

Operational Policies
Clinical Pathology Section of the
Kansas State Veterinary Diagnostic Laboratory
Rev. 5/2018 (Adi Wasserkrug-Naor)

Laboratory Hours

- Regular hours: 7 am to 5 pm, Mon – Fri (except University Holidays)
- Saturday hours: 8 am to 12 pm (except University Holidays)
- Emergency hours: All others

Turn-around Times

For the majority of the laboratory assays (CBCs, clinical chemistry assays, urinalysis):

- If samples submitted by 9 am, expect completed results by 1 pm.
- “ “ “ “ 1 pm, “ “ “ on the same day.
- “ “ “ “ 4:00 pm, “ “ “ on the same day if STAT fee applies

Cut-off Times

Week days (M-F)

- After 4:00 pm – need to STAT the sample
- After 4:30 pm – considered an after hour sample
- Cytology- if submitted after 4:30- if want result the same day, should be STAT.
Recommended to speak with the pathologist on duty.

Weekends (Saturday 8:00am-12:00pm)

- Samples submitted after 11:00 am- needs to be STAT
- Samples submitted after 11:30 am- will be considered after hours
- Pathology service- only by on call
- Not running bile acids

Cytology Samples

- Six slides maximum will be read for each cytology site. More slides are encouraged to be submitted, for validation processes
- Bone marrow aspirate- 12 slides will be reviewed. Recommended to submit the bone marrow sample along with the smears. More slides are encouraged to be submitted, for validation processes

Laboratory Samples (please – labeled samples – please)

- **Sample MUST be labeled with VHC medical record number and sample date;** owner's name is not required but frequently helpful.
- Request form must have a matching VHC medical record number, sample date, owner's first & last name, clinician's name, student's name, and animal's species

VHC Samples

Information	<i>Sample</i>	<i>Request form</i>
Animal ID	<i>Required</i>	<i>Required</i>
Sample Date	<i>Required</i>	<i>Required</i>
Owner's name	Desired	<i>Required</i>
Clinician's name	---	<i>Required</i>
Student's name	---	<i>Required</i>
Species	---	<i>Required</i>
Sample Time	Desired	Desired
Breed	---	Desired
Gender	---	Desired
Age	---	Desired
Sample source	Required for samples other than blood and urine	
Lesion description and relevant clinical signs		Required for all cytology samples

- **Samples will not be processed or analyzed without the required information. If the required information is not available, the submitting clinician or student will be paged and asked to provide the required information.**
- **The sample and form requirements apply to all samples (regular hours or emergency hours).**

Laboratory Tests Offered:

- Most of the offered laboratory tests are listed in the "Submission Form" for the Clinical Pathology Laboratory.
- A complete list is available in the website for the Kansas State Veterinary Diagnostic Laboratory
- A list of laboratory services available during "Emergency Hours" basis is shown later.

Requests for "STAT" Analyses

"Stat" is from the Latin word *statim* which translates to *immediately*. A "STAT" request is translated in the laboratory to mean **"This test result is so crucial to the life of the patient that we must set aside other tests and analyze this sample now."**

- A clinician's signature is required on the request form.
- The assays requested as a STAT are noted on the request form. Select only the specific life-saving tests that you really need; the remaining tests on the request form will be completed according to routine work-load scheduling.

Emergency Hours

During **Emergency Hours**, emergency services are requested as follows.

- Attending clinician asks personnel at the Discharge Desk to page the **On-duty Intern or resident** depending on the test to be performed. This request should not be made until it is known that a sample will be collected and submitted to the laboratory within 20 minutes (*animal is walking through the door*).
- The **On-duty Intern and/or resident** will respond to the page within 20 minutes to initiate the analysis of the samples. If the intern or resident needs assistance from a medical technologist, or pathologist, or pathology resident, the intern or resident will page the “on-call” person.
- If the clinician requires that a pathologist come in to analyze a sample, then the clinician must ask the emergency desk to page the **clinical pathologist on-call and clinical pathology (CP) resident**. Since residents come in for learning purposes, there is only one pathologist out-of-hours charge in this case. The exception to this is CSF; see below for protocol.
- **PT & PTT are performed by the VDL intern on-call.** The clinical pathologist is not called in as well.
- **Crossmatches are performed by the clinical pathology resident only.**
- **Out of hours CSF analysis. The clinical pathology resident is called for this test. Sample preparation is performed by the on-call clinical pathology resident. Cytologic evaluation of the prepared slide is performed by the on-call clinical pathologist.** Please note, there is an out-of-hours fee for EACH the resident and the clinical pathologist for out-of-hours CSF analysis, as they have independent duties with regard to the COMPLETE sample analysis. Partial analysis (which includes cell count and cytoprep prepared for next-business-day analysis) is also available. **For partial CSF analysis ONLY the clinical pathology resident is called.**
- Each month the Clinical Pathologist/resident duty schedule will be posted in the display case outside clinical pathology. Contact numbers for the CP residents and Clinical Pathologists are also provided there. The VDL intern schedule is at the discharge desk. Please contact Dr. Adi Wasserkrug-Naor (adiw@vet.k-state.edu) if you have any questions or concerns regarding the provided policies/procedures.
- Please Note: It is the clinician’s responsibility to determine WHO should be called in. The role of the discharge desk is to make the call the clinician asks them to make and thereby connect the clinician with the on-call clinical pathologist, resident, or intern.

Tests available during Emergency Hours (note: special fees for these services)

Hematologic procedures	Performed by the VDL Intern: CBC with preliminary leukocyte differential count CBC without leukocyte differential count Hematocrit (spun) Avian/Reptile PCV and differential count (Cell count or WBC concentration will not be provided after hours).
Serum chemistry assays	Performed by the VDL Intern: Chemistry Panels: Small Animal, Large Animal, Renal, Electrolyte, and Avian/Reptile Individual Chemistry Assays: any test included in the above panels plus amylase, lipase, triglyceride, and magnesium (total) may be ordered on an individual basis.
Blood chemistry assays	Performed by the VDL Intern Blood gases (pH, pCO ₂ , PO ₂ , & associated calculated values), blood electrolytes (Na ⁺ , K ⁺ , Cl ⁻ , fCa ²⁺ , fMg ²⁺), and other blood analytes (lactate, urea nitrogen, creatinine, glucose)
Fluid analyses* <ul style="list-style-type: none"> Partial analysis (Cell count , TPref & cytology slides made for next day analysis) Cytology interpretation of fluid 	Performed by the VDL Intern: Peritoneal and pleural fluids TP _{ref} , and TNCC Performed by the Clinical Pathology Resident and Pathologist on call: Interpretation of cytology
Urinalysis	Performed by the VDL Intern: Urinalysis without sediment examination
Crossmatch	Performed by the Clinical Pathology Resident
Coagulation (PT, PTT)	Performed by the VDL Intern
CSF Analysis <ul style="list-style-type: none"> Partial analysis (Cell count & cytoprep. made for next day analysis) Complete CSF 	Sample preparation and cell count are performed by the clinical pathology resident on-call. For either partial analysis or complete analysis the CP resident MUST be called. Evaluation of the cytopreparation is performed by the Clinical Pathologist on-call.

* A pathologist is “on call” for the emergency cytologic analysis of peritoneal or pleural fluid. Otherwise, the microscopic analysis of these samples will be completed the next working day.

Laboratory Samples

- The type of sample and the appropriate sample handling is essential. Please consult the laboratory personnel if you have any questions about sample collection or handling.
- A laboratory test result can only be as good as the sample. Procedures that lead to quality samples include the following.
 - Proper collection method
 - Clean venipuncture to minimize activation of platelets or coagulation factors.
 - For whole blood sample, prompt and gentle mixing of blood with anticoagulant.
 - Maintaining sample at appropriate ambient temperatures.
 - Prompt submission of samples to laboratory.
- **Tubes**
 - EDTA tubes (purple tops) for CBCs:
 - At least ½ full; smaller volumes lead to erroneous results (e.g., shrink RBCs to give falsely low spun Hct value)
 - If platelets are clumped, an accurate platelet count cannot be obtained.
 - Recommend collecting directly into EDTA tube; transferring from syringe frequently results in platelet clumping and RBC lysis
 - Clot tubes (red tops) for chemistry profiles
 - Typically need at least 1½ mL blood to obtain enough serum; more is needed if Hct is high or if several assays are requested or if repeat analyses are needed. (Please remember that sample needs to clot and retract before centrifuged – typically 30 minutes).
 - Recommend collecting directly into clot tube; transferring from syringe may cause RBC lysis and thus potentially erroneous results for some analyte measurements.
 - Heparin tubes (green tops) for NOVA chemistries
 - Blood should be directly collected into tube; transferring from syringe will allow time for clot formation; clots can plug the instrument and lead to a delay in analysis
 - Heparinized syringe for Blood Gas results
 - Use only enough heparin to “heparinized” the syringe; excess heparin causes erroneous results
 - Mix sample well; more mixing allows clots to form which can plug the instrument and cause a delay in the analysis of samples.
 - Do not allow air bubbles to remain in the sample.
 - Citrate tubes (blue tops) for coagulation
 - Tubes should be filled to the correct volume; excess citrate will result in prolonged clotting times; insufficient citrate may result in clot formation.
 - For plasma and serum assays, the amount of plasma or serum that can be harvested from the blood depends on the blood’s hematocrit.
 - If insufficient sample volume is submitted to complete all of the requested assays, the attending clinician or student will be asked to either:
 - Collect and submit additional samples.
 - Identify those test results that are needed most or prioritize the requests.
 - Dilution of sample to obtain sufficient volume for analysis is not recommended for three primary reasons: 1) more difficult to reproduce final results in diluted samples;

- 2) dilution may reduce the analyte's concentration below the assay's analytical range;
- 3) the preferred diluent may vary between assays (e.g., diluent may be water for one assay, may be phosphate-buffered saline for another assay).

Cut-off Times (COTs) or Turn-around Times (TATs)

COTs or TATs are established for two major reasons: 1) allows clinicians to schedule their management of cases; 2) allows laboratory personnel to schedule the completion of assays. For the majority of the laboratory assays (CBCs, typical clinical chemistry assays, routine urinalysis), the TATs for the laboratory are as follows; please see that attached COTs for specifics and additional times.

The time it takes to actually analyze patient samples frequently occupies less than half of the laboratory's staff time. The laboratory staff must also log samples into the laboratory, prepare samples for analysis, complete clerical aspects in recording and reporting results, perform routine and special maintenance procedures on the instruments, analyze quality control samples, troubleshoot instrument and assay problems, and order supplies and reagents. To complete these tasks efficiently and accurately, it is best that we maintain a routine schedule.

If samples are not submitted by the late afternoon cut-off time, then the samples will be held for analysis the next day. Because "regular hours" are limited to Monday through Friday, samples submitted late Friday afternoon may not be assayed until Monday.

If laboratory analyses are needed that do not conform to our established COTs schedule, clinicians may come to the laboratory to see if the analyses can be completed to meet the special needs. The ability of the laboratory to respond to these special requests will depend on day's workload and staffing.

Web Access to Results

As soon as the results have been approved by a medical technologist, a resident, or a pathologist, those results are available via the Kansas State Veterinary Diagnostic Laboratory Web Access Reports. This site is password protected because of the confidentiality of the information. Faculty, residents, interns, and veterinary students are given the password by direct contact.

Cut-off Times¹: Submission → Expected

Hours of Operation (except University holidays)

Regular hours: 7 am – 5 pm, Monday – Friday

Saturday hours: 8 am – noon

Emergency hours: All other times

Laboratory assays	Samples submitted by:	Expect results by: ⁱ
NOVA chemistry assays Blood Gases & Lactate NOVA Electrolyte NOVA Full Panel	4 pm (M-F) → noon (Sat) ⁱⁱⁱ →	Within 1 hour
CBC (mammalian) Routine chemistry assays (blood, serum, plasma) Routine urinalysis	9 am (M-F) → 1 pm (M-F) → 4:00 pm (M-F) ⁱⁱ → 10:30 am (Sat) ⁱⁱⁱ → After 4 pm (M-F) and after 10:30 am (Sat) Stat fees apply	1 pm ^{iv} same day ^{iv} Same day ^{iv} Same day ⁴
CBC (non-mammalian)	8 am–4 pm (M-F) → 10:30 am (Sat) ³ → After 4 pm (M-F) and after 10:30 am (Sat) Stat fees apply	Within 24 hours (M-F) Next working day (Sat or after hours)
Manual platelet counts Urine chemistry assays (microprotein, creat.,etc.)	9 am (M-F) → 3:30 pm (M-F) → 10:30 am (Sat) ³ →	1 pm ⁴ Same day ⁴ Same day ³
Bile Acid, Ammonia, Osmolality, Rumen Chloride	9 am (M-F) → 3:30 pm (M-F) →	1 pm ⁴ Same day ⁴
Coagulation assays (PT, PTT) Crossmatch (major and minor)	8 am–3:30 pm (M-F) 10:30am (Sat) ³ After 3:30 pm (M-F), and after 10:30 am (Sat) Stat fees apply	Usually 2 hr (consult lab)
Cytologic exam of tissues (aspirates, etc) (6 slide limit) Bone marrow cytologic exam (12 slide limit) Blood film examinations (atypical cells, organisms, etc.)	8 am- 4:30pm (M-F)→ After 4:30 pm (M-F) Stat fees apply	Same day
Routine body fluid (pleural, peritoneal, synovia, CSF, pericardial) including cytology	8 am – 4:00 pm (M-F)→ After 4:00 pm (M-F) Stat fees apply	Same day
STAT request for CBC, routine chemistry assays, crossmatch, coagulation, body fluids, or surgical tissue samples	7 am – 4:30 pm (M-F) 8 am – 11:30 am (Sat) ⁱⁱⁱ	Assayed immediately ¹

Ferritin Ceruloplasmin	Accessions with <10 Accession with ≥ 10	1 week >1 week
Haptoglobins (Run on Thursdays or Fridays)	Accessions with <10 Accessions with ≥ 10	1 week >1 week
Immunoassays (T4, cortisol etc.)	Under validation	Once validated hours of submission/ expecting results will be determined

¹These times are established assuming instruments are functioning properly and a minimum of three medical technologists are working (M–F). Otherwise, time to complete the analysis may be prolonged.

²Blood samples submitted after the afternoon submission deadline will be held over for analysis the next day (except Fridays) unless STAT analysis is required. For urinalysis samples, only “UA without sediment examination” will be held over because of the instability of sediment components.

³ Limit Saturday morning requests to those assay results needed for immediate case management; only one med. tech. on duty.

⁴ Except for samples that require an examination by pathologists who may not be available because of classroom, other academic responsibilities and not available on weekends, unless specifically called in. Preliminary results will typically be available by expected deadlines.

⁵STAT analysis of samples is provided for emergency cases in which data are needed for IMMEDIATE case management.