GUIDELINES FOR A FOCUSED EMERGENCY AND CRITICAL CARE INTERNSHIP PROGRAM

Veterinary Internship programs are not standardized and neither are they regulated. Each internship program has its own strengths and weaknesses. It is the responsibility of the prospective intern to determine which program will best fit his/her needs. The prospective intern is strongly encouraged to determine their own short- and long-term goals, interview the program mentor, obtain feedback from current and past interns of the program, and visit prospective programs if possible.

These Guidelines refer the prospective intern and program mentors to the VECCS FACILITIES DEFINITION (available on the VECCS website under “About Us”) to familiarize themselves with the different levels of emergency and critical care facilities. The prospective intern and program mentors can use the information contained in the definitions as a guide to what type of facility, staffing and equipment resources for which to look for in an internship program.

These Guidelines are meant to serve as a resource for:
1. the student or veterinarian interested in a focused emergency and critical care (EM/CC) internship
2. the facility supporting a focused EMM/CC internship
3. the rotating internship program offering an EM/CC rotation

It contains: a) list of questions the prospective intern may ask regarding a program; b) list of suggested topics to review during didactic instruction; and c) list of procedures and skills for which the intern may strive to accomplish during a focused EM/CC internship program.
Questions a Prospective Intern May Ask Regarding a Focused EM/CC Internship Program

Type of Practice
In what type of facility(ies) will the intern work?
Who are the supporting faculty? Experienced clinicians and/or board-certified specialists?

Goals
What expectations does the practice have for the intern?
What are the goals of the applicant?
    Mentored experience prior to general practice?
    Future board-certification in EM/CC?
Is the prospective intern thinking about doing a residency? If so, the applicant may ask how successful interns from the practice are in obtaining a residency, and the circumstances why placement may not have happened.

Education
Are there formal didactic rounds, Journal Club, morbidity and mortality rounds, dry and wet labs?
Are interns expected to complete a clinical investigative study or a research project and/or submit a publication?
Are interns expected to give a formal presentation?
Are there patient rounds? What kind?
Is there access to information electronically?
Is there a certificate awarded at the completion of the program?

Mentorship
Does each intern have a faculty advisor or mentor?
An ACVECC specialist on staff?
How many hours does the intern work under direct supervision of a senior doctor?
Does the intern cover emergency duty independently or under direct supervision?

Surgery/Anesthesia/Analgesia
Do interns perform surgery independently, with supervision?
Can interns gain experience in elective surgeries?
Does the hospital have modern equipment and capability to practice high quality medicine?
    Anesthetic ventilators?
    Anesthetic monitoring equipment, (e.g. BP, SpO2, ECG, ETCO2 - what type)?

Intensive Care Unit
Transfusion products are readily available?
Routinely place and utilize enteral feeding tubes?
Is parenteral nutrition available and utilized?
Is there central or invasive blood pressure monitoring capability?

Medical Record Keeping
Does the hospital use a problem oriented medical record?
Are the intern’s records reviewed by the faculty?

Work Logistics
What is the exact start/end dates of the internship?
Is there an orientation period?
What is the typical work schedule for an intern?
Is the intern expected to be on call in addition to scheduled clinical shifts?
Suggested Didactic Topics to Cover During A Focused Emergency and Critical Care Internship

Critical Thinking
• The problem based approach to patient care

Safety
• Infection control; Radiation safety
• Workplace and health safety for veterinary personnel

Triage, History, and Physical Examination
• Initial communication skills (telephone and in-person)
• Facility setup/organization/emergency drugs/supplies

Initial Approach to the Emergent Patient

Shock/Sepsis/SIRS
• Pathophysiology & Clinical management of shock
• The 3 P’s: pain, perfusion, and pulmonary stabilization for any species

Cardiopulmonary-Cerebral Resuscitation, CPCR
• Basic & Advanced Cardiac Life Support

Fluid Therapy
• IV fluid administration guidelines
• Peripheral and central IV catheter placement and care

Transfusion Medicine
• Types of and indications for transfusion/blood products

Coagulation
• Clotting cascade, DIC

Respiratory
• Respiratory distress: localization of lesion & stabilization and treatment
• Oxygen therapy, routes of administration, airway management techniques

Analgesia/Anesthesia/Sedation
• Physiology of pain
• Pre-emptive and multi-modal pain management for the critically ill

Surgical Principles

Trauma

Cardiovascular
• Congestive heart failure
• Fundamentals of cardiac electrophysiology

Abdomen
• Acute vomiting and diarrhea
• Acute abdomen; GDV
Genitourinary
- Dystocia, Pyometra
- Feline Lower Urinary Tract Disease, FLUTD, urethral obstruction,
- Poisonings and Intoxications
  - Management principles

Metabolic
- Blood gas and acid-base balance; lactate
- Electrolyte derangements; magnesium

Hematology
- Evaluation of a CBC & blood smear
- Bone marrow aspiration and biopsy

Pharmacology
- Antibiotics
- Constant rate infusions, CRI calculations

Neurology
- How to perform a complete neurologic exam,
- Distinguishing orthopedic from neurological disorders

Nutrition

Oncology

Ophthalmology
- Conjunctivitis: viral, allergic
- Uveitis
- Glaucoma
- Proptosis
- Corneal injury
- Descemetocele
- Eyelid trauma

Monitoring
- Cardiovascular monitoring in the ER, ICU, and during anesthesia
- Kirby’s Rule of 20
- Real-time and serial; hands on and machine assisted

Imaging
- Radiographic positioning
- Ultrasound fundamentals
- Advanced imaging introduction: CT, MR, IR

Exotic/Avian/Small Mammals/Wildlife
- Normal examination parameters, safe restraint, husbandry
- Problem-oriented approach to exotics emergencies
- Common emergency treatments: fluid administration, analgesia, anti-infective medications
- Sample collection: blood, respiratory, choanal, crop, vent
- Egg binding
- Respiratory distress; air sac tube placement
- Trauma
Administration, Documentation & Communications

- Reviewing hospital policies
- Management and leadership skills
  - Direct and respectful communication
  - Professional appearance and integrity
  - Appropriate self-management
- Timely documentation of medical findings, procedures and communications
- Attention to detail, accuracy, labeling, request/submission form data completion
- Difficult conversations: the distraught pet owner, money in medicine, lack of funds vs discretionary spending, end-of-life care, euthanasia, hospice, post-mortem examination
- Administrative aspects of staffing, stocking and managing an emergency and critical care service/hospital

Veterinary Disaster Response

- Training, planning, preparation, recovery
- Assisting working animals that become victims of a disaster
Suggested List of Procedures and Skills for which to become familiar during a Focused Emergency and Critical Care Internship

Airway and oxygenation
- laryngoscopic exam for laryngeal paralysis
- emergent/slash tracheostomy and tracheostomy tube care
- sternal and dorsal position tracheal intubation
- nasal, nasotracheal, transtracheal oxygen catheters
- hood/bag/flow-by/mask oxygen delivery

Respiratory
- thoracenteses
- chest tube placement, intermittent suction of chest tube, set-up underwater suction apparatus for pleural drainage, and manage
- set up and monitor patient on anesthetic ventilator
- nebulization and coupage
- transtracheal wash: orotracheal and percutaneous approaches
- arterial blood sampling
- evaluation of blood gases

Vascular Access
- central venous access: peel-away, Seldinger, through the needle
- central line medial saphenous vein cat, lateral saphenous vein dog
- emergency cutdown and venotomy cephalic vein, saphenous vein, jugular vein
- intraosseous catheter placement: humerus, femur, radius (avian)

CPCR
- closed chest CPCR
- orotracheal drug administration
- intraosseous drug administration
- closed chest compression
- simultaneous ventilation – compression
- interposed abdominal compression
- external defibrillation
- open chest CPCR
- cardiac massage
- temporary aortic occlusion: modified Rommel tourniquet, digital pressure
- open pericardium
- internal defibrillation
- using end tidal CO2 and Doppler to assess success of ROSC
- resuscitation of neonate, bird, reptile, small mammal

Cardiovascular
- CHF stabilization
- pericardiocentesis
- ECG diagnosis
- antiarrhythmic therapy

Hemorrhage Control
- control of massive bleeding from major peripheral arterial injuries
- counter pressure, hind-limb, abdominal (salvage maneuver)
- extremity, limb, tail amputation
- marginal ear vein ligature
Abdominal/Gastrointestinal
abdominocentesis, 4 quadrant diagnostic paracentesis
diagnostic peritoneal lavage
naso-esophageal – gastric, (NE, NG), tube placement and care
oro-gastric intubation and lavage
rectal prolapse replacement
assist with emergency abdominal exploration

Urogenital
male and female urethral catheterization
relieve urethral obstruction: male and female
set up closed urine collection system
cystocentesis
dystocia, medical and surgical management
assist with emergency abdominal exploration for uroabdomen
ovariohysterectomy for pyometra
caesarian section
cystotomy for cystoliths, biopsy, wall culture
castration for major testicular trauma

Eyes/Ears/Nose/Throat
direct and indirect ophthalmic exam: menace response, dazzle reflex, PLR’s
fluorescein stain
measurement of Schirmer Tear Test
measurement of intraocular pressure, comparative tonometry
third eyelid flap
enucleation
emergency tarsorrhaphy
recognition and management of uveitis
recognition and management of acute glaucoma
otic exam
ear cleaning/flushing for severe infection
aural hematoma, minimally invasive to surgical techniques
dental exam
simple extraction and basic dental techniques

Neurologic
perform complete neurological exam
differentiate between central and peripheral lesions
localize the lesion
cerebral spinal fluid, CSF tap, centesis and analysis

Wounds/Bandages/Splints/Casts
spica bandage or splint to thoracic and pelvic limb
wound debridement and penrose drain placement
wound debridement and closure with suction drain
management of open wound with delayed closure
management of infected wounds with honey/sugar
placement of metasplint
placement of Shantz dressing
placement of modified Robert Jones bandage
placement of half cast
placement of full cast
hip luxation replacement and place Ehmer type bandage
elkow luxation replacement and bandage
laceration repair

**Analgesia /Anesthesia/Sedation**
local anesthesia for wound repair
  - local block analgesia
  - intercostal
  - intrapleural
  - brachial plexus
  - dental
  - line
  - intra-articular
  - Bier block, IV regional anesthesia
epidural injection anesthesia/analgesia
epidural catheter placement
injectable anesthesia
  - ketamine/diazepam
  - propofol induction, CRI
  - etomidate
  - butorphanol/dexmedetomidine
balanced anesthesia for the critical patient
inhalant anesthesia, isoflurane/sevoflurane
low flow/close circuit anesthesia
sedation
  - acepromazine
  - butorphanol/acepromazine
  - combination narcotic/benzodiazepines
barbiturates
multi-modal, CRI analgesia, MLK, FLK, dexmedetomidine
analgesia
  - buprenorphine
  - fentanyl
  - hydromorphone
  - hydrocodone
  - methadone
  - transdermal analgesia: fentanyl, lidocaine

**Monitoring**
pulse oximetry
capnometry
capnography
esophageal stethoscope
central venous pressure set up and measurement
indirect blood pressure: Doppler flow, oscillometric
ECG

**Fluids and Intravenous Nutrition**
buretrol set-up/calculate drip rates
CRI calculation/administration
  - regular insulin
  - potassium supplementation
syringe pump(s) set up
synthetic colloids, bolus/CRI
partial parenteral nutrition, PPN

**Transfusion Medicine**
collection from blood donor and component separation
blood typing
crossmatch
autotransfusion from internal hemorrhage: set up and administration

**Enteral Nutrition**
NE tube placement
NG tube placement
esophagostomy tube placement and care
calculate/formulation of enteral feeding CRI
syringe feeding
microenteral feeding

**Medical/Laboratory Procedures**
low dose dexamethasone suppression test
ACTH stimulation test
urine protein:creatinine ratio
bone marrow aspirate
bone marrow core biopsy
activated clotting time, PT/PTT, buccal mucosal bleeding time
reticulocyte count
platelet estimate
glucometer use and limitations
blood culture collections
anaerobic cultures
arthrocentesis
fine needle aspiration
cytologic evaluation of: blood smears, fine needle aspirates, abdominal/thoracic fluid

**Radiology/Ultrasound**
radiographs: skull, chest, abdomen, spine, pelvis, extremities
contrast radiographic procedures: contrast swallow esophagram, Gastrointestinal contrast series, intravenous urography, positive and double contrast cystogram, cystourethrogram/excretory urogram
ultrasound: focused assessment with sonography in trauma, FAST
   pericardial effusion
cavitary fluid
urinary bladder
ultrasound-guided centeses

**Miscellaneous**
crash cart set up and serial inventory
changing oxygen tanks
surgical pack prep & wrap
triage
primary survey
secondary survey
barrier protection
decontamination
Suggested List of references to use during a Focused Emergency and Critical Care Internship

General Physiology - an edition of one of the following, published within the last 10 years

- Textbook of Medical Physiology, Boron and Boulpaep
- Review of Medical Physiology, Ganong
- Textbook of Medical Physiology, Guyton & Hall
- Berne & Levy Physiology, Koeppen & Stanton, et al.

Veterinary ECC

- Small Animal Critical Care Medicine, Silverstein & Hopper

Veterinary ECC Technical Manuals—at least one

- Veterinary Emergency and Critical Care Manual, Mathews, 2nd ed.
- Veterinary Emergency and Critical Care Procedures, Hackett
- Manual of SA Emergency & Critical Care Medicine, Macintire et al.

Fluid Therapy / Acid-Base / Electrolyte – at least one of the following, published within the last 10 years

- Fluid, Electrolyte, and Acid-Base Disorders in Small Animal Practice, DiBartola
- Fluid, Electrolyte, and Acid-Base Physiology, Halperin & Goldstein
- Clinical Physiology of Acid-Base and Electrolyte Disorders, Rose & Post

General Veterinary Internal Medicine

- Textbook of Veterinary Internal Medicine, Ettinger & Feldman, 6th ed.

Veterinary Surgery – at least one


Veterinary Anesthesia – at least one

- Veterinary Anesthesia & Analgesia, McKelvey & Hollingshead, 3rd ed.

Veterinary Pharmacology – at least one

- Small Animal Clinical Pharmacology and Therapeutics, Boothe
- Small Animal Clinical Pharmacology, Maddison et al., 2nd ed.

Veterinary Toxicology – at least one

- Veterinary Toxicology: Basic and Clinical Principles, Gupta
- Clinical Veterinary Toxicology, Plumlee
- Small Animal Toxicology, Peterson & Talcott, 2nd ed.

Veterinary Clinical Pathology – at least one

- Fundamentals of Veterinary Clinical Pathology, Stockham & Scott, 2nd ed.
- Duncan & Prasse’s Veterinary Laboratory Medicine: Clinical Pathology, Latimer et al., 4th ed.
- Small Animal Clinical Diagnosis by Laboratory Methods, Willard & Tvedten, 4th ed.

Specific Areas of Veterinary Internal Medicine

- Veterinary Pediatrics, Hoskins, 3rd ed.
- Respiratory Disease in Dogs and Cats, King
- Infectious Diseases of the Dog and Cat, Greene, 3rd ed.
• Essentials of Veterinary Ophthalmology, Gelatt, 2nd ed.

**Veterinary Neurology – at least one**
• Fundamentals of Veterinary Clinical Neurology, Bagley
• Handbook of Veterinary Neurology, Lorenz & Kornegay, 4th ed.

**Veterinary Oncology**
• Small Animal Clinical Oncology, Withrow & MacEwen, 4th ed.

**Veterinary Cardiology – at least one**
• Textbook of Canine and Feline Cardiology, Fox, et al., 2nd ed.
• Small Animal Cardiovascular Medicine, Kittleson & Keinle
• Cardiovascular Disease in Small Animal Medicine, Ware

**Journals**
• Journal of Veterinary Emergency and Critical Care
• Journal of the American Veterinary Medical Association
• American Journal of Veterinary Research
• Journal of Veterinary Internal Medicine
• Veterinary Surgery
• Veterinary Clinics of North America
• Compendium of Continuing Education for The Practicing Veterinarian

**Suggested Weblinks, 5/2010:**
www.AAHA.org
www.ACVECC.org
www.ACVN.org
www.ASPCA.org
www.IVAPM.org
www.PACEP.org
www.Trauma.org
www.SCCM.org
www.VECCS.org