting border policy.
4	The counts from the two chambers of the hemacytometer must agree within 25% or the count must be repeated. % Difference is the difference between the 2 counts divided by the Average of 2 counts then multiplied by 100.
5	Calculate the results by averaging the counts from both chambers following the <div style="display: flex; align-items: flex-start; margin-top: 10px;"> <div style="flex: 1;">  <p style="font-size: small;">Small squares = 1/400 sq. mm. 1/25 sq. mm.</p> <p style="font-size: small;">← 1.00113mm(1cm) →</p> <p style="font-size: x-small;">Counting grid (central area)</p> </div> <div style="flex: 1; padding-left: 20px;"> <p>Large Square (W) = 1 mm²</p> <p>Small Square (R) = 0.04 mm² for one small square = 0.2 mm² for all 5 small squares</p> </div> </div> <p>Formula:</p> $\text{Total cells/}\mu\text{l} = \frac{\text{Total Average Count} \times 10 \text{ cells/}\mu\text{l}}{\# \text{ of square mm counted}}$
6	After the count is completed dispose disposable hemacytometer.

BODY FLUID ANALYSIS, Continued

Performing cell count that needs dilution In performing cell count using a hemacytometer, cells when checked on a microscope should be on a monolayer spread to have an accurate count. High counts that tend to make cells on top of each other should be diluted. Follow steps in performing cell count with dilution.

Step	Action
1	Diluent to be used for Cell count body fluid is collected from the instrument/DXH800. On the DXH 800 instrument choose Single-Tube presentation and Choose 'Dispense Diluent'
3	Confirm procedure and insert an empty test tube on the left side loader as a container for your diluent to be used. Instrument will dispense diluent from instrument to the test tube. Repeat procedure for more diluent depending on the amount needed. Follow the instruction by instrument to stop Dispense diluent procedure
4	Still on Single-tube presentation, enter Specimen ID as 'diluent' and press enter . Run the dispensed diluent from instrument as a CBC to check background of the diluent dispensed. Results should all be zero to make sure diluent can be used for cell count dilution. Print out diluent dispensed background check and date/initial. File the diluent background check print out with Attachment A(Body Fluid Patient Log).
5	After passing the diluent background check, use the dispensed diluent to perform dilution analysis for Body Fluid Cell count. Use the lowest dilution factor possible to create a monolayer of cells on hemacytometer when checked on a microscope.
6	Perform cell count in duplicate using 40x magnification. Count the RBC's and WBC's. In the same number of squares in both chambers. Typically 9 squares are counted on each side of the chamber, for very high counts less squares may be counted, however, equal number of corresponding squares must be counted on both sides of the chamber. Follow the No cell counting border policy.
7	The counts from the two chambers of the hemacytometer must agree within 25% or the count must be repeated.
8	<p>Calculate the results by averaging the counts from both chambers following the</p> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p><small>Small square = 1/400 sq. mm. 1/25 sq. mm.</small></p>  <p><small>1 millimeter</small></p> <p><small>Counting grid (central area)</small></p> </div> <div> <p>Large Square (W) = 1 mm²</p> <p>Small Square (R) = 0.04 mm² for one small square = 0.2 mm² for all 5 small squares</p> </div> </div> <p>Formula:</p> <p>Total cells/ μl = $\frac{\text{Total Average Count} \times 10 \text{ cells}/\mu\text{l} \times \text{dilution factor}}{\# \text{ of square mm counted}}$</p>
9	After the count is completed dispose disposable hemacytometer.

BODY FLUID ANALYSIS, Continued

Preparing slide Prepare a cytospin smear for differential count following Cytospin smear preparation using Thermo Scientific Cytospin 4 with cytocentrifuge rotor, procedure LHM 299.22. Dilute fluids with high cell counts with saline. Add a drop of albumin into the chamber. Once smear is ready let the smear air dry, fix and stain with Wright stain.

Performing differential Follow the steps below to complete the differential count on body fluids.

Step	Action
1	Count 100 WBCs , perform a 5 part differential
2	If less than 100 WBCs are present for differential count, calculate count to percent of the total number of WBCs differentiated. Note the total number of cells differentiated in the comment field.
2	Look for and note any abnormal cells
3	If abnormal cells are present note the presence of abnormal cells on the comments section of the report. If there is an abundance of particular type of cell, make a comment in the comments section.
4	Slides will be saved for one week.

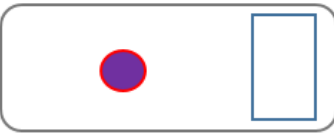
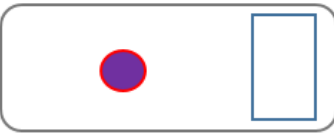
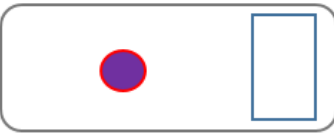
Resulting count Follow the steps below to complete the reporting of body fluid counts.

Step	Action
1	Use the Body Fluid Results Log to show raw counts and calculations. See Attachment A1(Body Fluid Results Log)
2	Results to be entered are: <ul style="list-style-type: none"> • Source • Color: Colorless, Yellow, Pink, Red, Xanthochromic • Appearance: Bloody, Cloudy, Clear, Clotted, Hazy, Slightly Hazy • RBC count -Calculation • WBC count -Calculation • Differential Indicate in the result comments the presence of cell clumps
3	Final Results are entered in the LIS using manual entry

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BODY FLUID ANALYSIS, Continued

Suspected Malignant Cells Follow the steps below for suspected malignant cells, document process to **Attachment R1: Pathologist Review for Suspicious cells Log**

Step	Action				
1	CLS will result the differential count but will not comment on the suspicious morphology.				
2	Print new accession id sticker for specimen with suspicious cells for review using print accession feature in Cerner App Bar.				
3	CLS will fill up the Pathologist Review for Suspicious cells Log By entering current date, specimen id using accession id sticker, and specimen type.				
4	<p>CLS will:</p> <ul style="list-style-type: none"> • Enter notes about the slide (suspicious cells seen) • Enter the X and Y coordinates of the cell(s) to be reviewed using the white circle marks found in the microscope stage. • Enter diagram of how the slide was clipped on the stage. <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Specimen type</th> <th>CLS Notes</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">CSF</td> <td> <p>Suspicious cells seen</p> <p style="text-align: center;">5</p>  </td> </tr> </tbody> </table>	Specimen type	CLS Notes	CSF	<p>Suspicious cells seen</p> <p style="text-align: center;">5</p> 
Specimen type	CLS Notes				
CSF	<p>Suspicious cells seen</p> <p style="text-align: center;">5</p> 				
5	CLS will then send the slide with the Pathologist Review for Suspicious cells Log Binder to the Medical Director for review. <i>In the absence of the Medical Director, send the slide to be reviewed to the Pathology Supervisor to forward slide to a Frozen- section pathologist from Pathology department.</i>				
6	If pathologist decides cells are suspicious or malignant, CLS will issue a corrected report with the comment provided by the pathologist in Cerner result entry under result comment.				
7	If pathologist decides cells are not suspicious or malignant, no corrected report is needed.				
8	Document the Pathology review comment in the Pathologist Review for Suspicious cells Log , the Pathologists name who performed review, and initial of CLS performing documentation.				

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BODY FLUID ANALYSIS, Continued

**Controlled
documents**

See list below

#	
LGM8000	Standard precautions and safety practices in the laboratory
LGM8005	Universal Body Substance precautions
LGM8010	Proper hand-washing
LGM8006	Infection control
LGM8007	Cleaning Work Areas
LGM8012	Proper storage and disposal of chemical hazardous waste
LIMM 214	Resulting Patients in the laboratory Information System
LHM299.22	Cytospin smear preparation using Thermo Scientific Cytospin 4
LHM287	Fluid Quality Control Procedure
Attachment A1	Body Fluid Log Form
Attachment R1	Pathologist Review for Suspicious cells Log

Author

Alvin Castillo, CLS

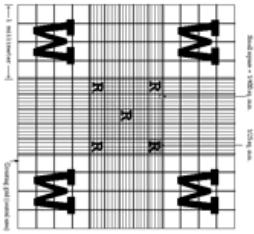
Kaiser Foundation Hospital
 Los Angeles Medical Center Laboratory
 Hematology Section
Body Fluid Results Log

Date: _____

Specimen Label

- Fluid Type:**
- CSF
 - Bronchial Lavage / Washing
 - Pericardial
 - Peritoneal
 - Pleural
 - Synovial
 - Other: _____
- Volume:** _____
- Fluid Appearance:**
- Color:**
- Colorless
 - Xanthochromic
 - Yellow
 - Pink
 - Red
 - Other: _____
- Appearance:**
- Clear
 - Slight hazy
 - Hazy
 - Bloody
 - Cloudy
 - Clotted

Cell Count



Large Square (W) = 1 mm²

Small Square (R) = 0.04 mm² for one small square
 = 0.2 mm² for all 5 small squares

Total cells/μl =
 Total Average Count x 10cells/μl x dilution factor
 # of square mm counted


<p>RBC</p> <p>Dilution (if applicable): _____</p> <p>Vol of specimen: _____ μl</p> <p>Vol of diluent: _____ μl</p> <p>Dilution factor = 1: _____</p> <p>Side 1: <input type="checkbox"/> 5 Small Squares <input type="checkbox"/> 1 Large Squares</p> <p>Side 2: <input type="checkbox"/> 9 Large Squares</p> <p>Average: _____</p> <p>RBC/μl: _____</p>	<p>WBC</p> <p>Dilution (if applicable): _____</p> <p>Vol of specimen: _____ μl</p> <p>Vol of diluent: _____ μl</p> <p>Dilution factor = 1: _____</p> <p>Side 1: <input type="checkbox"/> 5 Small Squares <input type="checkbox"/> 1 Large Squares</p> <p>Side 2: <input type="checkbox"/> 9 Large Squares</p> <p>Average: _____</p> <p>WBC/μl: _____</p>
CALCULATION	
RBC	WBC

TOTAL CELLS COUNTED FOR DIFF:	
DIFFERENTIAL COUNT %	
NEUT	
LYMPH	
MONO	
EOS	
BASO	

COMMENTS:

CLS: _____

PATHOLOGIST REVIEW FOR SUSPICIOUS CELLS LOG
KAISER PERMANENTE LAMC

Date	Specimen ID	Specimen type	CLS Notes	Pathologist Review	Pathologist	CLS INITIAL
1/11/2018	ACCESSION STICKER	CSF	Suspicious cells seen 5  104	Few Malignant Cells seen	Dr. Hediyeh Shafi	

Attachment R1