



Oregon State University
Carlson College of
Veterinary Medicine

Student Manual
Year 4 Instructional Program

Class of 2024
June 12, 2023 – June 16,
2024

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For additional policies, procedures, and forms, visit:
<https://vetmed.oregonstate.edu/students/current>

Year 4 Instruction Block Schedule

The final year of the professional educational program is scheduled in 13 blocks of 4 weeks each. All rotations start on Monday and end on Sunday, with the exception of Large Animal Emergency Care. This course starts on Sunday at 8pm and ends Monday morning. All students that have a course scheduled for the end of the year (13, 13b, 13b2 or 13a- 3 week) will stay on this last rotation until Wednesday, June 12, 2023 at noon.

Blocks for the academic year 2022-2023 will be as follows:

Block 1:	June 19, 2023 – July 16, 2023	
	Tuesday, July 4 (1b, 1b1)	Independence Day
Block 2:	July 17, 2023 – August 13, 2023	
Block 3:	August 14, 2023 – September 10, 2023	
Block 4:	September 11, 2023 – October 8, 2023	
	Monday, September 4 (3b, 3b2)	Labor Day
Block 5:	October 9, 2023 – November 5, 2023	
Block 6:	November 6, 2023 – December 3, 2023	
Block 7:	December 4, 2023 – December 31, 2022	
Block 8:	January 1, 2024 – January 28, 2024	
	Monday, January 15 (8b, 8b1)	Martin Luther King Day
Block 9:	January 29, 2024 – February 25, 2024	
Block 10:	February 26, 2024 – March 24, 2024	
Block 11:	March 25, 2024 – April 21, 2024	
Block 12:	April 22, 2024 – May 19, 2024	
Block 13:	May 20, 2024 – June 16, 2024 (released Wednesday, June 12)	
	Monday, May 27 (13a, 13a2)	Memorial Day

Monday holiday rule: Students stay on an extra day to cover Monday holidays. The next block starts on Tuesday instead of the normal Monday. Please note this when making any plans.

Schedule Changes: Changes are not permitted without the approval of the course coordinator. If you need to be absent during a block for any reason you must fill out the standard absence form in advance and have it signed by the Associate Dean for Student and Academic Affairs. If you have an emergency or become ill, you need to notify the appropriate people of your absence as soon as possible. You are responsible for contacting Jason Tanenbaum to schedule make up days of rotations if needed.

CCVM Student Policies

Absence Policy- Year 4

This policy is also listed on the CCVM website.

<http://vetmed.oregonstate.edu/students/current/absences>

Students in both elective and required clinical rotations are allowed to have no more than 0.5 days of excused absence per 1-week block, with a maximum of 5 excused days of absence during the senior year. The following are considered EXCUSED absences:

1. Job interviews
2. National or State licensing boards
3. A medical or family emergency
4. Scheduled medical appointments
5. Military or legal obligation such as subpoena or jury duty

Other personal circumstances necessitating absence from the block will be considered UNEXCUSED, unless the course leader and duty clinician to which the student is assigned deem it appropriate to classify as an EXCUSED absence. Except for emergencies, students must complete a Request to be Absent Form (available in the dean's office) for ALL anticipated absences. The form should be completed and returned to the Associate Dean for Student and Academic Affairs. Except in emergencies, if not submitted at least 1 week prior to the absence, the absence will automatically be considered UNEXCUSED.

When a student has greater than 0.5 days of excused absence/1 week of block time or ANY unexcused absence the student will be expected to make up that time along with any after-hours emergency time associated with the block. If, in the opinion of the course leader, absences were such that the student's learning opportunities were sufficiently reduced by the absences, the student may be required to repeat the entire block. Until absenteeism is made up, the student shall receive a grade of INCOMPLETE.

Grading

Students will receive "Pass" or "No Pass" for all rotations and electives in senior year. Instructors will establish criteria to evaluate student performance, and students will need to achieve a minimum score of 70% to pass. If a student does not perform satisfactorily, they will need to repeat the block, following the Academic Standards policy. The instructor may require a student to retake part or all of a block if they are repeatedly tardy or absent without an excused absence. Students must pass all core rotations to be allowed to graduate from the DVM program. Additional details about the year four academic process can be found in the Academic Standards Policy.

Pet policy

Dogs, cats, and other pets, by University rules, are not allowed in buildings unless they are part of the teaching program, or here as a patient. Animals here for teaching purposes and appointments must be properly housed within the Teaching Laboratory or Veterinary

Teaching Hospital. Please leave your pets at home. Pets are not allowed to be kept in vehicles in the College's parking lots.

Pregnancy, Disabled and Seriously Ill Students

The veterinary curriculum is both mentally and physically rigorous. Veterinary students are potentially exposed to materials and procedures that may result in physical or psychological injury. Traumatic injuries are an inherent risk of your chosen profession whether it be by direct contact with animals or equipment necessary to diagnose and treat disease or as a result of exposure to potentially hazardous chemicals or agents. Physical, academic and emotional stressors are also present that may lead to psychological distress. Injury may be increased when a student is pregnant, trying to become pregnant, disabled and/or seriously ill.

The CCVM realizes that individuals, who are pregnant, may become pregnant, are disabled or seriously ill have the right and responsibility to make decisions for themselves concerning their condition. The CCVM may not discriminate against these individuals based on their condition and the student should expect appropriate consideration from fellow students, staff and faculty.

The CCVM will provide reasonable accommodations to all students regardless of disabilities to the extent possible in classes and clinical rotations consistent with Oregon State University policies, state and federal law unless their presence constitutes a risk to the health and well-being of fellow classmates, staff, house officers or faculty. This risk will be determined by the Associate Dean of Student Success and Department of Clinical Sciences Chair. The following recommendations are for students who are pregnant, attempting to become pregnant, disabled (temporarily or permanently) or seriously ill:

1. The student should notify his/her healthcare provider of their condition and of the curricular requirements to develop a plan that is appropriate for the student's condition. The healthcare provider may contact the Associate Dean or Department Chair to assist in this assessment
2. The student should provide the Associate Dean with a signed statement from the healthcare provider that defines the risks that the student is exposed to
3. The student should notify the Associate Dean of his/her pregnancy, disability or illness as early as possible so steps can be taken to decide the best course of action for the student

The student will work with their healthcare provider and the Associate Dean of students then may elect one of the following:

1. Continuation as a student with no change in schedule or activities and a written acknowledgement of the risks involved
2. Continue as a student with schedule and/or activity changes and a written acknowledgement that program completion may be delayed, and hazards may still exist
3. Withdraw from the DVM program permanently or request readmission through the Student's Progress Committee

Lois Bates Acheson Veterinary Teaching Hospital

Dr. Helio de Morais

Director, Lois Bates Acheson Veterinary Teaching Hospital

Hospital Mission

The mission of the Oregon State University, Lois Bates Acheson Veterinary Teaching Hospital (VTH) is to provide superior clinical instruction as part of a professional veterinary curriculum; to provide high quality patient care and customer service; to serve as a referral and consultation center for veterinary practitioners as well as governmental and non-governmental agencies; to conduct original clinical research on emerging animal and human health concerns; and to offer an intellectual and academic atmosphere that supports the practice of innovative veterinary medicine.

Organization

The Veterinary Teaching Hospital is organized into service & support areas:

Clinical Service Areas

Anesthesiology
Diagnostic Imaging
Large Animal Internal
Medicine Large Animal Surgery
Rural Veterinary Practice
Large Animal & Small Animal
Theriogenology
Small Animal Internal Medicine
Small Animal Surgery
Cardiology
Oncology
Small Animal Emergency & Critical Care

Hospital Support Areas

Central Sterile
Client Services

- Medical Aide Supervisor
- Medical Aide Receptionists
- Process Improvement Manager
- Client Advocates
- Student Workers

Farm/Ranch Services

- Farm/Ranch Supervisor
- Animal Attendants
- Student Workers

Financial Services
Patient Services

- Patient Service Coordinators
- Certified Veterinary Technicians
- Veterinary Assistants
- Animal Attendants
- Student Workers

Pharmacy

Hospital Hours of Business

Large Animal Hospital Office Hours

Monday - Friday 8am to 5pm

541-737-2858 (Phone)

541-737-8651 (Fax)

Large Animal Emergency Service

541-737-2858 (Phone)

Available 24-hours/day, 7 days/week

Call the number; listen to instructions; leave a message; and a doctor will return call within minutes.

Small Animal Hospital Office Hours

Monday – Friday 8am to 6pm

541-737-4812 (Phone)

541-737-4818 (Fax)

Support Staff

Client Services

The Medical Aide Supervisor oversees the reception areas and the Medical Aide Receptionists. The Reception staff is responsible for client scheduling, patient receiving and discharging, billing, and maintaining medical records.

Farm Services

The Large Animal Farm/Ranch Supervisor is responsible for the entire Large Animal physical plant, including the surrounding CVM-managed property. The Farm/Ranch Supervisor is also responsible for husbandry and care of the CVM-owned animals. The Farm/Ranch Supervisor supervises Large Animal Attendants and Student Worker Attendants.

Financial Services

The Hospital's financial support is provided by the Process Improvement Manager and the VTH Accounting team.

Patient Services

The Patient Services Coordinators supervise the technical and patient care staff as well as coordinate safety and accident reporting.

General Technician, Animal Attendant, & Assistant Duties

Technicians in the Hospital are responsible for the complete organization of their assigned area, including patient care, student supervision, client communication, inventory and equipment maintenance, and assisting faculty with teaching and research. Animal attendants and assistants are responsible for maintaining the hospital's facility, equipment and supplies, in addition to assisting with patient care (feeding, walking, etc.) and restraint. While working in the clinic, technicians, animal attendants and assistants are required to follow all approved VTH and university policies and procedures, as well as to follow direction provided by the Patient Services Coordinators and/or work leaders and clinicians on their particular service.

The following duties apply to Technicians in all areas of the hospital:

- Provide basic and advanced patient care (blood draws, catheter placement, patient monitoring and critical care, administration of medications, etc.)
- Prepare for and assist clinicians with medical and surgical procedures
- Admit patients, perform physical examinations and take patient histories when necessary
- Oversee and instruct students in general and specialized patient care and techniques
- Provide student orientation for individual service areas
- Provide safety instruction for students and monitor student safety
- Monitor and encourage compliance of all hospital rules and policies
- Coordinate and assist in scheduling daily patient receiving and diagnostic procedures
- Coordinate patient care with core services (Anesthesia and Imaging), reception desk and, at times, the Large Animal Hospital
- Maintain organization and cleanliness of service area
- Maintain specialized service area supply inventory
- Operate and maintain specialty area equipment
- Communicate with clients over the phone, in person or via email, regarding patient care, procedure estimates and medication refills
- Keep accurate patient medical records and drug logs
- Prepare patient estimates for diagnostics, procedures and hospitalization
- Enter charges for all hospitalization, diagnostic testing, and medical, surgical and diagnostic procedures
- Assist in developing and maintaining hospital protocols, forms, logs and teaching materials
- Assist clinicians with research projects, student labs and student grading

General Animal Attendant duties may include the following:

- Maintain and stock general supplies and laundry throughout the hospital, including the ICU and Main Treatment areas
- Maintain and follow daily, weekly and monthly hospital cleaning schedules
- Coordinate maintenance and repairs for hospital equipment
- Coordinate cleaning schedules with outside services
- Maintain and order all hospital bagged and canned food
- Direct animal attendant student workers
- Provide patient care following direction from technicians or clinicians, including walking and feeding
- Assist with restraint for basic procedures, including venipuncture or bandage changes

In addition to the duties listed for Animal Attendants, Animal Assistant duties may also include:

- Provide additional patient care, such as icing incision sites, administering oral medications, etc.
- Assist with and perform selected rehabilitation procedures.

Safety

The OSU VTH realizes the importance of a safe work environment. The training for and practice of veterinary medicine is associated with physical and emotional hazards. Individuals who are pregnant, anticipate a pregnancy, are disabled or seriously ill should review recommendations under the previous CVM Student Policy section. Policies are in place to minimize injury to our students. In the event of a life-threatening injury involving students, staff or clients, emergency services (9- 911) should be called immediately. Someone should stay with the injured person until emergency services arrive. Some specific, relatively common, injuries are discussed below. Any accident or injury occurring at the VTH should be reported as soon as possible to service personnel and/or a supervisor, so that the appropriate paperwork can be completed (OSU Accident Reporting, Benton County Health).

Bites: It is important to remember that all bites should be reported to a service veterinary technician who will aid in completing necessary paperwork (see above) and mark the patient's file with Caution alerts. A policy on animal bites, as well as bite report form, is available in the Appendices. Immediately, all bites should be washed with soap and water for a minimum of 5 minutes and encouraged to bleed. Do not massage the wound. It is recommended that students see their healthcare provider or Student Health Services for further recommendations. The appendix also contains material students should read on rabies.

Sharps: Needle stick and other sharp injuries are common in veterinary practice. Students should read the Sharps Injury policy in the appendix. For life-threatening injuries see above. For non-life-threatening injuries wash it with warm soap and water for five minutes, encouraging bleeding. Do not massage the wound. Wrap and dress as appropriate. Seek medical care as previously directed.

Infectious Disease: As veterinary students, you will be exposed to or potentially exposed to many infectious and zoonotic agents. A comprehensive infectious disease policy for the hospital is in the appendix that covers personal safety as well as individual diseases. Students should read up on cryptosporidiosis, Salmonella ssp. Campylobacter, Giardia, Yersinia, hookworms, roundworms, rabies, tetanus, bartonellosis (cat scratch disease), toxoplasmosis, leptospirosis, brucellosis, Q fever, tuberculosis, anthrax, Lyme Disease, equine encephalitis, West Nile fever, and Herpes B virus (primate contact) as they may come into contact with patients that are or potentially are infected with these zoonotic organisms.

Radiologic Risks: Students may be exposed to several radiologic risks including radiation (radiograph, CT, MRI, fluoroscopy) and radionuclides. Students should adhere to the principles of ALARA. Students who are pregnant or may be pregnant are referred to an earlier section on safety for pregnant persons in the CCVM Student Policies. Additional safety information will be obtained during your diagnostic imaging rotation and orientation. The Appendix contains additional information regarding radiation exposure and ALARA.

Chemicals: Chemicals are used for a variety of tasks around the VTH. Students should familiarize themselves with the risks of exposure to chemicals in their environment. MSDS sheets are available in the VTH for all chemicals used and can be found in the hospital laboratory area (Tech Station). If you have questions regarding chemical exposure, please ask a service technician or clinician.

Controlled Substances

Controlled substances are those substances that fall under the jurisdiction of the Drug Enforcement Agency (DEA), which is part of the U.S. Department of Justice, who enforces the Controlled Substance Act, and therefore depict Federal regulations surrounding the use and accountability of. Controlled substances carry diversion and abuse potential, with different scheduling of the substances, which make them high-priority to many regulations in healthcare practices. The primary goal of the DEA is to prevent diversion and abuse of these substances while ensuring adequate supply of controlled substances are met for the country's legitimate medical, scientific, and research needs.

All employees and students within the Veterinary Teaching Hospital, which fall under the DEA registration of the Acheson Teaching Hospital Pharmacy, are subject to Title 21 United States Code (USC) Federal Controlled Substances Act. All definitions, rules, and regulations can be found at the following website:

<http://www.deadiversion.usdoj.gov/21cfr/21usc/index.html>.

Therefore, all employees and students must maintain appropriate scope of practice in veterinary medicine when using controlled substances. This means that appropriate protocol and use of controlled substances are warranted in patient therapy, in terms of prescribing, administering, and dispensing for legitimate medical purposes.

Controlled substances will require strict accountability, security, and documentation in all areas of the hospital, therefore a "closed-system" concept is warranted. This means that all records must be accurate and a reflection of secure physical inventory for all audit purposes. Students will, at times, be handling controlled substances and will be granted this authority under their respective VTH clinical practitioner and under their direct supervision. Students, in this regard, will be held responsible in abiding by all measures that fall under the Controlled Substance Act. Students are not allowed to access areas that contain controlled substances within the VTH, developed positive-will help in maintaining compliance for accountability and accuracy of, for example, serving as witnesses to controlled substance transactions from the Cubex® machines or preparing written prescription orders for controlled substances signed by the VTH practitioner.

If diversion is suspected, severe penalties can follow per Federal regulations, such as civil, criminal, or loss of licensure and in turn, punishments around the veterinary collegiate program as deemed necessary.

Controlled substances are divided into five schedules, determined by current accepted medical use in the U.S. and relative abuse potential and likelihood to cause dependence. Please familiarize yourself with the following examples (definitions are paraphrased):

- C I: high potential for abuse, lack of safety
 - Example: heroin
- C II: high potential for abuse and may lead to severe psychological or physical dependence
 - Examples: hydromorphone, morphine, fentanyl
- C III: have potential for abuse less than C I / C II, may lead to moderate or low physical dependence / high psychological dependence
 - Examples: buprenorphine, ketamine, APAP-codeine
- C IV: have a lower potential for abuse relative to C III
 - Examples: butorphanol, midazolam, diazepam
- C V: have a lower potential for abuse relative to C IV
 - Example: codeine syrup

Large Animal Services Veterinary Teaching Hospital Guidelines and Procedures

Introduction

The primary mission of faculty, staff, and students is quality patient care. The provision of excellent service is fundamental to the Veterinary Teaching Hospital (VTH). The VTH is expected to function and provide services in a manner similar to a successful private practice and this requires the attention of everyone to all aspects from patient care, client relations, and general order and cleanliness. The workload and schedule is demanding at times. Your performance under stressful situations will help you develop necessary skills and habits.

Hospital Hours

Regular business hours:

Monday through Friday 8:00 am - 5:00 pm

After-hours:

Monday through Thursday 5:00 pm - 8:00 am Friday 5:00 pm - Monday 8:00 am

Holidays: (Hospital closed for regular receiving):

Martin Luther King, Jr. Day

Memorial Day

Juneteenth

Independence Day

Labor Day

Veteran's Day

Thanksgiving

Christmas Eve

Christmas Day

New Year's Day

General Guidelines and Hospital Procedures

Dress Code: Clean and appropriately worn clothes are required at all times. Nametags are to be worn in the VTH at all times. You are required to carry a stethoscope, thermometer, pen light, a watch (digital or second hand) and bandage scissors in the VTH.

It is your responsibility to purchase and launder purchased clothing. We ask that each of you procure two pair of green duck bib overalls or coveralls (e.g. from Pella Products). Pella Products offers group discounts if, as a class, you want to coordinate your order. Shoes should be of a type that can be dipped into antiseptic solutions and sufficient to reduce injury if stepped on by an animal.

Scrubs are required in surgery. Surgery scrub suits will be worn in the operating rooms together with shoe covers at all times. Caps and masks will be worn as required. Surgical

scrub suits are not to be worn out of the operating room unless under coveralls or lab coats. For field service you will need coveralls and boots (spare coveralls should be available to replace dirty ones). Upon return from a field service call, students must change their clothes and sanitize or change boots before working in the VTH. This dress code requirement is designed to present students as professionals. No other type of clothing will be allowed for 4th year students in the hospital.

Professionalism and Conduct: Be punctual and dress and behave in a professional manner. Address all Veterinary Teaching Hospital Clinicians as Doctor; and if you have a preference for the way you would like to be addressed (e.g., Mr. Smith, Ms. Jones, etc..) tell people.

Discussions regarding cases in the presence of the owner or client are encouraged only when prompted by the clinician in charge.

Medical Records: Because our program is concerned with detailed case material, extensive records and information are required. Fill out the required forms completely and with the information required. Clearly record all procedures on the daily progress sheet so that the staff may see that relevant charges are made. Any supplies used should be recorded on appropriate forms. Completion of the medical record is the responsibility of the student, veterinary technician and clinician overseeing the case so be sure you are familiar with the portions of the medical record that are your responsibility.

Client Confidentiality: Information regarding clients and their animals is confidential and available only to the owner or his/her designated agent, or referring veterinarian. Patient information is to be released only by a clinician or by written order of the same. Any photographs or video taken must be approved by the owner/agent on the Authorization and Release form.

Patient Care: Students are required to participate in the full regimen of treatments for assigned patients. This includes after-hours care as necessary. All patients should be handled with care, and if aggressive behavior is noted, please call attention to this so that injuries to oneself and others can be prevented. Clinicians should be called to assist you with handling unruly cases. If you ever feel uncomfortable handling a patient or performing a procedure, notify a clinician immediately. Halters are to be left with the patients, but lead ropes, blankets, bandages, etc., should be returned to the owner or carrier when the patient arrives. All animals should be weighed on admission and discharge and details recorded. If owners require “blanketing” of their animals, we will be responsible for returning this equipment to them at discharge. We are in the animal care profession, but do receive requests to accept animal donations for teaching uses. Any person asking to donate animals should be directed to Large Animal Reception.

Procedures: Certain diagnostic or treatment procedures, e.g. rectal examinations, intravenous injections, and the passage of nasogastric tubes, should be performed only in the presence of a clinician. If you have any questions regarding the procedures you are performing as a clinical student, stop and ask a clinician.

Hospital Equipment: All equipment should be cleaned and broken equipment is replaced by a veterinary technician before storing. Return all equipment, supplies, and drugs, to their correct locations when you have finished using them. It is VTH policy that no equipment or supplies be used by students for personal reasons. This policy applies to evenings and weekends. There are no exceptions to this policy.

Facilities: The Hospital reception area, student computer area, and student break rooms are the designated places for students to remain unless busy with patient care. Please respect others by leaving these areas clean.

Safety Procedures

Your safety is our primary concern. There are numerous opportunities for injury in the VTH.

Animal Handling Risks: When dealing with animals, anything can happen, and you should be alert and prepared at all times. If you are unfamiliar with the demeanor of any specific animal, work in pairs or talk to the clinician-in-charge before doing anything. Animals are not to be left unattended while restrained in stocks, chutes, or when tied up. They react differently to restraint. Be alert. Always be aware of an avenue of escape. Keep the stall door closed enough so as not to encourage bolting by your patient. Do not completely close or lock the stall door when working inside stalls with animals. *Never* enter a bull or stallion's stall alone. Veterinary technicians and clinicians (not stall cleaners) are available to help. You should make sure that you have had proper instruction before working with unfamiliar animals. Do not hesitate to ask. If utilizing an assistant, make sure your assistant is aware of the potential hazard and knows how to restrain the animal.

Environment and Equipment: Do not shout or make loud noises in the hospital, as it frightens animals. Avoid running in the hospital. Remove debris from floors to prevent accidents. When spraying water in the VTH be aware of electrocution risks. Do not spray water on electrical outlets, light sockets, or electrical insect/fly killers. Human food and drink are not permitted in the hospital animal areas.

Many of the restraining chutes have hard projections that are at head height; look where you are going and watch what you, the animal, and other people are doing. Equipment used for treatment or restraint of large animals may also break, malfunction, or simply be inadequate at times, and you should never use equipment unless you are fully aware of its proper operation and limitations. Wear ear protection when using noisy equipment. Wear ear protection when using noisy equipment.

Injuries: If a life-threatening injury occurs, dial 9-911 and send someone to meet the emergency vehicle. In addition, if you are injured during the assigned time in the hospital this must be reported immediately to the attending clinician, service area supervisor, Hospital Director and Chair of the Department of Clinical Sciences.

Sharp objects (needles, scalpel blades) should be carefully handled and discarded in designated disposal containers. Do not to recap needles. For sharps, injuries and animal

bites the wounds should be immediately cleaned with warm running water and soap for several minutes followed by an antiseptic solution such as povidone-iodine or chlorhexidine. A bandage should be applied as necessary. Students should contact the Student Health Services at (541) 737-9355. An *Accident and Illness Form* needs to be completed and is located in the small animal hospital outside small animal reception. A technician supervisor (Robyn Panico or Dave Meyer) can assist in completing the paperwork. Specific information on sharps injury and reporting can be found in the appendices *Sharps Safety Plan* and *Sharps Injury Log*. Animal bites follow the procedure above. Animal bites should also be reported to the Benton County Health Department (541) 766-6835. For additional information on animal bite injuries and rabies, please read appendices *Animal Bite Procedure*, *Animal Bite Reporting Form*, *Compendium of Animal Rabies*, and *Human Rabies Prevention Program*. Appropriate paperwork must be completed. You may refer to the appendix on *Accident Reporting Procedures* and *Accident and Illness Form*.

Infectious Disease: See the *Large Animal Infectious Disease Protocol* in the appendices for a full discussion of infectious disease and risks in the large animal hospital. Consider the infectious agent(s) that are a concern and avoid contaminating yourself, the patient or other patients with that agent. Consider things like keeping the stall clean and clear of manure, avoid walking in manure, and avoid tracking manure into feed. Thoroughly clean shoes with a brush and disinfectant when you accidentally get fecal matter on shoes or where required in the facility. Wear appropriate personal protective equipment as indicated by the risk of exposure and transmission of infectious agents. This may include gloves, a gown, mask/goggles and boot covers/plastic booties. Exam gloves should be worn when working with all patients. **Wash Your Hands** between patients. Frequent hand washing has been proven to be the most important component to prevent the spread of infectious diseases. Hands should be scrubbed for at least 15 seconds, when treating animals with known infectious diseases, remove soiled garments and plastic booties. Do not share equipment between animals unless it has been cleaned and disinfected.

Patient Admission

Patients are admitted only by prior arrangement with the clinician or VTH reception staff. Admission (or discharge) of patients after-hours is not encouraged unless prior arrangements have been made or an emergency situation exists. Do so only when authorized by the clinician-in-charge. All required forms to be filled out and signed are in the reception area. Make sure that these forms are completely filled out. Weigh animals on admission and record the time and date of admission. Take as much history as possible from the owner or agent, or as directed by clinicians. With emergencies, common sense takes precedence over paperwork, which can be postponed until emergency treatment is instituted. Remember to complete the paperwork as soon as time permits. Do not allow a client or agent to leave before signing the required forms, especially the Authorization and Release form. Deposits are required for treatment. Clinicians and reception personnel will provide this function during office hours. Clinicians or technicians perform this duty overnight or during weekends.

Unloading (or loading) patients is the responsibility of the owner/hauler. Responsibility for animals or people injured during unloading or loading may be placed upon a volunteer helper. If help is requested by the owner/hauler, contact the clinician. Many animals behave badly when being unloaded or loaded from trailers. You may show the client the entrance but they must unload their animal themselves.

Keep the halter on the animal and give owner the lead shank and any other tack not required. Any tack kept should be clearly identified with the owner's name, stall number, and case number. Patient's tack is hung on the stall door

Assign stalls after the clinician has ascertained that no infectious disease is present. In the latter case, the animal will be placed in an isolation stall. If in doubt, confer with the clinician or technician. Each animal should be clearly identified on admission to ensure proper treatment.

Food and water should be given according to the clinician's instructions. Place a stall card and necessary instructions on the stall door.

Patient Discharge

No patients will be discharged unless specifically authorized by a clinician. All documents and invoices must be completed and signed before discharging the patient. Clinicians (clinical fellows, residents, faculty) must review discharges prior to their distribution to owners or referring veterinarians. When discharging patients, make sure that the written discharge instructions concerning the patient are clearly understood by the client as well as signed by the clinician and client. The date and time of discharge and patient current weight should be recorded in the medical record. A copy of the signed discharge should accompany the owner.

Patients slated for discharge should be ready to go home, i.e., they are to be groomed, and are to look presentable. Make sure the client is given any tack, shoes or equipment that belongs to them. Check the front of the stall, feed room and large animal reception for any belongings. Be sure that any medications to be dispensed are labeled properly and given to the client.

Mark the stall with a card that says 'Clean and Disinfect' or alternatively turn the stall card and write on it.

Additional Information

VTH Policies, Procedures Organizational Charts, and SOPS are available on the Veterinary Teaching Hospital intranet site. http://128.193.215.68:12469/vth-policies/policies_main.htm.

Large Animal Clinic After-Hours Responsibilities

After-Hours Student's Role

The after-hours students play a crucial role in maintaining client services and patient care outside of regular hours. The duties of these students are to monitor and treat patients, identify and report patient status changes, and assist in emergency cases. Students are expected to be punctual and available in Magruder Hall during their entire assigned periods. Remember that after hours provides valuable learning experiences in medication administration, patient assessment and monitoring, organization and teamwork. You are a valued member of the team and we appreciate your help.

After-Hours Schedule

There will always be one or more in-hospital clinicians and one field service (RVP) clinician on call. The hospital typically has a House Officer scheduled as primary on-call with a Senior Clinician available as back up. You should be aware of their intended whereabouts and of any required treatments, admissions, discharges, before the clinicians depart each day. The clinician and House Officer on duty may be reached by telephone if needed. A roster of on-duty emergency House Officers is located on the reception area bulletin boards. There are lists of clinician phone numbers in the reception area as well as in strategic locations in the hospital.

Remember the doors are locked outside of business hours so keep your access badge with you.

Duties

Telephone Responsibilities: After-hours students and technicians are responsible for answering the hospital “back” telephone line (541-737-6845) when on duty. When the VTH reception area closes, phone calls from clients and referring veterinarians are routed through the primary veterinary clinician (house officer) on duty. If that clinician needs to contact the hospital, he/she will phone on the back line. This hospital number may be answered on the phones in the hospital and communication room telephones by punching *7.

Please answer clearly, “OSU Veterinary Teaching Hospital. This is (your name) speaking. May I help you?” A clinician will notify you about the case, its estimated time of arrival, and will let you know about any special requirements or equipment to have on hand. In addition to preparing yourself to receive this case, please also notify the duty technician as soon as possible so that they may prepare for the patient's arrival.

Non-business and non-emergency calls are not to be made from VTH business telephones. Personal calls may be placed from lines other than 737-6845. When using the telephone, please be as brief as possible. Do not give out individual office numbers or clinician cell phone numbers to clients or referring veterinarians. When placing calls

remember the following:

For on-campus calls dial: 7 + the 4 digit number.

For local calls dial 9-541+ the 7 digit number.

For 1-800 calls dial 9-1-800+ the 7 digit number.

For long distance calls dial 9-1- + the 7 digit number and then the approved long distance code.

After-hours call boxes are mounted on the wall outside the VDL reception area and at the north gate by the small animal hospital. If **either** box is used, it rings on the hospital “back-line” at 7- 6845. You can then look at the live feed of the camera monitoring the north large animal hospital entrance and determine if the North or South gate should be opened. The gates now also have a sign on them labeling them as “North” or “South” so you can ask the client which gate they are at. The North gate button is located within the communications room and the South gate button is located next to the bovine scale.

The reception at the call boxes is less than ideal. This means the telephone will often ring and there appears to be no one at the other end, or you may simply hear a vehicle running. The client may also be unable to hear you in some circumstances. Be aware that even if you don't hear a voice, there is likely someone waiting at the gate. The back line will also ring with clients bringing specimens/animals to the VDL/necropsy after hours. If you are unsure of how to deal with this, please notify the technician who will meet the client by VDL and complete the appropriate paperwork, prior to placing the specimen in the correct location in the VDL.

Once you let a client through the gate, remember that reception is locked, and someone will need to meet them at the reception door to let them in.

Admissions and Discharges: Please refer to the LA VTH Guidelines and Procedures for general information on patient admission and discharge. In most instances, a clinician will be present at the time of client arrival. If the clinician has not arrived, have the owner unload the animal only if the clinician has said to do so. If not, utilize this time to obtain a good history. This is the client's first impression of OSU-VTH so ensure that you are dressed appropriately and act professionally. The usual rules about giving opinions, criticizing treatments, or giving advice also apply here. Many clients will not know if you are student, staff, or faculty. Identify yourself before proceeding with collecting a history or performing a physical examination.

After-hours, a veterinary technician or clinician will generate a case number, complete a financial estimate and collect a deposit for services. The student will aid in filling out the Client Information form as well as the Authorization and Release form. Alert the on-call clinician of any ‘walk-in’ emergencies.

In the event an animal arrives dead, the on-call clinician is still called for instructions. If

he/she feels it is necessary, they will contact the pathologist or instruct you to do so. The details regarding the pathologist on call are posted inside the front VDL door and in hospital Reception. The number for the emergency cell phone carried by the on-call pathologist is located on the door to the necropsy cooler and on the white board in the hall outside of the Equine Minor Treatment room. The pathologists must be notified of every specimen placed in the cooler; however, the clinician present will typically do this.

Medical Records: SOAPs are required for cases admitted to the emergency service at the end of your shift and until the case is transferred to another service. You are responsible to write records, SOAP's, and treatment sheets. Remember to have a clinician check the treatment sheet prior to administering medications. You are also responsible to turn in any requests or lab work between 7:30 and 8:30 am. In most cases, if a patient goes to surgery, the student who received the case will go to surgery with them and scrub in. In some instances, when it is close to the end of a shift, the emergency student starting at 10pm weekdays/8pm weeknights may scrub in instead. This decision is at the discretion of the clinician on duty; however, it is okay to remind the clinician that it is nearing the end of your shift as sometimes they lose track of time. Every effort will be made to ensure you have adequate time away from the hospital as long as patient care is not compromised. The student who scrubs into the case is responsible to have a surgery report in the record within 24 hours of the completion of the surgery. Final surgery reports are to be submitted electronically. Ensure you also provide the new student a full description of the case, and ensure records are complete for your involvement prior to leaving. Record all medications used and all medications and supplies checked out of pharmacy. Remember that the SOAP is the medical record. Everything from the examination, diagnostic test results, medications etc., must be accurately recorded here. Please ask your house officer or clinician if you are unsure of specific details.

Patient Care: If you admit a case, you are the student responsible for the case during your duty hours or until the case is officially transferred to another service. This will usually occur at transfer rounds the following morning. The primary on-call clinician (resident or clinical fellow) and the emergency clinician or surgeon will challenge you to take an active role in these cases. If you demonstrate you are prepared before case arrival, you will be more likely to be given more responsibility. However, if time is of the essence, and the clinician takes charge of the case, make sure you understand the whys in the case management and ask questions at an appropriate time. If a case requires emergency surgical care, the 5-10 pm or emergency student scrubs in for the surgery and the on-call backup student will provide support. You also should not leave the following morning until you have discussed the case with the house officer/emergency clinician in person, your paperwork is completed, medications for the day have been made, and the flow sheet has been approved by the house officer. If you do not have a patient, please assist other students with their 8 am treatments and do not leave until you have received permission from the house officer/emergency clinician on duty.

Critical care cases are your primary responsibility and the on-duty clinician, resident or clinical fellow is primarily responsible for decisions regarding their care. **Always call the clinician designated if the parameters (written on the stall-side treatment sheet) for clinician contact are met or if there are other patient changes that concern you.** Remember to use your best judgment and call earlier if you have questions

or concerns even if the parameters have not been reached. Clinicians would rather that you call too early, than too late. If you are uncertain whether to call a clinician, the duty technician is a valuable resource in making this decision.

Never underestimate the value of a physical examination and consider the information a clinician may need when on the phone with you (i.e. always perform a physical examination prior to calling unless the situation is emergent or dangerous).

The clinician/house officer to call is the person listed on the treatment sheet. If you do not get an answer, leave a voicemail, and call again. Keep calling. If the house officer does not respond, or you need an immediate response in an emergency, call the senior clinician on the case. If neither one can be reached, you may call the emergency clinician on duty.

As with other cases, treatment should not be instigated, altered, or discontinued without consultation with a clinician unless you are dealing with a life-threatening emergency. This is the time in your clinical training to take *initiative*, however, please do so under the guidance of the clinician in charge if at all possible. The location and use of emergency medical kits will be shown to you during orientation. Large animal emergencies can be dramatic, and your safety is always top priority. Take care not to get yourself into a situation where your safety may be at risk, and do not hesitate to call for help (clinician/technician) prior to entering a stall.

Treatment sheets and flow charts are set up by the daytime service and are to be followed exactly unless instructions change. Complete regularly scheduled BID treatments. These are the responsibility of medicine or surgery students assigned to the case, but may be performed by the ER and backup students or technicians as a courtesy. After-hours duty students may relieve block students of this responsibility but only with mutual agreement among concerned parties. A walk through and visual examination should be performed on all hospitalized patients by the ER student at regular hourly intervals. Investigate all concerns by reading the medical record.

Weekend treatments are given in the same schedule as weekdays. The time at which you begin morning treatments on weekdays will depend on your caseload. However, you should begin treatments early enough, with SOAPs completed, to be free to participate in rounds by 8:00 am. When you are present in the hospital after hours, you need to be able to hear changes with patients such as fluid pumps beeping. As such, while you may use personal electronics for entertainment during quiet times, headphones are not to be worn, and any sound must be quiet enough that you can hear noises from patient stalls. Remember that late night/early morning is the most common time for medication errors to be made. Double-check everything before you administer it, and always ask a technician or clinician if you are uncertain. Remember that nothing opaque goes into a vein. If a medication is not prepared and ready for a patient, double check with the technician/other students that they have not given it and forgotten to sign. If not, contact the student on the case to ask if they drew the medication up. Only once these avenues are exhausted, should you prepare the medication/get a medication from pharmacy.

Rounds: Attend clinic rounds and be prepared to discuss any cases under your care. This essentially means all hospitalized cases. To be prepared, read the medical records for all

cases and understand the case management decisions that have been made. Use the veterinary literature, colleagues, faculty, and internet in your quest to learn from these cases. Use discretion and judgment when discussing these cases with faculty. Remember, owner information is strictly confidential and not to be shared with other owners and non-VTH veterinarians. Pay attention to presentations during rounds of all hospitalized patients. If the reasons behind the management of the case are not apparent, challenge yourself to discover them by reading the record and the literature, and by having constructive discussions with colleagues and faculty or the emergency clinician. Be organized and ready for rounds presentations if you are transferring a case. You should have your SOAP, and all laboratory results available. Present the case in a logical manner- Signalment, history, physical examination findings. After this it is usually logical to present in the order tests were done; i.e. blood gas analysis/CBC/serum chemistry results, then per rectum findings, belly tap results etc. Update on surgical findings even if you were not scrubbed into the procedure. Summarize medications administered (dose in mg/kg, route of administration, frequency) and know WHY you are giving these. Summarize how the patient progressed overnight, and your morning physical examination findings. Be prepared with your plan for the day.

Professionalism: Give the after-hours duty technician your full cooperation. The after-hours duty technician reduces your overnight stays by 50%. Regarding client questions, do not get trapped into trying to answer questions that you do not feel confident about. It is better to refer questions than to speculate. Please take time to locate the duty technician at the start of your shift. They can update you on any special considerations such as patients to discharge, emergencies coming in, or critical cases that need extra attention. They may direct you to divide the cases so that one person deals with isolation cases and one with hospital cases. At the end of your shift, please check in with the technician again. This is the time to update them on any patient concerns that have arisen recently, let them know which treatments you finished/did not finish, and make sure they are aware you are leaving. Your knowledge of the cases is valuable- take a few minutes to update the emergency student taking over from you.

Sleeping Quarters

During large animal rotations, students may spend long shifts in the hospital. This may put them at risk during the commute home. The sleeping quarters are intended to provide a safe alternative for students and house officers who may be too tired to commute home. There is one room provided for living quarters to be shared between after-hours students and house officers. There are four beds located in these quarters. The room is equipped with a bed, bedding, and a washbasin. Showering and bathroom facilities are the student locker rooms across the hall from the living quarters. This is a shared space so please respect others and keep the area clean.

Linens can be placed in the provided bins in the student/faculty locker rooms for washing. All belongings must be removed from the room at the end of occupancy. Dogs, cats, or other pets are not allowed. Flip the sign on the door to "occupied" when you enter so anyone else entering knows to be respectful. The sleeping quarters are to be utilized only at the end of your shift.

While you are on duty in the hospital, you are expected to be awake and present in the hospital at all times, for patient and personnel safety.

Grades

After-hours duties are incorporated into your other grade rotations. Grading is based on attendance and professionalism as well as performance during rounds, quizzes and discussions with faculty and staff. Perfect attendance is mandatory. Absences that are not preauthorized will result in a failing grade. Tardiness can result in a heavy grading penalty. The after-hours schedule is made by Garland Burdock, Large Animal Technician Supervisor. Students may swap shifts, however they must be changed on the posted after-hours schedule. When switching shifts, it is vital that you consider your schedule in full. The large animal hospital is busy after hours and frequently takes in emergencies, often more than one per night. Expect to be called in when you are on back up. Therefore, do not make alterations that leave you with multiple shifts and back up shifts consecutively. Whenever possible, inform the on-duty house officers and clinicians of changes, difficulties and absences.

VMC 732 & VMC 752

Large Animal Clinical Medicine I and II

Guidelines and Procedures

Course Coordinator: Dr. Erica McKenzie

Course Instructors: Dr. Ana Pacheco, Dr. Erica McKenzie, Dr. Kelly Sears

Objective

To expose students to Large Animal Internal Medicine cases, many of which are received on a referral basis. Phone numbers relevant to operations in the large animal hospital are found in the General Information After-hours Duty sections of this manual.

I. Operation of the Medicine Service

- A. The medicine service handles out-patient and in-hospital cases requiring primarily medical management.
- B. Cases may be referred or transferred to other services as appropriate.
 1. Cases requiring surgical procedures or evaluation for lameness disorders will be addressed by the surgical service.
 2. Reproductive cases will be addressed by the theriogenology service, in conjunction with the medicine service, unless surgery is required. If these patients require hospitalization, they will typically be managed by the medicine service with close consultation with the theriogenology service.
 3. Some cases may involve one or more services, and the medicine service may also consult with other services on specific cases as appropriate.
- C. Students assigned to medicine are permitted to observe theriogenology or surgery cases if there is no conflict with medicine cases and if clinician approval is given.
- D. We interact extensively with other services in the hospital as listed below. Requisite forms or electronic submissions should be filled out completely at the time of sample submission or request and a copy left in the Hospital record.
 1. Pharmacy: Please see the pharmacy section of the manual
 2. Radiology and ultrasound: Imaging requests are submitted via the VetHosp program for radiography, fluoroscopy, contrast exams (barium, myelogram), computed tomography, and MRI. Where necessary (e.g. equine CT or myelogram, or small ruminant MRI), anesthesia requests may also be required. Ultrasonography is typically performed by the medicine service and does not require a request form.
 3. Endoscopy: Will be performed by the medicine service, typically with standing sedation. No request form is needed unless general anesthesia is involved.
 4. Clinical pathology and Diagnostic Services: Requests are submitted via the VetHosp program. Requests should be submitted before 4.00 pm to avoid additional charges. Specific samples (fecal enteric panels, Potomac horse fever serology, equine respiratory PCR panel) must be submitted by 10 am as stats if

results are desired that day. Send out samples to other labs should be submitted by midday. Take the appropriately protected sample(s) directly to veterinary diagnostic laboratory receiving. Special and outside laboratory tests may be submitted via the VetHosp program. Some may require additional forms but should be routed through VDL receiving. Ask the clinician or technician for help submitting uncommon “outside lab” samples. Some tests including blood gas analysis, glucose or lactate measurement, ketones, PCV and refractometry total protein measurement can be performed by students in the ‘technician lab’. You will be shown how to use this equipment at orientation, but do not hesitate to ask for help if needed.

5. Necropsy service:

- a) Take carcass to cooler or necropsy floor as required by VDL personnel. Identify carcass with appropriately colored tag and client details, and intended purpose i.e. necropsy/teaching necropsy/disposal.
- b) Submit information with a complete and thorough history to VDL receiving after confirming adequate completion of the form with the house officer and faculty member on service. Incomplete history is a common problem on these forms which is detrimental to the necropsy process, and every effort should be made to provide as complete a history as possible. DO NOT click the “import case history” button. Try and attend necropsies on patients that you were involved with-this is an excellent learning opportunity.

E. At present:

1. This service handles all internal medicine cases including:
 - a) Gastroenterology (nonsurgical), including colic cases presenting in-hours until diagnosed as requiring surgical intervention. Colic cases presenting after-hours are currently received by the surgical service.
 - b) Respiratory diseases (until or unless identified as surgical in nature)
 - c) Neurologic diseases
 - d) Urinary tract diseases (until or unless identified as surgical in nature)
 - e) Dermatological disorders
 - f) Endocrine disorders
 - g) Metabolic/nutritional diseases
 - h) Toxic diseases
 - i) Infectious diseases
 - j) Miscellaneous undiagnosed conditions
 - k) Almost all neonatal animals under two weeks of age
2. The medicine service provides basic assessment of cardiology cases and requests an in-hospital consult from the cardiology service for echocardiography. The medicine service can perform procedures including resting ECG, exercising or overnight ECG, and conversion of atrial fibrillation.
3. The medicine service commonly provides assessment and management of ophthalmology cases. Where necessary, we can request an in-hospital consult from Dr. Maxwell, a practicing veterinary ophthalmologist currently located in

Corvallis.

II. Procedures and Policies of Medicine Service

A. Attendance and duty

1. Students are expected to be present and properly attired on all weekdays from 8:00 a.m. to 5:00 p.m. or until casework is complete. Earlier attendance is frequently required to ensure cases are appropriately assessed before hospital receiving commences. Appropriate footwear is essential and students should wear coveralls. Sleeveless shirts and baseball caps are not appropriate. *Fingernails should be clipped short and jewelry removed. False nails are not acceptable on this rotation. You should be prepared to perform a per rectum examination on any day, and nails that are not clipped will result in you being unable to take part in this exercise.* Clothing and personal appearance are not only important for the impression we have on our clients, but also for safely performing procedures on client and teaching animals as well as avoiding loss of valuable personal items.
2. Treatments must be completed and charts filled in before 8:00 a.m., unless otherwise instructed. All treatment sheets must be prepared by rounds the night before, and signed by a clinician PRIOR to any treatments being performed.
3. Night care, if necessary for cases requiring close and constant observation such as critically ill foals, may be assigned to students on the service on a rotating basis. This is rare.
4. After hours scheduling is arranged by Garland Burdock (head technician) and involves the emergency rotation students in combination with the medicine and surgery rotation students into shifts. Students will be scheduled for primary or back up duty and called upon as needed based on number and type of emergencies presenting after hours. The large animal hospital is frequently busy after hours, and back up students should be prepared for the fact that they are often called in. If you have been in the clinic overnight, please notify your clinician the following day. If deemed appropriate and if it will not compromise patient care, you will be sent home for self-care; however, this cannot happen if clinicians are unaware that you were present overnight.

B. Equipment to be carried

1. Vocera
2. Stethoscope
3. Watch with a second hand or digital equivalent
4. Thermometer
5. Bright light source (LED preferred)
6. Scissors (bandage ± suture scissors)
7. A cell phone should be carried after hours for safety reasons

C. Records

All records for each case will be completed by the student assigned. These will be examined by the clinicians and house officers. Discharge reports will be examined by the house officers and the clinician in charge, so please ensure they are

completed with sufficient time prior to discharge for them to be looked at by both parties. Daily updates should be made to the content of this document in Vet Hosp

D. Relations with clients

1. Students should not discuss diagnosis, treatment, or prognosis with the owner or their representative, unless given permission for this to occur or with a house officer or clinician being present. Please do not give clients your personal cell phone number. If a client contacts you through your personal phone, notify your House Officer or Clinician immediately.
2. Do not argue with a clinician about a diagnosis or treatment in front of a client; please discuss it in a private fashion at an appropriate time.
3. Do not take photos of cases without client consent, and **do NOT post any photos of any client or their animal on social networking sites or blogs**. Consent for photography can be obtained on the Authorization and Release document. The hospital also has signs requesting that clients do not take photos within the hospital to protect staff/student/patient confidentiality. If a client asks to take your photo and you are not comfortable with this, politely decline. If a client takes your photo without permission, politely request they delete it, or speak to a clinician who will arrange this for you.
4. Client visitation: Please meet the client promptly in the waiting room when you are paged and take them back to their patient. Explain that they need to stay with their animal and are not to wander the hospital or look at other animal's records. You do not have to stay with the client for the entire visit, but be available and walk by them frequently. Notify a clinician of their arrival. If you have concerns (i.e. a client visiting other patients or looking through treatment sheets of patients that are not their own), please notify a clinician. Do not discuss another patient- if asked, politely answer that you are unfortunately not allowed to discuss another case due to client and patient confidentiality rules.

E. Emergency situations

'Emergency' refers to a situation which demands immediate action. These situations are usually unforeseen and, unfortunately, often come at inconvenient times. As veterinarians and veterinary students, it is our obligation to treat emergency situations whenever they arise.

With emergency cases, if you are the first person to greet the client, please instruct them to unload their patient and to bring them immediately to the designated area for that patient's triage. Also, alert a technician and/or clinician of their arrival immediately. If the client indicates it might not be safe to unload the patient due to fractures, aberrant behavior, or neurologic disease, please wait for appropriate assistance.

There is always room for controversy as to what constitutes the true emergency situation. Several broad categories can be classified as true emergencies: 1) severe respiratory compromise; 2) cardiac arrest; 3) massive hemorrhage or trauma; 4) rapid-acting poisons; 5) anaphylaxis; 6) penetrating wounds of the thorax or abdomen; 7) acute overwhelming bacteremia or toxemia; 8) massive or compound musculoskeletal injuries; 9) coma and loss of consciousness; 10) severe GI signs (i.e. colic); 11) continuous seizures; 12) multi- animal involvement.

III. Procedures with Each Case

If you wish to have an Entrustable Professional Activity (EPA) performed, you MUST notify/request this from the clinician/house officer prior to the case arrival. If this is not done, your request will later be declined.

- A. New case: Clients must initiate admission of patients at the reception area to complete admission documents/releases, etc.
 - 1. Take a history from the client under the supervision of a house officer and/or clinician; record on case report form. In emergent situations- take a brief, pertinent history and collect the full history at a later time, or assign a second student to complete the history while you assist with immediate patient triage and stabilization.
 - 2. Perform a physical examination under the supervision of a house officer and/or clinician; record on physical examination and physical diagnosis form.
 - 3. Discuss findings; determine a problem list.
 - 4. Discuss each problem in regard to differential diagnosis and pathophysiology.
 - 5. List differential diagnoses. Keep physical diagnosis form in the case record.
 - 6. Discuss diagnostic procedures and rule-outs or confirmation tests for each differential diagnosis.
 - 7. Perform tests or take samples under the supervision of the house officer and/or clinician. Fill out necessary laboratory or procedure request forms.
 - 8. Discuss possible further action or immediate treatment with the clinician and house officers.
 - 9. Administer treatment under supervision; record on daily progress notes.
 - 10. When test values are available, discuss the meaning and implications of each result.
 - 11. Reach primary diagnosis; record.
 - 12. Discuss treatment regimen.
 - 13. Administer treatment.
 - 14. Discuss cost of care and prognosis with clinicians.
- B. Hospitalized cases
 - 1. Each morning:
 - a) Examine the animal.
 - b) Record temperature, pulse and respiratory rate and perform a full physical examination.
 - (1) Appetite and water consumption
 - (2) Amount and character of manure
 - (3) Any changes in the case, especially related to the problem the animal presented for
 - (4) Other subjective observations for each system
 - (5) Other objective findings for each system
 - (6) Assessment of case

- (7) Plan for the day's treatment
- c) Administer medication.
Record any supplies/pharmaceuticals employed on the red sheets, and medications given on the treatment sheet and initial.
2. At other times:
- a) Monitor as predetermined in discussion.
 - b) Administer drugs as prescribed by clinician and record.
3. At discharge:
- a) Return any medications or supplies for client credit to pharmacy or supplies.
 - b) Be sure the animal is cleaned and groomed; and reweigh the animal.
 - c) Prior to arrival, discuss instructions for owner with clinician.
 - d) Create a document (well in advance of the discharge time) encompassing discharge instructions, or a case summary in the event of euthanasia of a hospitalized patient, for the owner and/or referring veterinarian, which should be reviewed and approved by the clinician. Ensure reception knows the day and approximate time that the animal will be discharged. Keep the document updated daily in case the animal leaves earlier than anticipated.
 - e) Give instructions to owner in presence of clinician, or listen to instructions as given by the clinician.
 - f) Reports and discussion with the referring veterinarian will be made by the senior clinician or house officers but students should be involved in these discussions.
 - g) Turn the stall card over and write C/D on it to notify animal attendants of departure
 - h) Take the treatment sheets, place in patient binder and put it on top of the binder carts in the "Discharged Medicine Patients" section – the technicians will review the file for billing completion prior to it being given to reception.
4. Restraint and handling of patients:
- a) Most animals admitted to the VTH have good temperaments and can be easily handled. However, good judgment and caution should be used when handling any animal, and proper restraint methods should always be used. This may include the use of appropriate sedation. In animals with questionable temperaments, consult a senior clinician or house officer and never handle such animals alone. Never assume cattle are safe to be in a stall with - consult with a clinician to decide an appropriate handling plan. This also applies to unusual species such as camels. Compassion and empathy for the patient's condition are mandatory! NEVER strike an animal for disciplinary reasons, and be aware of your position relative to theirs in a stall at all times. Label the stall of any patient that has a difficult temperament so everyone is alerted. Ask for assistance before entering these stalls. Do not get between a mother and its offspring regardless of species.
 - b) Some animals require special equipment for safe restraint. This equipment can cause injury if not properly used, so if not completely familiar with it you**

should ask a clinician or caretaker for assistance. Such equipment includes: squeeze chute, hydraulic chute, tilt table, head gates, bull leads, transporter chute, equine stocks and cross ties, twitch, hog holder, etc. **Animals should never be left unattended when confined in any chutes or stocks, or when tied, and should not have halters and lead ropes left on them in stalls when unattended.**

- c) When handling adult horses, a halter and lead must be used at all times. Do not ever tie a horse and never exit the stall (no matter how briefly) without removing the lead rope, as both situations can result in significant patient injury. Also, please ensure that the stall door is completely shut and latched when exiting the stall (again, no matter how briefly).
- d) Never assume a foal is halter trained, even if it is wearing a halter. Please speak with a technician/clinician regarding proper handling tips for foals. Please ensure a 'foal handling sheet' is placed on the front of any stall containing a foal. Footbaths should also be placed in front of all foal stalls and changed at least twice daily, more often if they become unclean.

IV. Equipment and Drugs

- A. All equipment must be cleaned and returned to its proper place after use.
- B. The student is responsible for cleaning up the treatment area after use.
 - 1. Clean up manure, blood and discharge.
 - 2. Used instruments should be returned to central services for re-sterilization.
 - 3. Instruments from cold trays should be cleaned up and returned to the tray.
- C. Pharmaceuticals and supplies for each case will be checked out of the Pharmacy or from ward stock, depending on the item needed. Ensure that the appropriate paperwork is completed so the owner can be charged appropriately i.e. complete the "red sheet" for ward supplies that do not come from Cubex or the pharmacy
- D. At each treatment area there should be:
 - 1. Diagnostic equipment, including sample containers.
 - 2. Diagnostic drugs, including local anesthetics.
 - 3. Sedatives and drugs used for restraint.
 - 4. Emergency treatment drugs and resuscitation equipment are available in the green 'crash cart' in the foal crib room. This should accompany sedated patients to the CT room when possible.
- E. General care of the equipment:
 - 1. Within our clinical areas, there is a great deal of specialized medical and surgical equipment. Like all equipment, it is expensive, and yearly costs for replacement from breakage and abuse continue to grow. When handling equipment, we suggest that you:
 - a) Handle it as if it were your own (WITH CARE!).
 - b) Clean all soiled equipment before replacing it. If equipment needs to be sterilized or ultrasonically cleaned, take it to central services and make sure that it will be returned to correct area. **Ensure that the long metal teat**

cannulas used for abdominocentesis procedures are not discarded; they must be kept for sterilization.

- c) Replace all equipment following use.
- d) Clean and disinfect examination tables, counters, and carts following use.
- e) Report defective or broken pieces of equipment to the senior clinician so that it may be taken to Central Services for repair.
- f) Please ask a staff member for instructions before attempting to utilize any equipment with which you may not be familiar.
- g) Place trash in appropriate receptacles, even if it is not your trash.
- h) Clean up the surrounding area when vacated! Place manure in the appropriate can; hose the floor to ensure that the area is clean and ready for the next client.
- i) Avoid spilling lubricant or mineral oil on the floor as it makes the floor slick and dangerous for horses and humans; clean up immediately if a spill occurs.

V. Rounds

- A. Combined rounds (transfer rounds) will be held on certain days with students from the surgery and medicine services, usually to address emergency cases that have arrived out of hours and which need to be assigned to another service. Students assigned to each case should be prepared to discuss them briefly and succinctly. Any daily changes in the case should receive particular emphasis.
- B. Other mornings, or following combined rounds, the medicine service will hold their own rounds with a more in-depth discussion of their cases.
- C. Senior papers are on Thursdays at 8:00 am for one hour and include in depth topics that are researched and prepared by your peers. Senior papers will be followed by medicine rounds.
- D. 'Grand rounds' are held each Friday morning at 8.00 am after case transfers, and three or more interesting cases are presented by medicine and surgery students, and an in-depth discussion is held. Discussion with clinicians/house officers in advance regarding what might be an appropriate case or topic to present is advised. A PowerPoint template is available for presentations on the student drive. Please see the following instructions regarding organizing grand rounds with the schedule determined by the students on the block:
 - 1. All medicine and surgery students should complete a proposed grand rounds schedule prior to the rotation commencing – see example on CANVAS
 - 2. Ensure a mix of surgery and medicine cases or topics each week
 - 3. Ensure the number of presenters are evenly scheduled across the block including in the first week
 - 4. Ensure that two-week students transitioning from surgery to medicine or vice versa do not have to present two weeks consecutively
 - 5. On weeks when Friday is not an option for presenting (such as thanksgiving for example) plan to present Wednesday morning that week unless otherwise instructed.

6. A fair system (such as a coin flip) might be required to determine students to take presentations the first week if self-selection is challenging.
7. Provide a copy of the draft schedule to Dr. Holder and Dr. McKenzie no later than the first Wednesday of the block for review and final approval.

VI. Instruction In Addition To Casework

- A. Discussions will be held in all blocks at the discretion of the clinicians and based on the students' request and time. Feel free to ask if you have a particular topic you would like to learn about, every effort will be made to accommodate this.
- B. Students should work with their clinician to complete any necessary documents related to their training such as RTA's and procedures lists or booklets.

VII. Non-case Related Time will be Spent in a Productive, Educational Manner

- A. Complete procedures required for graduation.
- B. Special short seminars with clinicians on selected problems.
- C. Practice examination skills and common procedures on normal animals.
- D. Review cases on other services, i.e., surgery, theriogenology.
- E. Observe necropsy of cases or pathology rounds.
- F. Auto-tutorial programs in the library or on CANVAS.
- G. Library study- notify clinicians of your whereabouts if you intend to go to the library
- H. Special assignments may be made if necessary.

VIII. Preparation

Review of common medical conditions in large animals and their treatment prior to this rotation is highly recommended. Knowledge of the principles of fluid therapy and antimicrobial use is critical. Throughout your rotation, you can expect to be constantly questioned regarding large animal medicine and physiology, especially relevant to a case you are managing. Therefore additional or review reading during your rotation is strongly recommended. A student library containing relevant internal medicine texts is located in the computer room to provide you ready access to applicable texts. Texts must not be removed from that room. Large animal medicine notes and lecture slides are available on the student share drive (T drive) in folder named "Clinical Course Handouts".

ADDENDA

How to write a SOAP for LA Medicine

S (Subjective): On day 1: You write your SOAP to cover the intake. This is where you write your history on the patient. On subsequent days: TAKE HISTORY OUT! The same information does not need to be revisited multiple days in a row. Now you write your subjective thoughts on the patient (attitude, appetite, behavior, etc.) and how the patient progressed overnight. Also include here how much manure was produced and how much water was consumed (in liters) over the previous 24 hours.

O (Objective): This is where you write all your physical examination data. Please divide

it into separate systems categories as follows:

VITAL SIGNS: T _ P _ REENT:

CV:

RESP:

GIT:

UG:

MS:

INTEG:

NEURO:

LN:

Then you write the significant results of any diagnostics that have been performed that morning: CBC/chemistry:

PCV/TP:

Venous blood gas:

A (Assessment): This is where you can provide a 4-5 (or more if needed) sentence paragraph (NO lists) on your assessment of how the patient is progressing today. You can describe laboratory results and how they have improved or declined and how they relate to patient progress to demonstrate your understanding of disease processes and what the important concerns are AT THIS POINT IN TIME.

P (Plan): This is where you write the plan for the day. Again, things should be written in lists in a sensible manner. Usually as follows:

MONITORING:

1. PE q X hours
2. Any additional monitoring

MEDICATIONS: (list in ORDER: IV, IM, SQ, PO, Topical)

1. Drug A (concentration): dose (in mg/kg), frequency, route
2. Drug B (concentration): dose (in mg/kg), frequency, route

DIAGNOSTICS:

1. Test A
2. Test B

THERAPIES/TREATMENTS/PROCEDURES:

1. Ultrasound A
2. Flush B, etc.

ADDENDUM:

This is written at the end of the day. This is where you discuss the results of any tests that come back AFTER the 8 am SOAP and any significant occurrences that have happened throughout the current day.

How to write a discharge statement for LA Medicine

Complete the listed sections below as instructed for animals discharged

alive.

Chief Complaint: Write the main complaint the animal is presenting for according to the client, e.g. 'Irregular cardiac rhythm' or 'acute colic'

History: Describe the signalment of the animal in question (name, age, species, breed) and the circumstances about why they presented. Prior information from referring veterinarians such as their examination or diagnostic findings, any medications given by the client or vet and other specifics about the current condition should be written here. You can also report the status of other animals on the property and the current diet and management conditions for this patient.

Physical Findings: Describe the initial assessment – attitude, body condition score and weight if available, vital signs, relevant normal findings of examination (heart and lung sounds, GI sounds, digital pulses etc.) and any abnormalities on examination.

Diagnostic Tests: These are usually best listed in order of occurrence. We do not want long lists of terms and numbers that clients will not recognize or understand. For example, indicate that 'a complete blood count was performed, and changes were identified including a high fibrinogen (an inflammatory protein) and a high neutrophil (white cell) count, consistent with chronic inflammation or infection'. *Write only clinically significant findings of laboratory work and diagnostic procedures* and attribute the meaning to them in a manner that the client can understand.

Diagnosis: List one or more final diagnoses that were achieved during the visit and indicate if the problem was resolved. e.g. 'Acute colic, resolved with medical management'

Case Assessment: Do not reiterate the entire history. Restate why the animal presented and the major findings of the examination and diagnostic procedures that culminated in the specific diagnosis. Then describe how the case was managed including what treatments were given and why (details such as doses are usually excluded). Then summarize how the animal responded to treatments and if the problems resolved or are continuing at this time. A segment educating the owner about specific disease conditions, such as recurrent airway obstruction, pigeon fever, colic or other disorders and methods of preventing them is usually relevant to finish up the case summary.

Treatment Recommendations: individually list ALL medications that the animal is to receive at home, including dose (in tablets or mls), route and frequency of administration, and how long the medications are to be given for. Also, indicate possible side effects that the owner should monitor for in this section.

Dietary and exercise recommendations can also be made in this section, as can recommendations for quarantine.

Follow up: indicate if re-evaluation is needed by OSU or the owner's veterinarian, and what specific tests or procedures are needed and approximately when they should be scheduled. Also, instruct the client to call with any questions or concerns. If results are not expected to be available for some tests or procedures at the time of writing, indicate

that they will be transmitted at some point when they are available.

Finish by thanking them for bringing their animal into the hospital,

How to write a case summary for LA Medicine (for animals that are not discharged)

Complete the listed sections below as instructed for animals that do not survive their visit. Ensure that the words ‘Discharge Statement’ at the top of the template document are replaced with ‘Case Summary’

Chief Complaint: Write the main complaint the animal is presenting for according to the client,
e.g. ‘Irregular cardiac rhythm’ or ‘acute colic’

History: Describe the signalment of the animal in question (name, age, species, breed) and the circumstances about why they presented. Prior information from referring veterinarians such as their examination or diagnostic findings, any medications given by the client or vet and other specifics about the current condition should be written here. You can also report the status of other animals on the property and the current diet and management conditions for this patient.

Physical Findings: Describe the initial assessment – attitude, body condition score and weight if available, vital signs, relevant normal findings of examination (heart and lung sounds, GI sounds, digital pulses etc.) and any abnormalities on examination.

Diagnostic Tests: These are usually best listed in order of occurrence. We do not want long lists of terms and numbers that clients will not recognize or understand. For example, indicate that ‘a complete blood count was performed, and changes were identified including a high fibrinogen (an inflammatory protein) and a high neutrophil (white cell) count, consistent with chronic inflammation or infection’. *Write only clinically significant findings of laboratory work and diagnostic procedures* and attribute the meaning to them in a manner that the client can understand.

Diagnosis: List one or more final diagnoses that were achieved during the visit and indicate if the problem was resolved. e.g. ‘Acute colic, resolved with medical management’

Case Assessment: Do not reiterate the entire history. Restate why the animal presented and the major findings of the examination and diagnostic procedures that culminated in the specific diagnosis. Then describe how the case was managed including what treatments were given and why (details such as doses are usually excluded). Then summarize how the animal responded to treatments and if the problems resolved or are continuing at this time. A segment educating the owner about specific disease conditions, such as recurrent airway obstruction, pigeon fever, colic, or other disorders and methods of preventing them is usually relevant to finish-up the case summary.

Delete the treatment and follow up sections.

Finish by thanking them for bringing their animal into the hospital, express sympathy that their animal was euthanized or deceased, and instruct them to call with any questions or concerns.

VMC 734 & VMC 754 Clinical Surgery I and II Guidelines and Procedures

Course Coordinator: TBD

Course Instructors: Dr. Katja Zellmer, Dr. Michael Huber, Dr. Lacy Kamm, Dr. Kelsey Jurek

Introduction

The clinical surgery block will expose the student to large animal surgical problems and procedures -- both routine and advanced. A variety of clinical cases will be seen in this block. The surgery section also assumes primary responsibility for seeing lameness cases, athletic injuries of all types, some medicine cases, a variety of post-surgical medical problems, diagnostic work-ups, and consultations on the majority of clinical cases admitted to the VTH. The lecture and laboratory instruction that you have received will now be seen in practice.

Remember that the practice of surgery is not only "cutting and suturing" -- first a proper diagnosis must be made and suitable treatment must be considered. The actual surgical procedure is often the easiest step in the treatment sequence. Post-operative care often determines the outcome of a case and must be rigorously attended to.

Orientation will commence at 8:00 a.m. the first morning of each block -- meet on the green floor. The following are some guidelines and procedures to help you understand how the surgery section operates. Not all points are covered; remember that when in doubt -- ask!

Objectives

Exposure to clinical cases will be used to develop clinical diagnostic abilities, decision making processes, and technical skills based on the student's didactic and laboratory training in large animal surgery. The student will be expected to review surgical anatomy, surgical procedures and diagnostic methods for the specific clinical cases encountered. Participation in clinical rounds will be used to develop dialogues among clinicians and students regarding clinical decision making, treatment options, prognosis and client costs of treatment, among other topics. Maintenance of complete case records by the student will be emphasized by periodic reviews of surgery reports and case record entries by faculty and other clinical staff. Technical skills such as administration, selection and dosing of medications, bandaging, placement of intravenous catheter diagnostic methods (such as nerve blocks) and other procedures will be supervised by the clinical and technical staff at levels consistent with the student's abilities.

Admitting a Case (During Regular Hours)

Clients should check in at the Reception desk and fill out necessary forms, including the Client Information Form. When the chart is ready, you will be called to see the case. The next step is recording the medical history and performing the physical exam. The

appropriate physical examination form should be filled out (i.e., Lameness Examination, Colic Examination, General Physical Examination, etc.). Typically, you will then discuss the history and physical exam findings with the clinician, resident, and/or clinical fellow, followed by your diagnostic plan.

The diagnostic plan will become evident as the examination progresses (e.g., if a lameness -- nerve blocks and/or radiographs will be considered; if an elective surgery case -- hospital admission and pre-operative work-up will be required).

Pre-Operative Work-Up

In most cases, elective procedures will be identified and surgery scheduled for the following day. Filling out the pre-anesthesia checklist form will aid you in preparing the case for surgery.

All elective cases going to surgery must have:

1. A CBC and musculoskeletal profile submitted. Some clinicians prefer the complete large animal profile, or only PVC/TS depending on the case--so ask.
2. A tetanus toxoid booster (if >6months since last booster-ask clinician).
3. Weight recorded.
4. A general physical examination completed.
5. Shoes removed? Ask clinician.
6. The surgical site clipped and some preparation. Ask clinician.
7. Been groomed
8. Held off feed usually beginning midnight the night before. Ask clinician.
9. Scheduled for surgery using a surgery request form turned into Shawn Davis.
10. Anesthesia request turned in (VetHosp).
11. Order pre-operative medications (ask clinician)-may include antibiotics, anti-inflammatories, etc.

Some cases will require a bath, bandaging to reduce edema, special diets, etc. Food animals will be held off for up to 12-24 hours or more while most horses are held off feed for 12 hours prior to surgery. Suckling animals are not held off feed except in special situations.

It is your responsibility to ask the clinician about any questions regarding the pre-operative work-up.

Surgery

The scheduled surgery time is when the patient should be walked into the induction stall. Frequently, this requires that the case be in the final preparatory stages for 30 to 60 minutes. Horses are led outside the induction area, cattle are readied in their pen, the transporter, or the surgery chute.

Prior to surgery a horse must have:

1. Its mouth rinsed.
2. Its tail wrapped.
3. Its feet picked out and scrubbed with a brush to remove all material.

4. A final grooming prior to moving to the induction stall.

Cases being induced in Surgery Room 1 (with the tilt table) will need a tail rope and shipping boots applied. These will be available in the induction stall.

During this final preparation time, it is convenient and expedient to be dressed in your surgical scrub suit. The scrubs are available in the surgery locker rooms; the student color is blue. You must wear coveralls or lab coats over the scrubs when wearing them anywhere other than the surgery suite. If your scrubs are soiled, you will not be allowed to enter the surgery area. Keep the scrubs clean for surgery.

Access to the surgery suite is through induction stalls (with a case only) or past the locker area on the south side of the surgical suite. Whenever entering this area, you must wear proper attire — this means clean shoes and clean scrubs. Entry to an operating room is permitted only with shoe covers, cap, mask, and scrubs. These items are available in the surgery suite ante-room or laid out in the induction stall for the student leading in a patient.

Orientation to operating room procedures and responsibilities will be conducted the first day of the block. Students attending a surgical case must be conversant with the diagnosis, approach to be utilized and associated anatomy, alternative techniques, complications to be expected, patient after-care, and approximate cost for the procedure. You will be expected to utilize your knowledge, textbooks, and current literature to learn as much about each procedure as possible. You will also be expected to use and develop your hands-on surgical skills under the surgeon's supervision.

Recovery from anesthesia is the responsibility of the student anesthetist, anesthesiologist, and surgery team. No animal is ever to be left unattended until it can stand and walk steadily on its own. A patient is returned to the stall only after the surgeon or anesthesiologist determines that it is safe to do so. Food is withheld for 1-2 hours post-recovery to prevent esophageal obstruction.

The student surgeon is responsible for filling out and placing in the surgeon's or resident's mailbox a completed surgery report within 24 hours. The procedure should be described in a concise, yet complete, style. Items to include: position (i.e., lateral recumbency), type of tourniquet (if used), incision site, approach, findings at the surgical site (including size of mass, condition of tissues, etc.) description of implants, closure by layers (suture materials and pattern). The resident or surgeon will critique and approve/reject your report.

Post-Operative Care

All instructions for case care are the responsibility of the surgeon. Any changes in treatment will also be approved and recorded in the case record.

Prior to discharge of a patient, the animal must be presentably groomed, and the case record must be completed with explicit discharge instructions, bill, report to the referring veterinarian, and discharge medications.

Records and Forms

The case record is a medical and legal document; and it is an integral part of your learning experience, a follow-up necessity, and a research tool. All entries should be

neat, succinct, and signed. Refer to the case record for any changes in therapy or diagnostic plan by the clinician. The case record can become burdensome if you don't keep up with the paperwork on a regular basis. Daily SOAPs of cases should be completed before rounds are scheduled to begin (by 8am).

Charges must be made for all supplies not charged through the Pharmacy and for professional services. The number of forms we use may at first seem overwhelming, but they are necessary for cataloging diagnostic, therapeutic, and progress information on each case. They also serve to organize and record the charges generated. You should be aware of (and discuss with the clinician) all charges — this will be of great assistance to you in practice and will make you aware of the cost of supplies, drugs, and daily care of patients.

Surgery Rounds

Surgery rounds are held as scheduled by the clinician-in-charge; some rounds are in combination with the medicine service. In addition, surgery, medicine and clinical services students will attend pathology rounds one morning (currently Wednesday) each week. Routine treatments must be done and recorded by 8:30 a.m., before rounds. You are expected to be prepared to present and discuss cases assigned to you. The following are to be included in the case presentation: signalment (breed, age, sex), presenting complaint, history, diagnostic procedures and work-up, diagnosis, treatment and/or surgery, progress and outcome, including fees/costs.

More detailed discussions will take place with new cases. Comments on daily case progress should highlight any changes since previous rounds. Grand rounds presentations will be held on Fridays from 8:00-9:00am to expose all students and clinicians to cases of special interest.

The Inevitable List of Do's and Don'ts

1. Clinicians or technicians will supervise intravenous injections, bandage changes, passage of a nasogastric tube, or other non-routine treatments. As your technical skills improve, less direct supervision of these functions will be necessary.
2. Rectal examinations are to be performed only when directed and supervised by a clinician.
3. Be careful around horses — most will stand quietly for routine procedures such as the insertion of a rectal thermometer, but some will object violently. Always work in pairs (or seek the aid of one of the technicians) when giving injections or working on an uncooperative animal.
4. If you have any questions regarding a case, reach the clinician in charge of the case or, if unable, contact the emergency duty clinician.
5. The job is never done until everything is cleaned up and the paperwork is done. Remember if you don't complete your paperwork in a timely manner, it will be redirected to you. We all like to go home at the end of the day. However, due to the nature of our profession, this is not always possible. Students should be prepared to work after-hours on any given day.
6. We are working with the public. It is the animal owner, not the animal, who pays the bills, gives us praise, or voices their disfavor if things don't go right. Reserve

controversial comments to private discussion with the clinician and the rest of the section. Owners have a right to privacy regarding the condition their animal is in. What is said on rounds and in communication with the client and referring veterinarian is to be moderated by the attending clinician.

Emergency Duty and Weekend Treatments

Emergency duty is part of the surgery rotation for both Surgery I and II students. After hours duties are scheduled by the LA technician supervisor (Garland Burdock). These duties include treatment shifts, emergency duty and backup duty. Please refer to the Large Animal Clinic After-Hours section of this handbook for more details. Weekend rounds are held at a time set by the clinician on duty (usually 8:30 or 9:00 a.m.). The surgery service generally has a large caseload, hence we request that all students on the service come in and do morning treatments. With the approval of the clinician in charge, students on the surgery rotation can arrange to care for each other's cases on weekend if necessary.

Additional Training

As time allows, informal laboratory periods for additional training on nerve block techniques and other diagnostic procedures will be provided. "Mini-seminars" will, at times, be conducted to discuss areas of students' interests.

Evaluation and Grades

A Surgery Block Evaluation form (see appendix on-line) with constructive comments will be used to formulate your grade. Please see "CCVM Student Policies" for information on the Pass/No Pass grading.

Students should expect one or more unannounced written or oral examinations covering their clinical block instruction. All active clinicians on the service participate in the final course evaluation.

Our Teaching Hospital requires a continuous flow of suitable cases to achieve its functions. To maintain this, we need the cooperation and confidence of referring veterinarians and animal owners. This involves attention to every detail. Sometimes the most insignificant detail, left undone, will result in the loss of a client or referral. As a service profession, we are required to be concerned with animal owner's problems, and to maintain a professional and polite approach to these problems and their solutions.

VMC 735 and VMC 755

Rural Veterinary Practice I and II

Course Coordinator: Dr. Jorge Vanegas

Jorge.vanegas@oregonstate.edu

Mobil: 541-223-4826

Can be contacted by e-mail, phone call, text.

Instructors: Dr. Joe Klopfenstein <https://vetmed.oregonstate.edu/people/joe-klopfenstein>
Dr. Kate Schoenhals <http://vetmed.oregonstate.edu/people/kate-schoenhals>
Dr. Jorge Vanegas <https://vetmed.oregonstate.edu/people/jorge-vanegas>

Large Animal Clinical Fellows will be covering the equine section of RVP for a total of 8 weeks. These weeks are not consecutive coverage but rather distributed through the whole year. If a student will be working with a clinical fellow during her/his time in RVP the name and contact information of the clinical fellow will be provided at the beginning of the rotation

Technicians

Betsy Snyder CVT – She provides technical support to RVP and Therio Services

Betsy.Snyder@oregonstate.edu

Kim Veldman – She provides technical support to equine RVP.

Kimberly.Veldman@oregonstate.edu

Course Objectives, purpose: To provide instruction and clinical experience in livestock and general equine practice, herd health management and production of livestock animals, and theriogenology cases in livestock and horses.

Course Objectives:

1. Expose students to ambulatory veterinary medicine and surgery of livestock and horses at a community practice level.
2. Apply preventive veterinary medicine and herd health concepts to livestock and horses
3. Advocate for the welfare of farm animals and horses
4. Participate in verbal and written communication with owners and caretakers of livestock and horses
5. Understand regulatory veterinary medicine and the relationship of agriculture and livestock species to public health.

Specific Course Learning Outcomes:

Students may decide how much time to spend on either the food animal or equine service with the expectation that at least one week will be spent on each during their rotation.

Food Animal: Students will actively participate in the delivery of livestock medicine and herd health programs to dairy, beef and small ruminant herds that are clients of OSU CCVM rural veterinary practice. Outcomes are dependent upon case presentation during the student's rotation.

1. Rectal palpations –gain experience in evaluating ovaries, normal tracts, abnormal tracts

and pregnancy status by rectal palpation and reproductive ultrasound.

2. Herd health management, record keeping and evaluation – develop a functional understanding of the basic production stages on a dairy, beef and small ruminant operation. Understand the importance of accurate and complete collection of data, record keeping and records analysis to herd problem solving. Understand vaccination protocols for dairy, beef and small ruminants.
3. Students will develop skills in the examination and treatment of sick and poorly performing animals – ruminant physical exam, development of livestock specific problem lists, understand the treatment of pathological conditions encountered in cattle and small ruminants and the role of herd management, nutrition and environment on disease incidence, control and prevention.
4. Develop skills in performing common farm animal procedures such as disbudding, dehorning and castration including anesthesia, sedation, post-operative care and pain mitigation.
5. Students will develop skills in performing common surgical procedures such as displacement of abomasum and cesarean section.
6. Regulatory veterinary medicine - learn the proper procedures for Brucellosis vaccinations and completing certificates of veterinary inspection.
7. Students will be expected to participate in the RVP emergency service. This will give students the opportunity to develop skills involved in the management of ambulatory or in-house (VTH) livestock clinical emergency situations.

Equine: Students will participate in the delivery of equine medical and surgical services to clients of the OSU CCVM equine rural veterinary practice service. Outcomes are dependent upon case presentation during the student's rotation.

1. Students will practice routine equine health maintenance procedures on CVM and client-owned animals.
 - a. Students will be able to perform a general physical examination with detailed examination of the digestive and locomotor systems.
 - b. Students will acquire skills in the development of equine specific problem lists and recommend appropriate diagnostic testing.
2. Students will be expected to be able to develop and administer vaccination and parasite control programs for horses.
3. Dentistry and surgery – students are expected to be able to examine the oral cavity and provide routine dental care including removal of wolf teeth, floating, and occlusal equilibration. Students shall know the various methods of equine castration and be able to demonstrate techniques for field anesthesia and castration.
4. Students should learn and be able to work up common equine emergencies such as equine colic (which is included in the digestive examination), lacerations, acute lameness, including but not limited to laminitis, and ophthalmic conditions.
5. Regulatory medicine: students will understand the specific requirements for animal movement and participate in completing coggins forms and certificates of veterinary inspection.
6. Equine after-hours emergency services. Students will be expected to participate in the

RVP emergency service. This will give them the opportunity to develop skills involved in management of ambulatory or in-house (VTH) clinical emergency situations.

Guidelines and Procedures

Attendance:

Since instruction is largely dictated by case material available, attendance is mandatory. Each student will be required to spend an equal amount of time in each of the sections of RVP (equine and food animal) as well as to share equally the participation on the emergency service.

There are legitimate reasons for being absent, and these will be evaluated on an individual case basis in accordance with the STUDENT MANUAL. When possible, a REQUEST TO BE ABSENT form should be submitted to the dean's office 6 weeks prior to a planned absence. An unexcused absence is grounds for receiving a grade of INCOMPLETE for the block.

Appointments:

The Rural Veterinary Service DOES NOT USE VetHosp to set up regular appointments. Visits are scheduled using an RVP email Outlook calendar. Appointments are identified in the Outlook calendar with a different color category for each of the sections of the service (Food Animal: green, Equine: blue). Our daily schedule is available in any of the computers in the RVP office. Clinicians and VTH receptionist will try to update the calendar as regularly as possible with information about the planned farm calls so the students can prepare ahead of time on the different procedures that may be performed, as well as necessary supplies and equipment.

RVP appointments generally occur during the same hours as the hospital operations, i.e., 8:00 a.m. to 5:00 p.m. Monday through Friday, but patient care, records management, etc. may require additional time before and after regular business hours, including weekends. Promptness for farm calls is important, and failure to be available on time may result in students being left behind and an unfavorable evaluation

Dress Code & Equipment:

Students must supply their own coveralls, boots, stethoscope and thermometer. Coveralls required for hospital assignments are also appropriate for field calls. **Boots are mandatory and must be of a material that is easily cleaned and disinfected after each call** (usually at the client's facility). An extra pair of clean coveralls should be immediately accessible, as they are frequently soiled while working and many days we visit different farms during the sametrip.

We rely on the students having their basic tools with them at all times during the rotation.

Emergency Duty:

RVP provides emergency service at any time of the day; thus, **the schedule posted on the calendar may change on short notice and several times throughout a day**. Therefore, students are encouraged to bring a packaged lunch to eat in between farm calls (in the truck) as we may be unable to return to the VTH until the end of the day. Some days may be filled with lots of calls and others may be slow, we do not have much control about that, although we try to even out the load throughout the week.

RVP has an emergency service that allows clients to be served 24/7. After-hours and weekend calls are rotated among clinicians. Both RVP I and II students will be assigned to be available for emergency duty on a similar rotating basis. Students assigned to emergency duty are required to be readily available while on duty, to carry the student emergency cell phone to be located and able to arrive at the hospital within 20 minutes of being contacted by the emergency clinician.

A student emergency phone is available in the RVP office. You can forward calls to your personal cellphone when you are schedule to be on call duty. Directions on forwarding the phone are post in the RVP office.

Emergency schedule is as follows:

- a. **Weekdays: from 5:00 pm to 8:00 am the next day**
- b. **Weekends and holidays: 8 am to 8 am next day**

Clinician will receive the call from the client requesting a visit and clinician will contact student.

Client Communications:

While on the service, certain basic rules of conduct are expected from the students: respect to clinicians, staff, fellow students and clients. This rotation is an excellent opportunity to test your skills with supervision by a faculty member. Own your cases but do not make diagnoses or recommendations to the client without the clinician's prior approval. Discussion of a case is always encouraged, however arguments or voicing strong disagreement with the clinician in front of the client are unacceptable. There is always time for further discussion later. Avoid making negative comments about anything but especially management procedures, facilities, conformation, etc., in the presence of the client.

Hospitalized Patients:

Although hospitalization of animals is not frequent in the RVP service, when they occur, the students are responsible for the patient records, medications, etc., as with any other hospitalized patient (i.e., LA surgery or LA medicine blocks). Treatments and patient record entries must be accomplished prior to 8:00 a.m. each day.

Student Rounds:

We will meet for RVP student rounds every Friday at 8:00 am (time might change depending on clinical activities. Clinician on the floor will communicate to students). Rounds will include case presentations by the students of cases attended during their rotation. Please present your topic in a Powerpoint format and presentation should not last more than 15 min to allow further discussion

Since much of the farm work is scheduled first thing in the morning, rounds or discussion of daily clinical activities will usually be held in the truck during trips to farms. However, you need to be aware that you are being evaluated constantly on your knowledge, technical skills and deportment. You can be questioned on any procedure and any subject you are supposed to know at any time during your interaction with clinician.

Grading:

Number of term credits:

Path	Weeks	Credits
General	4	6
Small Animal	2	3
Large Animal	4	6
Non-traditional	2	3

Method used to evaluate students: Students will be evaluated on their knowledge base (27%), clinical skills (35%), technical skills (15%), professionalism and conduct (13%), communication (5%), animal welfare (5%).

VMC 729

Clinical Theriogenology

Guidelines and Procedures

Course Coordinator: Dr. Charles Estill

Course Instructors: Dr. William Whitler, Dr. Charles Estill, Dr. Olivia Strickland (resident)

Course Objectives

Objectives for this course are to provide guided instruction and hands-on experience in basic and advanced reproductive procedures in domestic species, including the dog, cat, horse, cow, sheep, goat, camelid and pig. Procedures and discussions span the entire gamut of Theriogenology including but not limited to: include reproductive physiology, breeding management, breeding soundness examination, insemination timing and techniques, embryo transfer, in vitro fertilization, semen collection and evaluation, assisted breedings, pregnancy diagnosis, infertility management, diagnosis, treatment and prevention of periparturient disorders, dystocia, and fertility control. Specialized laboratory and imaging techniques include collection and interpretation of vaginal cytology samples, endocrine testing, microscopic and computer-assisted semen evaluation, processing and freezing of semen, ultrasonography of the male and female reproductive tracts, vaginoscopy, and hysteroscopy. The student learning experience will be strongly influenced by the caseload during their scheduled week and students should bear in mind that much of our work is dictated by season of the year.

Description of course

This course will be a one-week core rotation for 4th year professional veterinary students. Students will be assigned to clinical cases under the supervision of staff Theriogenologists and participate in routine veterinary procedures including physical exams, history taking, and some of the reproductive procedures listed above. Students will be required to read supplemental material and present case and topic presentations. Every student will make a formal rounds presentation (~30 min) to other students and faculty at least once during the course.

Emergency coverage will be shared with students on the Rural Veterinary Practice rotation and students should expect some afterhours and weekend emergencies.

Patient records are generally prepared by students and their completeness and accuracy are taken into consideration in the grading process.

Learning Outcomes

- Explain the normal estrous cycle of the major domestic species.
- Describe how to collect semen and perform a semen evaluation on stallions, ruminants, and dogs.
- Explain how to manage a breeding (canine, equine) with cooled, shipped or frozen semen.
- Demonstrate how to diagnose pregnancy and estimate gestational age in domestic species.
- Explain how to perform a breeding soundness examination in female animals.
- Recognize causes and therapy for female infertility.
- Demonstrate how to perform a breeding soundness examination in a male.
- Recognize causes of male infertility.
- Explain normal and abnormal events of pregnancy and parturition.
- Explain how to manage a dystocia.
- Articulate causes of neonatal diseases.
- Recognize diseases of the mammary gland.

Course specific risk assessment

There are many risks associated with the practice of veterinary medicine. While it is not possible to identify all the risks associated with a particular activity, the following are known potential hazards when participating in this course.

1. Known chemical hazards in this course: tranquilizers, povidone iodine, chlorhexidine, isopropyl alcohol, formalin, sedatives, isoflurane, prostaglandins, progestins, estrogens.
2. Known radiation hazards in this course: radiographs of pregnant dogs, cats, goats, pigs.
3. Known physical hazards in this course: cattle, horses, alpacas, sheep, goats, dogs, cats, OB wire, scalpel blades, suture needles.

VMC 782

Large Animal Emergency Care Guidelines and Procedures

Course Coordinator: Dr. Kelsey Jurek

Block Objectives

1. To provide students additional instruction in emergency and critical care of large animal species.
2. To improve patient care and minimize judgmental errors by reducing afterhours commitments for block students and providing alert, rested student care providers.
3. To reduce the hours which students in the Large Animal Medicine and Surgery blocks must devote to afterhours live-in duty.

Duty and Instructional Schedule

Students will spend one-week in this course. The block starts on Sunday night at 5:00 P.M. If there are not concurrent emergencies, you will be met by the house officer (resident or clinical fellow) on duty near that time on Sunday so they can familiarize you with protocol and orient you to hospitalized cases.

After Sunday, weekday shifts begin at 5:00 P.M. The final shift on Saturday begins at 5:00 P.M. Each shift ends the following morning after case transfer at rounds (usually by 9:30 A.M.) or by permission of the house officer (8:00 A.M.) if there are no new cases and there have not been any major changes associated with hospitalized cases. To reiterate, the house officer on duty from the night before will determine student dismissal, and thus it is incumbent on the house officer to arrive between 7:45 A.M. and 8:00 A.M. (in the event the house officer is not available, then the senior clinician on medicine or surgery can make the decision). If you experience difficulties with this system, please contact Dr. Jurek.

On weekdays, the emergency student will arrive in time to be changed into clinic attire and to be ready to assist the evening technician with 5:00 P.M. treatments. During the week (Sunday through Thursday nights, and Friday until Midnight), a night technician is often on duty and if permitted directly by the technician, students may find some time to rest during their shift. However, please do not rely on resting during the rotation. ***The emergency student shall plan to rest sufficiently so that he or she will be awake and alert for the entire duty period.*** If a night technician is not available, a backup student or technician is called to provide support. The backup student will be allowed to rest preferentially since he or she has clinic duty during the day. On occasion when there is no night technician scheduled, the emergency student will be up during the entire rotation.

Orientation

Ideally, all students will have had a previous daytime clinical rotation prior to the emergency care block. Students will be oriented to hospital functions on Sunday at 5:00 P.M. of each block. The House Officer on duty for Sunday or the Emergency Clinician will meet with you for this purpose.

It is strongly recommended, and it is the student's responsibility to attend one block orientation (LA Hospital) prior to the emergency rotation. Students are required to read all sections of this manual for additional orientation. Some instructional materials are to be found in a Hospital Manual located in the Communications Area of the LA Hospital. If the student has not had previous clinical duty at OSU prior to the start of the emergency care block, that student should advise the house officer or Emergency Clinician providing orientation on the first evening (Sunday 5:00 P.M.). Students should consider arriving one-to-two-hours early to work with experienced students and to receive additional orientation from the night technician.

Instructors

Dr. Jurek is the instructor in charge. House officers (residents and clinical fellows) will function as the daily instructors to interface with students. Additionally, students will, also, interact with medicine and surgery clinicians, the on-call anesthesiologist, the evening and night veterinary medical technicians, and all faculty attending morning Veterinary Teaching Hospital rounds.

Topics to be Discussed

This rotation is case-driven. Consequently, as in practice, students should be prepared for any type of case presentation. All previous veterinary experience, classes, discussions, notes, journals and texts are prerequisites. Remember that logical thinking, knowledge, and experience are the keys to case management of patients with multiple differential diagnoses and long problem lists. Examples include colic diagnosis, treatment of endotoxemia, severe trauma, dehydration, fluid therapy, correction of acid/base imbalances, casting and stabilizing fractures, interpreting laboratory data, performing laboratory tests available to the practitioner, oxygen therapy, and neonatal care.

Students completing the course should be able to evaluate and subsequently develop a treatment plan, calculate fluid therapy needs, insert intravenous catheters, administer oxygen, support fractures, and in other ways care for the critically ill emergency patient.

Library and Reference Materials

The veterinary college library has several texts on critical care medicine, and the more common veterinary journals, which contain articles on emergency care and treatment. A hospital library, made up of pertinent texts donated by previous classes, is available on the shelves of the large animal hospital communications room. Please leave the books in the hospital.

Grades

Attendance is required for each night of this block. Any absences need to be excused. If a student misses more than two shifts, regardless of the reason, a recommendation will be made to retake the block. Grading is Pass/No Pass with anything 70% or higher considered a "Pass".

Small Animal Services

Veterinary Teaching Hospital

Guidelines and Procedures

Appointments & Admitting

The Small Animal Hospital is primarily a referral hospital and appointments are made by the Reception staff according to hospital guidelines. The SA Hospital is open Mondays through Friday, from 8:00 a.m. until 6:00 p.m. Appointment schedules vary by service area.

Appointment scheduling is accomplished via an electronic scheduling program that can be viewed on line. Printed copies of the receiving schedules are also posted daily outside the door to the client services area. All appointment entries, changes and cancellations must be performed by the Reception staff. Recheck or recurring appointments are sometimes scheduled as drop offs between 7:30 and 9:00 a.m. but new clients cannot be admitted by this mechanism.

Clients dropping off a pet must have a scheduled visit through the Reception staff and the client must be greeted by the technician or student assigned to the case. During regular business hours, the student will facilitate the hospitalization process by escorting the client to the SA Reception desk to finalize the admissions process and to leave a deposit based on the content of the written estimate form. Estimates are the responsibility of the service technicians and attending clinician and are derived from the SA fee code schedule which is available on line.

Discharges

Hospital discharges are preferably accomplished in the afternoon from 1:00 to 5:30 p.m. Hospital discharges must be coordinated with the service technicians and Reception staff. It is the responsibility of individual services to make certain that all hospital charges are entered prior to the time of discharge.

No patient should be discharged without the knowledge and approval of the attending clinician. Patients should be clean and appropriately groomed prior to discharge. In addition, all dispensed medications should be retrieved, well in advance of the discharge time, from the VTH Pharmacy or hospital. A written discharge form, signed by the attending clinician, is required for all patients discharged from the hospital. A copy of this discharge form should be faxed to the referring veterinarian on the day of discharge along with any other information as indicated by the supervising clinician. Student involvement in these processes is determined by the particular clinical rotation.

After Hours Duties

The student is referred to the Small Animal After Hours Duties section of this manual for an explanation of their duties outside of business hours. The Small Animal Hospital does not provide after-hours emergency services for new clients, but day emergencies are scheduled with the approval of the supervising clinician who is responsible for coordinating the visit through the Reception staff. It is sometimes necessary for existing clients to bring their pet for urgent care outside of normal hours. These visits are

appropriately scheduled only with the approval of a supervising clinician. Students assigned to the rotation are responsible to assist in the management of such cases as requested and without hesitation. The Urgent Care service will receive new and existing client emergencies from 9 am to 4 pm Monday through Friday excluding holidays. This service will transfer all cases to an appropriate service by 5 pm that day. More details regarding the Urgent Care service may be found in the VMC 791 & 792 Small Animal Internal medicine section of this manual.

Student Involvement

Students assigned to a clinical rotation are required to participate in patient admissions, assessment, hospitalization, care and discharge. The exact role of the student may vary depending on service and patient. Students should never operate independently of the supervising clinical faculty member and should never initiate treatment or a procedure except under the direction of a veterinary technician or attending clinician.

Students are required to take an active role in filling out all required hospital forms and maintenance of the medical record. Detailed information regarding these procedures will be provided during the orientation to each service area rotation. All hospitalized patients must have a hospital ID collar with the owner's name and clinic number legible. The kennel assigned in the hospital should also be clearly identified and tagged with regard to feeding and any other special annotations (feeding instructions, special care, etc.) The medical record should be placed in the location that corresponds to the animal's cage or run when not in use by other services so it can be located when necessary. The student, technician, intern, resident and clinical faculty that received the patient are responsible for the animal's care including cage set up, maintenance and cleaning. All animals with intravenous catheters must be housed in the intensive care unit for continuous monitoring.

Clinical Attire and Student Conduct

Professional appearance should be maintained at all times. This includes good hygiene and cleanliness. Jeans, t-shirts, tank tops, shorts or open toed shoes are not permitted in any area of the Veterinary Teaching Hospital where you may interact with the public. Name badges should be worn at all times during work hours, and a white laboratory coat should be worn. It is important to behave professionally to our clients and referring DVMs. Students should be professional in their conduct and mindful of how their remarks might be perceived by the client. It is not appropriate to discuss or criticize case management by a colleague (referring veterinarian) in the presence of the owner. The owner's privacy must also be protected and cases should not be discussed inappropriately with anyone other than the hospital staff and attending clinician(s). Such discussions are best accomplished during clinical rounds. Students are referred to the OSU CVM Professional Code of Conduct under CVM Student Policies for more information.

Food and drink are only allowed in designated areas of the VTH where animals are NOT handled or housed. Water in closed or capped containers is okay.

Attendance: Attendance is mandatory. Please see the Year IV Absence policy in the CVM Student Policies section of the manual. Be punctual. Hours will vary between services so make sure you know what regular and after hours duties you have during your

rotation. If you are ill, it is your responsibility to contact the supervising clinician and/or technician. IF you are going to be late for or absent from afterhours duties you must call into the ICU (541) 737-4825 and speak to an ICU technician or small animal rotating intern.

Equipment

For all rotations, you are required to bring a stethoscope, bandage scissors, penlight and thermometer. For surgery, you should also bring suture scissors

Safety Procedures: There are many inherent dangers working with animals particularly in a hospital environment. Please be mindful at all times of your own safety, the safety of others around you and the safety of your patients and clients. If you are ever uncertain, err on the side of caution and ask for assistance. A more extensive explanation of the risks and responsibilities associated with student safety can be found in the CVM Student Policies, Lois Bates Acheson Veterinary Teaching Hospital sections as well as the Small Animal Infection Control Policy in the Appendix.

VTH Policies, Procedures Organizational Charts, and SOPS are available on the [Veterinary Teaching Hospital Smartsheet Dashboard](#). Familiarize yourself with these resources and information and ask your supervising clinician or veterinary technician if you have questions regarding a VTH Policy or Procedure.

Small Animal After-Hours Duties

Students on any small animal hospital rotation (Cardiology, Oncology, Internal Medicine or Surgery) and diagnostic imaging will be required to work evening and/or weekend shifts in the small animal hospital. In addition, students on small animal hospital rotations will also be scheduled for on-call shifts in which they may not be in the building but must be available in case their services are needed. The students on the Small Animal Hospital Intensive Care Unit and Hospital Services Rotation (VMC 797) will be assigned the overnight shifts Monday through Saturday. The monthly schedule will be posted on the bulletin board outside the ICU in the hallway across from diagnostic imaging. Any changes to the posted schedule must be initialed and approved in advance by an ICU technician.

The following rules apply to any shift that a student may be assigned in the ICU:

1. The student must report to the ICU on time for their designated shift and must stay until the shift is completed unless released by the ICU technician and/or Intern. An ICU shift is completed when the next shift's students and/or technicians have completed rounds on each of the hospital patients.
2. Attendance is mandatory. All missed and incomplete shifts (excused and unexcused) will be made up prior to receiving a diploma. An incomplete grade will be assigned until all shifts are made up. In the event of an emergency or illness, the student is required to contact the ICU technician or intern on-duty. This should be done by calling directly into the ICU (541-737-4825). Fellow students cannot approve absences. Any missed shifts will be reported to the scheduling ICU technician who will review the upcoming schedule and assign make-up shifts. These shifts may be assigned during the same block or any subsequent block in addition to normally scheduled shifts and duties.
3. Students should report for their shifts with clean scrubs and a stethoscope.
4. Any on-call student must be immediately available by phone for the entire shift. Students are responsible for updating their phone numbers in the ICU as needed. Students must be within 20 minutes travel time to the ICU when on duty or call.
5. During after hours, unauthorized people (including friends and family) are not allowed in the small animal hospital. On occasion it may be necessary to have food or supplies dropped off to students working after hours but extended stays are not permitted.
6. The primary duty of after hour care will be exemplary patient care followed by hospital maintenance. It is expected that the students on duty will work with each other and the technician to complete all necessary tasks. If all work has been completed, additional time may be spent studying, practicing emergency medicine and critical care techniques or going over use of equipment.
7. Absolutely no unprofessional behavior will be tolerated. This includes sleeping, watching movies and using the internet for non-veterinary related purposes. No food or drinks are allowed in the ICU or Tech Station. All personal items should be left in

one of the rounds or communications rooms.

8. There is a zero-tolerance policy for drugs and alcohol. If a student arrives for a shift and appears to be under the influence of drugs or alcohol, it is the immediate responsibility of the other students and technicians on-duty to contact the intern on-duty.
9. If any patient is housed in the small animal hospital, regardless of resuscitation status or level of care, two people must be present at all times.

OSU Veterinary Teaching Hospital

Small Animal Intensive Care Unit

Policy and Procedures

ICU PHONE NUMBER: (541) 737-4825

Do not give number to client or make client calls from this phone!

CRITICAL CARE SERVICE HEAD:

THANDEKA NGWENYAMA DVM DACVECC

Critical Care Faculty:

Pia Martiny DVM DACVECC

ICU TECHNICIANS:

Julie Brown CVT

Trevor Fitcha CVT

Janice Hutcheson CVT

Meghan Hiatt CVT, VTS-ECC

Tracey Jastad CVT

Jamie Edgmand CVT

Kimberly Warren CVT

Sara Lohse CVT

Marcy Stenerson CVT

Float Technicians:

Julie Posch CVT, VTS-ECC

Melanie Speck CVT

SCOPE AND PURPOSE

The CRITICAL CARE SERVICE (CCS) is responsible for providing 24-hour care to patients housed in the INTENSIVE CARE UNIT (ICU).

IMPORTANT: ICU is for housing and providing care for patients that are deemed critical, immunocompromised, or that need post-operative recovery monitoring. It is NOT a General Treatment area. Care for patients housed outside the ICU are not to be brought into ICU for treatments (e.g., bathing, bandage changes, etc.) or diagnostics, unless approved by ICU Technician.

DAILY ICU HOSPITALIZATION CHARGES START AT 10 AM. ALL PATIENTS MUST BE DISCHARGED BEFORE 10 AM TO AVOID INCURRING A DAILY ICU HOSPITALIZATION FEE.

ADMITTING PATIENTS TO THE ICU

1. Clinicians and students from the **PRIMARY ADMITTING SERVICE** will maintain primary case management for their patients admitted to the ICU.
2. Whenever possible, the staff in the ICU should be advised **at least ONE HOUR prior** to admission of a patient into the ICU.

- a. A student, house officer, or faculty member must round with the ICU technician regarding the case on admission. This includes any animal admitted following sedation or anesthesia.
3. Upon Admission to the ICU, students from the admitting service **MUST** complete the **ICU STUDENT SET-UP CHECKLIST (BLUE SHEET)**. Once complete, the checklist must be signed off by an ICU technician
4. The service admitting the patient is responsible for all patient set-up (e.g., cage, medications/therapeutics, records, equipment). Set-up includes all patients having:
 - a. All collars and harnesses (not necessary for patient monitoring and treatment) removed
 - b. An **I.D. NECKBAND** with the Patient / Client Sticker
 - c. An appropriately sized, adequately furnished (pads, mats, towels, absorbent pads) kennel. Dogs should not be left outside of cages or in 'pens'
 - d. A fully **COMPLETED CAGE CARD**
 - Patient's name
 - Case #
 - Assigned student name,
 - Attending clinician name
 - Primary Service (e.g., IM, Sx, Cardio, etc.)
 - Primary complaint or diagnosis
 - e. **Colors** of the **ID neck band** and **cage card** should match the infectious disease risk of the patient
 - **RED** – Isolation (Rm 174D)
 - **YELLOW** – Infectious / Zoonotic Risk with Barrier Nursing
 - **ORANGE** – Chemotherapy
 - **BLUE (OR WHITE)** – No infectious risk / General Populace
 - f. Special **INSTRUCTION TAGS** (e.g., “Will Bite”, “NPO”, “Seizure Watch”, “Chemo”, etc.) shall be attached on the cage door.
 - g. A **PATIENT SUPPLY CONTAINER / BOX** will be labeled for any personal items, food, leash/collar, etc. and will be neatly housed in the ICU
5. The following must be initiated / completed upon admission to the ICU:
 - a. An **ICU FLOW SHEET** with detailed orders and the clinician's signature.
 - Interns must have a resident or faculty signature as well. If the orders do not have the appropriate clinician's signature(s), treatments will not be given to the patient and the faculty will be contacted.
 - b. An **ICU CHARGE SHEET (Orange sheet)**
 - c. **EMERGENCY DRUG SHEET (YELLOW SHEET)** (placed on the clipboard behind ICU Flow Sheet)
 - d. **RESUSCITATION ORDERS** (e.g., DNR) – displayed clearly on patient's cage door and annotated on the ICU Flow Sheet.
6. **ALL** patients hospitalized in the ICU with **EXTERNAL (CPR)** orders or under

SEIZURE WATCH should have an intravenous catheter placed.

- a. This is to ease the administration of appropriate pharmaceuticals should an arrest or seizure occur.
- b. Exceptions to this are animals in which catheter placement is contraindicated due to underlying disease.
 - i. Exceptions must be approved by the **SUPERVISING FACULTY** on the service and noted on the ICU orders in the remarks.
- c. Animals that are DNR do not have to have an intravenous catheter placed.

ANESTHETIC RECOVERIES in the ICU

1. **ANESTHESIA PERSONNEL** are responsible for monitoring patients **UNTIL EXTUBATION**
2. **SURGICAL STUDENTS** are responsible for monitoring patients until a **rectal** temperature of **99° F** or **axillary** temperature of **100° F** is achieved.
 - a. ICU technical staff are committed to ALL patients housed in the VTH, depending upon the number of ICU patients currently present, may not be available to assist with monitoring patients during the immediate recovery period.
3. Recommended Post-Operative **BASELINE MONITORING**:
 - a. **TPR** with temperature acquired **EVERY HOUR** until maintained at ≥ 99 F without a heat source for **TWO** consecutive hours
 - b. Mucous Membranes / Capillary Refill Time**
 - c. Thoracic auscultation**
 - d. Pulse quality** (strength, regularity, synchronicity with heart rate)
 - e. Mentation**
 - f. Doppler blood pressure** (until value > 90 mmHg is achieved on 2 consecutive readings obtained no less than 15 minutes apart)

ADMITTING PATIENTS WITH KNOWN OR SUSPECTED *INFECTIOUS DISEASES* OR *CHEMOTHERAPY*

1. Follow appropriate guidelines as outlined in the **VTH INFECTIOUS DISEASE MANUAL**
2. At minimum, any contagious patient admitted to the ICU will undergo barrier nursing protocols. Proper hand wash hygiene and wear of PPE will be practiced.
3. Personnel allowed to handle contagious patients will be limited to only those necessary to provide patient care. This should ideally include only the primary student and one designated ICU technician.
4. Care and handling of contagious patients should be conducted at the end of the shift or after attending to all other patients in the ICU.
5. Each contagious patient admitted to the ICU will receive the appropriate color-coded **neckband** and **cage card**, be assigned their own ***INFECTIOUS DISEASE KIT***,

and have their cage clearly marked with appropriate **Signage** indicating the infectious disease and precaution needed.

6. All Chemotherapy patients will have their cages CLEARLY identified and must be handled in accordance with the VTH SOP for “**SAFE HANDLING OF CYTOTOXIC DRUGS**”

ISOLATION PATIENTS (174D)

1. ICU staff (technicians, students) are **NOT PERMITTED** to handle animals in isolation during their shifts.
2. **EXCEPTION** to this rule may occur during a critical emergency such as cardiopulmonary arrest.
3. If the **PRIMARY SERVICE** has hospitalized a patient in isolation, **THE PRIMARY SERVICE** is responsible for **ALL** of the patient’s care.
4. **THE PRIMARY SERVICE** may utilize ICU students, “after-hours” students, and ICU technicians for after hours, but it has to be in a manner in which they will not be returning to patients in the ICU. For example,
 - a. If an individual is completing their ICU shift, then they would be free to treat an isolation patient, or
 - b. If there are 2 students or one student and two CVT’s on overnights, then one student may be committed to the isolation patient.
5. It is the **PRIMARY SERVICE’S RESPONSIBILITY** to organize and communicate care for their patient’s housed in Isolation.

CARE of PATIENTS HOUSED in the WARDS

1. The ICU staff’s primary responsibility is dedicated towards providing the appropriate **LEVEL OF CARE** to the more critically ill patients housed in the ICU.
2. The student (or attending clinician) for a patient hospitalized in wards is responsible for rounding their patients care to the ICU intern at 6 PM (Monday – Friday). Weekend and holiday patient rounds will be at 8AM.
3. Patients housed in the Wards after-hours should be limited to only those patients that:
 - a. Have a **STABLE CONDITION** and
 - b. **DO NOT REQUIRE HANDS-ON INTERVENTION** or continual observation (e.g., hourly seizure watch) by the ICU Staff throughout the night
4. In an effort to ensure better quality of care is provided to all patients, the following actions should be practiced and observed by all Services:
 - a. You must round your patient to the ICU staff if they are spending the night in wards.
 - b. Each patient in wards is required to have a completely filled out ward’s treatment sheet, including doctor signature.
 - c. Students are responsible for the **7 AM and 7 PM** treatments of their Wards

patients 7 days a week

- d. Students are responsible for their **DAYTIME TREATMENTS** of wards patients during regular business hours. This includes end of day treatments (7PM) such as feeding patient and walking them.
 - e. Students are responsible for **MORNING** treatments of wards patients regardless of whether it is scheduled at 6 am, 7 am or 8am as well as being responsible for completing **END OF DAY** treatments that are scheduled from the hours of **5- 7 pm**.
5. Wards treatments between **11 PM to 7 AM** (or first morning treatment conducted by the student) should be **LIMITED**.
- a. Ward patients that require more frequent (**< Q 4 HRS**), hands-on treatments between **10 PM** and **7 AM** are advised to be hospitalized in the SA ICU overnight to ensure treatments will be completed. Prior coordination with the ICU technical staff is required before moving Ward patients into the ICU.
 - i. Not all patients in the Wards will always need to be transferred into the ICU every night. Transfer of patients into the ICU is not necessary for patients that just require a walk-by observation (except seizure or respiratory watches)
 - ii. Transfer into the ICU is advised primarily for patients that require:
 - 1. Frequent treatments (**e.g., < Q 4 HRS**)
 - 2. Hourly seizure or respiratory watches
 - iii. Students from the Primary Care Service are responsible for transferring patients into and out of the ICU to include cage set-up and cleaning.
 - b. **EXCEPTIONS** may be made for situations where moving patients into the ICU would cause more harm than good to either the Ward patient or ICU patients (e.g., highly anxious, continuous barking, etc.) or when the number of Wards patients requiring treatments does not preclude completion of their treatments in a timely manner (e.g., only 1 or 2 Ward patients). Prior coordination with the ICU staff should be consulted to determine this exception.
 - i. When patients that require treatments are kept in the Wards overnight, then treatments should be limited to **NO MORE** frequent than **≥ Q 4HR**.
 - ii. In addition, it is advised to coordinate treatments by scheduling them to occur during the prescribed 1-hr blocked times of: **(11PM-12AM)** and **(3-4 AM)**.
 - iii. Coordinating treatments during these blocked periods will allow the ICU student to anticipate and prepare for the treatments as well as reduce the number of trips to the Wards required through the night. Overall, this coordinated scheduling will help facilitate the ease of accomplishing treatments.
 - iv. If treatments are scheduled outside the prescribed treatment blocks (noted above), then it cannot be guaranteed that the treatments will be completed.

****PATIENTS TRANSFERRED INTO THE ICU OVERNIGHT CAN HAVE THE TREATMENTS**

SCHEDULED AT ANY TIME, NOT NECESSARILY DURING THE BLOCKED HOURS NOTED ABOVE

CHARGING FOR WARD PATIENTS Transferred to ICU for Overnight observation and care:

1. Ward patients housed overnight in the ICU may be charged the same level of hospitalization as if they remained in the Wards.

DAILY ICU RESPONSIBILITIES

CASE RESPONSIBILITIES:

ALL Services that have a patient in the ICU are required to perform the following:

1. **Every morning** (including weekends and holidays) by **8:30 AM** students **MUST**:
 - a. Change patient bedding and thoroughly clean the kennel/patient
 - b. Start a new **ICU FLOW SHEET**
 - c. Complete **PRESCRIPTIONS** as needed (24-hour supply of medications in patient belonging box by 10AM)
 - d. Complete **7:00 AM TREATMENTS**
 - e. Attend Zoom rounds at 7:30 AM
 - f. Complete **SOAPs**
 - g. Perform **IV CATHETER / BANDAGE CARE**: evaluate cleanliness and patency, re-tape if needed.
2. Students are responsible to communicate (round) their ICU patient to the ICU technicians at the end of their day. ICU patient treatment sheets should be updated, and **all** medications should be available for administration.
3. The ICU staff *may* ask the primary student to stay and help with their patient 7PM treatments. The student will be notified at the end of day rounds if they are needed to provide care for their ICU patient.

ZOOM PATIENT ROUNDS

1. Morning rounds at 7:30 AM will be coordinated by the ICU intern who is caring for the ICU patient. Overnight ICU students are responsible for presenting patient rounds.
2. Evening rounds at 6:00PM will be presented by the primary service student.
3. There is an ICU CVT that is designated as the 'Rounds CVT'. If you will be admitting a patient into the ICU notify so that we can facilitate the set up for your patient.
4. A clear and concise case summary should provide the following information: signalment, history, master problem list, current and proposed interventions, therapeutics, and plan of action.
 - a. Interventions discussed should, at minimum, include plans for: *fluid therapy, medications, diagnostics, monitoring, CPR code, nutrition, nursing care, procedures (e.g., surgery, feeding tube, urinary catheter, etc.), and expected term of hospital stay.*

ICU FLOW SHEET

1. Technicians and students are allowed to create a flow sheet, but the **SUPERVISING CLINICIAN must sign** the flow sheet in order for any treatments to be administered to the patient.
2. The **ICU flow sheet** and **charge sheet** need to be completed upon the patient's arrival to the ICU and **by 8:30 A.M. OF EACH DAY** of the ICU stay.
3. All portions of the ICU flow sheet must be completely filled out **DAILY**. This includes:
 - a. *Date, time, patient I. D. information, cage #, reason for admission, potential complications, clinician/student contact phone numbers, resuscitation orders, weight, diet, fluids (if indicated), specific orders and IV catheter placement/date.*
4. ICU Flow sheets **MUST** include the following:
 - a. Phone numbers of clinicians (first call is first clinician listed) and primary student (Vocera can only be used for Faculty and Residents)
 - b. Medication Dosages written in **MG/KG AND MG**
 - c. Route of administration and frequency clearly noted.
 - d. Dosages of IV pumps/CRIs clear and checked by the clinician or technician and initialed on the hospital orders.
 - e. Call parameters – clearly noted on treatment sheet.
5. It is recommended to schedule all TPRs and the majority of treatments / interventions on the following rotating schedule:
 - a. BID (Q12 HRS): 7 AM / 7 PM
 - b. TID (Q8 HRS): 7 AM / 3PM / 11 PM
 - c. QID (Q6 HRS): 7 AM / 11AM / 3PM / 11 PM
 - d. OVERNIGHT: (11PM-12 AM) / (3 -4 AM)

**NOTE: Coordinating the majority of treatments during these times will allow ICU technicians to coordinate care more efficiently, while at the same time preclude critically ill patients from being disturbed frequently and therefore disrupting their much-needed rest.*

6. Changes to a patient treatment sheet must be documented on the patient green sheet. Notify the ICU staff of the green sheet and an ICU CVT will update the patient chart. **Once a treatment sheet is signed – no changes are made without documenting on the green sheet.**
7. If there are any areas of omission, the ICU staff will contact the clinician and changes need to be made immediately. **THE CLINICIAN MUST READ AND VERIFY ALL ORDERS AND DRUG DOSAGES COMPLETELY.** The ICU staff will notify clinicians if orders are not completed.
8. It is important to maintain a detailed and meticulous observations on each case; note all *urination, defecation, vomiting, coughing, abnormal behavior, etc.; all*

procedures, catheter changes, lab results etc.

ICU CHARGE SHEET

1. The charge sheet is used to keep track of expenses of ICU patients; therefore, it is extremely important that **ALL students, clinicians and ICU technicians** make every effort to ensure charge sheets are current and accurate.
2. Daily accounting for each **24-hour period** will be tallied and documented on this sheet.
3. Each patient needs a **new charge sheet every 24 hours** beginning **8 am**.
4. Charge sheets include supplies, lab work, medications, etc.
5. The most current sheet should be placed behind the most current ICU flow sheet.
6. Clinicians, technicians and students are all responsible for marking on the sheet and/or communicating to the ICU staff regarding supplies, procedures and medications.

PATIENT RECORDS / CHARTS

1. All patients' records (soft and hardback) are to remain in the ICU in the chart rack.
2. The soft back should accompany the hardback.
3. Records should only leave the ICU when patients are in other service areas for procedures (e.g., surgery, oncology).
 - a. When patient records/charts are removed from ICU the person removing said chart will notify the ICU staff.
4. Maintain detailed and meticulous observations on each case. Note any and all:
 - a. *Urination, defecation, vomiting, coughing, abnormal behavior, etc.*
 - b. *Procedures performed, catheter changes, pertinent lab results, etc.*
 - c. *Changes in fluid regimen, nutrition, medications, treatments, etc.*
5. When administering medications **ALWAYS** record on the **ICU FLOW SHEET**:
 - a. Drug **NAME**, **AMOUNT** (mg / kg and mg), **DATE/TIME** of administration, and delivery **ROUTE** and **SITE** (e.g., central line, cephalic vein, etc.)

ADDITIONAL ICU RESPONSIBILITIES

1. A representative of the **PRIMARY SERVICE** hospitalizing a patient in the ICU (student, intern, resident, faculty) must round with ICU technicians upon
 - a. Admission,
 - b. After completion of daily ICU orders in the morning,
 - c. Evening Zoom rounds (6 PM), and
 - d. Any changes to the ICU orders (e.g., treatment, monitoring, diagnostics, etc.) will be written on the change of order sheet (Green sheet)
2. **Students** are responsible for the **7 AM morning treatments (7 days/week)**

scheduled prior to any service rounds

3. If the student is present at or around the time the treatment is requested, then it is expected the student will perform the treatment.
 - a. It is important to remember that if the ICU is busy caring for patients; students may need to volunteer or be asked to help with treatments.
 - b. You should anticipate and assist with time-consuming treatments or those requiring additional assistance.
 - c. Other students and/or technicians from the patients' primary service may also be asked to help with treatments if the ICU staff is busy.

EQUIPMENT/SUPPLIES

1. Students and clinicians are responsible for knowing how to work all equipment.
2. The ICU technicians will give instructions/demonstrations in orientation as well as when students are on the ICU rotation.
3. ICU equipment should **NOT** be removed from ICU.
 - a. Exceptions to this rule must be approved by the ICU technician on staff.
 - b. All equipment **MUST** be returned promptly after use.

ICU CLEANLINESS - GENERAL

1. All students, faculty and staff utilizing the ICU are expected to participate in keeping the unit clean and organized at all times.
2. When students and after-hours clinicians are not busy caring for patients, every effort should be made to keep the ICU clean and stocked.
3. Students are responsible for cleaning cages any time they become soiled, and cages should be thoroughly cleaned by the ADMITTING SERVICE **EVERY 24 hours**.
4. Exam tables should be cleaned immediately after use. Refer to the cleaning protocols for proper cleaning techniques.

DISCHARGING PATIENTS FROM THE ICU

Students and clinicians from the service admitting the patient are also responsible for removal of personal belongings and clean-up of housing facilities. The following are some general reminders.

1. Enter date and time of discharge, and exit code (see below) on the flow sheet in the remarks

A= ALIVE D= DIED IN ICU E= EUTHANIZED

2. Ensure the patient is clean and presentable to the owner for discharge.
3. Check the patient's treatment box and controlled drug safe for any personal belongings or medications, respectively.
 - a. **ALL MEDICATIONS** must be removed upon discharge of the animal from the ICU by the appropriate service.
 - b. Unused controlled drugs that are not going home with the patient should be disposed of by the ICU technician.

4. Leave ICU **CHARGE SHEET(S)** and **FLOW SHEET(S)** with the ICU technical staff for completion of ICU charges. Charge sheets and flow sheets will be returned to medical records once charges are completed. Upon discharge from ICU the medical record can be removed.
5. Clean and disinfect cage (see cage maintenance).
6. Any discharge from the ICU on a **WEEKEND** must be recorded in the ICU patient ICU Census log. All charges will be finalized by the ICU technician.

MEDICATIONS

GENERAL

1. All medications for each patient are to be brought to the ICU.
2. The ICU technician is **NOT** responsible for dropping off prescriptions or picking up medications from Pharmacy.
3. Medications/therapeutics must be filled daily to last through the following day.
4. Controlled drugs that have been filled for ICU patients must be placed in the **SMALL ANIMAL CONTROLLED DRUG SAFE** located in the tech station.
 - a. This safe will house controlled substances for in-hospital use as well as medications designated to go home with the patient.
 - b. The controlled drug safe is accessible via key entry to **ICU TECHNICIANS ONLY**.
5. Students are NOT permitted to formulate (compound) ICU medication (e.g., heparinize saline or dilute acepromazine) without the supervision of a technician or veterinarian.

USE OF MEDICATIONS RECEIVED FROM OUTSIDE OSU-SAVTH

1. The use of outside Controlled substances for hospitalized patients is **NOT** allowed and **will not be stored in the ICU**. Please refer to the VTH Policy on *“Use of Client-owned Medications on Patients in the Veterinary Teaching Hospital.”*

SMALL ANIMAL EMERGENCY CONTROLLED DRUG BOX

1. An emergency-controlled drug box that contains diazepam, midazolam, euthanasia solution and butorphanol, is accessible to ICU technicians and interns.
2. These drugs are only to be accessed **UNDER DIRE EMERGENCIES** when access to the Cubex or Pharmacy Rx is not conducive to the welfare of the patient. Refer to the: *“CONTROLLED SUBSTANCE EMERGENCY KITS FOR LARGE AND SMALL ANIMAL HOSPITALS”*

EMERGENCY CRASH CART/BOX

1. The emergency crash box located in ICU is for use to conduct cardiopulmonary resuscitation of patients either housed in ICU or that are brought to ICU for CPR. The cart is **NOT** to be removed from ICU at any time.
2. If the emergency drugs (e.g., epinephrine, atropine, vasopressin, etc.) are used during the resuscitative procedures then, at minimum, the following information will be recorded into the patient’s record:
 - a. **DRUG / CONCENTRATION** administered (e.g., epinephrine 1:1000)

- b. Amount used in **ML** and **MG**
- c. **INITIALS** of person administering the drug
- 3. Pharmacy is to be notified if drugs in the ER crash box are used so that the drugs are restocked.
- 4. Please refer to the *EMERGENCY KIT SOP* for further guidance.

IMPORTANT REMINDERS

1. There is absolutely **NO EATING OR DRINKING** in the ICU or tech station.
2. All personal items such as purses and backpacks should be kept outside of ICU and tech station.
3. Hands should be washed prior to obtaining gloves, after removing gloves and between patients.
4. **NEW GLOVES** are to be worn with each patient.
5. New **TEMPERATURE PROBE COVERS** must be used on **ALL** patients
6. Emergency # for power outages or security are located above telephone (yellow highlighted) in ICU.
7. In case of the Fire alarms sounding~ exit east side door of building. If the Fire dept. asks you to exit building, please do.
8. When unsure about orders or treatments contact the ICU technician.
9. All medication dosages must be checked by a CVT or DVM prior to administration.
10. A technician or clinician must be present for any procedures ~ blood draws/catheter placements/cystocentesis/etc.

ICU VISITATION POLICY

1. **ALL ICU visits must be approved by ICU staff.** In hospital visits are pending current COVID guidelines. Any ambulatory or stable patient can visit with their owner outside of the ICU or hospital.
 - a. Visitation within the ICU is limited to patients whose movement would be detrimental. (Currently not allowed due to COVID-19 guidelines).
 - b. If a patient has a known or suspected infectious disease, they will not be removed from their cage. Appropriate infectious disease biosecurity protocols **MUST** be followed (see below for “visits in ICU”).
 - c. Clients will abide by all policies and procedures regarding handling of infectious disease patients to include use of appropriate hand hygiene, personal protective wear, and barrier precautions.
2. All visitations will be no longer than **15 MINUTES** in duration, and are limited to **ONCE** daily.
3. When scheduling ICU visits it is important to avoid the main treatment times; therefore, visits should **NOT** occur in the:

**MORNINGS BETWEEN 7:00 AM AND 10:00 AM, OR
EVENINGS BETWEEN 5:00 PM AND 7:00 PM.**

4. The student or clinician on the service responsible for the patient must be present at **ALL** times.

VISITS CONDUCTED IN ICU:

1. Check current COVID-19 guidelines before scheduling visit
2. All phone calls must go through the client services telephone answering Service
 - a. **DO NOT** give out the ICU phone number under any circumstance
3. Advanced arrangements must be made with the ICU technician on duty to be sure that the visit will not be disruptive to other patients, treatments, or procedures.
 - a. If it is determined by the ICU technician that a visit is not appropriate (e.g., extremely hectic, deteriorating patient, patient arrest) then the visit must be delayed until deemed appropriate
4. All visits to the ICU must to be arranged in advance with the primary clinician on the case.
 - a. Clients will **NOT** be allowed to drop in for **UNSCHEDULED** visits.
 - b. Clinicians or students familiar with the case are responsible for escorting clients back to the ICU to visit with their pets.
 - c. The student or clinician on the case **MUST** be present in ICU during the entire visit.
5. For patients housed under **SEMI-ISOLATION: RESTRICTION CAGES ARE “OFF LIMITS” TO VISITORS**. Only personnel immediately involved with the restricted patient’s care shall be allowed to handle the patient. Some visitations may occur with proper senior clinician and area supervisor approval.
6. The client **MUST** apply hand sanitizer and wear gloves while handling patients in the ICU.
7. No more than **3 PERSONS per pet** should visit at any one time.
8. Children **UNDER THE AGE OF 16** must be accompanied by an adult at all times. Children under the **AGE OF TWO**, strollers and other family pets are not permitted in the hospital area.
9. **IMMUNOCOMPROMISED** individuals should not be allowed to visit in the ICU, but concessions can be made with respect to this policy on a case by case basis.
10. Visitation and discussion should be limited to the client and their pet. No other patients should be discussed.
11. The ICU staff reserves the right to ask any client to leave ICU if a problem arises.

LEVELS OF ICU CARE

1. **LEVELS OF CARE** will be based off both:
 - a) **Duration** of ICU stay
 - b) **Frequency** of required interventions

LEVEL 0

- (1) ICU hospitalization only
- (2) No handling by ICU staff
- (3) No IV catheter placed

LEVEL 1:

- (1) \leq **BID** (or **no more than TWO** scheduled treatment times)
- (2) $<$ **12 HR** hospitalization
- (3) Any patient with an IV catheter is considered at least Level **1 Care**

LEVEL 2:

- (1) \leq **BID** (or **no more than TWO** scheduled treatment times)
- (2) $>$ **12 HR** ICU hospitalization

LEVEL 3:

- (1) **TID** (at least but no more than 3 scheduled treatment times)
- (2) $<$ **12 HR** ICU hospitalization

LEVEL 4:

- (1) **TID** (at least but no more than 3 scheduled treatment times)
- (2) $>$ **12 HR** ICU hospitalization

LEVEL 5:

- (1) **QID** (at least but no more than 4 scheduled treatment times)
- (2) $<$ **12 HR** ICU hospitalization

LEVEL 6:

- (1) **QID** (at least but no more than 4 scheduled treatment times)
- (2) $>$ **12 HR** ICU hospitalization

LEVEL 7:

- (1) $>$ **QID** (more than **FOUR** scheduled treatment times)
- (2) $<$ **12 HR** ICU hospitalization

LEVEL 8

- (1) **QID** (more than **FOUR** scheduled treatment times)
- (2) $>$ **12 HR** ICU hospitalization
- (3) ISOLATION

VMC 791 and VMC 792

Small Animal Internal Medicine I & II

Course Coordinator: Dr. Jana Gordon

Course Instructors: Dr. Helio de Morais, Dr. Jana Gordon, Dr. Stacie Summers

Course Objective: To give students hands on practical experience in managing small animal internal medicine cases. Specifically, students will:

- Take clinical histories
- Perform physical examinations
- Create problem lists
- Compile lists of differential diagnoses
- Formulate diagnostic/therapeutic plans
- Obtain samples for diagnostic tests (e.g. blood, urine etc.)
- Perform diagnostic procedures
- Interpret laboratory results
- Discuss treatment options and plans
- Generate medical records
- Discharge patients
- Follow up on cases
- Participate in daily case and topic rounds
- Participate in after-hours care of patients

Dress Code:

Students should maintain a professional appearance with business casual or scrubs as acceptable options. A good barometer of appropriate clothing is what the residents on the IM service are wearing during receiving and client interactions. Clothing should be in good repair and a white lab coat should be worn with in person client interactions. Shoes should be closed toe. A nametag or badge should be worn at all times. Each student should also have their own stethoscope.

Professional Conduct:

As representatives of the veterinary profession, it is important to maintain not only a professional appearance but demeanor as well. The student must consistently demonstrate appropriate behavior in all settings when in the veterinary teaching hospital and interacting with faculty, staff, fellow students, clients, referring veterinarians and the general public. This includes the assurance of maintaining client and patient confidentiality inside and outside of the veterinary teaching hospital. If the student fails to do so their grade may be affected, they may be dismissed from their duties, may have to repeat a portion or all of the rotation, and may fail the course.

Inappropriate behavior observed within the IM service should be reported to a service technician, house officer or faculty member as deemed appropriate by persons involved.

Rotation Schedule:

The rotation begins at 8:00 a.m. on the first day of the block, or elective week, and ends at 8:00a.m. (after treatments are complete) on the first day of the following block, or

week. Students should expect to be present until their work is completed each evening. Students with after-hours obligations to the ICU will be dismissed at 5:00 pm. The rotation includes after hours, weekend and holiday responsibilities. This includes regularly scheduled obligations and call duty. There will be a general small animal medicine orientation with clinicians and technicians the first morning of the block that is required for all students. You must have reviewed the orientation video posted on canvas prior to orientation. On day 1 you need to have completed (and passed) the preventive health quiz on Canvas so we can make sure you are prepared to see wellness cases as soon as day 2.

Students will be assigned cases with an intern, resident or faculty as primary clinician. Once assigned to a case and clinician, the student retains his/her responsibilities to the case for the duration of the rotation. Each student is responsible for assigned cases until the animal is released or reassigned to other students.

Rounds:

In general, morning rounds will be held at 8:30 am (Monday-Friday). These will be discussions regarding hospitalized patients or topic rounds on small animal medicine topics. When presenting a case please use the standard protocol of name, signalment, history (including a brief diagnostic and therapeutic history), problem list, differential list, assessment and plan. Students may request topics for discussion; otherwise, topics will be assigned. On Wednesdays, students will have the option of attending the IM clinician journal club in place of rounds. When scheduled, students are expected to attend senior papers in lieu of morning rounds on Thursdays and IM rounds will be to follow. Afternoon rounds will be held at the discretion of the supervising clinician but will generally be at 4:30 pm for case discussions.

Student Assessment:

The student assessments may change for the 2021-2022 academic but currently students in the core rotation will receive an A, B, C, D or F and students in the elective rotation will receive a pass or fail based on the following criteria:

Attendance

Knowledge base Clinical performance Communication Professionalism Rounds

Participation

Other

Assessment

Student participation is vital to the success of any program. Students are encouraged to actively investigate the cases they are caring for. These cases provide the opportunity to learn about a variety of disease processes as well as their diagnosis and treatment. Current College policy states that students are not able to miss more than 0.5 days/week of their rotation (e.g. 2 days for a four- week VMC 791 rotation). If they do then they may be asked to make up any additional time. All absences must be excused. Please see the attendance policy to review excused absences.

Unexcused absences will need to be made up. Any unexcused absence may result in a lower grade or an incomplete. If students are going to be late for or miss the rotation then

they should contact the Dean's office and the course coordinator.

Students are also required to complete their after-hours duties. Any after-hours duties missed, excused or unexcused, must be made up prior to receiving their diploma. Missed shifts may be made up during the same rotation or subsequent rotations at the discretion of the scheduling technician. If a student is going to be late or miss an after-hours shift, they must contact the ICU (737-4825) and speak either to a technician on ICU duty or the intern on duty. If a student arrives for their shift intoxicated, or is deemed by the technician or intern on duty to be incapable of completing their shift for whatever reason, they will be sent home and the shift will be repeated at a future date.

General Operation of the Small Animal Internal Medicine (SAIM) Service

Personnel and Organization:

The small animal internal medicine service provides referring veterinarians and the community access to advanced diagnostics and therapeutics in small animal internal medicine. The internal medicine service consists of small animal internal medicine faculty, internal medicine residents, small animal rotating interns, and veterinary technicians.

Regular working hours:

8:00 am to 6:00 pm Monday through Friday. Students are expected to be present and in proper attire, weekdays from 8:00 am to 5:30pm **or until casework is completed**. It may be necessary to come in earlier in the morning to complete patient evaluations and records on time. Students are expected to meet with the clinician on weekends to assess hospitalized patients, contact owners, and write records.

Appointments/Receiving:

We receive regularly scheduled internal medicine appointments on Monday through Friday from 9:30 am to 3:00 pm. Additional appointments are scheduled at the discretion of the supervising clinician. Students are also responsible for receiving appointments for the Preventive Health Clinic, which runs Monday through Friday at 3:00 pm, with some additional drop-off appointments at 8:00 am. These appointments are for vaccinations, parasite prevention, microchipping and other wellness services offered to students, staff, and faculty of the CVM. They should not involve diagnosis and treatment of complex medical or surgical problems. If more complicated problems are found an appointment may be scheduled through the appropriate service. We will provide limited wellness exams for dogs and cats that may include evaluation for, and monitoring of, chronic diseases as well as age-related diseases and conditions. Appointments are overseen by a house officer on internal medicine.

Admitting cases:

Students should contact owners for a case history the evening before their visit when possible. Whether or not the student is in direct contact with the client or admitting patients into an examination room will depend on where the CVM is with COVID policy. A history sheet has been provided to assure a complete history is taken. If the animal is presenting for a recheck, please review the previous record prior to examining the patient. The student will perform a physical examination. This may include a fundic, otic

and rectal examination as deemed appropriate. The weight, BCS and a pain score should be entered in the medical record. A limited physical examination may be performed in the cases of aggressive animals or if multiple exams will negatively impact patient comfort. The student should also generate a problem list, a list of differential diagnoses and a tentative initial plan (space is provided in the medical record) and then discuss it with the clinician. The clinician will then assess the animal and discuss the case with the client.

Procedures:

Certain procedures will be performed by the student but must be under the immediate supervision of a clinician or licensed veterinary technician. Some procedures may be performed by the intern, resident or faculty supervisor of the case as deemed appropriate for the procedure and case.

Patient Care:

All patients admitted to the ICU and in the wards should be placed in a clean, appropriately sized cage. Animals should be placed on grates or absorbent bedding as indicated. All patients should have an id neck band with the case number, name of patient (first and last) and date. A cage card should be completed and placed on the cage with a patient sticker, the name of the clinician, the student's name and the presenting complaint or diagnosis. There are laminated tags available to hang on the cages in ICU for special instructions. The animal's belongings and medications are placed in a designated, labeled box. Please remove all collars as they can be a choking hazard.

All medications and supplies necessary for after-hours treatment must be either in the ICU or wards or accessible to the after-hours staff prior to the treatment time. If there are any specialized diagnostics or therapeutics (chest tube, abdominal lavage catheter, jugular catheter) the patient might have, make sure the after-hours staff is comfortable performing these diagnostics or therapeutics. The patient information should be placed on the appropriate hospitalization board in the general treatment area and/or ICU.

One student will have primary responsibility for the medical record and daily care of each patient; however, all students are expected to be generally familiar with all cases on the service.

Students retain case responsibility for each patient for the duration of the hospital stay, including weekends. Students may not delegate their case responsibilities to other students without prior approval by the clinician. Cases should not be transferred among students except for reasons constituting excused absences. If case responsibilities are inappropriately transferred, or shared for any other reasons, the primary student's grade may be affected. Students with patients in ICU or wards must have their cage cleaned, orders written, medications ready, and other supplies available by 8:30 am. Students are responsible for the 7-8:00am treatments of ICU patients and 7-8:00am and 7-8:00pm treatments of ward patients. Students also take care of their ward's patients during regular business hours. Please keep the animals clean and comfortable at all times - bedding, water, feedings, etc. If the student feeding the animal does not want the routine feedings by the kennel staff, this must be noted on the cage card. Animals must be walked on a leash in the designated fenced area outside. You are expected to clean up any urine, feces, or other materials deposited by your patient.

Records:

Students are responsible for filling out the history, physical examination and patient flow sheets (with clinician). SOAPs are also completed by students in VetHosp. SOAPs will be completed by the student in charge of the case and should be in the format of the problem oriented veterinary medical record (POVMR). The medical record is a legal document and may be provided to owners or referring veterinarians at their request. For inpatients there should be two SOAPs per day or a single SOAP and an addendum. The morning one is generally the more detailed one, outlining a plan for the day and should be completed prior to morning rounds. The afternoon one can be a brief update, or addendum, but should also include analysis of new test results and how they alter the plan. A single SOAP should be done on the day of admission of inpatients. The technician assigned to the case will fill out and submit anesthesia, imaging and laboratory requests. Medical records should remain in the ICU for ICU patients. For hospitalized patients in ICU or wards, new orders should be written and reviewed by the clinician before 8:30 each morning.

Communications:

Students will be in charge of client communications based on clinical discretion. The client communications should be recorded in the computer under case communications. Students may also be responsible for communicating with referring veterinarians and these communications should also be recorded in case communications. For any hospitalized patient, the student should communicate with the owners at least daily. Referring veterinarian communications are at clinician discretion. Any changes in medications or new prescriptions called in to a pharmacy should also be documented in case communications.

Pharmacy Prescriptions:

Fill out prescription forms completely with patient sticker, weight, date, clinician's name, and signature. All prescriptions must include the drug name, strength or concentration, total amount prescribed, and directions for use including amount in mg and either number of tablets/capsules, or volume of liquid, route of administration, and frequency. Alternatively, E script can be utilized and must contain all of the same information. Prescriptions should be submitted prior to 5:30 PM on the day they are needed.

Controlled substance (CS) prescriptions must include the patient's physical address (P.O. boxes are not acceptable). A maximum of 24 hours of CII injectable medication may be ordered for in hospital use. A maximum of 3 days of oral CII or oral and injectable CIII-CV CS may be ordered for in hospital use. A maximum of 30 days of any controlled substance may be sent home. CII CS prescriptions being sent home must be hand written and signed. CII CS cannot be on the same prescription as non-controlled or CIII-CV medications.

Medications can only be returned to the pharmacy for patient refund within 7 days of dispensing. The medication must not have left the hospital. Liquids, refrigerated items, and injections that have been drawn up are not eligible for credit. Vials must be sealed.

Clients may not bring their own medication into the hospital unless the pharmacy is unable to acquire the medication through normal distribution channels within an acceptable time frame, the medication is a compounded medication that cannot be made by the pharmacy, or the medication is very expensive and would prevent the owner from affording required care. Client-owned medication approved for use must be verified by the senior clinician or brought to the pharmacy for identification by a pharmacist.

Radiology and Ultrasound:

Forms are submitted electronically and must be submitted by 4:00 pm on the day of the procedure. Appointments should not be made for diagnostic imaging until the patient is admitted to avoid late and no-show appointments with diagnostic imaging. Make sure you consider time to acquire, admit and obtain sedation. Special procedures such as nuclear scintigraphy, fluoroscopy, computed tomography and magnetic resonance imaging should also be discussed with diagnostic imaging. Imaging should be documented on the patient flow sheet.

Endoscopy:

Discuss any endoscopic procedures with the clinician and veterinary technician. These procedures are typically not performed the same day the patient is admitted. Appropriate anesthesia request forms must be submitted ahead of time or at least the day prior to the procedure. These procedures require preparation. A gastroduodenoscopy only requires a 24 hour fast (water can be given) but a colonoscopy might require a 24 to 48 hour fast followed by 24 hours of enemas and saline cathartics. It is important to communicate with the clinician and client effectively to make sure animals are adequately and safely prepared for these procedures. Procedures are documented on the patient flow sheet.

Anesthesia:

Requests are submitted electronically and must be submitted by 3:00 pm the day prior to the procedure. After hours and same day requests are also submitted electronically and follow all notifications. A member of the anesthesia technician or faculty should be consulted regarding same day and after hour's availability.

Case Transfers:

Occasionally it is necessary to obtain a consult or transfer from another service area on a case seen through the internal medicine service. Sometimes consults are necessary on hospitalized patients and at other times the consult may be completed after the patient has been discharged. Records must be completed by the internal medicine service prior to complete of transfer and the clinician as well as technician on the service contacted. There are consultation forms that should be completed and posted in the consulting service box, with the medical record (unless an ICU patient) and any referral information.

Veterinary Diagnostic Laboratory (VDL):

All laboratory tests should be documented on the pink patient flow sheet. Take all submissions, with appropriate paperwork filled out, to the VDL office. They will accept submissions M-F 8:00- 4:30. Any tests that are shipped out to referral labs must be submitted by 11:30 am and should be evaluated by the internal medicine technician for accuracy prior to submission.

Necropsy & Care of Remains:

Refer to policy notebook located in the small animal treatment room. All submissions to VDL for necropsy and cremation should be under the guidance of a veterinary technician.

We hope the block will be an enjoyable learning experience. Students should not hesitate to ask for assistance or clarification of policies and procedures.

Textbooks: provided on service

OSU Student, Faculty and Staff Preventive Health Program

The students, faculty and staff at Oregon State University are able to participate in a preventive health program for dogs and cats offered through the internal medicine service at the small animal teaching hospital. The following companies have graciously donated their products to our program:

Pfizer®/Wyeth®/Fort Dodge® Bayer®

Merial/Boehringer-Ingelheim®

Novartis®

Merck Animal Health®

Services Offered:

Physical examination

Vaccinations

Heartworm testing

FeLV/FIV testing

Parasite prevention

Microchip placement

Basic wellness

Enrollment: Veterinary students, faculty and staff may enroll up to 4 dogs and/or cats in this program. Preventative health privileges are limited to animals that are personally owned and that live at the person's residence. A patient/doctor relationship must be established in all cases and pet ownership must be attested to when the names and case numbers are registered with the veterinary teaching hospital. Once designated, the animals eligible for the program will not be changed, except if ownership is transferred or the animal dies. No substitutions will be allowed. Upon the animal's death or transfer of ownership, the animal's spot on the discount list may be replaced with another animal. Once an animal is deleted from the discount list, it cannot be put back on the list. Those violating this policy may have discount privileges permanently removed.

Services are limited to those described above. Animals evaluated through the preventive health clinic are only approved for testing and treatment offered through the preventive health clinic. Evaluation for other stable disease conditions may be performed through the preventive health service at the discretion of the attending veterinarian as long as that condition has been previously documented in the medical record. Complex cases or

patients that have experienced a change in status will require a regularly scheduled appointment through the appropriate service area. For example, if your pet is on thyroid supplementation for hypothyroidism, refills and monitoring can be obtained through the preventive health clinic. But if your previously stable hypothyroid dog now has an inguinal mass to be evaluated an appointment through the small animal internal medicine service is required. Care guidelines regarding wellness and life stages follow AAHA and AAFP guidelines and should be reviewed by small animal medicine students prior to participating in the preventive health clinic.

Medical Records: A medical record must be completed for every animal enrolled in the preventive health program. Medical records should be completed prior to the day of evaluation. All pertinent records, including previous laboratory tests, must be available to dispense medications (e.g. heartworm test performed prior to filling a prescription for heartworm medications).

Physical Examinations: A physical examination will be performed or supervised by a veterinarian at least annually to participate in the program. A heartworm test is required prior to dispensing heartworm medications. A physical examination is required just prior to administration of any vaccine. A physical examination is not required prior to dispensing flea and/or tick preventative as long as a preventive health exam has been done in the last 12 months.

Vaccinations: Oregon State University (OSU) realizes that each animal has a different level of immunity and exposure to infection and that a single vaccination protocol may not be adequate for all cases. The College of Veterinary Medicine (CVM) also realizes that administration of biologics is associated with risk to the animal. The CVM has adopted the recommendations of the AAHA and AAFP regarding the use of core and non-core vaccinations. It is with these recommendations that the following protocols were developed.

Core vaccinations for the dog.

Puppy vaccinations will begin at 6 to 8 weeks of age and consist of a modified live virus (MLV) distemper, parvo and adenovirus-2 (DAP) vaccine given every 2 – 4 weeks to age 16 weeks. Puppies living in a high risk environment may benefit from receiving a final dose at 18 to 20 weeks of age. Puppies should then receive a booster vaccine at one year and then every 3 to 5 years. Adult dogs (> 16 weeks of age) that present for initial vaccination, will receive one or two doses of MLV DAP and subsequent booster at one year then every 3 years. Dogs between the ages of 16 to 20 weeks living in a high risk environment may benefit from administration of 2 doses of a MLV DAP vaccine 2 to 4 weeks apart. A killed rabies vaccine will be offered to dogs. Dogs can be vaccinated as early as 12 weeks of age. A booster should be given to dogs at 1 year and subsequently at 1 to 3 year intervals depending on county of residence. Benton County requires vaccination for dogs for rabies and a 3 year vaccine is appropriate.

Non-core vaccinations for the dog.

A MLV avirulent bacteria combination CAV-2, parainfluenza virus and *Bordetella bronchiseptica* intranasal vaccine will be offered as another non-core vaccine for

puppies and dogs at high risk (e.g. boarding). It is recommended this vaccination be given 72 hours prior to boarding. This vaccination can be given to puppies as a single dose as early as 3 weeks of age and then yearly. Adult dogs (> 14 weeks) require a single dose to be protective and subsequent vaccinations are given annually. Vaccination for leptospirosis will also be offered as a non-core vaccine but is strongly recommended because of increased cases of canine leptospirosis in the state of Oregon. Dogs that engage in outdoor activities such as hiking, camping, swimming in streams or are exposed to rivers and lakes are at more of a risk. This vaccine is a subunit vaccine that contains four serovars of *Leptospira spp.* including *L. pomona*, *L. canicola*, *L. grippityphosa* and *L. icterohemorrhagiae*. There have been very few reactions to this vaccine to date and this is believed to be due to the fact that it is a subunit vs. whole bacterin vaccine. This vaccine can be given to dogs 8 weeks of age and older using an initial vaccination followed by a booster 2 to 4 weeks later and annual boosters. Dogs > 16 weeks of age receive a single injection followed by a booster 2 to 4 weeks later and annual revaccination. There have been a few reports of canine influenza in the state of Oregon. We do not carry the killed canine influenza vaccine at this time. Vaccination recommendations are similar to those for parainfluenza, CAV-2 and *B. bronchiseptica*. The vaccine may be given to puppies 6 weeks of age or older. Regardless of age an initial vaccine followed by a booster at 2 to 4 weeks is required. When vaccination is recommended, initial vaccination series should be initiated 4 weeks prior to risk for exposure to allow 2 weeks between the initial vaccines and 2 weeks for the humoral immune response to develop.

Core vaccinations for the cat.

Kittens can be vaccinated with a MLV panleukopenia, herpes and calici virus vaccine as early as 4 weeks of age (if healthy and at high risk) but most kittens will begin vaccinations at 6-8 weeks of age followed by additional vaccinations every 3 to 4 weeks until 16-20 weeks of age. These kittens should then receive subsequent vaccination at 1 year and then every 3 years. Adult cats (>16 weeks of age) that present for initial vaccination will receive two doses of MLV vaccine 3 to 4 weeks apart and subsequent vaccination at 1 year and then every 3 years. A killed rabies vaccine will be offered to cats. The rabies vaccine is not considered core for cats by the AAEP, but because Benton County requires vaccination of cats we have included it in this section. Cats can be vaccinated as early as 12 weeks of age for rabies. The feline rabies vaccine is a non-adjuvant canarypox vector vaccine and must be repeated annually.

Non-core vaccinations for the cat.

The feline leukemia virus (FeLV) vaccine is not considered core but recommendations are to test and vaccinate all kittens and new cats to the household with an annual booster. Boosters may be every 1 to 2 years based on risk of exposure. All kittens and cats should be tested prior to initial administration. Kittens will be vaccinated for FeLV using either a non-adjuvant canarypox vector vaccine given subcutaneously or an alternative depending on availability of vaccine. The initial vaccination will be given to kittens 8 weeks of age or older followed by another vaccination 2 to 3 weeks later then booster one year later and every 1 to 2 years after. Adult cats can be given the initial vaccination followed by another vaccination 3 to 4 weeks later and then booster vaccination every 1 to 2 years.

Vaccines will be administered on the distal extremities subcutaneously as follows:

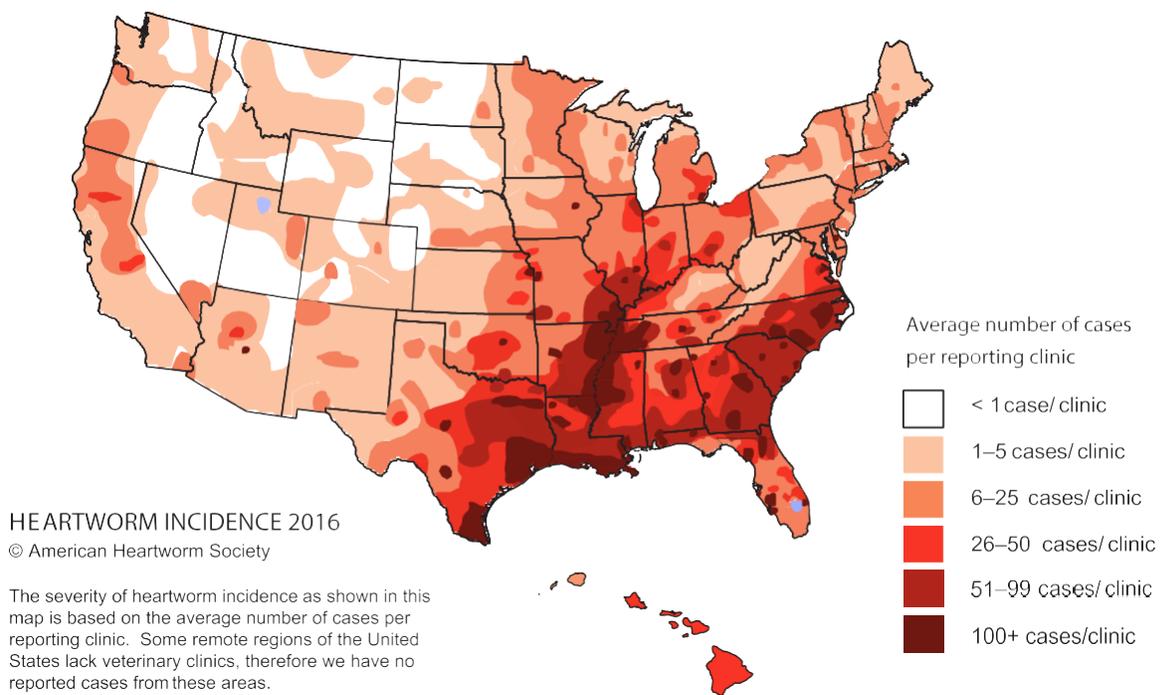
DAP – left hind limb
Leptospirosis – left forelimb
Rabies (dog) – right hind limb

FPHC – tail **OR** intranasal (1st vaccine)
FeLV–tail (2nd vaccine) **OR** left hind limb distal to stifle
Rabies (cat) – tail (2nd vaccine) **OR** right hind limb, distal to stifle in cats

Heartworm Disease

Prevalence:

Heartworm infection (*Dirofilaria immitis*) in dogs has been diagnosed around the globe, including all 50 states of the United States. In the United States, its territories and protectorates, heartworm is considered at least regionally endemic in each of the contiguous 48 states, Hawaii, Puerto Rico, U.S. Virgin Islands, and Guam. Heartworm transmission has not been documented in Alaska; however, there are regions in central Alaska that have mosquito vectors and climate conditions to support the transmission of heartworm for brief periods. The greatest numbers of cases are seen in the southeastern U.S. and the Mississippi River Valley. There is an apparent high level of prevalence documented in northern California.



Heartworm life cycle:

Mosquitoes are the intermediate hosts and more than 70 species are capable of transmitting the disease. Transmission can occur anytime infected mosquitoes are active and feeding. The dog is the definitive and primary host for heartworm, however, other species such as coyotes, wolves, foxes, ferrets, bears, cats, wild felidae (mountain lions bobcats, tigers, etc.), marine mammals (seals, sea lions, etc.) can also get infected (although less commonly). Rare instances of transmission of microfilaria from infected bitches to fetuses via the placenta and from dog to dog via blood transfusion can occur. However, these microfilariae will not develop into adult worms. Presence of these microfilariae can confound a diagnosis and may serve as a potential source of microfilaria that could be transmitted by feeding mosquitoes.

Microfilariae reside in the blood of most, but not all, infected canids. Microfilariae (307-322 μm x 6.8-7.0 μm) are ingested by feeding female mosquitoes. After two molts (approximately 2 weeks), infective third-stage larvae (L3s) are present in mosquito mouthparts. Development may be slower at cooler temperatures and ceases at temperatures below 57°F but the presence of microenvironments in urban areas suggests that the risk of heartworm transmission never reaches zero. Development progresses in the mosquito relative to ambient temperature; if ambient temperature increases, development will resume. L3s (1,000 μm x 40 μm) are deposited on the skin of the dog during subsequent feeding and migrate through the bite wound into the host. Most L3s molt to fourth-stage larvae (L4s) in subcutaneous tissues within 1-3 days after infection. L4s migrate through tissues for several weeks. A final molt to the sexually immature adult stage occurs approximately 2 months (50 to 70 days) after infection. The young adults (2-3 cm in length) enter the vascular system and are carried to the heart and pulmonary arteries, arriving as early as 70 days after infection. Rarely, ectopic infections of the eye, central nervous system, peritoneal cavity, systemic circulation, or skin have been reported. Final maturation and mating occurs in the pulmonary vessels. By 4 months after infection, the worms in the pulmonary arteries are around 10-15 cm in length. Fully mature adults at 6.5 months after infection reach lengths of 15-18 cm for males and 25-30 cm for females. Canine hosts typically demonstrate microfilaremia 6 to 7 months after infection (pre-patent period). Heartworms live approximately 5 to 7 years in the dog.

HEARTWORM IN DOGS:

Diagnosis:

Most dogs diagnosed with heartworms are asymptomatic however; cough, weight loss, exercise intolerance, dyspnea, collapse (due to arrhythmias-hypoxia), ascites, and hemoptysis can be seen as the disease advances. On physical exam a split second heart sound (due to pulmonary hypertension) and a right-sided heart murmur (tricuspid regurgitation) might be ausculted. Bronchovesicular sounds might be ausculted with pneumonitis. Jugular venous distension/pulsations (due to high right heart pressures) can also be noted (easier to see in a shaved neck). Eosinophilic, mixed and granulomatous pneumonia can occur, particularly in dogs. Pleural effusion is a rare finding in dogs with just heartworm infection. Some dogs develop renal glomerulonephritis, proteinuria (secondary to antigen-antibody complex deposition),

hemolytic anemia and amyloidosis.
Thromboembolism may also occur.

The onset and severity of disease in the dog is mainly a reflection of the number of adult heartworms present, the age of the infection and the level of activity of the dog. Dogs with higher numbers of worms are generally found to have more severe heart and lung disease changes. Until the number of mature heartworms exceeds 50 in a 25kg dog, nearly all of the heartworms reside in the lower caudal pulmonary arteries. Large burdens of heartworms result in their presence in the right chambers of the heart. In such infections, the most common early pathological changes caused by heartworms are due to inflammatory processes that occur in and around

the arteries of the lower portion of the lungs in response to the presence of heartworms (vascular endothelial cell damage, smooth muscle hypertrophy and fibrous tissue proliferation); all these changes in the lungs may lead to pulmonary hypertension and secondary tricuspid regurgitation/insufficiency. Later, the heart may become enlarged/hypertrophic due to pressure overload and right-sided heart failure may occur. A very active dog (e.g., working dog) is more likely to develop severe disease with a relatively small number of heartworms than an inactive one (e.g., a lap dog).

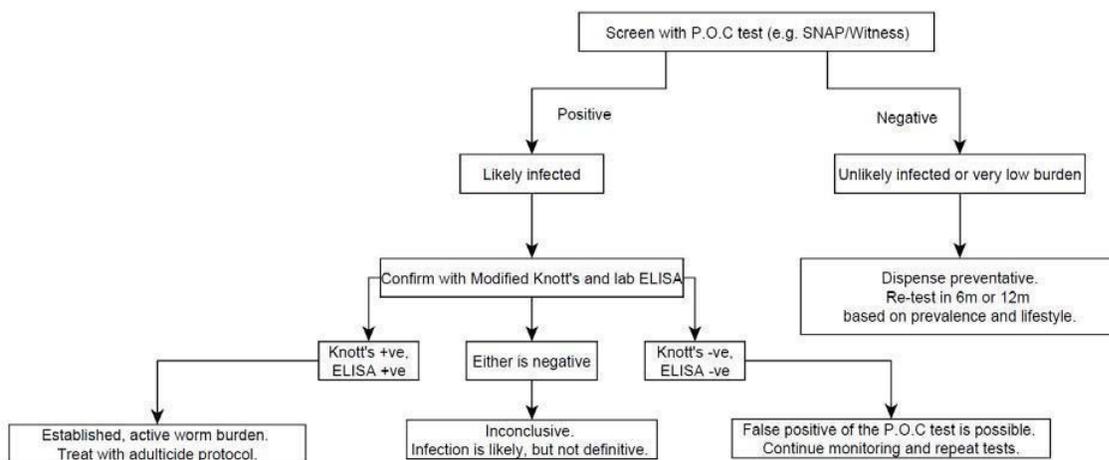
Caval syndrome occurs in a small number of cases, typically associated with large numbers of adults in the pulmonary arteries, right heart and caudal vena cava. Worms found in the right heart (right ventricle and right atrium) may interfere with the tricuspid valve function. This results also in right-sided heart failure. Other associated findings include: pallor, weak pulses, tachycardia, and sudden collapse, hemoglobinemia and hemoglobinuria, and DIC. Dogs with caval syndrome are typically very sick and it is considered an emergency.

Rarely, ectopic infections of the eye, central nervous system, peritoneal cavity, systemic circulation, or skin have been reported.

Dogs on heartworm prevention should be checked annually for the presence of circulating heartworm antigen to verify that they are being protected, and in areas where resistance may be a possibility it may be prudent to test outdoor dogs twice each year (see *Prevention* below). Recent work has shown that there are isolates of heartworms that are capable of developing to adults in dogs receiving routine prophylaxis with any of the available macrocyclic lactones. Antigen tests detect a glycoprotein found predominantly in the reproductive tract of the female worm (gravid uterus). Only mature infections (older than 6 months typically) with at least one female worm are usually detected. Low worm burdens (fewer than two adult females) and infections with only male worms may not be detected. Microfilaria tests in combination with the antigen tests allow for greater sensitivity. The earliest that heartworm antigen and microfilariae can be detected is about 5 and 6 months, respectively. Antigenemia usually precedes but sometimes lags the appearance of microfilariae by a few weeks. There is no need or justification for testing a dog for antigen and microfilariae prior to 7 months of age. Whether screening a population of asymptomatic dogs or seeking verification of a suspected heartworm infection, antigen testing is the most sensitive

diagnostic method. It is now recommended, however, that microfilaria testing be done in tandem with antigen testing. This is especially important if there is a high degree of suspicion or if the heartworm prevention history is unknown (e.g., dogs adopted from shelters). It has come to light that in some dogs infected with heartworms, antigen blocking, presumably from antigen– antibody complexes, may lead to false-negative antigen test results. These dogs will be antigen negative and possibly microfilariae positive; a study conducted on shelter dogs in the southeastern United States reported this occurred at a rate of 7.1% (Velasquez et al, 2014). It is important that these dogs are identified and treated to decrease the potential for selection of resistant subpopulations of heartworms. There will be instances where an infected dog is both antigen and microfilaria negative.

The high incidence of amicrofilaremic infections (no circulating L1-L2) has led to increased use of tests targeting adult worms. ELISA and immunochromatographic tests are available for detecting circulating heartworm antigen. Each testing format has proven to be clinically useful. The current generation of heartworm antigen tests identify most “occult” (adult worms present but not circulating microfilariae) infections consisting of at least one mature female worm and are nearly 100% specific. Currently there are no verified tests capable of detecting infections consisting of only adult male worms. False-negative and false- positive results can occur and unexpected test results should be repeated. If the results are still ambiguous, confirmation by a reference laboratory is recommended to confirm the result. It is recommended to confirm all positive antigen tests in asymptomatic dogs prior to any adulticide therapy. Concentration tests for microfilariae, thoracic radiography to detect signs of heartworm disease, or ultrasonographic visualization of worms may also validate weakly positive antigen test results (see below). The color intensity of a positive antigen test result (e.g IDEXX SNAP® test, Witness □ HW) cannot reliably be used to determine the level of worm burden. As said



above, false-negative test results occur most commonly when infections are light, female worms are still immature, only male worms are present, antigen blocking by antigen – antibody complexes, and/or the test kit instructions have not been followed. Heat treatment of serum samples prior to heartworm antigen tests to release blocked antigen

is currently available through reference laboratories, but routine heating of blood samples is not presently recommended for heartworm screening. Positive antigen tests regardless of its high sensitivity should be interpreted carefully, taking other relevant clinical information into consideration. In general, however, it is better to trust rather than reject positive antigen results.

Microfilaria testing should be done in tandem with antigen testing to determine whether this life-cycle stage is also present in dogs. The modified Knott test remains the preferred method for observing morphology and measuring body dimensions to differentiate *D. immitis* from non-pathogenic filarial species such as *Dipetalonema reconditum* (slide is examined under 100X for detection of microfilariae and under 400X to observe characteristics of the microfilariae). All dogs should also be tested for microfilariae as microfilaremia validates serologic results, is diagnostic should a dog have antigen-antibody complexes (no antigen detected on antigen tests), identifies the patient as a reservoir of infection, and alerts the veterinarian to a high microfilarial burden, which may precipitate a severe reaction following administration of a microfilaricide (e.g. milbemycin). Microfilaria tests are insensitive methods by themselves. Reduced microfilaria test sensitivity may occur due to variations in microfilaria concentrations based on time of day and season, variation of circulating numbers of microfilaria (highest in summer and afternoon/evening). A dog may have a negative microfilaria test when: single sex adult infections, elimination of microfilariae by administration of monthly preventives, host immune responses, occurrence of circulating antigen prior to microfilariae production (in rare cases, the appearance of microfilariae may precede antigenemia.), and true occult infections. Other methods less preferred for detection of microfilaria are: direct examination of fresh blood or blood treated with an anticoagulant, examination buffy coat in a microhematocrit tube, and concentration using a stained or unstained Millipore filter. If the microfilaria test is negative, a positive result can be verified using a second antigen test from a different manufacturer.

In instances of noncompliance or changing the brand or type of heartworm preventive, it is important to determine the heartworm status of the dog. The dog should be antigen and microfilaria-tested prior to starting or changing products. A positive test indicates pre-existing infection. When noncompliance/change of product has occurred, preventive therapy should be restarted and the dog should be retested 6 months later; a positive test at this time would most likely be due to an infection acquired before starting preventive therapy. Antigen and microfilaria testing should be performed 1 year after the initial test and annually thereafter.

As said above, it is important to confirm positive antigen tests with other diagnostic aids (in the symptomatic or asymptomatic dog). A CBC may suggest signs of heartworm infection: non-regenerative anemia (chronic disease), eosinophilia, basophilia, neutrophilia, and thrombocytopenia. Biochemical changes may include elevated liver enzymes, azotemia, hyperbilirubinemia, and hyperglobulinemia. Urinalysis may indicate proteinuria and albuminuria. Radiography provides the most objective method of assessing the severity of heartworm cardiopulmonary disease secondary to heartworm infection. Typical (nearly pathognomonic) signs of heartworm vascular

disease are enlarged tortuous, and often truncated peripheral intralobar and interlobar branches of the pulmonary arteries, particularly in the caudal lobes. These findings are accompanied by variable degrees of pulmonary parenchymal disease. The earliest and most subtle

If the lapse is...	Then...
Never been on preventative	Always test before dispensing
<5 months, previously on preventative	Testing is ideal Dispense heartworm treatment and test 6 months later
>5 months, previously on preventative	Always test before dispensing

pulmonary arterial changes are most commonly found in the dorsal caudal wedge of the diaphragmatic lung lobes. As the severity of infection and chronicity of disease progress, the pulmonary arterial signs are seen in larger branches. In the worst cases, eventually the right heart enlarges (evidenced by a reverse “D” shape to the heart) and right-sided heart failure may occur (see above). Additional radiographic findings may include lymphadenopathy and pleural effusion (uncommon in dogs). Heartworm associated lung disease is described as a cause of chronic respiratory signs in dogs and cats some of which fail to have the classic cardiovascular changes on imaging. On electrocardiography evidence of right ventricular enlargement can be found. Echocardiography can provide definite evidence of heartworm infection, as well as allow for assessment of cardiac anatomic and functional consequences of the disease. Echocardiography is not an efficient method of making a diagnosis in lightly infected dogs (worms are often limited to the peripheral branches of the pulmonary arteries). When heartworms are numerous, they are more likely to be present in the main pulmonary artery, right and proximal left interlobar branches, or within the right side of the heart. When significant infection is present, right heart enlargement/hypertrophy, pulmonary artery enlargement and tricuspid regurgitation may be seen.

Prevention:

Heartworm infection is prevented by the routine administration of a number of macrocyclic lactone preventives. Uninfected dogs should be maintained on macrocyclic lactone preventives all year-round. Preventives will not only protect dogs against infection but will also diminish the risk of infection in other dogs and secondary spreading of the disease in the population. It is extremely important, however, to do annual antigen testing on dogs receiving preventives to verify that they are not becoming infected despite precautions. Annual testing will ensure that infected dogs are detected and treated as soon as possible. For dogs living in highly endemic areas, twice-a-year testing is advised. These preventives (+/- additives) vary in their claims against other internal (hookworms, roundworms, whipworms) and external parasites (ticks and fleas) and are available in different formulations (tablets, topicals and injectable preparations). Macrocyclic lactone preventives currently available include: ivermectin (oral), milbemycin oxime (oral), selamectin (topical), and moxidectin (topical or injectable).

Fortunately, the dose of ivermectin, selamectin, milbemycin and moxidectin in the commercial heartworm preparations are low enough to be used safely even in dogs with the MDR1 mutation (Australian Shepherd, Collie and other herding breeds and their

crosses). It is only when the drugs are used at high doses, such as those used to treat mange (50 times higher dose than the heartworm prevention dose), that dogs with the mutation will develop neurological toxicity (<http://www.vetmed.wsu.edu/depts-VCPL/drugs.aspx>). Genetic testing for the mutation may be offered to the client if there is significant cause for concern.

Treatment:

Medical management consists of killing adults with an adulticide followed by a microfilaricide. Dogs with severe pulmonary hypertension and caval syndrome may have worms surgically extracted. Dogs with heart failure are stabilized prior to treatment. Stabilize dogs presenting with clinical heartworm disease. Any or all of the following may be medically indicated: corticosteroid therapy, fluid therapy, diuretics, vasodilators, and positive inotropic agents.

Dogs receiving a macrocyclic lactone should be maintained on preventive if it is already being administered. If a dog is not receiving a macrocyclic lactone preventive, administration of preventive should be instituted as soon as any severe medical condition has been stabilized. The purpose of preventive use is to prevent infection with new larvae if the dog is bitten by more infected mosquitoes because the treatment with melarsomine for removal of adult worms will not kill newly introduced larvae. Also administering a macrocyclic lactone preventive 2-3 months prior to administering melarsomine will make young worms (2 and 4 months) more susceptible to die.

CAPC (Companion Animal Parasite Council) recommends treating infected dogs with adulticide promptly, as soon as medically practical. Delaying treatment while maintaining dogs on preventives may contribute to selection for resistance and allows pathology to progress. Infected dogs are staged into 1 of 3 classes based on clinical signs: asymptomatic or mild disease (stage 1), moderate disease (stage 2), or severe disease (stage 3). Previously a two-dose protocol has been described for stage 1 and stage 2 disease where melarsomine dihydrochloride (2.5 mg/kg) is administered intramuscularly twice over a 24-hour period, killing greater than 90% of the worms present. However, due to decreased complication rates and increased safety, the American Heartworm Society recommends the three-dose protocol regardless of severity of disease (with the exception of caval syndrome). The three-dose method describes administering melarsomine dihydrochloride (2.5 mg/kg) intramuscularly once, followed in 1 month (or longer if the dog's condition dictates) by two intramuscular injections (2.5 mg/kg each) 24 hours apart. Any excitement or exercise beyond slow walking should be restricted for at least 6 to 8 weeks following each set of injections (this is ESSENTIAL for minimizing cardiopulmonary complications such as PTE). Avoiding overheating is also recommended. This treatment regimen will kill up to 98% of the worms present. Other, off-label regimens for administration of melarsomine dihydrochloride are not recommended. Melarsomine is not proven effective against heartworms younger than 4 months of age. Because dogs may have been bitten over a period of months by infected mosquitoes, the worms in a dog may be of different ages within a given season, and thus, melarsomine treatment may not be completely effective in all situations. This may necessitate additional therapy or alternate therapeutic strategies. All dogs that are treated with melarsomine should be tested for the presence

of microfilaria 1 month after completing therapy. If the dog tests positive for microfilaria, treat with a microfilaricide and retest in 4 weeks, then continue with a year-round heartworm prevention program. Dogs should be antigen tested and screened for microfilaria 9 months after completing therapy to determine if infection has been cleared. If still antigen positive, re-treat with doxycycline followed by two doses of melarsomine 24 hours apart. See attached treatment protocol.

In cases where melarsomine therapy is not possible or contraindicated, the use of a monthly heartworm preventive along with doxycycline at 10mg/kg BID for a 4-week period might be considered. This protocol is not recommended as a standard first-line treatment but instead as a salvage procedure. An antigen test should be performed every 6 months and the dog not considered cleared until 2 consecutive negative antigen tests have been obtained 6 months apart. If the dog still antigen positive after one year, repeat the doxycycline therapy. Exercise should be rigidly restricted for the duration of the treatment process.

Adulticidal therapy using long-term macrocyclic lactone administration (the “slow kill” method) IS NOT RECOMMENDED especially in light of resistance. It has been demonstrated that repeated macrocyclic lactone administration over a period of time to infected dogs increases the proportion of circulating microfilariae that possess resistance markers (i.e., application of long-term drug pressure will select for survival of drug-resistant microfilariae). If the “slow kill” method is the only medically acceptable option, microfilariae should be eliminated prior to exposure to preventive doses of macrocyclic lactones. Topical moxidectin/imidacloprid is label approved in dogs (FDA) for removal of microfilariae when used monthly. Pretreatment with antihistamines and glucocorticoids is advisable in the face of high microfilariae burdens to minimize potential reactions.

Depending on the macrocyclic lactone used, as many as 20% of dogs infected with heartworms will continue to have circulating microfilariae for at least a year or longer when receiving monthly preventative (even after adulticide therapy has been successfully completed). Current protocols utilizing doxycycline in combination with regular preventive doses of macrocyclic lactones have essentially eliminated the need for post-adulticidal elimination of microfilariae (see treatment protocol attached). Most filarial nematodes, including *D. immitis*, harbor obligate, intracellular, gram-negative bacteria belonging to the genus *Wolbachia* (Rickettsiales).

Although more research is needed, data suggest that the treatment of dogs with doxycycline prior to adulticide therapy may reduce the gross pulmonary pathology that occurs as a result of thromboembolic shower of dead worm fragments, aid in the suppression of microfilarial numbers after adulticide therapy, and interfere with the ability of the microfilariae to infect other dogs after they have passed through a mosquito host.

Public Health:

Dirofilaria immitis is of public health concern even though the number of reported cases is small (more than 100 human cases of pulmonary dirofilariasis have been reported in the U.S in the last 50 years). Prevention is best accomplished through

mosquito abatement programs (including screening outdoor kennels), and by using mosquito repellents, wearing protective clothing, and remaining indoors during mosquito feeding periods.

Reducing the prevalence of heartworm infection in the definitive canine host will also reduce transmission risk for humans.

HEARTWORM IN CATS:

Heartworm infection is less common in cats and they have lower worm burdens (usually 1 or 2 worms), fewer larva developing into adults a longer pre-patent period (7-8 months) and shorter survival times of adult worms (2-3 years). Pathologic findings are similar to dogs. The clinical importance of heartworms is amplified in cats because even a small number of heartworms are potentially life-threatening. Although live adult worms in the pulmonary arteries cause a local arteritis, some cats never manifest clinical signs. When clinical signs are evident, they usually develop during 2 stages of the disease: 1) arrival of heartworms in the pulmonary vasculature (immature adult worms 3-4 months post infection), and 2) death of adult heartworms. The initial phase is often misdiagnosed as asthma or allergic bronchitis, however it is part of a syndrome known as heartworm associated respiratory disease (HARD). When the adult worms begin to die (second stage) pulmonary inflammation and thromboembolism may occur (which usually leads to fatal acute lung injury).

Clinical signs associated with heartworm disease in cats can be vague or can consist of predominantly respiratory, gastrointestinal (e.g, emesis), and occasionally neurological. Most commonly cats have clinical signs of chronic respiratory disease (tachypnea, intermittent coughing, and increased respiratory effort).

Chronic cor pulmonale and right-sided heart failure may also occur. Radiographic findings are variable and include peribronchial infiltrates, interstitial disease, consolidation and pleural effusion. Caudal pulmonary arterial blunting and enlargement can be seen. Chylothorax and hydrothorax are sometimes found.

Fewer microfilaria circulate for shorter periods making tests for microfilaria insensitive (if you are looking for microfilariae do Knott s or Millipore test). Antigen tests underestimate prevalence because of early infection, resolved infection, low worm burdens, immature females, and all male infections. The current generation of available antigen tests can identify infections with a single mature female worm and are nearly 100% specific; however male infections and immature females infections can occur in cats as said above decreasing the utility of the antigen test for detecting infection. There are also documented cases of antigen-antibody complexes interfering with antigen testing resulting in false-negative tests. Heating the sample test-tube in a warm water bath to 104 degrees Celsius for 10 minutes will break these complexes down, releasing any antigen, resulting in more accurate test results. Antibody test have the advantage of being able to detect infection by both male and female worms. The sensitivity of the antibody test is variable and depends on larval stage, age of the worms, etc. (see American Heartworm Society guidelines). Limited evidence from several studies suggests that the antibody level in cats decreases with time as the parasite matures and that heartworm-infected cats with clinical signs are more likely to be antibody positive

than infected asymptomatic cats. Antibody tests overestimate prevalence because of persistence antibodies despite clearance of infection. Since both juvenile and adult worms are capable of causing clinical disease in the cat, both antibody and antigen tests are useful tools and when used together increase the probability of making appropriate diagnostic decisions. Adult worms can often be identified on echocardiogram. The diagnosis is most commonly made when a cat from an endemic area manifests the appropriate clinical signs, has radiographic findings consistent with infection and a positive antibody/antigen test.

No specific treatment is recommended for asymptomatic cats. Infected cats with symptomatic feline dirofilariasis should be treated with corticosteroids in decreasing dosages to minimize dyspnea, coughing, and wheezing caused by death of either juvenile (HARD) or adult worms. Antileukotrienes also may be beneficial in reducing the risks associated with adult worm death. Bronchodilators may be useful if there is radiographic evidence of air-trapping. Specific therapies should be used if vomiting and neurological signs are present.

There is insufficient experience with melarsomine at this time and its use is NOT recommended (preliminary data suggests that melarsomine is toxic to cats at doses as low as 3.5mg/kg). Surgical extraction can be considered in heavily infected cats or cats in critical condition. Preventatives are similar to dogs (milbemycin oxime, ivermectin, selamectin) and monthly prophylaxis should be considered in endemic areas (should be started in kittens at 8 weeks of age).

Table 1. American Heartworm Society recommended management protocol for dogs diagnosed with heartworm disease.

The American Heartworm Society has established guidelines for the diagnosis, prevention and management of heartworm disease in the dog and cat (<http://www.heartwormsociety.org>). The CVM agrees with these recommendations and it is with these recommendations that these notes were developed.

Day	Treatment
Day 0	<p>In a dog diagnosed and verified as heartworm positive:</p> <ul style="list-style-type: none"> • Positive antigen (Ag) test verified with microfilaria (MF) test • If no MF are detected, confirm with second Ag test from a different manufacturer • Apply an EPA-registered canine topical product labeled to repel and kill mosquitoes • Begin exercise restriction-the more pronounced the signs, the stricter the exercise restriction <p>If the dog is symptomatic:</p> <ul style="list-style-type: none"> • Stabilize with appropriate therapy and nursing care • Prednisone prescribed at 0.5 mg/kg BID first week, 0.5 mg/kg SID second week, 0.5 mg/kg every other day (EOD) for the third and fourth weeks
Day 1	<ul style="list-style-type: none"> • Administer appropriate heartworm preventive <ul style="list-style-type: none"> ◦ If MF are detected, pre-treat with antihistamine and glucocorticosteroids, if not already on prednisone, to reduce risk of anaphylaxis ◦ Observe for at least 8 hours for signs of reaction
Days 1-28	<ul style="list-style-type: none"> • Administer doxycycline 10 mg/kg BID for 4 weeks <ul style="list-style-type: none"> ◦ Reduces pathology associated with dead heartworms ◦ Disrupts heartworm transmission
Day 30	<ul style="list-style-type: none"> • Administer appropriate heartworm preventive • Apply an EPA-registered canine topical product to repel and kill mosquitoes
Days 31-60	<p>A one-month wait period following doxycycline before administering melarsomine is currently recommended as it is hypothesized to allow time for the <i>Wolbachia</i> surface proteins and other metabolites to dissipate before killing the adult worms. It also allows more time for the worms to wither as they become unthrifty after the <i>Wolbachia</i> endosymbionts are eliminated.</p>
Day 61	<ul style="list-style-type: none"> • Administer appropriate heartworm preventive • Administer first melarsomine injection, 2.5 mg/kg intramuscularly (IM) • Prescribe prednisone 0.5 mg/kg BID first week, 0.5 mg/kg SID second week, 0.5 mg/kg EOD for the third and fourth weeks • Decrease activity level even further : cage restriction; on leash when using yard
Day 90	<ul style="list-style-type: none"> • Administer appropriate heartworm preventive • Administer second melarsomine injection, 2.5 mg/kg IM • Prescribe prednisone, 0.5 mg/kg BID first week, 0.5 mg/kg SID second week, 0.5 mg/kg EOD for the third and fourth weeks
Day 91	<ul style="list-style-type: none"> • Administer third melarsomine injection, 2.5 mg/kg IM • Continue exercise restriction for 6 to 8 weeks following last melarsomine injections
Day 120	<ul style="list-style-type: none"> • Test for presence of MF <ul style="list-style-type: none"> ◦ If positive treat with a microfilaricide and retest in 4 weeks • Continue a year-round heartworm prevention program based on risk assessment described in prevention section
Day 365	<ul style="list-style-type: none"> • Antigen test 9 months after last melarsomine injection; screen for MF • If still Ag positive, re-treat with doxycycline followed by two doses of melarsomine 24 hours apart

Microchips

Microchips will be placed under the skin between the shoulders as recommended by Intervet/Schering Plough®. All pets will be scanned prior to and after implantation. Veterinary students, veterinary technicians and veterinarians will be able to pre-register their pets with HomeAgain® at no cost. All other individuals will be required to pay the pharmacy cost plus 28% for the microchip (as determined by the OSU discount policy).

Viral Disease Affecting Cats

Feline Upper Respiratory Disease

Several infectious organisms have been recognized as causing the signs of feline upper respiratory disease. The two major viral causes are feline calicivirus (FCV) and feline herpesvirus-1 (FHV-1), which is the cause of feline viral rhinotracheitis (FVR). The most common bacterial organisms associated with feline upper respiratory disease are *Bordetella bronchiseptica* and *Chlamydia felis*; whose prevalence varies by region and, while they can cause clinical signs on their own, are often seen in co-infections with FCV or FHV-1. Other viruses (cat pox, FeLV and FIV) can manifest with clinical signs of respiratory disease however they are also usually the result of co-infection with FCV or FHV-1 (or both).

Feline Calicivirus

Feline calicivirus is a non-enveloped, single-stranded RNA virus from the *Caliciviridae* Family. This virus can infect all felids but is most commonly seen in young kittens as they lose their maternal antibodies or in group situations. There are caliciviruses that infect dogs that are genetically distinct (canine calicivirus) and indistinct from FCV raising the possibility of transmission between dogs and cats. Since FCV is a single-stranded RNA virus it is capable of genetic heterogeneity, which can affect its antigenicity and may be responsible for the variable presentation seen with this virus. Infection is typically direct from actively infected or carrier cats via oral, nasal or conjunctival secretions. The virus typically replicates in 2 to 5 days in the oral and respiratory tissues. The virus can also replicate in the synovium, viscera and urinary bladder.

Clinical signs of FCV infection include depression, fever, ulcers of the tongue, lips or nose, hyper salivation, nasal discharge and occasionally lameness. The oral ulceration begins as a vesicle and heals over 2 to 3 weeks. Lesions in the lungs are less common but may include a focal alveolitis that can develop into an interstitial pneumonia. Sneezing, conjunctivitis and nasal discharge also occur as bacterial colonize the upper respiratory tract membranes. Lameness, which is less common, is the result of synovitis. In most cases, with supportive care, signs typically resolve in 7 to 10 days.

Morbidity can be high, up to 100%, however mortality is generally low with kittens under 6 months at a higher risk. Less commonly, outbreaks of more pathogenic forms of FCV with high mortality rate, coined virulent systemic feline calicivirus (VS-FCV), have been observed where clinical signs include respiratory tract infection, dyspnea, oral and footpad ulceration, facial edema, enteritis, pneumonia, coagulopathies, high fever, and icterus.

In practice, definitive diagnosis is not often necessary in the presence of the appropriate history, signs and signalment but in some instances (cattery outbreak, monitoring patient progress) diagnosis may be desirable. Viral isolation using PCR is now readily available through

Commercial laboratories with results in 2-7 days (laboratory dependent). Samples collected for PCR are deep pharyngeal and conjunctival swabs. The Idexx lab, for example, offers a feline Upper Respiratory Disease RealPCR panel which includes *Bordetella bronchiseptica*, *Chlamydia felis*, FCV, FHV-1 (with quantification), H7N2 influenza virus, influenza A virus (includes H3N2, H1N1, H3N8) and *Mycoplasma felis* RealPCR™ tests. Fluorescent antibodies on conjunctival scrapings and tonsillar biopsies can also be performed however samples are more difficult to obtain.

Treatment consists primarily of supportive care. Broad-spectrum antibiotics are indicated for secondary infections. Cleaning of secretions, nutritional support (strong smelling foods, appetite stimulants, enteral feeding devices), and nebulization (nebulizer, steam room) may also be indicated. Systemic antiviral agents have thus far proven ineffective against FCV and/or (in the case of ribavirin, which is effective against FCV) quite toxic to cats and should not be used.

Immune modulation with human interferon and recombinant feline-origin interferon have been investigated however results thus far have shown questionable efficacy. L-lysine supplementation has been recommended as it inhibits arginine, which is required for viral replication, however it's efficacy in FCV infected cats has not been proven. In 2018 Tulio M. Fumian et al., using the in vitro assays, identified other antiviral compounds, quercetagenin and PPNSD as potent RdRp (a viral nonstructural protein) inhibitors, and they also demonstrated a moderate inhibition of protease activity by GC376. Finally, they reported the identification of two compounds (nitazoxanide and 2CMC) with antiviral activity against FCV in cell culture at low micro molar concentrations with a potential combinational therapeutic utility to treat FCV-infected cats. Anyway, those treatment are still under study and are not yet feasible.

Acutely infected cats generally shed virus for up to 2–3 weeks. Most of them will eliminate the infection and do well if given appropriate supportive care. However approximately 80% or more of cats that survive acute FCV infection will become chronic carrier cats. These cats actively shed virus continuously from their oropharynx, for months to years, and can be clinically asymptomatic. It is estimated that 25% of clinically healthy breeding cats and approximately 10% of healthy household cats are FCV carriers. Repeated outbreaks in a multi-cat household or population of cats suggests a carrier cat is present. Chronic carrier cats may experience recrudescence of clinical signs, including sneezing episodes, nasal discharge, and chronic gingivitis which may respond completely too antibiotic therapy only to return 3-5 after discontinuation of antibiotics. Due to genetic heterogeneity, cats are susceptible to re-infection.

Vaccination against FHV-1/FCV induces what is called "nonsterile" immunity. This means that vaccination (intranasal or SQ) will prevent or lessen clinical signs, but will not prevent infection nor the establishment of a chronic carrier state. Vaccination also does not prevent virus shedding. By contrast, cats vaccinated and immunized against panleukopenia are completely protected in the event of subsequent exposure, this is

called "sterile" immunity. The FCV vaccine has to take into account the genetic heterogeneity and since the result is multiple strains it may be difficult to guarantee protection with a single serovar. Instead they have selected a few of the more common isolates to formulate the vaccines. Modified live vaccines are capable of inducing mild disease (mild upper respiratory signs, transient lameness), particularly in kittens, and approximately a third of cats vaccinated with intranasal vaccine develop post-vaccine sneezing. As with any inactivated vaccine, the adjuvants may cause fever, lethargy, injection site reactions and, rarely, sarcoma formation. Intranasal may provide a more rapid onset of action (72 hours after a single dose vs. 6-7 days with SQ) and have rarely been associated with oral lesions. This virus is inactivated by many commonly used disinfectants.

The current AAFP recommendations for vaccination against FCV/FHV-1/FPV are as follows: 6 weeks of age, and be repeated every 3-4 weeks (or 2-3 weeks in shelters) until 16-20 weeks of age and 1 year booster (12 months following last dose of initial series), booster every 3 years. The duration of immunity in adult, vaccinated cats has been shown to be at least 5 years. If intranasal vaccines are used a parenteral FPL vaccine is still recommended. If a cat is going to be placed in a known high-risk situation, an additional booster vaccination may be warranted 7–10 days prior to entry, particularly if it has not been vaccinated in the preceding year. However single dose of intranasal vaccine offers more rapid (2–6 days) onset of protection, and can be useful for animals entering a high-risk situation.

Feline Herpesvirus-1

FHV-1 is a double-stranded DNA virus from the alpha herpesvirus subfamily. Since it is a DNA virus it does not have the genetic heterogeneity of FCV so its isolates are similar and vaccine composed of a single serovar. This virus is also found in all felids but primarily the domestic cat. As with FCV, young cats or cats in group settings are most susceptible. Route of infection is the same as FCV as it primarily replicates in the upper respiratory tract and very rarely causes a viremia with more generalized disease. Generally speaking, FHV-1 causes more severe upper respiratory signs (more pronounced nasal discharge, conjunctivitis), and the cats feel more ill than FCV. Ulcerative keratitis (linear dendritic ulcers) and uveitis can occur and may be quite severe. Oral ulcers, skin ulcerations, neurologic disease and pulmonary infection occur rarely. FHV-1 has also been implicated in fading kitten syndrome. Acute infection typically begins as intermittent sneezing which progresses over 2-5 days and lasts 1 – 3 weeks but may result in permanent damage to the nasal turbinate and chronic nasal discharge.

Definitive diagnosis is not frequently clinically important, as discussed above. PCR panels are available and can be performed on deep pharyngeal and conjunctival swabs if warranted. Because FCV and FHV-1 can be found in apparently healthy cats, it may be difficult to know the significance of a positive test result in a single cat with signs of respiratory disease.

Treatment is focused primarily on supportive care; including broad spectrum antibiotics (Examples: Amoxicillin-clavulanate, doxycycline [must be compounded for use in cats],

azithromycin), nutritional support and hydration support as indicated. Cleaning secretions and humidification can also be of benefit. In cats who develop ocular lesions antiviral topical ophthalmic can also be used. Antiviral medication (see table below), specifically famciclovir, has recently been recommended by ophthalmologists for cats with severe ocular lesions and may shorten the course of the disease although this has not yet been widely studied. Famciclovir is well tolerated by cats however the optimum duration of treatment is yet unknown. In a retrospective study by S. M. Thomasy et al. (2016) comparing outcomes when famciclovir was administered thrice daily to cats with presumed herpetic disease at approximately 40 (n = 33 cats) or 90 mg/kg (n = 26 cats). Median duration of therapy required for clinical improvement was significantly longer in cats administered 40 versus 90 mg/kg. Furthermore, the reduction in treatment duration with the higher famciclovir dose was estimated to decrease overall client costs due to a reduction in total famciclovir administered. L-lysine supplementation has been recommended, as discussed above, however there is conflict amongst studies regarding its benefit and the cost can vary significantly. Immune modulating interferon (human or recombinant feline) treatment has not shown any benefit.

After primary infection, reinfection is rare but FHV-1 however, all kittens that recover from acute FHV-1 infection are expected to become chronic carrier cats. Healthy appearing carriers maintained in the population serve as reservoirs and can spread virulent virus to susceptible kittens, as well as adult cats, through direct cat-to-cat contact or fomite contamination. Chronic carrier cats have a latent infection and shed the virus sporadically (versus the continuous shedding of FCV). Stress has been shown to induce shedding and recrudescence of clinical signs in carrier cats. FHV-1 is less stable in the environment than FCV and susceptible to most disinfectants.

Vaccination against FHV-1 is discussed above as FHV-1 vaccines are most often combined with FCV vaccination.

Antiviral Drug	Mechanism of Action	Human Applications	Small Animal Applications
Acyclovir/ valacyclovir	Guanosine analogue; interferes with viral DNA polymerase and DNA synthesis. Activity requires viral TK.	Herpesviruses, especially HSV and varicella-zoster virus	Poorly effective against FHV-1
Penciclovir/ famciclovir	See acyclovir	Herpesviruses, especially HSV and varicella-zoster virus	FHV-1 infections
Cidofovir	Deoxycytidine monophosphate analogue. Activity independent of viral TK.	Systemically to treat cytomegalovirus retinitis; topically to treat papillomavirus infections	Topical treatment of FHV-1 ocular infections
Idoxuridine	Iodinated thymidine analogue. Interferes with viral DNA synthesis.	Topical treatment of HSV keratoconjunctivitis	Topical treatment of FHV-1 keratitis
Trifluridine	Fluorinated thymidine analogue. Interferes with viral DNA synthesis.	See idoxuridine	See idoxuridine
Vidarabine	Adenosine analogue. Interferes with viral DNA synthesis.	See idoxuridine	See idoxuridine

Feline Infectious Peritonitis

FIP is caused by feline coronaviruses, which are large enveloped positive-stranded RNA viruses and is an important cause of death in young cats, particularly in catteries and shelters.

Seroprevalence of feline coronavirus is 25% in single cat households and 75 to 100% in multi-cat households. FIP can occur in cats of any age but is more prominent in those less than 3 years old, especially between 4-16 months of age. However, FIP can occur at any age and there is a secondary peak of incidence in geriatrics cats (> 10 years), possibly as a result of suboptimal immune function. Male and sexually intact cats have been predisposed in some studies and disease peak may exist in the fall and winter. There are two biotypes of feline coronavirus; the highly pathogenic FIPV and the feline enteric coronaviruses (FECV). FECV is ubiquitous in cats and typically causes a mild gastroenteritis. FIPV is a mutation from FECV which occurs within the intestinal tract of the infected cat during the initial infection when replication of FECV is very high. The mutation which causes affinity for replication in macrophages, allowing for systemic spread of the virus, has been identified however mutation still does not guarantee development of FIP. Chronic stress appears to increase the rate of FECV replication, leading to a greater chance of mutation.

These viruses are highly infective and the transmission route is fecal-oral. More than half, and as many as 100% of cats in environment with more than six cats, become infected with FCoV. However, even though the prevalence of infection in multi-cat household is high, fewer than 10% of cats from larger, multicat households ultimately develop FIP. Most infected cats shed the virus intermittently but some shed chronically and remain reservoirs for infection; this is particularly important in group settings. Some strains remain infective for several weeks in the environment however they are susceptible to most disinfectants. Clinical FIP is determined by virus levels, virulence factors and host factors. Host factors which may play a role, especially if present at the time of infection, include immunosuppression, overcrowding, stress and genetic factors. Purebred cats are at a higher risk.

FECV replicates in enterocytes (and especially colonic epithelial cell) and destroys the villus tips. Clinical signs may include mild fever, small bowel diarrhea, and vomiting. When FECV mutates to virulent FIPV it can multiply in macrophages and infected macrophages are deposited in the endothelial lining of small venules. This is a key point relating to the pathogenesis of disease.

Because of the viruses associate with macrophages, systemic disease (FIP) is more likely to occur if the infected cat develops a strong humoral response to pathogenic FCoV and an ineffective cell-mediated immune response. The mutation may occur shortly after initial infection, or years later, which may explain why some indoors cats from single-cat household develop FIP several years after they are acquired. Clinical FIP is an immune-complex disease. With strong cell mediated immunity (CMI) the virus is eliminated or a latent infection occurs. If there is no CMI, pyogranulomatous vasculitis results. Tissue damage occurs due to an inflammatory response in perivascular locations initiated by antigen-antibody-complement complexes. Subsequently, pleural and peritoneal effusions may develop (wet form). If there is partial CMI, viral replication slows and granulomas form (dry form). The dry form can develop into the wet form.

General clinical signs of FIP include an antibiotic non-responsive fever, weight loss, anorexia and lethargy. Transient upper respiratory signs have been reported in some cats on initial infection with FCoV. Effusive FIP (wet form), dyspnea (due to pleural effusion), progressive, non-painful abdominal distention (due to ascites) and pericardial effusion are seen. No effusive FIP (dry form) any organ may be affected. Icterus, splenomegaly, renal failure, renomegaly, abdominal masses, coughing and/or dyspnea may be seen. Ocular involvement is commonly noted in the dry form and may cause anterior uveitis, retinal detachments and hemorrhage. Neurologic signs may include multifocal progressive signs such as ataxia, seizures, nystagmus, tremors, hyperesthesia, decreased proprioception and behavioral changes. FIP is one of the most common causes of neurologic disease in cats. Solitary intestinal masses can develop which may cause intestinal obstruction.

Clinicopathologic findings include a mild to moderate regenerative anemia, lymphopenia, and hyperproteinemia due to hyper-gammaglobulinemia (usually polyclonal gammopathy). Serum albumin to globulin ratio (A:G ratio) has good diagnostic value, and at values above 0.8, FIP is extremely unlikely. Azotemia, proteinuria, elevated liver enzymes and coagulopathy may also be observed and are the result of secondary organ damage. CSF analysis in cats with neuro signs may show hyperproteinemia, increased neutrophils and increased lymphocytes (however this is not consistent). Immuno-mediated glomerulonephritis has also been reported, and FIP always be considered in cats with protein-losing nephropathy, which is otherwise rare in cats.

FIP effusions have a higher diagnostic value than blood tests. The effusions typically have a very high protein content (>35 g/l) but a low cellularity (<5000 nucleated cells/ml), consisting primarily of macrophages and neutrophils, and are clear to yellow and may contain fibrin clots. When sufficient cells are present, the presence of viral antigen in macrophages confirms the diagnosis with a very high positive predictive value (PPV). The A:G ratio can also be measured in effusions; this test has a high PPV if the ratio is <0.4 and a high negative predictive value (NPV) if the ratio is >0.8. The demonstration of feline coronavirus-specific is only meaningful when the titer is high (1:1600), whereas the absence of antibodies has a good NPV.

Serology (immunofluorescence, ELISA, rapid immunomigration), is commonly employed in the diagnosis of FIP however positive results only indicate exposure to feline coronavirus. Most tests can be run on blood as well as effusion. Negative antibody titer helps to rule out FIP as less than 4% of cats with FIP will have a negative antibody titer. There is still no test available to differentiate between strains and recent FIP vaccination can also result in a positive titer. Very high titers (1:1600) in combination with other tests which suggest FIP indicate an increased likelihood of FIP, unless obtained from cats in an endemic environment. Positive CSF serology (>1:25) in cats with neuro signs may help to support diagnosis of FIP. Serology results should not be compared between laboratories due to different methodologies used. Real-time RT-PCR is a sensitive method to detect virus RNA in a variety of samples (feces, blood, effusions, and tissues) of feline coronavirus-infected cats and those with FIP; however, these still cannot differentiate between the biotypes.

The gold standard for ante-mortem diagnosis is histopathologic exam of biopsy specimens. Characteristic lesions are pyogranulomatous vasculitis. The most commonly affected organs are kidneys, brain and eyes; with liver and lungs affected less frequently. Immunohistochemistry can be used to demonstrate virus in these specimens. Immunocytochemistry on cells in CSF or effusion may help. A presumptive ante-mortem diagnosis can be made based on signalment, housing history, elimination of other differentials and a combination of clinic pathologic abnormalities.

FIP mortality rate is very high, >95%, once clinical signs develop. Survival time typically is 5-7 weeks post-diagnosis, although it varies from days to months. Supportive care includes SC/IV fluids, periodic thoracentesis, +/- antibiotics, anti-inflammatory and immunosuppressive medications (to help to suppress vasculitis). Parenteral and oral interferon (human and feline recombinant), as well antivirals, have also been used without proven benefit.

In multi-cat households that are seropositive, the goal is to control fecal contamination, stress, fomite transmission and other disease. Cats are grouped at lower numbers (<10) with one litter box for 2 cats. It is recommended to keep cats in stable groups of 3-4. Isolating kittens with the queen for 4-6 weeks then separating them from all adult cats can prevent infection with coronavirus. Testing and removal is not possible due to the inability to differentiate between FECV and FIPV. The prevalence of high frequency shedders in a cattery is the most significant risk factor for FIP incidence, so eliminating these cats could help control disease. These cats are detected by serial RT-PCR evaluation of fecal samples. Cats must be positive for > 8 consecutive months. Seropositive cats usually become seronegative within 6 months-1year unless exposed to other infected cats.

Pfizer has developed the only FIP vaccination, which is called Primucell FIP®. Vaccination is controversial as humoral immune response has been implicated in the pathogenesis of the disease. The vaccine is a temperature sensitive mutant given intranasal that replicates locally and, because of its temperature sensitivity, cannot spread beyond the upper respiratory tract. In seronegative cats, this may decrease the incidence of FIP to some degree, but one field study showed no significant reduction in the incidence. Vaccination has led to ADDE experimentally, but not in the field. Currently its use is only recommended in select situations and it is only given to seronegative cats. Two doses 3-4 weeks apart are given to cats older than 16 weeks, then yearly boosters. Unfortunately, in a cattery situation, 50% of kittens will have already been infected by 16 weeks of age. The ideal candidate for vaccination would be an uninfected cat going to a cattery, shelter, or multi-cat household where litter box sharing is likely.

Feline Leukemia Virus (FeLV)

FeLV is an enveloped RNA retrovirus. The virus is fragile, surviving a maximum of 24-48 hours at room temperature, and is rapidly inactivated by disinfectants, soaps and heating. There are 4 primary strains of FeLV ("A," "B," "C," and "T"). FeLV-A is the most abundant subtype and is responsible for transmission of the virus between cats.

Vaccination against subgroup A virus induces immunity to infection with all subgroups. FeLV is transmitted through salivary contact, including mutual grooming, shared food and water bowls, sexual contact, and potentially vertical transmission (it has been referred to as the “lover’s disease” versus FIV which is the “fighter’s disease”). Transmission is orinasal, the virus then replicates in oral lymphoid tissue, infects circulating mononuclear cells, enters systemic lymphoid centers, epithelial tissues and bone marrow. The virus is shed in saliva, tears, urine and feces and cats can shed virus for months to years. Transmission may also occur through reuse of instruments, blood transfusions and possibly fleas.

FeLV susceptibility varies with age and immune status. Maternal antibodies help protect kittens up to 12 weeks of age from infection. After infection, around 70+% of neonates, 30-50% of kittens aged 8- 12 weeks and <10-20% of immunocompetent adults cats become persistently viremia. The prevalence is currently around 3.5% nationwide but may be higher in certain populations (catteries). Cats with access to the outdoor; those that have contact with other cats; cats that are male, aggressive, or intact; and cats that are co-infected with FIV are at increased risk of infection. Adults cat are more likely to be infected with FeLV than cats younger than 6 months, the median age of cats infected with FeLV is 3 years.

The outcome of infection depends on: 1) the infectious dose 2) immune status 3) age of the cat and 4) virus strain. Clinical signs include malaise, lymphadenopathy and cytopenias. The virus may be eliminated at or before this stage. Cats with an inadequate immune response may appear healthy but develop persistent viremia and shedding (regressive form). FeLV related diseases may occur months to years later.

Most persistently infected cats (progressive form) die within 4 years and typically die within months of developing clinical signs. In some cats, viremia is followed by latent bone marrow infection. Viral DNA inserts into the host genome and replication is suppressed by antibody. ELISA, IFA and virus isolation on the blood and marrow are negative. These cats are not infectious. Most latently-infected cats eventually eliminate the virus. Less commonly cats develop hematopoietic malignancy months to years later. Cats that have recovered from FeLV are 60-fold more likely to develop cancer than cats never infected. And FeLV-negative cats that live with cats that test positive for FeLV antigen are more than 40-fold increase risk of lymphoma compared to tat expected without exposure to FeLV. Redevelopment of persistent viremia can occur with immunosuppression. Mediastinal lymphoma is the most common type in FeLV-infected cats (80% are FeLV+). Multicentric, renal, spinal and alimentary lymphoma can also occur. FeLV induced leukemia is usually acute and may be granulocytic, erythroid, lymphoid or megakaryocytic. Despite the name of the disease, leukemia is less common than lymphoma or anemia. Pancytopenia may occur due to marrow infiltration, myelodysplasia and myelofibrosis. Anemia (90% of FeLV-associated anemia are nonregenerative) may result from lymphoma, leukemia, chronic disease and immune-mediated destruction. Because these animals are immunosuppressed they are predisposed to bacterial, viral, protozoal and fungal infections. Other, less common, clinical manifestations include infertility, gastrointestinal signs, neurologic signs and peripheral lymphadenopathy.

Diagnosis is made by antigen detection using ELISA and IFA. FeLV diagnosis relies on antigen testing (p27 core antigen) by ELISA and/or IFA. ELISA is the screening test of choice and is sensitive, cheap and rapid. In-house kits are often used. Sensitivity and specificity are about 98%. ELISA+ cats should be retested 3 months later as there are 2 potential outcomes. They may eliminate the virus or become persistently infected. As an alternative, an IFA can be performed to verify the result. Cats that are IFA+ are persistently infected. IFA checks for viral antigen within cells and can be done on blood or marrow. ELISA+/ IFA- cats may be in the process of eliminating the infection. They should be retested in a few months. Saliva and tear ELISA's are less sensitive and specific. The newly arrived cat FeLV-negative with unknown origin, should be retested 3 weeks later to differentiate cat that is truly FeLV negative among others that have a primary stage of infection in which the virus is not yet in the blood but is in the lymph nodes.

Treatment is non-specific and supportive including blood transfusions, antibiotics, glucocorticoids (may further suppress immune system) and chemotherapy for LSA (survival is usually several months to rarely up to a couple of years). Cats with acute leukemia rarely respond to chemotherapy. A variety of antivirals and immunomodulators have been used with questionable efficacy.

Management of the healthy, viremic cat includes warning owners about the potential for spread to other cats in the household. Before removing a FeLV+ cat, all cats in the household should be tested. All cats in the household should be kept indoors to minimize risk of infection to other cats and introduction of other diseases. In catteries, test and removal programs have been successful. A sample protocol would be to test all cats and separate the positive from negative cats. Then, close the cattery and perform routine disinfection. Retest after 3 months and remove positive cats. Retest all cats every 3-6 months. Test, isolate for 3 months and retest all new introductions.

There are several commercially-available vaccines including whole killed vaccines, disrupted virus vaccines and gp70 subunit vaccines. Vaccines are not completely protective as vaccinated cats have developed FeLV. Vaccination is only recommended for FeLV negative cats. AAFP recommends administering FeLV vaccines to all kittens but considers the vaccine to be non-core for cats after their 1 year booster unless they are at risk of exposure. 19–22 Risk of exposure to FeLV is defined as access to outdoors, living with known FeLV-infected cats, or living in a multiple-cat environment where the status of all cats is not known. Vaccination of all kittens is recommended because a kitten's status (indoor versus outdoor, low risk versus high risk) may change, and susceptibility to persistent infection is believed to be highest in kittens. A single booster vaccination should be administered 1 year later for previously vaccinated cats. The AAFP Advisory Panel recommends that for cats at high risk of infection (eg, spending most of the day outdoors, in contact with infected cats, multiple-cat homes where the status of all cats is not known, etc), a booster vaccination may be administered yearly. Cats at low risk of infection (eg, households with small numbers of cats, cats with limited outdoor access), a booster vaccination may be administered every 2 years. Vaccinating older cats is controversial because of age related resistance. Vaccination does not interfere with

testing for FeLV. As with any adjuvant vaccination, there has been association with vaccine-associated sarcomas.

Feline Immunodeficiency Virus

FIV is a lentivirus (enveloped RNA virus), in the same family as HIV, which causes a chronic infection culminating in immunodeficiency. Unlike feline leukemia virus (FeLV), kittens do not appear to be more susceptible to infection than adults. The virus is present in the saliva of infected cats, and FIV infection is most likely to occur in male cats and free-roaming cats, reflecting efficient transmission by bite wounds.

Transmission via sustained contact among infected and uninfected cats, as with FeLV, may also occur. In addition, in utero and lactogenic transmission to kittens from queens may occur, especially if the queen is experiencing high levels of viremia. Experimentally, queens can be infected via semen, but it is unknown how important this mode of transmission is in nature.

Prevalence of FIV varies across North America according to gender and age, but is highest in middle-aged intact males. There does not appear to be significant breed predilections. The average prevalence in North America is ~4.6%, though there is significant regional variation.

The mean age at diagnosis is 6-8 years (80% of cats are over 2 years of age). Retrovirus survive only few minutes outside of the host and are very susceptible to disinfectant.

FIV infects CD4+ cells, CD8+ cells, B cells and macrophages. Some strains can infect cell types such as astrocytes. Clinical signs are related to gradual immune system dysfunction as well as FIV-induced neoplastic disease. There are several stages to the course of disease, which begins with replication in lymphoid and salivary tissues causing a peak viremia in several weeks; during which cats may experience mild “flu-like” symptoms (fever, lethargy, anorexia, and diarrhea) which often go unrecognized. This is followed by an asymptomatic phase that may last months to years during which cats have a slow decline in the number of CD4+ cells and the CD4+/CD8+ ratio. They may experience mild systemic inflammation, lymph node dysfunction, and mild to moderate immunosuppression which manifests as intermittent diarrhea and fever, mild hematologic changes, and being more prone to secondary infections (such as URIs and fungal disease) and certain cancers (lymphoma). They may also have delayed wound healing, lymphadenopathy, and in extreme cases stomatitis or encephalitis. When CD4+ cell numbers decrease below a critical level (<200 cells/ul in humans), the immune system begins to fail and viremia becomes more pronounced. This is the terminal phase and is associated with fAIDS. This phase may last months to years and some cats never develop terminal disease.

FIV diagnosis uses **antibody** testing. The most common form of testing is an ELISA. It is important to note that this test will record positive in animals exposed to FIV, as well as those vaccinated. Cats may take 1-2 months to test positive after exposure so a negative cat may need to be retested 60 days later to confirm negative status. Kittens under 6 months of age should not be tested, as there may be interference from maternal antibodies leading to false positives. Because of the low prevalence of FIV and the high sensitivity of the test, a negative ELISA result should be considered truly negative.

False negatives are very rare (except in the case of animals tested too soon after exposure). Despite the very high specificity of the ELISA test, FIV is a rare enough disease that false positives are common. Any positive result should be confirmed with further testing (PCR or Western Blot). Conflicting results should be confirmed by the third testing type. Vaccinated cats may still test Western Blot positive, while they are unlikely to be PCR positive.

Treatment of FIV is primarily supportive through management of secondary infections and keeping cats indoors to prevent exposure to other diseases. Antibiotics and antivirals can be used to control most infections. Immunomodulatory therapy (corticosteroids or interferon) has been used for stomatitis and dermatitis. Antiretroviral medications have been used with varying efficacy to treat some conditions, usually stomatitis and encephalitis. Cats in fAIDS crises may be treated with an antiretroviral, however, prognosis remains poor. AZT (zidovudine) has been the most successful. Cats with bone marrow suppression should not be treated with zidovudine. Most FIV-infected cats treated with zidovudine for as long as two years tolerated the drug well. The hematocrit can decline within three weeks of initiating treatment to approximately 50% of baseline but increases afterwards in most cases, even without discontinuation of treatment.

There are medications that are contraindicated in retroviral infection. The most commonly used medication being Cyclosporine (Atopica) which should be avoided (all cats who are candidates for cyclosporine therapy should have retroviral screening) as it may lower T-cell counts too far and cause severe immunosuppression. Corticosteroids are often indicated in FIV+ cats; however, immunosuppression may occur at lower-than-normal doses. Vaccination for other conditions should be performed only as necessary as there are reports of FIV+ cats developing vaccine associated disease with the use of modified-live vaccines (especially calicivirus).

An inactivated vaccine for FIV is available (Fort Dodge); however, it is not fully protective. The vaccine is made from FIV strains A and D, may have up to 80% efficacy against these strains.

Efficacy against other strains (which vary by region) ranges from 0-50%. The introduction of this vaccine generate controversy, because (1) exciting serologic assays cannot differentiate between natural infection or vaccine, (2) vaccination provide only partial protection from infection, (3) PCR assay results cannot be relied upon in vaccinated cats. However, vaccination against FIV could be recommended for cats at high risk of exposure, such as outdoor cats or cats living with FIV infected cats. When FIV vaccination is appropriate, a three-dose primary series is administered, with the first dose given as early as 8 weeks of age. Annual revaccination is recommended subsequent to the initial series if the risk of infection continues. Vaccinated animals will test ELISA+ indefinitely after vaccination. Transmission of FIV is reduced when cats are housed indoors. When one positive cat is identified in a household, all other cats should be tested and no new cats should be introduced, as this time lead to conflict and increase fighting behavior.

Viral Disease Affecting Dogs

Canine Infectious Respiratory Disease (CIRD)

Formerly referred to as infectious tracheobronchitis, CIRD is an acute, highly contagious disease of dogs that is caused by one or a number of viruses and bacteria. Most of the pathogens are insufficient in themselves to cause serious disease without the additional stress and high contact rates and multiple viral and bacterial pathogens work sequentially and synergistically to cause CIRD. The following agents have been implicated with the most commonly ones identified in **bold**:

Viral:

Canine parainfluenza virus (CPiV) **Canine respiratory coronavirus (CRCoV)** Canine adenovirus-2 (CAV-2)

Canine herpes virus -1 Canine influenza virus (CIV)

Canine distemper Virus (CDV) Pneumovirus (CPnV)

Bacterial:

Bordetella bronchiseptica, ***Mycoplasma cynos***

Streptococcus equi subsp. *zooepidemicus*

The most common mode of transmission is dog-to-dog contact and outbreaks are most common in high-stress, high-density environments, such as pet stores, boarding and grooming facilities, sporting events, shelters and veterinary hospitals. Aerosolized respiratory secretions and fomite spread may also be important, depending on the pathogen. Clinical signs usually develop one to three days post-exposure (can be up to ten days), although this is pathogen-specific. Pathogen shedding varies with infectious agent; viral agents typically shed for three to thirteen days post-infection, H3N8 CIV viral shedding ceases after approximately seven days, canine distemper virus (CDV), canine adenovirus 1 (CAV-1), *B. bronchiseptica* and *Mycoplasma* can be shed by recovered dogs for weeks to months.

Clinical signs develop because viruses and/or bacteria colonize the upper respiratory tract, trachea, bronchi, bronchioles and pulmonary interstitium. The milder clinical signs are typically seen with single virus infections. Co-infection of other viruses and bacteria tend to create the more severe

clinical signs. Signs may be mild with a self-limiting cough or more severe (especially in puppies) with fever, lethargy, anorexia, gagging, retching, pneumonia, mucopurulent to purulent nasal and ocular discharge. Death is uncommon but can occur.

Diagnostic testing is indicated if affected dogs are not responding to supportive care or if dogs are showing systemic signs of disease. Diagnostic testing is also indicated in the face of an outbreak. A definitive diagnosis helps guide effective treatment plans and control measures; however, it is important to note that many of the pathogens can be found with some frequency in normal dogs (especially in high-density environments) so isolating the same pathogen from multiple dogs is used to raise the index of suspicion. Ideally, acutely affected dogs should be sampled prior to treatment. Collection of

specimens from multiple dogs (at least 5–10) may increase the chance of positive test results and identification of the true causative agent. Several diagnostic tests are available, but sensitivity and specificity will vary depending on the pathogens involved, the location of sample collected, and the timing of collection. Diagnostic options include culture and sensitivity, serology, virus isolation, polymerase chain reaction (PCR), and histopathology. Culture and sensitivity is primarily useful for bacterial pathogens that demonstrate antimicrobial resistance (example, *Strep. zoo* can carry doxycycline resistance genes). Serology's use is limited due to standard vaccination; however, it is useful for CIV diagnosis in naïve populations. Virus isolation is uncommonly used and is primarily useful in identifying CIV. PCR testing is the most practical option for viral detection and respiratory PCR panels are available from most commercial laboratories. False positives can result from recent vaccination with a modified live virus and some laboratories now offer quantitative real-time PCR results that can help differentiate vaccination from field strain infection.

Treatment is primarily supportive. Antibiotics are given to address secondary bacterial infections in dogs with mucopurulent to purulent nasal or ocular discharge or evidence of pneumonia.

Doxycycline is a good first choice in the absence of antimicrobial susceptibility results because of its efficacy against *B. bronchiseptica* and its good penetration of lung tissue. Remember, doxycycline is bacteriostatic, and in cases of more severe infections and pneumonia, bactericidal antibiotics are indicated. Glucocorticoids have been used at anti-inflammatory doses short term (up to 5 days) to help control cough in dogs that do not have evidence of pneumonia however they do not shorten the course of disease. Concurrent use of glucocorticoids with bacteriostatic antibiotics is not recommended. Antitussives are not recommended due to retention of pathogens that should be expectorated. Methylxanthines (aminophylline, theophylline) have limited use as bronchospasm is not a typical feature of CIRDC. Nebulization of mucolytic agents or glucocorticoids does not appear to be beneficial, but aminoglycosides are effective against *B. bronchiseptica* when nebulized. Stimulation for barking should be minimized as should tracheal stimulation for collars. Hydration and nutritional support should be initiated as necessary. Oxygen supplementation may be required in severe cases.

Maternal antibodies to Canine adenovirus-2 (CAV-2) and Canine parainfluenza virus (CPiV) are absent by 16 weeks of age. Maternal antibodies to CAV-2 may interfere in puppies up to 16 weeks of age whereas maternal antibodies to CPiV may interfere up to 6 weeks of age. Maternal immunity for *B. bronchiseptica* is unknown. Dogs that have been infected by the viruses may be immune from reinfection for 1 year. Dogs may be immune from reinfection of *B. bronchiseptica* for 6 months. There are numerous vaccines available for the dog that protect against the major components of CIRDC. According to the 2018 AAHA Canine Vaccination Guidelines, CDV and CAV-2 vaccines (along with canine parvovirus) are core vaccines. Non-core vaccinations include CPiV (usually in combination w/ core vaccines), *Bordetella bronchiseptica* (parenteral (inactivated) or intranasal/oral (live avirulent)), CIV, *Bb* + CPiV ± CAV-2 (combination intranasal vaccine). Intranasal vaccines have the advantage of being able to be

administered to puppies 8 weeks or less (as early as 2 weeks vs. 6 weeks for parenteral) because maternal antibody does not interfere. Vaccination 3 to 5 days prior to exposure is required for intranasal vaccines to be effective. Duration of immunity following vaccination to CAV-2 and CPiV are at least 3 years but duration of immunity to *B. bronchiseptica* is 3 to 10 months which explains recommendations to booster every 12 months. Parental vaccines may result in local irritation or granuloma formation and require a booster 3 to 4 weeks following the first vaccination. Intranasal vaccines that contain live, attenuated *B. bronchiseptica* can cause sneezing, coughing and nasal discharge.

The prognosis is good with most dogs developing mild self-limiting signs. Complicated pneumonias carry a more guarded prognosis, especially in young dogs. Infected dogs should be isolated and the premises disinfected. Bear in mind that high pressure washing can aerosolize pathogen particles and further spread the disease therefore low pressure washing with standard disinfectants is indicated. As with any highly contagious disease, these dogs pose a risk to other hospitalized dogs so their hospitalization should be limited and appropriate precautions taken to prevent spread.

Canine Influenza

Canine influenza is caused by an RNA virus, a type A Orthomyxovirus which originated as a mutated form of equine influenza virus and is now widespread in pet dogs across the continental USA. Peak viral shedding precedes clinical signs, making the prevention of transmission difficult. Additionally, H₃N₈ CIV has a shorter incubation period than other causes of CIRDC. Historically, there has been regular CIV activity in the NE USA, as well as CO, TX, Las Vegas, and CA. CIV is highly infectious and morbidity rates can be as high as 60–80%. In 80–90% cases, dogs present with mild upper respiratory signs, but in 10–20% cases, severe lower respiratory tract signs are observed and co-infections can be identified. Mortality rates are very low for single-agent infections with CIV but can occur, especially with co-infections. A new strain of CIV (H₃N₂) was isolated from Chicago in early 2015. The strain is closely related to H₃N₂ Asian influenza strains and can infect both dogs and cats. There have been no documented feline cases in the USA.

Transmission is via aerosolization and fomites (including people). The virus incubates in 2 to 5 days and about 80% of infected dogs develop clinical signs but all infected dogs shed the virus for 7 to 10 days after the incubation period. Signs are similar to CIRDC and may be mild or severe. The majority of dogs develop a cough that may last 3 weeks and is unresponsive to antibiotics and cough suppressants. The cough may be dry or moist. Purulent nasal discharge is common and is secondary to bacterial infection by opportunistic bacteria. Fever is also common. Occasionally dogs will develop tachypnea and dyspnea. In addition, consolidation of lung lobes may be seen.

Ante mortem diagnosis is most often made via serologic tests. Diagnosis of CIV can be made by PCR or virus isolation only in the early stages of infection before viral shedding ceases; antibody testing is required after viral shedding stops. Antibody titers will begin to rise 10 days after infection. Commercially available PCR panels can detect a wide range of CIRDC pathogens from nasal or oropharyngeal swabs, including CIV. False negative PCR results can occur when the specimen is taken after viral shedding has

ceased which is common because shedding ceases by seven days after infection. The Cornell Animal Health Diagnostic Center offers virus isolation testing for both H3N8 and H3N2 CIV. CIV infection can also be diagnosed through Hemagglutination Inhibition (HI) testing for anti-CIV antibodies. Antibodies appear as early as 7 days after development of clinical signs. This test relies on submission of paired serum specimens to demonstrate a rising convalescent titer two to three weeks after the initial titer. It is still important to view titer results in light of the animal's history and clinical signs.

As with other viral respiratory diseases, treatment is supportive to include antibiotics for secondary bacterial infections as well as maintaining hydration and nutritional status. Antiviral agents do not appear effective with this disease. Even though infection has a high morbidity rate, the mortality rate is less than 8%. Zoetis currently manufactures separate killed vaccines against CIV H3N2 and H3N8. They are labeled for vaccination of healthy dogs as an aid in the control of disease associated with canine influenza virus infection. Vaccine selection should be based on the CIV endemic in the region and/or emergent outbreak strain. For initial vaccination, two doses are given 2 to 4 weeks apart. This vaccine can be administered to puppies as young as 6 weeks of age. Annual boosters are required. Vaccination for this infection is considered non-core and recommended for individuals at risk of exposure. The virus is susceptible to quaternary ammoniums and bleach. Suspects should be isolated and handled accordingly.

Canine Distemper Virus

CDV is a morbillivirus in the Paramyxoviridae family of viruses. It is a single-stranded RNA virus, enveloped in a lipid outer membrane that is easily disrupted by any disinfectant with detergent activity. Transmission is via inhalation of aerosolized secretions from an infected animal or contact with infected fomites. CDV replicates in lymphoid, nervous, and epithelial tissues and is shed in respiratory and conjunctival exudates, feces, saliva, vomitus, and urine of infected animals for 7 to 10 days, although some dogs shed virus for up to 60 to 90 days post infection. The virus is engulfed by macrophages and carried in the lymphatic system to lymph nodes in the pharynx and lungs, as well as to the tonsils. The incubation period can last between 1 and 3 weeks after exposure. Signs are reflective of CDV's epithelial tropism and secondary bacterial infections of these tissues occur as a result. Severity also appears to be related to the host immune response. Young and unvaccinated dogs are at the highest risk although outbreaks have been reported in vaccinated animals.

CDV infected dogs typically present with fever, lethargy, anorexia, and dehydration. Respiratory signs may include ocular and nasal discharge (mucopurulent to purulent), dyspnea and cough. GI signs may include anorexia, vomiting and diarrhea. Neurologic signs may include blindness, months to years after the initial infection. CDV infection is one of the most common causes of seizures in patients under six months of age. Hyperkeratosis of the foot pads, 'Hard pad', and nasal planum are more chronic signs. Enamel hypoplasia may also occur in young patients.

CDV may cause a lymphopenia and thrombocytopenia. Radiographs may initially show a diffuse interstitial pattern that develops into a bronchial or alveolar as secondary bacterial or extensive necrosis occurs. Eosinophilic inclusion bodies can be found in

infected cells (WBC, RBC, epithelial cells). The gold standard for diagnosing CDV infection is reverse-transcriptase polymerase chain reaction (RT-PCR) testing, which can be performed on any tissue sample. Urine is a good sample for RT-PCR, as the virus may persist longer in urine than in other tissues. Immunofluorescent assay techniques (IFA) can be performed on respiratory and genitourinary tissue; lymphoid tissue (tonsils); CSF; or conjunctival scrapings. Titers may also be performed and should consist of paired samples taken while the animal is sick and again during recovery. Treatment is supportive and focused mainly on preventing secondary bacterial infection. Intravenous fluids, antiemetics, prokinetics and nutritional support may be necessary for GI signs. Systemic antibiotic therapy is indicated if bacterial pneumonia develops. Anticonvulsants may be necessary for neurologic signs. Isolation of infected individuals is important to prevent spread to other patients in the hospital via aerosolized secretions.

CDV vaccination is considered a core vaccine. Vaccination is protective and in puppies begins at 6 to 8 weeks of age then every 3 to 4 weeks until 14 to 16 weeks of age followed by revaccination at one year then every 3 to 5 years. In adults, a single dose of MLV is given with a booster at 1 year then every 3 to 5 years.

The prognosis is guarded for acute CDV infection. Acute encephalitis carries a poorer prognosis.

Infectious Canine Hepatitis

Infectious canine hepatitis results from adenovirus-1 infection (related to adenovirus-2 a cause of kennel cough). The virus can be inactivated by heat and iodine-based disinfectants. Exposure is via the oronasal route. The virus moves to tonsils, regional LN, via hematogenous spread then to numerous tissues. During acute infection, the virus is present in all body secretions and continues to be shed in the urine for up to 9 months.

The virus has a predilection for the liver, attacking the Kupffer cells, as well as endothelial cells. Hepatic necrosis, endothelial damage and DIC are sequelae. Glomerulonephritis and anterior uveitis with corneal edema (blue eye) have also been reported. Most infections are subclinical however severe cases can result in death. Clinical signs vary but may include fever, anorexia, hepatomegaly, DIC, jaundice, and abdominal pain with or without effusion.

There are several tests specific for infectious canine hepatitis (IgM, IgG, and ELISA). On a serum chemistry profile, the liver enzymes usually are elevated (ALT, AST, ALP, and GGT).

Hypoglycemia, hypoalbuminemia, and bilirubinuria may also be observed secondary to liver failure.

Vaccination is typically part of a multivalent modified live vaccination for dogs along with distemper and parvovirus and follows the same protocol.

Viral Disease Affecting both Dogs and Cats

Canine Parvovirus and Feline Panleukopenia Virus

Canine parvovirus (CPV) infection is a common, highly contagious disease that may be fatal. Feline panleukopenia is less common than canine parvovirus infection. These are tiny, resistant non-enveloped DNA viruses that survive months, and sometimes over a year, on inanimate objects. They are resistant to most disinfectants apart from bleach (1:30 dilution) and glutaraldehyde (requires 10 min contact time). CPV has a high capacity to mutate and CPV-2c differs by a point mutation (Glu-426) in the DNA chain. Most susceptible dogs and cats are exposed to and infected by these viruses in their first year of life. Newer strains of CPV-2 may now be causing many cases of feline viral enteritis, which are being increasingly recognized. FPV does not infect dogs. Transmission is fecal-oral via exposure to feces, vomit or virus persistence on fomites. CPV-2 and FPV are shed a couple of days before clinical signs and shedding continues for a maximum of 6 weeks after recovery (usually 2-3 weeks). CPV-2 enteritis is of highest incidence in the summer.

Most infections with CPV-2 and FPV are subclinical. With CPV-2, puppies 6 weeks to 6 months of age are most susceptible due to declining maternal antibody, parvovirus preference for rapidly dividing cells and concurrent presence of intestinal parasites. Rottweilers, Dobermans, Pit Bull terriers and German Shepherds are at increased risk. With FPV, the highest morbidity and mortality is in unvaccinated kittens aged 3 to 5 months. Fading kitten syndrome may also occur. Once ingested the virus incubates for 4 to 14 days for CPV-2 and 2 to 10 days for FPV. The virus then replicates in oropharyngeal lymphoid tissues. Viremia develops and then the virus spreads throughout the body selectively damaging rapidly dividing cells in particular, the GI epithelium (crypt cells), thymus, lymph nodes and bone marrow (neutropenia, lymphopenia). Translocation of intestinal bacteria can result in septicemia, endotoxemia and DIC. Puppies who are infected in-utero or up to 8 weeks of age and may develop viral myocarditis. Infection of queens early in gestation may result in infertility, resorption or abortion. Kittens infected late in gestation or early in the neonatal period may have damage to the developing neural tissues (especially the cerebellum), optic nerve and retina. The most common lesion in these cats is cerebellar hypoplasia.

Clinical signs may include lethargy, decreased appetite, vomiting, diarrhea and abdominal discomfort. Rapid dehydration may occur. Pyrexia and leukopenia may be evident. Some animals develop secondary intestinal intussusceptions. Sudden death may occur within 1 to 2 days of illness usually due to gram negative sepsis, shock and DIC. Chronic diarrhea may persist occasionally in dogs and cats due to extensive bowel damage and secondary fibrosis. Canine myocarditis may be associated with sudden death or congestive heart failure. Some kittens in a litter may show cerebellar signs once they reach 2 to 3 weeks of age (ataxia, intention tremors, incoordination, broad-based stance). These kittens can be acceptable pets. Forebrain damage may result in seizures and behavioral changes. Neurologic signs in dogs with parvovirus enteritis may result from hypoxia due to myocarditis, intracranial hemorrhage (DIC) or hypoglycemia.

Signalment, vaccination history, clinical signs and leukopenia are suggestive. Leukopenia does not occur in all cases. Severe GI signs and leukopenia can also occur

with other GI infections, especially salmonellosis. The most common test used is an in-house fecal ELISA assay for CPV-2 antigen (also detects some FPV). It is very sensitive and specific. False positive results could occur 5 to 12 days after vaccination (with modified live vaccine). Negative results do not rule out infection. CPV-2 is often not present in the stool up to 5 to 7 days after onset of illness. Virus isolation can be performed on feces or tissues. Jejunum, ileum, mesenteric LN and other lymphoid tissues are best. Parvoviruses cause hemagglutination, therefore inhibition of hemagglutination by serial dilutions of antibody can be used to measure the antibody titer to CPV-2. Virus neutralization and ELISA assays are also available to detect antibodies. In-house antibody tests have been developed to CPV-2 and their primary use is to decide whether to vaccinate animals in which vaccination may not be desirable.

Treatment for CPV typically consists of hospitalization, hydration and nutritional support. Electrolytes, glucose and total protein are monitored. A recent study showed early enteral nutrition via naso-esophageal tube 12 hours after admission resulted in earlier clinical improvement and significant weight gain compared with using NPO until vomiting had ceased for 12 hours. Antimicrobials should be given to treat possible sepsis. Ampicillin or cephalosporin may be sufficient for uncomplicated cases. Gram negative coverage can be increased in severe cases with enrofloxacin or gentamicin. Deworming and treatment for Giardia may be indicated once GI signs improve.

CPV vaccination is considered a core vaccination in dogs. Maternal antibody interference is the primary cause of vaccination failure. Modified live vaccinations produce higher titers more likely to overcome maternal antibody interference at an earlier time point. With current canine parvovirus vaccines, there is now only a short period (few days to 2 weeks) where maternal antibody can interfere with vaccination (i.e. window of vulnerability). In order to be fully protective, the final booster must be given when the animal is at least 14–16 weeks age. MLV vaccines replicate in the GI tract and are shed in feces but are safe. Killed CPV-2 vaccines produce a weaker response. They should not be used in contaminated environments because the window of vulnerability is too great. Confining puppies until 1 week after the last vaccination helps to minimize exposure during the window of vulnerability. Immunity generated by MLV vaccines is of long duration so after the initial vaccination series, boosters should be repeated every 3 years.

In susceptible cats, MLV vaccine is given at 6 to 8 weeks then every 3 to 4 weeks with final booster between 14–16 weeks of age. Initial vaccine series is boosted every 3 years. Initial vaccination in adult cats consists of the MLV vaccine is given twice 3 to 4 weeks apart then every 3 years. Inactivated products are indicated for pregnant queens, colostrum-deprived kittens <4 weeks of age, and immunosuppressed cats.

Rabies

This is an enveloped RNA virus that can infect any mammal and is quickly inactivated by heat, sunlight and disinfectants. Different strains affect raccoons, bats and skunks and when these strains infect mammals other than their common hosts, death occurs. Typically, infection is via a bite but aerosolization is possible. Occasionally in humans the source is unknown and has even occurred as a result of organ transplantation. In

Oregon, Washington, and Idaho, bats are the only reservoir species, and other animals (notably bat predators such as foxes or cats) are only rarely infected as “spillover” from rabid bat populations. In other parts of the U.S., skunks, raccoons and foxes are important reservoirs in addition to bats. In many other parts of the world, dogs and other carnivores are the primary reservoirs and dogs account for the most human exposures worldwide. Wildlife rabies has been increasing and dog and farm animal rabies decreasing in the US, thanks to mandatory vaccination and reporting protocols. Raccoons account for most feline exposures and there have been more cases of rabies in cats than dogs in the last 20 years.

The virus incubates for weeks to up to 2 months in dogs and cats and time it takes to show clinical signs can vary depending on location of the bite wound. Replication begins locally at the site of the bite and then the virus travels to the neuromuscular junction, the peripheral nerves and finally to the forebrain. The virus then causes death or moves to other peripheral nerves and tissues (including salivary glands). Studies have established that, in dogs, shedding begins at most 3 days before signs occur; in cats, it is 1 day before. Shedding may persist until the animal dies, which is typically within a few days. Little or nothing is known about the shedding period in other species. The rationale for a 10-day confinement period for dogs, cats and ferrets rests on this observed interval between viral shedding and onset, padded by a healthy margin of safety.

Animals may exhibit one or all three of the phases: prodromal, furious/excitative and paralytic/dumb. During the prodromal phase mild fever, behavioral and voice changes may be noted. During the “furious” phase excitability, photophobia, hyperesthesia, aggression, pica, drooling, muscle tremors and incoordination may occur. Seizure, coma and death can also occur during the furious phase. The so-called “dumb” phase is characterized by reclusive behavior, salivation, anorexia, a startle response to sudden noise or light exposure and irritation around the site of the bite, resulting in frequent licking and biting of the area. In the paralytic phase cranial nerve paralysis can occur and death within 2 to 4 days from respiratory muscle paralysis. Rabies should be a differential for any acute behavioral change or flaccid paralysis. Suspects should be handled VERY cautiously with appropriate personal protective equipment and public health authorities should be contacted.

MLV vaccines were associated with post-vaccinal rabies in some cats, so dog and cat rabies vaccines in the US are now inactivated. These have been associated with a higher incidence of allergic reactions and vaccine-associated sarcomas (1:5000 cats), which can occur months to years after vaccination. Purevax® (Merial) is a non-adjuvanted, recombinant rabies/Canarypox vaccine that expresses immunogenic rabies proteins in the host and is thought to be less likely to contribute to vaccine-associated sarcoma formation. In dogs and cats the first vaccination is given at no less than 3 months of age, followed by a booster one year later, then every 1-3 years depending on the vaccine and the local regulations. Except for Purevax® (above), 1-year vaccinations are not recommended. Rabies vaccines should be given parenterally in the right rear limb. One injection does not give adequate protection. Booster vaccinations should be given when vaccination history is uncertain. Vaccinated animals should be boosted after suspected

exposure to rabies.

If a domestic animal is bitten by a wild animal that cannot be tested, that wild animal is considered to be rabid. Bite wounds should be washed under pressure with large amounts of warm soapy water, a QUAT compound, and/or ethanol solution and the following situations considered. Immediate copious lavage is the best way to reduce viral load at the site of the bite and prevent local viral replication.

Dogs and cats bitten by rabies suspects are handled differently depending on vaccination status and local public health policy. If an unvaccinated dog, cat or ferret has known contact with a known rabid animal, the bitten animal should be humanely euthanized under direction of the local public health authority (always consult with them before euthanizing an animal for rabies). If the owner will not permit this, the animal must undergo a supervised quarantine for 6 months, with the vaccine administered either as soon a quarantine starts or 1 month prior to release. A dog, cat or ferret with a current rabies vaccination that has had a known contact with a rabid animal should be revaccinated and confined at home for 45 days (indoors, in a fenced yard, or on a leash at all times).

All animal bites inflicted on people should be reported to local public health officials. Quarantine protocol differs among counties, even within the same state, so it is prudent to stay in contact with public health offices and stay abreast of local policies so you can relay accurate information to owners. Typically, if a healthy, vaccinated dog or cat has inflicted a bite the pet is confined and observed for 10 days, especially if the bite was unprovoked. Again, these bites still require reporting and the quarantine will be followed by a public health official. If the pet is unvaccinated local policy may require the animal to be euthanized and tested or quarantined for 10 days in an approved quarantine facility; this will be at the discretion and guidance of local public health authorities. If the animal is a stray it is typically euthanized and tested, regardless of presence or absence of neurologic signs. Any illness or neurologic signs in quarantined animals should immediately be reported to public health officials.

Rabies should be a differential for any acute behavioral change or flaccid paralysis. Suspects should be handled VERY cautiously and public health authorities should be contacted. When rabies suspects are euthanized the head should be submitted refrigerated (not frozen) for histologic diagnosis in which Negri bodies (eosinophilic viral inclusions) are seen within neurons. Fluorescent antibody testing is more sensitive and is also done on the brain.

Bacterial Disease Affecting Dogs

Ehrlichiosis Anaplasmosis Lyme Borreliosis

Ehrlichiosis

Caused by a bacterium, ehrlichia, that affects dogs, cats, goats and humans. Ehrlichiosis is found worldwide. The two most common are *E. canis* and *E. ewingii*. The incidence of *E. canis* is highest in tropical and subtropical regions. The vector is *Rhipicephalus sanguineus*, commonly called the brown dog tick or kennel tick. The organism is transmitted only from larva to nymph to adult within the tick. Jackals, foxes, and sometimes coyotes then act as a reservoir host. Transmission requires 24- 36 hours of tick attachment. German shepherds tend to be more susceptible and the prognosis may be poorer. Common clinical signs appreciated include fever, lethargy, inappetence, weight loss, mucosal hemorrhages, uveitis, pallor, edema and occasionally neurological signs. Indirect immunofluorescent assays (IFA) is considered the gold standard for diagnosis and antibodies can be detected within 7 - 28 days after the initial infection however, if dogs have a false negative result, PCR assays may be used with retesting in 2-3 weeks to evaluate seroconversion.

E. ewingii is primarily found in south-central and southeastern United States. The vector is *Amblyomma americanum*, commonly called the lone star tick. Common clinical signs appreciated include fever, lethargy, inappetence and signs of polyarthrititis. When performing diagnostic tests, serological testing is performed via ELISA assay and common laboratory finding are non- regenerative anemia and thrombocytopenia. Doxycycline is the first choice in treatment. Improvement is usually noted within the first 24-48 hours. Treat for 4 weeks. Prevention consists of routine inspection for ticks, topical ectoparasiticides and/or amitraz collars.

Anaplasmosis

Caused by a bacterium, *Anaplasma phagocytophilum* (granulocytic anaplasmosis) and *Anaplasma platys* (thombocytotropic anaplasmosis). *A. phagocytophilum* is distributed within the United States and Europe. The strain within the United States affects dogs, cats, horses, camelids and humans whereas the European strain affects ruminants. Within the United States, *A. phagocytophilum* is most widespread in the upper Midwest, northeast and western states. The mode of transmission is through tick vectors, mostly the *Ixodes ricinuspersulcatus* complex tick. Dogs and cats can become infected only after being exposed to infected nymphs or adult ticks which have been attached for 36-48hours. Common clinical signs include fever, lethargy, inappetence, lameness and GI upset. Diagnosis relies on history, clinical signs, laboratory findings, serology and often PCR. The treatment of choice is doxycycline for 2 weeks with clinical improvement seen within 24-48 hours. Prevention consists of inspection for ticks, topical ectoparasiticides and/or amitraz collars. Routine prophylactic use of antimicrobials to prevent disease is NOT recommended.

Lyme Borreliosis

Caused by a spirochete, *Borrelia burgdorferi*, that affects dogs, cats, horses, cattle and humans. The incidence is highest in New England, the upper Midwest and mid-Atlantic States. There is a smaller endemic focus on the west coast. The vector is *Ixodes*

scapularis (Midwest) and *I. pacificus* (West coast). Uninfected tick larvae feed on small rodents. The nymphs feed on mice or larger mammals such as dogs, humans and deer. Adults feed on large mammals. Ticks acquire infection at any stage and are most likely to acquire infection from the white-footed mouse *Peromyscus leucopus*. Transmission requires 48 hours of tick attachment. The spirochete replicates and migrates away from the tick bite site through connective tissues. Persistent infection is then established.

Most cases of Lyme disease are subclinical. In endemic areas seropositivity may be as high as 85% but only 5-10% of infected dogs show signs. Some seropositivity may result from nonpathogenic spirochetes. Signs result mainly from the host's inflammatory reaction. In dogs, erythema migrans (cutaneous rash seen in man) does not occur. Signs of arthritis, fever, lymphadenopathy and anorexia occur several months after tick exposure. A small percentage of dogs may be susceptible to a severe, treatment-resistant arthritis. Dogs may also develop a severe protein-losing nephropathy with anorexia, vomiting, lethargy and profound weight loss. Golden Retrievers and Labs seem predisposed. Co-infection with *Anaplasma phagocytophilum* may occur (i.e. canine granulocytic ehrlichiosis).

Diagnosis can be difficult as clinical signs and laboratory abnormalities are nonspecific. Joint taps reveal a neutrophilic arthritis. Culture from symptomatic animals is diagnostic, but expensive, can take 6 weeks and is insensitive. Skin biopsies can be useful from around the tick bite site. PCR has variable sensitivity. Antibody titers can be run but seropositivity does not mean a dog's signs are due to the spirochete. Paired titers are needed for definitive diagnosis. Vaccination results in false positives using ELISA and IFA. Western Blotting can be used to discriminate between natural infection, vaccination and "dual status". The IDEXX SNAP 3Dx test uses an ELISA that detects antibody against the C6 antigen. This antigen is only expressed during active infection and so will only be positive with natural infection.

Doxycycline is the first choice in treatment. Improvement is noted within the first 24-48 hours. Treat for 4 weeks. Relapse can occur but most cases respond to a second course of antibiotics. The infection is probably not ever completely cleared. NSAID's may also be used. Immunosuppressive doses of glucocorticoids should be avoided.

Prevention consists of inspection for ticks, topical ectoparasiticides and/or amitraz collars. Routine prophylactic use of antimicrobials to prevent disease is NOT recommended. The risk of humans acquiring infection after a deer tick bite in an endemic area is <2%. Vaccinations do not provide absolute protection. There are 2 vaccines available for dogs: a bacterin and a recombinant OSPA (outer surface protein A) subunit vaccine. Allergic reaction can occur with the bacterin vaccine but the risk is low. Concern exists that vaccination may induce autoantibody formation leading to arthritis or glomerulonephritis. Limit vaccination to outdoor, hunting or field trial dogs in endemic areas. Vaccinate before the tick season and never use the vaccine as a substitute for tick control.

Salmon poisoning

Caused by *Neorickettsia helminthoeca*, which belongs to the Anaplasmataceae family

and is a gram- negative, obligate, intracellular bacterium. Salmon poisoning affects dogs, foxes, coyotes, raccoons, and occasionally captive bears. The incidence of infection is restricted to coastal regions. In the United States this includes Washington, Oregon, and northern California but can also be seen in southern British Columbia, Canada. The vector is a trematode (fluke). Transmission usually occurs when the encysted trematode metacercariae from uncooked freshwater fish is ingested by dogs. Once ingested the trematode matures and attaches to the mucosa of the GI tract where it injects the organism so it can be shed through the feces for 60-250 days. After a few months, miracidia develop and penetrate snails which release cercariae intermittently. These cercariae swim around and then are ingested by fish. Once ingested they encyst as metacercariae and the process begins again.

Common clinical signs can range in severity and include lethargy and GI upset such as inappetence, vomiting, diarrhea or weight loss. The incubation period can be anywhere from 2-33 days but most commonly these signs are appreciated within the first 2 weeks post ingestion. On physical exam more than 70% of dogs will have a fever and peripheral lymphadenopathy. Diagnosis can be difficult as clinical signs and laboratory abnormalities are nonspecific. However, a compilation of history, PE findings, and diagnostic results should guide you. PCR and fecal floatation are used to confirm the diagnosis of salmon poisoning. A fecal floatation to look for eggs has >90% sensitivity and 100% specificity. Eggs typically appear within 5-8 days post ingestion. Eggs are light brown, ovoid, and operculated.

Treatment of choice is doxycycline, tetracycline, or oxytetracycline for a minimum of 1 week. Clinical improvement typically occurs within 24 hours with clinical signs resolving in 1-4 days. If dogs are severely affected close monitoring and hospitalization will be required. In general, the earlier treatment is started, the better the prognosis. Without appropriate treatment, death can result within 5-10 days. Animals that recover from one strain of salmon poisoning are immune to reinfection of that same strain but can be infected with another strain.

At this time there is no vaccine available. Prevention involves appropriate handling and cooking of infected fish. Discouragement of ingested raw fish in endemic areas is recommended. Careful monitoring of dogs swimming in areas with freshwater fish, especially salmon, is critical due to the variability and severity of clinical signs.

Endoparasites

Roundworms – Ascarids

Toxocara canis and *Toxocaris leonina* are the roundworms found in the dog. *Toxocara cati* and *Toxascaris leonina* are found in cats. *Baylisascaris procyonis* is an ascarid of raccoons that is occasionally found in dogs. *Baylisascaris procyonis* occurs in raccoons across the U.S. and Canada, with the highest prevalence in the midwestern and northeastern U.S. and along the west coast. *T. canis* can undergo transplacental transmission. *T. canis* and *T. cati* are also transmitted in the milk. Infection can also occur by ingestion of ova or other hosts. Almost all puppies are born infected with *T. canis* and produce eggs by 3 weeks of age. Signs are typically seen in young animals and include vomiting, diarrhea, weight loss, dull coat and failure to thrive.

Occasionally intussusception and intestinal obstruction can occur. Diagnosis is made on routine fecal flotation. Pyrantel, fenbendazole, pyrantel/febantel, milbemycin oxime, moxidectin and praziquantel are all effective. Puppies and kittens should be dewormed with pyrantel pamoate at 2, 4, 6, 8, 12 and 16 weeks of age then at 6 month intervals. The lactating bitch or queen should also be treated. Zoonosis is a concern with visceral larval migrans in children.

Hookworms

Ancylostoma caninum is the most common hookworm in the dog and *A. tubeforme* in the cat. *A. braziliense* occurs in dogs in the southern US and *Uncinaria stenocephala* in the Northern US and Canada. Infection occurs transplacentally, transmammary, via ingestion of the third-stage larvae or ingestion of other vertebrate hosts with infective larvae in their tissues. Infective larvae are often in the dirt and grass of contaminated areas. Clinical findings include vomiting, dark and tarry diarrhea (melena), weakness, pale mucous membranes, dehydration, anemia and poor growth. Cutaneous larval migrans also occurs in dogs and cats (hookworm dermatitis). Diagnosis is made by identification of ova in feces. Treatment is as described for roundworms although some animals need supportive therapy to keep them alive until the drugs can kill the worms. Pyrantel pamoate is the treatment of choice for infected puppies. All dogs in an infected environment should be treated and feces should be removed from the premises promptly. Prophylactic treatment in puppies and kittens can begin at 2 to 3 weeks of age. Hookworms can cause visceral and cutaneous larval migrans in man.

Tapeworms

Dipylidium caninum is the most common tapeworm of the dog and cat. The flea or, more rarely, lice is the intermediate host. *Echinococcus granulosus* uses dogs as a definitive host (no signs) and humans as definitive hosts (important zoonosis). Very rarely heavy infestations of *D. caninum* have been associated with diarrhea, weight loss and failure to thrive in dogs and cats. *D. caninum* can cause anal pruritis. Proglottids may be noted on the perineum or egg capsules demonstrated in the feces. Treatment is with flea control, fenbendazole, pyrantel/febantel +/- praziquantel, praziquantel alone and epsiprantel. Praziquantel is the treatment of choice.

Strongyloides

Strongyloides stercoralis can affect young puppies. Infection is via ingestion, transmammary and skin penetration. Hemorrhagic enteritis can occur and may result in death. Baermann funnel technique or fresh smears are performed for larvae. Treatment is with thiabendazole, fenbendazole or ivermectin. Dogs with diarrhea should be promptly isolated from dogs that appear healthy. It is a potential zoonosis particularly if the person is immunosuppressed.

Whipworms

Trichuris vulpis is reported in the dog. *T. serrata* and *T. campanala* occur in the cat (rare in domestic cats in North America). Infection is oral fecal. Infected ova are ingested, hatch in the small intestine and larvae migrate to the cecum and colon where they attach to the wall. Clinical signs reflect host response. Dogs may be asymptomatic or develop large bowel diarrhea often streaked with mucus and fresh blood. Anemia and hypoproteinemia

may also develop. Dogs may also develop pseudo-hypoadrenocorticism in which hyperkalemia, hyponatremia and hypochloremia can occur. Diagnosis is made by identification of ova on fecal flotation. Ova may be shed intermittently and missed on fecal examination. The organism is susceptible to fenbendazole, febantel/praziquantel, milbemycin, ivermectin/pyrantel pamoate, milbemycin oxime and moxidectin. Repeat treatment at 3 weeks and 3 months.

Ectoparasites

Fleas and ticks do occur in the Willamette Valley. Our current protocol for flea and tick control consists of administration of Revolution® given monthly beginning in May through October and Frontline Plus® from October through April. Revolution® will combat heartworm as well as external parasites in the heartworm susceptible months. Alternating with Frontline Plus® will help avoid/delay the development of resistance in fleas and ticks. We will also be offering additional types of flea and tick preventative including Capstar®, Program®, Advantix® and Advantage®.

Ticks

There are hard (ixodid) and soft (argasid) ticks. Soft ticks are found in the southern US and often colonize the external ear canal where larva and nymphs feed off the lymph in the ear canal. Hard ticks are more likely to be parasitic and spread disease. *Rhipicephalus sanguineus*, the brown dog tick, can transmit babesiosis, anaplasmosis, *E. canis*, *F. tularensis* and cause tick paralysis. *Dermacentor variabilis*, the American dog tick, can transmit RMSF, tularemia, anaplasmosis and cause tick paralysis. Ticks may cause anemia as all stages feed on blood and lymph. Treatment options are manual removal and topical insecticides. Exercise care when manually removing to ensure the whole tick is removed. Fipronil (Frontline®) kills all parasitic stages of ticks within 48 hours of application and has residual activity for one month. Fipronil kills ticks before they attach and has residual activity for 1 month. Amitraz collars (Preventic® collar) are also helpful in causing ticks to detach as well as prevent attachment. There are various dips and sprays that can also be used. Caution should be exercised in cats with these products as some cause serious side effects. The premises can also be treated with malathion, diazinon or chlorpyrifos.

Fleas

Ctenocephalides felis is the most common flea of the dog and cat. *Ctenocephalides canis*, *Echidnophaga gallinacean* and *Pulex irritans* may also infest the dog. The flea is an obligate parasite of the dog and cat and infestation is by contact with an infested environment (not directly from another animal). Fleas thrive in moist, warm environments. They can survive on a host for up to 100 days but will die within 2 to 4 days off the host. Fleas serve as an intermediate host for tapeworms so ingestion of an infected flea can lead to infection with tapeworms. Annoyance and pruritus are common complaints. Heavy infestations can lead to iron deficiency anemia and death, particularly in young animals. *Ctenocephalides felis* can transmit *Rickettsia typhi*, *Rickettsia felis*, *Bartonella henselae*, *Dipylidium caninum* and *Acanthocheilonema (Dipetalonema) reconditum*. Flea allergy dermatitis is caused by hypersensitivity to antigenic material from the salivary glands of fleas.

Treatment of fleas consists of treating the pet (adult stage composes 5% of total

population) and environment (eggs, larvae and pupa consist of 95% of total population). Lufenuron (Program®) is an insect development inhibitor given monthly that inhibits chitin synthesis. Chitin is essential for egg and larval development thus this product prevents eggs from hatching and flea larvae from maturing. Lufenuron does not kill adult fleas so it is best used in conjunction with an adulticide (Frontline®, Advantage®). It will take 1 to 3 months to benefit from full effects.

Lufenuron is available with milbemycin oxime (Sentinel®) to control fleas and heartworm. This product can be used in puppies and kittens from 6 weeks of age.

Fipronil (Frontline®) is an adulticide applied monthly for fleas in cats and every 3 months for dogs. Fipronil is a GABA inhibitor. GABA is an essential neurotransmitter in the CNS of fleas. It kills all fleas within 24 hours. Fipronil has no effect against eggs or larvae. The spray can be used in puppies from 2 days of age and kittens 7 weeks of age. The topical can be used in puppies 10 weeks and older and kittens 12 weeks and older.

Imidacloprid (Advantage®) is also an adulticide applied monthly that binds nicotinic receptors and disrupts nerve transmission. This product kills all fleas within 24 hours but has no effects on eggs or larvae. It can be used in puppies 6 weeks and older and kittens 8 weeks and older.

Nitenpyram (Capstar®) is an oral tablet that kills adult fleas within several hours. It can be administered as frequently as once daily and to puppies and kittens as young as 4 weeks of age. Best used with longer-acting products.

Selamectin (Revolution®) is a monthly avermectin that affects chloride channels in fleas. This product kills adults and prevents eggs from hatching. It is also used to prevent heartworm infection, control ticks (*Dermacentor variabilis*), ear mites and *Sarcoptes scabiei*. In cats it may also treat hookworm and roundworm infections. This product can be administered in puppies and kittens 6 weeks and older.

Flea collars with insect growth inhibitors are also available (methoprene, nylar-permethrin). Some are adulticides but others only affect eggs and larvae.

It is also important to treat the environment. Insect growth inhibitors can be used to render eggs and larvae non-viable (e.g. methoprene, fenoxycarb). Environmental adulticides include permethrin, carbaryl, chlorpyrifos, diazinon and malathion. There are also newer treatments including borate used on carpet and Interrupt® (a nematode that kills flea larvae/pupae in grass and soil). The premises should be treated every month until there is no evidence of fleas then every 3 to 4 months. Steam cleaning and routine vacuuming can also assist in the decrease of the environmental burden.

C. Felis can transmit many zoonotic agents including cat scratch disease (*B. henselae*), murine typhus (*R. typhi*), flea-borne typhus (*R. felis*) and tapeworms (*D. caninum*). Ingestion of infected fleas by children can result in development of adult *D. caninum* (tapeworm).

Summary of parasiticides

Primarily Endoparasiticide

Drug Name	Ingredient(s)	Activity	Species	Other
Strongid-T	Pyrantel pamoate	A, H	D, C	5-10mg/kg
Panacur	Fenbendazole	A, H, W, T, G	D, C	50 mg/kg x 3 d
Droncit	Praziquantel	T, D	D, C	Not in < 4 wks
Drontal	Praziquantel Pyrantel pamoate	A, H, D, T	C	Not in < 4 wks or < 1.5 lb
Drontal Plus	Praziquantel, pyrantel Febantel	A, H, W, D, T	D	Not in < 3 wks or < 2 lb
Heartgard Plus	Ivermectin Pyrantel pamoate	A, H, HWM	D	HWM
Feline Heartgard	Ivermectin	H, HWM	C	HWM, not < 6 weeks
Sentinel	Milbemycin oxime Lufenuron	A, H, W	D	Fleas, HWM, not in < 4 weeks, not in < 2 lb
Ivomec	Ivermectin	S	D, C	200µg/kg, repeat in 2 weeks, not in collies
Tribrissen	TMZ	coccidia	D, C	15 mg/kg PO BID x 7 d

Primarily Ectoparasiticide

Revolution	Selamectin	A, H (cat)	D, C -dogs:>6 weeks -cats:>8 weeks	Fleas, HWM, Dermacentor, Otodectes (cat), Sarcoptes
Advantage II	Imidacloprid Pyriproxifen		D No cats	Fleas
Advantage Multi	Imidacloprid Moxidectin	A, H, W (dog)	D, C	Fleas, HWM, Otodectes (cat)
Advantix	Imidacloprid Permethrin Pyriproxifen		D> 7 weeks No cats	Fleas, ticks, biting lice, mosquitos

Small Animal Critical Care Rotation (VMC 797)

COURSE COORDINATORS: Dr. Thandeka Ngwenyama, DVM, DACVECC and Pia Martiny, DVM, DACVECC

COURSE GOAL: The overarching goals of this rotation are for fourth-year veterinary students to develop the knowledge, skills, and attitudes necessary to care for critically ill patients and become active members of the care team in the ICU setting. This rotation is a mixture of supervised clinical experiences, hands-on patient care experience, deliberate practice of procedural skills, topic rounds and case discussions. There may be opportunities for participation in a series of simulation exercises to enhance clinical learning.

Core Competencies:

1. **Patient care:** Performs a general physical examination while attending to patient comfort and safety; identifies common abnormal findings. Develops a thorough and prioritized differential diagnosis for common patient presentations. Develops and implements management plans for common conditions, recognizing acuity, and modifies based on the clinical course. Students must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.
2. **Medical knowledge:** Explains the scientific knowledge (e.g., physiology, anatomy, mechanism of disease) for normal function and common medical conditions. Explains the indications, contraindications, risks, and benefits of common therapies. Explains the rationale, risks, and benefits for common diagnostic testing. Interprets results of common diagnostic tests.
3. **Practice-based learning and improvement:** Students must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning.
4. **Interpersonal and communication skills:** Students must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with clients, their families, and health professionals.
5. **Professionalism:** Students must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles.

Learning Objectives:

1. The ability to perform routine technical procedures, including, at a minimum, venipuncture, inserting an intravenous (IV) catheter, placing a nasogastric tube, inserting a foley catheter, closing a wound, applying a bandage, and interpreting cardiac monitoring and electrocardiography.
2. The ability to interpret the results of commonly used diagnostic procedures.
3. The ability to recognize patients with immediately life-threatening cardiac, pulmonary, or neurological conditions, regardless of etiology, and the ability to institute appropriate initial therapy.

4. The ability to recognize and outline an initial course of management for patients with serious conditions requiring critical care.
5. The ability to communicate effectively, both orally and in writing, with owner, peers, nurses, house officers, faculty, and other members of the healthcare team with whom students must exchange information while carrying out their responsibilities.

ROTATION SCHEDULE:

The rotation will begin Tuesday at 12:00am (11:59pm on Monday) and end the following Sunday morning at 8:30am. Shifts will generally run from 12:00am to ~8:30am. At the beginning of each shift, the overnight intern will round on each patient. It is encouraged to ask questions and discuss case management at this time. You will then appropriately assign patients to each overnight ICU student and perform your own physical exam and assessment on each of your assigned patients. You will be responsible for providing morning rounds on your assigned patients. At the end of each overnight shift, the ECC faculty will typically spend time (approx. 30-60 min) in the mornings after ICU morning rounds to check in with you, answer any questions, and review cases. Please make sure you have reviewed the ICU orientation video and corresponding quiz before your first ICU overnight shift.

ICU SETTING:

An ICU is a well-defined area of a hospital where patients with acute life-threatening illnesses or injuries receive continuous specialized medical and nursing care. The monitoring equipment in the ICU includes continuous electrocardiogram (ECG), pulse oximetry, respiratory rate, temperature, capnography, and blood pressure (invasive and noninvasive). Support equipment includes emergency airway equipment (including laryngoscopes, endotracheal tubes, and ambu bags), oxygenation support, mechanical ventilator, equipment for hemodynamic support, point of care ultrasound, point of care testing and etc. ICUs should also have computer stations for access to laboratory data, radiologic imaging studies, active medications, and medical information.

Effective communication among staff is necessary for optimal patient outcomes. Multidisciplinary team rounds—which includes veterinary specialists, nurses, house officers, and students—provide a forum for all members of the medical team to come together to discuss patient care plans, to problem solve, and to coordinate goals of treatment. Multidisciplinary rounds have been shown to improve efficiency, outcome, and reduce the cost of care. Utilization of team-based communication-enhancement techniques, such as iPASS (Illness severity, Patient summary, Action list, Situational awareness and contingency planning, Synthesis by receiver) and SBAR (Situation, Background, Assessment, Recommendation) method, improves transitions of care (handoffs) between providers, while simulation training focuses on refining team communication skills in a dynamic learning environment.

Dress Code:

Students should wear clean scrubs, a white lab coat (in case of client interaction) and a name tag. The lab coat is protective clothing, and you can expect it to get soiled. Please have an extra clean lab coat and pair of scrubs available. Your shoes should be comfortable. Athletic shoes are acceptable if they are clean and in good condition. You may not wear jeans, open-toed shoes, or sports/beach attire at any time.

Personnel and Organization:

The hospital service rotation provides after-hours care for the small animal services. These services include cardiology, internal medicine, oncology, and surgery. These services, their students, interns, residents, and faculty have primary case responsibility.

Professional Conduct:

As representatives of the veterinary profession, it is important to maintain not only a professional appearance but demeanor as well. The student must consistently demonstrate appropriate behavior in all settings when in the veterinary teaching hospital and interacting with faculty, staff, fellow students, clients, and the general public. Inappropriate behavior should be reported to a technician house officer or faculty member immediately and may result in lowering of grade (including failure) and assignment of additional duties/shifts.

ICU Rounds:

Goals: (1) to communicate the patient's present status to the entire team (patient-centered) (2) to establish patient-specific treatment goals and anticipate patient outcomes based upon anticipated response to treatment and (3) to provide educational value to the veterinary team by eliciting team members' perspectives to share clinical pearls and pitfalls

Assessment:

Oral presentation is accurate, organized, and concise. Areas of continued deliberate practice:

organization of presentations, being more concise in presentations, focusing on the key patient specific elements of a presentation, including more pertinent positives and negatives, better highlighting the key active issues, communicating areas of uncertainty, and modifying presentation based on audience, amount of time, purpose, and specialty.

The oral case presentation serves as a surrogate assessment of your ability to perform an accurate history, physical examination, to analyze and synthesize relevant clinical data, and to formulate a well-thought-out treatment plan. From an educational standpoint, your case presentations allow the instructor to gauge your understanding of the case. The ability to present a case in a clear, concise, and organized fashion is a skill which requires deliberate practice. Regarding your presentation, your instructor generally has two fundamental goals. The first will be to focus on patient-related issues to better understand what is wrong with the patient. The second will be to ascertain your understanding of the case to focus his or her teaching points better. Your instructor will be asking you questions that are patient care centered and diagnosis driven. Educators will ask questions to further clarify specific aspects of the case such as onset, location, duration, quality, aggravating or alleviating factors, and the like. Your instructor may also ask you direct questions to better access your knowledge base. "What antibiotics

should we use to treat this patient?” “What is the differential diagnosis for fever or sinus tachycardia?” Alternatively, your teacher may inquire about your overall assessment of the case by asking you, “What do you think is wrong with the patient?” or “What diagnostic studies should we order?” Questions such as these are higher order questions and explore your clinical reasoning and problem-solving abilities. It is common for assessment-oriented case presentations to be used in the ICU setting and during transitions of care. These presentations have a different focus than standard or traditional case presentations. When using an assessment-oriented presentation style, the directed opening statement should include the patient signalment, diagnosis or diagnostic impression, trajectory of disease, followed by a treatment plan.

ICU Rounds (Who, What, When, Where, Why and How)

Who:

- Primary student and primary intern/resident/faculty, ICU team and other members of the healthcare team are welcome to attend
- *ICU overnight students to present in the morning
- *Primary student to present at 6pm

What:

Morning and Evening ICU rounds

When:

- Morning-7:30 am (weekdays), 8 am (weekends and holidays)
- Swing-6pm (weekdays)

Why:

Great ICU rounds presentations improve patient care by:

- Communicating the patient’s present status to the entire team (patient-centered)
- Providing the team with accurate information
- Improving the efficiency of rounds
- Establishing goals and plans for each patient
- Enhancing team communication and coordination

How:

- Focused or compressed presentation that may resemble an oral version of the SOAP

Subjective:

- Include a brief reminder of who the patient is (signalment, diagnosis/main problems, concurrent illnesses)
- Report the events since the last visit or last presentation, is usually limited to updates on new events.
- Describe how the patient is doing now.

Objective

- What are the patient’s numbers? Current vital signs

- Pertinent medications
- Pertinent physical examination
- Data (Laboratory, Radiology, Telemetry)

Assessment

- Refer to the patient's problem list.
- Discuss changes in the assessment of the primary problem.
- Review the progress over the last 24 hours or if an outpatient since the last visit or new patient
- Address any unexpected changes or complications in the patient's course

Plan

- Summarize outstanding test results or pending consults
- Describe next steps in management
- Anticipate problems
- Discuss discharge plans or recommendations for follow up

Tips for Great Presentations

- Engage your listeners.
 - Make the patient come alive.
- Speak crisply and clearly.
- Be sure you use medical language!
- Practice and review your presentations.
 - Make sure you do a run through with your resident or attending.
- Seek feedback.
 - Ask instructor for advice on how to improve for next time.
- Remember, you should be able to give an oral presentation in 3 minutes or less!
 - Except for the most complex cases,
- Don't be afraid to take and use notes!
- Use templates that help with organization.
- Create a system and stick with it.
- Develop and use your own tools for data collection.

PATIENT MANAGEMENT GOALS:

- Provide excellent patient-centered care and be attentive to the needs of patients.
- Readily accept responsibility for patients and provide timely attention to all aspects of the patient's needs: medical condition, hygiene, treatments, comfort, and mental well-being.
- Understands the principles of triage and assessing and monitoring critical patients. In the management of critical patients, is able to respond in emergency/crisis situations as part of a team to assess the patient, make diagnostic and treatment recommendations, and provide immediate care.
- Compassionate patient care is your first priority. Be proactive and available to help the ICU staff at all times and with any task. All patients admitted to the ICU and in

the wards should be placed in a clean, appropriately sized cage. Animals should be placed on grates or absorbent bedding as indicated. All patients should have an id neck band with the case number, name of patient (first and last) and date. A cage card should be completed and placed on the cage with a patient sticker, the name of the clinician, the student's name and the presenting complaint or diagnosis. There are laminated tags available to hang on the cages for special instructions. The animal's belongings and medications are placed in a designated, labeled box. All medications and supplies necessary for treatment must be in the ICU or wards and accessible to the student prior to the treatment time.

PROFESSIONAL DEVELOPMENT:

Professionalism

Goal: Demonstrates all aspects of professionalism in interactions with others. Areas of deliberate practice: compassion and respect for patients and clients, balancing personal and patient care needs, interactions with other members of the health care team, dependability in fulfilling responsibilities, timeliness, utilizing feedback to improve performance and recognizing one's own personal limits and when to seek assistance.

Interprofessional interactions

Goal: Interacts appropriately with different health professionals based on their role in the care of an individual patient. Areas of continued deliberate practice: contributing within one's role to optimize care and team functioning, understanding of the roles of health professionals, respecting, and appreciating team members, ask more clarifying questions when uncertain and listen more carefully.

This is a clinical rotation, so you should take every opportunity to learn from the cases that are in ICU. While working in the intensive care unit it is expected that students will devote their time to the care of animals in the small animal teaching hospital. Any additional time should be utilized to maintain the intensive care unit or for educational purposes related to veterinary medicine.

There is no food or drink permitted in the ICU or laboratory area at any time.

Take the opportunity to hone your clinical skills by conducting your own physical exam of each patient. It is recommended that at the beginning of each shift you make an assessment of all patients in the wards and ICU. Your initial assessment (hands-on or utilizing the patient record) might include an evaluation of mentation, mucous membranes, pulse quality, heart and lung sounds as well as activity level.

Review the patient's history, presenting complaint/problem, and diagnostic findings, then use this information to develop your own problem list, diagnostic plan, and therapeutic strategy. Familiarize yourself with the patient's condition so you understand what to monitor and why.

Look at the monitoring equipment and make sure you are familiar with its operation. If there are any specialized diagnostics or therapeutics (chest tube, abdominal lavage catheter, jugular catheter) the patient might have, make sure you are comfortable performing these diagnostics or therapeutics. Assessments in compromised or

aggressive animals may be minimal and if there is any concern, please contact the supervising house officer or faculty.

If there are few or no cases in the ICU, use this time to review or learn about Emergency or Critical Care Topics that you are interested in. Regardless of the type of practice you pursue, you inherently will deal with some type of emergency at some point in your career.

An essential part of your professional development is learning to be an active participant in the learning process. Be proactive and do not hesitate to bring up topics of interest for discussion. Also, do not always settle for “the way it has always been done”, but rather pursue the evidence behind why we do things the way we do. Feel free to ask any question; however, be prepared that, in response to your question that a question may be asked of you. This approach is designed to explore the scope of your knowledge and to help you, if possible, to find the answer within your own knowledge base. Whatever gaps in knowledge remain, we will do our best to fill in or at least provide you with the references needed to fill those gaps in. Don’t hesitate to let us know if you have different information on the subject. We try to provide you with the references for our statements, whenever we can, so that you can check it out for yourselves. Students sometimes think that a teacher will be offended if the student has more or better information than the teacher. This is not the case with this service, as none of us thinks we know everything. Instead, we appreciate that medicine is continually revolving and, therefore, we welcome novel and better information and experience. However, be prepared for us to ask you for references for your information just as we are ready to provide them for you.

HOSPITAL RECORDS:

All medical records of ICU patients are to remain in the ICU. Records for animals in the wards are in the wards. The ICU patients will have signed (by clinician), completed orders (including an emergency drug sheet and resuscitation orders) upon admission to the ICU and daily by 8 am.

Animals in the wards will have ward sheets that are also signed and completed. If they are incomplete then you can contact the student, intern, resident, or faculty member responsible for the case. Please review all orders prior to your shift to make sure you understand them and obtain clarification if necessary. ICU students will be responsible for recording treatments and observations on orders sheets as well as procedures and supplies on the ICU charge sheet. Any additional paperwork (lab work, radiology reports, etc.) may be maintained in the appropriate section of the medical record. The ICU student is not responsible for maintaining SOAP’s in the patient’s medical record.

FACILITY:

A clean, quiet, well-organized hospital is crucial to adequately care for our patients. Every effort should be made to maintain a clean organized hospital. Noise and traffic should be kept to a minimum. Only individuals with a case in the ICU (students, faculty, and staff) or students and staff working in the ICU should be present in the ICU. Food or drink should remain in designated areas. Basically, no food or drink should be placed and/or consumed where animals or laboratory specimens are housed. This includes ICU and the laboratory area.

It is important to remember that animals carry diseases contagious to man, man may harbor disease that can put animals at risk and animals may have diseases that pose a risk to other animals. The easiest way to think of how you should maintain hygiene is to think of the animal and his cage as a single environment not to be contaminated by or contaminate the area outside the cage. What goes in should be clean and what comes out should not contaminate the environment. You will wash your hands after EVERY patient contact. You will wear clean gloves with every patient upon entering a cage and remove the gloves upon exiting before closing the cage door so as to not contaminate the environment. When a patient is out in the ICU and contaminates the environment (e.g. use tabletop for treatment, urinates/defecates in the ICU) the environment should be disinfected adequately to maintain cleanliness and minimize contamination. If you are accessing communal areas (medication drawers, bandage material, scrub containers, etc.) make sure you are not carrying contaminants with you (dirty gloves, unwashed hands, dirty scissors, etc.).

COMMUNICATION WITH CLIENTS AND VETERINARIANS:

During the rotation you will likely need to contact the student, intern, resident, or faculty member on a case. The ICU orders will have contact numbers in the list of order they should be contacted. The individuals listed should respond promptly (within 10 minutes). If they fail to respond, please contact the next individual listed. There are certain questions that can be answered by students (clarification of orders, location of equipment or supplies needed for treatments, etc.) but others should be addressed by interns, residents, or faculty. If there is any change in the status of a patient then the intern, resident or faculty should be contacted.

Client and referring veterinarian communications will be handled by the service in charge of the case. Students on the emergency medicine rotation should not advise owners of specific changes in patients or comment on the treatment of animals to the owner. Instead, students should contact the supervising clinician. A faculty member, resident or intern may occasionally ask you to contact an owner or veterinarian and the emergency medicine student may do so if comfortable.

Any questions the ICU student may not be able to answer, or should not discuss with the owner, should instead be answered by the supervising clinician. Students should contact the faculty member, resident, or intern before communicating with the owner or referring veterinarian.

When calling a clinician call the number left on the orders first. Leave messages if there is no answer. There is a list of phone numbers posted in the ICU with alternate means of contact (cell phone, pager, etc). If a clinician has not returned your call in 10 minutes and you need assistance, please call the intern on duty. The schedule for interns is posted outside ICU in the corridor between ICU and radiology.

If you are contacting an owner please identify yourself as follows, “Hello, this is (name) from Oregon State University’s College of Veterinary Medicine, I am calling regarding.....” Please record all communications with owners and veterinarians in the electronic medical record.

Patient Visitation:

Owners may wish to visit with their animals during their hospitalization. Visits should be scheduled by faculty, residents or interns and a member of that service must be present. Visits are not the responsibility of ICU personnel. Visits should take place out of the ICU if possible. Visitation within the ICU should take place only with animals in which movement from the ICU would be detrimental to their condition. If the visit is in ICU, it must be approved by ICU personnel and should be limited to 15 minutes. Visitation hours are M – F from 10 am to 6 pm and Saturday and Sunday from 10 am to 8 pm. Please remember that patient and client information is confidential so other cases should not be discussed with clients.

Student Assessment:

Students will receive a Pass or Fail, based on the following criteria:

Attendance
Knowledge Base
Clinical Performance and patient care
Communication
Professionalism
Teamwork
Rounds presentation
Participation
Assignment completion
Other

Because this is a one-week rotation midterm evaluations are not possible. Students should not expect a midterm evaluation and if they are performing poorly, they may fail (<70%) the rotation and not be notified until after the rotation is completed. It is very important that you are mindful of the rotation requirements and assessment methods. Historically, students that have failed the rotation (<70%) have done so because of poor attitude, poor work ethic and concerns over patient care/decision-making.

Attendance:

Student participation is vital to the success of any program. Students are encouraged to actively investigate the cases they are caring for. These cases provide the opportunity to learn about a variety of disease processes as well as their diagnosis and treatment.

Attendance is vital.

Current College policy states that students are **not able to miss more than 20% of their rotation (1 day for VMC 797)**. If they do, then they will be asked to make up any additional time or repeat the rotation. All absences must be excused. Please see the attendance policy to review excused absences. Any unexcused absence may result in a loss of points, an incomplete or both. Students are not able to sell or switch shifts. If a student is more than 15 minutes late for a shift, they may have to repeat a shift. If a student is going to be late or miss a shift, they must contact the ICU (737-4825).

Students are also required to complete their after-hours duties. Any after-hours duties missed, excused or unexcused, must be made up prior to receiving their diploma. Missed shifts may be made up during the same rotation or subsequent rotations at the discretion of the scheduling technician. If a student is going to be late or miss an after-hours shift, they must contact the ICU (737-4825) and speak either to a technician on ICU duty or the intern on duty. If a student arrives for their shift intoxicated or is deemed by the technician or intern on duty to be incapable of completing their shift for whatever reason, they will be sent home and the shift will be repeated at a future date.

Small Animal Critical Care Assignment:**ECC Journal article appraisal:**

Choose a case during the week and find a journal article based on treatment for an assigned case.

Present and discuss with Overnight Intern about how the journal article relates to the

case of your choice and if you agree or disagreed and/or would use this form of treatment if you were in charge of this case. In addition, if you find an ECC topic that is unique or clinically relevant this may also be presented and discussed. Include a maximum of 2 page pdf to be emailed to Dr.

Ngwenyama or Dr. Martiny (ECC faculty on clinics) by the following Monday at 8 am:
Format:

1. Clinical vignette/case synopsis
2. What was the basic scientific question that the study sought to answer?
3. If there was a comparison, how were the comparison groups defined?
4. What were the main findings
5. Will this change your practice? How?

Suspense: An electronic copy needs to be sent to the ECC faculty on clinics prior to 8 AM on Monday after completing the rotation.

Grading: This document will be graded by the course coordinator, house officers, and ICU nurses based on timely completion inclusion and detail of those things stated above.

Recommended References:

Advanced Monitoring and Procedures for Small Animal Emergency and Critical Care
Burkett Creedon JM, Davis H (eds)

Textbook of Small Animal Emergency Medicine
Drobatz KJ, Hopper K, Rozanski E, Silverstein DC (eds)

Veterinary Emergency and Critical Care Procedures
Hackett TB, Mazzaferro EM

Manual of Small Animal Emergency and Critical Care Medicine
Macintire DK, Drobatz DJ, Haskins SC, et al

Monitoring and Intervention for the Critically Ill Small Animal (The Rule of 20)
Kirby R, Linklater A

Veterinary Emergency and Critical Care Manual
Mathews KA

Small Animal Critical Care Medicine
Silverstein D, Hopper K (eds)

VMC 793 – Small Animal Surgery

<u>Faculty</u>	<u>Office #</u>
Dr. Brea Sandness*	737-6841
Dr. Jennifer Warnock	737-6859

* = *course coordinator*

- I. Introduction
- II. General information
- III. Expected learning outcomes
- IV. Grading
- V. Appendix
 - a. Suggestions on writing SOAPs
 - b. Suggestions on case presentations
 - c. Technician orientation handout (provided on first day of rotation)

I. INTRODUCTION

The course is a 4- or 2-week rotation in small animal surgery in the Veterinary Teaching Hospital. Emphasis will be placed on history taking, physical examination, diagnostic techniques, and therapeutics utilized in the management of small animals presented for surgical diseases. One of the faculty surgeons listed above will be in charge for each week of the rotation. The surgeon in charge may change during the course of the rotation. Surgery house officers, technicians and interns are assigned to the service and can also serve as an asset when you have questions with day-to-day procedures. This is intended to be a guideline but please be aware that individual faculty surgeons may request some variation to this guide.

II. GENERAL INFORMATION

Students are expected to be familiar with and adhere to policies described in the “Student Manual: Year 4 Instructional Program” available from the Dean’s office. The following sections from the above referenced manual are particularly applicable:

- CVM Student Policies
- Lois Bates Acheson Veterinary Teaching Hospital Overview
- Small Animal Services Guidelines and Procedures
- Small Animal Infection Control
- Intensive Care Unit
- Small Animal After-Hours Duty

III. EXPECTED LEARNING OUTCOMES

1. Students will be able to explain the general approach to surgery cases, including history taking, physical examination, diagnostic tests and their interpretations, the different therapeutic approaches including non-surgical options, the different surgical options and the prognosis.
2. Students will combine their knowledge of other medical disciplines with that of

- surgery.
3. Students will demonstrate appropriate clinical reasoning in diagnostic workups and a working knowledge of essential surgical principles.
 4. Client communication is a crucial aspect of clinical veterinary practice and students are expected to take charge in that respect. Most problems arise from a lack of communications or miscommunication with the clients. Most client problems are avoidable by adequate communication. You cannot “over-communicate”.

Note: many surgical procedures that are performed on the small animal surgery rotation in the Veterinary Teaching Hospital are beyond the training level of the senior veterinary student. The faculty surgeons do not expect the students to be able to perform the surgical procedures and at the same time the senior veterinary students should not expect to be performing the procedures. The decision as to what can be performed by a student remains at the discretion of the faculty surgeon in charge of the rotation. Instead of concentrating on the technical details of a particular surgery, the students are expected to learn the indications for the particular surgery, the postoperative care, and the prognosis. As well students are expected to learn general concepts in tissue handling, hemostasis, and anatomy for the surgical procedure.

IV. GRADING

Grading will be consistent with the description in the “CVM Student Policies” section of the “Student Manual: Year 4 Instructional Program” available from the Dean’s office. Students will be evaluated by their proficiency in handling surgical cases, by their performance at clinic rounds and by their participation in case discussions. Reading assignments, presentations, and quizzes may also form the basis for part of the grade.

VI. APPENDIX

SUGGESTIONS ON WRITING SOAPS

Subjective

- TPR
- Eating, drinking, eliminations, changes to treatments
- Current medications (include doses and frequency)

Objective

- Pertinent Physical examination findings (don’t just copy and paste!! Make sure to note the changes, incision status)
- Diagnostics since last SOAP (bloodwork, ultrasound, cytology, etc)

Assessment

- Each problem for the patient should have its own number
- The first problem should be the surgery
- Co-morbidities should always be listed as problems
- New problems since last SOAP should be listed as well

Plan

- Each problem should have its own plan
 - List the medications for each problem (i.e. a pre-existing cardiac condition with medications should have those medications listed under the plan for the heart condition)
- Plans should include as much as you know, including the discharge plan

Example:

S:

No interest in food, drinking some water

No V/D/R, normal urination, no defecation

No arrhythmias noted on

Current medications: LRS at 140ml/hr (2x maintenance), fentanyl CRI at 3mcg/kg/hr, famotidine 0.5mg/kg IV q12, monitoring for V/D/R, ECG for

O:

Gen: wt: 28.7kg QAR, T 101.4F, P 135bpm, R 30bpm, MM pink, CRT <2sec

EENT: clear OU, mild ceruminous discharge AU, no nasal discharge, moderate dental

tartar Integ: ventral abdominal incision is clean dry and intact, hair coat is clean with

mild amount of scale on caudal dorsum, multiple small (<2cm) soft mobile

subcutaneous masses along ventral and right lateral chest

PLN: no peripheral lymphadenopathy

CV: no murmurs or arrhythmias, adequate synchronous, pulses, soft and quiet

bronchovesicular sounds in all fields

Abd: slightly tense but non-painful on palpation, no obvious organomegaly or masses

palpable, rectal examination unremarkable

GU: unable to palpate kidneys, bladder is small, male castrated MS: ambulatory x4,

mildly stiff gait in pelvic limbs

NS: alert and appropriate, full neurologic examination not performed

PCV/TP: 32%, 4.6g/dl

Chemistry panel: hyperlactatemia 4.5mg/dl, mildly elevated ALP 168U/L, BUN 27mg/dl,

Creat 1.1mg/dl

BP: Doppler 180mmHg

A:

A1: 1d PO splenectomy for splenic mass – r/o malignant vs. benign neoplasia A2: azotemia – resolved

A3: hyperlactatemia – r/o hypoperfusion A4: mild hypertension – r/o pain vs. other

A5: inappetance – r/o ileus vs. nausea

P:

P1: continue IVF, fentanyl CRI at 3mcg/kg/hr (see below), famotidine 0.5mg/kg IV q12 and monitoring of ECG/V/D/R. Continue hospitalization for another 24 hours and

consider discharge. If continuing to do well, possible discharge tomorrow morning/afternoon

P3: continue IVF at 2x maintenance and re-evaluate lactate tomorrow

P4: administer fentanyl bolus (2mcg/kg) and recheck BP. If still elevated, continue to monitor BP q8. If continuing to be hypertensive, consider urinalysis for proteinuria and other diagnostics for cause of hypertension

P5: administer maropitant for possible nausea, may want to consider transitioning to oral pain medications if hypertension not pain related, consider other GI protectants (omeprazole), offer more tempting foods

SUGGESTIONS ON CASE PRESENTATIONS

New patient:

New patients get the traditional history, physical, and diagnostics with assessment and plan. Give the chief complaint and a brief and pertinent history of present illness (i.e. onset, duration, progression, response to treatment). Next give important past medical and surgical history as well as travel, medications, and allergy information. The physical exam is reviewed. Only give pertinent positives and negatives. The assessment and plan should include what you think is wrong and, briefly, why. Then, state what you plan to do for the patient, including labs. Be sure to know why things are being done: you will be asked.

Follow-up or hospitalized patient:

The follow-up presentation differs from the presentation of a new patient. It is an abridged presentation, perhaps referencing major patient issues that have been previously presented, but focusing on new information about these issues and/or what has changed. Give the patient's name, age, date of admission, briefly review the present illness, physical examination and admitting diagnosis. Then report any new finding, laboratory tests, diagnostic procedures and changes in medications.

General format of a case presentation:

- Signalment: species, age, sex, breed
- Problem or Chief Complaint
- History (onset, duration, progression) One sentence. Items that are unrelated to the present problem should only be briefly mentioned. For ongoing care, present other historical items only if there are new complaints.
- Physical examination findings
 - Co-morbidities: Highlight the pertinent positives and negatives that are germane to the diagnosis and/or plan being suggested. For ongoing care, mention only further positive findings and relevant negative findings
- Diagnostics
 - Bloodwork, imaging, consults, etc.
- Surgery
 - Surgical findings, samples collected
- Assessment and Plan:
 - Describe the main problem list from most important to least. Provide assessment/diagnosis for all of the problems or assess and give differentials for each individual problem if they can't all be accounted.
 - Provide a specific plan for the patient including additional diagnostics and

therapeutics. Be prepared to justify your plan based on current evidence.

- Post-operative plan
- Fluids (rate/hr)
- Medications (with doses and frequency): group by analgesics, antibiotics, other medication categories
- Treatments: monitoring, food/water/TPR/walks
 - Discharge plan
- Medications (with doses and frequency) grouped by category
- Activity restriction
- Monitoring: incision care, specific CS
- Follow up

A Few Practical Tips:

1. Try to be thorough without being long-winded or too detail oriented. Knowing what constitutes the "right amount" of relevant information will obviously take some practice and experience.
2. Include only the most essential facts; but be ready to answer any questions about all aspects of your patient.
3. Beware of jumping back and forth between descriptions of separate problems.
4. Use the presentation to build your case.
5. Your reasoning process should help the listener consider a differential diagnosis.
6. Ask for feedback from your listeners. This will allow you to correct errors and improve subsequent presentations.

Further Reading: <http://meded.ucsd.edu/clinicalmed/oral.htm>

TECHNICIAN ORIENTATION HANDOUT

The orientation handout will be provided and reviewed with you during the first day of the rotation with the service technicians. It provides valuable information about the logistical aspects and “nuts and bolts” of daily responsibilities for the rotation.

VMC 719 (Core rotation) and VMC 711 (Elective rotation) Clinical Cardiology Guidelines and Procedures

Course coordinator: Dr. Kate Scollan

Course instructors: Dr. Kate Scollan, Dr. Helio De Moraes

Welcome to the cardiology service:

During the next 2 weeks, please focus your attention on acquiring the skills needed to evaluate the cardiovascular system in domestic animals, particularly in those animals that are suspect for cardiovascular disease, as well as focusing on the treatment of common cardiovascular disorders.

The tools required for this rotation include a sound knowledge base, a functioning stethoscope, your cardiology notes, as well as ready access to the literature. You will get the most from this rotation if you review your class notes or a reference textbook prior to your first day on the rotation.

Top ten goals of the cardiology rotation:

By the end of this clinical rotation you should:

1. Be proficient at conducting a thorough cardiovascular physical examination with improved confidence about auscultation ability.
2. Be able to interpret ECGs in dogs and cats.
3. Be able to recognize common arrhythmias including AV block, sinus arrest, premature atrial and ventricular depolarizations, escape beats, atrial fibrillation, and ventricular tachycardia.
4. Be able to treat the most common arrhythmias in companion animals.
5. Be able to interpret non-invasive blood pressure measurements in dogs and cats, and treat systemic hypertension in dogs and cats.
6. Be able to recognize normal anatomic structures on thoracic radiographs, as well as recognize left and right heart enlargement patterns on thoracic radiographs.
7. Be able to recognize the radiographic hallmarks of cardiogenic pulmonary edema on thoracic radiographs.
8. Be familiar with the common echocardiographic modalities - two-dimensional and color flow imaging.
9. Be able to recognize the most common congenital heart defects in companion animals and know how they are treated.
10. Be able to recognize the most common acquired heart diseases of companion animals and know how they are treated.

Service personnel and organization:

The cardiology service operates as a team comprised of 2-4 senior veterinary students, the cardiology house officers (Dr. Charlotte Donnan, 2nd year resident; Dr. Yoegan Chen,

cardiology intern), the cardiology technicians (Robyn Panico, Amy Berry, and Allison Marvin), and a board-certified cardiologist (Dr. Kate Scollan; Dr. Helio De Morais) and possible visiting cardiologists. Questions about routine procedures are best directed to the cardiology technicians. Questions about a particular case should be directed to the clinician with primary case responsibility, i.e. the resident or faculty clinician. Questions about the rotation, grading, problems, schedule changes, and special requests should be directed to Dr. Scollan.

Rotation orientation and arrival information:

The rotation orientation will take place from 9:00-10:00 AM in the Cardiology Room of the SA Hospital. Please arrive a few minutes early to begin orientation at 9am. You will receive an email on the Friday before the rotation begins with welcome information.

DRESS CODE:

Please bring your white coat everyday, including the first day of the rotation. You are required to wear your white coat when interacting with clients in person. Clean, professional scrubs or business casual attire is required. Jeans, hats, or unprofessional attire are not acceptable for interacting with clients.

Rotation schedule and hospital receiving:

The cardiology service receives cases every Monday, Tuesday, and Wednesday. Thursdays are reserved for interventional procedures and afternoon student rounds. Fridays are reserved for urgent/emergent cases, research cases, student rounds, and occasionally additional procedures. There will be an orientation (9:00 – 9:45 AM) on the first Monday of the rotation, followed by in-coming case rounds from 10:00-10:15. Receiving on that day will begin at 10:15.

Morning in-coming case rounds: Case rounds to discuss in-coming cases will occur on all receiving days at 9:00am (except the orientation Monday). In these rounds you will present the cases you will be receiving that day to the group with a complete history and review of any records and images sent by the referring veterinarian. Be prepared to discuss the potential differentials based off the signalment and history and have a tentative diagnostic plan for your patient.

Canvas:

You will receive an invite to the rotation Canvas site named “OSU Cardiology VMC 719”. The invite is usually sent the Friday before the rotation starts, but sometimes occurs on the first day of the rotation. On Canvas you will find the video review of ECG interpretation, a digital copy of the ECG packet, a digital copy of the physical exam notes chapter, and helpful publications and book chapters.

Quizzes:

You will have a quiz on the physical examination and physiology concepts within the first few days of the rotation (usually the Wednesday morning of the week 1). You will have a quiz on ECG interpretation in later portion of week 2 after completion of the ECG practice packet.

On-call schedule:

A student is scheduled to be on call for cardio for each day of the 14-day rotation. This schedule will be made on your first day in conjunction with your rotation-mates and will need approval from the faculty clinician if changes are made. The schedule will be posted on the outside of ICU and will need phone numbers posted. When on call you will have to be reachable and within ~20-minute drive of the VTH. Failure to respond to a call during on call responsibility can result on failing the rotation.

Students on elective weeks (VMC 711) do not participate on the Cardiology on-call schedule.

Medical history taking:

Prior to receiving a case, we expect you will have prepared yourself for the case by reviewing the details for existing patients in VetHosp (as well as the communication log) and for new patients, by reviewing incoming referral information which is often located in VetHosp or the cardiology email (login details are provided to students). We expect you to read about all cases the service is seeing, not just your primary case. Please be proactive and ensure referring records are received prior to the appointment for new patients if possible.

For the medical history, please indicate the primary complaint as described by the owner to the best of your ability, as well as secondary problems mentioned by the owner and duration of problems.

List all medications the owner has administered to the pet, the dose of these medications, the duration of treatment (starting date and ending date), and the response to treatment – beneficial or otherwise. Please ask the owner if they gave any medications on the day of presentation and at what time. Please also ask if they need a refill of their medications to avoid end-of-day refill requests. Lastly please try to define what the objective(s) of the owner is (are) – expectation of a cure, confirmation of a prior diagnosis, concern for other pets in the household, etc.

Physical examination:

You should conduct a careful and thorough cardiovascular examination on each patient. This should include examination of the jugular veins, palpation and characterization of the femoral artery pulses (dogs and cats), and auscultation of the heart and lungs.

Consider what cardiac conditions cause systemic (jugular) venous distension (elevated central venous pressure)? What cardiovascular conditions result in bounding arterial pulses, weak pulses, pulse deficits, and pulses paradoxus? What cardiac events are best heard in each traditional cardiac auscultation location? What transient heart sounds are normal for the dog, cat, and horse? What physiologic events cause S₁ and S₂? What physiologic events cause S₃ and S₄ heart sounds? What are the common causes of a systolic murmur heard on the right side of the thorax? What are the possible causes of a systolic murmur heard best on the left side of the chest? What are the distinguishing features of an innocent murmur? What type of murmur is found in a dog with a left to right shunting patent ductus arteriosus? In what species are you most likely to hear a diastolic heart murmur?

Consultation with the clinician:

After you have obtained a history and performed a physical examination, compose a succinct problem list from the history and your physical examination with relevant differential diagnoses and your initial clinical plan. Be prepared to summarize the history and your physical examination findings to your clinician. The history, physical examination, and summary portion of the appointment should take less than 20 minutes ideally.

Once you and the clinician have solidified a treatment plan, the cardiology technicians will print an estimate and provide detailed consent forms. You and the primary clinician will return to the exam room or call the owner on the phone, the plan will be discussed with the owners and relevant signatures or verbal consent obtained. Please do not administer treatment or perform additional testing until you have reviewed and received approval for any procedures or treatments from the clinician in charge of the case.

All admitted patients must also be weighed and the weight must be recorded in the record, along with the scale that was used. All admitted patients must have a hospital ID collar in place and completed cage card. Please place patients in an appropriately sized kennel with bedding and water unless specified otherwise.

Out-patients:

Our goal is to be thorough and efficient while maintaining a positive learning environment. In an effort to stay organized, we place all of our patients on the dry erase board. After admission to the hospital, the procedures that have been outlined should be placed under the patient's name and the agreed upon discharge time should be noted. As the procedures are performed a check mark can readily identify what tests have been completed.

We generally perform ECGs, blood pressures, and echocardiograms within the cardiology suite. All procedures (blood draws, catheter placement, medication administration) must be supervised by a clinician or technician. Some diagnostics may be performed by the clinicians and technicians in your absence, but will be subsequently reviewed with you. It is our primary goal to create doctor- level competency regarding interpretation of diagnostic testing, not necessarily gain proficiency in technical procedures. We often provide you the opportunity to perform these technical skills and generally allow 2 attempts before a technician or clinician steps in ("2 strikes rule"). This may not be the case for unstable or fractious patients.

In-patients:

We frequently have in-patients on the cardiology service so you should plan to be available throughout the entire rotation, including weekends, unless the faculty member has approved prior arrangements. In addition to the responsibilities listed for out-patients it is your responsibility to:

- 1) Have your SOAP and treatment sheets completed by 8:00 a.m.
 - a. If an animal is to have surgery performed, please ensure that:
 - i. The anesthesia request is completed and updated. If a procedure needs to be done the same day the patient is admitted, please contact an anesthesia technician or clinician.
 - ii. NPO treatment orders are in place for the evening prior.

- iii. The ICU nurses have been rounded comprehensively and understand monitoring parameters, especially for arrhythmias.
 - iv. Please personally hand the intra-operative antibiotics to anesthetist the morning of the procedure. The first dose needs to be drawn up in syringe and labeled.
 - v. Clients have been contacted a minimum of twice daily with updates. Please record a summary of all conversations in VetHosp.
 - 1. To use the phone, often a long-distance code is required. First dial 9, then 1, then area code and number you are trying to call. You will then hear a series of beeps, and then dial 3895000.
 - vi. After discharge, please ensure the cage/kennel is left clean.
- 2) To facilitate treatment of in-patients, treatment times should be uniform when possible, according to the following schedule:
- Twice daily: 7 am, 7 pm
 - Three times daily: 7 am, 3pm, 11pm
 - Four times daily: 7 am, 1 pm, 7pm, 1 am

Medical paperwork:

The problem list (blue form) is completed by the primary clinician on the case. The pink (Hospitalization Orders) form is currently not used in cardiology. Please complete and sign the blue physical examination form, as well as the purple cardiology-specific history form. Discharge instructions should be completed by the admitting student and ready for review by the attending clinician 30 minutes prior to the scheduled discharge time. Templates for common disease processes, drugs, and the physical examination can be found on the desktop of each student computer in the cardiology suite. Please ensure that all necessary medications have been retrieved from the pharmacy by the scheduled discharge time. For the discharge appointment, the client should be taken into a room without the animal unless directed otherwise to allow for better focus and information transfer. We often have students conduct the discharge appointment although in some instances the primary clinician may conduct the discharge. In all cases, the clients must speak to the primary clinician prior to leaving the hospital.

Communication with the client and referring veterinarian:

Please ensure you know how to contact the owner prior to the owner leaving the hospital. The primary clinician on the case will perform the majority of the written and verbal communication with the referring veterinarian.

Grading for the rotation and student expectations:

Our goal is to be transparent about the grading process for our rotation. Your grade for the cardiology rotation is weighted based on the following components:

- 1) Knowledge base (20%)
- 2) Clinical skills (30%)
- 3) Proficiency in procedures (15%)

- 4) Professionalism (15%)
- 5) Communication (15%)
- 6) Animal welfare (5%)

Knowledge base includes understanding disease pathophysiology, treatment options, individual effort seeking out information and awareness of recent developments in the field. Clinical skills include data prioritization, diagnostic planning, and interpretation of lab data/radiographs/ECG. Proficiency in procedures includes phlebotomy skills and other technical tasks. Professionalism and conduct include work ethic, reliability during business hours and after hours, reaction to feedback. Communication includes collegiality and interactions with classmates, staff, and faculty. We do not grade based on your performance the first day of the rotation, rather we evaluate performance throughout the 2-week rotation. Both quantity and quality of effort are both factored into grading.

Please show initiative by being actively involved in all cases the cardiology team sees. This involves performing a cardiovascular exam on all patients (exception: fractious animals) to practice your physical examination skills. Please write histories or import discharge templates in advance whenever possible to optimize your time for experiential learning during business hours. Generally, students on the cardiology service have a decent amount of free time before and after receiving, so we expect you to use this time towards learning.

Students who meet basic expectations as outlined above receive feedback such as this:
You have a solid working foundational knowledge base. Please keep reading to solidify your knowledge base and spend time on rotations seeking out information relevant to your cases. You did a good job prioritizing case information and improved over the 2 weeks in your interpretation of diagnostics. You displayed strong verbal and written communications with clients. You were reliable during business hours and after-hours, and accepted feedback well.

Students who exceed our expectations receive feedback such as this:
You displayed an above average knowledge base in cardiology, and willingness to research new information without being prompted. You did an excellent job prioritizing case information and improved over the rotation in your interpretation of diagnostics. Your written discharges were excellent, requiring minimal corrections/edits on our behalf. You showed great teamwork with your classmates and strong verbal communication skills with owners.

Students who fall below our expectations receive feedback such as this:
You displayed a weak knowledge base in cardiology including disease pathophysiology, recent developments, and therapeutic medications. It was also found to be difficult for you to identify physical exam abnormalities and prioritize data to formulate an appropriate treatment plan effectively. Also newly learned concepts could not reliably be applied to clinical cases. Your medical records were not always complete or accurate. You struggled with appropriate interpretation of diagnostic tests.

Here is an example of a typical schedule for the 2-week rotation:

	Week 1	Week 2
Monday	9-9:45 Orientation 10-10:15 Case rounds 10:15-5:00 Receiving, case work up, discharges Evening- Watch ECG review video on Canvas	9-9:30 In-coming Case Rounds 9:30-5:00 Receiving, case work up, discharges
Tuesday	9-9:30 In-coming Case Rounds 9:30-5:00 Receiving, case work up, discharges Evening- Review physical exam/physiology notes	9-9:30 In-coming Case Rounds 9:30-5:00 Receiving, case work up, discharges
Wednesday	8:00-8:45 physical exam Quiz 9-9:30 In-coming Case Rounds 9:30-5:00 Receiving, case work up, discharges Evening- Work on ECGs #2-5	9-9:30 In-coming Case Rounds 9:30-5:00 Receiving, case work up, discharges
Thursday	7:30 Possible procedure in-take 8-9 Senior Papers/Resident Rounds 9:30-12:00 Procedure 2-4pm Student Rounds (ECG packet #2-5)	7:30 Possible procedure in-take 8-9 Senior Papers/Resident Rounds 9:30-12:00 Procedure 2-4pm Student Rounds (ECGs or worksheets)
Friday	Possible procedure or Receiving	Possible procedure or Receiving ECG Quiz
Saturday	On call shift /Possible discharge	On call shift /Possible discharge
Sunday	On Call shift Complete ECG packet for week 2	On Call shift

VMC 753

Clinical Oncology

Course Coordinator: Dr. Haley Leeper

Course Instructors: Drs. Haley Leeper and Katie Curran

The Clinical Oncology Service is devoted exclusively to the diagnosis and treatment of pets with cancer. The goal of the Clinical Oncology Service is to teach students a realistic approach to the diagnosis and treatment of pets with cancer. We are a very busy service, which allows students the opportunity to be involved with a wide variety of cases. Our most important goal, however, is for you to experience the practical diagnosis and treatment of a cancer patient.

Faculty

Dr. Katie Curran

Dr. Haley Leeper

Technicians

Shannon Litchfield, CVT

Mackenzie Rybalko, CVT

Residents

Dr. Kelly Hicks (3rd year)

Dr. Kayla Neiderfer (2nd year)

Dr. Kellie Snider (1st year)

Veterinary Assistant

Khira Hathaway

Learning Objectives

1. To diagnose, differentiate, and review the biological behavior of spontaneous neoplasms in dogs and cats
2. To develop skills in clinical medicine, palpation (especially liver, spleen, and lymph nodes), interpretation of laboratory data, and the management of geriatric patients
3. To become acquainted with chemotherapy, immunotherapy, radiation therapy, and surgical aspects of cancer management
4. To become familiar with chemotherapeutic agents, immunotherapies, and tyrosine kinase inhibitors and their side-effects
5. To learn how to diagnose, workup, and stage a small animal oncology patient
6. To become acquainted with cytology
7. To develop skills in fine needle aspirations
8. To become skilled in the use of the problem oriented medical record
9. To become familiar with the workings of clinical trials of new anticancer therapies

Evaluation of Student Performance

The general criteria for student performance assessment includes:

- Preparedness, initiative, and time management
- Critical thinking
- Patient care and client communication
- Daily case presentation
- Knowledge of veterinary medicine (diseases, diagnostics, treatments, etc.)
- Teamwork and collegiality

Attendance

Students are to be in the SA clinic by 7:30 am for orientation (first morning of the rotation) and 8:00 am for all other days. If you are unfamiliar with the hospital and do not know where oncology is located, please go to the small animal reception, and ask for them to contact oncology. Any absences need to be approved by the senior clinician on clinics. If you have an ICU afterhours shift or other commitment, please inform the oncology staff the morning of, so we can make sure you arrive to your shift on time. It is also recommended that you write your name and shift on the white board in the rounds room.

Orientation Quiz

Prior to your rotation you will be emailed a complete orientation packet from the service technicians. Please review this packet and complete the orientation quiz on the Canvas website prior to your first day of your rotation. The orientation quiz accounts for 10% of your OVERALL grade.

Rounds Room/Treatment Room

Oncology has three dedicated spaces for this rotation. The oncology treatment and rounds room are connected, and the chemotherapy administration room is next door. Based on new pharmacy regulations, students are not able to hold patients or be present for chemotherapy treatments. However, you are welcome to watch the oncology technicians deliver chemotherapy through the window (between rounds room and chemotherapy admin room). As a reminder no animals are allowed in the oncology rounds room and no food or drink are allowed in the oncology treatment room.

Receiving Appointments

We receive new and recheck appointments Monday-Thursday. Friday will be treated like a weekend, with emergency visits only. Any week that has a Monday holiday, the four-day receiving schedule will be shifted Tuesday-Friday. Fridays should be reserved for completing online and/or in-person assignments/rounds related to this rotation (self-guided studying assignments, Emperor of all Maladies docuseries, VICE rounds, cytology rounds, etc.). Students assigned to be SPA service will work with that service on Friday.

We recommend reviewing the next day's appointment schedule each afternoon, sign up for a case in VetHosp, and familiarize yourself with the incoming patient complaints. You are expected to review the patient's record before the animal arrives for its appointment.

To help transition to the role of doctor, we expect you to adequately plan for cases.

- Prepare for your case by reading up on the patient's history, understand the patient's comorbidities, and general disease process through review of textbooks or primary literature (class notes at a minimum). Please be sure to look through the communication notes, laboratory, diagnostic imaging tabs, medical records-referring etc. as these can provide additional sources of patient information. Sometimes, rDVM records, bloodwork, and radiographs are added the night or day of the appointment. If you don't see any records when reviewing the cases, don't assume that nothing has been performed. You may call "Oncology Service Specialist" on Vocera to request additional medical records.
- For new cases, be prepared to discuss the diagnostics you would like to perform and your reasons behind why you want to do those tests.
- Ask owners about their pet's medications EVERY SINGLE TIME. It is not appropriate to assume that owners are following the instructions written on the last discharge summary. For every medication, please confirm the following:
 - Drug, dose (mg/kg), route, frequency, when they started/stopped a medication.

For new appointments:

- Ensure you have a clean exam room before going up to receive the client. (Oncology has two assigned consult rooms)
- Review estimate and consent forms with owner, make sure they sign the forms, and confirm their contact information.
- Perform a complete history and physical exam.
 - Please be concise when taking histories from owners. We expect that you will be in and out of the room in ~20 minutes and ready to talk to your doctor.
 - Bring patient back to the oncology treatment room so your house officer can complete a physical exam before consulting with the client.
- Develop a diagnostic/treatment plan to review with the clinician

For recheck appointments:

- These cases may or may not need an exam room
 - Check with technician and/or clinicians ahead of time to determine the best use of the exam rooms
 - Most recheck examinations are drop-off appointments where an exam room is not needed
- Formulate a plan for the appointment based on the previous discharge summary

- Check the communication log as changes to the plan may be noted there
- The referring veterinarian may have done blood work for the current appointment. Ask the owner if this was performed. Also check the communication log and ask the technicians if any blood work has arrived for your patient.
- All patients need a signed authorization form and estimate for each appointment
- All recheck appointments will have a patient flow sheet (green sheet) that needs to be filled out according to the plan for that visit
- Perform a complete history and physical exam
- Develop a diagnostic/treatment plan to review with the clinician
- Consult with technician to formulate an estimate (these are generally made the day prior, however updates based on a changing plan may be needed)

Tips for learning about on-going cases:

- Read the most recent discharge report
- Look over the initial VTH history & physical exam and discharge from that visit
- Review pertinent radiographs, CT scans, etc.
- Check the Master Problem List

Chemotherapy Appointments

Chemotherapy appointments are considered drop-off appointments. The drop-off times are generally between 8:00am-10:00am, however some exceptions apply. For these visits it is recommended you review the chemotherapy/recheck drop off sheet with the client in the lobby prior to bringing the dog back to the treatment room. **All chemotherapy patients will have a patient flow sheet (green sheet) that needs to be filled out according to the plan for that visit. In addition, all patients will need to have a complete physical exam (including TPR, weight in kg) and a CBC +/- chemistry submitted as soon as possible.**

You should attempt to calculate the chemotherapy doses on scratch paper. These calculations are not part of the medical record. Please review how and why chemotherapy agents are dosed on body surface areas (i.e. M²), based on lean body weight. Compare your dose to that calculated by the oncology clinicians. A CBC must be deemed acceptable for chemotherapy by the clinician prior to drawing up and administering the drug.

*Charts for every patient (seen by oncology that day) are to be kept in the oncology treatment room until the patient has received all treatment, at which time it can be relocated to the rounds room.

Client Discharge Summaries

Client discharge letters are generated and modified through a different way than any other small animal rotation. A step-by-step guide has will be provided during orientation.

Oncology Procedures

- Aspirates and/or biopsies
- Venipuncture: only draw blood from the jugular vein unless the clinician instructs you otherwise. The peripheral veins are used for chemotherapy catheter placement.
- Urine collection: In most cases, urine can be collected by free catch methods.
- Radiation therapy: Certain tumors will be treated by radiation, either as a single treatment modality or as adjuvant therapy in conjunction with surgery and/or chemotherapy. Radiation therapy, both palliative intent and curative intent, are not currently available at Oregon State University. The closest facilities are VCA NW in Clackamas OR, UC Davis Veterinary Teaching Hospital, Washington State University Veterinary Teaching Hospital, and Colorado State University Veterinary Teaching Hospital.

Client Communications

At times, students will be responsible for client communications. You will generally be asked to communicate with your clients daily. This includes follow up on blood tests so please remember to track down results, interpret, and discuss with the clinician prior to calling your client with the information. All communications must be documented under “visit case communication.” If at any time medications, dosages, or dietary plans are changed by your clinician or house officer you must document all information. If you do not feel comfortable communicating with a client, please let your attending clinician know. Students are allowed to obtain authorization over the phone for certain diagnostic tests and procedures. Clinicians (faculty, residents and interns) should obtain authorization to do anything requiring sedation, anesthesia, anything posing a significant risk to the patient, and euthanasia.

Before Leaving Hospital

Before you leave the hospital for the day, please review the following check list:

- Check on any patient you may have hospitalized either in wards or ICU
- Make sure all Instinct treatment sheets are completely filled out and approved by a clinician
- Round with the ICU technician
- Check with your fellow students and offer any help with other patients
- Clean up after yourself and your patients (including kennels)

Rounds

Patient rounds will occur daily at 3:30pm, unless otherwise stated. You are obligated to attend senior papers on Thursdays from 8:00am-9:00am. Cytology rounds are scheduled every Friday from 8:00 am- 9:00am. Attendance is highly recommended as slides from patients seen that week on oncology are often reviewed.

Introductory rounds will be the first Monday of your rotation from 3:30-4:30pm. During these rounds we will review assignment and clinical expectations for the rotation in addition to meeting everyone on the team.

Topic rounds occur daily (Tuesday-Thursday) at 3:30pm for the first week only. Students on the rotation will choose a topic of their choice the night before so everyone is able to review the information and come prepared to participate. Topics can include: chemotherapy, disease reviews (lymphoma, osteosarcoma, etc.), or any topic related to veterinary oncology.

Case presentation rounds occur daily (Monday through Thursday second week) at 3:30pm. During these rounds, a review of why the patient is here, what diagnostics were performed, and the plan moving forward will be discussed. Each student will present on 1-2 of the cases they were assigned to that day. The cases not assigned to students will be presented by the residents if time permits. Students are encouraged to ask questions and participate in discussion regarding the clinical cases. The length of these rounds will vary depending on the number and complexity of the caseload on any given day. However, in general, we try to limit case rounds to ≤ 1 hour to be cognizant of everyone's time. Case rounds can be a challenge as it requires you to organize your thoughts and prioritize what is relevant and what is not. However, this is an imperative skill that we want to help you develop because you will be consulting with fellow colleagues within your hospital or calling specialists for consultations. As part of this, you will be expected to present the case in a succinct, logical manner. The format for case presentation is as follows:

1. Signalment: Always begin with full signalment
2. Presenting complaint: a brief sentence on why we are seeing the patient today
3. History: summarize relevant history only. Use medical terminology (do not repeat as the owner told you).
4. Physical exam: in the afternoon case rounds, please present only pertinent information (only state findings relevant to the case - we don't need the TPR or bloodwork abnormalities that you do not feel are clinically relevant).
5. Diagnostic findings: summarize relevant findings
6. Plan: Be thinking about your plans for this case – when do you want to restage this patient and when do you want to see them next?

**New case presentation should be done within 3 minutes, rechecks should be done in 1-2 minutes.

Housekeeping rounds occur daily at 9am in the oncology treatment room. This is for the clinicians and technicians only. The purpose of these rounds is to review the plan for each patient, so all team members are kept up to date. Since we use medications that carry a significant risk if errors occur, it is important that both the clinicians prescribing the medications and the technicians administering them are all on the same page. These rounds also serve as an opportunity for house officer learning, as they are presenting their proposed plan to the senior clinician. If you are present in the treatment room when these rounds start you may be asked to step outside as treatment/diagnostic plans are discussed. This is not meant to exclude you, but to provide you the opportunity to think about your own diagnostic/therapeutic plan for your patients.

Oncology Clinical Rotation Self-Guided Study Assignments

Throughout your rotation, you will be asked to complete 5 guided studying assignments on various topics. These assignments can be accessed through Canvas and are required to be completed by the end of your rotation. These are meant to be open-book and/or open-note as the questions are at the knowledge level of a first-year oncology resident. Therefore, the exercise is more in where you will find the information and how you evaluate the credibility of that source. These are great assignments to complete on your Fridays. If you have any questions regarding these, please contact the house officer or senior clinician on clinics during your rotation.

The textbook, Small Animal Clinical Oncology, is a great resource to utilize.

- **Chemotherapy:** to familiarize yourself with common chemotherapy agents and their uses in veterinary medicine
- **Cancer Biology and Paraneoplastic Syndromes:** review cell cycle, cell replication, hallmarks of cancer and paraneoplastic syndromes that can occur with cancer.
- **Advanced Diagnostics in Veterinary Oncology:** to become acquainted with several diagnostics used in the veterinary oncology field
- **Oncology Case Based Medicine:** Four individual cases to test your clinical knowledge and thought process
- **Disease and Treatment:** diagnostics, median survival times and treatment options for many oncological diseases

The Emperor of All Maladies Docuseries- Not required, optional learning

The Emperor of All Maladies: A Biography of Cancer, by Siddhartha Mukherjee, won the Pulitzer Prize in 2011. It is an excellent book and well worth your time. However, it is 600_ pages, and there is also an excellent docuseries produced by PBS that covers similar content. As part of the clinical oncology rotation, you may watch the 3-part series, via the OSU Library website (directions to obtain access are listed on Canvas). Please watch the 3-part series and reflect on the two question prompts.

VICE Video Rounds- Not required, optional learning

VICE stands for Veterinary Isolated Clinical Education. These videos were created by veterinary specialists at universities across the country. The individual links we have provided include case-based medicine and problem-based learning approaches to a variety of topics associated with small animal clinical oncology. You will need to copy each URL and past them into your web browser to access the content. Each video is accompanied by a worksheet to help guide you through the video.

Oncology Rotation Evaluations

A Qualtrics survey will be emailed to you the second Thursday of your rotation to evaluate the house officers and oncology rotation in general. This survey *is NOT mandatory, and completely voluntary*. The hope is to generate more feedback to provide the house officers as well as gauge how the rotation is viewed from your perspective. We are very open to hearing what worked and what didn't, and if you have any suggestions for improvement. This feedback allows us to always work toward improving the rotation for future students. When the results are shared with other stakeholders (i.e. house officers), no names or other identifying features will be attached to comments.

Helpful Learning Aides

A variety of videos and other helpful learning aides are under the Files tab on the Canvas site. Please look through these and ask if you have any questions related to their content.

Suggested References

- Course notes from 3rd year oncology lectures and 2nd year oncology pharmacology
- Pathology notes on neoplasia
- Textbooks (available in oncology rounds room; please do NOT remove from this area)
 - Clinical Veterinary Oncology: S.J. Withrow and E.G. MacEwen (Vail) (5th and 6th editions)
 - Textbook of Veterinary Internal Medicine: S.J. Ettinger
 - Kirk's Current Veterinary Therapy: J. Bonagura
 - Nelson and Couto's Internal Medicine Textbook
 - Managing the Clinical Veterinary Patient. A Practice Manual. G. Ogilvie and A. Moore
- Journals (many to choose from), check out Pubmed!

**Oregon State University:
Acheson Teaching Hospital Pharmacy or VTH Pharmacy**

General Information:

Location:

147 Magruder Hall
Corvallis, OR 97331

Phone contact:

Main phone: (541) 737-6863

Fax:

(541) 737-9487

Business Hours:

Monday through Friday: 8 AM – 6 PM

Saturday: 9 AM – 12 PM

Sunday: Closed

[Supply Room: Monday through Friday: 8 AM – 5PM (closed 12 PM – 1 PM)]

After Hours Contact (emergencies only):

(541) 207-5721

Services Offered:

The Acheson Teaching Hospital Pharmacy at OSU CVM offers a variety of services for our patients and referring veterinarians. Our pharmacy department is licensed as a dual retail and institutional pharmacy which allows prescription orders to be used on an inpatient and outpatient basis, making medications accessible to meet all of our patients' therapeutic needs. Both commercial products and a limited number of compounded formulas are available.

The VTH Pharmacy staff consists of three licensed pharmacists, two full-time certified pharmacy technicians, one full-time supply room technician, pharmacy technician student-workers, and pharmacy interns. The VTH Pharmacy is a managed entity of the College of Pharmacy with a working relationship to the College of Veterinary Medicine.

The Pharmacy fulfills the pharmaceutical needs of the VTH, specifically, for the Small Animal Hospital, Large Animal Hospital, and the core services.

The VTH Pharmacy abides by regulations set forth by the Oregon Board of Pharmacy (OBOP), Drug Enforcement Agency, Veterinary Medical Examining Board, and any applicable State or Federal laws.

Staff:

Brian T. Bowers, PharmD, Director of Pharmacy

Lauralei Fisher-Cronkrite, PharmD, Assistant Director of Pharmacy, PIC

Julie Haynes, PharmD, staff pharmacist

Jeffrey Holland, certified pharmacy technician

Audrey Sturner, certified pharmacy technician

Alyssa Tucker, supply room technician

Subject: VTH Pharmacy Prescription Writing

Applicable To: Pharmacy and prescribers within VTH

Purpose/Principle:

To formalize protocol and procedure for in-house prescription writing

Policy/Procedures:

1. Only prescribers (veterinary clinicians) in the Department of Clinical Sciences that have prescription authority, given by the VTH Director, can prescribe pharmaceuticals for VTH patient cases
2. Appropriate scope of practice is required for prescription writing with valid Veterinarian Patient Client Relationship (VCPR)
3. Pharmaceuticals and supply inventory items will be written on separate forms for filling and dispensing
 - a. White forms = “Rx only”
 - b. Blue forms = “Supply only”
4. Prescriptions for medications will require the following information:
 - a. Patient and client information including:
 - i. First and last name of owner (full name required)
 - ii. Name of animal
 - iii. Species of animal
 - iv. Case number assigned by hospital
 - v. Owner’s physical address if dispensing a controlled substance
 - vi. It is preferred to use patient stickers, however, it is acceptable to write all information manually
 - b. Drug information including:
 - i. Name of the drug
 - ii. Strength or concentration of the drug
 - iii. Drug formulation
 - iv. Complete instructions for drug use (sig), including route of administration and dosing
 1. Example: 1 tab po bid
 - v. Quantity prescribed
 - vi. Refills authorized (when necessary)
 - vii. When applicable, prohibition of substitution of a brand name drug
 1. “No substitution”
 2. “N.S.”
 3. “Brand medically necessary”
 4. “Brand necessary”
 5. “D.A.W. (Dispense As Written)”
 6. Words of similar meaning
 - viii. For food animals: withdrawal times

- c. Authorized prescriber signature
 - d. Name of student/technician writing the order
 - e. Weight of the animal
 - f. Date prescription is written
 - g. CII orders must be written on separate prescriptions, as required by Federal and State Law
 - h. CIII-CV orders can be written separately or on the same prescription with non-controlled drugs
5. Supply orders will require, at minimum, case number, animal name, and owner last name
- a. A clinician or a veterinary technician signature is required for dispensing to ensure charges are appropriate.

Oversight / Follow Through:

The Director of Pharmacy shall be responsible for the implementation and oversight of this policy.

Subject: Pharmacy Order Writing and Submissions Policy

Applicable To: All VTH Personnel with Order Writing Authority.

Purpose/Principle: To provide structure and familiarity to the pharmaceutical and medical supply ordering process and to potentially reduce unnecessary order errors and dispensing time in a continuing effort to maximize patient care.

General:

When submitting an order, place the order request in the slotted file organizer on the counter (by the pharmacy window) if there are no questions. Orders should be filed by time of submission (earliest submissions in front). Please get the attention of one of the Pharmacy staff for assistance if there are questions. It is the expected that prescriptions are reviewed for accuracy by the veterinarian, student, or technician prior to submission.

On average, it 10-15 minutes for a prescription to be filled. This is only an estimate and is highly dependent on the complexity of the prescription as well as the number of prescriptions received from all areas of the hospital at a given time. If you have an emergency (e.g. animal crashing or need immediate euthanasia), obtain medication from the Cubex® machines or crash kits if possible. If this is not an option, notify a pharmacy staff member that you have an emergency situation. Emergency situations will take priority over all other prescriptions. The next level of priority is given to inpatients and then to outpatient prescriptions. An owner is waiting is not a valid reason for a prescription to take priority over others, but requests will be completed in a timely manner.

Helpful Notes:

1. Please realize that Pharmacy staff is working on orders throughout the day.
2. Please be respectful and minimize all unnecessary disturbances when submitting orders.
3. The VTH works on a closed formulary system. All available medications are listed in VetHosp as a guideline for all order submissions.
4. All orders that are for procedures scheduled for the following day should be submitted by 5:00 PM if possible (i.e. surgery orders). All discharge orders are to be submitted no later than 5:00 PM. This will leave the last hour of the day for last minute urgent orders and gives the Pharmacy staff an opportunity to prepare for the next day's service.
5. The pharmacy staff is always happy to answer questions and provide clarification.

Policy/Procedure:

1. Hospital medication orders submitted to the Pharmacy will be submitted on an approved white VTH Rx order form, electronically through VetHosp. Supply orders will be submitted on a blue VTH Supply order form or electronically through VetHosp.
2. **Please refer to "SOP Prescription Writing" for all requirements**
3. Indicate if the patient is an inpatient or an outpatient to notify Pharmacy personnel of the destination of drugs to be dispensed. Outpatient medications will be dispensed in child-resistant packaging, when possible, to be in compliance with the Poison Prevention Act. If the medication will not fit in child-resistant packaging, the dispensing container will be labeled with a sticker that says "Not child proof – Keep out of children's reach."
4. Print all names legibly
5. Forms, strengths, and quantities of drugs may be found in the pharmacy electronic formulary (VetHosp formulary)
6. Liquids should be submitted in mL. Solids should be submitted in tablets, capsules, or grams, whichever is appropriate for the drug
7. If the product is an injectable, it is preferred that the dose be written in mL. For example, "acepromazine 10 mg/mL, dispense 0.65 mL." is preferred over "acepromazine 10 mg/ml, dispense 6.5 mg."
 - a. If the requested volume is less than 1 mL, the dose should be rounded to the nearest hundredth to improve measurement accuracy. Only the 1 mL syringes have the ability to correctly measure to the hundredths place (see Other Comments section).
 - b. The number of doses should be clearly indicated if a vial is not dispensed (e.g. four doses of 0.3 mL).
8. If the order is written for a controlled substance (CS) the following will apply:
 - a. All inpatient orders for CS must include complete directions for use. All small animal (SA) inpatient CII CS orders are limited to a 24 hour supply for injectable medication is based upon the stated frequency of dosing interval in the directions for use. Oral CII inpatient CS order are limited to a 72 hour supply. All SA inpatient CIII-V orders are limited

to a 72 hour supply (i.e. tramadol tablets). If the CS request is for a CRI, the rate of infusion is required and it is the clinician's responsibility to order a quantity that will be used within 24 hours. All large animal (LA) CS orders intended for multiple dosing require complete directions for use and should be limited to a 24-hour supply whenever possible.

- i. Orange "VTH Pharmacy" tape will be used to seal CS outpatient orders to prevent use in the hospital.
 - b. It is preferred that outpatient orders for CS are written separately from inpatient orders for efficient workflow.
 - c. A maximum of a 1 month supply of CS (CII-CV) may be sent home. These orders will be double counted by the person filling the prescription and counted one more time by the pharmacist. The quantity should be circled on the prescription label.
 - d. All CII controlled substances must be written on a separate prescription from all other medications.
 - e. Controlled substances in schedule III through V can be written on a prescription with non-controlled substances.
9. Directions for use.
- a. All orders intended for inpatient and outpatient dispensing must include complete directions for use.
 - b. It is recommended that only recognized abbreviations be used. Full written descriptions are always preferred over abbreviations.

Examples of the resulting format of steps above:

For oral forms:

ranitidine 150 mg tablets dispense #2 tablets Give 1/2 tablet (75 mg) by mouth every 12 hours for (condition).	or	ranitidine 150 mg tablets total 4 doses Give 1/2 tablet (75 mg) by mouth every 12 hours for (condition).
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For injectable products:

acepromazine 10 mg/mL injection
dispense 4 syringes of 0.1 mL
Give 0.1 mL IV every 4 to 6 hours if
needed for sedation.

10. If any corrections or changes are required to the prescription hard copy please follow this procedure:
- a. Mark out the item to be changed with a single line through the error
 - b. Make the necessary change in close proximity to the error.
 - c. All corrections or changes must be initialed by the person making the change.

- d. Certain changes will require the authorization of the practitioner.
- e. Changes must be reviewed by the pharmacist on duty.

NOTE: If a clinician or veterinary technicians fills the order themselves (e.g., after hours) the space provided on the form that says "filled by" must also be initialed.

- 11. When leaving an order at the Pharmacy the following procedures are required:
 - a. Make sure that the billing account for the case, internal client or research account, is **active** and billable before leaving the order at the Pharmacy. **This is a required item for order processing.**
 - b. Waiting for an Rx or order dispense is permitted but it is preferred that someone come back to pick it up when it is ready.
 - c. Prescriptions/orders are prioritized in the following sequence
 - i. Emergencies e.g., butorphanol to sedate an animal that is causing danger to itself or persons
 - 1. If medication cannot be retrieved from the Cubex® or crash kits, the person submitting the order should alert the pharmacy staff of the situation.
 - ii. Inpatient hospital orders
 - iii. Outpatient orders
 - iv. Ward stock orders.
 - v. Research and teaching orders.
 - d. Orders must be submitted to the Pharmacy as they are completed for each patient.
 - e. Except for an urgent situation as previously described, **the latest time for order submission to the Pharmacy is 5:45pm.** Any order submitted to the Pharmacy after 5:45 will be filled the next day.
 - f. All large orders for research or student teaching must be submitted to the pharmacy **two weeks in advance of start date.** Small fill-in orders for research or student teaching may be submitted for same day retrieval. These small orders will be filled in the sequence of priority provided above.
 - g. Medications intended for ward-stock that are on a preprinted ward-stock order form require clinician or technician approval. If the requested medication is not a controlled substance then a technician may review and approve the order. If the medication being requested is a controlled substance then the order must be reviewed and signed by a VTH clinician. Students are not allowed to submit a request for ward-stock unless for fluids or supply items.

Retrieving an Order from the Pharmacy:

When picking up an order from the Pharmacy, follow these steps:

- 1. When retrieving an order from the Pharmacy, the student, technician, or clinician will verify that they are receiving the correct items.
- 2. The person picking up the order will sign (legibly) on the "verified by" line of the hard copy or provide a fingerprint.

3. The prescription/order is retained and filed by the pharmacy.
4. Items that require mailing to clients will be retrieved, as per items 1 and 2 above, and then taken by the recipient to Shipping & Receiving for further processing (see “Mailing Prescriptions SOP”).
5. All hospital orders that are intended to be used after hours must be picked up before closing time (6 PM).
6. Items for research and teaching should only be picked up during normal operating hours.

Other Comments:

1. It is preferred that all prescription orders submitted to the VTH pharmacy are submitted during business hours Monday through Friday when full pharmacy staff is available. Saturday morning pharmacy hours are intended to provide medication for hospitalized patients and new admissions. The pharmacy is not fully staffed on Saturdays.
2. All diluents required for reconstitution (unless provided by the product manufacturer) require a written order.
3. To avoid errors, abbreviating drug names is discouraged.
4. Only commonly recognized abbreviations should be used. When in doubt, write out the full word.
5. Please consider dosing accuracy when ordering injectables and round up or down as appropriate. Please do not request dispensing of injectables that cannot be accurately measured:
 - 0.5 mL syringe – marked in 0.01 mL increments (e.g., 0.01, 0.02, 0.03, etc.).
 - 1 mL syringe – marked in 0.01 mL increments (e.g., 0.25, 0.26, 0.27, etc.).
 - 3 mL syringe – marked in 0.1 mL increments (e.g., 0.1, 0.2, 0.3, etc.).
 - 6 mL syringe – marked in 0.2 mL increments (e.g., 0.2, 0.4, 0.6, etc.).
 - 12 mL syringe – marked in 0.2 mL increments (e.g., 0.2, 0.4, 0.6, etc.).
 - 20 mL syringe – marked in 1 mL increments.
 - 35 mL syringe – marked in 1 mL increments.
 - 60 mL syringe – marked in 1 mL increments.
6. When writing a prescription for an outside pharmacy, DO NOT use SID as an abbreviation. Most pharmacists are not aware of this abbreviation and it can be easily misinterpreted.

Oversight / Follow Through:

The Director of Pharmacy, in cooperation with VTH Hospital Director, shall be responsible for the implementation and oversight of this policy.

Subject: VTH and Pharmacy Use of Cubex® Machines

Applicable To: VTH Clinical Science Clinicians and Staff; VTH Pharmacy Staff

Purpose/Principle: To provide procedure and protocol for Cubex® use within the

Veterinary Teaching Hospital (VTH)

Policy/Procedure:

1. Communication Chain:
 - a. Problems should be discussed with a work leader of service chief first. The work leader or Service chief will communicate issues to the VTH Pharmacist
 1. The pharmacist will inform work leaders, service chiefs, and hospital administrators of issues with Cubex® as those issues arise.
2. The Cubex® machines are for **inpatient hospital use (i.e. unit-dose use only)**
 - a. Outpatient use is not permitted per Oregon Board of Pharmacy (OBOP) and Drug Enforcement Administration (DEA)
 1. Cubex® machines cannot hold outpatient inventory quantities
 2. Clinicians should plan for prescribing and dispensing needs over weekends and holidays (i.e. on Friday or Saturday business hours with VTH Pharmacy)
 - b. Outpatient medications will be dispensed by the VTH Pharmacy during normal business hours only per OBOP and DEA requirements
 1. Outpatient prescriptions submitted outside of business hours will be filled the next business day
 2. Outpatient prescriptions should be called into a retail pharmacy, if possible, when the VTH pharmacy is closed.
 3. In the rare event that a patient is discharged after pharmacy business hours and the medication is not available from a retail pharmacy, **non-controlled** medication may be dispensed in a quantity sufficient to last until the pharmacy is open (i.e. 1-day supply of trilostane or pergolide)
 1. In order to maintain enough inventory for all inpatients, no extra doses may be dispensed
 2. The VTH pharmacy will supply the remaining outpatient regimen during normal business hours
 4. **Controlled substances must be dispensed from the VTH pharmacy for all outpatient use.** CIII-CV medications may be called in by a prescriber with a personal DEA number.
 5. All Cubex® activity will be reviewed by VTH pharmacy for appropriate use
3. Cubex® Hours of Operation
 - a. Cubex machines are primarily intended for **after-hours and weekend use**
 - b. Guidelines for permitted use during normal pharmacy operating hours
 1. Specific medications will be available for use during all hours; see “Urgent Access Drugs,” “Emergency Access Drugs,” and “Oncology Treatment Drugs” on inventory lists
 1. Product List:

- a. SA: hydromorphone, dexmedetomidine, atipamezole, butorphanol, buprenorphine, etc.
 - b. LA: butorphanol, detomidine, etc.
 - c. SA Oncology: cytotoxic (liquid/injectables only) drugs
 - i. Reduces unnecessary handling/exposure to harmful agents
 - 2. If is preferred that inpatient controlled substances are dispensed from Cubex®. However, they may be obtained from VTH Pharmacy
 - 3. SA/LA Crash carts (not part of Cubex®): Emergency CPR drugs
 - 2. The anesthesia department will continue to have access to certain medications under current department and ward stock procedures (separate Cubex® machine for the anesthesia department is being considered). *Pending; current operations continue until further notice
4. Individuals with Access
 - a. All practicing clinicians within the VTH will have access to Cubex® inventory
 - b. All VTH licensed veterinary technicians will have access to Cubex® inventory
 - c. Students will not have access to inventory
 - d. Access will be done by bio-ID (fingerprint) and/or manual ID login and pin password
 - e. All individuals with access to the Cubex® will be trained by a VTH pharmacist
5. Record-Keeping
 - a. All users that access controlled substances are required to write a prescription and have it signed by prescribing clinician (required by Federal law)
 - 1. Signed prescriptions will be left for pharmacy in a designated location adjacent to the Cubex®
 - b. Cubex® generates a report of all users taking inventory from machines
 - 1. This report will be printed by pharmacy staff to meet record-keeping requirements for non-controlled substances
6. Waste/Disposals
 - a. Controlled substances must be returned to the VTH Pharmacy or disposed of in a Cactus Sink® unit
 - 1. Discarded medication is not credited to the client
 - 2. Medication for discard may not be used for another case
 - 1. Example: A 1 mL vial of buprenorphine is opened and 0.15 mL is given to a cat. The remainder of the vial must be used on the same patient or must be discarded

3. Use of controlled substances is monitored closely by pharmacy personnel. All records should be accurate and match dispensed or discarded quantities
 1. Discrepancies will reviewed by hospital directors
 4. See Return/Waste SOP for all pharmaceutical items
7. Pharmacy procedures for restocking and monitoring
- a. Each business morning, a report of medication taken from Cubex® the previous night/weekend will be printed
 - b. Pharmacy personnel will restock and monitor Cubex® use (especially controlled substances) each business day
 - c. Signed Cubex® controlled substance prescriptions will be brought to the Pharmacy each business day and reconciled with the controlled substances taken from the Cubex®.
 - d. The VTH Pharmacist will monitor use of medications and adjust quantities and available items accordingly
 1. VTH Pharmacy Committee will be actively involved in adjusting Cubex® inventory.
 - e. Pharmacy personnel will maintain a binder with expiration dates of Cubex® inventory
 1. Any inventory within one month of expiring will be brought back to pharmacy and replaced with longer-dated inventory
 - f. Discrepancy reports will be generated by the pharmacy the quantity in Cubex® does not the physical inventory
 1. An email should be sent to VTH Pharmacist/pharmacy personnel as soon as a discrepancy occurs
 1. If the source of the discrepancy cannot be located and fixed immediately, an email will be sent to hospital administrators and potential responsible parties
 - a. Trends in discrepancies will be noted
 - b. Penalties may ensue if a discrepancy cannot be corrected (see Penalties for Misuse)
8. Penalties for misuse of Cubex®
- a. Misuse of the Cubex® will be reported to the Hospital Director(s)
 - b. Penalties will be determined by the Hospital Directors, and may include loss of access, fees, or other consequences as deemed appropriate
 1. Director of Pharmacy reserves right to impose fees
9. Medication for emergencies
- a. The pharmacy cannot dispense medications without a proper prescription and patient information
 1. Medications are available through Cubex® as soon as a case has been admitted through VetHosp
 1. Emergency medications may be obtained either through Cubex® (see pharmaceutical options mentioned above), crash carts, or emergency kits

- a. If there is not enough time or no case number is assigned to a patient, an “Emergency Patient” is available through Cubex®. An email will notify the VTH pharmacy of the medication taken, the quantity of medication, and the person who accessed the Cubex®. The pharmacy will follow up with the doctor or technician assigned to the case so that charges can be assigned appropriately
2. After normal operating hours, a case number may be generated within VetHOSP. This will allow access to Cubex®
3. If necessary, rush orders can still be obtained from pharmacy with a proper prescription
 - a. This will allow for complete pharmacy prescription filling and compliance with OBOP

10. Inventory Lists of SA, LA, SA Oncology, and Anesthesia departments

- a. See VetHosp formulary

Oversight/Follow Through:

The Director of Pharmacy services, in cooperation with VTH Hospital Director, shall be responsible for the implementation and oversight of this policy.

Electronic Rx Submission/Refill Program

- Definition/Purpose: The VetHosp 2.0 Electronic Prescription Submission/Refill program is intended for Rx orders submitted to the VTH pharmacy. Prescriptions for VTH patients are submitted (electronically signed/ reviewed and approved) by VTH clinical faculty and house officers (prescribers). These prescriptions can be prepared by VTH clinical staff and students for prescriber review.
- FAQs:
 - General use:
 - **Who can approve (electronically sign) a prescription item for a patient?** A: Only VTH prescribers (clinical house officers and faculty) with valid VCPR can approve/sign Rx items for a patient; 4th year students and clinical staff (CVTs) of the VTH can prepare electronic orders, which are submitted to the VTH prescribers for approval.
 - **Am I required to use the electronic Rx order submission instead of the current written Rx paper submission system to the VTH pharmacy?** A: No, participation in the electronic Rx order program

is *optional*, especially during the initial launch. The intention is to transition the majority of prescriptions to the new electronic Rx program due to increased efficiency for both the pharmacy and the hospital. However, you may continue to submit paper prescriptions if you prefer.

- **Can electronic Rx ward stock be approved in VetHosp as well?** A: Yes, the program already exists. (NOTE: controlled substance ward stock orders for anesthesia/RVP must continue to follow manual Rx white copy submission)
- **Are any policies or requirements different with the new electronic Rx submission?** A: All Oregon Board of Pharmacy (OBOP), Drug Enforcement Administration (DEA), and current policies apply (see attached policy for prescription requirements, order submission and examples). There are slight differences in the new application with respect to refills and outpatient Schedule II orders. Schedule II orders like hydrocodone-homatropine tablets/syrup and codeine tablets MUST continue to be handwritten on a paper prescription due to DEA regulations.
- **What does the question ‘Is this an eScript or for an outside pharmacy?’ mean?** A: The Oregon Veterinary Medical Examining Board (OVMEB) requests that we have in place an option for Rx hardcopy prints to be provided to a public pharmacy of client’s choice. Therefore, the “Outside pharmacy” button will allow you to create a prescription to give to the client if they wish to fill medications with a public pharmacy rather than the VTH pharmacy. The ‘eScript’ button allows you to submit an Rx order to the VTH pharmacy for filling.
- **What are the step-by-step functions to help me navigate throughout the electronic Rx program? (later attached)**
- **Can I check the status of an Rx I submit to the VTH pharmacy?** A: Yes, the electronic Rx program offers the ability to see at step of the process a specific Rx is at. This includes if an order has been created, submitted, is in the process of filling, is in the process of being checked by the pharmacist, is ready-for-pickup, or has been picked up (specific person and date/time will now be identified).
- **What are important reminders about prescription items?** A: Prescriptions are finalized and approved drug orders with valid VCPR and are official documents. Review all prescription orders before signing to alleviate problems of returns, errors, and missing required information for accuracy and efficiency measures.

- **Can I submit Rx returns in the electronic system?** A: No, if you must return Rx items, they must be returned accompanied by a white Rx hardcopy with a signature. The Rx product must be returned within 7 days per policy and must be in reusable condition.
- **Can I view the Rx item cost before I submit an Rx electronic order to the VTH pharmacy?** A: Yes, you have multiple areas to view the cost for a patient; the new electronic Rx order submission automatically provides the cost of the drug after you input a drug quantity.
- **Does a patient case need to be active before I can start using the new electronic Rx order submission program?** A: Yes. The case needs to be activated and once you start preparing Rx orders under a particular case, it will remain open while in the eScript queue.
- **Do the Rx 'wait-times' change if I use the new electronic Rx order submission program?** A: No, the VTH pharmacy will continue to provide prescription dispensing in 10 - 15 minutes on average as the standard (highly dependent upon level of hospital Rx order requests/prioritization and efficiency of Rx prescribing).
- **What are personal identification requirements in VetHosp, with respect to my position in the VTH?** A: There are requirements that must identify any hospital student or personnel member beyond normal user and password to VetHosp authentication. This is both required legally and for custody of drug purposes, where we will require a fingerprint read (just like Cubex®) and an electronic signature stamp with user right limitations appropriate to your position.

Outpatient Refills:

- **Can clients directly contact the VTH pharmacy for prescription refills?** A: No. The VTH support staff (i.e. reception) and veterinary technicians must be contacted by the client to initiate a refill request to the VTH pharmacy. This will allow for appropriate case activations, billing, and Rx pick-up by the VTH service. This system also aligns with compliance with the Oregon Board of Pharmacy and consultation(s). Additionally, clients are not permitted to pick-up their own Rx orders at the VTH pharmacy due to the location of the pharmacy in a secure area.
- **Can clients call to request an Rx transfer to a public pharmacy?** A: No. The VetHosp system is not designed to accommodate transfers. Additionally, there are certain challenges regarding product availability,

VTH pharmacy access, product costs, facilities (i.e., phone-lines) and pharmacy resources. An appropriate mechanism is to have the VTH prescriber approve an 'Outside pharmacy' Rx hardcopy to a client and/or telephone the Rx order to a pharmacy of their choice.

- **How many refills can I prescribe for non-controlled substances?** In Oregon, you can prescribe up to 12 refills or up to one year. Examples: 30-day supply of a total of 12 fills, 60-day supply of a total of 6 refills, 90-day supply of a total of 4 refills, etc.
- **How many refills can I prescribe for controlled substances (CIII –V)?** In Oregon and per Federal requirements, you can prescribe up to 5 refills or up to 6 months, whichever is earlier: 30-day supply per fill
- **How many refills can I prescribe for controlled substances that are schedule II?** In Oregon and per Federal requirements, you cannot prescribe refills (they must be in the form of a new, written prescription); 30-day supply per fill
- **Can a client request to combine controlled substance or psychotherapeutic (i.e., trazodone, fluoxetine, etc.) refills for a lump refill beyond what was normal prescribed (i.e., 30-day RX with 2 refills dispensed as a 90-day supply)?** A: No, in Oregon a client cannot request two refills combined on these items (other Rx items may be permissible, but it is not preferred).
- **Can a client request less than what was original prescribed for a refill?**
A: Yes, however, it is preferred to dispense the original amount prescribed to help alleviate discrepancies and communication errors
- **Can a refill request be changed once it has been approved from the original Rx order (i.e., the 2nd refill request requires a dose change)?** A: No.
Refills only apply to the original Rx order submitted. Another Rx order would have to be submitted/approved for such changes.
- **Do I need a license to prescribe prescription items to the VTH pharmacy? To an outside pharmacy?** A: You do not need a State or DEA license to prescribe prescriptions to your patients at the VTH pharmacy, however, you may be required to have a personal license State and/or DEA license for public pharmacy Rx orders.

PREScription WRITING

Consider these elements for writing an accurate and complete prescription.
 Consider these elements to supplement your prescription writing knowledge.
 Review these elements before and after prescription writing.

for patient cases

Rx CHECKLIST:

1. **ALWAYS** review for accuracy & completeness.
2. Confirm your patient's case is '**ACTIVE**' in VetHosp.
3. CII orders require a **SEPARATE** prescription.
4. Allow **10-15 minutes** for Rx processing with consideration to your position in the fill-line.
5. Did you already consider the **COST** of the medication?
6. Was **Med-Rec** performed? (Ensure the quantity prescribed meets the client's needs by verifying any medications/supplies at home.)
7. For **compounding**, check with the pharmacist for its availability and timing. Allow at least 2 days of advance notice for compounded refills.

Important/relevant information?

Write a note to the pharmacy staff in the top margin.

Is the patient's current weight provided?

Current weight is necessary to ensure safety and efficacy in dosing medications.

What is a prescription?

A finalized "drug order" for a specified patient that is complete with all requirements and reviewed for accuracy.

Patient Identifiers:

Patient-case labels contain all required elements and should be utilized on prescriptions. Required elements include the case number, patient's name, species, DOB, owner's full name, and physical address.

Drug Selection:

Copy the desired medication (including concentration/ strength and formulation) exactly as it appears in VetHosp.

VCPR established and maintained?

By law, a veterinarian-client-patient-relationship (VCPR) is required to prescribe and dispense a prescription. Each prescription must be signed by the prescribing clinician associated with the case.

To go home with patient; owner arriving at 4 pm

FOR VTH USE ONLY **DO NOT COPY**

OUT	IN	TGH	CLINICIAN	WEIGHT (KG)	DATE	FILLED	CHARGED	PREScription #
		AM PM	Dr. Liberty	27.3 kg	07/04/2016			

500-097

Rogers, Steve
 111 Main Street
 Albany, OR 97322-8995
 541-555-1111
 Canine 02/01/2004 Ne "Captain America"

Oregon State University College of Veterinary Medicine

Lois Bates Acheson Veterinary Teaching Hospital
 147 Magruder Hall • Corvallis, OR 97331
 Large Animal: 541-737-2858 Small Animal: 541-737-4812

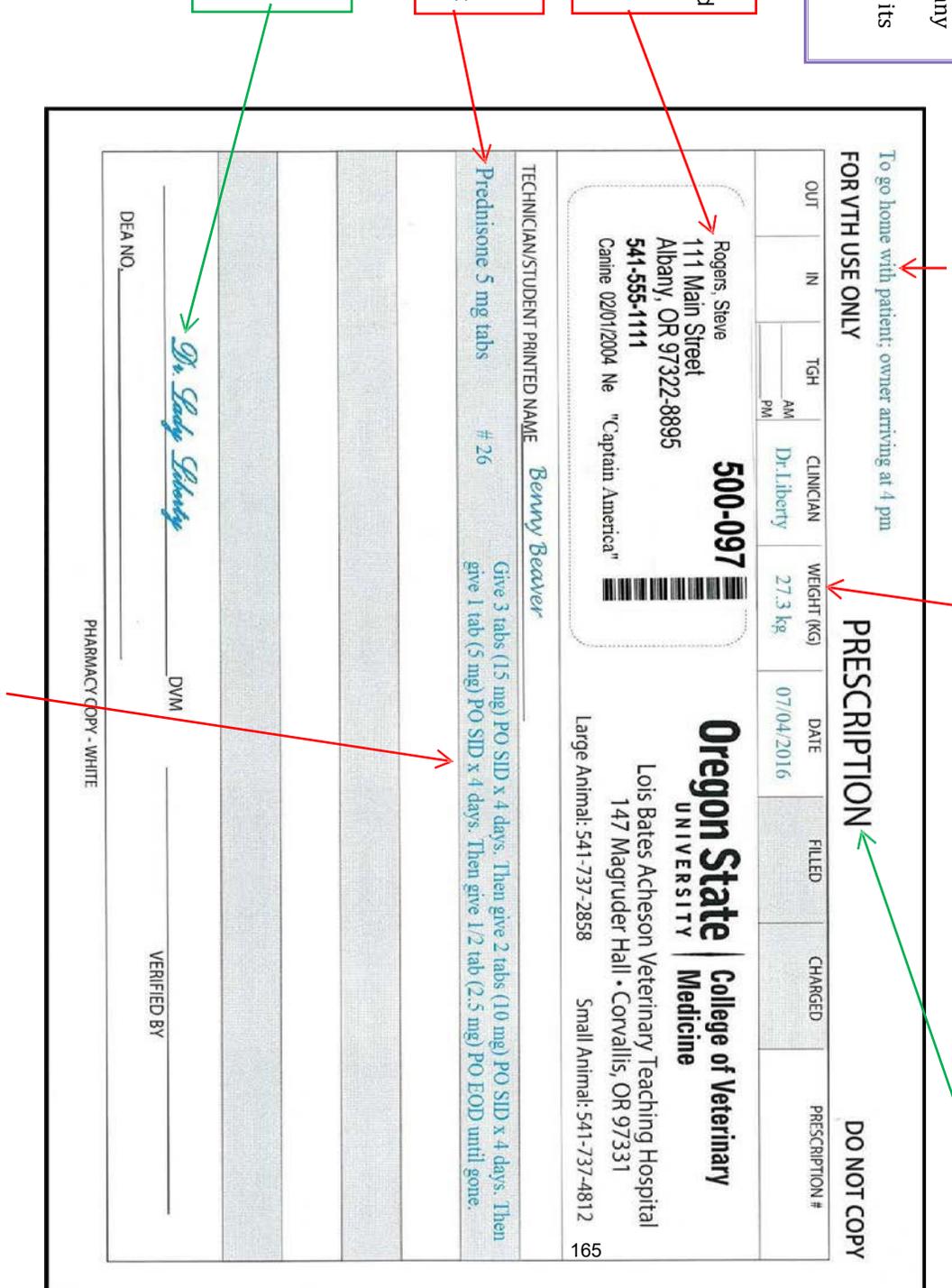
95

TECHNICIAN/STUDENT PRINTED NAME Benny Beaver

Prednisone 5 mg tabs # 26 Give 3 tabs (15 mg) PO SID x 4 days. Then give 2 tabs (10 mg) PO SID x 4 days. Then give 1 tab (5 mg) PO SID x 4 days. Then give 1/2 tab (2.5 mg) PO EOD until gone.

DEA NO. _____ DVM _____ VERIFIED BY _____

PHARMACY COPY - WHITE



IMPORTANT NOTES:

- Failure to meet the parameters outlined in this document may cause delays in prescription dispensing.
- Prescriptions should be written and dropped off by the student assigned to its related case. This will prevent delays should any questions/concerns arise.
- A pharmacist's job is to know exactly how a drug is being used for therapeutic effectiveness and safety while respecting the requirements of State and Federal Law.

Drug Information:

1. Directions for use should always be complete and include the dose, route and frequency. "For in-patient use" and "Use as directed" is NOT satisfactory.
2. Do NOT round the dose. Provide the dosing range or weight-based dose if uncertain about the dose.
3. Always double-check calculations (i.e. mg ≠ ml) and units (i.e. mg vs mcg)

PRESCRIPTION WRITING

Consider these elements for writing an accurate and complete prescription. Consider these elements to supplement your prescription writing knowledge. Review these elements before and after prescription writing.

for patient cases

Rx CHECKLIST:

1. **ALWAYS** review for accuracy & completeness.
2. Confirm your patient's case is '**ACTIVE**' in VetHosp.
3. CII orders require a **SEPARATE** prescription.
4. Allow **10-15 minutes** for Rx processing with consideration to your position in the fill-line.
5. Did you already consider the **COST** of the medication?
6. Was **Med-Rec** performed? (Ensure the quantity prescribed meets the client's needs by verifying any medications/supplies at home.)
7. For **compounding**, check with the pharmacist for its availability and timing. Allow at least 2 days of advance notice for compounded refills.

Important/relevant information?

Write a note to the pharmacy staff in the top margin.

Is the patient's current weight provided?

Current weight is necessary to ensure safety and efficacy in dosing medications.

What is a prescription?

A finalized "drug order" for a specified patient that is complete with all requirements and reviewed for accuracy.

Patient Identifiers:
Patient-case labels contain all required elements and should be utilized on prescriptions. Required elements include the case number, patient's name, species, DOB, owner's full name, and physical address.

Drug Selection:
Copy the desired medication (including concentration/ strength and formulation) exactly as it appears in VetHosp.

VCPR established and maintained?
By law, a veterinarian-client-patient-relationship (VCPR) is required to prescribe and dispense a prescription. Each prescription must be signed by the prescribing clinician associated with the case.

Please page when ready for pick-up
FOR VTH USE ONLY

OUT	IN	TGH	AM PM	CLINICIAN	WEIGHT (KG)	DATE	FILLED	CHANGED	PRESCRIPTION #
				Dr. Green	910 kg	03/17/2016			

500-097

Banner, Bruce
111 Main Street
Albany, OR 97322-8895
541-555-1111
Equine Belgian Draft Horse 02/01/2004 "Hulk"

Oregon State
UNIVERSITY

College of Veterinary
Medicine

Lois Bates Acheson Veterinary Teaching Hospital
147 Magruder Hall • Corvallis, OR 97331
Large Animal: 541-737-2858 Small Animal: 541-737-4812

DO NOT COPY

TECHNICIAN/STUDENT PRINTED NAME <i>Benny Beaver</i>	#1 vial (100mL)
Flunixin inj. (50 mg/mL)	Administer 20 mL (1000 mg) IV SID for 5 days as directed.

DEA NO. _____

Dr. Roger Queen

DVM

VERIFIED BY _____

PHARMACY COPY - WHITE

Please page when ready for pick-up
FOR VTH USE ONLY

PRESCRIPTION

DO NOT COPY

Flunixin inj. (50 mg/mL)

#1 vial (100mL)

Administer 20 mL (1000 mg) IV SID for 5 days as directed.

Dr. Roger Queen

DVM

VERIFIED BY

PHARMACY COPY - WHITE

IMPORTANT NOTES:

- Failure to meet the parameters outlined in this document may cause delays in prescription dispensing.
- Prescriptions should be written and dropped off by the student assigned to its related case. This will prevent delays should any questions/concerns arise.
- A pharmacist's job is to know exactly how a drug is being used for therapeutic effectiveness and safety while respecting the requirements of State and Federal Law.

Drug Information:

1. Directions for use should always be complete and include the dose, route and frequency. "For in-patient use" and "Use as directed" is NOT satisfactory.
2. Do NOT round the dose. Provide the dosing range or weight-based dose if uncertain about the dose.
3. Always double-check calculations (i.e. mg ≠ ml) and units (i.e. mg vs mcg)

VMC 737

Veterinary Anesthesiology I

Guidelines and Procedures

Instructor in Charge:
Dr. Ron Mandsager

Co – Instructors:

COURSE DESCRIPTION

The course is a three-week, five-credit rotation in veterinary anesthesiology in the Veterinary Teaching Hospital. Emphasis will be placed on the selection of anesthetic techniques for various species and procedures, and anesthetic management and supportive therapy of anesthetized animals.

PREREQUISITES

Successful completion of VM 768, Principles of Veterinary Anesthesia, or its equivalent.

PREPARATION AND EXPECTATIONS

Students are expected to review all second- and third-year anesthesia notes and any relevant reference materials prior to starting the rotation. You will be invited to a Canvas Studio site the week before your rotation. In that Canvas site you will find orientation material we expect you to review prior to the first day of the rotation. In addition, you will find the most recent information from VMC 768 and other relevant information within that Canvas site.

Students will be expected to review the basic pharmacokinetics and pharmacodynamics of the commonly used anesthesia-related drugs when the rotation starts.

Students will be expected to be proficient and accurate when performing injections.

Students will be expected to have experience placing venous catheters.

Students will be expected to be proficient and accurate when performing endotracheal intubation.

Full scrub suit is required while present in the surgery rooms. Full scrub suits are not allowed outside the surgery areas unless a lab coat or coveralls is worn over them. Exam gloves should be worn at all times when handling vascular catheters placed in large animal patients. Use of exam gloves is recommended and may be required in small animal patients.

A stethoscope should be carried by the student. A thermometer is recommended but not required.

COURSE SCHEDULE

This rotation will begin at 8 am on Monday, the first day of the block, for orientation. Orientation will take approximately two to three hours. Depending on scheduling, subsequent daily activities in the rotation will commonly begin at 7:30 am. The next day's

start time will be determined and communicated the prior afternoon. Rounds and other discussion sessions will likely be held each day and will cover a variety of topics.

Rotations 01a1 and 13a1 (the first and last rotations of the academic year):

- Rotation 01a1 starts on the Wednesday of the week before the date listed for the rotation. Orientation will be at 8:00 am on that Wednesday, and then you will take over for the departing 4th year students at 12:00 pm.
- Rotation 13a1 runs into the week before graduation. You are expected to continue with our rotation until 12:00 pm on the Wednesday of that week.

If a rotation change happens to fall on a three-day weekend, you are expected to be available for emergency coverage on the Monday of that three-day weekend – the rotation doesn't end until 8:00 am on Tuesday morning.

CELL PHONE USE

Students should be mindful about using their cell phones during this course. Cell phones should not be used while one is actively managing an anesthetized animal. Please use your cell phones in a professional manner at other times.

EMERGENCY DUTY

Emergency duty is an important component in our service mission to the Veterinary Teaching Hospital. Students will be expected to assist with afterhours emergency cases. You will be asked to provide afterhours contact information. Emergency duty will be divided as equally as possible between participants in this rotation. Division of responsibility for emergency duty will vary depending on the number of students enrolled. Whenever cases extend beyond 5 pm, the students assigned to emergency duty that evening will finish those cases.

Two students, one as primary and one as secondary, will be available after hours when hospital patients need to be anesthetized on an emergency basis. It is expected that students will manage their availability in a dependable manner. We expect you to be able to be present within the hospital within 20 minutes of an emergency call.

COURSE OBJECTIVES

1. Students will be able to explain the principles and techniques of veterinary anesthesiology.
2. Students will be able to relate physiology and pharmacology to veterinary anesthesiology.
3. Students will be able to explain why certain anesthetic agents are administered in selected cases.
4. Students will be taught the proper procedures for pre-anesthetic preparation of the patient, induction and maintenance of anesthesia, positioning of the patient, and recovery from anesthesia.
5. Students will be taught the effects of patient positioning on anesthetic management and post anesthetic complications.
6. Students will learn the variables used to monitor depth of anesthesia and the rationale

for choosing them.

7. Students will learn to interpret the variables used to monitor depth of anesthesia and the use of supportive therapy to improve patient response to anesthesia.
8. Students will be able to interpret blood pressure data, electrocardiographic results, respiratory gas data, and blood gas analysis as they pertain to anesthesia.
9. Students will become proficient at venipuncture, tracheal intubation, venous and arterial catheterization, use of infusion pumps and ventilators, and other technical skills associated with anesthesia.
10. Students will be able to deliver supportive care to the anesthetized patient.
11. Students will be able to recognize and manage anesthetic emergencies.
12. Students will be able to recognize post anesthetic complications and administer appropriate therapy.
13. Students will be able to describe and modify anesthetic protocols for patients with comorbid diseases and conditions.

SAFETY

Every precaution is taken to prevent human or animal injury during this rotation and students are briefed in safety procedures during orientation and during the rotation. When injections are given to animals in this rotation, that animal must be held or restrained by a second individual. Use of muzzles on canine patients is recommended or required whenever deemed necessary. While the rotation may seem daunting because of the size of the horse, no significant human injuries have occurred in this rotation. If you feel that you are being placed in an unsafe position while unsupervised in this rotation, you should notify the instructor. Any student who is pregnant should advise the instructor of her status.

OTHER

Providing anesthesia to our patients is a team sport. We encourage and expect you to work with and assist your colleagues on the rotation to provide care to our patients as much as possible, from setting up for a case to cleaning up after its completion. During 'down time' during the rotation, please use this time constructively. Ways to do so include discussion sessions with the clinician conducting the rotation, individual self-study reading anesthesia related articles in the literature, and completing assignments given by the instructor.

EVALUATION

A Pass/No Pass will be assigned and based upon the student's performance in the clinical setting, attendance, and upon the results of an examination should an examination be given following the completion of the rotation. Informal assessments of performance will be made during the rotation. Performance in the clinical setting will be assessed by the students' technical skills, ability to answer questions posed during the discussion sessions, case management and decision-making skills, and medical record keeping.

VMC 796 CLINICAL IMAGING

Course coordinator: Dr. Susanne Stieger-Vanegas

Email: susanne.stieger@oregonstate.edu susanne

Phone: 541-737 4833 (office)

Link to instructor bio or website: <https://vetmed.oregonstate.edu/people/susanne-stieger-vanegas>

Course instructors: Drs. Stacy Cooley and Lauren Newsom

Link to Dr. Cooley's bio or website: <https://vetmed.oregonstate.edu/people/stacy-cooley>

Link to Dr. Newsom's bio or website: <https://vetmed.oregonstate.edu/people/lauren-newsom>

Additionally, the residents and interns on diagnostic imaging are contributing and providing learning experiences for the students in the VMC 796 course.

Course description: The course is a 2-week, 3 credit clinical rotation in veterinary diagnostic imaging in the Veterinary Teaching Hospital at the Carlson College of Veterinary Medicine at OSU. The emphasis will be placed on performing common radiographic procedures, learning to improve radiographic techniques, learning to perform a normal abdominal ultrasound study in a small animal and to gain experience reading radiographs of clinical and teaching cases.

Prerequisite: Fourth-year standing in veterinary medicine

Preparation and Requirements: Students are expected to review the second-year diagnostic imaging course notes (VMC 764) or equivalent course material before the clinical imaging rotation. Students are expected to know basic X-ray physics, film development, computed radiography, digital radiography and artifacts associated with film development or image development that were taught in the 2nd year course although these topics will not be covered directly or specifically in rounds. Additionally, all students are expected to be familiar with normal radiographic anatomy, location and radiographic imaging characteristics of common disease prior to the start of the clinical imaging rotation. Students are expected to read through the CANVAS course website before the first day of rotation and familiarize themselves with the information provided in the course website.

Course schedule: You are expected to be ready to contribute to imaging related tasks from Monday to Friday from 8am to 5pm or longer if clinical cases are still ongoing. At first day of the block, an approximately 1-hour session is given by the radiology technician to allow hands-on experience in patient positioning and radiographic technique. Additional material in regards to equipment is also provided on the CANVAS website. During the first day, the radiologist or one of the house officers in diagnostic imaging will familiarize the students with the ultrasound unit available for scanning and explain a standard small animal abdominal ultrasound examination; this information is also included on the CANVAS website and students should look through the ultrasound

videos to get familiar with the ultrasound machine available to perform ultrasound examinations during student ultrasound training in the mornings.

All students should expect to be available for imaging from 8am until 5:00 pm from Monday through Friday. There may be days when our work will take us past that time and students are expected to assist with these cases, and there will be days when our caseload is light. During the rotation, students are assigned 1 day per week to ultrasound and may be assigned 1 day per week to the reading room. You may be instructed to attend journal reviews, necropsy rounds and senior paper presentations.

After the first Monday, the students will start each weekday except Thursday from 8:00-9:00 am performing abdominal ultrasound examinations on their dog or cat, or an ultrasound phantom, which is available in the imaging service. This ultrasound time is your opportunity to practice scanning on your own pets or on phantoms. If you plan to bring your pet for ultrasound scanning in the morning, you have to read through the animal care and use protocol and sign an owner informed consent form both of which are provided on the CANVAS website and as a printed version in the imaging service. If you bring in your pet for practicing ultrasound and your animal is housed in one of the VTH kennels/cages or runs, you are required to clean their run/cage at the end of the day. Animals brought in for an ultrasound covered by the course ACUP can only be kept in the kennels in the locations covered by the ACUP. You will not be able to bring or house your animals into other locations not covered by the ACUP, and these include the meeting rooms, lecture halls or the radiology reading room. Take advantage of this time, as you may not always be able to scan the clinical patients during appointments. This is an exciting opportunity for you to learn ultrasound in small animal patients, please comply with the rules.

On Thursday morning, all imaging students are required to attend senior papers from 8-9am. If no senior papers are scheduled, you should use the time to practice your ultrasound skills.

Daily morning rounds are scheduled (starting at 9:30 am) on every weekday. You are expected come prepared to morning rounds.

After rounds, you are expected to assist with clinical cases in imaging. When students are not busy with obtaining radiographs, in ultrasound, or performing case discussions, students are expected to make use of their time and review the clinical imaging cases from the day, study the teaching files, practice and perform ultrasound scans and read through the teaching materials on the Canvas teaching website or in imaging related books (imaging related books are available in the reading room and can be used in the imaging rooms while on diagnostic imaging rotation).

Students are expected to be prompt and eager to participate in rounds, radiography, and ultrasound. Attendance is mandatory for this rotation. If an absence occurs, it must be excused, the absence form needs to be filled out and the course instructor (Susanne.stieger@oregonstate.edu) needs to be informed.

Students should be dressed professionally and suitably for the work involved. Sandals and other open-toed shoes are inappropriate, as we are working with large and small animals.

TENTATIVE SCHEDULE FOR THE CLINICAL RADIOLOGY ROTATION

Please make sure you check the CANVAS website or check in with the radiologist on clinics for the newest information as the schedule may change if clinical cases require immediate attention or if the imaging staff or radiologists have teaching or other responsibilities. The order of the topics may change e.g. some weeks we may due to non-cardiac thorax sets in week 1 and two cardiac thorax sets in week 2. The topic choice will be discussed with the students the day before rounds.

Week #1

DAY	TIME	ACTIVITY
Monday	8 am	Come to the imaging room, check in and start familiarizing yourself with materials posted on Canvas, check where the teaching files are, access NOVARad and ensure you can access images
	After 8.15am	Radiology Orientation: duties while on radiology rotation, expectations, equipment use, radiation safety (rad techs)
	9:30-10:45 am	Case rounds- TOPIC: Small animal musculoskeletal system
	As time permits	Introduction to ultrasound including the machine and phantoms
Tuesday	8:00-9:00 am	Ultrasound practice
	9:30-10:45 am	Case rounds- TOPIC: Small or large animal musculoskeletal system
Wednesday	8:00-9:00 am	Ultrasound practice
	9:30-10:45 am	Case rounds – TOPIC: Large animal musculoskeletal system
Thursday	8:00-9:00 am	Senior papers (rotation students required to attend)
	9:15-10:00 am	Case rounds– TOPIC: Non-cardiac thorax
Friday	8:00-9:00 am	Ultrasound practice
	9:30-10:45 am	Discussion of clinical quiz week 1. By Friday 9am, students have to have finished the theoretical and practical quiz. Topics covered in the 2 quizzes include radiation physics, safety, positioning, SA bone, LA bone, non-cardiac thorax

Week #2

DAY	TIME	ACTIVITY
Monday	8:00-9:00 am	Ultrasound practice
	9:30-10:45 am	Case rounds- TOPIC: Cardiac thorax
Tuesday	8:00-9:00 am	Ultrasound practice
	9:30-10:45 am	Case rounds – TOPIC: Abdomen
Wednesday	8:00-9:00 am	Ultrasound practice
	9:30-10:45 am	Case rounds– TOPIC: Abdomen
Thursday	8:00-9:00 am	Senior papers (rotation students required to attend)
	9:30-10:45 am	Case rounds – TOPIC (Thorax, abdomen, etc.)
Friday	8:00-9:00 am	Ultrasound practice
	9:30-10:45 am	Discussion of clinical quiz week 2. Topic areas covered include cardiac thorax, thoracic and abdominal disease. Additionally, an ultrasound review needs to be submitted by 9am on Friday.

Note: Quizzes will be administered using the CANVAS teaching website.

SPECIFIC BLOCK RESPONSIBILITIES AND INFORMATION

1. **Case related responsibility** – primary case responsibility equates to the acquisition of imaging examinations and is to be rotated among the imaging students
 - a. Students will assume primary responsibility for an imaging case at the clinic and discuss with a technician or faculty/imaging resident on duty the views needed to evaluate the problem(s) identified on the request.
 - b. Students determine the positioning of the animal, exposure settings, cassette size and adjust the settings on the digital screen. Students will receive close guidance when obtaining radiographs by the technicians early in the rotation and receive more responsibilities as they demonstrate competence.
 - c. Please, make sure that a supervising technician from imaging or a radiologist is available before you start obtaining radiographs.
 - d. Students decide with help of the staff or faculty/imaging resident on duty if the radiographs obtained are adequate or if the radiographs need to be repeated.
 - e. Students will perform common radiographic procedures, learn radiographic troubleshooting techniques, and gain experience reading radiographs of clinical and teaching cases.
 - f. Different types of film processing and processing maintenance will be discussed with the radiology technicians. The focus will be on radiographic equipment commonly used including (computed radiography (CR) and digital radiography

(DX) equipment.

- g. Students assigned to an ultrasound case will help during the ultrasound study and if time and the condition of the animal permits will be able to scan the animal after the initial study is finished.
- h. If you are concerned about the health of the patient at any time during the imaging examination, inform the closest veterinarian, veterinary technician, or radiology technician.

2. General responsibilities

- a. Your safety is important. As you are aware, animals are sometimes unpredictable. Listen to your intuition if you sense an animal is frightened and/or aggressive. Treat all patients humanely and as gently as possible but use a muzzle if you sense that they could bite. If you have concerns, please ask the technician or radiologist on clinics for guidance and help.
- b. Be aware that you may encounter zoonotic diseases, including rabies. Wash your hands frequently while on this rotation, certainly after each patient. Use precautions (such as gloves and disposable aprons) when handling patients suspected or known to have zoonotic diseases. You should also see to it that the imaging room is properly disinfected and that other patients are not exposed, to the extent possible. If you have questions, please ask the technicians or radiologists on clinics for guidance and help.
- c. When time permits, it is the responsibility of the student to study the teaching files available on the computer viewing stations and the additional radiology teaching files stored in a plastic bin. These are different cases than you have seen in previous radiography labs or rounds. Every student is expected to be familiar with small and large animal common radiographic disease and anatomy.
- d. Be prepared to discuss radiographic special procedures regarding feasibility, indications, contraindications, contrast media, procedure and interpretation.
- e. Review cases radiographed and visit with the attending clinicians or students to receive pertinent clinical information, which might help in the interpretation. Cases can be viewed on the computer stations in the common radiography area.
- f. Keep the imaging areas clean and neat at all times. The ultrasound, small animal and large animal rooms need to be tidied at the end of the day.
- g. Protect tables and the X-ray/US/CT/MRI equipment

3. CANVAS teaching website

All information pertinent to the course including assignments, reading material and case sets for morning rounds are posted on the course CANVAS website. Please, make sure you read through the course website before you start the rotation.

4. Morning rounds

Each student needs to be prepared for morning rounds including being able to describe and discuss diagnostic imaging findings of the clinical radiographic and ultrasound cases of the prior day or dependent on the case load be able to discuss the prepared case sets. Students are expected to be able to discuss differential diagnoses for each case. Students

will be able to review the clinical cases of the day and the prepared case sets on the common shared viewing stations in radiology and on CANVAS. The prepared case sets are organized in sets of 8-10 cases and are given to the students the day before rounds and all cases need to be reviewed by every student prior to morning rounds. Students are expected to read appropriate sections of the Thrall textbook to help prepare for rounds topics and/or discussions. If a contrast study was performed, students need to be able to describe how the study was performed including contrast agent used, contrast agent dose and timing of the contrast study. Furthermore, students need to be familiar with normal radiographic anatomy in small and large animals.

Students should be verbally able to formulate a diagnostic imaging report, summarize the findings and discuss differential diagnoses. A diagnostic imaging report should contain the following information outlined below:

Outline for a diagnostic imaging report for the morning rounds

- **Case #**
- **Signalment of the patient**
- **Brief pertinent history of the patient**
- **Findings:** Describe your radiographic findings. In this section, be sure to include use of the 5 opacities, Roentgen signs, pulmonary patterns and other radiographic terms where appropriate. Make sure you summarize your findings if they are present in all radiographic views, and don't describe each radiographic view separately.
- **Impressions:** Summarize your findings and list differential diagnosis for each finding. Make sure, you rank the most likely differential diagnosis first and then rank them in the order of likelihood.
- Describe the next appropriate step and why you would consider this the next step. This can be other diagnostic imaging tests, other diagnostic tests or therapeutic recommendations.
- Is your diagnosis consistent with the history/ clinical signs (if given)? Briefly, why or why not?

The following radiology topics will be covered and should be reviewed thoroughly by the students before morning discussions: Small and large animal appendicular and axial skeleton, non-cardiac thoracic disease, cardiac disease, abdominal disease. Week one rounds will cover small and large animal skeletal diseases and non-cardiac thoracic disease. Week two rounds will cover cardiac thoracic diseases and abdomen including ultrasound. Students are expected to know basic X-ray physics, artifacts associated with image creation, artifacts noted in computed and digital radiographic images that were taught in the 2nd year course although this topic will not be covered directly or specifically in rounds.

LEARNING OUTCOMES

- a. Students will integrate the knowledge learned in classes and labs to take diagnostic quality radiographs on clinic cases.
- b. Students will learn to recognize high quality radiographs and know how to correct deficiencies in image quality.

- c. Students will understand the basic function of image processing with focus on CR and DR and what is required for processing maintenance.
- d. Students will learn a structured and methodical approach to evaluate radiographs and apply this to clinical and teaching cases. In addition, they will learn proper terminology, refine reporting skills and need to be able to present and discuss a prioritized differential diagnoses list.
- e. Additional imaging modalities will be discussed on a case by case basis

TEXTBOOKS FOR THE CLINICAL IMAGING ROTATION

Required:

- Thrall, DE, editor. Textbook of Veterinary Diagnostic Radiology, seventh edition. WB Saunders, Philadelphia, 2018

or

- Thrall, DE, editor. Textbook of Veterinary Diagnostic Radiology, sixth edition. WB Saunders, Philadelphia, 2012, Hardcover ISBN: 9781455703647, eBook ISBN: 9781455775095

Optional:

- Hecht, S. Diagnostic Radiology in Small Animal Practice 2nd Edition, 5m Publishing
- Burk DL, Feeney DA. Small Animal Radiology & Ultrasound, *3rd edition*, WB Saunders, 2003.
- Butler JA, Colles CM, Dyson SJ, Kold SE and Poulos PW. Clinical Radiology of the Horse, *4th edition*. Blackwell Science, 2017. ISBN: 978-1-118-91228-7
- Pennick D and D'Anjou MA. Atlas of Small Animal Ultrasonography, 2nd edition, Blackwell Publishing, 2015.
- Nyland TG. Small animal diagnostic ultrasound, 3rd edition, WB Saunders, Philadelphia, 2014.
- Kealy JK, McAllister H. Diagnostic Radiology and Ultrasonography of the Dog and Cat, *5th edition*. WB Saunders, Philadelphia, 2010.
- Morgan, JP. Techniques of Veterinary Radiography, *fifth edition*. Iowa State University Press, Ames, 1993.

Additional learning material

- Auto-tutorial digital files are available to familiarize students with radiographic examples (including contrast imaging studies) of common diseases in small and large animals. The information of how to access the digital images is readily available in a plastic file box in the main radiology room and can be viewed on a DICOM viewer (NOVarad) on the computers in radiology. Any questions related to these cases can be directed to the radiology resident or radiologist on duty.
- A great website to learn about various cases is <http://www.veterinaryradiology.net/> (Links to an external site.) by Dr. Allison Zwingenberger. This website provides new cases every month and includes exotic, small and large animal radiographic studies.
- <https://www.vet.k-state.edu/vhc/services/small/radiology/case-of-the-week/> (Links to an external site.)

- <https://www.vmc.umn.edu/about-us/specialties-services/medical-imaging/interesting-cases> (Links to an external site.)
- <https://acvr.org/>

Grading: Grades will be given on a Pass/No Pass scale. Students will be evaluated by their proficiency in reading radiographic case studies, by their performance at clinic rounds, by their participation in case discussions, their technical skills in radiography and ultrasound, and with exams in radiography and ultrasound. Final grading will be performed using evaluate. In evaluate a numerical score will be provided for clinical reasoning and decision making (40% of grade), Clinical quiz 1 and 2 (each 10%, and a total of 20% of grade), multiple choice quiz 1 and 2 (10% of grade), public health (0%), communication (5%), and collaboration (5% of the grade), professionalism (5% of the grade) and scholarship (5% of the grade). The final grades will be submitted after the rotation and when all assessments are submitted in evaluate. If you have concerns about your performance in the rotation, make sure, you check in with the radiologists on clinical duty.

Questions about the rotation, grading, problems, schedule changes, and special requests should always be directed to Dr. Susanne Stieger-Vanegas (Susanne.stieger@oregonstate.edu) and the radiologist on clinics.

Please remember to follow the expectations for student conduct during this rotation.

https://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/student-conduct-community-standards/Code/code_of_conduct_83-2_compressed.pdf

Please, read through the next section carefully.

SAFETY CONSIDERATIONS FOR THE CLINICAL IMAGING ROTATION

SAFETY RULES FOR LABORATORY AT CVM AT OSU

These protocols are intended to protect you and make your laboratory experience enjoyable and productive.

https://vetmed.oregonstate.edu/sites/vetmed.oregonstate.edu/files/main/laboratory_safety_policy_9-16-13.pdf

ADDITIONAL IMAGING SPECIFIC RULES: RADIOLOGY

Any radiographic study performed by a student in the VTH has to be performed under the supervision of a technician certified in the safe use of the radiology equipment, a radiologist or veterinarian. The principle guiding radiation safety in the veterinary teaching hospital is the ALARA principle (**A**s **L**ow **A**s **R**easonably **A**chievable). It cannot be overstated that the last two words in ALARA are “reasonably achievable.” Reasonably achievable is very different from “as low as possible.” If the guiding principle was to obtain radiation exposure levels as low as possible, that would indicate a zero tolerance

for radiation exposure. A goal of zero exposure would place unrealistic economic, design, and workflow constraints on the veterinary profession to the point that obtaining radiographs in a general practice would likely be impractical or cost prohibitive. However, all possible precautions must be taken to minimize exposure to ionizing radiation and properly monitor exposure to radiation by using badges. It is completely inappropriate to take a radiograph without wearing badges and proper shielding equipment (gown, thyroid shield, lead gloves, eyeglasses). If you are concerned that someone is not taking appropriate radiological safety precautions, please notify the radiology technician or radiologist on duty immediately. The clinical radiology rotation will be used to instruct and provide the students with the tools necessary to obtain radiation exposures as low as reasonably achievable. These tools fall into three categories: time, distance, and shielding.

Time: Always use the shortest exposure time possible and keep the number of repeat radiographs as low as possible. Use always the technique chart that is provided in- and outside each imaging room.

Distance: Always stay as far from the radiation source as practical. Small increases in distance will dramatically decrease exposure. If possible, exit the room during radiography! The use of sedation to allow for sandbag and non-manual restraint is recommended. A tutorial about the proper use of sandbags and tape for non-manual restraint (including instructional pictures) can be found in- and outside the radiology room as well as the library in the radiology reading room.

Shielding: Use proper lead shielding equipment such as lead apron, lead gloves and thyroid shield, etc. You are required to wear appropriate lead shielding. Not wearing gloves is not an option in any circumstance if holding a patient, cassette or cassette holder. Obtaining radiographs which include unshielded fingers or hands in the radiograph is unacceptable. There should never be unshielded fingers or hands or other body parts of a human in our veterinary radiographs. It is important to remember that hands or fingers even when covered by lead gloves should never be in the primary beam. Lead gloves are not made for protection from radiation in the primary beam and only protect the hands from scattered radiation.

COMPUTED TOMOGRAPHY

Never be in the CT room while a patient is being scanned. All monitoring can be performed remotely from the CT monitoring room. Students and staff are not allowed in the CT scanning room while a patient is scanned.

ULTRASOUND

Ultrasound is not associated with any harmful radiation and it is safe to spend time in the ultrasound room. The ultrasound equipment, especially the transducers are very sensitive to force e.g. falling on the floor etc. as they contain small piezoelectric crystals. Treat the ultrasound equipment with care and keep it clean. If you clean the transducers use not more than a maximum of 50% solution of alcohol, as the surface of the probe gets otherwise damaged. Special cleaning wipes for transducers are available in each room ultrasound equipment is used.

MAGNETIC RESONANCE TOMOGRAPHY

Remember that the magnet in an MRI unit is always on, 24/7, regardless of whether there are patients or staff present. The magnet is also unforgiving! If you enter the room with something with iron or many metals you will not get a second chance. The metallic substance will be attracted to the magnet, and you will likely not be able to stop it! The magnetic field creates a projectile effect causing metallic items to rapidly accelerate into the bore of the magnet. This means that metal items brought close to the bore of the magnet will be pulled into the magnet. If a patient is in the magnet at the time, this can result in injury and/or death of the patient. Remember, that the magnetic field is likely to have an immediate effect. A very few number of metallic items are not magnetic and will not get pulled into the magnet, so please assume that all metal will be affected.

Make sure you properly screen yourself and check your pockets so that you do not carry any metallic objects including a stethoscope, pen, needles, etc. before you enter the MRI environment. Leave all metallic objects in the MRI monitoring area. If you carry your wallet into the magnet room, your credit card strips will be wiped of all-important information and will be rendered useless.

If a metallic object becomes attached to the magnet, or a patient or human life is endangered by a metallic object being carried into the magnet room, the magnet must be quenched. This can cost tens of thousands of dollars.

Absolute contraindications for entering the MRI environment are

- Pacemakers
- Implanted cardiac defibrillator/neuro-stimulators or infusion pumps
- Brain aneurysm clips
- Cochlear implants
- Metal fragments in eyes or in the head
- Magnetic implants
- External pacer wires

Conditional contraindications for entering the MRI environment include

- Shrapnel, bullets, etc.
- Intravascular stents, filters, etc.
- Bone joint pins, screws, plates, etc.
- Transdermal delivery systems
- Prosthetic devices
- Internal pacer wires
- Un-secured body piercings (Niobium piercings are non-magnetic)

If you have any of these objects/medical devices in your body, inform the MRI technician and clinician in charge of you. You **MUST** not enter the MRI environment.

REMEMBER:

- Never enter the magnet room for any reason unless accompanied by the MRI

technologist or radiologist on clinics.

- Never take anything into the magnet room without checking first with the MRI technologist or radiologist on clinics.
- Always remove everything from your pockets that could potentially be a projectile
- Never take tools into the MRI room for any reason!
- The MRI technologist and radiologist have absolute authority over all personnel, patients and equipment entering the MRI environment.
- For the safety of all, under no circumstances should the MRI technician's or radiologist's directions be ignored!



Oregon State University
Oregon Veterinary
Diagnostic Laboratory

Oregon Veterinary Diagnostic Laboratory Guidelines & Procedures

INTRODUCTION

The Oregon Veterinary Diagnostic Laboratory (OVDL) is an AAVLD-accredited facility providing a full range of testing services for the diagnosis of animal disease and the promotion of animal and public health. These services include necropsy, histopathology, bacteriology, virology, molecular diagnostics, clinical pathology and serology. The OVDL accepts animals, tissue and fluid specimens, and other materials for diagnostic testing. The results of these tests are provided to the VTH clinician, referring veterinarian, or animal owner to help them make informed decisions related to the health of the animals under their care.

The primary mission of the OVDL is to provide quality diagnostic services to clients in an accurate and timely manner and to teach veterinary and graduate students in the method of laboratory diagnostics. The OVDL also assists and is engaged in research efforts as well as public health and forensic issues.

HOURS OF OPERATION

The OVDL is open Monday through Friday, 8 a.m. to 5 p.m., and is closed on weekends and holidays. Case material is handled during normal business hours. The OVDL does not accept samples from the public after hours. However, the OVDL has a pathologist on-call seven days a week. A roster listing the pathologist on duty and the OVDL cell phone number (541-740-8633) is posted in the OVDL Business Office, Receiving Room, Necropsy Room, and both Large and Small Animal Teaching Hospitals.

Depending upon case load and the nature of a case, animals submitted late in the afternoon may be held, unless time sensitive at the discretion of the pathologist, for necropsy on the following work day.

If specimens are delivered (FedEx, UPS or hand delivered) after hours or on weekends and accepted by VTH personnel, please follow posted instructions so the specimens are stored correctly and OVDL is aware they were delivered.

OVDL RECEIVING WINDOW

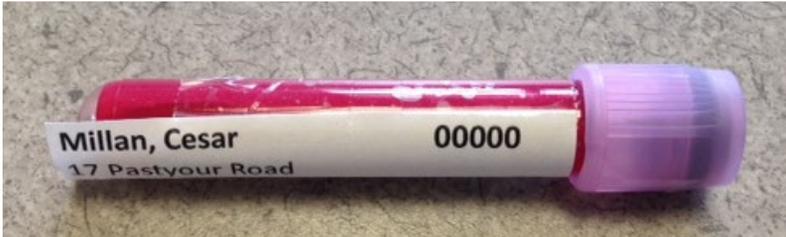
OVDL Receiving is located in Magruder 130. The OVDL Receiving window is open for receipt of VTH specimens from 8:30 a.m. until 5:00 p.m., Monday through Friday.

- NOTE: Same day testing may not be available for some tests. Limited testing is available after 4:00p.m. with the addition of a STAT or Call-in fee.
- If possible, please centrifuge and split serum samples after 4:30p.m.
- Afterhours: A drop box is located outside M130 for afterhours submission of necropsy paperwork. A key is available in both Large and Small Animal hospitals if afterhours entry to OVDL Receiving (M130) is needed. Entry to M130 may be needed afterhours, for example, to place blood culture vials into the incubator.



LABELING OF SAMPLES

- Label all specimen containers with pre-printed VTH case stickers
- Labeling tubes: Position animal case number at the top of the tube and leave a window where blood/fluid is visible in the tube. It is okay for labels to hang off the bottom of very small tubes.
- Correct label position: Blood/fluid is visible along the length of the tube.



- Incorrect label positions: Do not cover blood/fluid with label. Do not wrap labels like a flag.



- If the specimens are difficult to distinguish (for example: abdominal fluid vs. urine vs. serum vs. csf), then hand write the name of the contents on the specimen container.
- Slides: place slides and a case sticker on a slide tray. Hand-label all slides with the animal case number and the site. Place tray with slides into a transport bag for delivery.
- For animals in isolation, it is acceptable to place the VTH case sticker on an outer transport bag.

VETHOSP SUBMISSION FORM

- You **MUST** submit a paper copy of the VetHosp submission form with your specimens.
- When ordering tests (e.g., Cytology: Slide Eval), make sure that the number in front of the test request matches the number of submitted sites.
- Lookup the previous lab submission in VetHosp to edit a request. If you make a change to a previous submission, you **MUST** submit a new paper copy of the submission form to the OVDL.

- Some tests are not provided by OVDL, and specimens are shipped to Outside labs to complete testing. Whenever possible, submit separate samples and create a separate submission for outside lab services.
- STATs and Necropsy requests may require a clinician (or designee) signature. If required, a signature line will print at the top of the Vethosp submission form.

SUBMISSION DELIVERY

- **Timestamp:** Upon delivery of specimens, timestamp the front page of the submission form (below the dotted box) and place the submission form in the submission form basket just inside the OVDL Receiving window.
- Place specimens in the sample bin just inside the OVDL Receiving window
- Feel free to ask us questions! If needed, squeak the squeaker to get our attention.
- Some specimens have specific submission requirements (for example, ammonia samples must be delivered on “wet” ice). See <https://vetmed.oregonstate.edu/ovdl/test-catalog>
- **STAT:** Verbally alert OVDL staff when delivering a STAT, “I have a STAT!” Cutoff times are listed below. The timestamp on your submission form is used to determine eligibility for testing.

ALERT STAFF when delivering a **STAT** sample

	Monday	Tuesday	Wednesday	Thursday	Friday
STAT Deadlines					
Molecular STAT Deadline	10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM
Histology STAT Deadline	11:00 AM	11:00 AM	11:00 AM	11:00 AM	10:00 AM
Send-Out STAT Window	11:30-1:00 PM	11:30-1:00 PM	11:30-1:00 PM	11:30-1:00 PM	8:00-1:00 PM
Virology STAT Deadline	1:00 PM	1:00 PM	1:00 PM	1:00 PM	1:00 PM
Endocrine Testing Window	10:00 AM - 2 PM	10:00 AM - 2 PM			
Clin Path STAT Window	4:00-4:30 PM	4:00-4:30 PM	4:00-4:30 PM	4:00-4:30 PM	4:00-4:30 PM
Bacteriology STAT Window	4:00-5:00 PM	4:00-5:00 PM	4:00-5:00 PM	4:00-5:00 PM	4:00-5:00 PM
IDEXX STAT Window	4:00-5:00 PM	4:00-5:00 PM	4:00-5:00 PM	4:00-5:00 PM	4:00-5:00 PM
Clin Path CALL IN	After 4:30 PM	After 4:30 PM	After 4:30 PM	After 4:30 PM	After 4:30 PM

OVDL CUTOFF TIMES FOR VTH SPECIMEN SUBMISSIONS AND TESTING

Clinical Pathology: **STAT available 4-4:30 pm** Same-day testing or “set-up” is available with a STAT request for most Clinical Pathology tests. A STAT is required for same day results on samples submitted between 4:00 pm and 4:30 pm.

Coagulation tests: Notify the lab a minimum of one hour, when possible, prior to submission of coagulation tests including TEG, PT/PTT and Dimers.

Endocrine Tests 10am-2pm: All endocrine tests (ACTH, cortisol, progesterone, and TT4) will be run between the hours of 10am to 2pm daily. STAT is not available for these tests.

Cytology Call-in after 4:30pm: Only cytology and blood smear evaluations received after 4:30 pm may be run same day with the addition of a call-in fee. Contact the Clinical Pathology section at 7-6820 for more information.

Bacteriology: STAT available 4-5:00 pm and Saturday

Same-day testing or “set-up” is available with a STAT request for most tests. A STAT is required for same day set-up of samples submitted between 4:00pm-5:00pm and on Saturdays when staff is available. Contact the Bacteriology Section at 7-6824 for more information.

Outside Lab shipments: STAT available 11:00 am-12:30 pm M-Th, cutoff 12:30 pm Fridays

Requests must be received by 11:30 am Monday–Thursday in order to be sent out by UPS the same day. Between 11:30 am and 1:00 pm a STAT must be added for same day shipping. Specimens submitted on Friday for send-out require a STAT by 1:00pm, and only certain outside lab samples may be shipped on Fridays. Specimens received Friday without a STAT will be sent out on the following business day.

IDEXX STAT after 4:00pm: IDEXX requests between 4:00-5:00pm require a STAT for same day shipping.

Molecular Diagnostics: STAT cutoff 10:00 am

Same-day PCR testing is available with a STAT request for most PCR assays, if the specimen is received by 10:00 am. If the specimen is received after 10:00 am, results will be available the following business day. A STAT fee will be assessed for each specimen/test for which this request is made. Some tests require additional time for processing and are not available on a STAT basis. Contact the Molecular Diagnostics Section at 7-6615 for more information.

Virology: STAT cutoff 1:00 pm

Same day testing is available for some of the more rapid diagnostic assays with a STAT request, if the specimen is received by 1:00 pm. If specimen is received after 1:00 pm, results will be available the following business day. A STAT fee will be assessed for each specimen/test for which this request is made. Most virology tests require multiple days to complete and initial set up will be performed the following business day if the specimen is received after 4:00 pm. Contact the Virology Section at 7-2172 for more information.

Histopathology: STAT 11:00 am M-Th, 10:00 am Friday

Same day processing and reporting are available for some tests with a STAT request, if specimen is received by 11:00 am Monday through Thursday or 10:00 am on Friday. A

STAT fee will be assessed for each specimen for which this request is made. Histology technicians or pathologists will determine the suitability of the specimen for same day processing. If deemed unsuitable, the client will be notified and the specimen will be held pending submission of a revised OVDL Submission Form requesting routine histopathology processing and reporting. Contact the Histopathology Section at 7-6822 for more information.

Necropsy

Regardless of the time of submission, timing of necropsies is at the discretion of the Pathologist on duty.

OVDL AFTER-HOURS

After 5 p.m. and on the weekends and holidays, callers to the OVDL are automatically transferred to the pathologist on-call. If the case warrants, the clinician should request the option of an after-hours necropsy with the pathologist on-call. The necropsy coolers are locked outside of regular business hours; keys are held by VTH section supervisors, receiving, maintenance, and the Pathology Laboratory Coordinator.

NECROPSY SERVICE

There are two types of necropsies available for VTH cases.

1. Complete Necropsy (Complete Diagnostic Workup)
2. Teaching Necropsy

Complete Diagnostic Workup includes a necropsy with specimen collection appropriate for diagnostic tests deemed appropriate by the pathologist. This may include histopathology, bacteriology, parasitology, virology, molecular diagnostics, serology, clinical pathology, and toxicology.

TEACHING NECROPSIES

Requests for Teaching Necropsies must be indicated as such on the OVDL Accession form. These necropsies are charged to a separate VTH index. Teaching necropsy requests are initiated by a VTH faculty clinician for cases that they believe have significant teaching value and for which the client is unwilling to pay for a necropsy. Teaching Necropsies support the educational mission of the college.

Please note: The OVDL does not provide cosmetic necropsies.

Note to clinicians – The collection of specimens for teaching purposes (i.e. labs or demonstrations) requires that you contact the Pathology Laboratory Coordinator (7-9240, MAGR 122) to discuss your needs. Simple collections are provided as a courtesy; those requiring significant dissection or tissue manipulation may incur a collection fee. Samples will be collected, tagged and placed in the OVDL cooler by the Pathology Laboratory Coordinator. As cooler space is extremely limited teaching specimens must be removed from the OVDL cooler and taken to other storage within 24 hours of collection or they will be discarded. Any specimens placed in the OVDL cooler must be submitted through VetHosp and will be accessioned by the OVDL; this includes cremation or disposal only submissions. All specimens must be marked or tagged with the responsible party's name and date. Unlabeled specimens will be discarded immediately.

SPECIMEN SUBMISSION

All VTH specimens submitted for any diagnostic testing must be accompanied by an OVDL accession form that includes the name of the clinician or house officer. Testing will not proceed without the requesting doctor's name on the form. It is also critical that an accurate and complete history accompany each specimen submitted. The OVDL diagnosticians may delay testing until a history is provided. Submission of live animals (aside from poultry and fish) is prohibited. Euthanasia of poultry or fish incurs an additional fee.

CARE OF REMAINS

In the interests of public safety and biosecurity the OVDL does not release any animal remains to owners, following a necropsy. Aside from routine disposal, remains can only be released to a licensed crematory service. For large animals, necropsy eliminates the possibility of cremation due to subsequent problems with transportation of the remains.

In some instances, it may be possible to send the head, heart, and hooves for cremation. A large animal may also be released to the crematory service for whole-body cremation, provided a necropsy was not performed. Arrangements for cremation are the responsibility of clinicians and clients (not OVDL). Collection of keepsakes, such as clips of hair, feathers, etc. must be done before the animal is delivered to the OVDL. “Care of Remains” instructions must be indicated on the OVDL submission form.

DISPOSAL REGULATIONS

There are several important regulations involving different disposal “streams” for biological materials in the necropsy area. Although no personnel should be utilizing these disposal streams out of hours, the regulations are emphasized here to avoid accidents that could result in fines or loss of access to current disposal services:

- 1) The dumpster offal carts (rectangular) cannot contain plastic gloves or metal (such as horseshoes or fixation pins/plates).
- 2) Carcasses/tissues cannot be freely disposed of through the OVDL – consult with the Pathology Laboratory Coordinator. An accession form must be completed for all carcasses/tissues placed in an OVDL cooler. This allows for chain of custody and tracking of all specimens placed in the cooler(s). In most instances, a disposal fee is also applicable.
- 3) Proper tagging of specimens and prompt completion of a submission form is critical. We do not wish remains intended for cremation to end up in the wrong disposal stream. Necropsy staff utilize a color-coded tag system to prevent remains from going in the wrong disposal stream.

Necropsy	Cremation	<u>Green</u>
	Regular Disposal	<u>Blue</u>
NO Necropsy	Cremation Only	<u>Pink</u>
	Disposal Only	<u>Tan</u>
	Hold	<u>Red</u>

SAFETY

Safety is a priority in the OVDL. We use a variety of sharp instruments (knives, saws, scissors, scalpels, needles) that can cut and puncture. Work with heavy animals can cause back injury and muscle strains. Large animals can slip from the overhead hoist. The floor of the Necropsy Room is slippery when wet, even more so when blood and tissue are present. The animals and tissues we work with can harbor zoonotic pathogens. If you are

injured while working in the OVDL, please notify your supervisor and the OVDL (Pathology Laboratory Coordinator, Quality & Safety Manager, or Director) immediately. Report any safety concerns to the OVDL Pathology Laboratory Coordinator immediately. Necropsy staff will provide safety training prior to working in necropsy, but ultimately it is your responsibility to notify the Pathology Laboratory Coordinator if you do not feel safe performing a particular task or procedure.

A few words on rabies in Oregon...

The OVDL provides rabies diagnostic testing for Oregon and the Pacific Northwest. Rabies is not a common disease in this state. The majority of positive cases are found among migratory bats during the summer months. Occasionally, the disease spills over into other species such as foxes. On rare occasions we do find rabies in un-vaccinated domestic animals. Therefore, rabies should be considered as a possible differential diagnosis in the presence of compatible signs and history. Rabies suspect cases may come to the laboratory during your Diagnostic Services block. You will not be asked to work with any of these specimens until they have been verified to be rabies-free.

If in doubt, ask OVDL personnel for help...we will be happy to assist!

REPORT OF RESULTS

TURN AROUND TIMES (TATs)

Although there are instances in which finalization of a case is delayed for several weeks due to the nature of the test (Outside lab testing, virus isolation, toxicology assays, extended fixation times for brains and spinal cords, necessary lengthy decalcification of bone specimens, etc) the OVDL does have expected TATs for routine cases. These can be found on the OVDL web page, <https://vetmed.oregonstate.edu/ovdl>. Clinicians are encouraged to contact the pathologist regarding a case which is “overdue” as a diagnosis may be available but not yet entered into a report.

Standard TATs:

- 1) Gross necropsy findings can usually be accessed by the clinician within 2 business days. This can take the form of CoreOne entry, phone call or email by the pathologist.
- 2) Histopathology from necropsies is completed for most cases within 10 business days.

CNS cases may take longer.

- 3) Biopsy written reports are generally completed within 2 business days of receiving a fully-fixed specimen. Incompletely fixed specimens, those requiring decalcification, and those cases needing special stains may be delayed.

ACCESS TO REPORTS

Reports can be viewed through VetHosp. Preliminary reports can be viewed under Hospital.

Diagnostic Clinical Pathology

VMB 736

Instructors in Charge: Dr. Elena Gorman and Dr. Jen Johns
Co-instructors: Dr. Latifat Adekunle and Dr. Shannon Phelps

Diagnostic clinical pathology is a critical component of all disciplines in medicine and surgery. Veterinarians are required to understand and integrate laboratory findings in multiple species and understand comparative pathophysiology and variations between species. This course is designed to provide a systematic approach to 1) understand the need for particular diagnostic tests, 2) appropriately interpret and integrate findings (both normal and abnormal), and 3) utilize this information to formulate differential diagnoses, need for additional testing, and/or treatment.

All materials will be published for each class in Canvas. Class convenes every morning at 8:30 am in Magruder 298 and 202 unless otherwise specified (see general schedule below). There will be an hour break for lunch and the afternoon will commence in Magruder 202 at 1:00 pm until the days' activities are complete (typically 5-5:30 pm). The days' activities are variable and subject to change. During the clinical case workups, students will work in small groups to assess the cases. The facilitator may be requested to assist at any time, but we encourage groups to investigate questions on their own as much as possible – much like general practice. Cases will be discussed as a larger group the following day.

PowerPoints containing relevant information are available on the Canvas site and use of text books and other references, including recent literature, is encouraged. The cases are variable and may include interpretation of a peripheral blood smear, cytology specimens, laboratory data, and any other relevant information or diagnostic findings. We encourage questions and in-depth discussion of these cases.

A. Subjects to be Covered

1. Procedures for creating and reviewing blood smears
2. Hematology and hemostasis
3. Cytology
4. Urinalysis
5. Biochemical and blood gas analysis
6. Interpretation of laboratory data in a case-based format

B. Objectives/Skills

1. Find reliable resources and investigate answers to questions
2. Review basic clinical pathology procedures so that you are comfortable with performing these on your own and teaching them to your staff
3. Integrate appropriate laboratory results and apply them to your patient(s)
4. Assess a variety of infectious disease processes and determine appropriate confirmatory tests
5. By the end of this block you should be able to:
 - a) Make and assess good quality blood smears
 - b) Perform differential cell counts on peripheral blood smears
 - c) Perform basic hematology procedures such as PCV, total plasma protein, fibrinogen, and platelet estimate
 - d) Interpret coagulation data +/- perform a crossmatch using a commercial kit
 - e) Identify and interpret morphologic abnormalities in blood
 - f) Perform a complete urinalysis including interpretation of urine sediment
 - g) Evaluate and interpret uncomplicated cytologic samples
 - h) Interpret laboratory data in cases from common domestic species
 - i) Understand the importance of quality control and appropriate submission procedures in laboratory medicine

C. Texts

There is no required text. The following might be helpful for reference:

Thrall MA, et al. Veterinary Hematology, Clinical Chemistry and Cytology. 3rd edition Wiley Blackwood, 2022.

Stockham and Scott, Fundamentals of Veterinary Clinical Pathology, 2nd edition. Blackwell Publishing, 2008.

Cowell and Tyler's Diagnostic Cytology and Hematology of the Dog and Cat, 5th edition. Elsevier Saunders, 2019.

Walton RM. Equine Hematology, Cytology and Clinical Chemistry, 2nd edition. Wiley-Blackwell, 2021.

Raskin, Meyer and Boes. Canine and Feline Cytopathology: A Color Atlas and Interpretation Guide, 4th edition. Elsevier, 2022.

Cornell University: EClinpath online textbook. <http://eclinpath.com/>

D. Grading

Grading is Pass/No Pass. As the rotation is only 5 days, no mid-rotation evaluation is given. Final grades will be based on attitude, attendance and active participation plus general knowledge, interpretive and critical thinking ability, preparation and involvement in laboratory procedures, daily quizzes and diagnostic practical exercises given throughout the week. Discussion is critical to determining how well each student understands and integrates information. Quizzes and practical exercises will be published in Canvas; these are all open book and are to be completed independently (excepting the practice practical exercise which can be discussed between classmates). Investigation is not only encouraged but is expected. The final practical exercise is a 20 point quiz. If less than 13 points is obtained, a second case will be provided for additional practice and evaluation. For clarification, a copy of the grading form used for rotation is available.

Attendance is mandatory for all sessions unless prior approval for an absence is obtained or there is an emergency. Approval for planned absences must be cleared prior to start of the rotation (note that only 1/2 day absences are allowed for 1-week rotations per 4th year rotation guidelines). Tardiness is not tolerated.

E. Dress Requirements

A lab coat, covered legs and close-toed shoes are required during the hematology and urinalysis labs in room 202.

F. Proposed Schedule (subject to change)

	Monday	Tuesday	Wednesday	Thursday	Friday
8:30 AM	Hematology review	Practical 1 discussion	Case discussions 1	Case discussions 2	8 am: Cytology rounds Case discussions 3
1 PM	Hematology lab and Practical exercise 1	Case workups 1	Case workups 2	Case workups 3	Urinalysis Lab Practical exercise 2

VMB 795: Diagnostic Services Overview

This welcome notice is effective as of fall 2023. The entire pathology team are working hard to ensure that you receive a valuable block of instruction that you can carry with you into your future careers.

Our service will take all students on the necropsy floor Mondays, Tuesdays, Wednesdays and Fridays (ie. days physically prosecuting necropsies). Thursdays are allocated for catch up/self study*. Our lab observes all the routine university holidays and you will not be expected to attend these days (<https://hr.oregonstate.edu/benefits/current-employees/time-holidays-protected-leaves/holiday-schedule>)

Our lab infrequently performs ‘emergency’ necropsies out of routine hours. Students should be accessible, but not necessarily in the immediate vicinity (you may travel away from the immediate Corvallis area). If you are going further afield (eg. beyond Portland metro area or equivalent), or will otherwise be non-accessible, please work with your other rotation colleagues to ensure that at least 1-2 students may be available should the need arise. In all likelihood, weekend involvement will not be necessary but our team would like some degree of student availability should the need arise. If in doubt, please discuss with the pathologist/resident on duty.

We are using a canvas STUDIO site found here: <https://canvas.oregonstate.edu/courses/1793094> and this is where you will find all necessary resources for this course.

Advance preparation

Please make a concerted effort to review the instructional videos on Canvas, prepared by Dr. Loehr. As time for prosecution may be limited, this will be a primary mechanism for covering the technical elements of a diagnostic necropsy. The following videos are deemed *mandatory advance preparation* (should take approximately 2hrs to complete). Please know you may be asked to leave the general necropsy area if you have not completed this preparation. You may contact the on-duty pathologist if there are extenuating circumstances.

General

Lab Orientation

PPE Basics

Sample Collection

Instrument Setup and Sampling SA

Necropsy Technique

Cat - Cavity Opening
Cat - Cavity Sample Collection
Cat - Organ Dissection

Cattle - Organ Removal
Cattle - Organ Dissection: Internal Organs
Cattle - Organ Dissection: PLUCK
Cattle - Brain Extraction - Part 1 and Part 2

There are a number of other videos available and these are strongly encouraged – especially if you have not had the opportunity to complete these skills yourself already. These could be completed at your convenience over the duration of the rotation.

Please check you can access the google share drive that we are using to share the necropsy gross images that you use for your presentations (ensure you log on with your OSU/onid ID).

We recommend you contact the on duty pathologist in advance of the rotation if you have any special requests/concerns that might be especially applicable to this block of instruction. Common examples include: physical impairment that might limit your ability to prosect specimens, pregnancy or concern regarding exposure to abortifacients, immunosuppressive disease, concern of fainting, and formalin sensitivity.

Expectations during rotation: general administration

Our schedule follows an approximate timeline as outlined below. You can assume this is the schedule unless you hear otherwise. However, please note that this can and does change according to caseload, staffing, and other commitments. Variations from this schedule will be communicated by the pathologist team.

Default meeting times are as follows*:

- Monday: orientation with necropsy staff at 9.30am (1st week only). You will meet to begin cases at approximately 10:15am both weeks
- Tuesday at 10:15am
- Wednesday gross pathology rounds at 8:30am

- Thursday: no requirement to be on necropsy floor - self-study and canvas materials
- Friday at 10:15am
- MTWThF: Student-led case presentation rounds at 3:30pm (approximately one hour). To be held over zoom and/or in person depending on pathologist on duty.

If there are changes to this, your pathologist will communicate exact start time. Generally, necropsies will be performed in the morning and into early afternoon; rounds (everyone over zoom) will be near the end of the day.

On Mondays, Tuesdays, Wednesdays and Fridays you will be prosecuting routine diagnostic necropsy specimens submitted to the OVDL. The number of cases you directly are responsible for will be dictated by case load for that particular day. You can expect anywhere between 0-2 cases on a given day; we aim for you to have been actively involved in at least one each of small animal, equid, and production animal necropsy during this rotation (subject to case submissions). Once you have completed this you may have more discretion regarding which cases you would like to prosecute.

Please note that on very busy days faculty/residents may take primary responsibility for the prosecution (+/- handing report presentation on to student). As you proceed with the necropsy, we will take images with our camera that belongs in necropsy. We recommend that you take request to have lots of photos taken: lesions, non-lesions, normal anatomy, anything else you find interesting and could wish to share with your colleagues. Photos will be uploaded onto a share drive at the end of the day. You should use these photos for your case presentations. Please do not use your own device for reasons of biocontainment.

On most days we aim for you to be off the floor by mid-afternoon (exact time dependent on cases for the day and concurrent circumstances). Lunch time will be dependent on cases and schedules and may be unpredictable. Please ensure you come on a full stomach and communicate with the pathologist if any special needs. We can accommodate most concerns.

Rounds and guidelines for case presentations

We aim to round most days in the afternoon (approximately 1-1.5hrs). These may be in person and/or over zoom and will be communicated by the pathologist on duty. This is set for a default time of 3:30pm but may be subject to change depending on case load and unanticipated circumstances (look for any additional communication with the pathologist and/or resident). We recommend that groups have a means of communicating among each other in real time, for last minute changes that might arise (eg. text threads, teams, email, other). Rounds are typically student led and will center

on cases from the previous day. If case material is in short supply, the pathologist may choose to use the supplementary materials on Canvas. Rounds might be truncated on the first day. Pathologists may have individual preference regarding how rounds are run (including expectations for case presentations). We recommend you check with your primary pathologist on the first day of each week to ensure everyone is on the same page.

In general, you are expected to assemble a short professional presentation (for screen share) of cases you have reviewed on prior days. Your presentation will utilize the images taken at the time of necropsy (images shared over Gdrive). Consider this a mixture of presentation and a platform for group discussion. We recommend that you use powerpoint that should include:

1. OVDL case number, date, relevant history/signalment (do not include everything – only what is relevant. Approximately 1 slide
2. Gross necropsy findings – dependent on lesions – about 3-5 slides(?) Please make images (what you saw!) the center piece of this, with relatively little text. Images can and should include a full spectrum of changes ranging from those diagnostic lesions, incidental findings, autolytic/agonal findings, or simply those findings that you had difficulty interpreting.
3. Gross morphologic diagnoses – 1 slide
4. Diagnosis (or differential diagnoses) – 1 slide
5. Discussion of testing strategies you might use to resolve your differentials (or confirm your diagnosis). Or is your gross diagnosis adequate? Is there zoonotic concern, herd health implications, public health concern, other? Suggest tests in bullet format (ie. PCR for XX, histopathology for YY, viral isolation for ZZ)
6. Open – be prepared to provide an overview of your proposed disease (of differentials), including answering questions.

Please keep the pre-prepared element of your presentation under 10mins. Use your slides as platform to communicate your findings to your peers and keep your thoughts organized. Do NOT prepare a lecture! Expect to stop and start and answer questions. Also be prepared to discuss the disease process(es) that may be present in your case. All students will be expected to engage in discussion, even if you were not actively involved in the prosection.

Please upload your completed presentation onto the google share drive and these may be used for future teaching purposes.

For Wednesday gross rounds at 8:30am, please check with your pathologist on duty regarding expectations for your involvement (eg. presence on the floor or in the gallery; requirement for presentation of history, findings, Ddx, or a combination thereof).

Thursdays 'off' necropsy floor

You have Thursdays 'off' the necropsy floor to catch up on cases not yet reviewed, come back to discussion points, review supplementary canvas content and complete some of the quizzes. Assume rounds at the normal time unless you hear otherwise. This session may not occur on 4-day weeks.

Absence policy

We will permit one day approved absence with no make-up required (contact on duty pathologist in advance). Absences longer than this will likely require make up and we will work with you and the Dean's office to accommodate reasonable requests.

Grading

To satisfactorily pass this rotation, the following minimal requirements are in place:

1. Daily attendance and active engagement unless arranged otherwise
2. At least one case presentation during rounds (most students will present many more than this). Required elements described elsewhere in this document.
3. Real time assessment of a minimum of five different routine necropsy skills, to be completed over the course of your two week block (we recommend you do more, with or without formal real time faculty/resident feedback). Please call your attending pathologist/resident and clearly indicate that you would like to receive real time evaluation on this skill (you will receive no assistance before or during the skill). The attending will listen/watch until you indicate you are complete, then offer immediate verbal feedback (for some skills you may call attending once you have completed it).

Evaluated criteria are marked in parentheses. *There are no consequences for non-satisfactory completion of one skill in isolation* – the purpose of this is to ensure all students a) meet rotation minimal requirements, and b) also provide you with explicit constructive feedback that you can implement in the future. If

deemed unsatisfactory, we recommend you repeat this skill again over the course of the rotation. Please keep a personal log of completed and evaluated skills – the pathologist may ask to see this at the end of rotation.

- i. Triage a routine necropsy specimen for zoonotic risk and recommend a course of action (*identify, evaluate, implement basic plan*)
- ii. Summarize reasonable differential diagnoses for a routine necropsy submission prior to prosection (*assimilate and summarize clinical data, create at least two reasonable differential diagnoses*)
- iii. Demonstrate in a necropsy specimen common examples of autolysis, normal anatomic variation, changes of non-significance (*most bodies for necropsy will have three or more of these*)
- iv. Evaluate diaphragm for integrity (*demonstrate negative pressure or lack thereof*)
- v. Open three body cavities in an efficient and timely manner (*thorax, pericardium, abdomen; usually from left lateral recumbency in a way that preserves organs for evaluation*)
- vi. Screen major viscera for gross lesions of diagnostic significance, or lack thereof (*identify major organs and relevant lesions*)
- vii. Organ extraction – such as pluck, endocrine organs, gastrointestinal tract, kidneys (*efficiently extract organs allowing for subsequent evaluation*)
- viii. Cardiac dissection (*extraction and identification of major anatomic landmarks*)
- ix. Comprehensive gross evaluation of a system such as respiratory, hepatobiliary, alimentary, urinary, endocrine organ (*systematic gross evaluation of major anatomic components; sectioning technique*)
- x. Gross evaluation and description of a lesion of diagnostic significance (*anatomic location, number, distribution, size, shape, color*)
- xi. Create a morphologic diagnosis (*severity, chronicity, distribution, process*)
- xii. Demonstrate appropriate procedure for collecting tissues for histopathology testing (*fixation solution, organs collected, sample size/shape, representation*)
- xiii. Demonstrate appropriate procedure for collecting fresh tissues for ancillary testing (*indication for testing, anticipated tests, appropriate sample, labeling, cleanliness*)
- xiv. Brain extraction and appropriate sampling (*extraction in a way that preserves structures for gross evaluation; sampling for histopathology +/- ancillary tests*)
- xv. Recommend appropriate additional testing strategies upon completion of gross examination
- xvi. Assimilate multi-disciplinary test results to suggest appropriate differential diagnoses
- xvii. Apply a knowledge of morphologic diagnosis to suggest appropriate differential diagnoses

4. Minimal knowledge of veterinary medicine and pathology
5. Appropriate professional behavior and interactions. Examples of non-professional behavior are: eating/drinking in the necropsy area, inappropriate biosafety precautions, unsafe behavior including sharps handling, lack of respect for deceased patients (including body parts) and/or grieving clients, inappropriate carcass disposal, unprofessional peer/staff/faculty interactions, failure to follow up on requests, and minimal engagement in rounds or case discussions.

Students deemed to be failing this rotation will receive verbal warning from the pathologist on duty on or before the last Friday of the first week.

Other instructions

- Our canvas page is building a number of quizzes which are excellent instructional resources. Currently these do not contribute to your grade but are a great opportunity for self study.
- Where there is additional down time (including days where few or no cases on the previous day to prepare presentation) there is plenty of other prepared material on canvas to work through. Your faculty pathologist will recommend module(s) they would like you to work through. Many of these modules are excellent study resources for NAVLE.

OHS Small Animal Primary Care

VMC 794

Guidelines and Procedures

Instructor in charge – Dr. Kirk Miller

This rotation is a two-week required rotation in Primary Care based at the Oregon Humane Society in Portland, OR. Students will perform medical and surgical treatments for the benefit of animals donated to OHS. Students will be provided with living quarters at the OHS for the duration of their two-week rotation. Students will be supervised by either an Oregon State University CVM faculty member (DVM) or a veterinarian employed by the Oregon Humane Society. This is a pass/fail course and evaluations will be completed by the Oregon State University faculty member.

The block will start with orientation on Monday. The students are expected to be on duty from Monday through Friday each week. The students will meet at the front of the building – SW corner labeled Incoming Pets - at 8:30 AM the first Monday of the rotation. The morning will be spent getting oriented, assigning rooms, paperwork, etc. We will begin taking care of patients in the afternoon.

Learning Objectives:

- To give students experience in performing physical examinations.
- To give students experience in providing preventative medicine and general health care.
- To give students experience in performing elective surgeries.
- To give students experience in dental techniques commonly used in small animal general practice.
- To expose students to behavioral problems in animals put up for adoption.

Learning Outcomes:

After completing the course, the students will have participated in a number of ovario-hysterectomies and castrations of dogs and cats. They will understand the common behavioral problems of dogs and cats that might make them undesirable pets. They will enumerate the procedures and vaccinations necessary for continuing good health in pets.

Clinic Assignments:

Students will work under the supervision of the OSU CVM faculty member (Dr. Miller) and the veterinarians employed by OHS. OHS has several Veterinarians plus a Shelter Medicine Intern and a Shelter Medicine Resident – all are involved in student instruction. Each student is responsible for assigned cases until the patient is adopted or transferred to another student.

Students will be responsible for morning treatments daily. These should be completed prior to morning rounds at 8:30 am (starting treatments at 7 am is required).

Students will rotate through different areas each day; special procedures/dentistry, behavior, surgery, and taking care of medical cases presented through the shelter. Evening rounds are held at 5 pm followed by evening treatments.

Evenings/Weekends:

Students should expect to work evenings while at OHS. Examples include helping process/intake large numbers of dogs from other shelters, discharging surgical patients, and providing medical information about pets to potential adopters. Students will typically be on duty until at least 7 pm Monday through Thursday.

There is no requirement that students work at OHS on the weekends. However, if students are staying in the Portland area, any help would be greatly appreciated. Students will be able to provide continuity of care for their hospitalized patients and be able to assist the on-call Doctor with any emergencies that arise.

Case Load:

OHS takes in about 12,000 animals per year. The save rate or “live release rate” is consistently around 98%. Students will be responsible for the care of their hospitalized patients including patients in various isolation facilities. It is impossible to predict the number of cases per student, but every effort is made to provide equitable distribution of cases.

Attire/ Professional Behavior:

Attire consists of surgical scrubs. Professional behavior will be expected when dealing with foster parents, fellow students, and staff.

Standard Equipment for Each Student:

- Bandage scissors
- Suture scissors
- Stethoscope
- Penlight
- Name badge

Student Assessment:

Evaluation is based on criteria such as: attendance, rounds participation, case participation, case management, attitude, work ethic, and teamwork with each other and OHS staff.

Students will be pass or fail based on the above criteria:

If a major problem (e.g., patient care insufficient, attitude problem) is noted early on, the clinician will give the student notice early in the block (formative comments) to give the student time to improve.

Textbooks:

There is a collection of books here at OHS which is comparable to many small hospitals. Between the books available here and resources on the web most students are able to access the information needed to care for their patients.

Living Conditions:

Dorm rooms are available for student use during your rotation. The rooms are equipped with beds and bedding, desks, lamps, etc. Students should bring their own towels and toiletries.

There is a kitchen and living room in the student living quarters. The kitchen is well-equipped with a refrigerator, microwave, stove, dishwasher, etc. Dishes, pots/pans, and most items needed for cooking are provided. The living room has a television with a satellite dish and a DVD player.

Pet Policy:

Students are allowed to bring one small or medium sized dog to stay with them while they are at OHS. The dog must be spayed or neutered, well-behaved, house-trained, wear visible ID, and be crated while students are working. There are offices nearby where people work – please do not bring large, loud, or poorly behaved dogs.

Contact Person:

If you have any questions regarding this rotation, please contact Dr. Miller. The best way to reach him is via e-mail at kirk.miller@oregonstate.edu.

The address is:

Kirk Miller, DVM, Dip ABVP
1067 NE Columbia Blvd
Portland, OR 97211

VMC 780

Veterinary Preceptorship

Guidelines and Procedures

Course Coordinator: Dr. Stacy Semevolos
stacy.semevolos@oregonstate.edu
(541) 737-7666 office phone

Preceptorship Requirement

The opportunity to observe and to work with practicing veterinarians in a variety of settings is a very valuable experience for veterinary students. All fourth-year veterinary students are required to participate in at least four weeks and up to eight weeks of preceptorships. Preceptorships can be scheduled as one, two, three, or four weeks at a time as long as there are at least four weeks total. The weeks may all be with the same veterinarian or with different preceptors.

Students are responsible for arranging their own preceptorships. Here is a [list of preceptorships](#) that our students have gone to in recent years.

Students must get approval from the Dean's office for each preceptorship by entering the potential preceptor's information into this [form](#). This must be submitted at least 2 weeks before the preceptorship begins.

The primary requirement for approval of a preceptorship is that the student will be supervised at all times by a licensed DVM. Within a week after completing the preceptorship, the student is to submit a report on the preceptorship and a "daily log" of the practice activities during the block to the student services coordinator. **This information is a requirement for graduation and is submitted to the Canvas assignments.** Any changes in preceptorship rotation, i.e., change of preceptor, length of time, date, etc., must be approved by the Dean's Office.

Students may receive payment for time while receiving academic credit. See the 'Policy on Student Compensation During Academic Preceptorships' for details and limitations.

Objectives of the Preceptorship Program

1. To familiarize students with the problems associated with the practice of veterinary medicine. These include the clinical, financial, and management situations which may be different from those seen in a university environment.
2. To increase the variety of clinical cases and clients that students are exposed to in their educational programs.
3. To acquaint the student with the philosophy of practice and the role of the veterinarian in a community.
4. To allow the student to interact with the practitioners and their clients.
5. To provide the student the opportunity to apply knowledge gained in an academic

setting to practice situations.

6. To improve communication between veterinarians and the College.

Duties of Preceptors

The preceptorship program is intended to demonstrate the realities of practice to students. Consequently, working hours and conditions will be those negotiated by the student and the practitioner prior to the start of the preceptorship. Although the work day may not be an 8:00 a.m. to 5:00 p.m. arrangement, the preceptorship program is intended to be full-time participation, and include approximately 40 hours per week. The student should be allowed to perform and participate in those professional services approved by the practitioner that do not conflict with State Veterinary Medical Practice Acts.

Insurance

Individual health and accident insurance is required of every CCVM student and is the responsibility of each student. Students are not covered by OSU insurance for any education activity. Some preceptorship locations may require liability insurance for students on site at their location. There is free liability insurance available to students offered through the AVMA:

<https://www.avmaplit.com/products/student-liability/>

Responsibilities of the Student

1. Conduct yourself in a professional and ethical manner.
2. Follow instructions and carry out assignments from the veterinarian.
3. Honor confidentiality of the doctor/client relationship.
4. Use good judgment in handling matters that arise when a veterinarian is unavailable for consultation.
5. Provide a description of the type of practice, experience gained, and turn in a "daily log" of the practice activities in which he or she was involved during the block.

Responsibilities of the Preceptor

1. Conduct his or her practice in a professional and ethical manner.
2. Advise student of his or her duties and responsibilities.
3. Supervise student in assignments when necessary.
4. Discuss important aspects of practice with student in a meaningful way.
5. Evaluate performance of student.

Emergency/Safety Information

If, at any time, or for any reason, you feel uncomfortable, unsafe, or unsupervised at your preceptorship, contact the Dean's office right away at (541)737-2098. If it is after hours or on the weekend, or there is no answer at the phone number given, call Dr. Scollan at the phone number listed at the top of this section.

Information for Radiation Exposure Monitoring

INFORMATION FOR PRECEPTOR

Student participation in imaging activities is an important learning experience including the training in proper radiation safety guidelines. You will be responsible for radiation safety for students that are actively engaged in radiographic imaging (e.g., holding patients during x-ray exposure, being in the room during fluoroscopy procedures). If a student participates in radiographic imaging where radiation exposure monitoring is required by state or federal regulations, or by additional facility requirements compliant with such regulations radiation safety monitoring including dosimetry has to be provided. (See requirement that an employer have a program to monitor occupational radiation exposure: State of OR: OAR 333-120-0020 “General Provisions: Radiation Protection Programs”, US Federal: 10CFR20 subpart B “Radiation Protection Programs”; Exposure limits for occupational radiation dose to individuals: State of OR: OAR 333-120-0100 “Radiation Dose Limits: Occupational Dose Limits For Adults”, US Federal: 10CFR20 subpart C “Occupational Dose Limits”). A radiation dosimetry report for the student must be submitted to the Carlson College of Veterinary Medicine (including radiation.safety@oregonstate.edu) within 90 days of the conclusion of the training experience. If you are unable to provide a dosimeter for students visiting your practice, you must have students leave the room during exposure or be 4- 6 feet from the x-ray machine when on ambulatory calls.

INFORMATION FOR STUDENTS

When you are on a preceptorship observing and working with practicing veterinarians in a variety of clinical settings, the veterinarian or supervisor at that facility is responsible for providing radiation safety monitoring and training of you in that time when you are engaged in radiographic imaging (including e.g. holding patients during x-ray exposure, being in the room during fluoroscopy procedures). If you are participating in radiographic imaging where radiation exposure monitoring is required by state or federal regulations, or by additional facility requirements compliant with such regulations radiation safety monitoring including dosimetry has to be provided. (See requirement that an employer have a program to monitor occupational radiation exposure: State of OR: OAR 333-120-0020 “General Provisions: Radiation Protection Programs”, US Federal: 10CFR20 subpart B “Radiation Protection Programs”; Exposure limits for occupational radiation dose to individuals: State of OR: OAR 333-120-0100 “Radiation Dose Limits: Occupational Dose Limits For Adults”, US Federal: 10CFR20 subpart C “Occupational Dose Limits”). A radiation dosimetry report for you must be submitted to the Carlson College of Veterinary Medicine (including radiation.safety@oregonstate.edu) within 90 days of the conclusion of the training experience. If the preceptor (veterinarian/supervisor of clinic) is unable to provide a dosimeter for you during the preceptorship, you must leave the room during exposure or be 4- 6 feet from the x-ray machine when on ambulatory calls.

Overview

Courses outside of CCVM can be used to satisfy elective credit requirements. Approved outside electives are:

- Courses that have been reviewed and approved by the Curriculum Committee. You can view the current list at <https://beav.es/Syb> or by scanning this QR code



- Clinical rotations at other AVMA accredited veterinary colleges

Procedures

If you are taking an outside elective, you should:

1. Register for the appropriate number of VMC 790 Clinical Experience credits
 - 2a. If the course is one that issues a completion certificate, submit it to the Student Services Coordinator when the course is complete.
 - 2b. If the course does not issue a certificate, enter the information into the preceptorship submission form and indicate that you will be doing the course for elective credit.

Requesting review of a new course

Students can submit a petition to the curriculum committee to request review of a course that is not currently on the list of approved electives. To do so, send the information described in the following policy to the Student Services Coordinator who will forward the petition to the committee.

Policy for Outside Course Credit Requests

A. Credit for elective courses not offered at Carlson College of Veterinary Medicine must meet the following criteria:

1. Student must present a paragraph summarizing how the course is important to their professional development to the curriculum committee.
2. Students requesting credit for courses offered outside Oregon State University Carlson College of Veterinary Medicine must provide to the curriculum committee:
 - i) A course syllabus written by the course director that contains the following:
 - (1) Evidence that the course is designed and facilitated by a veterinarian or faculty member at a teaching facility.

- (2) A description of the course contents including a listing of laboratory and lecture hours
- (3) Course objectives.
- (4) Course learning outcomes.
- (5) Method for monitoring outcomes.
- (6) Course credits.

B. Credit will be assigned according to university guidelines-

1. Approximately 1 credit will be assigned for each:

- i) 10 hours lecture
- ii) 20 hours discussion
- iii) 30 hours laboratory

2. When transferring in course work from a semester system institution, each semester credit will approximately equal 1.5 quarter credits.

C. The decision whether to assign credit is at the discretion of the curriculum committee.

D. If the student requests elective credit for an official rotation at an outside AVMA-accredited veterinary school, it does not require curriculum committee approval to assign elective credits at 1 credit per week of full-time rotation.

E. Any requests regarding courses for elective credit must be submitted to the student services coordinator, with all supporting documents, at least 12 weeks prior to the start of the course.

This policy was proposed by the Courses and Curriculum Committee and approved by the Faculty on June 18, 2019. Revisions to this policy were proposed by the Courses and Curriculum Committee and approved by the Faculty on April 21, 2020. Revisions to this policy were proposed by the Courses and Curriculum Committee and approved by the Faculty on May 24, 2022.

Graduation Requirements

Registration

The course registration process continues each term for 4th year. All required courses, elective and preceptorship credits must be accounted for on your final OSU transcript in order to graduate.

Summer term= Evaluate blocks 1, 2 and 3

Fall term= Evaluate blocks 4, 5 and 6

Winter term= Evaluate blocks 7, 8, 9 and 10

Spring term= Evaluate blocks 11, 12 and 13

Senior Papers

A written paper and oral presentation of the paper are a part of the requirements for graduation. Students are encouraged to develop topics that might be used for presentations given after graduation or result in a publication. The subject should be related to veterinary medicine and be of interest to veterinarians. References used should provide the most current knowledge on the subject.

Written Paper

The paper will be written in electronic format, double-spaced. The reference section is to be single-spaced. Your title page should show the title and the author. The advisor's name should be in the lower right-hand corner. When the advisor gives their final approval to the paper, they should email the Student Services Coordinator and/or the Associate Dean noting their approval of the final version. Failure to comply with these requirements will mean rejection of the paper, regardless of content. The written paper will be critiqued as to content, style, and format, by the student's senior paper advisor and the Dean's Office. Students should follow the instructions to authors of *JAVMA*. You can find the *JAVMA* instructions to authors for specific details at <http://www.avma.org/News/Journals/Pages/javma-ifa.aspx>

Oral Presentation

The oral presentation is scheduled for 15 minutes of presentation and 5 minutes of discussion, question and answer. The senior paper may be the main points and basic principles of a big subject or an in-depth research of a smaller subject. The oral presentation should be designed to best convey to the audience some of the material in the written paper. As much as possible the paper should not be read, as this is not an engaging method to present the material.

The faculty attending the oral presentation will evaluate the content and the presentation, and give the presentation a PASS or NO PASS. Their comments will be informative and intended as constructive criticism. If a majority of the faculty gives a grade of NO PASS, then the student will be required to either re-submit a satisfactory paper, or make another oral presentation of passing quality, or both.

Calendar

1. *Selection of date and topic for the presentation.* Date selection for the oral presentations is done with a lottery system. All dates should be selected by June 30, 2023. No more than 3 papers may be scheduled on any one day. Topics should be selected as soon as possible and each presentation topic must be different from all others. The Dean's Office will serve as the coordinator for this program and will maintain the master calendar.

2. *Selection of advisor.* The advisor is usually someone in the College of Veterinary Medicine. Any faculty member may be asked to serve as a faculty advisor. Occasionally, the best advisor is someone outside the College, and this is acceptable if the individual is able to advise and review drafts of the paper. If you need help with finding a faculty member to advise you on your topic of interest, contact the Associate Dean for assistance.

The advisor will:

- a. Help define an adequate subject and the scope of the paper. A proposed title and outline of the paper must be presented for approval to your advisor at least 60 days prior to the scheduled seminar presentation date. The student must complete the required form (including student name, topic, advisor's name, presentation date, paper draft due date, and final paper due date plus signatures of student and advisor) and submit to the Dean's office at least 60 days prior to the scheduled seminar presentation date. If this form is not submitted, the oral presentation will be delayed.
- b. Review the paper's rough drafts and give constructive comments on the content and format.
- c. Assist the student, as needed, in creating the PowerPoint and oral presentation. Review the PowerPoint and oral presentation prior to the scheduled presentation date.
- d. Review and approve the final copy ***within 4 weeks of*** the oral presentation or prior to completion of program/graduation, whichever comes first. The final paper must be presented to the advisor at least 14 days prior to this deadline.

Be sure that you and your advisor are clear on expectations and deadlines before you start researching your topic. If you can't agree on these, you should probably find a different advisor. Expectations of different advisors can vary quite a bit so this needs to be discussed at the outset.

3. *Submitting the final paper.*

The final copy of the paper which has been approved by the advisor must be submitted ***within 4 weeks of*** the oral presentation or prior to completion of program/graduation, whichever comes first. At the same time, an email from the advisor approving the paper must be sent to the Student Services Coordinator and/or the Associate Dean. **The final paper needs to be uploaded to the digital senior paper repository.** If any of the above are not completed before this date, this could result in a delay of graduation.

4. *Final approval of the paper*

The Dean's Office will notify the student once confirmation that it has been successfully uploaded to the digital archive and the signed cover page or email approval have been received. The student and faculty advisor will receive a compiled version of faculty comments on the presentation. If you do not receive notification of approval within a few weeks of completion, check with the Dean's office to find out the status of your paper.

Entrustable Professional Activities (EPAs)

Entrustable Professional Activities (EPAs) are essential workplace activities that veterinarians are expected to perform in clinical practice and are based on the competency-based veterinary education framework (<https://cbve.org/>).

- Eight core EPAs have been developed and are used by veterinary colleges worldwide: (<https://www.aavmc.org/wp-content/uploads/2020/10/CBVE-Publication-2-EPA.pdf>)
 - EPA1: Gather a history, perform an examination, and create a prioritized differential list
 - EPA2: Develop a diagnostic plan and interpret results
 - EPA3: Develop and implement a management/treatment plan
 - EPA4: Recognize a patient requiring urgent or emergent care and initiate evaluation and management
 - EPA5: Formulate relevant questions and retrieve evidence to advance care
 - EPA 6: Perform a common surgical procedure on a stable patient, including pre-operative and post-operative management
 - EPA7: Perform general anesthesia and recovery of a stable patient including monitoring and support
 - EPA8: Formulate recommendations for preventive healthcare

Requirements for senior students:

Completion of a minimum of 16 EPA assessments is required for graduation. Students must have at least one assessment completed in each of the 8 EPA categories, and the remainder can be from any category.

These EPA assessments are intended to provide immediate and useful feedback to students on mastery of workplace activities in a directly-observed, real patient setting. It is the responsibility of each senior student to make sure all EPA categories and assessments are fulfilled prior to graduation. Clinicians are encouraged to initiate EPA assessments at their discretion throughout the rotation, in order to provide immediate and useful feedback.

EPA assessments will be made using a 5-point entrustment scale and specific verbal feedback on what the student is doing well, and what is needed to advance to the next level. The entrustment scale is based on the question, “Can the learner do the activity unsupervised?” and is as follows:

1. Not ready to trust -- Learner could not perform and observed only --I did it
2. Trust with constant guidance --Learner required step by step guidance -- I talked them through
3. Trust with intermittent guidance -- Learner required direct supervision with intermittent guidance -- I directed them from time to time
4. Trust with on demand guidance --Learner required on demand supervision -- I was available just in case
5. Trust with no guidance -- Learner required minimal supervision, could trust to do on own if already graduated-- I did not need to be there

All EPA assessments will be performed using Smartsheet ([Student Evaluations](#)). We

highly encourage clinicians and students to download the [Smartsheet App](#) to provide immediate access to EPA assessments. Students will be able to view their individual assessments for each EPA as well as their cohort average through a Smartsheet dashboard. In addition, an email is sent to the student and evaluator upon completion of each EPA assessment. To initiate an EPA assessment, the clinician chooses the appropriate EPA category in the student evaluation form in Smartsheet and completes an assessment, based on their direct observation of the activity. Once completed, the clinician and student should discuss the assessment and clarify any questions or concerns. Students can also ask a clinician (faculty member or house officer) to complete a specific EPA for a case or activity, using the [Student Request form](#). Student requests for EPAs should be made within 24 hours of seeing the patient.

**Clinicians and students are encouraged to complete at least 1 EPA assessment per clinical rotation for each student and pay attention to EPAs that pertain only to specific rotations. This will allow students to achieve the required number of assessments and see their growth over time.

**It is expected that students may receive lower entrustment scores earlier in the senior year and that these will improve over time. Some categories will have lower entrustment scores than others. Cohort averages will help students to gauge their performance with their peers, but it is not a competition! Student progress should primarily be based on their own performance over time rather than comparison to others.

The following table provides examples of relevant EPAs for each of the required rotations (this is illustrative only-any EPA can be completed in any rotation if it is deemed relevant to the specific EPA).

Required Rotations	Relevant EPAs
VMB 736- Diagnostic Clinical Pathology	1,2,3,4,5
VMB 795-Diagnostic Services	1,2,5
VMC 732- LA Clinical Medicine	1,2,3,4,5,8
VMC 734- LA Clinical Surgery	1,2,3,4,5,6
VMC 735- Rural Veterinary Practice	1,2,3,4,5,6,7,8
VMC 737- Vet. Anesthesiology	1,4,7
VMC 782-LA Emergency Care	1,2,3,4,6
VMC 791-Clinical SA Medicine	1,2,3,4,5,8
VMC 793-Clinical SA Surgery	1,2,3,4,5,6
VMC 794- OHS SA Primary Care	1,2,3,4,5,6,7,8
VMC 796- Clinical Imaging	1,2,5
VMC 797- SA Critical Care	1,2,3,4,5
VMC 719- Clinical Cardiology	1,2,3,4,5
VMC 753-Clinical Oncology	1,2,3,4,5
VMC 729- Theriogenology	1,2,3,5

Miscellaneous

Graduation Policy for Guest Hooders

A graduating veterinary student may request to be hooded by an immediate relative (parent, grandparent, sibling, or spouse) who is a veterinarian. Such requests should be submitted to the Associate Dean for Student and Academic Affairs, at least 6 weeks prior to the graduation ceremony. If approved, the student will be notified by the Dean's Office regarding specific arrangements and expectation.

International Travel Registry

The Oregon State international travel registry is designed to capture travel information for all faculty, staff, and students traveling internationally for university-related activities such as conferences, research, professional or club activities, etc. If you are traveling out of the US for preceptorship or electives please use this registry.

<https://oregonstate-idea.terradotta.com/index.cfm?FuseAction=Security.LoginWizardStepOne>

Registry Benefits

- Automatic enrollment in the Travel Accident & Sickness Plan which includes access to the 24/7 safety and security emergency services.
- In the event of an emergency, this registry will enable OSU to locate and contact you to coordinate help.
- The registry allows travelers to securely store a copy of their passport.

Diversity and Inclusion Training Requirements

All students must attend a minimum of 4 events at the CCVM or other events focused on diversity and inclusion. Student must send a short description of the event and what was learned relevant to diversity and inclusion to the Dean's office to fulfill the graduation requirement.

Clinical Rotation Evaluation Form-CBVE competencies

SKILL LEVEL:	NOVICE: The minimum expectation for entry to clinical rotations	ADVANCED BEGINNER: Developing competence	COMPETENT: Expectation for day-one practice	PROFICIENT: Aspirational expectation after some time in practice
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****Each rotation selects competencies from this list to evaluate students**

Clinical Reasoning and Decision-making

Competency 1.1

Gathers and assimilates relevant information about animals (i.e. Collects history; Performs physical examination; Interprets diagnostic test results; Performs necropsy examination).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 1.2

Synthesizes and prioritizes problems to arrive at differential diagnoses (i.e. Identifies problems; Creates refined problem list; Prioritizes differential diagnoses).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 1.3

Creates and adjusts a diagnostic and/or treatment plan based on available evidence (i.e. Appraises available clinical information; Explains justification for plan; Re-evaluates animal or population to adjust plan; Uses critical thinking to determine appropriate action).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 1.4

Incorporates animal welfare, client expectations, and economic considerations into the diagnostic or treatment plan (i.e. Considers disease in context of the whole animal and client; Presents a range of options to the client; Considers euthanasia as a management option when appropriate).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 1.5

Prioritizes situational urgency and allocates resources (i.e. Triage cases to address most urgent and important problems first; Recognizes emergent situation and directs action;

Recognizes and responds to reportable, transboundary, epizootic, and emerging/re-emerging diseases).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 1.6

Adapts knowledge to varied scenarios and contexts (i.e. Extrapolates knowledge to novel species or situations; Adjusts existing protocol or procedure when standard measures are unavailable).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 1.7

Recognizes limitations of knowledge, skill and resources and consults as needed (i.e. Identifies situations in which referral is warranted; Consults experts both within and outside the veterinary profession).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Individual and Population Animal Care and Management

Competency 2.1

Performs veterinary procedures and post-procedural care (i.e. Performs elective procedures- e.g. castration; Performs routine therapeutic procedures; Performs emergency procedures; Provides analgesia and postoperative care; Anesthetizes and recovers patients; Obtains diagnostic radiographs, obtains diagnostic abdominal ultrasound images, Manages patient comfort).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 2.2

Promotes comprehensive wellness and preventive care (i.e. Recommends disease prevention measures; Provides counseling to obtain radiographs for breeding programs; Provides nutritional counseling; Advises clients regarding routine dental care; Counsels clients about husbandry and welfare needs).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 3.1

Applies population management principles in compliance with legal regulations and economic realities (i.e. Recommends disease prevention measures; Advises on nutritional

management; Advises on imaging options for breeding programs; Recommends housing and husbandry protocols; Designs therapeutic plans for disease management).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 3.2

Recommends and evaluates protocols for biosecurity (i.e. Develops isolation protocols; Selects disinfection protocols; Recommends protocols for animal movement; Recommends and familiar with ALARA protocols)

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 3.3

Advises stakeholders on practices that promote animal welfare (i.e. Advocates for animal welfare; Explains ethical and welfare-related aspects of production processes; Recognizes proper handling and/or adequate production facilities; Advises on animal husbandry and transport; Advises on safe radiation exposure).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Public Health

Competency 4.1

Recognizes zoonotic diseases and responds accordingly (i.e. Identifies the clinical signs, clinical course, transmission potential and pathogens associated with zoonotic diseases; Responds to zoonotic disease diagnosis through owner education, reporting, quarantine, and disinfection).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 4.2

Promotes the health and safety of people and the environment (i.e. Makes recommendations for management of animal waste, carcasses, and by-products; Implements safety and infection control practices; Advises on disaster/emergency preparedness and response; Practices responsible use of antimicrobial agents; Describes and practices the role of the veterinarian in ALARA; Describes the role of the veterinarian in food safety).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Communication

Competency 5.1

Listens attentively and communicates professionally (i.e. Communicates with diverse audiences; Utilizes a variety of communication platforms).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 5.2

Adapts communication style to colleagues and clients (i.e. Demonstrates client-centered communication; Elicits client goals, expectations, perspectives and constraints; Demonstrates communication of medical information using professional terminology, Engages clients in difficult conversations such as financial decisions and end-of-life care).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 5.3

Prepares documentation appropriate for the intended audience (i.e. Documents care and communication using professional terminology; Ensures documentation fulfills professional and legal requirements)

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Collaboration

Competency 6.1

Solicits, respects and integrates contributions from others (i.e. Invites input from others; Acknowledges input and incorporates into ongoing plan of action; Leverages roles to achieve shared goals, Consults specialists to provide best medical care).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 6.2

Functions as leader or team member based on experience, skills and context (i.e. Applies principles of teamwork; Bases action on collaborative input; Manages conflict).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 6.3

Maintains ongoing relationship to provide continuity of collaborative effort (i.e. Follows up to determine if collaborator can implement the plan; Provides support through encouragement, education, or redirection to refine the plan of action).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 6.4

Demonstrates inclusivity and cultural competence (i.e. Demonstrates respect for diversity; Encourages diverse contributions within the workplace)

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Professionalism and Professional Identity

Competency 7.1

Adopts an ethical approach to meeting professional obligations (i.e. Applies an ethical approach to professional decision-making; Recognizes and responds to evidence of neglect and abuse).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 7.2

Practices time management (i.e. Recognizes impact of time management on stakeholders; Prioritizes and completes tasks according to importance and urgency)

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 7.3

Reflects on personal actions (i.e. Invites and responds to constructive feedback on performance; Critiques decision-making process and its outcomes)

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 7.4

Engages in self- directed learning and career planning (i.e. Engages in self-directed learning as a foundation for life-long learning; Identifies and undertakes professional development to meet learning needs; Uses appropriate resources for learning and decision making).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 7.5

Attends to wellbeing of self and others (i.e. Recognizes sources of workplace stress and acts to remedy adverse situations; Recognizes signs of stress in self and colleagues, engages in self-care; Manages expectations of client and self)

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Financial and Practice Management

Competency 8.1

Weighs economic factors in personal and business decision-making (i.e. Applies financial principles to professional decisions; Explains work-related insurance; Describes relationship between revenue generation, expense categories, and compensation).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 8.2

Delivers veterinary services compliant with legal and regulatory requirements (i.e. Acts in accordance with codes of professional practice, veterinary practice acts and licensing board regulations; Acts in accordance with legal and regulatory requirements; Ensures and demonstrates ALARA principles, Selects drugs in accordance with regulatory and legal requirements).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 8.3

Advocates for the health and safety of patients, clients, and members of the team within the workplace (i.e. Complies with workplace health and safety regulations; Applies safe practices for handling hazardous materials).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Scholarship

Competency 9.1

Evaluates health-related information (i.e. Retrieves and evaluates information based on research principles; Analyzes information for accuracy, reliability, validity and applicability).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 9.2

Integrates, adapts and applies knowledge and skills (i.e. Formulates questions and customizes solutions; Applies literature to solve clinical or scientific problems).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Competency 9.3

Disseminates knowledge and practices to stakeholders (i.e. Develops and disseminates educational material; Explains evidence-based recommendations).

Pre-Novice	Novice	Advanced Beginner	Competent	Proficient	N/A
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Scoring of Competency Domains:

***Points possible in each category vary depending on the clinical rotation**

Clinical Reasoning and Decision-making: (20-40 points possible) = _____

Animal Care and Management: (0-25 points possible) = _____

Public Health: (0-5 points possible) = _____

Communication: (5-20 points possible) = _____

Collaboration: (5-10 points possible) = _____

Professionalism: (5-15 points possible) = _____

Financial and Practice Management: (0 points possible) = _____

Scholarship: (5-10 points possible) = _____

Total Overall Points: (100 points possible)= _____

Rotation grade:

____ **Pass: ≥ 70 points**

____ **No Pass: < 70 points**

Comments to Student: