Veterinary Health Center
MANHATTAN, KANSAS

OFFICIAL PROTOCOL

DIAGNOSTIC IMAGING AND RADIOLOGY

OBJECTIVES

1. Develop sound radiation safety practices.
2. Produce diagnostic radiographic studies and assess image quality.
3. Develop a routine for systematic description and interpretation of images using Roentgen signs and communicate radiographic findings.
4. Understand indications for contrast procedures and alternative imaging modalities available to veterinary medicine.

SCHEDULE

Students are expected to arrive at the Radiology section at 8:00 A.M. Lunch periods are scheduled by the technologists depending on caseload and daily schedule.

Students will attend rounds at 8:00 A.M. Monday-Thursday and 9:00 A.M. Friday unless specified otherwise.

Students are assigned to different imaging duties, on a rotating basis. Students should be available in person (and by pager) until the diagnostic imaging appointments are completed for the day.

Students will have afternoon (4:00-5:00) rounds to evaluate pertinent teaching cases from day before when clinical case load allows.

During non-busy times, students will be expected to review imaging literature, VCS 845 notes and PPT's, and listen to residents' interpretations of clinical cases. Students should remain available in the event clinical patients present.

ATTENDANCE

Diagnostic Imaging (Radiology) requires that a minimum of 13 contact days must be completed, no more than 2 days can be missed. If a student is out 3 days, 1 day must be made up; 4 days out will require the rotation to be rescheduled.

DRESS CODE

The following uniforms are required:
A. Small Animal, Dispensary, Radiology, Clinical Laboratory:
I. White jacket with proper identification.
II. Dress shirt or dress blouse. Ties are no longer required as studies have shown them to harbor bacteria because they are infrequently washed. If a tie is worn it should be tucked inside or clipped to a shirt so that it does not accidentally come in contact with a wound.

III. Dress footwear (sandals or other open-toed shoes are not permissible).
IV. Dress slacks, appropriate length dress or skirt

RADIATION SAFETY ATTENDANCE

IMPORTANT!!! Pregnant students are not allowed to work near devices which emit ionizing radiation. Pregnant students and students suspecting themselves of being pregnant must communicate this in writing/via email to one of the radiologists and Department Office (prior to starting the rotation) so that non-hazardous responsibilities within the section can be assigned.

1. A radiation dosimeter is issued to each student at the beginning of the block. It must be worn on the outside of the protective apron, at collar level. Badges are worn right-side out. The badges may only be taken from the building on ambulatory or other duties related to the VHC. Please do not launder badges!
2. Radiation-attenuating aprons, gloves and lead glasses must be worn by persons in the room when an exposure is made or fluoroscopy is in use. Gloves/gowns are damaged when folded or bitten. Hang after use. Do not use as protection from scratches/bites.
3. **STAY OUT OF THE PRIMARY BEAM!!! PROTECTIVE GARMENTS WILL NOT PROTECT YOU.** Stand as far from the animal as possible when restraining it for an exposure and collimate the beam as much as possible. Use cassette holders for large animal radiography**. THE BEST EXPOSURE IS NO EXPOSURE.** As few people as possible should be used to restrain an animal. Animal restraint devices (tape, sedation, etc.) should be used whenever possible. Think out the procedure carefully to minimize retakes and double-check each other's setup(s). **Do not hesitate to discuss the need for sedation with the radiology veterinary technician or radiologist if the animal shows indications of being difficult to restrain.**

CLINICAL RESPONSIBILITIES

1. **Main Room, Back Room, and Large Animal Room.**
    A. Review the clinical history of the patient and be aware of possible complications (oxygen dependent or aggressive, etc.)

    B. Obtain diagnostic quality radiographs as requested for the clinical patients.
        1. Check schedule and ensure patients are imaged on time.
        2. Contact Radiologist or Technologist on case when problems arise (sedation needed, case delayed due to emergency, etc.)

    C. Determine correct positioning for requested study.
        1. Position animals for exposure.

    D. Evaluate quality of radiographic study with the radiology technologist, resident, or radiologist and discuss case to see if additional views will be needed before releasing animal from radiology.

    E. Understand the indications for radiography for that case, properly interpret the films independent of the radiologist and be able to discuss your findings.

    F. Make sure workspace in rooms are clean and clutter free after each patient.

2. Special Procedures

A. Check with the radiology Technologist 1 **day in advance of scheduled duty** to see what special procedure(s) are planned for the following day.

B. Know indications and protocol for the scheduled procedure.

C. Help the radiology Technologist/house officer set up equipment and supplies for the procedure and attend the study.

D. All Main Room/Large Animal Room/Back Room responsibilities described above also apply.

E. Make sure workspace in rooms are clean and clutter free after each patient.

3. Ultrasonography

A. Hands on ultrasound is available as a lab during the first week of the rotation. Student owned dogs are used for these labs and this will be confirmed and finalized prior to the lab.

B. Check schedule, page clinician and responsible student for patients and have patients ready in ultrasound room to be imaged at their appointed time(s).

C. Contact the student and clinician assigned to the case before each case, and arrange sedation, timing, etc. when problems arise (sedation required, case delay, etc.).

D. Make sure workspace is clean and clutter free after each patient.

E. Follow up on all cases of the day (cytology results and surgical outcome, etc.

4. Special Group Project – What's Your Diagnosis?

A. Each rotation will be required to produce a "What's Your Diagnosis" case study that will be distributed to all students (1^{st}-4^{th} year) within our Veterinary program.

B. The teaching value can be anything (something as simple as anatomy, pathology, disease processes or how to develop a differential list and prioritize it).

C. The case selection will be made by faculty in the imaging section. We will entertain a student suggested case.

D. Once the case is chosen a rough draft of the case must be presented to a faculty member by the Monday of the second week of rotation for review. Final should be handed in by Thursday of third week.

E. Instructions and template are on course homepage in Canvas.

F. Faculty member will be responsible for making sure that distribution occurs.

5. Grading

A. Grades are based upon professionalism, participation in rounds (quizzes in rounds), technical proficiency, clinical skills, anatomy quiz, physics take-home assignment and a final examination of radiographic interpretation. Point contributions of these criteria towards the final grade are outlined on the next page.

B. The final examination is given from 8-10:15 a.m. in the morning two days prior to the last workweek day of the block (i.e. on Wednesday morning if the block ends on Friday). The exam is comprised of radiographs from clinical cases to be interpreted. Students must work independently, in a locked down browser and the examination is NOT "open-book."

C. The anatomy and final examination scores must be at least 70% to achieve a passing grade for the rotation. If less than 70% is achieved on the anatomy or final exam, a single re-examination will be given on the following day (similar format or oral examination at the faculty discretion). The recorded final examination grade will be 70% even if the student scores higher on the reexamination. Scoring less than 70% on the re-examination in either the anatomy or final examination will result in a **D** grade for the rotation.

SENIOR RADIOLOGY TOPIC ROUNDS

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	Orientation	Anatomy Quiz Film Interpretation	Ultrasound Lab	Ultrasound Lab	Large animal Lab
2	Thoracic Radiology	Thoracic Radiology	Abdomen Radiology Take home physics exam due	Abdomen Radiology	Technical Topic
3	Orthopedic Radiology	Orthopedic Radiology	Exam 8:00 – 10:00 a.m.	Open	Technician Topic

8:00 a.m. – 10h30: (Monday, Tuesday, Wednesday, Thursday) Topic rounds, tests, etc. as listed in the above chart
8:00-10:00 a.m. (or until finished): Resident rounds to review films from the previous day

The group will be split in 2 for the ultrasound lab rounds. The first day, half the group will do hands-on ultrasound while the remaining students use this time for review of the cases in the conference room. The groups will switch for the second day.

Recommended References:
Veterinary Diagnostic Radiology (Thrall)

BSAVA Manual of Canine and Feline Radiography and Radiology: A Foundation Manual
(Editors: Andrew Holloway, Fraser McConnell)
BSAVA Manual of Canine and Feline Abdominal Imaging (Editors: Robert O'Brien, Frances Barr
BSAVA Manual of Canine and Feline Musculoskeletal Imaging (Editors: Robert Kirberger, Fintan McEvoy)
BSAVA Manual of Canine and Feline Thoracic Imaging (Editors: Tobias Schwarz, Victoria Johnson)
BSAVA Manual of Canine and Feline Ultrasonography (Editors: Frances Barr, Lorrie Gaschen)

Daily Objectives: You are required to know normal anatomy as covered in previous courses. The notes from the radiology course and chapters in Thrall should be reviewed prior to morning topic rounds. The sophomore radiology lab material that is available in the computer lab is also excellent review material. In addition, knowledge from medicine, surgery, pathology and physiology is required to apply to cases on an integrated basis.

You are required to review the radiology notes and PPTs prior to the exam the third week.
If there are any questions regarding this material, please ask the radiologist or resident on duty.
Conference room is to be cleaned each Friday.

RADIOLOGY STUDENT GRADE EVALUATION FORM

Date: _____
Name: _____ Dr./Tech: _____

KNOWLEDGE: (Score _____/70 (*53 points required)
1. Rounds case quizzes: 6 quizzes will be average to a score out of 20. /20
Radiologic take home quiz (_____/10)
3. Radiology proficiency worksheet (_____/5)
4. Anatomy examination (_____/10)
5. Final examination (_____/25)

**Passing score on final exam is 70%. A single re-take of a final examination of similar format is allowed. However, the maximum score on a retake examination is 70%. A student must pass the exam to pass the rotation.

CLINICAL SKILLS AND PROFESSIONALISM (Score _____/30) ** 21 points required.
1. Knowledge Base / Interpretation Skills (_____/6)
2. Self-Educational / Resources / Problem solving skills (_____/6)
3. Punctual / Organized / Prepared / Efficient (_____/6)
4. Work ethic / Participation / Interactions w/others / Communication skills (_____/6)
5. Clinical skills; Positioning/Safety (_____/6)

Comments: _____
_____

Student name:
Date:
Section/Lab:
Evaluator:

Updated 3/31/2022 *Approved by N. Cassel*

CRITERIA	MARK /5
System of evaluation	**/5**
Description of pathology using Roentgen signs	**/5**
Use of correct terminology, identification of pathology	**/5**
Summary/Conclusion/Diagnosis	**/5**
Integration of knowledge, knowledge of anatomy, pathophysiology,	**/5**
SUBTOTAL	**/25**